APPENDIX E
Noise Analysis

WORLD OIL GAS STATION NOISE ASSESSMENT

Morgan Hill, California

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INTRODUCTION

A gas station redevelopment project is proposed at 16720 Monterey Road (APN 817-01-002) in Morgan Hill, California. As part of the proposed project, the existing 4-pump gas station, 880-square-foot retail store, and fuel canopy would be replaced with a new 6-pump gas station, a new underground storage tank (UST) system, a new canopy, and a 2,115-square-foot retail store.

This report evaluates the project's potential to result in significant noise impacts with respect to applicable guidelines established by the City of Morgan Hill. The report is divided into two sections: 1) the Setting Section provides a brief description of the fundamentals of environmental noise, summarizes applicable regulatory criteria, and discusses the results of the ambient noise monitoring survey completed at the site to document existing noise conditions; and 2) the Noise Assessment Section describes the permanent operational noise sources generated at the project site and evaluates the project's impact on existing noise-sensitive receptors in the project 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.

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.

Regulatory Background

The City of Morgan Hill have established regulatory criteria that are applicable in this assessment. A summary of the applicable regulatory criteria is provided below.

City of Morgan Hill General Plan. The Safety, Services and Infrastructure Chapter in the Morgan Hill 2035 General Plan sets forth policies with the goal of minimizing the impact of noise on people through noise reduction and suppression techniques, and through appropriate land use policies in the City of Morgan Hill. The following policies are applicable to the proposed project:

Policy SSI-8.2- *Impact Evaluation:* The impact of proposed development project on existing land uses should be evaluated in terms of the potential for adverse community response based on significant increase in existing noise levels, regardless of compatibility guidelines.

Policy SSI-8.3- *Commercial and Industrial Noise Level Standards:* Evaluate interior noise levels in commercial and industrial structures on a case-by-case basis based on the use of the space.

Policy SSI-8.5- *Traffic Noise Level Standards:* Consider noise level increases resulting from traffic associated with new projects significant if: a) the noise level increase is 5 dBA L_{dn} or greater, with a future noise level of less than 60 dBA L_{dn}, or b) the noise level increase is 3 dBA L_{dn} or greater, with a future noise level of 60 dBA L_{dn} or greater.

Policy SSI-8.6- *Stationary Noise Level Standards:* Consider noise levels produced by stationary noise sources associated with new projects significant if they substantially exceed existing ambient noise levels.

Policy SSI-8.7- *Other Noise Sources:* Consider noise levels produced by other noise sources (such as ballfields) significant if an acoustical study demonstrates they would substantially exceed ambient noise levels.

Policy SSI-8.9- *Site Planning and Design:* Require attention to site planning and design techniques other than sound walls to reduce noise impacts, including: a) installing earth berms, b) increasing the distance between the noise source and the receiver; c) using non-sensitive structures such as parking lots, utility areas, and garages to shield noise-sensitive areas; d) orienting buildings to shield outdoor spaces from the noise source; and e) minimizing the noise at its source.

Policy SSI-9.3- *Sound Wall Design:* The maximum height of sound walls shall be eight feet. Residential projects adjacent to the freeway shall be designed to minimize sound wall height through location of a frontage road, use of two sound walls or other applicable measures. Sound wall design and location shall be coordinated for an entire project area and shall meet Caltrans noise attenuation criteria for a projected eight-lane freeway condition. If two sound walls are used, the first shall be located immediately adjacent to the freeway right-of-way and the second shall be located as necessary to meet Caltrans noise requirements for primary outdoor areas. The minimum rear yard setback to the second wall shall be 20 feet.

Policy SSI-9.5- *Noise Studies for Private Development:* In order to prevent significant noise impacts on neighborhood residents which are related to roadway extensions or construction of new roadways, require completion of a detailed noise study during project-level design to quantify noise levels generated by projects such as the Murphy Avenue extension to Mission View Drive and the Walnut Grove Extension to Diana Avenue. The study limits should include noise sensitive land uses adjacent to the project alignment as well as those along existing segments that would be connected to new segments. A significant impact would be identified where traffic noise levels would exceed the "normally acceptable" noise level standard for residential land uses and/or where ambient noise levels would be substantially increased with the project. Project specific mitigation measures could include, but not be limited to, considering the location of the planned roadway alignment relative to existing receivers in the vicinity, evaluating the use of noise barriers to attenuate project-generated traffic noise, and/or evaluating the use of "quiet pavement" to minimize traffic noise levels at the source. Mitigation should be designed to reduce noise levels into compliance with "normally acceptable" levels for residential noise and land use compatibility.

Policy SSI-9.6- *Earth Berms:* Allow and encourage earth berms in new development projects as an alternative to sound walls if adequate space is available.

Policy SSI-9.7- *Sound Barrier Design:* Require non-earthen sound barriers to be landscaped, vegetated, or otherwise designed and/or obscured to improve aesthetics and discourage graffiti and other vandalism.

City of Morgan Hill Municipal Code. The City of Morgan Hill's Municipal Code Chapter 8.28 states that "It is unlawful and a misdemeanor for any person to make or continue, or cause to be made or continued, any loud, disturbing, unnecessary or unusual noise or any noise which annoys, disturbs, injures or endangers the comfort, health, repose, peace or safety of other persons within the city." The following sections of the code would be applicable to the project:

C. 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;

G. Loading or Unloading Vehicles and Opening Boxes. The creation of loud and excessive noise in connection with loading or unloading any vehicle or the opening and destruction of bales, boxes, crates and containers;

Chapter 18.76 establishes quantitative noise performance standards:

18.76.090 - Noise.

A. No land use or activity may produce a noise level in excess of the standards in Table 18.76-1.

Table 18.76-1: Maximum Noise Levels

Receiving Land Use	Maximum Noise Level at Lot Line of Receiving Use [1]
Industrial and Wholesale	70 dBA
Commercial	65 dBA
Residential or Public/Quasi Public	60 dBA

Notes:
[1] The planning commission may allow an additional 5 dBA noise level at the lot line if the maximum noise level shown in Table 18.76-1 cannot be achieved with reasonable and feasible mitigation.

B. Noise standards in Table 18.76-1do not apply to noise generated by vehicle traffic in the public right-of-way or from temporary construction, demolition, and vehicles that enter and leave the site of the noise-generating use (e.g., construction equipment, trains, trucks).

C. All uses and activities shall comply with Municipal Code Chapter 8.28 (Noise).

(Ord. No. 2277 N.S., § 5(Exh. A), 6-6-2018)

Existing Noise Environment

The project site is located at 16720 Monterey Road in the City of Morgan Hill. The project site is surrounded by a restaurant to the north, townhouses to the east, San Pedro Avenue and a vacant parcel to the south, and Monterey Road and commercial/retail uses to the west.

The noise environment at the site and in the surrounding area results primarily from vehicular traffic along Monterey Road. Local traffic along San Pedro Avenue and other surrounding roadways would also contribute to the existing noise environment. In addition, occasional aircraft flyovers associated with nearby San Martin Airport and San José International Airport have some contribution to the noise environment.

A noise monitoring survey consisting of one long-term (LT-1) and one short-term (ST-1) noise measurements was made at the site between Monday, July 26, 2021 and Thursday, July 29, 2021. All measurement locations are shown in Figure 1.

Long-term noise measurement LT-1 was made approximately 55 feet east of the centerline of Monterey Road. Hourly average noise levels at LT-1 typically ranged from 66 to 74 dBA L_{eq} during daytime hours (7:00 a.m. and 10:00 p.m.) and from 53 to 72 dBA L_{eq} during nighttime hours (10:00 p.m. and 7:00 a.m.). The day-night average noise level on Tuesday, July 27, 2021 and on Wednesday, July 28, 2021 was 73 dBA L_{dn}. The daily trend in noise levels at LT-1 is shown in Figures 2 through 5.

Short-term noise measurement was made on Monday, July 26, 2021, at 10:00 a.m. ST-1 was made in a 10-minute interval, and the results of the measurements are summarized in Table 3. ST-1 was along the eastern boundary of the site, near the existing residential land uses adjoining the site. Typical traffic noise levels along Monterey Road ranged from 50 to 69 dBA. The 10-minute L_{eq} measured at ST-1 was 57 dBA.

FIGURE 1 Noise Measurement Locations

Source: Google Earth 2021.

FIGURE 2 Daily Trend in Noise Levels at LT-1, Monday, July 26, 2021

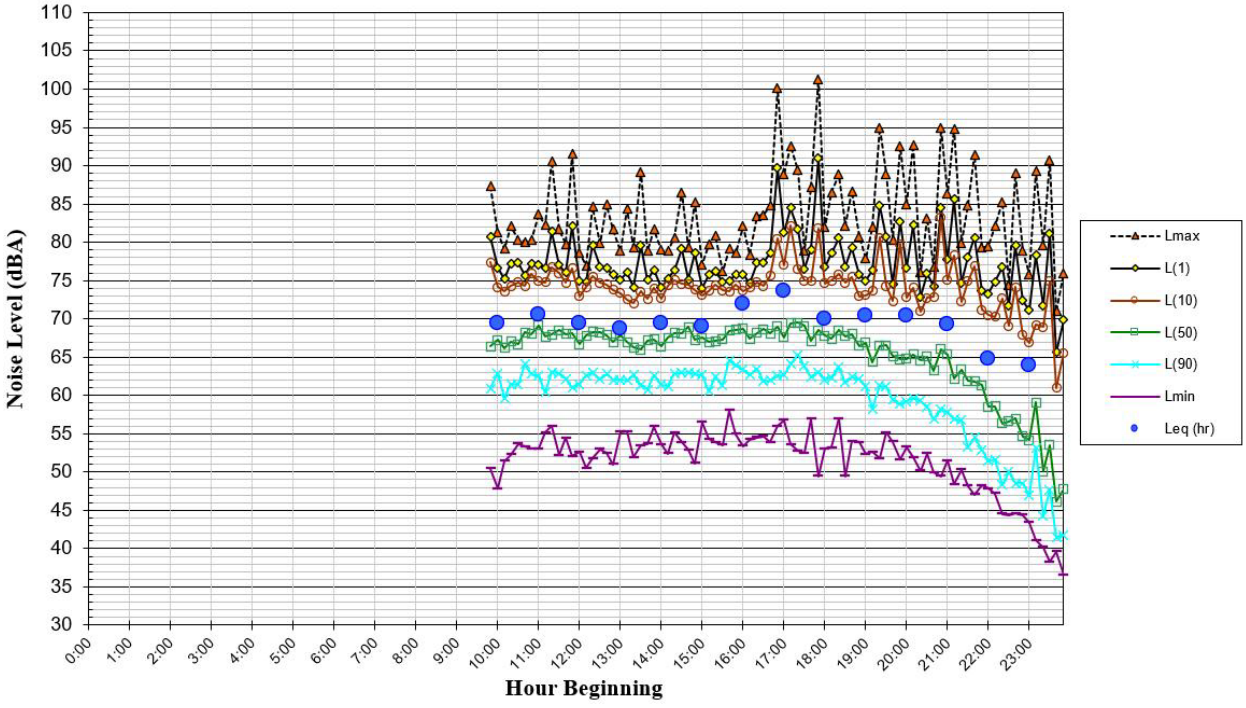

FIGURE 3 Daily Trend in Noise Levels at LT-1, Tuesday, July 27, 2021

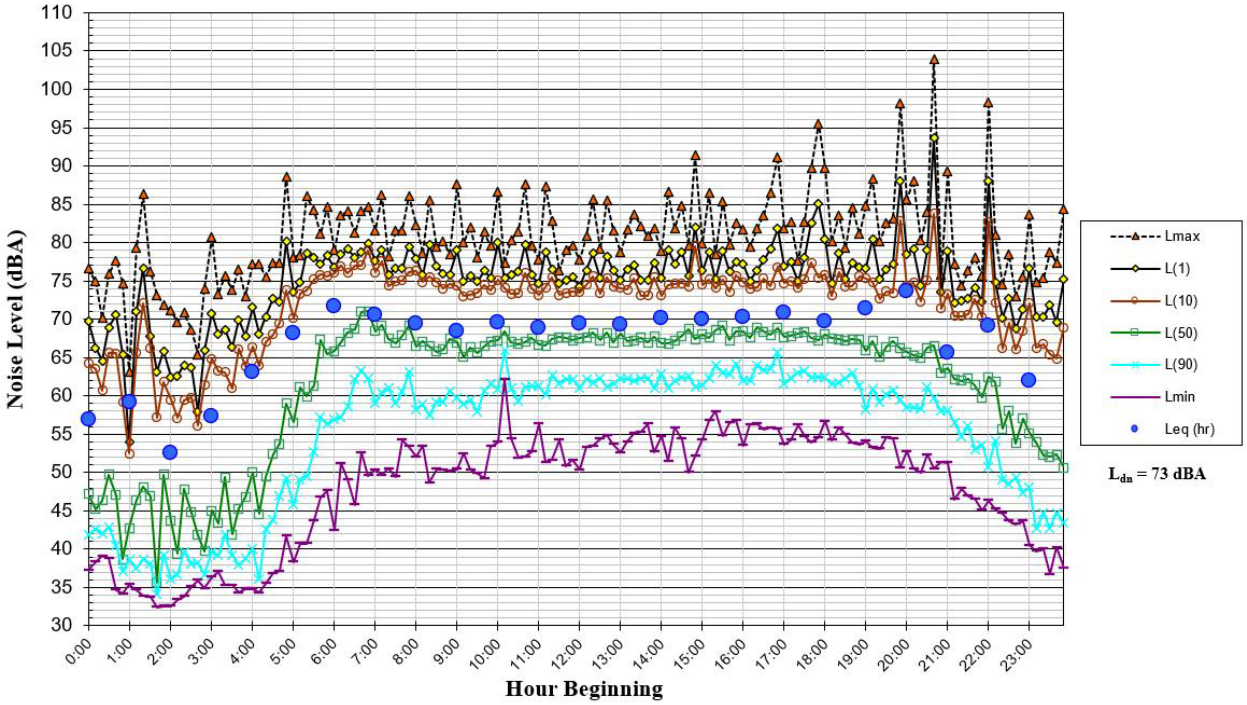

FIGURE 4 Daily Trend in Noise Levels at LT-1, Wednesday, July 28, 2021

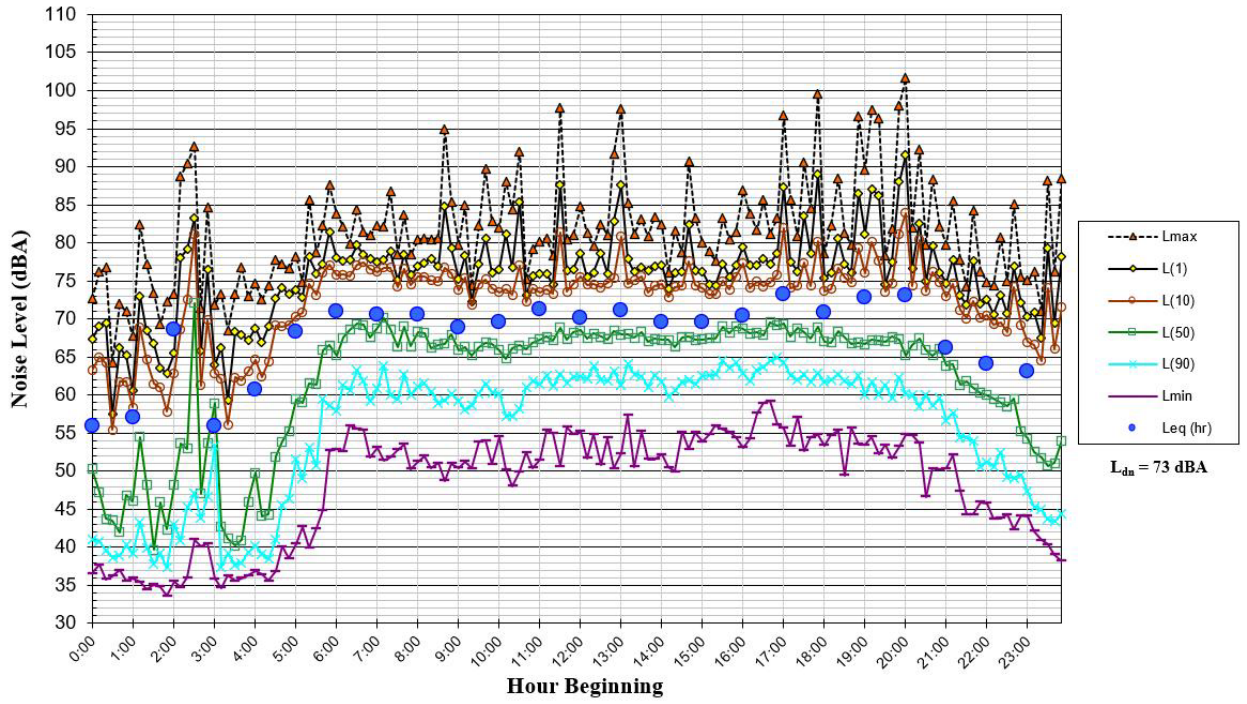

FIGURE 5 Daily Trend in Noise Levels at LT-1, Thursday, July 29, 2021

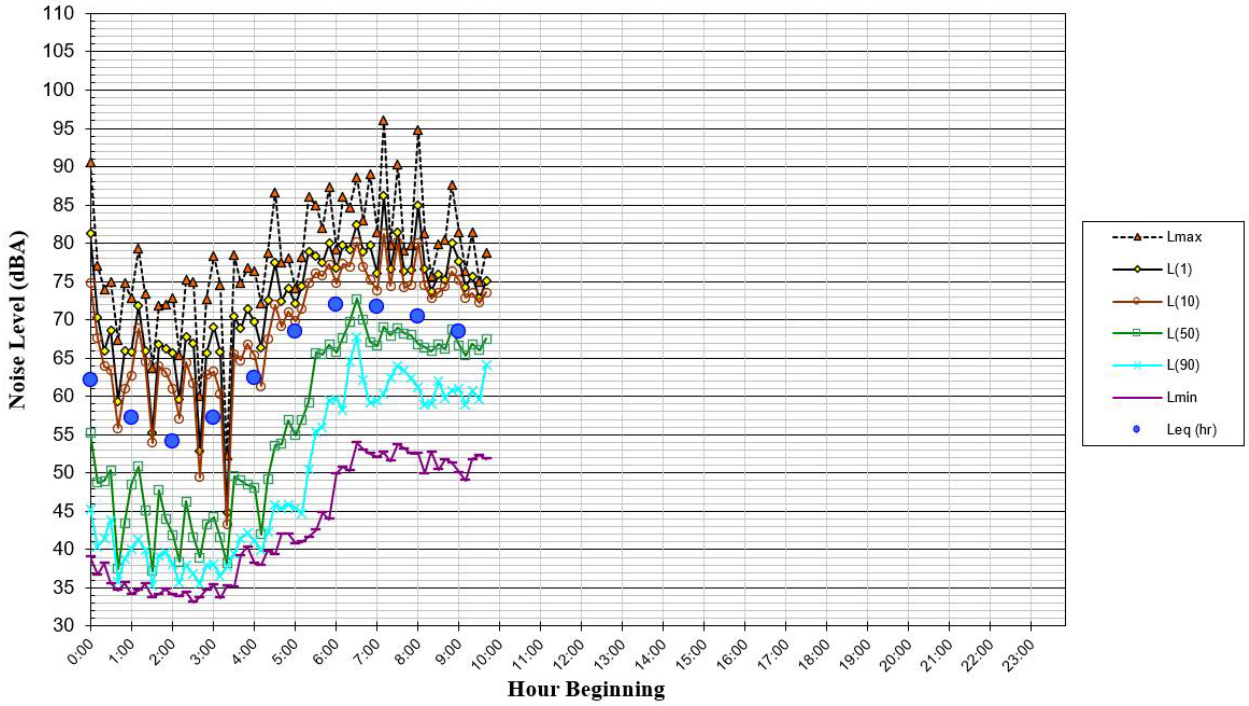

TABLE 3 Summary of Short-Term Noise Measurements (dBA)

Noise Measurement Location	Date, Time	Measured Noise Level, dBA					
		L_{max}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{eq}
ST-1: made along the eastern boundary of the project site	7/26/2021, 10:00-10:10	69	65	60	55	50	57

NOISE ASSESSMENT

Permanent Noise Level Increase

Policy SSI-8.5 of the City of Morgan Hill General Plan consider noise level increases resulting from traffic associated with new projects significant if: a) the noise level increase is 5 dBA L_{dn} or greater, with a future noise level of less than 60 dBA L_{dn}, or b) the noise level increase is 3 dBA L_{dn} or greater, with a future noise level of 60 dBA L_{dn} or greater. According to the 2035 noise contours included in the Morgan Hill 2035 Draft Environmental Impact Report,[1] the surrounding residences would have future noise levels exceeding 60 dBA L_{dn}. Therefore, a significant impact would occur if traffic due to the proposed project would permanently increase ambient levels by 3 dBA L_{dn}. For reference, a 3 dBA L_{dn} noise increase would be expected if the project would double existing traffic volumes along a roadway.

The traffic study completed for the proposed project included peak hour traffic volumes for two intersections in the project vicinity. The traffic volumes for the existing plus project scenario were

[1] Placeworks, "Morgan Hill 2035 DEIR," January 13, 2016.

compared to the traffic volumes for the existing scenario for all roadway segments included in the traffic study. A traffic noise increase of less than 1 dBA L_{dn} was calculated along each roadway segment. Therefore, the project-generated traffic noise would not result in a substantial, permanent noise level increase at noise-sensitive receptors. This would be a less-than-significant impact.

Operational Noise

Under the City of Morgan Hill's Noise Element and Municipal Code, noise levels produced by operational noise at the project site would be considered significant if noise levels substantially exceed existing ambient noise levels, exceed 60 dBA L_{eq} at residential properties, or would permanently increase ambient noise levels by 3 dBA L_{dn}, under Policy SSI-8.5 of the City's General Plan.

Propagating the hourly average noise levels measured at LT-1 to the residential property line, ambient noise levels would range from 53 to 61 dBA L_{eq} during daytime hours and from 40 to 60 dBA L_{eq} during nighttime hours, assuming a 5 dBA reduction from the existing sound wall. The estimated day-night average noise level would be 63 dBA L_{dn} at the residential backyards.

Mechanical Equipment

The proposed project would include a 2,115 square-foot retail store. Six pump stations, with the capacity of 12 gas pumps, would be constructed as part of the project. The fuel will be stored in a new underground storage tank (UST) system located to the east of the fuel canopy. The fueling stations and retail store will be open 24 hours a day, seven days per week.

A heating, ventilation and air conditioning (HVAC) unit, is proposed at the retail store. The selected HVAC unit would generate noise levels up to 66 dBA at a distance of 5 feet and would be located at the center of the rooftop of the convenience store. While the building façade would provide partial shielding, no attenuation is assumed in this study to credibly represent worst-case conditions.

The nearest noise-sensitive receptors would be approximately 100 feet east of the center of the proposed HVAC unit. Conservatively, the existing six-foot sound wall along the residential property line would provide a minimum 5 dBA of noise attenuation. Under this assumption, noise levels due to the HVAC unit would be about 35 dBA at the residential property line. Typically, HVAC units' cycle on and off throughout a 24-hour period. Therefore, these estimated noise levels would represent hourly average noise attributable to mechanical equipment during daytime and nighttime hours, and the estimated day-night average noise level would be 41 dBA L_{dn}. These units would not exceed 60 dBA L_{eq} or ambient noise levels at the nearest residential land uses, and this would not result in a measurable noise level increase (i.e., 0 dBA L_{dn} increase).

An air/water dispenser would be located at the project site along the eastern portion of the parking area. While the existing gas station does include such equipment, it is unknown if the ambient noise measurements included the operation of the existing air/water dispenser. Conservatively, it is assumed the ambient measurements did not include this noise source. This type of equipment typically generates noise levels up to 65 dBA at a distance of 5 feet and does not run continuously.

In a worst-case hour, it is assumed that this equipment would operate for a total of 20 minutes, which means the hourly average noise level would be 60 dBA L_{eq} at 5 feet. If this worst-hour would occur each hour between 7:00 a.m. and 10:00 p.m., the day-night average noise level at 5 feet would be 58 dBA L_{dn}.

The nearest residential property line is 15 feet from the proposed air/water dispenser. At this distance, maximum noise levels would be 51 dBA, hourly average noise levels would be 46 dBA L_{eq}, and day-night average noise levels would be 44 dBA L_{dn}. The air/water dispenser would not produce noise levels that would exceed 60 dBA L_{eq} or ambient noise levels at the nearest residential land uses, and this would not result in a measurable noise level increase (i.e., 0 dBA L_{dn} increase).

Parking Lot and Gas Station Activities

According to the site plan, 11 parking spaces are proposed as part of the project. These parking spaces would be located along the eastern boundary of the gas station area, nearest to the residences. Additionally, 12 fuel pumps would also include similar noise sources as parking spaces, which would include vehicular circulation, louder engines, car alarms, door slams, and human voices. These sources typically generate noise levels ranging from 53 to 63 dBA L_{max} at a distance of 50 feet.

The site is currently developed with 8 fuel pumps and does include parking. So, the residences to the east would be exposed to similar noise levels currently, and the ambient noise environment would also include noise from parking lot and gas station activities. However, for the purpose of estimating worst-case scenario, the proposed project is treated as a new development.

The isolated, maximum instantaneous noise sources generated by vehicular circulation at parking lots and gas stations would occur during both daytime and nighttime hours. The traffic study conducted for the proposed project includes the net daily trips and net peak hour AM and PM trips, assuming 12 vehicle fueling positions compared to the existing eight fueling positions. The net daily trips would increase by 286 trips, and the net peak hour increases would be 23 trips in the AM and 9 trips in the PM. Since the ambient noise levels included existing vehicle circulation at the gas station, the noise level increase from existing ambient conditions would be approximately 1 dBA L_{dn}, which would not be considered a substantial increase under the City's General Plan.

Truck Deliveries

Gas stations would also require heavy truck deliveries for fuel deposits. The proposed project estimates approximately 5,500 gallons of fuel to be sold daily. The typical fuel truck carries about 9,000 gallons, which would result in about 1 truck delivery per day. Additionally, smaller vender truck deliveries would occur at the retail store. For purposes of this analysis, one heavy fuel truck delivery and one vender truck delivery is assumed in one day. This would represent the worst-case scenario.

The fuel tanks would be located underground along the eastern portion of the project site. It is assumed that these trucks would access the site from San Pedro Avenue, park to the east of the fuel canopy, and dispense the fuel into tanks. A loading zone for the vender trucks is shown in the northernmost parking spot along the eastern side of the property.

Depositing the fuel into the tanks would not generate measurable noise levels; however, noise due to low speed truck maneuvering results from a combination of engine, exhaust, and tire noise, as well as the intermittent sounds of back-up alarms and releases of compressed air associated with truck/trailer air brakes. For the heavy fuel trucks, maximum instantaneous noise levels would typically range from 70 to 75 dBA L_{max} at a distance of 50 feet. Smaller vender trucks typically generate maximum noise levels of 60 to 65 dBA L_{max} at the same distance. While the length of time to dispense the fuel in the tanks or unload supplies could take as long as one hour or so, typically, delivery trucks are stationary during this time with the engine off. The total time when these maximum noise levels would occur would typically be for less than 3 minutes in any one hour.

Assuming worst-case conditions, this analysis assumes both truck deliveries would occur in the same hour, which would result in an hourly average noise level of 58 dBA L_{eq} at the nearest residential property line, assuming a 5 dBA reduction due to the existing sound wall. This would result in a day-night average noise level of 47 dBA L_{dn}.

When all noise sources on the site are added together (i.e., mechanical equipment, parking circulation, and truck deliveries) at the nearest residential property line, the day-night average noise level would be 65 dBA L_{dn}, which would result in a 2 dBA L_{dn} increase over ambient levels. This represents a less-than-significant impact.

Cumulative Noise

Cumulative noise impacts would include either cumulative traffic noise increases under future conditions or temporary construction noise from cumulative construction projects.

A significant cumulative traffic noise increase would occur if two criteria are met: 1) if the cumulative traffic noise level increase was 3 dBA L_{dn} or greater for future levels exceeding 60 dBA L_{dn} or was 5 dBA L_{dn} or greater for future levels at or below 60 dBA L_{dn}; 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 L_{dn} or more attributable solely to the proposed project.

The traffic study included 2025 cumulative traffic volumes, with and without the project. When both cumulative scenarios were compared to the existing traffic scenario, a noise level increase of 1 dBA L_{dn} or less was calculated along every roadway segment, with and without the project. Therefore, the project would not result in a cumulative noise increase due to traffic.

There are no known approved projects surrounding the project site that would be constructed during the same timeframe as the proposed project. Therefore, the noise-sensitive receptors surrounding the project site would not be subject to cumulative construction impacts.