Appendix G: Noise and Vibration Assessment

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HYATT HALF MOON BAY
NOISE AND VIBRATION ASSESSMENT

Half Moon Bay, California

July 12, 2019

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Project: 17-129

INTRODUCTION

The project proposes the construction of a three-story, 129-room hotel on a 5.03-acre lot located north of the intersection of Cabrillo Highway and Higgins Canyon Road in the City of Half Moon Bay. The proposed hotel would include a venue for weddings and other commercial facilities including a restaurant and bar. The site is currently vacant and is bordered by an auto dealership to the north, and the Coastside Fire Protection District Station No. 40, the Coastal Repertory Theater, and residences to the east, opposite Main Street. State Route 1 borders the site to the west. The site would be accessed from Seymour Street and Main Street.

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 ground-borne 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 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 L_{dn}/CNEL. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn}/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 L_{dn}/CNEL with open windows and 65-70 dBA L_{dn}/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 L_{dn}/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 L_{dn}/CNEL. At a L_{dn}/CNEL of about 60 dBA, approximately 12 percent of the population is highly annoyed. When the L_{dn}/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 L_{dn}/CNEL of 60-70 dBA. Between a L_{dn}/CNEL 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 L_{dn}/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.

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 p.m. and 7:00 a.m.
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 p.m.to 10:00 p.m. and after addition of 10 decibels to sound levels measured in the night between 10:00 p.m. and 7:00 a.m.
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 Reactions 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	Virtually no risk of damage to normal 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 dwellings such as plastered walls or ceilings
0.5	Severe - Vibrations considered unpleasant	Threshold at which there is a risk of damage to newer residential structures

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

Regulatory Background

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

State CEQA Guidelines. The 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.

Pursuant to court decisions, the impacts of site constraints, such as exposure of the proposed project to excessive levels of noise and vibration, are not included in the Impacts and Mitigation Section of this report. These items are discussed in a separate section addressing the project's consistency with the policies set forth in the City's General Plan.

CEQA does not define what noise level increase would be considered substantial. Typically, project-generated noise level increases of 3 dBA L_{dn}/CNEL or greater would be considered significant where exterior noise levels would exceed the normally acceptable noise level standard (60 dBA L_{dn}/CNEL for residential land uses). Where noise levels would remain at or below the normally acceptable noise level standard with the project, noise level increases of 5 dBA L_{dn}/CNEL or greater would be considered significant.

2016 California Building Code, Title 24, Part 2. The current version of the California Building Code (CBC) requires interior noise levels attributable to exterior environmental noise sources to be limited to a level not exceeding 45 dBA L_{dn}/CNEL in any habitable room.

1991 Noise Element of the General Plan. The City of Half Moon Bay's 1991 Noise Element establishes exterior and interior noise levels for noise-sensitive developments affected by transportation-related noise sources. For hotels, the City limits interior noise levels to 45 dBA CNEL. An exterior noise level standard for hotels is not established in the General Plan; however, since this type of land use would be considered sensitive, an exterior limit 65 dBA CNEL would be appropriate. Applicable objectives and policies contained in the Noise Element include:

Objective 1.0: Incorporate noise considerations into land use planning decisions.

Policy 1.a Establish acceptable limits of noise for various land uses throughout the community. The City adopts the noise standards presented in Exhibit 13 which identify interior and exterior noise standards in relation to specific land uses; particularly residential areas, schools, hospitals, open space preserves, and parks. The standards would specify the maximum noise levels allowable for new developments impacted by transportation noise sources operating on public or quasi-public property. (Sources on private property would be subject to the noise ordinance requirements, as called out in Policy 3.a.)

Policy 1.b The City shall require a noise impact evaluation by a qualified acoustical engineer (i.e., a Registered Professional Engineer in the State of California with a minimum of three years experience in acoustics) for all new residential subdivisions and for all new commercial developments on any site within 300 feet of any residential district or Planned Unit Development District where residential uses are proposed.

Noise from an intervening highway shall be considered as a part of the noise evaluation. Should mitigation be necessary, specific proposals shall be addressed by the Architectural Review Committee, Planning Commission, or both.

Policy 1.c The City shall not approve projects that do not comply with the adopted standards.

Objective 2.0: Establish measures to reduce noise impacts from traffic noise sources.

Policy 2.a The City shall require, for new development projects that are impacted by noise or cannot meet the standards specified in the Noise Element, the construction of barriers to mitigate sound emissions where necessary or where feasible.

Policy 2.c The City shall ensure the effective enforcement of City, State, and Federal noise levels by all appropriate City divisions.

Policy 2.d The City shall consider the special nature of the Spanish Town commercial area in its land use deliberations. Efforts to maintain low levels of noise in this area should be continued. Continued use of roadway configurations that maintain a slow speed through the area will be most effective in maintaining low levels of noise.

Objective 3.0: Establish measures to control non-transportation noise impacts.

Policy 3.a The City shall establish new Community Noise Ordinance to mitigate noise conflicts from non-transportation noise sources. The City of Half Moon Bay does not currently have a problem with non- transportation sources of noise (e.g., industrial noise sources). Therefore, it does not seem prudent to adopt a Noise Ordinance aimed at the sources. However, in-fill construction is occurring throughout the City, and this can impact existing residential areas. Therefore, it is proposed to limit construction activities that occur within 500 feet of existing residences to Monday through Friday from 7 A.M. to 7 P.M. only. Construction also should not be allowed on federal holidays.

City of Half Moon Bay Municipal **Code.** Chapter 9.23 of the City's Municipal Code qualitatively limits noise generation within the City. The Municipal Code includes the following regulations:

9.23.010 Curfew--Offensive noise.

A. No person shall between the hours of ten p.m. and eight a.m. make, cause, suffer or permit to be made any offensive noise (1) which is made within one hundred feet of any building or place regularly used for sleeping purposes, or (2) which disturbs, or would tend to disturb, any person within hearing distance of such noise.

B. "Offensive noise" means any noise which is loud, boisterous, irritating, penetrating, or unusual, or that is unreasonably distracting in any other manner, such that it is likely to disturb people in the vicinity of such noise, and includes, but is not limited to, noise made by barking or howling dogs, by an individual alone or by a group of people engaged in any business meeting, gathering, game, dance, or amusement, or by any appliance, contrivance, device, structure, construction, ride, machine, implement, or instrument.

C. Subsection A of this section shall not apply to any person engaged in performance of a contract for public works awarded by the city of Half Moon Bay where the city manager or his or her designee determines that the project has the potential to disrupt traffic and that this disruption could be alleviated by authorizing construction work to commence before eight a.m. and conclude after ten p.m. or that due to time constraints on project completion it is necessary to allow the contractor to work between the hours of ten p.m. and eight a.m.

D. Subsection A of this section shall not apply to any person engaged in performance of a contract for public works awarded by the city of Half Moon Bay, in the event of emergency and if the city manager or his or her designee so authorizes such work.

E. Subsection A of this section shall not apply to any person engaged in the performance of a public or private construction project where the city manager or his or her designee determines that the specific tasks delineated below to be undertaken in connection with the subject construction project require an extended period of time to complete or, due to concerns based on public health and safety, those tasks should be undertaken between the hours of ten p.m. and eight a.m. When this determination has been made, the city manager or his or her designee may authorize such tasks to commence, be completed or be undertaken between the hours of ten p.m. and eight a.m. However, no such tasks shall be undertaken during these hours without the express written permission of the city manager or his or her designee, and then only to the extent and between the hours specifically authorized by the city in writing. In addition, notice of the dates and times that the following tasks will be undertaken shall be provided by the contractor in accordance with city instructions to all residents, tenants and property owners who occupy or own property within three hundred feet of the site at which such tasks will be performed:

1. Large concrete foundation pours which cannot reasonably be split over multiple days;

2. Movement of large quantities of construction materials which cannot safely be completed during normal daytime traffic;

3. Movement of buildings, prefabricated structures or other large items which would cause extensive traffic disruption during non-curfew hours;

4. Construction necessary to minimize disruption of public utilities.

F. Subsection A of this section shall not apply to any person engaged in routine landscaping and maintenance activities performed in connection with a golf course, or to any similar business or lawfully conducted operation, where the city manager or his or her designee determines that such activities must be undertaken between the hours of ten p.m. and eight a.m. in order to carry out the purposes of the operation.

G. Subsection A of this section shall not apply between the hours of ten p.m. and twelve a.m. to any property located outside of the following zoning districts: C-D (Commercial Downtown), C-R (Commercial Residential), C-G (Commercial General), P-S (Public Service) and PUD zoning districts located south of Highway 92 and east of Highway 1. (Ord. C-5-11 §1(part), 2011).

9.23.020 Unreasonably disturbing noises.

A. No person shall make, cause, suffer or permit to be made any noises or sounds which are unreasonably disturbing or physically annoying to people of ordinary sensitivity; or which are so harsh or so prolonged or unnatural or unusual in their use, time or place as to cause physical discomfort to any person.

B. The following noises, among others, are hereby declared to be unreasonably disturbing noises in violation of the provisions of this section; provided, however, such enumeration shall not be deemed or construed as in any degree exclusive, but merely illustrative, it being the intent and purpose of the provisions of this chapter to include and prohibit all noises of the kind and character described in this section:

> 7. Pile Drivers, Hammers, and Similar Equipment. The operation, between the hours of eight p.m. and seven a.m., of any pile driver, steam shovel, pneumatic hammer, derrick, steam or electric hoist, or other appliance, the use of which is attended by loud or unusual noise;
>
> 8. Blowers, Fans, and Combustion Engines. The operation of any noise-creating blower, power fan, or internal combustion engine, the operation of which causes noise due to the explosion of operating gases or fluids, unless the noise from such blower or fan is muffled and such engine is equipped with a muffler device to deaden such noise;

9.23.025 Public health and safety.

A. This chapter shall not apply to refuse collection, recyclables collection or street sweeping activities undertaken by, or pursuant to contract with, the city of Half Moon Bay. Similarly, this chapter shall not apply to any other activity undertaken by the city, another governmental agency, or city contractor for public health and safety purposes when, in the judgment of the city or governmental agency, such activity cannot be undertaken effectively or efficiently in compliance with the regulations set forth in this chapter.

B. This chapter shall not apply to any use or event that is conducted in accordance with a permit, and all applicable permit conditions, issued by the city of Half Moon Bay. (Ord. C-10-12 §1(part), 2012: Ord. C-5-11 §1(part), 2011).

9.23.030 Subsequent offense within forty-eight hours.

Any person who violates any section of this chapter and is cited for such a violation, and who within forty-eight hours after receiving such a citation again violates the same section, is guilty of a misdemeanor. A person is cited for a violation when he or she is issued and signs an infraction or misdemeanor citation, or when he or she is arrested and booked, or when a complaint is filed and the person is notified of the filing of such a complaint. (Ord. C-5-11 §1(part), 2011).

9.23.040 Enforcement.

The provisions of this chapter are enforceable without reference to the regulations concerning noise set forth in the zoning ordinance and the fact that the city officer issuing a citation has not obtained a scientific noise measurement prior to issuing the citation shall not constitute a defense. (Ord. C-5-11 §1(part), 2011).

Chapter 14.40 establishes the allowable hours of construction as follows:

14.40.010 Hours designated.

All residential, commercial and industrial construction work shall occur only during the following hours: 7:00 a.m. to 6:00 p.m. Monday through Friday; 8:00 a.m. to 6:00 p.m. Saturdays; and 10:00 a.m. to 6:00 p.m. Sundays and holidays. (Ord. 8-89 §1(part), 1989).

14.40.020 Modification.

The director of public works/city engineer may, upon written application, modify the hours of construction whenever, in his/her reasonable judgement, there is good cause for such modification due to emergency or impracticality. (Ord. 8-89 §1(part), 1989).

Existing Noise Environment

The project site is located north of the intersection of State Route 1 (SR 1 or Cabrillo Highway) and Main Street/Higgins Canyon Road in the City of Half Moon Bay. The site is currently vacant. An auto dealership adjoins the site to the north, and opposite Main Street to the east is the Coastside Fire Protection District Station No. 40, the Coastal Repertory Theater, and residences.

The noise environment at the site and in the surrounding areas results primarily from vehicular traffic along SR 1. Local traffic from Main Street, as well as operational noise from the nearby fire station, would also affect the noise environment at the project site. Occasional aircraft associated with Half Moon Bay Airport and San Francisco International Airport contribute to ambient noise levels at the project site.

A noise monitoring survey was conducted at the site between Wednesday, May 22, 2019 and Friday, May 24, 2019. The survey included two long-term (LT-1 and LT-2) noise measurements and two short-term (ST-1 and ST-2) noise measurements. All measurement locations are shown in Figure 1.

Long-term noise measurement LT-1 was made along the northern boundary of the site, approximately 225 feet east of the centerline of SR 1. Hourly average noise levels at LT-1 typically ranged from 57 to 65 dBA L_{eq} during daytime hours between 7:00 a.m. and 10:00 p.m. During nighttime hours between 10:00 p.m. and 7:00 a.m., hourly average noise levels ranged from 45 to 59 dBA L_{eq}. The average community noise equivalent level during the monitoring period was 63 dBA CNEL on Thursday, May 23, 2019. The daily trend in noise levels at LT-1 is shown in Figures 2 through 4.

LT-2 was made from a tree adjoining Main Street, approximately 20 feet from the centerline of the roadway. Hourly average noise levels at LT-2 ranged from 60 to 65 dBA L_{eq} during daytime hours and from 49 to 64 dBA L_{eq} during nighttime hours. The average community noise equivalent level during the monitoring period was 65 dBA CNEL on Thursday, May 23, 2019. The daily trend in noise levels at LT-2 is shown in Figures 5 through 7.

Short-term noise measurements were made on Wednesday, May 22, 2019 between 11:30 a.m. and 12:20 p.m. Each of the short-term measurements were made in 10-minute intervals, and the results of the measurements are summarized in Table 4.

Short-term noise measurement ST-1 was made near the center of the project site, approximately 160 feet east of the centerline of SR 1 and approximately 220 feet west of the centerline of Main Street. The dominant noise source at ST-1 was roadway traffic, with passenger vehicles generating noise levels of 57 to 63 dBA during this 10-minute measurement. Additionally, small aircraft flyovers occurred during this measurement, generating noise levels of 58 to 60 dBA. The 10-minute L_{eq} measured at ST-1 was 60 dBA $L_{eq(10\text{-}min)}$. ST-2 was made in front of the Coastal Repertory Theater, approximately 30 feet east of the centerline of Main Street. The predominant noise source was Main Street traffic. During the 10-minute period, vehicle pass-bys generated noise levels ranging from 60 to 68 dBA, while buses generated noise levels of 70 to 73 dBA. The 10-minute L_{eq} measured at ST-2 was 60 dBA $L_{eq(10\text{-}min)}$.

FIGURE 1 Noise Measurement Locations

Source: Google Earth 2018.

FIGURE 2 Daily Trend in Noise Levels at LT-1, Wednesday, May 22, 2019

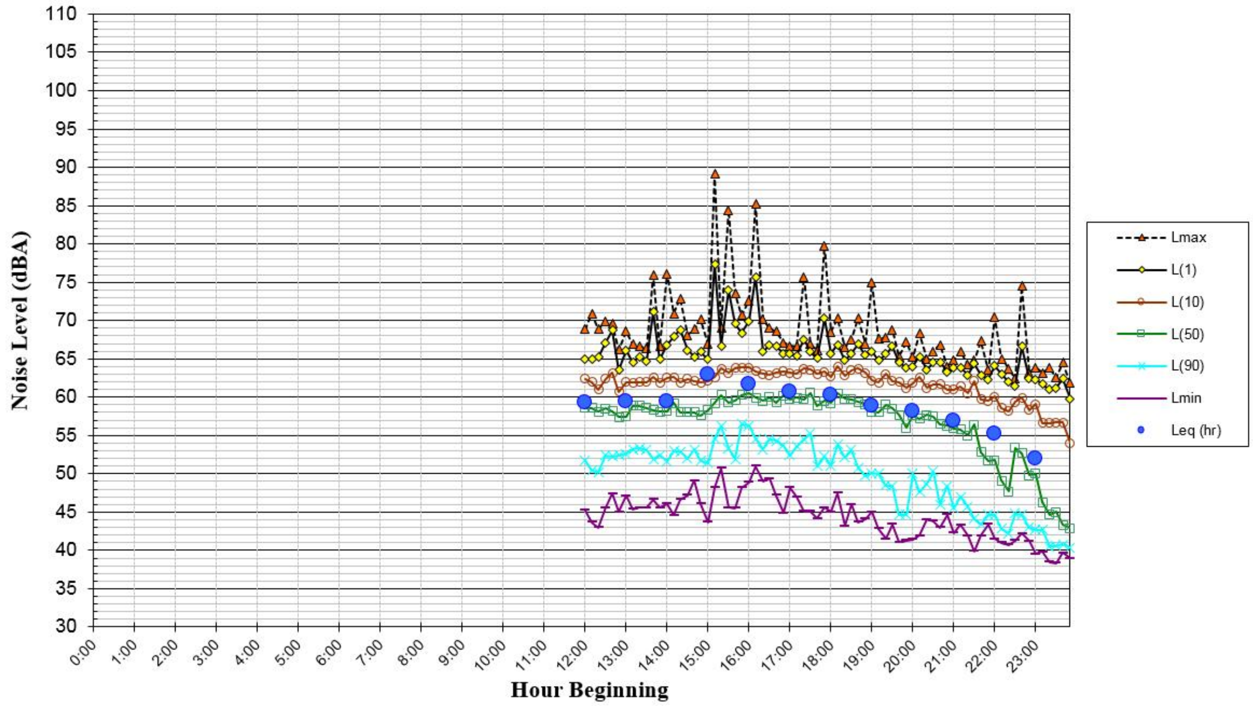


FIGURE 3 Daily Trend in Noise Levels at LT-1, Thursday, May 23, 2019

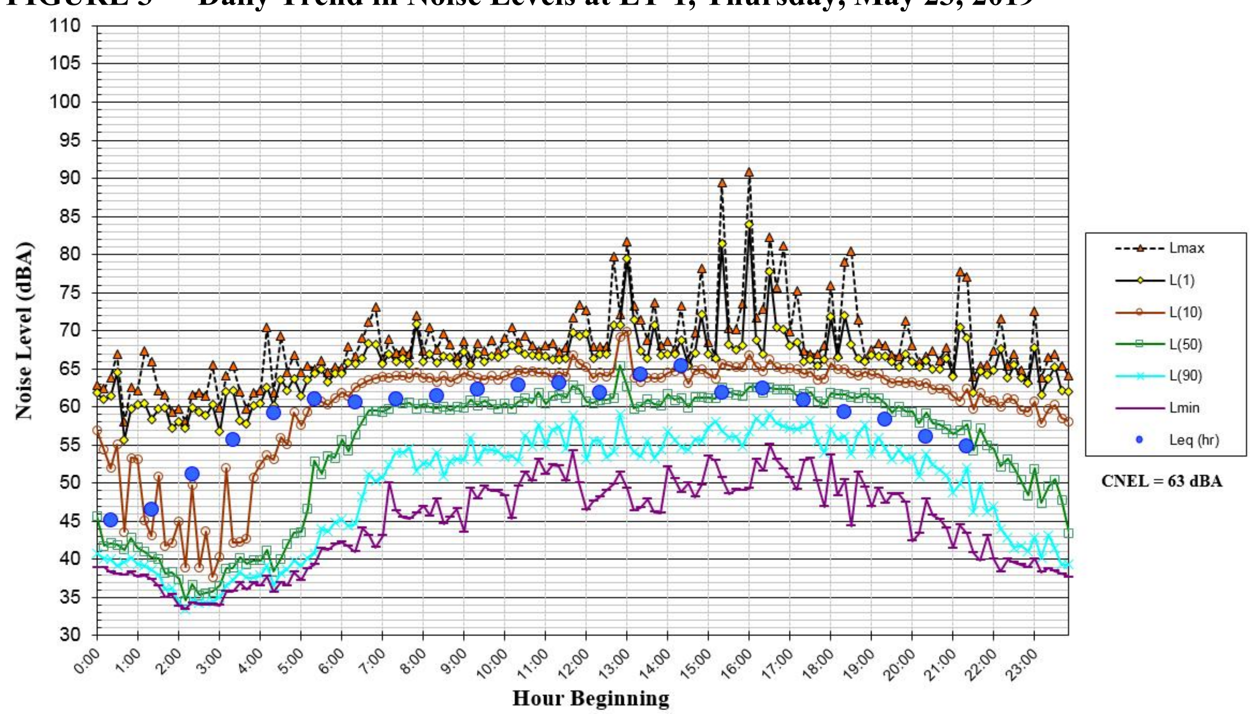


FIGURE 4 Daily Trend in Noise Levels at LT-1, Friday, May 24, 2019

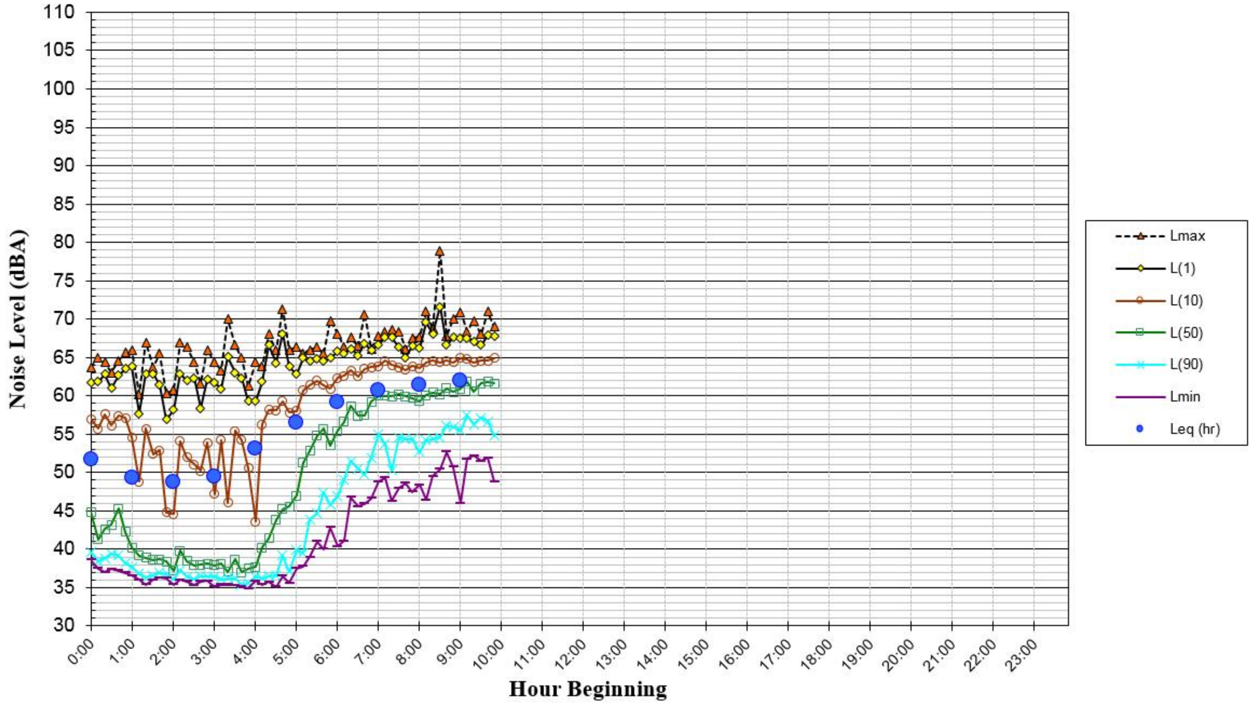


FIGURE 5 Daily Trend in Noise Levels at LT-2, Wednesday, May 22, 2019

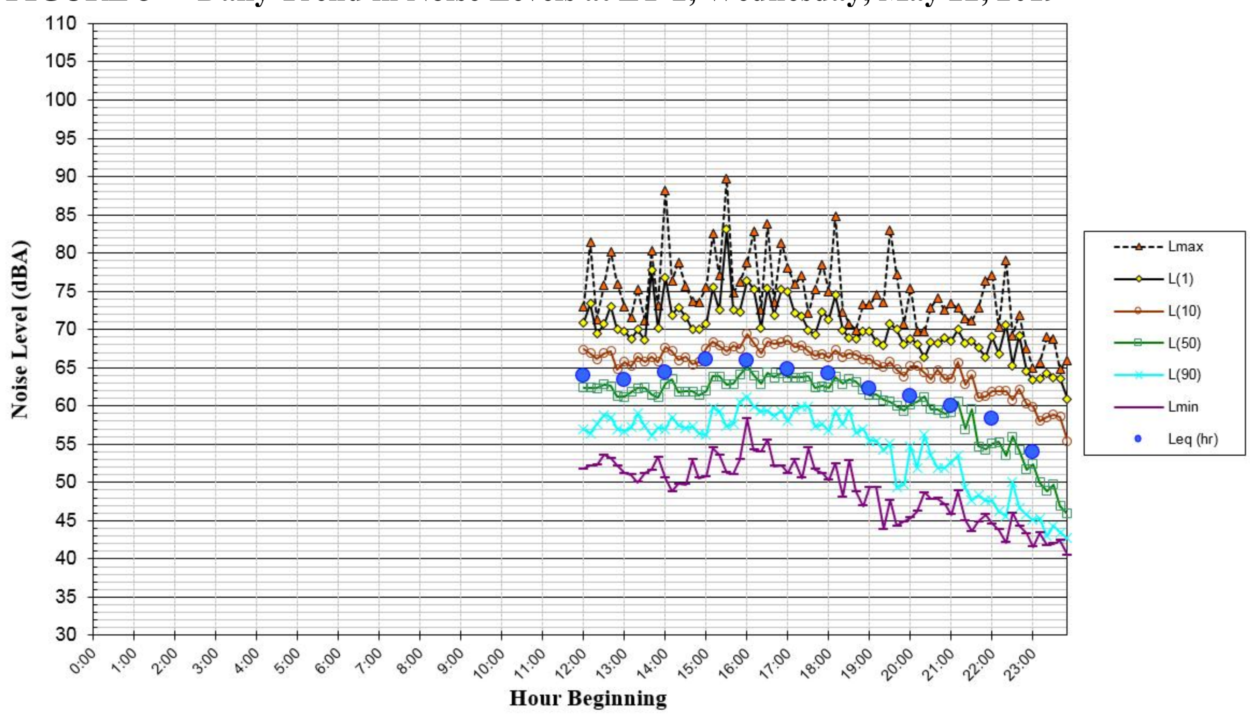


FIGURE 6 Daily Trend in Noise Levels at LT-2, Thursday, May 23, 2019

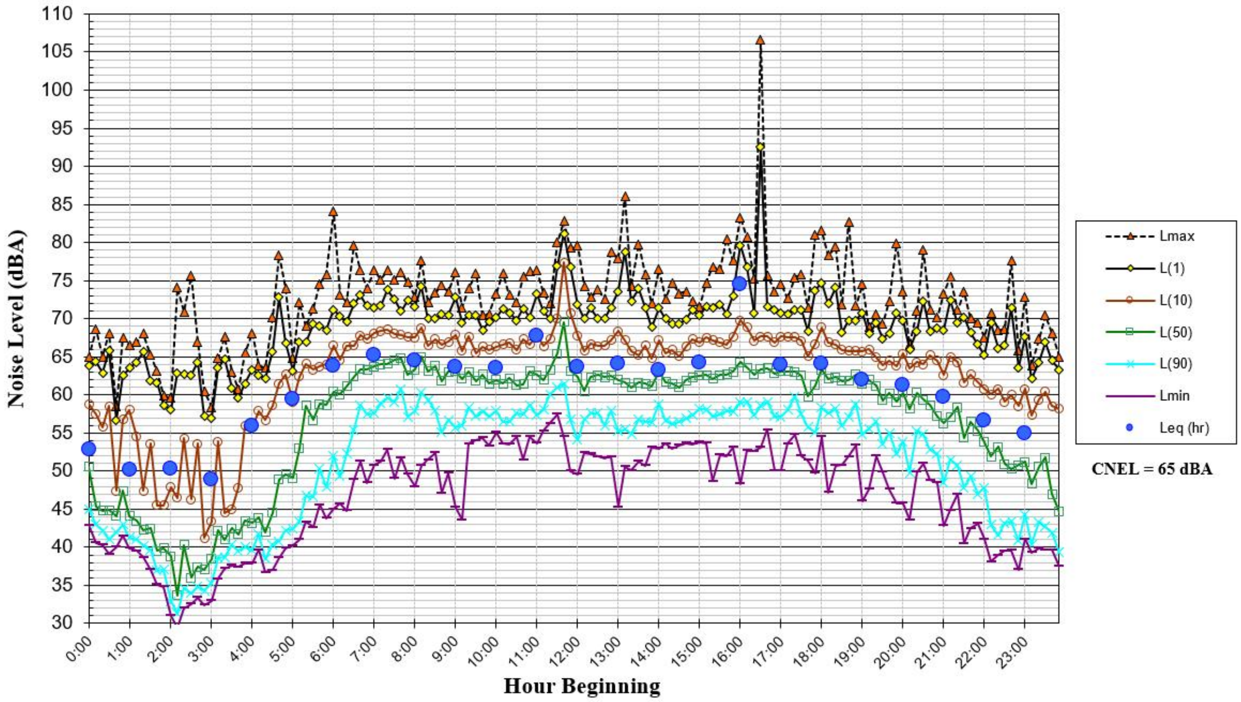


FIGURE 7 Daily Trend in Noise Levels at LT-2, Friday, May 24, 2019

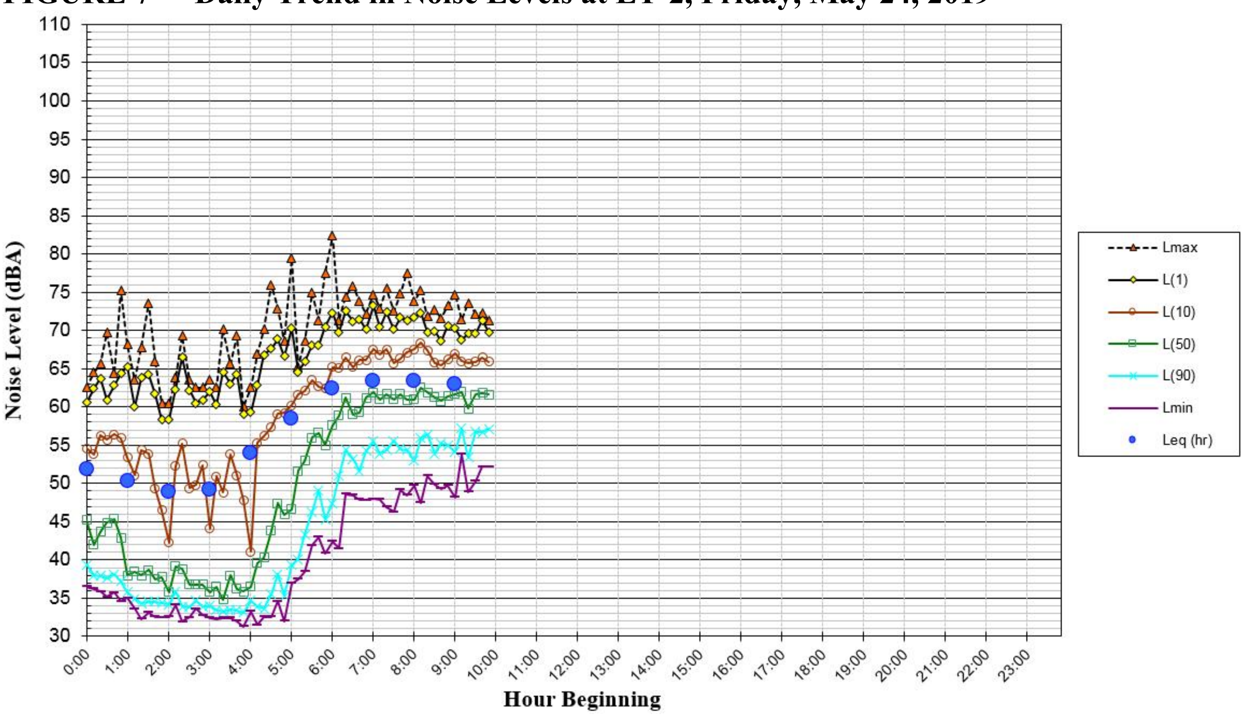


TABLE 4 Summary of Short-Term Noise Measurements (dBA)

Noise Measurement Location (Date, Time)	Measured Noise Level, dBA					
	L_{max}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	$L_{eq(10\text{-}min)}$
ST-1: Center of project site (5/22/2019, 11:30-11:40)	68	66	64	59	53	60
ST-2: ~30 feet east of the centerline of Main Street (5/22/2019, 12:10-12:20)	73	69	65	57	51	60

PLAN CONSISTENCY ANALYSIS

Noise and Land Use Compatibility Assessment

The future noise environment at the project site would continue to result primarily from vehicular traffic along SR 1 and the other local roadways. A traffic study was completed for Hyatt Place project,[1] which included combined traffic volumes due to cumulative and project effects to represent future conditions with the inclusion of the proposed project. According to this study, traffic volumes along SR 1 and Main Street would increase by 1 and 2 dBA CNEL, respectively, under cumulative plus project conditions. Therefore, the future noise level would be 64 dBA CNEL at a distance of 225 feet from the centerline of SR 1 (LT-1) and would be 67 dBA CNEL at a distance of 20 feet from the centerline of Main Street (LT-2).

Noise produced by the existing fire station, which is located opposite Main Street to the east, would also affect the noise environment at the project site. The future hotel occupants would be exposed to intermittent noise generated by fire station operations, such as the circulation of fire trucks and regular testing of sirens, horns, pumps, and other equipment. In 2013, *Illingworth & Rodkin, Inc.* (I&R) measured the noise produced by fire station operations at Fire Station 5 in Palo Alto, California. At 85 feet from the noise source, the maximum instantaneous noise level, which was measured during a test of a fire truck siren, was 90 dBA L_{max}. This would represent the loudest potential noise level generated at the nearby fire station.

Future Exterior Noise Environment

Neither the City's General Plan nor the Municipal Code defines exterior noise level thresholds for outdoor use areas located at hotels. Typically, common outdoor use areas at hotels should be maintained at or below 65 dBA CNEL to be considered satisfactory. For purposes of this study, 65 dBA CNEL is considered the acceptable noise threshold for common outdoor use areas.

The outdoor use areas proposed as part of the project include a pool amenity area, a patio seating area, and a vegetable garden/breakout lawn area. Each of these outdoor use areas are studied for compliance with the 65 dBA CNEL threshold of acceptability. West of the proposed buildings, there are also walking paths, to which the occupants of the proposed hotel would have access. However, since the users of the walking path would be moving along the path, the paths would not be considered an outdoor use area of frequent human use that would benefit from a lowered noise level. The use of these paths is transitory in nature and are not analyzed for compliance

[1] W-Trans, "Hyatt Place Transportation Analysis Assumptions," May 29, 2019.

with the 65 dBA CNEL threshold established for outdoor activity areas where receptors would likely spend more time outdoors.

The pool amenity area is located south of Guestroom Building 2. The proposed hotel guestroom buildings to the north and to the south, as well as the fitness center located west of the pool area, would provide partial shielding at the pool amenity area from traffic along SR 1 and Main Street. The center of the pool amenity area would be set back from the centerline of Main Street by approximately 135 feet. At this distance, the future exterior noise levels at the pool area would be 60 dBA CNEL.

The patio seating area would be located along the western building façade near the main arrival area. This outdoor use area would be completely shielded from traffic along Main Street, while being partially shielded from SR 1 traffic by the building façades to the north and to the south of the patio. The center of the patio would be set back approximately 185 feet from the centerline SR 1. At this distance, the future exterior noise levels would be 68 dBA CNEL.

The vegetable garden/breakout lawn areas are proposed south of the hotel, adjacent to the meeting room. This outdoor space would be exposed to traffic noise along both SR 1 and Main Street, with the proposed hotel providing partial shielding on the north side. The center of this outdoor use area would be setback approximately 205 feet from the centerline of SR 1 and approximately 60 feet from the centerline of Main Street. At these distances, the future exterior noise levels at the vegetable garden/breakout lawn area would be 67 dBA CNEL.

The future noise environment at the patio seating area and the vegetable garden/breakout lawn areas would exceed 65 dBA CNEL by 2 to 3 dBA. To meet the exterior noise threshold, additional noise control measures would be required.

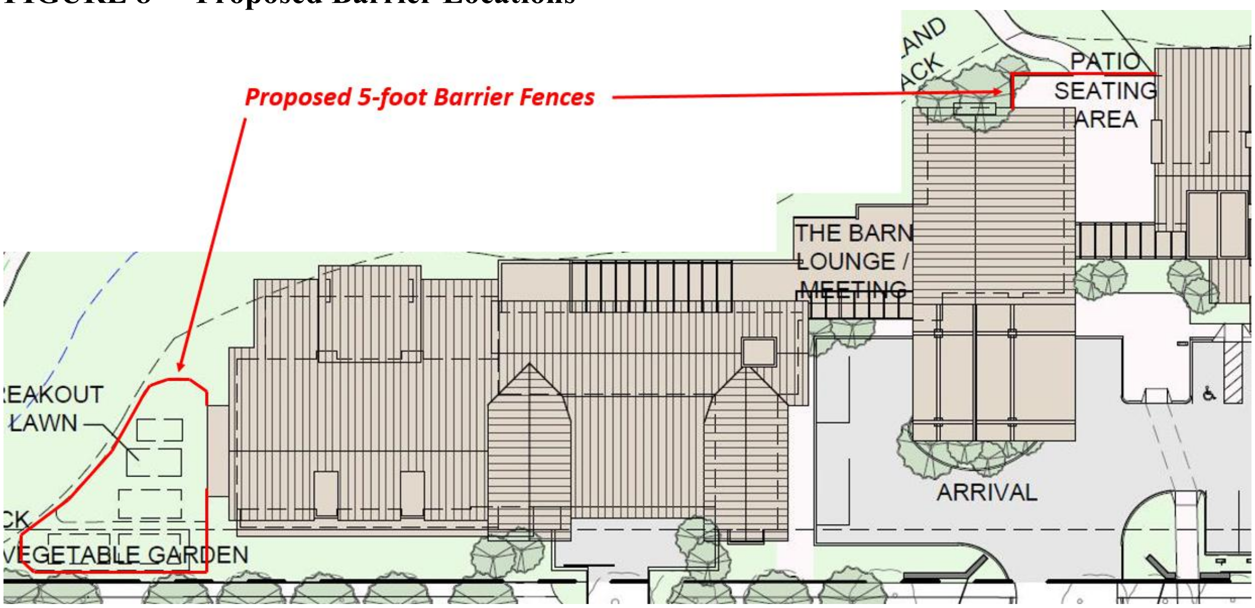
Recommended Measures to Reduce Exterior Noise Levels

Methods available to reduce exterior noise levels at the patio seating area and the vegetable garden/breakout lawn area would include site planning alternatives (e.g., increased setbacks and using the proposed buildings as noise barriers), the construction of traditional noise barriers, or a combination of the above. Relocating these outdoor use areas such that the proposed hotel would provide shielding from SR 1 would reduce noise levels to below 65 dBA CNEL. Assuming relocation of these outdoor use areas would not be feasible, the optimal measure for noise reduction would be to construct a sound wall or a specially-designed barrier fence capable of reducing noise levels by 2 to 3 dBA.

For a barrier to be effective, the line-of-sight between the occupants of the outdoor spaces and the noise source(s) must be interrupted. Therefore, a perimeter barrier along the boundaries of each outdoor use area with a minimum height of 5 feet would be required. To maximize effectiveness of the barrier, the barrier should attach to the hotel at both ends. Figure 8 shows the proposed locations of both perimeter barriers. Due to the nature of the outdoor use areas, traditional barriers would reduce visibility and aesthetic appeal. A specially-designed barrier made of ½-inch laminated glass would be an option so occupants of the patio and garden could see through the barriers. The proposed barriers should be continuous from grade to top, with no cracks or gaps, and have a minimum surface density of three lbs/ft.[2] Other options for the barrier construction would include one-inch thick marine-grade plywood or fence boards, concrete masonry units (CMU), or masonry block. For access to the walking paths, a 3-foot gate could also be built into the barriers.

Assuming the barrier is determined to be the best option, final recommendations shall be confirmed when detailed site plans and grading plans are available. With the implementation of this proposed barrier, the exterior noise environment would be below 65 dBA CNEL.

FIGURE 8 Proposed Barrier Locations



Future Interior Noise Environment

A noise standard of 45 dBA CNEL would apply to hotel room interiors of the proposed building. Typically for rooms in which sleeping occurs, a maximum instantaneous noise level of 50 dBA L_{max} would be required at night to minimize sleep disruption and a maximum instantaneous noise level of 55 dBA L_{max} would be required during daytime hours to avoid speech interference. It should be assumed that most non-emergency activities at the fire station would occur during daytime hours only. Therefore, only the 55 dBA L_{max} daytime threshold would apply.

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 commercial hotel construction provides approximately 20 to 25 dBA of exterior-to-interior noise reduction, assuming windows are closed and an adequate form of forced-air mechanical ventilation system is provided. Where exterior noise levels range from 60 to 65 dBA CNEL, the inclusion of adequate forced-air mechanical ventilation with standard construction materials would reduce interior noise levels to 45 dBA CNEL or below. Where noise levels exceed 65 dBA CNEL, forced-air mechanical ventilation systems and sound-rated construction methods are normally required. Such methods or materials may include a combination of smaller window and door sizes as a percentage of the total building façade facing the noise source, sound-rated windows and doors, sound-rated exterior wall assemblies, and mechanical ventilation.

The western façades of proposed hotel would be located between 95 and 220 feet from the centerline of SR 1. The hotel rooms facing this building façade would be exposed to future exterior noise levels ranging from 64 to 70 dBA CNEL. The rooms located on the eastern façade would be set back approximately 105 to 130 feet from the centerline of Main Street. At these distances, and with these rooms receiving shielding from SR 1, future exterior noise levels along the eastern façade would be at or below 60 dBA CNEL.

Additionally, the fire station would continue to produce maximum instantaneous noise levels of 90 dBA L_{max} at a distance of 85 feet. The nearest hotel room would be approximately 475 feet from the nearest location where the fire station noise would potentially occur. Additionally, the southern hotel façade where the meeting room and kitchen is located would provide at least partial shielding for the hotel rooms. At a distance of 475 feet, the loudest fire station noise would be 75 dBA L_{max}, assuming no noise level reduction from the intervening building. Additionally, the 55 dBA L_{max} threshold would also apply at the meeting room, which is approximately 215 feet from the nearest potentially fire station noise. At this distance, the meeting room would be exposed to future exterior noise levels of 82 dBA L_{max}.

With windows partially open for ventilation, interior noise level would be up to 55 dBA CNEL at the exterior-facing rooms facing SR 1. The exterior-facing rooms facing Main Street and the fire station would have future interior noise levels up to 45 dBA CNEL and up to 60 dBA L_{max}. Sound-rated windows and doors would be required to meet the City's 45 dBA CNEL and 55 dBA L_{max} interior thresholds.

Noise Insulation Features to Reduce Future Interior Noise Levels

Detailed unit layouts were not available at the time of this study; however, preliminary calculations were made to estimate Sound Transmission Class (STC)[2] ratings for doors and windows, using a STC 46 wall assembly as an example. The following noise insulation features shall be incorporated into the proposed project to reduce interior noise levels to 45 dBA CNEL or less and to 55 dBA L_{max} or less:

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

- Preliminary calculations indicate that the hotel rooms facing SR 1 would require windows and doors with a minimum STC rating of 28 and an adequate form of forced-air mechanical ventilation to meet the interior noise threshold of 45 dBA CNEL.

[2] **Sound Transmission Class -** A single figure rating designed to give an estimate of the sound insulation properties of a partition. Numerically, STC represents the number of decibels of speech sound reduction from one side of the partition to the other. The STC is intended for use when speech and office noise constitute the principal noise problem.

- The exterior-facing units facing Main Street and the fire station would require windows and doors with a minimum STC rating of 28 and an adequate form of forced-air mechanical ventilation to meet the 45 dBA CNEL and 55 dBA L_{max} thresholds. Additionally, the meeting room should also include windows and doors with a minimum STC rating of 28 and adequate forced-air mechanical ventilation to meet the interior noise requirements.

- A qualified acoustical specialist shall prepare a detailed analysis of interior hotel noise levels resulting from all exterior sources during the design phase pursuant to requirements set forth in the State Building Code. The study will review the final site plan, building elevations, and floor plans prior to construction and recommend building treatments to reduce hotel interior noise levels to 45 dBA CNEL or lower and 55 dBA L_{max} or lower. Treatments would include, but are not limited to, sound-rated windows and doors, sound-rated wall and window constructions, acoustical caulking, protected ventilation openings, etc. The specific determination of what noise insulation treatments are necessary shall be conducted on a room-by-room basis during final design of the project. Results of the analysis, including the description of the necessary noise control treatments, shall be submitted to the City, along with the building plans and approved design, prior to issuance of a building permit.

The implementation of these noise insulation features would reduce interior noise levels to 45 dBA CNEL or less and 55 dBA L_{max} or less.

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 and that would exceed applicable noise standards presented in the General Plan or Municipal Code at existing noise-sensitive receptors surrounding the project site.

    - Hourly average noise levels during construction that would exceed 60 dBA L_{eq} at residential land uses or exceed 70 dBA L_{eq} at commercial land uses and exceed the ambient noise environment by at least 5 dBA L_{eq} for a period of more than one year would constitute a significant temporary noise increase in the project vicinity.

    - 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 60 dBA CNEL, or b) a noise level increase of 3 dBA CNEL or greater, with a future noise level of 60 dBA CNEL 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 or Municipal Code.

- A significant impact would be identified if the construction of the project would generate excessive vibration levels surrounding receptors. Groundborne vibration levels exceeding 0.3 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. The incorporation of construction best management practices as project conditions of approval would result in a **less-than-significant** temporary noise 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.

Chapter 14.40.010 of the City's Municipal Code defines the allowable construction hours between 7:00 a.m. and 6:00 p.m. on weekdays, between 8:00 a.m. and 6:00 p.m. on Saturdays, and between 10:00 a.m. and 6:00 p.m. on Sundays and holidays. The City does not define temporary construction noise limits.

The noise level threshold for speech interference indoors is 45 dBA. Assuming a 15 dBA exterior-to-interior reduction for standard residential construction and a 25 dBA exterior-to-interior reduction for standard commercial construction, this would correlate to an exterior threshold of 60 dBA L_{eq} at residential land uses and 70 dBA L_{eq} at commercial land uses. Additionally, temporary construction would be annoying to surrounding land uses if the ambient noise environment increased by at least 5 dBA L_{eq} for an extended period of time. Therefore, the temporary construction noise impact would be considered significant if project construction activities exceeded 60 dBA L_{eq} at nearby residences or exceeded 70 dBA L_{eq} at nearby commercial land uses and exceeded the ambient noise environment by 5 dBA L_{eq} or more for a period longer than one year.

The nearest existing residential receptors are located to the east, opposite Main Street. Additional residences along Main Street are located north of Seymour Street. For all of these receptors and the theater located to the east of the site, opposite Main Street, the ambient noise environment would be represented by LT-2. During daytime hours, ambient hourly average noise levels would range from 60 to 75 dBA L_{eq} at these receptors. Residences are also located along

Seymour Street to the northwest of the project site. For these residences and the dealership adjoining the site to the north, LT-1 would represent the ambient noise environment, with daytime hourly average noise levels ranging from 57 to 65 dBA L_{eq}.

Construction activities generate considerable amounts of noise, especially during earth-moving activities when heavy equipment is used. The highest maximum noise levels generated by project construction would typically range from about 80 to 90 dBA L_{max} at a distance of 50 feet from the noise source. A list of typical maximum instantaneous noise levels measured at 50 feet are provided in Table 5. Typical hourly average construction-generated noise levels for hotel buildings are about 81 to 88 dBA L_{eq} measured at a distance of 50 feet from the center of the site during busy construction periods (e.g., earth moving equipment, impact tools, etc.), as shown in Table 6. 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 can provide an additional 5 to 10 dBA noise reduction at distant receptors.

Project construction is expected to last for approximately 18 months (566 days). A detailed list of equipment expected to be used during each phase of construction was provided and is summarized in Table 7. Federal Highway Administration's (FHWA's) Roadway Construction Noise Model (RCNM) was used to calculate the hourly average noise levels for each phase of construction, assuming every piece of equipment would operate simultaneously, which would represent the worst-case scenario. This construction noise model includes representative sound levels for the most common types of construction equipment and the approximate usage factors of such equipment that were developed based on an extensive database of information gathered during the construction of the Central Artery/Tunnel Project in Boston, Massachusetts (CA/T Project or "Big Dig"). The usage factors represent the percentage of time that the equipment would be operating at full power.

For each phase, the worst-case hourly average noise level, as estimated at the property line of each surrounding land use, is also shown in Table 7. Construction would occur throughout the site, and therefore, hourly average noise levels at each of the receiving land uses would vary depending on the location of the active construction site. For the purposes of estimating the worst-case scenario, noise levels in Table 7 were calculated assuming the center of the active construction site to be located at the center of the nearest proposed hotel building to the receiving land use.

The results in Table 7 show that hourly average noise levels during construction would temporarily exceed 60 dBA L_{eq} at residential land uses and 70 dBA L_{eq} at commercial land uses and would exceed ambient noise levels by 5 dBA L_{eq} or more. Since construction is expected to last for a period of more than one year, this would be considered a significant 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
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 Noise-Sensitive Receptors

Phase of Construction	Time Duration	Construction Equipment (Quantity)	Calculated Hourly Average Noise Levels, L_{eq} (dBA)				
			Residences			Commercial	
			East (185ft)	North (335ft)	NW (665ft)	Dealership (120ft)	Theater (115ft)
Demolition	1 day	Tractor/Loader/Backhoe (1)	69 dBA L_{eq}	64 dBA L_{eq}	58 dBA L_{eq}	72 dBA L_{eq}	73 dBA L_{eq}
Site Preparation	5 days	Rubber-Tired Dozer (3) Tractor/Loader/Backhoe (4)	76 dBA L_{eq}	71 dBA L_{eq}	65 dBA L_{eq}	80 dBA L_{eq}	80 dBA L_{eq}
Grading/Excavation	10 days	Excavator (1) Grader (1) Rubber-Tired Dozer (1) Tractor/Loader/Backhoe (3)	76 dBA L_{eq}	71 dBA L_{eq}	65 dBA L_{eq}	80 dBA L_{eq}	80 dBA L_{eq}
Trenching	20 days	Tractor/Loader/Backhoe (1) Excavator (1)	70 dBA L_{eq}	65 dBA L_{eq}	59 dBA L_{eq}	74 dBA L_{eq}	75 dBA L_{eq}
Building Exterior	335 days	Crane (1) Forklift (3) Generator Set (1) Tractor/Loader/Backhoe (3) Welder (1)	75 dBA L_{eq}	70 dBA L_{eq}	64 dBA L_{eq}	79 dBA L_{eq}	79 dBA L_{eq}
Building Interior/Architectural Coating	175 days	Air Compressor (1)	62 - 75 dBA L_{eq}[a]	57 - 70 dBA L_{eq}[a]	51 - 64 dBA L_{eq}[a]	66 - 79 dBA L_{eq}[a]	67 - 79 dBA L_{eq}[a]
Paving	20 days	Cement and Mortar Mixer (2) Paver (1) Paving Equipment (2) Roller (2) Tractor/Loader/Backhoe (1)	76 dBA L_{eq}	71 dBA L_{eq}	65 dBA L_{eq}	80 dBA L_{eq}	81 dBA L_{eq}

[a] Range in temporary noise levels for the building interior/architectural coating phase represents the equipment for this phase only, as well as the time period when this phase would operate simultaneously with the building exterior phase.

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.

Construction activities will be conducted in accordance with the provisions of the City's Municipal Code, which limits temporary construction work to between 7:00 a.m. and 6:00 p.m. on weekdays, between 8:00 a.m. and 6:00 p.m. on Saturdays, and between 10:00 a.m. and 6:00 p.m. on Sundays and holidays. Additionally, the construction crew shall adhere to the following construction best management practices to reduce construction noise levels emanating from the site and minimize disruption and annoyance at existing noise-sensitive receptors in the project vicinity. With the incorporation of the following construction best management practices, this would be a less-than-significant impact.

Construction Best Management Practices

Develop a construction noise control plan, including, but not limited to, the following available controls:

- Construct temporary noise barriers, where feasible, to screen stationary noise-generating equipment. Temporary noise barrier fences would provide a 5 dBA noise reduction if the noise barrier interrupts the line-of-sight between the noise source and receptor 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 should be strictly prohibited.

- Locate stationary noise-generating equipment, such as air compressors or portable power generators, as far as possible from sensitive receptors as feasible. If they must be located near receptors, adequate muffling (with enclosures where feasible and appropriate) shall be used to reduce noise levels at the adjacent sensitive receptors. Any enclosure openings or venting shall face away from sensitive receptors.

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

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

- 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 contractor 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.

- Designate a "disturbance coordinator" who would be responsible for responding to any complaints about construction noise. The disturbance coordinator will determine the cause of the noise complaint (e.g., bad muffler, etc.) and will 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 in it the notice sent to neighbors regarding the construction schedule.

The implementation of the reasonable and feasible controls outlined above would reduce construction noise levels emanating from the site, minimizing disruption and annoyance. With the implementation of these controls, as well as the Municipal Code limits on allowable construction hours, and considering that construction is temporary, the 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 due to project-generated traffic at the existing noise-sensitive land uses in the project vicinity. **This is a less-than-significant impact.**

A significant impact would occur if the permanent noise level increase due to project-generated traffic was 3 dBA CNEL or greater for future noise levels exceeding 60 dBA CNEL or was 5 dBA CNEL or greater for future noise levels at or below 60 dBA CNEL. The ambient measurements made for the proposed project indicate that existing noise levels at the noise-sensitive receptors located in the project vicinity exceed 60 dBA CNEL; therefore, a significant impact would occur if project-generated traffic increased levels by 3 dBA CNEL or more. For reference, a 3 dBA CNEL noise increase would be expected if the project would double existing traffic volumes along a roadway.

W-Trans completed a transportation analysis for the proposed project in May 2019.[1] By comparing the peak hour traffic volumes for the existing plus project scenario to the existing volumes for each intersection included in the report, the noise level increase due to the proposed project was calculated. During typical weekdays, a 2 dBA CNEL noise level increase was calculated along Seymour Street between State Route 1 (SR 1) and Main Street. Along every other roadway segment in the project site vicinity, a noise level increase of 1 dBA CNEL or less was calculated during typical weekdays. For typical weekdays, this would be a less-than-significant impact.

The traffic study also included a peak hour weekend scenario, which would result in a noise level increase of 3 dBA CNEL along Seymour Street between SR 1 and Main Street, while all other roadway segments would result in a noise level increase of 1 dBA CNEL or less. While there are two residences located along Seymour Street between SR 1 and Main Street that would potentially be impacted, the peak hour traffic volumes along this roadway segment are insignificant in their sound level compared to those of the intersecting roadways. The existing noise environment located at these residences would be dominated by SR 1 and Main Street. Since the traffic volumes along these roadways would not double with the inclusion of the proposed project, the future noise environment at the residences would not increase by 3 dBA CNEL under existing plus project conditions. Therefore, the proposed project would not result in a permanent noise increase at existing noise-sensitive receptors in the project vicinity. This impact is a less-than-significant impact.

Mitigation Measure 1b: None required.

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

A significant impact would occur 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 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.

Cumulative traffic noise level increases were calculated by comparing the cumulative (no project) traffic volumes and the cumulative plus project volumes to existing traffic volumes, as described in the *W-Trans* report. A noise level increase of 2 dBA DNL or less was calculated along each of the roadway segments included in the traffic study, except along Seymour Street between SR 1 and Main Street where a 4 dBA CNEL increase was calculated under the cumulative plus project traffic scenario. Along this segment, a noise level increase of 1 dBA CNEL was calculated under the cumulative (no project) scenario. While this would be considered a "cumulative considerable" contribution, the existing traffic volumes along this segment are significantly lower than the volumes along the surrounding roadways (SR 1 and Main Street). Therefore, as discussed in **Impact 1b**, doubling of the traffic along this roadway segment would not result in a measurable increase in noise levels since the noise environment is dominated by the other intersecting roadways. This impact is a less-than-significant impact.

Mitigation Measure 1c: None required.

Impact 1d: **Noise Levels in Excess of Standards.** The proposed project is not expected to generate noise in excess of standards established in the City's Municipal Code on a daily basis at the nearby sensitive receptors. Further, monthly testing of the emergency generator would not be expected to exceed ambient noise levels at any of the proposed generator locations. **This is a less-than-significant impact.**

Mechanical Equipment Noise

The City's General Plan and Municipal Code do not include operational noise thresholds for mechanical equipment. However, Sections 9.23.010 and 9.23.020 discuss "offensive noise" and unreasonably disturbing noises, which would annoy people or which are so harsh or so prolonged, unnatural, or unusual as to cause physical discomfort. To ensure the proposed project would not result in an unreasonably disturbing noise, mechanical equipment noise generated at the project site would be considered a less-than-significant impact if noise levels fell below or within the range of the ambient noise environment.

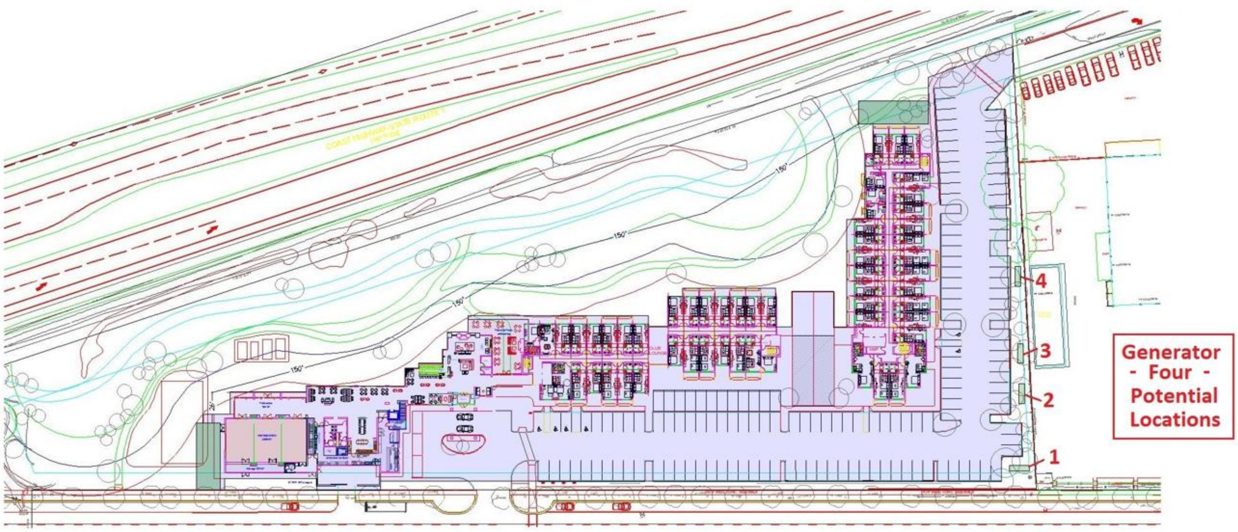
The proposed project would include mechanical equipment, such as heating, ventilation, and air conditioning systems. Information regarding the number, type, size, location, and noise level data of the mechanical equipment units to be used in the proposed project was not available at the time of this study. Typically, mechanical equipment at hotel buildings would be located within equipment rooms on the interior of the buildings, on the ground level surrounding the buildings, or on the rooftops. However, detailed plans showing floorplans or roof layouts were not available at the time of this study. Therefore, worst-case conditions were assumed, which would be ground floor along the nearest building façade facing the surrounding residential land uses.

For buildings of this size, HVAC units (i.e., heat pumps) typically generate noise levels ranging from 49 to 53 dBA at approximately 1 meter or 3.28 feet. These types of units cycle on and off continually, and therefore, multiple units would be running at any given time. Assuming several units to be running simultaneously, the mechanical equipment noise generated at the nearest building façade of the hotel would be 40 dBA L_{eq} or below at the property line of the residences located to the east, opposite Main Street. Since the other residential land uses in the area would be located even farther from the proposed hotel buildings, mechanical equipment noise would be below 40 dBA L_{eq}.

Under worst-case conditions, mechanical equipment associated with the proposed project that would operate on a daily basis would not be expected to exceed 40 dBA L_{eq} at the surrounding noise-sensitive land uses. Therefore, mechanical equipment noise would not be expected to increase the ambient noise environment at the noise-sensitive receptors surrounding the site. If equipment were to be located in less sensitive locations, such as within equipment rooms on the building interior or on the rooftop, equipment noise would be further reduced. These types of noise-reducing design considerations should be taken into account during final design when the site plan is finalized. Other noise reduction measures could include, but are not limited to, selection of equipment that emits low noise levels and/or installation of noise barriers, such as enclosures and parapet walls, to block the line-of-sight between the noise source and the nearest receptors. With the incorporation of measures to reduce noise levels at surrounding sensitive receptors, this would be a less-than-significant impact.

In addition to HVAC units, the proposed hotel would also include an emergency generator, which would be 300 kW in capacity. Four different locations for the generator have been proposed and are shown in Figure 9. The generator would provide emergency electrical services for elevators, lighting, and kitchen refrigerators. A Level 2 acoustic enclosure would be included for the proposed project, and with this enclosure, the proposed generator would produce noise levels of 75.4 dB at a distance of 23 feet under full-load conditions. Typically, emergency generators are tested monthly for about 2 hours during the daytime. From each of the proposed generator positions, noise levels at the property line of the nearest residences, which are located to the east, opposite Main Street, would range from 56 dBA if the generator was located at position 4 to 67 dBA if the generator was located at position 1. Hourly average noise levels, as represented by LT-2, typically range from 60 to 75 dBA L_{eq} during daytime hours. Therefore, testing of the emergency generator at any of the proposed on-site locations would not generate noise levels exceeding ambient conditions at the nearest noise-sensitive receptor, assuming a Level 2 acoustic enclosure for the generator. All other noise-sensitive receptors would be farther from the project site and would be exposed to generator noise levels lower than the residences to the east. This would be a less-than-significant impact.

FIGURE 9 Proposed Locations for the Emergency Generator



Truck Loading and Unloading

Truck deliveries for the proposed hotel would have the potential to generate noise. Loading areas were not identified on the site plan provided at the time of this study. However, the most likely loading zones would be located in the parking lots adjacent to the hotel façades. For a hotel of this size, it is assumed that one or two truck deliveries would occur per week, and typical deliveries would take approximately 15 minutes or less.

To minimize the noise impact associated with truck deliveries, it is assumed that deliveries would only occur between 7:00 a.m. and 10:00 p.m. Based on the size of the proposed land use, smaller delivery and vendor would be expected for the proposed project. These trucks typically generate maximum noise levels of 65 to 70 dBA at a distance of 50 feet. Using a 6 dBA per doubling of the distance propagation rate, the noise levels due to deliveries at the nearest residences would range from 60 to 65 dBA. Compared to the ambient noise environment, which has maximum instantaneous noise levels ranging from 67 to 107 dBA L_{max} and hourly average noise levels ranging from 60 to 75 dBA L_{eq}, truck deliveries would not be expected to increase the existing noise environment, assuming daytime deliveries only. This would be a less-than-significant impact.

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

Impact 2: **Exposure to Excessive Groundborne Vibration.** Construction-related vibration is not expected to result in vibration levels in excess of 0.3 in/sec PPV at the existing sensitive uses surrounding the project site. **This is a less-than-significant impact.**

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

The California Department of Transportation recommends a vibration limit of 0.5 in/sec PPV for buildings that are structurally sound and designed to modern engineering standards, which typically consist of buildings constructed since the 1990s. A conservative vibration limit of 0.3 in/sec PPV has been used for buildings that are found to be structurally sound but where structural damage is a major concern (see Table 3 above for further explanation). For historical buildings or buildings that are documented to be structurally weakened, a cautious limit of 0.08 in/sec PPV is often used to provide the highest level of protection. No historical buildings or buildings that are documented to be structurally weakened adjoin the project site. For the purposes of this study, groundborne vibration levels exceeding the conservative 0.3 in/sec PPV limit at the existing nearby sensitive buildings would have the potential to result in a significant vibration impact.

Table 8 presents typical vibration levels that could be expected from construction equipment at a distance of 25 feet. 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. Vibration levels would vary depending on soil conditions, construction methods, and equipment used.

Equipment in Table 8 could be used during demolition or construction activities, and vibration levels are shown for the nearest potential equipment usage, with respect to the surrounding structures on nearby sites. Since landscaping would not be expected to require heavy equipment, all distances were measured from the edge of the parking lot on the project site to the surrounding buildings. To the north, equipment, such as vibratory rollers, could be used during paving for the parking lot, which would be as close as 15 feet from the nearest building at the dealership. Vibration levels would be up to 0.37 in/sec PPV due to the vibratory roller. However, this adjacent building is used as a mechanic shop and would not be considered vibration-sensitive. The main building on the dealership property would be 85 feet from the nearest heavy construction activity, and at this distance, vibration levels would be at or below 0.06 in/sec PPV.

The nearest residences and the theater, which are both east of Main Street, would be 85 to 95 feet from the nearest heavy construction activity. These sensitive structures would be exposed to vibration levels at or below 0.06 in/sec PPV. The fire station, which would not be considered a sensitive land use, would be more than 165 feet from the nearest heavy construction activity and would be exposed to vibration levels at or below 0.03 in/sec PPV.

TABLE 8 Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft. (in/sec)	Vibration Levels at Nearest Surrounding Building Façades (in/sec PPV)				
			Sensitive Uses		Non-Sensitive Uses		
			East Residence (85ft)	East Theater (95ft)	North Mechanic Building (15ft)	North Main Dealership Building (85ft)	East Fire Station (165ft)
Clam shovel drop		0.202	0.053	0.047	**0.354**	0.053	0.025
Hydromill (slurry wall)	in soil	0.014	0.002	0.002	0.014	0.001	0.001
	in rock	0.030	0.004	0.004	0.030	0.003	0.002
Vibratory Roller		0.210	0.055	0.048	**0.368**	0.055	0.026
Hoe Ram		0.089	0.023	0.020	0.156	0.023	0.011
Large bulldozer		0.089	0.023	0.020	0.156	0.023	0.011
Caisson drilling		0.089	0.023	0.020	0.156	0.023	0.011
Loaded trucks		0.076	0.020	0.018	0.133	0.020	0.010
Jackhammer		0.035	0.009	0.008	0.061	0.009	0.004
Small bulldozer		0.003	0.001	0.001	0.005	0.001	0.0004

Source: Transit Noise and Vibration Impact Assessment, United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, May 2006 and modified by Illingworth & Rodkin, Inc., June 2019.

Construction activity for the proposed project is not expected to result in cosmetic damage to the residences and theater. While the main dealership building would not be exposed to vibration levels exceeding 0.3 in/sec PPV, the mechanic shop located along the shared northern boundary of the project site would potentially be exposed to vibration levels in excess of the 0.3 in/sec PPV standard. However, this type of building would not be considered a sensitive use. Therefore, this would not be considered a significant impact.

Mitigation Measure 2: None required.

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

Half Moon Bay Airport is a public airport located approximately 4.9 miles northwest of the project site. San Francisco International Airport is a public-use airport located more than 10 miles north of the project site. As shown in Figures 10 and 11, the project site lies outside the 65 dBA CNEL noise contour for both airports. Although aircraft-related noise would be audible at the project site, noise from aircraft would not substantially increase ambient noise levels. Exterior and interior noise levels resulting from aircraft would be compatible with the proposed project.

Mitigation Measure 3: None required.

FIGURE 10 Noise Contours for Half Moon Bay Airport

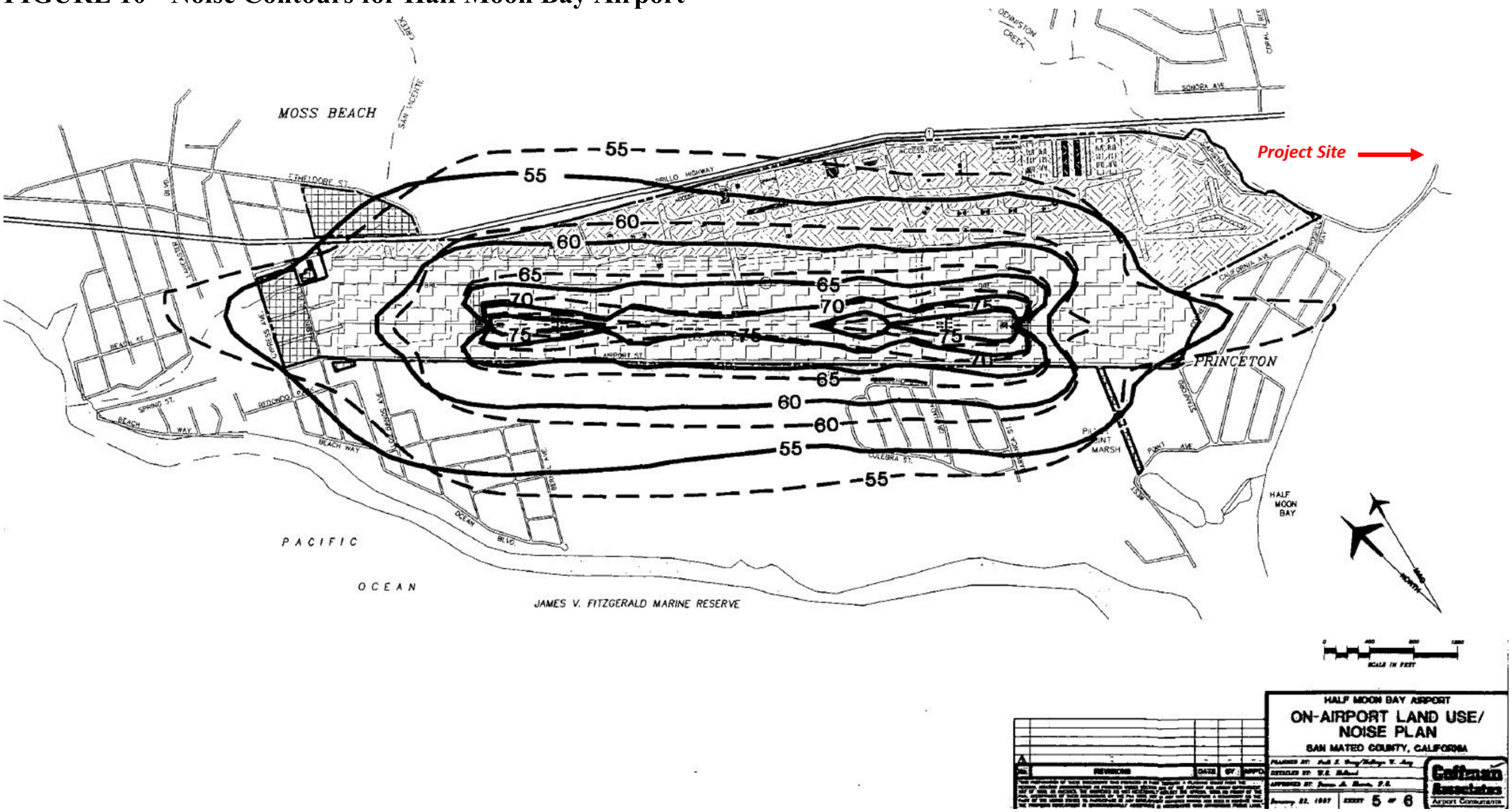


FIGURE 11 2020 Noise Contours for San Francisco International Airport