PARK HABITAT PROJECT NIGHTTIME CONSTRUCTION NOISE ASSESSMENT

San José, California

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Prepared for:

Fiona Phung
David J. Powers & Associates, Inc.
1871 The Alameda, Suite 200
San José, CA 95126

Prepared by:

Carrie J. Janello
Michael S. Thill

ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality
429 East Cotati Avenue
Cotati, CA 94931
(707) 794-0400

Job No.: 16-051

INTRODUCTION

The project proposes to develop a 21-story mixed-use building at 180 Park Avenue in San José, California. The proposed building would include 1,191,895 square feet of office space, 61,521 square feet of tech museum expansion space, 14,661 square feet of retail space, 11,596 square feet of gym space, and 320,014 square feet of parking garage.

The report summarizes the analysis of nighttime construction noise and is divided into two sections: 1) the Setting Section provides a brief description of the fundamentals of environmental noise, summarizes applicable regulatory criteria, and provides a summary of noise measurements made in the project vicinity that are used to represent existing ambient conditions at nearby receptors; and 2) the Nighttime Construction Noise Analysis Section discusses the predicted construction noise levels generated using SoundPLAN version 8.2, compares the predicted levels to applicable regulations established by the City of San José, and presents mitigation measures, where necessary, to reduce impacts at surrounding noise-sensitive land uses to a less than significant level.

SETTING

Fundamentals of Environmental Noise

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

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

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level (dBA).* This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

This *energy-equivalent sound/noise descriptor* is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

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

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

Effects of Noise

Sleep and Speech Interference

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

Annoyance

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

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, November 2009.

Regulatory Background

The proposed project would be subject to noise-related regulations, plans, and policies established within documents prepared by the City of San José. These documents are implemented during the environmental review process to limit noise exposure at existing noise-sensitive land uses. Applicable planning documents include the City of San José General Plan and Municipal Code.

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-1.7 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.

Existing Noise Environment

The project site fronts Park Avenue in the center of the block between South Almaden Boulevard and South Market Street in the downtown area of San José, California. The site is surrounded by commercial uses, including the Tech Museum of Innovation located east of the site, the City National Civic Center located south of the site, and the Hyatt Hotel located west of the site. Restaurant, office, and parking uses are located across Park Avenue.

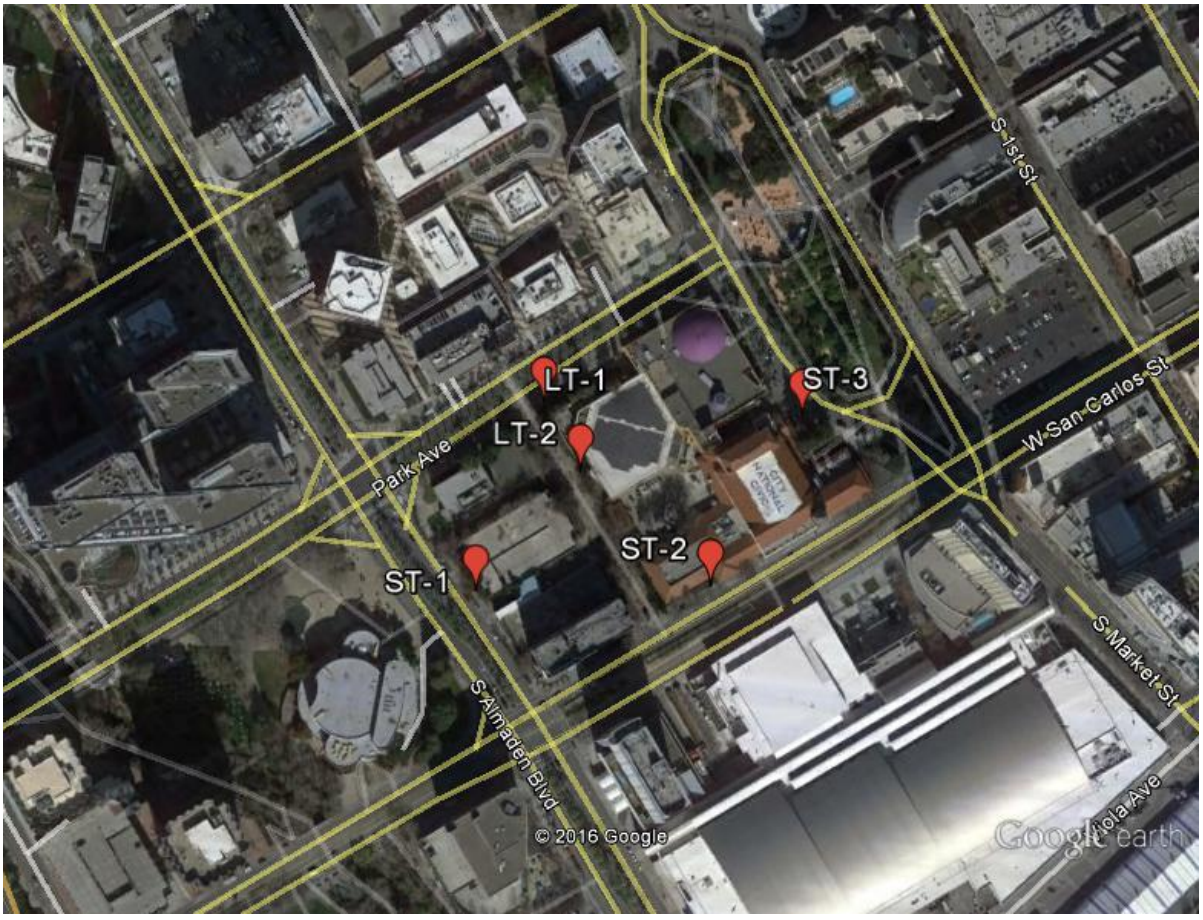
A noise monitoring survey was performed in the vicinity of the project site beginning on Tuesday, March 8, 2016 and concluding on Thursday, March 10, 2016. The noise environment at the site and in the surrounding areas results primarily from vehicular traffic along the local roadways. Intermittent overhead aircraft associated with the Mineta San José International Airport also affect the noise environment at the site. During attended measurements at the site, approximately 4 to 5 jets flew over the site every 10-minutes, generating maximum noise levels in the range of 73 to 83 dBA L_{max}. Two Santa Clara Valley Transportation Authority (VTA) light rail train (LRT) routes run along East San Carlos Street, with trains running frequently between the hours of 4:30 am and 12:30 am daily. LRT bell soundings occur as the trains exit the stop located on San Carlos Street,

east of Almaden Boulevard. The monitoring survey included two long-term noise measurements and three short-term measurements, as shown in Figure 1. Table 3 summarizes the results of the short-term measurements. The results of the long-term noise measurements are shown in Appendix A.

Long-term noise measurement LT-1 was made at a distance of about 55 feet from the center of Park Avenue. The primary noise source at this location is traffic along Park Avenue, with occasional noises generated by aircraft overflights. Hourly average noise levels ranged from 63 to 73 dBA L_{eq} at this location during daytime hours, and from 54 to 68 dBA L_{eq} at night. The day-night average noise level on Wednesday, March 9, 2016 was 68 dBA DNL. Maximum noise levels intermittently reached 90 to 93 dBA L_{max}, with daytime maximum levels typically in the range of 75 to 85 dBA L_{max}.

LT-2 was measured west of Parkside Hall, about 225 feet south of the center of Park Avenue. The primary noise sources at this location were traffic on the surrounding roadways and intermittent jet overflights. Hourly average noise levels at this location ranged from 60 to 67 dBA L_{eq} during the day and from 50 to 65 dBA L_{eq} at night. The day-night average noise level on Wednesday, March 9, 2016 was 66 dBA DNL. Maximum noise levels intermittently reached 86 to 89 dBA L_{max}, with daytime maximum levels typically in the range of 75 to 85 dBA L_{max}.

FIGURE 1 Noise Measurement Locations



Source: Google Earth, 2021.

TABLE 3 Summary of Short-Term Noise Measurement Data

Noise Measurement Location	Measured Noise Levels, dBA					Primary Noise Source
	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{eq}	
ST-1: 75 feet east of center of Almaden Boulevard (3/10/2016, 9:50 am - 10:00 am)	78	71	64	60	68	Traffic on Almaden Blvd, Jets (5)
ST-2: 75 feet north of center of San Carlos Street (3/10/2016, 10:10 am - 10:20 am)	81	74	66	59	71	Traffic on San Carlos St, Jets (4), LRT (3)
ST-3: 75 feet west of center of Market Street (3/10/2016, 10:30 am - 10:40 am)	77	70	60	56	65	Traffic on Market St, Jets (4),

CONSTRUCTION NOISE ANALYSIS

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.

The General Plan does not establish noise thresholds for construction activities. 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. 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 hotels, sleep disturbance may occur at levels exceeding 55 dBA L_{eq} for steady noises and 65 dBA L_{eq} for fluctuating noises.

Existing ambient noise levels in the project vicinity range from 50 to 68 dBA L_{eq} at night. Therefore, to protect occupants of existing noise-sensitive land uses during sleeping hours between 10:00 p.m. and 7:00 a.m., construction noise levels shall not exceed typical ambient conditions.

Figure 2 shows a 500-foot radius around the project site and highlights in blue the noise-sensitive receptors falling within the 500-foot radius, which includes the following:

- Hyatt Place San José/Downtown hotel (Hyatt) in the northeast corner of the West San Carlos Street and Almaden Boulevard intersection – nearest building façade where overnight occupants would be sleeping is approximately 280 feet from the center of the proposed project site;

- Hilton San José hotel (Hilton) in the southeast corner of the West San Carlos Street and Almaden Boulevard intersection – nearest building façade where overnight occupants would be sleeping is approximately 535 feet from the center of the proposed project site; and

- San José Marriott hotel (Marriott) in the southwest corner of the West San Carlos Street and South Market Street intersection – nearest building façade where overnight occupants would be sleeping is approximately 635 feet from the center of the proposed project site.

FIGURE 2 Aerial Image Showing Noise-Sensitive Receptors within 500 feet of the Project Site

Source: Google Earth, 2021.

The Hyatt Place hotel would have direct line-of-sight to construction activities on the project site, while the Hilton and Marriott would be partially shielded by intervening buildings, such as the San José Civic building, the Bowers Institute, and the Hyatt hotel, from construction activities occurring below-grade and occurring on the first three floors of the mixed-use building. However, these hotels would have direct line-of-sight to activities occurring above the third floor.

Construction noise levels vary on a day-to-day basis depending on the type and amount of equipment operating on-site and the specific task that is being completed on a particular day. 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 typically range from about 80 to 90 dBA L_{max} at a distance of 50 feet from the noise source (Table 4). While pile driving was initially studied for this project, drill rigs are planned to be used as an alternative to pile driving, which generates high noise levels. Drill rigs can generate maximum instantaneous noise levels up to 85 dBA L_{max} at 50 feet, reducing noise levels by up to 20 dBA.

Typical hourly average construction-generated noise levels for mixed-use commercial buildings would range from 75 to 89 dBA L_{eq}, as 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 5. The noise levels associated with construction of the commercial building interiors would be substantially less than the noise levels associated with demolition and structural activities. 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.

TABLE 4 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

Equipment Category	L_{max} Level (dBA)[1,2]	Impact/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 5 Hourly Average Noise Levels for Construction Equipment at 50 feet

	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: United States Environmental Protection Agency, 1973, Legal Compilation on Noise, Vol. 1, p. 2-104.

Project construction is expected to start in October 2021 and operational in 2025, lasting a total of 37 months. Construction activities would include demolition, shoring/grading/excavation, below slab utility, foundation/structure, building exterior, and building interior. During each phase of construction, there would be a different mix of equipment operating, and noise levels would vary by phase and vary within phases, based on the amount of equipment in operation and the location at which the equipment is operating. Project construction is expected to occur continuously over a 24-hour period throughout construction. The original noise assessment completed in 2016 included measures to reduce the daytime construction activities to a less-than-significant level. These best management practices are as follows:

- Construction activities shall be limited to the hours between 7:00 am and 7:00 pm, Monday through Friday, unless permission is granted with a development permit or other planning approval. No construction activities are permitted on the weekends at sites within 500 feet of a residence.

- Construct solid plywood fences around ground level construction sites adjacent to operational businesses, hotels, and other noise-sensitive land uses.

- Equip all internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.

- Unnecessary idling of internal combustion engines should be strictly prohibited.

- Locate stationary noise-generating equipment such as air compressors or portable power generators as far as possible from sensitive receptors. Construct temporary noise barriers to screen stationary noise-generating equipment when located near adjoining sensitive land uses. Temporary noise barriers could reduce construction noise levels by 5 dBA.

- Utilize "quiet" air compressors and other stationary noise sources where technology exists.

- Control noise from construction workers' radios to a point where they are not audible at existing residences bordering the project site.

- Notify all adjacent business, residences, and other noise-sensitive land uses of the construction schedule, in writing, and provide a written schedule of "noisy" construction activities to the adjacent land uses and nearby residences.

- A temporary noise control blanket barrier could be erected, if necessary, along building facades facing construction sites. This mitigation would only be necessary if conflicts occurred which were irresolvable by proper scheduling. Noise control blanket barriers can be rented and quickly erected.

- Pre-drill foundation pile holes to minimize the number of impacts required to seat the pile.

- Consider the use of "acoustical blankets" for receptors located within 100 feet of the site during pile driving activities.

- Designate a "disturbance coordinator" who would be responsible for responding to any complaints about construction noise. The disturbance coordinator will determine the cause of the noise complaint (e.g., bad muffler, etc.) and will require that reasonable measures be implemented to correct the problem. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include in it the notice sent to neighbors regarding the construction schedule.

It is assumed that all nighttime construction work shall incorporate these measures, as well. However, due to nighttime construction work occurring during noise-sensitive times of the day when occupants of the nearby hotels would be sleeping, specific equipment and activities expected to occur at night are examined to provide further mitigation, where necessary, to minimize sleep disturbance.

Table 6 summarizes the type, quantity, and usage of each piece of equipment anticipated to be used during each phase of project construction occurring during nighttime hours. Table 6 also

summarizes the estimated worst-case scenario hourly average noise levels estimated during nighttime hours at a distance of 50 feet. 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. Based on the nighttime equipment usage, the range in estimated noise levels shown in Table 6 was calculated by assuming the minimum required equipment operating at night and every piece of equipment operating simultaneously. RCNM includes representative sound levels for the most common types of construction equipment and the approximate usage factors of such equipment that were developed based on an extensive database of information gathered during the construction of the Central Artery/Tunnel Project in Boston, Massachusetts (CA/T Project or "Big Dig"). The usage factors represent the percentage of time that the equipment would be operating at full power.

TABLE 6 Expected Construction Equipment and Usage Per Phase and Estimated Hourly Average Noise Levels During Nighttime Construction

Construction Phase	Time Duration	Construction Equipment (Quantity)	Average Hours Per Night	No. of Workdays	Estimated Nighttime Construction L_{eq} at 50 feet
Demolition	10/11/2021 – 1/20/2022	Excavator (3)	2 hours	20 days	82 dBA
Shoring/ Grading/ Excavation	1/14/2022 – 8/1/2022	Excavator (3) Tractor/Loader/Backhoe (3) Crane – Shoring Operation (2) Shoring Pile Rig (3)	8 hours 8 hours 8 hours 8 hours	200 days 200 days 135 days 65 days	86 to 89 dBA[a]
Below Slab Utility	5/7/2024 – 11/15/2024	Tractor/Loader/Backhoe (2)	6 hours	13 days	83 dBA
Foundation/ Structure	8/2/2022 – 2/16/2024	Tractor/Loader/Backhoe (2) Redi-Mix Truck (6) Concrete Pump (5) Personnel/Material Hoist (2) Crane (3) Welder (2)	4 hours 10 hours 10 hours 10 hours 10 hours 4 hours	185 days 185 days 93 days 370 days 370 days 185 days	78 to 88 dBA[b]
Building – Exterior	8/11/2023 – 5/27/2024	Crane (1) Forklift (4) Generator Set (1) Personnel/Material Hoist (2) Tractor/Loader/Backhoe (1) Welder (4)	6 hours 6 hours 4 hours 4 hours 6 hours 6 hours	290 days 290 days 120 days 235 days 290 days 290 days	83 to 84 dBA[b,c]
Building – Interior (Architectural Coating)	7/26/2023 – 10/16/2024	Air Compressor (2) Aerial Lift (4)	6 hours 6 hours	282 days 352 days	74 to 79 dBA[b,c,d]

[a] Range in noise levels reflects minimum equipment used during nighttime construction of the shoring/grading/excavation phase only and when all equipment would be used simultaneously for this phase and the demolition phase.

[b] Range in noise levels reflects minimum equipment used during nighttime construction and when all equipment would be used simultaneously.

[c] Between 8/11/2023 and 2/16/2024, the Building – Exterior phase would overlap with the Foundation/Structure and Building – Interior phases. With equipment from all three phases operating simultaneously, nighttime construction noise levels would potentially be up to 90 dBA L_{eq}.

[d] Between 2/16/2024 and 5/27/2024, the Building – Interior phase would overlap with the Building – Exterior phase. With equipment from both phases operating simultaneously, nighttime construction noise levels would potentially be up to 86 dBA L_{eq}.

To estimate the nighttime noise levels at the surrounding hotels, the collective noise source levels from Table 6 were positioned at the geometrical center of the project site and propagated to the building façades of the nearby hotels shown in Figure 2. Table 7 summarizes the nighttime construction noise levels at the nearby hotels.

As shown in Table 7, the Marriott would not be exposed to nighttime construction noise levels exceeding ambient conditions. The Hyatt would be exposed to nighttime construction noise levels in excess of ambient conditions during the Shoring/Grading/Excavation, Foundation/Structure, and Building – Exterior phases. Ambient conditions would also be exceeded during the time period when the Building – Interior would overlap with other phases. The Hilton would also be exposed to nighttime construction noise levels in excess of ambient conditions during the overlapping period of the Foundation/Structure and Building – Exterior phases. If overlapping phases can be avoided during nighttime hours, ambient noise conditions would be exceeded by 1 to 6 dBA at the Hyatt and ambient levels would not be exceeded at the Hilton. This would be a significant impact and would require additional mitigation.

TABLE 7 Estimated Nighttime Construction Noise Levels at Nearby Hotels

Construction Phase	Estimated Nighttime Construction Noise Levels					
	Nighttime Ambient Noise Levels = 50 to 68 dBA L_{eq}					
	Hyatt (280ft)		Hilton (535ft)		Marriott (635ft)	
	L_{eq}, dBA	Exceeds Nighttime Ambient?	L_{eq}, dBA	Exceeds Nighttime Ambient?	L_{eq}, dBA	Exceeds Nighttime Ambient?
Demolition	67	No	61	No	59	No
Shoring/ Grading/ Excavation	72 to 74[a]	Yes	66 to 68[a]	No	64 to 67[a]	No
Below Slab Utility	68	No	62	No	61	No
Foundation/ Structure	63 to 73[b]	Yes	58 to 67[b]	No	56 to 66[b]	No
Building – Exterior	68 to 69[b] (up to 74)[c]	Yes	62 to 63[b] (up to 69)[c]	No[b] Yes[c]	61 to 62[b] (up to 67)[c]	No
Building – Interior (Architectural Coating)	59 to 64[b] (up to 70)[d]	No[b] Yes[d]	53 to 58[b] (up to 65)[d]	No	52 to 56[b] (up to 63)[d]	No

[a] Range in noise levels reflects minimum equipment used during nighttime construction of the shoring/grading/excavation phase only and when all equipment would be used simultaneously for this phase and the demolition phase.
[b] Range in noise levels reflects minimum equipment used during nighttime construction and when all equipment would be used simultaneously.
[c] Between 8/11/2023 and 2/16/2024, the Building – Exterior phase would overlap with the Foundation/Structure and Building – Interior phases.
[d] Between 2/16/2024 and 5/27/2024, the Building – Interior phase would overlap with the Building – Exterior phase .

Mitigation Measures to Reduce Nighttime Construction Noise

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 or within 200 feet of existing commercial uses. Mitigation measures, such as erecting a temporary barrier along the perimeter would not be effective for this project, considering

the hotel rooms are located above the ground level and would have direct line-of-sight over any barrier. The measures proposed in the original project included a noise control blanket. This may be required for the Hyatt hotel during nighttime construction, especially during drilling activities. Additionally, the following measures would further reduce noise levels due to nighttime construction activities at the nearby Hyatt and Hilton hotels:

- Limit concrete pouring activities during nighttime hours, where possible.
- Limit the active equipment to no more than three pieces of heavy equipment (e.g., one dozer and two excavators) during nighttime activities, where possible.
- Avoid drilling activities during nighttime hours, where possible.
- Avoid overlapping construction phases at night.
- To the extent consistent with applicable regulations and safety considerations, operation of vehicles requiring use of back-up beepers shall be avoided during nighttime hours and/or, the work sites shall be arranged in a way that avoids the need for any reverse motions of large 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).
- If credible complaints are made from the nearby Hyatt hotel, a temporary "acoustical blanket" may be used along the northern building façade to further reduce nighttime noise levels.

Implementation of the above measures, in addition to the previous measures proposed for daytime construction activities, would reduce construction noise levels emanating from the site by 5 dBA L_{eq}. A 5 dBA L_{eq} reduction would result in construction noise levels during nighttime activities to be at or below 68 dBA L_{eq} at the Hyatt and Hilton hotels under worst-case conditions. The nighttime construction noise impact would be reduced to a less-than-significant level.

Cumulative Nighttime Construction Noise

Cumulative construction noise impacts at night would occur if two projects operating at night during the same time period share one or more noise-sensitive receptors. From the City's website,[1] three planned or approved projects with nighttime work would share receptors with Park Habitat. These projects include the following:

- **Almaden Office** – this project is located in the northwestern corner of the Almaden Boulevard/ Woz Way intersection, approximately 690 feet southwest of the project site. Nighttime construction work would consist of only concrete pouring for up to 12 days a year. Additionally, the noise assessment for this project included measures to reduce the

[1] https://gis.sanjoseca.gov/maps/devprojects/

nighttime construction impact to a less-than-significant level at the Hilton Hotel. Since both Almaden Office and Park Habitat would reduce nighttime construction at the shared receptors to a less-than-significant impact, cumulative construction is therefore not assumed.

- **City View** – this project is located at 150 Almaden Boulevard, north of Park Avenue from the project site and would consist of the entire block. This project has been approved and will include 69 months of 24-hour construction. According to the noise assessment completed for the City View project, nighttime construction for this project would be significant and unavoidable at the Hyatt. While the start date for City View was not included in the noise assessment, it is likely that construction would overlap with Park Habitat.

- **200 Park Avenue –** located at 200 Park Avenue, this project is currently under construction and adjoins the project site to the west. Completion of this construction project will be ongoing through the end of 2022. This project included extended construction hours on Monday through Saturday, 6:00 a.m. to midnight and 24-hour construction for up to eight days to accommodate large concrete pours. The Hyatt adjoins this site to the south and would potentially be exposed to three construction projects occurring during nighttime hours at the same time.

Potentially, 200 Park Avenue, City View, and Park Habitat could have nighttime construction simultaneously. The Hyatt, which is adjoins 200 Park to the south, would potentially be exposed to excessive nighttime construction. During this overlapping period, rooms facing the northern façade may have to remain vacate. This ongoing nighttime work may have an impact on their business, which is a substantial concern. This would result in a significant cumulative construction noise impact even with the incorporation of mitigation measures recommended for each individual project.

To control the noise at the Hyatt during nighttime hours, the following additional measures shall be implemented during the overlapping period of these nighttime construction projects:

- Implement a construction noise monitoring plan, which includes a provision for noise monitoring at the nearby Hyatt hotel to confirm that nighttime construction noise levels meet nighttime noise level thresholds. Construction monitoring shall occur for the first two days of construction for each month to demonstrate that the nighttime construction activities are compliant with the construction noise level thresholds (68 dBA L_{eq} at the exterior building façade and/or 45 dBA L_{eq} within the hotel rooms). These thresholds are based on ambient conditions and thresholds for potential sleep disturbance. Additional noise monitoring shall be completed on a more frequent basis if needed, in response to credible 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.

Once the office building at 200 Park Avenue is complete, the new office building would provide partial shielding from the construction activities at City View. With 200 Park Avenue nighttime

work complete and the new office building providing partial shielding, nighttime construction noise would be reduced at the hotel's northern façade. However, due to changing nighttime activities at the City View and Park Habitat sites, nighttime noise would still potentially be significant at the hotel. The above monitoring plan should still be enforced throughout the remaining overlapping time period between City View and Park Habitat to ensure the impact on the Hyatt hotel would be reduced to the extent feasible.