477 9TH AVE MIXED-USE PROJECT NOISE AND VIBRATION ASSESSMENT

San Mateo, California

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INTRODUCTION

A five-story mixed-use project is proposed at 477 9th Avenue in San Mateo, California. The proposed project would include approximately 27,076 square feet of office uses on levels one and two and 120 residential units on levels three through five. Existing on-site buildings would be demolished prior to the construction of the project.

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

Effects of Noise

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noises of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA L_{dn}. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} 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 L_{dn} with open windows and 65 to 70 dBA L_{dn} 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 L_{dn} as a measure of noise has been found to provide a valid correlation between 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 L_{dn}. At a L_{dn} of about 60 dBA, approximately 12 percent of the population is highly annoyed. When the L_{dn} 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 L_{dn} of 60 to 70 dBA. Between a L_{dn} 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 L_{dn} 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 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.

Fundamentals of Groundborne Vibration

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

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

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with the enjoyment of life, are evaluated against different vibration limits. Human perception of 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 of 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 in 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.

Railroad and light rail operations are potential sources of substantial ground vibration depending on distance, the type and the speed of trains, and the type of railroad track. People’s response to ground vibration from rail vehicles has been correlated best with the average, root mean square

(RMS) velocity of the ground. The velocity of the ground is expressed on the decibel scale. The reference velocity is 1 x 10-6 in/sec RMS, which equals 0 VdB, and 1 in/sec equals 120 VdB. Although not a universally accepted notation, the abbreviation "VdB" is used in this document for vibration decibels to reduce the potential for confusion with sound decibels.

Typical background vibration levels in residential areas are usually 50 VdB or lower, well below the threshold of perception for most humans. Perceptible vibration levels inside residences are attributed to the operation of heating and air conditioning systems, door slams and foot traffic. Construction activities, train operations, and street traffic are some of the most common external sources of vibration that can be perceptible inside residences. Table 4 illustrates some common sources of vibration and the association to human perception or the potential for structural damage.

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.

TABLE 4 Typical Levels of Groundborne Vibration

Human/Structural Response	Velocity Level, VdB	Typical Events (50-foot setback)
Threshold, minor cosmetic damage	100	Blasting, pile driving, vibratory compaction equipment
		Heavy tracked vehicles (Bulldozers, cranes, drill rigs)
Difficulty with tasks such as reading a video or computer screen	90	
		Commuter rail, upper range
Residential annoyance, infrequent events	80	Rapid transit, upper range
Residential annoyance, occasional events		Commuter rail, typical Bus or truck over bump or on rough roads
Residential annoyance, frequent events	70	Rapid transit, typical
Approximate human threshold of perception to vibration		Buses, trucks and heavy street traffic
	60	
		Background vibration in residential settings in the absence of activity
Lower limit for equipment ultra-sensitive to vibration	50	

Source: Transit Noise and Vibration Impact Assessment, US Department of Transportation Federal Transit Administration, September 2018.

Regulatory Background – Noise

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

State of California

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 Code, Title 24, Part 2. The current version of the California Building Code (CBC) requires interior noise levels in multi-family residential units attributable to exterior environmental noise sources to be limited to a level not exceeding 45 dBA L_{dn}/CNEL in any habitable room.

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.
>
> **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.

City of San Mateo

City of San Mateo General Plan: The Noise Element of the City of San Mateo General Plan sets forth goals and policies to control environmental noise and protect citizens from excessive noise exposure. The goals and policies relevant to this project are summarized below:

GOAL 1: Protect "noise sensitive" land uses from excessive noise levels.

POLICIES:

N 1.1: Interior Noise Level Standard. Require submittal of an acoustical analysis and interior noise insulation for all "noise sensitive" land uses listed in Table N-1 that have an exterior noise level of 60 dB (L_{dn}) or above, as shown on Figure N-1. The maximum interior noise level shall not exceed 45 dB (L_{dn}) in any habitable rooms.

N 1.2: Exterior Noise Level Standard. Require an acoustical analysis for new parks, play areas, and multi-family common open space (intended for the use and the enjoyment of residents) that have an exterior noise level of 60 dB (L_{dn}) or above, as shown on Figure N-1. Require an acoustical analysis that uses peak hour L_{eq} for new parks and play areas. Require a feasibility analysis of noise reduction measures for public parks and play areas. Incorporate necessary mitigation measures into residential project design to minimize common open space noise levels. Maximum exterior noise should not exceed 67 dB (L_{dn}) for residential uses and should not exceed 65 dB (L_{eq}) during the noisiest hour for public park uses.

GOAL 2: Minimize unnecessary, annoying and unhealthful noise.

POLICIES:

N 2.1: Noise Ordinance. Continue implementation and enforcement of City's existing noise control ordinance: (a) which prohibits noise that is annoying or injurious to neighbors of normal sensitivity, making such activity a public nuisance, and (b) restricts the hours of construction to minimize noise impact.

N 2.2: Minimize Noise Impact. Protect all "noise-sensitive" land uses listed in Tables N-1 and N-2 from adverse impacts caused by noise generated on-site by new developments. Incorporate necessary mitigation measures into development design to minimize noise impacts. Prohibit long-term exposure increases of 3 dB (L_{dn}) or greater at the common property line, excluding existing ambient noise levels.

N 2.3: Minimize Commercial Noise. Protect land uses other than those listed as "noise sensitive" in Table N-1 from adverse impacts caused by the on-site noise generated by new developments. Incorporate necessary mitigation measures into development design to minimize noise impacts. Prohibit new uses that generate noise levels of 65 dB (L_{dn}) or above at the property line, excluding existing ambient noise levels.

N 2.4: Traffic Noise. Recognize projected increases in ambient noise levels resulting from traffic increases. Promote the installation of noise barriers along highways where "noise-sensitive" land uses listed in Table N-1 are adversely impacted by unacceptable noise levels [60 dB (L_{dn}) or above]. Require adequate noise mitigation to be incorporated into the widening of SR 92 and US 101. Accept noise increases on El Camino Real at existing development and require new multi-family development to provide common open space having a maximum exterior noise level of 67 dB (L_{dn}).

N 2.5: Railroad Noise. Promote the installation of noise barriers along the railroad corridor where "noise-sensitive" land uses are adversely impacted by unacceptable noise levels [60 dB (L_{dn}) or greater]. Promote adequate noise mitigation to be incorporated into any rail service expansion or track realignment. Study the need of depressing the rail line to eliminate at-grade crossings or other mitigation measures to decrease noise levels prior to substantial expansion of the rail service.

TABLE N-1
NOISE SENSITIVE LAND-USE COMPATIBILITY GUIDELINES FOR COMMUNITY NOISE ENVIRONMENTS[1]
Day-Night Average Sound Level (L_{dn}), Decibels

Land-Use Category	Normally Acceptable[2]	Conditionally Acceptable[3]	Normally Unacceptable[4]
Single-Family Residential	50 to 59	60 to 70	Greater than 70
Multi-Family Residential	50 to 59	60 to 70	Greater than 70
Hotels, Motels, and Other Lodging Houses	50 to 59	60 to 70	Greater than 70
Long-Term Care Facilities	50 to 59	60 to 70	Greater than 70
Hospitals	50 to 59	60 to 70	Greater than 70
Schools	50 to 59	60 to 70	Greater than 70
Multi-Family Common Open Space Intended for the Use and Enjoyment of Residents	50 to 67	--	Greater than 67

TABLE N-2
NOISE GUIDELINES FOR OUTDOOR ACTIVITIES
Average Sound Level (L_{eq}), Decibels

Land Use Category	Normally Acceptable[2]	Conditionally Acceptable[3]	Normally Unacceptable[4]
Parks, Playgrounds	50 to 65*	--	Greater than 65*

[1] These guidelines are derived from the California Department of Health Services, Guidelines for the Preparation and Content of the Noise Element of the General Plan, 2003. The State Guidelines have been modified to reflect San Mateo's preference for distinct noise compatibility categories and to better reflect local land-use and noise conditions. It is intended that these guidelines be utilized to evaluate the suitability of land-use changes only and not to determine cumulative noise impacts. Land uses other than those classified as being "noise sensitive" are exempt from these compatibility guidelines.

[2] 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.

[3] Conditionally Acceptable – New construction should be undertaken only after a detailed analysis of the noise reduction requirement is conducted and needed noise insulation features included in the design.

[4] Normally Unacceptable – New construction 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.

* Average Sound Level (L_{eq}) for peak hour.

City of San Mateo Municipal Code: The Noise Regulations of the San Mateo Municipal Code, Chapter 7.30 are set forth to protect the inhabitants of the City against all forms of nuisances.

Section 7.30.040 Maximum Permissible Sound Levels. It is unlawful for any person to operate or cause to be operated any source of sound at any location within the city or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level when measured on any other property to exceed:

(1) The noise level standard for that property as specified in Table 7.30.040 for a cumulative period of more than thirty minutes in any hour;

(2) The noise level standard plus five dB for a cumulative period of more than fifteen minutes in any hour;

(3) The noise level standard plus ten dB for a cumulative period of more than five minutes in any hour;

(4) The noise level standard plus fifteen dB for a cumulative period of more than one minute in any hour; or

(5) The noise level standard or the maximum measured ambient level, plus twenty dB for any period of time.

If the measured ambient level for any area is higher than the standard set in Table 7.30.040, then the ambient shall be the base noise level standard for purposes of this section. In such cases, the noise levels for purposes of subsections (2) through (5) of this section shall be increased in five dB increments above the ambient.

Table 7.30.040: Noise Level Standards

Noise Zone	Time Period	Noise Level, dBA
Noise Zone 1 (single-family residential zone)	10 p.m.--7 a.m.	50
	7 a.m.--10 p.m.	60
Noise Zone 2 (commercial/mixed residential, multi-family residential)	10 p.m.--7 a.m.	55
	7 a.m.--10 p.m.	60
Noise Zone 3 (commercial or central business district)	10 p.m.--7 a.m.	60
	7 a.m.--10 p.m.	65
Noise Zone 4 (any manufacturing or industrial zone)	Anytime	70

Section 7.30.060 Special Provisions. Construction, alteration, repair, or land development activities authorized by a valid city permit shall be allowed at the following times:

- Weekdays: between 7:00 a.m. and 7:00 p.m.
- Saturdays: between 9:00 a.m. and 5:00 p.m.

- Sundays and Holidays: between 12:00 p.m. and 4:00 p.m.
- Or at other such hours as authorized or restricted by the permit, so long as they meet the following conditions:
  1. No individual piece of equipment shall produce a noise level exceeding 90 dBA at a distance of 25 feet. If the device is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close to 25 feet as possible.
  2. The noise level outside of any point outside the property plane of the project shall not exceed 90 dBA.

Regulatory Background – Vibration

Federal Government

Federal Transit Administration. The FTA has identified vibration impact criteria for sensitive buildings, residences, and institutional land uses near rail transit and railroads. These criteria are shown in Table 5. The thresholds for office buildings that operate primarily during daytime hours are 75 VdB for frequent events (more than 70 events of the same source per day), 78 VdB for occasional events (30 to 70 vibration events of the same source per day), and 83 VdB for infrequent events (less than 30 vibration events of the same source per day).

TABLE 5 Groundborne Vibration Impact Criteria

Land Use Category	Groundborne Vibration Impact Levels (VdB re 1 µinch/sec, RMS)		
	Frequent Events[1]	**Occasional Events[2]**	**Infrequent Events[3]**
Category 1 Buildings where vibration would interfere with interior operations.	65 VdB[4]	65 VdB[4]	65 VdB[4]
Category 2 Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3 Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

Notes:
1. "Frequent Events" is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.
2. "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.
3. "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.
4. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration sensitive manufacturing or research should always require detailed evaluation to define the acceptable vibration levels. Ensuring low vibration levels in a building requires special design of HVAC systems and stiffened floors.

Existing Noise Environment

The project site is located at 477 9th Avenue in San Mateo, California. Adjoining the project site to the north is the Social Security Administration's office building. The site is bound to the south by 9th Avenue, to the east by South Claremont Street, and to the west by Union Pacific Railroad (UPRR) railroad tracks. Other surrounding land uses include auto body and tire shops to the east, opposite South Claremont Street; a garden center and other commercial uses to the south, opposite 9th Avenue; and an auto body shop and other commercial uses to the west, opposite the railroad tracks.

The existing noise environment at the site results primarily from railroad activity (UPRR and Caltrain) and local vehicular traffic along 9th Avenue and South Claremont Street. U.S. Highway 101 (Highway 101) traffic and aircraft associated with the San Francisco International Airport also contribute to the noise environment.

A noise monitoring survey, which included two long-term (LT-1 and LT-2) and three short-term (ST-1 through ST-3) noise measurements, was performed at the site between Wednesday, March 15, 2023 and Friday, March 17, 2023. All measurement locations are shown in Figure 1.

Long-term noise measurement LT-1 was made approximately 80 feet from the nearest railroad tracks west of the project site. LT-1 was positioned at the approximate setback of the western façade of the proposed building. Hourly average noise levels at LT-1 typically ranged from 68 to 76 dBA L_{eq} during daytime hours (between 7:00 a.m. and 10:00 p.m.) and from 45 to 73 dBA L_{eq} during nighttime hours (between 10:00 p.m. and 7:00 a.m.). The day-night average noise level (L_{dn}) for the 24-hour period occurring on Thursday, March 16, 2023 was 75 dBA L_{dn}. The daily trends in noise levels at LT-1 are shown in Figures A1 through A3 in the Appendix of this report.

Noise measurement LT-2 was made approximately 45 feet west of the centerline of South Claremont Street. Hourly average noise levels at LT-2 typically ranged from 58 to 74 dBA L_{eq} during the day and from 46 to 65 dBA L_{eq} at night. The day-night average noise level (L_{dn}) for the 24-hour period occurring on Thursday, March 16, 2023 was 68 dBA L_{dn}. The daily trends in noise levels at LT-2 are shown in Appendix Figures A4 through A6.

Two short-term noise measurements were made on Wednesday, March 15, 2023 in 10-minute intervals between 12:20 p.m. and 1:00 p.m.

ST-1 was made near the center of the site, approximately 105 feet from the nearest railroad tracks and approximately 195 feet from the centerline of South Claremont Street. Two 10-minute noise measurements were made at ST-1. During the first 10-minute period, two train pass-bys occurred, which generated noise levels up to 88 dBA due to train whistles. Traffic noise along 9th Avenue, which was the dominant noise source at ST-1 in the absence of train activity, ranged from 45 to 64 dBA during both 10-minute measurement periods. Additional noise source sources at ST-1 included general aviation, which generated noise levels of 57 dBA. The 10-minute average noise levels at ST-1 ranged from 49 dBA L_{eq} in the absence of trains to 67 dBA L_{eq} with two train pass-bys.

ST-2 was made along the southern boundary of the project site, approximately 40 feet from the centerline of 9th Avenue. During this measurement, passenger cars along 9th Avenue generated noise levels ranging from 49 to 64 dBA. Additionally, a Caltrain pass-by occurred during the 10-minute period. The crossing arm bells generated noise levels of 65 to 66 dBA at ST-2, and the train whistle generated noise levels up to 87 dBA. The 10-minute average noise level at ST-2 was 67 dBA L_{eq}.

Table 6 summarizes the results of the 10-minute noise measurements made at ST-1 and ST-2.

TABLE 6 Summary of Short-Term Noise Measurement Data (dBA)

Noise Measurement Location	Date, Time	Measured Noise Level, dBA					
		L_{max}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{eq}
ST-1: ~105 feet from the nearest railroad tracks and ~195 feet from South Claremont Street centerline	3/15/2023, 12:20-12:30 (2 trains)	88	81	63	51	46	67
	3/15/2023, 12:30-11:40 (no trains)	64	56	51	48	45	49
ST-2: ~40 feet from the 9th Avenue centerline	3/15/2023, 12:50-13:00	87	79	67	60	54	67

A third short-term measurement (ST-3) was taken on Thursday March 16, 2023 alongside the vibration sensor near the northwestern corner of the site. Six trains (three northbound and three southbound) were measured at ST-3, approximately 65 feet from the nearest railroad tracks. Each of the trains included one engine and five cars traveling at speeds ranging from 30 to 45 mph. The sound exposure level (SEL), which is a sound pressure measurement over a period of time encompassing the duration of the train pass-bys, ranged from 92 to 95 dBA.

FIGURE 1 Aerial Image Showing the Project Site, Vicinity, and Locations of Noise and Vibration Measurements

Source: Google Earth, 2023.

Existing Vibration Environment

Vibration measurements were made near the northwestern corner of the project site. As shown in Figure 1, V-1 and ST-3 were positioned approximately 65 feet from the edge of the nearest railroad tracks. At this location, the vibration sensor was at-grade with the tracks.

Six observed and recorded vibration measurements of individual train activity were conducted on Thursday, March 16, 2023, between 10:36 a.m. and 11:48 a.m. The instrumentation used to conduct the measurements included a Roland model R-05 solid state recorder and seismic grade, low noise accelerometers firmly fixed to the ground. This system was capable of accurately measuring very low vibration levels. Vibration levels were measured at ground level at a setback distance of 65 feet from the edge of the nearest railroad tracks.

Vibration levels ranged from 64 to 73 VdB, and the average was 70 VdB. Table 7 summarizes each of the six measurements made at V-1. Vibration levels were measured in the vertical axis because ground vibration is typically most dominant on this axis. Vibration levels measured at V-1 during each of the train pass-by events can be seen in Figure A7 of Appendix A.

TABLE 7 Summary of Train Pass-by Vibration Measurements Made at V-1

Date, Time	Train Information							Vibration Level, VdB
	Type of Train	No. of Engines	No. of Cars	Track	Distance from V-1, feet	Direction of Travel	Speed, mph	
3/16/2023, 10:36 a.m.	CalTrain	1	5	Near	65	NB	30	64
3/16/2023, 11:04 a.m.	CalTrain	1	5	Far	85	SB	45	73
3/16/2023, 11:11 a.m.	CalTrain	1	5	Near	65	NB	35	70
3/16/2023, 11:36 a.m.	CalTrain	1	5	Far	85	SB	45	72
3/16/2023, 11:45 a.m.	CalTrain	1	5	Far	85	SB	45	73
3/16/2023, 11:48 a.m.	CalTrain	1	5	Near	65	NB	35	68

PLAN CONSISTENCY ANALYSIS

Noise and Land Use Compatibility

The City of San Mateo General Plan, which is presented in detail in the Regulatory Background section of this report, includes exterior and interior noise thresholds for residential uses. Note, the City's exterior noise thresholds apply only to common use areas and not private balconies, porches, or patios. Additionally, the State of California establishes acceptable interior noise limits within residential and non-residential land uses. The thresholds that apply to the proposed project are summarized below:

- Policy N 1.2 and Table N-1 of the City's General Plan identifies exterior noise thresholds of 59 dBA L_{dn} or below as "normally acceptable" for multi-family residential uses; however, the policy further states that common open spaces at multi-family residential buildings intended for the use and enjoyment of residents would be limited to a maximum allowable noise level of 67 dBA L_{dn}.

- The City and State's acceptable interior noise level standard is 45 dBA L_{dn} or less for the proposed residential land uses.

- The Cal Green Code standards specify an interior noise environment attributable to exterior sources not to exceed an hourly equivalent noise level ($L_{eq\ (1\text{-}hr)}$) of 50 dBA in occupied areas of nonresidential uses during any hour of operation.

The future noise environment at the site would continue to result primarily from vehicular traffic along nearby roadways and adjoining railroad tracks. The traffic study completed for the proposed project included peak hour turning movements for five intersections in the project vicinity. The estimated traffic noise increase under the cumulative plus project traffic scenario would be 1 dBA L_{dn} along Claremont Street and 9th Avenue when compared to existing volumes. Additionally, train activity along the adjoining tracks is not expected to change under future conditions, and therefore, would not contribute to a noise level increase at the project site. Conservatively, a 1 dBA L_{dn} traffic noise increase is assumed at the project site under future cumulative conditions.

Future Exterior Noise Environment

The site plan shows two outdoor use areas associated with the residential component of the proposed project: a third-level courtyard, which would be completely surrounded by the proposed building and a fifth-level roof deck. The courtyard would be shielded from direct exposure to all surrounding traffic and train noise sources by the proposed building. Future exterior noise levels at the courtyard would be at or below 60 dBA L_{dn}.

The fifth-level roof deck would be located in the southwestern corner of the proposed building and would have direct line-of-sight to 9th Avenue and the railroad tracks. The center of the roof deck would be set back from the centerline of 9th Avenue by approximately 65 feet and from the edge of the nearest railroad tracks by approximately 85 feet. The elevation of the roof deck (about 44.3 feet above the ground) would provide partial shielding at the center of the roof deck, where most extended outdoor use is expected to occur. Future exterior noise thresholds at the center of the roof deck would be 66 dBA L_{dn}. This would meet the 67 dBA L_{dn} limit in Policy N 1.2 for multi-family residential buildings. Therefore, the proposed project would be compatible with the future exterior noise environment at the project site.

Future Interior Noise Environment

<u>Residential Land Uses</u>
Standard residential construction provides approximately 15 dBA of exterior-to-interior noise reduction, assuming the windows are partially open for ventilation. Standard construction with the windows closed provides approximately 20 to 25 dBA of noise reduction in interior spaces. Where exterior noise levels range from 60 to 65 dBA L_{dn}, 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 L_{dn}, 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.

Residential units are located on levels three through five of the proposed building. Units located along the eastern façade nearest South Claremont Street would be set back from the centerline of the roadway by approximately 40 feet. At this distance, the units facing South Claremont Street would be exposed to future exterior noise levels up to 69 dBA L_{dn}. Assuming windows to be partially open, future interior noise levels in these units would be up to 54 dBA L_{dn}.

Units along the southern façade would be set back approximately 40 to 65 feet from the centerline of 9th Avenue. At this distance, the units facing 9th Avenue would be exposed to future exterior noise levels would be up to 76 dBA L_{dn}. Assuming windows to be partially open, future interior noise levels in these units would be up to 61 dBA L_{dn}.

Units located in the northwestern and southwestern corners of the proposed building would have direct exposure to train activity. However, the remaining units located along the western façade of the building would have an indoor hallway between the units and the western façade, which would provide additional attenuation from train noise. The nearest corner units would be set back approximately 70 feet from the edge of the nearest railroad tracks. At this distance, the units nearest the tracks would be exposed to future exterior noise levels would be up to 76 dBA L_{dn}. Assuming windows to be partially open, future interior noise levels in these units would be up to 61 dBA L_{dn}.

To meet the City and State's interior noise requirement of 45 dBA L_{dn}, implementation of noise insulation features would be required.

<u>Office Land Uses</u>
Commercial offices on levels one and two would have setbacks from the centerlines of the surrounding roadways of approximately 40 feet from South Claremont Street and from 9th Avenue. At these distances, daytime hourly average noise levels would range from 69 to 77 dBA L_{eq}, with day-night average noise levels up to 69 dBA L_{dn}.

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

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

Noise Insulation Features to Reduce Future Interior Noise Levels

The following noise insulation features shall be incorporated into the proposed project to reduce interior noise levels to 45 dBA L_{dn} or less at residential interiors:

- Provide a suitable form of forced-air mechanical ventilation, as determined by the local building official, for all residential units on the project site, so that windows can be kept closed at the occupant's discretion to control interior noise and achieve the interior noise standards.

- Preliminary calculations indicate that residential units facing South Claremont Street would require windows and doors with a minimum rating of 30 STC with adequate forced-air mechanical ventilation to meet the interior noise threshold of 45 dBA L_{dn}.

- Units facing 9th Avenue would require windows and doors with a minimum rating of 34 to 35 STC with adequate forced-air mechanical ventilation to meet the interior noise threshold of 45 dBA L_{dn}.

- Corner units with direct line-of-sight to the railroad tracks would require windows and doors with a minimum sound-rating of 34 to 35 STC with adequate forced-air mechanical ventilation to meet the interior noise threshold of 45 dBA L_{dn}.

The implementation of these noise insulation features would reduce interior noise levels to 45 dBA L_{dn} or less at residential uses.

Conditions of Approval

Interior Noise Standard for Residential Development. The project applicant shall prepare final design plans that incorporate building design and acoustical treatments to ensure compliance with State Building Codes and City noise standards. A project-specific acoustical analysis shall be prepared to ensure that the design incorporates controls to reduce interior noise levels to 45 dBA L_{dn} or lower within the residential unit and to 50 dBA $L_{eq(1\text{-}hr)}$ or lower within nonresidential interiors. The project applicant shall conform with any special building construction techniques requested by the City's Building Department, which may include sound-rated windows and doors, sound-rated wall constructions, and acoustical caulking.

Train Vibration and Land Use Compatibility

The FTA vibration impact assessment criteria (summarized in Table 5) were used to evaluate vibration levels produced by trains passing the project area under future conditions. The FTA vibration impact criteria are based on maximum overall levels for a single event. The impact criteria in Table 5 provide thresholds based on the number of train pass-bys in a given day: frequent events (more than 70 events of the same source per day), occasional events (30 to 70 vibration events of the same source per day), and infrequent events (less than 30 vibration events of the same source per day).

Future Vibration Environment

As shown in Table 7, six trains passed the site in just over an hour. According to the existing Caltrain schedule,[1] over 70 trains pass through San Mateo in a 24-hour period, which would fall within the frequent events FTA vibration impact category. It is assumed that the train schedule would remain the same under future conditions. Therefore, maximum vibration levels of 72 VdB for residences and buildings where people normally sleep would be the threshold for the proposed project.

Train pass-bys along the near and far tracks resulted in measured vibration levels up to 73 VdB. While the overall vibration levels did exceed 72 VdB during two of the Caltrain pass-bys, the threshold was not exceeded at any individual frequency, as shown in Figure A7.

Additionally, the FTA Manual includes adjustment factors applied to the measurements to account for coupling loss; amplification due to resonances of floors, walls, and ceilings; and floor-to-floor attenuation. At the ground-level where office space and parking would occur, no adjustment would apply; however, an adjustment of 1 VdB would be made at residential levels three through five. Therefore, vibration levels at the residential levels where sleeping would occur would be at or below 72 VdB. Vibration levels experience at the project site would be compatible with the proposed land uses.

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;

[1] https://www.caltrain.com/station/sanmateo?active_tab=route_explorer_tab&origin=7009

(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 and future noise-sensitive land uses would potentially be exposed to a temporary increase in noise levels in excess of the City's construction noise limits. With the incorporation of construction best management practices as project conditions of approval, the impact would be reduced to a **less-than-significant level**.

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 early January 2024, with an estimated completion date of mid-September 2025. Construction phases would include demolition, site preparation, 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.

Section 7.30.060 of the City of San Mateo's Municipal Code limits construction to weekdays between 7:00 a.m. and 7:00 p.m., Saturdays between 9:00 a.m. and 5:00 p.m., and Sundays and holidays between 12:00 p.m. and 4:00 p.m. Additionally, the City specifies that no individual piece of equipment shall produce a noise level exceeding 90 dBA at a distance of 25 feet and that the noise level outside any point outside the property plane of the project shall not exceed 90 dBA.

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 8) from the equipment. Table 9 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 72 to 88 dBA L_{eq} for mixed-use buildings, 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 result in lower construction noise levels at distant receptors.

Equipment expected to be used in each construction phase are summarized in Table 10, 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.

Table 11 summarizes the worst-case construction noise levels propagated from the geometrical center of the proposed building to the property lines of the surrounding land uses, assuming all pieces of equipment per phase operating simultaneously. Noise levels in Table 11 do not assume reductions due to intervening buildings or existing barriers.

TABLE 8 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

Equipment Category	L_{max} Level (dBA)[1,2]	Impact/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 9 Typical Ranges of Construction Noise Levels at 50 Feet, L_{eq} (dBA)

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

I - All pertinent equipment present at site.
II - Minimum required equipment present at site.

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

TABLE 10 Estimated Construction Noise Levels at a Distance of 25 feet

Phase of Construction	Total Workdays	Construction Equipment (Quantity)	Estimated Construction Noise Level at 25 feet
Demolition	28 days	Concrete/Industrial Saw (1)[a] Excavator (1) Rubber-Tired Dozer (1) Tractor/Loader/Backhoe (3) [a]	91 dBA L_{eq}
Site Preparation	12 days	Grader (1)[a] Rubber-Tired Dozer (1) Tractor/Loader/Backhoe (1)[a]	90 dBA L_{eq}
Grading/Excavation	26 days	Excavator (1) Grader (1)[a] Rubber-Tired Dozer (1) Concrete/Industrial Saw (1)[a] Tractor/Loader/Backhoe (2)	91 dBA L_{eq}
Trenching/Foundation	67 days	Tractor/Loader/Backhoe (1) [a] Excavator (1)[a]	88 dBA L_{eq}
Building – Exterior	156 days	Crane (1)[a] Forklift (1) Tractor/Loader/Backhoe (1) [a] Welder (3)	87 dBA L_{eq}
Building – Interior/ Architectural Coating	209 days	Air Compressor (1) [a]	80 dBA L_{eq}
Paving	28 days	Cement & Mortar Mixer (1) Paver (1) Paving Equipment (1)[a] Roller (1) Tractor/Loader/Backhoe (1) [a]	90 dBA L_{eq}

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

TABLE 11 Estimated Construction Noise Levels at Receiving Property Lines

Phase of Construction	Calculated Hourly Average Noise Levels, L_{eq} (dBA)			
	North Office (145ft)	East Commercial (170ft)	South Commercial (230ft)	West Commercial (240ft)
Demolition	78 dBA L_{eq}	77 dBA L_{eq}	74 dBA L_{eq}	74 dBA L_{eq}
Site Preparation	75 dBA L_{eq}	74 dBA L_{eq}	71 dBA L_{eq}	71 dBA L_{eq}
Grading/Excavation	79 dBA L_{eq}	77 dBA L_{eq}	75 dBA L_{eq}	74 dBA L_{eq}
Trenching/Foundation	72 dBA L_{eq}	71 dBA L_{eq}	68 dBA L_{eq}	68 dBA L_{eq}
Building –Exterior	73 dBA L_{eq}	71 dBA L_{eq}	69 dBA L_{eq}	68 dBA L_{eq}
Building – Interior/ Architectural Coating	65 dBA L_{eq}	63 dBA L_{eq}	60 dBA L_{eq}	60 dBA L_{eq}
Paving	76 dBA L_{eq}	75 dBA L_{eq}	72 dBA L_{eq}	72 dBA L_{eq}

As shown in Tables 10 and 11, construction noise levels would intermittently range from 80 to 91 dBA L_{eq} when activities occur approximately 25 feet from nearby receptors and would typically range from 60 to 79 dBA L_{eq} when focused near the center of the site. Individual pieces of equipment could potentially exceed the City's 90 dBA noise limit at a distance of 25 feet. Further, when equipment is used within 25 feet of the project's boundaries, 90 dBA could be exceeded outside the property plane.

Modification, placement, and operation of construction equipment are possible means for minimizing the impact of construction noise on existing sensitive receptors. Construction equipment should be well-maintained and used judiciously to be as quiet as possible. Additionally, construction activities for the proposed project shall incorporate the following best management practices as project conditions of approval to reduce noise from construction activities near sensitive land uses:

- The applicant or their designated contractor shall prepare a detailed construction plan identifying the schedule for major noise-generating construction activities and include all equipment expected to be used in each construction phase of the project, along with the quantity of each type of equipment and noise levels. This construction plan shall be submitted to the Building and Planning Division subject to the review and satisfaction of the Community Development Director, or their designee prior to the issuance of any construction, grading or demolition permit.

- The applicant or their designated contractor shall designate a "disturbance coordinator" who would 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 measures be implemented to reduce the noise impact. The applicant or their designated contractor shall conspicuously post a construction project sign that includes a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule.

- The applicant or their designated contractor shall provide a plan for construction staging areas, which shall be established at locations that will create the greatest distance between the construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction. The construction staging plan shall be submitted to the Planning Division and Public Works, subject to review and satisfaction of the Community Development and Public Works Directors, or their designees, prior to issuance of any construction, grading or demolition permit.

- Quieter saws, cement mixers, cranes, dozers, excavators, graders, and pavers shall be selected. No individual device or piece of equipment shall produce a noise level exceeding 90 dBA at a distance of 25 feet from the source, in accordance with San Mateo Municipal Code section 7.30.060(e).

- All internal combustion engine-driven equipment shall be equipped with intake and exhaust mufflers that are in good condition and appropriate for the equipment.

- Idling of internal combustion engines for longer than five minutes in duration shall be strictly prohibited.

- Stationary noise-generating equipment shall be located as far as possible from sensitive receptors and property lines. If they must be located within 30 feet of receptors and property lines, adequate muffling (with temporary barriers where feasible and appropriate) shall be used to reduce noise levels at the adjacent sensitive receptors to 90 dBA. All temporary barriers used shall be eight feet in height at minimum, continuous from grade to top, with no cracks or gaps, and have a minimum surface density of three pounds per square foot (e.g., one-inch thick wood fence boards).

- Construction contractors and subcontractors shall utilize "quiet" air compressors and other stationary noise sources where technology exists.

Implementation of the above conditions of approval would reduce construction noise levels emanating from the site, limit construction hours, and minimize disruption and annoyance. With the implementation of these measures and recognizing that noise generated by construction activities would occur over a temporary period, the impact would be reduced to a less-than-significant level.

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

According to Policy N2.2 of the City's General Plan, a significant permanent noise increase would occur at existing noise-sensitive receptors if a new development results in a permanent noise increase of 3 dBA L_{dn} or greater.

Operational noise is limited to the noise levels specified in Table 7.30.040, adjusted for ambient conditions. If existing conditions exceed the limits, then existing ambient noise levels would be used as the thresholds. The thresholds would be the following:

- For noise sources operating more than 30 minutes in a given hour, thresholds would be 60 dBA at night and 65 dBA during the day at commercial or office buildings and 70 dBA anytime at industrial uses. The measured hourly average noise levels during daytime hours ranged from 68 to 76 dBA L_{eq} (average of 71 dBA L_{eq}) and from 45 to 73 dBA L_{eq} during nighttime hours (average of 59 dBA L_{eq}) along the railroad tracks. Hourly average noise levels during daytime hours ranged from 58 to 74 dBA L_{eq} (average of 64 dBA L_{eq}) and from 46 to 65 dBA L_{eq} during nighttime hours (average of 54 dBA L_{eq}) along South Claremont Street. Conservatively, for all receptors located along the railroad tracks (i.e., north offices, south commercial, and west commercial), thresholds for operations occurring more than 30 minutes in a given hour would be 71 dBA during daytime hours and 60 dBA during nighttime hours. For the east commercial uses, thresholds would be 65 dBA during daytime hours and 60 dBA during nighttime hours.

- Thresholds for activities occurring more than five minutes in a given hour for the north offices, south commercial uses, and west commercial uses would be 81 dBA L_{08} during daytime hours and 70 dBA L_{08} during nighttime hours. For the east commercial uses, thresholds would be 75 dBA L_{08} during daytime hours and 70 dBA L_{08} during nighttime hours.

Project Traffic Increase

The traffic study included peak hour turning movements for five intersections in the project vicinity for the existing traffic volumes. When project trips were added to the existing traffic volumes, the existing plus project scenario was estimated. By comparing the existing plus project traffic volumes to the existing volumes, the project's contribution to the overall noise level increase was determined to be less than 1 dBA L_{dn} along each roadway segment in the project vicinity. Therefore, the project would not result in a permanent noise increase of 3 dBA L_{dn} or more at noise-sensitive receptors in the project vicinity.

Mechanical Equipment

On the ground level of the proposed building, the site plan shows two electrical and two transformer rooms along the northern façade, a fire pump generator room in the northeastern corner, and a boiler room located on the interior of the parking garage near the northeastern corner.

Transformers up to 1,000 kVA typically generate noise levels up to 64 dB, as measured at 1 meter (3.28 feet). Assuming the transformer runs continuously during daytime and nighttime hours, the day-night average noise level would be 70 dBA L_{dn} at a distance of 1 meter (3.28 feet). With no windows in the transformer room, the building would provide about 20 dBA attenuation for surrounding receptors.

The applicant has indicated that a diesel fire pump with an integral generator model JU4H-UF30 has been chosen for the project. The source level provided by the applicant was 103 dBA at 1 meter (3.28 feet). This type of equipment would not typically run continuously, as it operates during emergency situations when the noise level restrictions would not typically apply. However, emergency equipment is tested monthly for a period of one hour between 7:00 a.m. and 10:00 p.m. to ensure the equipment is operating efficiently in case an emergency occurs. During the monthly testing periods, the noise level thresholds would apply. The building wall assembly would provide a conservative 20 dBA attenuation, which is assumed for this analysis.

The applicant has also provided source levels for the boiler (model KN-20), which would generate noise levels ranging from 57 to 63 dBA at 5 feet under low fire conditions and from 74 to 82 dBA at 5 feet under high fire conditions. Assuming continuous operations for a 24-hour period, the day-night average noise level at 5 feet would be up to 88 dBA L_{dn} under high fire conditions, which would represent worst-case conditions. Similar to the other ground-level equipment, the building façade would provide a minimum attenuation of 20 dBA.

Table 12 summarizes the hourly average noise levels and day-night average noise levels expected at the property lines of the nearest surrounding receptors with direct exposure to the equipment rooms, which would include the north offices and the east commercial uses. Receptors to the south and to the west would be well shielded from all equipment rooms and are not considered receptors for the ground-level equipment.

Based on the estimated noise levels in Table 12, the ground-level equipment rooms would not exceed the City's daytime or nighttime thresholds at the east commercial uses or the north offices.

Note, the fire pump generator noise levels are only subject to the daytime noise limits during the monthly testing periods and would not be subject to the nighttime thresholds. For all existing receptors, the noise level increase due to ground-level equipment would not be measurable or detectable (0 dBA L_{dn} increase). This would be a less-than-significant impact.

TABLE 12 Estimated Operational Noise Levels from Mechanical Equipment

Receptor	Transformer		Fire Pump Generator		Boiler		L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
	Distance from Center of Room, feet	L_{eq}, dBA	Distance from Center of Room, feet	L_{eq}, dBA	Distance from Center of Room, feet	L_{eq}, dBA		
North Offices	30	25[a]	30	64[a,b]	75	Up to 39[a]	51[a]	0
East Commercial	95	< 20[a]	80	55[a,b]	115	Up to 35[a]	44[a]	0

[a] Conservative 20 dBA noise level attenuation due to a wall assembly of the building.
[b] Hourly average thresholds for the fire pump generator would only be applicable during monthly testing during daytime hours. These noise levels would not be subject to the nighttime threshold requirements.

Additional mechanical equipment, including heat pump condenser units and air handling units, would be located along the centerline of the north, east, and south building sections on the roof. Details pertaining to such equipment, such as the specific types of units, noise level information, number of units, etc., are unavailable at this time. Typical heat pump condensing units generate noise levels up to 66 dBA at a distance of 3 feet. Air handling units typically generate noise levels up to 62 dBA at a distance of 20 feet. Assuming worst-case conditions, up to 10 units of each are assumed to operate at any given time in the same general area of the roof, for a combined noise level of 89 dBA at 3 feet. These types of units would cycle on and off continuously over a given 24-hour period, and assuming all 10 units of each operating continuously at any given time throughout each hour, the day-night average noise level under worst-case conditions would be 95 dBA L_{dn} at 3 feet.

The site plan shows a parapet wall of just under 5 feet tall that would surround the roof, providing a minimum 20 dBA shielding when combined with the elevation of the roof above the ground for all existing receptors surrounding the building. Table 13 summarizes the hourly average and day-night average noise levels propagated from the center of the equipment to the surrounding property lines.

TABLE 13 Estimated Operational Noise Levels from Rooftop Equipment

Receptor	Distance from Center of Rooftop Equipment, feet	Combined L_{eq} from Rooftop Equipment, dBA	Combined L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
North Offices	60	43[a]	49[a]	0
East Commercial	110	37[a]	44[a]	0
South Commercial	135	36[a]	42[a]	0
West Commercial	190	33[a]	39[a]	0

[a] Conservative 20 dBA noise level attenuation due to a parapet wall of just under 5 feet tall and elevation of the rooftop above the ground.

Assuming attenuation from the parapet wall combined with the elevation of the rooftop, the rooftop equipment would not exceed the City's hourly average noise levels during daytime or nighttime hours at the nearest surrounding receptors or the day-night average noise level at the property line. For all existing receptors, the noise level increase due to rooftop equipment would not be measurable or detectable (0 dBA L_{dn} increase).

Truck Loading and Unloading

The site plan shows a loading in the northwestern corner of the sites. While the north offices and south and west commercial uses would have direct line-of-sight to the loading zone, the east commercial uses would be mostly shielded and not considered a sensitive receptor for truck loading and unloading activities. For all loading and unloading activities, including trash pickup which would also occur at the identified loading area since the trash receptacle is shown in the northwestern corner as well, truck maneuvering would take more than five minutes but less than 15 minutes per delivery.

Truck maneuvering noise would include a combination of engine, exhaust, and tire noise, as well as the intermittent sounds of back-up alarms and releases of compressed air associated with truck/trailer air brakes. For offices and multi-family residences, medium-sized delivery trucks would be expected at the proposed building. Medium-sized delivery trucks typically generate maximum noise levels of 60 to 65 dBA at 50 feet. The noise level of backup alarms can vary depending on the type and directivity of the sound, but maximum noise levels are typically in the range of 65 to 75 dBA at a distance of 50 feet. All deliveries are assumed to occur during daytime hours between 7:00 a.m. and 10:00 p.m.

It is assumed that up to two deliveries would occur weekly and only one delivery would occur in a given hour. While the proposed building would provide some shielding for the receptors to the north and to the south, no attenuation is conservatively assumed for this analysis. Table 14 summarizes expected noise levels generated by typical truck deliveries at the receptors with exposure to the loading areas, assuming worst-case conditions which would include two truck deliveries in a 24-hour period.

Based on the estimated noise levels in Table 14, truck loading and unloading activities would not exceed the City's L_{08} daytime thresholds, which are summarized above to be 81 dBA L_{08}, at the receptors with direct line-of-sight to the loading areas. For all existing receptors, the noise level increase due to truck loading and unloading activities would not be measurable or detectable (0 dBA L_{dn} increase). This would be a less-than-significant impact.

TABLE 14 Estimated Operational Noise Levels from Truck Loading and Unloading Activities

Receptor	Distance from Center of Loading Area, feet	Noise Levels from Truck Deliveries, dBA L_{08}	L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
North Offices	40	67	50	0
South Commercial	325	49	32	0
West Commercial	135	56	40	0

Total Combined Project-Generated Noise

The operational noise levels produced by the proposed project combined (i.e., traffic, mechanical equipment, and truck loading and unloading activities) would result in an increase of less than 1 dBA L_{dn} at all existing noise-sensitive receptors surrounding the project site. Therefore, the proposed project would not result in a substantial increase over ambient noise levels in the project vicinity. Further, operational noise levels would not exceed 65 dBA L_{dn} at the property lines or exceed ambient levels at the surrounding land uses. This is a less-than-significant impact.

Impact 2: Exposure to Excessive Groundborne Vibration. Construction-related vibration levels would not exceed applicable vibration thresholds at nearby sensitive land uses. **This is a less-than-significant impact.**

The construction of the project may generate perceptible vibration when heavy equipment or impact tools (e.g., jackhammers, hoe rams) are used. Construction activities would include demolition, site preparation work, foundation work, and new building framing and finishing. Pile driving equipment, which can cause excessive vibration, is not expected to be required for the proposed project.

The California Department of Transportation recommends a vibration limit of 0.5 in/sec PPV for buildings structurally sound and designed to modern engineering standards, which typically consist of buildings constructed since the 1990s. Conservative vibration limits of 0.3 in/sec PPV has been used for buildings that are found to be structurally sound but where structural damage is a major concern (see Table 3 above for further explanation). For historical buildings or buildings that are documented to be structurally weakened, a cautious limit of 0.08 in/sec PPV is often used to provide the highest level of protection.

Table 15 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 15 also summarizes the distances to the 0.08 in/sec PPV threshold for historical buildings and to the 0.3 in/sec PPV threshold for all other buildings. The nearest historical buildings identified by the City would be 400 feet or more from the project vicinity. At 400 feet, vibration levels at the nearest historical structure would be 0.01 in/sec PPV or below. Therefore, the nearest historical buildings would not be considered a sensitive receptor for construction vibration and will not be discussed further.

TABLE 15 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 0.3 in/sec PPV (feet)
Clam shovel drop		0.202	59	18
Hydromill (slurry wall)	in soil	0.008	4	1
	in rock	0.017	7	2
Vibratory Roller		0.210	61	19
Hoe Ram		0.089	28	9
Large bulldozer		0.089	28	9
Caisson drilling		0.089	28	9
Loaded trucks		0.076	24	8
Jackhammer		0.035	12	4
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 2023.

Table 16 summarizes the vibration levels at each of the surrounding buildings in the project vicinity. 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 (as shown in Table 16), which are different than the distances used to propagate construction noise levels (as shown in Table 11), were estimated under the assumption that each piece of equipment from Table 15 was operating along the nearest portion of the active construction site where the worst vibration-generating equipment would operate, which would represent the worst-case scenario.

As shown in Table 16, buildings surrounding the site consisting of conventional construction materials would not be exposed to vibration levels exceeding the 0.3 in/sec PPV threshold. Additionally, the nearest historical building would not be exposed to vibration levels exceeding the conservative 0.08 in/sec PPV threshold.

Neither cosmetic, minor, or major damage would occur at historical or conventional buildings located 60 feet or more from the project site. At these locations, and in other surrounding areas where vibration would not be expected to cause cosmetic damage, vibration levels may still be perceptible. However, as with any type of construction, this would be anticipated and would not be considered significant, given the intermittent and short duration of the phases that have the highest potential of producing vibration (use of jackhammers and other high-power tools). By use of administrative controls, such as notifying neighbors of scheduled construction activities and scheduling construction activities with the highest potential to produce perceptible vibration during hours with the least potential to affect nearby businesses, perceptible vibration can be kept to a minimum.

In summary, the construction of the project would not generate vibration levels exceeding 0.08 in/sec PPV at the nearest historical properties nor 0.3 in/sec PPV at the surrounding buildings of conventional materials. This would be a less-than-significant impact.

TABLE 16 Vibration Source Levels for Construction Equipment

Equipment		PPV (in/sec) Estimated at Nearest Building Façades Surrounding the Project Site			
		North Office Buildings (25ft)	East Commercial Buildings (65ft)	South Commercial Buildings (70ft)	West Commercial Buildings (120ft)
Clam shovel drop		0.202	0.071	0.065	0.036
Hydromill (slurry wall)	in soil	0.008	0.003	0.003	0.001
	in rock	0.017	0.006	0.005	0.003
Vibratory Roller		0.210	0.073	0.068	0.037
Hoe Ram		0.089	0.031	0.029	0.016
Large bulldozer		0.089	0.031	0.029	0.016
Caisson drilling		0.089	0.031	0.029	0.016
Loaded trucks		0.076	0.027	0.024	0.014
Jackhammer		0.035	0.012	0.011	0.006
Small bulldozer		0.003	0.001	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 2023.

Impact 3: **Excessive Aircraft Noise.** The project site is located about 3.9 miles from the San Francisco International Airport. The noise environment attributable to aircraft is considered normally acceptable. This is a **less-than-significant** impact.

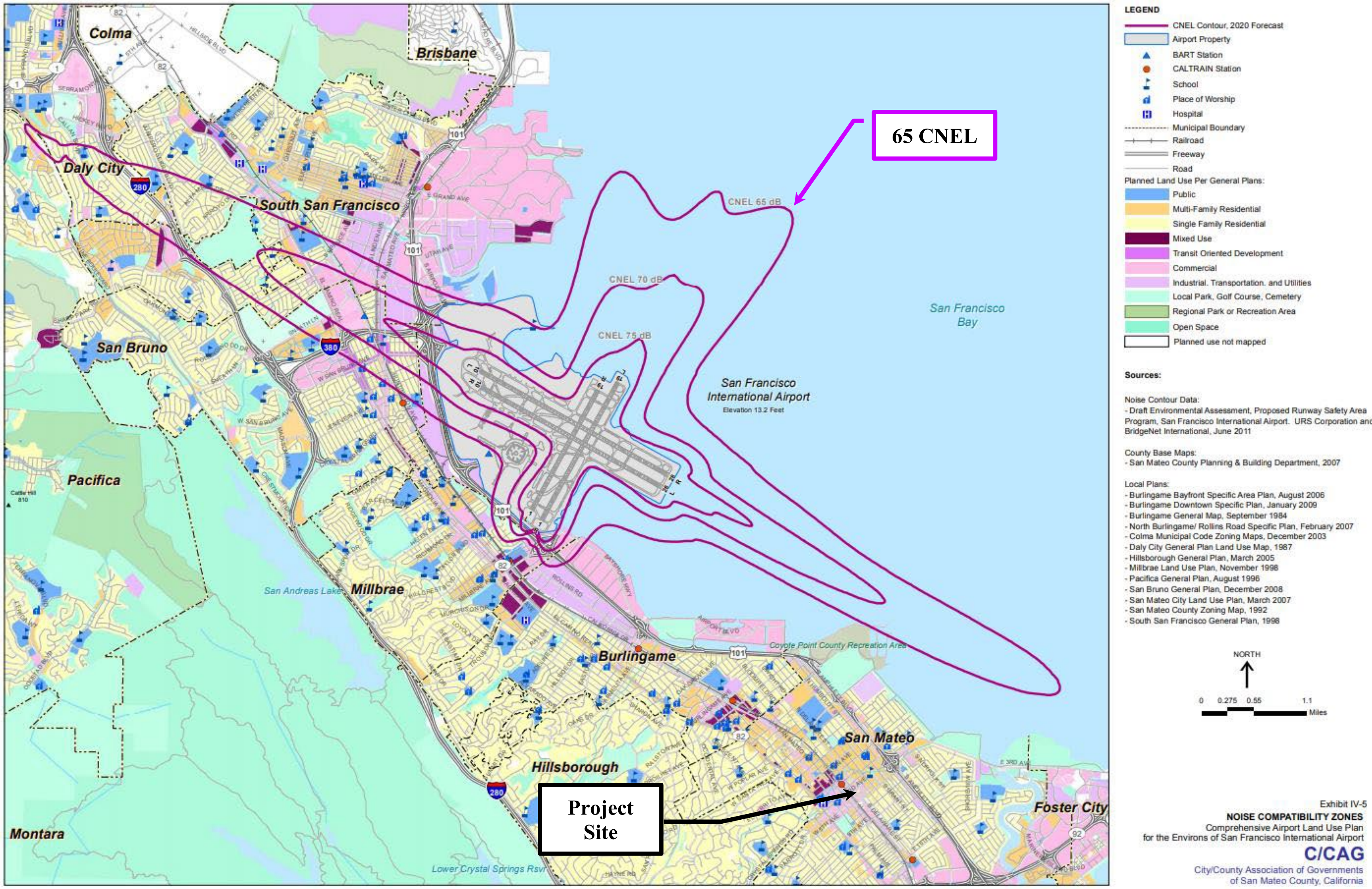
The San Francisco International Airport is a public-use airport located approximately 3.9 miles northwest of the project site. According to the *Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport*,[2] the project site lies well outside the 65 dBA CNEL/L_{dn} noise contour (see Figure 2), and the required safe and compatible threshold for exterior noise levels would be at or below 65 dBA CNEL/L_{dn} for aircrafts. Therefore, the proposed project would be compatible with the exterior noise standards for aircraft noise.

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

Mitigation Measure 3: **None required.**

[2] Ricondo & Associates, Inc. with Jacobs Consultancy and Clarion Associates, *Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport*, November 2012.

FIGURE 2 2020 CNEL Noise Contours for San Francisco International Airport Relative to Project Site



Cumulative Impacts

Cumulative noise impacts would include temporary construction noise from cumulative construction projects.

A significant cumulative traffic noise impact would occur if two criteria are met: 1) if the cumulative traffic noise level increase was 3 dBA L_{dn} or greater for future levels exceeding the normally acceptable threshold; 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 L_{dn} or more attributable solely to the proposed project.

Cumulative plus project peak hour traffic volumes were included in the traffic study. The cumulative (no project) volumes were estimated by subtracting the project trips from the cumulative plus project scenario. When cumulative (no project) and cumulative plus project traffic volumes were compared to the existing peak hour volumes, an increase of 3 dBA L_{dn} or more was calculated along three roadway segments: B Street, north of 9th Avenue; B Street, south of 9th Avenue; and 9th Avenue, west of B Street. However, the same noise level increase was estimated under both cumulative (no project) and cumulative plus project traffic conditions, which means the project would not result in a cumulatively considerable contribution to the overall traffic noise increase. All other segments in the project vicinity would result in a 2 dBA L_{dn} or less increase under cumulative (no project) and cumulative plus project scenarios. Therefore, the project would not cause a significant cumulative noise increase at noise-sensitive uses in the project vicinity.

The City of San Mateo has identified one development project located within 500 feet of the proposed 477 9th Avenue project site:

- **Nazareth Vista Mixed-Use** – this project is located at 616 South B Street and is approximately 490 feet west of the proposed project site. The Nazareth Vista Mixed-Use Project, which is currently in the planning review phase, would consist of demolishing the existing buildings at the site and constructing a six-story mixed-use building. Construction dates for this project have not been confirmed. These two project sites would not share noise-sensitive receptors with direct line-of-sight to both sites. Therefore, a significant cumulative construction impact would not be assumed.

Since the Nazareth Vista Mixed-Use Project would not share noise-sensitive receptors with the 477 9th Avenue Project, the potential cumulative construction impact would be less-than-significant.

APPENDIX

FIGURE A1 Daily Trend in Noise Levels at LT-1, Wednesday, March 15, 2023

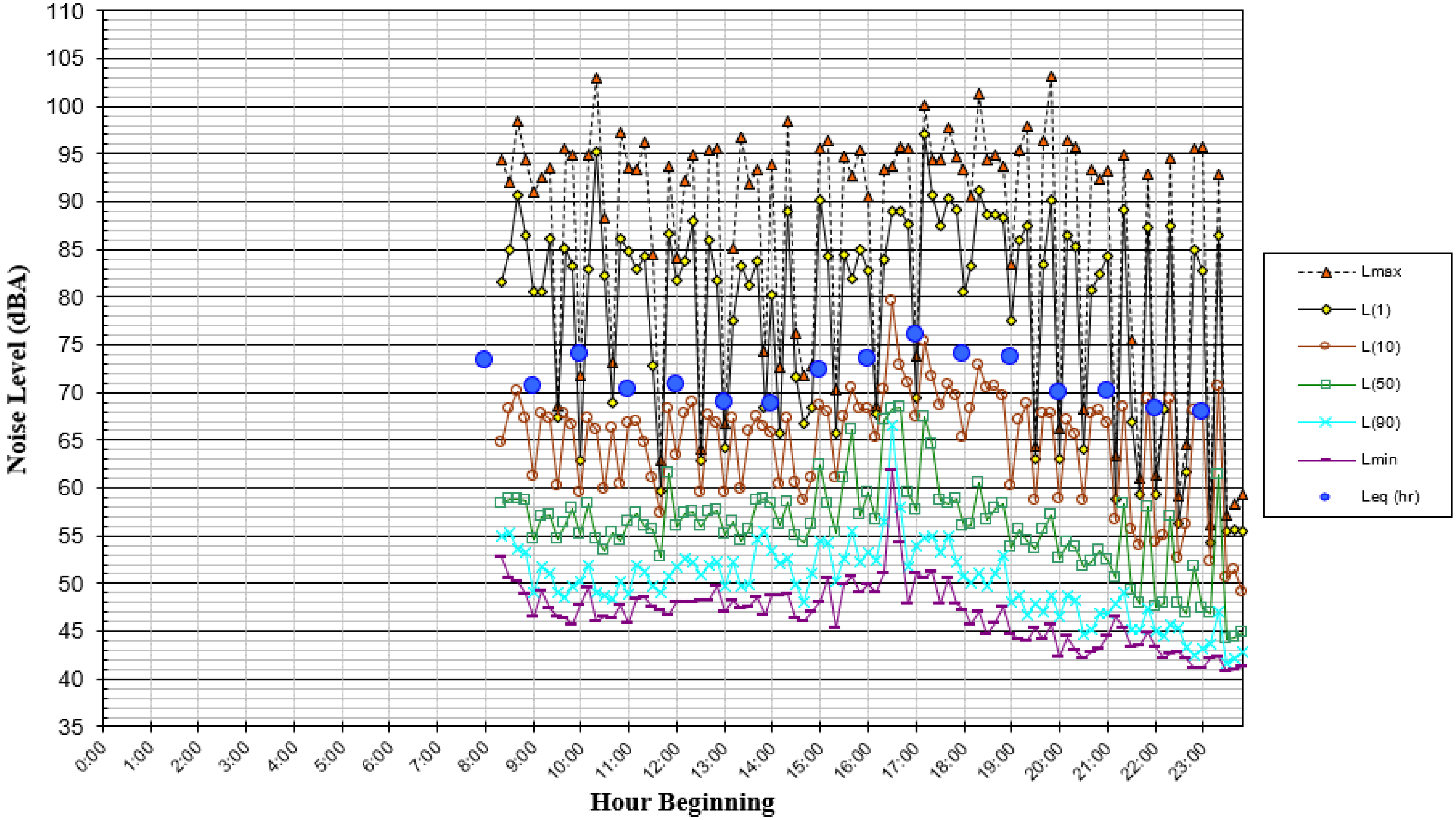


FIGURE A2 Daily Trend in Noise Levels at LT-1, Thursday, March 16, 2023

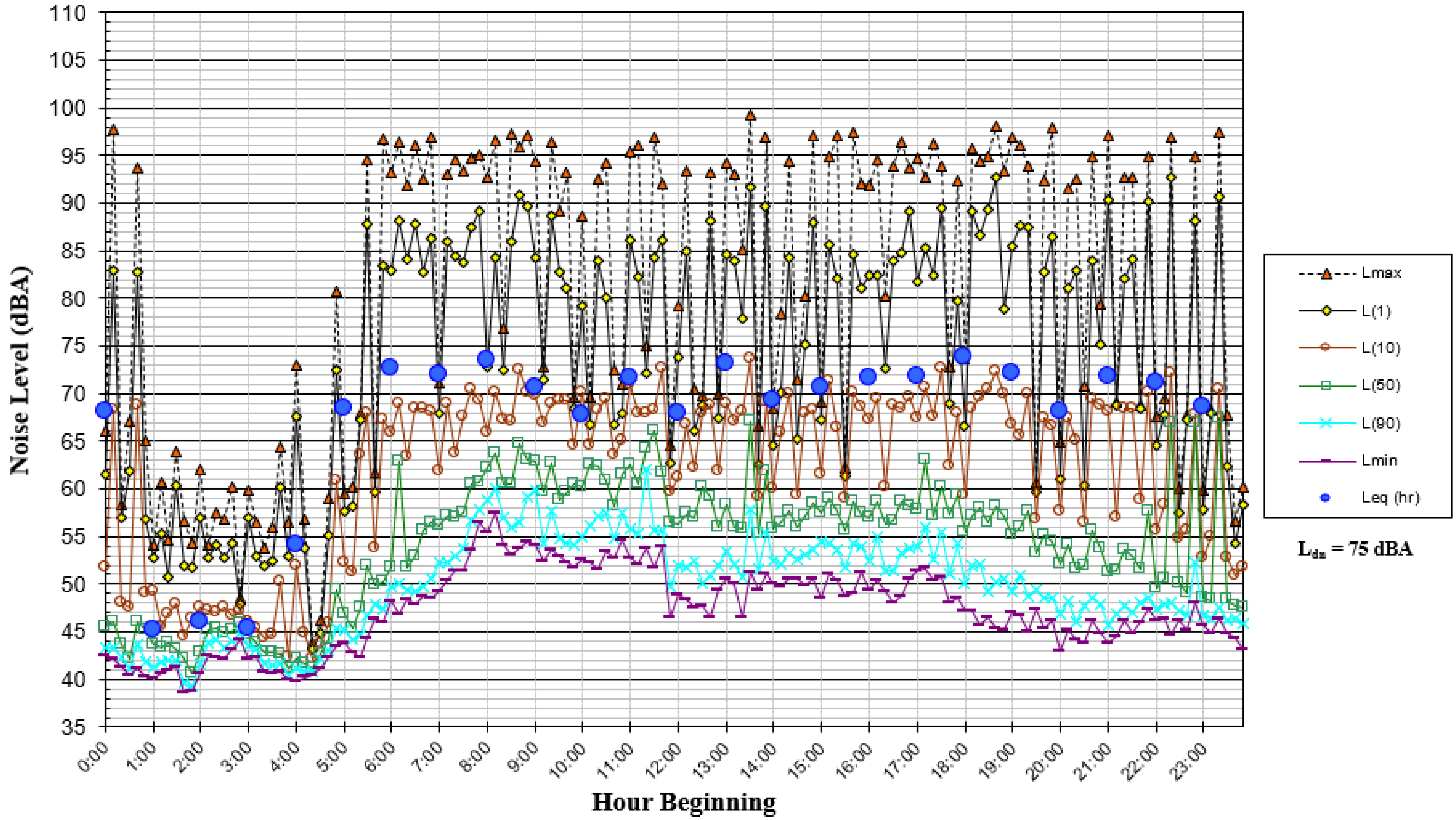


FIGURE A3 Daily Trend in Noise Levels at LT-1, Friday, March 17, 2023

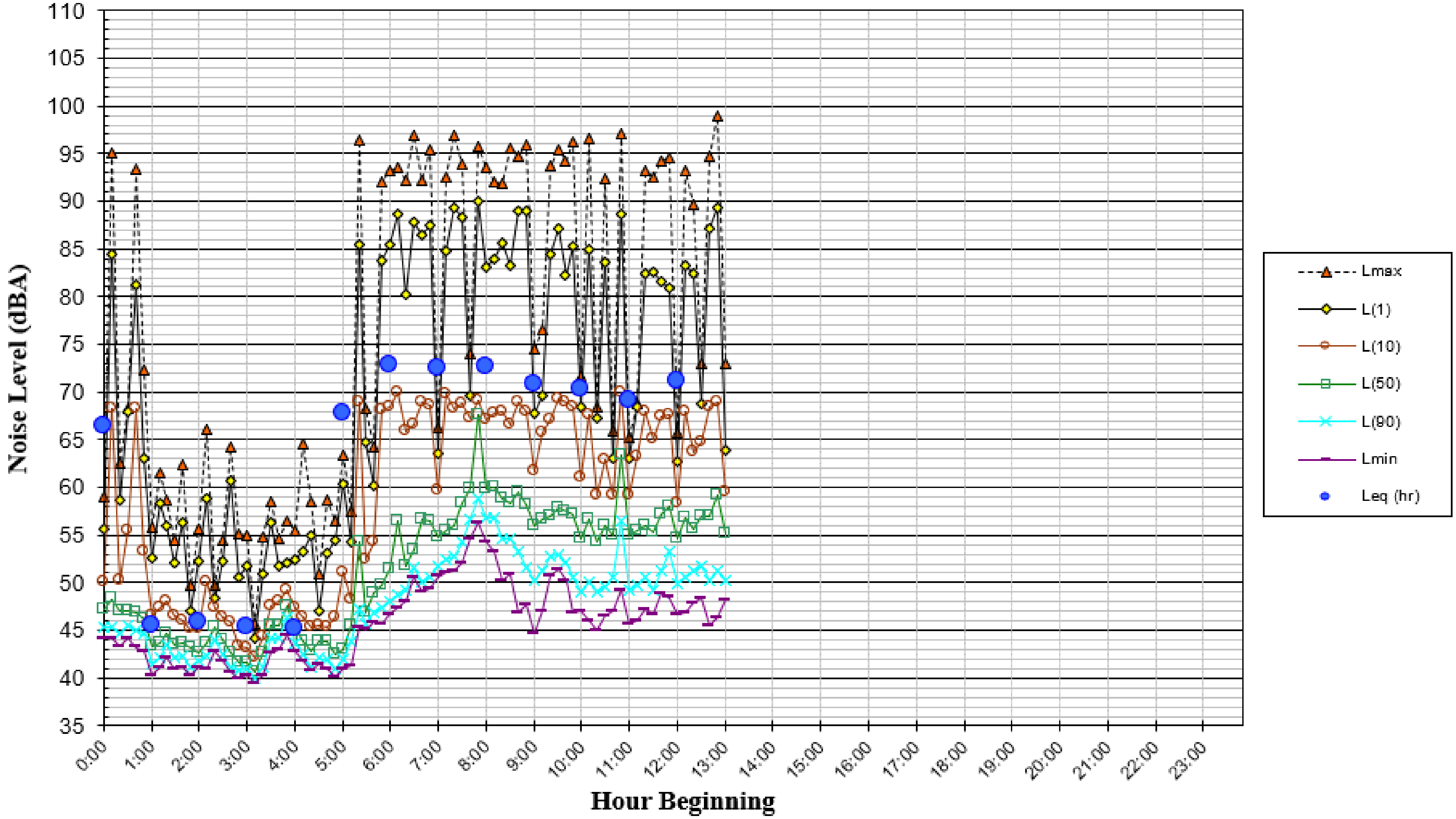


FIGURE A4 Daily Trend in Noise Levels at LT-2, Wednesday, March 15, 2023

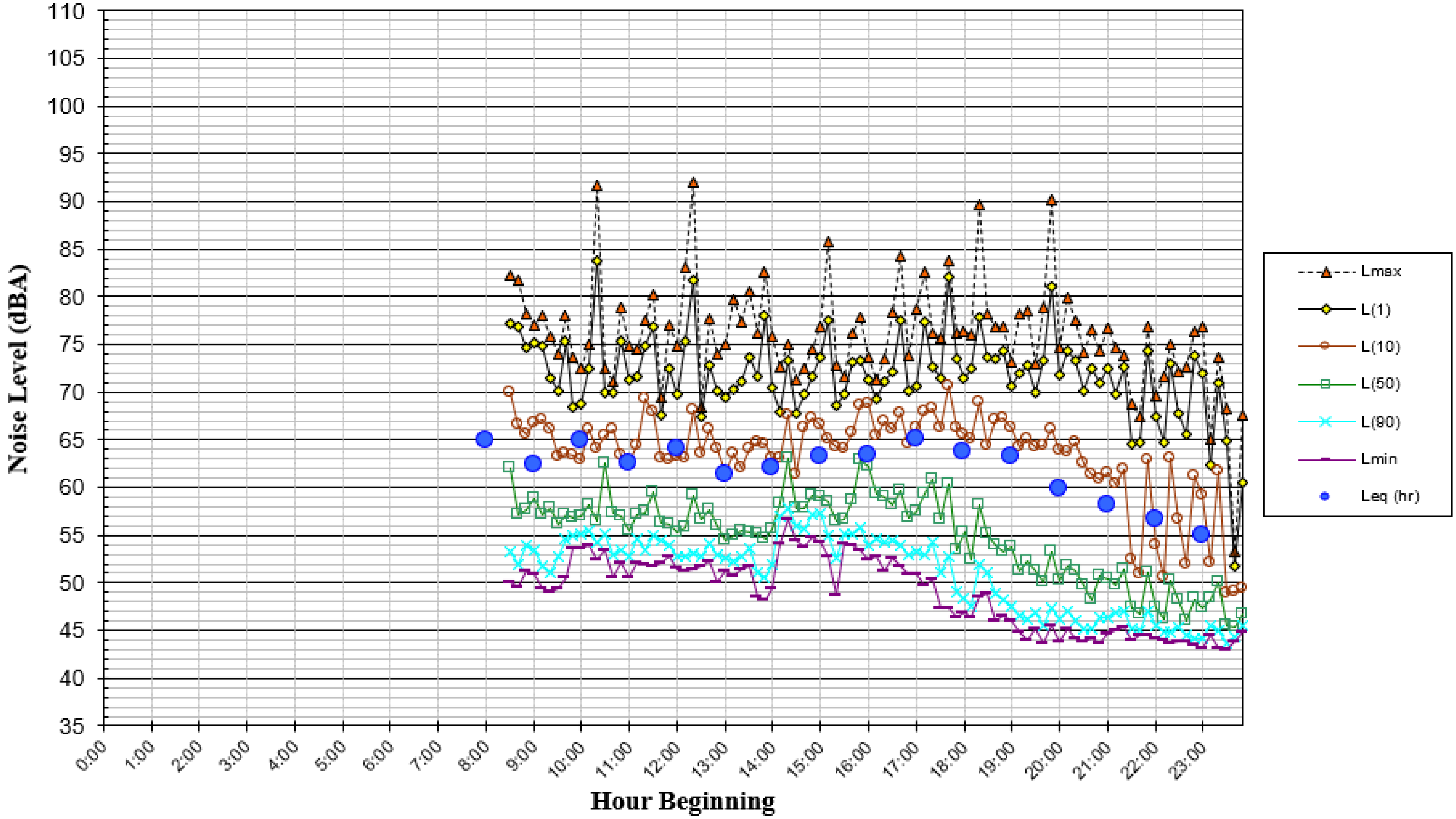
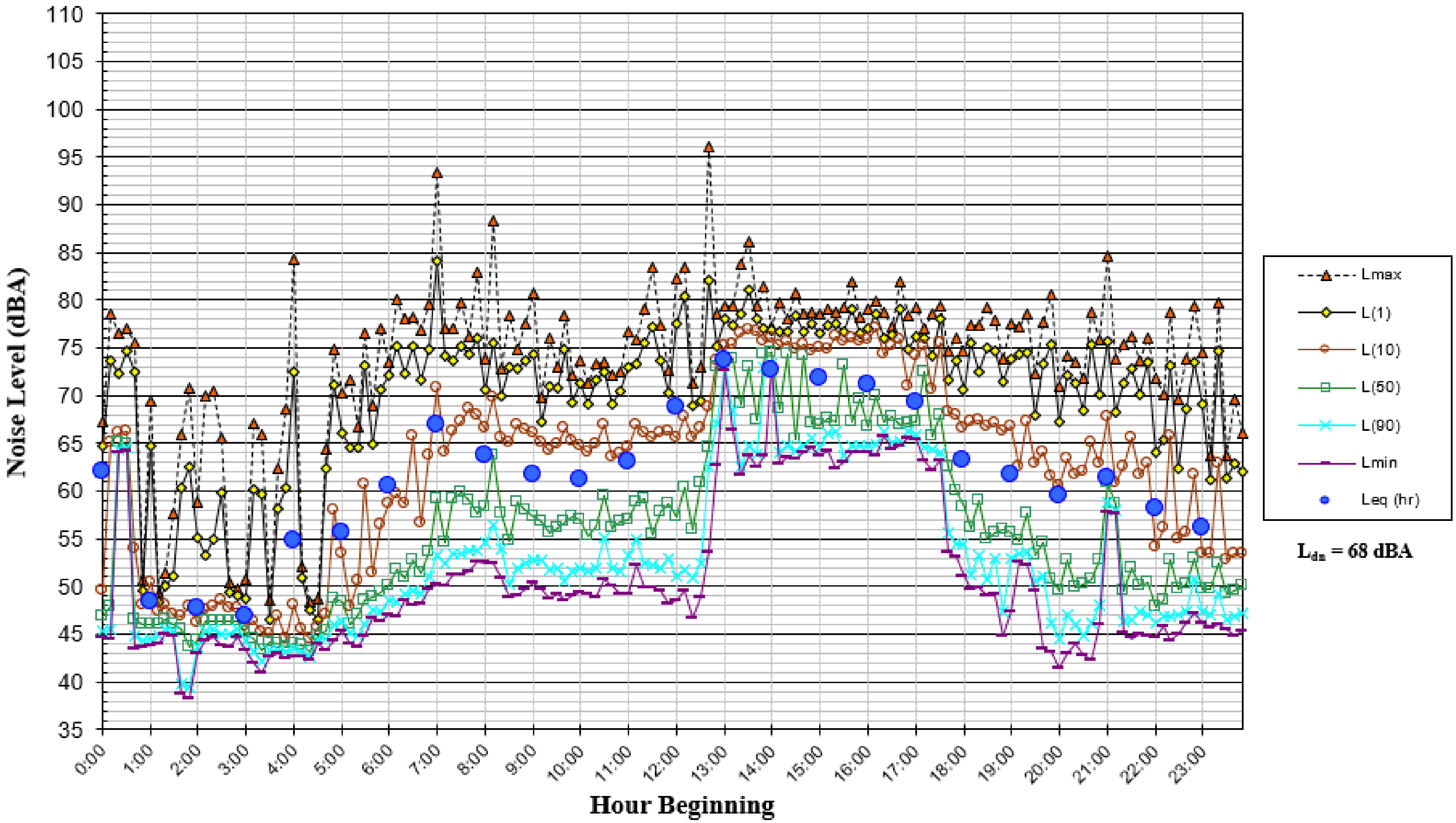


FIGURE A5 Daily Trend in Noise Levels at LT-2, Thursday, March 16, 2023



L_{dn} = 68 dBA

FIGURE A6 Daily Trend in Noise Levels at LT-2, Friday, March 17, 2023

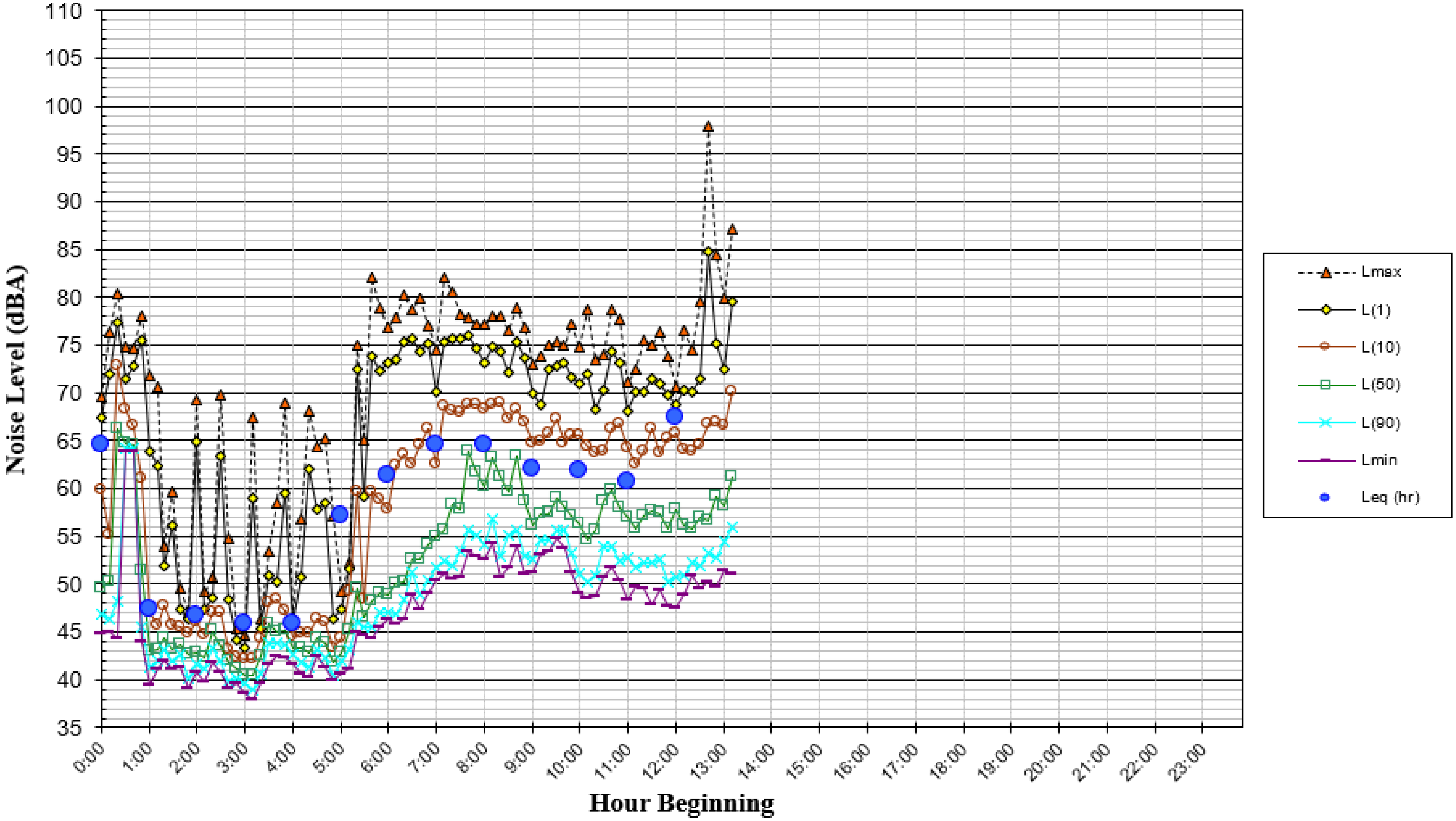


FIGURE A7 Caltrain Vibration Levels at a Distance of 65 feet from the Edge of the Nearest Tracks