

439 & 451 SOUTH 4TH STREET PROJECT NOISE AND VIBRATION ASSESSMENT

San José, California

January 11, 2023

Prepared for:

**Shannon George
Principal Project Manager
David J. Powers & Associates, Inc.
1871 The Alameda, Suite 200
San José, CA 95126**

Prepared by:

**Carrie J. Janello
Michael S. Thill**

ILLINGWORTH & RODKIN, INC.
/// Acoustics • Air Quality ///

**429 East Cotati Avenue
Cotati, CA 94931
(707) 794-0400**

Project: 15-122

INTRODUCTION

The project proposes to construct a 25-story high-rise multi-family residential building at 439 and 451 South 4th Street in San José, California. The 0.52-acre project site, which is located on two parcels, is currently developed with a large three-story apartment complex on the northern parcel and a two-story residence on the southern parcel. The proposed project would demolish the existing buildings and parking areas and construct a residential building with up to 209 units, with study rooms, a dog park, a gym, a pool, community rooms, and an amenity deck on the roof. The project would include one level of underground parking and three above-grade parking levels.

This report evaluates the project's potential to result in significant noise and vibration impacts with respect to applicable California Environmental Quality Act (CEQA) guidelines. The report is divided into three sections: 1) the Setting Section provides a brief description of the fundamentals of environmental noise, summarizes applicable regulatory criteria, and discusses the results of the ambient noise monitoring survey completed to document existing noise conditions; 2) the General Plan Consistency Section discusses noise and land use compatibility utilizing policies in the City's General Plan; and, 3) the Impacts and Mitigation Measures Section describes the significance criteria used to evaluate project impacts, provides a discussion of each project impact, and presents measures, where necessary, to mitigate the impacts of the project on sensitive receptors in the vicinity.

SETTING

Fundamentals of Environmental Noise

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its *loudness*. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level (dBA)*. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA

are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This *energy-equivalent sound/noise descriptor* is called L_{eq} . The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level (CNEL)* is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels. The *Day/Night Average Sound Level (DNL or L_{dn})* is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Effects of Noise

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noises of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA DNL. Typically, the highest steady traffic noise level during the daytime is about equal to the DNL and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12 to 17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57 to 62 dBA DNL with open windows and 65 to 70 dBA DNL if the windows are closed. Levels of 55 to 60 dBA are common along collector streets and secondary arterials, while 65 to 70 dBA is a typical value for a primary/major arterial. Levels of 75 to 80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed, those facing major roadways and freeways typically need special glass windows.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The DNL as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 50 dBA DNL. At a DNL of about 60 dBA, approximately 12 percent of the population is highly annoyed. When the DNL increases to 70 dBA, the percentage of the population highly annoyed increases to about 25 to 30 percent of the population. There is, therefore, an increase of about 2 percent per dBA between a DNL of 60 to 70 dBA. Between a DNL of 70 to 80 dBA, each decibel increase increases by about 3 percent the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the DNL is 60 dBA, approximately 30 to 35 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 3 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 4 percent increase in the percentage of the population highly annoyed.

Fundamentals of Groundborne Vibration

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One method is the Peak Particle Velocity (PPV). The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. In this report, a PPV descriptor with units of mm/sec or in/sec is used to evaluate construction generated vibration for building damage and human complaints. Table 3 displays the reactions of people and the effects on buildings that continuous or frequent intermittent vibration levels produce. The guidelines in Table 3 represent syntheses of vibration criteria for human response and potential damage to buildings resulting from construction vibration.

Construction activities can cause vibration that varies in intensity depending on several factors. The use of pile driving and vibratory compaction equipment typically generates the highest construction related groundborne vibration levels. Because of the impulsive nature of such activities, the use of the PPV descriptor has been routinely used to measure and assess groundborne vibration and almost exclusively to assess the potential of vibration to cause damage and the degree of annoyance for humans.

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with the enjoyment of life, are evaluated against different vibration limits. Human perception to vibration varies with the individual and is a function of physical setting and the type of vibration. Persons exposed to elevated ambient vibration levels, such as people in an urban environment, may tolerate a higher vibration level.

Structural damage can be classified as cosmetic only, such as paint flaking or minimal extension of cracks in building surfaces; minor, including limited surface cracking; or major, that may threaten the structural integrity of the building. Safe vibration limits that can be applied to assess the potential for damaging a structure vary by researcher. The damage criteria presented in Table 3 include several categories for ancient, fragile, and historic structures, the types of structures most at risk to damage. Most buildings are included within the categories ranging from “Historic and some old buildings” to “Modern industrial/commercial buildings”. Construction-induced vibration that can be detrimental to the building is very rare and has only been observed in instances where the structure is at a high state of disrepair and the construction activity occurs immediately adjacent to the structure.

The annoyance levels shown in Table 3 should be interpreted with care since vibration may be found to be annoying at lower levels than those shown, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage.

TABLE 1 Definition of Acoustical Terms Used in this Report

Term	Definition
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e. g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
L_{max} , L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01} , L_{10} , L_{50} , L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurements and Noise Control, Harris, 1998.

TABLE 2 Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60 dBA	
		Large business office
Quiet urban daytime	50 dBA	Dishwasher in next room
Quiet urban nighttime	40 dBA	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
	10 dBA	Broadcast/recording studio
	0 dBA	

Source: Technical Noise Supplement (TeNS), California Department of Transportation, September 2013.

TABLE 3 Reaction of People and Damage to Buildings from Continuous or Frequent Intermittent Vibration Levels

Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.01	Barely perceptible	No effect
0.04	Distinctly perceptible	Vibration unlikely to cause damage of any type to any structure
0.08	Distinctly perceptible to strongly perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.1	Strongly perceptible	Threshold at which there is a risk of damage to fragile buildings with no risk of damage to most buildings
0.25	Strongly perceptible to severe	Threshold at which there is a risk of damage to historic and some old buildings.
0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential structures
0.5	Severe - Vibrations considered unpleasant	Threshold at which there is a risk of damage to new residential and modern commercial/industrial structures

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

Regulatory Background – Noise

This section describes the relevant guidelines, policies, and standards established by State Agencies, Santa Clara County, and the City of San José . The State of California Environmental Quality Act (CEQA) Guidelines, Appendix G, are used to assess the potential significance of impacts pursuant to local General Plan policies, Municipal Code standards, or the applicable standards of other agencies. A summary of the applicable regulatory criteria is provided below.

State of California

2019 California Building Code, Title 24, Part 2. The current version of the California Building Code (CBC) requires interior noise levels attributable to exterior environmental noise sources to be limited to a level not exceeding 45 dBA DNL/CNEL in any habitable room.

State CEQA Guidelines. CEQA contains guidelines to evaluate the significance of effects of environmental noise attributable to a proposed project. Under CEQA, noise impacts would be considered significant if the project would result in:

- (a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies;
- (b) Generation of excessive groundborne vibration or groundborne noise levels; or
- (c) For a project located within the vicinity of a private airstrip or an airport land use plan or where such a plan has not been adopted within two miles of a public airport or public use

airport, if the project would expose people residing or working in the project area to excessive noise levels.

Santa Clara County

Santa Clara County Airport Land Use Commission Comprehensive Land Use Plan. The Comprehensive Land Use Plan (CLUP) adopted by the Santa Clara County Airport Land Use Commission contains standards for projects within the vicinity of San José International Airport which are relevant to this project;

4.3.2.1 Noise Compatibility Policies

- N-1 The Community Noise Equivalent Level (CNEL) method of representing noise levels shall be used to determine if a specific land use is consistent with the CLUP.
- N-2 In addition to the other policies herein, the Noise Compatibility Policies presented in Table 4-1 shall be used to determine if a specific land use is consistent with this CLUP.
- N-3 Noise impacts shall be evaluated according to the Aircraft Noise Contours presented on Figure 5 (not shown in this report).
- N-6 Noise level compatibility standards for other types of land uses shall be applied in the same manner as the above residential noise level criteria. Table 4-1 presents acceptable noise levels for other land uses in the vicinity of the Airport.

Table 4 - 1

NOISE COMPATIBILITY POLICIES

LAND USE CATEGORY	CNEL					
	55-60	60-65	65-70	70-75	75-80	80-85
Residential – low density Single-family, duplex, mobile homes	*	**	***	****	****	****
Residential – multi-family, condominiums, townhouses	*	**	***	****	****	****
Transient lodging - motels, hotels	*	*	**	****	****	****
Schools, libraries, indoor religious assemblies, hospitals, nursing homes	*	***	****	****	****	****
Auditoriums, concert halls, amphitheaters	*	***	***	****	****	****
Sports arena, outdoor spectator sports, parking	*	*	*	**	***	****
Playgrounds, neighborhood parks	*	*	***	****	****	****
Golf courses, riding stables, water recreation, cemeteries	*	*	*	**	***	****
Office buildings, business commercial and professional, retail	*	*	**	***	****	****
Industrial, manufacturing, utilities, agriculture	*	*	*	***	***	****
* Generally 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. Mobile homes may not be acceptable in these areas. Some outdoor activities might be adversely affected.					
** 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. Outdoor activities may be adversely affected. <u>Residential:</u> Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.					
*** Generally 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. Outdoor activities are likely to be adversely affected.					
**** Unacceptable	New construction or development shall not be undertaken.					

Source: Based on General Plan Guidelines, Appendix C (2003), Figure 2 and Santa Clara County ALUC 1992 Land Use Plan, Table 1

Source: Comprehensive Land Use Plan Santa Clara County, Norman Y Mineta San José International Airport, May 25, 2011, Amended May 23, 2019.

City of San José

City of San José General Plan. The Environmental Leadership Chapter in the Envision San José 2040 General Plan sets forth policies with the goal of minimizing the impact of noise on people through noise reduction and suppression techniques, and through appropriate land use policies in the City of San José. The following policies are applicable to the proposed project:

EC-1.1 Locate new development in areas where noise levels are appropriate for the proposed uses. Consider federal, state, and City noise standards and guidelines as a part of new development review. Applicable standards and guidelines for land uses in San José include:

Interior Noise Levels

- The City's standard for interior noise levels in residences, hotels, motels, residential care facilities, and hospitals is 45 dBA DNL. Include appropriate site and building design, building construction and noise attenuation techniques in new development to meet this standard. For sites with exterior noise levels of 60 dBA DNL or more, an acoustical analysis following protocols in the City-adopted California Building Code is required to demonstrate that development projects can meet this standard. The acoustical analysis shall base required noise attenuation techniques on expected Envision General Plan traffic volumes to ensure land use compatibility and General Plan consistency over the life of this plan.

Exterior Noise Levels

- The City's acceptable exterior noise level objective is 60 dBA DNL or less for residential and most institutional land uses (Table EC-1). The acceptable exterior noise level objective is established for the City, except in the environs of the San José International Airport and the Downtown, as described below:
 - For new multi-family residential projects and for the residential component of mixed-use development, use a standard of 60 dBA DNL in usable outdoor activity areas, excluding balconies and residential stoops and porches facing existing roadways. Some common use areas that meet the 60 dBA DNL exterior standard will be available to all residents. Use noise attenuation techniques such as shielding by buildings and structures for outdoor common use areas. On sites subject to aircraft overflights or adjacent to elevated roadways, use noise attenuation techniques to achieve the 60 dBA DNL standard for noise from sources other than aircraft and elevated roadway segments.

Table EC-1: Land Use Compatibility Guidelines for Community Noise in San José

LAND USE CATEGORY	EXTERIOR NOISE EXPOSURE (DNL IN DECIBELS (DBA))					
	55	60	65	70	75	80
1. Residential, Hotels and Motels, Hospitals and Residential Care ¹						
2. Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds						
3. Schools, Libraries, Museums, Meeting Halls, Churches						
4. Office Buildings, Business Commercial, and Professional Offices						
5. Sports Arena, Outdoor Spectator Sports						
6. Public and Quasi-Public Auditoriums, Concert Halls, Amphitheaters						

¹Noise mitigation to reduce interior noise levels pursuant to Policy EC-1.1 is required.

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:

- Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.

Unacceptable:

- New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

EC-1.2 Minimize the noise impacts of new development on land uses sensitive to increased noise levels (Categories 1, 2, 3 and 6) by limiting noise generation and by requiring use of noise attenuation measures such as acoustical enclosures and sound barriers, where feasible. The City considers significant noise impacts to occur if a project would:

- Cause the DNL at noise sensitive receptors to increase by five dBA DNL or more where the noise levels would remain “Normally Acceptable;” or
- Cause the DNL at noise sensitive receptors to increase by three dBA DNL or more where noise levels would equal or exceed the “Normally Acceptable” level.

EC-1.3 Mitigate noise generation of new nonresidential land uses to 55 dBA DNL at the property line when located adjacent to existing or planned noise-sensitive residential and public/quasi-public land uses.

EC-1.6 Regulate the effects of operational noise from existing and new industrial and commercial development on adjacent uses through noise standards in the City's Municipal Code.

EC-1.7 Require construction operations within San José to use best available noise suppression devices and techniques and limit construction hours near residential uses per the City's Municipal Code. The City considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would:

- Involve substantial noise generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

For such large or complex projects, a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses.

Regulatory Background – Vibration

City of San José General Plan. The Environmental Leadership Chapter in the Envision San José 2040 General Plan sets forth policies to achieve the goal of minimizing vibration impacts on people, residences, and business operations in the City of San José. The following policies are applicable to the proposed project:

EC-2.3 Require new development to minimize continuous vibration impacts to adjacent uses during demolition and construction. For sensitive historic structures, including ruins and ancient monuments or building that are documented to be structurally weakened, a continuous vibration limit of 0.08 in/sec PPV (peak particle velocity) will be used to minimize the potential for cosmetic damage to a building. A continuous vibration limit of 0.20 in/sec PPV will be used to minimize the potential for cosmetic damage at buildings of normal conventional construction. Equipment or activities typical of generating continuous vibration include but are not limited to: excavation equipment; static compaction equipment; vibratory pile drivers; pile-extraction equipment; and vibratory compaction equipment. Avoid use of impact pile drivers within 125 feet of any buildings, and within 300 feet of historical buildings, or buildings in poor condition. On a project-specific basis, this distance of 300 feet may be reduced where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction. Transient vibration impacts may exceed a vibration limit of 0.08 in/sec PPV only when and where warranted by a technical study by a qualified professional that

verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction.

Existing Noise Environment

The project site is located west of South 4th Street between East San Salvador Street and East William Street in San José, California. The project site is in the vicinity of San José State University. Adjacent to the property to the north, to the south, and to the west are existing residential land uses, a church, and commercial uses. Opposite South 4th Street to the east are residential and commercial mixed-use buildings. Interstate 280 (I-280) is located approximately 1,250 feet to the south of the project site.

A noise monitoring survey was performed in the vicinity of the project site beginning on Wednesday September 16, 2015 and concluding on Friday September 18, 2015. Limited access to the project site at the time of the monitoring survey prevented measurements from being made on the site. Therefore, measurements were made in the surrounding area. The monitoring survey included three long-term noise measurements, as shown in Figure 1. The noise environment at the site and in the surrounding areas results primarily from vehicular traffic along South 4th Street, East Salvador Street, and East William Street. Traffic noise from I-280 would also affect the noise environment in the vicinity of the project site. Occasional overhead aircraft associated with the Mineta San José International Airport also affect the noise environment.

The existing traffic volumes along the local roadways provided in the December 2021 traffic study by *Hexagon Traffic Consultants, Inc.*¹ were compared to the existing traffic volumes included in the previous traffic studies completed for the proposed project. The change in traffic volumes in December 2021 resulted in a less than 1 dBA DNL increase in noise levels over previous years. Therefore, the measurements made in 2015 would represent the existing noise environment in 2021.

Long-term noise measurement LT-1 was made at the rear of 405 South 4th Street on the shared property line with 439 South 4th Street. LT-1 was placed in an alley behind the apartment building in a tree approximately 10 feet above the ground. From this location, LT-1 had direct line-of-sight to East San Salvador Street and was setback approximately 160 feet from the centerline. Hourly average noise levels at this location typically ranged from 55 to 75 dBA L_{eq} during the day, and from 46 to 61 dBA L_{eq} at night. The day-night average noise level on Thursday September 17, 2015 was 62 dBA DNL. The daily trend in noise levels at LT-1 is shown in Figure 2. As shown in Figure 2, there were elevated levels just after 7:00 a.m. on both Thursday and Friday, and on Friday, there was another elevated level just after 9:00 a.m. These isolated events could be explained by vehicles in the alley or people accessing the dumpsters.

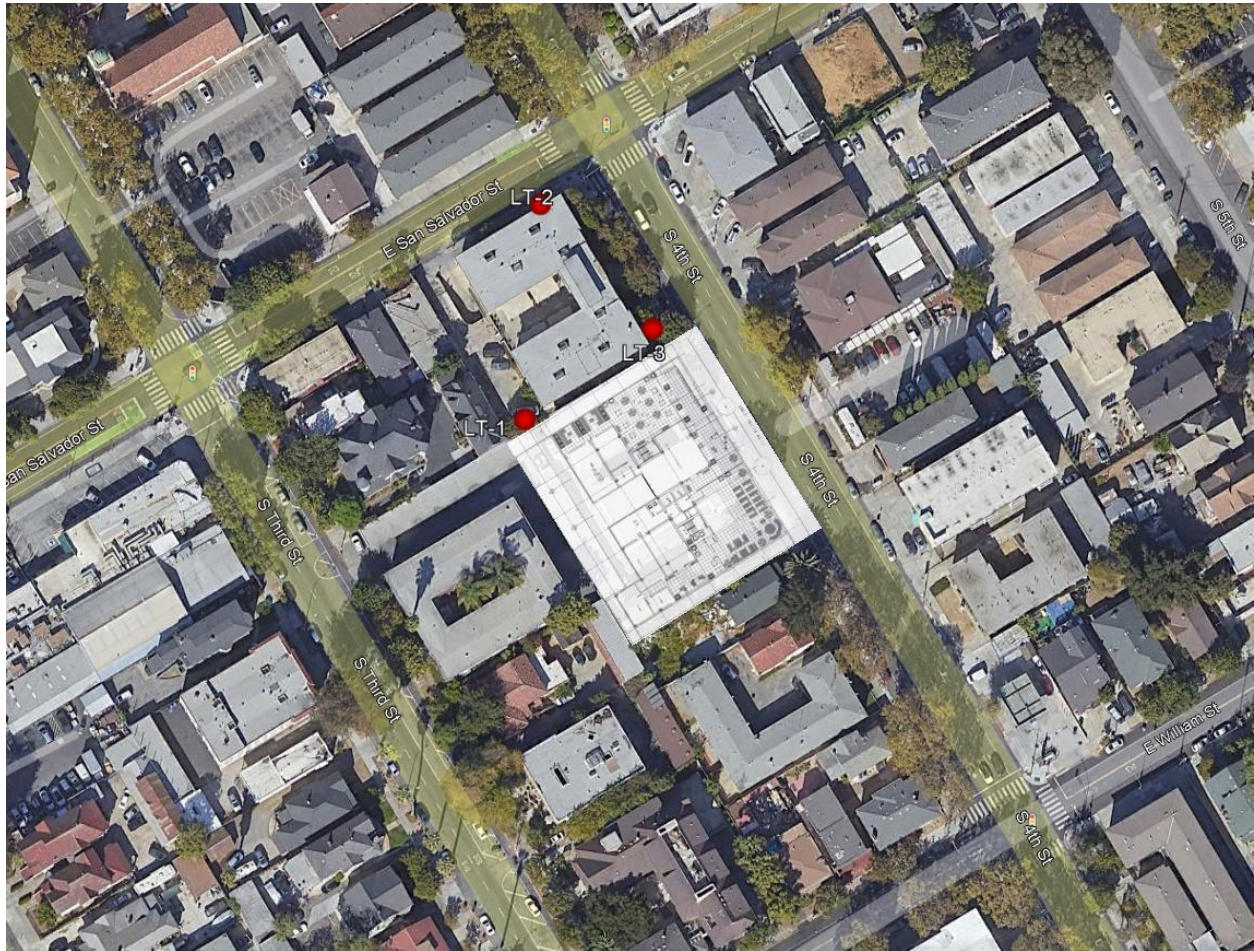
LT-2 was measured near the intersection of East San Salvador and Street South 4th Street. LT-2 was approximately 25 feet south of the centerline of East San Salvador Street and 65 feet west of the centerline of South 4th Street. Hourly average noise levels at this location typically ranged from 62 to 75 dBA L_{eq} during the day, and from 54 to 67 dBA L_{eq} at night. The day-night average noise

¹ Hexagon Transportation Consultants, Inc., "South 4th Street Residential Local Transportation Analysis," December 3, 2021.

level on Thursday September 17, 2015 was 69 dBA DNL. The daily trend in noise levels at LT-2 is shown in Figure 3.

The final long-term noise measurement LT-3 was taken along the sidewalk of South 4th Street near the northeastern corner of the project site. LT-3 was approximately 40 feet west of the centerline of South 4th Street. Hourly average noise levels at this location typically ranged from 63 to 70 dBA L_{eq} during the day, and from 52 to 65 dBA L_{eq} at night. The day-night average noise level on Thursday September 17, 2015 was 68 dBA DNL. The daily trend in noise levels at LT-3 is shown in Figure 4.

FIGURE 1 Noise Measurement Locations



Source: Google Earth 2022.

FIGURE 2 Daily Trend in Noise Levels at LT-1, Wednesday, September 16 through Friday, September 18, 2015

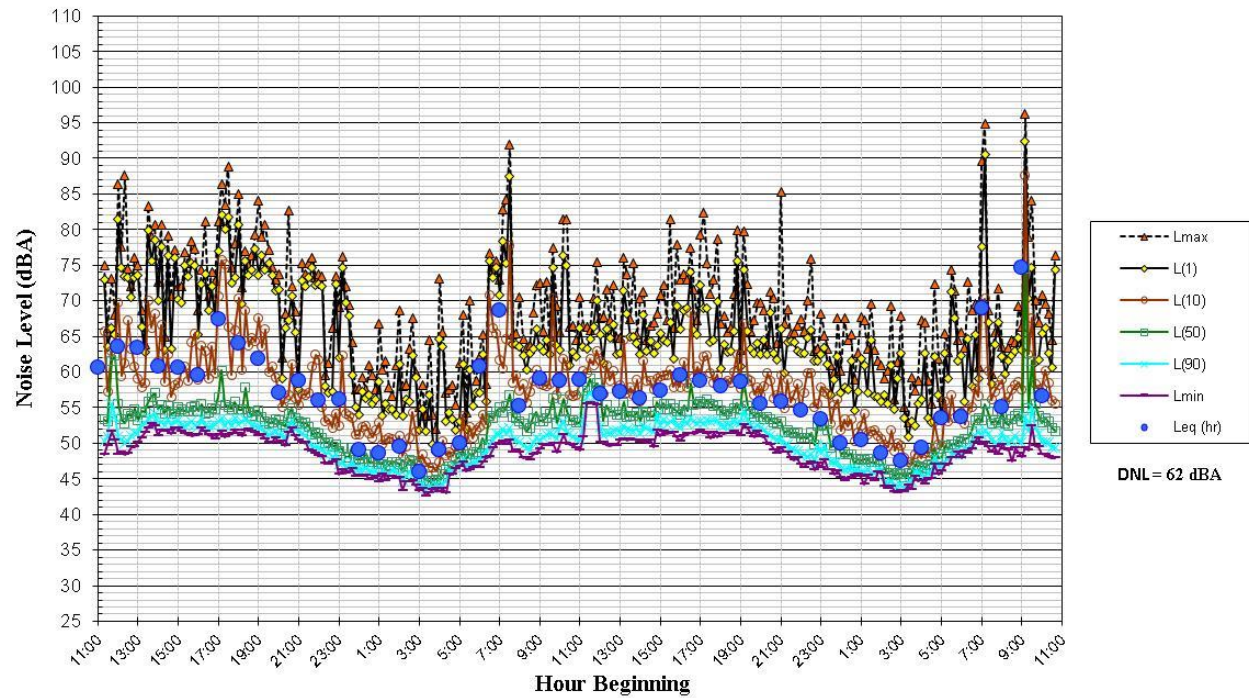


FIGURE 3 Daily Trend in Noise Levels at LT-2, Wednesday, September 16 through Friday, September 18, 2015

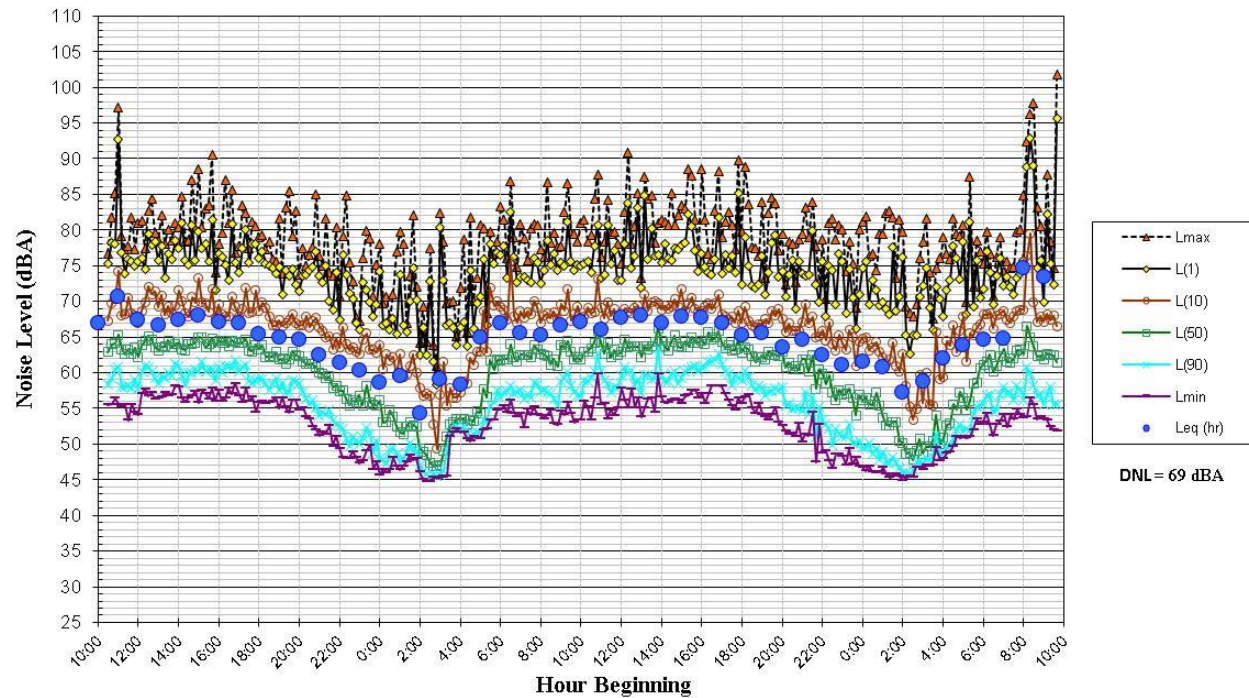
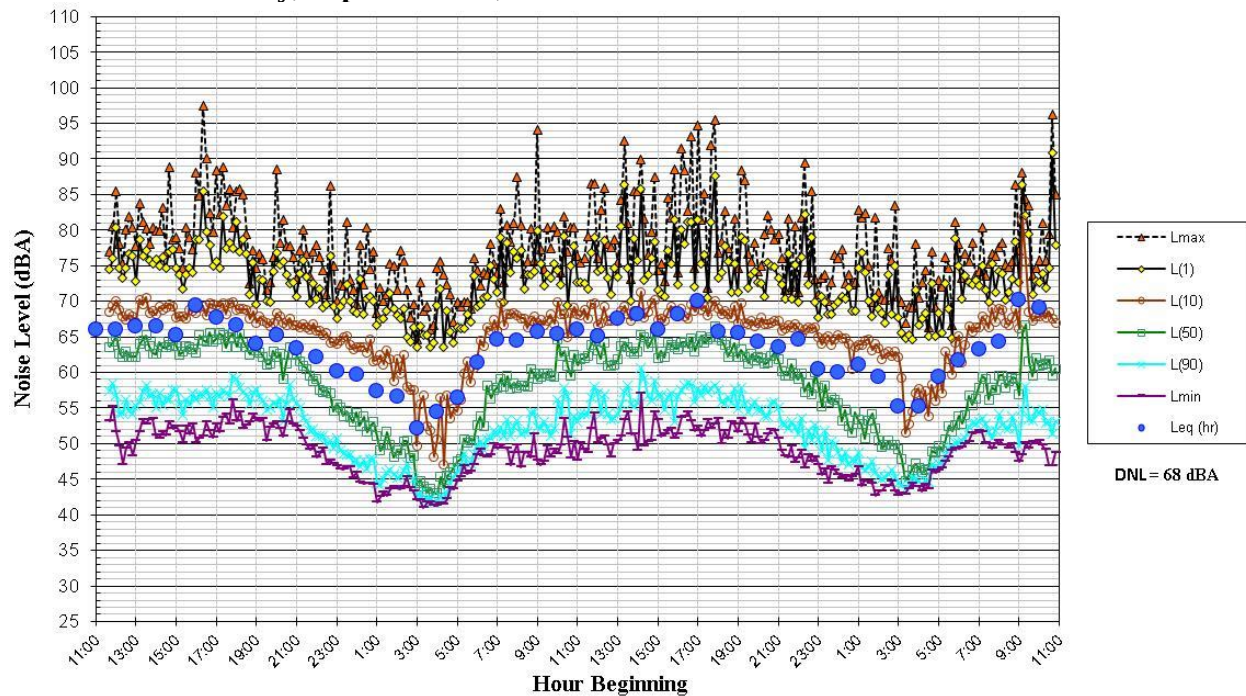


FIGURE 4 Daily Trend in Noise Levels at LT-3, Wednesday, September 16 through Friday, September 18, 2015



PLAN CONSISTENCY ANALYSIS

Noise and Land Use Compatibility

The Environmental Leadership Chapter in the Envision San José 2040 General Plan sets forth policies with the goal of minimizing the impact of noise on people through noise reduction and suppression techniques and through appropriate land use policies in the City of San José. The applicable General Plan policies were presented in detail in the Regulatory Background section and are summarized below for the proposed project:

- The City's acceptable exterior noise level standard is 60 dBA DNL or less for the proposed residential land uses.
- The City's acceptable interior noise level standard is 45 dBA DNL or less for the proposed residential land uses.

The future noise environment at the project site would continue to result primarily from traffic along South 4th Street and the surrounding roadways. The noise level increase for the Central/Downtown section of the City estimated in the noise assessment conducted for the Envision San José 2040 General Plan Comprehensive Update² was 1 dB by 2035. Additionally, a traffic operations analysis was conducted by *Hexagon Transportation Consultants, Inc.* for the proposed project. This study included peak hour traffic turning movements for the four

² Illingworth and Rodkin, Inc., "Envision San José 2040 General Plan Comprehensive Update Environmental Noise Assessment", December 2010.

intersections immediately surrounding the project site. Compared to the traffic volumes along South 4th Street and the nearby roadways, the peak hour project trips result in a less than 1 dBA DNL increase over the peak hour traffic volumes under the existing conditions. Therefore, the same project-generated traffic noise increase would occur under 2035 cumulative conditions. The total cumulative plus project noise level increase at the project site by the year 2035 would be 1 dBA DNL.

Future Exterior Noise Environment

The project site plan shows the dog park, pool deck, and an outdoor dining area on the rooftop of the proposed building and an outdoor patio on the fifth floor. The dog park and the fifth-floor outdoor patio would be located along the western building façade and would be well-shielded from all surrounding traffic noise by the proposed building and the existing buildings surrounding the site, in addition to the elevation of the rooftop. Future exterior noise levels at these outdoor use areas would be below 60 dBA DNL.

The pool area and the outdoor dining would be located in the southeastern and northeastern corners, respectively, on the rooftop. The centers of both outdoor use areas would be set back approximately 65 feet from the centerline of South 4th Street. The elevation of the rooftop would be 246 feet above the ground, which would provide a minimum attenuation of 15 dBA. Therefore, the future exterior noise levels at the outdoor use areas located on the rooftop would be below 60 dBA DNL. The outdoor use area associated with the residential component of the proposed project would be compatible with the City's noise level thresholds.

Future Interior Noise Environment

The eastern façade of the proposed building would have residential units as close as 35 feet from the centerline of South 4th Street. These units would be located on floors five through 25. At a setback of 35 feet, the eastern-facing residential units would be exposed to future exterior noise levels up to 69 dBA DNL.

The northern and southern façades of the proposed building would be shielded from traffic noise along East San Salvador Street and East William Street by the adjacent buildings, which would also provide partial shielding from South 4th Street, as well. However, with setbacks ranging from 35 to 165 feet, the exterior-facing units along these building façades would be exposed to future exterior noise levels ranging from 63 to 69 dBA DNL due to traffic noise from South 4th Street.

While the western façade would be shielded from traffic noise along South 4th Street, these residences would be exposed to existing alley and parking lot noise from the surrounding area, which was assessed by monitoring location LT-1. Some traffic noise from East San Salvador Street and East William Street would affect these units, especially on the upper floors. The residences along the western façade of the proposed building would be exposed to future exterior noise levels ranging from 63 to 64 dBA DNL.

Standard residential construction provides approximately 15 dBA of exterior-to-interior noise reduction, assuming the windows are partially open for ventilation. Standard construction with the

windows closed provides approximately 20 to 25 dBA of noise reduction in interior spaces. Where exterior noise levels range from 60 to 65 dBA DNL, the inclusion of adequate forced-air mechanical ventilation is often the method selected to reduce interior noise levels to acceptable levels by closing the windows to control noise. Where noise levels exceed 65 dBA DNL, forced-air mechanical ventilation systems and sound-rated construction methods are normally required. Such methods or materials may include a combination of smaller window and door sizes as a percentage of the total building façade facing the noise source, sound-rated windows and doors, sound rated exterior wall assemblies, and mechanical ventilation so windows may be kept closed at the occupant's discretion.

For the proposed project, the interior noise levels would be up to 54 dBA DNL, which exceeds the City's threshold for interior noise.

Noise Insulation Features to Reduce Future Interior Noise Levels

The following noise insulation features shall be incorporated into the proposed project to reduce interior noise levels to 45 dBA DNL or less:

- Preliminary calculations indicate that exterior-facing residences facing South 4th Street along the eastern building façade would require windows and doors with a minimum STC³ rating of 31 with the incorporation of adequate forced-air mechanical ventilation to meet the interior noise threshold established by the City.
- For residences along the northern and southern façades that are within 120 feet of the centerline of South 4th Street, windows and doors with a minimum STC rating of 28 to 31 with the incorporation of forced-air mechanical ventilation would be required.
- Provide a suitable form of forced-air mechanical ventilation, as determined by the local building official, for all residences on the project site, so that windows can be kept closed to control noise.

Conditions of Approval

Interior Noise Standard for Residential Development. The project applicant shall prepare final design plans that incorporate building design and acoustical treatments to ensure compliance with State Building Codes and City noise standards. A project-specific acoustical analysis shall be prepared to ensure that the design incorporates controls to reduce interior noise levels to 45 dBA DNL or lower within the residential units. The project applicant shall conform with any special building construction techniques requested by the City's Building Department, which may include sound-rated windows and doors, sound-rated wall constructions, and acoustical caulking.

³ **Sound Transmission Class (STC)** A single figure rating designed to give an estimate of the sound insulation properties of a partition. Numerically, STC represents the number of decibels of speech sound reduction from one side of the partition to the other. The STC is intended for use when speech and office noise constitute the principal noise problem.

NOISE IMPACTS AND MITIGATION MEASURES

Significance Criteria

The following criteria were used to evaluate the significance of environmental noise resulting from the project:

- A significant noise impact would be identified if the project would generate a substantial temporary or permanent noise level increase over ambient noise levels at existing noise-sensitive receptors surrounding the project site.
 - A significant noise impact would be identified if temporary construction-related activities would substantially increase ambient noise levels at sensitive receptors. The City of San José considers large or complex projects involving substantial noise-generating activities and lasting more than 12 months significant when within 500 feet of residential land uses or within 200 feet of commercial land uses or offices. After a period of 12 months, a significant temporary noise impact would occur if construction noise levels would exceed 80 dBA L_{eq} at residential land uses near the site or 90 dBA L_{eq} at commercial land uses near the site.
 - A significant permanent noise level increase would occur if project-generated traffic would result in: a) a noise level increase of 5 dBA DNL or greater, with a future noise level of less than 60 dBA DNL, or b) a noise level increase of 3 dBA DNL or greater, with a future noise level of 60 dBA DNL or greater.
 - A significant noise impact would be identified if the project would expose persons to or generate noise levels that would exceed applicable noise standards presented in the General Plan.
- A significant impact would be identified if the construction of the project would generate excessive vibration levels surrounding receptors. Groundborne vibration levels exceeding 0.08 in/sec PPV would have the potential to result in cosmetic damage to historic buildings, and groundborne vibration levels exceeding 0.2 in/sec PPV would have the potential to result in cosmetic damage to normal buildings.
- A significant noise impact would be identified if the project would expose people residing or working in the project area to excessive aircraft noise levels.

Impact 1a: Construction Noise. Existing noise-sensitive land uses would be exposed to construction noise levels in excess of the significance thresholds for an extended period of time. Even with the incorporation of mitigation measures to reduce temporary construction noise as much as possible, this would be a **significant and unavoidable impact**.

The project applicant proposes to demolish the existing buildings located on the project site and construct a 25-story residential building. The construction schedule assumed that the earliest

possible start date would be January 2023, and the project would be built out over a period of approximately 23 months. Construction phases would include demolition, site preparation, grading, trenching, building construction, paving, and architectural coating. During each phase of construction, there would be a different mix of equipment operating, and noise levels would vary by phase and vary within phases, based on the amount of equipment in operation and the location at which the equipment is operating.

Noise impacts resulting from construction depend upon the noise generated by various pieces of construction equipment, the timing and duration of noise-generating activities, and the distance between construction noise sources and noise-sensitive areas. Construction noise impacts primarily result when construction activities occur during noise-sensitive times of the day (e.g., early morning, evening, or nighttime hours), the construction occurs in areas immediately adjoining noise-sensitive land uses, or when construction lasts over extended periods of time.

Policy EC-1.7 of the City's General Plan requires that all construction operations within the City use best available noise suppression devices and techniques and to limit construction hours near residential uses per the Municipal Code allowable hours, which are between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday when construction occurs within 500 feet of a residential land use. Further, the City considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would involve substantial noise-generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

However, the City of San José does not establish noise level thresholds for construction activities. As an alternative, this analysis uses the noise limits established by the Federal Transit Administration (FTA) to identify the potential for impacts due to substantial temporary construction noise. The FTA identifies construction noise limits in the *Transit Noise and Vibration Impact Assessment Manual*.⁴ During daytime hours, an exterior threshold of 80 dBA L_{eq} shall be applied at residential land uses and 90 dBA L_{eq} shall be applied at commercial and industrial land uses.

Construction activities generate considerable amounts of noise, especially during earth-moving activities when heavy equipment is used. The construction of the proposed project would involve demolition of existing structures and pavement, substantial excavation to create the below-grade parking garage and to lay foundations, building erection, paving, and landscaping. The hauling of excavated materials and construction materials would generate truck trips on local roadways, as well. For the proposed project, impact pile driving may be required and is assumed in this analysis. Construction activities for individual projects are typically carried out in stages. During each stage of construction, there would be a different mix of equipment operating, and noise levels would vary by stage and vary within stages, based on the amount of equipment in operation and the location at which the equipment is operating. Typical construction noise levels at a distance of 50 feet are shown in Tables 4 and 5. Table 4 shows the average noise level ranges, by construction phase, and Table 5 shows the maximum noise level ranges for different construction equipment.

⁴ Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, FTA Report No. 0123, September 2018.

Most demolition and construction noise falls with the range of 80 to 90 dBA at a distance of 50 feet from the source.

The highest noise levels would be generated during grading, excavation, and foundation construction. The erection of large buildings from steel structures could also cause considerable noise for fairly long durations. At 50 feet, maximum noise levels generated by impact pile driving would be 105 dBA L_{max} . Other project construction equipment would typically range from 85 to 95 dBA L_{max} at a distance of 50 feet from the noise source. Construction-generated noise levels drop off at a rate of about 6 dBA per doubling of the distance between the source and receptor. Shielding by buildings or terrain can provide an additional 5 to 10 dBA noise reduction at distant receptors.

Equipment expected to be used in each construction phase are summarized in Table 6, along with the quantity of each type of equipment, the reference noise level at 50 feet assuming the operation of the two loudest pieces of construction equipment, and the estimated noise levels at the nearest property lines projected from the center of the construction activity by phase. Federal Highway Administration's (FHWA's) Roadway Construction Noise Model (RCNM) was used to calculate the hourly average noise levels for each phase of construction, assuming the two loudest pieces of equipment would operate simultaneously, as recommended by the FTA for construction noise evaluations. This construction noise model includes representative sound levels for the most common types of construction equipment and the approximate usage factors of such equipment that were developed based on an extensive database of information gathered during the construction of the Central Artery/Tunnel Project in Boston, Massachusetts (CA/T Project or "Big Dig"). The usage factors represent the percentage of time that the equipment would be operating at full power.

TABLE 4 Typical Ranges of Construction Noise Levels at 50 Feet, L_{eq} (dBA)

	Domestic Housing		Office Building, Hotel, Hospital, School, Public Works		Industrial Parking Garage, Religious Amusement & Recreations, Store, Service Station		Public Works Roads & Highways, Sewers, and Trenches	
	I	II	I	II	I	II	I	II
Ground Clearing	83	83	84	84	84	83	84	84
Excavation	88	75	89	79	89	71	88	78
Foundations	81	81	78	78	77	77	88	88
Erection	81	65	87	75	84	72	79	78
Finishing	88	72	89	75	89	74	84	84
I – All pertinent equipment present at site.								
II – Minimum required equipment present at site.								

Source: U.S.E.P.A., Legal Compilation on Noise, Vol. 1, p. 2-104, 1973.

TABLE 5 Construction Equipment 50-foot Noise Emission Limits

Equipment Category	L _{max} Level (dBA) ^{1,2}	Impact/Continuous
Arc Welder	73	Continuous
Auger Drill Rig	85	Continuous
Backhoe	80	Continuous
Bar Bender	80	Continuous
Boring Jack Power Unit	80	Continuous
Chain Saw	85	Continuous
Compressor ³	70	Continuous
Compressor (other)	80	Continuous
Concrete Mixer	85	Continuous
Concrete Pump	82	Continuous
Concrete Saw	90	Continuous
Concrete Vibrator	80	Continuous
Crane	85	Continuous
Dozer	85	Continuous
Excavator	85	Continuous
Front End Loader	80	Continuous
Generator	82	Continuous
Generator (25 KVA or less)	70	Continuous
Gradall	85	Continuous
Grader	85	Continuous
Grinder Saw	85	Continuous
Horizontal Boring Hydro Jack	80	Continuous
Hydra Break Ram	90	Impact
Impact Pile Driver	105	Impact
Insitu Soil Sampling Rig	84	Continuous
Jackhammer	85	Impact
Mounted Impact Hammer (hoe ram)	90	Impact
Paver	85	Continuous
Pneumatic Tools	85	Continuous
Pumps	77	Continuous
Rock Drill	85	Continuous
Scraper	85	Continuous
Slurry Trenching Machine	82	Continuous
Soil Mix Drill Rig	80	Continuous
Street Sweeper	80	Continuous
Tractor	84	Continuous
Truck (dump, delivery)	84	Continuous
Vacuum Excavator Truck (vac-truck)	85	Continuous
Vibratory Compactor	80	Continuous
Vibratory Pile Driver	95	Continuous
All other equipment with engines larger than 5 HP	85	Continuous

Notes:

¹ Measured at 50 feet from the construction equipment, with a “slow” (1 sec.) time constant.² Noise limits apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation.³ Portable Air Compressor rated at 75 cfm or greater and that operates at greater than 50 psi.

Source: Mitigation of Nighttime Construction Noise, Vibrations and Other Nuisances, National Cooperative Highway Research Program, 1999.

TABLE 6 Estimated Construction Noise Levels at Nearby Land Uses

Phase (Work Days)	Construction Equipment (Quantity)	Calculated Hourly Average L_{eq} , dBA				
		Noise Level at 50ft	Res. – South (85ft)	Res. & Comm. – East (140ft)	Res. & Comm. – North (95ft)	Comm. – West (80ft)
Demolition (20 days)	Concrete/Industrial Saw (1) ^a Excavator (1) Rubber-Tired Dozer (2) Tractor/Loader/Backhoe (2) ^a	86	81	77	80	82
Site Preparation (5 days)	Rubber-Tired Dozer (1) ^a Tractor/Loader/Backhoe (2) ^a	84	80	75	79	80
Grading/ Excavation (90 days)	Excavator (1) Rubber-Tired Dozer (1) Concrete/Industrial Saw (1) ^a Tractor/Loader/Backhoe (2) ^a	86	81	77	80	82
Trenching (25 days)	Tractor/Loader/Backhoe (3) ^a Excavator (1) ^a	85	81	77	80	81
Building- Exterior (150 days)	Crane (1) ^a Forklift (4) Tractor/Loader/Backhoe (2) ^a	73	79	74	78	79
Building – Interior/ Architectural Coating (300 days)	Air Compressor (3) ^a Aerial Lift (5) ^a	80	75	71	74	76
Paving (30 days)	Cement & Mortar Mixer (1) ^a Paver (2) Paving Equipment (2) ^a Roller (1)	86	81	77	80	82

^a Denotes two loudest pieces of construction equipment per phase.

Note: Building – interior/architectural coating phase would overlap with the building – exterior phase from October 2023 through mid-January 2024 and with the paving phase in January and February 2024.

As shown in Table 6, construction noise levels would intermittently range from 73 to 86 dBA L_{eq} when activities occur approximately 50 feet from nearby receptors, and would typically range from 71 to 82 dBA L_{eq} when focused near the center of the project site. Additionally, pile driving, which is expected to last no longer than 30 days, is not included in the hourly average noise estimates. Pile driving is typically conducted independently from other construction activities, and due to the loud noise levels generated by pile driving, pile driving would dominate the noise environment. Pile driving would occur more than 25 feet from the nearest residence and would result in noise levels up to 100 dBA L_{eq} over a short-term duration anticipated to be no more than 30 days.

Construction noise levels would exceed the exterior threshold of 80 dBA L_{eq} at residential land uses to the south during demolition, grading, trenching, paving, and during pile driving activities. Construction noise levels during the remaining phases of construction (e.g., site preparation, building construction, and architectural coating) would not produce noise levels exceeding 80 dBA L_{eq} at residential land uses. The 90 dBA L_{eq} threshold for commercial land uses would potentially be exceeded during pile driving activities only. Since project construction would last for a period of more than one year and considering that the project site is within 500 feet of existing residential uses and within 200 feet of existing commercial uses, this temporary construction impact would be considered significant in accordance with Policy EC-1.7 of the City's General Plan.

Mitigation Measure 1a:

Pursuant to General Plan Policy EC-1.7, a construction noise logistics plan shall be prepared that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses. Project construction operations shall use best available noise suppression devices and techniques including, but not limited to the following:

- Limit construction hours to between 7:00 AM and 7:00 PM, Monday through Friday, unless permission is granted with a development permit or other planning approval. No construction activities are permitted on the weekends at sites within 500 feet of a residence. Construction outside of these hours may be approved through a development permit based on a site-specific “construction noise mitigation plan” and a finding by the Director of PBCE that the construction noise mitigation plan is adequate to prevent noise disturbance of affected residential uses.
- Construct solid plywood fences around construction sites adjacent to operational business, residences, or other noise-sensitive land uses. A temporary 8-foot noise barrier shall be constructed along the south property line of the project site to shield adjacent residential land uses from ground-level construction equipment and activities. The noise barrier shall be solid over the face and at the base of the barrier in order to provide a 5 dBA noise reduction.
- Equip all internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.
- Prohibit unnecessary idling of internal combustion engines.
- Locate stationary noise-generating equipment such as air compressors or portable power generators as far as possible from sensitive receptors. Construct temporary noise barriers to screen stationary noise-generating equipment when located near adjoining sensitive land uses.
- Utilize “quiet” air compressors and other stationary noise sources where technology exists.
- Control noise from construction workers’ radios to a point where they are not audible at existing residences bordering the project site.
- Notify all adjacent business, residences, and other noise-sensitive land uses of the construction schedule, in writing, and provide a written schedule of “noisy” construction activities to the adjacent land uses and nearby residences.

- If complaints are received or excessive noise levels cannot be reduced using the measures above, erect a temporary noise control blanket barrier along surrounding building facades that face the construction sites.
- Designate a “disturbance coordinator” who shall be responsible for responding to any complaints about construction noise. The disturbance coordinator shall determine the cause of the noise complaint (e.g., bad muffler, etc.) and shall require that reasonable measures be implemented to correct the problem. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule.

In accordance with Policy EC-1.7, a construction noise logistics plan should be developed for the proposed project.

Construction Noise Logistics Plan: Prior to the issuance of any grading or demolition permits, the project proponent shall submit and implement a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting and notification of construction schedules, equipment to be used, and designation of a noise disturbance coordinator. The noise disturbance coordinator shall respond to neighborhood complaints and shall be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses. The noise logistic plan shall be submitted to the Director of Planning or Director’s designee of the Department of Planning, Building and Code Enforcement prior to the issuance of any grading or demolition permits.

As a part of the noise logistic plan and project, pile driving noise minimization measures for the proposed project shall be considered and may include, but are not limited to, the following best management practices:

- In accordance with Policy EC-1.7 of the City’s General Plan, utilize the best available noise suppression devices and techniques during construction activities.
- If impact pile driving is proposed, foundation pile holes shall be pre-drilled to minimize the number of impacts required to seat the pile. Pre-drilling foundation pile holes is a standard construction noise control technique. Pre-drilling reduces the number of blows required to seat the pile.
- If impact driving is proposed, multiple-pile drivers shall be considered to expedite construction. Although noise levels generated by multiple pile drivers would be higher than the noise generated by a single pile driver, the total duration of pile driving activities would be reduced.
- Locate material stockpiles, as well as maintenance/equipment staging and parking areas, as far as feasible from residential receptors.
- The project applicant shall prepare a detailed construction schedule for major noise-generating construction activities. The construction plan shall identify a procedure for

coordination with adjacent residential land uses so that construction activities can be scheduled to minimize noise disturbance.

- In order to minimize negative effects of construction noise on the surrounding neighborhoods near the project site, the following measures will be utilized to identify, mitigate, respond to and track any complaints that may arise pertaining to construction noise:
 - Notify property owners and occupants located within 500 feet of construction activities at least 14 calendar days prior to commencement of construction;
 - Post a large on-site sign near the public right-of-way containing permitted construction days/hours, complaint procedures and phone numbers for the complaint manager and City Code Enforcement unit;
 - Maintain a complaint log that records received complaints and how complaints were addressed, which shall be submitted to the City for review upon the City's request;
 - If reliable noise complaints are received during demolition, excavation, and/or construction activities, noise levels should be monitored at the location from which the noise complaints originated by a qualified acoustical professional. Integrated average (L_{eq}) noise level measurements on an hourly basis should be made of activities representative of those that generated the complaint. If the measured noise levels during this test are found to exceed 80 dBA L_{eq} at residential property lines or 90 dBA L_{eq} at commercial property lines, an acoustical professional should be retained to specify additional noise attenuation measures to reduce noise levels to City Standards. These measures may include operational considerations, the use of additional ground level noise barriers or noise control blanketing of the building structure.

After implementation of the noise mitigation measures temporary construction activities would potentially cause a substantial increase in noise levels at nearby residences in the area. The impact would be significant and unavoidable.

Impact 1b: Permanent Noise Level Increase/Exceed Applicable Standards. The proposed project would not result in a substantial permanent noise level increase or exceed applicable standards at the noise-sensitive receptors in the project vicinity. **This is a less-than-significant impact.**

A significant impact would result if traffic generated by the project would substantially increase noise levels at sensitive receptors in the vicinity. A substantial increase would occur if: a) the noise level increase is 5 dBA DNL or greater, with a future noise level of less than 60 dBA DNL, or b) the noise level increase is 3 dBA DNL or greater, with a future noise level of 60 dBA DNL or greater. Residences surrounding the project site have existing noise levels of 62 dBA DNL or greater; therefore, a significant impact would occur if project-generated traffic would permanently increase noise levels by 3 dBA DNL.

The City's General Plan does not include thresholds for equipment noise generated at residential buildings; however, the Municipal Code requires mechanical equipment noise to be maintained at or below 55 dBA at receiving residential properties when operational noise is generated at residential uses. Additionally, Section 20.40.600 of the Municipal Code includes a noise limit of 60 dBA on receiving commercial uses.

Project Traffic Increase

For the proposed project, peak hour turning movements were provided for the four intersections in the project vicinity. Project trips were added to the existing volumes to calculate the existing plus project scenario, and the existing plus project traffic volumes were compared to existing volumes to determine the project's contribution to the permanent noise level increase. Upon comparison of these traffic conditions, a traffic noise increase of less than 1 dBA was estimated for each roadway segment included in the traffic study. For all existing receptors, the noise level increase due to project traffic would not be measurable or detectable (0 dBA DNL increase).

Mechanical Equipment

The site plan shows ground-floor equipment rooms for an emergency generator, electrical equipment, while the pump room would be located in the basement level. Additionally, the roof plan shows a cooling tower room, which would include heating pumps, open to the sky.

Noise level information for the specific equipment proposed, as well as quantity of equipment and size of equipment, was unavailable at the time of this study. Typical heating pumps would generate noise levels ranging from 56 to 66 dBA at a distance of 3 feet. Assuming up to 10 heating pumps would run simultaneously at any given time, hourly average noise levels would range from 66 to 76 dBA L_{eq} at a distance of 3 feet. Cooling towers would include fan operations with noise levels up to 74 dBA at a distance of 50 feet. When combined with the heating pumps, the total mechanical equipment noise generated on the rooftop of the proposed residential building would be 89 dBA at a distance of 3 feet. The site plan indicates that this equipment would be located within a room but open to the sky. The existing residential and commercial uses surrounding the site are one- to two-stories tall. The rooftop equipment would be 246 feet above the ground. The elevation of the equipment, combined with the walls of the room, would provide a minimum noise level reduction of 20 dBA.

Table 7 shows the estimated mechanical equipment noise propagated to the surrounding land uses.

TABLE 7 Estimated Operational Noise Levels for the Rooftop Equipment, Propagated from the Center of the Rooftop Equipment

Receptor	Distance from Center of the Rooftop Equip.	Hourly Leq, dBA	DNL, dBA	Noise Level Increase, dBA DNL
Existing Res - south	125 feet	36 ^a	43 ^a	0
Existing Res & Comm - east	175 feet	33 ^a	40 ^a	0
Existing Res & Comm - north	50 feet	44 ^a	51 ^a	0
Existing Comm - west	25 feet	50 ^a	57 ^a	1

^a A conservative 20 dBA reduction was applied to the noise levels due to the wall façade of the cooling tower room and due to the elevation of the rooftop equipment.

Based on the estimated noise levels in Table 7, mechanical equipment noise levels from rooftop equipment are not calculated to exceed the City's Municipal Code limits for existing residential or commercial land uses. For all existing residential receptors, the noise level increase due to mechanical equipment noise would not be measurable or detectable (0 dBA DNL increase). For the existing commercial uses to the west, a noise level increase of 1 dBA DNL would result from the rooftop mechanical equipment at the project site.

The ground-level emergency generator would receive a minimum noise level reduction of 20 dBA from the building façades. The proposed emergency diesel generator is expected to have a capacity of 1,000 kW. Generators of this size would typically generate noise levels up to 89 dBA at a distance of 50 feet with a standard weather enclosure. With the inclusion of Level 1 or Level 2 sound enclosures, noise levels could be reduced to 65 dBA at 50 feet from the generator room. Emergency generators are typically tested monthly for a period of one hour between 7:00 a.m. and 10:00 p.m. Further, it is assumed that the City's thresholds would not apply during emergency conditions when the generators may run continuously during daytime and nighttime hours. During the testing periods, the threshold would apply. The generator room for the proposed residential building would be located along the eastern building façade. Table 8 summarizes the hourly average noise levels and day-night average noise levels expected at the property lines of the surrounding receptors, assuming a conservative 20 dBA noise level reduction due to the building façade. This is incorporated into the results of Table 8.

TABLE 8 Estimated Operational Noise Levels for Monthly Tests of the Emergency Generator

Receptor	Distance from Center of the Generator Room	Weather Enclosure			Level 1 or Level 2 Sound Enclosure		
		Hourly Leq, dBA	DNL, dBA	Noise Level Increase, dBA DNL	Hourly Leq, dBA	DNL, dBA	Noise Level Increase, dBA DNL
Existing Res - south	60 feet	67 ^a	54 ^a	0	43 ^a	30 ^a	0
Existing Res & Comm - east	90 feet	64 ^a	50 ^a	0	40 ^a	26 ^a	0
Existing Res & Comm - north	115 feet	62 ^a	48 ^a	0	38 ^a	24 ^a	0
Existing Comm - west	105 feet	63 ^a	49	0	39 ^a	25 ^a	0

^a A conservative 20 dBA reduction was applied to the noise levels due to the wall façade of the cooling tower room only.

While the hourly average noise levels during testing of the emergency generators would potentially exceed 55 dBA at residential uses or 60 dBA at commercial uses, this exceedance would only occur for one hour every month if a weather enclosure is selected as part of the design. The 55 dBA DNL threshold for residential land uses and the 60 dBA DNL threshold for commercial uses would not be exceeded. For all existing receptors, the noise level increase due to emergency generator noise would not be measurable or detectable (0 dBA DNL increase).

The final design plans should be reviewed by a qualified acoustical consultant to address any potential conflicts with the Municipal Code. The City's standard permit condition shall be implemented as condition of approval for the proposed project. The standard permit condition states the following:

A detailed acoustical study shall be prepared during final building design to evaluate the potential noise generated by building mechanical equipment and demonstrate the necessary noise control to meet the City's 55 dBA DNL goal. Noise control features such as sound attenuators, baffles, and barriers shall be identified and evaluated to demonstrate that mechanical equipment noise would not exceed 55 dBA DNL at noise-sensitive locations around the project site. The noise control features identified by the study shall be incorporated into the project prior to issuance of a building permit.

Total Combined Project-Generated Noise

The operational noise levels produced by the proposed project combined (i.e., traffic and mechanical equipment) would result in an increase of 1 dBA DNL or less at all existing noise-sensitive receptors surrounding the project site. Therefore, the proposed project would not result in a substantial increase over ambient noise levels in the project vicinity. Further, operational noise levels would not exceed 55 dBA DNL at the nearest noise-sensitive receptors with the incorporation of the City's standard permit code as a condition of approval. This is a less-than-significant impact.

Mitigation Measure 1b: No further mitigation required.

Impact 2: Exposure to Excessive Groundborne Vibration. Residences and local businesses in the vicinity of the project site would be exposed to construction-related vibration, particularly during impact pile driving events. **This is a significant impact.**

The construction of the project may generate perceptible vibration when heavy equipment or impact tools (e.g. jackhammers, hoe rams) are used. Construction activities would include site demolition work, preparation work, excavation of below-grade levels, foundation work, and new building framing and finishing.

According to Policy EC-2.3 of the City of San Jose General Plan, a vibration limit of 0.08 in/sec PPV shall be used to minimize the potential for cosmetic damage to sensitive historical structures, and a vibration limit of 0.20 in/sec PPV shall be used to minimize damage at buildings of normal conventional construction. Figure 5 shows the project site and the historic properties within 200 feet of the site (buildings 1, 11, 13, 14, 17, and 18). Each building that would be considered a San José City Landmark or would be eligible for the National Register or California Register for historic resources are identified in the figure. A significant impact at these buildings would occur if exposed to vibration levels exceeding 0.08 in/sec PPV threshold. For all other buildings in the immediate vicinity of the project site, a significant impact would occur if nearby buildings were exposed to vibration levels in excess of 0.20 in/sec PPV.

Impact pile driving, which produces substantial vibrations, may be used for the foundation construction method. Pile driving would potentially occur for a total of 30 days, averaging approximately eight hours per day and would not occur within 25 feet of the nearest adjacent building. Table 9 presents typical vibration levels for impact and vibratory pile driving at a distance of 25 feet. Without knowing specific locations for pile driving activities, estimations for the vibration exposure at each surrounding building is not feasible; however, Table 9 also shows the distance at which 0.08 and 0.2 in/sec PPV would occur for the upper range and for typical impact and vibratory activity. Each of the historical buildings identified in Figure 5 would be within 190 feet of the project site and would therefore be susceptible to potential damage when impact and vibratory pile driving activities generate vibration levels in the upper range shown in Table 9. Under typical impact pile driving levels, damage would not be expected at Building 11 but could potentially occur at the other historic buildings. Typical vibratory pile driving levels would potentially result in damage at Building 1 only. For all other construction equipment, the distances

in the last column of Table 9 would provide a diameter around the project site in which buildings subject to potential damage could be identified.

FIGURE 5 Nearby Buildings Surrounding the Project Site

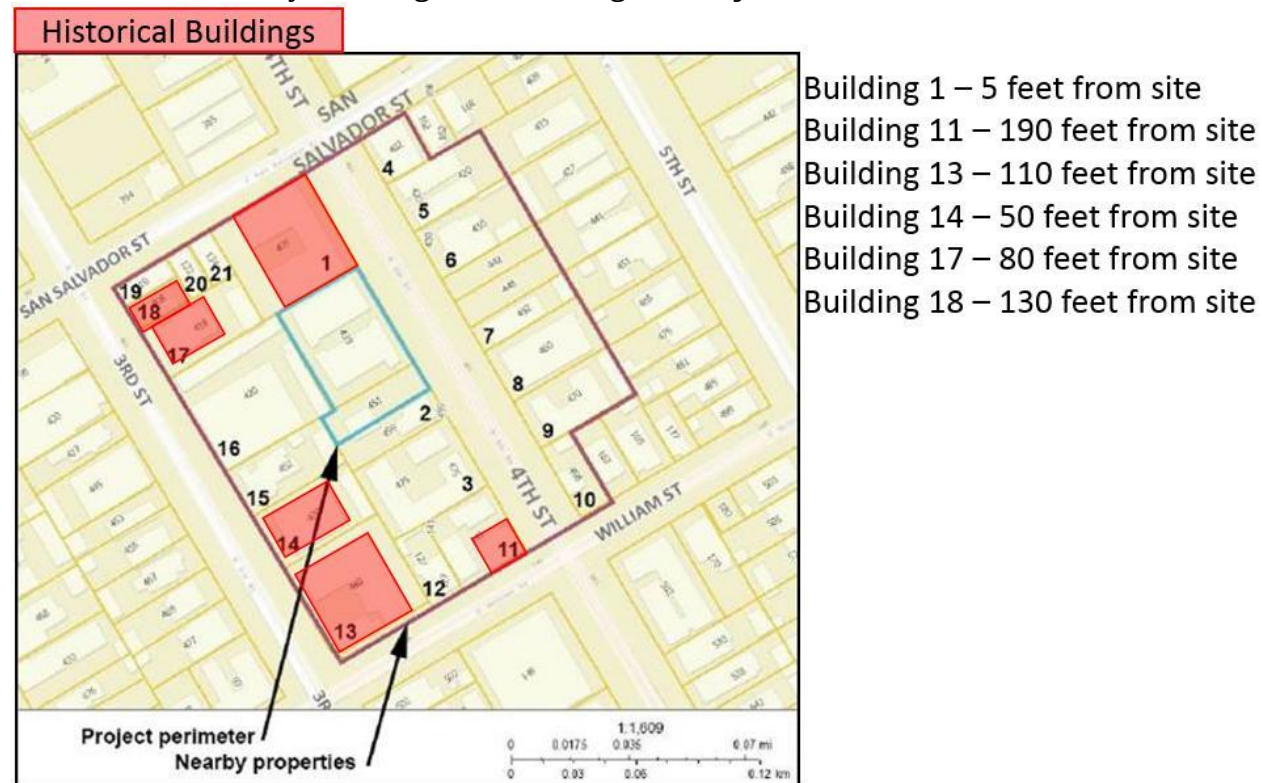


TABLE 9 Vibration Source Levels for Pile Driving Activities Occurring at 25 feet

Equipment		PPV at 25 ft. (in/sec)	Minimum Distance to Meet 0.08 in/sec PPV (feet)	Minimum Distance to Meet 0.2 in/sec PPV (feet)
Pile Driver (Impact)	upper range	1.158	290 feet	125 feet
	typical	0.644	170 feet	75 feet
Pile Driver (Sonic)	upper range	0.734	190 feet	85 feet
	typical	0.170	50 feet	25 feet

Source: Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, Office of Planning and Environment, U.S. Department of Transportation, September 2018, as modified by Illingworth & Rodkin, Inc., January 2022.

Other project construction activities, such as drilling, the use of jackhammers, rock drills and other high-power or vibratory tools, and rolling stock equipment (tracked vehicles, compactors, etc.) may also generate substantial vibration in the immediate vicinity. Table 10 summarizes vibration levels generated by typical construction equipment at a distance of 25 feet. Vibration levels would vary depending on soil conditions, construction methods, and equipment used. Table 10 also presents estimated vibration levels calculated at the setback distances of the surrounding buildings. Vibration levels are highest close to the source, and then attenuate with increasing distance at the

rate $\left(\frac{D_{ref}}{D}\right)^{1.1}$, where D is the distance from the source (in feet) and D_{ref} is the reference distance of 25 feet.

The historical building adjacent to the project site along the northern property line (Building 1) is approximately 5 feet from the project site. Due to the close proximity of this building to the project site, the residential apartment building would be exposed to excessive vibration levels. Construction equipment, such as clam shovel drops, hydromills in rock, vibratory rollers, hoe rams, large bulldozers, caisson drillings, loaded trucks, and jackhammers, would cause vibration levels ranging from 0.1 to 1.233 in/sec PPV at 5 feet, as shown in Table 10. The use of these pieces of construction equipment would be in excess of the City's 0.08 in/sec PPV vibration threshold. Additionally, use of a vibratory roller along the nearest boundary of the project site to Building 14 would generate vibration levels exceeding 0.08 in/sec PPV at the building façade.

The distances of the nearest buildings adjacent to the project site along the western and southern boundaries would be 20 and 10 feet, respectively, from the project site. As summarized in Table 10, various pieces of construction equipment could potentially exceed the City's 0.2 in/sec PPV threshold. The buildings opposite South 4th Street are approximately 100 feet or more from the project site. At these distances, construction activities would be unlikely to generate vibration levels exceeding 0.2 in/sec PPV.

A study completed by the US Bureau of Mines analyzed the effects of blast-induced vibration on buildings in USBM RI 8507.⁵ The findings of this study have been applied to buildings effected by construction-generated vibrations.⁶ As reported in USBM RI 8507⁵ and reproduced by Dowding,⁶ Figure 6 presents the damage probability, in terms of "threshold damage," "minor damage," and "major damage," at varying vibration levels. Threshold damage, which is described as cosmetic damage in this report, would entail hairline cracking in plaster, the opening of old cracks, the loosening of paint or the dislodging of loose objects. Minor damage would include hairline cracking in masonry or the loosening of plaster, and major structural damage would include wide cracking or shifting of foundation or bearing walls. As shown in Figure 6, maximum vibration levels of 1.2 in/sec PPV would result in approximately 20% of threshold damage or cosmetic damage, while no minor or major damage was observed with maximum vibration levels of 1.2 in/sec PPV.

⁵ Siskind, D.E., M.S. Stagg, J.W. Kopp, and C.H. Dowding, Structure Response and Damage Produced by Ground Vibration from Surface Mine Blasting, RI 8507, Bureau of Mines Report of Investigations, U.S. Department of the Interior Bureau of Mines, Washington, D.C., 1980.

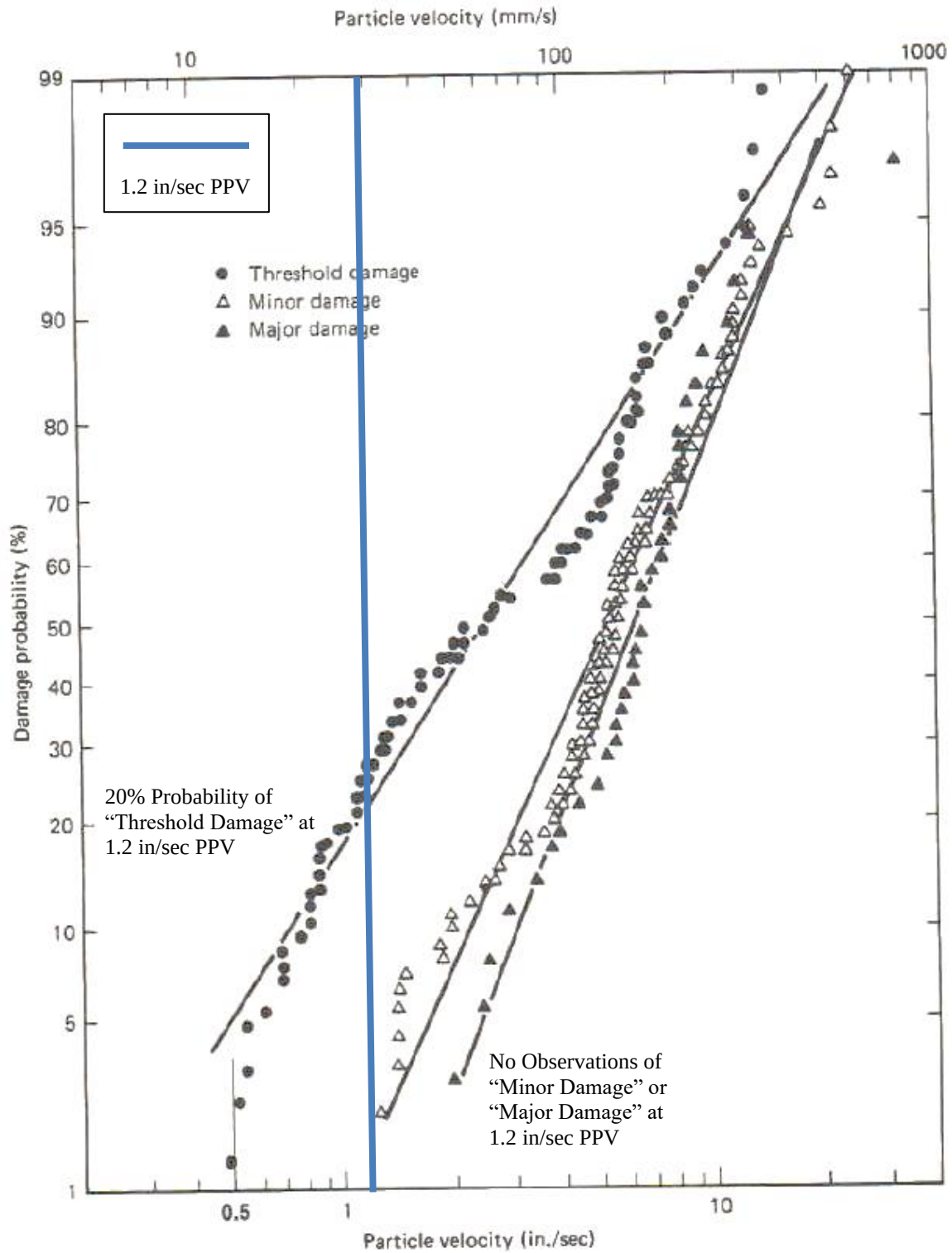
⁶ Dowding, C.H., Construction Vibrations, Prentice Hall, Upper Saddle River, 1996.

TABLE 10 Vibration Source Levels for Construction Equipment and at Building Façades Surrounding the Project Site

Equipment	PPV at 25 ft. (in/sec)	Vibration Levels at Nearest Building (in/sec PPV)								
		PPV at 5 ft. at Building 1	PPV at 190 ft. at Building 11	PPV at 110 ft. at Building 13	PPV at 50 ft. at Building 14	PPV at 80 ft. at Building 17	PPV at 130 ft. at Building 18	PPV at 20 ft. at Nearest Building (west)	PPV at 10 ft. at Nearest Building (south)	PPV at 100 ft. at Nearest Building (east)
Clam shovel drop	0.202	1.186	0.022	0.040	0.094	0.056	0.033	0.258	0.553	0.044
Hydromill (slurry wall)	in soil	0.008	0.047	0.001	0.002	0.004	0.002	0.001	0.010	0.022
	in rock	0.017	0.100	0.002	0.003	0.008	0.005	0.003	0.022	0.047
Vibratory Roller	0.210	1.233	0.023	0.041	0.098	0.058	0.034	0.268	0.575	0.046
Hoe Ram	0.089	0.523	0.010	0.017	0.042	0.025	0.015	0.114	0.244	0.019
Large bulldozer	0.089	0.523	0.010	0.017	0.042	0.025	0.015	0.114	0.244	0.019
Caisson drilling	0.089	0.523	0.010	0.017	0.042	0.025	0.015	0.114	0.244	0.019
Loaded trucks	0.076	0.446	0.008	0.015	0.035	0.021	0.012	0.097	0.208	0.017
Jackhammer	0.035	0.206	0.004	0.007	0.016	0.010	0.006	0.045	0.096	0.008
Small bulldozer	0.003	0.018	0.0003	0.001	0.001	0.001	0.0005	0.004	0.008	0.001

Source: Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, Office of Planning and Environment, U.S. Department of Transportation, September 2018, as modified by Illingworth & Rodkin, Inc., January 2022.

FIGURE 6 Probability of Cracking and Fatigue from Repetitive Loading



Source: Dowding, C.H., Construction Vibrations, Prentice Hall, Upper Saddle River, 1996 as modified by Illingworth & Rodkin, Inc., May 2018.

Pile driving activities would have the potential to generate vibration levels of 0.08 in/sec PPV or more at each of the historic buildings within 200 feet of the project site or to generate vibration levels of 0.2 in/sec PPV or more buildings of normal conventional construction located within 125 and 85 feet for impact and vibratory driving, respectively. Typical construction equipment, shown in Table 10, would have the potential to produce vibration levels of 0.08 in/sec PPV or more at the historic building adjoining the project site to the north, and a vibratory roller used along the nearest property line to Building 14 would potentially generate vibration levels of 0.08 in/sec PPV or more. Due to the sensitive nature of these buildings, cosmetic or minor damage would potentially occur.

Heavy vibration-generating construction equipment, such as vibratory rollers or clam shovel drops, would have the potential to produce vibration levels of 0.2 in/sec PPV or more at buildings of normal conventional construction located within 25 feet of the project site (i.e., adjacent buildings to the north, to the west, and to the south). Project-generated vibration levels would fall below the General Plan threshold of 0.2 in/sec PPV at other surrounding conventional buildings located 30 feet or more from the project site. Neither cosmetic, minor, or major damage would occur at conventional buildings located 30 feet or more from the project site.

At these locations, and in other surrounding areas where vibration would not be expected to cause cosmetic damage, vibration levels may still be perceptible. However, as with any type of construction, this would be anticipated and would not be considered significant, given the intermittent and short duration of the phases that have the highest potential of producing vibration (use of jackhammers and other high-power tools). By use of administrative controls, such as notifying neighbors of scheduled construction activities and scheduling construction activities with the highest potential to produce perceptible vibration during hours with the least potential to affect nearby businesses, perceptible vibration can be kept to a minimum.

In summary, the construction of the project would generate vibration levels exceeding the General Plan threshold of 0.08 in/sec PPV or more at historic buildings within 50 feet of the project site and of 0.2 in/sec PPV or more at buildings of normal conventional construction located within 25 feet of the project site. Impact and vibratory pile driving would potentially exceed the City's thresholds at historic buildings located within 290 and 190 feet, respectively, of the pile driving activities and at conventional buildings located within 125 and 85 feet, respectively, of the pile driving activities. Such vibration levels would be capable of cosmetically damaging the adjacent buildings. This is a significant impact.

Mitigation Measure 2:

The project shall implement the following measures, in addition to the best practices specified in Mitigation Measure 1a of this report, to minimize the impacts of groundborne vibration.

Construction Vibration Monitoring, Treatment, and Reporting Plan: The project proponent shall implement a construction vibration monitoring plan to document conditions prior to, during, and after vibration generating construction activities. All plan tasks shall be undertaken under the direction of a licensed Professional Structural Engineer in the State of California and be in

accordance with industry-accepted standard methods. The construction vibration monitoring plan shall include, but not be limited to, the following measures:

- The report shall include a description of measurement methods, equipment used, calibration certificates, and graphics as required to clearly identify vibration-monitoring locations.
- A list of all heavy construction equipment to be used for this project and the anticipated time duration of using the equipment that is known to produce high vibration levels (clam shovel drops, vibratory rollers, hoe rams, large bulldozers, caisson drillings, loaded trucks, jackhammers, etc.) shall be submitted to the Director of Planning or Director's designee of the Department of Planning, Building and Code Enforcement by the contractor. This list shall be used to identify equipment and activities that would potentially generate substantial vibration and to define the level of effort required for continuous vibration monitoring. Phase demolition, earth-moving, and ground impacting operations so as not to occur during the same time period.
- Where possible, use of the heavy vibration-generating construction equipment shall be prohibited within 20 feet of any adjacent building.
- Document conditions at all structures located within 125 feet of construction and at historic structures located within 300 feet of construction prior to, during, and after vibration generating construction activities. All plan tasks shall be undertaken under the direction of a licensed Professional Structural Engineer in the State of California and be in accordance with industry-accepted standard methods. Specifically:
 - Vibration limits shall be applied to vibration-sensitive structures located within 300 feet of any high impact construction activities, such as pile driving, and 75 feet of other construction activities identified as sources of high vibration levels.
 - Performance of a photo survey, elevation survey, and crack monitoring survey for each structure of normal construction within 125 feet of any high impact construction activities and/or within 30 feet of other construction activities identified as sources of high vibration levels and each historic structure within 300 feet of pile driving activities and/or within 75 feet of other construction activities. Surveys shall be performed prior to any construction activity, in regular intervals during construction, and after project completion, and shall include internal and external crack monitoring in structures, settlement, and distress, and shall document the condition of foundations, walls and other structural elements in the interior and exterior of said structures.
- Develop a vibration monitoring and construction contingency plan to identify structures where monitoring would be conducted, set up a vibration monitoring schedule, define structure-specific vibration limits, and address the need to conduct photo, elevation, and crack surveys to document before and after construction conditions. Construction contingencies shall be identified for when vibration levels approached the limits.

- At a minimum, vibration monitoring shall be conducted during demolition and excavation activities.
- If vibration levels approach limits, suspend construction and implement contingency measures to either lower vibration levels or secure the affected structures.
- Designate a person responsible for registering and investigating claims of excessive vibration. The contact information of such person shall be clearly posted on the construction site.
- Conduct a post-construction survey on structures where either monitoring has indicated high vibration levels or complaints of damage has been made. Make appropriate repairs or compensation where damage has occurred as a result of construction activities.

The implementation of these measures would reduce the impact to a less-than-significant level.

Impact 3: Excessive Aircraft Noise. The project site is located more than two miles from a public airport or public use airport and would not expose people residing or working in the project area to excessive aircraft noise levels with the implementation of forced-air mechanical ventilation. **This is a less-than-significant impact.**

Norman Y. Mineta San José International Airport is a public-use airport located approximately 2.3 miles northwest of the project site. According to the City's new Airport Master Plan Environmental Impact Report,⁷ the project site lies just outside the 60 dBA CNEL/DNL contour line (see Figure 7). According to Policy EC-1.11 of the City's General Plan, the required safe and compatible threshold for exterior noise levels would be at or below 65 dBA CNEL/DNL for aircrafts. Therefore, the proposed project would be compatible with the City's exterior noise standards for aircraft noise.

Assuming standard construction materials for aircraft noise below 60 dBA DNL, the future interior noise levels resulting from aircraft would be below 45 dBA DNL. Therefore, future interior noise at the proposed building would be compatible with aircraft noise. This would be a less-than-significant impact.

Mitigation Measure 3: None required.

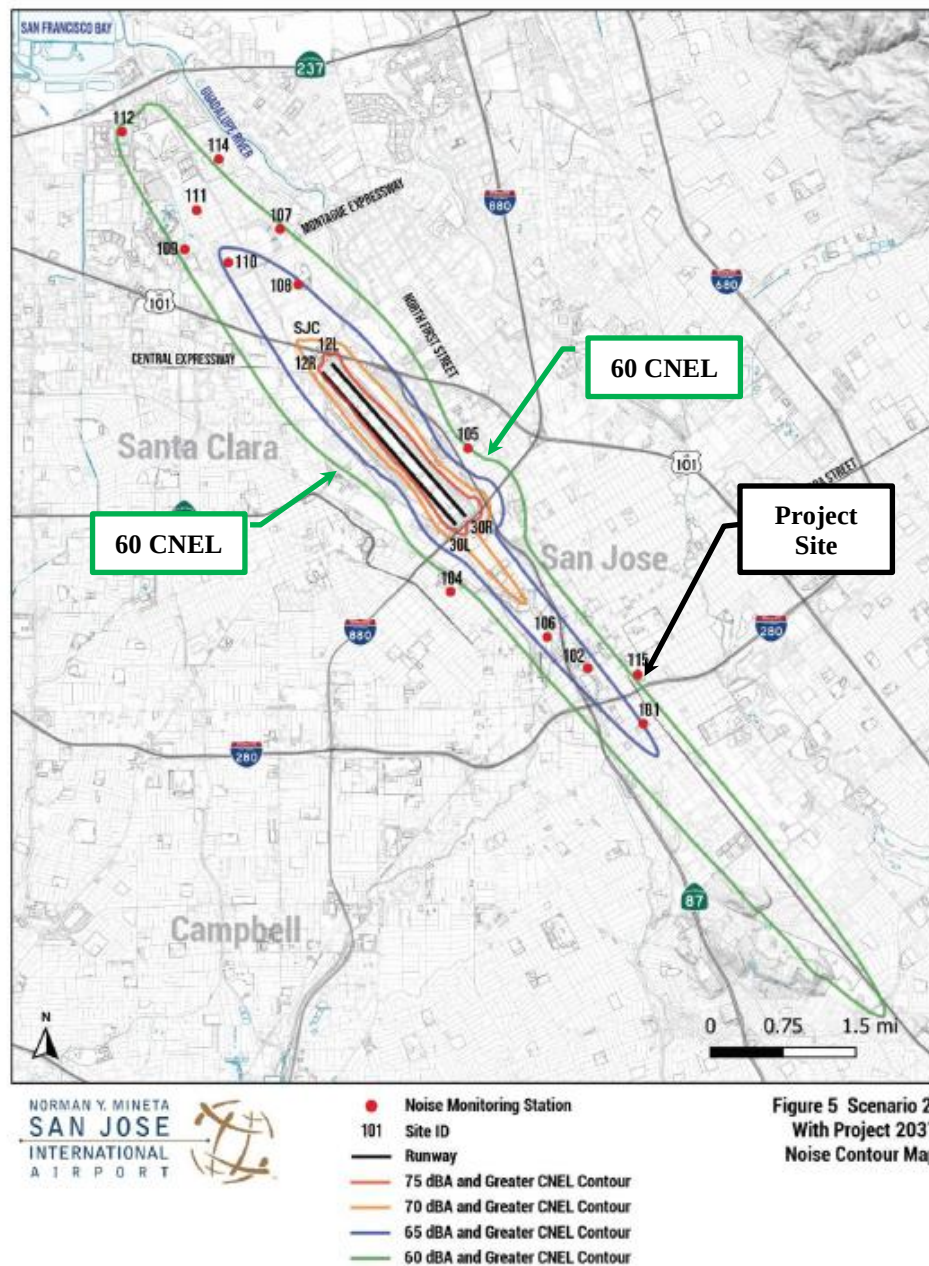
⁷ David J. Powers & Associates, Inc., Integrated Final Environmental Impact Report, Amendment to Norman Y. Mineta San Jose International Airport Master Plan, April 2020.

FIGURE 7 2037 CNEL Noise Contour Map for SJIA Relative to Project Site

Figure 5
Scenario 2: With Project 2037 Noise Contour Map

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Source: BridgeNet International 2019

Cumulative Impacts

Cumulative noise impacts would include temporary construction noise from cumulative construction projects. Cumulative traffic volumes were not provided for the proposed project, and therefore, cumulative noise increases could not be assessed here. However, due to full buildout in the project vicinity discussed previously, a significant cumulative traffic noise increase would not be expected due to the proposed project.

From the City's website,⁸ the following planned or approved projects are located within 1,000 feet of the proposed project:

- **The Mark Residential Tower** – this project is located at 459 and 475 South 4th Street, which are the two adjacent properties to the south of the project site. This approved project would include the construction of a 20-story multi-family residential building. Potentially, the Mark Residential Tower and the proposed project at 439 and 451 South 4th Street could have an overlapping period of construction or could be constructed consecutively. The residential buildings located to the east of South 4th Street and adjacent properties to the west would be exposed to direct construction activity from both of these sites.
- **MVP** – this project includes mixed-use buildings at 420 South 3rd Street and 420 South 3rd Street and is currently in the planning review phase. The 20-story mixed-use building at 420 3rd Street would consist of 152 residential units and approximately 3,000 square feet of retail space, while two mixed-use towers with up to 254 residential units and approximately 8,000 square feet of ground floor commercial space is proposed at 420 2nd Street. Noise-sensitive receptors directly impacted by both construction sites would include the receptors to the north and south of both sites. The construction schedule for the 420 South 3rd Street project site is unavailable at this time; however, these shared receptors would potentially be exposed to construction activities at both sites simultaneously or consecutively.
- **BoTown Project** – this project is located at 409 South 2nd Street and would consist of a 29-story building with 250 residential units and 7,645 square feet of commercial space. This project site would be about 580 feet west of the South 4th Street project site and is currently in the planning review phase. While the construction schedule is currently unavailable, there would not be any receptors with direct line-of-sight to both construction sites. This would not result in a cumulative construction impact.
- **Valley Title** – this project is located at 345 South 2nd Street, approximately 610 feet northwest of the South 4th Street site. This proposed office building would be 20 stories tall with 1.39 million square feet of commercial office with ground floor retail space. This project is currently in the planning review phase. The construction schedule is currently unavailable, and there would not be any receptors with direct line-of-sight to both construction sites. This would not result in a cumulative construction impact.

⁸ <https://gis.sanjoseca.gov/maps/devprojects/>

- **San José Stage/Home 2 Hotel** – this project is located at 490 South 1st Street, approximately 800 feet southwest of the South 4th Street site. This proposed hotel would include 144 rooms and a 22,102 square-foot theater. This project is currently in the planning review phase. The construction schedule is currently unavailable, and there would not be any receptors with direct line-of-sight to both construction sites. This would not result in a cumulative construction impact.
- **Gateway Tower** – this project is located at 455-493 South 1st Street, approximately 985 feet southwest of the South 4th Street site. This 25-story building would include 300 residential units and 4,850 square feet of ground floor retail. This project has been approved, but construction has not yet started. There would not be any receptors with direct line-of-sight to both construction sites. This would not result in a cumulative construction impact.

The existing receptors to the north, to the south, and to the west of the South 4th Street project site would also be considered sensitive receptors during construction activities at the Mark Residential Tower and MVP project sites. With the inclusion of Mitigation Measures 1a and 2 in this report and those provided in the Environmental Impact Report (EIR) for the Mark Residential Tower and MVP, and the measures included in the *Downtown San José Strategy Plan 2040 EIR*, noise and vibration impacts due to cumulative construction would be reduced. However, the proposed project would include pile driving activities, and the Mark Residential Tower would include drilled piles. Considering the size of each project, the heavy noise- and vibration-generating equipment, and the length of total construction time for each project, this would be a **significant and unavoidable cumulative noise impact** for the receptors in the immediate vicinity.