NOISE AND VIBRATION ASSESSMENT

APPENDIX G

to the
Alexandria Center for Life Science Project Draft EIR

ALEXANDRIA CENTER FOR LIFE SCIENCE
NOISE AND VIBRATION ASSESSMENT

San Carlos, California

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INTRODUCTION

The approximately 24.7-acre project site is currently occupied by various businesses and parking. The project proposes to demolish the existing buildings to construct six life science office buildings totaling approximately 1,734,532 square-feet (sf), two (2) parking garages with up to 3,373 parking spaces, and a surface parking lot with up to 144 parking spaces. The development of the site could occur in three phases.

- **Phase 1** – Phase 1 of the project proposes to construct two office buildings and one parking garage.

- **Phase 2** – Phase 2 of the project proposes to construct two additional office buildings, the second parking garage, an approximately 4,500 square-foot amenity space, and another approximately 11,543 square foot amenity space, which for the purpose of this analysis, is assumed to have a childcare/community center.

- **Phase 3** – Phase 3 of the project proposes to construct the final two office buildings and the surface parking lot, completing construction of the entire project.

To be responsive to market conditions however, the phases could change and the combinations of buildings in each phase could differ from those shown above. Each phase also could be broken down into subphases, resulting in the construction of one building at a time and a longer overall construction duration. This report analyzes the fastest construction schedule because that schedule results in higher per day noise than a slower construction schedule, under which less construction work would be done each day.

This report evaluates the project's potential to result in significant noise and vibration impacts with respect to applicable California Environmental Quality Act (CEQA) guidelines. The report is divided into three sections: 1) the Setting Section provides a brief description of the fundamentals of environmental noise and groundborne vibration, summarizes applicable regulatory criteria, and discusses 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.

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 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 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 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 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.

Fundamentals of Groundborne Vibration

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

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

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

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

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

TABLE 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.

SETTING
REGULATORY SETTING – NOISE

This section describes the relevant guidelines, policies, and standards established by State Agencies, Santa Clara County, and the City of San Carlos. 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.

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, to 85 dBA L_{eq} at commercial land uses, and to 90 dBA L_{eq} at industrial land uses. For a General Construction Noise Assessment, it should be assumed that all equipment operates at the center of the project.

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:

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

(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.
>
> **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 Carlos

San Carlos 2030 General Plan. The City of San Carlos adopted the 2030 General Plan in October 2009. The Noise Element of the General Plan[2] provides goals, policies, and actions to maintain a community with a noise environment that supports a high quality of life. The goals, policies, and actions that apply to the proposed project are as follows:

Goal NOI-1: Encourage compatible noise environments for new development and control sources of excessive noise citywide.

> **Policy NOI-1.1.** Use the Noise and Land Compatibility Standards shown in Figure 9-1, the noise level performance standards in Table 9-1 and the projected future noise contours for

2 City of San Carlos, *San Carlos 2030 General Plan*, Noise Element, Adopted October 12, 2009.

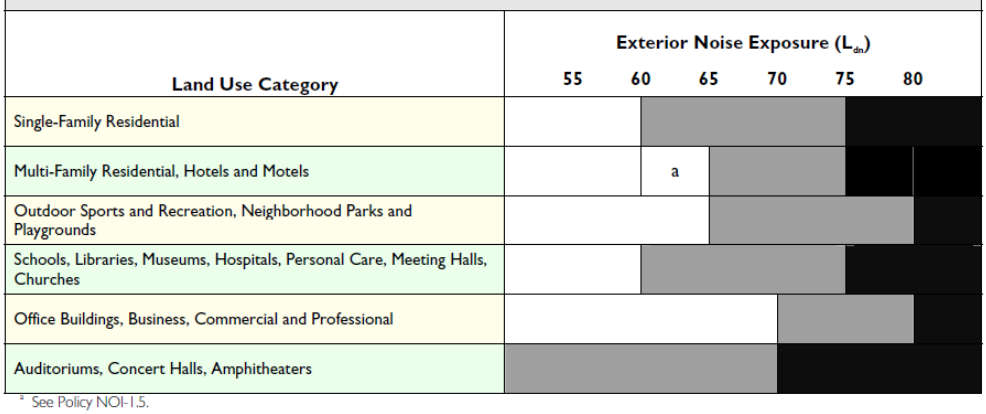
the General Plan shown in Figure 9-3 and detailed in Table 9-2, as a guide for future planning and development decisions.

Policy NOI-1.2. Minimize noise impacts on noise-sensitive land uses. Noise-sensitive land uses include residential uses, retirement homes, hotel/motels, schools, libraries, community centers, places of public assembly, daycare facilities, churches, and hospitals.

Policy NOI-1.3. Limit noise impacts on noise-sensitive uses to noise level standards as indicated in Table 9-1.

Policy NOI-1.4. Require a detailed acoustic report in all cases where noise-sensitive land uses are proposed in areas exposed to exterior noise levels of 60 CNEL/L_{dn} or greater. If recommended in the report, mitigation measures shall be required as conditions of project approval.

FIGURE 9-1 LAND USE COMPATIBILITY FOR COMMUNITY NOISE ENVIRONMENT



[a] See Policy NOI-1.5.

NORMALLY ACCEPTABLE. Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special 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.

TABLE 9-1 NON-TRANSPORTATION NOISE STANDARDS

Land Use Receiving the Noise	Hourly Noise-Level Descriptor	Exterior Noise-Level Standard In Any Hour (dBA)		Interior Noise-Level Standard In Any Hour (dBA)	
		Daytime (7am-10pm)	Nighttime (10pm-7am)	Daytime (7am-10pm)	Nighttime (10pm-7am)
Residential	L_{eq}	55	45	40	30
	L_{max}	70	60	55	45
Medical, convalescent	L_{eq}	55	45	45	35
	L_{max}	70	60	55	45
Theater, auditorium	L_{eq}	--	--	35	35
	L_{max}	--	--	50	50
Church, meeting hall	L_{eq}	55	--	40	40
	L_{max}	--	--	55	55
School, library, museum	L_{eq}	55	--	40	--
	L_{max}	--	--	55	--

Notes:
1. The Residential standards apply to all residentially zoned properties.
2. Each of the noise levels specified above shall be lowered by 5 dBA for tonal noises characterized by a whine, screech, or hum, noises consisting primarily of speech or music, or recurring impulsive noises.
3. In situations where the existing noise level exceeds the noise levels indicated in the above table, any new noise source must include mitigation that reduces the noise level of the noise source to the existing level.
4. The exterior noise standards are measured at any point on the receiving property where there is, or could be in the future, frequent human use and quiet would be beneficial.
5. These standards do not apply to temporary sources such as construction activities.

Policy NOI-1.6. Where noise mitigation measures are required to achieve the noise level standards, the emphasis of such measures shall be placed upon site planning and project design. The use of noise barriers shall be considered after practical design-related noise mitigation measures have been integrated into the project.

Policy NOI-1.8. During all phases of construction activity, reasonable noise reduction measures shall be utilized to minimize the exposure of neighboring properties to excessive noise levels.

a. Construction activities shall comply with the City's noise ordinance.

Policy NOI-1.9. Minimize potential transportation-related noise through the use of setbacks, street circulation design, coordination of routing and other traffic control measures and the construction of noise barriers and consider use of "quiet" pavement surfaces when resurfacing roadways.

Policy NOI-1.12. Ensure consistency with the noise compatibility policies and criteria contained in the San Carlos Airport Land Use Plan.

Action NOI-1.1. Establish a noise abatement protocol for existing sensitive land uses located in areas anticipated to experience significant noise increases with the implementation of the General Plan. Cumulative traffic noise impacts on existing noise-sensitive uses could be reduced through the inclusion of exterior and/or interior sound-reduction measures, such as setbacks, noise barriers, forced-air mechanical ventilation and

sound-rated window construction. The City should research sources of funding for these actions.

Action NOI-1.4. Require the evaluation of mitigation measures for projects that would cause the following criteria to be exceeded or would cause a significant adverse community response:

a. Cause the L_{dn} at noise-sensitive uses to increase by 3 dBA or more and exceed the "normally acceptable" level.

b. Cause the L_{dn} at noise-sensitive uses to increase by 5 dBA or more and remain "normally acceptable."

c. Cause noise levels to exceed the limits in Table 9-1.

Action NOI-1.5. Enforce Section 27007 of the California Motor Vehicle Code that prohibits amplified sound that can be heard 50 or more feet from a vehicle.

Action NOI-1.6. Enforce Section 27150 of the California Motor Vehicle Code that addresses excessive exhaust noise.

Comprehensive Airport Land Use Compatibility Pan (ALUCP) For the Environs of San Carlos Airport - Noise Compatibility Criteria and Policies for San Carlos Airport

Noise Policy 1 Nosie Impact Area. The threshold for evaluation is the project CNEL 60 dB contour depicted on Exhibit 4-2. This contour defines the noise impact area of the Airport. All land uses located outside this contour are consistent with the noise compatibility and policies of the ALUCP.

Noise Policy 2 - Airport Noise/Land Use Compatibility Criteria. The noise compatibility policies set forth in this section shall be used in conjunction with the 20-year future noise exposure contours depicted on Exhibit 4-2 and noise/land use compatibility criteria presented in Table 4-3.

a) The compatibility criteria in this section indicate the maximum acceptable airport-related noise levels, which are measured in terms of CNEL, for a range of land uses.

b) Noise compatibility policies only apply to the identified noise contours. Within the four noise exposure ranges, each land use type is shown as "compatible", "conditionally compatible", or "incompatible". The meaning of these terms is provided in Table 4-3.

c) Land uses not specifically listed in Table 4-3 shall be evaluated using the criteria for similar listed uses.

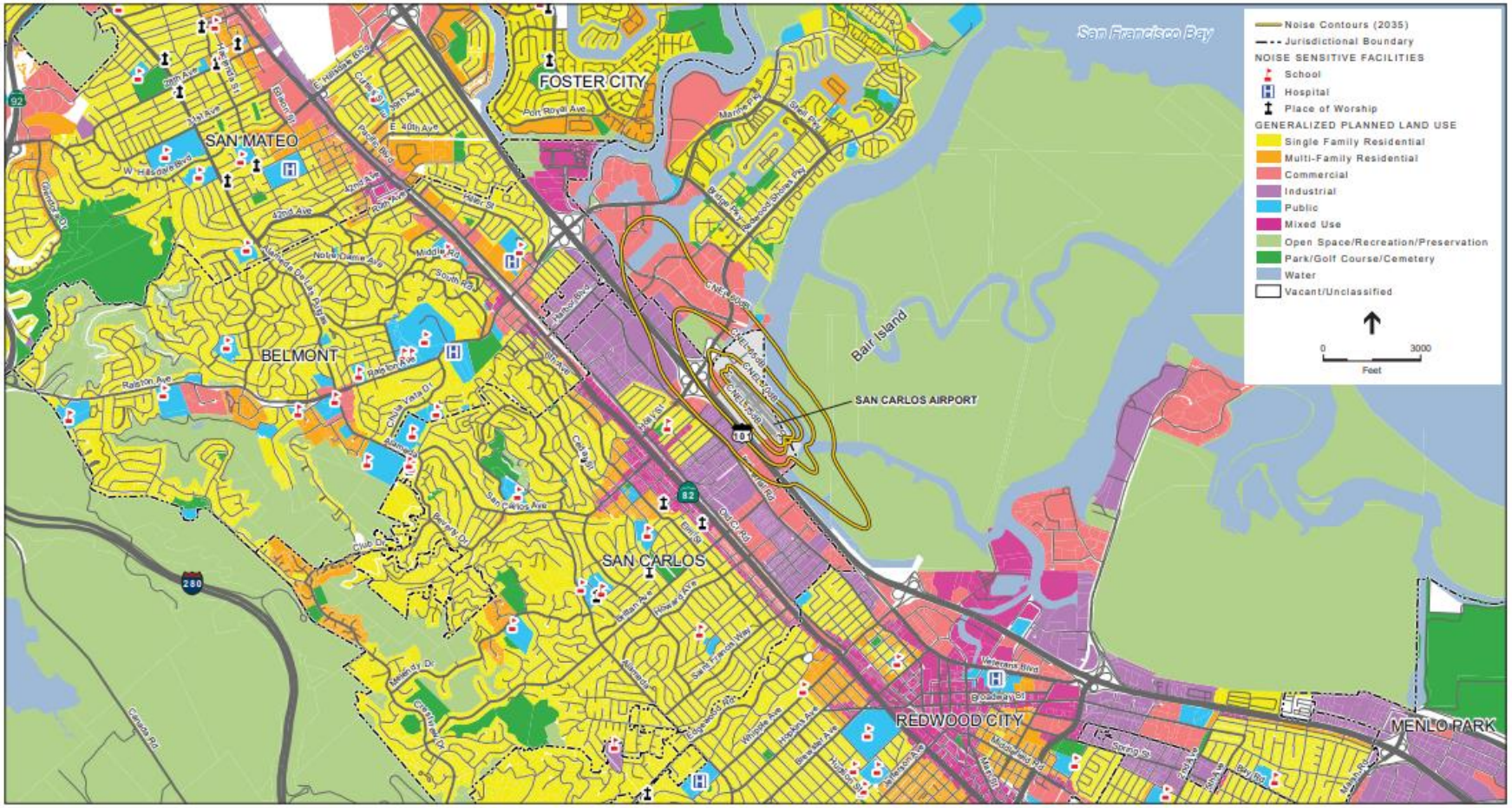
TABLE 4-3
NOISE COMPATIBILITY CRITERIA

Land Use Category	Community Noise Equivalent Level (dBA)			
	<60	60-64	65-69	70-75
Residential and Lodging				
Residential Single-family (detached, semi-detached, attached row)	Y	C(2)	N	N
Multi-family residential	Y	C(2)	N	N
Mobile home parks or courts	Y	N	N	N
Retirement homes; intermediate care facilities	Y	C(2)	N	N
Hotels; motels; other transient lodging	Y	Y	C(1)	N
Public/Institutional				
Children's schools (K-12) and child care facilities	Y	C(2)	C(2)	N
Adult schools; colleges; universities (excluding laboratories, gymnasiums, and outdoor athletic facilities)	Y	Y	C(1)	N
Outdoor amphitheaters and stadiums	Y	N	N	N
Auditoriums; concert halls; indoor arenas	Y	Y	C(1)	N
Hospitals; nursing homes; other health care services	Y	C(2)	N	N
Religious facilities; cemetery chapels; mortuaries; libraries; museums	Y	C(2)	N	N
Prisons; reformatories	Y	Y	C(3)	N
Public safety facilities (e.g., police, fire stations)	Y	Y	C(3)	C(3)
Cemeteries	Y	Y	Y	N
Recreational				
Children-oriented neighborhood parks; playgrounds	Y	Y	N	N
Community parks; regional parks; golf courses; tennis courts; athletic fields; outdoor spectator sports; fairgrounds; water recreation facilities	Y	Y	N	N
Recreation buildings; gymnasiums; club houses; athletic clubs; dance studios	Y	Y	C(3)	C(3)
Campgrounds; recreational vehicle/motor home parks	Y	C(4)	N	N
Commercial				
Office buildings; office areas of industrial facilities; medical clinics; laboratories; radio, television, and recording studios	Y	Y	C(3)	N
Retail sales; eating/drinking establishments; movie theaters; personal services	Y	Y	C(3)	N
Wholesale sales; warehouses; mini/other indoor storage	Y	Y	Y	C(3)
Auto and marine sales and repair services; car washes; gas stations	Y	Y	Y	C(3)
Animal shelters/kennels	Y	C(4)	C(4)	N
Industrial				
Light industrial/manufacturing; miscellaneous manufacturing; research and development facilities	Y	Y	Y	C(3)
Printing, publishing, and allied industries	Y	Y	Y	Y
Processing of food, wood and paper products; warehouses; wholesale storage	Y	Y	Y	Y

TABLE 4-3
NOISE COMPATIBILITY CRITERIA

Land Use Category	Community Noise Equivalent Level (dBA)			
	<60	60-64	65-69	70-75
Refining, manufacturing and storage of chemicals, petroleum and related products; manufacturing and assembly of electronic components	Y	Y	Y	Y
Salvage yards; natural resource extraction and processing; public works yards; solid waste facilities; outdoor storage; automobile dismantling	Y	Y	Y	Y
Utilities, road, rail rights-of-way; communication and other utilities; automobile parking	Y	Y	Y	Y
Agriculture and Animal-Related				
Nature preserves; wildlife preserves	Y	Y	Y	Y
Agriculture-related activities (except livestock); greenhouses; fishing	Y	C(1)	C(5)	C(5)
Horse stables; livestock breeding or farming	Y	Y	C(5)	C(5)
Zoos	Y	C(4)	N	N
Interactive Nature Exhibits	Y	C(4)	N	N

Notes:
Y – Land use and related structures are compatible without restrictions.
C(1) – Land use and related structures are conditionally compatible. Building structure must be capable of attenuating exterior noise levels to an interior noise level of CNEL 45 dB or lower.
C(2) - Land use and related structures are conditionally compatible. Building structure must be capable of attenuating exterior noise levels to an interior noise level of CNEL 45 dB or lower. Requires that an avigation easement be granted to San Mateo County as the operator of San Carlos Airport.
C(3) - Land use and related structures are conditionally compatible. Building structure must be capable of attenuating exterior noise levels to an interior noise level of CNEL 50 dB or lower.
C(4) – Land Use is conditionally compatible. Caution should be exercised with regard to noise-sensitive outdoor uses as these uses are likely to be disrupted by aircraft noise events.
C(5) – Land Use is conditionally compatible. Caution should be exercised with regard to noise-sensitive outdoor uses as these uses are likely to be disrupted by aircraft noise events. Accessory dwelling units are not compatible.
N – Land use and related structures are not compatible under any circumstances.
Source: ESA Airports, September 2014.



SOURCE: Belmont, 1982; San Mateo County, 1986; Foster City, 1993; Menlo Park, 1994; San Carlos, 2009; City of San Mateo, 2010; Redwood City, 2010; ESRI, 2014; ESA Airports, 2015

San Carlos Airport ALUCP . 130753

Exhibit 4-2
Future Conditions (2035) Aircraft Noise Contours

San Carlos Municipal Code. Chapter 9.30, Noise Control, of the City's Municipal Code seeks to protect the peace, health and safety of its citizens from unnecessary and unreasonable noises produced by any machine, person or device.

9.30.030 Basic noise regulation. Except as otherwise permitted under this chapter, no person shall cause and no property owner shall permit, as to property owned by him, a noise produced by any person, amplified sound or device, or any combination thereof in excess of the noise limits established in Table 18.21.050-A to emanate from any property, public or private, as measured at the receiving property line. (Ord. 1439 § 4 (Exh. B (part)), 2011: Ord. 1086 § 1 (part), 1991)

9.30.070 Exempt activities. The following noise-generating activities are exempt from the provisions of this chapter:

A. Transportation facilities, such as freeways, airports, buses, and railroads;

B. Construction activities; such activities, however, shall be limited to the hours of eight a.m. to six p.m. Monday through Friday, and nine a.m. to five p.m. on Saturdays and Sundays. No construction noise-related activities on the following holidays: New Year's Day, Martin Luther King Jr. Day, President's Day, Memorial Day, 4th of July, Labor Day, Veteran's Day, Thanksgiving Day and Christmas Day. All gasoline-powered construction equipment shall be equipped with an operating muffler or baffling system as originally provided by the manufacturer, and no modification to these systems is permitted (the Building Official shall have the authority to grant exceptions to construction noise-related activities);

C. Home workshops and gas-powered gardening equipment; such activities, however, shall be limited to the hours of eight a.m. to sunset Monday through Friday, and ten a.m. to sunset on Saturday, Sunday and holidays stated in subsection B of this section;

D. Public works and public utilities activities; such activities, however, shall be limited to the hours set forth under subsection B of this section, except for emergency situations (the Public Works Director shall have the authority to grant exceptions to public works and public utilities construction noise-related activities);

E. Emergency vehicles;

F. Solid waste pickup; such activities, however, shall be limited to the hours of collection set forth under the applicable franchise agreement for solid waste pickup, recyclable materials pickup and/or organic materials pickup as may be restricted for residential, commercial and City facilities. (Ord. 1439 § 4 (Exh. B (part)), 2011: Ord. 1086 § 1 (part), 1991)

Chapter 18.21 provides performance standards for noise and vibration. The following sections apply to this report:

18.21.050 Noise.

A. Noise Limits. No use or activity shall create noise levels that exceed the following standards. The maximum allowable noise levels specified in Table 18.21.050-A, Noise Limits, do not apply to noise generated by automobile traffic or other mobile noise sources in the public right-of-way.

1. Adjustments to Noise Limits. The maximum allowable noise levels of Table 18.21.050-A, Noise Limits, shall be adjusted according to the following provisions. No more than one increase in the maximum permissible noise level shall be applied to the noise generated on each property.

a. Ambient Noise. If the ambient noise level at a noise-sensitive use is ten dBA or more below the standard, the allowable noise standard shall be decreased by five decibels.

b. Duration. The maximum allowable noise level (L_{50}) shall be increased as follows to account for the effects of duration:

i. Noise that is produced for no more than a cumulative period of fifteen minutes in any hour may exceed the noise limit by five decibels; and

ii. Noise that is produced for no more than a cumulative period of five minutes in any hour may exceed the noise limits by ten decibels;

iii. Noise that is produced for no more than a cumulative period of one minute in any hour may exceed the noise limits by fifteen decibels.

c. Character of Sound. If a noise contains a steady audible tone or is a repetitive noise (such as hammering or riveting) or contains music or speech conveying informational content, the maximum allowable noise levels shall be reduced by five decibels.

d. Prohibited Noise. Noise for a cumulative period of thirty minutes or more in any hour which exceeds the noise standard for the receiving land use.

TABLE 18.21.050-A: NOISE LIMITS

Land Use Receiving the Noise	Noise-Level Descriptor	Exterior Noise Level Standard in Any Hour (dBA)		Interior Noise-Level Standard in Any Hour (dBA)	
		Daytime (7 a.m. – 10 p.m.)	Nighttime (10 p.m. – 7 a.m.)	Daytime (7 a.m. – 10 p.m.)	Nighttime (10 p.m. – 7 a.m.)
Residential	L_{50}	55	45	40	30
	L_{max}	70	60	55	45
Medical, convalescent	L_{50}	55	45	45	35
	L_{max}	70	60	55	45
Theater, auditorium	L_{50}	-	-	35	35
	L_{max}	-	-	50	50
Church, meeting hall	L_{50}	55	-	40	40
	L_{max}	-	-	55	55
School, library, museum	L_{50}	55	-	40	-
	L_{max}	-	-	55	-

Notes: 1. New residential development in noise impacted areas area subject to the following noise levels:

a. For new single-unit residential development, maintain a standard of 60 L_{dn} for exterior noise in private use areas.

b. For new multi-unit residential development, maintain a standard of 65 L_{dn} in community outdoor recreation areas. Noise standards are not applied to private decks and balconies and shall be considered on a case-by-case basis in the MU-DC District.

c. Where new residential units (single and multifamily) would be exposed to intermittent noise levels generated during train operations, maximum railroad noise levels inside homes shall not exceed forty-five dBA in bedrooms or fifty-five dBA in other occupied spaces. These single-event limits are only applicable where there are normally four or more train operations per day.

TABLE 18.21.050-B: NOISE EXPOSURE
—LAND USE REQUIREMENTS AND LIMITATIONS

Land Use	Day/Night Average Sound Level (Ldn)	Requirements and Limitations
Residential (1) and Other Noise-Sensitive Uses (e.g., Schools, Hospitals, and Churches)	Less than 60	Satisfactory
	60 to 75	Acoustic study and noise attenuation measures required
	Over 75	Acoustic study and noise attenuation measures required
Auditoriums, Concert Halls, Amphitheaters	Less than 70	Acoustic study and noise attenuation measures required
	Over 70	Not allowed
Commercial and Industrial	Less than 70	Satisfactory
	70 to 80	Acoustic study and noise attenuation measures required
	Over 80	Airport-related development only; noise attenuation measures required
Outdoor Sports and Recreation, Parks	Less than 65	Satisfactory
	65 to 80	Acoustic study and noise attenuation measures required; avoid uses involving concentrations of people or animals
	Over 80	Limited to open space; avoid uses involving concentrations of people or animals

Notes: 1. New residential development in noise impacted areas area subject to the following noise levels:

a. For new single-unit residential development, maintain a standard of 60 L_{dn} for exterior noise in private use areas.

b. For new multi-unit residential development, maintain a standard of 65 L_{dn} in community outdoor recreation areas. Noise standards are not applied to private decks and balconies and shall be considered on a case-by-case basis in the MU-DC District.

c. Where new residential units (single and multifamily) would be exposed to intermittent noise levels generated during train operations, maximum railroad noise levels inside homes shall not exceed forty-five dBA in bedrooms or fifty-five dBA in other occupied spaces. These single-event limits are only applicable where there are normally four or more train operations per day.

B. Noise Exposure – Land Use Requirements and Limitations. Table 18.21.050-B, Noise Exposure—Land Requirements and Limitations, describes the requirements and limitations of various land uses within the listed day/night average sound level (L_{dn}) ranges.

C. Acoustic Study. The Director may require an acoustic study for any proposed project that could cause any of the following:

1. Locate new residential uses within the fifty-five CNEL impact area of the San Carlos Airport;

2. Cause noise levels to exceed the limits in Table 18.21.050-A;

3. Create a noise exposure that would require an acoustic study and noise attenuation measures listed in Table 18.21.050-B, Noise Exposure – Land Use Requirements and Limitations; or

4. Cause the L_{dn} at noise-sensitive uses to increase three dBA or more.

D. Establishing Ambient Noise. When the Director has determined that there could be cause to make adjustments to the standards, an acoustical study shall be performed to establish ambient noise levels. In order to determine if adjustments to the standards should be made either upwards or downwards, a minimum twenty-four-hour-duration noise measurement shall be conducted. The noise measurements shall collect data utilizing noise metrics that are consistent with the noise limits presented in Table 18.21.050-A, e.g., L_{max} (zero minutes), L_{02} (one minute), L_{08} (five minutes), L_{25} (fifteen minutes) and L_{50} (thirty minutes). An arithmetic average of these ambient noise levels during the three quietest hours shall be made to demonstrate that the ambient noise levels are regularly ten or more decibels below the respective noise standards. Similarly, an arithmetic average of ambient noise levels during the three loudest hours should be made to demonstrate that ambient noise levels regularly exceed the noise standards.

E. Noise Attenuation Measures. Any project subject to the acoustic study requirements of subsection C of this section may be required as a condition of approval to incorporate noise attenuation measures deemed necessary to ensure that noise standards are not exceeded.

1. New noise-sensitive uses (e.g., schools, hospitals, churches, and residences) shall incorporate noise attenuation measures to achieve and maintain an interior noise level of forty-five dBA.

2. Noise attenuation measures identified in an acoustic study shall be incorporated into the project to reduce noise impacts to satisfactory levels.

3. Emphasis shall be placed upon site planning and project design measures. The use of noise barriers shall be considered and may be required only after all feasible design-related noise measures have been incorporated into the project. (Ord. 1438 § 4 (Exh. A (part)), 2011)

REGULATORY SETTING – 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 4. The thresholds for residences are 72 VdB for frequent events (more than 70 events of the same source per day), 75 VdB for occasional events (30 to 70 vibration events of the same source per day), and 80 VdB for infrequent events (less than 30 vibration events of the same source per day).

TABLE 4 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.

State of California

California Department of Transportation. To avoid damage to buildings, Caltrans recommends that construction vibration levels are limited to 0.5 in/sec PPV for buildings structurally sound and designed to modern engineering standards, to 0.3 in/sec PPV for buildings that are found to be structurally sound but where structural damage is a major concern, and to 0.08 in/sec PPV for ancient buildings or buildings that are documented to be structurally weakened (see Table 3).

City of San Carlos

San Carlos 2030 General Plan. The City of San Carlos adopted the 2030 General Plan in October 2009. The Noise Element of the General Plan[3] provides goals, policies, and actions to maintain a community with a noise and vibration environment that supports a high quality of life. The goals, policies, and actions that apply to the proposed project are as follows:

Goal NOI-1: Encourage compatible noise environments for new development and control sources of excessive noise citywide.

> **Policy NOI-1.14.** The Federal Transit Administration vibration impact criteria and assessment methods shall be used to evaluate the compatibility of train vibration with proposed land uses adjoining the UPRR (Caltrain) corridor. Site specific vibration studies shall be completed for vibration-sensitive uses proposed within 100 feet of active railroad tracks.

San Carlos Municipal Code. Chapter 18.21 of the City's Municipal Code includes the following regarding vibration:

18.21.060 Vibration. No vibration shall be produced that is transmitted through the ground and is discernible without the aid of instruments by a reasonable person at the lot lines of the site. Vibrations from temporary construction, demolition, and vehicles that enter and leave the subject parcel (e.g., construction equipment, trains, trucks, etc.) are exempt from this standard. (Ord. 1438 § 4 (Exh. A (part)), 2011)

ENVIRONMENTAL SETTING

Existing Noise Environment

The project is proposed at 900-961 Industrial Road, 987-1075 Commercial Street, and 915 Old County Road in the City of San Carlos. The project site is bound by Old County Road to the south, commercial land uses and Commercial Street to the west, commercial land uses and Brittan Avenue to the east, and Industrial Road to the north. Residential land uses are located to the south across Old County Road, the Union Pacific Rail (UPRR) tracks, and El Camino Real.

The noise environment at the site and in the surrounding area results primarily from local vehicular traffic along Industrial Road, Old County Road, and El Camino Real, as well as train activity on the UPRR tracks. Some commercial and industrial uses from the surrounding sites, other local roadway traffic, and intermittent aircraft associated with San Carlos Airport also contribute to the noise environment.

3 City of San Carlos, *San Carlos 2030 General Plan*, Noise Element, Adopted October 12, 2009.

A noise monitoring survey consisting of four long-term (LT-1 through LT-4) and five short-term (ST-1 through ST-5) noise measurements was conducted at the site between Tuesday, August 15, 2023, and Thursday, August 17, 2023. All measurement locations are shown in Figure 1.

Long-term noise measurement LT-1 was made approximately 40 feet south of the centerline of Industrial Road. Hourly average noise levels at LT-1 typically ranged from 57 to 73 dBA L_{eq} during daytime hours (7:00 a.m. to 10:00 p.m.) and from 51 to 63 dBA L_{eq} during nighttime hours (10:00 p.m. to 7:00 a.m.). The day-night average noise level was 67 dBA L_{dn} on Wednesday, August 16, 2023. The daily trend in noise levels at LT-1 is shown in Figures A1 through A3 of Appendix A.

Long-term noise measurement LT-2 was made approximately 30 feet east of the centerline of Brittan Avenue. Hourly average noise levels at LT-2 typically ranged from 63 to 74 dBA L_{eq} during daytime hours and from 56 to 69 dBA L_{eq} during nighttime hours. The day-night average noise level was 72 dBA L_{dn} on Wednesday, August 16, 2023. The daily trend in noise levels at LT-2 is shown in Figures A4 through A6 of Appendix A.

Long-term noise measurement LT-3 was made approximately 25 feet north of the centerline of Old County Road. Hourly average noise levels at LT-3 typically ranged from 62 to 73 dBA L_{eq} during daytime hours and from 49 to 68 dBA L_{eq} during nighttime hours. The day-night average noise level was 71 dBA L_{dn} on Wednesday, August 16, 2023. The daily trend in noise levels at LT-3 is shown in Figures A7 through A9 of Appendix A.

Long-term noise measurement LT-4 was made approximately 25 feet west of the centerline of Commercial Street. Hourly average noise levels at LT-4 typically ranged from 51 to 69 dBA L_{eq} during daytime hours and from 50 to 61 dBA L_{eq} during nighttime hours. The day-night average noise level was 63 dBA L_{dn} on Wednesday, August 16, 2023. During the time of our measurements Commercial Street was closed off to traffic. The daily trend in noise levels at LT-4 is shown in Figures A10 through A12 of Appendix A.

Short-term noise measurements were made on Tuesday, August 15, 2023, between 11:00 a.m. and 12:30 p.m. Table 5 summarizes the noise measurement results measured at each site.

As shown in Figure 1, ST-1 was made within Phase 2 of the project, approximately 30 feet east of the centerline of Commercial Street. The dominant noise source at ST-1 was traffic along Industrial Road and Old County Road. Commercial Street was closed to traffic during the measurements. Traffic along nearby Industrial Road and Old County Road produced noise levels that ranged from 57 to 70 dBA. Additional noise contributions from jet flyovers ranged from 55 to 57 dBA, and from existing commercial uses ranged from 50 to 51 dBA at ST-1. The 10-minute L_{eq} measured at ST-1 was 55 dBA.

ST-2 was made within Phase 2 of the project, approximately 40 feet east of the centerline of Commercial Street. Traffic along Industrial Road dominated the noise environment at ST-2. Typical local traffic noise levels from Industrial Road ranged from 55 to 68 dBA. Additional noise contributions from jet flyovers ranged from 55 to 64 dBA, train pass-bys produced noise levels

that ranged from 53 to 54 dBA, and existing industrial uses produced noise levels that ranged from 51 to 52 dBA at ST-2. The 10-minute L_{eq} measured at ST-2 was 56 dBA.

ST-3 was made within Phase 3 of the project, approximately 185 feet south of centerline of Industrial Road and approximately 370 feet west of the centerline of Brittan Avenue. Local traffic along Industrial Road dominated the noise environment at ST-3, with noise levels ranging from 53 to 62 dBA. Construction activities produced noise levels ranging from 52 to 61 dBA. The 10-minute L_{eq} measured at ST-3 was 57 dBA.

ST-4 was made within Phase 1 of the project along the eastern boundary of existing commercial uses, approximately 300 feet west of the centerline of Brittan Avenue and approximately 390 feet north of the centerline of Old County Road. Traffic noise from Brittan Avenue and Old County Road generated noise levels ranging from 50 to 67 dBA, and existing industrial uses produced noise levels ranging from 48 to 63 dBA at ST-4. The 10-minute L_{eq} measured at ST-4 was 53 dBA.

ST-5 was also made within Phase 1 of the project along the eastern boundary of adjacent commercial uses, approximately 90 feet north of the centerline of Old County Road, and 255 feet west of the centerline of Brittan Avenue. Traffic along Old County Road generated noise levels ranging from 50 to 63 dBA at ST-5. Other contributing noise sources included train pass-bys that produced noise levels that ranged from 81 to 83 dBA. The 10-minute L_{eq} measured at ST-5 was 63 dBA.

TABLE 5 Summary of Short-Term Noise Measurements (dBA)

Noise Measurement Location	Date, Time	Measured Noise Level, dBA					
		L_{max}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{eq}
ST-1: ~ 30 feet from the centerline of Commercial Street	8/15/2023 11:00-11:10 a.m.	70	64	56	52	51	55
ST-2: ~40 feet from the centerline of Commercial Street	8/15/2023 11:20-11:30 a.m.	68	66	59	53	51	56
ST-3: ~185 feet from the centerline of Industrial Road and ~370 feet from the centerline of Brittan Avenue	8/15/2023 11:40-11:50 a.m.	64	62	59	56	53	57
ST-4: ~ 300 feet from the centerline of Brittan Avenue and ~ 390 feet from the centerline of Old County Road	8/15/2023 12:00-12:10 p.m.	67	62	56	50	48	53

Noise Measurement Location	Date, Time	Measured Noise Level, dBA					
		L_{max}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{eq}
ST-5: ~90 feet from the centerline of Old County Road and ~ 255 feet from the centerline of Brittan Avenue	8/15/2023 12:20 – 12:30 p.m.	83	77	60	54	51	63

FIGURE 1 Aerial Image of the Project Site and Surrounding Area Showing the Noise Measurement Locations

Source: Google Earth, 2023.

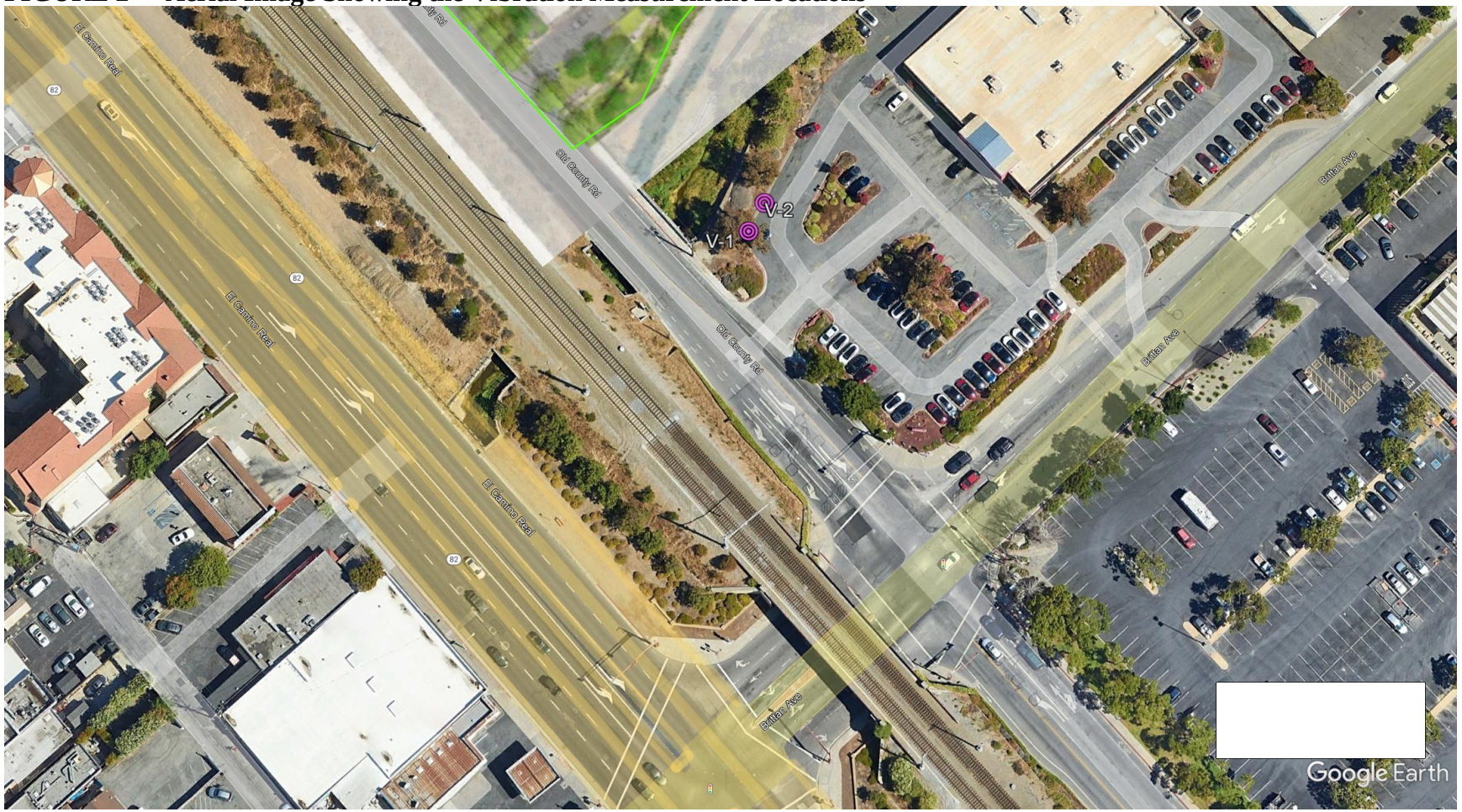
Existing Vibration Environment

Vibration measurements were made near the southeastern corner of the project site, at the intersection of Old County Road and Brittan Avenue. As shown in Figure 2, V-1 was made approximately 115 feet from the edge of the nearest set of Caltrain tracks, while V-2 was made approximately 130 feet from the edge of the nearest set of Caltrain tracks. At these locations, the vibration sensors were approximately 20 feet below the elevated tracks.

Six observed and recorded vibration measurements of individual train events were conducted on Thursday, August 17, 2023 between 9:40 a.m. and 10:40 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 in the vertical axis because ground vibration is typically the most dominant on this axis. Vibration levels measured at V-1 and V-2 during each of the train pass-by events can be seen in Figures A13 and A14 of Appendix A.

All measurements were made along the sidewalk at the intersection of Old County Road and Brittan Avenue. At V-1, vibration levels ranged from 57 to 66 VdB, and the average was 61 VdB. At V-2, vibration levels ranged from 53 to 59 VdB, and the average was 56 VdB. Table 6 summarizes each of the six measurements made at V-1 and V-2.

FIGURE 2 Aerial Image Showing the Vibration Measurement Locations



Source: Google Earth, 2023.

TABLE 6 Summary of Train Pass-by Vibration Measurements Made at V-1 and V-2

Date, Time	Train Information						Distance from V-1 (feet)	Vibration Level at V-1	Distance from V-2 (feet)	Vibration Level at V-2
	Type of Train	No. of Engines	No. of Cars	Track	Direction of Travel	Speed				
8/17/2023, 9:40 a.m.	Caltrain	1	4	Far	SB	34 mph	130	57 VdB	150	53 VdB
8/17/2023, 9:41 a.m.	Caltrain	1	4	Near	NB	40 mph	115	66 VdB	135	59 VdB
8/17/2023, 10:02 a.m.	Caltrain	1	4	Far	SB	48 mph	130	60 VdB	150	56 VdB
8/17/2023, 10:21 a.m.	Caltrain	1	4	Near	NB	36 mph	115	61 VdB	135	57 VdB
8/17/2023, 10:33 a.m.	Caltrain	1	4	Far	SB	35 mph	130	58 VdB	150	55 VdB
8/17/2023, 10:40 a.m.	Caltrain	1	5	Near	NB	40 mph	115	59 VdB	135	53 VdB

PLAN CONSISTENCY ANALYSIS

Noise and Land Use Compatibility

The City of San Carlos's 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 Carlos. Noise level thresholds established in Figure 9-1 of the City's General Plan that apply to this project include the following:

- The City's acceptable exterior noise level standard is 70 dBA L_{dn} or less for proposed office buildings and commercial uses.

- The City's conditionally acceptable exterior noise level standard is 70 to 80 dBA L_{dn} for proposed office buildings and commercial uses.

The future noise environment at the project site after the project is constructed and is fully operational would continue to be dominated by local traffic along Old County Road, Industrial Road, Commercial Street, and Brittan Avenue and by trains traveling along the UPRR (Caltrain) tracks. A traffic study completed for the proposed project included existing peak hour turn movements for several intersections in the project vicinity. Under the Future with project scenario (Year 2030), projected traffic volumes without the project along Old County Road, Commercial Street, Brittan Avenue, and Industrial Road would increase noise levels by up to 3 dBA L_{dn} above existing ambient conditions.

High speed rail (HSR) is proposed along the train corridor starting in 2040. According to the EIR/EIS completed for the HSR project, an increase of 108 HSR trains (both directions) would occur during daytime hours and 26 HSR trains (both directions) would occur during nighttime hours by 2040 between the Scott Boulevard in Santa Clara to San Jose Diridon Station. During peak hours of operations, which occurs six times per day, nine HSR trains would be added. While the EIR/EIS does not include permanent noise level increases based on the additional train activity, the estimated noise level increase based on the daily increase in train pass-bys would be approximately 3 dBA. [4]

Future Exterior Noise Environment

The future exterior noise environment is considered at outdoor use areas, discussed here under the header of what building they are near. Typically, the City's exterior thresholds are enforced at the center of an outdoor use area and this analysis analyzes the exterior noise levels at the center of the proposed open space area, as it is the location at which most of the extended use of the area would occur.

Building 1

[4] California High-Speed Rail Authority, "San Francisco to San Jose Project Section Draft EIR/EIS," July 2020.

The site plan shows an open space area east of Building 1. Building 1 also has an interior courtyard. The ground-level open spaces and interior courtyard would be subject to the City's 70 dBA L_{dn} threshold at the center of the space. The majority of use would occur at the center of each activity area. Therefore, the City's exterior noise thresholds are typically enforced at the center of the outdoor use area.

The center of the open space east of Building 1 is approximately 360 feet east from the centerline of Commercial Street and approximately 160 feet south from the centerline of Industrial Road. At this distance, the future exterior noise levels would be 66 dBA L_{dn}, which would be below the City's normally acceptable threshold of 70 dBA L_{dn} for commercial uses.

The Building 1 Courtyard will be completely enclosed by the proposed building and will not be exposed to direct traffic noise from surrounding roadways. The center of the courtyard would be approximately 230 feet east from the centerline of Commercial Street and approximately 200 feet south from the centerline of Industrial Road. Future exterior noise levels at the center of building 1 courtyard would be below 60 dBA L_{dn}.

Building 3

The site plan shows two open space areas south of Building 3, and one west of Building 3. Building 3 also has an interior courtyard. The ground-level open spaces and interior courtyard would be subject to the City's 70 dBA L_{dn} threshold at the center of the space.

The center of the first outdoor space is approximately 400 feet east from the centerline of Commercial Street, approximately 600 feet south from the centerline of Industrial Road, and approximately 700 feet west of Brittan Avenue. At this distance, the future exterior noise levels would be 64 dBA L_{dn}, which would be below the City's normally acceptable threshold of 70 dBA L_{dn} for commercial uses.

The center of the second outdoor space is approximately 580 feet east from the centerline of Commercial Street, approximately 700 feet south from the centerline of Industrial Road, and approximately 530 feet west of Brittan Avenue. At this distance, the future exterior noise levels would be 63 dBA L_{dn}, which would be below the City's normally acceptable threshold of 70 dBA L_{dn} for commercial uses.

The center of the third outdoor space is approximately 320 feet east from the centerline of Commercial Street and approximately 400 feet south from the centerline of Industrial Road. At this distance, the future exterior noise levels would be below 60 L_{dn}, which would be below the City's normally acceptable threshold of 70 dBA L_{dn} for commercial uses.

The Building 3 Courtyard will be completely enclosed by the proposed building and will not be exposed to direct traffic noise from surrounding roadways. The center of the courtyard would be

approximately 375 feet east from the centerline of Commercial Street, approximately 715 feet south from the centerline of Industrial Road, and approximately 800 feet north from the centerline of Old County Road. Future exterior noise levels at the center of building 1 courtyard would be below 60 dBA L_{dn}.

The future exterior noise levels at the proposed outdoor use areas of Building 3 would be below the City's 70 dBA threshold.

Building 5

The site plan shows two open space areas; one north of Building 5, and the second between Buildings 4 and 5. The ground-level open spaces and interior courtyard would be subject to the City's 70 dBA L_{dn} threshold at the center of the space.

The center of the first outdoor space is approximately 580 west feet from the centerline of Brittan Street, approximately 540 feet east from the centerline of Commercial Street, and approximately 645 feet north from the centerline of Old County Road. At this distance, the future exterior noise levels would be 65 dBA L_{dn}, which would be below the City's normally acceptable threshold of 70 dBA L_{dn} for commercial uses.

The center of the second outdoor space is approximately 315 feet east from the centerline of Commercial Street, approximately 530 feet north from the centerline of Old County Road, and approximately 800 feet west from the centerline of Brittan Avenue. At this distance, the future exterior noise levels would be 64 dBA L_{dn}, which would be below the City's normally acceptable threshold of 70 dBA L_{dn} for commercial uses.

Building 6

The Building 6 Courtyard will be completely enclosed by the proposed building and will not be exposed to direct traffic noise from surrounding roadways. The center of the courtyard would be approximately 195 feet from the centerline of Old County Road, approximately 230 feet from the centerline of Commercial Street and 900 feet from the centerline of Brittan Avenue. Future exterior noise levels at the center of the building 6 courtyard would be below 60 dBA L_{dn}.

The future exterior noise levels at the outdoor use areas for Building 6 would be below the City's 70 dBA threshold.

Building 7

The site plan shows an open space to the south of Building 7. Building 7 also has an interior courtyard. The Building 7 playground and courtyard will be completely enclosed by the proposed building and would not be exposed to direct traffic noise from surrounding roadways. The center of the courtyard would be approximately 375 feet east from the centerline of Commercial Street, approximately 715 feet south from the centerline of Industrial Road, and approximately 800 feet

north from the centerline of Old County Road. Future exterior noise levels at the center of building 1 courtyard would be below 60 dBA L_{dn}.

The center of the outdoor space south of Building 7 is approximately 360 feet east from the centerline of Commercial Street. At this distance, the future exterior noise levels would be below 60 dBA L_{dn}, which would be below the City's normally acceptable threshold of 70 dBA L_{dn} for commercial uses.

The future exterior noise levels at proposed outdoor use areas of Building 7 would be below the City's 70 dBA threshold.

Future Interior Noise Environment

Pursuant to the California Building Code, building envelopes must 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 all operational hours.

Building 1

Building 1 is a 5-story building with office/lab spaces located on each floor. The northern façade of Building 1 would be set back from the centerline of Industrial Road by approximately 40 feet and approximately 200 feet from the centerline of Commercial Street. The western façade would be setback from the centerline of Industrial Road approximately 180 feet and approximately 80 feet from the centerline of Commercial Street. At these distances, building facades would be exposed to future exterior noise levels ranging from 63 to 69 dBA $L_{eq(1\text{-}hr)}$. The standard construction materials in combination with forced-air mechanical ventilation would satisfy the daytime threshold of 50 dBA $L_{eq(1\text{-}hr)}$.

Building 2

Building 2 is a 5-story building with office/lab spaces located on each floor. The northern façade of Building 2 would be set back from the centerline of Industrial Road by approximately 70 feet. At this distance, future exterior noise levels would reach 66 dBA $L_{eq(1\text{-}hr)}$. The standard construction materials in combination with forced-air mechanical ventilation would satisfy the daytime threshold of 50 dBA $L_{eq(1\text{-}hr)}$.

Building 3

Building 3 is a 6-story building with office/lab spaces located on each floor. The northern façade of Building 3 would be set back from the centerline of Industrial Road by approximately 350 feet and the eastern façade would be set back approximately 480 feet from the centerline of Brittan Avenue. At these distances, building facades would be exposed to future exterior noise levels ranging from 59 to 62 dBA $L_{eq(1\text{-}hr)}$. The standard construction materials in combination with forced-air mechanical ventilation would satisfy the daytime threshold of 50 dBA $L_{eq(1\text{-}hr)}$.

Building 4

Building 4 is a 5-story building with office/lab spaces located on each floor. The western façade of Building 4 would be set back from the centerline of Commercial Street by approximately 70 feet. At this distance, future exterior noise levels would reach 57 dBA $L_{eq(1\text{-}hr)}$. The standard construction materials in combination with forced-air mechanical ventilation would satisfy the daytime threshold of 50 dBA $L_{eq(1\text{-}hr)}$.

Building 5

Building 5 is a 7-story building with office/lab spaces located on each floor. The southern façade of Building 5 would be set back from the centerline of Old County Road by approximately 410

feet and approximately 450 feet or more from the centerlines of Commercial Street and Brittan Avenue. The eastern façade would be set back from the centerline of Brittan Avenue approximately 420 feet and the western façade would be set back from the centerline of Commercial Street approximately 345 feet. At these distances, building facades would be exposed to future exterior noise levels ranging from 60 to 64 dBA $L_{eq(1\text{-}hr)}$. T he standard construction materials in combination with forced-air mechanical ventilation would satisfy the daytime threshold of 50 dBA $L_{eq(1\text{-}hr)}$.

Building 6

Building 6 is a 5-story building with office/lab spaces located on each floor. The southern façade of Building 6 would be set back from the centerline of Old County Road by approximately 60 feet and approximately 230 feet from the centerline of Commercial Street. The western façade would be setback from the centerline of Commercial Street approximately 45 feet and approximately 105 feet from the centerline of Old County Road. At these distances, building facades would be exposed to future exterior noise levels ranging from 68 to 70 dBA $L_{eq(1\text{-}hr)}$.
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 $L_{eq(1\text{-}hr)}$.

Building 7

Building 7 is a 2-story building with classrooms located on the ground floor. The western façade of Building 7 would be set back from the centerline of Commercial Street by approximately 320 feet. At this distance, future exterior noise levels would reach 51 dBA $L_{eq(1\text{-}hr)}$. The standard construction materials in combination with forced-air mechanical ventilation would satisfy the daytime threshold of 50 dBA $L_{eq(1\text{-}hr)}$.

Train Vibration and Land Use Compatibility

The FTA vibration impact assessment criteria (summarized in Table 3) 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 3 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 6, six trains were measured in 1 hour. According to the existing Caltrain schedule,[5] about 61 trains currently pass through San Carlos in a 24-hour period, which would fall within the occasional events FTA vibration impact category. High speed rail (HSR) is proposed along the train corridor starting in 2040. According to the EIR/EIS completed for the HSR project, an increase of 108 HSR trains (both directions) would occur during daytime hours and 26 HSR trains (both directions) would occur during nighttime hours by 2040 between the Scott Boulevard in Santa Clara to San Jose Diridon Station. During peak hours of operations, which occurs six times per day, nine HSR trains would be added.[6]

Assuming more than 70 pass-by events (ie Frequent Events) under future conditions, which would represent worst-case conditions, maximum vibration levels of 75 VdB under frequent events for institutional uses with primarily daytime use would be the threshold for the proposed project. The FTA does not include a vibration standard for commercial land-uses. As a worst-case scenario the residential threshold was used for our analysis.

Train pass-bys along the near and far tracks resulted in measured vibration levels of 57 to 66 VdB at 115 to 130 feet. According to the EIR/EIS, Caltrain trains create similar ground-borne vibration levels to those from HSR trains.[7] Therefore, the nearest proposed building would be compatible with the future worst-case vibration environment at the project site.

5 https://www.caltrain.com/station/sancarlos?active_tab=route_explorer_tab&origin=7013

[6] California High-Speed Rail Authority, "San Francisco to San Jose Project Section Draft EIR/EIS," July 2020.

[7] California High-Speed Rail Authority, "San Francisco to San Jose Project Section Draft EIR/EIS," July 2020.

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 be exposed to a temporary increase in ambient noise levels due to project construction activities but would not exceed FTA standards. This is a **less-than-significant** temporary noise impact.

The noise analysis relies on the construction assumptions described above, in the Introduction. Construction will start later than shown in the assumptions and the phasing of the project may change. Construction initiated later or completed in different phases, would have substantially the same noise and vibration impacts as analyzed here.

During each phase, construction would occur Monday through Friday 8:00 a.m. to 6:00 p.m. Construction of Phase 1 is expected to last for 26 months. Construction for Phase 2 is expected to last for i30 months. Construction for Phase 3 is expected to last for30 months. Construction of Phase 1, Phase 2, and Phase 3 was assumed to not occur at the same time. Continuous construction activities are expected for about 7 years and 5 months. Construction phases for each phase of the project would include site preparation, demolition (as needed), grading, trenching, building construction, architectural coating, and paving (as needed). During construction, there would be a different mix of equipment operating at different times in the process, 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 receptors. 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.

Chapter 9.30.070 of the City's Municipal Code limits construction activities to between 8:00 a.m. and 6:00 p.m. on weekdays and to between 9:00 a.m. and 5:00 p.m. on weekends. Construction activities are prohibited on the following holidays: New Year's Day, Martin Luther King Jr. Day, President's Day, Memorial Day, 4th of July, Labor Day, Veteran's Day, Thanksgiving Day and Christmas Day. Additionally, the Municipal Code requires all gasoline-powered construction equipment to be equipped with an operating muffler or baffling system as originally provided by the manufacturer, and no modification to these systems is permitted.

While the City of San Carlos does not establish noise level thresholds for construction activities, this analysis uses the noise limits established by the Federal Transit Administration (FTA) to identify the potential for impacts due to substantial temporary construction noise. The FTA identifies construction noise limits in the *Transit Noise and Vibration Impact Assessment Manual*.[8] 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 7) from the equipment. Table 8 shows the hourly average noise emission level ranges, by construction phase, typical for various types of projects. Hourly average noise emission levels generated by construction are about 72 to 89 dBA L_{eq} for commercial buildings and parking garages, 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.

TABLE 7 Typical 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

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

Equipment Category	L_{max} Level (dBA)[1,2]	Impact/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 8 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 for Phase 1, Phase 2, and Phase 3 of the project are summarized in Tables 9 through 11, respectively, along with the quantity of each type of equipment and the reference noise emission 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 9 Estimated Construction Noise Levels for Phase 1 at a Distance of 50 feet

Phase of Construction	Construction Equipment (Quantity)	Estimated Construction Noise Level at 50 feet
Site Preparation	Excavator (1)[a]	77 dBA L_{eq}
Grading	Rubber-Tired Dozer (1) Scraper (4)[a] Tractor/Loader/Backhoe (2)[a] Generator Set (2) Excavator (1)	83 dBA L_{eq}
Trenching	Drill Rig (1)[a] Forklift (1) Rubber-Tired Dozer (1)[a] Generator Set (2)	83 dBA L_{eq}
Site Preparation	Drill Rig (1)[a]	81 dBA L_{eq}
Trenching	Drill Rig (1)[a] Forklift (1) Excavator (1)[a]	82 dBA L_{eq}

Phase of Construction	Construction Equipment (Quantity)	Estimated Construction Noise Level at 50 feet
Building Construction	Crane (3) Pump (6)[a] Front End Loader (1) Aerial Lift (3) Forklift (5) Generator Set (8) Welder (4) Concrete Saw (4)[a]	84 dBA L_{eq}
Architectural Coating	Aerial Lift (3) Crane (3)[a] Forklift (5)[a]	74 dBA L_{eq}
Paving	Paver (1) Forklift (2) Pump (1)[a] Tractor/Loader/Backhoe (1)[a]	82 dBA L_{eq}
Building Construction	Crane (3)[a] Forklift (3) Welder (2)[a]	75 dBA L_{eq}
Architectural Coating	Cement Mixer Truck (2)[a] Forklift (5)[a]	76 dBA L_{eq}

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

TABLE 10 Estimated Construction Noise Levels for Phase 2 at a Distance of 50 feet

Phase of Construction	Construction Equipment (Quantity)	Estimated Construction Noise Level at 50 feet
Site Preparation	Air Compressor (1)[a] Forklift (1)[a]	75 dBA L_{eq}
Demolition	Air Compressor (2) Concrete/industrial Saw (4)[a] Excavator (2) Generator Set (1)[a] Front End Loader (2)	84 dBA L_{eq}
Site Preparation	Excavator (1)[a]	77 dBA L_{eq}
Grading	Excavator (1) Rubber-Tired Dozer (1) Scraper (4)[a] Tractor/Loader/Backhoe (2)[a] Generator Set (2)	83 dBA L_{eq}
Trenching	Drill Rig (1)[a] Rubber-Tired Dozer (1)[a] Generator Set (1) Forklift (1)	83 dBA L_{eq}
Site Preparation	Drill Rig (1)[a]	81 dBA L_{eq}
Trenching	Drill Rig (1)[a] Forklift (1) Excavator (2)[a]	82 dBA L_{eq}
Building Construction	Crane (3) Pump (6)[a] Front End Loader (1) Aerial Lift (3) Forklift (5) Generator Set (8) Welder (4) Concrete Saw (4)[a]	84 dBA L_{eq}
Architectural Coating	Aerial Lift (4) Crane (1)[a] Forklift (1)[a]	74 dBA L_{eq}
Paving	Paver (1) Forklift (2) Pump (1)[a] Tractor/Loader/Backhoe (1)[a]	82 dBA L_{eq}
Building Construction	Crane (3)[a] Forklift (3) Wedler (2)[a]	75 dBA L_{eq}
Architectural Coating	Cement Mixer Truck (2)[a] Forklift (1)[a]	76 dBA L_{eq}

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

TABLE 11 Estimated Construction Noise Levels for Phase 3 at a Distance of 50 feet

Phase of Construction	Construction Equipment (Quantity)	Estimated Construction Noise Level at 50 feet
Site Preparation	Air Compressor (1)[a] Forklift (1)[a]	75 dBA L_{eq}
Demolition	Air Compressor (2) Concrete/industrial Saw (4)[a] Excavator (2) Generator Set (1)[a] Front End Loader (2)	84 dBA L_{eq}
Site Preparation	Excavator (1)[a]	77 dBA L_{eq}
Grading	Excavator (1) Rubber-Tired Dozer (1) Scraper (4)[a] Tractor/Loader/Backhoe (2)[a] Generator Set (2)	83 dBA L_{eq}
Trenching	Drill Rig (1)[a] Rubber-Tired Dozer (1)[a] Generator Set (2) Forklift (1)	83 dBA L_{eq}
Site Preparation	Drill Rig (1)[a]	81 dBA L_{eq}
Trenching	Drill Rig (1)[a] Forklift (1) Excavator (2)[a]	82 dBA L_{eq}
Building Construction	Crane (3) Pump (6)[a] Front End Loader (1) Aerial Lift (3) Forklift (5) Generator Set (8) Welder (4) Concrete Saw (4)[a]	84 dBA L_{eq}
Architectural Coating	Aerial Lift (4) Crane (1)[a] Forklift (1)[a]	74 dBA L_{eq}
Paving	Paver (1) Forklift (2) Pump (1)[a] Tractor/Loader/Backhoe (1)[a]	82 dBA L_{eq}
Building Construction	Crane (3)[a] Forklift (3) Wedler (2)[a]	75 dBA L_{eq}
Architectural Coating	Cement Mixer Truck (2)[a] Forklift (1)[a]	76 dBA L_{eq}

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

Noise-sensitive receptors in the vicinity of all three phases are identified in Figure 3. Each of the receptors identified in the figure would have varying levels of exposure depending on the work location on the project site. The future development at 1091 Industrial Road is included within Com-4 as the land-use designation will remain the same in the future. The future development at 841 Old County Road is included within Com-13 as the land-use designation will remain the same in the future. The future development at 993 Laurel Street is included within Res-2 as the land-use designation will remain the same in the future.

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 each individual phase, which are identified in Figure 3. Table 12 summarizes the hourly average noise level calculated from all construction equipment planned during Phase 1 operating simultaneously. Table 13 summarizes the hourly average noise level calculated from all construction equipment planned during Phase 2 operating simultaneously. Table 14 summarizes the hourly average noise level calculated from all construction equipment planned during Phase 3 operating simultaneously. The hourly average noise levels in Tables 12- 13 assume the construction noise source level is positioned at the center of the respective Phase and propagated to the receiving property lines as defined in the FTA *Transit Noise and Vibration Impact Assessment Manual*.[9] The geometrical center of the site is used to represent the entire construction area. At distances farther from the construction site, total construction noise would be generated by all equipment scattered on the site operating simultaneously. The center of the cumulative noise source would, therefore, be the center of the construction site. The noise from multiple pieces of equipment operating simultaneously, with overlapping construction phasing, would generate the worst-case scenario as construction noise levels increase based on the cumulative equipment in use simultaneously.

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

FIGURE 3 Aerial Image Identifying the Noise-Sensitive Receptors in the Vicinity of Each Project Site

Source: Google Earth, 2023.

TABLE 12 Estimated Construction Noise Levels for Phase 1 at the Receiving Property Lines in the Project Vicinity

Phase of Construction	Calculated Hourly Average Noise Levels, L_{eq} (dBA)										
	Com-1 Com-2 Com-3 Com-4 Com-5 (1200+ feet)	Com-6 (610 feet)	Com-7 (420 feet)	Com-8 Com-9 (730 feet)	Com-10 (970 feet)	Com-11 (700 feet)	Com-12 (800 feet)	Res-1 Lod-1 (600 feet)	Fut-2 Res-2 (770 feet)	Com-13 Com-14 (430 feet)	Com-15 Com-16 (730 feet)
Site Preparation	49	55	58	53	51	54	53	55	53	58	53
Grading	61	67	71	66	63	66	65	67	65	70	66
Trenching	56	62	66	61	58	61	60	62	60	65	61
Site Preparation	53	59	63	58	55	58	57	59	57	62	58
Trenching	58	64	67	62	60	63	61	64	62	67	62
Building Construction	65	71	74	69	67	70	68	71	69	74	69
Architectural Coating	52	58	61	57	54	57	56	59	56	61	57
Paving	55	61	65	60	57	60	59	61	59	64	60
Building Construction	52	58	61	56	54	57	56	58	56	61	56
Architectural Coating	52	58	61	56	54	57	56	58	56	61	56

TABLE 13 Estimated Construction Noise Levels for Phase 2 at the Receiving Property Lines in the Project Vicinity

Phase of Construction	Calculated Hourly Average Noise Levels, L_{eq} (dBA)						
	Com-1 Com-3 Com-4 (690 feet)	Com-2 (650 feet)	Com-5 Com-8 Com-9 Com-10 Com-11 Res-1 Res-2 Lod-1 Com-12 Fut-2 (1000+ feet)	Com-6 Com-7 (610 feet)	Com-13 (575 feet)	Com-14 Com-15 (200 feet)	Com-16 (500 feet)
Site Preparation	52	52	49	53	54	63	55
Demolition	67	68	64	68	69	78	70
Site Preparation	57	57	54	58	59	68	60
Grading	66	67	63	67	68	77	69
Trenching	61	62	58	62	63	72	64
Site Preparation	58	59	55	59	60	69	61
Trenching	61	61	58	62	62	72	64
Building Construction	70	70	66	71	71	80	72
Architectural Coating	54	55	51	55	56	65	57
Paving	60	61	57	61	62	71	63
Building Construction	57	57	54	58	58	68	60
Architectural Coating	55	56	52	57	57	66	58

TABLE 14 Estimated Construction Noise Levels for Phase 3 at the Receiving Property Lines in the Project Vicinity

Phase of Construction	Calculated Hourly Average Noise Levels, L_{eq} (dBA)								
	Com-1 (685 feet)	Com-2 Com-3 Com-4 (450 feet)	Com-5 (700 feet)	Com-6 Com-7 (260 feet)	Com-8 Com-9 (550 feet)	Com-10 Com-11 Com-12 Res-1 Res-2 Lod-1 Fut-2 (1300+ feet)	Com-13 (930 feet)	Com-14 Com-15 (600 feet)	Com-16 (860 feet)
Site Preparation	52	56	52	60	54	46	49	53	50
Demolition	67	71	67	76	69	62	65	68	65
Site Preparation	54	58	54	62	56	48	51	55	52
Grading	67	70	67	75	69	61	64	68	65
Trenching	61	65	61	70	63	56	59	62	59
Site Preparation	58	61	58	67	60	53	56	59	56
Trenching	61	64	61	69	63	55	58	62	59
Building Construction	70	73	70	78	72	64	67	71	68
Architectural Coating	58	61	57	66	60	52	55	59	56
Paving	57	61	57	65	59	51	54	58	55
Building Construction	60	64	60	69	62	55	58	61	58
Architectural Coating	56	59	55	64	57	50	53	57	54

As shown in Tables 12 through 14, construction noise levels would typically range from 46 to 71 dBA L_{eq} at residential land uses (600 to 1000 feet from the center of activity) and from 45 to 80 dBA L_{eq} at commercial uses (200 to 1200 feet from the center of activity). Table 15 summarizes the construction noise level results in Tables 12 through 14 for each receptor. As shown in Table 15, FTA's residential threshold of 80 dBA L_{eq} and the commercial threshold of 85 dBA L_{eq} would not be exceeded at any noise sensitive receptors. This is a **less than significant** impact.

TABLE 15 Summary of Construction Noise Levels Expected at Each Receiving Property Line in the Project Vicinity

Receptor	Phase 1	Phase 2	Phase 3
Com-1[a]	48 to 64 dBA L_{eq}	52 to 70 dBA L_{eq}	52 to 70 dBA L_{eq}
Com-2[a]	49 to 65 dBA L_{eq}	52 to 70 dBA L_{eq}	56 to 73 dBA L_{eq}
Com-3[a]	49 to 65 dBA L_{eq}	52 to 70 dBA L_{eq}	56 to 73 dBA L_{eq}
Com-4 [a]	49 to 65 dBA L_{eq}	52 to 70 dBA L_{eq}	56 to 73 dBA L_{eq}
Com-5 [a]	48 to 64 dBA L_{eq}	48 to 65 dBA L_{eq}	52 to 70 dBA L_{eq}
Com-6[b]	55 to 71 dBA L_{eq}	53 to 71 dBA L_{eq}	60 to 78 dBA L_{eq}
Com-7 [b]	58 to 74 dBA L_{eq}	53 to 71 dBA L_{eq}	60 to 78 dBA L_{eq}
Com-8 [b]	53 to 69 dBA L_{eq}	49 to 66 dBA L_{eq}	54 to 72 dBA L_{eq}
Com-9 [b]	53 to 69 dBA L_{eq}	49 to 66 dBA L_{eq}	54 to 72 dBA L_{eq}
Com-10[c]	51 to 67 dBA L_{eq}	46 to 64 dBA L_{eq}	46 to 63 BA L_{eq}
Com-11 [c]	54 to 70 dBA L_{eq}	46 to 64 dBA L_{eq}	46 to 64 dBA L_{eq}
Com-12 [c]	53 to 68 dBA L_{eq}	47 to 65 dBA L_{eq}	45 to 63 dBA L_{eq}
Com-13[d]	58 to 74 dBA L_{eq}	54 to 71 dBA L_{eq}	49 to 67 dBA L_{eq}
Com-14 [d]	58 to 74 dBA L_{eq}	63 to 80 dBA L_{eq}	53 to 71 dBA L_{eq}
Com-15 [d]	53 to 69 dBA L_{eq}	63 to 80 dBA L_{eq}	53 to 71 dBA L_{eq}
Com-16 [d]	53 to 69 dBA L_{eq}	55 to 72 dBA L_{eq}	50 to 68 dBA L_{eq}
Res-1 [c]	55 to 71 dBA L_{eq}	47 to 65 dBA L_{eq}	46 to 64 dBA L_{eq}
Res-2 [c]	53 to 69 dBA L_{eq}	47 to 65 dBA L_{eq}	46 to 64 dBA L_{eq}
Lod-1 [c]	55 to 71 dBA L_{eq}	47 to 65 dBA L_{eq}	46 to 64 dBA L_{eq}
Fut-1[b]	58 to 74 dBA L_{eq}	53 to 71 dBA L_{eq}	60 to 78 dBA L_{eq}
Fut-2	53 to 69 dBA L_{eq}	47 to 65 dBA L_{eq}	46 to 64 dBA L_{eq}

[a] Receptor's existing daytime ambient noise environment is represented by LT-1, which ranges from 57 to 73 dBA L_{eq}, with an average daytime L_{eq} of 65.
[b] Receptor's existing daytime ambient noise environment is represented by LT-2, which ranges from 63 to 74 dBA L_{eq}, with an average daytime L_{eq} of 71.
[c] Receptor's existing daytime ambient noise environment is represented by LT-3, which ranges from 62 to 73 dBA L_{eq}, with an average daytime L_{eq} of 69.
[d] Receptor's existing daytime ambient noise environment is represented by LT-4, which ranges from 51 to 69 dBA L_{eq}, with an average daytime L_{eq} of 59.

Reasonable regulation of the hours of construction, as well as regulation of the arrival and operation of heavy equipment and the delivery of construction material, are necessary to protect the health and safety of persons, promote the general welfare of the community, and maintain the quality of life.

While not necessary to reach significance conclusions, San Carlos General Plan Policy NOI-1.8 requires all phases of construction activity to utilize reasonable noise reduction measures to minimize the exposure of neighboring properties to excessive noise levels and comply with the City's noise ordinance. The Municipal Code limits temporary construction work to between 8:00 a.m. and 6:00 p.m. on weekdays and between 9:00 a.m. and 5:00 p.m. on weekends. Construction activity is not permitted on the following holidays: New Year's Day, Martin Luther King Jr. Day, President's Day, Memorial Day, 4th of July, Labor Day, Veteran's Day, Thanksgiving Day and Christmas Day. Further states, all gasoline-powered construction equipment shall be equipped with an operating muffler or baffling system as originally provided by the manufacturer, and no modification to these systems is permitted. In addition, the following measures are recommended to be included as conditions of the project approval to reduce construction noise levels as low as practical in accordance with Policy NOI-1.8 of the General Plan:

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

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

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

- Prohibit all unnecessary idling of internal combustion engines;

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

- Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction.

Mitigation Measure 1a: None required.

Impact 1b: Permanent Noise Level Increase/Exceed Applicable Standards. The proposed project would not result in a substantial permanent noise level increase at the noise-sensitive receptors in the project vicinity. Further, operational noise levels generated by the proposed project would not exceed applicable standards established by the City of San Carlos. This is a **less-than-significant** impact.

According to Action NOI-1.4 of the City's General Plan, a significant impact would occur if the proposed project would cause the L_{dn} at noise-sensitive uses to increase by 3 dBA or more and exceed the "normally acceptable" level; cause the L_{dn} at noise-sensitive uses to increase by 5 dBA or more and remain "normally acceptable;" or cause noise levels to exceed the limits in Table 9-1 of the General Plan. According to Figure 9-1 of the City's General Plan, the "normally acceptable" threshold for single-family receptors is 60 dBA L_{dn}, for multi-family, hotels and motel receptors is 65 dBA L_{dn}, and for commercial uses is 70 dBA L_{dn}.

Table 9-1 of General Plan and the Municipal Code provides exterior and interior daytime and nighttime L_{eq}/L_{50} and L_{max} thresholds for non-transportation sources. Table 9-1 and the Municipal Code include thresholds for the following type of receptors: residential, medical, convalescent, theater, auditorium, church, meeting hall, school, library, and museum uses only. The site is surrounded by existing commercial, hotels, and residential uses. The threshold for residential land use is for daytime is 55 dBA L_{eq}/L_{50} with a L_{max} of 70 dBA and for nighttime is 45 dBA L_{eq}/L_{50} with a L_{max} of 60 dBA

Project Traffic Increase

The traffic study included peak hour turning movements for the existing traffic volumes and trip generation counts for the proposed project. By comparing the existing plus project trips traffic scenario to the existing scenario, the total contribution of the Project to the overall noise level increase was determined to be 3 dBA L_{dn} or less along each roadway segment in the project vicinity, as summarized in Table 16. Although the proposed project causes the L_{dn} to increase by 3 dBA the "normally acceptable" noise level would not be exceeded. Therefore it is not a significant impact.

TABLE 16 Estimated Noise Level Increases of Existing Plus Project Traffic Volumes Over Existing Volumes at Receptors in the Project Vicinity

Roadway	Segment	Existing Plus Project Noise Levels	Estimated Noise Level Increase
Commercial Street	Between Industrial Road and Old County Road	66 dBA L_{dn}	3 dBAL_{dn}
Industrial Road	West of Commercial Street	67 dBA L_{dn}	0 dBA L_{dn}
	Between Commercial Street and Brittan Avenue	67 dBA L_{dn}	0 dBA L_{dn}
	East of Britan Avenue	67 dBA L_{dn}	0 dBA L_{dn}

Roadway	Segment	Existing Plus Project Noise Levels	Estimated Noise Level Increase
Old County Road	West of Commercial Street	73 dBA L_{dn}	2 dBA L_{dn}
	Between Commercial Street and Brittan Avenue	73 dBA L_{dn}	2 dBA L_{dn}
	East of Britan Avenue	73 dBA L_{dn}	2 dBA L_{dn}
Brittan Avenue	Between Industrial Road and Old County Road	72 dBA L_{dn}	0 dBA L_{dn}

Mechanical Equipment

Phase 1

The plans shows three transformers, two generators, and a fire pump room on the ground floor of Building 5. For Building 6 it shows two transformers, two generators and a fire pump room are on the ground floor.

A 1,500 kW diesel-fired emergency generator powered by a 1,650 hp engine has been selected for Building 5 and a 1,000 kW diesel-fired powered by a 1,500 hp engine has been selected for Building 6. The building tenant would have the option of installing one additional 2,000-kW generator, powered by a 2,000-hp engine, alongside the preinstalled generator for the building. For this analysis, it is assumed the tenants would install a 2,000 kW generator. According to the manufacturer specifications provided by the applicant, both generators would produce a maximum average noise level of 75 dBA at 7 meters (23 feet) including the proposed noise enclosure. While generators operating under emergency conditions would be exempt from City noise limits, monthly testing of emergency generators, which typically occur for a period of one hour between 7:00 a.m. and 10:00 p.m., would be required meet the City's standards at the surrounding residential uses and to fall within the existing ambient conditions.

Transformers between 2,500 and 3,000 kVA typically generate noise levels up to 68 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 74 dBA L_{dn} at a distance of 1 meter (3.28 feet).

Each fire pump would be located within a mechanical room inside the building. The City of San Carlos does not recognize mechanical equipment located on the interior of the buildings to be noise sources that require analysis. The mechanical equipment analysis will be limited to equipment on the exterior of the project buildings.

Table 17 summarizes the hourly average noise levels and the combined day-night average noise level for all noise-generating mechanical equipment located on the ground level of Buildings 5 and 6 as propagated to the surrounding receptors. Operational noise levels due to emergency generator testing

and ground floor mechanical equipment would not exceed the City's standards and daytime or nighttime average ambient noise levels at any of the surrounding receptors. For all existing receptors, the noise level increase due to emergency generator testing would not be measurable or detectable (0 dBA L_{dn} increase).

For Building 5, the roof plan shows 3 cooling towers (1 is for future use), 8 air handling units (AHUs) (2 are for future use), 9 lab exhaust fans (2 are for future use), 7 general exhaust fans, and 8 air-water heat pumps (1 is for future use).

For Building 6, the roof plan shows 8 AHUs (2 are for future use), 4 general exhaust fans, 11 lab exhaust fans (2 are for future use), 4 cooling towners (1 is for future use), and 3 air source heat pumps (1 is for future use).

Cooling towers typically include fan operations with noise levels up to 74 dBA at a distance of 50 feet. Typical heating pumps would generate noise levels ranging from 56 to 66 dBA at a distance of 3 feet. When operating at full speed, noise levels from the exhaust fans could be up to 76 dBA at a distance of 5 feet and up to 65 dBA at 5 feet when operating at 35% speed. Heating/cooling equipment and AHUs typically generate noise levels up to 62 dBA at a distance of 20 feet.

All equipment operating simultaneously would generate the worst-case noise source, with noise propagating from the geometrical center of the collective noise source. Assuming all equipment to be operating simultaneously during a given hour, the combined rooftop noise level at Building 5 would be 89 dBA L_{eq} at 5 feet, and assuming this worst-hour noise level to be operating each hour in a 24-hour period, the day-night average noise level for the Building 5 would be 95 dBA L_{dn} at 5 feet, assuming a conservative 10 dBA attenuation from the mechanical screen. Assuming all equipment to be operating simultaneously during a given hour, the combined rooftop noise level at Building 6 would be 90 dBA L_{eq} at 5 feet, and assuming this worst-hour noise level to be operating each hour in a 24-hour period, the day-night average noise level for Building 6 building would be 96 dBA L_{dn} at 5 feet, assuming a conservative 10 dBA attenuation from the mechanical screen.

Table 18 summarizes Buildings 5 and 6 rooftop mechanical equipment noise levels propagated to the property lines of the surrounding land uses. Note, an additional attenuation of 10 dBA is assumed for all rooftop sources due to the elevation of the equipment above the ground. The 10 dB of attenuation is due to the distance the mechanical equipment is located from the edge of the roof, the building façade will break the line of sight from the source, mechanical equipment, to the ground floor receptor. This is applied to the values in Table 18 for all ground-level receptors.

Mechanical noise L_{eq} due to rooftop equipment at both proposed buildings would not exceed daytime or nighttime average noise standards at residential land uses for non-transportation noise sources. For all existing receptors, the noise level increase due to emergency generator testing would not be measurable or detectable (0 dBA L_{dn} increase).

TABLE 17 Estimated Operational Noise Levels for Ground Floor Mechanical Equipment Sources for Buildings 5 and 6

Receptor	Distance from Southern Façade of Building 5, feet	L_{eq} from Building 5 Noise, dBA	Distance from Western Façade of Building 6, feet	L_{eq} from Building 6 Noise, dBA	Combined L_{eq}, dBA	Combined Project L_{dn}, dBA	Ambient Noise Levels L_{dn}, dBA	Combined Project and Ambient Noise Levels L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
Fut-1	370	42	930	23	42	48	72	72	0
Com-7	135	51	725	26	51	57	72	72	0
Com-9	460	40	1085	22	40	46	72	72	0
Com-10	825	35	1200	21	35	41	71	71	0
Com-11	730	36	915	24	36	43	71	71	0
Fut-2	660	37	660	26	37	44	71	71	0
Res-1	660	37	660	26	37	44	71	71	0
Res-2	730	36	485	29	37	43	71	71	0
Lod-1	730	36	485	29	37	43	71	71	0
Com-12	1000	33	530	28	34	41	71	71	0
Com-13	720	36	100	43	44	50	63	63	0
Com-14	740	36	280	34	38	44	63	63	0

TABLE 18 Estimated Operational Noise Levels for Rooftop Mechanical Equipment Sources for Buildings 5 and 6

Receptor	Distance from Center of Building 5, feet	L_{eq} from Building 5 Noise, dBA	Distance from Center of Building 6, feet	L_{eq} from Building 6 Noise, dBA	Combined Project L_{eq}, dBA	Combined Project L_{dn}, dBA	Ambient Noise Levels L_{dn}, dBA	Combined Project and Ambient Noise Levels L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
Fut-1	400	31[a]	820	26[a]	32[a]	38[a]	72	72	0
Com-7	250	35[a]	545	29[a]	36[a]	42[a]	72	72	0
Com-9	620	27[a]	945	25[a]	29[a]	35[a]	72	72	0
Com-10	1000	23[a]	1065	24[a]	26[a]	33[a]	71	71	0
Com-11	820	25[a]	725	27[a]	29[a]	35[a]	71	71	0
Fut-2	700	26[a]	555	29[a]	31[a]	37[a]	71	71	0
Res-1	700	26[a]	555	29[a]	31[a]	37[a]	71	71	0
Res-2	740	26[a]	465	31[a]	32[a]	38[a]	71	71	0
Lod-1	740	26[a]	465	31[a]	32[a]	38[a]	71	71	0
Com-12	980	23[a]	590	29[a]	30[a]	36[a]	71	71	0
Com-13	570	28[a]	250	36[a]	37[a]	43[a]	63	63	0
Com-14	610	27[a]	260	36[a]	36[a]	43[a]	63	63	0

[a] Conservative 20 dBA attenuation assumed for penthouse mechanical screens combined with the elevation of the rooftop equipment.

Phase 2

Mechanical ground floor plans for Buildings 1, 4, and 7 have not been finalized. For this analysis we assumed the ground floor of Buildings 1 and 4 would each include 2 transformers, 2 generators, and a fire pump room. Building 7 will have 1 transformer.

The generators have not been selected for Buildings 1 and 4. For our analysis we assume A 1,000 kW diesel-fired emergency generator powered by a 1,500 hp engine has been selected for Building 1 and Building 4. The building tenant would have the option of installing one additional 2,000-kW generator, powered by a 2,000-hp engine, alongside the preinstalled generator for the building. For our analysis it is assumed the tenants would install a 2,000 kW generator.

Table 19 summarizes the hourly average noise levels and the combined day-night average noise level for all noise-generating mechanical equipment located on the ground level of Buildings 1, 4, and 7 as propagated to the surrounding receptors. Operational noise levels due to emergency generator testing and ground floor mechanical equipment would not exceed the City's standards and daytime or nighttime average ambient noise levels at any of the surrounding receptors. For all existing receptors, the noise level increase due to ground level mechanical equipment noise would be 1 dBA L_{dn} or less.

Mechanical roof plans for Buildings 1, 4, and 7 have not been finalized. For this analysis we assumed the roof of Buildings 1 and 4 would each include 8 AHUs (2 are for future use), 4 general exhaust fans, 11 lab exhaust fans (2 are for future use), 4 cooling towers (1 is for future use), and 3 air source heat pumps (1 is for future use).For Building 7 it is assumed that there will be 1 cooling tower, 1 chiller, 1 AHU, 1 heat pump, and 3 general exhaust fans.

Assuming all equipment to be operating simultaneously during a given hour, the combined rooftop noise level at Building 1 would be 90 dBA L_{eq} at 5 feet, and assuming this worst-hour noise level to be operating each hour in a 24-hour period, the day-night average noise level for the Building 1 would be 96 dBA L_{dn} at 5 feet, assuming a conservative 10 dBA attenuation from the mechanical screen. Assuming all equipment to be operating simultaneously during a given hour, the combined rooftop noise level at Building 4 would be 90 dBA L_{eq} at 5 feet, and assuming this worst-hour noise level to be operating each hour in a 24-hour period, the day-night average noise level for the Building 4 would be 96 dBA L_{dn} at 5 feet, assuming a conservative 10 dBA attenuation from the mechanical screen. Assuming all equipment to be operating simultaneously during a given hour, the combined rooftop noise level at Building 7 would be 84 dBA L_{eq} at 5 feet, and assuming this worst-hour noise level to be operating each hour in a 24-hour period, the day-night average noise level for the Building 7 would be 90 dBA L_{dn} at 5 feet.

Table 20 summarizes Buildings 1, 4, and 7 rooftop mechanical equipment noise levels propagated to the property lines of the surrounding land uses. Note, an additional attenuation of 10 dBA is assumed for all rooftop sources due to the elevation of the equipment above the ground. This is applied to the values in Table 20 for all ground-level receptors.

Mechanical noise L_{eq} due to rooftop equipment at all three proposed buildings would not exceed daytime or nighttime average noise standards at residential land uses for non-transportation noise

sources. For all existing receptors, the noise level increase due to emergency generator testing would not be measurable or detectable (0 dBA L_{dn} increase).

TABLE 19 Estimated Operational Noise Levels for Ground Floor Mechanical Equipment Sources

Receptor	Distance from western façade Building 1, feet	L_{eq} from Building 1 Noise, dBA	Distance from western façade Building 4, feet	L_{eq} from Building 4 Noise, dBA	Distance from Center of Building 7, feet	L_{eq} from Building 7 Noise, dBA	Combined Project L_{eq}, dBA	Combined Project L_{dn}, dBA	Ambient Noise Levels L_{dn}, dBA	Combined Project and Ambient Noise Levels L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
Com-1	330	42	1080	22	830	48	49	55	67	67	0
Com-2	285	44	1080	22	750	48	49	56	67	67	0
Com-3	430	40	1090	22	750	48	48	55	67	67	0
Com-4	725	36	1215	21	810	48	48	55	67	67	0
Com-5	1100	32	1455	20	1030	49	49	55	67	67	0
Com-6	700	36	965	23	560	47	48	54	67	67	0
Fut-1	825	34	825	24	435	47	47	54	72	72	0
Com-7	910	34	720	26	440	46	47	53	72	72	0
Com-8	1065	32	1090	22	755	48	48	54	72	72	0
Com-9	1245	31	1100	22	810	48	48	54	71	71	0
Com-11	1700	28	1045	22	1100	48	48	54	71	71	0
Res-1	1595	29	910	24	1045	47	47	54	71	71	0
Fut-2	1730	28	990	23	1195	47	48	54	71	71	0
Lod-1	1555	29	785	25	1045	47	47	53	71	71	0
Res-2	1700	28	925	23	1205	47	47	54	71	71	0
Com-12	1575	29	820	25	1185	47	47	53	71	71	0
Com-13	900	34	150	39	575	43	45	51	71	71	0
Com-14	90	54	75	45	410	42	55	61	63	65	2
Com-15	120	51	610	27	535	46	52	59	67	68	1

Receptor	Distance from western façade Building 1, feet	L_{eq} from Building 1 Noise, dBA	Distance from western façade Building 4, feet	L_{eq} from Building 4 Noise, dBA	Distance from Center of Building 7, feet	L_{eq} from Building 7 Noise, dBA	Combined Project L_{eq}, dBA	Combined Project L_{dn}, dBA	Ambient Noise Levels L_{dn}, dBA	Combined Project and Ambient Noise Levels L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
Com-16	355	42	400	31	660	45	47	53	63	63	0

TABLE 20 Estimated Operational Noise Levels for Rooftop Mechanical Equipment Sources

Receptor	Distance from Center of the Building 1, feet	L_{eq} from Building 1 Noise, dBA	Distance from Center of Building 4, feet	L_{eq} from Building 4 Noise, dBA	Distance from Center of Building 7, feet	L_{eq} from Building 7 Noise, dBA	Combined Project L_{eq}, dBA	Combined Project L_{dn}, dBA	Ambient Noise Levels L_{dn}, dBA	Combined Project and Ambient Noise Levels L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
Com-1	360	33	1070	24	830	20	34	40	67	67	0
Com-2	230	37	1020	24	750	27	37	44	67	67	0
Com-3	310	34	1040	24	750	27	35	42	67	67	0
Com-4	575	29	1150	23	810	26	31	38	67	67	0
Com-5	945	25	1375	21	1030	24	28	35	67	67	0
Com-6	580	29	880	25	560	29	33	39	67	67	0
Fut-1	705	27	730	27	435	31	34	40	72	72	0
Com-7	830	26	670	28	440	31	34	40	72	72	0
Com-8	920	25	1000	24	755	27	30	36	72	72	0
Com-9	1150	23	1000	24	810	26	29	36	71	71	0
Com-11	1650	20	980	24	1100	23	28	34	71	71	0
Res-1	1595	20	880	25	1045	24	28	35	71	71	0
Fut-2	1735	19	975	24	1195	23	27	34	71	71	0
Lod-1	1570	20	790	26	1045	24	29	35	71	71	0

Receptor	Distance from Center of the Building 1, feet	L_{eq} from Building 1 Noise, dBA	Distance from Center of Building 4, feet	L_{eq} from Building 4 Noise, dBA	Distance from Center of Building 7, feet	L_{eq} from Building 7 Noise, dBA	Combined Project L_{eq}, dBA	Combined Project L_{dn}, dBA	Ambient Noise Levels L_{dn}, dBA	Combined Project and Ambient Noise Levels L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
Res-2	1725	19	945	25	1205	22	27	34	71	71	0
Com-12	1640	20	865	25	1185	23	28	34	71	71	0
Com-13	960	24	230	37	575	29	38	44	71	71	0
Com-14	420	32	165	40	410	32	41	47	63	63	0
Com-15	230	37	470	31	535	30	38	45	67	67	0
Com-16	495	30	440	31	660	28	35	41	63	63	0

[a] Conservative 20 dBA attenuation assumed for penthouse mechanical screens combined with the elevation of the rooftop equipment.

Phase 3

Mechanical ground floor plans for Buildings 2 and 3 have not been finalized for this analysis we assumed the ground floor of each building will each include 3 transformers, 2 generators, and a fire pump room.

The specific generators have not been selected for Buildings 2 and 3. For our analysis we assume A 1,500 kW diesel-fired emergency generator powered by a 2,000 hp engine has been selected for Building 2 and Building 3. The building tenant would have the option of installing one additional 2,000-kW generator, powered by a 2,000-hp engine, alongside the preinstalled generator for the building. For our analysis it is assumed the tenants would install a 2,000 kW generator.

Table 21 summarizes the hourly average noise levels and the combined day-night average noise level for all noise-generating mechanical equipment located on the ground level of Buildings 2 and 3 as propagated to the surrounding receptors. Operational noise levels due to emergency generator testing and ground floor mechanical equipment would not exceed the City's standards and daytime or nighttime average ambient noise levels at any of the surrounding receptors. For all existing receptors, the noise level increase due to emergency generator testing would not be measurable or detectable (0 dBA L_{dn} increase).

Mechanical roof plans for Buildings 2 and 3 have not been finalized. For this analysis we assumed the roof of Buildings 2 and 3 would each include 8 AHUs (2 are for future use), 4 general exhaust fans, 11 lab exhaust fans (2 are for future use), 4 cooling towers (1 is for future use), and 3 air source heat pumps (1 is for future use).

Assuming all equipment to be operating simultaneously during a given hour, the combined rooftop noise level at buildings 2 and 3 would be 90 dBA L_{eq} at 5 feet, and assuming this worst-hour noise level to be operating each hour in a 24-hour period, the day-night average noise level for each building would be 97 dBA L_{dn} at 5 feet, assuming a conservative 10 dBA attenuation from the mechanical screen.

Table 22 summarizes Buildings 2 and 3 rooftop mechanical equipment noise levels propagated to the property lines of the surrounding land uses. Note, an additional attenuation of 10 dBA is assumed for all rooftop sources due to the elevation of the equipment above the ground. This is applied to the values in Table 22 for all ground-level receptors.

Mechanical noise L_{eq} due to rooftop equipment at both proposed buildings would not exceed daytime or nighttime average noise standards at residential land uses for non-transportation noise sources. For all existing receptors, the noise level increase due to emergency generator testing would not be measurable or detectable (0 dBA L_{dn} increase).

TABLE 21 Estimated Operational Noise Levels for Ground Floor Mechanical Equipment Sources for Buildings 2 and 3

Receptor	Distance from the eastern facade of Building 2, feet	L_{eq} from Building 2 Noise, dBA	Distance from the eastern façade or Building 3, feet	L_{eq} from Building 3 Noise, dBA	Combined Project L_{eq}, dBA	Combined Project L_{dn}, dBA	Ambient Noise Levels L_{dn}, dBA	Combined Project and Ambient Noise Levels L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
Com-1	620	37	770	25	38	44	72	72	0
Com-2	370	42	595	28	42	48	72	72	0
Com-3	235	46	510	29	46	52	72	72	0
Com-4	260	45	520	29	45	51	71	71	0
Com-5	545	38	705	26	39	45	71	71	0
Com-6	155	49	225	26	50	56	71	71	0
Fut-1	325	43	210	37	44	50	71	71	0
Com-7	550	38	315	33	40	46	71	71	0
Com-8	490	39	510	29	40	46	63	63	0
Com-14	665	37	660	27	37	44	63	63	0
Com-15	665	37	660	27	37	44	63	63	0

TABLE 22 Estimated Operational Noise Levels for Rooftop Mechanical Equipment Sources for Buildings 2 and 3

Receptor	Distance from Center of the Building 2, feet	L_{eq} from Building 2 Noise, dBA	Distance from Center of Building 3, feet	L_{eq} from Building 3 Noise, dBA	Combined L_{eq}, dBA	Combined L_{dn}, dBA	Ambient Noise Levels L_{dn}, dBA	Combined Project and Ambient Noise Levels L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
Com-1	500	30[a]	675	28 [a]	32 [a]	38 [a]	67	67	0
Com-2	285	35 [a]	540	29 [a]	36 [a]	42 [a]	67	67	0
Com-3	225	37 [a]	510	30 [a]	38 [a]	44 [a]	67	67	0
Com-4	310	34 [a]	570	29 [a]	35 [a]	42 [a]	67	67	0
Com-5	655	28 [a]	810	26 [a]	30 [a]	36 [a]	67	67	0
Com-6	280	35 [a]	370	33 [a]	37 [a]	44 [a]	72	72	0
Fut-1	430	31 [a]	350	33 [a]	35 [a]	42 [a]	72	72	0
Com-7	620	28 [a]	420	32 [a]	33 [a]	40 [a]	72	72	0
Com-8	600	29 [a]	640	28 [a]	31 [a]	38 [a]	72	72	0
Com-14	550	29 [a]	510	30 [a]	33 [a]	39 [a]	63	63	0
Com-15	550	29 [a]	510	30 [a]	33 [a]	39 [a]	63	63	0

[a] Conservative 20 dBA attenuation assumed for penthouse mechanical screens combined with the elevation of the rooftop equipment.

All Phases

Table 23 summarizes the combined hourly average noise levels and day-night noise level for all noise-generating mechanical equipment located on the ground level of Buildings 1-7 as propagated to the surrounding receptors. Operational noise levels due to emergency generator testing and ground floor mechanical equipment would not exceed the City's standards and daytime or nighttime average ambient noise levels at any of the surrounding receptors. For all existing receptors, the noise level increase due to mechanical equipment noise would be 2 dBA L_{dn} or less.

Table 24 summarizes the combined hourly average noise levels and day-night noise level for all noise-generating mechanical equipment located on the roof level of Buildings 1-7 propagated to the property lines of the surrounding land uses. Note, an additional attenuation of 10 dBA is assumed for all rooftop sources due to the elevation of the equipment above the ground. This is applied to the values in Table 24 for all ground-level receptors. Mechanical noise L_{eq} due to rooftop equipment at both proposed buildings would not exceed daytime or nighttime average noise standards at residential land uses for non-transportation noise sources. For all existing receptors, the noise level increase due to mechanical equipment noise would be 1 dBA L_{dn} or less.

TABLE 23 Estimated Operational Noise Levels for Ground Floor Mechanical Equipment Sources for Buildings 1-7

Receptor	Combined Project L_{eq}, dBA	Combined Project L_{dn}, dBA	Ambient Noise Levels L_{dn}, dBA	Combined Project and Ambient Noise Levels L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
Com-1	49	56	67	67	0
Com-2	50	56	67	67	0
Com-3	50	57	67	67	0
Com-4	50	56	67	67	0
Com-5	49	56	67	67	0
Com-6	52	58	72	72	0
Com-7	52	59	72	72	0
Com-8	49	55	72	72	0
Com-9	49	55	71	71	0
Com-10	35	41	71	71	0
Com-11	48	54	71	71	0
Com-12	47	54	71	71	0
Com-13	47	54	71	71	0
Com-14	55	61	63	65	2
Com-15	52	59	63	64	1
Com-16	47	53	63	63	0
Fut-1	50	56	72	72	0
Fut-2	48	54	71	71	0
Res-1	48	54	71	71	0

Receptor	Combined Project L_{eq}, dBA	Combined Project L_{dn}, dBA	Ambient Noise Levels L_{dn}, dBA	Combined Project and Ambient Noise Levels L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
Res-2	48	54	71	71	0
Lod-1	47	54	71	71	0

TABLE 24 Estimated Operational Noise Levels for Rooftop Mechanical Equipment Sources for Buildings 1-7

Receptor	Combined Project L_{eq}, dBA	Combined Project L_{dn}, dBA	Ambient Noise Levels L_{dn}, dBA	Combined Project and Ambient Noise Levels L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
Com-1	46	52	67	67	0
Com-2	50	56	67	67	0
Com-3	50	56	67	67	0
Com-4	47	53	67	67	0
Com-5	42	49	67	67	0
Com-6	49	55	72	72	0
Com-7	49	56	72	72	0
Com-8	44	50	72	72	0
Com-9	43	49	71	71	0
Com-10	36	42	71	71	0
Com-11	41	47	71	71	0
Com-12	42	48	71	71	0
Com-13	50	57	71	71	0
Com-14	53	59	63	64	1
Com-15	49	56	63	64	1
Com-16	45	51	63	63	0
Fut-1	49	55	72	72	0
Fut-2	42	49	71	71	0
Res-1	43	49	71	71	0
Res-2	43	50	71	71	0
Lod-1	44	50	71	71	0

Truck Loading and Unloading

Phase 1

The site plan shows a loading zone within Building 5 along the southern building façade, which would be enclosed by the building to the north, to the south, and to the west, providing shielding. Receptors Com-7 and Com-9 are the closest receptors that would be exposed to loading activities at Building 5.

Building 6 shows a loading zone along the western building façade, which would be enclosed by the building to the north and east providing shielding. Receptors Com-12, Com-13, Lod-1, and Res-2 are the closest receptors that would be exposed to loading activities at Building 6. However, due to the Building 6, these receptors would receive some shielding. Conservatively, 5 dBA attenuation is assumed for these receptors.

The loading zones at Buildings 5 and 6 are expected to have heavy-sized trucks, with up to four deliveries in a week. Truck delivery 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. Heavy trucks typically generate maximum instantaneous noise levels of 70 to 75 dBA at a distance of 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. Assuming a single truck would take up to 20 minutes to load/unload, one loading/unloading event could be initiated in a single hour, and two heavy trucks could be loading/unloading at the same time, hourly average noise levels would be 73 dBA L_{eq} for heavy trucks. It is assumed that all deliveries and on-site maintenance activities would occur during daytime hours between 7:00 a.m. and 10:00 p.m. Assuming up to four deliveries in a single day during these daytime hours, not counting small delivery trucks such as FedEx and UPS, the day-night average noise level at 50 feet would be 65 dBA L_{dn}. This would represent worst-case conditions.

Table 25 summarizes the truck loading/unloading noise levels propagated to the property line of the receptors. Since the loading dock is designed for two operations the center of the loading dock areas is used. Two trucks loading/unloading simultaneously would generate the worst-case noise source, with noise propagating from the geometrical center of the collective noise source. The collective noise source would then be treated as a point source and propagate from the geometrical center of the collective noise source.

Operational L_{eq} due to truck loading/unloading noise would not exceed daytime average ambient noise levels at any surrounding land use. For all existing receptors, the noise level increase due to truck loading/unloading noise sources would be 1 dBA L_{dn} or less.

TABLE 25 Estimated Operational Noise Levels for Truck Loading and Unloading Sources Buildings 5 and 6

Receptor	Distance from Center of the Loading Zone, feet	L_{eq} from Heavy Truck Noise, dBA	Combined Project L_{dn} dBA	Ambient Noise Levels L_{dn}, dBA	Combined Project and Ambient Noise Levels L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
Com-7	150	64	56	72	72	0
Com-9	475	54	46	72	72	0
Com-12	560	52[a]	45	71	71	0
Com-13	120	66[a]	58	63	64	1
Lod-1	550	52[a]	45	71	71	0
Res-2	710	50[a]	42	71	71	0

[a] Conservative 5 dBA attenuation assumed for east building façades surrounding three sides of the loading zone for Building 6.

Phase 2

Building 1 shows a loading zone along the western building façade, which would be enclosed by the building to the east, and partially enclosed to the north providing shielding. Receptors Com-13, Com-15 and Com-14 are the closest receptors that would be exposed to loading activities at Building 1.

Building 4 shows a loading zone along the southern building façade, which would be enclosed by the building to the north, east and west providing shielding. Receptors Com-13 and Com-14 are the closest receptors that would be exposed to loading activities at Building 4. However, due to the Building 4, these receptors would receive some shielding. Conservatively, 5 dBA attenuation is assumed for these receptors.

It is assumed that all deliveries and on-site maintenance activities would occur during daytime hours between 7:00 a.m. and 10:00 p.m. Assuming up to four deliveries in a single day, not counting small delivery trucks such as FedEx and UPS, during these daytime hours, the day-night average noise level at 50 feet would be 59 dBA L_{dn}. This would represent worst-case conditions.

Table 26 summarizes the truck loading/unloading noise levels propagated to the property line of the receptors.

Operational L_{eq} due to truck loading/unloading noise would not exceed daytime average ambient noise levels at any surrounding land use. For all existing receptors, the noise level increase due to mechanical equipment noise would be 1 dBA L_{dn} or less.

TABLE 26 Estimated Operational Noise Levels for Truck Loading and Unloading Sources Buildings 1 and 4

Receptor	Distance from Center of the Loading Zone, feet	L_{eq} from Heavy Truck Noise, dBA	Combined Project L_{dn} dBA	Ambient Noise Levels L_{dn}, dBA	Combined Project and Ambient Noise Levels L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
Com-13	875(Building 1) 270 (Building 4)	48(Building 1) 54[a] (Building 4)	46[a]	71	71	0
Com-14	320	46[a]	44[a]	63	63	0
Com-15	115	60	58	67	68	1

[a] Conservative 5 dBA attenuation assumed for east building façades surrounding three sides of the loading zone of Building 4.

Phase 3

Building 2 shows a loading zone along the eastern building façade, the sound from which would be enclosed by the building to the west, and partially enclosed to the north providing shielding. The closest receptors with exposure to loading activities at Building 2 would be Com-3, Com-4, Com-5, Com-6, Fut-1, Com-7, and Com-8.

Building 3 shows a loading zone along the northern building façade, which would be enclosed by Building 3 to the north, west, and south providing shielding. Receptors Com-6, Fut-1, and Com-8 are the closest receptors that would be exposed to loading activities at Building 3.

It is assumed that all deliveries and on-site maintenance activities would occur during daytime hours between 7:00 a.m. and 10:00 p.m. Assuming up to four deliveries in a single day, not counting small delivery trucks such as FedEx and UPS, during these daytime hours, the day-night average noise level at 50 feet would be 59 dBA L_{dn}. This would represent worst-case conditions.

Table 27 summarizes the truck loading/unloading noise levels propagated to the property line of the receptors.

Operational L_{eq} due to truck loading/unloading noise would not exceed daytime average ambient noise levels at any surrounding land use. For all existing receptors, the noise level increase due to truck loading/unloading noise sources would not be measurable or detectable (0 dBA L_{dn} increase).

TABLE 27 Estimated Operational Noise Levels for Truck Loading and Unloading Sources Buildings 2 and 3

Receptor	Distance from Center of the Loading Zone, feet	L_{eq} from Heavy Truck Noise, dBA	Combined L_{dn} Project dBA	Ambient Noise Levels L_{dn}, dBA	Combined Project and Ambient Noise Levels L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
Com-3	240	60	52	72	72	0
Com-4	250	59	52	71	71	0
Com-5	535	48[a]	40[a]	71	71	0
Com-6	150 (Building 2) 275 (Building 3)	64 (Building 2) 58 (Building 3)	56	71	71	0
Com-7	550	52	45	71	71	0
Com-8	480 (Building 2) 570 (Building 3)	54 (Building 2) 52 (Building 3)	46	63	63	0
Fut-1	310 (Building 2) 290 (Building 3)	57 (Building 2) 58 (Building 3)	50	71	71	0

All Phases

Table 28 summarizes the truck loading/unloading noise levels for Buildings 1-6 propagated to the property line of the receptors.

Operational L_{eq} due to truck loading/unloading noise would not exceed daytime average ambient noise levels at any surrounding land use. For all existing receptors, the noise level increase due to mechanical equipment noise would be 1 dBA L_{dn} or less.

TABLE 28 Estimated Operational Noise Levels for Loading/Unloading Activities Buildings 1-6

Receptor	Combined Project L_{eq}, dBA	Combined Project L_{dn}, dBA	Ambient Noise Levels L_{dn}, dBA	Combined Project and Ambient Noise Levels L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
Com-3	60	52	67	67	0
Com-4	59	51	67	67	0
Com-5	48	40	67	67	0
Com-6	65	57	72	72	0
Com-7	65	57	72	72	0
Com-8	55	47	72	72	0
Com-9	54	46	71	71	0
Com-12	52	44	71	71	0
Com-13	66	58	71	71	0
Com-14	55	47	63	63	0
Com-15	66	58	63	64	1
Fut-1	61	53	72	72	0
Res-2	50	42	71	71	0
Lod-1	52	45	71	71	0

Daycare

Phase 2

The project plans show a potential playground in the center of Building 7. Playground activities will be the dominant noise source at the optional daycare. Playground activities typically range from 59 to 67 dBA L_{eq} at a distance of 50 feet from the center of the playground, with maximum noise levels up to 75 dBA L_{max}. It is assumed the playground would be used from 7 am until 7pm Monday through Friday. Receptors Fut-1, Com-7, Com-8, and Com-9 would be exposed to noise from a daycare.

Table 26 summarizes the daycare noise levels propagated to the property line of the receptors.

Operational L_{eq} due to daycare noise would not exceed daytime average ambient noise levels at any surrounding land use. For all existing receptors, the noise level increase due to daycare noise sources would not be measurable or detectable (0 dBA L_{dn} increase).

TABLE 29 Estimated Operational Noise Levels for Daycare Noise Sources

Receptor	Distance from Center of the Playground, feet	L_{eq} from Daycare Noise, dBA	Combined L_{dn} dBA	Noise Level Increase, dBA L_{dn}
Fut-1	420	49	46	0
Com-7	420	49	46	0
Com-8	740	44	41	0
Com-9	760	43	38	0

Total Combined Project-Generated Noise

The traffic noise levels produced by the project would result in an increase of 3 dBA L_{dn} or less at all existing receptors surrounding the site but would not exceed the City's "normally acceptable" noise level. Therefore, the project would not result in a substantial increase.

Table 30 summarizes the proposed project combined (mechanical equipment, truck loading/unloading activities, and daycare) propagated to the property line of the receptors. The operational noise levels produced by the proposed project combined (mechanical equipment, truck loading/unloading activities, and daycare) would result in an increase of 2 dBA L_{dn} or less at all existing receptors surrounding the project site. Therefore, the proposed project would not result in a substantial increase over existing ambient noise levels in the project vicinity.

Further, operational noise levels would not exceed the daytime noise standard of 55 dBA L_{eq} or the nighttime noise standard of 45 dBA L_{eq} at the nearest residential receptors.

TABLE 30 Estimated Project Operational Noise Levels for Mechanical Equipment, Truck Loading/Unloading, and Daycare

Receptor	Combined Project Worst-Case L_{eq}, dBA	Combined Project L_{dn}, dBA[a]	Ambient Noise Levels L_{dn}, dBA	Combined Project and Ambient Noise Levels L_{dn}, dBA[a]	Noise Level Increase, dBA L_{dn}
Com-1	49	56	67	67	0
Com-2	50	57	67	67	0
Com-3	60	58	67	68	1
Com-4	60	58	67	67	0
Com-5	52	56	67	67	0
Com-6	65	61	72	72	0

Receptor	Combined Project Worst-Case L_{eq}, dBA	Combined Project L_{dn}, dBA[a]	Ambient Noise Levels L_{dn}, dBA	Combined Project and Ambient Noise Levels L_{dn}, dBA[a]	Noise Level Increase, dBA L_{dn}
Com-7	65	61	72	72	0
Com-8	56	56	72	72	0
Com-9	55	56	71	71	0
Com-10	35	42	71	71	0
Com-11	48	54	71	71	0
Com-12	47	54	71	71	0
Com-13	48	60	71	71	0
Com-14	58	62	63	65	2
Com-15	66	62	63	65	2
Com-16	61	56	63	64	1
Fut-1	61	58	72	72	0
Fut-2	48	54	71	71	0
Res-1	48	54	71	71	0
Res-2	52	55	71	71	0
Lod-1	53	54	71	71	0

[a] L_{dn} noise levels assume the playground operates from 7am-7pm and there is a total of 4 truck delivers between the hours of 7am-10pm

Mitigation Measure 1b: No further mitigation required.

Impact 2: Exposure to Excessive Groundborne Vibration. Construction-related vibration levels at the project site would not exceed 0.3 in/sec PPV at the existing structures. **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.

For structural damage, 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, 0.3 in/sec PPV for buildings that are found to be structurally sound but where structural damage is a major concern, and a conservative limit of 0.08 in/sec PPV for historic buildings or buildings that are documented to be structurally weakened.
Table 27 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 31 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.

According to the National Historic Resource Inventory,[10] the nearest historical structure is located over 2,000 feet from the project site. At this distance, construction vibration levels would have no impact on the historical structure. Historical buildings are not discussed further in this impact discussion. Therefore, conservatively, groundborne vibration levels exceeding 0.3 in/sec PPV would have the potential to result in a significant vibration impact.

[10]https://www.nps.gov/subjects/nationalregister/database-research.htm

TABLE 31 Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft. (in/sec)	Minimum Distance to Meet 0.3 in/sec PPV (feet)	Minimum Distance to Meet 0.08 in/sec PPV (feet)
Clam shovel drop		0.202	18	56
Hydromill (slurry wall)	in soil	0.008	1	3
	in rock	0.017	2	6
Vibratory Roller		0.210	19	58
Hoe Ram		0.089	9	27
Large bulldozer		0.089	9	27
Caisson drilling		0.089	9	27
Loaded trucks		0.076	8	23
Jackhammer		0.035	4	12
Small bulldozer		0.003	<1	2

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., November 2022.

Tables 32 through 34 summarize the vibration levels at nearest buildings surrounding Phase 1, Phase 2, and Phase 3. 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 damage to buildings on receiving land uses, not 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. To represent the worst-case scenario, vibration levels were estimated under the assumption that each piece of equipment was operating along the nearest boundary of the project site and propagated to the nearest structure.

A study completed by the US Bureau of Mines analyzed the effects of blast-induced vibration on buildings in USBM RI 8507.[11] The findings of this study have been applied to buildings affected by construction-generated vibrations.[12] As reported in USBM RI 8507[6] and reproduced by Dowding,[7] Figure 4 presents the damage probability, in terms of "threshold damage" (described above as cosmetic damage), "minor damage," and "major damage," at varying vibration levels. Threshold damage, or cosmetic damage, would entail hairline cracking in plaster, the opening of old cracks, the loosening of paint or the dislodging of loose objects. Minor damage would include hairline cracking in masonry or the loosening of plaster, and major structural damage would

11 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.

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

include wide cracking or shifting of foundation or bearing walls. As shown in Figure 4, there would be no observations of "threshold damage," "minor damage," or "major damage" at buildings of normal conventional construction when vibration levels were 0.210 in/sec PPV or less.

Project-generated vibration levels are below the 0.3 in/sec PPV structural damage threshold, which implies that neither cosmetic, minor, or major damage would occur beyond 25 feet. At these locations and in other surrounding areas where vibration would not be expected to cause structural 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.

While construction activity may be perceptible, the proposed project is not expected to result in "architectural" damage to any surrounding structure. This is a less-than-significant impact.

TABLE 32 Vibration Levels Estimated at the Nearest Structures Surrounding Phase 1

Equipment		PPV (in/sec)				
		Com-7 (50 feet)	**Com-13 (65 feet)**	**Fut-1 Future 1030 Brittan Ave (80 feet)**	**Com-14 (95 feet)**	**Res-1 (275 feet)**
Clam shovel drop		0.094	0.071	0.056	0.047	0.014
Hydromill (slurry wall)	in soil	0.004	0.003	0.002	0.002	0.001
	in rock	0.008	0.006	0.005	0.004	0.001
Vibratory Roller		0.098	0.073	0.058	0.048	0.015
Hoe Ram		0.042	0.031	0.025	0.020	0.006
Large bulldozer		0.042	0.031	0.025	0.020	0.006
Caisson drilling		0.042	0.031	0.025	0.020	0.006
Loaded trucks		0.035	0.027	0.021	0.018	0.005
Jackhammer		0.016	0.012	0.010	0.008	0.003
Small bulldozer		0.001	0.001	0.001	0.001	0.0002

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., November 2022.

TABLE 33 Vibration Levels Estimated at the Nearest Structures Surrounding Phase 2

Equipment		PPV (in/sec)			
		Com-14 (50 feet)	**Com-15 (65 feet)**	**Com-2 (110 feet)**	**Com-1 (190 feet)**
Clam shovel drop		0.094	0.071	0.040	0.022
Hydromill (slurry wall)	in soil	0.004	0.003	0.002	0.001
	in rock	0.008	0.006	0.003	0.002
Vibratory Roller		0.098	0.073	0.041	0.023
Hoe Ram		0.042	0.031	0.017	0.010
Large bulldozer		0.042	0.031	0.017	0.010
Caisson drilling		0.042	0.031	0.017	0.010
Loaded trucks		0.035	0.027	0.015	0.008
Jackhammer		0.016	0.012	0.007	0.004
Small bulldozer		0.001	0.001	0.001	0.0003

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., May 2023.

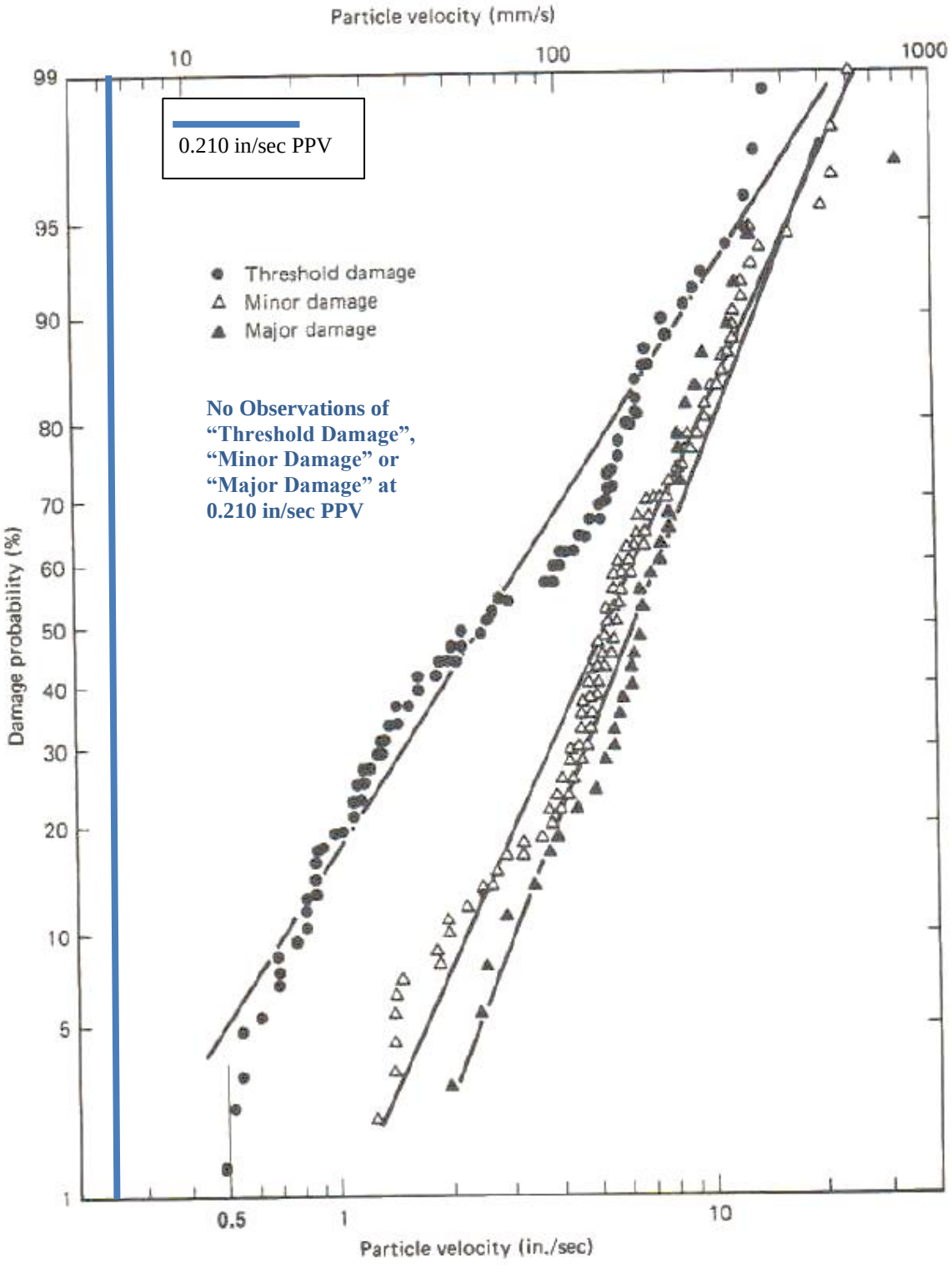
TABLE 34 Vibration Levels Estimated at the Nearest Structures Surrounding Phase 3

Equipment		PPV (in/sec)				
		Com-7 (45 feet)	**Fut-1 Future 1030 Brittan Ave (60 feet)**	**Com-6 (70 feet)**	**Com-3 (120 feet)**	**Com-4 (160 feet)**
Clam shovel drop		0.106	0.077	0.065	0.036	0.026
Hydromill (slurry wall)	in soil	0.004	0.003	0.003	0.001	0.001
	in rock	0.009	0.006	0.005	0.003	0.002
Vibratory Roller		0.110	0.080	0.068	0.037	0.027
Hoe Ram		0.047	0.034	0.029	0.016	0.012
Large bulldozer		0.047	0.034	0.029	0.016	0.012
Caisson drilling		0.047	0.034	0.029	0.016	0.012
Loaded trucks		0.040	0.029	0.024	0.014	0.010
Jackhammer		0.018	0.013	0.011	0.006	0.005
Small bulldozer		0.002	0.001	0.001	0.001	0.0004

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., November 2022.

Mitigation Measure None Required.

FIGURE 4 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 1000 feet San Carlos Airport and approximately 9 miles from San Francisco International Airport. Additionally, the project site lies outside the 60 dBA CNEL noise contour for the San Carlos Airport. The noise environment attributable to aircraft is considered normally acceptable. **This is a less-than-significant impact.**

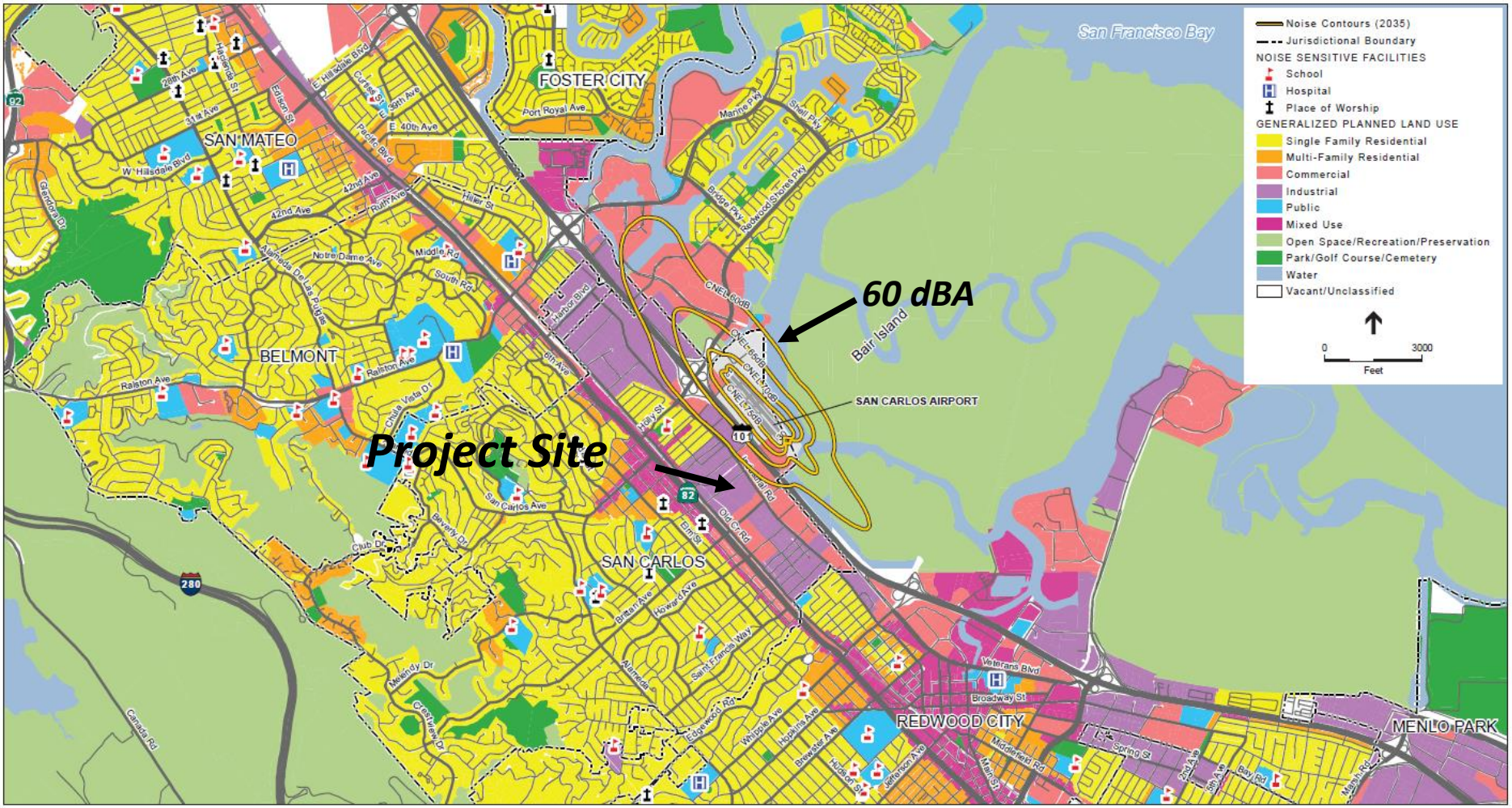
The San Carlos Airport (SQL) is a public-use airport located approximately 1000 feet north of the project site. As shown in Figure 5, the project site lies just outside the 60 dBA CNEL noise contour for the San Carlos Airport. The San Francisco International Airport is a public-use airport located approximately 9 miles northwest of the project site. According to the *Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport*,[13] the project site lies outside the Airport Influence Area and well outside the 65 dBA CNEL/L_{dn} noise contour, and the required safe and compatible threshold for exterior noise levels would be at or below 65 dBA CNEL for aircrafts. Therefore, the proposed project would be compatible with the exterior noise standards for aircraft noise.

Assuming standard construction materials, future interior noise levels resulting from aircraft would be below 50 dBA $L_{eq1\text{-}hr}$. 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.**

13 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 5 2035 Noise Contours for San Carlos Airport



SOURCE: Belmont, 1982; San Mateo County, 1986; Foster City, 1993; Menlo Park, 1994; San Carlos, 2009; City of San Mateo, 2010; Redwood City, 2010; ESRI, 2014; ESA Airports, 2015

San Carlos Airport ALUCP . 130753

Exhibit 4-2

Future Conditions (2035) Aircraft Noise Contours

Cumulative Impacts

Cumulative noise impacts would include temporary construction noise from cumulative construction projects. From the City's website,[14] the following planned or approved projects (at the time of the analysis for this project) are located within 1,000 feet of the proposed project:

- **1030 Brittan Avenue** – this project is located east adjoining the project site. This project was identified as a future receptor (Fut-1) in this report but analyzed as an existing receptor as the project will be complete prior to the completion of the Project. The 1030 Brittan Avenue project would include construction of a new three-story research and development lab and office building with one level of below-grade parking. This project is currently under construction. Due to the close proximity of the project site and the receptors shared by both project sites (i.e., Com-6, Com-7, Com-8, and Com-9), nearby receptors could be exposed to construction activities at both sites simultaneously or consecutively. It is assumed the 1030 Brittan Avenue would mitigate noise levels to meet construction noise standards. Construction noise levels due to the Alexandria Project are well below the FTA's construction noise standard and should not contribute to a cumulative noise impact. It is not anticipated that the combined average hourly construction noise levels from both sites would exceed the FTA's standard of 85 dBA L_{eq} at the shared receptors. It is assumed the 1030 Brittan Avenue project would be designed to meet the City's General Plan and Municipal Code noise standards. The Alexandria Project was not determined to generate noise levels within 8 dB of the City's L_{dn} noise standard. Thus, the Alexandria Project should not contribute to a cumulative noise impact. Vibration will occur close to a project's property line. At the distance between the 1030 Brittan Avenue project and the Alexandria Project vibration levels would not combine to produce a higher vibration level.

- **1091 Industrial Road** – this project is located northeast of the project site, opposite Industrial Road. This project was identified as an existing receptor in this report (Com-4). The 1091 Industrial Road project would include construction of a new three-story building with two levels dedicated to parking garage below grade with an amenity building serving food and drinks at the building entry. This project is currently under construction. Due to the close proximity of the project site and the receptors shared by both project sites (i.e., Com-2, Com-3, Com-5, Com-6, Com-8, Fut-1), nearby receptors could be exposed to construction activities at both sites simultaneously or consecutively. It is assumed the 1091 Industrial Road project would mitigate noise levels to meet construction noise standards. Construction noise levels due to the Alexandria Project are well below the FTA's construction noise standard and should not contribute to a cumulative noise impact. .It is not anticipated that the combined average hourly construction noise levels from both sites would exceed the FTA's standard of 85 dBA L_{eq} at the shared receptors. It is assumed the 1091 Industrial Road project would be designed to meet the City's General Plan and Municipal Code noise standards. The Alexandria Project was not determined to generate noise levels within 8 dB of the City's L_{dn} noise standard. Thus, the Alexandria Project should not contribute to a cumulative noise impact. Vibration will occur close to a project's

14 https://mydashgis.com/SanCarlosProjects/map

property line. At the distance between the 1091 Industrial Street project and the Alexandria Project vibration levels would not combine to produce a higher vibration level.

- **841 Old County Road** – this project is located northwest of the project site, opposite Commercial Street. This project was identified as an existing receptor in this report (Com-13). The 841 Old County Road project would include demolition of the existing buildings and construction of two new Life Science Research & Development buildings. The Project includes three and four stories of office/lab space above one level of at-grade parking and two levels of below grade parking. This project is currently in the planning review phase. Construction dates for this project have not been confirmed but due to the close proximity of the project site and the noise-sensitive receptors shared by both project sites (i.e. Com-13, Com-14, Com-16, Com-12, Lod-1, Res-2,), nearby sensitive receptors could be exposed to construction activities at both sites simultaneously or consecutively. It is assumed the 841 Old County Road project would mitigate noise levels to meet construction noise standards. Construction noise levels due to the Alexandria Project are well below the FTA's construction noise standard and should not contribute to a cumulative noise impact. It is not anticipated that the combined average hourly construction noise levels from both sites, should it overlap, would exceed the FTA's standard of 80 dBA L_{eq} at the shared residential receptor or 85 dBA L_{eq} at the shared commercial receptors. It is assumed the 841 Old County Road project would be designed to meet the City's General Plan and Municipal Code noise standards. The Alexandria Project was not determined to generate noise levels within 8 dB of the City's L_{dn} noise standard. Thus, the Alexandria Project should not contribute to a cumulative noise impact. Vibration will occur close to a project's property line. At the distance between the 840 Old County Road project and the Alexandria Project vibration levels would not combine to produce a higher vibration level.

- **993 Laurel Street** – this project is located approximately 435 feet southwest of the project site. This project was identified as a future receptor in this report (Res-2). The 993 Laurel Street project would include a new 21,540 square-foot three-story mixed-use building with retail and office uses. This project is currently in the final decision making process to receive planning approvals. Construction dates for this project have not been confirmed but due to the close proximity of the project site and the noise-sensitive receptors shared by both project sites (i.e. Res-1 and Res-2), these sensitive receptors could be exposed to construction activities at both sites simultaneously or consecutively. It is assumed the 993 Laurel Street project would mitigate noise levels to meet construction noise standards. Construction noise levels due to the Alexandria Project are well below the FTA's construction noise standard and should not contribute to a cumulative noise impact. It is not anticipated that the combined average hourly construction noise levels from both sites would exceed the FTA's standard of 80 dBA L_{eq} at the shared residential receptor. It is assumed the 993 Laurel Street project would be designed to meet the City's General Plan and Municipal Code noise standards. The Alexandria Project was not determined to generate noise levels within 8 dB of the City's L_{dn} noise standard. Thus, the Alexandria Project should not contribute to a cumulative noise impact. Vibration will occur close to a project's property line. At the distance between the 993 Laurel Street project and the Alexandria Project vibration levels would not combine to produce a higher vibration level.

- **1040-1052 Laurel Street** – this project is located approximately 600 feet southwest of the project site. The 1040-1052 Laurel Street project would include two new three-story buildings with six residential condominium units, each having two-car garages. This project is currently under construction. Due to the close proximity of the project site and the noise-sensitive receptors shared by both project sites (i.e., Res-1, Res-2, Lod-1, Fut-2, Com-11, Com-10), the nearby sensitive receptors could be exposed to construction activities at both sites simultaneously or consecutively. It is assumed the 1040-1052 Laurel Street project would mitigate noise levels to meet construction noise standards. Construction noise levels due to the Alexandria Project are well below the FTA's construction noise standard and should not contribute to a cumulative noise impact. .It is not anticipated that the combined average hourly construction noise levels from both sites would exceed the FTA's standard of 80 dBA L_{eq} at the shared residential receptors or 85 dBA L_{eq} at the shared commercial receptors. It is assumed the 1040-1052 Laurel Street project would be designed to meet the City's General Plan and Municipal Code noise standards. The Alexandria Project was not determined to generate noise levels within 8 dB of the City's L_{dn} noise standard. Thus, the Alexandria Project should not contribute to a cumulative noise impact. Vibration will occur close to a project's property line. At the distance between the 1040-1052 Laurel Street project and the Alexandria Project vibration levels would not combine to produce a higher vibration level.

- **777 Industrial Road** – this project is located at 777 Industrial Road. This project site is approximately 800 feet northwest of the project site. This project includes the redevelopment of the former Honda dealership to a Life Science Research & Development building. The project includes three levels of office/lab space above at-grade parking. This project is currently under construction. Due to the close proximity of the project site and the receptors shared by both project sites (i.e., Com-1, Com-15, and Com-16), the nearby receptors could be exposed to construction activities at both sites simultaneously or consecutively. It is assumed the 777 Industrial Road project would mitigate noise levels to meet construction noise standards. Construction noise levels due to the Alexandria Project are well below the FTA's construction noise standard and should not contribute to a cumulative noise impact. .It is not anticipated that the combined average hourly construction noise levels from both sites would exceed the FTA's standard of 85 dBA L_{eq} at the shared receptors. It is assumed the 777 Industrial Road project would be designed to meet the City's General Plan and Municipal Code noise standards. The Alexandria Project was not determined to generate noise levels within 8 dB of the City's L_{dn} noise standard. Thus, the Alexandria Project should not contribute to a cumulative noise impact. Vibration will occur close to a project's property line. At the distance between the 777 Industrial Road project and the Alexandria Project vibration levels would not combine to produce a higher vibration level.

- **789 Old County Road** – this project is located at 789 Old County Road. This project site is approximately 630 feet northwest of the project site. This project would include the demolition of the existing buildings and construction of two new Life Science Research & Development buildings. The two buildings consist of one three story office/lab space above two levels of above grade parking and the second building with five stories of office/lab

space above two levels of above-grad parking. This project is currently in the planning phase and the construction schedule for the project is unknown. Due to the close proximity of the project site and the receptors shared by both project sites (i.e., Com-13, Com-14, and Com-16), the nearby receptors could be exposed to construction activities at both sites simultaneously or consecutively. It is assumed the 789 Old County Road project would mitigate noise levels to meet construction noise standards. Construction noise levels due to the Alexandria Project are well below the FTA's construction noise standard and should not contribute to a cumulative noise impact. It is not anticipated that the combined average hourly construction noise levels from both sites would exceed the FTA's standard of 85 dBA L_{eq} at the shared receptors. It is assumed the 789 Old County Road project would be designed to meet the City's General Plan and Municipal Code noise standards. The Alexandria Project was not determined to generate noise levels within 8 dB of the City's L_{dn} noise standard. Thus, the Alexandria Project should not contribute to a cumulative noise impact. Vibration will occur close to a project's property line. At the distance between the 789 Old County Road project and the Alexandria Project vibration levels would not combine to produce a higher vibration level.

- **888 Bransten Road** – this project is located at 888 Bransten Road. This project site is approximately 670 feet north of the project site. This project consists of the construction and operation of a new 3-story commercial and life science building with surface parking. This project has been approved, but the construction schedule for the project is unknown. Due to the close proximity of the project site and the receptors shared by both project sites (i.e., Com-1, Com-15, and Com-16), the nearby receptors could be exposed to construction activities at both sites simultaneously or consecutively. It is assumed the 888 Bransten Road project would mitigate noise levels to meet construction noise standards. Construction noise levels due to the Alexandria Project are well below the FTA's construction noise standard and should not contribute to a cumulative noise impact. It is not anticipated that the combined average hourly construction noise levels from both sites would exceed the FTA's standard of 85 dBA L_{eq} at the shared receptors. It is assumed the 888 Bransten Road project would be designed to meet the City's General Plan and Municipal Code noise standards. The Alexandria Project was not determined to generate noise levels within 8 dB of the City's L_{dn} noise standard. Thus, the Alexandria Project should not contribute to a cumulative noise impact. Vibration will occur close to a project's property line. At the distance between the 888 Bransten Road project and the Alexandria Project vibration levels would not combine to produce a higher vibration level.

Other than those discussed above, there were no other projects located within 1,000 feet of the proposed project site. However, note that the pipeline of proposed/approved projects can and does change over time as some projects are abandoned and other new projects are proposed. New projects would need to consider their impacts with respect to the cumulative context when they are proposed.

The existing and future receptors Com-1, Com-2, Com-3, Com-5, Com-6, Com-7, Com-8, Com-9, Com-10, Com-11, Com-12, Com-13, Com-14, Com-15, Com-15, Res-1, Res-2, Lod-1, Fut-1, and Fut-2 would be considered sensitive receptors during construction activities at both the project

and the eight cumulative projects listed above. However, due to the size of the eight cumulative projects, the time duration and equipment used at those sites would be expected to be less than the project. Construction noise levels are not anticipated to exceed the FTA's thresholds. Therefore, the cumulative construction noise impact would be less-than-significant.

APPENDIX A

FIGURE A1 Daily Trend in Noise Levels for LT-1 on Tuesday, August 15, 2023

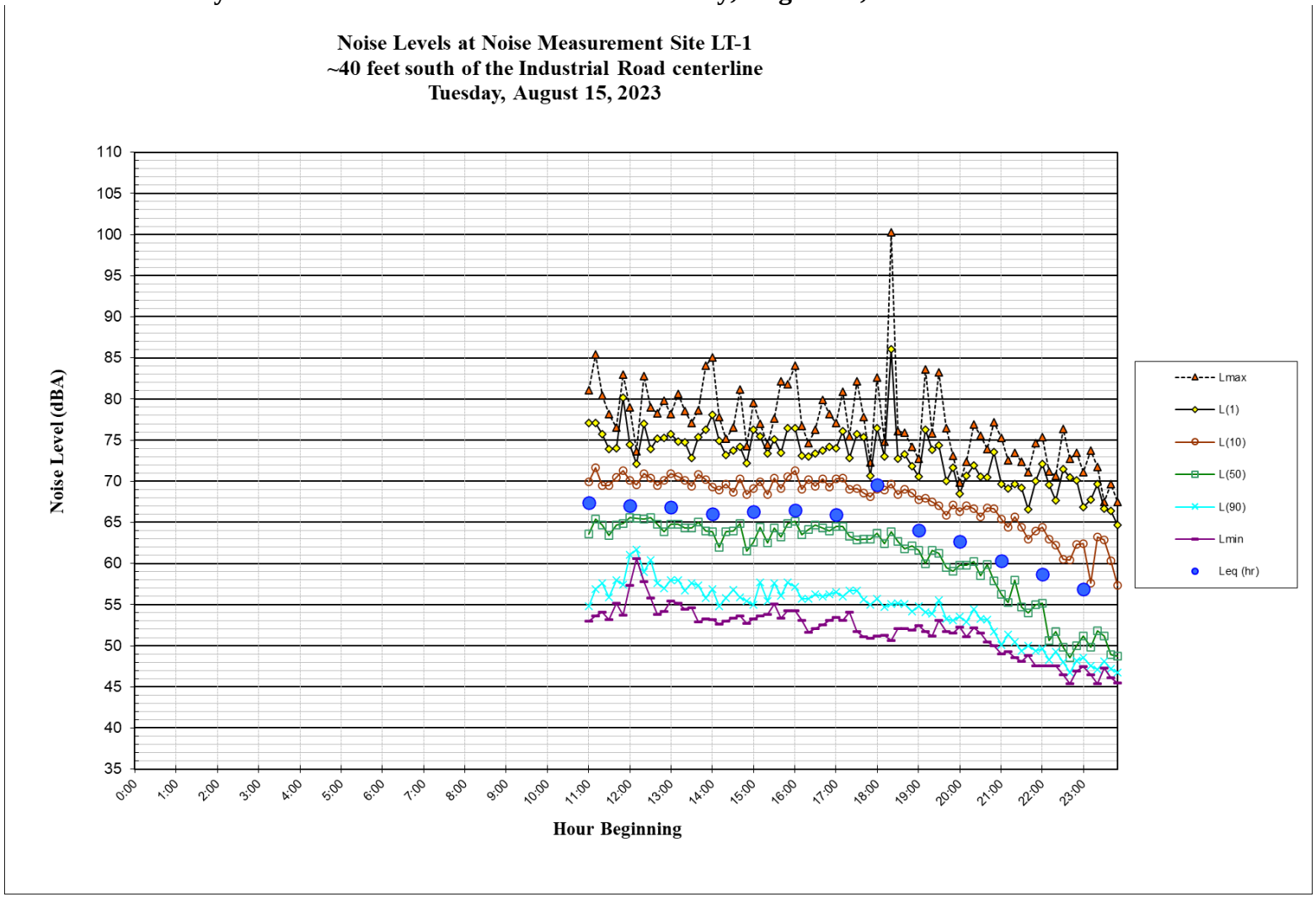


FIGURE A2 Daily Trend in Noise Levels for LT-1 on Wednesday, August 16, 2023

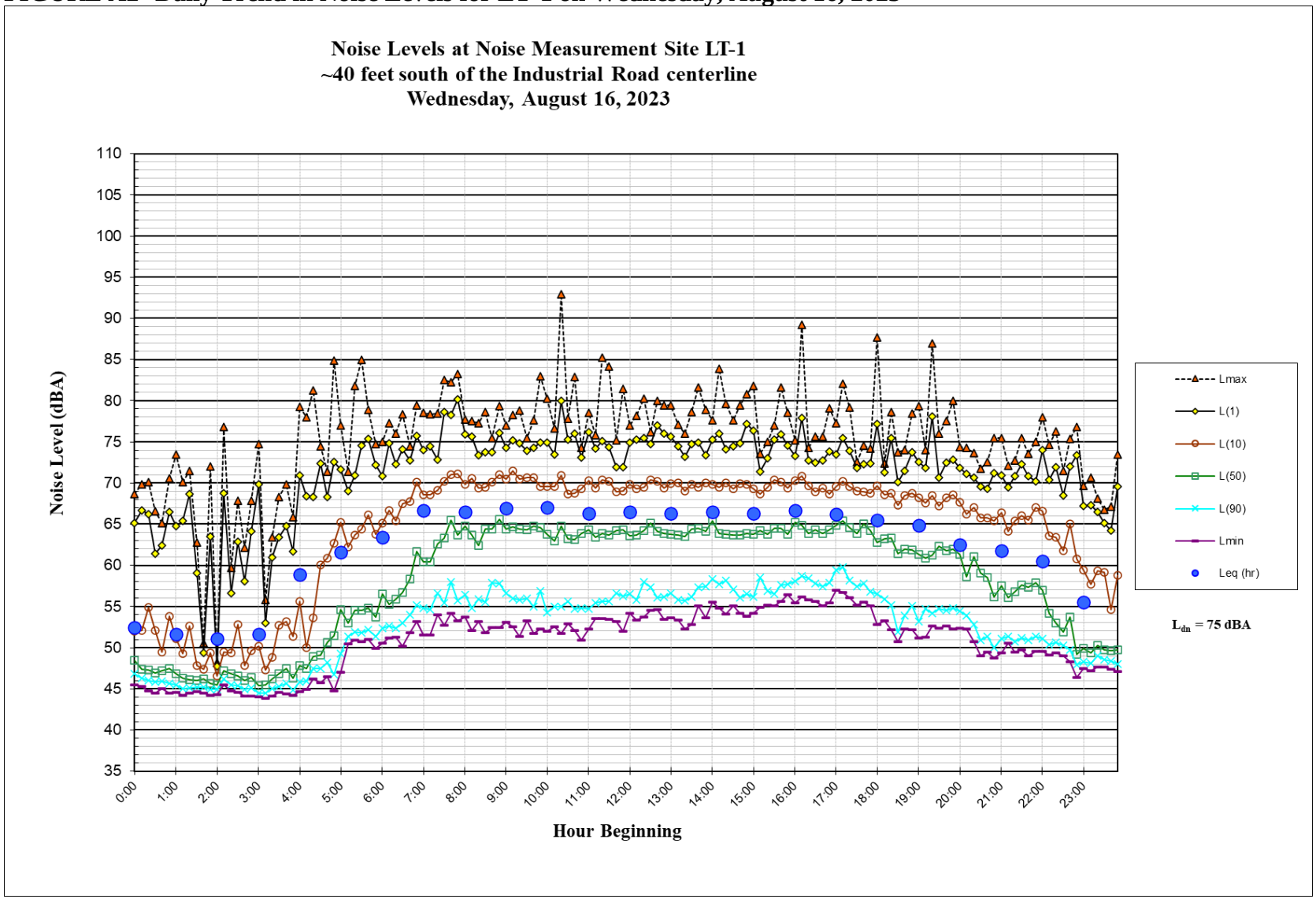


FIGURE A3 Daily Trend in Noise Levels for LT-1 on Thursday, August 17, 2023

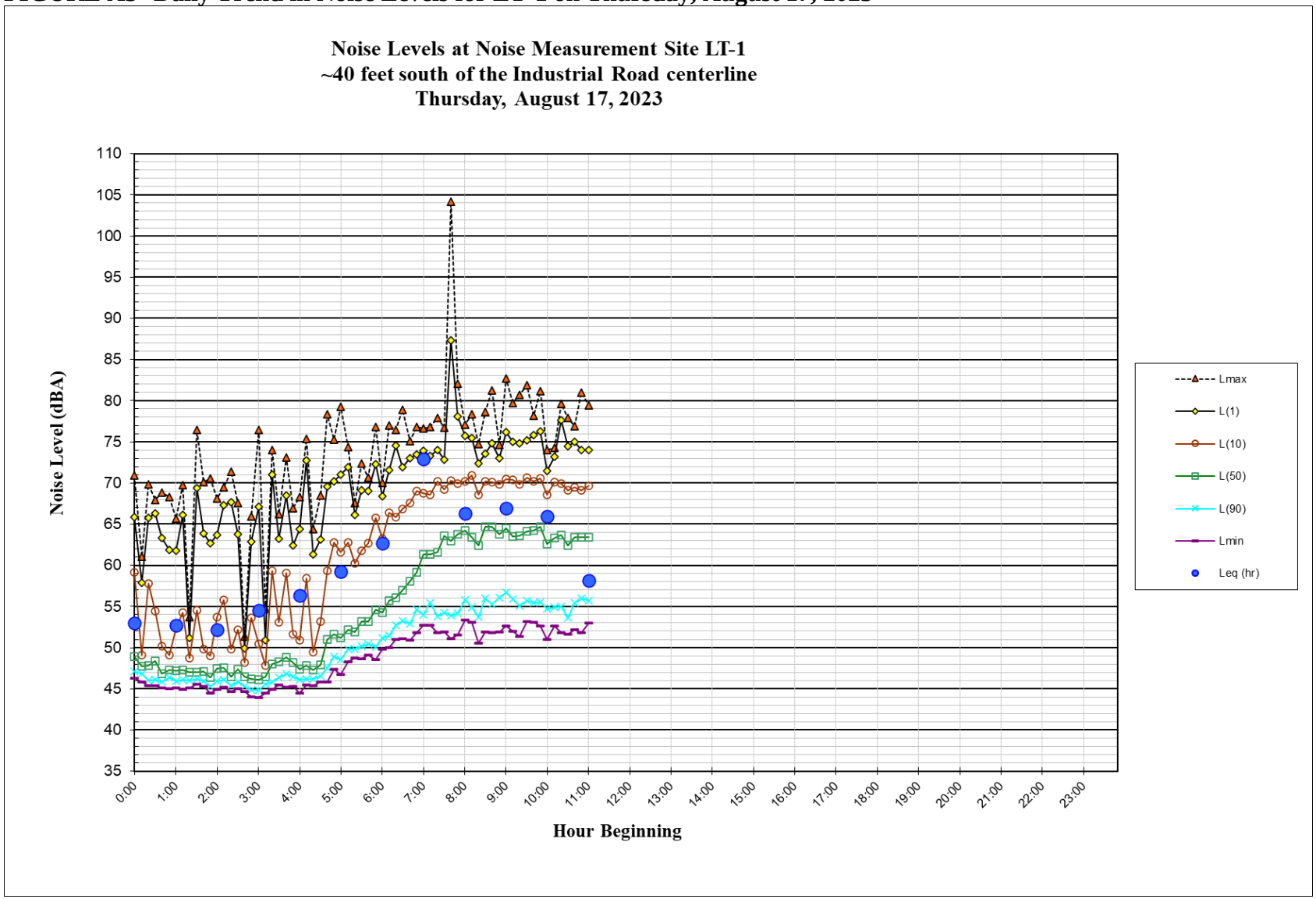


FIGURE A4 Daily Trend in Noise Levels for LT-2 on Tuesday, August 15, 2023

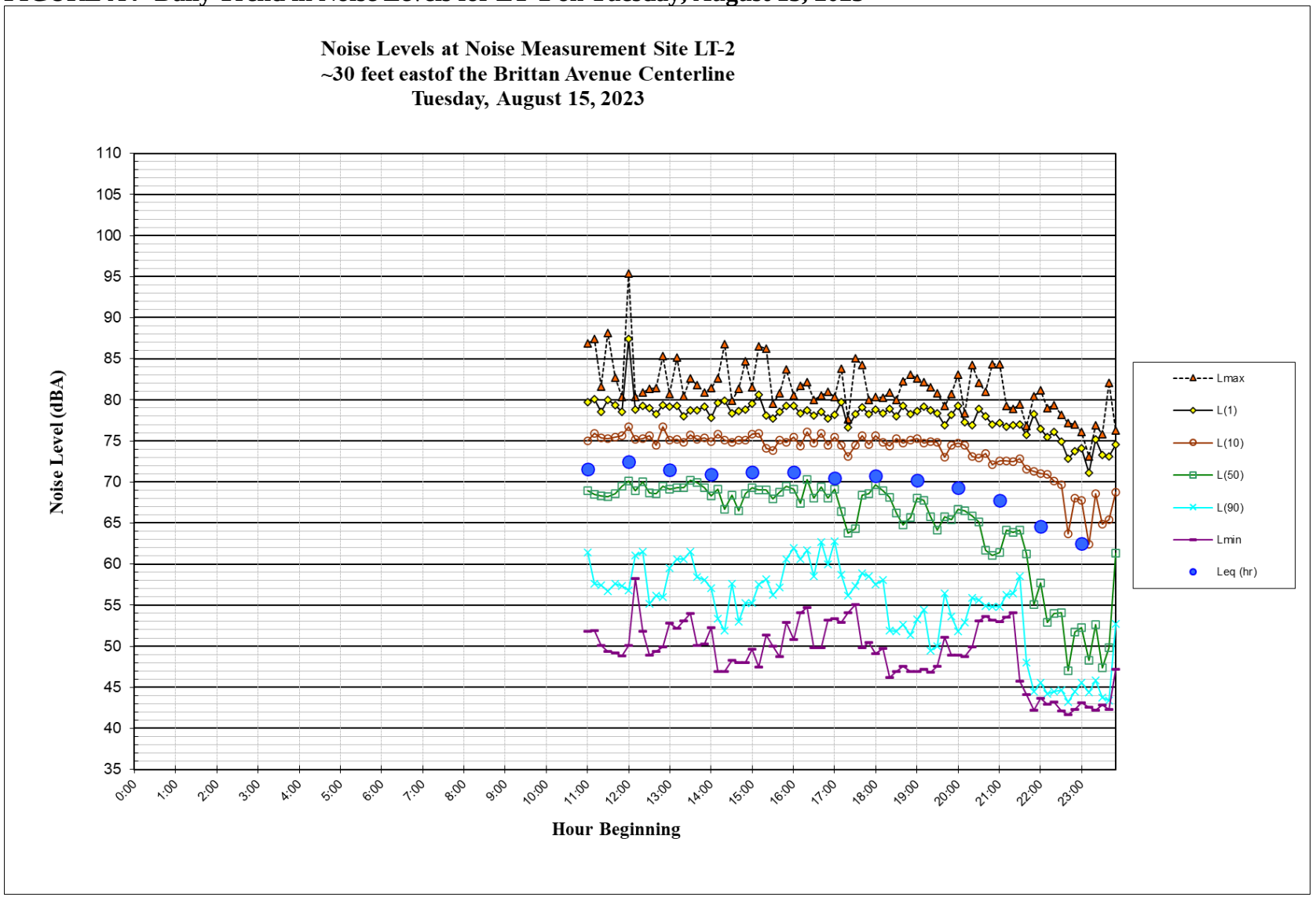


FIGURE A5 Daily Trend in Noise Levels for LT-2 on Wednesday, August 16, 2023

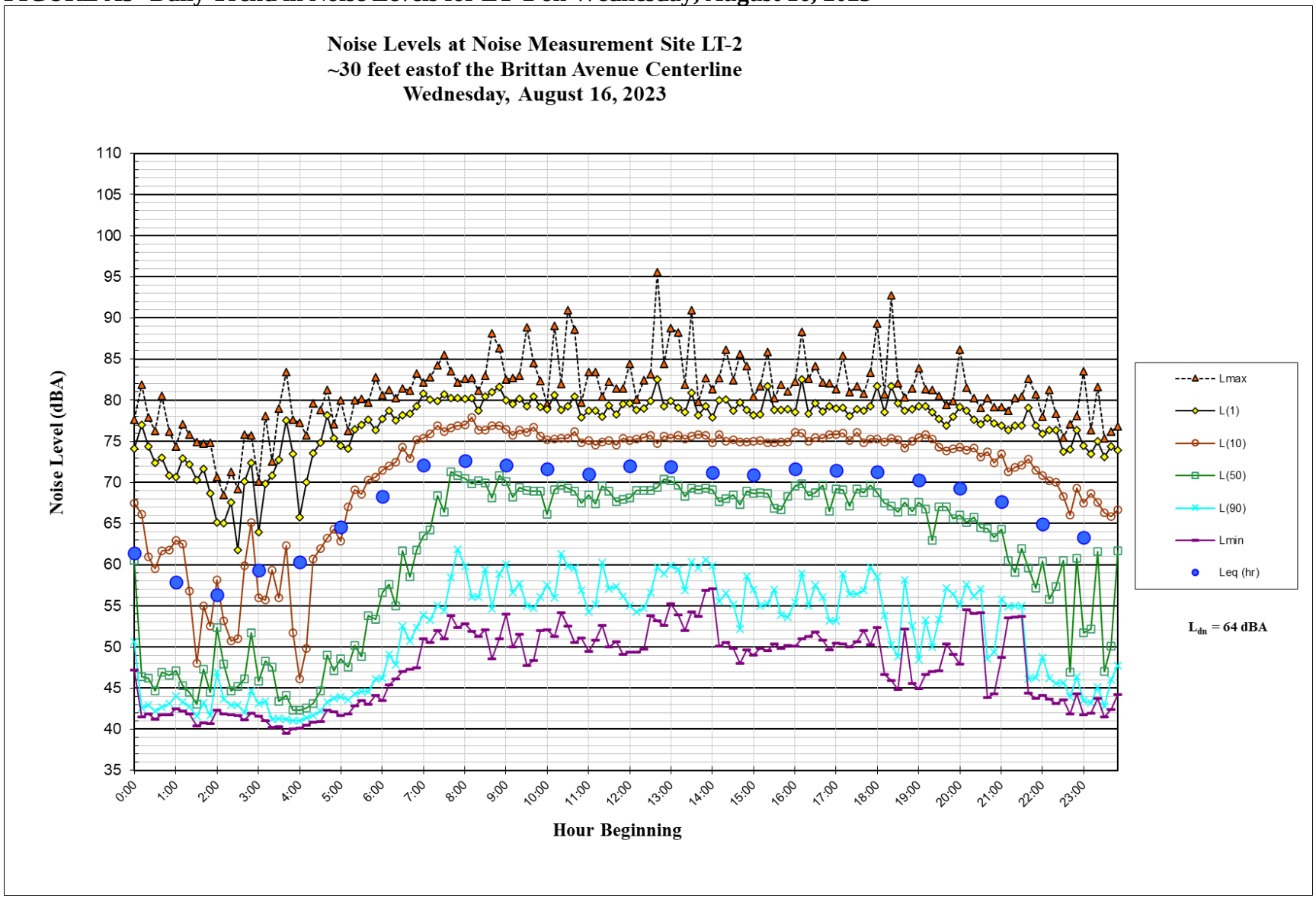


FIGURE A6 Daily Trend in Noise Levels for LT-2 on Thursday, August 17, 2023

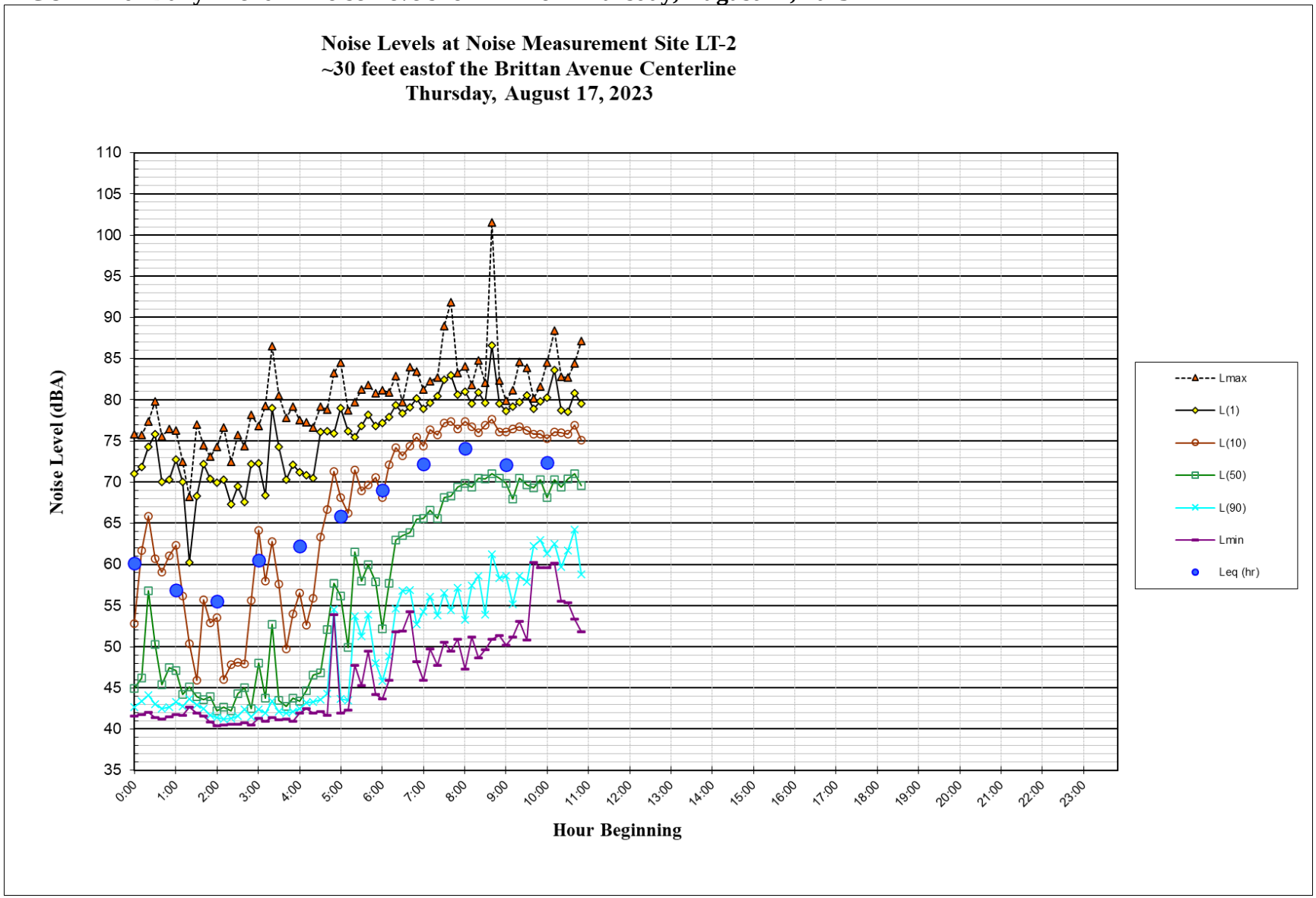


FIGURE A7 Daily Trend in Noise Levels for LT-3 on Tuesday, August 15, 2023

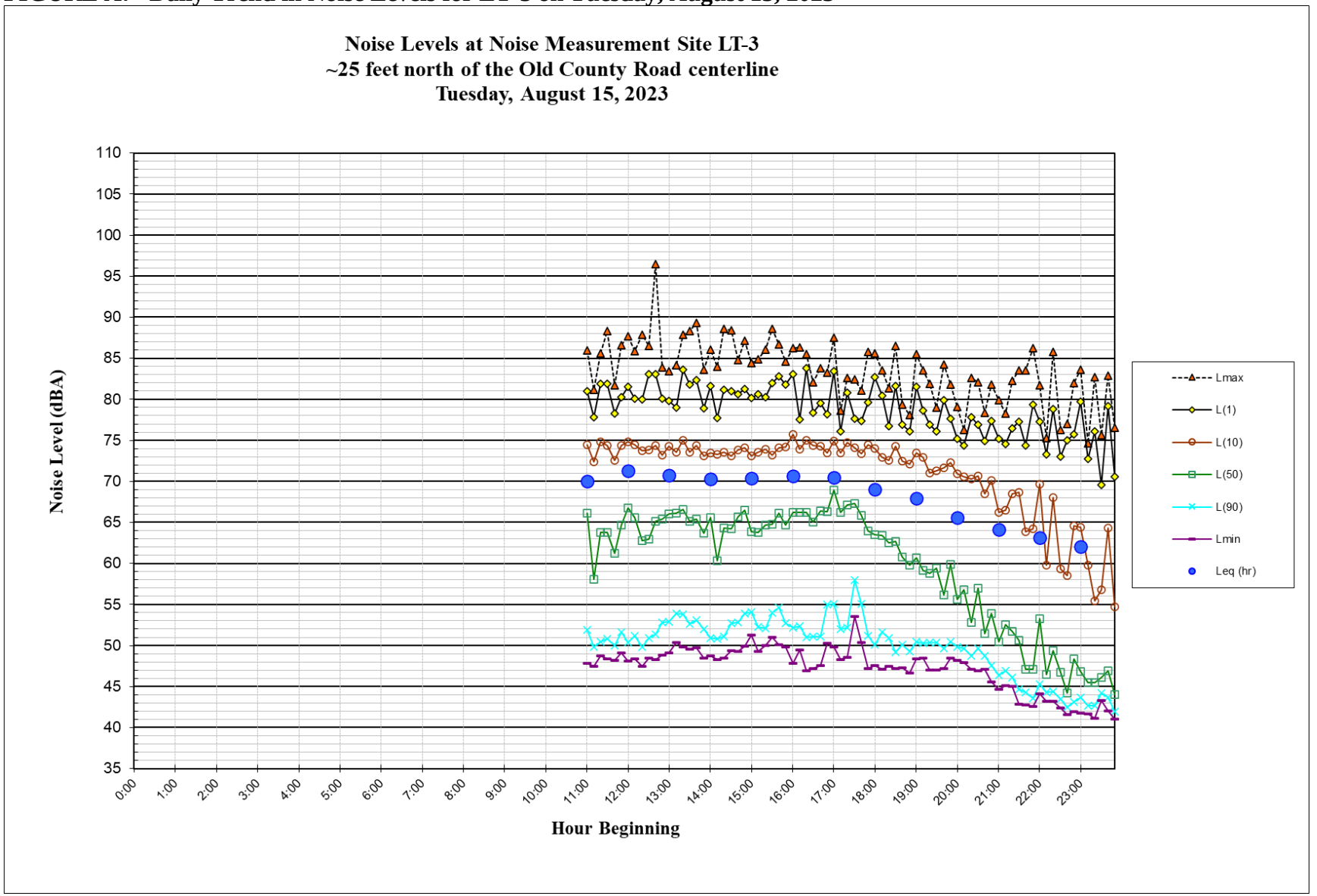


FIGURE A8 Daily Trend in Noise Levels for LT-3 on Wednesday, August 16, 2023

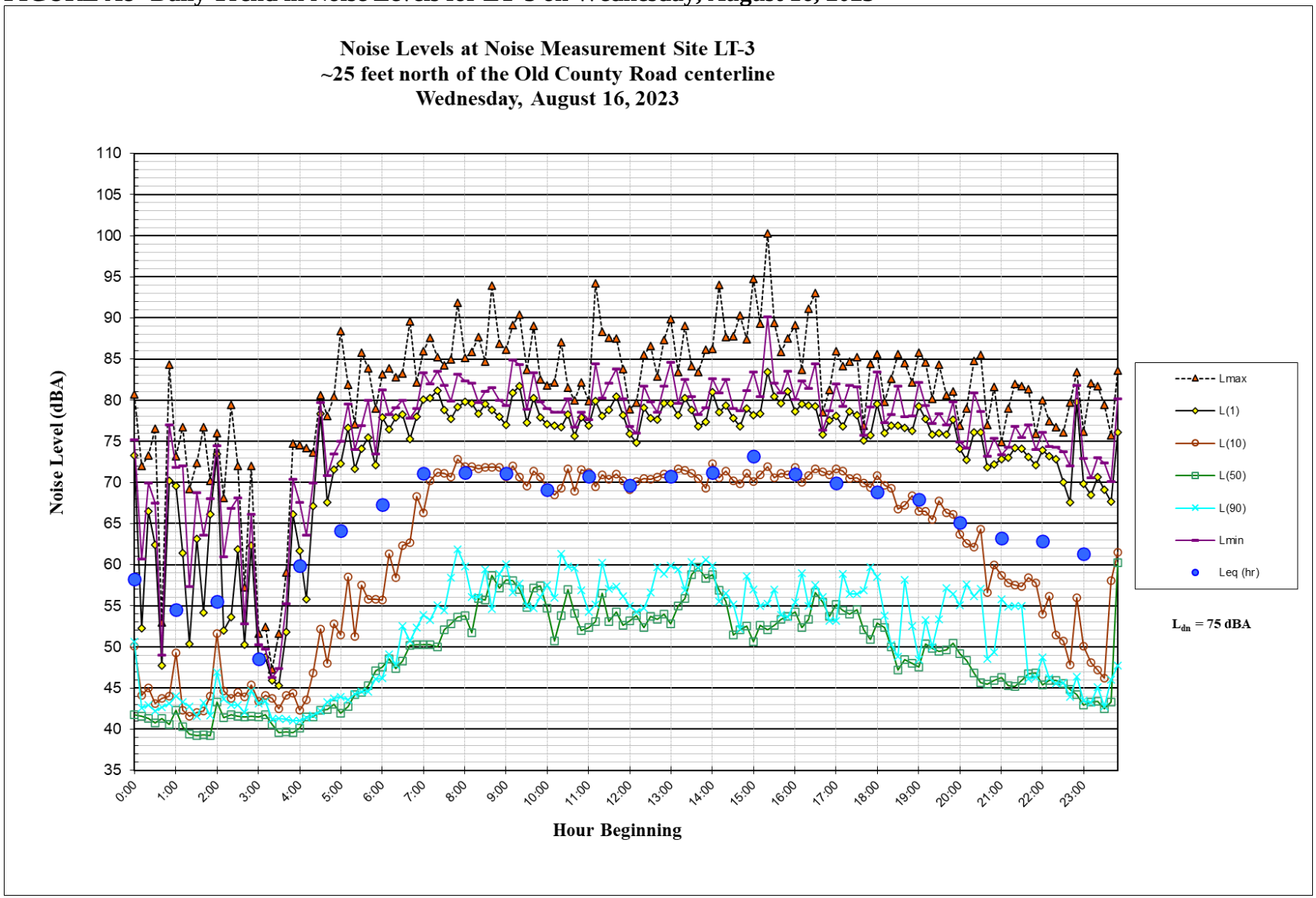


FIGURE A9 Daily Trend in Noise Levels for LT-3 on Thursday, August 17, 2023

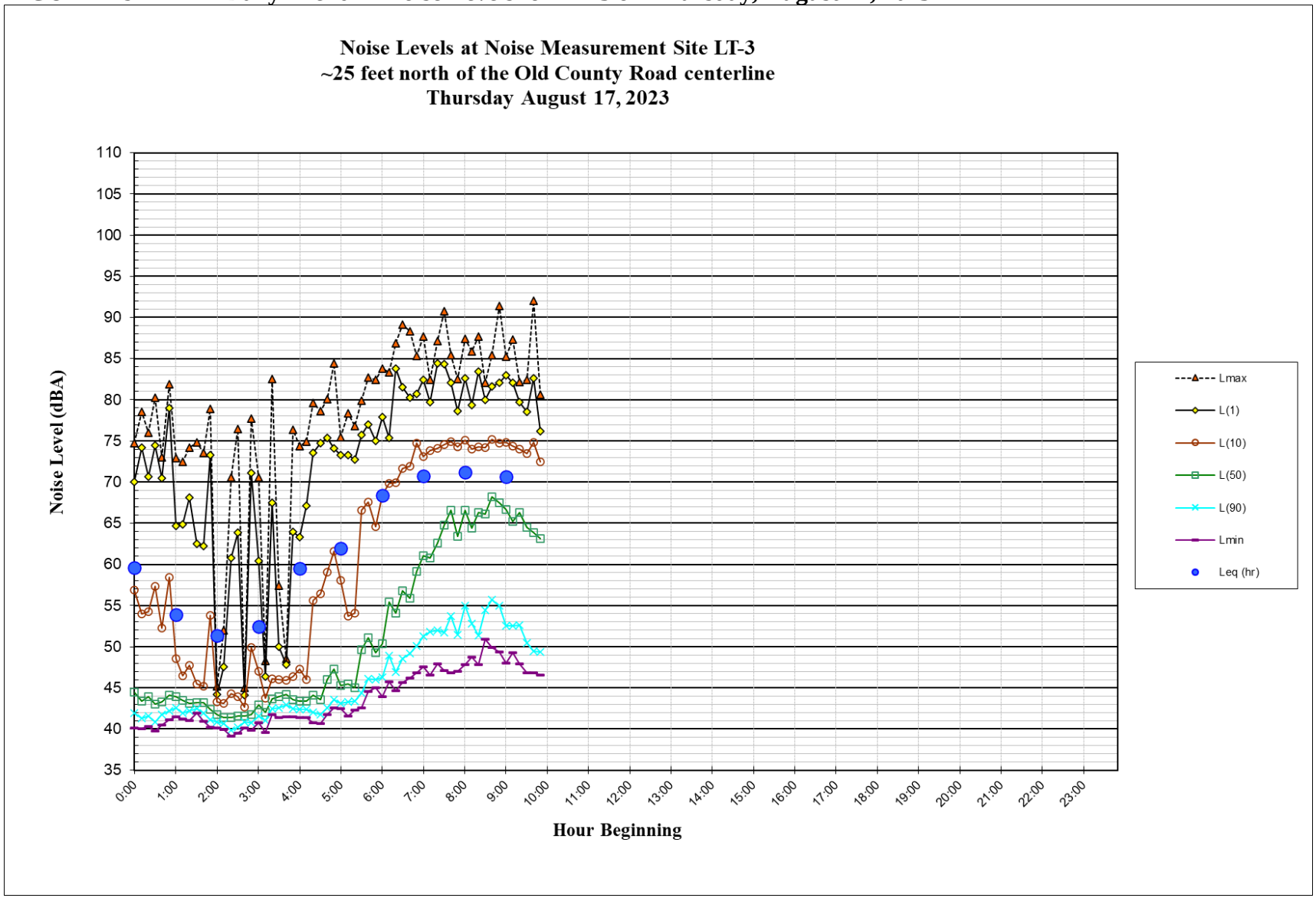


FIGURE A10 Daily Trend in Noise Levels for LT-4 on Tuesday, August 15, 2023

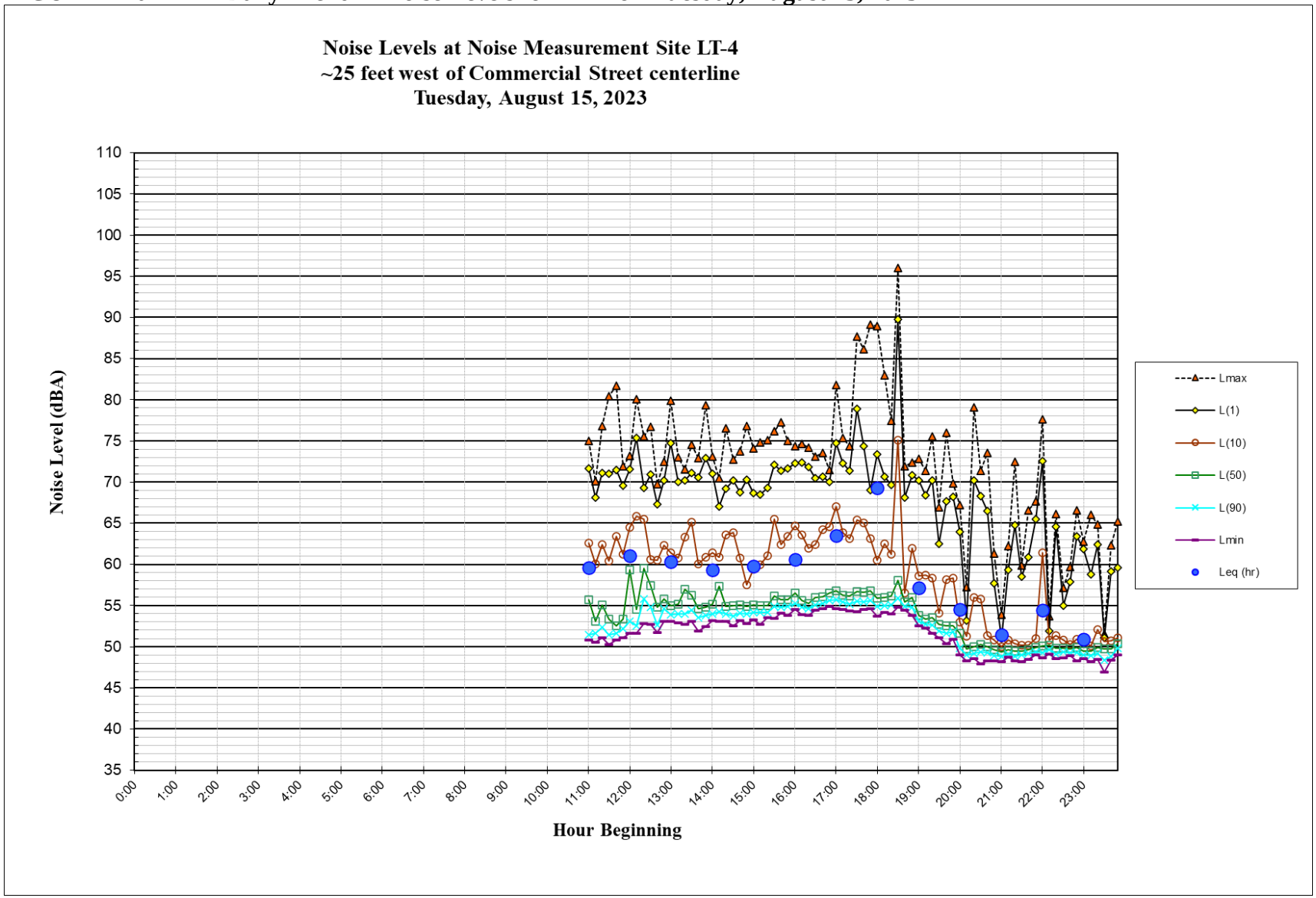


FIGURE A11 Daily Trend in Noise Levels for LT-4 on Wednesday, August 16, 2023

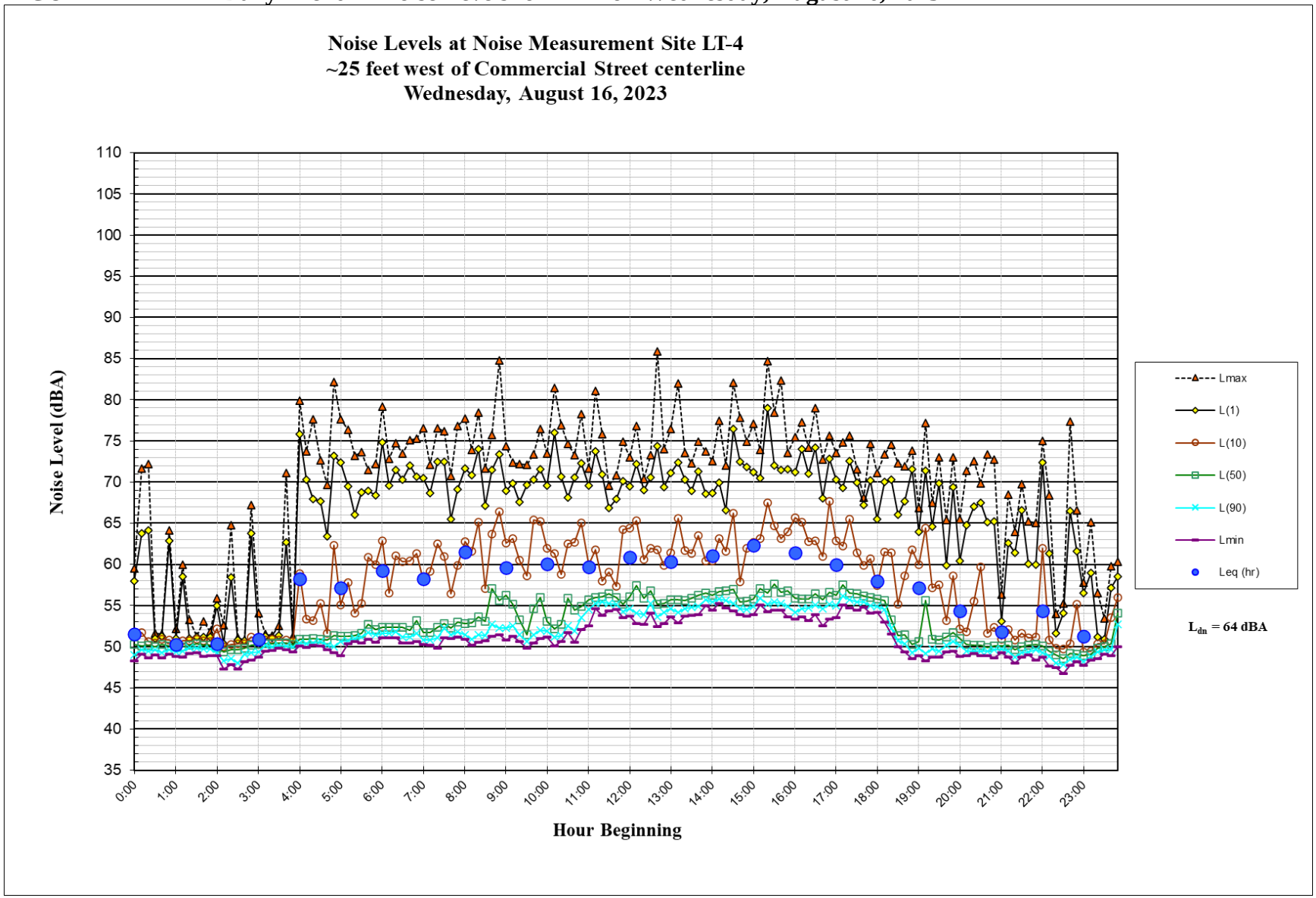


FIGURE A12 Daily Trend in Noise Levels for LT-4 on Thursday, August 17, 2023

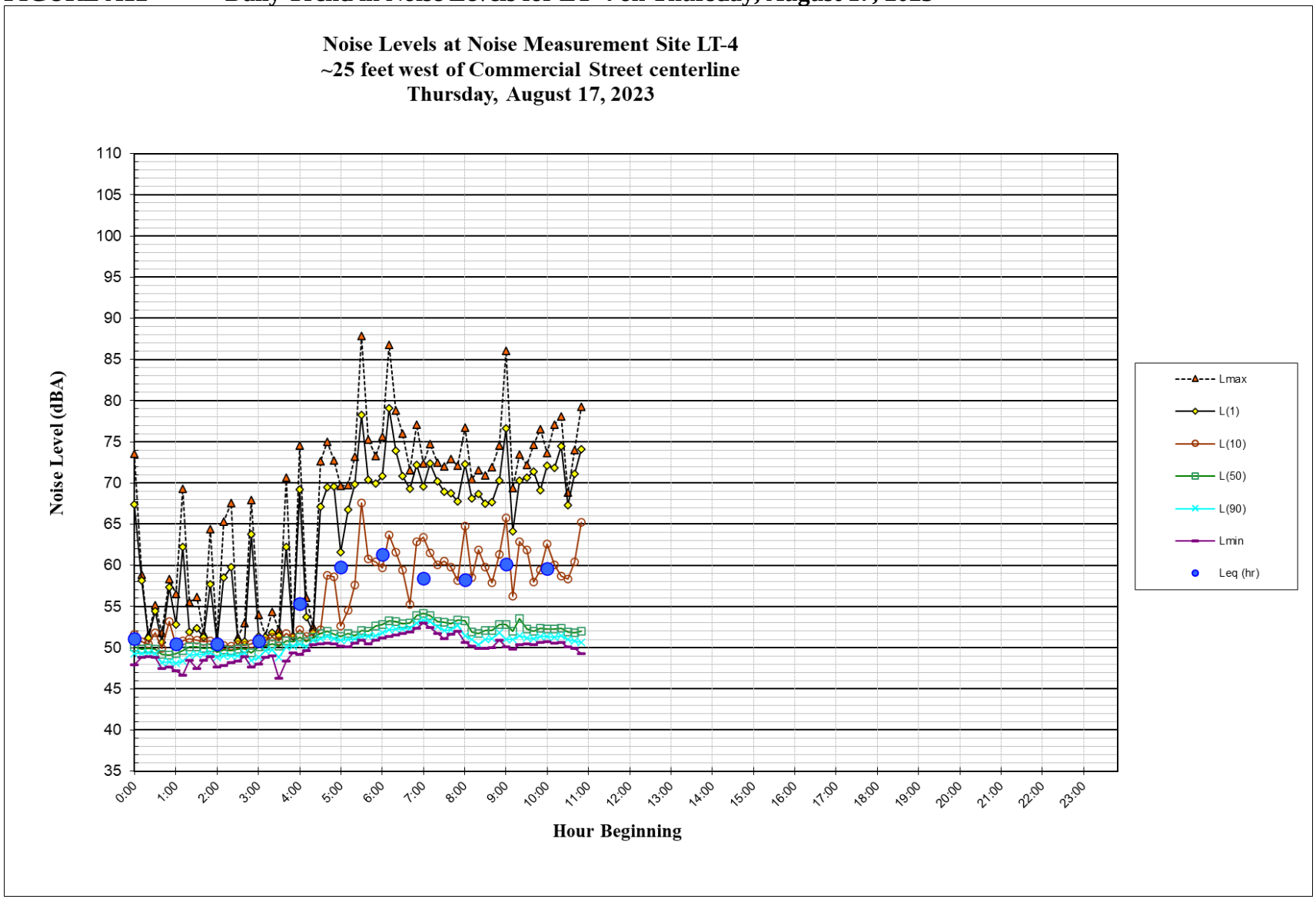


FIGURE A13 Caltrain Vibration Levels at a Distance of 115 feet from the Edge of the Nearest Tracks

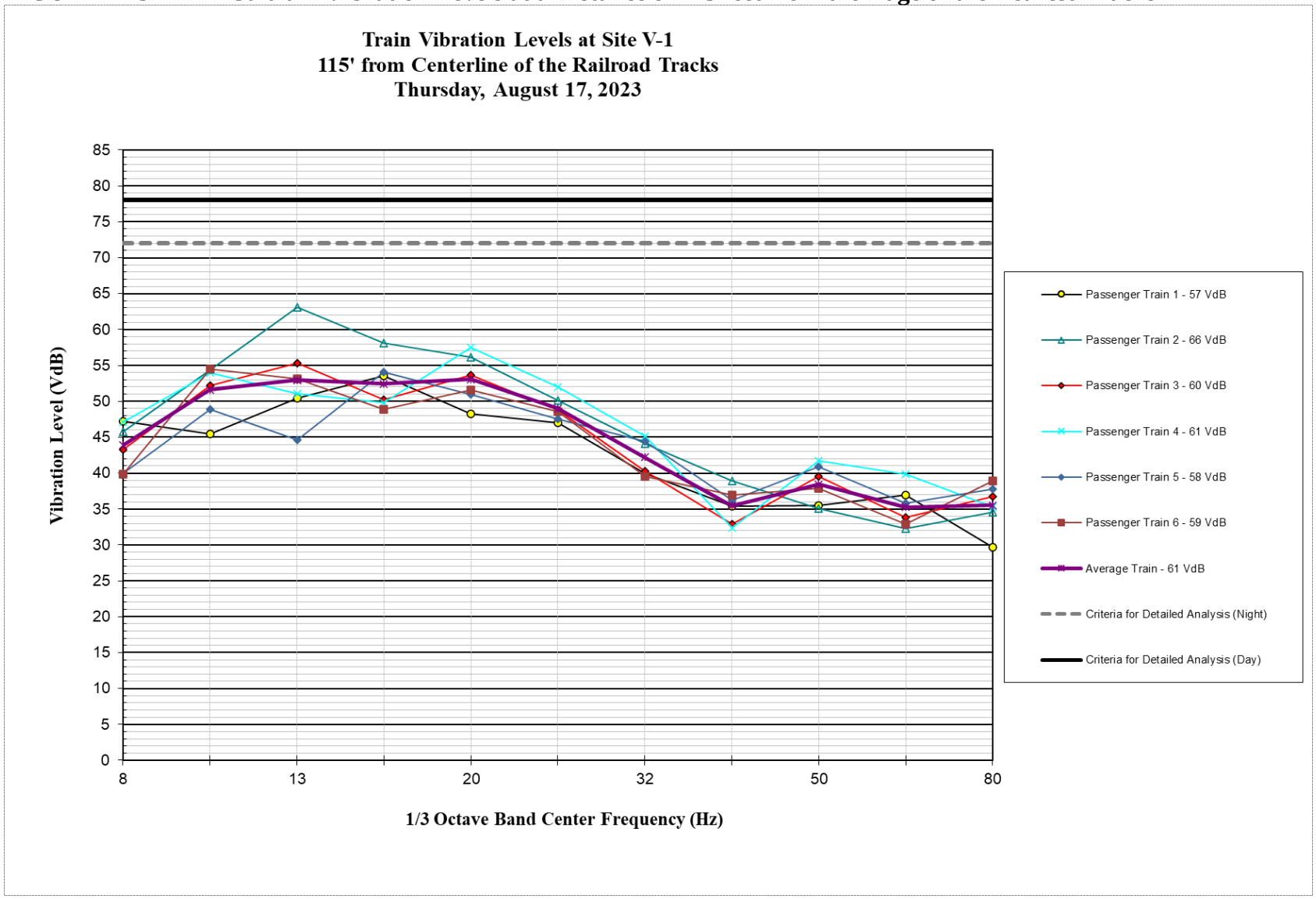


FIGURE A14 Caltrain Vibration Levels at a Distance of 130 feet from the Edge of the Nearest Tracks