SOUTH ALMADEN OFFICES PROJECT NOISE AND VIBRATION ASSESSMENT

San José, California

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INTRODUCTION

Two 16-story office towers are proposed at a site northwest of the South Almaden Boulevard/Woz Way intersection in San José, California. The existing parking lot located at the project site would be demolished, and the proposed office towers would be constructed. The North Tower would consist of approximately 586,663 square feet (sf) of office space, 13,885 sf of amenity/food and beverage space, 25,136 sf of back of house operations, 2,071 sf of penthouse space, and approximately 13,585 sf would be mechanical space. The South Tower would consist of 900,452 sf of office space, 26,883 sf of back of house operations space, 25,252 sf of amenity/food and beverage space, 1,531 sf of penthouse space, and 30,401 sf of mechanical space. Additionally, the project proposes three levels of below-grade parking for a total of 1,343 parking spaces.

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 and groundborne vibration, 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* (L_{dn} or *DNL*) 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 12-17 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 57-62 dBA DNL with open windows and 65-70 dBA DNL if the windows are closed. Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels of 75-80 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 25-30 percent of the population. There is, therefore, an increase of about 2 percent per dBA between a DNL of 60-70 dBA. Between a DNL of 70-80 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 30-35 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	
		Broadcast/recording studio
	10 dBA	
	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, September 2013.

Regulatory Background - Noise

The State of California, Santa Clara County, and the City of San José have established regulatory criteria that are applicable in this assessment. The State CEQA Guidelines, Appendix G, California Building Code, Santa Clara County Airport Land Use Commission Comprehensive Land Use Plan, and the City of San Jose General Plan are used to assess the potential significance of impacts. A summary of the applicable regulatory criteria is provided below.

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.

Pursuant to recent court decisions, the impacts of site constraints, such as exposure of the proposed project to excessive levels of noise and vibration, are not included in the Impacts and Mitigation Section of this report. These items are discussed in a separate section addressing the project's consistency with the policies set forth in the City's General Plan.

CEQA does not define what noise level increase would be considered substantial. Typically, an increase in the DNL noise level resulting from the project at noise sensitive land uses of 3 dBA or greater would be considered a significant impact when projected noise levels would exceed those considered acceptable for the affected land use. An increase of 5 dBA DNL or greater would be considered a significant impact when projected noise levels would remain within those considered acceptable for the affected land use.

2019 California Building Cal Green Code. The State of California established exterior sound transmission control standards for new non-residential buildings, as set forth in the 2010 California Green Building Standards Code (Section 5.507.4.1 and 5.507.4.2). These standards were not altered in the 2019 revisions. Section 5.507 states that either the prescriptive (Section 5.507.4.1) or the performance method (Section 5.507.4.2) shall be used to determine environmental control at indoor areas. The prescriptive method is very conservative and not practical in most cases; however, the performance method can be quantitatively verified using exterior-to-interior calculations. For the purposes of this report, the performance method is utilized to determine consistency with the Cal Green Code. Both of the sections that pertain to this project are as follows:

> **5.507.4.1 Exterior noise transmission, prescriptive method.** Wall and roof-ceiling assemblies exposed to the noise source making up the building or additional envelope or altered envelope shall meet a composite STC rating of at least 50 or a composite OITC rating of no less than 40, with exterior windows of a minimum STC of 40 or OITC of 30 within the 65 dBA CNEL or DNL noise contour of a freeway or expressway, railroad, industrial source or fixed-guideway noise source, as determined by the Noise Element of the General Plan.
>
> **5.507.4.2 Performance method.** For buildings located, as defined by Section 5.507.4.1, wall and roof-ceiling assemblies exposed to the noise source making up the building envelope or addition envelope or altered envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level ($L_{eq(1\text{-}hr)}$) of 50 dBA in occupied areas during any hour of operation.

Santa Clara County Airport Land Use Commission Comprehensive Land Use Plan. The Comprehensive Land Use Plan 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

Policy N-3 Noise impacts shall be evaluated according to the Aircraft Noise Contours presented on Figure 5 (2022 Aircraft Noise Contours).

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	

[1]Noise 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.

EC-1.11 Require safe and compatible land uses within the Mineta San José International Airport noise zone (defined by the 65 CNEL contour as set forth in State law) and encourage aircraft operating procedures that minimize noise.

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 northwest of the South Almaden Boulevard/Woz Way intersection in San José, California. Existing single-family residences are located south of the site, opposite Woz Way. An existing office building is adjacent to the site to the north, and a children's museum and park are located to the west, opposite the Guadalupe River. A Convention Center public parking garage, an office building, and a hotel are located to the east, opposite South Almaden Boulevard.

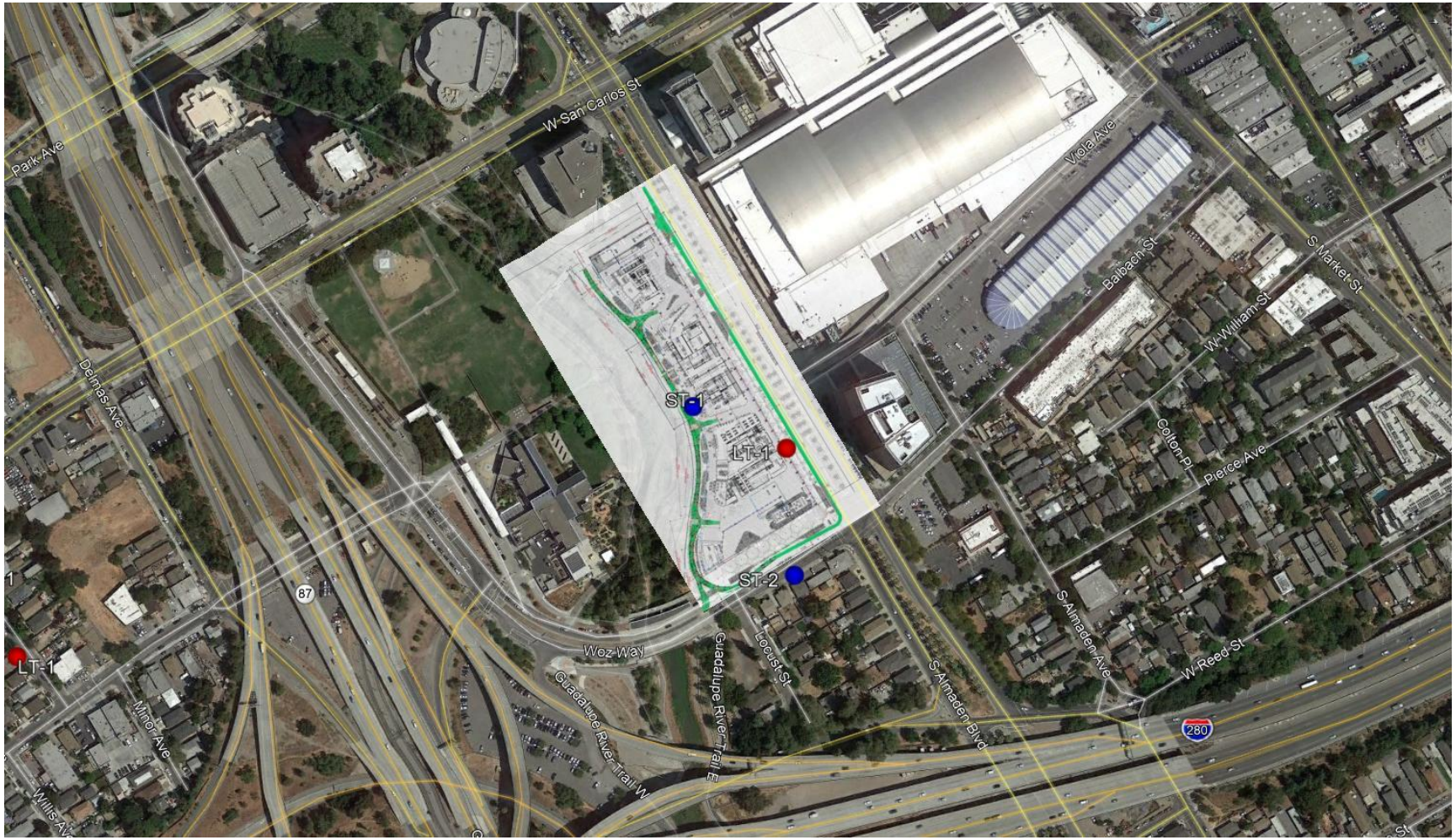
A noise monitoring survey was performed in the project vicinity beginning on Wednesday, March 13, 2019 and concluding on Friday, March 15, 2019. The monitoring survey included one long-term (LT-1) noise measurement and two short-term (ST-1 and ST-2) noise measurements. All measurement locations are shown in Figure 1. The existing noise environment at the project site results primarily from vehicular traffic along I-280 and SR 87. Traffic along South Almaden Boulevard and aircraft associated with Mineta San José International Airport operations also affect the noise environment.

Long-term noise measurement LT-1 was made approximately 65 feet west of the centerline of South Almaden Boulevard. Hourly average noise levels typically ranged from 64 to 72 dBA L_{eq} during the day, and from 58 to 69 dBA L_{eq} at night. The day-night average noise level on Thursday, March 14, 2019 was 72 dBA DNL. The daily trend in noise levels at LT-1 is shown in Figures 2 through 4.

Short-term noise measurements were made over periods of 10-minutes, concurrent with the long-term noise data, on Wednesday, March 13, 2019, between 11:20 a.m. and 11:50 a.m. in order to complete the noise survey. All short-term measurement results are summarized in Table 4.

ST-1 was along the Guadalupe River Trail to the west of the existing parking lot. ST-1 was approximately 205 feet west of the centerline of South Almaden Boulevard. Ambient noise levels at ST-1, which would be void of nearby parking lot activity, ranged from 57 to 58 dBA. Cars in the parking lot generated maximum instantaneous noise levels of 59 to 66 dBA, and an overhead jet generated noise levels reaching 77 dBA during the measurement period. The 10-minute average noise level measured at ST-1 was 63 dBA $L_{eq(10\text{-}min)}$. ST-2 was made at the front of 276 Woz Way, which represents the nearest residential land uses. The ambient noise environment in the absence of local traffic, ranged from 59 to 62 dBA. Car pass-bys generated maximum instantaneous noise levels of 65 to 77 dBA, and a truck pass-by generated noise levels of 75 dBA. Additionally, jet flyovers produced noise levels that ranged from 76 to 82 dBA, and a train horn generated noise levels of 65 dBA. The 10-minute average noise level measured at ST-2 was 67 dBA $L_{eq(10\text{-}min)}$.

FIGURE 1 Noise Measurement Locations



Source: Google Earth 2019.

FIGURE 2 Daily Trend in Noise Levels at LT-1, Wednesday, March 13, 2019

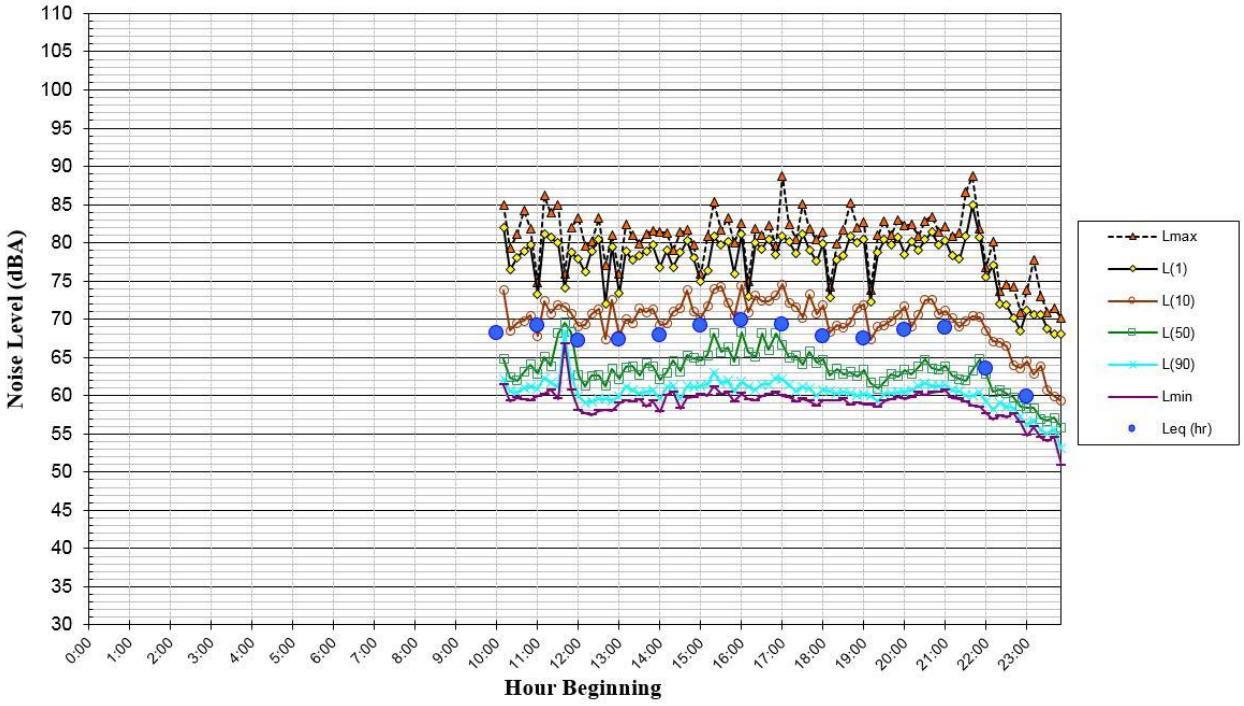


FIGURE 3 Daily Trend in Noise Levels at LT-1, Thursday, March 14, 2019

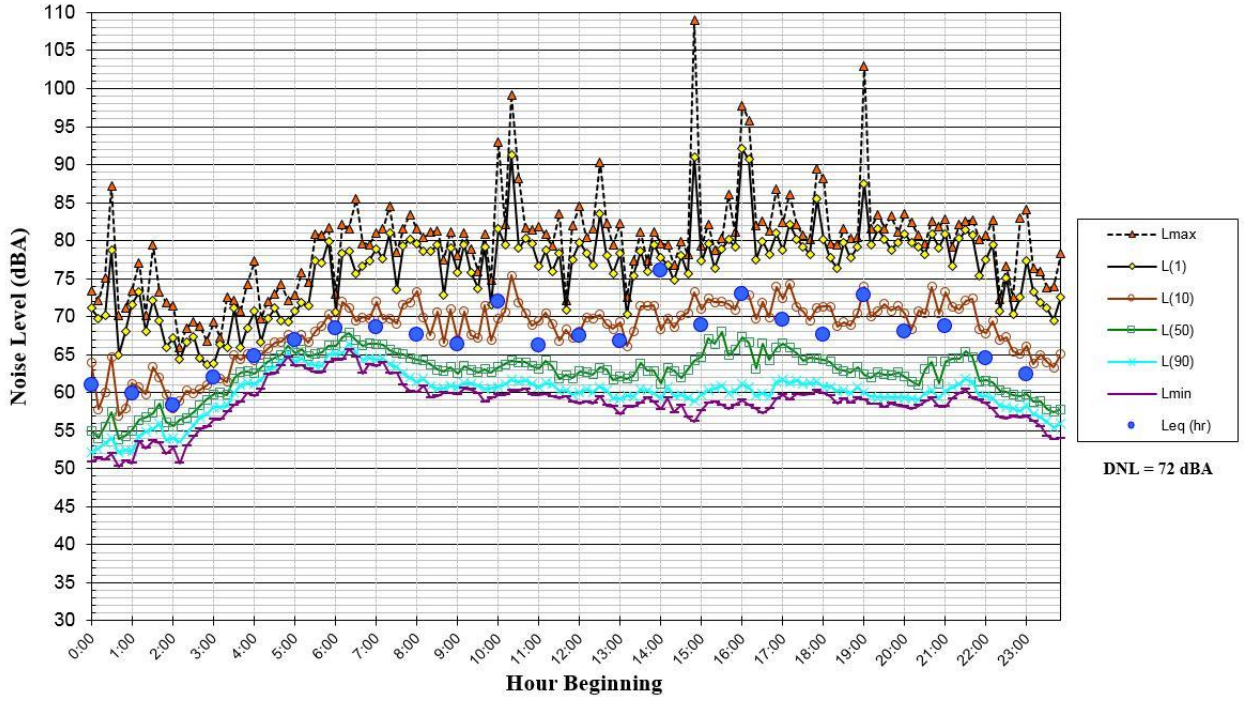


FIGURE 4 Daily Trend in Noise Levels at LT-1, Friday, March 15, 2019

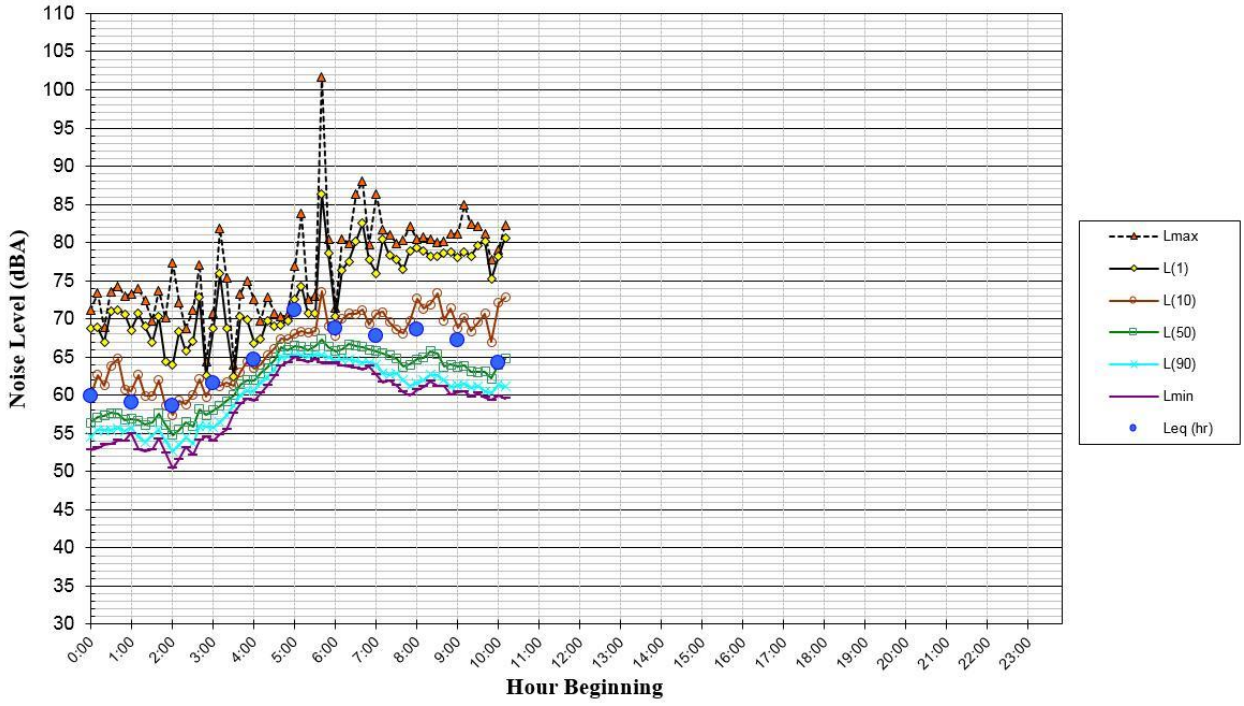


TABLE 4 Summary of Short-Term Noise Measurements (dBA)

Noise Measurement Location (Date, Time)	L_{max}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	$L_{eq(10\text{-}min)}$
ST-1: To the west of the existing parking lot (3/13/2019, 11:20-11:30 a.m.)	79	76	61	58	57	63
ST-2: Front yard equivalent of 276 Woz Way (3/13/2019, 11:40-11:50 a.m.)	82	79	70	63	60	67

PLAN CONSISTENCY ANALYSIS

Noise and Land Use Compatibility

The future noise environment at the project site would continue to result primarily from vehicular traffic along the surrounding roadways. A traffic report was completed for the proposed project in January 2020 by *Hexagon Transportation Consultants, Inc*. However, the traffic study did not include cumulative plus project traffic volumes. Therefore, to estimate future traffic noise levels, a review of the traffic volumes contained in the *Downtown San José Strategy Plan 2040 EIR*[1] was made since the proposed project falls within the project limits of this area plan. The total noise level increase along South Almaden Boulevard was found to be 3 dBA DNL above existing conditions for the year 2040. Therefore, the future noise levels would be 75 dBA DNL at a distance of 65 feet from the centerline of South Almaden Boulevard (LT-1).

[1] City of San José, "Downtown San José Strategy Plan 2040 Environmental Impact Report," December 2018.

Future Exterior Noise Environment

The exterior noise threshold established in the City's General Plan for new commercial buildings is 70 dBA DNL at usable outdoor activity areas.

According to the site plan, outdoor dining areas are shown on the ground-level, and terraces are shown on Levels 2 through 15.

Three ground-level dining areas along the east-west sidewalk areas between the proposed buildings. While these outdoor use areas would be mostly shielded from I-280 and SR 87, they would have direct line-of-sight to South Almaden Boulevard. Setbacks from the centerline would as close as 90 feet from the centerline of South Almaden Boulevard, with the upper floors of the buildings providing an overhang. At a setback of 90 feet, these dining areas would have future exterior noise levels up to 75 dBA DNL, which would exceed the City's exterior noise threshold. The proposed outdoor dining areas located at the rear of the buildings, adjacent to Guadalupe River, would be mostly shielded from I-280, SR 87, and South Almaden Boulevard by existing and proposed intervening buildings. Therefore, the future exterior noise levels at these outdoor spaces would be below 70 dBA DNL.

The three terraces on Level 2 are located along the northern façade, along the southern façade, and in the center, surrounded by the building on all four sides. The terrace located on the northern façade would be partially shielded from South Almaden Boulevard by the proposed building itself due to the elevation of the terrace relative to the roadway; however, portions of this terrace would have direct line-of-sight to the roadway, with the center being set back approximately 140 feet from the centerline of the roadway. At this distance and assuming partial shielding, the future exterior noise levels would be below 70 dBA DNL.

The terraces on Levels 3 and 4 would receive more shielding than Level 2 because of the increased elevation above the roadway; therefore, future exterior noise levels at these outdoor use areas would be below 70 dBA DNL. An outdoor terrace on Level 5 is located along the eastern façade at the center of the buildings. While this outdoor use area is partially shielded by the towers on the north and on the south side of the terrace, there is direct line-of-sight to South Almaden Boulevard. The center of this outdoor use area is set back approximately 110 feet from the centerline of the roadway. At this distance and with additional shielding from the elevation of the terrace, the future exterior noise levels would be below 70 dBA DNL.

For the remaining terraces located on levels 6 through 15, the increased heights above the roadway would further reduce noise levels. Therefore, future exterior noise levels at each of the terraces in the proposed building would be at or below 70 dBA DNL.

Noise levels at the outdoor use areas located on Levels 2 through 15 and the ground-level outdoor seating located to the west of the proposed buildings are not expected to exceed the City's exterior noise level limits. However, the outdoor seating areas with direct line-of-sight to South Almaden Boulevard would potentially be exposed to future exterior noise levels exceeding the City's 70 dBA DNL threshold. Due to the nature of these outdoor seating areas being open to the sidewalk area, any attenuation, such as sound walls, would reduce the aesthetic appeal. With future exterior

noise levels falling within the City's conditionally acceptable range, the City could provide conditional approval for the proposed project, and mitigation would not be recommended.

To achieve 70 dBA DNL at the three outdoor dining areas with direct line-of-sight to South Almaden Boulevard, the optimal alternative would be to increase the setbacks of these outdoor seating areas. Figure 5 shows recommended locations for each outdoor dining area. In each case, the outdoor dining areas would have a minimum setback of 180 feet from the centerline of South Almaden Boulevard. Additionally, the proposed office buildings would provide partial shielding from the roadway. With the increased setbacks and partial shielding from the office buildings, the future exterior noise levels would be at or below 70 dBA DNL.

FIGURE 5 Recommended Locations for Ground-Level Outdoor Dining Areas

Future Interior Noise Environment

The performance method enforced in the Cal Green Code requires that interior noise levels be maintained at 50 dBA $L_{eq(1\text{-}hr)}$ or less during hours of operation at the proposed buildings.

The setback of the eastern building façade from the centerline of South Almaden Boulevard would be approximately 65 to 70 feet, which was also the setback of the long-term noise measurement LT-1. At the nearest building façade facing the roadway, future hourly average noise levels during daytime hours would range from 67 to 75 dBA $L_{eq(1\text{-}hr)}$, and a day-night average noise level of 75 dBA DNL at the building exterior.

Standard construction materials for commercial uses would provide about 25 dBA of noise reduction in interior spaces. The inclusion of adequate forced-air mechanical ventilation systems is normally required so windows may be kept closed at the occupant's discretion and would provide an additional 5 dBA reduction. The standard construction materials in combination with forced-air mechanical ventilation would satisfy the daytime threshold of 50 dBA $L_{eq(1\text{-}hr)}$.

Spaces where lower noise levels would be desired, such as private offices and conference rooms, may benefit from additional noise control in order to meet a lower, more desirable interior noise level. Additional noise control could be accomplished by selecting higher sound-rated windows (STC 34 to STC 38 along exterior façades).

For consistency with the Cal Green Code, the following Conditions of Approval will be implemented by the project applicant:

- Provide forced-air mechanical ventilation and sound rated windows to maintain interior noise levels at acceptable levels. A qualified acoustical specialist shall prepare a detailed analysis of interior noise levels resulting from all exterior sources during the final design phase of the project pursuant to requirements set forth in the General Plan and State Building Code. The study will review the final site plan, building elevations, and floor plans prior to construction and confirm building treatments necessary to reduce interior noise levels to 50 dBA $L_{eq(1\text{-}hr)}$ or lower, and address and adequately control noise from rooftop equipment on adjacent buildings, as necessary. Treatments would include, but are not limited to, sound-rated windows and doors as specified above, acoustical caulking, protected ventilation openings, etc. Results of the analysis, including the description of the necessary noise control treatments, shall be submitted to the City, along with the building plans and approved design, prior to issuance of a building permit.

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 and that would exceed applicable noise standards presented in the General Plan or Municipal Code at existing noise-sensitive receptors surrounding the project site.

    - A significant noise impact would be identified if construction-related noise would temporarily 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.

    - 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 0.2 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: **Temporary Construction Noise – Daytime Hours Only.** Existing noise-sensitive land uses would be exposed to a temporary increase in ambient noise levels due to project construction activities. The incorporation of construction best management practices as project conditions of approval would result in a **less-than-significant** temporary noise impact.

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 to 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.

Existing residences are located to the south of the project site, opposite Woz Way. There is also an office building adjoining the project site to the north, a commercial office building to the east, opposite South Almaden Boulevard, and a Children's Discovery Museum to the west, opposite the Guadalupe River. An existing Hilton hotel is also located southeast of the South Almaden Boulevard/West San Carlos Street intersection. The residences, office buildings, and hotel would be located along South Almaden Boulevard, and the ambient noise environment would be represented by LT-1 and ST-2, which range from 64 to 72 dBA L_{eq} during daytime hours. While ambient measurements were not made at the museum, the noise environment at this location would be louder than at LT-1, ST-1, and ST-2 due to the close proximity of the museum to the SR 87 and I-280 interchange. Therefore, the daytime noise levels of 64 to 72 dBA L_{eq} would represent a conservative ambient noise environment for this sensitive land use.

Construction activities generate considerable amounts of noise, especially during earth-moving activities when heavy equipment is used. The highest maximum noise levels generated by project construction would typically range from about 80 to 90 dBA L_{max} at a distance of 50 feet from the noise source. A list of typical maximum instantaneous noise levels measured at 50 feet are provided in Table 5. Typical hourly average construction-generated noise levels for office

buildings are about 78 to 89 dBA L_{eq} measured at a distance of 50 feet from the center of the site during busy construction periods (e.g., earth moving equipment, impact tools, etc.), as shown in Table 6. 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.

Project construction is expected to start in early 2021 and last for about 4 years. In addition to the five-day work week allowed by the City of San José, extending the construction hours to include Saturday work between 7:00 a.m. and 7:00 p.m. is also proposed.

A detailed list of equipment expected to be used during each phase of construction was provided and is summarized in Table 7. 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 every piece of equipment would operate simultaneously, which would represent the worst-case scenario. 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.

For each phase, the worst-case hourly average noise level, as estimated at the property line of each surrounding land use, is also shown in Table 7. Construction would occur throughout the site, and therefore, hourly average noise levels at each of the receiving land uses would vary depending on the location of the active construction site. For the purposes of estimating the worst-case scenario, noise levels in Table 7 were calculated assuming the center of the active construction site to be located at the center of the nearest tower to the receiving land use.

As shown in Table 7, ambient levels at the surrounding uses would potentially be exceeded by 5 dBA L_{eq} or more at various times throughout construction. 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 residences and within 200 feet of existing commercial uses, the proposed project would be considered a significant temporary impact.

The proposed project falls within the *Downtown San José Strategy Plan 2040 EIR* plan area, which included the mitigation measures to reduce temporary construction noise levels at noise-sensitive receptors. The *Downtown San José Strategy Plan 2040 EIR* would enforce Policy EC-1.7 of the City's General Plan, which states the following:

> Construction operations within the City will be required to use available noise suppression devices and techniques and continue to 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.

Additionally, the City requires that reasonable noise reduction measures be incorporated into the construction plan and implemented during all phases of construction activity. Accordingly, the *Downtown San José Strategy Plan 2040 EIR* requires that all projects shall implement the following standard noise control measures:

- Construction will be limited to the hours of 7:00 a.m. to 7:00 p.m. Monday through Friday for any on-site or off-site work within 500 feet of any residential unit. 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 Planning, Building and Code Enforcement that the construction noise mitigation plan is adequate to prevent noise disturbance of affected residential uses.

- The contractor shall use "new technology" power construction equipment with state-of-the-art noise shielding and muffling devices. All internal combustion engines used on the project site shall be equipped with adequate mufflers and shall be in good mechanical condition to minimize noise created by faulty or poorly maintained engines or other components.

- The unnecessary idling of internal combustion engines shall be prohibited. Staging areas and stationary noise-generating equipment shall be located as far as possible from noise-sensitive receptors such as residential uses (a minimum of 200 feet, where feasible).

- The surrounding neighborhood within 500 feet shall be notified early and frequently of the construction activities.

- A "noise disturbance coordinator" shall be designated to respond to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaints (e.g., beginning work too early, bad muffler, etc.) and institute reasonable measures warranted to correct the problem. A telephone number for the disturbance coordinator would be conspicuously posted at the construction site.

Adherence to the Municipal Code requirements would minimize impacts to neighboring properties from temporary increases in ambient noise levels resulting from future construction activities. Larger projects within the *Downtown San José Strategy Plan 2040 EIR* plan area that are expected

to last over one year in duration, such as the proposed project, may result in a substantial temporary noise increase at adjacent land uses and would require a "construction noise logistics plan," in accordance with GP Policy EC-1.7. As stated in the *Downtown San José Strategy Plan 2040 EIR*, typical construction noise logistics plan would include, but not be limited to, the following measures to reduce construction noise levels as low as practical:

- Utilize 'quiet' models of air compressors and other stationary noise sources where technology exists;

- Equip all internal combustion engine-driven equipment with mufflers, which are in good condition and appropriate for the equipment;

- Locate all stationary noise-generating equipment, such as air compressors and portable power generators, as far away as possible from adjacent land uses;

- Locate staging areas and construction material areas as far away as possible from adjacent land uses;

- Prohibit all unnecessary idling of internal combustion engines;

- 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; *(not applicable to the proposed project)*

- If impact pile driving is proposed, temporary noise control blanket barriers shall shroud pile drivers or be erected in a manner to shield the adjacent land uses. Such noise control blanket barriers can be rented and quickly erected; *(not applicable to the proposed project)*

- 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. Notify all adjacent land uses of the construction schedule in writing; *(not applicable to the proposed project)*

- Designate a "disturbance coordinator" who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator will determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and will require that reasonable measures warranted to correct the problem be implemented. 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.

With the implementation of GP Policy EC-1.7, Municipal Code requirements, and the above measures included in the *Downtown San José Strategy Plan 2040 EIR*, the potential for annoyance

and disruption due to daytime construction noise during the City's allowable hours, as well as on Saturdays between 7:00 a.m. and 7:00 p.m., would be reduced. As part of the notification to neighbors regarding construction activities, the contractor should include notification of work on Saturdays. These measures would reduce the temporary construction noise impact occurring during daytime hours to less-than-significant.

Mitigation Measure 1a: No further mitigation required.

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.

TABLE 6 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 7 Estimated Construction Noise Levels at Nearby Land Uses

Phase of Construction	Time Duration	Construction Equipment (Quantity)	Calculated Hourly Average Noise Levels, L_{eq} (dBA)				
			South Residential (200ft)	Northeast Hotel (525ft)	North Office (170ft)	West Museum (350ft)	East Office (235ft)
Demolition	28 days	Concrete/Industrial Saw (4) Excavator (6) Rubber-Tired Dozer (5) Tractor/Loader/Backhoe (4)	79 dBA	71 dBA	80 dBA	74 dBA	78 dBA
Site Preparation	99 days	Grader (6) Rubber-Tired Dozer (5) Tractor/Loader/Backhoe (4)	80 dBA	71 dBA	81 dBA	75 dBA	78 dBA
Grading/Excavation	437 days	Scraper (3) Excavator (5) Grader (4) Rubber-Tired Dozer (4) Tractor/Loader/Backhoe (3)	80 dBA	72 dBA	81 dBA	75 dBA	79 dBA
Foundations/Below Grade Structure	284 days	Tractor/Loader/Backhoe (1) Excavator (1) Concrete Trucks (5[a]) Concrete Pumps (2)	73 dBA	65 dBA	75 dBA	69 dBA	72 dBA
Super Structure/Steel/ Deck/Fireproofing	363 days	Generator Set (1) Plumbing/Bolt-up/Welding (1) Crane (3) Concrete Trucks (10[b]) Concrete Pumps (2)	73 dBA	65 dBA	75 dBA	68 dBA	72 dBA
Building Exterior	413 days	Crane (4) Forklift (5) Generator Set (6) Welder (8)	75 dBA	67 dBA	76 dBA	70 dBA	74 dBA
Building Interior /Architectural Coating	524 days	Air Compressor (5) Aerial Lift (15)	71 dBA	63 dBA	73 dBA	66 dBA	70 dBA
Sitework	309 days	Cement and Mortar Mixer (4) Paver (1) Paving Equipment (2) Roller (2) Tractor/Loader/Backhoe (1)	76 dBA	68 dBA	78 dBA	71 dBA	75 dBA

[a] The total number of concrete truck trips for the Foundations phase would be 1,497 during daytime hours and 1,981 during nighttime hours; however, for modeling the worst-case construction noise levels, up to five were assumed to be operating simultaneously at the site at any given time.

[b] The total number of concrete truck trips for the Super Structure phase would be 6,143 during daytime hours; however, for modeling the worst-case construction noise levels, up to 5 were assumed to be operating simultaneously at the site at any given time.

Impact 1b: **Temporary Construction Noise – Nighttime Hours Only.** Existing noise-sensitive land uses would be exposed to a temporary increase in ambient noise levels due to project construction activities. The incorporation of construction best management practices as project conditions of approval would result in a **less-than-significant** temporary noise impact.

In addition to extending daytime construction hours to include work on Saturdays, the project proposes nighttime construction for up to 12 days each year, which would include concrete pouring only.

There are no noise limits given for construction occurring outside of the allowable hours of construction. Policies EC-1.3 and EC-1.6 of the City's General Plan state that operational noise levels shall not exceed 55 dBA DNL at any residential property line. For a 24-hour noise source, this would be equivalent to a noise level of 55 dBA L_{eq} during daytime hours (7:00 a.m. to 10:00 p.m.) and 45 dBA L_{eq} during nighttime hours (10:00 p.m. to 7:00 a.m.). Therefore, a nighttime criterion of 45 dBA $L_{eq,}$ or the ambient where existing nighttime noise levels exceed the threshold, would be applicable to the assessment of nighttime construction noise at residential uses, which would include the nearby hotel since occupants would be sleeping during nighttime hours. Nighttime activities at nearby sensitive receptors would primarily occur indoors, however, and for this reason, the exterior nighttime criteria are applied at the building façades and not at the property line.

As discussed in the fundamentals section of this report, steady noises of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA would affect sleep. Assuming a 15 dBA exterior-to-interior reduction, which is typical for standard residential construction with windows open, sleep disturbance may result when exterior noise levels exceed 50 dBA L_{eq} for steady noises and 60 dBA L_{eq} for fluctuating noises. Standard hotel construction, which assumes windows to be shut, would result in an exterior-to-interior reduction ranging from 20 to 25 dBA. At the exterior building façades of the nearby hotel, sleep disturbance may occur at levels exceeding 55 dBA L_{eq} for steady noises and 65 dBA L_{eq} for fluctuating noises. The nighttime criterion of 45 dBA $L_{eq,}$ or the ambient where existing nighttime noise levels exceed the threshold, would be a more conservative threshold when considering the potential for sleep disturbance.

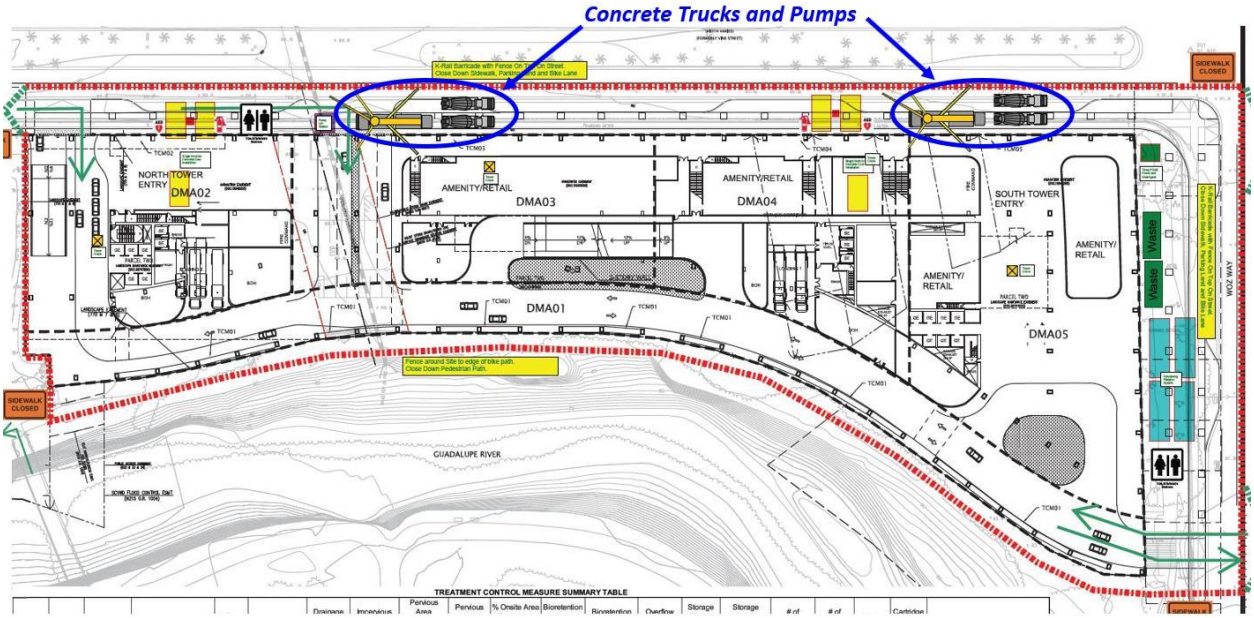
Existing ambient noise levels during nighttime hours at LT-1 ranged from 58 to 69 dBA L_{eq} (average of 63 dBA L_{eq}). The residences located southeast of the South Almaden Avenue/Balbach Street intersection would be set back from South Almaden Boulevard by 300 feet or more, as measured from the centerline of the roadway. At these setbacks and with partial shielding from the first row of buildings, the ambient noise environment would be about 10 dBA lower than LT-1 during nighttime hours, which would be an average of 53 dBA L_{eq}. Since the noise-sensitive receptors located in the project vicinity are currently exposed to nighttime noise levels greater than 45 dBA L_{eq}, construction noise levels that are below ambient levels would be unlikely to cause sleep disturbance. In consideration of ambient levels, this analysis uses a nighttime construction noise level limit criterion of 45 dBA L_{eq} or the existing ambient nighttime noise level, whichever is greater. For the residences south of Woz Way and the hotel northeast of the project site, a nighttime limit of 63 dBA L_{eq} is used in this analysis, while a nighttime threshold of 53 dBA L_{eq} is used for the residences southeast of the South Almaden Avenue/Balbach Street intersection. The

nearby office buildings and museum would not be impacted by nighttime construction since operational hours of these buildings would occur during daytime hours only.

Nighttime construction activities would include concrete pouring only, which would include concrete trucks and pumps. Based on the nature of concrete pouring and the type of equipment to be used, it is assumed that all noise-generating activities from the equipment would occur on the ground level during each year of nighttime construction work. FHWA's RCNM was used to calculate the hourly average noise levels for nighttime concrete pouring. As stated in Table 7 above, 1,981 total trucks are expected during the Foundations phase during nighttime hours. However, not all these trucks would be operating at the same time on the site. Assuming up to five trucks and two pumps would represent the worst-case conditions, an hourly average noise level of 83 dBA L_{eq} would be generated during nighttime work, as measured at a distance of 50 feet. Reducing the number of trucks to three would reduce the hourly average noise level by 1 dBA.

The location of the concrete trucks and pumps are shown in Figure 6. The equipment would be located on the curbside of South Almaden Boulevard.

FIGURE 6 Location of Concrete Trucks and Pumps



The residences south of Woz Way would have direct line-of-sight to the construction site. The concrete trucks and pumps used during nighttime construction, as identified in Figure 6, would be set back approximately 210 to 610 feet from the nearest residential building façade to the south. Assuming five concrete trucks and two pumps and no shielding from the intervening buildings, hourly average noise levels would range from 61 to 71 dBA L_{eq} at the nearest residential façade, depending on the on-site location of the concrete pouring. The ambient noise levels would potentially be exceeded by up to 8 dBA L_{eq} when concrete pouring occurs along the southern boundary of the project site. If concrete trucks and pumps were positioned along the curbside of Woz Way, the nearest residential building façade would be approximately 75 feet from the equipment. At 75 feet, nighttime construction work would be up to 80 dBA L_{eq}. The ambient noise

levels would potentially be exceeded by up to 17 dBA L_{eq} when concrete pouring occurs along Woz Way.

The second row of residences would be approximately 265 to 665 feet from the nighttime work when equipment is located along the curbside of South Almaden Boulevard. These residences would be partially shielded from nighttime construction activities by the first row of residences, which would provide about a 5 dBA L_{eq} reduction in noise levels. Assuming five concrete trucks and two concrete pumps, hourly average noise levels due to nighttime construction activities would range from 56 to 64 dBA L_{eq}, depending on the location of the construction work along South Almaden Boulevard. The ambient noise levels would potentially be exceeded by up to 1 dBA L_{eq} when concrete pouring occurs along the eastern boundary of the project site. If concrete trucks and pumps were positioned along the curbside of Woz Way, the nearest residential building façade in the second row of buildings would be approximately 130 feet from the equipment. At 130 feet, nighttime construction work would be up to 70 dBA L_{eq}, assuming a conservative 5 dBA L_{eq} reduction. The ambient noise levels would potentially be exceeded by up to 7 dBA L_{eq} when concrete pouring occurs along Woz Way.

The nearest Hilton Hotel façade would be 815 to 950 feet from the South Almaden Boulevard locations identified in Figure 6, which would expose the occupants to exterior construction noise ranging from 58 to 59 dBA L_{eq}, assuming five concrete trucks and two pumps and no shielding effects. The ambient noise levels are not expected to be exceeded during nighttime hours.

The residences located southeast of the South Almaden Avenue/Balbach Street intersection would be 450 to 720 feet from the identified locations of concrete pumping equipment shown in Figure 6. The intervening buildings along South Almaden Boulevard would mostly shield the residences during construction. Assuming a conservative noise level reduction of 10 dBA for the intervening buildings, hourly average noise levels during nighttime concrete pouring would range from 50 to 54 dBA L_{eq} when five concrete trucks and two pumps are operational. This would exceed 53 dBA L_{eq} by up to 1 dBA L_{eq}. If concrete trucks and pumps were positioned along the curbside of Woz Way, the nearest residential building façade would be approximately 435 feet from the equipment, with less shielding from intervening buildings. Assuming partial shielding of up to 5 dBA, nighttime construction work would be up to 59 dBA L_{eq}. The ambient noise levels would potentially be exceeded by up to 6 dBA L_{eq} when concrete pouring occurs along Woz Way.

Even with the implementation of measures included in the *Downtown San José Strategy Plan 2040 EIR* and Policy EC-1.7 of the City's General Plan, nighttime construction activities would potentially result in a significant impact at the single-family residences south and southeast of the project site.

Mitigation Measure 1b:

San José requires the issuance of a Development Permit for construction occurring outside of the allowable hours of 7:00 a.m. to 7:00 p.m., Monday through Friday within 500 feet of existing residential land uses. Concrete pouring is proposed during nighttime hours for up to 12 days each year during the 4-year duration of project construction. The following measures would reduce nighttime noise impacts at nearby noise-sensitive residences to a less-than-significant level:

- Limit the active equipment to as few pieces of equipment as possible.

- To the extent consistent with applicable regulations and safety considerations, operation of back-up beepers shall be avoided near sensitive receptors during nighttime hours, and/or the work sites shall be arranged in a way that avoids the need for any reverse motions of trucks or the sounding of any reverse motion alarms during nighttime work. If these measures are not feasible, equipment and trucks operating during the nighttime hours with reverse motion alarms must be outfitted with SAE J994 Class D alarms (ambient-adjusting, or "smart alarms" that automatically adjust the alarm to 5 dBA above the ambient near the operating equipment).

- Limit nighttime concrete pouring to the northernmost equipment location shown in Figure 6 or a minimum distance of 270 feet from the southern and northern boundaries, where feasible. Restrict concrete trucks and pumps along Woz Way during all nighttime activities.

- If nighttime construction noise continues to result in excessive disruption to nearby neighbors, implement a construction noise monitoring plan, which includes a provision for noise monitoring at the nearby receptors to confirm that nighttime construction noise levels meet nighttime noise level thresholds at the single-family residential land uses and the nearby hotel. Construction monitoring shall occur for the first two days of construction for period of nighttime construction work to demonstrate that the nighttime construction activities are compliant with the construction noise level thresholds (63 dBA L_{eq} exterior noise level at the first-row of south residences and hotel and 53 dBA L_{eq} at the southeast residences). These thresholds are based on existing ambient conditions. Additional noise monitoring shall be completed on a more frequent basis if needed, in response to complaints. In the event of noise complaints, the contractor will provide information to client within 48 hours of being notified of the complaint, regarding the noise levels measured and activities that correspond to the complaints, as well as the proposed changes at the site to reduce the noise levels to below the thresholds.

- Sensitive residential receptors identified by the noise-monitoring with the potential to be exposed to nighttime construction noise levels exceeding 63 dBA L_{eq} at the southern residences or 53 dBA L_{eq} at the southeastern residences, shall be provided with vouchers for alternate accommodations for the duration of the nighttime construction.

- Residences or other noise-sensitive land uses within 500 feet of construction sites should be notified of the nighttime construction schedule, in writing, prior to the beginning of construction. This notification shall specify the dates for all nighttime construction. Designate a "construction liaison" that would be responsible for responding to any local complaints about nighttime construction noise. The liaison would determine the cause of the noise complaints (e.g., starting too early, bad muffler, etc.) and institute reasonable measures to correct the problem. Conspicuously post a telephone number for the liaison at the construction site.

Implementation of the above measures, as well as all measures included in the *Downtown San José Strategy Plan 2040 EIR* and Policy EC-1.7 of the City's General Plan, would reduce nighttime

construction noise levels emanating to existing nighttime ambient noise conditions, and with the inclusion of hotel vouchers with continued complaints, the disruption and annoyance to the surrounding noise-sensitive receptors would be reduced to a less-than-significant level.

Impact 1c: **Permanent Noise Level Increase.** The proposed project is not expected to cause a substantial permanent noise level increase at the existing residential land uses in the project vicinity. **This is a less-than-significant impact.**

According to Policy EC-1.2 of the City's General Plan, a significant permanent noise increase would occur if the project would increase noise levels at noise-sensitive receptors by 3 dBA DNL or more where ambient noise levels exceed the "normally acceptable" noise level standard. Where ambient noise levels are at or below the "normally acceptable" noise level standard, noise level increases of 5 dBA DNL or more would be considered significant. The City's General Plan defines the "normally acceptable" outdoor noise level standard for the residential land uses to be 60 dBA DNL. Existing ambient levels, based on the measurements made in the project vicinity, exceed 60 dBA DNL. Therefore, a significant impact would occur if traffic due to the proposed project would permanently increase ambient levels by 3 dBA DNL. For reference, a 3 dBA DNL noise increase would be expected if the project would double existing traffic volumes along a roadway.

The traffic study included peak hour turning movements for the existing traffic volumes at 11 intersections in the vicinity of the project site. The traffic study also included peak hour project trips, which when added to the existing volumes provided existing plus project peak hour turning movements. By comparing the existing plus project traffic scenario to the existing scenario, the project's contribution to the overall noise level increase was determined to be 2 dBA DNL or less along each roadway segment in the project vicinity. Therefore, the project would not result in a permanent noise increase of 3 dBA DNL or more at noise-sensitive receptors in the project vicinity. This is a less-than-significant impact.

Mitigation Measure 1c: **None required.**

Impact 1d: **Noise Levels in Excess of Standards.** The proposed project could generate noise in excess of standards established in the City's General Plan at the nearby sensitive receptors. The incorporation of mitigation measures to reduce operational noise levels as project conditions of approval would result in a **less-than-significant** noise impact.

Mechanical Equipment Noise

Under the City's Noise Element, noise levels from building equipment shall not exceed a noise level of 55 dBA DNL at receiving noise-sensitive land uses. Noise-sensitive receptors surrounding the site would include existing residences to the south of the site, opposite Woz Way; an office building adjoining the site to the north; and a museum to the west, opposite Guadalupe River.

Various mechanical equipment for heating, ventilation, and cooling purposes, exhaust fans, emergency generators, and other similar equipment could produce noise levels exceeding ambient levels when located near existing or proposed land uses. The site plans show back of house

operation, primary switchgear, pump, service, and substation rooms in the below-grade levels. The ground level shows emergency electrical, emergency generator, and additional back of house operations rooms. Levels 2 through 15 each show electrical rooms; and Level 16 is identified as a mechanical penthouse, which would include electrical rooms, cooling towers, and solar panels.

Most of the equipment rooms and all of the below-grade equipment rooms shown in the site plan would be located on the interior of the building, with the proposed building providing adequate shielding from the surrounding land uses. Due to the height of this penthouse level, noise levels due to equipment on these levels would not be expected to exceed 55 dBA DNL at the surrounding land uses. The emergency generators, however, would be located on the level one in rooms along the exterior of the buildings. In the north tower, the generator room would be located along the western building façade, approximately 130 feet from the property line shared with the office building and approximately 200 feet from the museum's property line. In the south tower, the generator room is located along the western building façade, approximately 295 feet from the nearest residential property line and approximately 215 feet from the museum's property line. There would also be an emergency generator room located along the eastern building façade in the center of the project site. This generator room would be adequately shielded from all surrounding noise-sensitive uses.

At the time of this study, specific equipment, quantity of each piece of equipment, and any noise-suppressing features such as enclosures, mufflers, etc., were not available. A 1500 kW emergency generator and possibly 750 kW generators have been identified for the proposed project. Assuming worst-case scenario conditions, the 1500 kW generator could potentially be located in any of the rooms nearest the surrounding buildings. Each of these worst-case scenarios are considered here. Generators of this size would typically generate noise levels up to 89 dBA at a distance of 50 feet. With the inclusion of sufficient noise control features, 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 55 dBA DNL threshold would not apply during emergency conditions when the generators may run continuously during daytime and nighttime hours. During the testing periods when the threshold would apply, noise levels due to generator operation would be below 50 dBA DNL at the surrounding noise-sensitive receptors.

It is expected that mechanical equipment noise for the proposed project would meet the City's applicable noise limits. However, during final design of the mechanical systems, the noise levels from the emergency generators should be examined once specific equipment has been selected to ensure compliance with the City's 55 dBA DNL threshold.

For noise-generating land uses, the *Downtown San José Strategy Plan 2040 EIR* states the following:

> The implementation of General Plan Policies EC-1.2, EC-1.3, and EC-1.9 would reduce potential impacts associated with new noise-producing land uses facilitated by the plan to a less-than-significant level. Policy EC-1.2 limits noise generation by requiring use of noise attenuation measures, such as acoustical enclosures and sound barriers, where feasible, to avoid substantial increases to ambient noise. General Plan Policy EC-1.3 would be

implemented and would require new projects to mitigate noise generation to 55 dBA DNL at the property line. Lastly, General Plan Policy EC-1.9 would be implemented and would require that studies be conducted to mitigate loud intermittent noise sources associated with new projects.

For the proposed project, mechanical equipment shall be selected and designed to reduce impacts on surrounding uses to meet the City's 55 dBA DNL requirement prior to the issuance of building permits. A qualified acoustical consultant shall be retained by the project applicant to review mechanical noise as the equipment systems are selected in order to determine specific noise reduction measures necessary to reduce noise to comply with the City's noise limit at the shared property lines. Noise reduction measures could include, but are not limited to, selection of equipment that emits low noise levels and/or installation of noise barriers, such as mechanical equipment screens or enclosures. This would satisfy the *Downtown San José Strategy Plan 2040 EIR* requirements, and with the implementation of this mitigation measures as a project condition of approval, this is a less-than-significant impact.

Truck Loading and Unloading

The site plan shows loading areas at both buildings on the second below-grade parking level. Therefore, noise due to loading and unloading activities would be shielded from the surrounding noise-sensitive receptors. However, the heavy trucks would use ground-level driveways to access the below-grade parking garage. Three ramps are shown on the site plan: one along the northern boundary of the project site from South Almaden Boulevard, another from South Almaden Boulevard towards the center of the site, and the final one located in the southwestern corner from Woz Way. While delivery pickup times and frequency of these events were not provided at the time of this study, it is assumed that these activities, including maintenance activities would occur during daytime hours.

The centerline of the access driveway nearest to the office building would be approximately 65 feet from the property line of the office building and 200 feet or more from the property line of the museum. The centerline of the southernmost driveway would be 125 feet from the nearest residence property line and approximately 200 feet from the museum property line. Typically, trucks would travel at speeds of 5 to 10 mph along these access driveways. At a distance of 35 feet from the centerline of the driveway, a heavy truck pass-by would generate noise levels ranging from 68 to 70 dBA and would last for less than 5 minutes.

Assuming up to 2 deliveries per day at each tower, the adjacent office building would be exposed to noise due to truck deliveries of 54 dBA DNL under worst-case scenario, while the nearest residences and the museum would be exposed to truck delivery noise below 50 dBA DNL under worst-case scenario.

Truck deliveries occurring at the proposed project site are not expected to generate levels exceeding 55 dBA DNL or existing ambient conditions at the nearby noise-sensitive land uses. This would be a less-than-significant impact.

Mitigation Measure 1d: No further mitigation required.

Impact 2: **Exposure to Excessive Groundborne Vibration due to Construction.** Construction-related vibration levels resulting from activities are not expected to exceed 0.2 in/sec PPV at the surrounding sensitive land uses. **This is a less-than-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 preparation work, foundation work, and new building framing and finishing. While a list of construction equipment was not available for the proposed project, pile driving equipment, which can cause excessive vibration, is not expected to be required for the proposed project.

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. Based on the inventory of historically documented buildings in the City of San José,[2] no historical structures are located within 200 feet of the project site. Therefore, a significant impact would occur if any of the surrounding buildings would be exposed to vibration levels exceeding 0.2 in/sec PPV.

Table 8 presents typical vibration levels that could be expected from construction equipment at a distance of 25 feet. 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 generate substantial vibration in the immediate vicinity. Jackhammers typically generate vibration levels of 0.035 in/sec PPV, and drilling typically generates vibration levels of 0.09 in/sec PPV at a distance of 25 feet. Vibration levels would vary depending on soil conditions, construction methods, and equipment used.

Worst-case scenario vibration levels were calculated at the nearest building façades surrounding the site, as measured from project's boundaries. The potential vibration levels for each piece of equipment at the surrounding receptors is also summarized in Table 8. The nearest existing building to the project site would be the office building to the north. Located approximately 45 feet from the project's boundary, the worst-case vibration levels at this structure would be 0.110 in/sec PPV. All other surrounding buildings would be subject to vibration levels at or below 0.055 in/sec PPV.

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.

[2] http://www.sanjoseca.gov/DocumentCenter/View/35475

Since vibration levels are expected to be below 0.2 in/sec PPV at all surrounding building façades during project construction and no historical buildings are located within 200 feet of the project site, this would be a less-than-significant impact.

Mitigation Measure 2: **None required.**

TABLE 8 Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft. (in/sec)	Vibration Levels at Nearest Surrounding Building Façades (in/sec PPV)				
			Adjacent Office Building (45 feet)	Convention Center (115 feet)	Office Building (150 feet)	Residences (85 feet)	Museum (250 feet)
Clam shovel drop		0.202	0.106	0.038	0.028	0.053	0.016
Hydromill (slurry wall)	in soil	0.008	0.004	0.001	0.001	0.002	0.001
	in rock	0.017	0.009	0.003	0.002	0.004	0.001
Vibratory Roller		0.210	0.110	0.039	0.029	0.055	0.017
Hoe Ram		0.089	0.047	0.017	0.012	0.023	0.007
Large bulldozer		0.089	0.047	0.017	0.012	0.023	0.007
Caisson drilling		0.089	0.047	0.017	0.012	0.023	0.007
Loaded trucks		0.076	0.040	0.014	0.011	0.020	0.006
Jackhammer		0.035	0.018	0.007	0.005	0.009	0.003
Small bulldozer		0.003	0.002	0.001	0.0004	0.001	0.0002

Source: Transit Noise and Vibration Impact Assessment, United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, May 2006, as modified by Illingworth & Rodkin, Inc., June 2019.

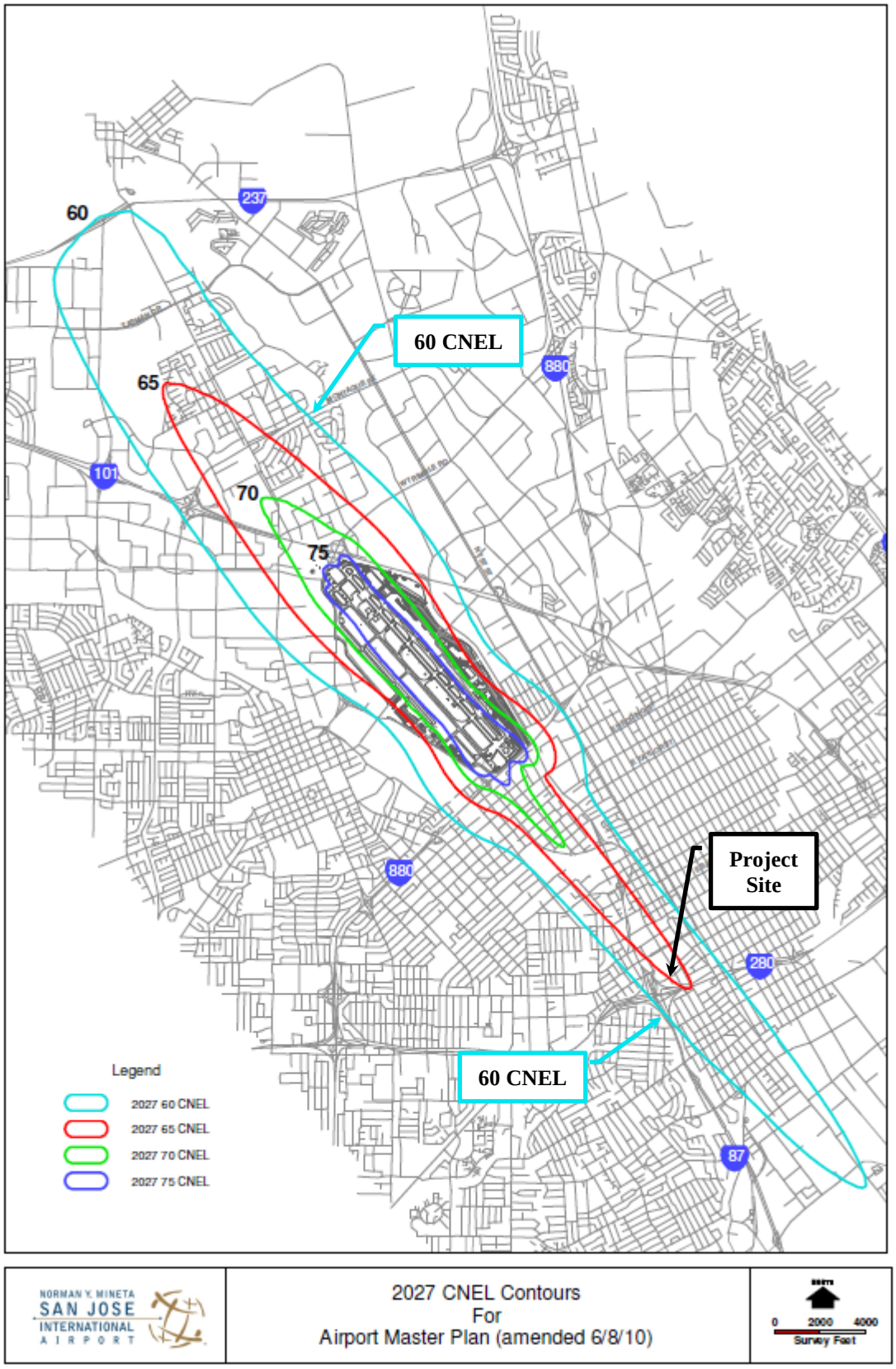
Impact 3: **Excessive Aircraft Noise.** The project site is located more than two miles from a public airport or public use airport and would not expose people residing or working in the project area to excessive aircraft noise levels with the implementation of forced-air mechanical ventilation. **This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

Norman Y. Mineta San José International Airport is a public-use airport located approximately 2.1 miles northwest of the project site. The project site lies near the 65 dBA CNEL 2027 noise contour for the airport, according to the Norman Y. Mineta San José International Airport Master Plan Update Project[3] report published in February 2010 as an addendum to the Environmental Impact Report (see Figure 7). This means that future exterior noise levels due to aircraft from Norman Y. Mineta San José International Airport would be about 65 dBA CNEL/DNL at the project site. 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. This would be a less-than-significant impact.

Mitigation Measure 3: **None required.**

[3] City of San José, "Norman Y. Mineta San José International Airport Master Plan Update Project: Eighth Addendum to the Environmental Impact Report," City of San José Public Project File No. PP 10-024, February 10, 2010.

FIGURE 7 2027 CNEL Noise Contours for SJIA Relative to Project Site



Cumulative Impacts

Cumulative noise impacts would include temporary construction noise from cumulative construction projects. Cumulative traffic noise increases due to the proposed project was studied in the *Downtown San José Strategy Plan 2040 EIR.* Therefore, no further cumulative traffic noise increases would occur due to the proposed project.

Approved temporary construction projects in the vicinity of the project site include the following:

- **Museum Place and 200 Park Avenue Office** – the Museum Place project site is located at 180 Park Avenue, which is adjacent to the 200 Park Avenue Office site. These sites are approximately 700 to 785 feet northeast of the Almaden Office site. While 200 Park Avenue Office is currently under construction, modifications to the original project for Museum Place are currently under review, and it is assumed that construction for this project would begin in sometime in 2020. Considering these are both high-rise tower projects, construction for both projects would occur simultaneously with Almaden Office. In addition to the Hilton Hotel identified as a receptor in the Almaden Office report, two other hotels adjoin the Park Avenue project sites. Due to the size of the construction projects and the close proximity of noise-sensitive receptors, occupants of the hotels would be subject to excessive construction noise from all three project sites for an extended period of time. With the inclusion of the respective mitigation measures of all three projects, as well as those included in the *Downtown San José Strategy Plan 2040 EIR*, noise impacts due to cumulative construction would be reduced, but considering the size of each project and the length of time each construction project would take, this would be a significant and unavoidable cumulative noise impact for the receptors in the immediate vicinity.

Pending temporary construction projects in the vicinity of the project site include the following:

- **City View** – this project is located in the northeast corner of the Almaden Boulevard/Park Avenue intersection. While this project site would be more than 900 feet north of the Almaden Office project site, it is located opposite Park Avenue from the Museum Place and 200 Park Avenue Office sites. City View would include the construction of three 19-story buildings for commercial and office use. This project is expected to start in 2020 and would include 24-hour construction activities. This construction noise would add to the disruption of the same three hotels discussed above. This would be a significant and unavoidable cumulative noise impact for the receptors in the immediate vicinity.

- **Balbach Affordable Housing** – this project is located in the southeast corner of the Balbach Street/South Almaden Boulevard intersection. This project site would be opposite the intersection from the project site and located within 200 feet of the Almaden Office boundary. This project is an 8-story building with 87 residential units; however, there is no currently information regarding the construction schedule for this project, which is why these residents would not be considered receptors for Almaden Office. Potentially, the Balbach Affordable Housing project and Almaden Office project could have an overlapping period of construction or could be constructed consecutively, considering the 4.5-year schedule for Almaden Office. The residences south of Woz Way and southeast of

the Almaden Avenue/Balbach Street intersection would be exposed to direct construction activity from both of these sites. With the inclusion of Mitigation Measures 1a and 1b in this report and those proposed for Balbach Affordable Housing, as well as the mitigation measures included in the *Downtown San José Strategy Plan 2040 EIR*, noise impacts due to cumulative construction would be reduced, but considering the length of time each construction project would take, this would be a significant and unavoidable cumulative noise impact for the receptors in the immediate vicinity.

All other approved and pending development projects in the downtown area would be located more than 900 feet from the project site and would not share impacted receptors with the proposed project. No further cumulative impacts would be expected.

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Michael S. Thill has 21 years of professional experience with environmental acoustics. Mr. Thill's expertise lies in conducting field research, analyzing data, and noise modeling. He has conducted numerous field surveys in a variety of noise environments and has authored technical noise reports for residential projects, mixed-use projects, commercial projects, transportation projects, educational facilities, redevelopment projects, and office and industrial developments. Mr. Thill is proficient with use of FHWA's traffic noise prediction model (TNM) and is familiar with the procedures for preparing highway noise impact studies presented in Caltran's *Traffic Noise Analysis Protocol* and the *Technical Noise Supplement* (TENS). He received a BS degree in Environmental Science from the University of California at Santa Barbara.

Carrie J. Janello has over 11 years of acoustics experience as a consultant at Illingworth & Rodkin and has been responsible for acquiring and analyzing wayside traffic noise data and tire/pavement noise using the sound intensity technique for both the California Department of Transportation (Caltrans) and the Arizona Department of Transportation (ADOT). Ms. Janello has conducted field surveys for a variety of noise and vibration projects, including underwater hydroacoustic measurements during pile driving activities, and has authored technical noise reports for residential and commercial projects, roadway projects, wineries, car washes, area plans, and data centers. Ms. Janello has extensive experience with FHWA's traffic noise prediction model (TNM) and SoundPLAN modeling software. She graduated with her BS and MS degrees in Mechanical Engineering from the Ohio State University in 2004 and 2005, respectively. Her background is in Acoustics, Vibrations, Digital Signal Processing (DSP), Systems Dynamics, and Automotive Noise, Vibrational, and Harshness (NVH), with emphasis in Powertrain Systems.