LOTUS PRESCHOOL AND CR CLASSROOM REPLACEMENT NOISE AND VIBRATION ASSESSMENT

San José, California

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INTRODUCTION

The 1.17-acre existing project site at 639 N. 5th Street is currently developed with an existing two-story classroom building and three, one-story single-family residences. The project proposes to demolish the existing uses and construct a larger school development with a two-story building which would include classrooms, administrative areas, a multipurpose room, a library, a conference room, and storage space. The project would also include a separate one-story storage and workshop building. There are currently 24 students that attend the school, and the implementation of the project would increase the number of students to 36. The ages of the students at the preschool would be two to five years old, although the building would host cub scouts, boy scouts, and girl scouts, religion classes, and language classes for elementary to high school students. The preschool would operate Monday through Friday between the hours of 7:30 a.m. and 5:30 p.m. and would include up to eight full-time employees, two part-time employees, and two volunteers. There would be a total of 53 surface parking spaces provided along the northern and western portion of the site. Construction is proposed to begin in March 2025 and be completed by November 2025.

This report evaluates the project's potential to result in significant environmental noise or vibration impacts with respect to applicable California Environmental Quality Act (CEQA) guidelines. The report is divided into three sections: 1) the Setting Section provides a brief description of the fundamentals of environmental noise, summarizes applicable regulatory criteria, and discusses the results of the ambient noise monitoring survey completed to document existing noise conditions; 2) the General Plan Consistency section discusses land use compatibility utilizing noise-related policies in the City's General Plan; and, 3) the Impacts and Mitigation Measures Section describes the significance criteria used to evaluate operational impacts, provides a discussion of each project impact, and presents measures, where necessary, to mitigate the project's impact 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 the 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 p.m. to 10:00 p.m.) and a 10 dB addition to nocturnal (10:00 p.m. to 7:00 a.m.) noise levels. The *Day/Night Average Sound Level* (*DNL* or L_{dn}) is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Effects of Noise

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noises of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA DNL. Typically, the highest steady traffic noise level during the daytime is about equal to the DNL and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12 to 17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57 to 62 dBA DNL with open windows and 65 to 70 dBA DNL if the windows are closed. Levels of 55 to 60 dBA are common along collector streets and secondary arterials, while 65 to 70

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.

dBA is a typical value for a primary/major arterial. Levels of 75 to 80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed, those facing major roadways and freeways typically need special glass windows.

Annoyance

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

Fundamentals of Groundborne Vibration

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

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

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

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

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

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.

Regulatory Background – Noise

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

Federal Government

Federal Transit Administration. The Federal Transit Administration (FTA) has identified construction noise thresholds in the *Transit Noise and Vibration Impact Assessment Manual*,[1] which limit daytime construction noise to 80 dBA L_{eq} at residential land uses, 85 dBA L_{eq} at commercial and office land uses, and to 90 dBA L_{eq} at industrial land uses.

State of California

State CEQA Guidelines. The California Environmental Quality Act (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;

(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.

2022 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 2022 California Green Building Standards Code (Section 5.507.4.1 and 5.507.4.2). 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 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 when the building falls within the 65 dBA L_{dn} noise contour of a freeway or expressway, railroad, industrial source or fixed-guideway noise source, as determined by the local general plan noise element.

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

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 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.

The performance method, which establishes the acceptable interior noise level, is the method typically used when applying these standards.

2021 California Collaborative for High Performing Schools - Acoustical Performance. The CCHP has established acoustical performance criteria for environmental noise from exterior sources for new construction modernizations.

General performance criteria for background noise:

- In Core Learning Spaces the Exterior-source background A-weighted noise level shall be 40 dBA or less.

For an enhanced rating the following criteria shall be achieved:

- In Core Learning Spaces and spaces designated as Performance Arts Spaces (PAS) or Audio/Video Production Spaces (APS), exterior source background A-weighted noise levels shall be 35 dBA or less.
- In Ancillary Learning Spaces and LAS, exterior-source background A-weighted noise levels shall be 40 dBA or less.

Santa Clara County

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

4.3.2.1 Noise Compatibility Policies

N-1 The Community Noise Equivalent Level (CNEL) method of representing noise levels shall be used to determine if a specific land use is consistent with the CLUP.

N-2 In addition to the other policies herein, the Noise Compatibility Policies presented in Table 4-1 shall be used to determine if a specific land use is consistent with this CLUP.

N-3 Noise impacts shall be evaluated according to the Aircraft Noise Contours presented on Figure 5 (not shown in this report).

N-6 Noise level compatibility standards for other types of land uses shall be applied in the same manner as the above residential noise level criteria. Table 4-1 ((presents acceptable noise levels for other land uses in the vicinity of the Airport.

Table 4 - 1

NOISE COMPATIBILITY POLICIES

LAND USE CATEGORY	CNEL					
	55-60	60-65	65-70	70-75	75-80	80-85
Residential – low density Single-family, duplex, mobile homes	*	**	***	****	****	****
Residential – multi-family, condominiums, townhouses	*	**	***	****	****	****
Transient lodging - motels, hotels	*	*	**	****	****	****
Schools, libraries, indoor religious assemblies, hospitals, nursing homes	*	***	****	****	****	****
Auditoriums, concert halls, amphitheaters	*	***	***	****	****	****
Sports arena, outdoor spectator sports, parking	*	*	*	**	***	****
Playgrounds, neighborhood parks	*	*	***	****	****	****
Golf courses, riding stables, water recreation, cemeteries	*	*	*	**	***	****
Office buildings, business commercial and professional, retail	*	*	**	***	****	****
Industrial, manufacturing, utilities, agriculture	*	*	*	***	***	****
* Generally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements. Mobile homes may not be acceptable in these areas. Some outdoor activities might be adversely affected.					
** Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Outdoor activities may be adversely affected. Residential: Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.					
*** Generally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. Outdoor activities are likely to be adversely affected.					
**** Unacceptable	New construction or development shall not be undertaken.					

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

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

City of San José

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

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

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.

Source: Envision San José 2040 General Plan, Adopted November 1, 2011, As Amended on May 16, 2019.

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-1.7 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 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

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

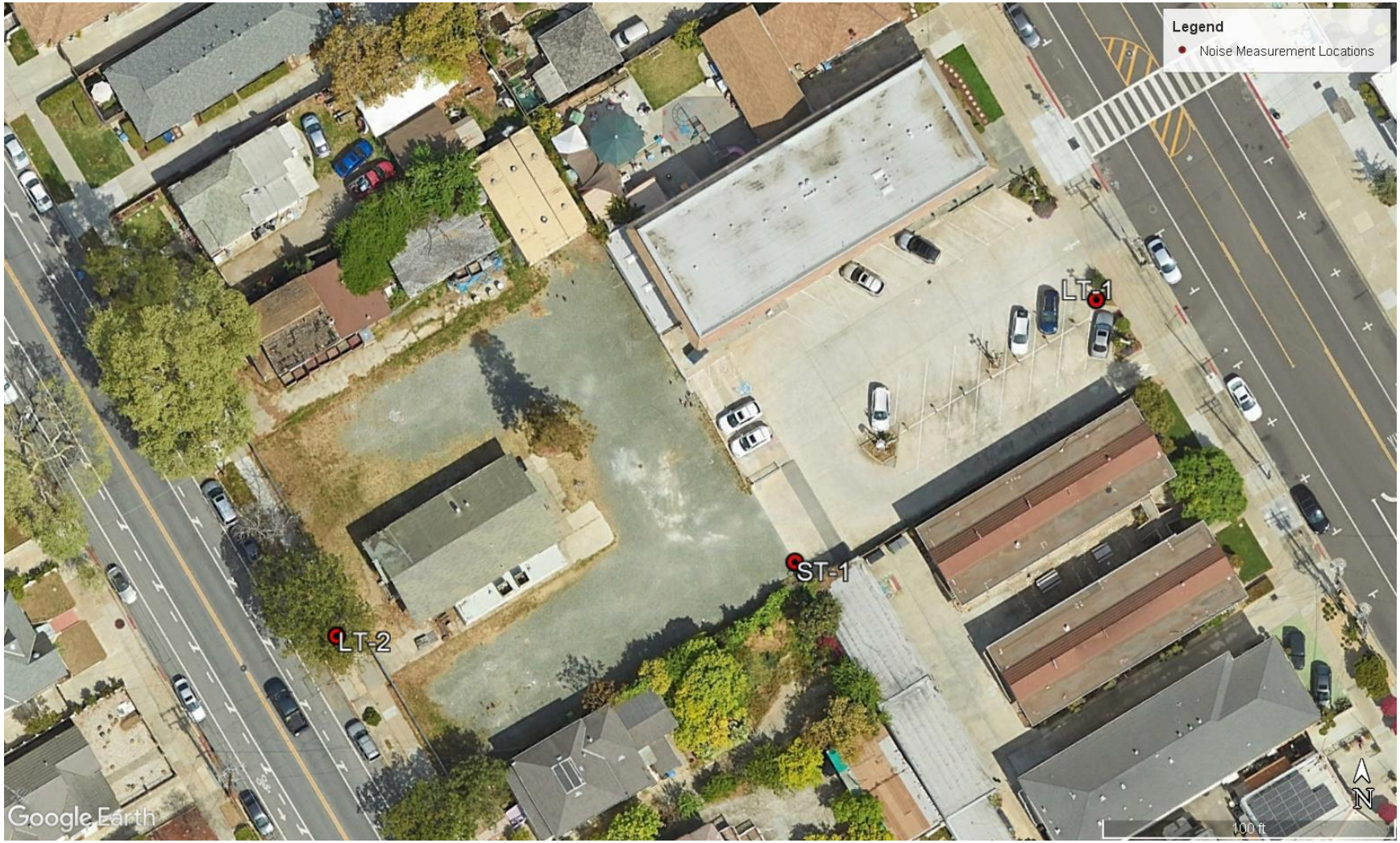
The existing noise environment in the area is comprised primarily of noise produced by local vehicular traffic and aircraft. On-site traffic counts indicate that there is more traffic along North 4th Street than along North 5th Street, resulting in marginally higher noise levels at the southwest boundary of the site as compared to the northeast boundary of the site. Land uses in the vicinity are mostly residential with commercial buildings and churches also located nearby. Figure 1 shows an aerial image of the project site and vicinity and the selected noise measurement locations.

A noise monitoring survey was performed to quantify and characterize ambient noise levels at the site and in the project vicinity between Tuesday, August 29, 2023 and Friday, September 1, 2023. The monitoring survey included two long-term noise measurements (LT-1 and LT-2) and one short-term measurement (ST-1).

Long-term noise measurement LT-1 was located along the northeast boundary of the site, approximately 50 feet from the centerline of North 5th Street. This location was selected to quantify noise levels at the portion of the site closest to North 5th Street, as well as at other nearby land uses along North 5th Street. Hourly average noise levels at this location ranged from 53 to 70 dBA L_{eq} during the day and from 47 to 63 dBA L_{eq} at night. The day-night average noise level was 60 dBA DNL on Wednesday, August 30, 2023, and 61 dBA DNL on Thursday, August 31, 2023.

Long-term noise measurement LT-2 was located along the southwest boundary of the site, approximately 35 feet from the centerline of North 4th Street. This location was selected to quantify noise levels at the portion of the site closest to North 4th Street, as well as at other nearby land uses along North 4th Street. Hourly average noise levels at this location ranged from 59 to 65 dBA L_{eq} during the day and from 52 to 64 dBA L_{eq} at night. The day-night average noise level was 66 dBA DNL on Wednesday, August 30, 2023, and 65 dBA DNL on Thursday, August 31, 2023.

FIGURE 1 Noise Measurement Locations



Source: Google Earth, 2024

Short-term noise measurement ST-1 was conducted on Tuesday, August 29, 2023, during a ten-minute interval starting at 11:10 a.m. and concluding at 11:20 a.m. ST-1 was made near the center of the site, approximately 180 feet from the centerline of North 4th Street and 185 feet from the centerline of North 5th Street. This location was selected to quantify noise levels at the portion of the site furthest from traffic noise influence. The 10-minute average noise level measured at this location was 49 dBA L_{eq}. The 10-minute average noise levels measured concurrently at LT-1 and LT-2 were 54 and 61 dBA L_{eq}, respectively. During the noise measurement, 45 vehicles and 2 trucks passed by on North 4th Street, while 28 vehicles passed by on North 5th Street, producing noise levels ranging from 47 to 57 dBA. Five jet aircraft produced noise levels ranging from 53 to 57 dBA. A brief emergency vehicle siren produced noise levels up to 60 dBA. A summary of the short-term noise measurement along with concurrent long-term noise data is presented in Table 4.

TABLE 4 Summary of Short-Term Noise Measurement Data (dBA)

Noise Measurement Location	Date/ Time	L_{max}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{eq}
ST-1: Center of the Site	8/29/2023 11:10 to 11:20 am	60	56	52	47	45	49
LT-1: Northeast Side of the Site		65	62	59	51	49	54
LT-2: Southwest Side of the Site		76	71	65	56	47	61

PLAN CONSISTENCY ANALYSIS

Noise and Land Use Compatibility Thresholds

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

- The City's "normally acceptable" exterior noise level is 60 dBA DNL or less for the proposed school use (Table EC-1) and the "conditionally acceptable" exterior noise level is 60 – 75 dBA DNL.

- The California Green Building Code limits interior noise levels within new non-residential land uses to an hourly equivalent noise level ($L_{eq\ (1\text{-}hr)}$) of 50 dBA in occupied areas during any hour of operation.

- The CCHP has established acoustical performance criteria for environmental noise from exterior sources for new construction modernizations:

  General performance criteria for background noise:
  - In Core Learning Spaces the Exterior-source background A-weighted noise level shall be 40 dBA or less.

For an enhanced rating the following criteria shall be achieved:

- In Core Learning Spaces and spaces designated as PAS or APS, exterior source background A-weighted noise levels shall be 35 dBA or less.
- In Ancillary Learning Spaces and LAS, exterior-source background A-weighted noise levels shall be 40 dBA or less.

The future noise environment at the project site would continue to result primarily from local vehicular traffic along North 4th Street and North 5th Street. Traffic data provided for the project states that the existing average number of daily vehicular trips is approximately 110. The project is expected to add approximately 87 daily trips, resulting in approximately 197 daily trips. When considering the average daily traffic (ADT) volumes along North 4th Street and North 5th Street, this small increase in daily vehicle trips will not substantially contribute to increased noise levels in the vicinity of the project. ADT volumes from the City of San José were utilized in determining the future traffic noise at the site.[2] Assuming a one percent increase in traffic volumes each year, traffic noise at the site is expected to increase by less than 1 dBA DNL in the future. The majority of the noise environment at the project site, including all outdoor use areas, is in the "normally acceptable" category as described in the General Plan.

Future Exterior Noise Environment

The project plans include outdoor activity areas that would be sensitive to noise. A playground and courtyard plaza are planned near the center of the site, while a Japanese garden is planned for the northeast side of the property. The future noise exposure at the playground would range from 57 to 58 dBA DNL, while the courtyard plaza would be approximately 57 dBA DNL. The future noise exposure for the Japanese garden would range from 57 dBA DNL near the courtyard plaza to 61 dBA DNL near North 5th Street. The majority of the future exterior noise environment will be at or below 60 dBA DNL, with the exception of the very edge (five-feet) of the Japanese garden along North 5th Street, where noise levels may be up to 61 dBA DNL.

Future Interior Noise Environment

Standard building construction provides approximately 15 dBA of exterior-to-interior noise reduction, assuming the windows are partially open for ventilation. Standard construction with the windows closed provides approximately 20 to 25 dBA of noise reduction in interior spaces. Where exterior noise levels range from 60 to 65 dBA DNL, the inclusion of adequate forced-air mechanical ventilation is often the method selected to reduce interior noise levels to acceptable levels by closing the windows to control noise. Where noise levels exceed 65 dBA DNL, forced-air mechanical ventilation systems and sound-rated construction methods are normally required. Such methods or materials may include a combination of smaller window and door sizes as a percentage of the total building façade facing the noise source, sound-rated windows and doors, sound rated exterior wall assemblies, and mechanical ventilation so windows may be kept closed at the occupant's discretion.

2 City of San José GIS Open Data Average Daily Traffic, *https://gisdata-csj.opendata.arcgis.com/datasets/average-daily-traffic/*, Accessed June 2024.

The project plans show a two-story classroom building planned along the southeast side of the site. The future noise exposure would be 58 dBA DNL for the southwest façade of the classroom building, facing North 4th Street, and 60 dBA DNL at the northeast façade of the building, facing North 5th. Noise levels would be approximately 57 dBA DNL on the northwest and southeast sides of the building.

Because typical structural attenuation offers up 25 dBA for a newer building with windows closed, noise levels in core learning spaces would meet the enchanted rating criteria for High Performance Schools. Noise levels would be substantially below the 50 dBA L_{eq} threshold set forth in the California Green Building Code. The environmental noise would be below the general thresholds for speech interference (45 dBA for continuous noise and 55 dBA for fluctuating noise). Therefore, the project would adequately meet the thresholds established by the General Plan and other agencies.

NOISE IMPACTS AND MITIGATION MEASURES

This section describes the significance criteria used to evaluate project impacts under CEQA, provides a discussion of each project impact, and presents mitigation measures, where necessary, to reduce project impacts to less-than-significant levels.

Significance Criteria

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

(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;

(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.

Impact 1a: **Temporary Construction Noise.** Existing noise-sensitive land uses would not be exposed to a temporary increase in ambient noise levels due to project construction activities for a period of more than one year. With the implementation of the City's Standard Permit Condition, this would be considered a **less-than-significant** impact.

The project applicant proposes to demolish the existing buildings on the project site. The construction schedule assumed that the earliest possible start date would be the beginning of March 2025, and the project would be built out over a period of approximately 9 months. Construction phases would include demolition, site preparation, grading, trenching, building construction, architectural coating, and paving. During each phase of construction, there would be a different

mix of equipment operating, and noise levels would vary by phase and vary within phases, based on the amount of equipment in operation and the location at which the equipment is operating.

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

Policy EC-1.7 of the City's General Plan requires that all construction operations within the City 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 that is 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.

While the City of San José does not establish noise level thresholds for construction activities, this analysis uses the noise limits established by the Federal Transit Administration (FTA) to quantify potential for impacts due to substantial temporary construction noise. The FTA identifies construction noise limits in the *Transit Noise and Vibration Impact Assessment Manual*.[3] During daytime hours, an exterior threshold of 80 dBA L_{eq} shall be enforced at residential land uses, 85 dBA L_{eq} shall be enforced at commercial land uses, and 90 dBA L_{eq} shall be enforced at industrial land uses.

Construction activities generate considerable amounts of noise, especially during earth-moving activities when heavy equipment is used. The hauling of excavated materials and construction materials would generate truck trips on local roadways, as well. For the proposed project, pile driving, which generates excessive noise levels, is not expected. The typical range of maximum instantaneous noise levels for the proposed project would be 70 to 90 dBA L_{max} at a distance of 50 feet (see Table 5) from the equipment. Table 6 shows the hourly average noise level ranges, by construction phase, typical for various types of projects. Hourly average noise levels generated by construction are about 75 to 89 dBA L_{eq} for schools, measured at a distance of 50 feet from the center of a busy construction site. 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 often results in lower construction noise levels at distant receptors.

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

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.

Equipment expected to be used in each construction phase are summarized in Table 7, along with the quantity of each type of equipment and the reference noise level at 50 feet, assuming the operation of the two loudest pieces of construction equipment for each construction phase.

Federal Highway Administration's (FHWA's) Roadway Construction Noise Model (RCNM) was used to calculate the hourly average noise levels for each phase of construction, assuming the two loudest pieces of equipment would operate simultaneously, as recommended by the FTA for construction noise evaluations. This construction noise model includes representative sound levels for the most common types of construction equipment and the approximate usage factors of such equipment that were developed based on an extensive database of information gathered during the construction of the Central Artery/Tunnel Project in Boston, Massachusetts (CA/T Project or "Big Dig"). The usage factors represent the percentage of time that the equipment would be operating at full power.

Temporary construction noise was assessed at the receiving property lines of all existing noise-sensitive receptors in the area that would have direct exposure to the project site, which would include residences to the northwest, southeast, and southwest, and the church to the northeast. Table 8 summarizes the hourly average noise levels calculated for the loudest two pieces of construction equipment operating simultaneously in each phase when the construction source level is positioned near the center of the site and propagated to the receiving property lines.

TABLE 7 Estimated Construction Noise Levels for the Proposed Project at a Distance of 50 feet

Phase of Construction	Total Workdays	Construction Equipment (Quantity)	Estimated Construction Noise Level at 50 feet, dBA L_{eq}
Demolition	15 days	Concrete/Industrial Saw (2)[a] Excavator (2) Rubber-Tired Dozer (2) Tractor/Loader/Backhoe (2)	86
Site Preparation	5 days	Grader (2)[a] Rubber-Tired Dozer (2) Tractor/Loader/Backhoe (2)	84
Grading/ Excavation	10 days	Excavator (2) Grader (2)[a] Rubber-Tired Dozer (2) Tractor/Loader/Backhoe (1)	84
Trenching/Foundations	15 days	Excavator (2)[a] Tractor/Loader/Backhoe (2)	80
Building –Exterior	180 days	Crane (1)[a] Forklift (1)[a]	74
Building – Interior/ Architectural Coating	90 days	Air Compressor (1)[a]	74
Paving	3 days	Paver (1)[a] Paving Equipment (1)[a] Roller (1) Tractor/Loader/Backhoe (1)	77

[a] Denotes two loudest pieces of construction equipment per phase.

TABLE 8 Estimated Construction Noise Levels at the Property Lines of the Surrounding Land Uses

Phase of Construction	Calculated Hourly Average Noise Levels, L_{eq} (dBA)		
	Northwest and Southeast Residences (90ft)	Southwest Residences (220ft)	Northeast Church (235ft)
Demolition	81	73	72
Site Preparation	79	71	71
Grading/Excavation	79	71	71
Trenching/Foundation	75	67	66
Building –Exterior	69	61	60
Building – Interior/ Architectural Coating	69	61	60
Paving	72	64	64

As shown in Table 7, construction noise levels would intermittently range from 74 to 86 dBA L_{eq} when noisy construction equipment is operated within 50 feet from nearby receptors. When equipment is located near the center of the project site or farther from the receiving property lines, construction noise levels would typically range from 69 to 81 dBA L_{eq} at the property lines of the nearest residential land uses to the northwest and southeast of the site, from 61 to 73 dBA L_{eq} at the property lines of the residences to the southwest, and from 60 to 72 dBA L_{eq} at the property line of the church to the northeast. Although noise levels may be briefly, marginally above FTA thresholds at the nearest residential property lines, project construction is expected to last for a period of less than one year, and the temporary increase in noise levels would result in a less-than-significant impact, according to Policy EC-1.7 of the City's General Plan, assuming the City's Standard Permit Condition are incorporated into the project.

The City requires that reasonable noise reduction measures be incorporated into the construction plan and implemented during all phases of construction activity as part of their Standard Permit Condition. The following measures shall be included as part of the proposed project construction:

- Limit construction 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.

- Construct solid plywood fences around ground level construction sites adjacent to operational businesses, residences, or 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.

- Prohibit unnecessary idling of internal combustion engines.

- Locate stationary noise-generating equipment such as air compressors or portable power generators as far as possible from sensitive receptors. Construct temporary noise barriers to screen stationary noise-generating equipment when located near adjoining sensitive land uses.

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

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

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

- If complaints are received or excessive noise levels cannot be reduced using the measures above, erect a temporary noise control blanket barrier along surrounding building facades that face the construction sites.

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

With the implementation of GP Policy EC-1.7, Municipal Code requirements, and the City's Standard Permit Conditions, the temporary construction noise impact would be reduced to a less-than-significant level.

Mitigation Measure 1a: No further mitigation required.

Impact 1b: Permanent Noise Level Increase/Exceed Applicable Standards. The proposed project would not result in a substantial permanent noise level increase at receptors in the project vicinity. Operational noise levels generated by the proposed project would not exceed applicable City standards. 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 nearby residential land uses and church 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 or operational noise due to the proposed project would permanently increase ambient levels by 3 dBA DNL or more.

Under Policy EC-1.3 of the City's Noise Element, noise levels from nonresidential building equipment shall not exceed a noise level of 55 dBA DNL at receiving residential land uses. Noise-sensitive receptors surrounding the site that would be subject to this threshold include the residences to the northwest and southeast. The existing daily average noise level at these residences ranges from 57 to 65 dBA DNL. The City's General Plan does not include thresholds for nonresidential receptors. The existing daily average noise level at the church property line to the northeast is 60 to 61 dBA DNL.

Project Traffic Increase

The project's trip generation data was reviewed to determine the change in traffic noise levels along roadways serving the site due to the proposed project. The project would result in approximately 87 new trips per day. New trips would only occur during typical school hours. This

small increase in daily trips would not measurably increase traffic noise levels in the project vicinity.

Parking Lot Noise

A surface parking lot is planned along the northwest property line. Noise sources associated with the use of the parking lot would include vehicular circulation, loud engines, door slams, and human voices. The maximum noise level of a passing car at 15 mph typically ranges from 45 to 55 dBA L_{max} at a distance of 100 feet. The noise generated during an engine start is similar. Door slams cause slightly lower noise levels. The hourly average noise levels resulting from all of these noise-generating activities in a busy parking lot typically ranges from 40 to 50 dBA L_{eq} at a distance of 100 feet from the parking area. Busy parking lot operation is expected during morning drop off times and afternoon pick up times. Typical hourly operations would include a few cars at any time, which would result in lower levels. The nearest residential property line that could be affected by parking lot noise is approximately 32 feet northwest of the center of the parking lot. Noise levels resulting from parking activities would increase ambient noise levels at the nearest property line to the northwest by less than 1 dBA DNL. The five-foot-tall solid wood fences planned along the property lines would further reduce noise levels. All other noise sensitive receptors in the vicinity are further from the parking lot or would be shielded by intervening buildings.

Playground Noise

The noise associated with the use of playground areas is typically characterized by children yelling and playing and whistles during recess or physical education classes. Average noise levels generated during playground activities typically range from 59 to 65 dBA L_{eq} at a distance of 50 feet. The center of the playground would be approximately 80 feet from the nearest property line to the southeast, but playground noise would be completely shielded at this property line by the classroom building. The center of the playground would be approximately 105 feet from the residential property line to the northwest, where playground activities would result in a noise level increase of less than 1 dBA DNL. The five-foot-tall solid wood fences planned along the property lines would further reduce noise levels.

Mechanical Equipment

The project plans do not show any mechanical equipment such as heating and cooling equipment. However, this equipment would typically be installed on the rooftop of classroom type buildings, with no direct line of site to nearby noise sensitive receptors. Considering the distances this equipment would be from nearby noise-sensitive receptors and the shielding provided by the building, noise levels from the mechanical equipment would not result in a noise increase at adjacent property lines. Plans show a transformer on the northeast side of the building, where future noise levels are approximately 60 dBA DNL, and the transformer would not measurably contribute to the noise environment. Noise from mechanical equipment would be less than 1 dBA DNL above ambient levels at adjacent receptors.

Trash Enclosure

A trash enclosure is planned near the northwest corner of the site, near a residential property line. Trash collection can be loud, but usually only occurs once a week, and for a short period of time. The trash enclosure would be approximately 10 feet from the residential property line to the northwest. Because trash enclosure noise would occur for a short period of time, and considering normal ambient noise levels, a noise level increase of less than 1 dBA DNL would occur at the nearby property line.

The permanent noise level increase due to vehicle traffic, parking, playground activities, and trash pick-up would be less than 1 dBA DNL at the nearest residential land use. The ambient noise environment in the area exceeds 60 dBA DNL near roadways and is below 60 dBA DNL further from roadways. Therefore, the proposed project would not cause a substantial permanent noise level increase at sensitive receptors in the project vicinity (i.e., 3 dBA DNL or greater) resulting in a less-than-significant impact.

Mitigation Measure 1b: None required.

Impact 2: Exposure to Excessive Groundborne Vibration. Construction-related vibration levels would potentially exceed applicable vibration thresholds at nearby sensitive land uses. **This is a potentially 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 demolition, site preparation work, foundation work, new building framing and finishing, and paving. 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 José 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. The vibration limits contained in this policy are conservative and designed to provide the ultimate level of protection for existing buildings in San José. Vibration levels exceeding these thresholds would be capable of cosmetically damaging adjacent buildings. Cosmetic damage (also known as threshold damage) is defined as hairline cracking in plaster, the opening of old cracks, the loosening of paint or the dislodging of loose objects. Minor damage is defined as hairline cracking in masonry or the loosening of plaster. Major structural damage is defined as wide cracking or the shifting of foundation or bearing walls.

Table 9 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. Table 9 also summarizes the distances to the 0.08 in/sec PPV threshold for historical buildings and to the 0.2 in/sec PPV threshold for all other buildings. According to the National Register of Historic Places,[4] the nearest recognized historical structures, within the Hensley Historic District to the southeast, would be over 1,000 feet from the project site. However, the City of San José identifies this neighborhood as a potential future historic district, based on building ages and potential cultural significance.[5] Conservatively, the 0.08 in/sec PPV threshold should be applied to any contributing buildings located withing the potential historic district of Japantown.

TABLE 9 Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft. (in/sec)	Minimum Distance to Meet 0.08 in/sec PPV (feet)	Minimum Distance to Meet 0.2 in/sec PPV (feet)
Clam shovel drop		0.202	59	26
Hydromill (slurry wall)	in soil	0.008	4	2
	in rock	0.017	7	3
Vibratory Roller		0.210	61	27
Hoe Ram		0.089	28	13
Large bulldozer		0.089	28	13
Caisson drilling		0.089	28	13
Loaded trucks		0.076	24	11
Jackhammer		0.035	12	6
Small bulldozer		0.003	2	<1

Source: Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, Office of Planning and Environment, U.S. Department of Transportation, September 2018, as modified by Illingworth & Rodkin, Inc., January 2024.

Vibration levels are highest close to the source and then attenuate with increasing distance at the rate $\left({}^{D_{ref}}/_{D}\right)^{1.1}$, where D is the distance from the source in feet and D_{ref} is the reference distance of 25 feet. While construction noise levels increase based on the cumulative equipment in use simultaneously, construction vibration levels would be dependent on the location of individual pieces of equipment. That is, equipment scattered throughout the site would not generate a collective vibration level, but a vibratory roller, for instance, operating near the project site boundary would generate the worst-case vibration levels for the receptor sharing that property line. Further, construction vibration impacts are assessed based on the potential for damage to buildings on receiving land uses, not at receptors at the nearest property lines. Therefore, the distances used to propagate construction vibration levels are different than the distances used to propagate construction noise levels (shown in Table 8). Table 10 summarizes the construction vibration levels estimated at the nearest façades of the surrounding off-site buildings based on distances measured from the nearest project boundary.

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[4] National Register of Historic Places Map, https://www.nps.gov/maps/full.html?mapId=7ad17cc9-b808-4ff8-a2f9-a99909164466

[5] City of San José Historic Resources Inventory, https://www.sanjoseca.gov/your-government/departments-offices/planning-building-code-enforcement/planning-division/historic-resources/historic-resources-inventory

The nearest building would be the residence adjoining the site to the southeast, which would be approximately 5 feet from the shared property line. At a distance of 5 feet, vibration levels would be up to 1.23 in/sec PPV. A study completed by the US Bureau of Mines analyzed the effects of blast-induced vibration on buildings in USBM RI 8507.[6] The findings of this study have been applied to buildings affected by construction-generated vibrations.[7] As reported in USBM RI 8507[5] and reproduced by Dowding,[6] Figure 2 presents the damage probability, in terms of "threshold damage" (described above as cosmetic damage), "minor damage," and "major damage," at varying vibration levels. As shown in Figure 2, maximum vibration levels of 0.2 in/sec PPV or lower would result in virtually no measurable damage, while maximum vibration levels of 1.23 in/sec PPV would result in less than 23% chance of cosmetic damage, less than 2% chance of minor damage, and a 0% chance of major damage at the buildings immediately adjoining the project site.

TABLE 10 Vibration Source Levels for Construction Equipment at Receiving Structures Surrounding the Project Site

Equipment		PPV (in/sec)			
		Southeast Residential Buildings (5ft)	Northwest Residential Buildings (10ft)	Southwest Residential Buildings (100ft)	Northeast Buddhist Church Building (115ft)
Clam shovel drop		1.186	0.553	0.044	0.038
Hydromill (slurry wall)	in soil	0.047	0.022	0.002	0.001
	in rock	0.100	0.047	0.004	0.003
Vibratory Roller		1.233	0.575	0.046	0.039
Hoe Ram		0.523	0.244	0.019	0.017
Large bulldozer		0.523	0.244	0.019	0.017
Caisson drilling		0.523	0.244	0.019	0.017
Loaded trucks		0.446	0.208	0.017	0.014
Jackhammer		0.206	0.096	0.008	0.007
Small bulldozer		0.018	0.008	0.001	0.001

Source: Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, Office of Planning and Environment, U.S. Department of Transportation, September 2018, as modified by Illingworth & Rodkin, Inc., January 2024.

Neither cosmetic, minor, or major damage would occur at conventional buildings located 30 feet or more from the project site. At these locations, and in other surrounding areas where vibration would not be expected to cause cosmetic damage, vibration levels may still be perceptible. However, as with any type of construction, this would be anticipated and would not be considered significant, given the intermittent and short duration of the phases that have the highest potential of producing vibration (use of jackhammers and other high-power tools). By use of administrative controls, such as notifying neighbors of scheduled construction activities and scheduling construction activities with the highest potential to produce perceptible vibration during hours with the least potential to affect nearby businesses, perceptible vibration can be kept to a minimum.

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

[7] Dowding, C.H., Construction Vibrations, Prentice Hall, Upper Saddle River, 1996.

In summary, the construction of the project would potentially exceed the General Plan threshold of 0.08 in/sec PPV at nearby potential historical buildings, and potentially generate vibration levels exceeding the 0.2 in/sec PPV threshold at nonhistorical properties adjoining the project site. This would be a potentially significant impact.

Mitigation Measure 2:

The project applicant shall implement a Construction Vibration Monitoring Plan to reduce vibration levels due to construction activities to at or below 0.2 in/sec PPV for conventional buildings and below 0.08 in/sec PPV for potential historic buildings. All plan tasks shall be in accordance with industry-accepted standard methods. The construction vibration monitoring plan shall include, but not be limited to, the following measures:

- All potential historic buildings within 200 feet of the project site shall be identified.

- A list of all heavy construction equipment to be used for this project known to produce high vibration levels (e.g., tracked vehicles, vibratory compaction, jackhammers, hoe rams, clam shovel drop, and vibratory roller, etc.) shall be submitted to the City by the contractor. This list shall be used to identify equipment and activities that would potentially generate substantial vibration and to define the level of effort for reducing vibration levels below the thresholds.

- Place operating equipment on the construction site at least 20 feet from the project site boundaries shared with existing conventional buildings and at least 65 feet from potential historic buildings.

- Smaller equipment to minimize vibration levels to below 0.2 in/sec PPV shall be used at the property lines adjoining adjacent buildings. For example, a smaller vibratory roller, such as the Caterpillar model CP433E vibratory compactor, could be used when compacting materials within 30 feet of the adjacent conventional buildings.

- Avoid using vibratory rollers and clam shovel drops within 30 feet of the adjacent conventional buildings and at least 65 feet from potential historic buildings.

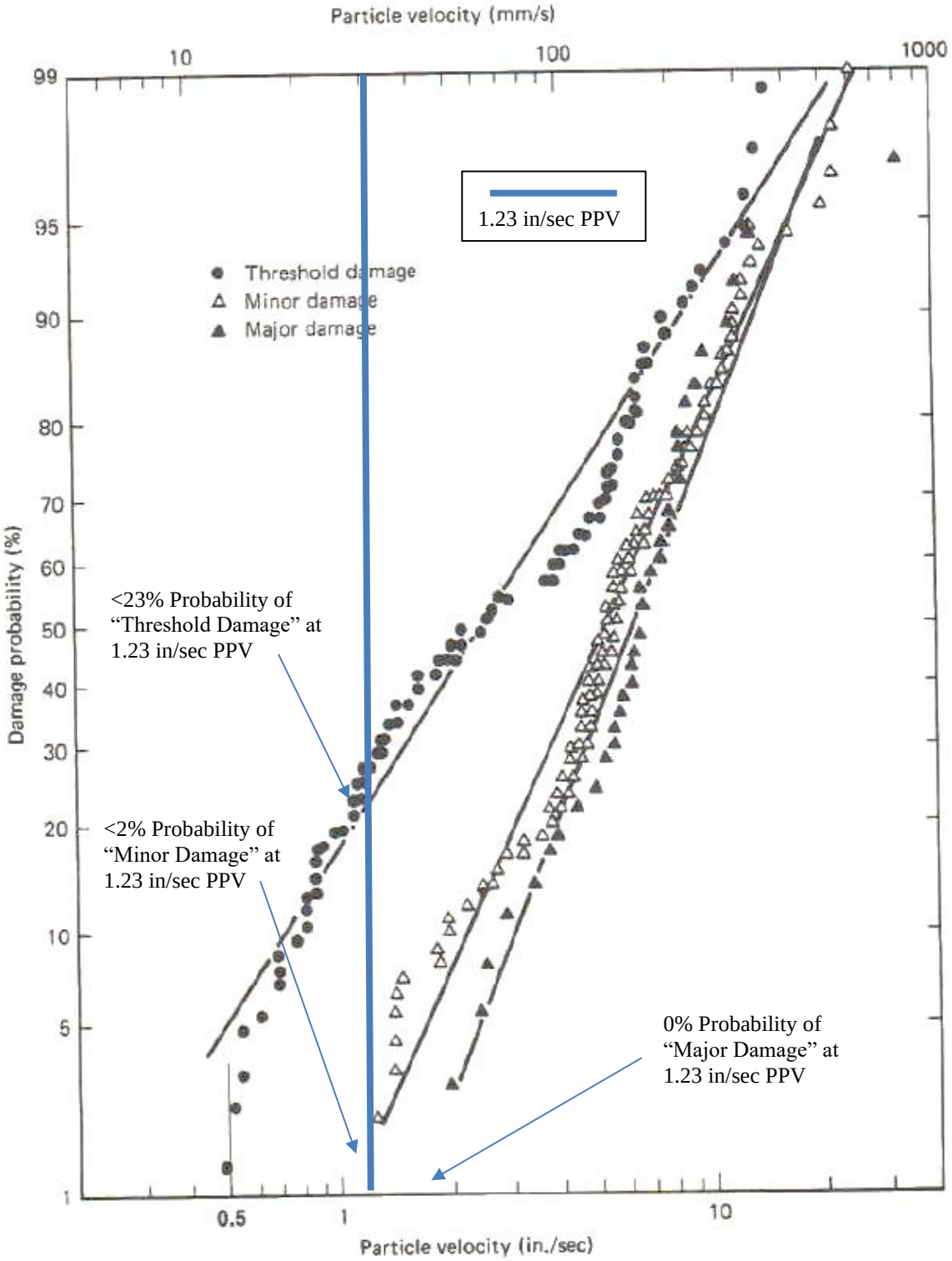
- Select demolition methods not involving impact tools.

- Avoid dropping heavy equipment and use alternative methods for breaking up existing pavement, such as a pavement grinder, instead of dropping heavy objects, within 30 feet of the adjacent conventional buildings and at least 65 feet from potential historic buildings.

- Designate a Disturbance Coordinator responsible for registering and investigating claims of excessive vibration. The contact information of such person shall be clearly posted on the construction site.

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

FIGURE 2 Probability of Cracking and Fatigue from Repetitive Loading



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

Impact 3: **Excessive Aircraft Noise.** The project site is located approximately 1 mile from San José Mineta International Airport, and the noise environment attributable to aircraft is considered acceptable under the Santa Clara County ALUC noise compatibility policies. This is a **less-than-significant** impact.

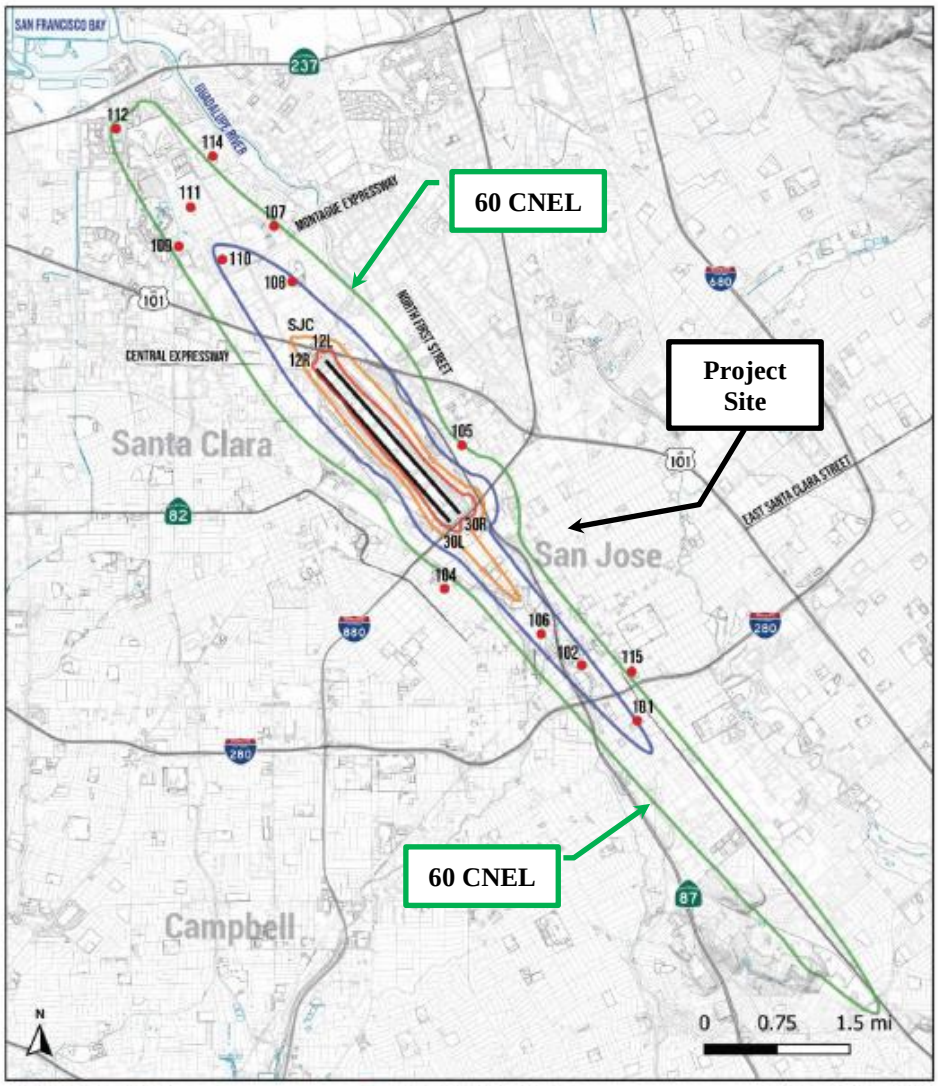
San José Mineta International Airport is a public-use airport located approximately 1 mile northwest of the project site. According to the City's Airport Master Plan Environmental Impact Report,[8] the project site lies outside of the 60 dBA CNEL/DNL contour line (see Figure 3). According to Policy EC-1.11 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 aircraft. Therefore, the proposed project would be compatible with the City's exterior noise standards for aircraft noise. Interior noise levels due to aircraft would be 45 dBA DNL or less assuming existing construction materials and methods. This is a less-than-significant impact.

Mitigation Measure 3: **None required.**

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

FIGURE 3 2037 CNEL Noise Contours for SJIA Relative to Project Site

Figure 5
Scenario 2: With Project 2037 Noise Contour Map



Source: BridgeNet International 2019

Cumulative Impacts

Cumulative noise impacts would include either cumulative traffic noise increases under future conditions or temporary construction noise from cumulative construction projects.

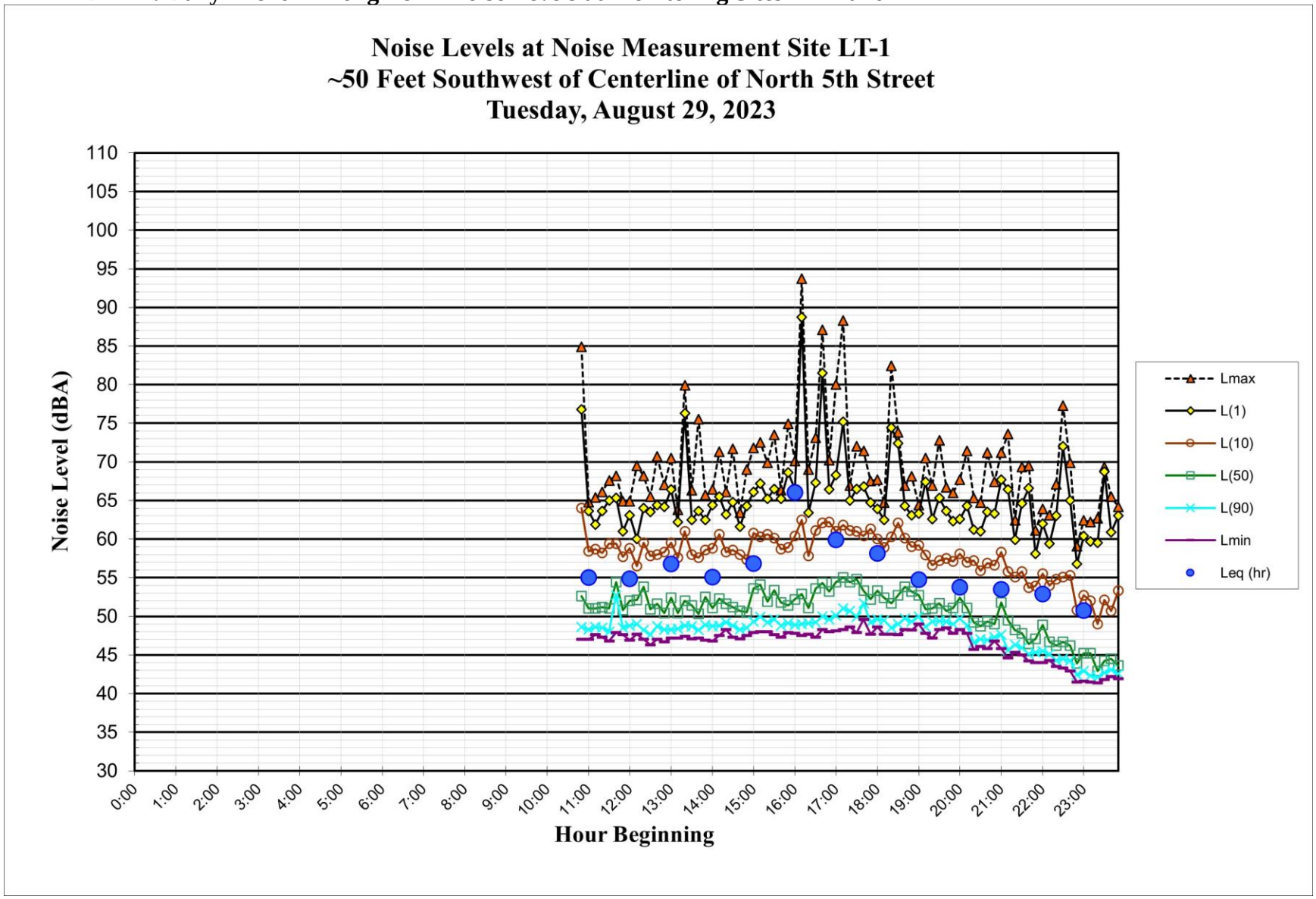
A significant cumulative traffic noise increase would occur if two criteria are met: 1) if the cumulative traffic noise level increase was 3 dBA DNL or greater for future levels exceeding 60 dBA DNL or was 5 dBA DNL or greater for future levels at or below 60 dBA DNL; and 2) if the project would make a "cumulatively considerable" contribution to the overall traffic noise increase. A "cumulatively considerable" contribution would be defined as an increase of 1 dBA DNL or more attributable solely to the proposed project.

This small increase in daily/hourly trips would not measurably increase traffic noise levels in the project vicinity. Therefore, the project would not result in a significant cumulative traffic noise increase. This is a less-than-significant impact.

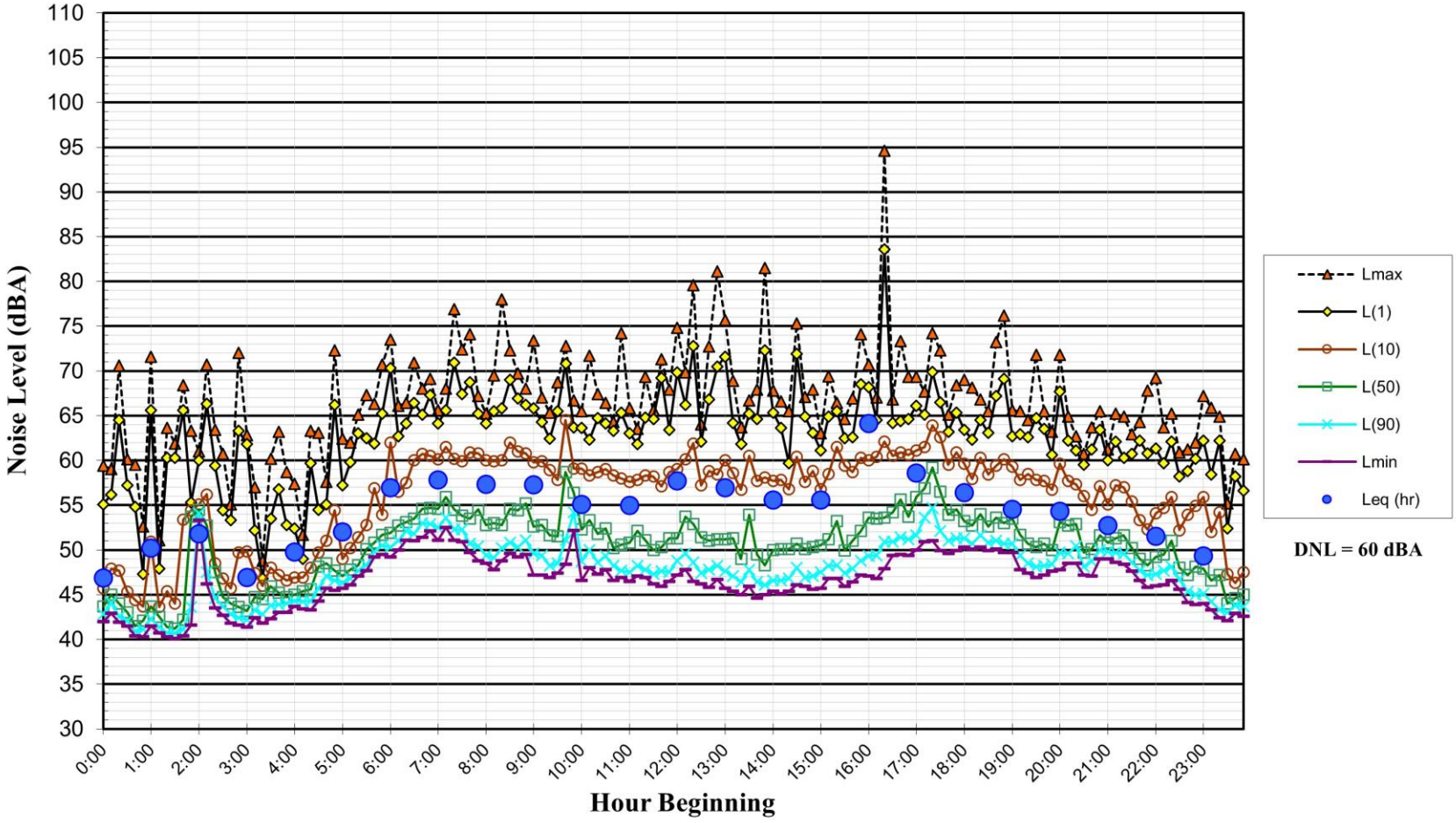
According to the City's website, the nearest planned or approved project is located at 0 North 6th Street, approximately 450 northeast of the project site.[9] The construction of the 6th Street project will be completed before the construction of this project begins. There are no other planned or approved projects within 1,000 feet of the project site. Therefore, there would not be a cumulative construction noise impact associated with the proposed project.

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

APPENDIX A: Daily Trend in Long Term Noise Levels at Monitoring Sites LT-1 and LT-2

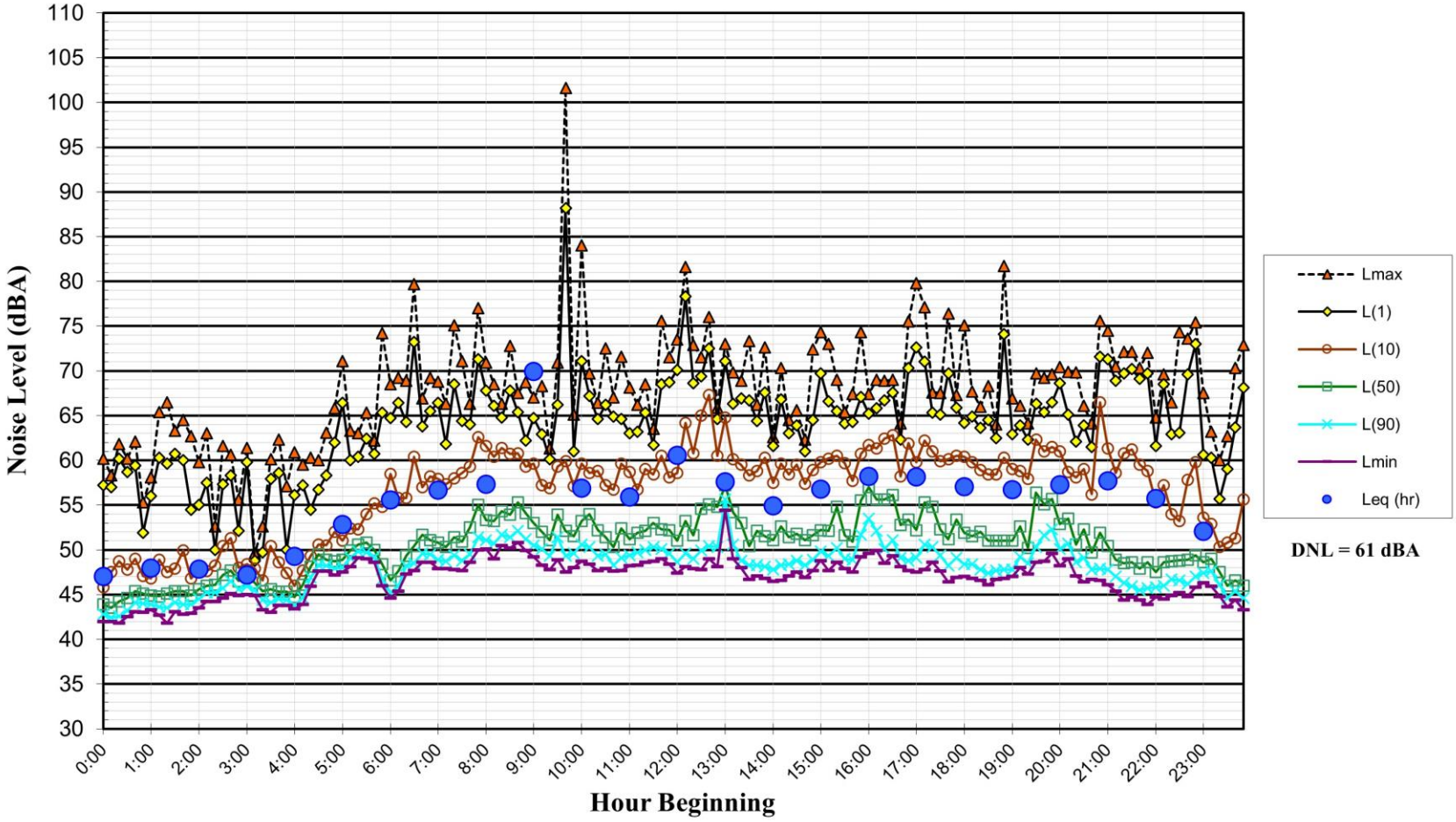


Noise Levels at Noise Measurement Site LT-1
~50 Feet Southwest of Centerline of North 5th Street
Wednesday, August 30, 2023



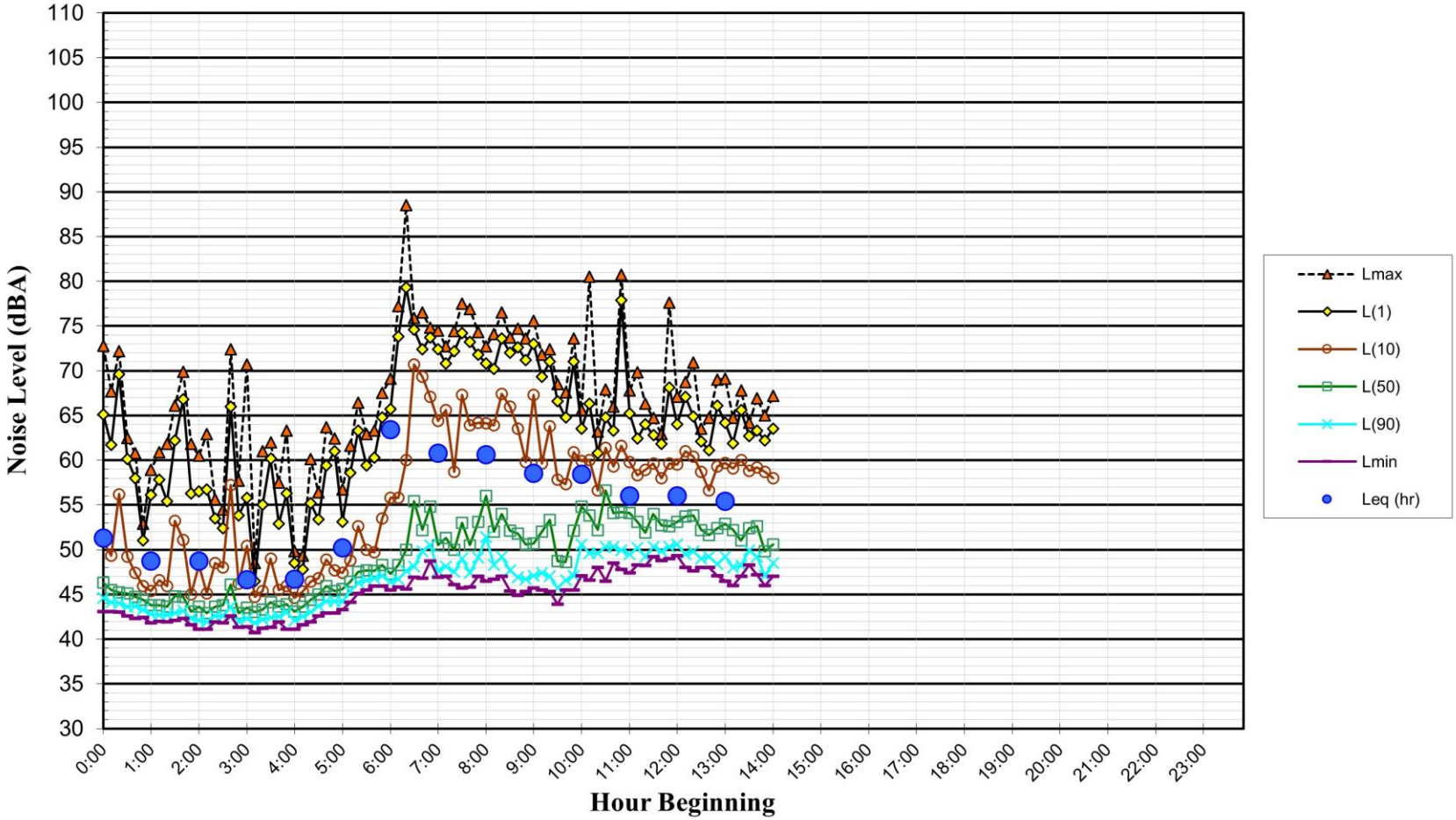
DNL = 60 dBA

Noise Levels at Noise Measurement Site LT-1
~50 Feet Southwest of Centerline of North 5th Street
Thursday, August 31, 2023

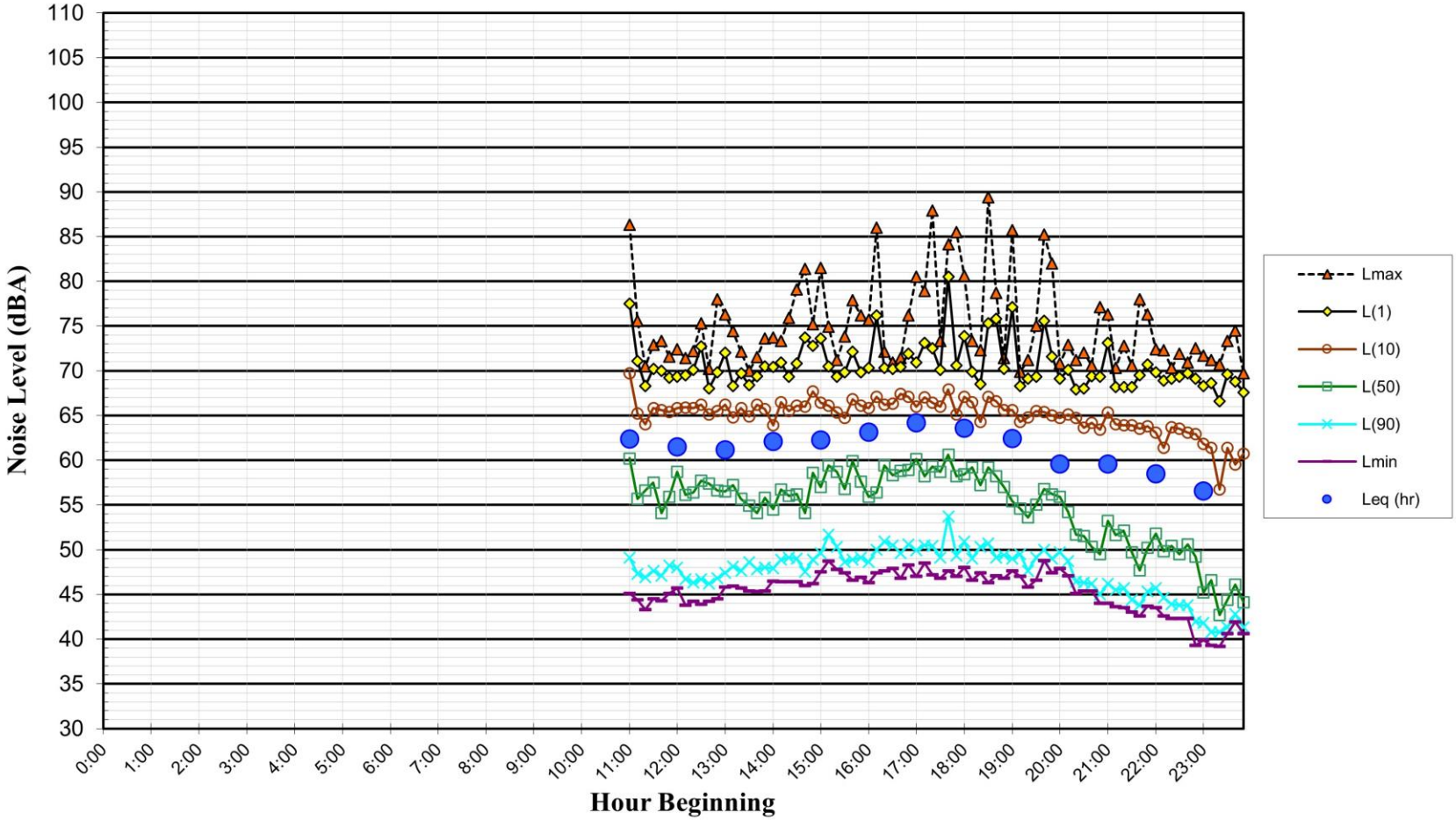


DNL = 61 dBA

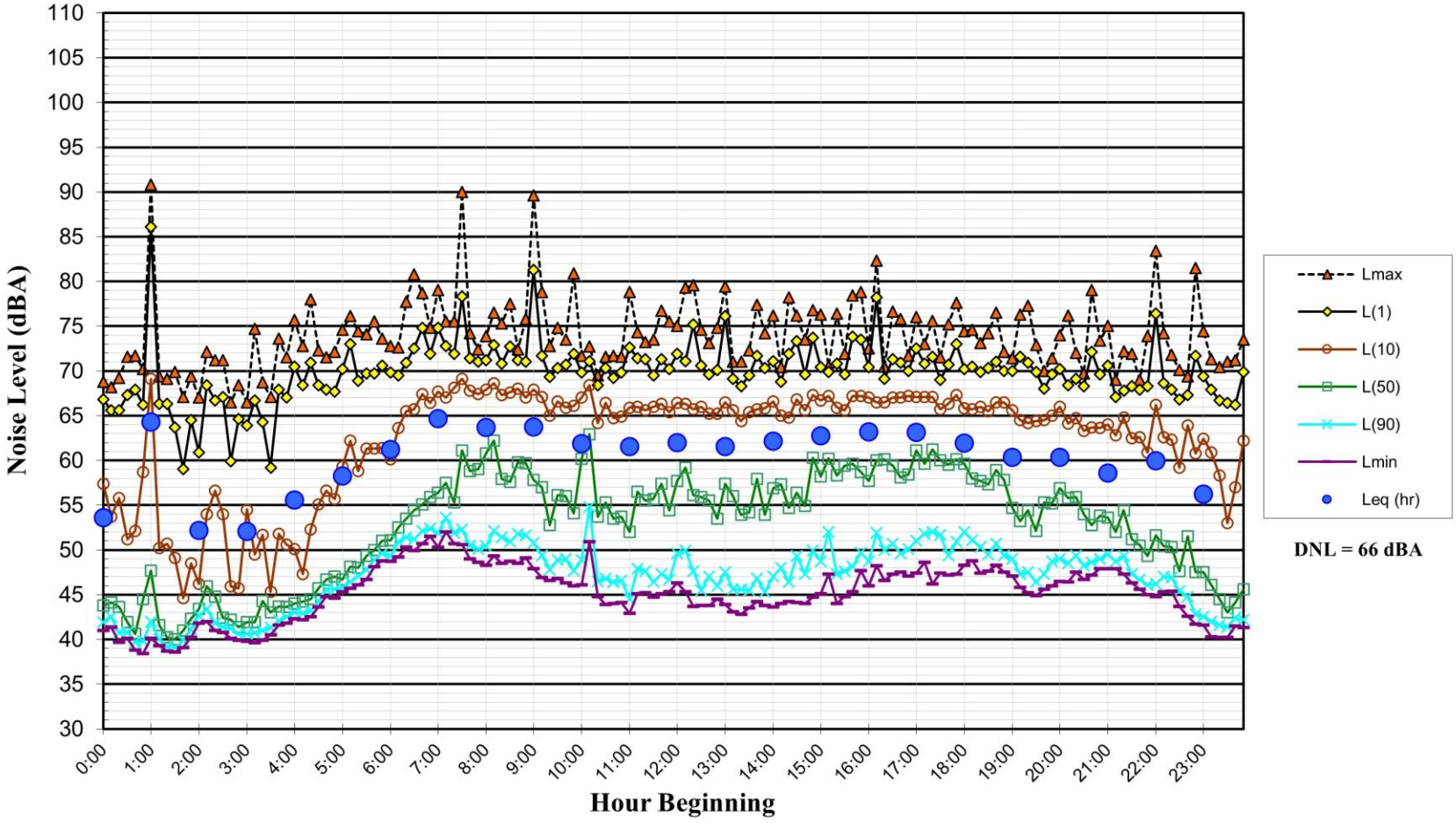
Noise Levels at Noise Measurement Site LT-1
~50 Feet Southwest of Centerline of North 5th Street
Friday, September 1, 2023



Noise Levels at Noise Measurement Site LT-2
~35 Feet Northeast of Centerline of North 4th Street
Tuesday, August 29, 2023

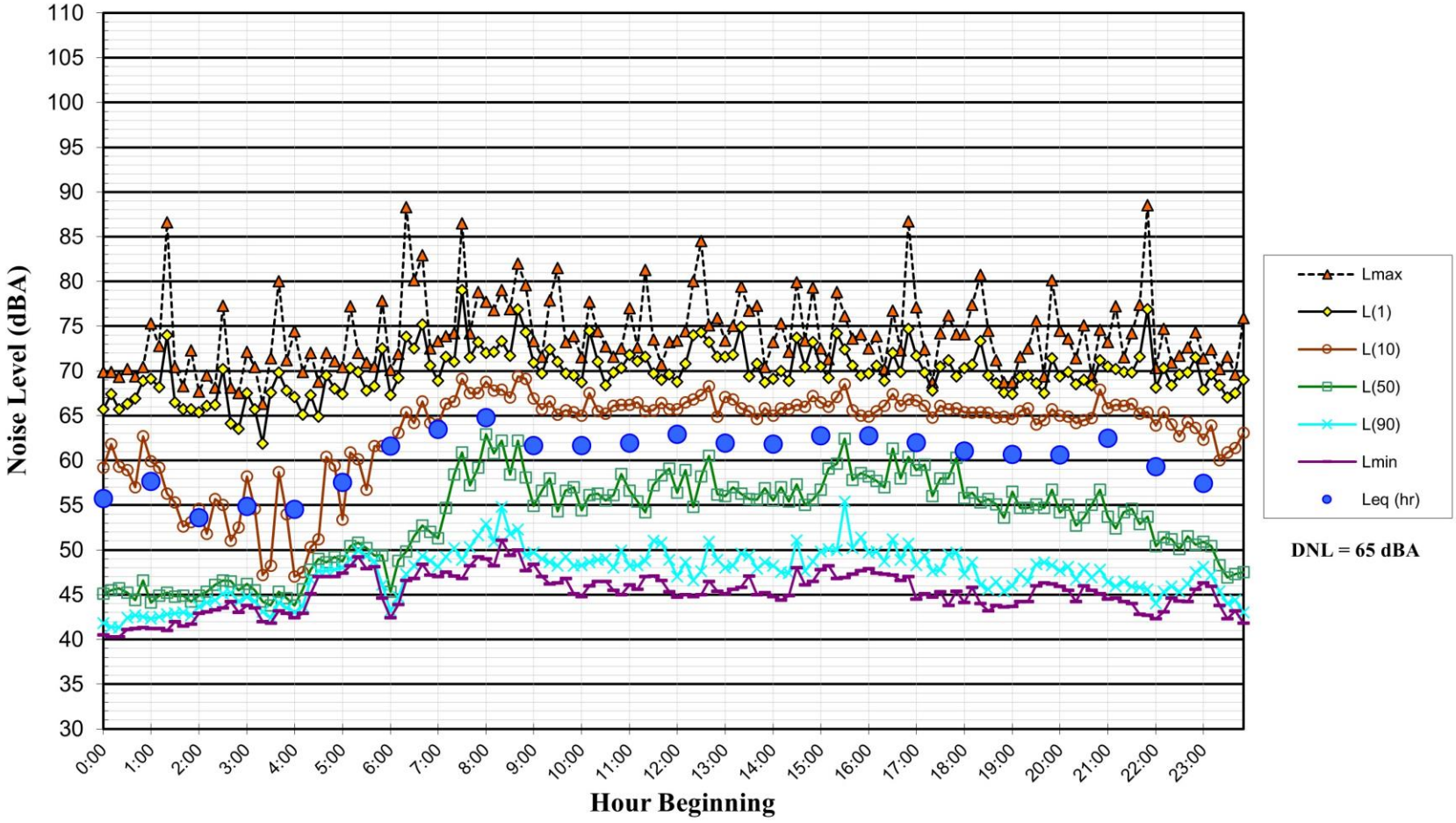


Noise Levels at Noise Measurement Site LT-2
~35 Feet Northeast of Centerline of North 4th Street
Wednesday, August 30, 2023



DNL = 66 dBA

Noise Levels at Noise Measurement Site LT-2
~35 Feet Northeast of Centerline of North 4th Street
Thursday, August 31, 2023



DNL = 65 dBA

Noise Levels at Noise Measurement Site LT-2
~35 Feet Northeast of Centerline of North 4th Street
Friday, September 1, 2023