EL PASEO & 1777 SARATOGA AVENUE MIXED-USE VILLAGE NOISE AND VIBRATION ASSESSMENT

San José, California

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INTRODUCTION

The approximately 10.7-acre site is located at the intersection of Saratoga Avenue and Lawrence Expressway/Quito Road in San José. The project consists of two sites, El Paseo and 1777 Saratoga Avenue. El Paseo is approximately 8.9-acres in size comprised of a portion of APN 403-33-014 and located east of the intersection of Saratoga Avenue and Quito Road. 1777 Saratoga Avenue is approximately 1.8-acres comprised of five parcels (ANPs 386-10-033, -036, -044, -045 and -046) and located north of the intersection of Saratoga Avenue and Lawrence Expressway. Currently, the El Paseo site is developed with three commercial buildings and is part of the larger El Paseo de Saratoga Shopping Center. The 1777 Saratoga Avenue site is currently developed with four office buildings.

The project proposes to rezone both sites to Planned Development (PD) for residential market-rate mixed-use that meets the City's Signature Project requirements. The project proposes two development options:

- Education Mixed-Use Option or
- Non-Education Mixed-Use Option

The two development options both propose residential and commercial uses. The Non-Education Mixed-Use Option would construct 1,100 multi-family units and 165,000 square feet of general commercial space. In comparison, the Education Mixed-Use option would have 370 fewer multi-family residential units and 60,000 fewer square feet of commercial space but includes a 450,000 square foot private kindergarten through 12th grade (K-12) education facility with an additional 120,000 square foot, 200-unit dorm facility. A breakdown of the proposed uses by project site is provided in Table 1 below.

This report evaluates the project's compatibility with the onsite noise environment and the project's potential to result in significant noise and vibration impacts with respect to applicable California Environmental Quality Act (CEQA) guidelines. The report is divided into three sections: 1) the Setting Section provides a brief description of the fundamentals of environmental noise and groundborne vibration, summarizes applicable regulatory criteria, and discusses the results of the ambient noise monitoring survey completed to document existing noise conditions; 2) the General Plan Consistency 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 measures, where necessary, to mitigate the impacts of the project on sensitive receptors in the vicinity.

TABLE 1 Proposed Uses by Project

Proposed Development Options*			
Land Use	**1777 Saratoga Avenue**	**El Paseo**	**TOTAL**
Non-Education Mixed-Use Option			
Multifamily Residential Units	280	820	1,100
Commercial SF	6,000	159,000**	165,000
Educational Facility SF	0	0	0
• Educational Facility Students/Staff	0	0	0
• Educational Facility Related Units	0	0	0
Education Mixed-Use Option			
Multifamily Residential Units	280	450	730
Commercial SF	6,000	60,000	66,000
Educational Facility SF***	0	450,000	450,000
• Educational Facility Students/Staff	0	2,500/500	2,500/500
• Educational Facility Related Units	0	200	200

* The numbers in this table represent the maximum amount of development proposed.
** The Non-Education Option assumes that of the 159,000 square feet of commercial proposed at the El Paseo site, approximately 52,508 would consist of general office and 36,120 of medical office. Office uses are allowed under the El Paseo site's Regional Commercial General Plan land use designation.
*** The Education Mixed-Use Option assumes the educational facility and dorm space would be converted from 370 multifamily residential units (for a total of 730 units) and an 60,000 (for a total of 165,000 square feet) of general commercial space from the Non-Education Mixed-Use Option.

SETTING

Fundamentals of Environmental Noise

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

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 2.

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 3. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This *energy-equivalent sound/noise descriptor* is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

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

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

Effects of Noise

Sleep and Speech Interference

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

Annoyance

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

Fundamentals of Groundborne Vibration

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One method is the Peak Particle Velocity (PPV). The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. In this report, a PPV descriptor with units of mm/sec or in/sec is used to evaluate construction generated vibration for building damage and human complaints. Table 4 displays the reactions of people and the effects on buildings that continuous or frequent intermittent vibration levels produce. The guidelines in Table 4 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 4 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 4 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 2 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 3 Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60 dBA	
		Large business office
Quiet urban daytime	50 dBA	Dishwasher in next room
Quiet urban nighttime	40 dBA	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
		Broadcast/recording studio
	10 dBA	
	0 dBA	

Source: Technical Noise Supplement (TeNS), California Department of Transportation, September 2013.

TABLE 4 Reaction of People and Damage to Buildings from Continuous or Frequent Intermittent Vibration Levels

Category	Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
1	0.01	Barely perceptible	No effect
2	0.04	Distinctly perceptible	Vibration unlikely to cause damage of any type to any structure
3	0.08	Distinctly perceptible to strongly perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
4	0.1	Strongly perceptible	Threshold at which there is a risk of damage to fragile buildings with no risk of damage to most buildings
5	0.25	Strongly perceptible to severe	Threshold at which there is a risk of damage to historic and some old buildings.
6	0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential structures
7	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.

Regulatory Background - Noise

State of California

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

State CEQA Guidelines. CEQA contains guidelines to evaluate the significance of effects of environmental noise attributable to a proposed project. Under CEQA, noise impacts would be considered significant if the project would result in:

(a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies;

(b) Generation of excessive groundborne vibration or groundborne noise levels; or

(c) For a project located within the vicinity of a private airstrip or an airport land use plan or where such a plan has not been adopted within two miles of a public airport or public use airport, if the project would expose people residing or working in the project area to excessive noise levels.

2019 California Building Code, Title 24, Part 2. The current version of the California Building Code (CBC) requires interior noise levels attributable to exterior environmental noise sources to be limited to a level not exceeding 45 dBA DNL/CNEL in any habitable room.

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

Santa Clara County

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

4.3.2.1 Noise Compatibility Policies

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

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

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

N-4 No residential or transient lodging construction shall be permitted within the 65 dB CNEL contour boundary unless it can be demonstrated that the resulting interior sound levels will be less than 45 dB CNEL and there are no outdoor patios or outdoor activity areas associated with the residential portion of a mixed use residential project or a multi unit residential project. (Sound wall noise mitigation measures are not effective in reducing noise generated by aircraft flying overhead.)

Table 4 - 1

NOISE COMPATIBILITY POLICIES

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

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

City of San José

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

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

Interior Noise Levels

- The City's standard for interior noise levels in residences, hotels, motels, residential care facilities, and hospitals is 45 dBA DNL. Include appropriate site and building design, building construction and noise attenuation techniques in new development to meet this standard. For sites with exterior noise levels of 60 dBA DNL or more, an acoustical analysis following protocols in the City-adopted California Building Code is required to demonstrate that development projects can meet this standard. The acoustical analysis shall base required noise attenuation techniques on expected Envision General Plan traffic volumes to ensure land use compatibility and General Plan consistency over the life of this plan.

Exterior Noise Levels

- The City's acceptable exterior noise level objective is 60 dBA DNL or less for residential land uses (Table EC-1). The acceptable exterior noise level objective is established for the City, except in the environs of the San José International Airport and the Downtown, as described below:

    - For new multi-family residential projects and for the residential component of mixed-use development, use a standard of 60 dBA DNL in usable outdoor activity areas, excluding balconies and residential stoops and porches facing existing roadways. There will be common use areas available to all residents that meet the 60 dBA exterior standard. Use noise attenuation techniques such as shielding by buildings and structures for outdoor common use areas.

Table EC-1: Land Use Compatibility Guidelines for Community Noise in San José

LAND USE CATEGORY	EXTERIOR NOISE EXPOSURE (DNL IN DECIBELS (DBA)) 55 60 65 70 75 80
1. Residential, Hotels and Motels, Hospitals and Residential Care[1]	
2. Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds	
3. Schools, Libraries, Museums, Meeting Halls, Churches	
4. Office Buildings, Business Commercial, and Professional Offices	
5. Sports Arena, Outdoor Spectator Sports	
6. Public and Quasi-Public Auditoriums, Concert Halls, Amphitheaters	

[1]Noise mitigation to reduce interior noise levels pursuant to Policy EC-1.1 is required.

Normally Acceptable:

- Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable:

- Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.

Unacceptable:

- New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

Source: Envision San Jose 2040 General Plan, Adopted November 1, 2011, As Amended on February 27, 2018.

EC-1.2 Minimize the noise impacts of new development on land uses sensitive to increased noise levels (Categories 1, 2, 3 and 6) by limiting noise generation and by requiring use of noise attenuation measures such as acoustical enclosures and sound barriers, where feasible. The City considers significant noise impacts to occur if a project would:

- Cause the DNL at noise sensitive receptors to increase by five dBA DNL or more where the noise levels would remain "Normally Acceptable;" or

- Cause the DNL at noise sensitive receptors to increase by three dBA DNL or more where noise levels would equal or exceed the "Normally Acceptable" level.

EC-1.3 Mitigate noise generation of new nonresidential land uses to 55 dBA DNL at the property line when located adjacent to existing or planned noise sensitive residential and public/quasi-public land uses.

EC-1.4 Include appropriate noise attenuation techniques in the design of all new General Plan streets projected to adversely impact noise sensitive uses.

EC-1.6 Regulate the effects of operational noise from existing and new industrial and commercial development on adjacent uses through noise standards in the City's Municipal Code.

EC-1.7 Require construction operations within San José to use best available noise suppression devices and techniques and limit construction hours near residential uses per the City's Municipal Code. The City considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would:

- Involve substantial noise generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

For such large or complex projects, a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses.

EC-1.8 Allow commercial drive-through uses only when consistency with the City's exterior noise level guidelines and compatibility with adjacent land uses can be demonstrated.

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

EC-1.14 Require acoustical analyses for proposed sensitive land uses in areas with exterior noise levels exceeding the City's noise and land use compatibility standards to base noise attenuation techniques on expected Envision General Plan traffic volumes to ensure land use compatibility and General Plan consistency.

Regulatory Background – Vibration

City of San José

City of San José General Plan. The Environmental Leadership Chapter in the Envision San José 2040 General Plan sets forth policies to achieve the goal of minimizing vibration impacts on people, residences, and business operations in the City of San José. The following policies are applicable to the proposed project:

EC-2.3 Require new development to minimize continuous vibration impacts to adjacent uses during demolition and construction. For sensitive historic structures, including ruins and ancient monuments or building that are documented to be structurally weakened, a continuous vibration limit of 0.08 in/sec PPV (peak particle velocity) will be used to minimize the potential for cosmetic damage to a building. A continuous vibration limit of 0.20 in/sec PPV will be used to minimize the potential for cosmetic damage at buildings of normal conventional construction. Equipment or activities typical of generating continuous vibration include but are not limited to: excavation equipment; static compaction equipment; vibratory pile drivers; pile-extraction equipment; and vibratory compaction equipment. Avoid use of impact pile drivers within 125 feet of any buildings, and within 300 feet of historical buildings, or buildings in poor condition. On a project-specific basis, this distance of 300 feet may be reduced where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction. Transient vibration impacts may exceed a vibration limit of 0.08 in/sec PPV only when and where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction.

Existing Noise Environment

The project consists of two sites, El Paseo and 1777 Saratoga Avenue. El Paseo is located east of the intersection of Saratoga Avenue and Quito Road. Commercial buildings adjoin the site to the north and east and are located opposite Quito Road to the west, and single-family residences adjoin the site to the south. 1777 Saratoga Avenue is located north of the Saratoga Avenue and Lawrence Expressway intersection. Commercial buildings adjoin the site to the north and are located opposite Saratoga Avenue to the east. Single-family residences are located opposite Lawrence Expressway to the south.

A noise monitoring survey was performed in the project vicinity between Thursday, February 27, 2020 and Tuesday, March 3, 2020 prior to COVID-19 shelter-in-place restrictions. The monitoring survey included five long-term (LT-1, LT-2, LT-3, LT-4, and LT-5) noise measurements and three short-term (ST-1, ST-2, and ST-3) noise measurements. All measurement locations are shown in Figure 1. The existing noise environment at the project site and in the surrounding area results primarily from vehicular traffic along Saratoga Avenue and Lawrence Expressway.

Long-term noise measurement LT-1 was made approximately 220 feet northeast of the centerline of Lawrence Expressway and approximately 350 feet from the centerline of Saratoga Avenue. LT-1 was located at the commercial land use adjacent to the 1777 Saratoga Avenue site. Hourly average noise levels at this location typically ranged from 51 to 68 dBA L_{eq} during the day and from 42 to 58 dBA L_{eq} at night. The day-night average noise level across the five-day noise monitoring survey was 59 dBA DNL. The daily trend in noise levels at LT-1 is shown in Figures 2 through 7.

LT-2 was made approximately 85 feet southwest of the centerline of Lawrence Expressway adjacent to the single-family residential land uses to the southwest of the 1777 Saratoga Avenue site. Hourly average noise levels at this location typically ranged from 59 to 70 dBA L_{eq} during the day and from 47 to 68 dBA L_{eq} at night. The day-night average noise level across the five-day noise monitoring survey was 67 dBA DNL. The daily trend in noise levels at LT-2 is shown in Figures 8 through 13.

LT-3 was made approximately 50 feet southeast of the centerline of Saratoga Avenue. Hourly average noise levels at this location typically ranged from 65 to 75 dBA L_{eq} during the day and from 52 to 70 dBA L_{eq} at night. The day-night average noise level across the five-day noise monitoring survey was 72 dBA DNL. The daily trend in noise levels at LT-3 is shown in Figures 14 through 19.

LT-4 was made approximately 95 feet east of the centerline of Quito Road, adjacent to the single-family residences to the south of El Paseo. Hourly average noise levels at this location typically ranged from 58 to 70 dBA L_{eq} during the day and from 48 to 65 dBA L_{eq} at night. The day-night average noise level across the five-day noise monitoring survey was 65 dBA DNL. The daily trend in noise levels at LT-4 is shown in Figures 20 through 25.

LT-5 was made approximately 530 feet east of the centerline of Quito Road behind the existing commercial building planned to be demolished as part of the project. Hourly average noise levels at this location typically ranged from 46 to 59 dBA L_{eq} during the day and from 36 to 56 dBA L_{eq} at night. The day-night average noise level across the five-day noise monitoring survey was 61 dBA DNL. The daily trend in noise levels at LT-5 is shown in Figures 26 through 31.

Short-term noise measurement ST-1 was made over a 10-minute period, concurrent with the long-term noise data, on Tuesday, March 3, 2020 between 11:20 a.m. and 11:30 a.m. ST-1 was made adjacent to the single-family residences to the southwest of El Paseo, approximately 60 feet west of the centerline of Quito Road. The primary noise source at ST-1 was Quito Road traffic. Typical car pass-bys produced noise levels that ranged from 60 to 75 dBA, and a heavy truck pass-by generated noise levels of 65 to 85 dBA. The 10-minute average noise level measured at ST-1 was 65 dBA $L_{eq(10\text{-}min)}$.

Short-term noise measurement ST-2 was made over a 10-minute period, concurrent with the long-term noise data, on Tuesday, March 3, 2020 between 11:40 a.m. and 11:50 a.m. ST-2 was made at the entrance to Saratoga Station parking lot, approximately 80 feet west of the centerline of Saratoga Avenue. The primary noise source at ST-2 was local traffic and operational noise from the parking lot. Typical car pass-bys produced noise levels that ranged from 60 to 70 dBA, and a heavy truck pass-by generated noise levels of 75 dBA. The 10-minute average noise level measured at ST-2 was 66 dBA $L_{eq(10\text{-}min)}$.

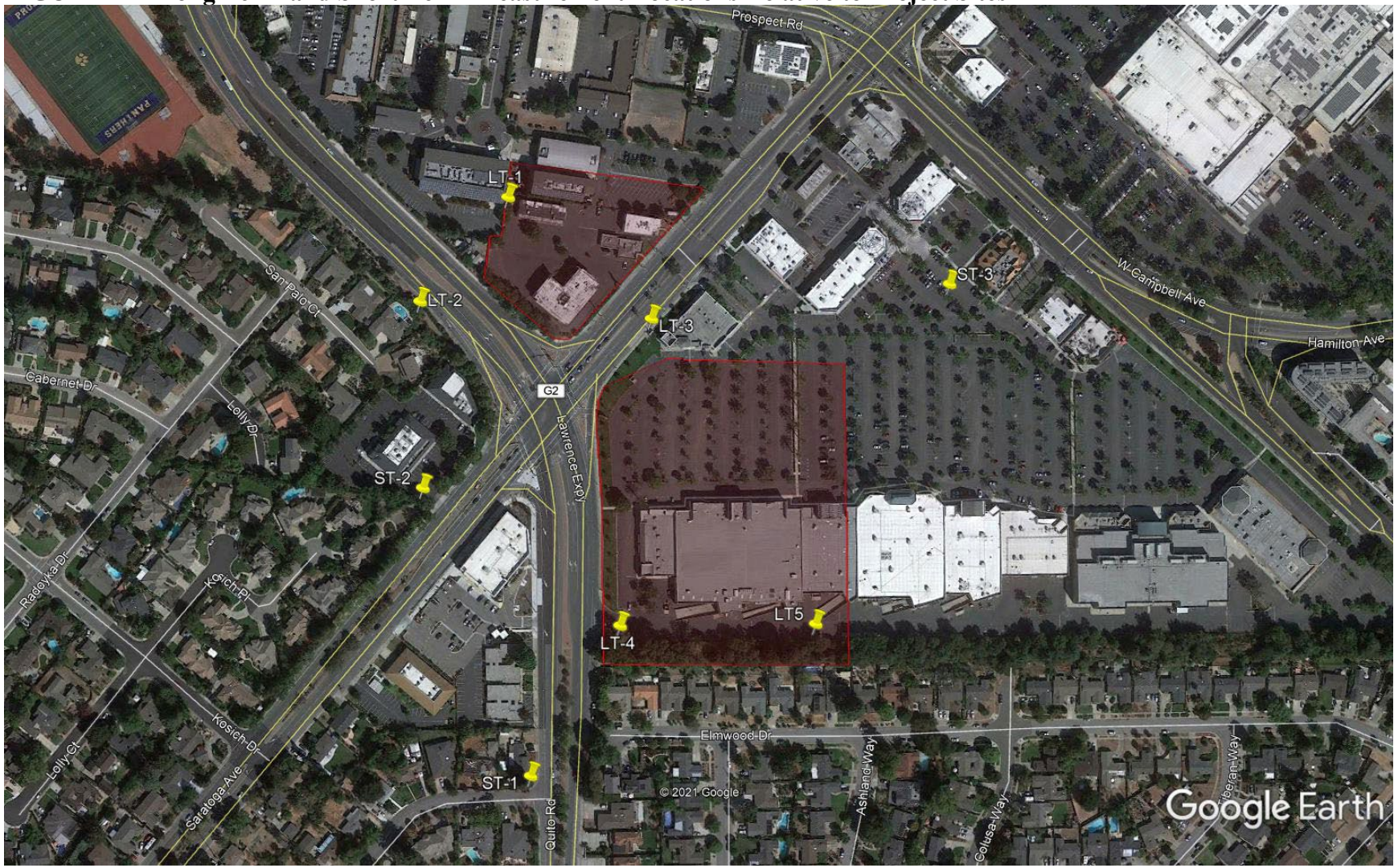
Short-term noise measurement ST-3 was made over a 10-minute period, concurrent with the long-term noise data, on Tuesday, March 3, 2020 between 12:00 p.m. and 12:10 p.m. ST-3 was made at the Pete's Coffee parking lot located in the El Paseo de Saratoga Shopping Center, approximately 260 feet southwest of the centerline of W Campbell Avenue. The primary noise source at ST-3 was shopping center traffic and an aircraft flyover. Typical car pass-bys produced noise levels that ranged from 55 to 65 dBA, and an aircraft flyover produced noise levels that ranged from 55 to 58 dBA. The 10-minute average noise level measured at ST-3 was 56 dBA $L_{eq(10\text{-}min)}$.

The short-term measurement results for ST-1, ST-2, and ST-3 are summarized in Table 5.

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

Noise Measurement Location (Date, Time)	L_{max}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	$L_{eq(10\text{-}min)}$
ST-1: Corner of Paseo Cerro and Quito Road (3/3/2020, 11:20-11:30 a.m.)	78	72	70	62	55	66
ST-2: Entrance to Saratoga Station Parking Lot (3/3/2020, 11:40-11:50 a.m.)	85	77	69	60	52	66
ST-3: Parking Lot in front of Pete's Coffee (3/3/2020, 12:00-12:10 p.m.)	69	63	60	53	50	56

FIGURE 1 Long Term and Short Term Measurement Locations Relative to Project Sites



Source: Google Earth, 2021

FIGURE 2: Noise Levels at Noise Measurement Site LT-1
~220' Northeast of the Centerline of Lawrence Expressway
Thursday, February 27, 2020

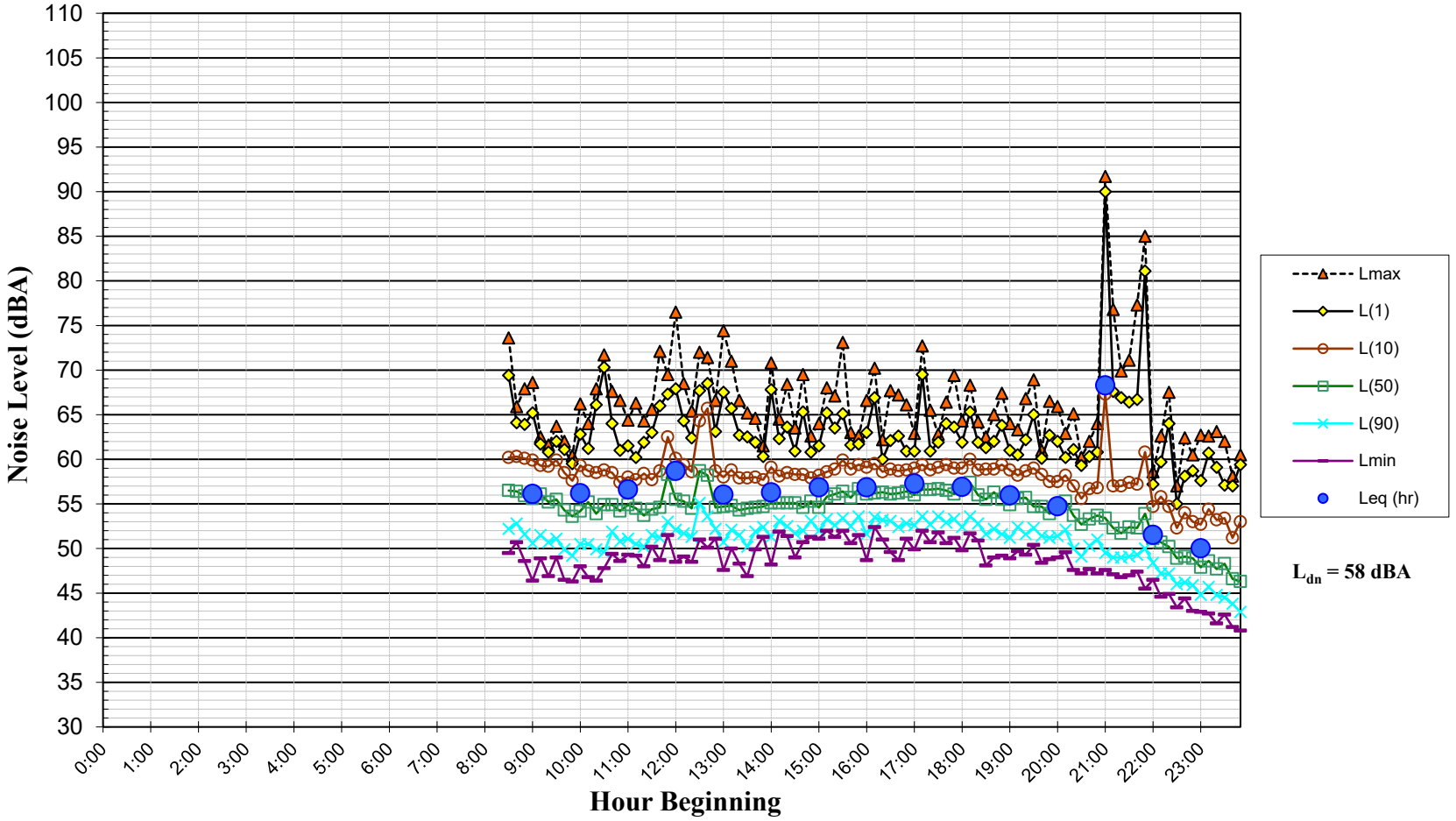


FIGURE 3: Noise Levels at Noise Measurement Site LT-1
~220' Northeast of the Centerline of Lawrence Expressway
Friday, February 28, 2020

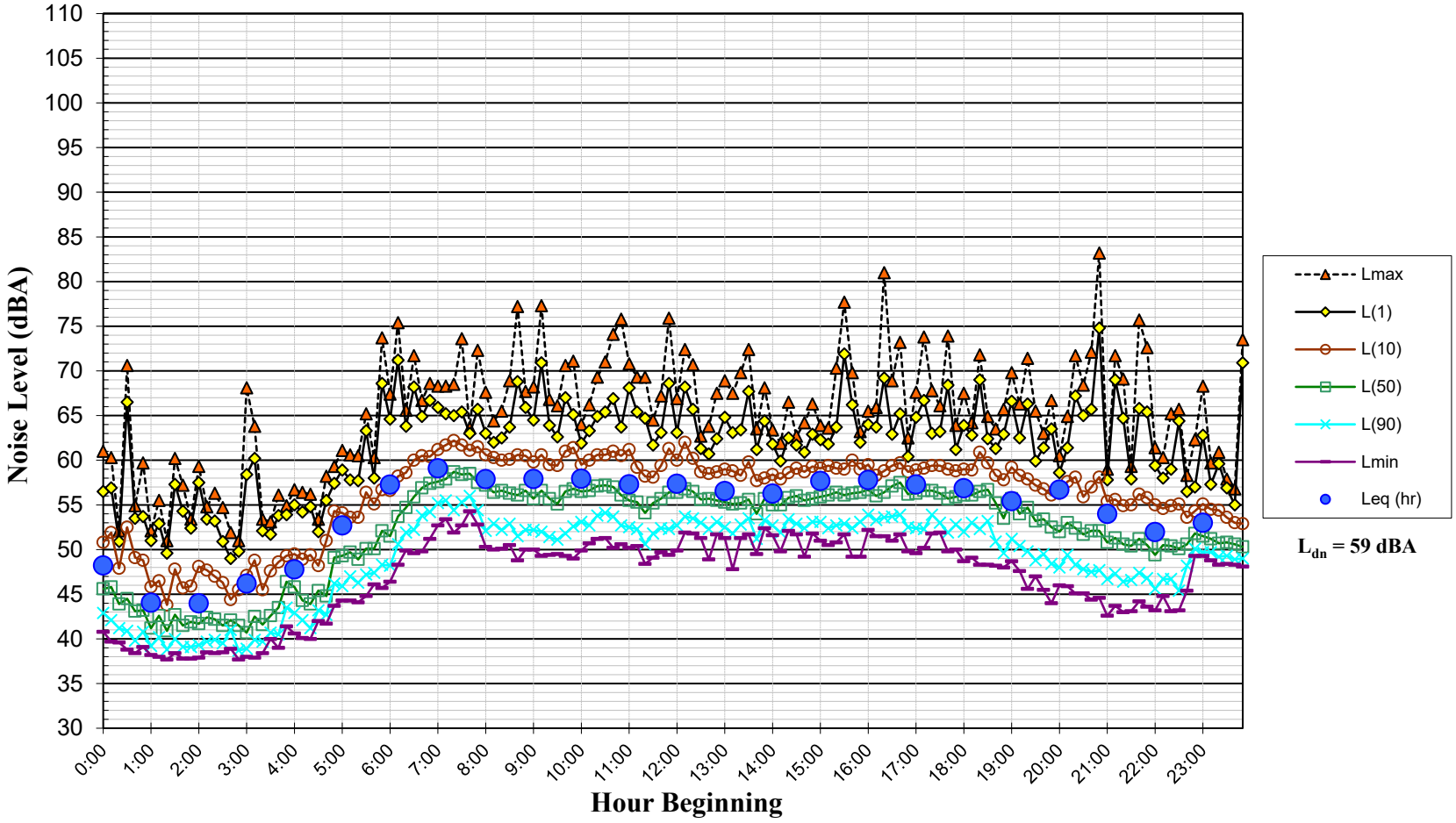


FIGURE 4: Noise Levels at Noise Measurement Site LT-1
~220' Northeast of the Centerline of Lawrence Expressway
Saturday, February 29, 2020

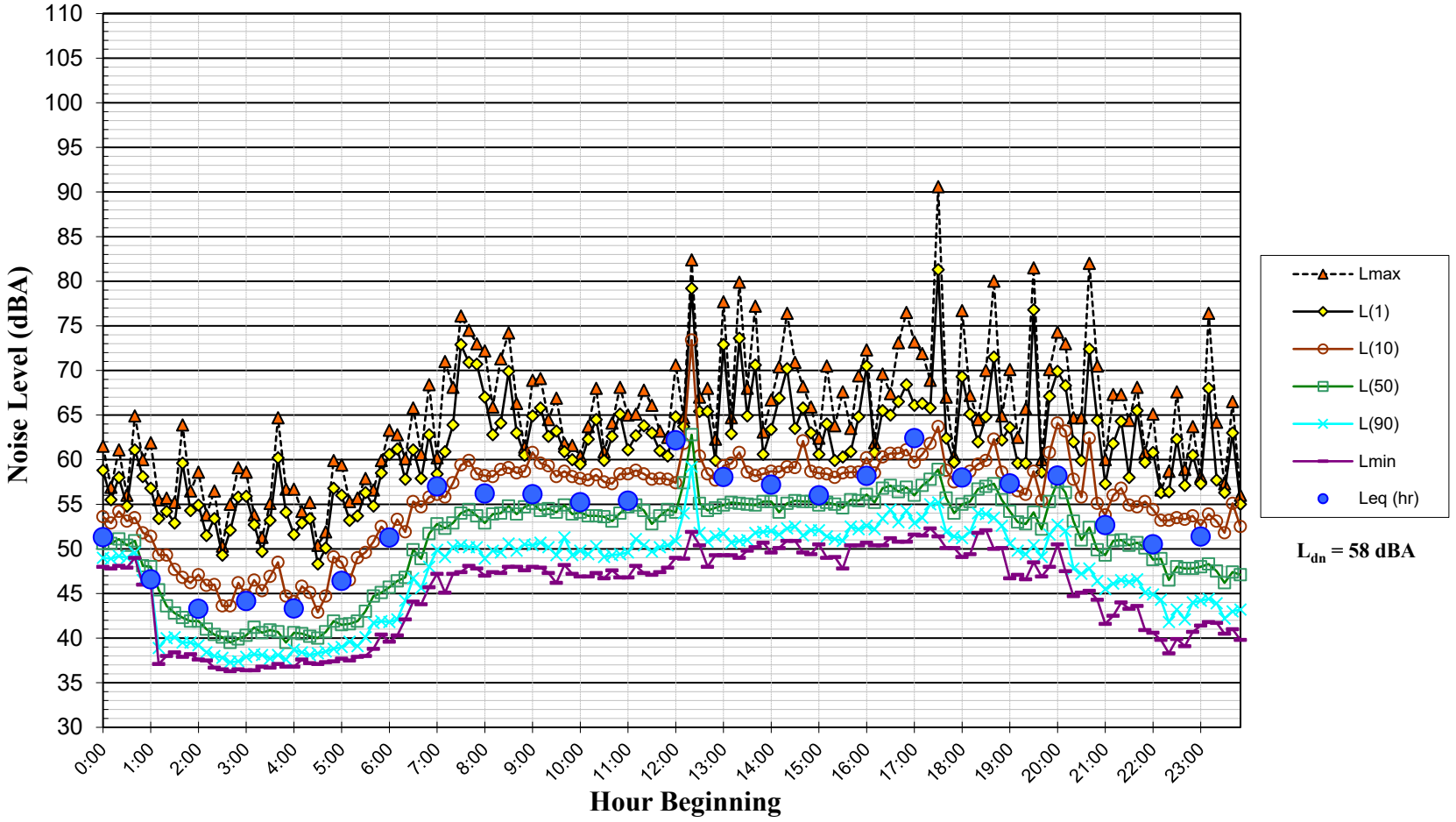


FIGURE 5: Noise Levels at Noise Measurement Site LT-1
~220' Northeast of the Centerline of Lawrence Expressway
Sunday, March 1, 2020

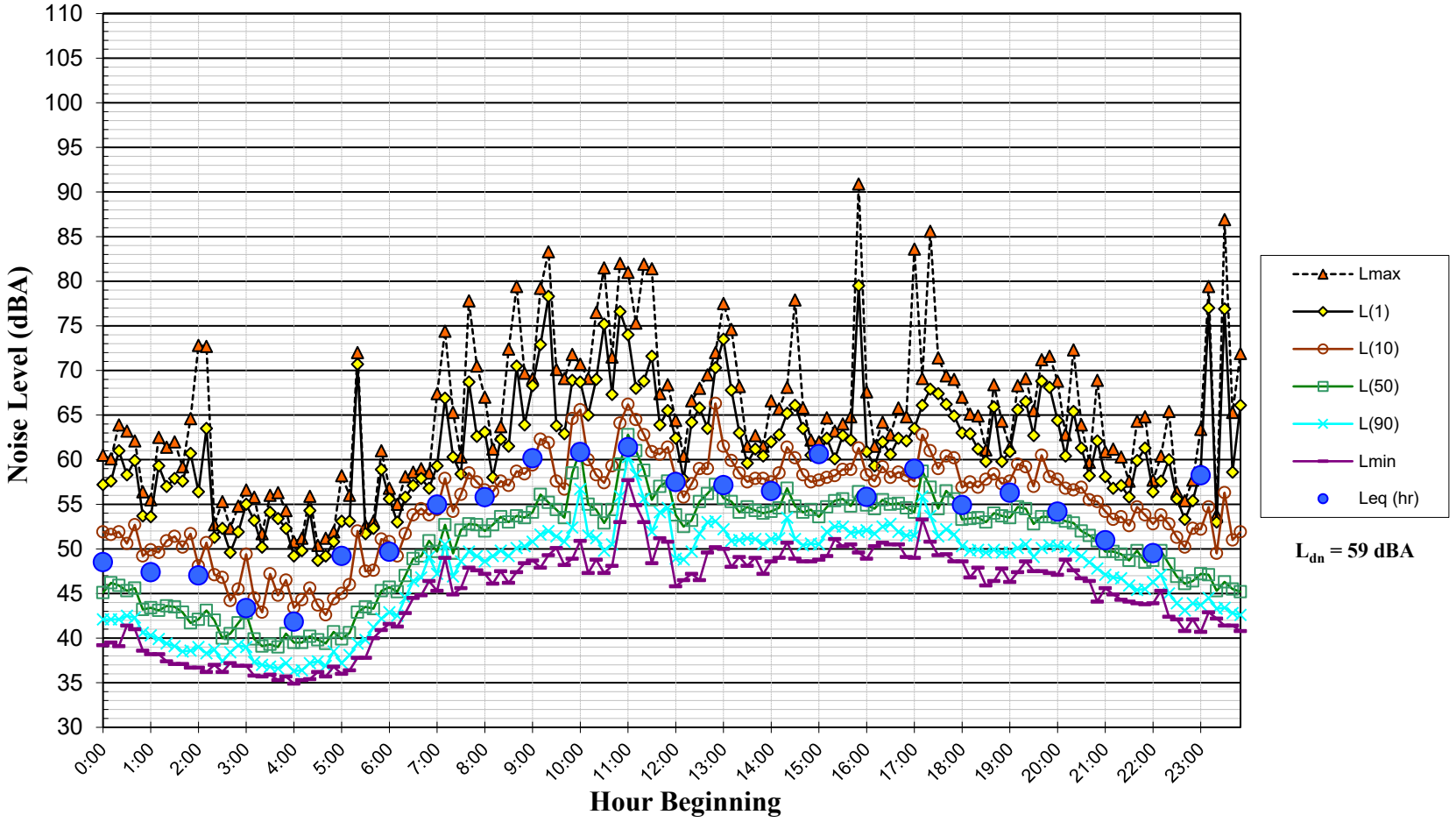


FIGURE 6: Noise Levels at Noise Measurement Site LT-1
~220' Northeast of the Centerline of Lawrence Expressway
Monday, March 2, 2020

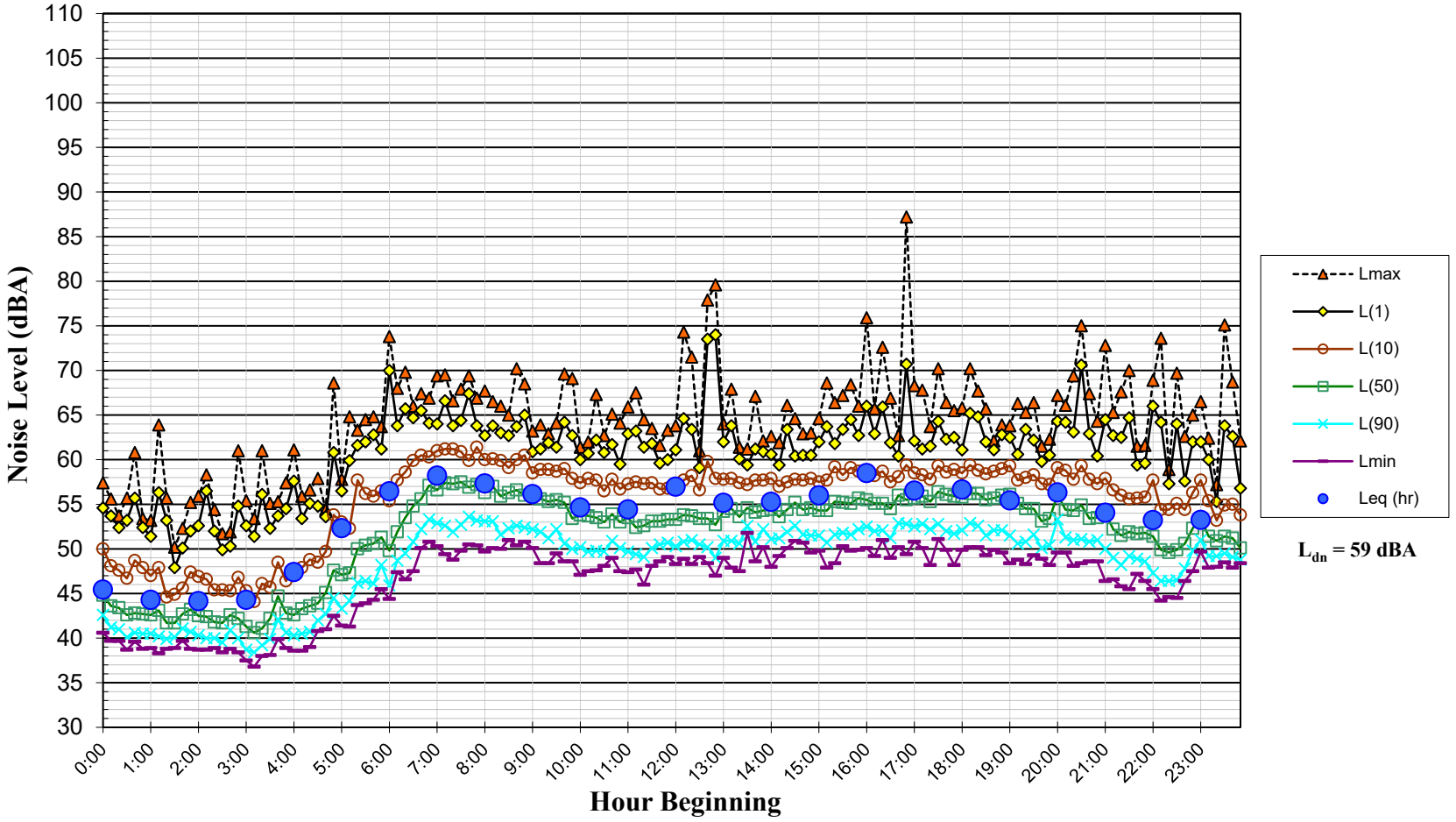


FIGURE 7: Noise Levels at Noise Measurement Site LT-1
~220' Northeast of the Centerline of Lawrence Expressway
Tuesday, March 3, 2020

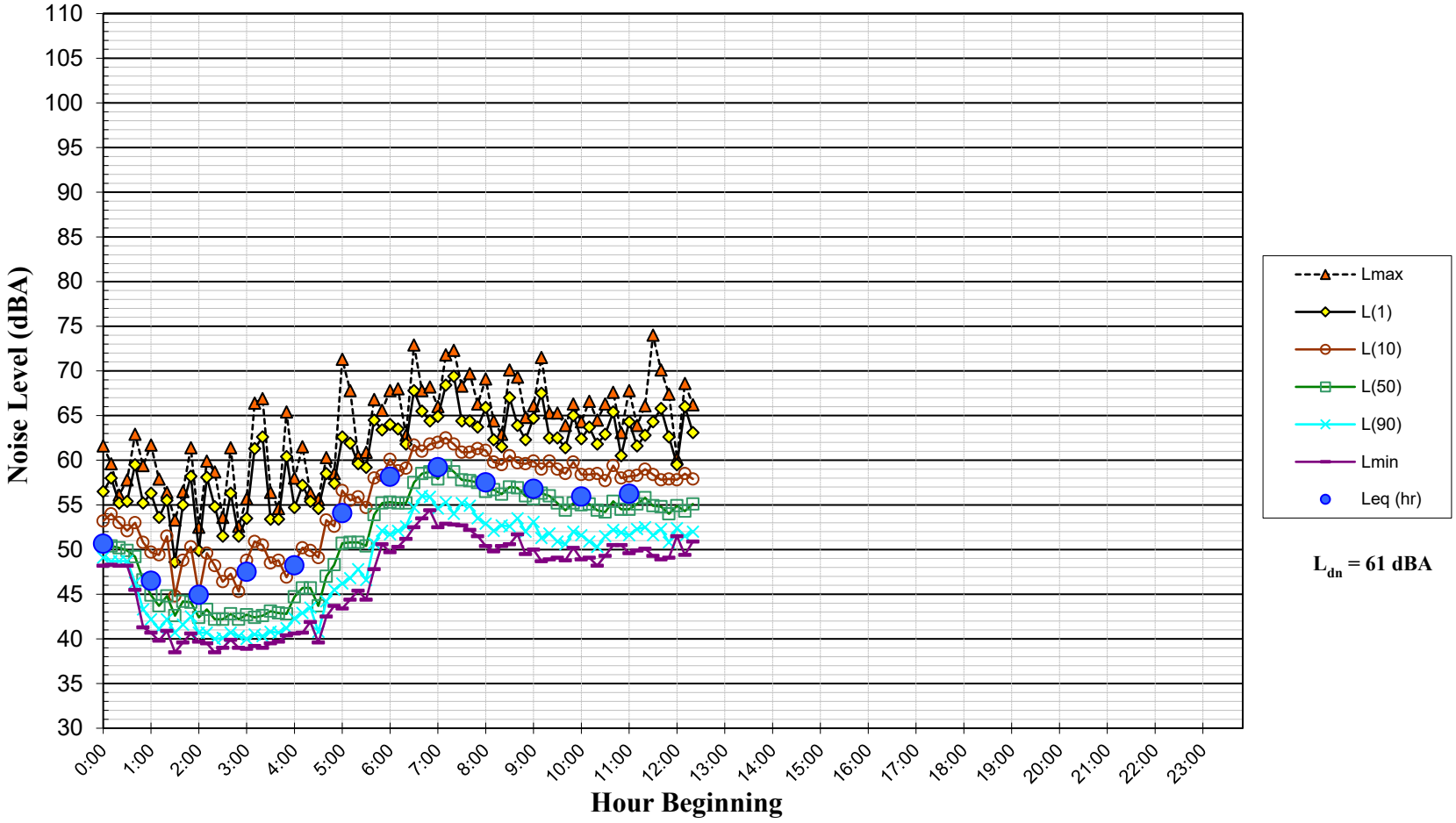


FIGURE 8: Noise Levels at Noise Measurement Site LT-2
~85' Southwest of the Centerline of Lawrence Expressway
Thursday, February 27, 2020

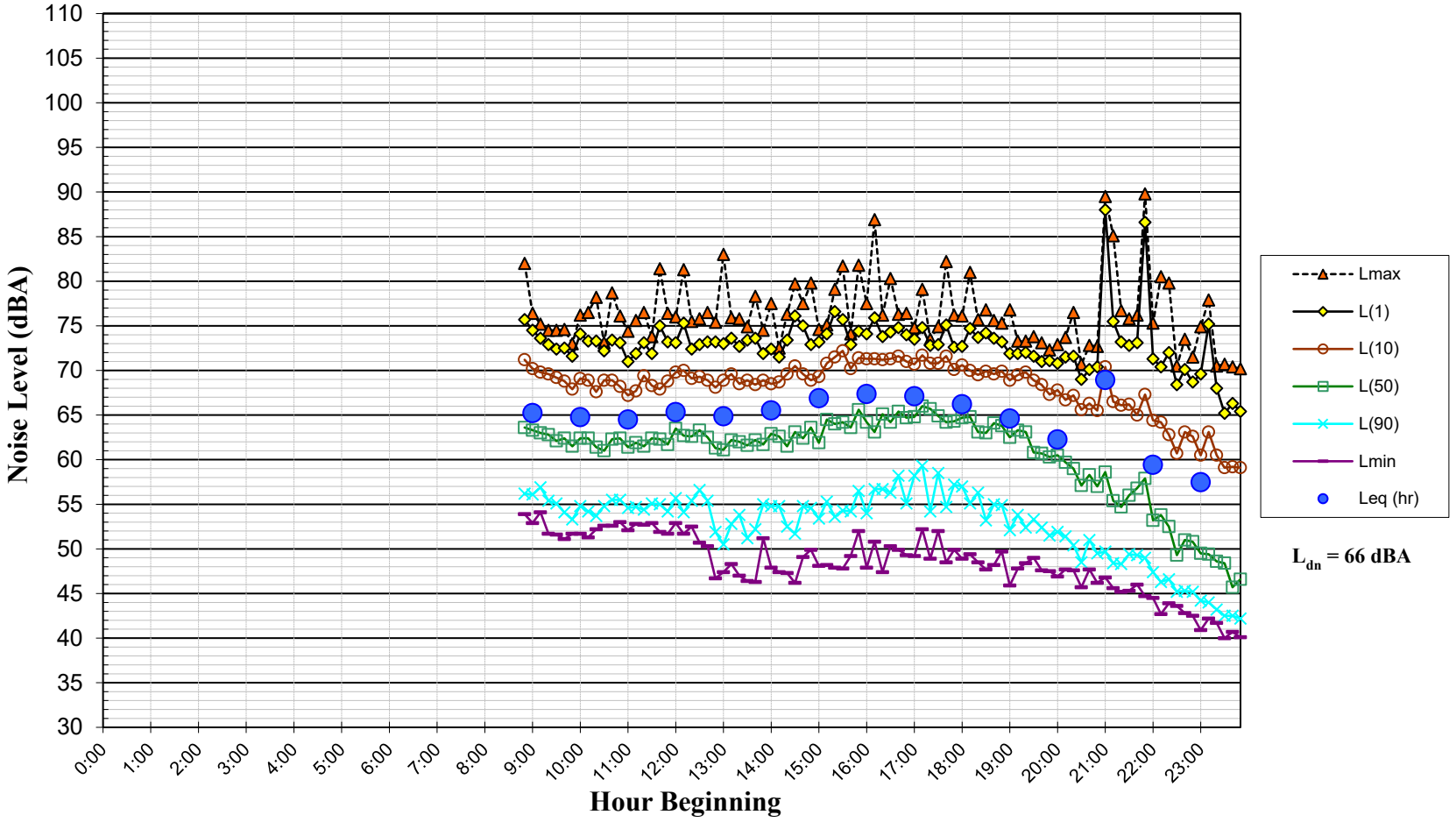


FIGURE 9: Noise Levels at Noise Measurement Site LT-2
~85' Southwest of the Centerline of Lawrence Expressway
Friday, February 28, 2020

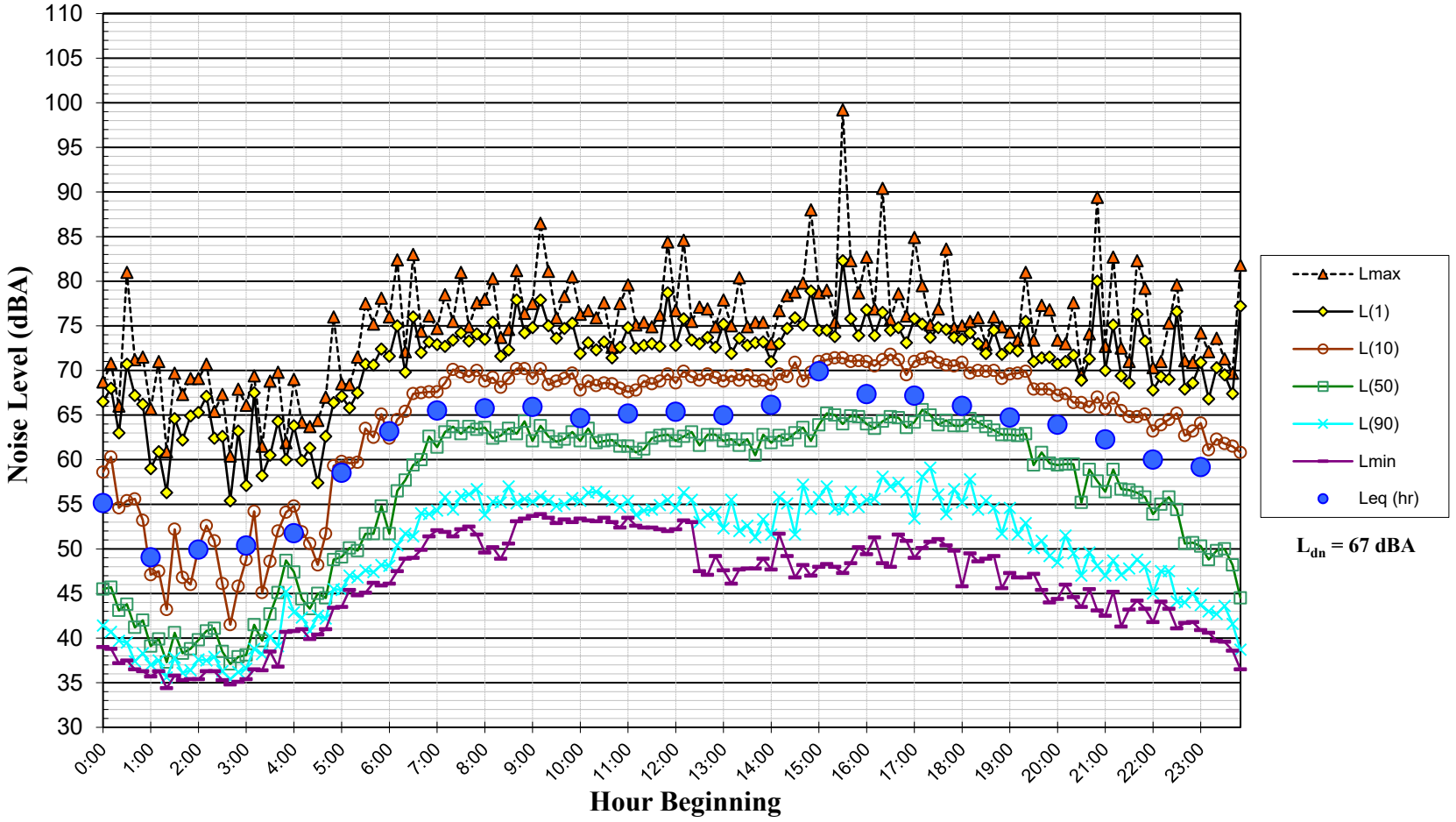


FIGURE 10: Noise Levels at Noise Measurement Site LT-2
~85' Southwest of the Centerline of Lawrence Expressway
Saturday, February 29, 2020

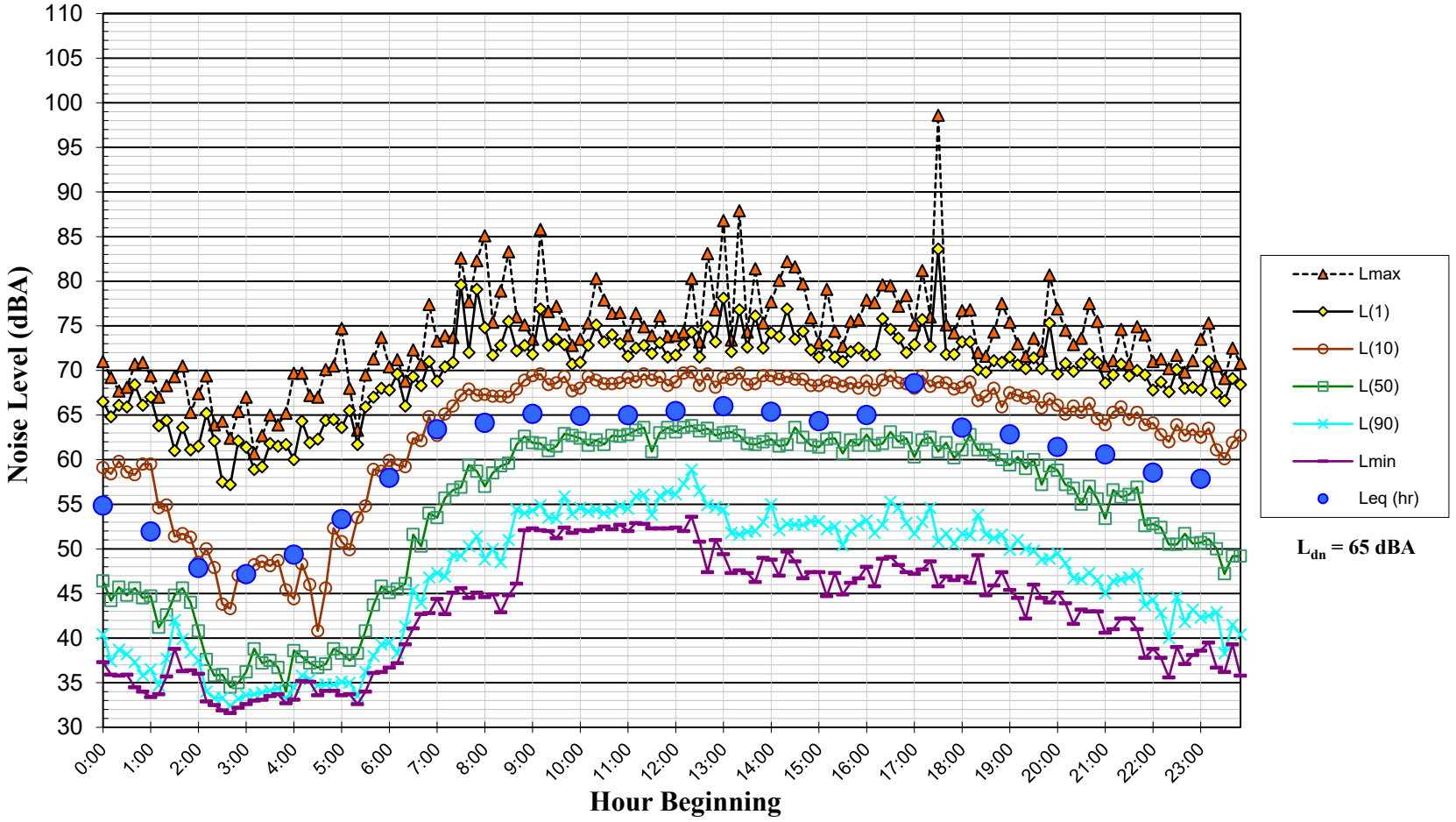


FIGURE 11: Noise Levels at Noise Measurement Site LT-2
~85' Southwest of the Centerline of Lawrence Expressway
Sunday, March 1, 2020

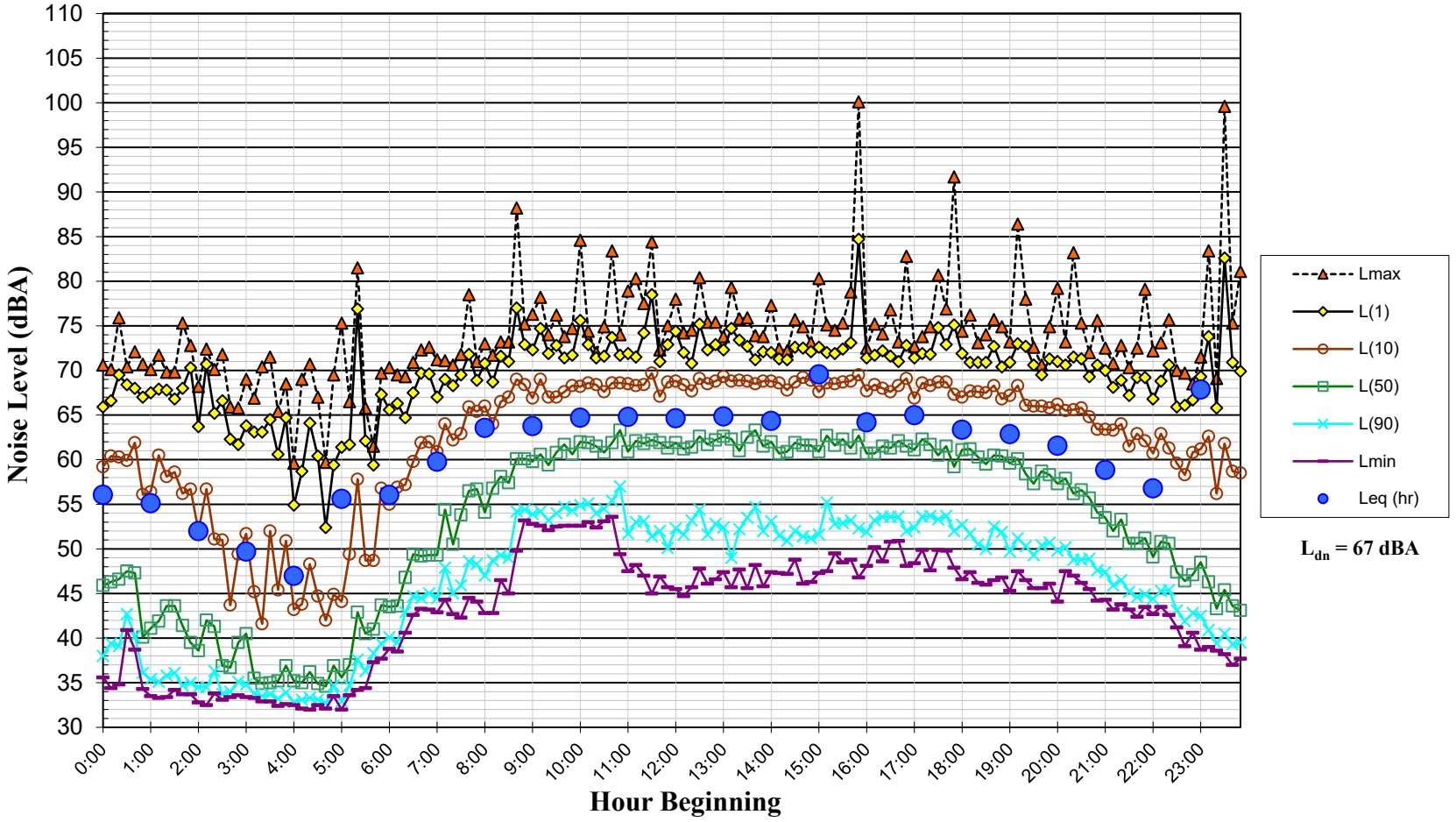


FIGURE 12: Noise Levels at Noise Measurement Site LT-2
~85' Southwest of the Centerline of Lawrence Expressway
Monday, March 2, 2020

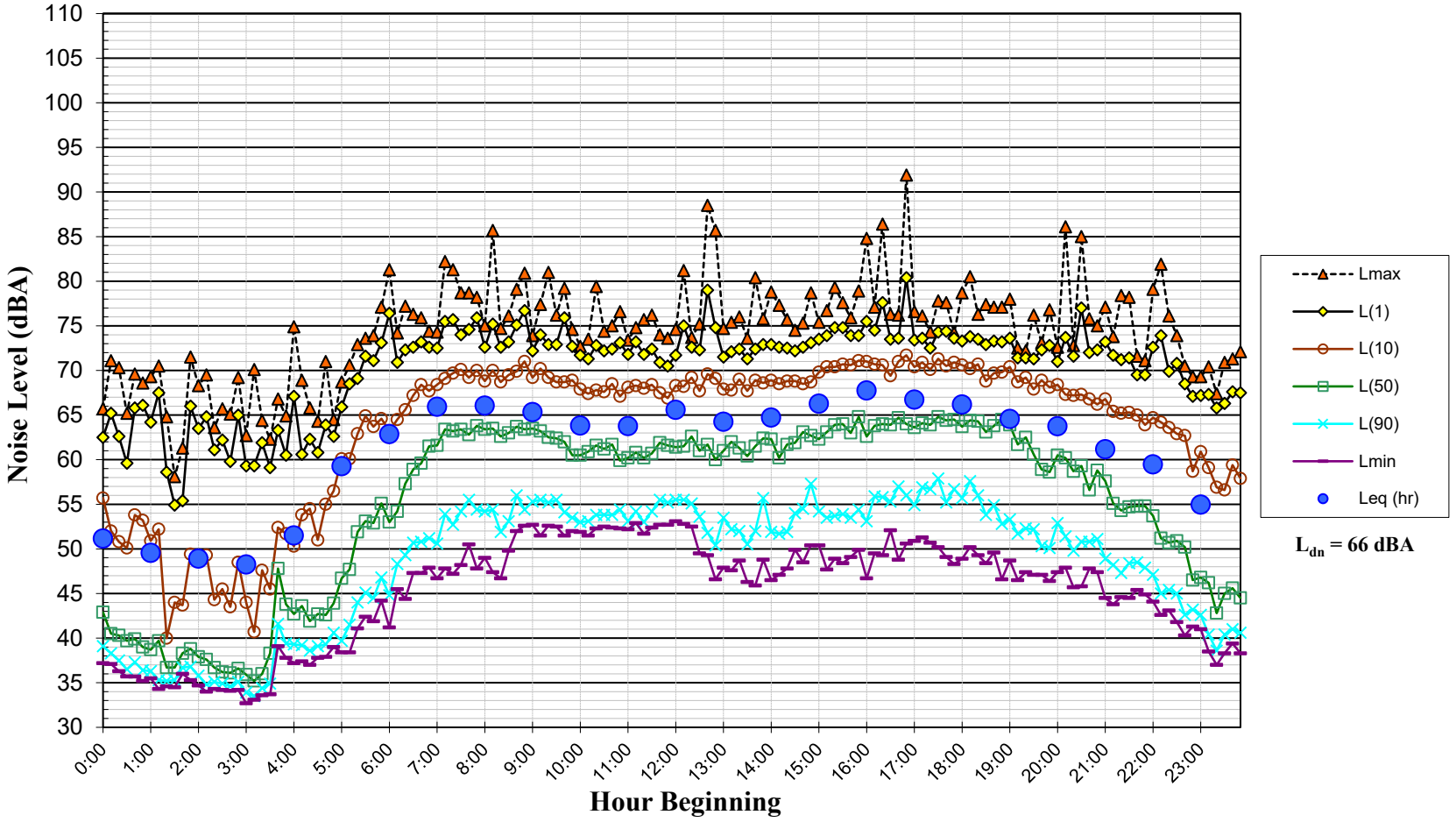


FIGURE 13: Noise Levels at Noise Measurement Site LT-2
~85' Southwest of the Centerline of Lawrence Expressway
Tuesday, March 3, 2020

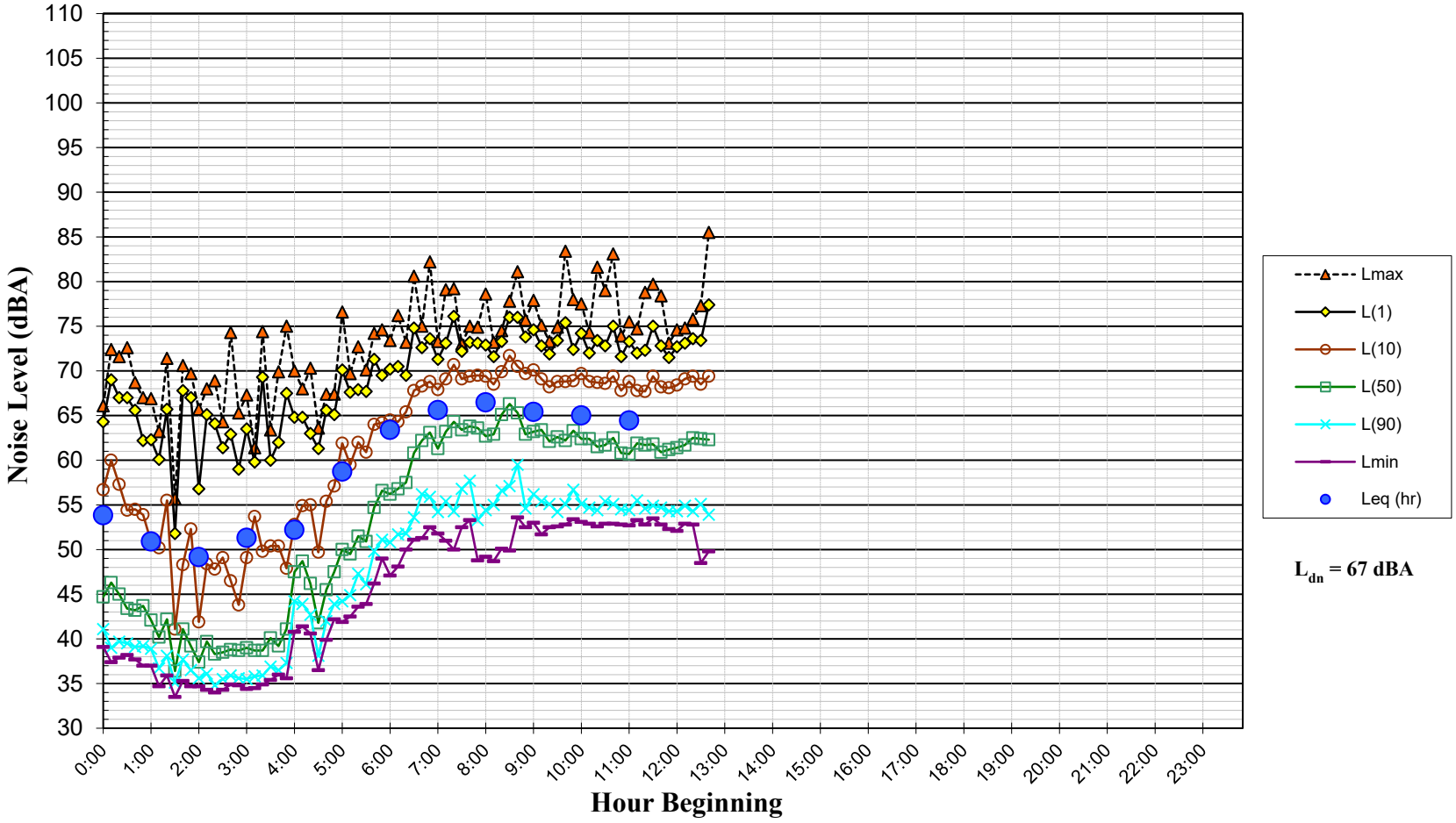
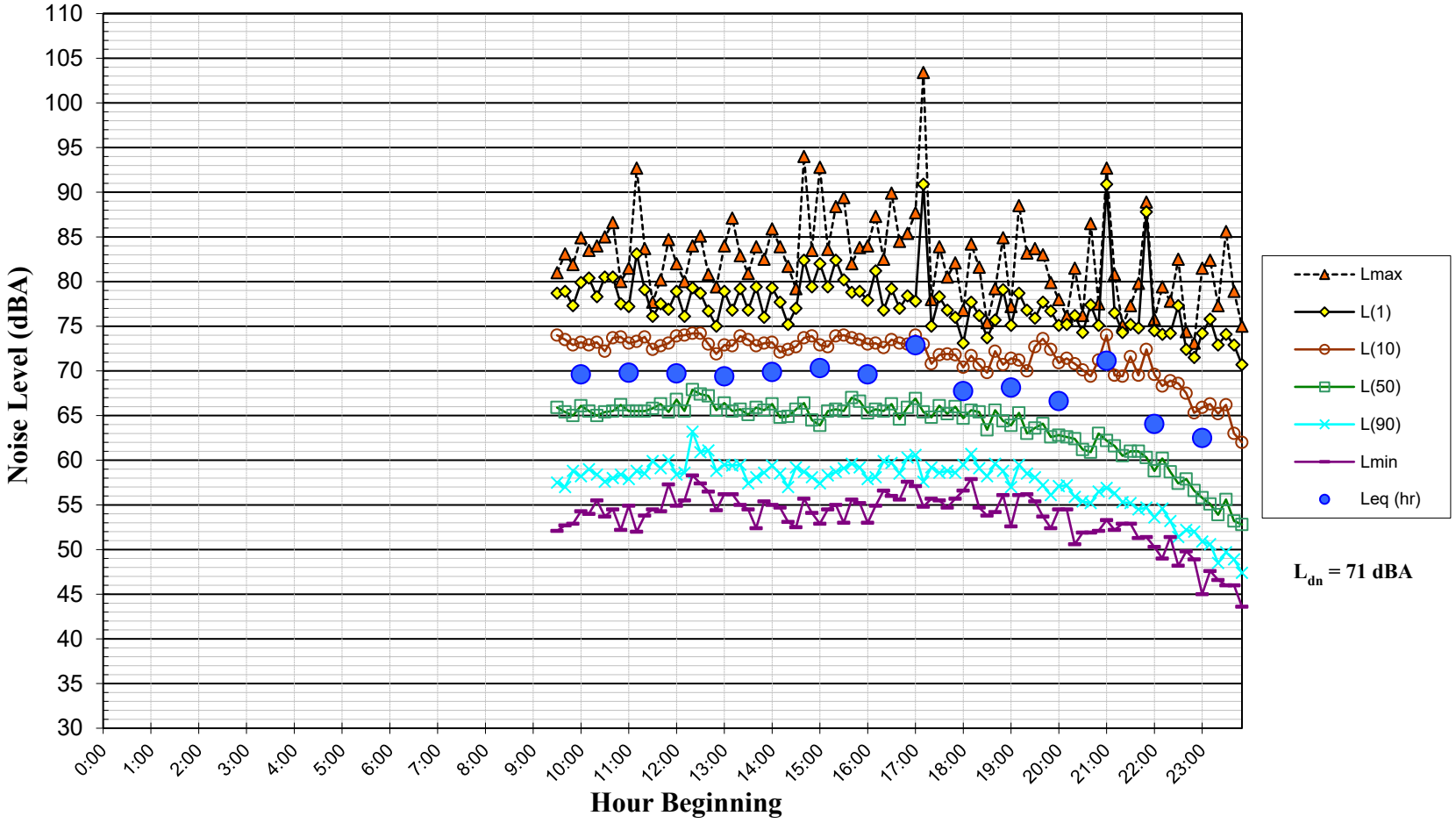


FIGURE 14: Noise Levels at Noise Measurement Site LT-3
~50' Southeast of the Centerline of Saratoga Avenue
Thursday, February 27, 2020



L_{dn} = 71 dBA

FIGURE 15: Noise Levels at Noise Measurement Site LT-3
~50' Southeast of the Centerline of Saratoga Avenue
Friday, February 28, 2020

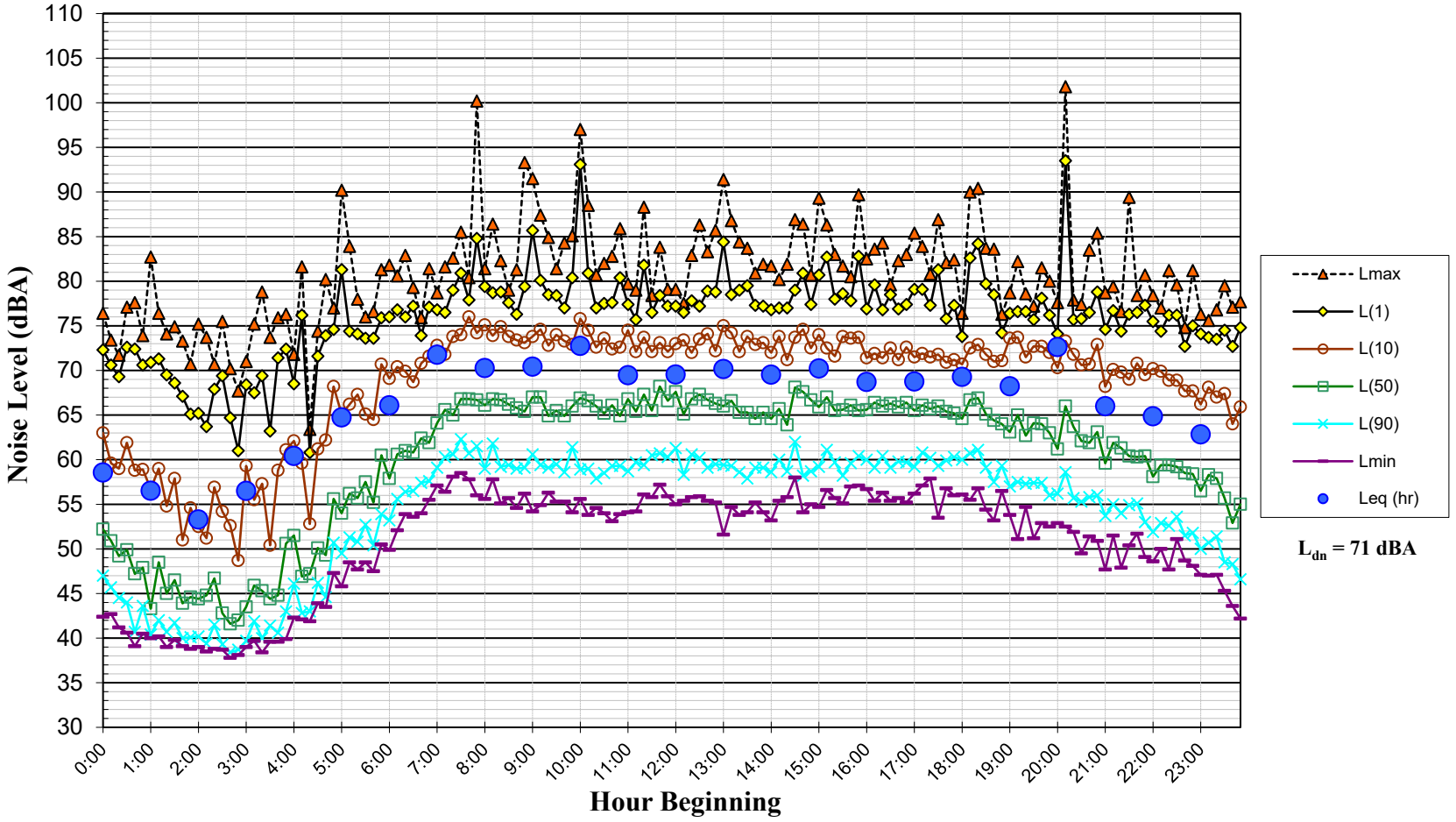


FIGURE 16: Noise Levels at Noise Measurement Site LT-3
~50' Southeast of the Centerline of Saratoga Avenue
Saturday, February 29, 2020

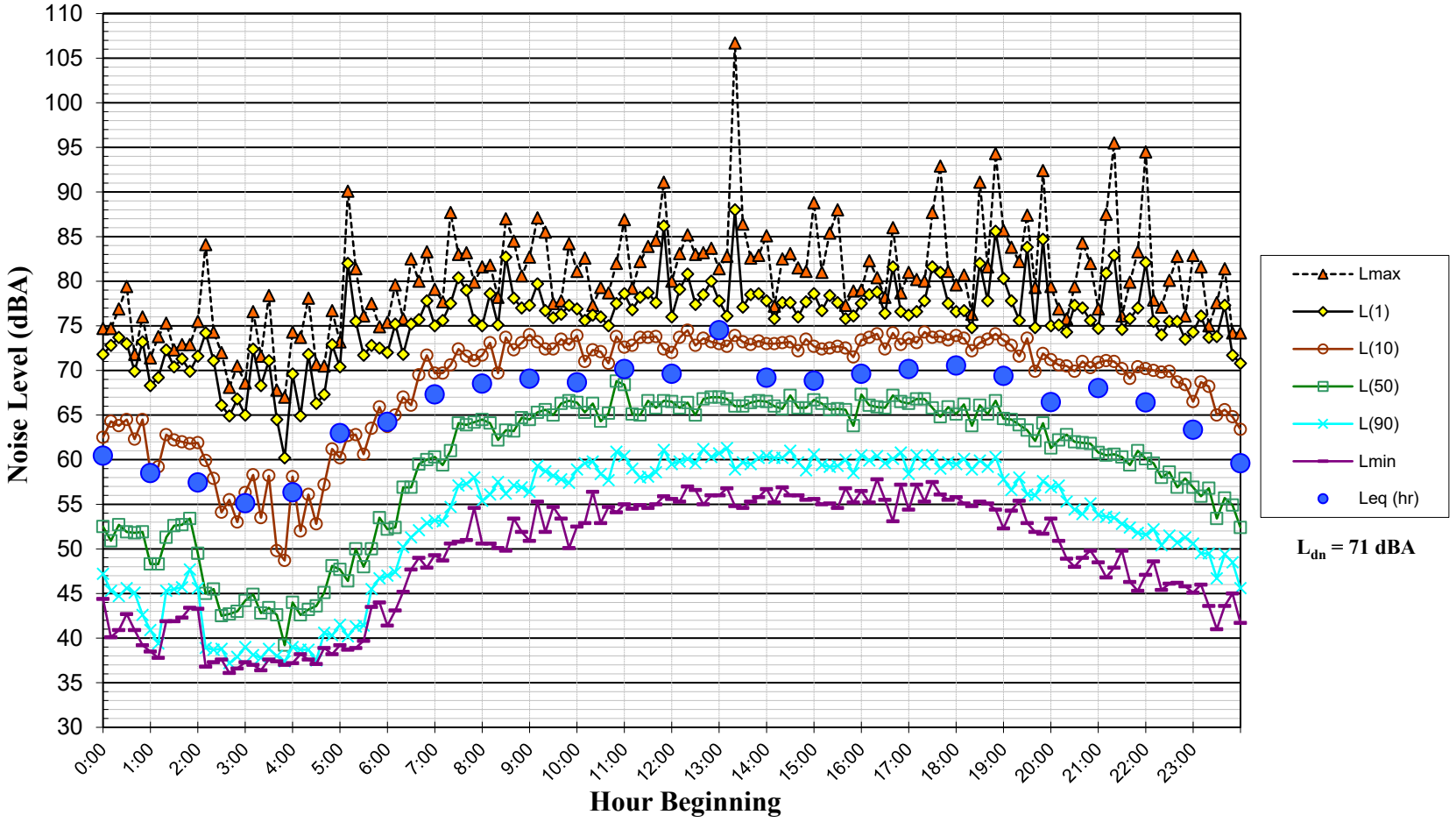


FIGURE 17: Noise Levels at Noise Measurement Site LT-3
~50' Southeast of the Centerline of Saratoga Avenue
Sunday, March 1, 2020

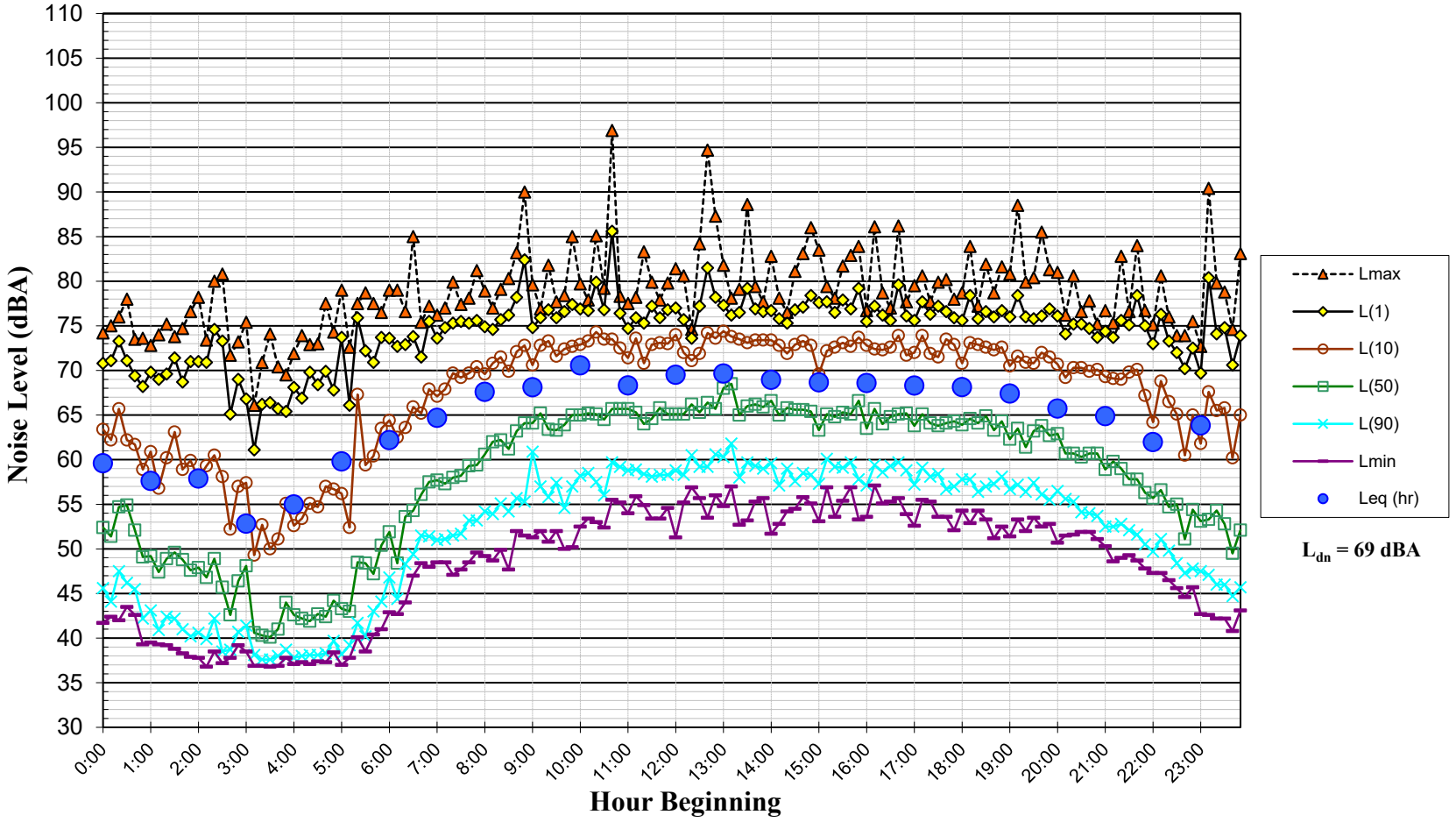


FIGURE 18: Noise Levels at Noise Measurement Site LT-3
~50' Southeast of the Centerline of Saratoga Avenue
Monday, March 2, 2020

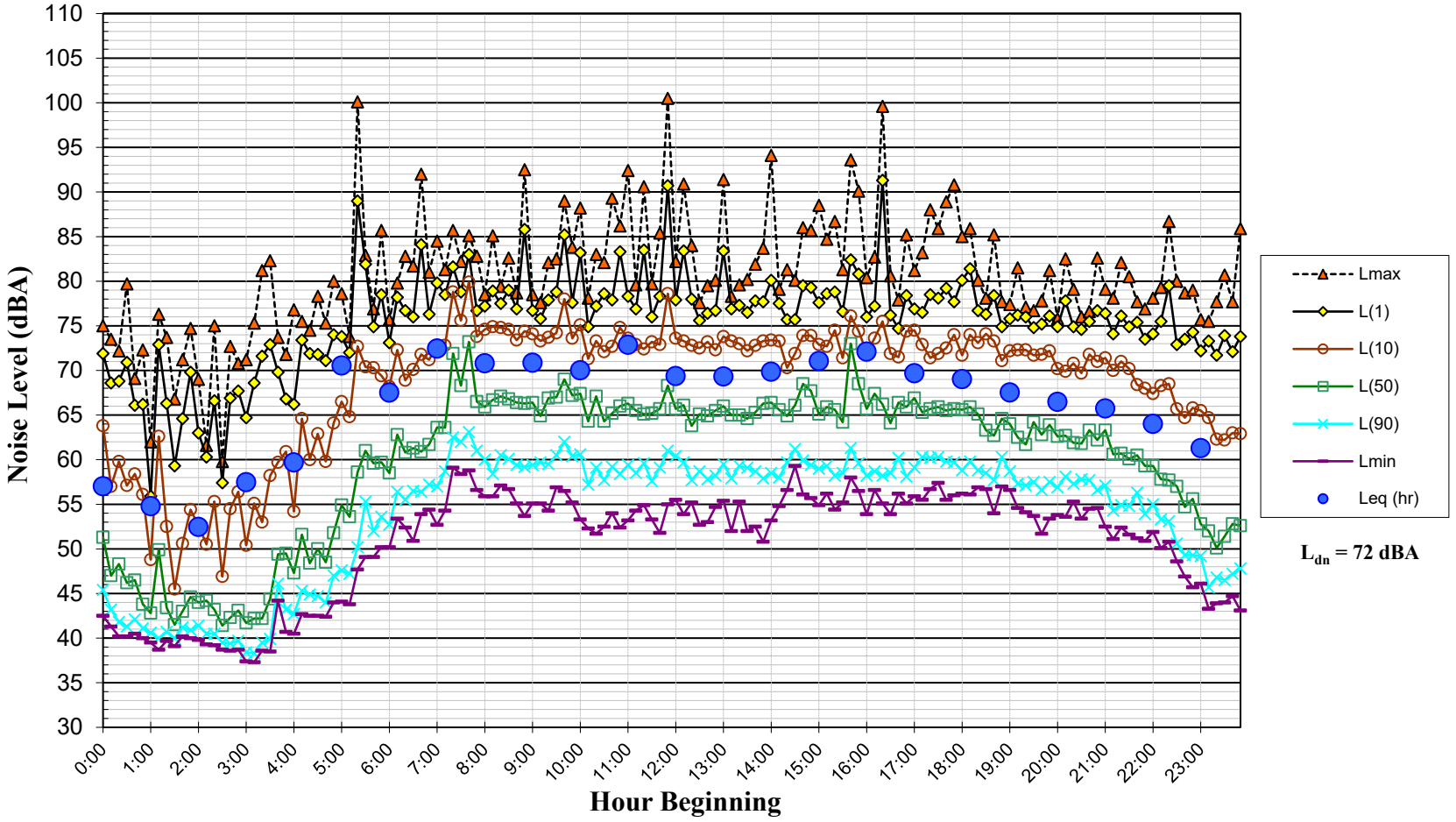
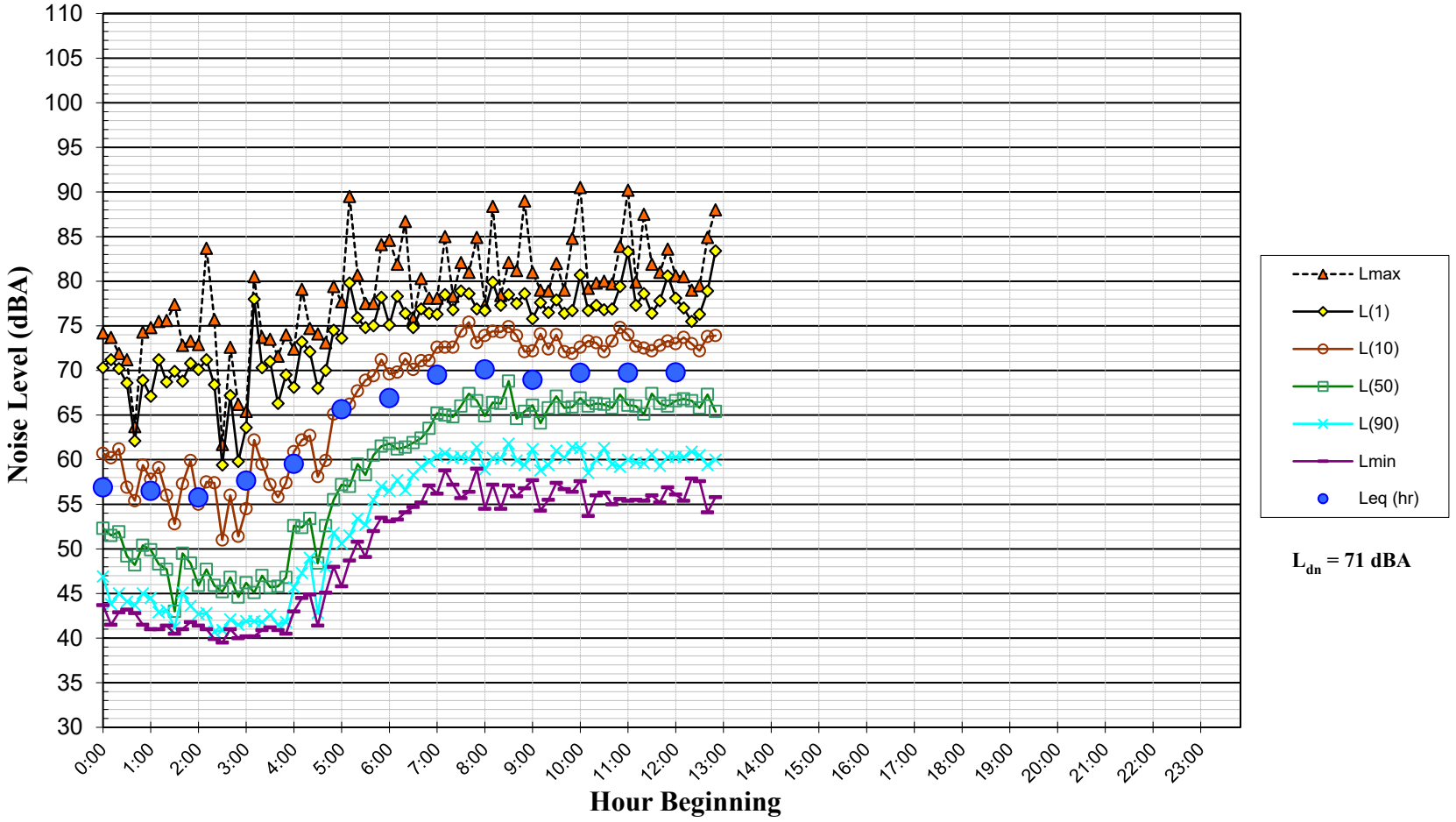


FIGURE 19: Noise Levels at Noise Measurement Site LT-3
~50' Southeast of the Centerline of Saratoga Avenue
Tuesday, March 3, 2020



L_{dn} = 71 dBA

FIGURE 20: Noise Levels at Noise Measurement Site LT-4
~95' East of the Centerline of Quito Road
Thursday, February 27, 2020

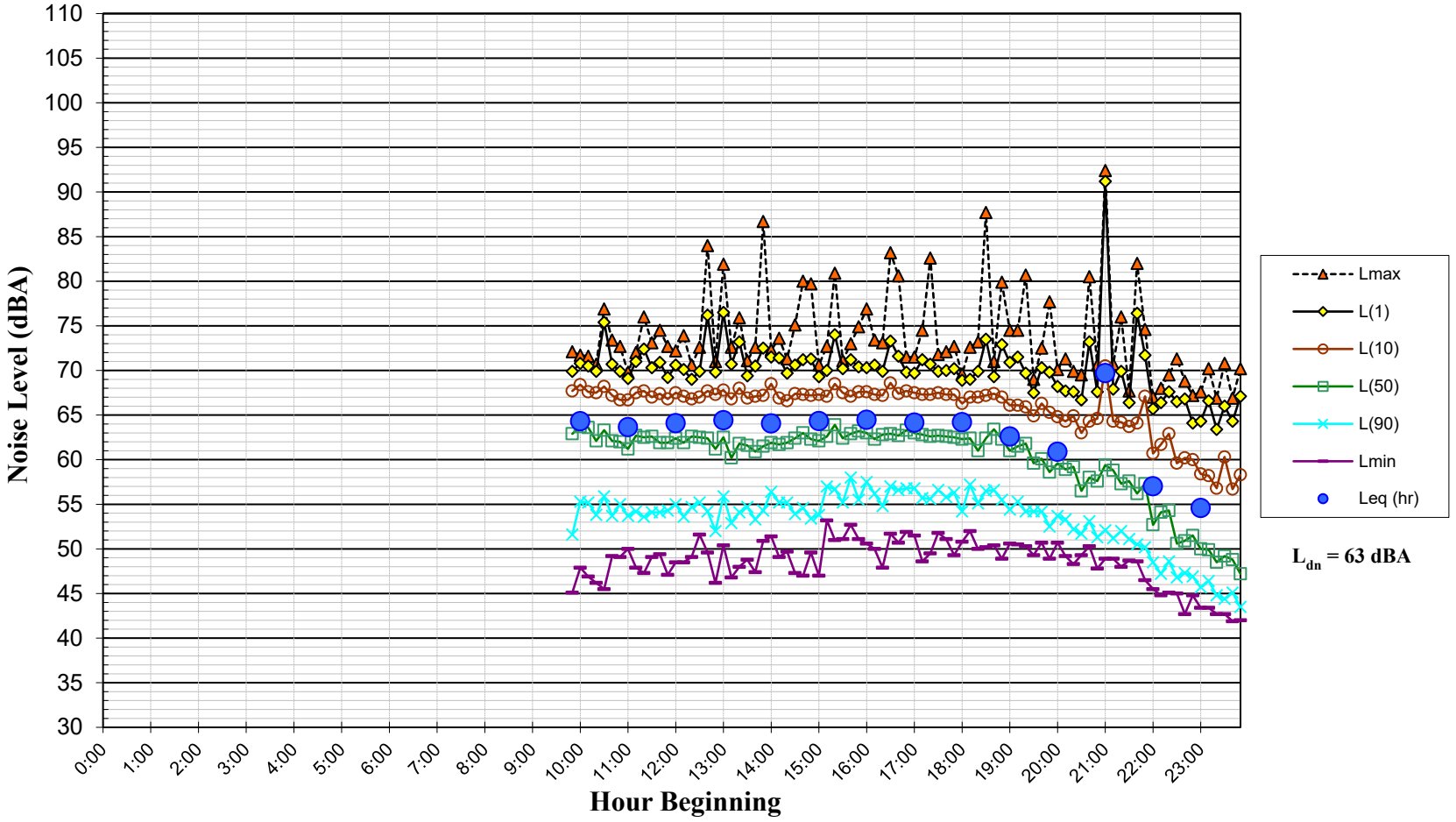


FIGURE 21: Noise Levels at Noise Measurement Site LT-4
~95' East of the Centerline of Quito Road
Friday, February 28, 2020

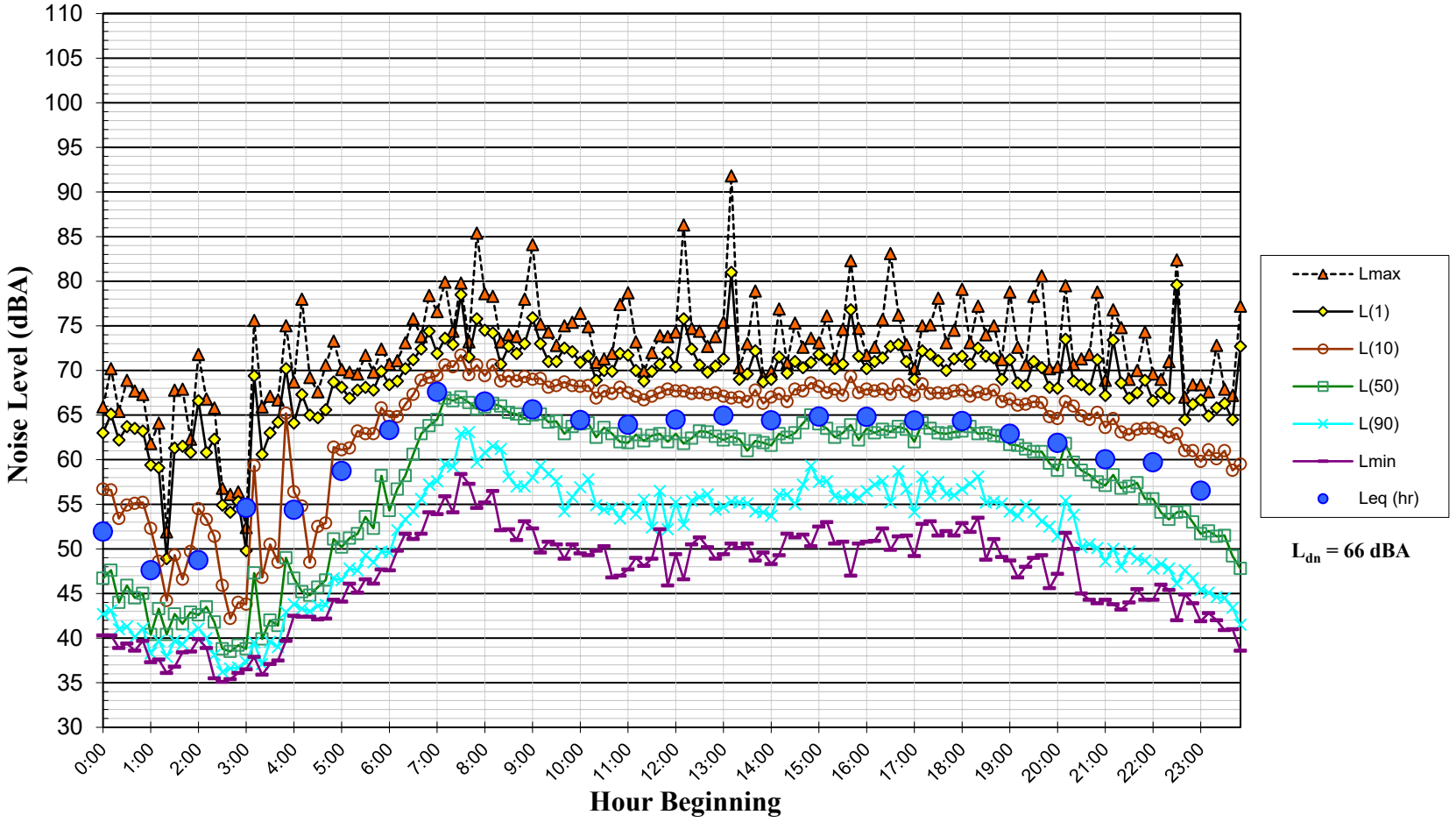


FIGURE 22: Noise Levels at Noise Measurement Site LT-4
~95' East of the Centerline of Quito Road
Saturday, February 29, 2020

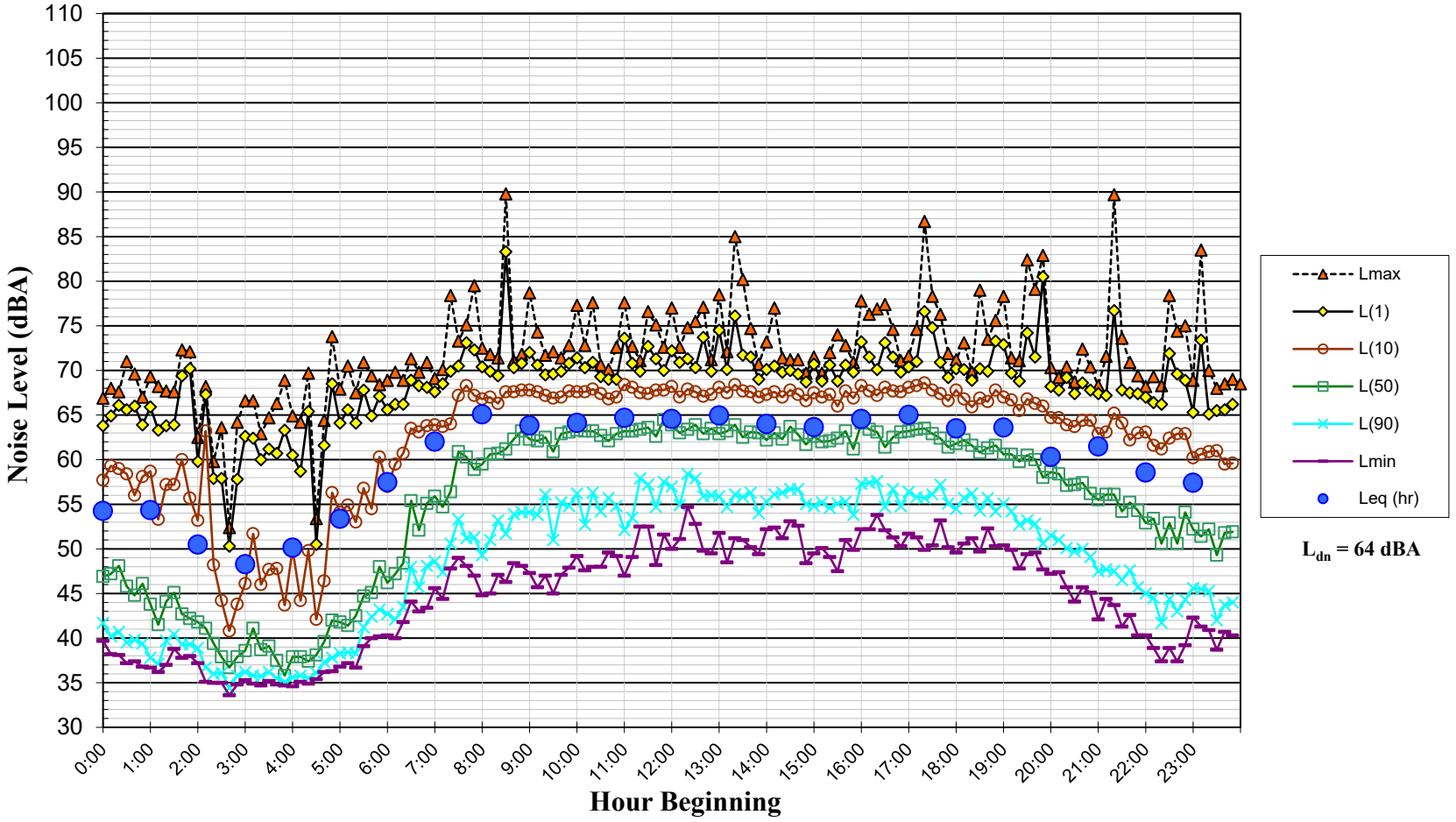


FIGURE 23: Noise Levels at Noise Measurement Site LT-4
~95' East of the Centerline of Quito Road
Sunday, March 1, 2020

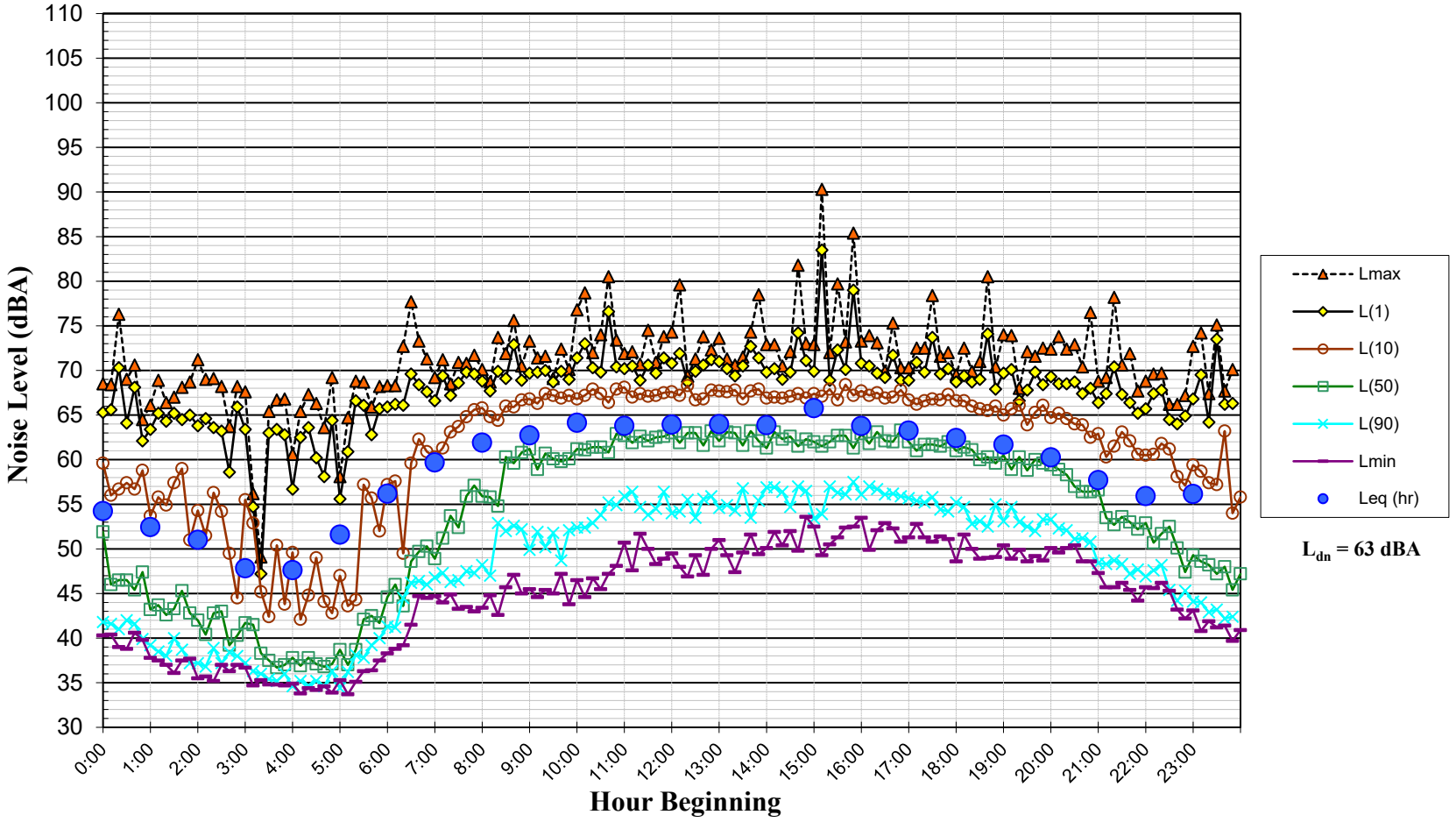


FIGURE 24: Noise Levels at Noise Measurement Site LT-4
~95' East of the Centerline of Quito Road
Monday, March 2, 2020

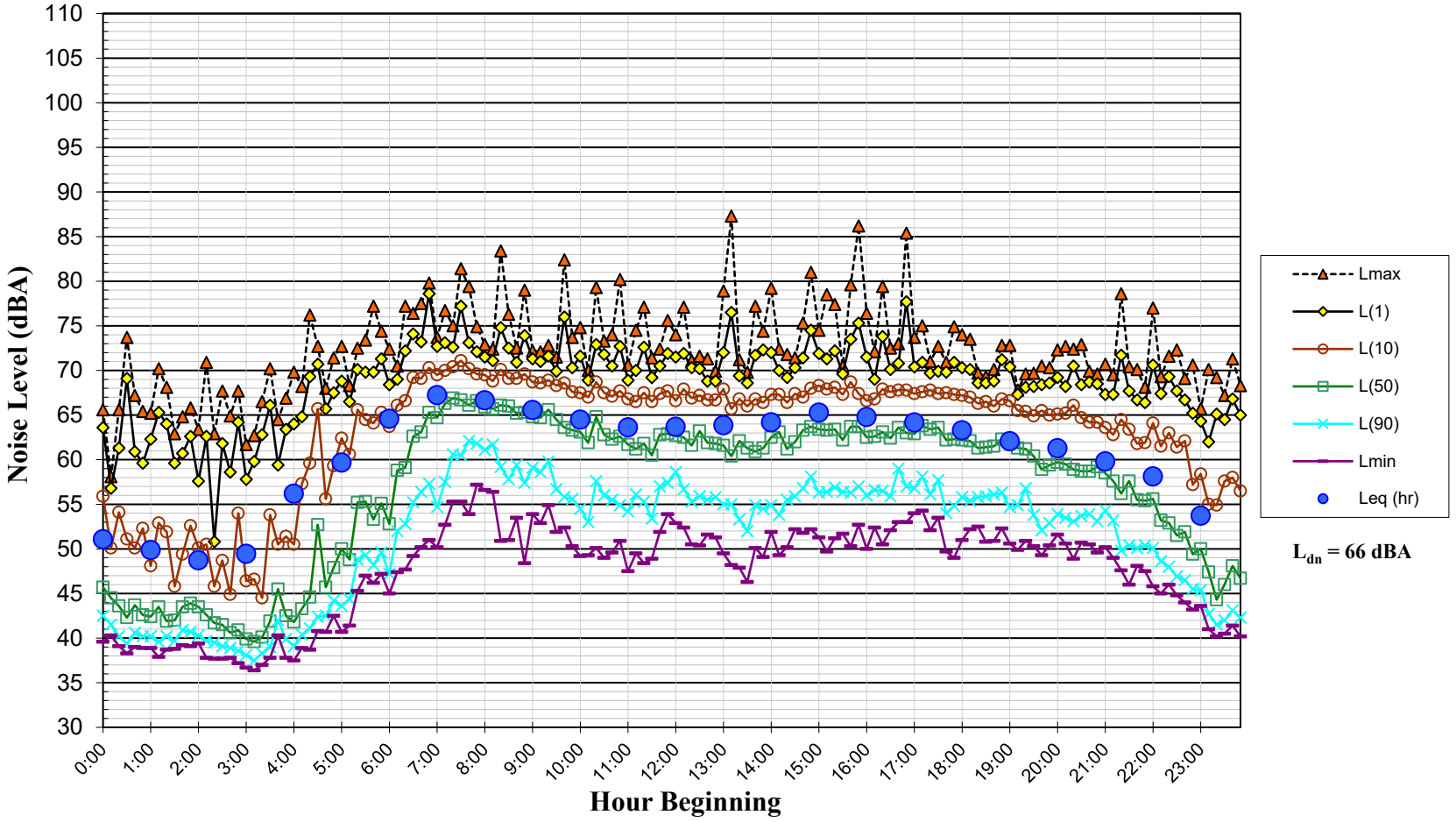
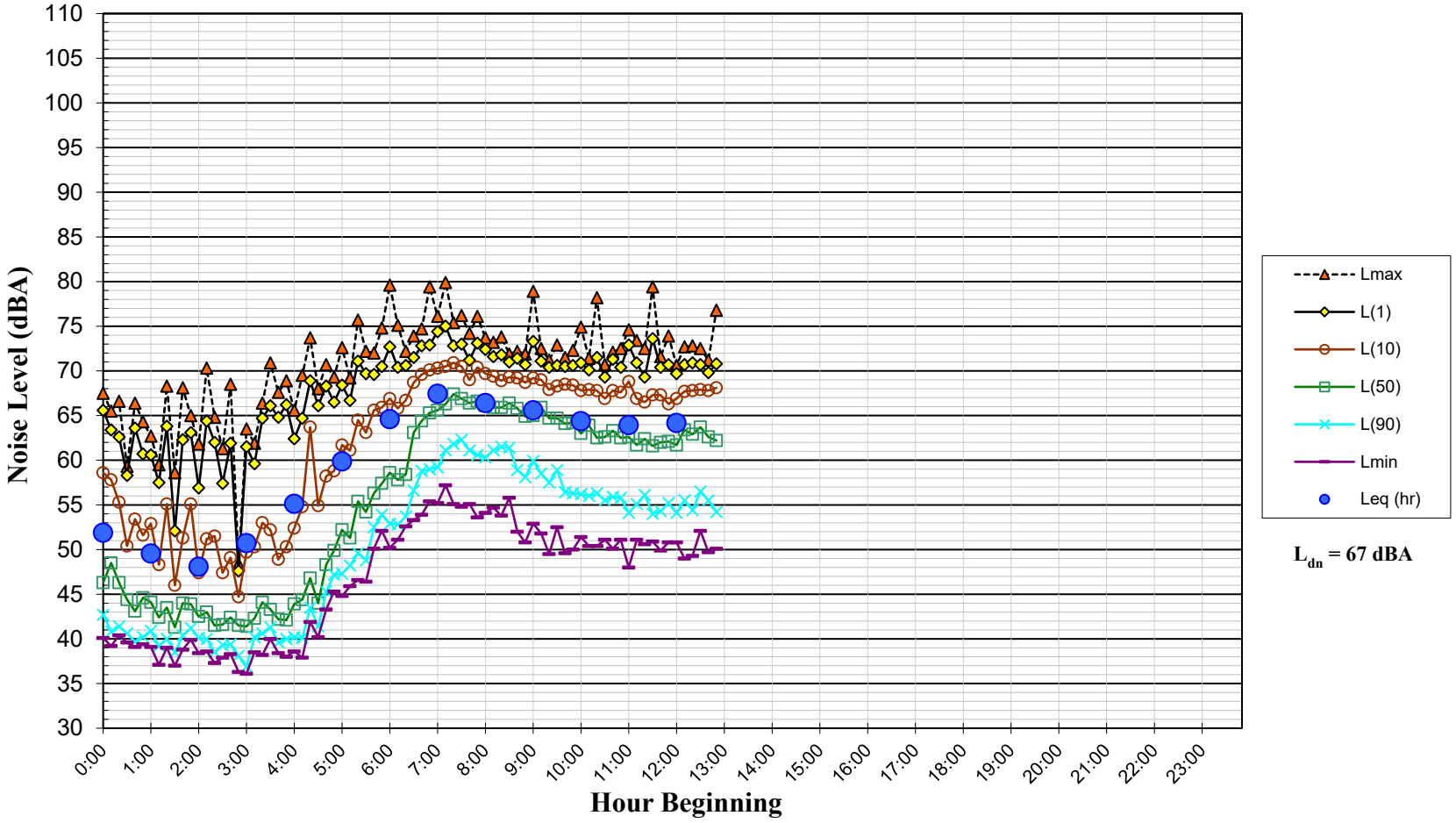


FIGURE 25: Noise Levels at Noise Measurement Site LT-4
~95' East of the Centerline of Quito Road
Tuesday, March 3, 2020



L_{dn} = 67 dBA

FIGURE 26: Noise Levels at Noise Measurement Site LT-5
~530' East of the Centerline of Quito Road
Thursday, February 27, 2020

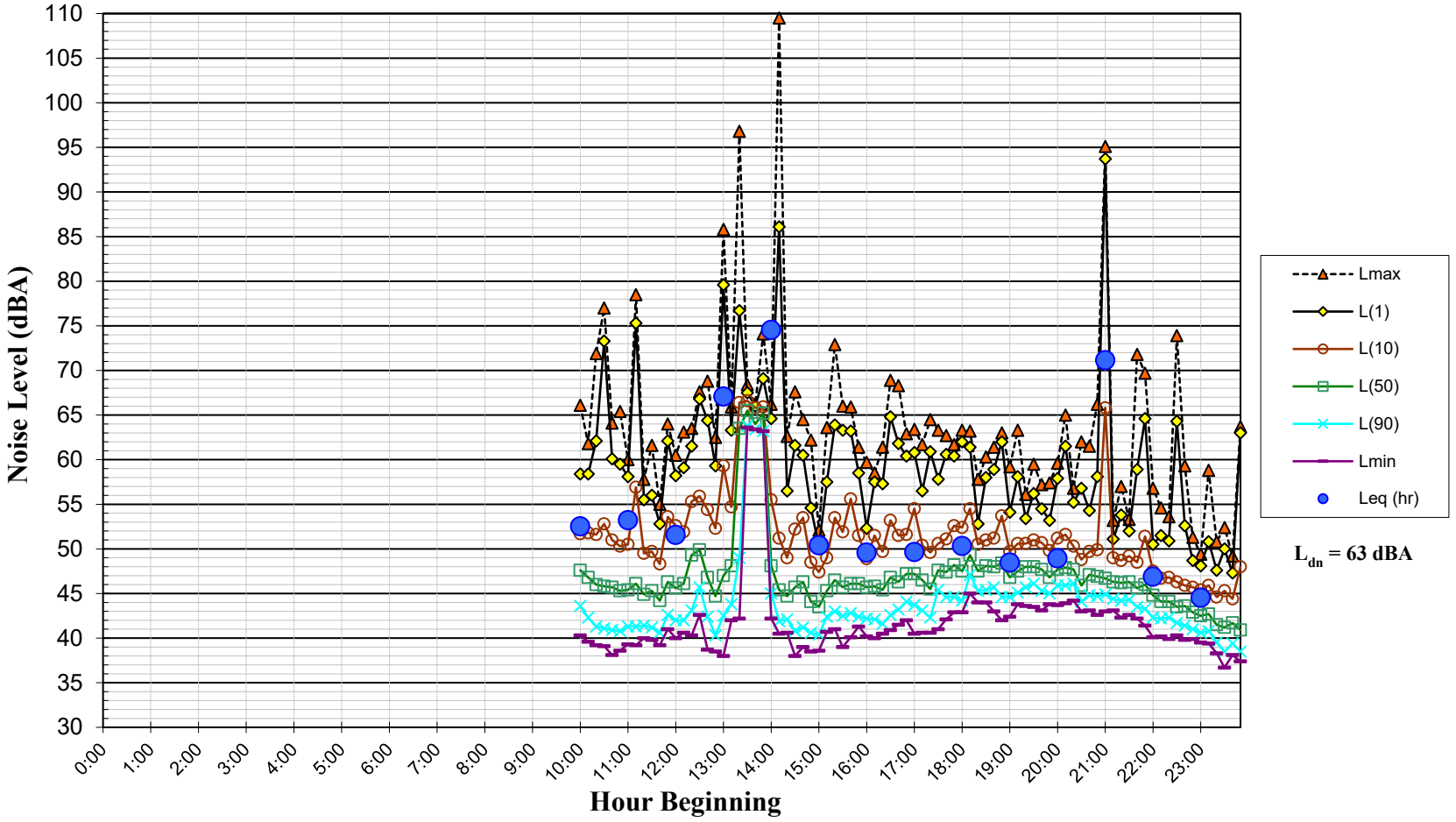


FIGURE 27: Noise Levels at Noise Measurement Site LT-5
~530' East of the Centerline of Quito Road
Friday, February 28, 2020

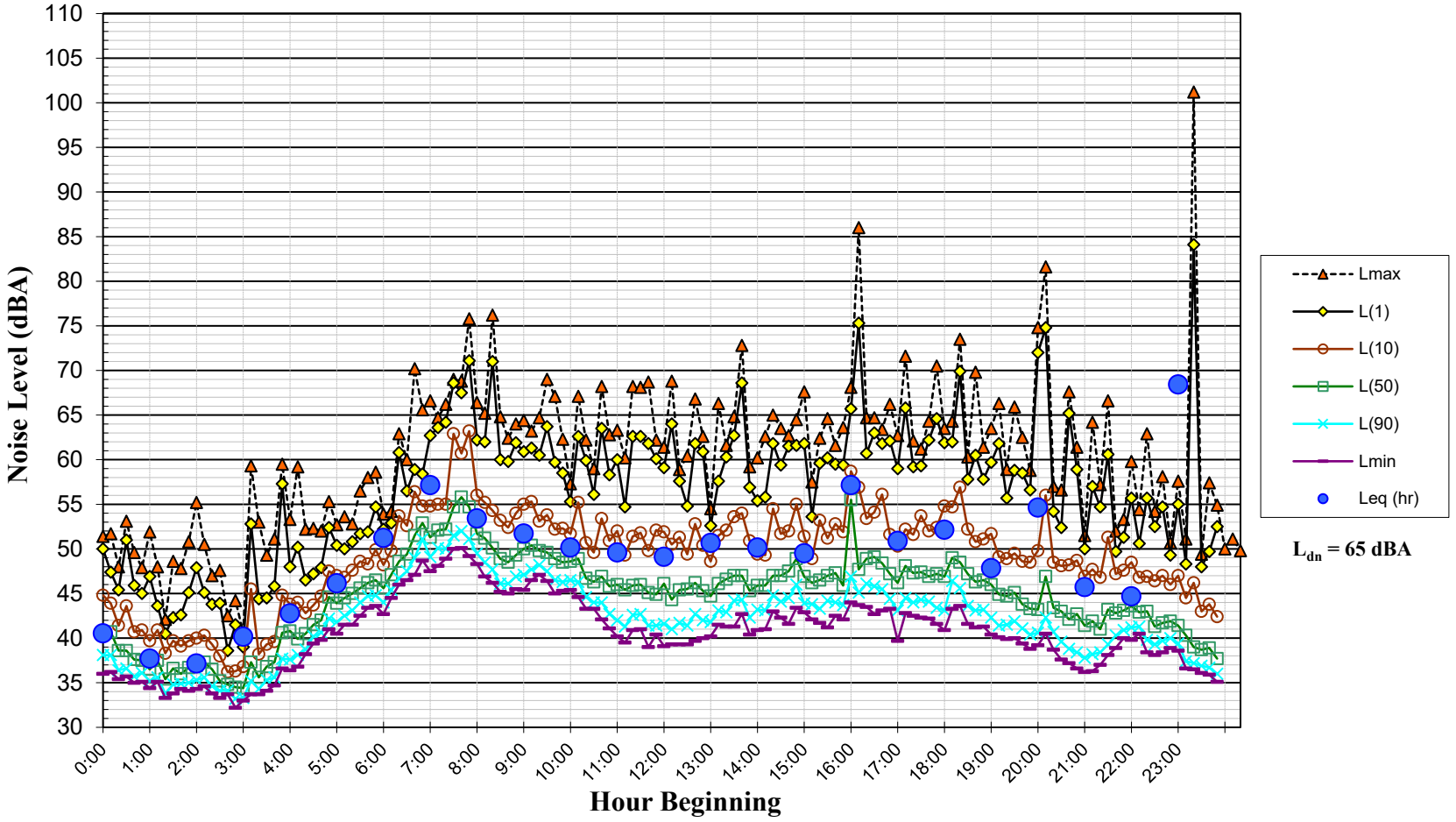


FIGURE 28: Noise Levels at Noise Measurement Site LT-5
~530' East of the Centerline of Quito Road
Saturday, February 29, 2020

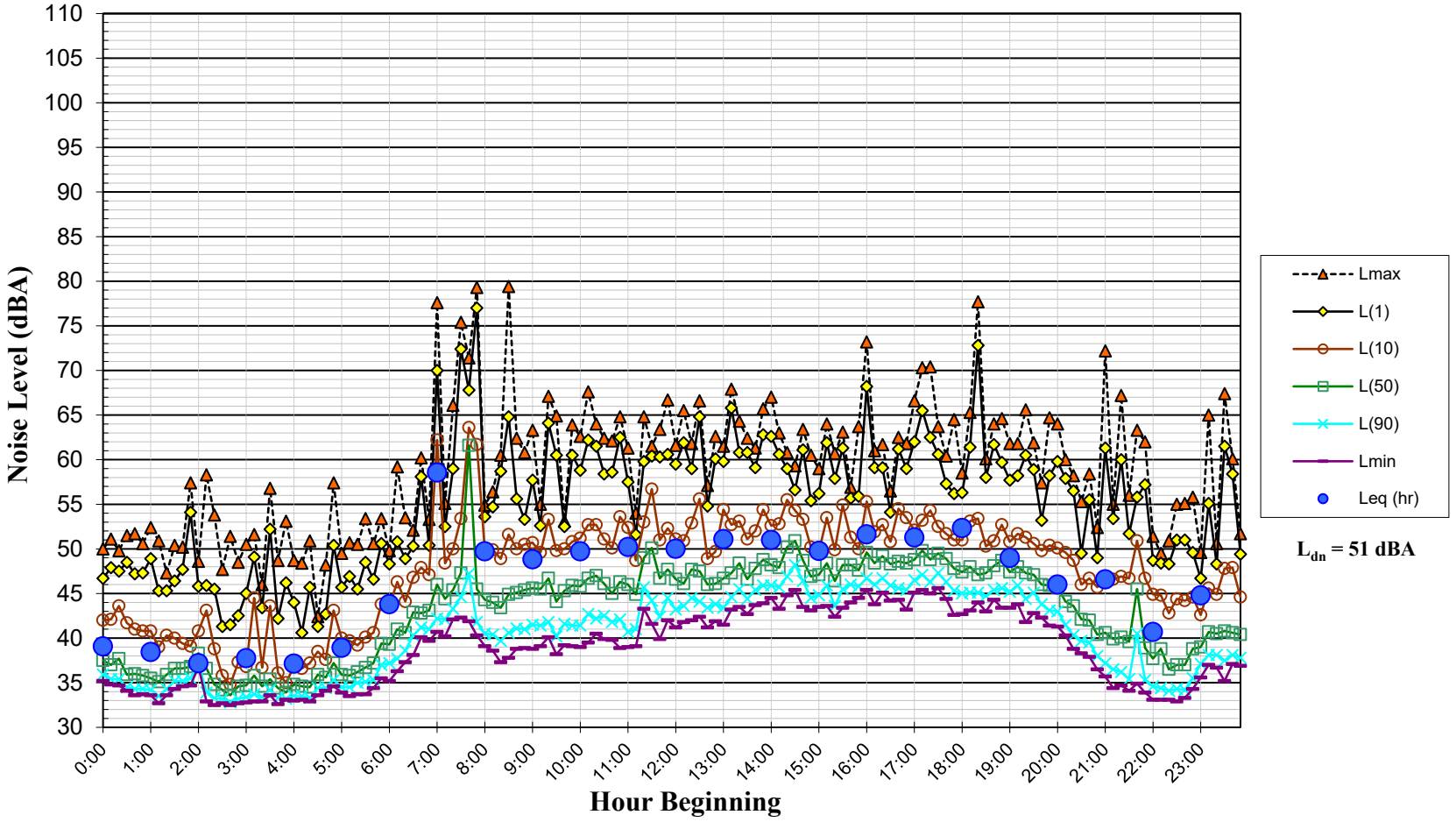


FIGURE 29: Levels at Noise Measurement Site LT-5
~530' East of the Centerline of Quito Road
Sunday, March 1, 2020

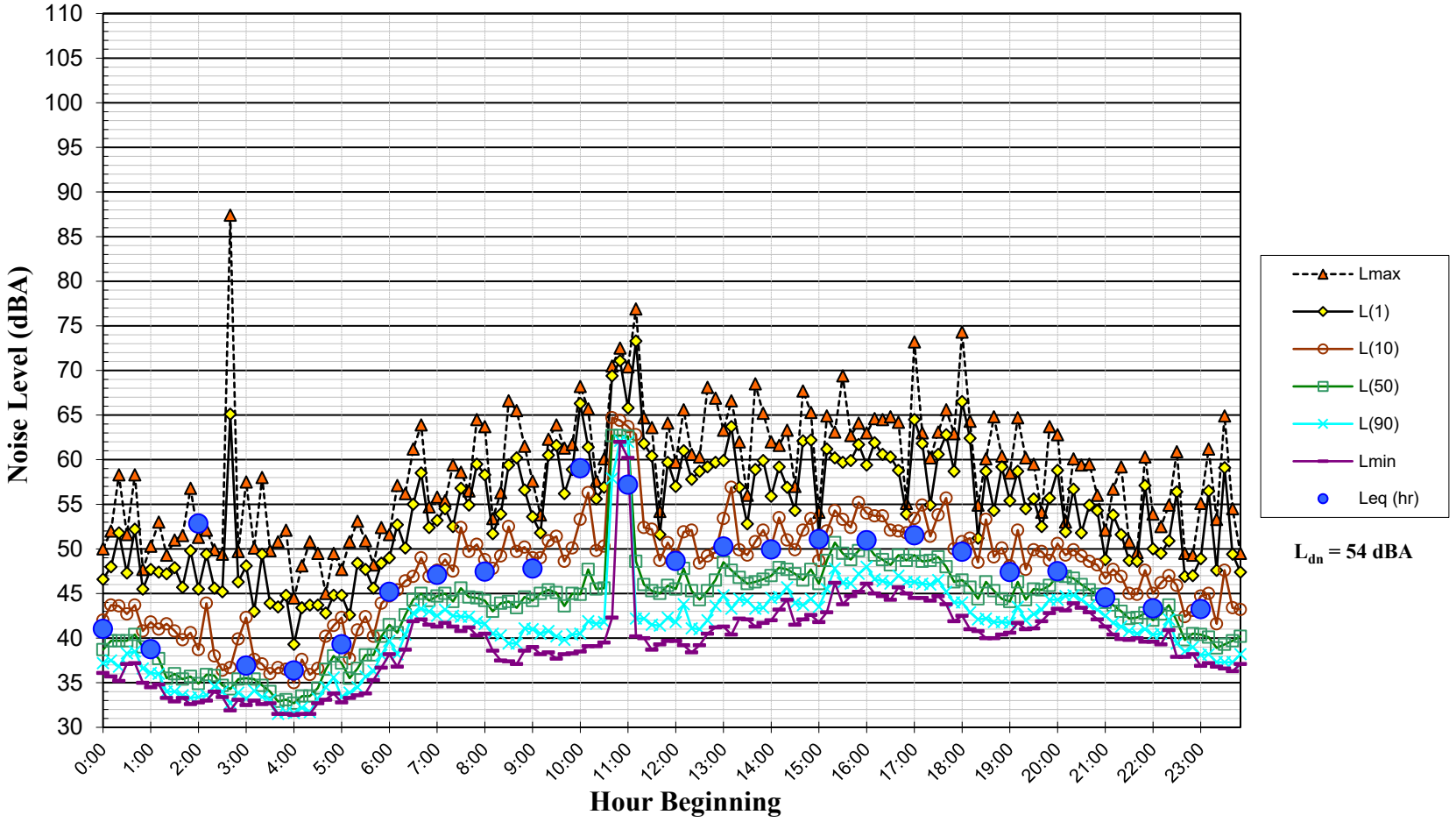


FIGURE 30: Noise Levels at Noise Measurement Site LT-5
~530' East of the Centerline of Quito Road
Monday, March 2, 2020

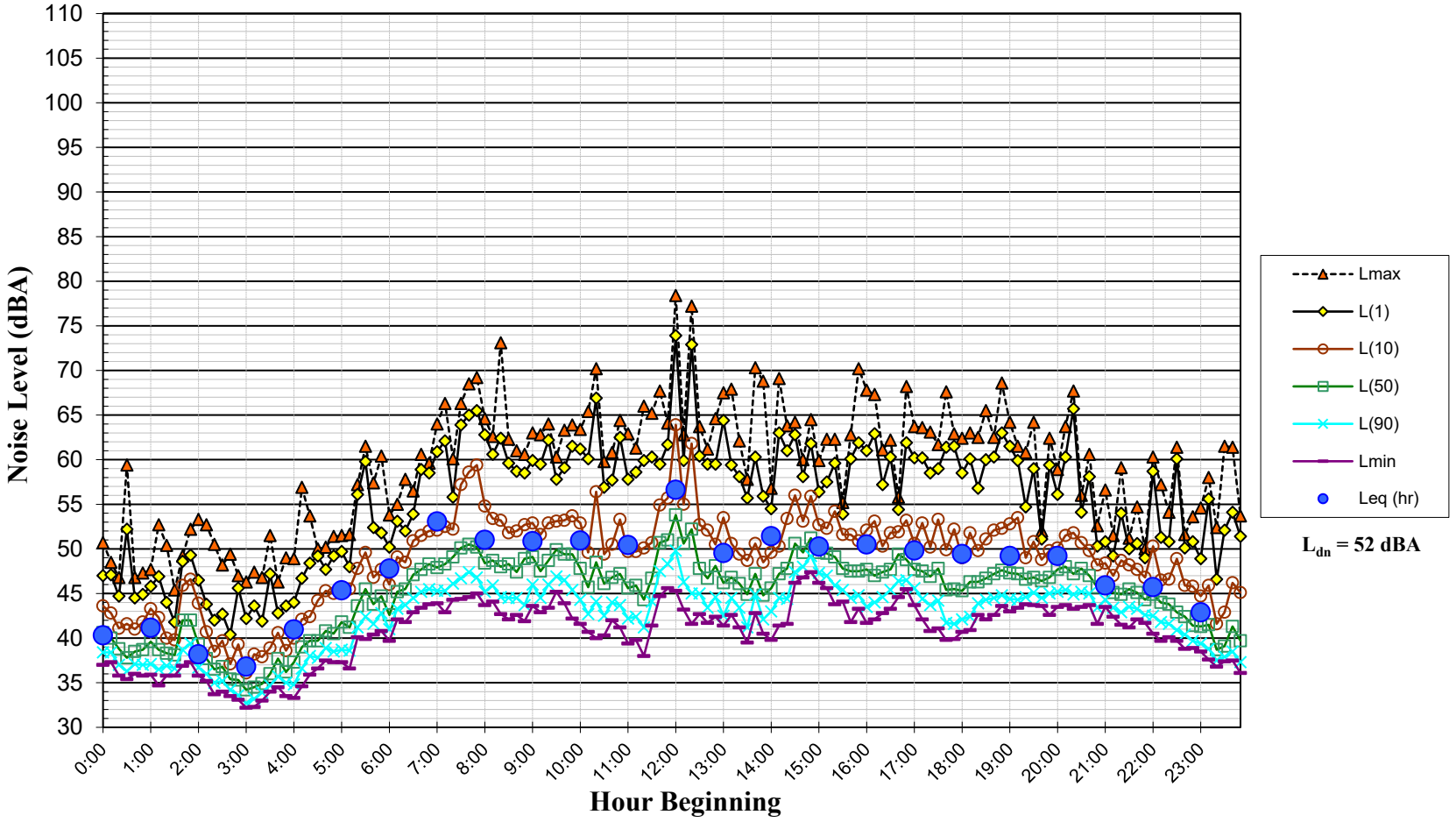
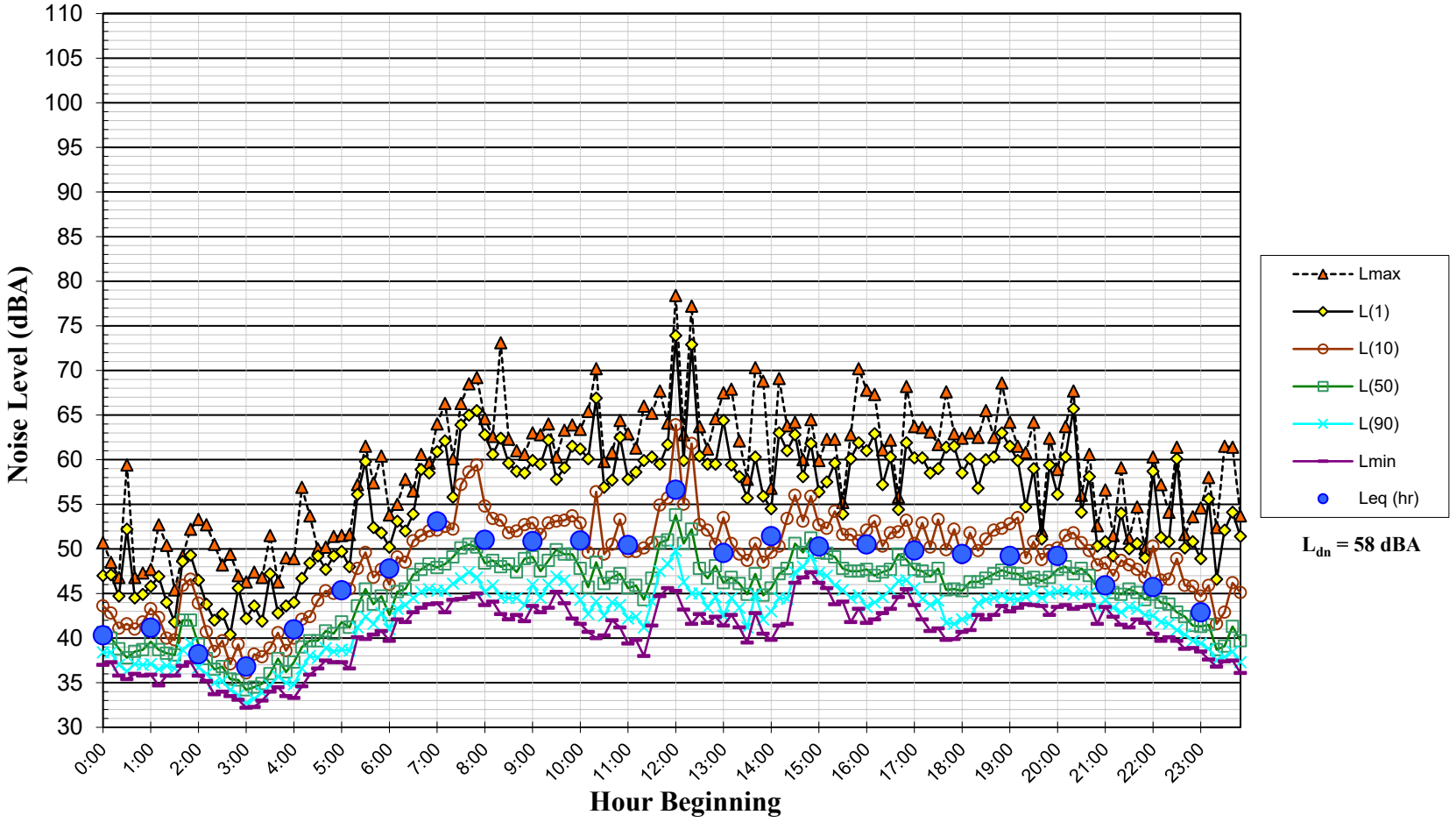


FIGURE 31: Noise Levels at Noise Measurement Site LT-5
~530' East of the Centerline of Quito Road
Monday, March 2, 2020



EDUCATION MIXED-USE OPTION 1:

GENERAL PLAN CONSISTENCY ANALYSIS

Noise and Land Use Compatibility

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

- For the proposed residential land use and educational facilities, the City's "normally acceptable" exterior noise level standard is 60 dBA DNL or less and the "conditionally acceptable" exterior noise level standard is 75 dBA DNL or less.
- For the proposed outdoor sports and recreation, the City's "normally acceptable" exterior noise level standard is 65 dBA DNL or less and the "conditionally acceptable" exterior noise standard is 80 dBA DNL or less.
- For the proposed commercial land use, the City's "normally acceptable" exterior noise level standard is 70 dBA DNL or less and the "conditionally acceptable" exterior noise level standard is 80 dBA DNL or less.
- The California Building Code requires that interior noise levels within proposed commercial uses meet the 50 dBA $L_{eq(1\text{-}hr)}$ performance standard during operational hours.
- The California Building Code requires that residential interior noise levels attributable to exterior environmental noise sources be limited to 45 dBA DNL/CNEL in any habitable room.

The future noise environment at the project site would continue to result primarily from vehicular traffic along Saratoga Avenue and Lawrence Expressway/Quito Road. While a traffic study was completed for the proposed project, it did not include future cumulative traffic volumes. As the site is located within a heavily built-out area, future traffic volumes are not anticipated to increase drastically over existing conditions. To estimate future traffic volumes, an annual average increase of 1% in overall traffic volumes was assumed. Traffic volumes were calculated for a future 2041 scenario based off a baseline of existing conditions plus project.

Future Exterior Noise Environment

The exterior noise threshold established in the City's General Plan for new residential uses is 60 dBA DNL at usable outdoor activity areas. According to site plans dated August 21, 2020 and the provided project description, the project site would include outdoor use areas intended for students and residents.

The 1.5-acre park/activity field is nearest to Quito Road and would be set back 300 feet from the centerline of the roadway and approximately 45 feet south from the edge of Building 3. The park/activity field will be partially shielded from Quito Road by Building 2. The park/activity field would have future exterior noise levels below 65 dBA DNL, which would meet the City's normally acceptable noise threshold for outdoor sports and recreation.

FIGURE 32 1.5-Acre Park/Activity Field

Buildings 1 and 2

Buildings 1 and 2 will include a 1st floor interior atrium, 4th floor decks, and 8th floor roof-top decks.

The atrium will be located on the 1st floor in-between Buildings 1 and 2, with the buildings starting on the 2nd floor. The atrium will be exposed to traffic noise from Quito Road. The future exterior noise levels at 1st floor atrium would be below the City's "normally acceptable" limit of 60 dBA DNL for exterior use areas.

Buildings 1 and 2 will share a 4th floor deck located in the middle of the combined buildings extending south along the western building face and on the southern building face. The 4th floor deck will be adjacent to Quito Road. The future exterior noise levels at 4th floor deck would range from below 60 dBA DNL at the center of the space to 67 dBA DNL at the edge of the deck along

the western façade of Building 2. The center of the outdoor space would be adequately shielded and future exterior noise levels at the 4th floor deck would be below 60 dBA DNL. The future noise levels at the centers of the outdoor use areas associated with the residential component of the proposed project would meet the City's normally acceptable threshold of 60 dBA DNL.

The roof deck on the 8th floor of Building 1 would face Quito Road/Lawrence Expressway and Saratoga Avenue. The future exterior noise levels at Building 1 8th floor roof top deck would range from 60 dBA DNL at the center of the space to 66 dBA DNL at the edge of the roof deck. These noise levels would exceed the City's "normally acceptable" limit of 60 dBA DNL but would below the City's "conditionally acceptable" limit of 70 dBA DNL for exterior use areas. Due to the elevation of this roof deck above roadways below, the center of the outdoor space would be adequately shielded and future exterior noise levels at the roof deck would be below 60 dBA DNL. The future noise levels at the centers of the outdoor use areas associated with the residential component of the proposed project would meet the City's normally acceptable threshold of 60 dBA DNL.

The roof deck on the 8th floor of Building 2 would face Quito Road. The future exterior noise levels at Building 2 8th floor roof top deck would range from 60 dBA DNL at the center of the space to 67 dBA DNL at the edge of the roof deck. These noise levels would exceed the City's "normally acceptable" limit of 60 dBA DNL, but would below the City's "conditionally acceptable" limit of 70 dBA DNL for exterior use areas. Due to the elevation of this roof deck above roadways below, the center of the outdoor space would be adequately shielded and future exterior noise levels at the roof deck would be below 60 dBA DNL. The future noise levels at the centers of the outdoor use areas associated with the residential component of the proposed project would meet the City's normally acceptable threshold of 60 dBA DNL.

FIGURE 33 1st Floor Atrium Buildings 1 and 2

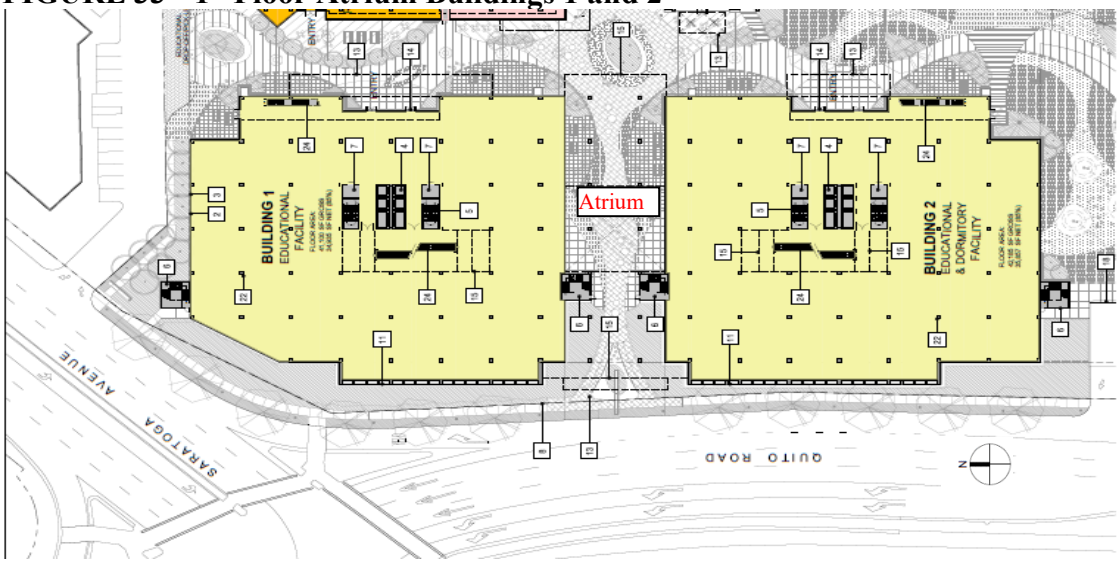


FIGURE 34 4th Floor Decks Buildings 1 and 2

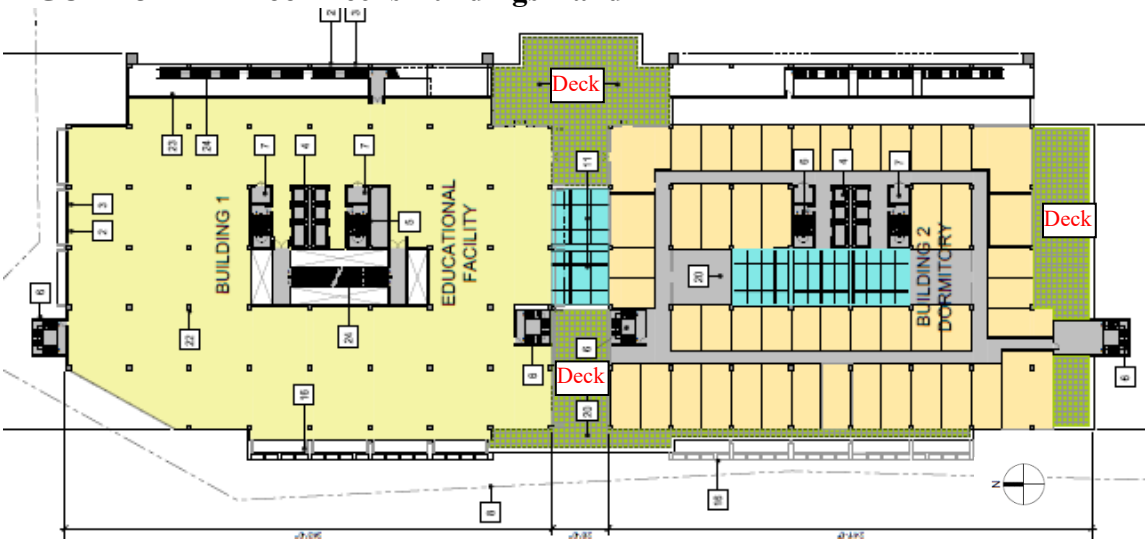
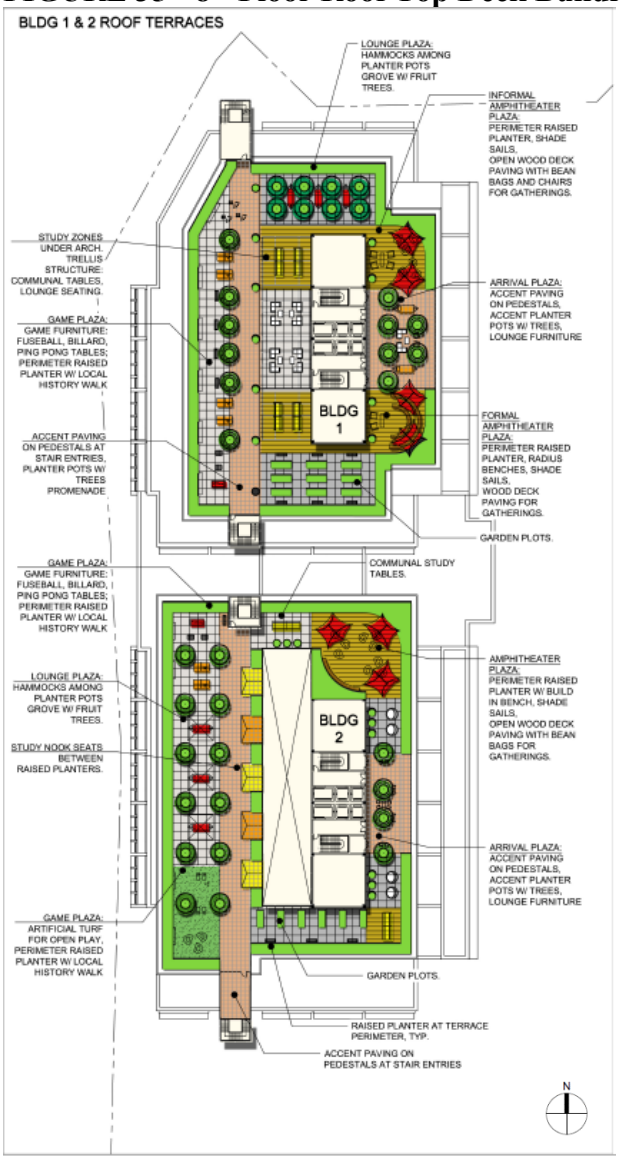


FIGURE 35 8th Floor Roof Top Deck Buildings 1 and 2



Building 3

Building 3 will include a 3rd floor deck, 1st floor patios, 3rd-6th floor private balconies, and a 7th floor roof top deck.

The 3rd floor deck would be on the eastern building face and shielded from roadway noise. The future exterior noise levels at the 3rd floor deck would be below the City's "normally acceptable" limit of 60 dBA DNL for exterior use areas.

Patios and balconies are excluded from the City's exterior use area standard. Common industry practice, with regard to the exterior noise assessment of multi-family land uses is to apply the exterior noise threshold to common outdoor use areas and not to small private outdoor use areas (e.g., balconies, patios, etc.). This common practice is due to the following considerations:

1. Frequency of use – small balconies and patios associated with multi-family residential land uses are not frequently used by residents for outdoor enjoyment, particularly when adjacent to transportation-related noise sources and when other outdoor amenity areas are provided as a part of a project. It is anticipated that residents of this project that desire a quiet outdoor use area would use the shared open space area for outdoor enjoyment.

2. Feasibility of mitigation – it is not possible to mitigate high noise exposures to meet the exterior noise thresholds without completely enclosing the space. The necessary mitigation to meet the exterior noise threshold eliminates the outdoor space altogether.

The roof deck on the 7th floor would be shielded from roadway noise by project Buildings 1, 2, and 4. The future exterior noise levels the 7th floor roof top deck would be below the City's "normally acceptable" limit of 60 dBA DNL for exterior use areas.

FIGURE 36 3rd Floor Deck

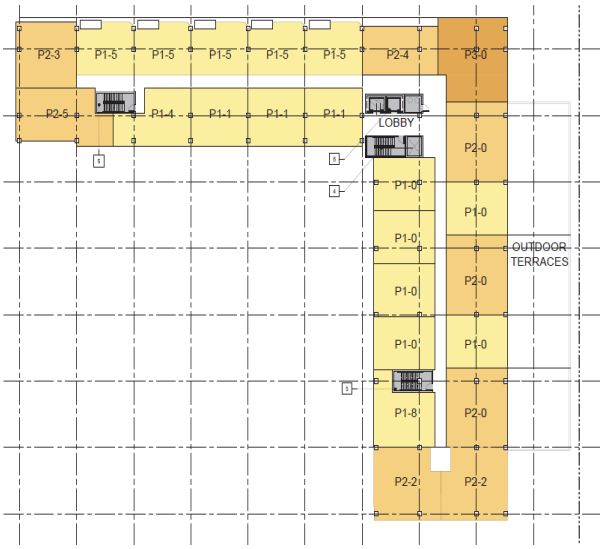
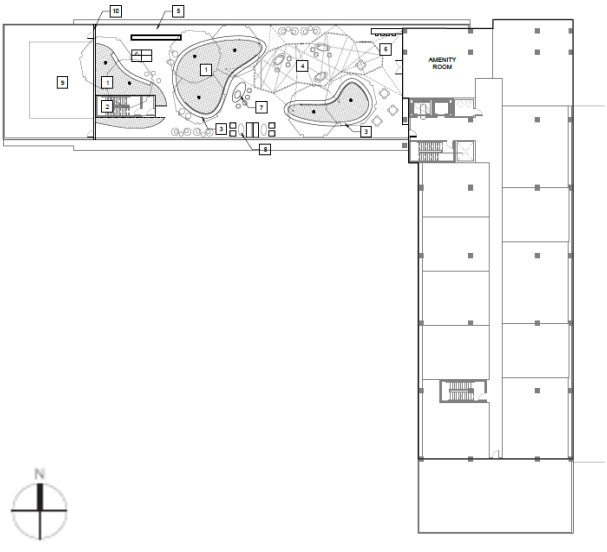


FIGURE 37 7th Floor Roof Top Deck



Building 4

Building 4 will include a 2nd floor courtyard, 7th floor roof-top decks, and 2nd -9th floor private balconies.

The courtyard will be located on the 2nd floor interior of the building. The courtyard will be surrounded by the proposed building on three sides and would be shielded from nearby traffic noise. The future exterior noise levels at the 2nd floor courtyard would be below 60 dBA DNL and the City's "normally acceptable" limit for exterior use areas.

There will be two 7th floor roof top decks on the southern end of the building. The decks would be partially shielded from roadway noise by Project Buildings 1 and 2. The future exterior noise levels at the 7th floor roof top decks would be below 60 dBA DNL and the City's "normally acceptable" limit for exterior use areas.

FIGURE 38 2nd Floor Courtyard

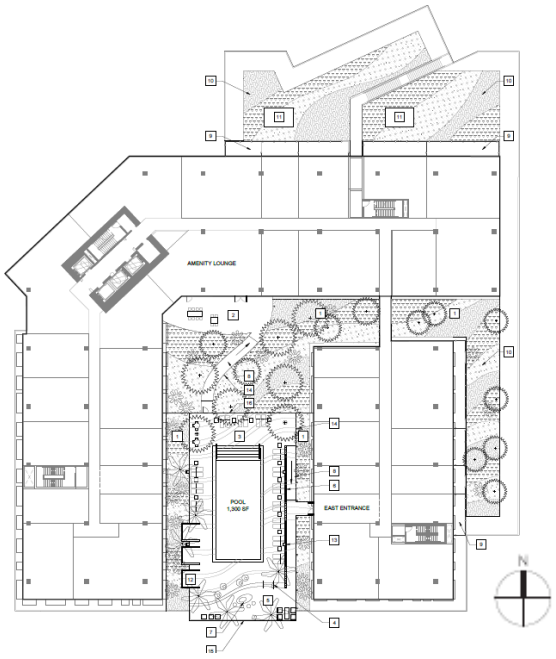
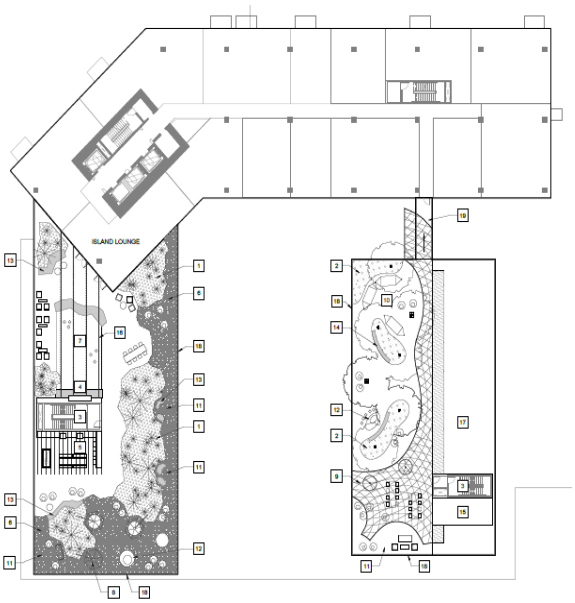


FIGURE 39 7th Floor Roof Top Deck



Balconies are excluded from the City's exterior use area standard. Common industry practice, with regard to the exterior noise assessment of multi-family land uses is to apply the exterior noise threshold to common outdoor use areas and not to small private outdoor use areas (e.g., balconies, patios, etc.). This common practice is due to the following considerations:

1. Frequency of use – small balconies and patios associated with multi-family residential land uses are not frequently used by residents for outdoor enjoyment, particularly when adjacent to transportation-related noise sources and when other outdoor amenity areas are provided as a part of a project. It is anticipated that residents of this project that desire a quiet outdoor use area would use the shared open space area for outdoor enjoyment.

2. Feasibility of mitigation – it is not possible to mitigate high noise exposures to meet the exterior noise thresholds without completely enclosing the space. The necessary mitigation to meet the exterior noise threshold eliminates the outdoor space altogether.

Building 5

Building 5 will include a 3rd floor courtyard/pool, 2nd -10th floor private balconies, and 9th floor roof top deck.

The courtyard will be located on the 3rd floor interior of the building. The courtyard will be shielded by the proposed building on two sides. The courtyard will be partially exposed to noise from Saratoga Avenue and Quito Road, but future exterior noise levels would be below 60 dBA DNL and the City's "normally acceptable" limit for exterior use areas.

Balconies are excluded from the City's exterior use area standard. Common industry practice, with regard to the exterior noise assessment of multi-family land uses is to apply the exterior noise threshold to common outdoor use areas and not to small private outdoor use areas (e.g., balconies, patios, etc.). This common practice is due to the following considerations:

1. Frequency of use – small balconies and patios associated with multi-family residential land uses are not frequently used by residents for outdoor enjoyment, particularly when adjacent to transportation-related noise sources and when other outdoor amenity areas are provided as a part of a project. It is anticipated that residents of this project that desire a quiet outdoor use area would use the shared open space area for outdoor enjoyment.

2. Feasibility of mitigation – it is not possible to mitigate high noise exposures to meet the exterior noise thresholds without completely enclosing the space. The necessary mitigation to meet the exterior noise threshold eliminates the outdoor space altogether.

The roof deck on the 9th floor of Building 5 would face Quito Road and would be exposed to future noise levels that would range from 60 dBA DNL at the center of the space to 67 dBA DNL at the edge of the roof deck. These noise levels would exceed the City's "normally acceptable" limit of 60 dBA CNEL, but would below the City's "conditionally acceptable" limit of 70 dBA DNL for exterior use areas. Due to the elevation of this roof deck above roadways below, the center of the outdoor space would be adequately shielded and future exterior noise levels at the roof terrace would be below 60 dBA DNL. The future noise levels at the centers of the outdoor use areas associated with the residential component of the proposed project would meet the City's normally acceptable threshold of 60 dBA DNL.

FIGURE 40 3rd Floor Courtyard

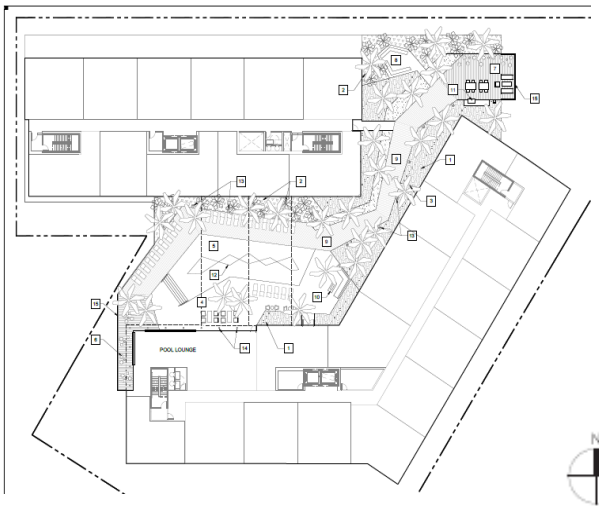
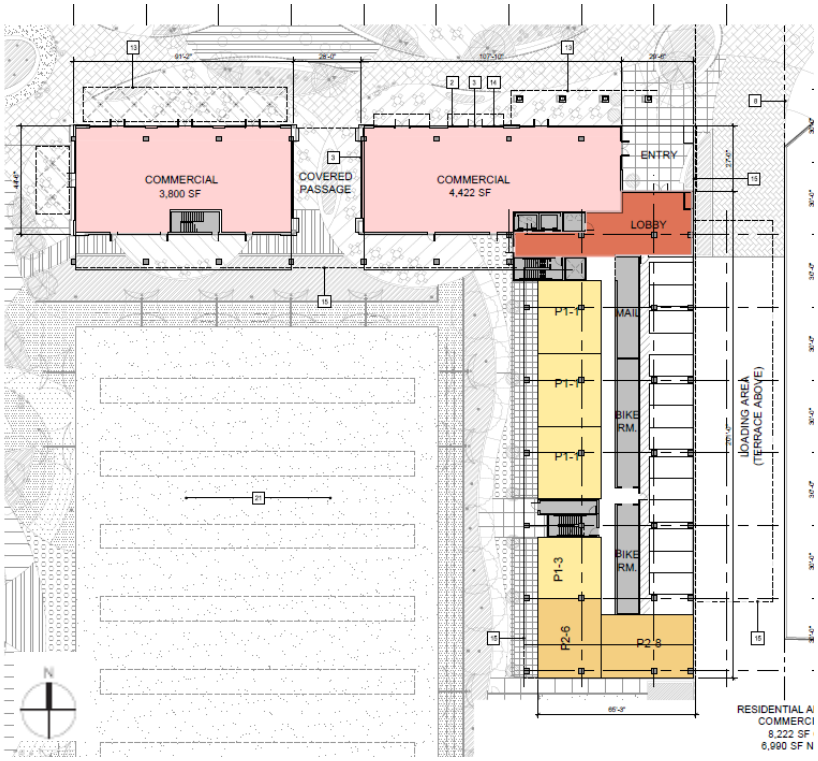


FIGURE 41 9th Floor Roof Top Deck

Commercial Uses

The site plan shows outdoor dining and seating areas at Building 3 along the northern, western, and southern building façades. These outdoor areas will be shielded from roadway noise by Project Buildings 1, 2 and 4. The outdoor dining and seating areas would be exposed to future exterior noise levels less than 55 dBA DNL and well below the City's "normally acceptable" limit of 70 dBA DNL for exterior use areas.

FIGURE 41 1st Floor Commercial Outdoor Use Area



Future Interior Noise Environment

The California Building Code requires that interior noise levels attributable to exterior environmental noise sources not exceed 45 dBA DNL in any habitable room. The Cal Green Code requires that interior noise levels attributable to exterior sources not exceed 50 dBA L_{eq} (1-hr) in occupied areas of non-residential uses during any hour of occupation.

Future 2041 building façade noise exposures were calculated using the SoundPLAN model.

Buildings 1 and 2

Table 6 below lists noise levels at Building 1 and 2 façades at different elevations. As indicated in Table 6, the exterior noise exposure would range from 49 to 65 dBA DNL. Based on the results of long-term measurements LT-3 and LT-4, loudest hour noise levels are approximately 3 dBA above the corresponding DNL levels. Applying this relationship to the modeled results, it is anticipated that the loudest hour exterior noise exposure of building facades would range from 52 to 68 dBA L_{eq}.

TABLE 6 Future Noise Exposure at Building 1 and 2 Façades

Floor	Future Noise Exposure at Facades (dBA DNL)			
	North	East	South	West
1	60	49	52	64
2	61	55	54	65
3	62	60	54	65
4	62	62	54	65
5	63	62	53	65
6	63	62	52	64
7	63	62	52	64

Interior noise levels would vary depending upon the design of the buildings (relative window area to wall area) and the selected construction materials and methods. Standard residential construction provides approximately 15 dBA of exterior-to-interior noise reduction, assuming the windows are partially open for ventilation. Standard construction with the windows closed provides approximately 20 to 25 dBA of noise reduction in interior spaces. Where exterior noise levels range from 49 to 65 dBA DNL, the inclusion of adequate forced-air mechanical ventilation can reduce interior noise levels to acceptable levels by allowing occupants the option of closing the windows to control noise.

Education dormitories will be located on Building 2 floors four through seven. As seen in Table 6, noise levels are anticipated to reach 65 dBA DNL. Assuming modern construction, as indicated in project plans, and windows in the closed position providing a minimum noise reduction of 25 dBA, interior noise levels would reach 40 dBA DNL. With the inclusion of forced-air mechanical ventilation to allow occupants the option of keeping windows closed, interior noise levels are anticipated to meet the interior noise threshold of 45 dBA DNL.

Education Facilities will be located on Building 1 floors one through seven and Building 2 floors one through three. As seen in Table 6, noise levels are anticipated to range from 49 to 65 dBA DNL. Based on the results of long-term measurements LT-3 and LT-4, loudest hour noise levels are approximately 3 dBA above the corresponding DNL levels. Thus, noise levels are anticipated to be between 51 and 67 dBA L_{eq}. Assuming modern construction and windows in the closed position providing a minimum noise reduction of 25 dBA, interior noise levels would reach 43 dBA L_{eq}. With the inclusion of forced-air mechanical ventilation to allow occupants the option of keeping windows closed, interior noise levels are anticipated to be below the Cal Green Code Standard of 50 dBA L_{eq} during the loudest hours.

Building 3

Table 7 below lists noise levels at building façades at different elevations. As indicated in Table 7, the exterior noise exposure would range from 45 to 54 dBA DNL. Based on the results of long-term measurement LT-5, loudest hour noise levels are approximately 4 dBA higher the corresponding DNL levels. Applying this relationship to the modeled results, it is anticipated that the loudest hour exterior noise exposure of building facades would range from 49 to 58 dBA L_{eq}.

TABLE 7 Future Noise Exposure at Building 3 Façades

Floor	Future Noise Exposure at Facades (dBA DNL)			
	North	East	South	West
1	47	48	42	47
2	48	49	46	49
3	50	50	46	48
4	52	50	46	52
5	54	50	47	54
6	55	50	47	54
7	55	50	47	55

Education dormitories will be located on floors three through seven. As seen in Table 7, noise levels are anticipated to reach 55 dBA DNL. Assuming modern construction, as indicated in project plans, and windows partially open providing a minimum noise reduction of 15 dBA, interior noise levels would reach 40 dBA DNL. Interior noise levels are anticipated to meet the interior noise threshold of 45 dBA DNL.

Commercial uses would be located along the first floor of the northern façade. As seen in Table 7, noise levels are anticipated to reach 47 dBA DNL along the first floor of the northern façade. Based on the results of long-term measurements LT-5, loudest hour noise levels are approximately 5 dBA above the corresponding DNL levels. Thus, noise levels are anticipated to reach 52 dBA L_{eq} along the first floor of the northern façade. Assuming modern construction and windows partially opened providing a minimum noise reduction of 15 dBA, interior noise levels would reach 39 dBA L_{eq}. Interior noise levels are anticipated to be below the Cal Green Code Standard of 50 dBA L_{eq} during the loudest hours.

Building 4

Table 8 below lists noise levels at building façades at different elevations. As indicated in Table 8, the exterior noise exposure would range from 49 to 60 dBA DNL. Based on the results of long-term measurement LT-4, loudest hour noise levels are approximately 2 dBA above the corresponding DNL levels. Applying this relationship to the modeled results, it is anticipated that the loudest hour exterior noise exposure of building facades would range from 51 to 62 dBA L_{eq}.

TABLE 8 Future Noise Exposure at Building 4 Façades

Floor	Future Noise Exposure at Facades (dBA DNL)			
	North	East	South	West
1	55	51	47	54
2	57	52	50	56
3	57	53	50	57
4	58	53	51	58
5	59	53	52	58
6	59	53	53	59
7	-	53	52	59
8	-	53	52	59
9	-	53	52	59

Education dormitories will be located on floors two through nine. As seen in Table 8, noise levels are anticipated to range from 50 to 59 dBA DNL. Assuming modern construction, as indicated in project plans, and windows partially open providing a minimum noise reduction of 15 dBA, interior noise levels would range from 35 to 44 dBA DNL. Interior noise levels are anticipated to meet the interior noise threshold of 45 dBA DNL.

Commercial uses would be located on the entire first floor. As seen in Table 8, noise levels are anticipated to range from 47 to 54 dBA DNL along the first floor of the northern façade. Based on the results of long-term measurements LT-4, loudest hour noise levels are approximately 2 dBA above the corresponding DNL levels. Thus, noise levels are anticipated to range from 49 to 56 dBA L_{eq} along the first floor. Assuming modern construction and windows partially opened providing a minimum noise reduction of 15 dBA, interior noise levels would range from 34 to 41 dBA L_{eq}. Interior noise levels are anticipated to be below the Cal Green Code Standard of 50 dBA L_{eq} during the loudest hours.

Building 5

Table 9 below lists noise levels at building façades at different elevations. As indicated in Table 9, the exterior noise exposure would range from 54 to 66 dBA DNL. Based on the results of long-term measurements LT-1 and LT-3, loudest hour noise levels are approximately 2 dBA above the corresponding DNL levels. Applying this relationship to the modeled results, it is anticipated that the loudest hour exterior noise exposure of building facades would range from 56 to 68 dBA L_{eq}.

TABLE 9 Future Noise Exposure at Building 5 Façades

Floor	Future Noise Exposure at Facades (dBA DNL)				Future Noise Exposure at Facades (dBA DNL)			
	Building 5.1				Building 5.2			
	North	East	South	West	North	East	South	West
1	60	65	64	57	54	55	56	53
2	61	65	64	58	55	55	57	54
3	61	65	64	58	55	56	57	54
4	60	65	63	58	55	56	57	54
5	60	64	63	57	55	56	57	54
6	60	64	63	57	55	56	57	54
7	60	64	63	57	55	56	57	54
8	60	64	62	57	55	56	57	54
9	60	64	62	57	55	55	57	54

Education dormitories will be located on floors three through ten. As seen in Table 9, noise levels are anticipated to reach 65 dBA DNL. Assuming modern construction, as indicated in project plans, and windows in the closed position providing a minimum noise reduction of 25 dBA, interior noise levels would reach 40 dBA DNL. With the inclusion of forced-air mechanical ventilation to allow occupants the option of keeping windows closed, and windows and doors with a minimum rating of 28 STC, the interior noise threshold of 45 dBA DNL would be met.

Commercial uses would be located along the first floor of the eastern façade with direct exposure to exterior traffic noise. As seen in Table 9, noise levels are anticipated to reach 65 dBA DNL along the first floor of the eastern façade. Based on the results of long-term measurements LT-1 and LT-3, loudest hour noise levels are approximately 2 dBA above the corresponding DNL levels. Thus, noise levels are anticipated to reach 67 dBA L_{eq} along the first floor of the eastern façade. Assuming modern construction and windows in the closed position providing a minimum noise reduction of 25 dBA, interior noise levels would reach 42 dBA L_{eq}. With the inclusion of forced-air mechanical ventilation to allow occupants the option of keeping windows closed, interior noise levels are anticipated to be below the Cal Green Code Standard of 50 dBA L_{eq} during the loudest hours.

Conditions of Approval

A qualified acoustical specialist shall prepare a detailed analysis of interior residential and commercial noise levels resulting from all exterior sources during the design phase pursuant to requirements set forth in the State Cal Building Code and the State Cal Green Code, respectively. The study will review the final site plan, building elevations, and floor plans prior to construction and recommend building treatments, where applicable, to reduce commercial interior noise levels to 45 dBA DNL or 50 dBA L_{eq} or lower. Treatments would include, but are not limited to, sound-rated windows and doors, sound-rated wall and window constructions, acoustical caulking, protected ventilation openings, etc. Results of the analysis, including the description of the necessary noise control treatments, shall be submitted to the City, along with the building plans and approved design, prior to issuance of a building permit.

NOISE IMPACTS AND MITIGATION MEASURES

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 and vibration resulting from the project:

- **Temporary or Permanent Noise Increases in Excess of Established Standards.** A significant noise impact would be identified if the project would generate a substantial temporary or permanent noise level increase in ambient noise levels at existing noise-sensitive receptors in excess of the applicable noise standards presented in the General Plan as follows:

    - Temporary Noise Increase. A significant noise impact would be identified if construction-related noise would temporarily increase ambient noise levels at sensitive receptors. The City of San José considers large or complex projects involving substantial noise-generating activities and lasting more than 12 months significant when within 500 feet of residential land uses or within 200 feet of commercial land uses or offices.

    - Permanent Noise Increase. A significant permanent noise level increase would occur if the project would result in: a) a noise level increase of 5 dBA DNL or greater, with a future noise level of less than 60 dBA DNL, or b) a noise level increase of 3 dBA DNL or greater, with a future noise level of 60 dBA DNL or greater.

    - Operational Noise in Excess of Standards. A significant noise impact would be identified if the project would expose persons to or generate noise levels that would exceed applicable noise standards presented in the General Plan.

- **Generation of Excessive Groundborne Vibration.** A significant impact would be identified if the construction of the project would generate excessive vibration levels surrounding receptors. Groundborne vibration levels exceeding 0.08 in/sec PPV would have the potential to result in cosmetic damage to historic buildings, and groundborne vibration levels exceeding 0.2 in/sec PPV would have the potential to result in cosmetic damage to normal buildings.

- **Excessive Aircraft Noise Levels.** A significant noise impact would be identified if the project would expose people residing or working in the project area to excessive aircraft noise levels.

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

Chapter 20.100.450 of the City of San José's Municipal Code establishes allowable hours of construction within 500 feet of a residential unit between 7:00 am and 7:00 pm Monday through Friday unless permission is granted with a development permit or other planning approval. No construction activities are permitted on the weekends at sites within 500 feet of a residence. Policy EC-1.7 of the City of San José's General Plan requires that all construction operations within the City use best available noise suppression devices and techniques and to limit construction hours near residential uses per the Municipal Code allowable hours. Further, the City of San José considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would involve substantial noise-generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

Temporary noise increases resulting from construction vary depending upon the noise levels generated by various pieces of construction equipment, the timing and duration of noise-generating activities, the distance between construction noise sources and noise-sensitive areas, and the presence of intervening shielding features such as buildings or terrain.

Construction activities for individual projects are typically carried out in stages. During each stage of construction, there would be a different mix of equipment operating, and noise levels would vary by stage and vary within stages, based on the amount of equipment in operation and the location at which the equipment is operating. Typical construction noise levels at a distance of 50 feet are shown in Tables 10 and 11. Table 10 shows the average and maximum noise levels for different construction equipment and Table 11 shows the average noise level ranges by construction phase. Most demolition and construction noise falls with the range of 80 to 90 dBA at a distance of 50 feet from the source.

TABLE 10 Construction Equipment 50-foot Noise Emission Levels (dBA)

Equipment Category	$L_{eq}^{1,2,3}$	$L_{max}^{1,2}$	Equipment Category	$L_{eq}^{1,2,3}$	$L_{max}^{1,2}$
Air Hose	93	100	Horizontal Bore Drill	87	88
Air-Operated Post Driver	83	85	Impact Pile Driver	99	105
Asphalt Distributor Truck (Asphalt Sprayer)	-	70	Impact Wrench	68	72
Auger Drill	88	101	Jackhammer	91	95
Backhoe	76	84	Jig Saw	92	95
Bar Bender	66	75	Joint Sealer	-	74
Blasting (Abrasive)	100	103	Man Lift	72	73
Blasting (Explosive)	83	93	Movement Alarm	79	80
Chainsaw	79	83	Mud Recycler	73	74
Chip Spreader	-	77	Nail Gun	70	74
Chipping Gun	95	100	Pavement Scarifier (Milling Machine)	-	84
Circular Saw	73	76	Paving – Asphalt (Paver, Dump Truck)	-	82
Compactor (Plate)	-	75	Paving – Asphalt (Paver, MTV, Dump Truck)	-	83
Compactor (Roller)	82	83	Paving – Concrete (Placer, Slipform Paver)	87	91
Compressor	66	67	Paving – Concrete (Texturing/Curing Machine)	73	74
Concrete Batch Plant	87	90	Paving – Concrete (Triple Roller Tube Paver)	85	88
Concrete Grinder	-	97	Power Unit (Power Pack)	81	82
Concrete Mixer Truck	81	82	Pump	73	74
Concrete Pump Truck	84	88	Reciprocating Saw	64	66
Concrete Saw	85	88	Rivet Buster	100	107
Crane	74	76	Rock Drill	92	95
Directional Drill Rig	68	80	Rumble Strip Grinding	-	87
Drum Mixer	66	71	Sander	65	68
Dump Truck (Cyclical)	82	92	Scraper	-	92
Dump Truck (Passby)	-	73	Shot Crete Pump/Spray	78	87
Excavator	76	87	Street Sweeper	-	81
Flatbed Truck	-	74	Telescopic Handler (Forklift)	-	88
Front End Loader (Cyclical)	72	81	Vacuum Excavator (Vac-Truck)	86	87
Front End Loader (Passby)	-	71	Ventilation Fan	62	63
Generator	67	68	Vibratory Concrete Consolidator	78	80
Grader (Passby)	-	79	Vibratory Pile Driver	99	105
Grinder	68	71	Warning Horn (Air Horn)	94	99
Hammer Drill	72	75	Water Spray Truck	-	72
Hoe Ram	92	99	Welding Machine	71	72

Notes: [1] Measured at 50 feet from the construction equipment, with a "slow" (1 sec.) time constant.

[2] Noise levels apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation.

[3] Equipment without average (L_{eq}) noise levels are non-stationary and best represented only by maximum instantaneous noise level (L_{max}).

Source: Project 25-49 Data, National Cooperative Highway Research Program, https://apps.trb.org/cmsfeed/trbnetprojectdisplay.asp?projectid=3889, October 2018

TABLE 11 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.

Construction of the project is planned to occur between the hours of 7:00 a.m. and 5:00 p.m., Monday through Friday, over a period of 42 months. A detailed list of equipment expected to be used during each phase of construction was provided and assessed for each phase of construction.

Project construction for El Paseo is expected to be completed in five phases. Phase 1a is expected to start in September 2021 and would include demolition of the exiting site, site preparation, grading/excavation, trenching/foundation and building exterior for the podium. Phase 2a is expected to start in January 2023 and would include the construction of Building 1. Phase 3a is expected to start in March 2023 and would include construction of Building 2. Phase 4a is expected to start in April 2023 and would include construction of Building 3. Phase 5a is expected to start in June 2023 and would include construction of Building 4. Project construction for 1777 Saratoga Avenue would be completed in six phases. Phase 1b is expected to start in September 2021 and would include demolition of the existing site. Phase 2b is expected to start in November 2021 and would include grading/excavation of the site. Phase 3b is expected to start in June 2022 and would include trenching and the foundation. Phase 4b is expected to start in July 2022 and would include construction of Building 5. Phase 5b is expected to start in November 2023 and would include the interior of Building 5. Phase 6b is expected to start in January 2024 and would include paving the project site.

A detailed list of equipment expected to be used during each phase was provided by the applicant. Federal Highway Administration's (FHWA's) Roadway Construction Noise Model (RCNM) was used to calculate the hourly average noise levels for each phase of construction, assuming every piece of equipment would operate simultaneously, which would represent the worst-case scenario. This construction noise model includes representative sound levels for the most common types of construction equipment and the approximate usage factors of such equipment that were developed based on an extensive database of information gathered during the construction of the Central Artery/Tunnel Project in Boston, Massachusetts (CA/T Project or "Big Dig"). The usage factors

represent the percentage of time that the equipment would be operating at full power. Assuming all equipment for each stage would be operating simultaneously, which would represent the worst-case construction scenario, at 50 feet measured from the center of the El Paseo site, hourly average noise levels would range from 80 to 96 dBA L_{eq} for Phases a1 through 5a. At 50 feet measured from the center of the 1777 Saratoga Avenue site, hourly average noise levels would range from 78 to 92 for Phases of 1b through 6b.

For overall construction noise levels, multiple pieces of equipment used simultaneously would add together creating a collective noise source. While every piece of equipment per stage of construction would likely be scattered throughout the site, the noise-sensitive receptors surrounding the site would be subject to the collective noise source generated by all equipment operating at once. Therefore, to assess construction noise impacts at the receiving property lines of noise-sensitive receptors during each phase of construction, the collective worst-case hourly average noise level for each stage was centered at the geometrical center of the active construction site and propagated to the nearest property line of the surrounding land uses.

Noise-sensitive uses surrounding the El Paseo site include single-family residential uses approximately 220 feet from the center of construction to the south, commercial uses approximately 300 feet to the north, approximately 220 feet to the east, and approximately 350 feet to the west. These surrounding uses fall within the City's significant noise impact range of 500 feet for residences but outside the City's significant impact range of 200 feet from commercial uses.

Noise-sensitive uses surrounding the 1777 Saratoga Avenue site include commercial uses approximately 170 feet from the center of construction to the west, a place of worship approximately 150 feet to the north, commercial uses approximately 300 feet to the east, and single-family residences approximately 300 feet to the southwest. These surrounding uses fall within the City's significant noise impact range of 200 feet from commercial uses.

Hourly average and maximum construction noise levels at El Paseo for each construction phase, assuming all equipment operating simultaneously, are shown in Table 12 for each of the nearby noise sensitive land uses relative to the center of the active construction site. Hourly average and maximum construction noise levels at the 1777 Saratoga Avenue site for each construction phase, assuming all equipment operating simultaneously, are shown in Table 13 for each of the nearby noise sensitive land uses relative to the center of the active 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. Noise levels in shielded areas would be anticipated to be 5 to 20 dB lower.

TABLE 12 El Paseo Site Calculated Construction Noise Levels at Nearby Land Uses

Phase of Construction		Total Work Days	Calculated Noise Levels (dBA)							
			Commercial to the North (300 ft)		Single Family Residence to the South (220 ft)		Commercial to the East (220 ft)		Commercial to the West (350 feet)	
			L_{eq}	L_{max}	L_{eq}	L_{max}	L_{eq}	L_{max}	L_{eq}	L_{max}
Site Prep & Podium	Demolition	61	79	85	81	87	81	87	77	83
	Grading/Excavation	116	70	79	73	82	73	82	68	78
	Trenching/Foundation	81	72	82	70	80	67	77	66	76
	Building Exterior	261	74	79	72	77	69	74	68	73
	Concrete	15	79	81	82	84	82	84	78	79
Building 1	Building Exterior	409	75	80	77	82	77	82	73	78
	Building Interior	265	65	68	67	70	67	70	63	66
	Paving	24	69	77	72	80	72	80	68	76
Building 2	Building Exterior	385	75	80	77	82	77	82	73	78
	Building Interior	264	65	68	67	70	67	70	63	66
	Paving	24	69	77	72	80	72	80	68	76
Building 3	Building Exterior	400	74	81	77	84	77	84	73	80
	Building Interior	264	75	80	77	82	77	82	73	78
	Paving	26	65	68	67	70	67	70	63	66
Building 4	Building Exterior	440	74	81	77	84	77	84	73	80
	Building Interior	330	75	80	77	82	77	82	73	78
	Paving	40	65	68	67	70	67	70	63	66

TABLE 13 1777 Saratoga Avenue Site Calculated Construction Noise Levels at Nearby Land Uses

Phase of Construction	Total Work Days	Calculated Noise Levels (dBA)							
		Commercial to the West (170 ft)		Place of Worship to the North (150 ft)		Commercial to the East (300 ft)		Single Family Residences to the Southwest (300 feet)	
		L_{eq}	L_{max}	L_{eq}	L_{max}	L_{eq}	L_{max}	L_{eq}	L_{max}
Demolition	55	79	86	80	87	74	81	74	81
Grading/Excavation	67	79	92	80	93	74	87	74	87
Trenching/Foundation	59	68	77	69	78	63	72	63	72
Building Exterior	453	81	86	82	88	7	82	76	82
Building Interior	217	67	70	69	72	63	66	63	66
Paving	117	73	80	75	81	69	75	69	75

Ambient noise levels at sensitive receptors near the site are expected to be similar to that of the site itself, with peak-hour noise levels ranging from 61 to 73 dBA $L_{eq\ (1\text{-}hr)}$. As seen in Tables 12 and 13, Project construction would result in noise levels exceeding the ambient by 5 dBA L_{eq} or more throughout most phases of construction at most nearby receptors. Since project construction would last for a period longer than one year and considering that the El Paseo site is within 500 feet of existing residences and the 1777 Saratoga Avenue site is within 500 feet of existing residences and within 200 feet of existing commercial uses, Policy EC-1.7 of the City's General Plan would consider this temporary construction noise impact to be significant.

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. The following reasonable noise reduction measures should be incorporated into the construction plan and implemented during all phases of construction activity for both the El Paseo site and the 1777 Saratoga Avenue site:

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

- A construction noise logistics plan specifying the hours of construction, noise and vibration minimization measures, and posting or notifications of construction schedules is required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses.

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

- The unnecessary idling of internal combustion engines shall be prohibited.

- Staging areas and stationary noise-generating equipment shall be located as far as possible from noise-sensitive receptors such as residential uses (a minimum of 200 feet).

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

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

coordinator would be conspicuously posted at the construction site and included in the noise logistics plan.

With the implementation of GP Policy EC-1.7, Municipal Code requirements, and the above measures, the temporary construction noise impact would be reduced to a **less-than-significant** level.

Mitigation Measure 1a: No further mitigation required.

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

The project proposes nighttime construction for up to 15 days within 14 months occurring at the El Paseo site, which would include concrete pouring only.

There are no noise limits given for construction occurring outside of the allowable hours of construction. As discussed in the fundamentals section of this report, steady noises of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA would affect sleep. Assuming a 25 dBA exterior-to-interior reduction, which is typical for standard residential construction with windows closed, sleep disturbance may result when exterior noise levels exceed 60 dBA for steady noises and 70 dBA for fluctuating noises.

Existing ambient noise levels during nighttime hours at LT-4 ranged from 48 to 65 dBA L_{eq} (average of 49 dBA L_{eq}). Existing ambient noise levels during nighttime hours at LT-5 ranged from 36 to 68 dBA L_{eq} (average of 45 dBA L_{eq}). Since the noise-sensitive receptors located in the project vicinity are currently exposed to nighttime noise levels up to 68dBA L_{eq}, construction noise levels that are at or below 60 dBA L_{eq} would be unlikely to cause sleep disturbance. For the residences south and southwest of the El Paseo site, a nighttime limit of 60 dBA L_{eq} is used in this analysis. The nearby commercial uses would not be impacted by nighttime construction since operational hours of these buildings would occur during daytime hours only.

Nighttime construction activities would consist of concrete pouring only, which would include concrete trucks and pumps. Based on the nature of concrete pouring and the type of equipment to be used, it is assumed that all noise-generating activities from the equipment would occur on the ground level during the nighttime construction work. FHWA's RCNM was used to calculate the hourly average noise levels for nighttime concrete pouring. Twenty total trucks are expected during the Concrete phase. However, not all these trucks would be operating at the same time on the site. Assuming one truck and one pump would represent the worst-case conditions, an hourly average noise level of 78 dBA L_{eq} would be generated during nighttime work, as measured at a distance of 50 feet. Increasing the number of trucks to two would increase the hourly average noise level by 1 dBA.

The residences south of the El Paseo project site do not have direct line-of-sight to the construction, as there is an existing berm which would provide around 10 dB of noise reduction. The concrete trucks and pumps used during nighttime construction, would be set back approximately 100 to 480 feet from the nearest residential property line to the south. Assuming one concrete truck and one pump and shielding from the existing berm, hourly average noise levels would range from 49 to 62 dBA L_{eq} at the nearest residential property line, depending on the on-site location of the concrete pouring. The worst-case condition would occur when the concrete pumping operation is located 100 feet from the project's southern property line. At this location the hourly average noise level would exceed the nighttime noise limit by 2 dBA.

The second row of residences south of the El Paseo site would be approximately 255 feet from the nighttime work when equipment is located along the southern boundary of the El Paseo project site. These residences would be partially shielded from nighttime construction activities by the first row of residences as well as the existing berm, which would provide about a 15 dBA L_{eq} reduction in noise levels. Assuming one concrete truck and one concrete pump, hourly average noise levels due to nighttime construction activities would range from 44 to 50 dBA L_{eq}, depending on the on-site location of the concrete pouring. The nighttime noise limit of 60 dBA L_{eq} is not expected to be exceeded.

The residences southwest of the El Paseo project site do not direct line-of-sight to the construction, there are existing buildings which would provide around 7 dB of noise reduction. The concrete truck and pump used during nighttime construction, would be set back approximately 280 to 900 feet from the nearest residential property line to the southwest. Assuming one concrete truck and one pump and shielding from the buildings, hourly average noise levels would range from 46 to 56 dBA L_{eq} at the nearest residential property line, depending on the on-site location of the concrete pouring. The nighttime noise limit of 60 dBA L_{eq} is not expected to be exceeded.

The second row of residences southwest of the El Paseo project site would be approximately 470 to 700 feet from the nighttime work when equipment is located along the southwestern boundary of the El Paseo project site. These residences would be partially shielded from nighttime construction activities by the existing buildings, which would provide about a 7 dBA L_{eq} reduction in noise levels. Assuming one concrete truck and one concrete pump, hourly average noise levels due to nighttime construction activities would range from 48 to 52 dBA L_{eq}, at the nearest residential property line, depending on the on-site location of the concrete pouring. The nighttime noise limit of 60 dBA L_{eq} is not expected to be exceeded.

Nighttime construction activities would potentially result in a significant impact at the single-family residences south of the El Paseo project site.

Mitigation Measure 1b:

San José requires the issuance of a Development Permit for construction occurring outside of the allowable hours of 7:00 a.m. to 7:00 p.m., Monday through Friday within 500 feet of existing residential land uses. Concrete pouring is proposed during nighttime hours for up to 15 days during a 14-month duration. The following measures would reduce nighttime noise impacts at nearby noise-sensitive residences to a less-than-significant level:

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

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

- Limit nighttime concrete pouring to the northernmost equipment location or a minimum distance of 100 feet from the southern boundary of the El Paseo site, where feasible.

    - If the concrete pumping operation is located within 100 feet of the southern boundary of the El Paseo site, when feasible install temporary noise barriers around the concrete pumping operation to control the noise levels at the source.

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

With the implementation of the above Mitigation Measure 1b, the temporary nighttime construction noise impact would be reduced to a **less-than-significant** level.

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

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

The traffic study prepared for the proposed project by Hexagon Transportation Consultants, Inc. included peak hour turning movements for twenty-four affected intersections in the project vicinity. When the project trips were added to the existing traffic volumes, the existing plus project scenario was calculated. Comparing the existing plus project traffic volumes to the existing traffic volumes, a noise level increase of 0 to 1 dBA DNL was calculated along every roadway segment included in the traffic study. The project would not result in doubling of the traffic, and therefore, the proposed project would not result in a permanent noise increase of 3 dBA DNL or more. This is a **less-than-significant** impact.

Mitigation Measure 1c: None required.

Impact 1d: Noise Levels in Excess of Standards. The proposed project is not expected to generate noise in excess of standards established in the City's General Plan or Municipal Code at nearby sensitive receptors. Noise originating from operational noise sources was analyzed based on a credible worst-case scenario. No potential exceedances were identified. **This is a less-than-significant impact.**

The City's General Plan does not include policies specifically addressing operational noise generated by residential land uses. However, the mechanical noise for these types of uses should be addressed with respect to the City's Municipal Code threshold of 55 dBA DNL to minimize disturbance to the existing and future residences surrounding the project site.

For the commercial component of the proposed project, Policies EC-1.3 and EC-1.6 of the City's General Plan states that noise generated by new nonresidential land uses should not exceed 55 dBA DNL at the property lines of adjacent existing or planned noise-sensitive uses.

Section 20.30.700 of the City's Municipal Code establishes a limit of 55 dBA for noise sources generated by any use or combination of uses when measured at the property line, however, the Municipal Code is not used as a criterion to determine the significance of project impacts under CEQA.

The proposed project would include mechanical equipment, such as heating, ventilation, and air conditioning systems (HVAC), fire pumps, and generators.

With the proposal of rooftop decks, it is assumed the HVAC units will either be entirely enclosed, if located along the rooftop, or located within a separate enclosure elsewhere in the building. Therefore, it is not anticipated that noise from the mechanical equipment would be in violation of the City's Municipal Code. However, due to the number of variables inherent in the mechanical equipment needs of the project, the impacts of mechanical equipment noise on nearby noise-sensitive uses should be assessed during the final project design stage. Design planning should consider the noise criteria associated with such equipment and utilize site planning to locate equipment in less noise-sensitive areas. Other controls could include, but shall not be limited to, fan silencers, enclosures, and mechanical screening. The final design plans should be reviewed by a qualified acoustical consultant to address any potential conflicts.

The site plans for proposed Buildings, 1, 2, 3, 4 and 5 include a fire pump and generator on the first floor of each building. Noise levels generated by electrical equipment and pumps would be adequately attenuated such that noise levels on adjacent property lines would be at or below 55 dBA DNL.

The emergency generator expected to be used at Buildings 1, 2, 3, 4 and 5 would be the Kohler KD1750 industrial diesel generator set, which has a capacity of 1750 kW. Generators of this size would typically generate noise levels up to 98 dBA at a distance of 23 feet. While noise due to generator operations are typically not subject to noise regulations during an emergency, emergency generators are typically tested monthly for a period of one hour between 7:00 a.m. and 10:00 p.m. Assuming a minimum attenuation of 25 dBA due to the building, the estimated hourly average noise levels and day-night average noise levels were calculated at the property lines of the nearest surrounding commercial or residential uses for each generator room. These levels are summarized in Table 14. The estimated day-night average noise level would be below the 55 dBA threshold established by the City of San José. Figure 42 shows the location of the emergency generators for the Education Mixed-Use Option at the El Paseo site Buildings 1, 2, 3, and 4. Figure 43 shows the location of the emergency generator for Building 5 at the 1777 Saratoga site.

TABLE 14 Estimated Operational Noise Levels for Monthly Emergency Generator Test

Generator Room	Nearest Receptor	L_{eq}	DNL
Building 1	Comm. Northeast (110 feet)	59	45
Building 2	Residential South (150 feet)	57	43
Building 3	Comm. East (50 feet)	66	52
Building 3	Residential South (280 feet)	51	37
Building 4	Comm. Northwest (110 feet)	59	45
Building 5	Comm. North (85 feet)	62	48
Building 5	Place of Worship West (95 feet)	61	47

FIGURE 42 Fire Pump and Generator Locations- El Paseo

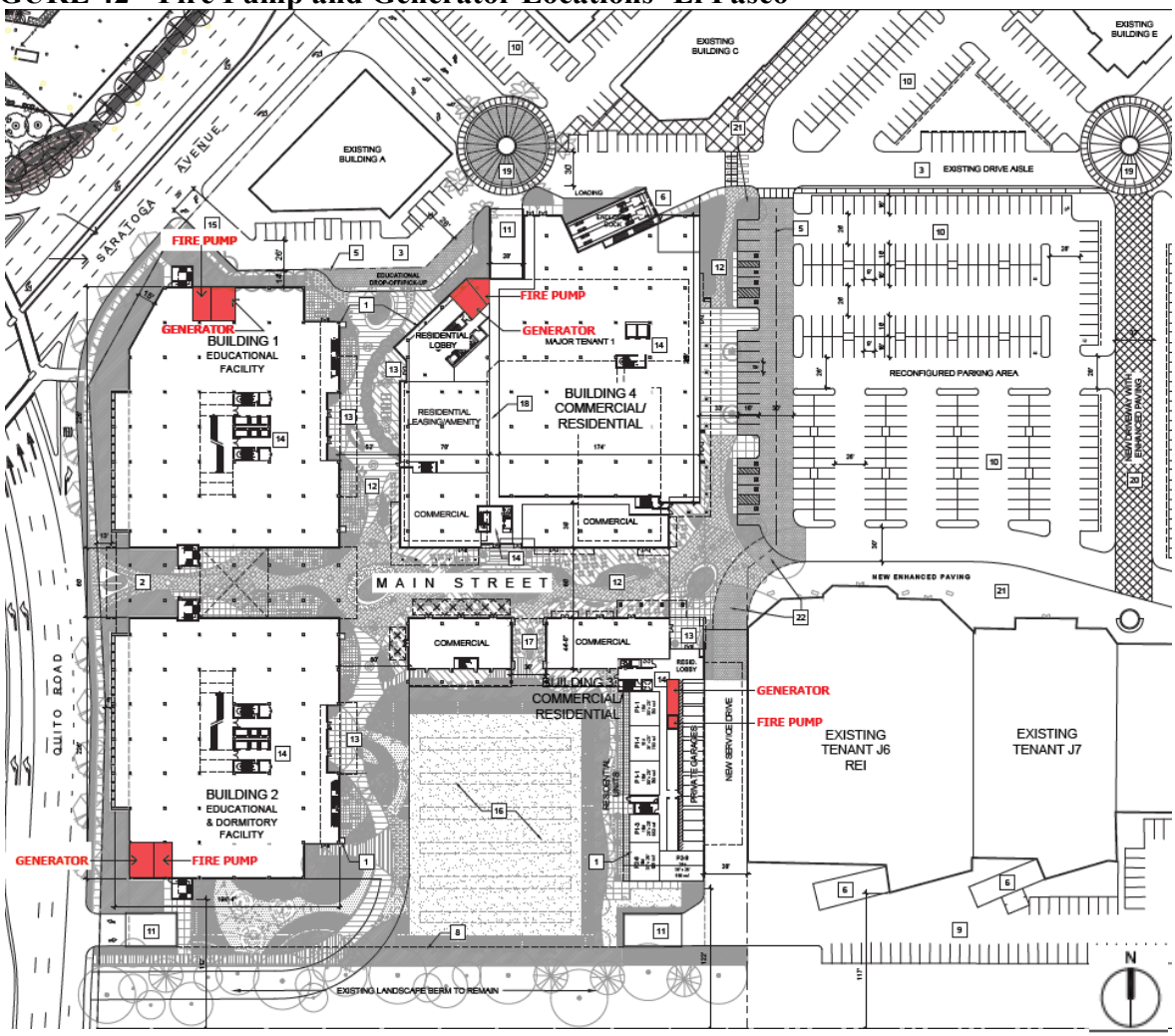
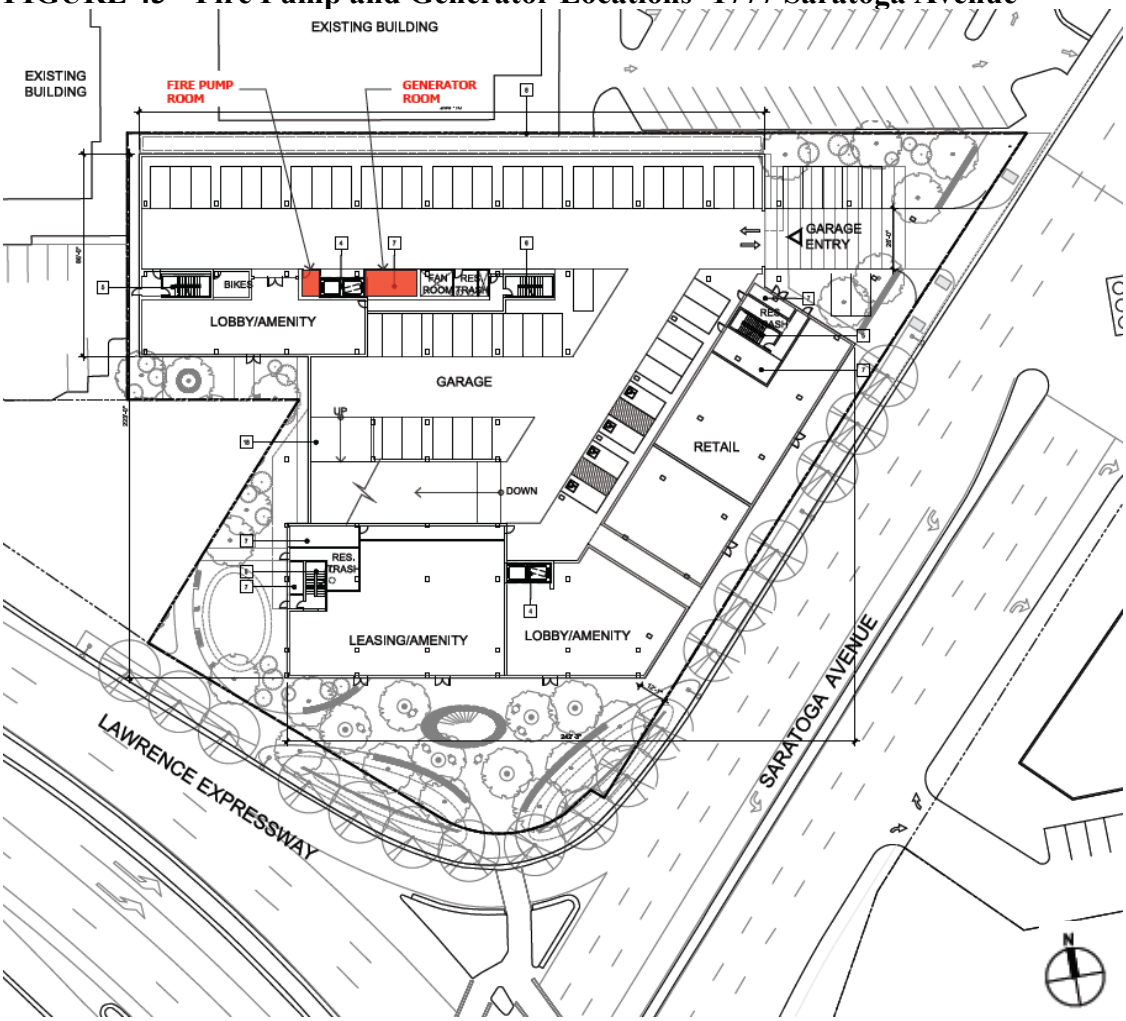


FIGURE 43 Fire Pump and Generator Locations- 1777 Saratoga Avenue



Truck Deliveries

Proposed Building 4 shows a loading zone on the ground level and located within docking bays, which can be closed with bay doors. Building 4 shows the loading zone along the northern façade, which would have direct line-of-sight to the commercial property to the north and partial line of sight to the commercial property to the northwest The center of the loading zone would be approximately 75 feet from the commercial property and approximately 100 feet from the commercial property to the northwest.

Truck delivery noise would include maneuvering activities occurring at the loading docks. Due to the existing commercial land use at the project site and the surrounding area, truck pass-by activities already exist along the roadways and would be included in the ambient noise environment. Trucks maneuvering would generate 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 used for incoming deliveries typically generate maximum instantaneous noise levels of 70 to 75 dBA L_{max} 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 L_{max} at a distance of 50 feet. The number of truck deliveries each day is unknown at this time; however, the building has only one loading area for trucks. Therefore, the maximum number of truck deliveries in any given hour would be one. This would represent worst-case scenario. Typically, loading or unloading a truck would take up to five minutes. Assuming one truck delivery in any given hour, the hourly average noise level at 50 feet would be 62 dBA L_{eq}. Under credible worst-case conditions, it is assumed that each hour during regular operational hours between 9:00 a.m. and 5:00 p.m. would result in the maximum hourly average noise level of 62 dBA L_{eq}, which would include one delivery per hour. Therefore, the day-night average noise level at 50 feet would be 58 dBA DNL.

At a distance of 75 feet from the center of the loading zone, the hourly average noise level would be 58 dBA L_{eq}, and the day-night average noise level would be 54 dBA DNL. This would meet the City's Municipal Code threshold for nonresidential land uses. At a distance of 100 feet from the center of the loading zone, the hourly average noise level would be 56 dBA L_{eq}, and the day-night average noise level would be 52 dBA DNL. This would meet the City's Municipal Code threshold for nonresidential land uses.

Based on the worst-case assumptions, the City's 55 dBA DNL threshold is not expected to be exceeded at the shared property lines of nonresidential land uses. This would be a less-than-significant impact.

No additional exterior noise-generating equipment is anticipated for the project. This is a **less-than-significant** impact.

Mitigation Measure 1d: None required.

Impact 2: **Exposure to Excessive Groundborne Vibration due to Construction.** Construction-related vibration levels are expected to potentially exceed applicable vibration thresholds at a nearby sensitive land use. **This is a potentially significant impact.**

Demolition and construction activities required for construction often generate perceptible vibration levels and levels that could affect nearby structures when heavy equipment or impact tools (e.g., jackhammers, pile drivers, hoe rams) are used in the vicinity of nearby sensitive land uses. Building damage generally falls into three categories. Cosmetic damage (also known as threshold damage) is defined as hairline cracking in plaster, the opening of old cracks, the loosening of paint or the dislodging of loose objects. Minor damage is defined as hairline cracking in masonry or the loosening of plaster. Major structural damage is defined as wide cracking or the shifting of foundation or bearing walls.

Policy EC-2.3 of the City of San José General Plan establishes a vibration limit of 0.08 in/sec PPV to minimize the potential for cosmetic damage to sensitive historic structures, and a vibration limit of 0.2 in/sec PPV to minimize damage at buildings of normal conventional construction. The vibration limits contained in this policy are conservative and designed to provide the ultimate level of protection for existing buildings in San José.

According to the City of San José Historic Resources Inventory,[1] there are no historic buildings located within 500 feet of the project site. There would be no risk of damage to any historic buildings resulting from project construction.

Construction activities associated with the project would include demolition of existing site, site preparation, foundation work, new building framing and finishing, and paving. According to construction information provided by the project design team, pile driving is not a method of construction.

Table 15 presents typical vibration levels from construction equipment at 25 feet. Vibration levels would vary depending on soil conditions, construction methods, and equipment used. Table 8 also presents construction vibration levels at representative distances from the construction equipment located at the closest property line to the nearest structures. Calculations were made to estimate vibration levels at distances of 5 feet from the site to represent the distance between the existing commercial and the nearest site property line, as well as 25 feet, 90 feet to represent the distance to other nearby structures. Vibration levels are highest close to the source, and then attenuate with increasing distance at the rate $(D_{ref}/D)^{1.1}$, where D is the distance from the source in feet and D_{ref} is the reference distance of 25 feet.

[1] "City of San José Historic Resources Inventory." City of San José, Accessed March 17, 2021, https://www.sanjoseca.gov/your-government/departments/planning-building-code-enforcement/planning-division/historic-preservation/historic-resources-inventory .

TABLE 15 Vibration Levels for Construction Equipment at Various Distances

Equipment		PPV at 5 ft. (in/sec)	PPV at 10 ft. (in/sec)	PPV at 25 ft. (in/sec)	PPV at 90 ft. (in/sec)
Clam shovel drop		**1.186**	**0.553**	0.202	0.044
Hydromill (slurry wall)	in soil	0.047	0.022	0.008	0.002
	in rock	0.100	0.047	0.017	0.004
Vibratory Roller		**1.233**	**0.575**	0.210	0.051
Hoe Ram		**0.523**	0.244	0.089	0.022
Large bulldozer		**0.523**	0.244	0.089	0.022
Caisson drilling		**0.523**	0.244	0.089	0.022
Loaded trucks		0.446	0.208	0.076	0.019
Jackhammer		0.206	0.096	0.035	0.009
Small bulldozer		0.018	0.008	0.003	0.001

Source: Transit Noise and Vibration Impact Assessment, United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, September 2018 as modified by Illingworth & Rodkin, Inc., November 2020.

As indicated in Table 8, heavy vibration generating construction equipment, such as vibratory rollers, clam shovel drops, hoe rams, large bulldozers, and caisson drilling, would have the potential to produce vibration levels greater than the 'modern' structure threshold of 0.5 in/sec PPV within about 5 feet of construction. Vibratory rollers and clam shovel drops would have the potential to exceed the 0.5 in/sec PPV limit within about 12 feet of construction. The place of worship buildings to the north and west of the 1777 Saratoga site and the existing commercial buildings to the east and north of the El Paseo site could be exposed to vibration levels above 0.5 in/sec PPV resulting from project construction. Vibration levels could exceed the historic building threshold of 0.25 in/sec PPV at distances within about 25 feet of construction. There are no historic buildings located within 25 feet.

The US Bureau of Mines has analyzed the effects of blast-induced vibration on buildings in USBM RI 8507[2], and these findings have been applied to vibrations emanating from construction equipment on buildings[3]. Figure 44 presents the damage probability as reported in USBM RI 8507 and reproduced by Dowding assuming a maximum vibration level of 1.2 in/sec PPV. As shown on Figure 44, these studies indicate an approximate 20% probability of "threshold damage" (referred to as cosmetic damage elsewhere in this report) at vibration levels of 1.2 in/sec PPV or less and no observations of "minor damage" or "major damage" at vibration levels of 1.2 in/sec PPV or less. Based on these data, cosmetic or threshold damage would be manifested in the form of hairline cracking in plaster, the opening of old cracks, the loosening of paint or the dislodging of loose objects. However, minor damage (e.g., hairline cracking in masonry or the loosening of plaster) or major structural damage (e.g., wide cracking or shifting of foundation or bearing walls) to the residential and commercial structures adjacent to the site would not be anticipated to occur assuming a maximum vibration level of 1.2 in/sec PPV.

[2] 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.
[3] Dowding, C.H., Construction Vibrations, Prentice Hall, Upper Saddle River, 1996.

Groundborne vibration levels from project construction would be anticipated to exceed 0.5 in/sec PPV when construction is located within 12 feet of the structures adjacent to the El Paseo site to the north and east and adjacent to the 1777 Saratoga site to the north and west. Vibration levels may still be perceptible in areas further from the site during periods of heavy construction but would not be expected to cause structural damage. This is a **potentially significant impact**.

Mitigation Measure 2: The following measures are recommended to reduce vibration impacts from construction activities to a less-than-significant impact:

- Limit the use of vibratory rollers, hoe rams, large bulldozers, and caisson drilling, and avoid clam shovel drops within 15 feet of the property lines shared with residences and commercial structures adjacent to the site.

- Place operating equipment on the construction site as far as possible from vibration-sensitive receptors.

- Use smaller equipment to minimize vibration levels below the limits.

- Select demolition methods not involving impact tools.

- Avoid dropping heavy objects or materials near vibration sensitive locations.

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

- A construction vibration-monitoring plan shall be implemented to document conditions at the residences and commercial structures within 25 feet of the project site prior to, during, and after vibration generating construction activities. All plan tasks shall be undertaken under the direction of a licensed Professional Structural Engineer in the State of California and be in accordance with industry accepted standard methods. The construction vibration monitoring plan should be implemented to include the following tasks:

    - Identification of sensitivity to ground-borne vibration of the residences and commercial structures adjacent to the site. A vibration survey (generally described below) would need to be performed.

    - Performance of a photo survey, elevation survey, and crack monitoring survey for the residences and commercial structures adjacent to the site. Surveys shall be performed prior to and after completion of vibration generating construction activities located within 25 feet of the structure. The surveys shall include internal and external crack monitoring in the structure, settlement, and distress, and shall

document the condition of the foundation, walls and other structural elements in the interior and exterior of the structure.

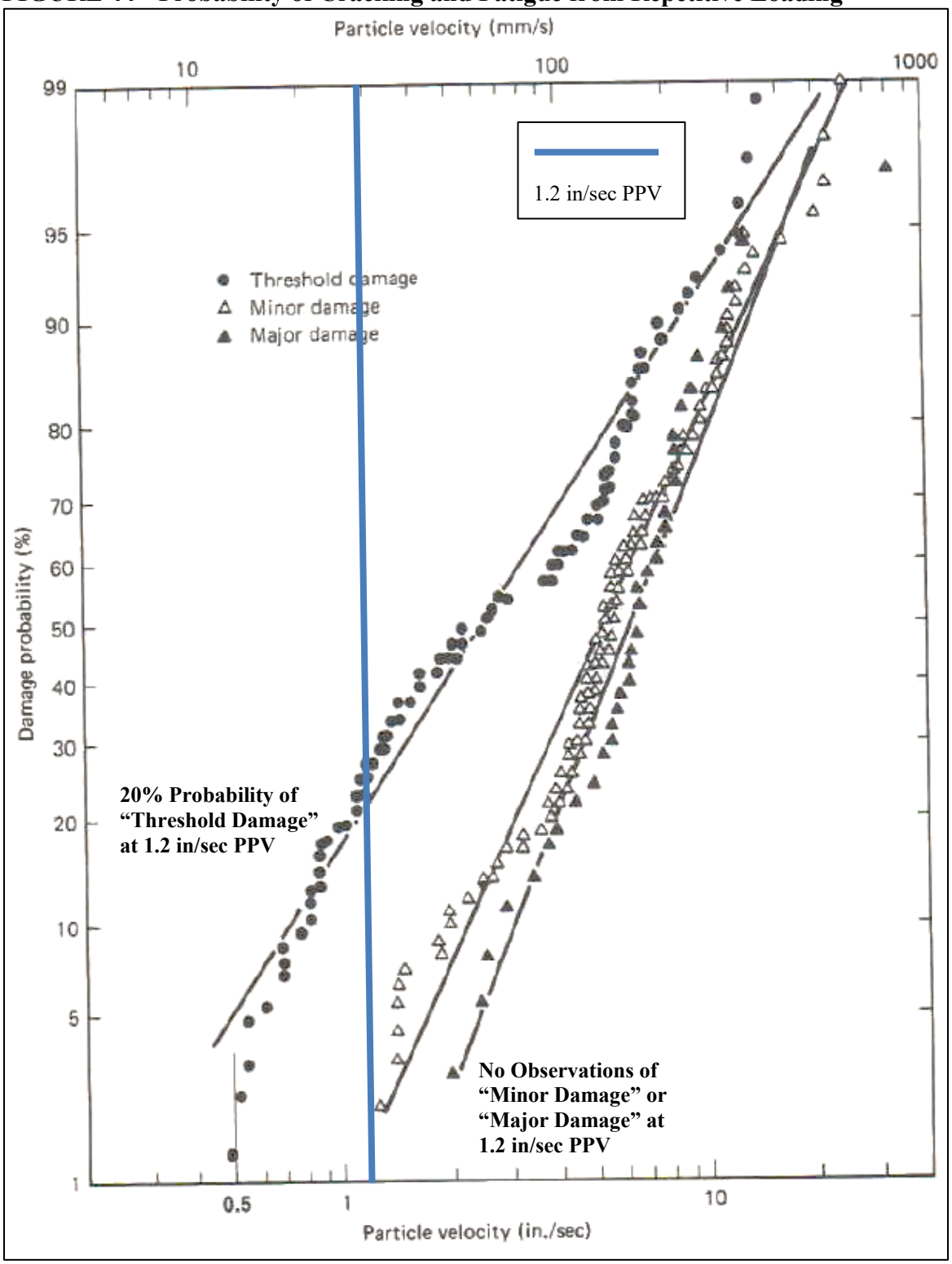
- Conduct a post-survey on the structure where either monitoring has indicated high levels or complaints of damage. Make appropriate repairs in accordance with the Secretary of the Interior's Standards where damage has occurred as a result of construction activities.

- The results of any vibration monitoring shall be summarized and submitted in a report shortly after substantial completion of each phase identified in the project schedule. The report will include a description of measurement methods, equipment used, calibration certificates, and graphics as required to clearly identify vibration-monitoring locations. An explanation of all events that exceeded vibration limits will be included together with proper documentation supporting any such claims.

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

Implementation of these measures would reduce the impact to a **less-than-significant** level.

FIGURE 44 Probability of Cracking and Fatigue from Repetitive Loading



Source: Dowding, C.H., Construction Vibrations, Prentice Hall, Upper Saddle River, 1996 as modified by Illingworth & Rodkin, Inc., November 2020.

Impact 3: **Excessive Aircraft Noise.** The project site is located approximately 2 miles from a public airport or public use airport and would not expose people residing or working in the project area to excessive aircraft noise levels. **This is a less-than-significant impact.**

Norman Y. Mineta San José International Airport is a public-use airport located approximately 5.8 miles northeast of the project site. As seen in Figure 45, the project sites lie outside of the 60 dBA CNEL 2037 noise contour of the airport, according to the City's new Airport Master Plan Environmental Impact Report.[4] Future exterior noise levels due to aircraft from Norman Y. Mineta San José International Airport would not exceed 60 dBA CNEL/DNL. According to Policy EC-1.11 of the City's General Plan, the required safe and compatible threshold for exterior noise levels would be at or below 65 dBA CNEL/DNL for aircraft. Therefore, the proposed project would be compatible with the City's exterior noise standards for aircraft noise.

Assuming standard construction materials for aircraft noise below 60 dBA DNL, the future interior noise levels resulting from aircraft would be at or 45 dBA DNL and below 50 dBA $L_{eq(1\text{-}hr)}$. Therefore, future interior noise at the proposed building would be compatible with aircraft noise. This would be a **less-than-significant** impact.

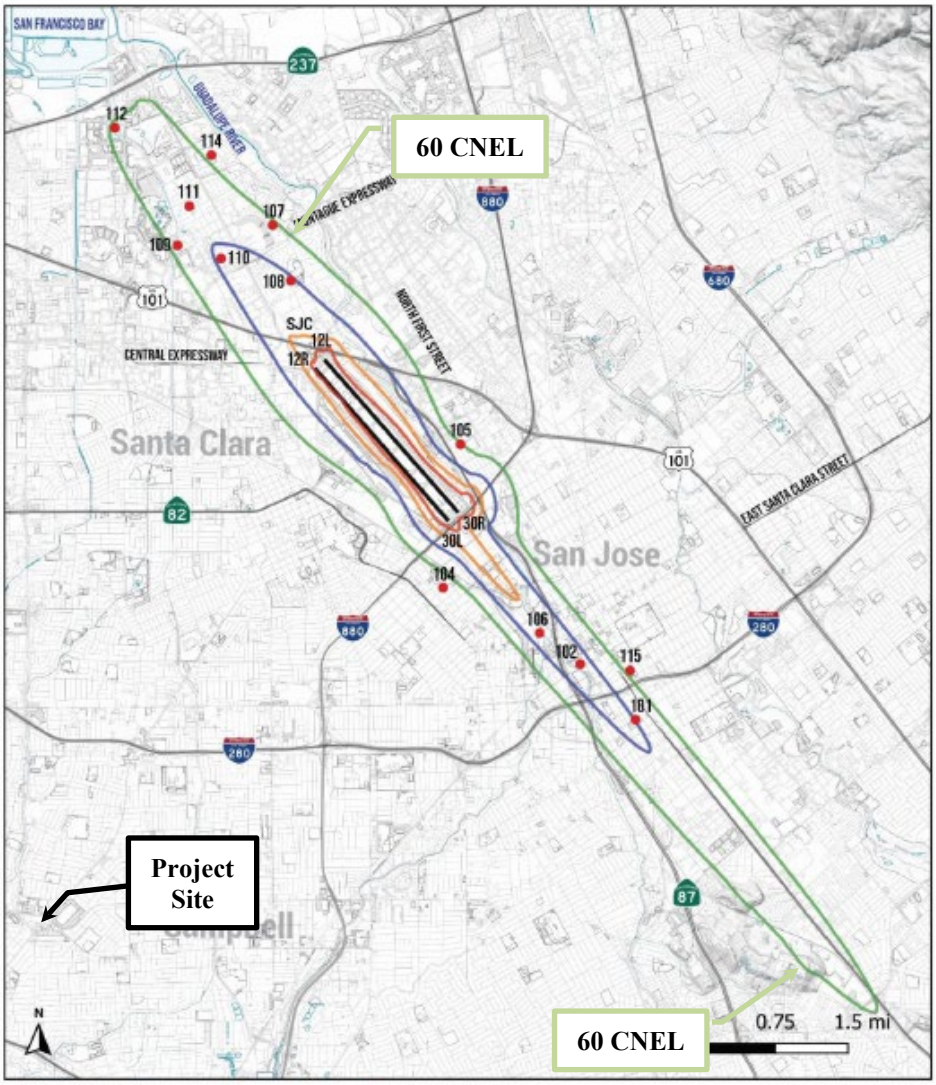
Mitigation Measure 3: **None required.**

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

FIGURE 45 2037 CNEL Noise Contours for SJIA Relative to Project Site

Figure 5
Scenario 2: With Project 2037 Noise Contour Map

SAN JOSE INTERNATIONAL AIRPORT | Environmental Impact Report FINAL | October 2019



NORMAN Y. MINETA SAN JOSE INTERNATIONAL AIRPORT

- Noise Monitoring Station
- 101 Site ID
- Runway
- 75 dBA and Greater CNEL Contour
- 70 dBA and Greater CNEL Contour
- 65 dBA and Greater CNEL Contour
- 60 dBA and Greater CNEL Contour

Figure 5 Scenario 2: With Project 2037 Noise Contour Map

Source: BridgeNet International 2019

NON-EDUCATION MIXED-USE OPTION:

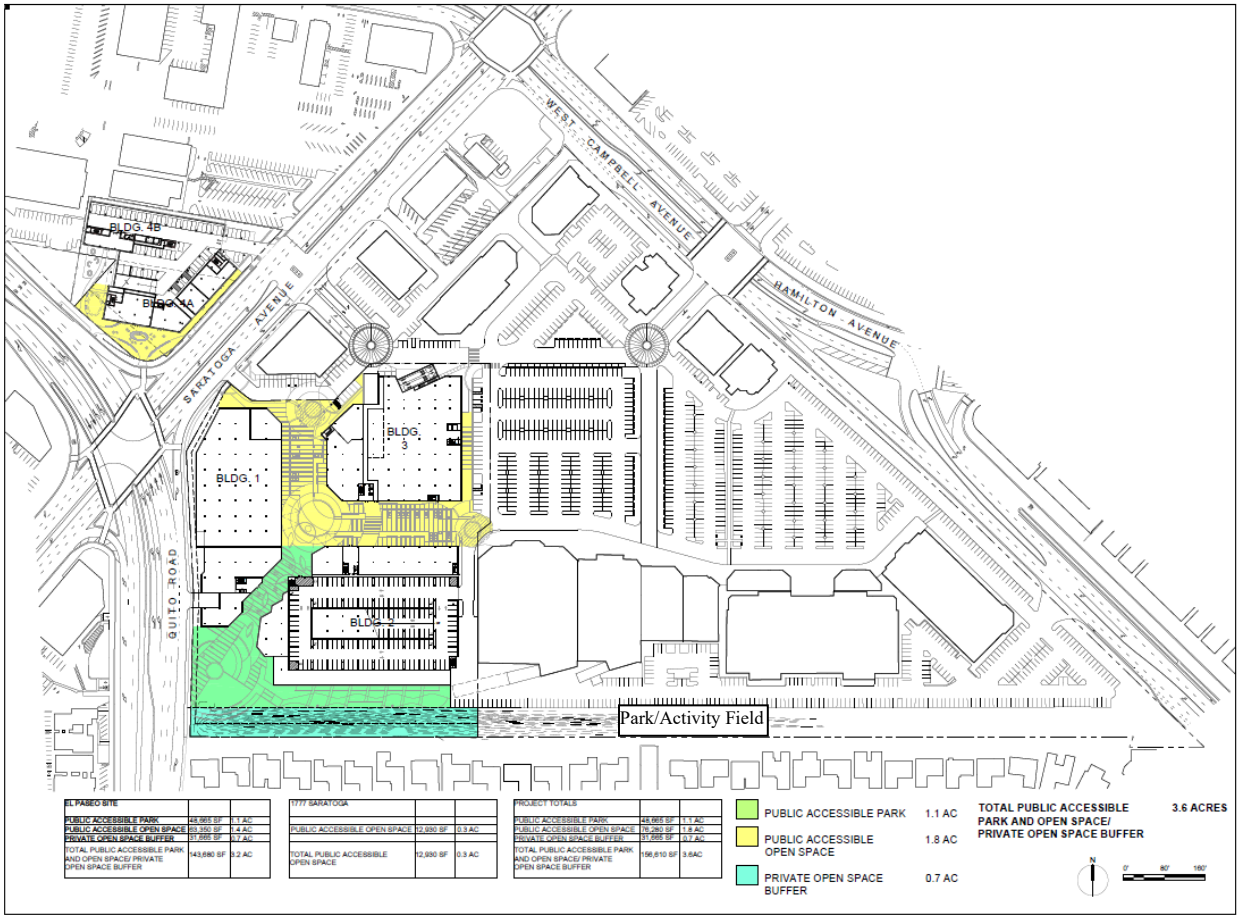
GENERAL PLAN CONSISTENCY ANALYSIS

Future Exterior Noise Environment

The exterior noise threshold established in the City's General Plan for new residential uses is 60 dBA DNL at usable outdoor activity areas. According to site plans dated August 21, 2020 and the provided project description, the project site would include outdoor use areas intended for residents and the public.

The public accessible park is nearest to Quito Road and would be set back 80 feet from the centerline of the roadway. The public accessible park would have future exterior noise levels up to 65 dBA DNL, which would meet the City's "normally acceptable" limit of 65 dBA DNL for neighborhood parks

FIGURE 46 Site Plan



Building 1

Building 1 will include two 3rd floor podium courtyards and two 8th floor roof top decks.

The podium courtyards will be located on the 3rd floor and will be exposed to traffic noise from Quito Road and Saratoga Avenue. The future exterior noise levels at the 3rd floor Podium Courtyard 1 would range from 58 dBA DNL at the center of the space to 60 dBA DNL at the edge of the courtyard. These noise levels are below the City's "normally acceptable" limit of 60 dBA DNL for exterior use areas.

The future exterior noise levels at 3rd floor Podium Courtyard 2 would range from 60 dBA DNL at the center of the space to 65 dBA DNL at the edge of the podium deck. These noise levels would exceed the City's "normally acceptable" limit of 60 dBA DNL, but below the City's "conditionally acceptable" limit of 70 dBA DNL for exterior use areas. The center of the outdoor space would be adequately shielded and future exterior noise levels at the podium deck would be below 60 dBA DNL. The future noise levels at the centers of the outdoor use areas associated with the residential component of the proposed project would meet the City's normally acceptable threshold of 60 dBA DNL.

FIGURE 47 3rd Floor Podium Decks

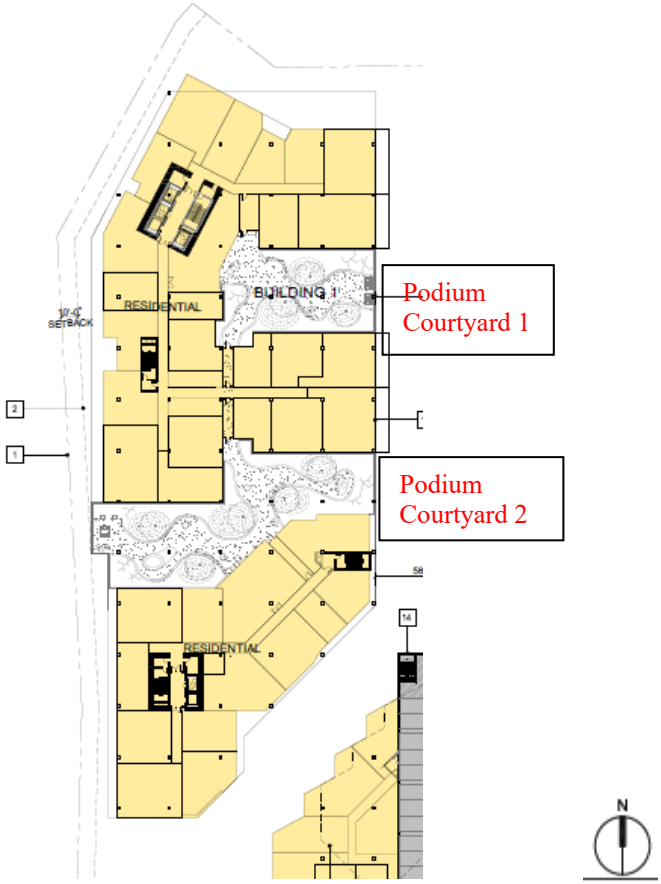
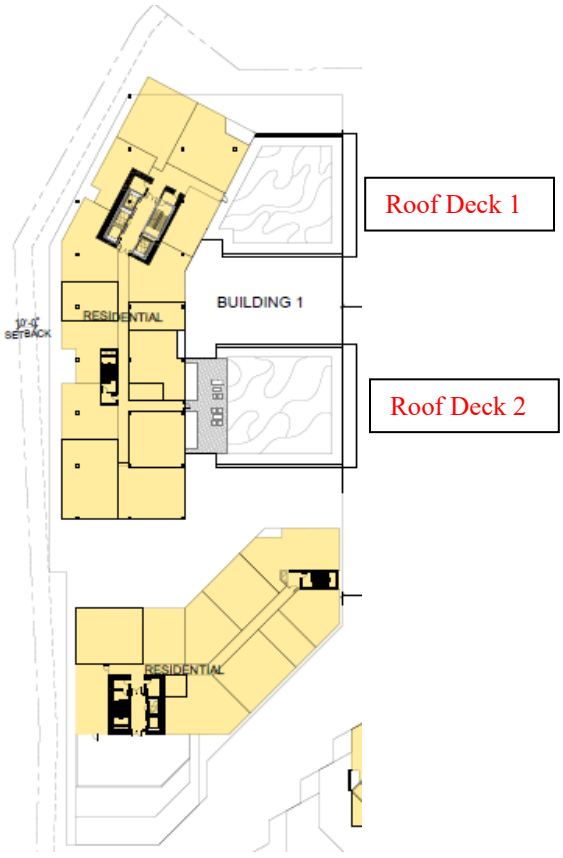


FIGURE 48 8th Floor Roof Top Decks



Building 2

Building 2 will include a 4th floor podium deck, a 6th floor roof deck, and a 8th floor roof-top deck.

The podium deck will be located on the 4th floor and will be exposed to traffic noise from Quito Road. The future exterior noise levels at 4th floor podium decks 1, 2, and 3 would be below 60 dBA DNL. This noise level would be below the City's "normally acceptable" limit of 60 dBA DNL for exterior use areas.

A roof deck will be located on the 6th floor facing south. The future exterior noise levels at the 6th floor roof top deck would range from 56 dBA DNL at the center of the space to 59 dBA DNL at the edge of the roof deck. These noise levels are below the City's "normally acceptable" limit of 60 dBA DNL for exterior use areas.

Two roof deck will be located on the 8th floor facing south. The future exterior noise levels at the 8th floor roof top deck 1 would range from 56 dBA DNL at the center of the space to 59 dBA DNL at the edge of the roof decks. The future exterior noise levels at the 8th floor roof top deck 2 would range from 56 dBA DNL at the center of the space to 57 dBA DNL at the edge of the roof decks. These noise levels are below the City's "normally acceptable" limit of 60 dBA DNL for exterior use areas.

FIGURE 49 4th Floor Podium Deck

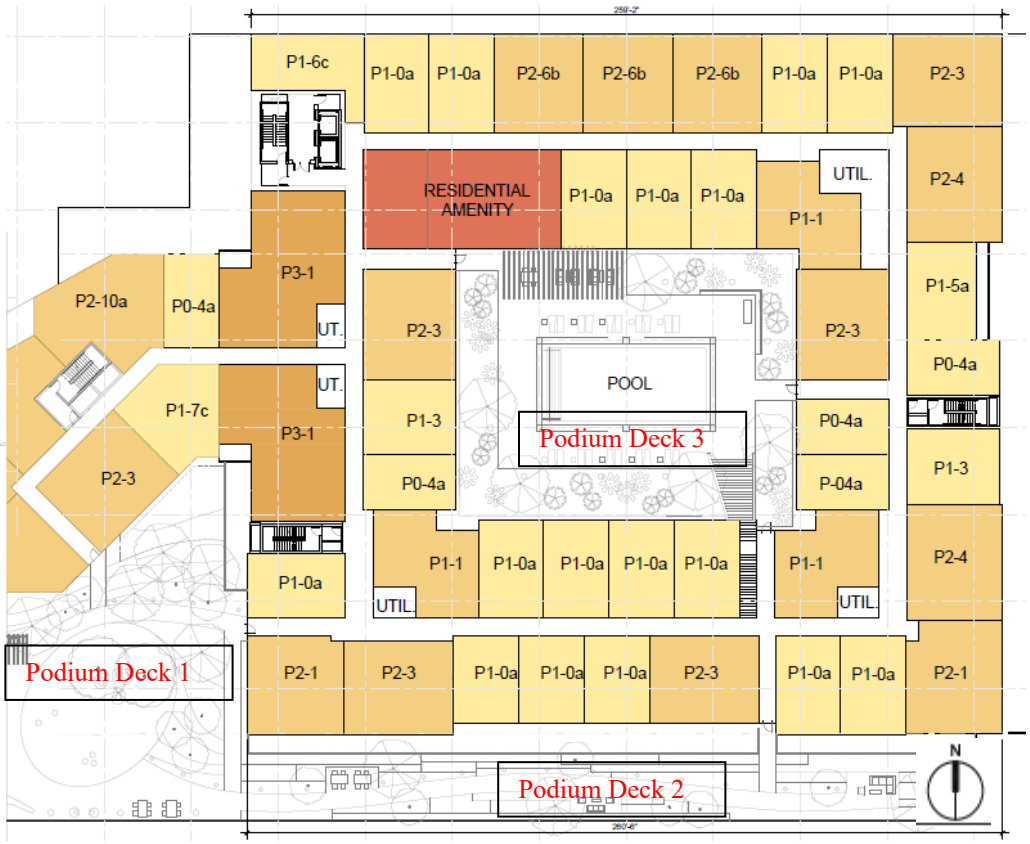


FIGURE 50 6th Floor Roof Top Deck

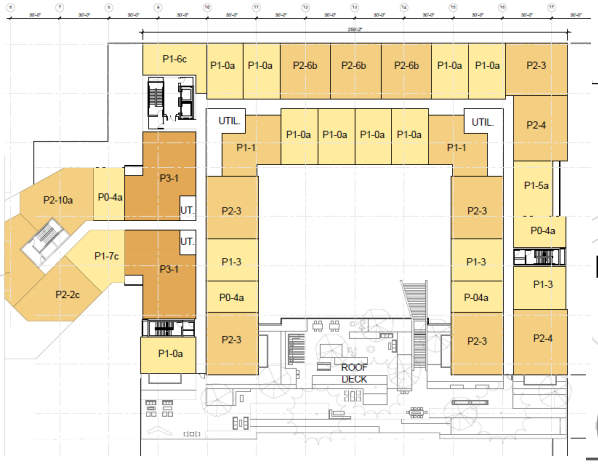
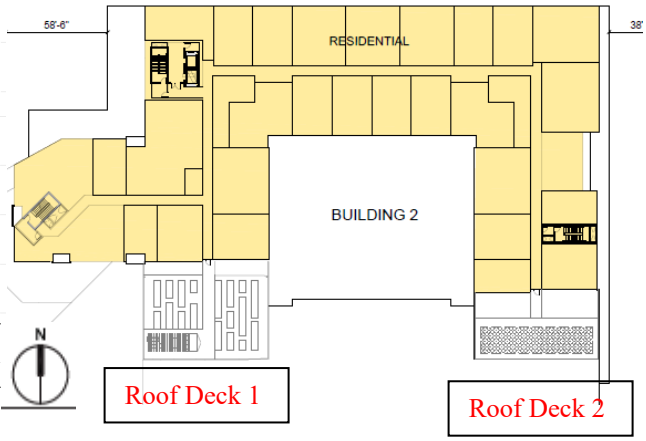


FIGURE 51 8th Floor Roof Top Decks



Building 3

Building 3 will include a 3rd floor courtyard, 3rd-11th floor private balconies, and two 8th floor roof top decks.

The 3rd floor podium deck would be shielded from traffic noise by Building 3. The future exterior noise levels at the 3rd floor courtyard would be below 60 dBA DNL and the City's "normally acceptable" limit for exterior use areas.

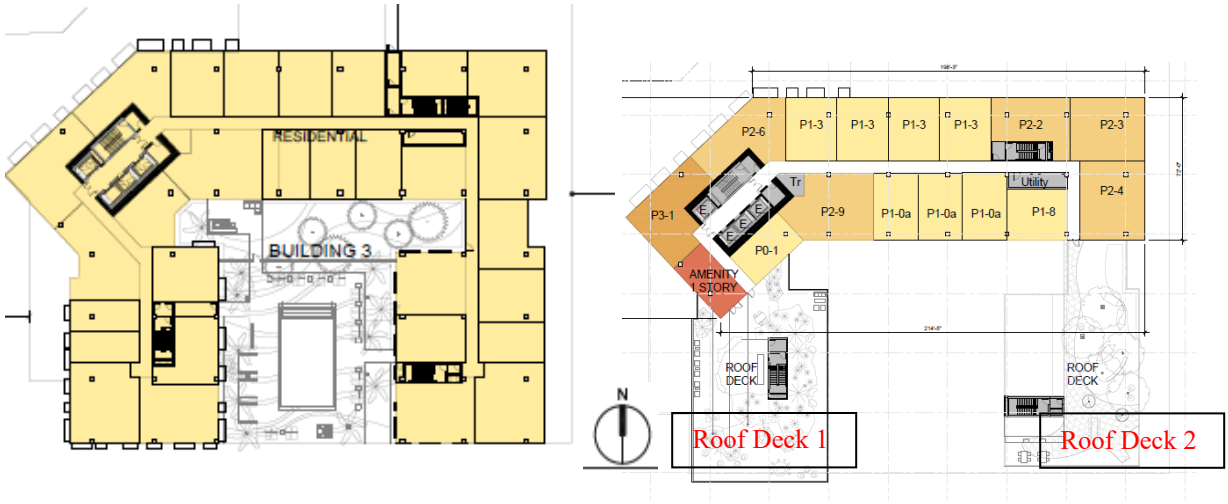
Balconies are excluded from the City's exterior use area standard. Common industry practice, with regard to the exterior noise assessment of multi-family land uses is to apply the exterior noise threshold to common outdoor use areas and not to small private outdoor use areas (e.g., balconies, patios, etc.). This common practice is due to the following considerations:

1. Frequency of use – small balconies and patios associated with multi-family residential land uses are not frequently used by residents for outdoor enjoyment, particularly when adjacent to transportation-related noise sources and when other outdoor amenity areas are provided as a part of a project. It is anticipated that residents of this project that desire a quiet outdoor use area would use the shared open space area for outdoor enjoyment.

2. Feasibility of mitigation – it is not possible to mitigate high noise exposures to meet the exterior noise thresholds without completely enclosing the space. The necessary mitigation to meet the exterior noise threshold eliminates the outdoor space altogether.

The two roof decks will be located on the 8th floor facing south. The future exterior noise levels at the 8th floor roof top deck 1 would range from 58 dBA DNL at the center of the space to 60 dBA DNL at the edge of the roof deck 1. The future exterior noise levels at the 8th floor roof top deck 2 would range from 57 dBA DNL at the center of the space to 60 dBA DNL at the edge of the roof deck 2. These noise levels are below the City's "normally acceptable" limit of 60 dBA DNL for exterior use areas

FIGURE 52 3rd Floor Podium Deck **FIGURE 53 8th Floor Roof Top Deck**



Building 4

Building 4 will include a 3rd floor courtyard/pool, 2nd -10th floor private balconies, and 9th floor roof top deck.

The courtyard will be located on the 3rd floor interior of the building. The courtyard will be shielded by the proposed building on two sides. The courtyard will be partially exposed to noise from Saratoga Avenue and Lawrence Expressway/Quito Road. The future exterior noise levels the 3rd floor courtyard would be below 60 dBA DNL. This noise level would be below the City's "normally acceptable" limit of 60 dBA DNL for exterior use areas.

Balconies are excluded from the City's exterior use area standard. Common industry practice, with regard to the exterior noise assessment of multi-family land uses is to apply the exterior noise threshold to common outdoor use areas and not to small private outdoor use areas (e.g., balconies, patios, etc.). This common practice is due to the following considerations:

1. Frequency of use – small balconies and patios associated with multi-family residential land uses are not frequently used by residents for outdoor enjoyment, particularly when adjacent to transportation-related noise sources and when other outdoor amenity areas are provided as a part of a project. It is anticipated that residents of this project that desire a quiet outdoor use area would use the shared open space area for outdoor enjoyment.

2. Feasibility of mitigation – it is not possible to mitigate high noise exposures to meet the exterior noise thresholds without completely enclosing the space. The necessary mitigation to meet the exterior noise threshold eliminates the outdoor space altogether.

The roof deck will be located on the 9th floor facing Quito Road. The future exterior noise levels at 9th floor roof top deck would range from 60 dBA DNL at the center of the space to 67 dBA DNL at the edge of the roof deck. These noise levels would exceed the City's "normally acceptable" limit of 60 dBA DNL, but below the City's "conditionally acceptable" limit of 70 dBA DNL for exterior use areas. Due to the elevation of this roof deck above roadways below, the center of the

outdoor space would be adequately shielded and future exterior noise levels at the roof deck would be below 60 dBA DNL. The future noise levels at the centers of the outdoor use areas associated with the residential component of the proposed project would meet the City's normally acceptable threshold of 60 dBA DNL.

FIGURE 54 3rd Floor Courtyard

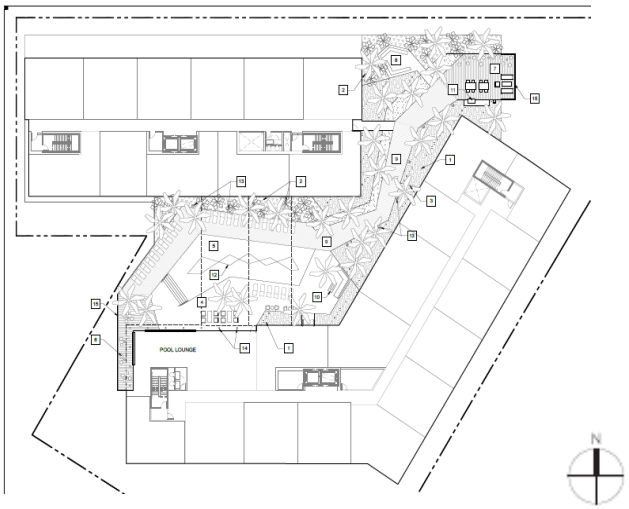


FIGURE 55 9th Floor Roof Top Deck

Future Interior Noise Environment

The California Building Code requires that interior noise levels attributable to exterior environmental noise sources not exceed 45 dBA DNL in any habitable room. The Cal Green Code requires that interior noise levels attributable to exterior sources not exceed 50 dBA L_{eq} (1-hr) in occupied areas of non-residential uses during any hour of occupation.

Future 2041 building façade noise exposures were calculated using the SoundPLAN model.

Building 1

Table 16 below lists noise levels at Building 1 at different elevations. As indicated in Table 16, the exterior noise exposure would range from 50 to 65 dBA DNL. Based on the results of long-term measurements LT-3, loudest hour noise levels are approximately 3 dBA above the corresponding DNL levels. Applying this relationship to the modeled results, it is anticipated that the loudest hour exterior noise exposure of building facades would range from 53 to 69 dBA L_{eq}.

TABLE 16 Future Noise Exposure at Building 1 Façades

Floor	Future Noise Exposure at Facades (dBA DNL)			
	North	East	South	West
1	62	49	59	65
2	61	49	59	64
3	65	56	62	65
4	64	59	62	64
5	64	59	62	64
6	64	60	62	64
7	64	60	62	64
8	64	60	61	63
9	64	60	61	63
10	64	60	61	63

Residential units will be located on floors three through ten. As seen in Table 16, noise levels are anticipated to reach 65 dBA DNL. Assuming modern construction, as indicated in project plans, and STC 28 windows in the closed position and the inclusion of forced-air mechanical ventilation, to allow occupants the option of keeping windows closed, would reduce interior noise levels sufficiently to meet the California Building Code Standard of 45 dBA DNL.

Commercial uses would be located on the entire first floor. As seen in Table 16, noise levels are anticipated to range from 49 to 65 dBA DNL along the first floor. Based on the results of long-term measurements LT-3, loudest hour noise levels are approximately 3 dBA above the corresponding DNL levels. Thus, noise levels are anticipated to range from 52 to 68 dBA L_{eq} along the first floor. Assuming modern construction and windows in the closed position providing a minimum noise reduction of 25 dBA, interior noise levels would reach 43 dBA L_{eq} meeting the Cal Green Code Standard of 50 dBA L_{eq} during the loudest hours.

Building 2

Table 17 below lists noise levels at building façades at different elevations. As indicated in Table 17, the exterior noise exposure would range from 45 to 58 dBA CNEL. Based on the results of long-term measurement LT-5, loudest hour noise levels are approximately 4 dBA above the corresponding DNL levels. Applying this relationship to the modeled results, it is anticipated that the loudest hour exterior noise exposure of building facades would range from 49 to 62 dBA L_{eq}.

TABLE 17 Future Noise Exposure at Building 2 Façades

Floor	Future Noise Exposure at Facades (dBA DNL)			
	North	East	South	West
1	48	46	54	58
2	48	46	54	57
3	52	49	57	57
4	54	52	58	57
5	56	53	57	57
6	56	53	57	57
7	57	53	57	57
8	57	54	57	57
9	57	54	57	57

Residential units will be located on floors one through nine. As seen in Table 17, noise levels are anticipated to reach 58 dBA DNL. Assuming modern construction, as indicated in project plans, and windows partially open providing a minimum noise reduction of 15 dBA, interior noise levels would reach 43 dBA DNL. Interior noise levels are anticipated to meet the interior noise threshold of 45 dBA DNL.

Commercial uses would be located on the entire first floor. As seen in Table 17, noise levels are anticipated to reach 58 dBA DNL along the first floor. Based on the results of long-term measurements LT-5, loudest hour noise levels are approximately 4 dBA above the corresponding DNL levels. Thus, noise levels are anticipated to reach 62 dBA L_{eq} along the first floor. Assuming modern construction and windows partially opened providing a minimum noise reduction of 15 dBA, interior noise levels would reach 47 dBA L_{eq}. Interior noise levels are anticipated to be below the Cal Green Code Standard of 50 dBA L_{eq} during the loudest hours.

Building 3

Table 18 below lists noise levels at building façades at different elevations. As indicated in Table 18, the exterior noise exposure would range from 46 to 59 dBA CNEL. Based on the results of long-term measurement LT-3, loudest hour noise levels are approximately 3 dBA below the corresponding CNEL levels. Applying this relationship to the modeled results, it is anticipated that the loudest hour exterior noise exposure of building facades would range from 49 to 63 dBA L_{eq}.

TABLE 18 Future Noise Exposure at Building 3 Façades

Floor	Future Noise Exposure at Facades (dBA DNL)			
	North	East	South	West
1	56	50	46	56
2	56	49	46	55
3	57	55	54	57
4	58	56	55	57
5	58	56	57	58
6	58	56	57	58
7	58	57	58	58
8	59	57	58	58
9	59	57	58	58
10	59	57	58	59
11	59	57	58	59

Residential units will be located on floors three through eleven. As seen in Table 18, noise levels are anticipated to reach 59 dBA DNL. Assuming modern construction, as indicated in project plans, windows in the closed position, and the inclusion of forced-air mechanical ventilation to allow occupants the option of keeping windows closed, interior noise levels are anticipated to meet the interior noise threshold of 45 dBA DNL.

Commercial uses would be located along the entire first floor. As seen in Table 7, noise levels are anticipated to reach 56 dBA DNL along the first floor of the northern façade. Based on the results of long-term measurements LT-3, loudest hour noise levels are approximately 3 dBA above the corresponding DNL levels. Thus, noise levels are anticipated to reach 59 dBA L_{eq} along the first floor of the northern façade. Assuming modern construction and windows partially opened providing a minimum noise reduction of 15 dBA, interior noise levels would reach 44 dBA L_{eq}. Interior noise levels are anticipated to be below the Cal Green Code Standard of 50 dBA L_{eq} during the loudest hours.

Building 4

Table 19 below lists noise levels at building façades at different elevations. As indicated in Table 19, the exterior noise exposure would range from 57 to 68 dBA DNL. Based on the results of long-term measurements LT-1 and LT-3, loudest hour noise levels are approximately 2 dBA above the corresponding DNL levels. Applying this relationship to the modeled results, it is anticipated that the loudest hour exterior noise exposure of building facades would range from 59 to 70 dBA L_{eq}.

TABLE 19 Future Noise Exposure at Building Façades

Floor	Future Noise Exposure at Facades (dBA DNL)				Future Noise Exposure at Facades (dBA DNL)			
	Building 4.1				Building 4.2			
	North	East	South	West	North	East	South	West
1	62	66	65	59	56	56	59	56
2	62	65	64	58	55	56	58	55
3	65	65	65	61	58	58	59	59
4	64	65	65	61	50	59	60	59
5	64	65	65	61	60	60	60	59
6	64	65	64	61	60	60	60	59
7	64	65	64	61	60	60	60	59
8	64	65	64	61	60	60	60	59
9	64	65	64	61	60	60	59	59

Residential units will be located on floors three through ten. As seen in Table 19, noise levels are anticipated to range from 55 to 66 dBA DNL. Preliminary calculations would require windows and doors with a minimum rating of 28 STC to meet the interior noise threshold of 45 dBA DNL. With the inclusion of forced-air mechanical ventilation to allow occupants the option of keeping windows closed, interior noise levels are anticipated to be below the California Building Code Standard of 45 dBA DNL.

Commercial uses would be located along the first floor of the eastern façade with direct exposure to exterior traffic noise. As seen in Table 19, noise levels are anticipated to reach 66 dBA DNL along the first floor of the eastern façade. Based on the results of long-term measurements LT-1 and LT-3, loudest hour noise levels are approximately 2 dBA above the corresponding DNL levels. Thus, noise levels are anticipated to reach 68 dBA L_{eq} along the first floor of the eastern façade. Assuming modern construction and windows in the closed position providing a minimum noise reduction of 25 dBA, interior noise levels would reach 43 dBA L_{eq}. With the inclusion of forced-air mechanical ventilation to allow occupants the option of keeping windows closed, interior noise levels are anticipated to be meet the Cal Green Code Standard of 50 dBA L_{eq} during the loudest hours.

Conditions of Approval

A qualified acoustical specialist shall prepare a detailed analysis of interior residential and commercial noise levels resulting from all exterior sources during the design phase pursuant to requirements set forth in the State Cal Building Code and the State Cal Green Code, respectively. The study will review the final site plan, building elevations, and floor plans prior to construction and recommend building treatments, where applicable, to reduce commercial interior noise levels to 45 dBA DNL or 50 dBA L_{eq} or lower. Treatments would include, but are not limited to, sound-rated windows and doors, sound-rated wall and window constructions, acoustical caulking, protected ventilation openings, etc. Results of the analysis, including the description of the necessary noise control treatments, shall be submitted to the City, along with the building plans and approved design, prior to issuance of a building permit.

NOISE IMPACTS AND MITIGATION MEASURES

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 and vibration resulting from the project:

- **Temporary or Permanent Noise Increases in Excess of Established Standards.** A significant noise impact would be identified if the project would generate a substantial temporary or permanent noise level increase in ambient noise levels at existing noise-sensitive receptors in excess of the applicable noise standards presented in the General Plan or Municipal Code, as follows:

    - Temporary Noise Increase. A significant noise impact would be identified if construction-related noise would temporarily increase ambient noise levels at sensitive receptors. The City of San José considers large or complex projects involving substantial noise-generating activities and lasting more than 12 months significant when within 500 feet of residential land uses or within 200 feet of commercial land uses or offices.

    - Permanent Noise Increase. A significant permanent noise level increase would occur if the project would result in: a) a noise level increase of 5 dBA DNL or greater, with a future noise level of less than 60 dBA DNL, or b) a noise level increase of 3 dBA DNL or greater, with a future noise level of 60 dBA DNL or greater.

    - Operational Noise in Excess of Standards. A significant noise impact would be identified if the project would expose persons to or generate noise levels that would exceed applicable noise standards presented in the General Plan or Municipal Code.

- **Generation of Excessive Groundborne Vibration.** A significant impact would be identified if the construction of the project would generate excessive vibration levels surrounding receptors. Groundborne vibration levels exceeding 0.08 in/sec PPV would have the potential to result in cosmetic damage to historic buildings, and groundborne vibration levels exceeding 0.2 in/sec PPV would have the potential to result in cosmetic damage to normal buildings.

- **Excessive Aircraft Noise Levels.** A significant noise impact would be identified if the project would expose people residing or working in the project area to excessive aircraft noise levels.

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

Chapter 20.100.450 of the City of San José's Municipal Code establishes allowable hours of construction within 500 feet of a residential unit between 7:00 am and 7:00 pm Monday through Friday unless permission is granted with a development permit or other planning approval. No construction activities are permitted on the weekends at sites within 500 feet of a residence. Policy EC-1.7 of the City of San José's General Plan requires that all construction operations within the City use best available noise suppression devices and techniques and to limit construction hours near residential uses per the Municipal Code allowable hours. Further, the City of San José considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would involve substantial noise-generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

Temporary noise increases resulting from construction vary depending upon the noise levels generated by various pieces of construction equipment, the timing and duration of noise-generating activities, the distance between construction noise sources and noise-sensitive areas, and the presence of intervening shielding features such as buildings or terrain.

Construction activities for individual projects are typically carried out in stages. During each stage of construction, there would be a different mix of equipment operating, and noise levels would vary by stage and vary within stages, based on the amount of equipment in operation and the location at which the equipment is operating. Typical construction noise levels at a distance of 50 feet are shown in Tables 20 and 21. Table 20 shows the average and maximum noise levels for different construction equipment and Table 21 shows the average noise level ranges by construction phase. Most demolition and construction noise falls with the range of 80 to 90 dBA at a distance of 50 feet from the source.

TABLE 20 Construction Equipment 50-foot Noise Emission Levels (dBA)

Equipment Category	$L_{eq}^{1,2,3}$	$L_{max}^{1,2}$	Equipment Category	$L_{eq}^{1,2,3}$	$L_{max}^{1,2}$
Air Hose	93	100	Horizontal Bore Drill	87	88
Air-Operated Post Driver	83	85	Impact Pile Driver	99	105
Asphalt Distributor Truck (Asphalt Sprayer)	-	70	Impact Wrench	68	72
Auger Drill	88	101	Jackhammer	91	95
Backhoe	76	84	Jig Saw	92	95
Bar Bender	66	75	Joint Sealer	-	74
Blasting (Abrasive)	100	103	Man Lift	72	73
Blasting (Explosive)	83	93	Movement Alarm	79	80
Chainsaw	79	83	Mud Recycler	73	74
Chip Spreader	-	77	Nail Gun	70	74
Chipping Gun	95	100	Pavement Scarifier (Milling Machine)	-	84
Circular Saw	73	76	Paving – Asphalt (Paver, Dump Truck)	-	82
Compactor (Plate)	-	75	Paving – Asphalt (Paver, MTV, Dump Truck)	-	83
Compactor (Roller)	82	83	Paving – Concrete (Placer, Slipform Paver)	87	91
Compressor	66	67	Paving – Concrete (Texturing/Curing Machine)	73	74
Concrete Batch Plant	87	90	Paving – Concrete (Triple Roller Tube Paver)	85	88
Concrete Grinder	-	97	Power Unit (Power Pack)	81	82
Concrete Mixer Truck	81	82	Pump	73	74
Concrete Pump Truck	84	88	Reciprocating Saw	64	66
Concrete Saw	85	88	Rivet Buster	100	107
Crane	74	76	Rock Drill	92	95
Directional Drill Rig	68	80	Rumble Strip Grinding	-	87
Drum Mixer	66	71	Sander	65	68
Dump Truck (Cyclical)	82	92	Scraper	-	92
Dump Truck (Passby)	-	73	Shot Crete Pump/Spray	78	87
Excavator	76	87	Street Sweeper	-	81
Flatbed Truck	-	74	Telescopic Handler (Forklift)	-	88
Front End Loader (Cyclical)	72	81	Vacuum Excavator (Vac-Truck)	86	87
Front End Loader (Passby)	-	71	Ventilation Fan	62	63
Generator	67	68	Vibratory Concrete Consolidator	78	80
Grader (Passby)	-	79	Vibratory Pile Driver	99	105
Grinder	68	71	Warning Horn (Air Horn)	94	99
Hammer Drill	72	75	Water Spray Truck	-	72
Hoe Ram	92	99	Welding Machine	71	72

Notes: [1] Measured at 50 feet from the construction equipment, with a "slow" (1 sec.) time constant.

[2] Noise levels apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation.

[3] Equipment without average (L_{eq}) noise levels are non-stationary and best represented only by maximum instantaneous noise level (L_{max}).

Source: Project 25-49 Data, National Cooperative Highway Research Program, https://apps.trb.org/cmsfeed/trbnetprojectdisplay.asp?projectid=3889, October 2018

TABLE 21 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.

Construction of the project is planned to occur between the hours of 7:00 a.m. and 5:00 p.m., Monday through Friday, over a period of 52 months. A detailed list of equipment expected to be used during each phase of construction was provided and assessed for each phase of construction.

Project construction for the El Paseo site is expected to be completed in four phases. Phase 1a is expected to start in September 2021 and would include demolition of the exiting site, site preparation, grading/excavation, trenching/foundation and building exterior for the podium. Phase 2a is expected to start in April 2023 and would include the construction of Building 1. Phase 3a is expected to start in August 2023 and would include construction of Building 2. Phase 4a is expected to start in October 2023 and would include construction of Building 3. Project construction for 1777 Saratoga Avenue would be completed in six phases. Phase 1b is expected to start in September 2021 and would include demolition of the existing site. Phase 2b is expected to start in November 2021 and would include grading/excavation of the site. Phase 3b is expected to start in June 2022 and would include trenching and the foundation. Phase 4b is expected to start in July 2022 and would include construction of Building 5. Phase 5b is expected to start in November 2023 and would include the interior of Building 4. Phase 6b is expected to start in January 2024 and would include paving the project site.

A detailed list of equipment expected to be used during each phase was provided by the applicant. Federal Highway Administration's (FHWA's) Roadway Construction Noise Model (RCNM) was used to calculate the hourly average noise levels for each phase of construction, assuming every piece of equipment would operate simultaneously, which would represent the worst-case scenario. This construction noise model includes representative sound levels for the most common types of construction equipment and the approximate usage factors of such equipment that were developed based on an extensive database of information gathered during the construction of the Central Artery/Tunnel Project in Boston, Massachusetts (CA/T Project or "Big Dig"). The usage factors represent the percentage of time that the equipment would be operating at full power. Assuming

all equipment for each stage would be operating simultaneously, which would represent the worst-case construction scenario, at 50 feet measured from the center of the El Paseo site, hourly average noise levels would range from 80 to 96 dBA L_{eq} for Phases 1a through 4a. At 50 feet measured from the center of the 1777 Saratoga Avenue site, hourly average noise levels would range 78 to 92 for Phases of 1b through 6b..

For overall construction noise levels, multiple pieces of equipment used simultaneously would add together creating a collective noise source. While every piece of equipment per stage of construction would likely be scattered throughout the site, the noise-sensitive receptors surrounding the site would be subject to the collective noise source generated by all equipment operating at once. Therefore, to assess construction noise impacts at the receiving property lines of noise-sensitive receptors during each phase of construction, the collective worst-case hourly average noise level for each stage was centered at the geometrical center of the active construction site and propagated to the nearest property line of the surrounding land uses.

Noise-sensitive uses surrounding the El Paseo site include single-family residential uses approximately 220 feet from the center of construction to the south, commercial uses approximately 300 feet to the north, approximately 220 feet to the east, and approximately 350 feet to the west. These surrounding uses fall within the City's significant noise impact range of 500 feet for residences but outside the City's significant impact range of 200 feet from commercial uses.

Noise-sensitive uses surrounding the 1777 Saratoga Avenue site include commercial uses approximately 170 feet from the center of construction to the west, a place of worship approximately 150 feet to the north, commercial uses approximately 300 feet to the east, and single-family residences approximately 300 feet to the southwest. These surrounding uses fall within the City's significant noise impact range of 200 feet from commercial uses.

Hourly average and maximum construction noise levels at the El Paseo site for each construction phase, assuming all equipment operating simultaneously, are shown in Table 22 for each of the nearby noise sensitive land uses relative to the center of the active construction site. Hourly average and maximum construction noise levels at 1777 Saratoga Avenue for each construction phase, assuming all equipment operating simultaneously, are shown in Table 23 for each of the nearby noise sensitive land uses relative to the center of the active 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. Noise levels in shielded areas would be anticipated to be 5 to 20 dB lower.

TABLE 22 El Paseo Calculated Construction Noise Levels at Nearby Land Uses

Phase of Construction		Total Work Days	Calculated Noise Levels (dBA)							
			Commercial to the North (300 ft)		Single Family Residence to the South (220 ft)		Commercial to the East (220 ft)		Commercial to the West (350 feet)	
			L_{eq}	L_{max}	L_{eq}	L_{max}	L_{eq}	L_{max}	L_{eq}	L_{max}
Site Prep & Podium	Demolition	55	79	85	81	87	81	87	77	83
	Grading/Excavation	145	70	79	73	82	73	82	68	78
	Trenching/Foundation	114	72	82	70	80	67	77	66	76
	Building Exterior	237	74	79	72	77	69	74	68	73
	Concrete	15	79	81	82	84	82	84	78	79
Building 1	Building Exterior	270	75	80	77	82	77	82	73	78
	Building Interior	267	65	68	67	70	67	70	63	66
	Paving	21	69	77	72	80	72	80	68	76
Building 2	Building Exterior	410	75	80	77	82	77	82	73	78
	Building Interior	307	65	68	67	70	67	70	63	66
Building 3	Building Exterior	445	74	81	77	84	77	84	73	80
	Building Interior	250	75	80	77	82	77	82	73	78

TABLE 23 1777 Saratoga Avenue Calculated Construction Noise Levels at Nearby Land Uses

Phase of Construction	Total Work Days	Calculated Noise Levels (dBA)							
		Commercial to the West (170 ft)		Place of Worship to the North (150 ft)		Commercial to the East (300 ft)		Single Family to the Southwest (300 feet)	
		L_{eq}	L_{max}	L_{eq}	L_{max}	L_{eq}	L_{max}	L_{eq}	L_{max}
Demolition	55	79	86	80	87	74	81	74	81
Grading/Excavation	67	79	92	80	93	74	87	74	87
Trenching/Foundation	59	68	77	69	78	63	72	63	72
Building Exterior	453	81	86	82	88	7	82	76	82
Building Interior	217	67	70	69	72	63	66	63	66
Paving	117	73	80	75	81	69	75	69	75

Ambient noise levels at sensitive receptors near the site are expected to be similar to that of the site itself, 59 to 71 dBA DNL. Peak-hour noise levels would be about two dBA more at 61 to 73 dBA $L_{eq\ (1\text{-}hr)}$. As seen in Tables 22 and 23, Project construction would result in noise levels exceeding the ambient by 5 dBA L_{eq} or more throughout most phases of construction at most nearby receptors. Since project construction would last for a period longer than one year and considering that the El Paseo site is within 500 feet of existing residences and the 1777 Saratoga Avenue site is within 500 feet of existing residences and within 200 feet of existing commercial uses, Policy EC-1.7 of the City's General Plan would consider this temporary construction noise impact to be significant.

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. The following reasonable noise reduction measures should be incorporated into the construction plan and implemented during all phases of construction activity for both the El Paseo site and the 1777 Saratoga Avenue site:

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

- A construction noise logistics plan specifying the hours of construction, noise and vibration minimization measures, and posting or notifications of construction schedules is required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses.

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

- The unnecessary idling of internal combustion engines shall be prohibited.

- Staging areas and stationary noise-generating equipment shall be located as far as possible from noise-sensitive receptors such as residential uses (a minimum of 200 feet).

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

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

With the implementation of GP Policy EC-1.7, Municipal Code requirements, and the above measures, the temporary construction noise impact would be reduced to a **less-than-significant** level.

Mitigation Measure 1a: No further mitigation required.

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

The project proposes nighttime construction for up to 15 days within 15 months occurring at the El Paseo site, which would include concrete pouring only.

There are no noise limits given for construction occurring outside of the allowable hours of construction.
As discussed in the fundamentals section of this report, steady noises of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA would affect sleep. Assuming a 25 dBA exterior-to-interior reduction, which is typical for standard residential construction with windows closed, sleep disturbance may result when exterior noise levels exceed 60 dBA for steady noises and 70 dBA for fluctuating noises.
Existing ambient noise levels during nighttime hours at LT-4 ranged from 48 to 65 dBA L_{eq} (average of 49 dBA L_{eq}). Existing ambient noise levels during nighttime hours at LT-5 ranged from 36 to 68 dBA L_{eq} (average of 45 dBA L_{eq}). Since the noise-sensitive receptors located in the project vicinity are currently exposed to nighttime noise levels up to 68 dBA L_{eq}, construction noise levels that are below 60 dBA L_{eq} would be unlikely to cause sleep disturbance. For the residences south and southwest of the El Paseo site, a nighttime limit of 60 dBA L_{eq} is used in this analysis. The nearby commercial uses would not be impacted by nighttime construction since operational hours of these buildings would occur during daytime hours only.

Nighttime construction activities would consist of concrete pouring only, which would include concrete trucks and pumps. Based on the nature of concrete pouring and the type of equipment to be used, it is assumed that all noise-generating activities from the equipment would occur on the ground level during the nighttime construction work. FHWA's RCNM was used to calculate the hourly average noise levels for nighttime concrete pouring. Twenty total trucks are expected during the Concrete phase. However, not all these trucks would be operating at the same time on the site. Assuming one truck and one pump would represent the worst-case conditions, an hourly average noise level of 78 dBA L_{eq} would be generated during nighttime work, as measured at a distance of 50 feet. Increasing the number of trucks to two would increase the hourly average noise level by 1 dBA.

The residences south of the El Paseo project site do not have direct line-of-sight to the construction, as there is an existing berm which would provide around 10 dB of noise reduction. The concrete trucks and pumps used during nighttime construction, would be set back approximately 100 to 480 feet from the nearest residential property line to the south. Assuming one concrete truck and one pump and shielding from the existing berm, hourly average noise levels would range from 49 to 62 dBA L_{eq} at the nearest residential property line, depending on the on-site location of the concrete pouring. The worst-case condition would occur when the concrete pumping operation is located 100 feet from the project's southern property line. At this location the hourly average noise level would exceed the nighttime noise limit by 2 dBA.

The second row of residences south of the El Paseo site would be approximately 255 feet from the nighttime work when equipment is located along the southern boundary of the El Paseo project site. These residences would be partially shielded from nighttime construction activities by the first row of residences as well as the existing berm, which would provide about a 15 dBA L_{eq} reduction in noise levels. Assuming one concrete truck and one concrete pump, hourly average noise levels due to nighttime construction activities would range from 44 to 50 dBA L_{eq}, depending on the on-site location of the concrete pouring. The nighttime noise limit of 60 dBA L_{eq} is not expected to be exceeded.

The residences southwest of the El Paseo project site do not direct line-of-sight to the construction, there are existing buildings which would provide around 7 dB of noise reduction. The concrete truck and pump used during nighttime construction, would be set back approximately 280 to 900 feet from the nearest residential property line to the southwest. Assuming one concrete truck and one pump and shielding from the buildings, hourly average noise levels would range from 46 to 56 dBA L_{eq} at the nearest residential property line, depending on the on-site location of the concrete pouring. The nighttime noise limit of 60 dBA L_{eq} is not expected to be exceeded.

The second row of residences southwest of the El Paseo project site would be approximately 470 to 700 feet from the nighttime work when equipment is located along the southwestern boundary of the El Paseo project site. These residences would be partially shielded from nighttime construction activities by the existing buildings, which would provide about a 7 dBA L_{eq} reduction in noise levels. Assuming one concrete truck and one concrete pump, hourly average noise levels due to nighttime construction activities would range from 48 to 52 dBA L_{eq}, at the nearest residential property line, depending on the on-site location of the concrete pouring. The nighttime noise limit of 60 dBA L_{eq} is not expected to be exceeded.

Nighttime construction activities could potentially result in a significant impact at the single-family residences south of the El Paseo project site.

Mitigation Measure 1b:

San José requires the issuance of a Development Permit for construction occurring outside of the allowable hours of 7:00 a.m. to 7:00 p.m., Monday through Friday within 500 feet of existing residential land uses. Concrete pouring is proposed during nighttime hours for up to 15 days during a 15-month duration. The following measures would reduce nighttime noise impacts at nearby noise-sensitive residences to a less-than-significant level:

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

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

alarms (ambient-adjusting, or "smart alarms" that automatically adjust the alarm to 5 dBA above the ambient near the operating equipment).

- Limit nighttime concrete pouring to the northernmost equipment location or a minimum distance of 100 feet from the southern boundary of the El Paseo site, where feasible.
    - If the concrete pumping operation is located within 100 feet of the southern boundary of the El Paseo site, when feasible install temporary noise barriers around the concrete pumping operation to control the noise levels at the source.

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

With the implementation of the above Mitigation Measure 1b, the temporary nighttime construction noise impact would be reduced to a **less-than-significant** level.

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

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

The traffic study prepared for the proposed project by Hexagon Transportation Consultants, Inc. included peak hour turning movements for twenty-four affected intersections in the project vicinity. When the project trips were added to the existing traffic volumes, the existing plus project scenario was calculated. Comparing the existing plus project traffic volumes to the existing traffic volumes, a noise level increase of 0 to 1 dBA DNL was calculated along every roadway segment included in the traffic study. The project would not result in doubling of the traffic, and therefore, the proposed project would not result in a permanent noise increase of 3 dBA DNL or more. This is a **less-than-significant** impact.

Mitigation Measure 1c: None required.

Impact 1d: Noise Levels in Excess of Standards. The proposed project is not expected to generate noise in excess of standards established in the City's General Plan or Municipal Code at nearby sensitive receptors. Noise originating from operational noise sources was analyzed based on a worst-case scenario. No potential exceedances were identified. **This is a less-than-significant impact.**

The City's General Plan does not include policies specifically addressing operational noise generated by residential land uses. However, the mechanical noise for these types of uses should be addressed with respect to the City's Municipal Code threshold of 55 dBA DNL to minimize disturbance to the existing and future residences surrounding the project site.

For the commercial component of the proposed project, Policies EC-1.3 and EC-1.6 of the City's General Plan states that noise generated by new nonresidential land uses should not exceed 55 dBA DNL at the property lines of adjacent existing or planned noise-sensitive uses.

Section 20.30.700 of the City's Municipal Code establishes a limit of 55 dBA for noise sources generated by any use or combination of uses when measured at the property line.

The proposed project would include mechanical equipment, such as heating, ventilation, and air conditioning systems (HVAC), fire pumps, and generators.

With the proposal of a rooftop decks, it is assumed the HVAC units will either be entirely enclosed, if located along the rooftop, or located within a separate enclosure elsewhere in the building. Therefore, it is not anticipated that noise from the mechanical equipment would be in violation of the City's Municipal Code. However, due to the number of variables inherent in the mechanical equipment needs of the project, the impacts of mechanical equipment noise on nearby noise-sensitive uses should be assessed during the final project design stage. Design planning should consider the noise criteria associated with such equipment and utilize site planning to locate equipment in less noise-sensitive areas. Other controls could include, but shall not be limited to, fan silencers, enclosures, and mechanical screening. The final design plans should be reviewed by a qualified acoustical consultant to address any potential conflicts.

The site plans for proposed Buildings, 1, 2, 3, and 4 include a fire pump and generator on the first floor of each building. Noise levels generated by electrical equipment and pumps would be adequately attenuated such that noise levels on adjacent property lines would be at or below 55 dBA DNL.

The emergency generator expected to be used at Buildings 1, 2, 3, and 4 would be the Kohler KD1750 industrial diesel generator set, which has a capacity of 1750 kW. Generators of this size would typically generate noise levels up to 98 dBA at a distance of 23 feet. While noise due to generator operations are typically not subject to noise regulations during an emergency, emergency generators are typically tested monthly for a period of one hour between 7:00 a.m. and 10:00 p.m. Assuming a minimum attenuation of 25 dBA due to the building façades, the estimated hourly average noise levels and day-night average noise levels were calculated at the property lines of the

nearest surrounding commercial or residential uses for each generator room. These levels are summarized in Table 24. The estimated day-night average noise level would be below the 55 dBA threshold established by the City of San José. Figure 56 shows the location of the emergency generators for Buildings 1, 2, and 3. Figure 57 shows the location of the emergency generator for Building 4.

TABLE 24 Estimated Operational Noise Levels for Monthly Emergency Generator Test

Generator Room	Nearest Receptor	L_{eq}	DNL
Building 1	Comm. Northeast (150 feet)	57	43
Building 2	Residential South (300 feet)	51	37
Building 2	Comm. East (250 feet)	52	38
Building 3	Comm. Northwest (150 feet)	57	43
Building 4	Comm. North (85 feet)	62	48
Building 4	Place of Worship West (95 feet)	61	47

FIGURE 56 Fire Pump and Generator Locations- El Paseo Site

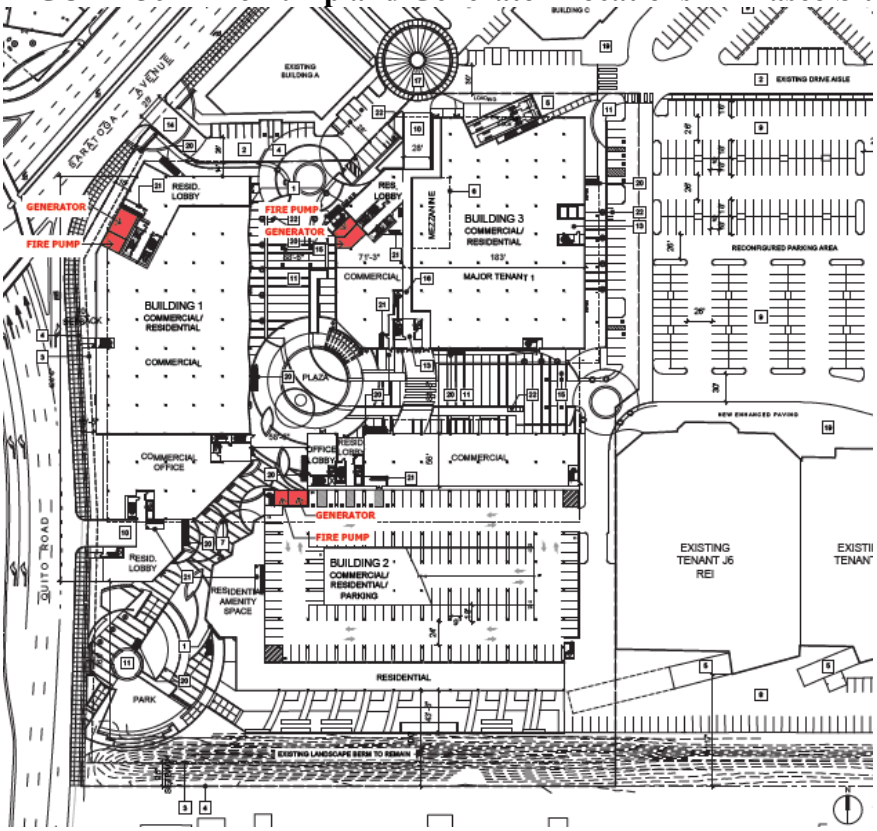
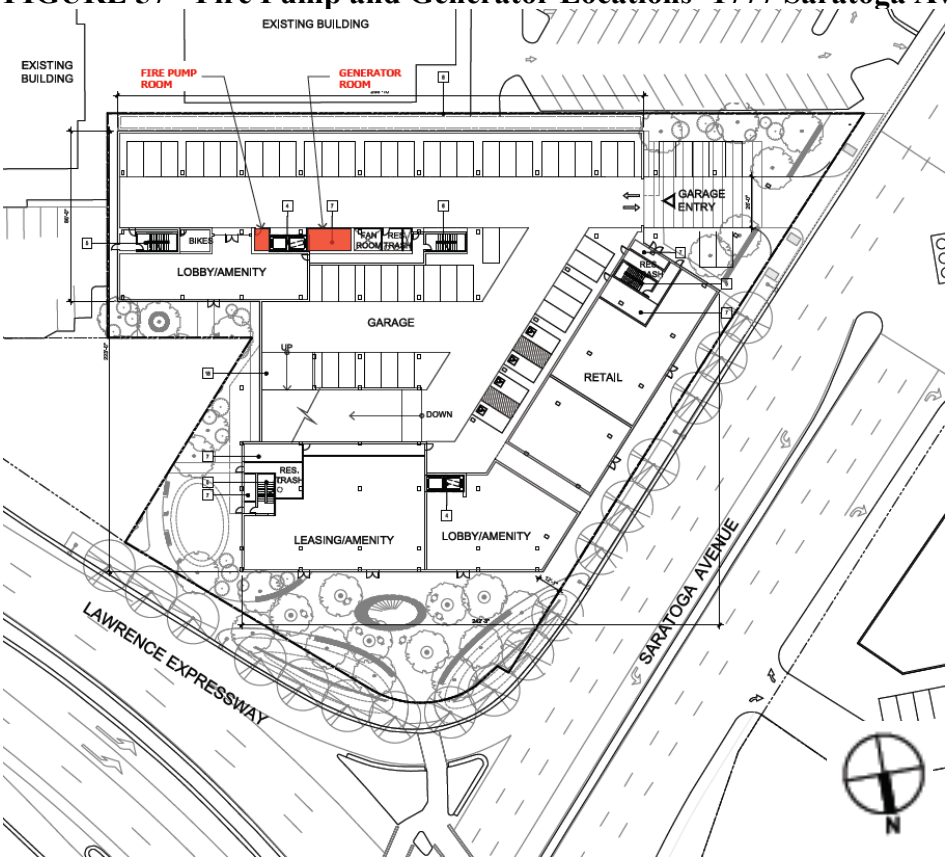


FIGURE 57 Fire Pump and Generator Locations- 1777 Saratoga Avenue Site



Truck Deliveries

Proposed Building 3shows a loading zone on the ground level and located within docking bays, which can be closed with bay doors. Building 3 shows the loading zone along the northern façade, which would have direct line-of-sight to the commercial property to the north and partial line of sight to the commercial property to the northwest. The center of the loading zone would be approximately 75 feet from the commercial property to the north and approximately 100 feet from the commercial property to the northwest.

Truck delivery noise would include maneuvering activities occurring at the loading docks. Due to the existing commercial land use at the project site and the surrounding area, truck pass-by activities already exist along the roadways and would be included in the ambient noise environment. Trucks maneuvering would generate 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 used for incoming deliveries typically generate maximum instantaneous noise levels of 70 to 75 dBA L_{max} 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 L_{max} at a distance of 50 feet. The number of truck deliveries each day is unknown at this time; however, the building has only one loading area for trucks. Therefore, the maximum number of truck deliveries in any given hour would be one. This would represent worst-case scenario. Typically, loading or unloading a truck

would take up to five minutes. Assuming one truck delivery in any given hour, the hourly average noise level at 50 feet would be 62 dBA L_{eq}. Under worst-case conditions, it is assumed that each hour during regular operational hours between 9:00 a.m. and 5:00 p.m. would result in the maximum hourly average noise level of 62 dBA L_{eq}, which would include one deliveries per hour. Therefore, the day-night average noise level at 50 feet would be 58 dBA DNL.

At a distance of 75 feet from the center of the loading zone, the hourly average noise level would be 58 dBA L_{eq}, and the day-night average noise level would be 54 dBA DNL. This would meet the City's Municipal Code threshold for nonresidential land uses. At a distance of 100 feet from the center of the loading zone, the hourly average noise level would be 56 dBA L_{eq}, and the day-night average noise level would be 52 dBA DNL. This would meet the City's Municipal Code threshold for nonresidential land uses.

Based on the worst-case assumptions, the City's 55 dBA DNL threshold is not expected to be exceeded at the shared property lines of nonresidential land uses. This would be a less-than-significant impact.

No additional exterior noise-generating equipment is anticipated for the project. This is a **less-than-significant** impact.

Mitigation Measure 1d: None required.

Impact 2: **Exposure to Excessive Groundborne Vibration due to Construction.** Construction-related vibration levels are expected to potentially exceed applicable vibration thresholds at a nearby sensitive land use. **This is a potentially significant impact.**

Demolition and construction activities required for construction often generate perceptible vibration levels and levels that could affect nearby structures when heavy equipment or impact tools (e.g., jackhammers, pile drivers, hoe rams) are used in the vicinity of nearby sensitive land uses. Building damage generally falls into three categories. Cosmetic damage (also known as threshold damage) is defined as hairline cracking in plaster, the opening of old cracks, the loosening of paint or the dislodging of loose objects. Minor damage is defined as hairline cracking in masonry or the loosening of plaster. Major structural damage is defined as wide cracking or the shifting of foundation or bearing walls.

Policy EC-2.3 of the City of San José General Plan establishes a vibration limit of 0.08 in/sec PPV to minimize the potential for cosmetic damage to sensitive historic structures, and a vibration limit of 0.2 in/sec PPV to minimize damage at buildings of normal conventional construction. The vibration limits contained in this policy are conservative and designed to provide the ultimate level of protection for existing buildings in San José.

According to the City of San José Historic Resources Inventory,[5] there are no historic buildings located within 500 feet of the project site. There would be no risk of damage to any historic buildings resulting from project construction.

Construction activities associated with the project would include demolition of existing site improvements, site preparation, foundation work, new building framing and finishing, and paving. According to construction information provided by the project design team, pile driving is not a method of construction.

Table 25 presents typical vibration levels from construction equipment at 25 feet. Vibration levels would vary depending on soil conditions, construction methods, and equipment used. Table 25 also presents construction vibration levels at representative distances from the construction equipment located at the closest property line to the nearest structures. Calculations were made to estimate vibration levels at distances of 5 feet from the site to represent the distance between the residence to the southeast and the nearest site property line, as well as 10 feet, 90 feet, and 100 feet to represent the distance to other nearby structures. Vibration levels are highest close to the source, and then attenuate with increasing distance at the rate $(D_{ref}/D)^{1.1}$, where D is the distance from the source in feet and D_{ref} is the reference distance of 25 feet.

[5] "City of San José Historic Resources Inventory." City of San José, Accessed March 17, 2021, https://www.sanjoseca.gov/your-government/departments/planning-building-code-enforcement/planning-division/historic-preservation/historic-resources-inventory .

TABLE 25 Vibration Levels for Construction Equipment at Various Distances

Equipment		PPV at 5 ft. (in/sec)	PPV at 10 ft. (in/sec)	PPV at 25 ft. (in/sec)	PPV at 90 ft. (in/sec)	PPV at 100 ft. (in/sec)
Clam shovel drop		**1.186**	**0.553**	0.202	0.044	0.044
Hydromill (slurry wall)	in soil	0.047	0.022	0.008	0.002	0.002
	in rock	0.100	0.047	0.017	0.004	0.004
Vibratory Roller		**1.233**	**0.575**	0.210	0.051	0.046
Hoe Ram		**0.523**	0.244	0.089	0.022	0.019
Large bulldozer		**0.523**	0.244	0.089	0.022	0.019
Caisson drilling		**0.523**	0.244	0.089	0.022	0.019
Loaded trucks		0.446	0.208	0.076	0.019	0.017
Jackhammer		0.206	0.096	0.035	0.009	0.008
Small bulldozer		0.018	0.008	0.003	0.001	0.001

Source: Transit Noise and Vibration Impact Assessment, United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, September 2018 as modified by Illingworth & Rodkin, Inc., November 2020.

As indicated in Table 25, heavy vibration generating construction equipment, such as vibratory rollers, clam shovel drops, hoe rams, large bulldozers, and caisson drilling, would have the potential to produce vibration levels greater than the 'modern' structure threshold of 0.5 in/sec PPV within about 5 feet of construction. Vibratory rollers and clam shovel drops would have the potential to exceed the 0.5 in/sec PPV limit within about 12 feet of construction. The place of worship buildings to the north and west of 1777 Saratoga and the existing commercial buildings to the east and north of El Paseo could be exposed to vibration levels above 0.5 in/sec PPV resulting from project construction. Vibration levels could exceed the historic building threshold of 0.25 in/sec PPV at distances within about 25 feet of construction. There are no historic buildings located within 25 feet.

The US Bureau of Mines has analyzed the effects of blast-induced vibration on buildings in USBM RI 8507[6], and these findings have been applied to vibrations emanating from construction equipment on buildings[7]. Figure 58 presents the damage probability as reported in USBM RI 8507 and reproduced by Dowding assuming a maximum vibration level of 1.2 in/sec PPV. As shown on Figure 58, these studies indicate an approximate 20% probability of "threshold damage" (referred to as cosmetic damage elsewhere in this report) at vibration levels of 1.2 in/sec PPV or less and no observations of "minor damage" or "major damage" at vibration levels of 1.2 in/sec PPV or less. Based on these data, cosmetic or threshold damage would be manifested in the form of hairline cracking in plaster, the opening of old cracks, the loosening of paint or the dislodging of loose objects. However, minor damage (e.g., hairline cracking in masonry or the loosening of plaster) or major structural damage (e.g., wide cracking or shifting of foundation or bearing walls) to the residential and commercial structures adjacent to the site would not be anticipated to occur assuming a maximum vibration level of 1.2 in/sec PPV.

[6] Siskind, D.E., M.S. Stagg, J.W. Kopp, and C.H. Dowding, Structure Response and Damage Produced by Ground Vibration form Surface Mine Blasting, RI 8507, Bureau of Mines Report of Investigations, U.S. Department of the Interior Bureau of Mines, Washington, D.C., 1980.
[7] Dowding, C.H., Construction Vibrations, Prentice Hall, Upper Saddle River, 1996.

Groundborne vibration levels from project construction would be anticipated to exceed 0.5 in/sec PPV when construction is located within 12 feet of the structures adjacent to El Paseo to the north and east and 1777 Saratoga to the north and west. Vibration levels may still be perceptible in areas further from the site during periods of heavy construction but would not be expected to cause structural damage. This is a **potentially significant impact**.

Mitigation Measure 2: The following measures are recommended to reduce vibration impacts from construction activities to a less-than-significant impact:

- Limit the use of vibratory rollers, hoe rams, large bulldozers, and caisson drilling, and avoid clam shovel drops within 15 feet of the property lines shared with residences and commercial structures adjacent to the site.

- Place operating equipment on the construction site as far as possible from vibration-sensitive receptors.

- Use smaller equipment to minimize vibration levels below the limits.

- Select demolition methods not involving impact tools.

- Avoid dropping heavy objects or materials near vibration sensitive locations.

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

- A construction vibration-monitoring plan shall be implemented to document conditions at the residences and commercial structures adjacent to the site prior to, during, and after vibration generating construction activities. All plan tasks shall be undertaken under the direction of a licensed Professional Structural Engineer in the State of California and be in accordance with industry accepted standard methods. The construction vibration monitoring plan should be implemented to include the following tasks:

    - Identification of sensitivity to ground-borne vibration of the residences and commercial structures adjacent to the site. A vibration survey (generally described below) would need to be performed.

    - Performance of a photo survey, elevation survey, and crack monitoring survey for the residences and commercial structures adjacent to the site. Surveys shall be performed prior to and after completion of vibration generating construction activities located within 25 feet of the structure. The surveys shall include internal and external crack monitoring in the structure, settlement, and distress, and shall

document the condition of the foundation, walls and other structural elements in the interior and exterior of the structure.

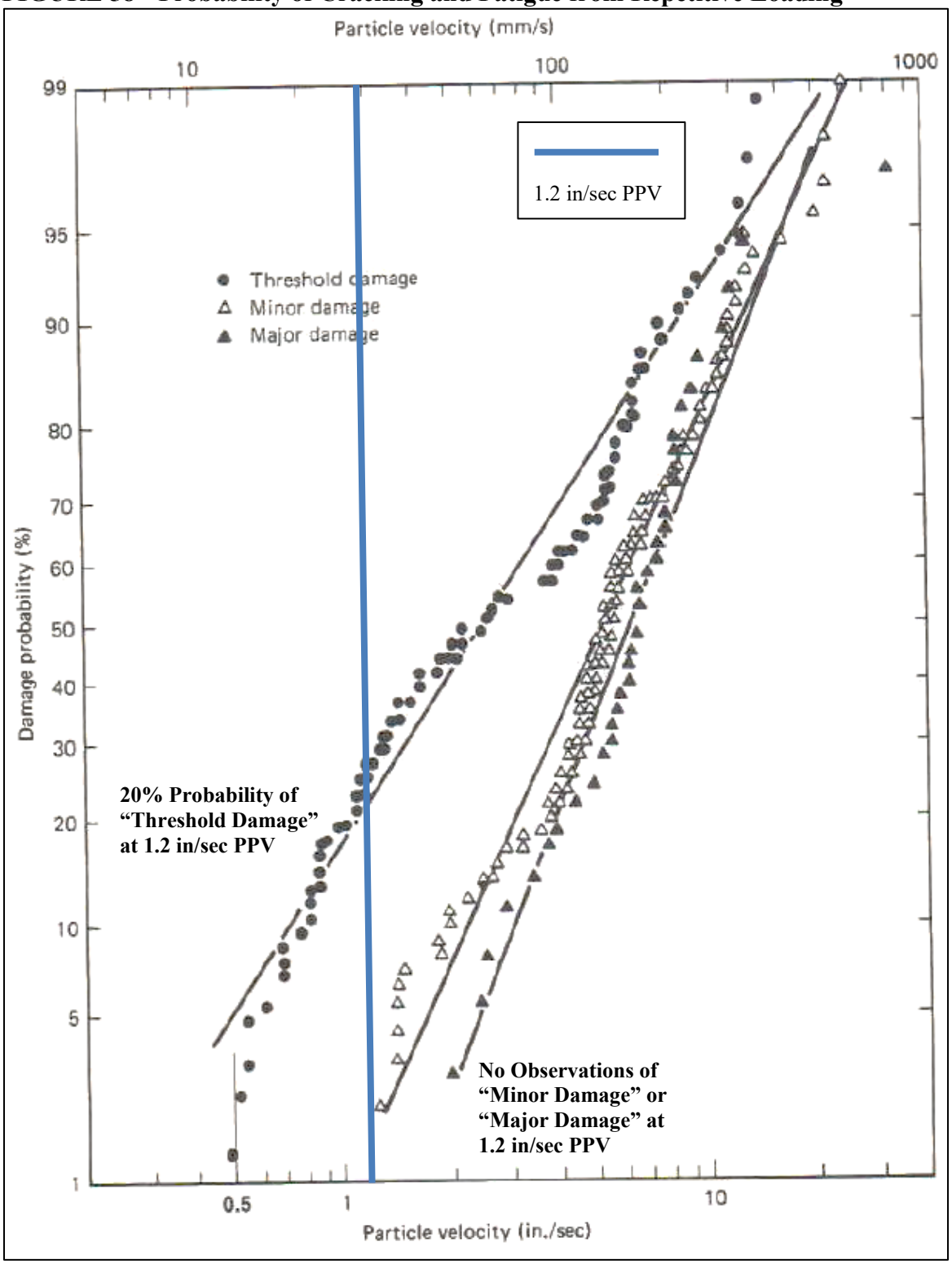
- Conduct a post-survey on the structure where either monitoring has indicated high levels or complaints of damage. Make appropriate repairs in accordance with the Secretary of the Interior's Standards where damage has occurred as a result of construction activities.

- The results of any vibration monitoring shall be summarized and submitted in a report shortly after substantial completion of each phase identified in the project schedule. The report will include a description of measurement methods, equipment used, calibration certificates, and graphics as required to clearly identify vibration-monitoring locations. An explanation of all events that exceeded vibration limits will be included together with proper documentation supporting any such claims.

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

Implementation of these measures would reduce the impact to a **less-than-significant** level.

FIGURE 58 Probability of Cracking and Fatigue from Repetitive Loading



Source: Dowding, C.H., Construction Vibrations, Prentice Hall, Upper Saddle River, 1996 as modified by Illingworth & Rodkin, Inc., November 2020.

Impact 3: **Excessive Aircraft Noise.** The project site is located approximately 2 miles from a public airport or public use airport and would not expose people residing or working in the project area to excessive aircraft noise levels. **This is a less-than-significant impact.**

Norman Y. Mineta San José International Airport is a public-use airport located approximately 5.8 miles northeast of the project site. As seen in Figure 59, the project site lies outside of the 60 dBA CNEL 2037 noise contour of the airport, according to the City's new Airport Master Plan Environmental Impact Report.[8] Future exterior noise levels due to aircraft from Norman Y. Mineta San José International Airport would not exceed 60 dBA CNEL/DNL. According to Policy EC-1.11 of the City's General Plan, the required safe and compatible threshold for exterior noise levels would be at or below 65 dBA CNEL/DNL for aircraft. Therefore, the proposed project would be compatible with the City's exterior noise standards for aircraft noise.

Assuming standard construction materials for aircraft noise below 60 dBA DNL, the future interior noise levels resulting from aircraft would be at or 45 dBA DNL and below 50 dBA $L_{eq(1\text{-}hr)}$.. 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.**

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

FIGURE 59 2037 CNEL Noise Contours for SJIA Relative to Project Site

Figure 5
Scenario 2: With Project 2037 Noise Contour Map

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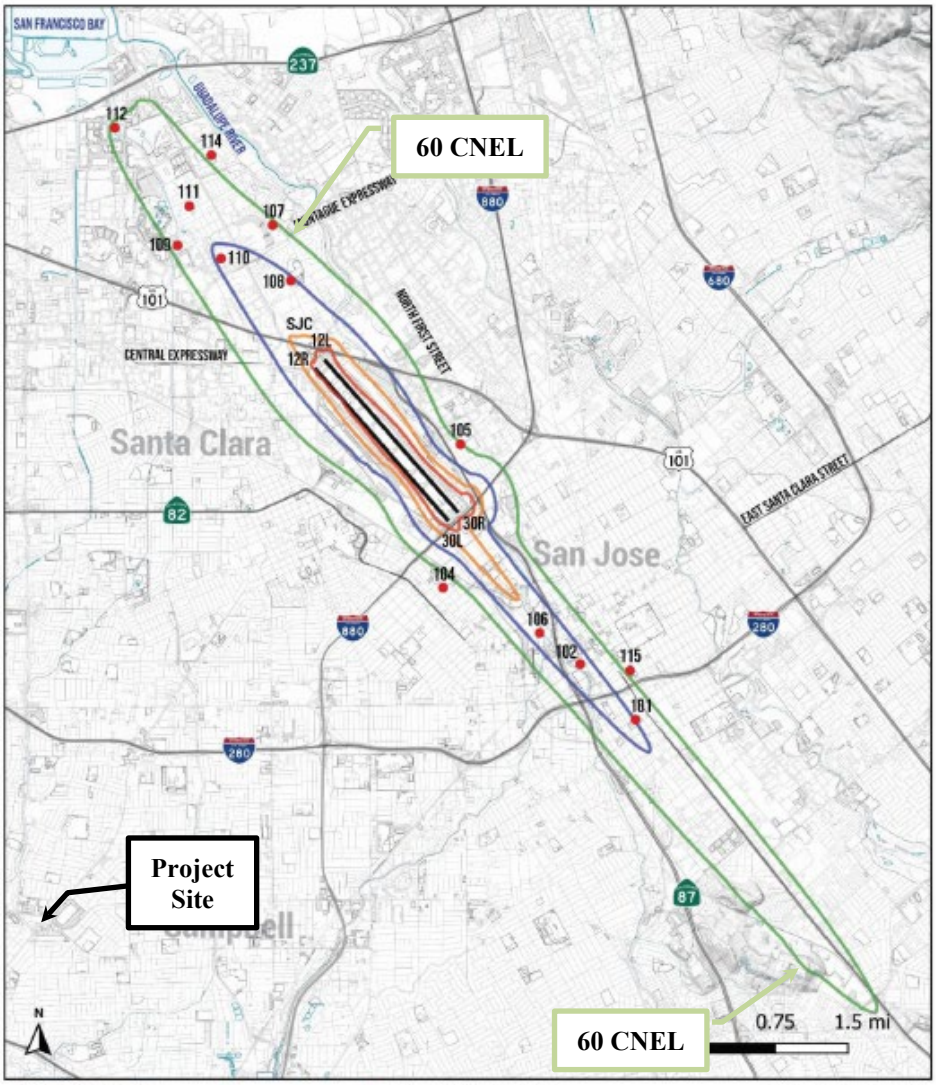

NORMAN Y. MINETA SAN JOSE INTERNATIONAL AIRPORT

- Noise Monitoring Station
- 101 Site ID
- Runway
- 75 dBA and Greater CNEL Contour
- 70 dBA and Greater CNEL Contour
- 65 dBA and Greater CNEL Contour
- 60 dBA and Greater CNEL Contour

Figure 5 Scenario 2: With Project 2037 Noise Contour Map

Source: BridgeNet International 2019