# *3896 STEVENS CREEK BOULEVARD NOISE AND VIBRATION ASSESSMENT*

## *San José, California*

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## INTRODUCTION

A commercial development consisting of office, retail, restaurant, and health club uses, as well as associated structured parking has been proposed at 3896 Stevens Creek Boulevard in San José, California. Located between Saratoga Avenue and Northlake Drive, the site is currently developed with four one-story commercial buildings and surface parking lots. As part of the proposed project, these existing structures would be demolished. The project would construct a 12-story office building connected to an eight-story parking structure and a three-story Lifetime Fitness facility. The parking garage would be accessed from Saratoga Avenue and Northlake Drive.

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

## SETTING

### Fundamentals of Environmental Noise

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

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

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level (dBA).* This scale gives greater weight to the frequencies of sound to which

the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This *energy-equivalent sound/noise descriptor* is called $L_{eq}$. The most common averaging period is hourly, but $L_{eq}$ can describe any series of noise events of arbitrary duration.

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

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level* (*CNEL*) is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels. The *Day/Night Average Sound Level* ($L_{dn}$ 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 12-17 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 57-62 dBA DNL with open windows and 65-70 dBA DNL if the windows are closed. Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels of 75-80 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 25-30 percent of the population. There is, therefore, an increase of about 2 percent per dBA between a DNL of 60-70 dBA. Between a DNL of 70-80 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 30-35 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 3 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 4 percent increase in the percentage of the population highly annoyed.

**Fundamentals of Groundborne Vibration**

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

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

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

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

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

**TABLE 1 Definition of Acoustical Terms Used in this Report**

| Term | Definition |
|---|---|
| Decibel, dB | A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals. |
| Sound Pressure Level | Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e. g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter. |
| Frequency, Hz | The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz. |
| A-Weighted Sound Level, dBA | The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. |
| Equivalent Noise Level, $L_{eq}$ | The average A-weighted noise level during the measurement period. |
| $L_{max}$, $L_{min}$ | The maximum and minimum A-weighted noise level during the measurement period. |
| $L_{01}$, $L_{10}$, $L_{50}$, $L_{90}$ | The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period. |
| Day/Night Noise Level, $L_{dn}$ or DNL | The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am. |
| Community Noise Equivalent Level, CNEL | The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am. |
| Ambient Noise Level | The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location. |
| Intrusive | That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level. |

Source: Handbook of Acoustical Measurements and Noise Control, Harris, 1998.

**TABLE 2 Typical Noise Levels in the Environment**

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

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

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

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

Source: Transportation and Construction Vibration Guidance Manual, California Department of Transportation, September 2013.

**Regulatory Background - Noise**

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 Jose 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 Cal Green Code.*** The State of California established exterior sound transmission control standards for new non-residential buildings, as set forth in the 2010 California Green Building Standards Code (Section 5.507.4.1 and 5.507.4.2). These standards were not altered in the 2019 revisions. 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. Both of 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 or additional envelope or altered 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 within the 65 dBA CNEL or DNL noise contour of a freeway or expressway, railroad, industrial source or fixed-guideway noise source, as determined by the Noise Element of the General Plan.
>
> **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 or addition envelope or altered 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 Airport Land Use Commission Comprehensive Land Use Plan.*** The Comprehensive Land Use Plan 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

**Policy N-3** Noise impacts shall be evaluated according to the Aircraft Noise Contours presented on Figure 5 (2022 Aircraft Noise Contours).

***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.

The City's acceptable exterior noise level objective is 70 dBA DNL or less for office buildings, business commercial, and professional offices (Table EC-1).

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.

**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-1.6** 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-1.11** 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.

**Regulatory Background – Vibration**

***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 site is located south of Stevens Creek Boulevard between Saratoga Avenue and Northlake Drive in San José, California. Existing commercial land uses are located west of the project site, opposite Saratoga Avenue. To the north, opposite Stevens Creek Boulevard, there is a multi-family residential building and commercial land uses. Multi-family residential land uses and a Pep Boys commercial retail land use are located to the east, opposite Northlake Drive. Adjacent to the project site along the southern and eastern boundaries, there is an existing temple and community center that would remain under future project conditions. To the south of the project site, is an existing commercial center, and opposite Kiely Boulevard, are multi-family residential land uses and retail shops.

A noise monitoring survey was performed in the project vicinity beginning on Wednesday, August 10, 2016 and concluding on Friday, August 12, 2016. This monitoring survey was made for a previous development proposal at the project site, but the data remains applicable to establish existing conditions in the site vicinity. The monitoring survey included three long-term (LT-1 through LT-3) noise measurements and six short-term (ST-1 through ST-6) noise measurements. All measurement locations are shown in Figure 1. The existing noise environment at the project site results primarily from vehicular traffic on the surrounding roadways and the occasional aircraft fly-overs from Mineta San José International Airport.

Long-term noise measurement LT-1 was made along Northlake Drive, approximately halfway between Stevens Creek Boulevard and Kiely Boulevard. LT-1 was located approximately 45 feet west of the Northlake Drive centerline. Hourly average noise levels at this location typically ranged from 54 to 64 dBA $L_{eq}$ during the day and from 44 to 61 dBA $L_{eq}$ at night. The day-night average noise level from Wednesday, August 10, 2016 through Friday, August 12, 2016 was 60 dBA DNL. The daily trend in noise levels at LT-1 is shown in Figure 2.

LT-2 measured noise levels along Kiely Boulevard at a distance of approximately 45 feet north of the Kiely Boulevard centerline. Hourly average noise levels at this location typically ranged from 60 to 70 dBA $L_{eq}$ during the day and from 48 to 63 dBA $L_{eq}$ at night. The day-night average noise level from Wednesday, August 10, 2016 through Friday, August 12, 2016 was 66 dBA DNL. The daily trend in noise levels at LT-2 is shown in Figure 3.

Site LT-3 was located along Saratoga Avenue approximately halfway between Stevens Creek Boulevard and Kiely Boulevard. LT-3 was 65 feet east of the centerline of Saratoga Avenue. Hourly average noise levels at this location typically ranged from 64 to 68 dBA $L_{eq}$ during the day and from 56 to 66 dBA $L_{eq}$ at night. The day-night average noise level from Wednesday, August 10, 2016 through Friday, August 12, 2016 was 69 dBA DNL. The daily trend in noise levels at LT-3 is shown in Figure 4.

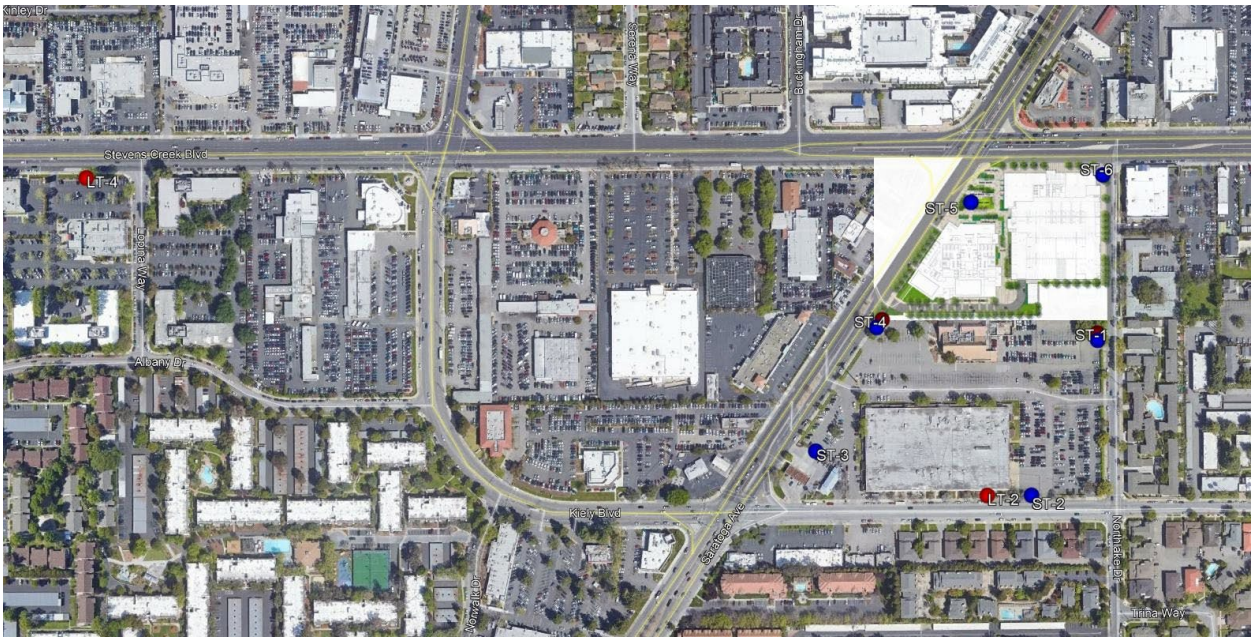
Each of the short-term noise measurements were taken around the perimeter of the project site, as shown in Figure 1. The short-term noise measurements were made over periods of ten-

minutes, concurrent with the long-term noise data, on Friday, August 12, 2016 between 12:10 p.m. and 2:00 p.m. All short-term measurements are summarized in Table 4.

ST-1 was taken near LT-1, approximately 45 feet west of the centerline of Northlake Drive. The 10-minute average noise level measured at ST-1 was 54 dBA $L_{eq(10\text{-}min)}$. The maximum instantaneous noise level measured at ST-1 (67 dBA $L_{max}$) was caused by a loud stereo during a vehicle pass-by. ST-2 was made near LT-2, approximately 45 feet north of the centerline of Kiely Boulevard. The 10-minute average noise level measured at ST-2 was 61 dBA $L_{eq(10\text{-}min)}$. ST-3 was made along the shared property line of the project site and the Chevron gas station near the Saratoga Avenue/Kiely Boulevard intersection. ST-3 was approximately 120 feet east of the centerline of Saratoga Avenue. The 10-minute average noise level measured at ST-3 was 63 dBA $L_{eq(10\text{-}min)}$. ST-4 was made near LT-3, approximately 65 feet east of the centerline of Saratoga Avenue. The 10-minute average noise level measured at ST-4 was 67 dBA $L_{eq(10\text{-}min)}$. The maximum instantaneous noise levels at ST-3 and ST-4 ranged from 77 to 83 dBA $L_{max}$ and were attributed to motorcycle pass-bys. ST-5 was made near the corner of Saratoga Avenue and Stevens Creek Boulevard. ST-5 was approximately 85 feet east of the centerline of Saratoga Avenue and approximately 155 feet south of the centerline of Stevens Creek Boulevard. The 10-minute average noise level measured at ST-5 was 63 dBA $L_{eq(10\text{-}min)}$. ST-6 was made at the corner of Northlake Drive and Stevens Creek Boulevard. ST-6 was approximately 25 feet west of the centerline of Northlake Drive and approximately 85 feet south of the centerline of Stevens Creek Boulevard. The 10-minute average noise level measured at ST-6 was 68 dBA $L_{eq(10\text{-}min)}$. A noisy vehicle pass-by was measured to be 82 dBA $L_{max}$ at ST-6.

In addition to the measurements made at the project site and the immediate surrounding area, a long-term measurement was made approximately 70 feet south of the centerline of Stevens Creek Boulevard in 2017 at 4300 Stevens Creek Boulevard. This measurement, identified in Figure 1 as LT-4, was made between Wednesday, May 24, 2017 and Friday, May 26, 2017. Hourly average noise levels at this location typically ranged from 67 to 76 dBA $L_{eq}$ during the day and from 56 to 69 dBA $L_{eq}$ at night. The day-night average noise level at this receptor was 72 dBA DNL, and the daily trend is shown in Figure 5.

**FIGURE 1 Noise Measurement Locations**




Source: Google Earth 2020.

**FIGURE 2 Daily Trend in Noise Levels at LT-1, Wednesday, August 10 through Friday, August 12, 2016**

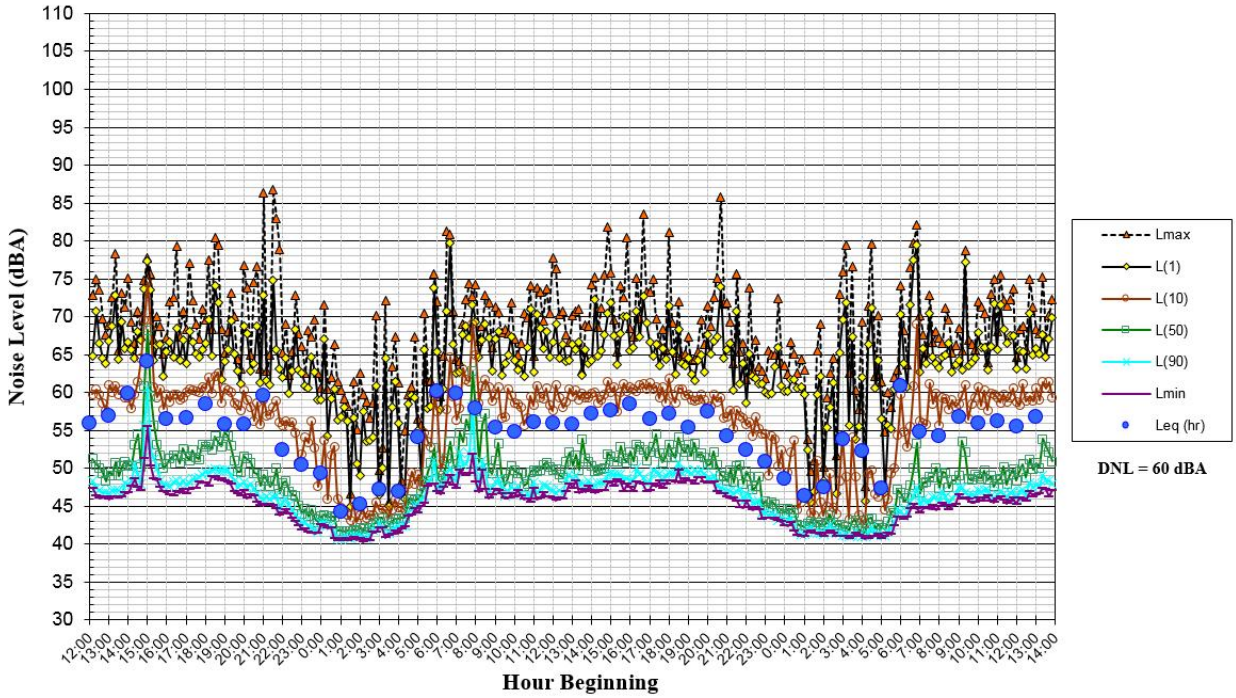


**FIGURE 3 Daily Trend in Noise Levels at LT-2, Wednesday, August 10 through Friday, August 12, 2016**

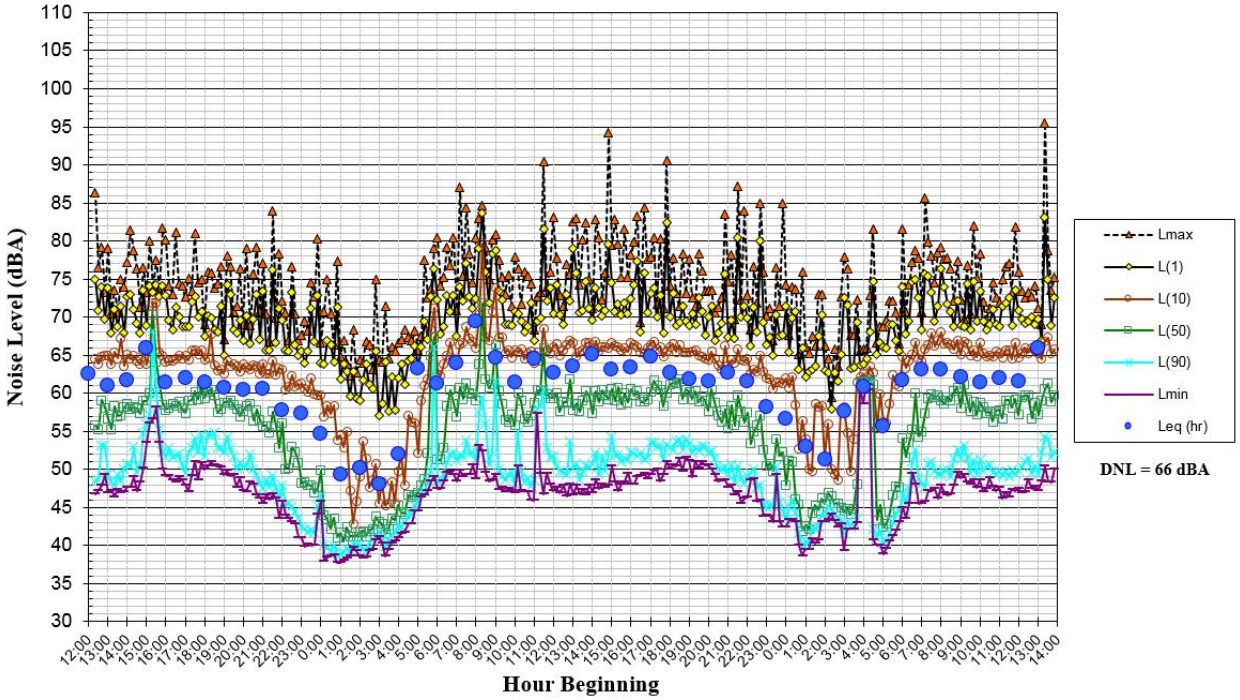



**FIGURE 4 Daily Trend in Noise Levels at LT-3, Wednesday, August 10 through Friday, August 12, 2016**

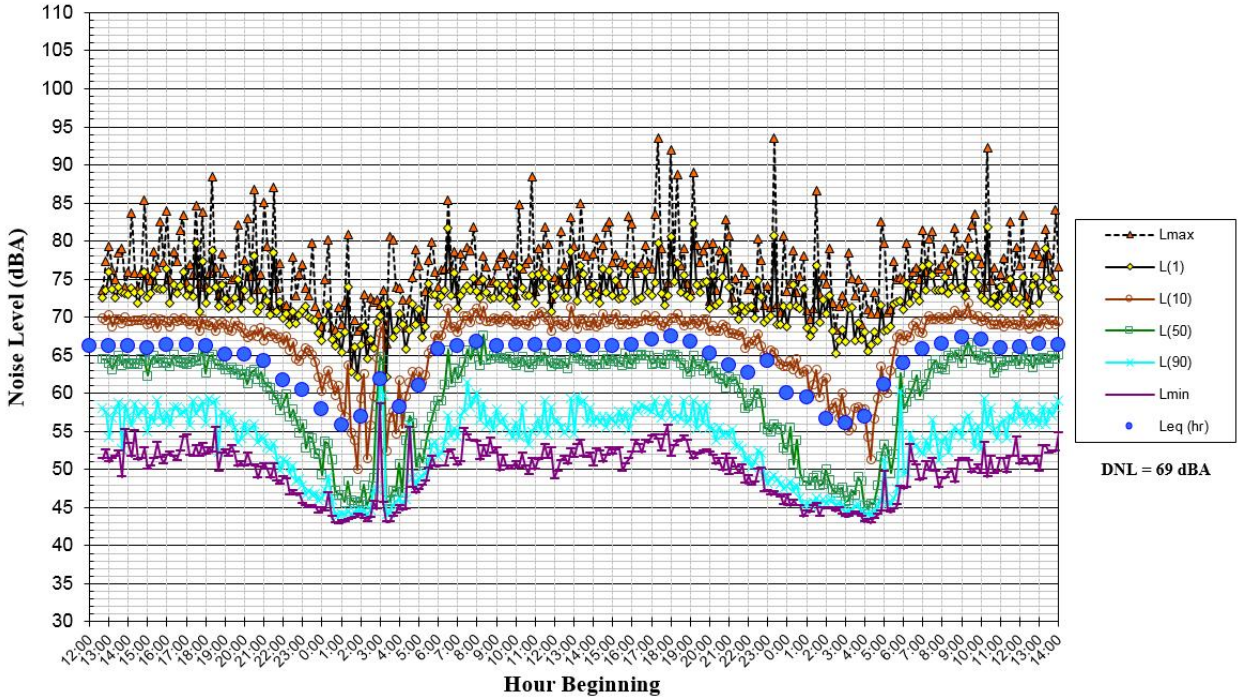


**FIGURE 5 Daily Trend in Noise Levels at LT-4, Wednesday, May 24 through Friday, May 26, 2017**

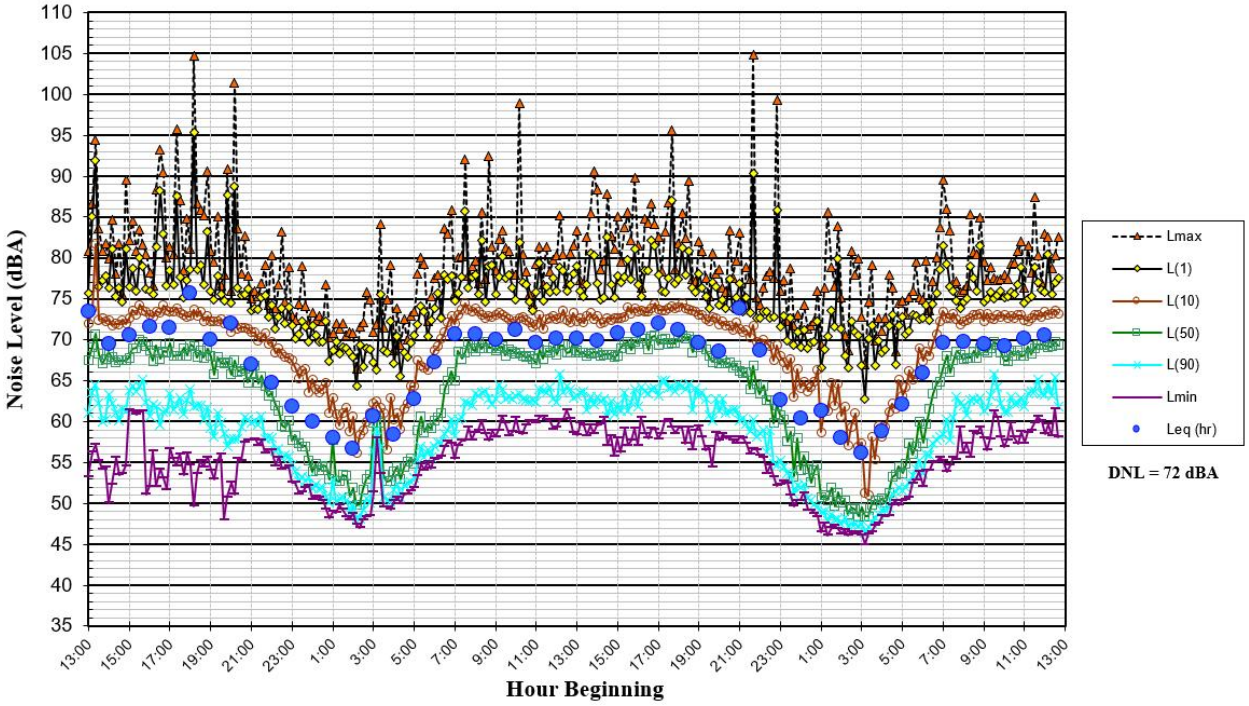



**TABLE 4 Summary of Short-Term Noise Measurements (dBA)**

| Noise Measurement Location (Date, Time) | $L_{max}$ | $L_{(1)}$ | $L_{(10)}$ | $L_{(50)}$ | $L_{(90)}$ | $L_{eq(10)}$ |
|---|---|---|---|---|---|---|
| ST-1: ~45 feet west of Northlake Drive (8/12/2016, 12:10-12:20 p.m.) | 67 | 64 | 57 | 48 | 45 | 54 |
| ST-2: ~45 feet north of Kiely Boulevard (8/12/2016, 12:30-12:40 p.m.) | 73 | 70 | 66 | 59 | 45 | 61 |
| ST-3: ~120 feet east of Saratoga Avenue (8/12/2016, 12:50-1:00 p.m.) | 83 | 73 | 63 | 58 | 54 | 63 |
| ST-4: ~65 feet east of Saratoga Avenue (8/12/2016, 1:10-1:20 p.m.) | 77 | 74 | 70 | 65 | 57 | 67 |
| ST-5: Corner of Saratoga Avenue and Stevens Creek Boulevard (8/12/2016, 1:30-1:40 p.m.) | 75 | 72 | 65 | 60 | 56 | 63 |
| ST-6: Corner of Northlake Drive and Stevens Creek Boulevard (8/12/2016, 1:50-2:00 p.m.) | 82 | 78 | 71 | 66 | 59 | 68 |

## PLAN CONSISTENCY ANALYSIS

### Noise and Land Use Compatibility

The exterior noise threshold established in the City's General Plan for new commercial uses is 70 dBA DNL at common outdoor activity areas. The performance method enforced in the Cal Green Code requires that interior noise levels be maintained at 50 dBA $L_{eq(1\text{-}hr)}$ or less during hours of operation within the proposed nonresidential buildings.

The future noise environment at the project site would continue to result primarily from vehicular traffic along Stevens Creek Boulevard and the surrounding roadways. A traffic report was prepared for the proposed project in March 2020. The traffic study included cumulative plus project traffic conditions to represent the future traffic volumes under full buildout conditions. Compared to the existing traffic volumes along the roadways adjoining the project site, there would be a 1 dBA DNL noise level increase along Stevens Creek Boulevard and along Saratoga Avenue, while a 4 dBA DNL increase would occur along Northlake Drive, south of Stevens Creek Boulevard. Therefore, the future exterior noise levels would be 64 dBA DNL at a distance of 45 feet from the centerline of Northlake Drive (LT-1), 70 dBA DNL at a distance of 65 feet from the centerline of Saratoga Avenue (LT-3), and 73 dBA DNL at a distance of 70 feet from the centerline of Stevens Creek Boulevard (LT-4).

*Future Exterior Noise Environment*

The outdoor use areas proposed at the project site include a common use plaza in the northwestern corner of the site; balconies on the sixth, eighth, and 10$^{th}$ floors of the office building; two 12$^{th}$-floor terraces at the office building; an outdoor play area on the second floor of the fitness center, and a rooftop lounge and pool area at the fitness center.

The common use plaza area would include a work space, a dining space, a flexible lawn area, and an outdoor café area connected to the Lifetime Fitness café. This outdoor space would be set back approximately 85 to 230 feet from the centerline of Stevens Creek Boulevard (center would be approximately 155 feet) and approximately 60 to 190 feet from the centerline of Saratoga Avenue (center would be approximately 125 feet). The proposed buildings would provide partial shielding for this outdoor space; however, there would be direct line-of-sight to both roadways. At the northern and eastern edges of the plaza area, future exterior noise levels would be up to 72 and 71 dBA DNL, respectively; however, at the center of the plaza, future exterior noise levels would be 69 dBA DNL. Since most of the outdoor use is expected to occur towards the center, away from the roadways, this would meet the City's 70 dBA DNL threshold for commercial uses.

The sixth-, eighth-, and 10$^{th}$-floor balconies would be located along the northern façade of proposed office building, facing Stevens Creek Boulevard, and in the southwestern corner of the proposed office building, overlooking the plaza. While the balconies located on the northern façade would be surrounded by the office structure on the eastern, western, and southern sides, the balconies would have direct line-of-sight to Stevens Creek Boulevard. The centers of the balconies would be set back approximately 80 feet from the centerline. While the elevation of the

balconies would provide some shielding, the future exterior noise levels at each of the northern balconies would be up to 63 dBA DNL. The balconies located in the southwestern corner of the building would be partially shielded from Stevens Creek Boulevard by the proposed office building. The centers of these balconies would be approximately 175 feet from the centerline of Stevens Creek Boulevard and approximately 180 feet from the centerline of Saratoga Avenue. Assuming partial shielding from the building and the elevations of the balconies, the future exterior noise levels would be up to 63 dBA DNL at the centers of the balconies, with noise levels up to 65 dBA DNL at the edges. The future noise environment at these balconies would meet the City's exterior noise level threshold, although balconies are typically exempted from the noise threshold.

The 12th-floor includes two terraces: the north terrace runs along the northern façade and wraps around to the western façade; and the south terrace runs along the southern façade and wraps around to the eastern façade. The northern terrace would have direct line-of-sight to Stevens Creek Boulevard and Saratoga Avenue, with slight exposure to Northlake Drive. The future exterior noise levels at this 12th floor terrace, which would be about 133 feet above the ground, would range from below 60 to 65 dBA DNL, assuming some shielding due to the elevation and building. The south terrace would be mostly shielded from Stevens Creek Boulevard but would be exposed to Northlake Drive and Saratoga Avenue. The future exterior noise levels at this 12th floor terrace would range from below 60 to 63 dBA DNL, assuming some shielding due to the elevation and building.

The outdoor play area on the second floor of the fitness building will be located in the southwest corner, along Saratoga Avenue. The center of the outdoor play area would be set back approximately 85 feet from the centerline of the roadway. The northern portion of the fitness center and the elevation above the ground would provide partial shielding. Assuming partial shielding, the future exterior noise levels would be 62 dBA DNL at the center of the outdoor play area, with noise levels up to 70 dBA DNL at the edge. This would meet the City's threshold for commercial outdoor use areas.

The rooftop pool and lounge area at Lifetime Fitness would take up the majority of the roof area, with setbacks from the centerline of Saratoga Avenue ranging from 65 to 265 feet. While the proposed office building would provide partial shielding from Stevens Creek Boulevard, the rooftop pool and lounge area would have some direct exposure to traffic noise along this roadway. The setbacks from the centerline of Stevens Creek Boulevard would range from 230 to 400 feet. The rooftop area on this building would be elevated approximately 63 feet above the ground, which would also provide some shielding, especially for the areas set back from the edge of the building. The future exterior noise levels at rooftop pool and lounge area would range from below 60 dBA DNL at receptors away from the building's edges to 62 dBA DNL along the edges. This exterior noise level would be compatible with the City's noise and land use compatibility standards for commercial land uses.

The future exterior noise levels at each of the proposed outdoor use areas would be at or below the City's 70 dBA DNL threshold. Therefore, no additional noise control measures are required.

*Future Interior Noise Environment*

The setback of the northern façade of the proposed office building from the centerline of Stevens Creek Boulevard would be approximately 80 feet. At this distance, future hourly average noise levels during daytime hours would range from 67 to 76 dBA $L_{eq(1\text{-}hr)}$.

The western façade of the proposed fitness center would be set back approximately 60 feet from the centerline of Saratoga Avenue. At this distance, future hourly average noise levels during daytime hours would range from 65 to 69 dBA $L_{eq(1\text{-}hr)}$.

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

Spaces where lower noise levels would be desired, such as private offices and conference rooms, may benefit from additional noise control in order to meet a lower, more desirable interior noise level. Additional noise control could be accomplished by selecting higher sound-rated windows (STC 34 to STC 38 along exterior façades).

For consistency with the Cal Green Code, the following Conditions of Approval will be implemented by the project applicant:

- Provide forced-air mechanical ventilation to maintain interior noise levels at acceptable levels.

## NOISE IMPACTS AND MITIGATION MEASURES

### Significance Criteria

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

- A significant noise impact would be identified if the project would generate a substantial temporary or permanent noise level increase over ambient noise levels at existing noise-sensitive receptors surrounding the project site.

    - 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.

    - A significant permanent noise level increase would occur if project-generated traffic 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.

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.

- A significant impact would be identified if the construction of the project would generate excessive vibration levels surrounding receptors. Groundborne vibration levels exceeding 0.2 in/sec PPV would have the potential to result in cosmetic damage to normal buildings.

- 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.** Existing noise-sensitive land uses would be exposed to a temporary increase in ambient noise levels due to project construction activities. **This is a significant impact.**

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

Policy EC-1.7 of the City's General Plan requires that all construction operations within the City to use best available noise suppression devices and techniques and to limit construction hours near residential uses per the Municipal Code allowable hours, which are between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday when construction occurs within 500 feet of a residential land use. Further, the City considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would involve substantial noise-generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

Existing residences located in the northeast corner of the Northlake Drive/Kiely Boulevard intersection and the existing Islamic Community Center of Bozniaks of the Bay Area, which adjoins the site in the southeast corner, would have ambient noise levels represented by LT-1 and ST-1. These noise levels would range from 54 to 64 dBA $L_{eq}$ during daytime hours. Existing residences located south of Kiely Boulevard and the existing commercial uses adjoining the site to the south, which were part of the original project site and are expected to be vacant at the time of project construction, would be represented by LT-2, ST-2, and ST-3, which would have ambient daytime levels ranging from 60 to 70 dBA $L_{eq}$. Other surrounding receptors include commercial properties to the east, opposite Northlake Drive; to the west, opposite Saratoga Avenue; and to the north, opposite Stevens Creek Boulevard. There is also an existing apartment

building along Saratoga Avenue, approximately 200 feet north of the centerline of Stevens Creek Boulevard. Each of the commercial uses would be represented by LT-4, ST-5, and ST-6 since they are all located along the Stevens Creek Boulevard corridor. Daytime ambient noise levels would range from 63 to 76 dBA $L_{eq}$.

The typical range of maximum instantaneous noise levels for the proposed project, based on the equipment list provided, would be 70 to 90 dBA $L_{max}$ at a distance of 50 feet (see Table 5). The proposed project would require auger drilling of piles, which would result in maximum noise levels of 85 dBA $L_{max}$ at a distance of 50 feet, for construction of the office building. The fitness center will utilize a hydraulic ram system to compact crushed rock into the earth. Hydraulic ram systems generate noise levels ranging from 81 to 94 dBA at a distance of 50 feet, depending on the location of the tampers. Table 6, which does not include the use of auger drills or hydraulic ram systems, shows the hourly average noise level ranges, by construction phase for various types of construction projects. Hourly average noise levels generated by construction are about 75 to 89 dBA $L_{eq}$ for commercial developments measured at a distance of 50 feet from the center of a busy construction site. Construction-generated noise levels drop off at a rate of about 6 dBA per doubling of the distance between the source and receptor. Shielding by buildings or terrain often result in lower construction noise levels at distant receptors.

Construction of the office building and parking garage would occur first, following all demolition on the project site, and last for about 20 months. The fitness center would be constructed concurrently with the office building; however, total construction for the fitness center would last for approximately one year. Since the overlapping construction periods are not available, construction noise levels were estimated for the two buildings separately. Table 7 summarizes the equipment expected to be used during demolition of the existing buildings, while Tables 8 and 9 summarize the equipment to be used during construction of the office building and fitness center, respectively. For all phases of demolition and construction, the equipment shown in each table was used as inputs into the Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM) to predict the combined average noise level. To model worst-case conditions, it was assumed that all equipment per phase would be operating simultaneously. For construction noise, the use of multiple pieces of equipment simultaneously would add together as a collective noise source. While every piece of equipment per phase 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, the collective worst-case hourly average noise level for each phase was centered at the geometrical center of the site and propagated to the nearest property line of the surrounding land uses. These noise level estimates are also shown in Tables 7 through 9. These levels do not assume reductions due to intervening buildings or existing barriers.

Using the modeled worst-case noise levels for each phase, the construction noise levels were calculated from the geometrical center of the project site to the property line of the surrounding land uses. During demolition, the existing buildings would be spread throughout the site, so the center of the entire site was used for the propagation calculation. For the construction of each individual building, the centers of the buildings were used as the center for the respective calculations.

An auger drill will be used for pile installation at the proposed office building, while a hydraulic ram system will be used at the fitness center. Approximately 1,800 piles will be installed using two drill rigs at the office building and parking structure, while up to 200 piles will be installed at the fitness center using two hydraulic ram systems. For the office building and parking structure, the pile installation is expected to take the entire 90-day period of the grading/excavation phase. Therefore, the construction noise levels for the grading/excavation phase of the office building and parking structure assume use of the auger drills throughout the phase. However, pile installation is expected to last for 20 days only during the grading/excavation phase of the fitness center. Therefore, the construction noise levels shown in Table 9 for this phase reflect noise levels with and without the hydraulic ram systems.

As shown in Tables 7 through 9, ambient levels at the surrounding uses would potentially be exceeded by 5 dBA $L_{eq}$ or more at various times throughout construction. Project construction is expected to last for a period of about 20 months. Since project construction is expected to exceed one year in duration and would include pile driving activities, the project would be considered a significant temporary noise impact.

**TABLE 5 CONSTRUCTION EQUIPMENT 50-FOOT NOISE EMISSION LIMITS**

| Equipment Category | $L_{max}$ Level (dBA)[1,2] | Impact/Continuous |
|---|---|---|
| Arc Welder | 73 | Continuous |
| Auger Drill Rig | 85 | Continuous |
| Backhoe | 80 | Continuous |
| Bar Bender | 80 | Continuous |
| Boring Jack Power Unit | 80 | Continuous |
| Chain Saw | 85 | Continuous |
| Compressor[3] | 70 | Continuous |
| Compressor (other) | 80 | Continuous |
| Concrete Mixer | 85 | Continuous |
| Concrete Pump | 82 | Continuous |
| Concrete Saw | 90 | Continuous |
| Concrete Vibrator | 80 | Continuous |
| Crane | 85 | Continuous |
| Dozer | 85 | Continuous |
| Excavator | 85 | Continuous |
| Front End Loader | 80 | Continuous |
| Generator | 82 | Continuous |
| Generator (25 KVA or less) | 70 | Continuous |
| Gradall | 85 | Continuous |
| Grader | 85 | Continuous |
| Grinder Saw | 85 | Continuous |
| Horizontal Boring Hydro Jack | 80 | Continuous |
| Hydra Break Ram | 90 | Impact |
| Impact Pile Driver | 105 | Impact |
| Insitu Soil Sampling Rig | 84 | Continuous |
| Jackhammer | 85 | Impact |
| Mounted Impact Hammer (hoe ram) | 90 | Impact |
| Paver | 85 | Continuous |
| Pneumatic Tools | 85 | Continuous |
| Pumps | 77 | Continuous |
| Rock Drill | 85 | Continuous |
| Scraper | 85 | Continuous |
| Slurry Trenching Machine | 82 | Continuous |

| Equipment Category | $L_{max}$ Level (dBA)[1,2] | Impact/Continuous |
|---|---|---|
| Soil Mix Drill Rig | 80 | Continuous |
| Street Sweeper | 80 | Continuous |
| Tractor | 84 | Continuous |
| Truck (dump, delivery) | 84 | Continuous |
| Vacuum Excavator Truck (vac-truck) | 85 | Continuous |
| Vibratory Compactor | 80 | Continuous |
| Vibratory Pile Driver | 95 | Continuous |
| All other equipment with engines larger than 5 HP | 85 | Continuous |

Notes:

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

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

[3] Portable Air Compressor rated at 75 cfm or greater and that operates at greater than 50 psi.

## TABLE 6 Typical Ranges of Construction Noise Levels at 50 Feet, $L_{eq}$ (dBA)

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

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

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

**TABLE 7 Estimated Construction Noise Levels at the Nearest Receptors during Demolition of Existing Structures**

| Phase | Time Duration | Construction Equipment (Quantity) | Calculated Hourly Average $L_{eq}$, dBA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Community Center (170ft) | Northlake Drive Residences (415ft) | Kiely Blvd Residences (860ft) | Comm. South (240ft) | Comm. East (330ft) | Comm. West (315ft) | Res. & Comm. North (345ft) |
| Demolition | 60 days | Concrete/Industrial Saw (2)<br>Excavator (1)<br>Rubber-Tired Dozer (1)<br>Tractor/Loader/Backhoe (1) | 77 | 69 | 63 | 74 | 71 | 72 | 71 |

**TABLE 8 Estimated Construction Noise Levels at the Nearest Receptors during Construction of Office Building and Parking Garage**

| Phase | Time Duration | Construction Equipment (Quantity) | Calculated Hourly Average $L_{eq}$, dBA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Community Center (170ft) | Northlake Drive Residences (340ft) | Kiely Blvd Residences (890ft) | Comm. South (265ft) | Comm. East (210ft) | Comm. West (440ft) | Res. & Comm. North (435ft) |
| Site Preparation | 15 days | Grader (1)<br>Rubber-Tired Dozer (1)<br>Tractor/Loader/Backhoe (2) | 75 | 69 | 61 | 71 | 73 | 67 | 67 |
| Grading/Excavation | 90 days | Excavator (1)<br>Tractor/Loader/Backhoe (2)<br>Auger Drill (2)<br>Mobile Crane (2)<br>Concrete Pump (2)<br>Compact Loader (4)<br>Reachlift with Fork (2)<br>Manlift (2)<br>Support Truck (2)<br>Air Compressor (2) | 78 | 72 | 63 | 74 | 76 | 69 | 70 |
| Trenching | 15 days | Tractor/Loader/Backhoe (1)<br>Excavator (1) | 71 | 65 | 57 | 67 | 69 | 63 | 63 |
| Building-Exterior | 200 days | Crane (1)<br>Forklift (2)<br>Generator Set (4)<br>Tractor/Loader/Backhoe (2)<br>Welder (1)<br>Man Lift (2) | 76 | 70 | 62 | 72 | 74 | 68 | 68 |
| Building-Interior/ Architectural Coating | 350 days | Aerial Lift (2)<br>Forklift (2) | 63 | 57 | 49 | 59 | 61 | 55 | 55 |
| Paving | 154 days | Paver (1)<br>Paving Equipment (2)<br>Roller (2)<br>Tractor/Loader/Backhoe (2) | 77 | 71 | 63 | 74 | 76 | 69 | 69 |

**TABLE 9 Estimated Construction Noise Levels at the Nearest Receptors during Construction of Life Time Fitness**

| Phase | Time Duration | Construction Equipment (Quantity) | Calculated Hourly Average $L_{eq}$, dBA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Community Center (205ft) | Northlake Drive Residences (510ft) | Kiely Blvd Residences (795ft) | Comm. South (150ft) | Comm. East (490ft) | Comm. West (230ft) | Res. & Comm. North (420ft) |
| Site Preparation | 10 days | Grader (1)<br>Rubber-Tired Dozer (1)<br>Off-Highway Truck (2)<br>Tractor/Loader/Backhoe (2) | 74 | 66 | 62 | 77 | 66 | 73 | 68 |
| Grading/ Excavation[a] | 210 days | Excavator (2)<br>Tractor/Loader/Backhoe (2)<br>Hydraulic Ram System (2)<br>Mobile Crane (1)<br>Concrete Pump (2)<br>Compact Loader (4)<br>Reachlift with Fork (2)<br>Support Truck (1)<br>Air Compressor (1) | 75-85[b] | 67-77[b] | 63-73[b] | 78-88[b] | 67-77[b] | 74-84[b] | 69-79[b] |
| Building-Exterior | 121 days | Crane (1)<br>Forklift (2)<br>Generator Set (4)<br>Welder (1)<br>Man Lift (8) | 73 | 65 | 61 | 76 | 65 | 72 | 67 |
| Building-Interior/ Architectural Coating | 268 days | Aerial Lift (12)<br>Forklift (2) | 67 | 59 | 55 | 70 | 59 | 66 | 61 |
| Paving | 25 days | Paver (1)<br>Paving Equipment (2)<br>Roller (2)<br>Tractor/Loader/Backhoe (1) | 75 | 67 | 63 | 78 | 67 | 74 | 69 |

[a] Trenching activities would occur concurrently with grading/excavating activities. All grading/excavation noise levels include trenching, as well.
[b] Noise levels reflect equipment with and without the auger drilling.

**Mitigation Measure 1a:**

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 Municipal Code requires that reasonable noise reduction measures be incorporated into the construction plan and implemented during all phases of construction activity. In accordance with Policy EC-1.7, a construction noise logistics plan should be developed for the proposed project.

Construction Noise Logistics Plan: Prior to the issuance of any grading or demolition permits, the project proponent shall submit and implement a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting and notification of construction schedules, equipment to be used, and designation of a noise disturbance coordinator. The noise disturbance coordinator shall respond to neighborhood complaints and shall be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses. The noise logistic plan shall be submitted to the Director of Planning or Director's designee of the Department of Planning, Building and Code Enforcement prior to the issuance of any grading or demolition permits.

As a part of the noise logistic plan and project, construction activities for the proposed project shall include, but is not limited to, the following best management practices:

- In accordance with Policy EC-1.7 of the City's General Plan, utilize the best available noise suppression devices and techniques during construction activities.

- Construction activities shall be limited to the hours between 7:00 AM and 7:00 PM, Monday through Friday, unless permission is granted with a development permit or other planning approval. No construction activities are permitted on the weekends at sites within 500 feet of a residence (San José Municipal Code Section 20.100.450).

- Construct temporary noise barriers, where feasible, around the perimeter of the construction site. The temporary noise barrier fences provide noise reduction if the noise barrier interrupts the line-of-sight between the noise source and receiver and if the barrier is constructed in a manner that eliminates any cracks or gaps.

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

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

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

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

- Construction staging areas shall be established at locations that would create the greatest distance between the construction-related noise source and noise-sensitive receptors nearest the project site during all project construction.

- A temporary noise control blanket barrier shall be erected, if necessary, along building facades facing construction sites. This mitigation would only be necessary if conflicts occurred which were irresolvable by proper scheduling.

- If impact pile driving is proposed, foundation pile holes shall be pre-drilled to minimize the number of impacts required to seat the pile. Pre-drilling foundation pile holes is a standard construction noise control technique. Pre-drilling reduces the number of blows required to seat the pile. *(not applicable)*

- Locate material stockpiles, as well as maintenance/equipment staging and parking areas, as far as feasible from residential receptors.

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

- The project applicant shall prepare a detailed construction schedule for major noise-generating construction activities. The construction plan shall identify a procedure for coordination with adjacent residential land uses so that construction activities can be scheduled to minimize noise disturbance.

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

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

- All auger drilling activities and hydraulic ram system activities shall be done during weekdays between 7:00 a.m. and 7:00 p.m. Due to the nature of the Community Center and prayer activities at dawn and dusk, restricting these drilling activities to summer months when sunrise and sunset are well-outside the allowable construction hours would reduce potential disruption and complaints from the neighbors.

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.

**Impact 1b:** **Permanent Noise Level Increase.** The proposed project would not result in a substantial permanent noise level increase at the existing residential 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, 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 report completed for the proposed project included existing peak hour turning movements for 13 intersections in the project vicinity. Additionally, the traffic study included peak hour trips for each of these intersections. When the peak hour 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 resulted in a 4 dBA DNL increase along Northlake Drive, south of Stevens Creek Boulevard, and a 2 dBA DNL increase along Northlake Drive, north of Kiely Boulevard. Since only commercial uses are located along Northlake Drive, south of Stevens Creek Boulevard, the 4 dBA DNL increase would not result in a significant impact. Residential land uses are located along Northlake Drive, north of Kiely Boulevard, but since a noise level of increase of 2 dBA DNL was calculated along this segment, a significant impact would not occur. Along all other segments included in the noise report, a noise level increase of 1 dBA DNL or less was calculated. Therefore, a significant permanent noise level increase due to project-generated traffic would not occur at residential land uses. This is a less-than-significant impact.

**Mitigation Measure 1b:** **None required.**

**Impact 1c:** **Cumulative Noise Increase.** The proposed project would not result in a cumulatively considerable contribution to future noise levels at residential land uses in the vicinity. **This is a less-than-significant impact.**

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

Cumulative traffic noise level increases were calculated by comparing the cumulative traffic volumes and the cumulative plus project volumes to the existing traffic volumes. The traffic

noise increases calculated under both cumulative scenarios (with and without the project) were the same throughout the vicinity of the project site, except along Northlake Drive between Kiely Boulevard and Stevens Creek Boulevard. Along Northlake Drive, south of Stevens Creek Boulevard, a 4 dBA DNL increase was calculated under the cumulative plus project scenario, while no measurable increase was calculated under the cumulative (no project) scenario. However, there are no residential land uses along this segment. Along Northlake Drive, north of Kiely Boulevard, the cumulative plus project scenario resulted in a noise level increase of 2 dBA DNL, while the cumulative scenario did not result in a measurable noise level increase. However, since this cumulative plus project increase would be less than 3 dBA DNL, the first criteria for significant cumulative noise increase was not met. Therefore, the proposed project would not result in a cumulatively considerable contribution to increased noise levels. This is a less-than-significant impact.

**Mitigation Measure 1c: None required.**

**Impact 1d: Noise Levels in Excess of Standards.** The proposed project could generate noise in excess of standards established in the City's General Plan at the nearby sensitive receptors. The incorporation of mitigation measures to reduce operational noise levels as project conditions of approval would result in a **less-than-significant** noise impact.

Policy EC-1.3 of the City's General Plan restricts noise generated by new nonresidential land uses to 55 dBA DNL at the property line of adjacent existing or planned noise-sensitive residential land uses. The existing Community Center would be treated as a noise-sensitive use due to the sensitive nature of activities that occur at this site, such as prayer at dawn and at dusk. Additionally, future commercial uses are expected at the property to the south of the project site, which is currently developed with older commercial uses. While noise performance standards provided in the City's Municipal Code limit commercial uses adjacent to other commercial uses to 60 dBA at the shared property line, exceeding the Municipal Code thresholds would not be considered a significant impact.

*Mechanical Equipment Noise*

Proposed Office Building

Various mechanical equipment for heating, ventilation, and cooling purposes, exhaust fans, emergency generators, and other similar equipment could produce noise levels exceeding ambient levels when located near existing or proposed land uses. The site plan shows a fire pump room, a maintenance electrical room, a DCW pump room, and a utility yard on the ground level; a boiler room on the second floor; a chiller room on the fourth floor; and mechanical fan rooms, water heater tank, and a cooling tower on the rooftop. Details pertaining to the number, type, size, and manufacturer-provided noise level information for all mechanical equipment were not available at the time of this study. All equipment located within rooms of the proposed office building and parking garage would be adequately shielded from the surrounding receptors. The fans and water heaters appear to be located within mechanical rooms on the rooftop, while the cooling towers would be outside. A type of screen may be planned around the cooling towers; however, for purposes of modeling the worst-case scenario, no noise reduction properties for the

screen are assumed. Additionally, two on-site emergency generators are proposed in the utility yard on the ground level along the southern boundary of the project site.

Typical noise levels at the air intake of a cooling tower would be about 80 dBA, as measured at about 3 feet. The site plan shows a single cooling tower. Assuming this unit would operate continuously throughout the daytime and nighttime hours, the estimated day-night average noise level at 3 feet would be up to 86 dBA DNL. The center of the unit would be set back approximately 65 feet from the southern edge of the building's rooftop and would be approximately 280 feet from the southern boundary shared with the Community Center. The height of the rooftop, which is approximately 147 feet, would provide partial shielding, as would the intervening parking structure. However, assuming worst-case conditions, which would include no noise reduction due to shielding, the day-night average noise level at the shared property line of the Community Center would be 47 dBA DNL. The nearest residential property line would be 405 feet from the cooling tower. The day-night average noise level at the nearest residential property line would be 44 dBA DNL. This would be a less-than-significant impact.

Noise generated by emergency generators would be exempt from City noise thresholds during emergencies; however, emergency generators are tested monthly to ensure proper maintenance in case of emergency. During these monthly tests, generators are operating for one hour between 7:00 a.m. and 10:00 p.m. The proposed project would include two emergency generators located south of the parking structure. Each generator would be tested for one hour during the monthly testing. Both proposed generators would have a capacity of 1,000 kW. Generators of this size would typically generate noise levels up to 89 dBA at a distance of 50 feet. With the inclusion of sufficient noise control features, noise levels could be reduced to 65 dBA at 50 feet. Assuming these noise levels would occur for two hours on a given day during monthly testing, the day-night average noise level would be 78 dBA DNL at 50 feet with no shielding and would be 54 dBA DNL at 50 feet with the inclusion of noise control features. The generators would be approximately 10 and 30 feet from the property line shared with the Community Center and about 45 feet from the property line shared with the existing and future commercial uses to the south. The utility yard, in which the generators would be located, would be surrounded by a concrete masonry unit (CMU) wall, which would provide at least 5 dBA reduction if tall enough to break the line-of-sight between the generators and the receptors. Assuming a 5 dBA reduction, testing for the emergency generators at the property line of the Community Center would range from 61 dBA DNL with the inclusion of noise control to 85 dBA DNL without noise control features. At 45 feet, testing for the emergency generators would range from 50 dBA DNL with the inclusion of noise control to 74 dBA DNL without noise control features, assuming a 5 dBA reduction.

The emergency generators are expected to generate noise levels in excess of the City's 55 dBA DNL threshold at the adjoining sensitive property lines. This would be a significant impact. Additionally, the 60 dBA DNL performance standard established in the Municipal Code for receiving commercial uses would also potentially be exceeded.

Proposed Workout Facility

Mechanical equipment was not shown in the plan set of the Lifetime Fitness facility. Therefore, it is assumed that all mechanical equipment would be located inside and would be adequately

shielded from all surrounding noise-sensitive receptors. While an emergency generator would be brought to the site, as needed, an emergency generator for Lifetime Fitness would not be permanently located on-site. Therefore, monthly testing of the generator would not impact the receptors surrounding the project site.

While the proposed fitness facility is not expected to generate noise levels in excess of the City's General Plan thresholds, this should be verified once specific equipment has been selected for the proposed building. As a project condition of approval, mechanical equipment shall be selected and designed to reduce excessive noise levels at the surrounding uses to meet the City's 55 dBA DNL noise level requirement at the existing Community Center. Further, the Municipal Code limit of 60 dBA DNL at receiving commercial uses should be considered at the property line of the future commercial uses to the south of the site. A qualified acoustical consultant shall be retained to review mechanical noise as these systems are selected to determine specific noise reduction measures necessary to reduce noise to comply with the City's General Plan noise level requirement of 55 dBA DNL at the adjacent sensitive property lines and the City's Municipal Code requirement of 60 dBA DNL at the adjacent commercial uses. Noise reduction measures could include, but are not limited to, selection of equipment that emits low noise levels and installation of noise barriers, such as enclosures and parapet walls, to block the line-of-sight between the noise source and the nearest receptors. Other alternate measures may be optimal, such as locating equipment in less noise-sensitive areas.

*Truck Loading and Unloading*

Truck deliveries are expected for the proposed project. The frequency of deliveries for the office building and fitness center is not available at this time; however, based on the sizes and types of the commercial uses, one to two deliveries per week by vendor or smaller-sized trucks would be expected for both buildings. It is assumed that loading/unloading activities, including maintenance activities, would occur between 7:00 a.m. and 10:00 p.m.

Vendor delivery trucks typically generate maximum noise levels of 60 to 65 dBA $L_{max}$ at a distance of 50 feet. Low speed truck noise results from 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. The noise levels produced by backup alarms can vary depending on the type and directivity of the sound, but maximum noise levels are typically between 65 to 75 dBA $L_{max}$ at a distance of 50 feet. Assuming a typical delivery would take about 15 to 20 minutes, the hourly average noise level from a delivery would be 68 dBA $L_{eq}$ at a distance of 50 feet. Worst-case conditions would include up to two deliveries per day, which would result in day-night average noise levels up to 57 dBA DNL at 50 feet.

<u>Proposed Office Building</u>
The office building shows a loading zone in the northeastern corner of the building, just behind the ground-level lease space. This loading zone would be accessed from Northlake Drive. The nearest noise-sensitive land uses would be the Community Center and the residences along Northlake Drive. The northern property line of the Community Center would be 255 feet from the center of the loading zone, while the northern boundary of the residential development would be 365 feet from the center of the loading zone. At these distances, the day-night average noise

levels would range from 40 dBA DNL at the residential property to 43 dBA DNL at the Community Center.

All other noise-sensitive uses would be farther from the loading zone and/or would be shielded by the intervening project buildings. Daytime deliveries at the proposed office building would not exceed the City's 55 dBA DNL threshold. This is a less-than-significant impact.

Proposed Workout Facility

Lifetime Fitness shows a loading zone area in the southeastern corner of the building. This loading zone would be accessed from the driveway along Saratoga Avenue. While loading zone activities would be shielded from all existing residential land uses, there would be direct line-of-sight to the future commercial uses located to the south of the project site. The adjacent Community Center would also be exposed to this delivery noise; however, the utility yard would provide partial shielding. The distance from the loading zone to the property line of the future adjoining commercial uses would be approximately 75 feet. At this distance, the day-night average noise level would be 54 dBA DNL, which would be below the Municipal Code standard of 60 dBA DNL threshold. At the Community Center, which would be approximately 125 feet from the loading zone, the day-night average noise level would be 49 dBA DNL.

With greater distances and additional shielding from intervening buildings, noise levels due to truck deliveries at the fitness center would be below 55 dBA DNL at all other surrounding noise-sensitive receptors.

Assuming that deliveries would occur between 7:00 a.m. and 10:00 p.m., deliveries at the proposed fitness center would not exceed the City's 55 dBA DNL threshold at sensitive uses. This is a less-than-significant impact.

**Mitigation Measure 1d:**

Emergency generators shall be selected and designed to reduce excessive noise levels to meet the City's 55 dBA DNL noise level requirement at the existing Community Center and would exceed 60 dBA DNL at the future commercial uses to the south of the site. A qualified acoustical consultant shall be retained to review noise level information as units are selected to determine specific noise reduction measures necessary to reduce noise to comply with the City's General Plan noise level requirement of 55 dBA DNL at the adjacent sensitive property lines and the City's Municipal Code limit of 60 dBA DNL at adjacent commercial property lines. Noise reduction measures could include, but are not limited to, selection of equipment that emits low noise levels and installation of noise barriers, such as enclosures and parapet walls, to block the line-of-sight between the noise source and the nearest receptors. Other alternate measures may be optimal, such as locating equipment in less noise-sensitive areas.

**Impact 2:** **Exposure to Excessive Groundborne Vibration due to Construction.** Construction-related vibration levels resulting from activities at the project site would exceed 0.2 in/sec PPV at the community center located adjacent to the project site. **This is a significant impact.**

The construction of the project may generate perceptible vibration when heavy equipment or impact tools (e.g. jackhammers, hoe rams) are used. Construction activities would include site preparation work, foundation work, and new building framing and finishing. For pile installation at the project site, pile driving, which can cause excessive vibration, is not expected; however, up to two auger drill rigs are expected to be used near the existing Islam Community Center.

According to Policy EC-2.3 of the City of San Jose General Plan, a vibration limit of 0.08 in/sec PPV shall be used to minimize the potential for cosmetic damage to sensitive historical structures, and a vibration limit of 0.20 in/sec PPV shall be used to minimize damage at buildings of normal conventional construction.

Table 10 presents typical vibration levels that could be expected from construction equipment at a distance of 25 feet. Project construction activities, such as drilling, the use of jackhammers, rock drills and other high-power or vibratory tools, and rolling stock equipment (tracked vehicles, compactors, etc.), may generate substantial vibration in the immediate vicinity. Drilling typically generates vibration levels of 0.09 in/sec PPV at a distance of 25 feet. Vibration levels would vary depending on soil conditions, construction methods, and equipment used. Table 10 also summarizes the distances to the 0.08 in/sec PPV threshold for historical buildings and to the 0.2 in/sec PPV threshold for all other buildings.

**TABLE 10 Vibration Source Levels for Construction Equipment**

| Equipment | | PPV at 25 ft. (in/sec) | Minimum Distance to Meet 0.08 in/sec PPV (feet) | Minimum Distance to Meet 0.2 in/sec PPV (feet) |
|---|---|---|---|---|
| Clam shovel drop | | 0.202 | 58 | 26 |
| Hydromill (slurry wall) | in soil | 0.008 | 3 | 1 |
| | in rock | 0.017 | 6 | 2 |
| Vibratory Roller | | 0.210 | 60 | 27 |
| Hoe Ram | | 0.089 | 28 | 12 |
| Large bulldozer | | 0.089 | 28 | 12 |
| Caisson drilling | | 0.089 | 28 | 12 |
| Loaded trucks | | 0.076 | 24 | 10 |
| Jackhammer | | 0.035 | 12 | 5 |
| Small bulldozer | | 0.003 | 1 | <1 |

Source: Transit Noise and Vibration Impact Assessment Manual, United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, September 2018, as modified by Illingworth & Rodkin, Inc., December 2019.

Based on the inventory of historically documented buildings in the City of San José,[1] there are no historical structures located within 200 feet of the project boundary. Therefore, vibration levels exceeding 0.2 in/sec PPV at the surrounding buildings would be considered a significant impact.

Table 11 summarizes the vibration levels at the nearest building façades surrounding the site. While construction noise sources increase based on all equipment in use simultaneously, construction vibration would be dependent on the location of individual pieces of equipment.

[1] https://www.sanjoseca.gov/home/showdocument?id=24021

That is, equipment scattered throughout the site would not generate a collective vibration source level, but a vibratory roller, for instance, operating near the project site boundary would generate the worst-case vibration levels for the receptor sharing that property line. Further, construction vibration impacts are assessed based on damage to buildings on receiving land uses, not receptors at the nearest property lines. Therefore, the distances used to propagate construction vibration levels (as shown in Table 11), which are different than the distances used to propagate construction noise levels (as shown in Tables 7 through 9), were estimated under the assumption that each piece of equipment from Table 10 was operating along the nearest boundary of the project site, which would represent the worst-case scenario.

Buildings adjacent to the site would include the Islam Community Center and other existing commercial buildings to the south. However, the existing commercial buildings are planned for demolition in the future, potentially prior to project construction. Since these buildings are not expected under future conditions, they are not considered sensitive uses for purposes of this study. The Community Center would exist under future project conditions, and due to the building being within 5 feet of the shared property lines, vibration levels would potentially be up to 1.2 in/sec PPV.

The nearest buildings to the north, to the east, and to the west include commercial uses 60 feet or more from the project site boundaries. At these distances, the nearest buildings to the north, to the east, and to the west would be exposed to vibration levels up to 0.08 in/sec PPV, which would be below the City's 0.2 in/sec PPV threshold.

The City's threshold of 0.2 in/sec PPV for non-historical buildings would potentially be exceeded at the adjacent Community Center when construction activities are within 20 feet of the shared boundaries.

**TABLE 11 Vibration Source Levels for Construction Equipment**

| Equipment | | PPV (in/sec) | | | | |
|---|---|---|---|---|---|---|
| | | Community Center (5ft) | East Comm. (60ft) | Northlake Drive Res. (135ft) | West Comm. (100ft) | North Comm. (125ft) |
| Clam shovel drop | | **1.186** | 0.077 | 0.032 | 0.044 | 0.034 |
| Hydromill (slurry wall) | in soil | 0.047 | 0.003 | 0.001 | 0.002 | 0.001 |
| | in rock | 0.100 | 0.006 | 0.003 | 0.004 | 0.003 |
| Vibratory Roller | | **1.233** | 0.080 | 0.033 | 0.046 | 0.036 |
| Hoe Ram | | **0.523** | 0.034 | 0.014 | 0.019 | 0.015 |
| Large bulldozer | | **0.523** | 0.034 | 0.014 | 0.019 | 0.015 |
| Caisson drilling | | **0.523** | 0.034 | 0.014 | 0.019 | 0.015 |
| Loaded trucks | | **0.446** | 0.029 | 0.012 | 0.017 | 0.013 |
| Jackhammer | | **0.206** | 0.013 | 0.005 | 0.008 | 0.006 |
| Small bulldozer | | 0.018 | 0.001 | 0.0005 | 0.001 | 0.001 |

Source: Transit Noise and Vibration Impact Assessment Manual, United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, September 2018, as modified by Illingworth & Rodkin, Inc., December 2019.

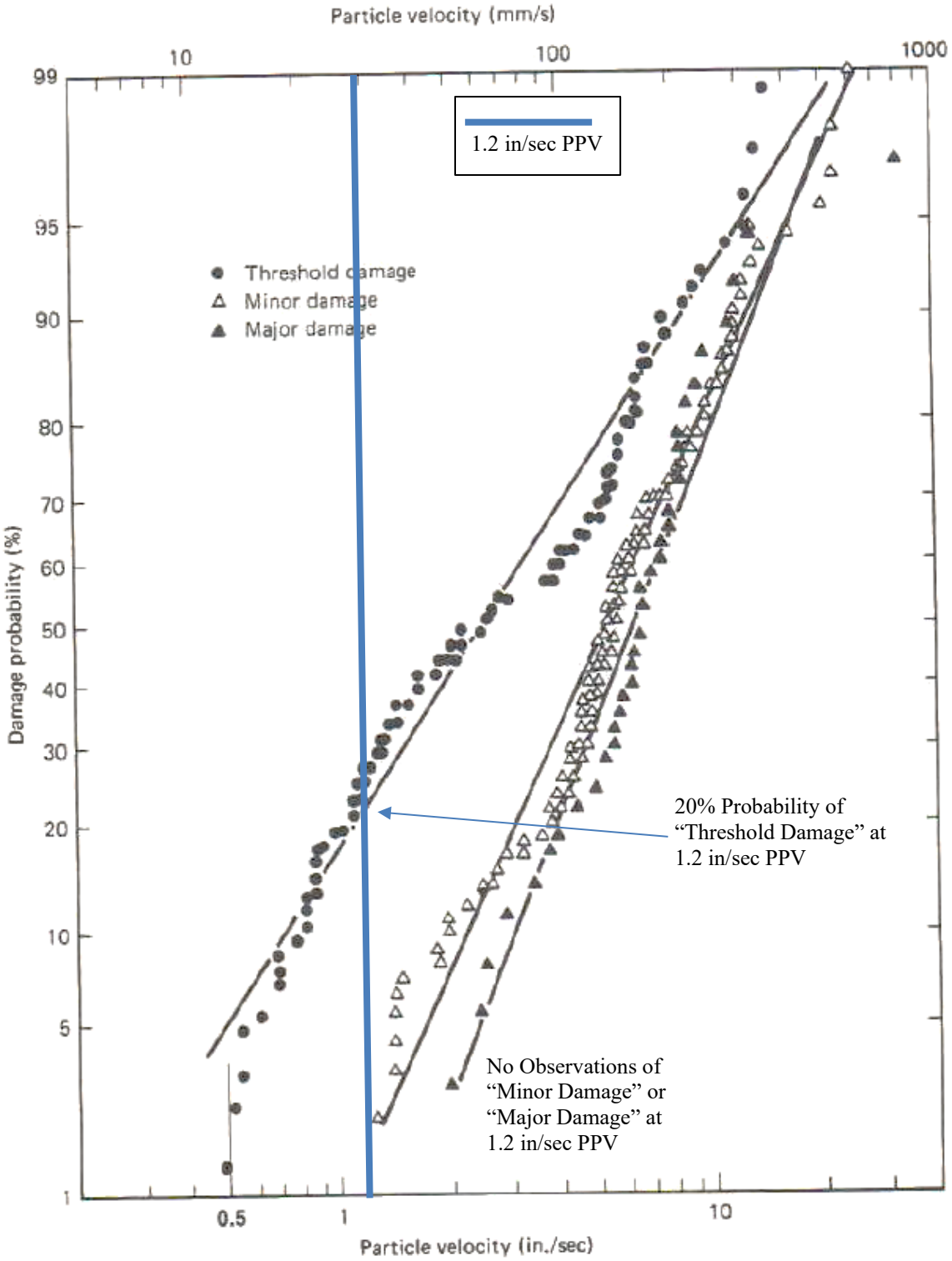
A study completed by the US Bureau of Mines analyzed the effects of blast-induced vibration on buildings in USBM RI 8507.[2] The findings of this study have been applied to buildings affected by construction-generated vibrations.[3] As reported in USBM RI 8507[5] and reproduced by Dowding,[6] Figure 6 presents the damage probability, in terms of "threshold damage," "minor damage," and "major damage," at varying vibration levels. Threshold damage, which is described as cosmetic damage in this report, would entail hairline cracking in plaster, the opening of old cracks, the loosening of paint or the dislodging of loose objects. Minor damage would include hairline cracking in masonry or the loosening of plaster, and major structural damage would include wide cracking or shifting of foundation or bearing walls. As shown in Figure 6, maximum vibration levels of 1.2 in/sec PPV would result in about 20% chance of threshold damage or cosmetic damage, while no minor or major damage would be expected.

Typical construction equipment, as shown in Table 11, would have the potential to produce vibration levels of 0.2 in/sec PPV or more at the non-historical Community Center adjoining the site. While no minor or major damage would occur at this conventional building, there is the potential to generate threshold or cosmetic damage. This is a potentially significant impact.

At this location, and in other surrounding areas within 200 feet, vibration levels would potentially be perceptible. By use of administrative controls, such as notifying neighbors of scheduled construction activities and scheduling construction activities with the highest potential to produce perceptible vibration during hours with the least potential to affect nearby businesses, perceptible vibration can be kept to a minimum.

[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.

**FIGURE 6 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., December 2019.

**Mitigation Measure 2:**

The project shall implement the following measures, in addition to the best practices specified in Mitigation Measure 1a of this report, to minimize the impacts of groundborne vibration.

Construction Vibration Monitoring, Treatment, and Reporting Plan: The project proponent shall implement a construction vibration monitoring plan to document conditions 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 shall include, but not be limited to, the following measures:

- The report shall include a description of measurement methods, equipment used, calibration certificates, and graphics as required to clearly identify vibration-monitoring locations.

- A list of all heavy construction equipment to be used for this project and the anticipated time duration of using the equipment that is known to produce high vibration levels (clam shovel drops, vibratory rollers, hoe rams, large bulldozers, caisson drillings, loaded trucks, jackhammers, etc.) shall be submitted to the Director of Planning or Director's designee of the Department of Planning, Building and Code Enforcement 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. Phase demolition, earth-moving, and ground impacting operations so as not to occur during the same time period.

- Where possible, use of the heavy vibration-generating construction equipment shall be prohibited within 20 feet of any adjacent building.

- Document conditions at all structures located within 30 feet of construction 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. Specifically:

    - Vibration limits shall be applied to vibration-sensitive structures located within 30 feet of all construction activities identified as sources of high vibration levels.

    - Performance of a photo survey, elevation survey, and crack monitoring survey for each structure of normal construction within 30 feet of all construction activities identified as sources of high vibration levels. Surveys shall be performed prior to any construction activity, in regular intervals during construction, and after project completion, and shall include internal and external crack monitoring in structures, settlement, and distress, and shall document the condition of foundations, walls and other structural elements in the interior and exterior of said structures.

- Develop a vibration monitoring and construction contingency plan to identify structures where monitoring would be conducted, set up a vibration monitoring schedule, define structure-specific vibration limits, and address the need to conduct photo, elevation, and crack surveys to document before and after construction conditions. Construction contingencies shall be identified for when vibration levels approached the limits.

- At a minimum, vibration monitoring shall be conducted during demolition and excavation activities.

- If vibration levels approach limits, suspend construction and implement contingency measures to either lower vibration levels or secure the affected structures.

- 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.

- Conduct a post-construction survey on structures where either monitoring has indicated high vibration levels or complaints of damage has been made. Make appropriate repairs or compensation where damage has occurred as a result of construction activities.

Implementation of this mitigation measure would reduce the impact to a less-than-significant level.

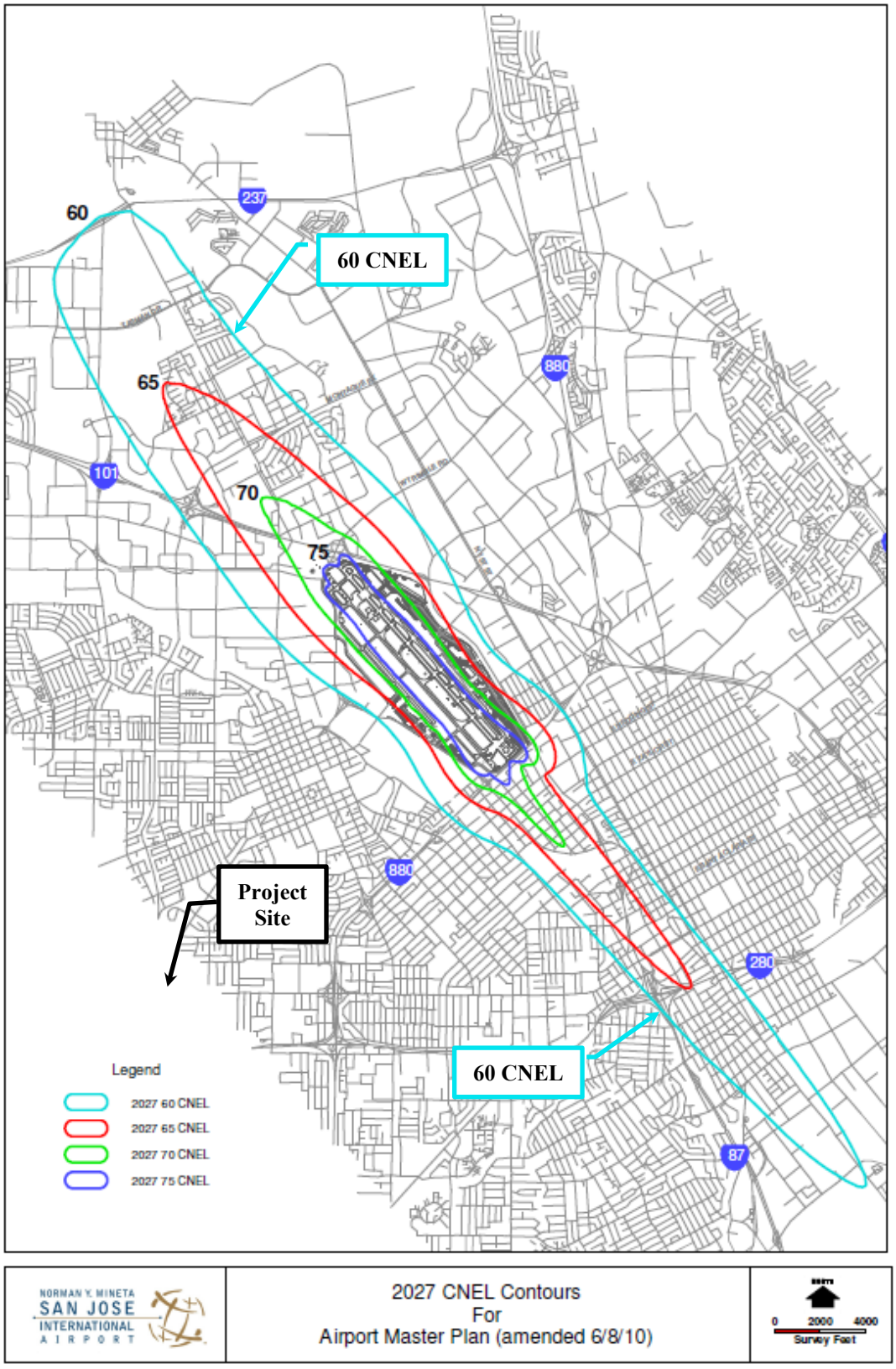
**Impact 3:** **Excessive Aircraft Noise.** The project site is located more than three miles from a public airport or public use airport and would not expose people residing or working in the project area to excessive aircraft noise levels. **This is a less-than-significant impact.**

Norman Y. Mineta San José International Airport is a public-use airport located approximately 3.3 miles northeast of the project site. The project site lies well outside the 60 dBA CNEL 2027 noise contour of the airport, according to the Norman Y. Mineta San José International Airport Master Plan Update Project[4] report published in February 2010 as an addendum to the Environmental Impact Report (see Figure 7). This means that future exterior noise levels due to aircraft 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. This is a less-than-significant impact.

**Mitigation Measure 3:** **None required.**

[4] City of San José, "Norman Y. Mineta San José International Airport Master Plan Update Project: Eighth Addendum to the Environmental Impact Report," City of San José Public Project File No. PP 10-024, February 10, 2010.

**FIGURE 7 2027 CNEL Noise Contours for SJIA Relative to Project Site**



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July 23, 2020

Tyler Rogers
David J. Powers & Associates
1736 Franklin Street, 3rd Floor
Oakland, California 94612

**Subject: 3896 Stevens Creek Boulevard Addendum Noise Memorandum, San José, CA – Evaluation of the Additional Roadway Improvements**

Dear Tyler:

Illingworth & Rodkin, Inc. completed a CEQA noise and vibration assessment for the 3896 Stevens Creek Boulevard Project in April 2020. Since the completion of the noise and vibration assessment, additional roadway improvements have been proposed to address transportation impacts identified in the CEQA process. The proposed roadway improvements are as follows:

- Removal of the southeast and northwest pork chop islands at Saratoga Avenue/Stevens Creek Boulevard
- Relocation of southeast bus stop (including the bus shelter) and relocation of the northwest bus stop (bench only)
- Removal of northeast and southwest pork chop islands at Saratoga Avenue/Kiely Boulevard

The purpose of this letter is to evaluate the impact of the proposed roadway improvements and updated traffic study on the noise and vibration assessment completed in April 2020.

**Temporary Construction Noise and Vibration**

The proposed roadway improvements summarized above would require minimal construction work. Limited equipment would be required for these activities. Due to the size of the proposed project and the heavy-duty construction equipment required for the project, the additional construction required for the roadway improvements would be insignificant compared to the project construction considered in the April 2020 assessment and would not result in further temporary construction noise or vibration impacts. With the implementation of Mitigation Measures 1a and 2 of the April 2020 noise assessment, temporary noise and vibration impacts for the proposed project, with the inclusion of the additional roadway improvements, would be reduced to a less-than-significant impact.

**Permanent Traffic Noise Level Increase**

Based on the proposed roadway improvements summarized above, the traffic report was updated to reflect potential changes to the peak AM and PM traffic volumes at the 13 intersections included in the study. The traffic volumes included in the updated traffic study did not substantially increase from the those evaluated in the April 2020 assessment. The existing plus project peak hour volumes for each roadway segment were compared to the existing peak hour volumes. The updated traffic study resulted in a 4 dBA DNL increase along Northlake Drive, south of Stevens Creek Boulevard, which is consistent with the noise level increase calculated in the April 2020 assessment. Since only commercial uses are located along Northlake Drive, south of Stevens Creek Boulevard, the 4 dBA DNL increase would result in a less-than-significant impact.

Consistent with the April 2020 assessment, all other roadway segments, including Northlake Drive, north of Kiely Boulevard, resulted in a noise level increase of 2 dBA DNL or less. This would be a less-than-significant impact.

**Cumulative Noise Level Increase**

Both cumulative scenarios (with and without the project) were compared to the existing traffic scenario. Consistent with the April 2020 assessment, the traffic noise increase calculated under both cumulative scenarios (with and without the project) was 2 dBA DNL or less along all segments included in the traffic study, except along Northlake Drive, south of Stevens Creek Boulevard. Along Northlake Drive, south of Stevens Creek Boulevard, a 4 dBA DNL increase was calculated under the cumulative plus project scenario, while no measurable increase was calculated under the cumulative (no project) scenario. However, there are no residential land uses along this segment. Therefore, this is a less-than-significant impact. This is consistent with the conclusions of the April 2020 assessment.

The proposed roadway improvements would not change the findings or conclusions of the noise and vibration assessment completed in April 2020.

♦ ♦ ♦

If you have any questions or comments regarding this analysis, please do not hesitate to call.

Sincerely,

Carrie J. Janello
Senior Consultant
***Illingworth & Rodkin, Inc***.