505 EAST BAYSHORE ROAD NOISE AND VIBRATION ASSESSMENT

Redwood City, California

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Project: 21-133

INTRODUCTION

A townhouse development is proposed at 505 East Bayshore Road in Redwood City, California. The 2.54-acre project site is currently developed with several corrugated metal warehouse buildings and outdoor storage facilities associated with an existing industrial facility. The removal of the existing development will clear the site for nine three-story townhouse buildings, and an open space common area with amenities. Fifty-six (56) townhouse units ranging from 1,200 square feet to 1,700 square feet would be divided among the nine buildings and would range from two- to three-stories. Three of buildings would be built on the northern portion of the site, with six buildings on the southern portion of the site being separated by a new internal roadway providing vehicular access from East Bayshore Road. The 26,951 square foot common open space/amenity area will be located on the eastern side of the site, and walking paths are planned throughout the site. A public bicycle/pedestrian path is planned along the northern property line, starting at East Bayshore Road, and continuing through the neighboring property to the east.

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 conditions; 2) the General Plan Consistency Section discusses 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 CNEL. Typically, the highest steady traffic noise level during the daytime is about equal to the CNEL 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 CNEL with open windows and 65-70 dBA CNEL 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 CNEL 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 CNEL. At a CNEL of about 60 dBA, approximately 12 percent of the population is highly annoyed. When the CNEL 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 CNEL of 60-70 dBA. Between a CNEL of 70-80 dBA, each decibel increase increases the percentage of the population highly annoyed by about 3 percent. People appear to respond more adversely to aircraft noise. When the CNEL 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.

TABLE 1 Definition of Acoustical Terms Used in this Report

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

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

TABLE 2 Typical Noise Levels in the Environment

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

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

Fundamentals of Groundborne Vibration

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

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

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

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

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

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

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

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

Regulatory Background

The State of California and the City of Redwood City have established regulatory criteria that are applicable in this assessment. Questions contained in Appendix G of the CEQA Guidelines are used to assess the potential significance of impacts pursuant to local General Plan policies, Municipal Code standards, or the applicable standards of other agencies. A summary of the applicable regulatory criteria is provided below.

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

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

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

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

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

City of Redwood City 2010 General Plan. The City of Redwood City's General Plan identifies noise and land use compatibility standards for various land uses and establishes policies to control noise within the community. Table PS-10 from the General Plan shows acceptable levels for various land uses. Applicable goals, policies, and programs presented in the General Plan are as follows:

Goal PS-13 Minimize the impact of point source noise and ambient noise levels throughout the community.

Policy PS-13.3 Consider noise impacts as part of the development review process, particularly the location of parking, ingress/egress/loading, and the refuse collection areas relative to surrounding residential development and other noise-sensitive land uses.

Policy PS-13.4 In accordance with the Municipal Code and noise standards contained in the General Plan, strive to provide a noise environment that is at an acceptable noise level near schools, hospitals, and other noise-sensitive areas.

Policy PS-13.5 Limit the hours of operation at all noise generation sources that are adjacent to noise-sensitive areas, wherever practical.

Policy PS 13.6 Require all exterior noise sources (construction operations, air compressors, pumps, fans, and leaf blowers) to use available noise suppression devices and techniques to bring exterior noise down to acceptable levels that are compatible with adjacent land uses.

Policy PS-13.8 Implement appropriate standard construction noise controls for all construction projects.

Policy PS-13.9 Require noise created by new non-transportation noise sources to be mitigated so as not to exceed acceptable interior and exterior noise level standards.

Policy PS-13.10 Do not allow new residential or other noise sensitive land use development in noise impacted areas unless effective mitigation measures are incorporated into the project design to reduce outdoor activity area noise levels.

Program PS-63 **Enforcing Construction and Maintenance Noise Regulations.** Minimize noise from property maintenance equipment, construction activities, and other non-transportation noise sources by enforcing construction and

maintenance hours, including vehicle start-up and preparation. Enforce standard construction noise controls such as:

- Limit construction to the hours of 8:00 a.m. to 5:00 p.m. on weekdays, and 9:00 a.m. to 5:00 p.m. on Saturdays, with no noise-generating construction on Sundays or holidays.
- Control noise from construction workers' radios to the point where they are not audible at existing residences that border the project site.
- Equip all internal combustion engine-driven equipment with mufflers that are in good condition and appropriate for the equipment.
- Utilize quiet models of air compressors and other stationary noise sources where technology exists.
- Locate stationary noise-generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction project area.
- Prohibit unnecessary idling of internal combustion engines.
- Notify residents adjacent to the project site of the construction schedule in writing.

Program PS-68 **Maintenance Equipment Restrictions.** Consider the possible restriction of certain types of heating, ventilating, and air condition systems (HVAC) and/or maintenance equipment (such as leaf blowers) within the City.

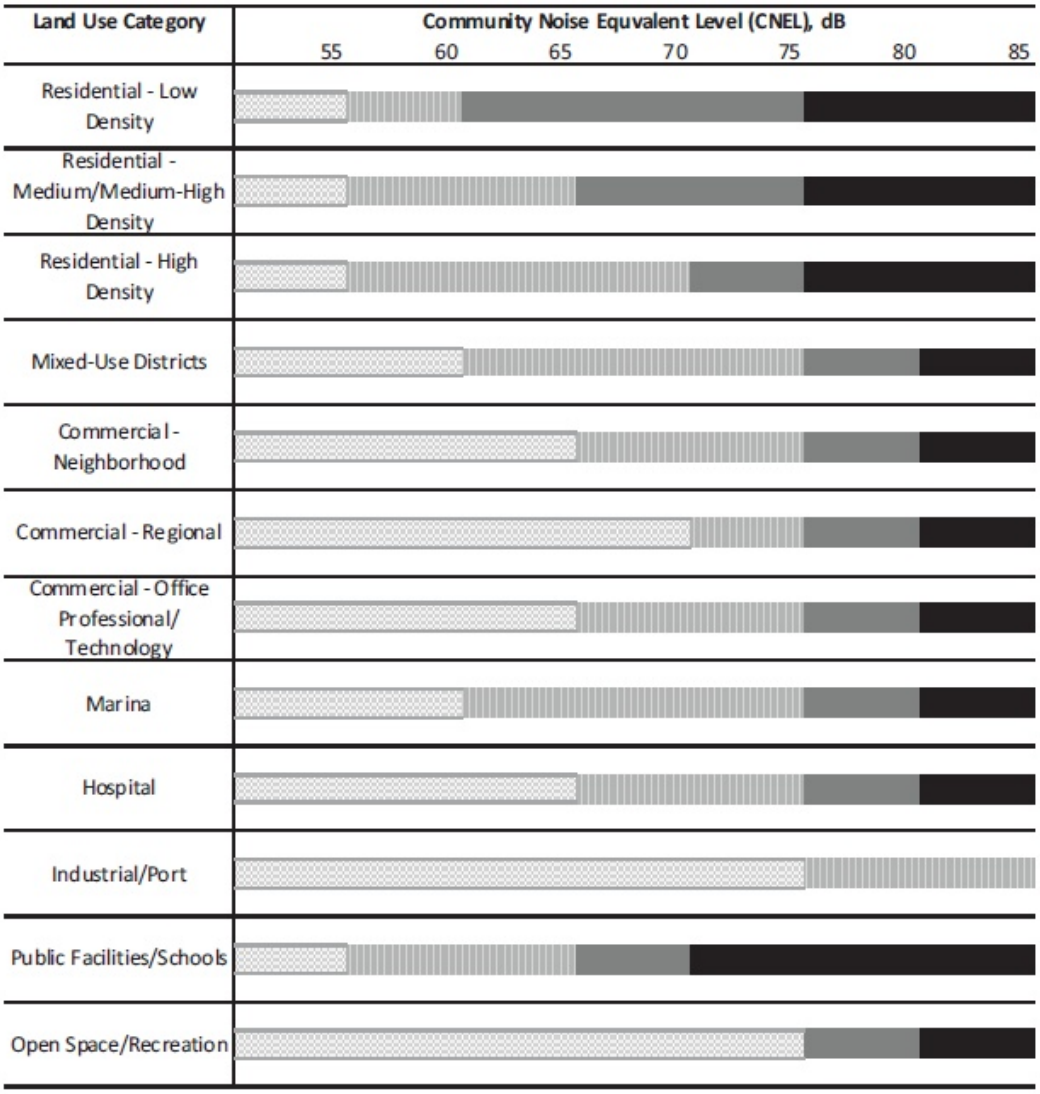


Figure PS-10: Redwood City Noise Guidelines for Land Use Planning

City of Redwood City Municipal Code Noise Regulation. The City's Municipal Code establishes noise level performance standards assemblages of three or persons, as well as for fixed sources of noise. The following sections from the Municipal Code apply to this project:

Section 24.31. Prohibited Noise Levels. It shall be unlawful for any person to suffer or allow noise levels to be generated by:

A. Construction activities, including demolition, alteration, repair or remodeling of or to existing structures and construction of new structures on property within the City, at more than 110 dB measured at any point within a residential district of the City and outside of the plane of said property; or

B. An individual item of machinery, equipment or device used during construction activities, including demolition, alteration, repair or remodeling of or to existing structures and construction of new structures on property within the City, at more than 110 dB measured within a residential district of the City at a distance of twenty-five feet (25') from said machinery, equipment or device. If said machinery, equipment or device is housed within a structure on the property, then the measurement shall be made at a distance as near to twenty-five feet (25') from said machinery, equipment or device as possible.

Section 24.32. Time Limitations. Notwithstanding the provisions in this Division to the contrary, it shall be unlawful for any person to engage in construction activities, including demolition, alteration, repair or remodeling of or to existing structures and the construction of new structures on property in a residential district or within five hundred feet (500') of a residential district in the City, between the hours of eight o'clock (8:00) p.m. and seven o'clock (7:00) a.m. the following day, Monday through Friday of any week or at any time on Saturdays, Sundays, or holidays if the noise level generated by any such activity exceeds the local ambient measured at any point within the residential district and outside of the plane of said property.

Existing Noise Environment

The project site is located approximately 450 to 820 feet northeast of U.S. Highway 101 (US 101) in Redwood City, California. Currently, the site is occupied by the Alan Steel & Supply Co. and contains a number of warehouse buildings. The land uses surrounding the project site include a paved walking trail and wetlands to the north, car dealerships to the south, and a vacant movie theater building to the east.

The noise environment in the project vicinity results primarily from vehicular traffic along US 101 and vehicular traffic along East Bayshore Road. Bicycle and pedestrian activities along the trail, local car dealership activities, and industrial activities also contribute to the noise environment in the area. Overhead aircraft associated with the San Carlos Airport periodically result in relatively high noise levels.

Illingworth & Rodkin, Inc. conducted a noise monitoring survey at the project site from Wednesday, February 16, 2022 through Friday, February 18, 2022. One long-term noise measurement (LT-1) and four short-term noise measurements (ST-1 through ST-4), as shown in Figure 1, were made as part of this monitoring survey.

Long-term noise measurement LT-1 was located along East Bayshore Road, just south of the project site. The measurement was positioned approximately 330 feet north of the centerline of US 101 and approximately 30 feet east of the centerline of East Bayshore Road. The primary noise source at this location was vehicular traffic along US 101 and East Bayshore Road. Hourly average noise levels at this location typically ranged from 67 to 73 dBA L_{eq} during the day and from 59 to 71 dBA L_{eq} at night. The community noise equivalent level on Thursday, February 17, 2022 was 75 dBA CNEL. The daily trend in noise levels at LT-1 is shown in Figures 2 through 4.

Short-term noise measurements ST-1 through ST-4 were conducted on Wednesday, February 16, 2022 in 10-minute intervals starting at 11:30 a.m. and concluding at 12:40 p.m. Table 4 summarizes the results for the short-term measurements.

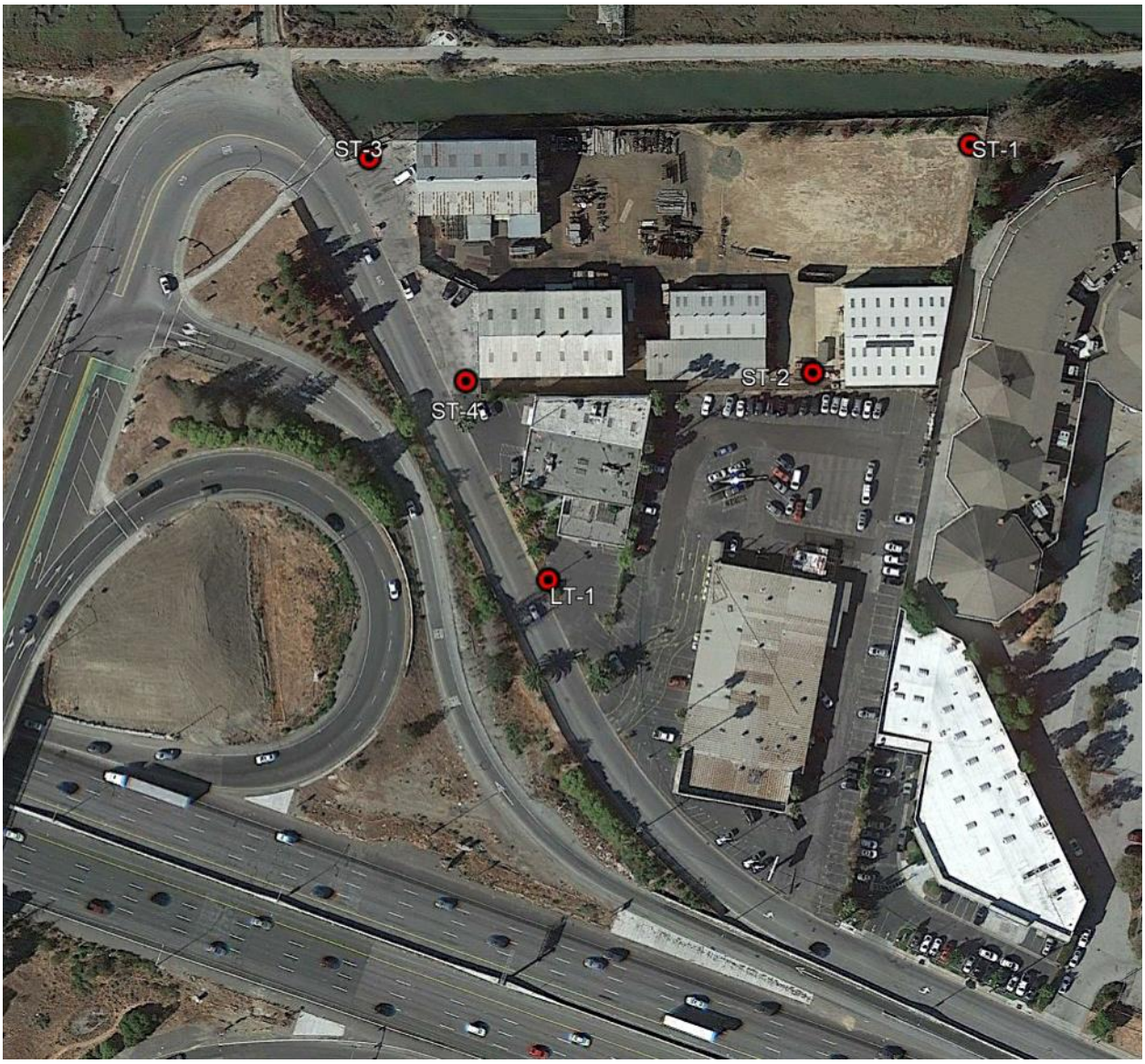
Measurement ST-1 was made near the northeastern corner of the project site, approximately 795 feet north of US 101, approximately 500 feet east of East Bayshore Road, and approximately 75 feet south of the bicycle/pedestrian path. The 10-minute $L_{eq(10\text{-}min)}$ measured at ST-1 was 50 dBA $L_{eq(10\text{-}min)}$. Distant vehicular traffic along US 101 was the primary noise source at this location (48 to 50 dBA), with occasional overhead aircraft associated with the San Carlos Airport contributing to the noise levels (52 to 54 dBA).

Short-term noise measurement ST-2 was completed at the southern boundary of the project site, near the car dealership. ST-2 was approximately 570 feet north of US 101 and approximately 300 feet east of East Bayshore Road. The 10-minute $L_{eq(10\text{-}min)}$ measured at ST-2 was 55 dBA $L_{eq(10\text{-}min)}$. Distant vehicular traffic along US 101 was the primary noise source at this location, with occasional overhead aircraft (58 to 68 dBA), helicopter noise (54 to 68 dB), and pressure washer noise from the car dealership (52 to 54 dBA) contributing to the noise levels.

Short-term noise measurement ST-3 was made at the northwestern corner of the project site, along East Bayshore Road and near the bicycle/pedestrian path. ST-3 was approximately 615 feet north of US 101, approximately 45 feet east of East Bayshore Road, and approximately 85 feet south of the bicycle/pedestrian path. The 10-minute $L_{eq(10\text{-}min)}$ measured at ST-3 was 61 dBA $L_{eq(10\text{-}min)}$. Vehicular traffic along East Bayshore Road was the main noise source at this measurement site (62 to 72 dBA), with background vehicular traffic noise from US 101 and occasional overhead aircraft contributing to the noise levels.

Short-term noise measurement ST-4 was made at the southwestern corner of the project site, along East Bayshore Road and near the car dealership to the south. ST-4 was approximately 465 feet north of US 101, and approximately 40 feet east of East Bayshore Road. The 10-minute $L_{eq(10\text{-}min)}$ measured at ST-4 was 67 dBA $L_{eq(10\text{-}min)}$. Vehicular traffic along East Bayshore Road was the main noise source at this measurement site (62 to 85 dBA), with background vehicular traffic noise from US 101 and occasional overhead aircraft contributing to the noise levels.

FIGURE 1 Noise and Vibration Measurement Locations



Source: Google Earth 2022.

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

Noise Measurement Location	Measured Noise Level, dBA					
	L_{max}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{eq}
ST-1: Northeastern corner of the site, ~795' from the centerline of US 101 (2/16/2022, 11:30-11:40 a.m.)	54	53	51	50	49	50
ST-2: Southern boundary of the site, ~570' from the centerline of US 101 (2/16/2022, 11:50 a.m. -12:00 p.m.)	69	65	56	52	51	55
ST-3: Northwestern corner of the site, ~615' from the centerline of US 101 (2/16/2022, 12:10-12:20 p.m.)	71	67	64	60	55	61
ST-4: Southwestern corner of the site, ~465' from the centerline of US 101 (2/16/2022, 12:30-12:40 p.m.)	85	77	70	64	58	67

FIGURE 2 Daily Trends in Noise Levels at LT-1, Wednesday, February 16, 2022

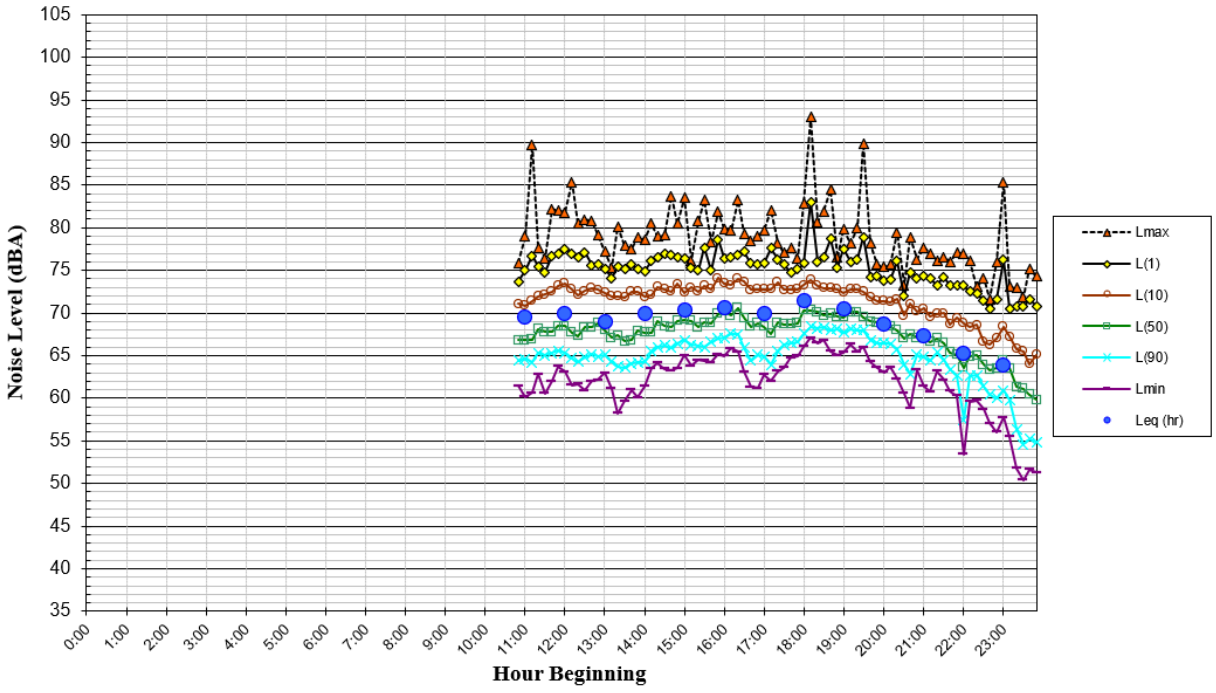


FIGURE 3 Daily Trends in Noise Levels at LT-1, Thursday, February 17, 2022

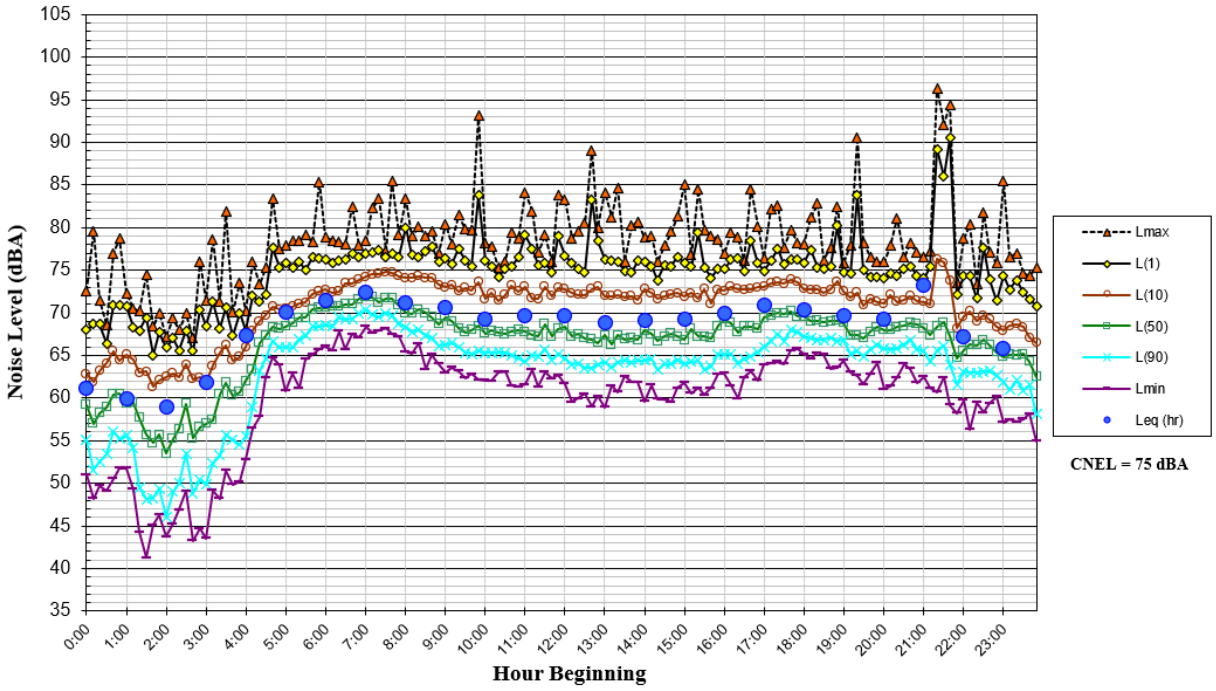
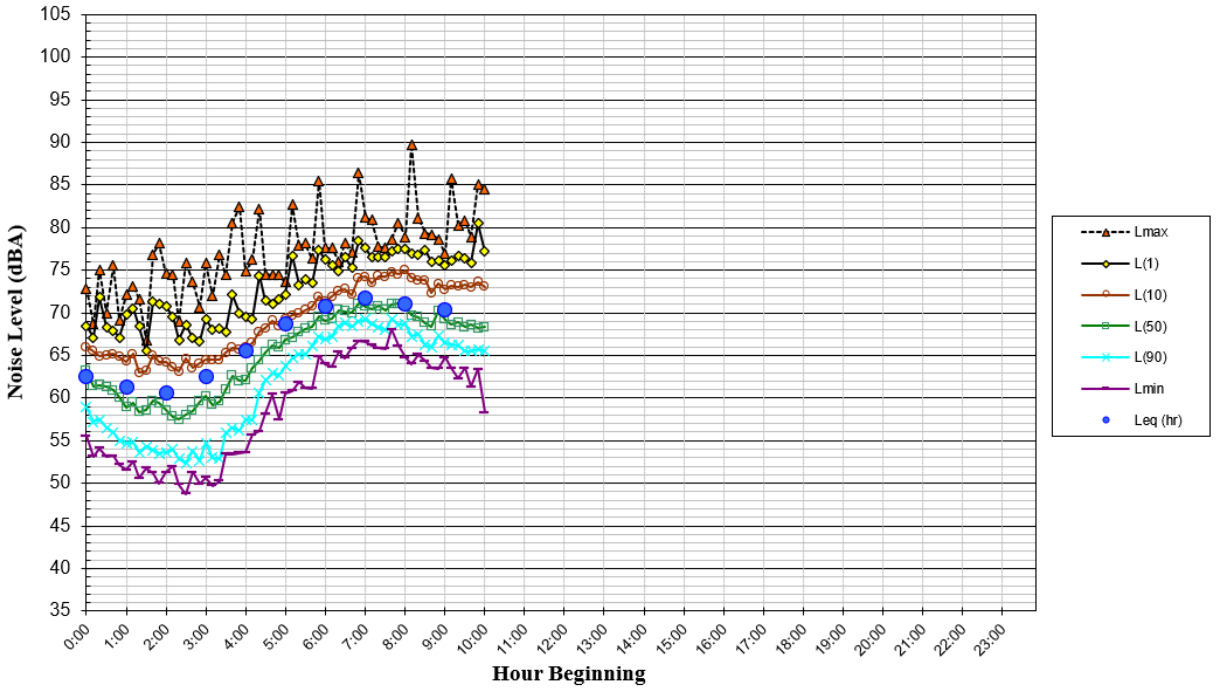


FIGURE 4 Daily Trends in Noise Levels at LT-1, Friday, February 18, 2022



GENERAL PLAN CONSISTENCY ANALYSIS

Noise and Land Use Compatibility

The City's General Plan designates the project site as Commercial Regional, and the site is zoned CG – Commercial General. The project proposes a General Plan Amendment to Mixed Use – Waterfront Neighborhood and a rezoning to MUWF – Mixed Use Waterfront.

Figure PS-10 of the Public Safety section of the Redwood City General Plan provides exterior noise standards for common outdoor use areas at various types of land uses in Redwood City. Outdoor noise levels at mixed-use waterfront uses are considered "normally acceptable" at or below 60 dBA CNEL, and "conditionally acceptable" at or below 75 dBA CNEL. Interior noise levels in multi-family residential units attributable to exterior environmental noise sources are limited to 45 dBA CNEL or less per the California Building Code.

The future noise environment at the project site would continue to result primarily from vehicular traffic along US 101 with secondary noise sources including adjacent commercial operations at locations such as the Toyota dealer car wash. Based on a review of the 2010 existing and 2030 projected noise contours in Figures PS-11 and PS-12 of the Redwood City General Plan, traffic noise levels along US 101 near the project site are not anticipated to increase.

Future Exterior Noise Environment

The project proposes 26,951 square feet of common open space, including an amenity area for residents on the eastern portion of the site that includes a barbeque area and fireplace. Exterior noise levels at common open space areas adjacent to East Bayshore Road would range from 66 to 73 dBA CNEL, while well shielded areas along the shoreline trail and adjacent to the six townhome buildings along the southernmost portion of the site would be subject to exterior noise levels ranging from 55 to 65 dBA CNEL. Although noise levels immediately adjacent to East Bayshore Road and commercial land uses to the south would be considered "conditionally acceptable" for mixed-use waterfront land, there would be several locations along the north and east boundaries of the site where the "normally acceptable" threshold would be achieved. All occupants would have access to the shoreline trail and common open space area for quiet outdoor enjoyment.

Future Interior Noise Environment

Interior noise levels would vary depending upon the design of the buildings (relative window area to wall area) and the selected construction materials and methods. Standard residential construction provides approximately 15 dBA of exterior-to-interior noise reduction, assuming the windows are partially open for ventilation. Standard construction with the windows closed provides approximately 20 to 25 dBA of noise reduction in interior spaces. Where exterior noise levels range from 60 to 65 dBA CNEL, the inclusion of adequate forced-air mechanical ventilation can reduce interior noise levels to acceptable levels by allowing occupants the option of closing the windows to control noise. Where noise levels exceed 65 to 70 dBA CNEL, forced-air mechanical ventilation systems and sound-rated construction methods are normally required. Such methods or materials may include a combination of sound-rated windows and doors, sound-rated exterior wall

assemblies, and mechanical ventilation so windows may be kept closed at the occupant's discretion. Attaining the necessary noise reduction from exterior to interior spaces is readily achievable in noise environments less than 75 dBA CNEL with proper wall construction techniques, the selections of proper windows and doors, and the incorporation of forced-air mechanical ventilation systems.

Title 24, Part 2 of the California Building Code and the City of Redwood City require that interior noise attributable to exterior sources be maintained at or below 45 dBA CNEL in multi-family residential units.

Analysis of on-site noise measurements indicate anticipated worst-case noise levels at residential units in Building 1 and Building 7, adjacent to East Bayshore Road, would reach 66 to 73 dBA CNEL. Interior noise levels within Buildings 1 and 7 would range from 51 to 58 dBA CNEL assuming standard residential construction methods with the windows partially open for ventilation. Exterior noise levels at the remaining townhome buildings (Buildings 2-6, 8, and 9) would typically range from 60 to 70 dBA CNEL. Assuming standard residential construction methods with the windows partially open for ventilation, interior noise levels within Buildings 2-6, 8, and 9 would range from 45 to 55 dBA CNEL. Uncontrolled interior noise levels would exceed the 45 dBA CNEL interior noise limit established by the General Plan and State Building Code; therefore, noise insulation would be required.

Noise Insulation Features to Reduce Future Interior Noise Levels

For consistency with the General Plan the following Conditions of Approval are recommended for consideration by the City:

- Project-specific acoustical analyses are required by the State Building Code to confirm that interior noise levels in residences will be reduced to 45 dBA CNEL or lower. The specific determination of what treatments are necessary will be conducted on a unit-by-unit basis. Results of the analysis, including the description of the necessary noise control treatments, will be submitted to the City along with the building plans and approved prior to issuance of a building permit.

- Building sound insulation requirements would need to include the provision of forced-air mechanical ventilation for units throughout the site so that windows could be kept closed at the occupant's discretion to control noise.

- Special building techniques (e.g., sound-rated windows and building facade treatments) may be required to maintain interior noise levels at or below acceptable levels. These treatments would include, but are not limited to, sound rated windows and doors, sound rated wall constructions, acoustical caulking, protected ventilation openings, etc. Preliminary calculations indicate that residential units would require sound rated windows and doors with ratings ranging from STC 28-34 to assure that the 45 dBA CNEL indoor standards are met.

IMPACTS AND MITIGATION MEASURES

Significance Criteria

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

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

    a. Temporary Construction Noise Increase. A significant temporary construction noise impact would be identified if construction-related noise would occur outside of the hours specified in the Municipal Code or be conducted without the inclusion of best management practices (General Plan Policies PS 13.6, PS 13.8, and PS-63 and Municipal Code Sections 24.31 and 24.32).

    b. Permanent Noise Increase. A significant permanent noise level increase would occur if project-generated traffic would result in: a) a noise level increase of 5 dBA CNEL or greater, with a future noise level of less than 55 dBA CNEL, or b) a noise level increase of 3 dBA CNEL or greater, with a future noise level of 55 dBA CNEL or greater.

2. **Generation of Excessive Groundborne Vibration:** A significant impact would be identified if the construction of the project would generate excessive vibration levels surrounding receptors. Groundborne vibration levels exceeding 0.5 in/sec PPV would have the potential to result in cosmetic damage to new residential and modern commercial/industrial structures.

3. **Excessive Aircraft Noise.** 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.** Nearby noise-sensitive land uses would be exposed to a temporary increase in ambient noise levels due to project construction activities. The incorporation of standard construction noise controls provided in Program PS-63 of the General Plan would result in a **less-than-significant** impact.

The proposed project would be constructed in approximately 18 months, beginning in January of 2023 and concluding in June of 2024. The existing development on the site would be demolished to accommodate the project. In addition, the current site elevation would be increased to three feet above the Federal Emergency Management Agency (FEMA) base flood elevation of 10 feet to protect from flooding and sea level rise. Construction phases would include demolition, site

preparation, grading/excavation, trenching/foundation, building – exterior, building – interior/ architectural coating, and paving. During each phase of construction, there would be a different mix of equipment operating, and noise levels would vary by phase and vary within phases, based on the amount of equipment in operation and the location at which the equipment is operating.

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

Section 24.31 of the City's Municipal Code restricts construction activities to 110 dBA at any time within residential districts and limits noise produced by any individual piece of construction equipment used within a residential district to no more than 110 dBA at a distance of 25 feet or 25 feet from the housing if the equipment is enclosed. Section 24.32 states that construction activities would be unlawful in a residential district or within 500 feet of a residential district between the hours of 8:00 p.m. and 7:00 a.m. Monday through Friday or at any time on weekends or holidays if the noise level generated by any construction activity exceeds local ambient noise levels within the residential district. Policy PS 13.6 of the City's General Plan requires all exterior noise sources, including construction operations, to use available noise suppression devices and techniques and Policy PS-13.8 requires construction projects to implement appropriate standard construction noise. Program PS-63 enforces standard construction noise controls to minimize noise from construction activities. These include the following:

- Limit construction to the hours of 8:00 a.m. to 5:00 p.m. on weekdays, and 9:00 a.m. to 5:00 p.m. on Saturdays, with no noise-generating construction on Sundays or holidays.
- Control noise from construction workers' radios to the point where they are not audible at existing residences that border the project site.
- Equip all internal combustion engine-driven equipment with mufflers that are in good condition and appropriate for equipment.
- Utilize quiet models of air compressors and other stationary noise sources where technology exists.
- Locate stationary noise-generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction project area.
- Prohibit unnecessary idling of internal combustion engines.
- Notify residents adjacent to the project site of the construction schedule in writing.

Maximum instantaneous noise levels generated by typical construction equipment at 50 feet are provided in Table 5. The typical range of maximum instantaneous noise levels for the proposed project would be 70 to 90 dBA L_{max} at a distance of 50 feet from the equipment, and 76 to 96 dBA L_{max} at a distance of 25 feet from the equipment when adjusting for the shorter distance between the noise source and receptor. Table 6 shows the hourly average noise level ranges, by construction phase, typical for various types of projects. Hourly average noise levels generated by construction are about 65 to 88 dBA L_{eq} for residential buildings, measured at a distance of 50 feet from the center of a busy construction site. Construction-generated noise levels drop off at a rate of about 6

TABLE 5 Construction Equipment 50-Foot Noise Emission Limits

Equipment Category	L_{max} Level (dBA)[1,2]	Impact/Continuous
Arc Welder	73	Continuous
Auger Drill Rig	85	Continuous
Backhoe	80	Continuous
Bar Bender	80	Continuous
Boring Jack Power Unit	80	Continuous
Chain Saw	85	Continuous
Compressor[3]	70	Continuous
Compressor (other)	80	Continuous
Concrete Mixer	85	Continuous
Concrete Pump	82	Continuous
Concrete Saw	90	Continuous
Concrete Vibrator	80	Continuous
Crane	85	Continuous
Dozer	85	Continuous
Excavator	85	Continuous
Front End Loader	80	Continuous
Generator	82	Continuous
Generator (25 KVA or less)	70	Continuous
Gradall	85	Continuous
Grader	85	Continuous
Grinder Saw	85	Continuous
Horizontal Boring Hydro Jack	80	Continuous
Hydra Break Ram	90	Impact
Impact Pile Driver	105	Impact
Insitu Soil Sampling Rig	84	Continuous
Jackhammer	85	Impact
Mounted Impact Hammer (hoe ram)	90	Impact
Paver	85	Continuous
Pneumatic Tools	85	Continuous
Pumps	77	Continuous
Rock Drill	85	Continuous
Scraper	85	Continuous
Slurry Trenching Machine	82	Continuous
Soil Mix Drill Rig	80	Continuous
Street Sweeper	80	Continuous
Tractor	84	Continuous
Truck (dump, delivery)	84	Continuous
Vacuum Excavator Truck (vac-truck)	85	Continuous
Vibratory Compactor	80	Continuous
Vibratory Pile Driver	95	Continuous
All other equipment with engines larger than 5 HP	85	Continuous

Notes:

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

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

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

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

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

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

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

dBA per doubling of the distance between the source and receptor. Shielding by buildings or terrain often result in lower construction noise levels at distant receptors.

Equipment expected to be used in each construction phase are summarized in Table 7, along with the quantity of each type of equipment, the reference noise level at 50 feet assuming the operation of the two loudest pieces of construction equipment, and the estimated noise levels at the nearest property lines projected from the center of the construction activity by phase. Federal Highway Administration's (FHWA's) Roadway Construction Noise Model (RCNM) was used to calculate the hourly average noise levels for each phase of construction, assuming the two loudest pieces of equipment would operate simultaneously, as recommend by the FTA for construction noise evaluations. This construction noise model includes representative sound levels for the most common types of construction equipment and the approximate usage factors of such equipment that were developed based on an extensive database of information gathered during the construction of the Central Artery/Tunnel Project in Boston, Massachusetts (CA/T Project or "Big Dig"). The usage factors represent the percentage of time that the equipment would be operating at full power.

As shown in Table 7, construction noise levels would intermittently range from 77 to 85 dBA L_{eq} when activities occur approximately 50 feet from nearby receptors, and would typically range from 57 to 81 dBA L_{eq} when focused near the acoustic center of the project site. In addition, there is a potential project scenario that would assume that the Syufy project (557 E. Bayshore) could be occupied while the proposed Gatekeeper project is still under construction. Construction noise levels would typically range from 64 to 72 dBA L_{eq} at these future residences when measured from the acoustic center of the project site.

Under this scenario, Section 24.31 of the City's Municipal Code would be enforced and would restrict construction noise levels to 110 dBA at any time within residential districts and limits noise

produced by any individual piece of construction equipment used within a residential district to no more than 110 dBA at a distance of 25 feet or 25 feet from the housing if the equipment is enclosed. Similarly, Section 24.32 would be enforced and would prohibit construction activities in a residential district or within 500 feet of a residential district between the hours of 8:00 p.m. and 7:00 a.m. Monday through Friday or at any time on weekends or holidays if the noise level generated by any construction activity exceeds local ambient noise levels within the residential district. Policy PS 13.6 of the City's General Plan would also require all exterior noise sources, including construction operations, to use available noise suppression devices and techniques and Policy PS-13.8 and Program PS-63 would also require construction projects to implement appropriate standard construction noise controls to minimize noise from construction activities. In addition, full disclosure of the potential for elevated noise levels produced by Syufy and Gatekeeper construction activities will be provided to future occupants/tenants. This disclosure will be provided as part of the mortgage, lease, sublease, and/or other contractual real-estate transaction associated with the subject property. The enforcement of the Municipal Code, implementation of construction noise controls, and adequate disclosures would result in a **less-than-significant** impact.

Mitigation Measure 1a: None required.

TABLE 7 Construction Noise Levels

Phase (Work Days)	Construction Equipment (Quantity)	Calculated Hourly Average L_{eq} (dBA) at Nearest Property Lines From Operation of Two Loudest Pieces of Construction Equipment at Acoustic Center of the Site				
		Noise Level at 50 feet	North Trail (150 feet)	East Future Residential (215 feet)	South Commercial (75 ft)	West Trail (520 ft)
Demolition (5 days)	Concrete/Industrial Saw (1)* Excavator (1) Rubber-Tired Dozer (1)* Tractor/Loader/Backhoe (1)	84	74	71	80	64
Site Preparation (16 days)	Grader (1)* Rubber-Tired Dozer (1) Tractor/Loader/Backhoe (1)*	84	74	71	80	64
Grading/ Excavation (44 days)	Excavator (1) Grader (1)* Rubber Tired Dozer (1) Tractor/Loader/Backhoe (1)*	84	74	71	80	64
Trenching/ Foundation (21 days)	Tractor/Loader/Backhoe (1)* Excavator (1) * Concrete/Industrial Saw (1)* Plate Compactor (1)*	85	75	72	81	65
Building - Exterior (128 days)	Air Compressor (2) Forklift (1) Tractor/Loader/Backhoe (1)*	81	71	68	77	61
Building – Interior/ Architectural Coating (151 days)	Air Compressor (2)* Forklift (1)	77	67	64	73	57
Paving (22 days)	Cement and Mortar Mixer (1) Paver (1) Paving Equipment (1)* Roller (1) Tractor/Loader/Backhoe (1)*	82	72	69	68	62

*Denotes two loudest pieces of construction equipment per phase

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

A significant permanent noise increase would occur if the project would increase noise levels at noise-sensitive receptors by 3 dBA CNEL or greater where future ambient noise levels exceed the "normally acceptable" noise level standard. Where future ambient noise levels would remain below the "normally acceptable" noise level standard, noise level increases of 5 dBA CNEL or greater would be considered significant. According to Figure PS-10 of the City's General Plan, 60 dBA CNEL would be the "normally acceptable" noise level threshold for mixed-use waterfront uses, and 65 dBA CNEL would be the "normally acceptable" noise level threshold for commercial-regional uses. Since existing ambient noise levels in the vicinity of the project site exceed 65 dBA CNEL, it is expected that ambient noise levels would continue to exceed 65 dBA CNEL under future conditions. Therefore, a significant impact would occur if traffic due to the proposed project would permanently increase ambient levels by 3 dBA CNEL. For reference, a 3 dBA CNEL noise increase would be expected if the project would double existing traffic volumes along a roadway.

The traffic study completed for the proposed project includes peak hour turning movement data for 6 intersections of roadways serving the project site. The existing plus project traffic scenario was compared to the existing traffic scenario to estimate the noise level increase due to project-generated traffic. Based on the results of the calculations, the traffic noise increase due to the project was less than 0.5 dBA during the am and pm peak hours. CNEL noise level increases would be less given the proximity of the site to US Highway 101, which is the major noise source affecting the project area. Such traffic noise increases would not be noticeable and would be below the 3 dBA CNEL threshold of significance. This is a **less-than-significant** impact.

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

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

The construction of the project may generate perceptible vibration when heavy equipment or impact tools are used. Construction phases utilizing such equipment or tools would include demolition, site preparation, grading, trenching, building construction, and paving. Foundation construction techniques involving impact or vibratory pile driving equipment, which can cause excessive vibration, are not expected with the proposed project.

The California Department of Transportation recommends a vibration limit of 0.5 in/sec PPV as the threshold at which there is a risk of damage to new residential and modern commercial/industrial structures. Cosmetic damage (also known as threshold damage) is defined as hairline cracking in plaster, the opening of old cracks, the loosening of paint or the dislodging of loose objects. Minor damage is defined as hairline cracking in masonry or the loosening of plaster. Major structural damage is defined as wide cracking or the shifting of foundation or bearing walls.

Vibration levels would vary depending on soil conditions, construction methods, and equipment used. 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. Vibratory rollers typically generate vibration levels of 0.202 in/sec PPV at 25 feet while drilling and the use of jackhammers typically generates vibration levels ranging from 0.035 to 0.089 in/sec PPV at a distance of 25 feet.

Vibration levels are highest close to the source, and then attenuate with increasing distance at the rate $(D_{ref}/D)^{1.1}$, where D is the distance from the source in feet and D_{ref} is the reference distance of 25 feet. Table 8 summarizes the vibration levels expected at nearby buildings.

All structures in the project vicinity would be located 15 feet or more from the primary work area, and groundborne vibration levels attributable to project construction would not exceed the 0.5 in/sec PPV threshold for conventional buildings. Neither cosmetic, minor, or major damage would be expected.

At these locations, and in other surrounding areas where vibration would not be expected to cause cosmetic damage, vibration levels may still be perceptible. However, as with any type of construction, this would be anticipated and would not be considered significant, given the intermittent and short duration of the phases that have the highest potential of producing vibration (use of jackhammers and other high-power tools). By use of administrative controls, such as notifying neighbors of scheduled construction activities and scheduling construction activities with the highest potential to produce perceptible vibration during hours with the least potential to affect nearby businesses, perceptible vibration can be kept to a minimum. This is a **less-than-significant** impact.

Mitigation Measure 2: **None required.**

TABLE 8 Calculated Vibration Levels at Nearest Buildings (in/sec PPV)

Equipment		South Commercial (15 feet)	South Commercial (155 feet)	Southeast Commercial (195 feet)	East Commercial (30 feet)
Clam shovel drop		0.354	0.027	0.021	0.165
Hydromill (slurry wall)	in soil	0.014	0.001	0.001	0.007
	in rock	0.030	0.002	0.002	0.014
Vibratory Roller		0.368	0.028	0.022	0.172
Hoe Ram		0.156	0.012	0.009	0.073
Large bulldozer		0.156	0.012	0.009	0.073
Caisson drilling		0.156	0.012	0.009	0.073
Loaded trucks		0.133	0.010	0.008	0.062
Jackhammer		0.061	0.005	0.004	0.029
Small bulldozer		0.005	0.000	0.000	0.002

Source: Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, Office of Planning and Environment, U.S. Department of Transportation, September 2018, as modified by Illingworth & Rodkin, Inc., March 2022.

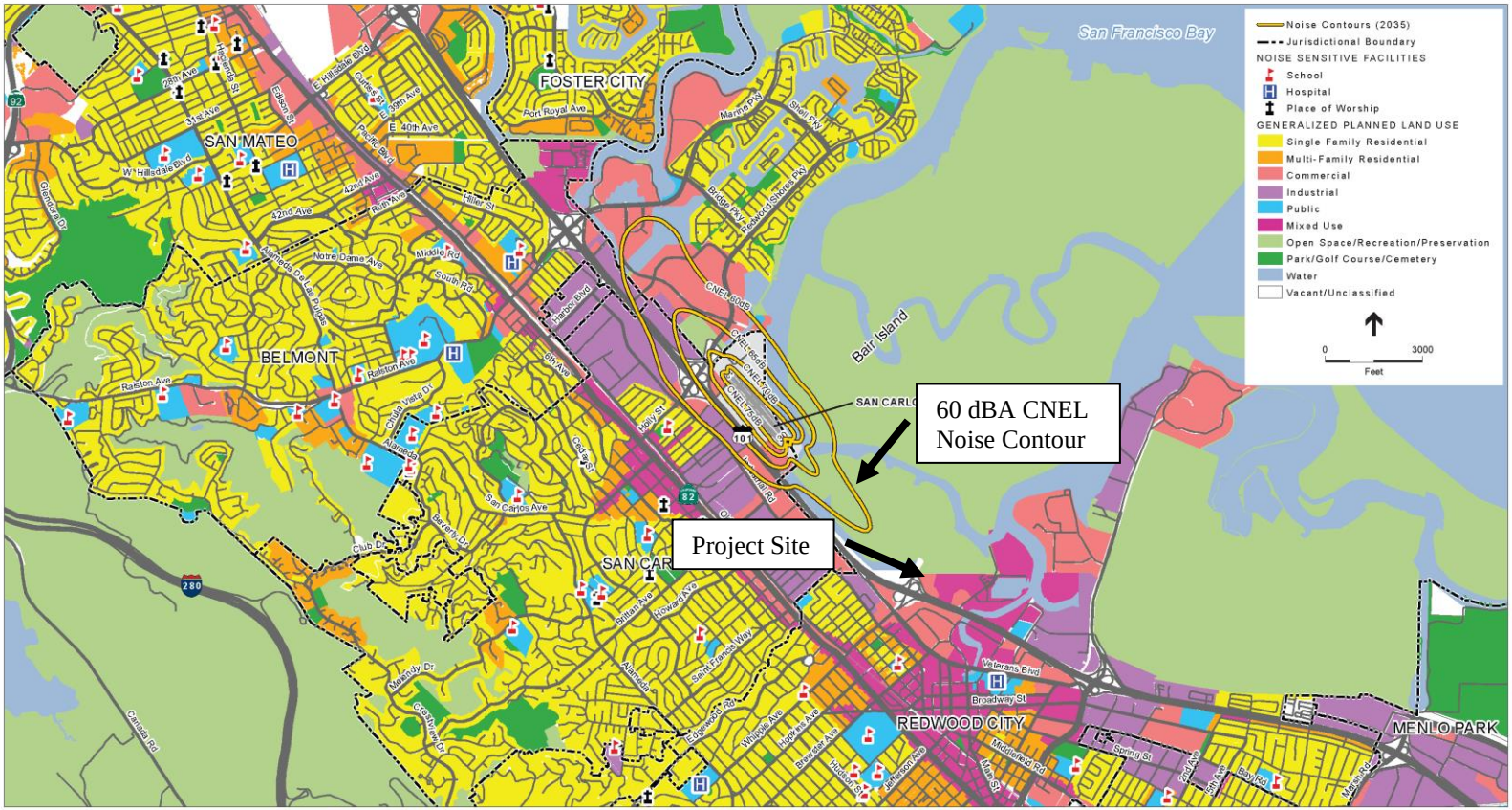
Impact 3: **Excessive Aircraft Noise.** The San Carlos Airport is located approximately 1.1 miles northwest of the project site, but the noise environment attributable to aircraft is considered normally acceptable with residential land uses. This is a **less-than-significant** impact.

San Carlos Airport is a public airport located about 1.1 miles northwest of the project site. According to the 2035 noise contours for the airport, which are included in the Comprehensive Airport Land Use Compatibility Plan for the Environs of San Carlos Airport,[1] the project site falls outside the 60 dBA CNEL noise contour. Figure 5 below shows the location of the project site with respect to the 2035 noise contours for the airport. While aircraft flyovers may at times be audible at the outdoor use areas on the project site, noise levels due to aircraft would not exceed 60 dBA CNEL. Therefore, both the exterior and interior noise levels resulting from aircraft would be compatible with the proposed project, resulting in a **less-than-significant** impact.

Mitigation Measure 3: **None required.**

[1] ESA Airports, "Comprehensive Airport Land Use Compatibility Plan for the Environs of San Carlos Airport," prepared for City/County Association of Governments of San Mateo County, adopted October 2015.

FIGURE 5 Project Site in Relation to San Carlos Airport 2035 Noise Contours



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

San Carlos Airport ALUCP . 130753

Exhibit 4-2

Future Conditions (2035) Aircraft Noise Contours

Cumulative Impacts

Cumulative construction noise impacts could result from the simultaneous construction of the proposed project and other nearby projects. Based on a review of the City's Development Projects website,[2] the following project is located within 1,000 feet of the project site:

- **Syufy Site** – SyRes Properties LLC proposes to redevelop the former movie theater site with a 480 unit multi-family development and 97,101 square foot sport club "Villa Sport". The project requires a Zoning Map Amendment to Mixed Use Waterfront for consistency with the General Plan, a Use Permit for the Villa Sport and an Architectural Permit.

The Syufy Site project is still in environmental review. However, assuming that the Syufy Site and the proposed project receive their respective approvals, the worst-case scenario would assume overlapping construction schedules. As such, overall construction noise levels could increase by up to 3 dBA above the levels shown in Table 7 assuming construction activities were occurring simultaneously on both sites. However, in no case would construction noise levels exceed 110 dBA noise limit at existing residential properties located approximately 1,350 feet to the east-southeast along Bair Island Road. Therefore, cumulative construction noise would be considered **less-than-significant**.

Cumulative traffic noise could also result from the traffic generated by the project when added to the traffic generated by other reasonably foreseeable projects. Cumulative traffic conditions were also reviewed to determine if the proposed project would make a cumulatively considerable contribution to significant traffic noise increases expected in the area. A significant cumulative traffic noise increase would occur if two criteria are met: 1) if the cumulative traffic noise level increase was 3 dBA CNEL or greater for future levels exceeding 60 dBA CNEL or was 5 dBA CNEL or greater for future levels at or below 60 dBA CNEL; and 2) if the project would make a "cumulatively considerable" contribution to the overall traffic noise increase. A "cumulatively considerable" contribution would be defined as an increase of 1 dBA CNEL or more attributable solely to the proposed project. The cumulative plus project traffic scenario was compared to the cumulative traffic scenario (with and without the Blomquist Extension) and traffic noise levels were calculated to increase by less than 1 dBA CNEL. This is a **less-than-significant** cumulative impact.

[2] https://www.redwoodcity.org/city-hall/current-projects/development-projects