SAN JACINTO RETAIL CENTER

NOISE STUDY

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SAN JACINTO RETAIL CENTER
SAN JACINTO, CALIFORNIA
Noise Study

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SAN JACINTO RETAIL CENTER
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NOISE STUDY

This report is an analysis of the potential noise impacts associated with the San Jacinto Retail Center Project, a gas station/restaurant/retail project proposed for construction in the City of San Jacinto, Riverside County. The report has been prepared by Birdseye Planning Group, LLC, under contract to the applicant to support the entitlement process and address a request from the City of San Jacinto Planning Department. This study analyzes the potential for temporary impacts associated with construction activity, long-term impacts associated with traffic on neighboring roadways and operation of the various project elements described herein on a site located at the northwest corner of Cottonwood Avenue and State Street in the City of San Jacinto, California.

PROJECT DESCRIPTION

The 2.16-acre project site is currently vacant. The applicant proposes to construct three buildings that will provide 8,540 square-feet (SF) of retail (Building A), a 2,890 SF fast-food restaurant with drive-through window (Building C), and a 2,950 SF convenience store with 8 gasoline pumps and 16 fueling positions under an overhead canopy (Building B). Building A may accommodate auto-related retail or an auto repair facility. The site is 2.16 acres in size and located on the northeast corner of the Cottonwood Avenue/State Street intersection in the City of San Jacinto, CA (APN 434-050-008, -014). Vehicular access to the site will be provided via one full-access, unsignalized driveway along State Street and one (1) full-access, unsignalized driveway along Cottonwood Avenue.

The site is zoned Commercial 2 (C-2). The proposed project is consistent with the existing commercial zoning. Adjacent land uses are a mobile home park to the west, vacant land to the north and east, commercial to the south/southeast. The proposed Project is expected to be begin construction in early 2019 and be operational by late 2019. The site is shown in Figure 1. The proposed site plan is shown in Figure 2.

SETTING

Overview of Sound Measurement

Noise level (or volume) is generally measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels to be consistent with that of human hearing response, which is most sensitive to frequencies around 4,000 Hertz (about the highest note on a piano) and less sensitive to low frequencies (below 100 Hertz).

Figure 1—Vicinity Map

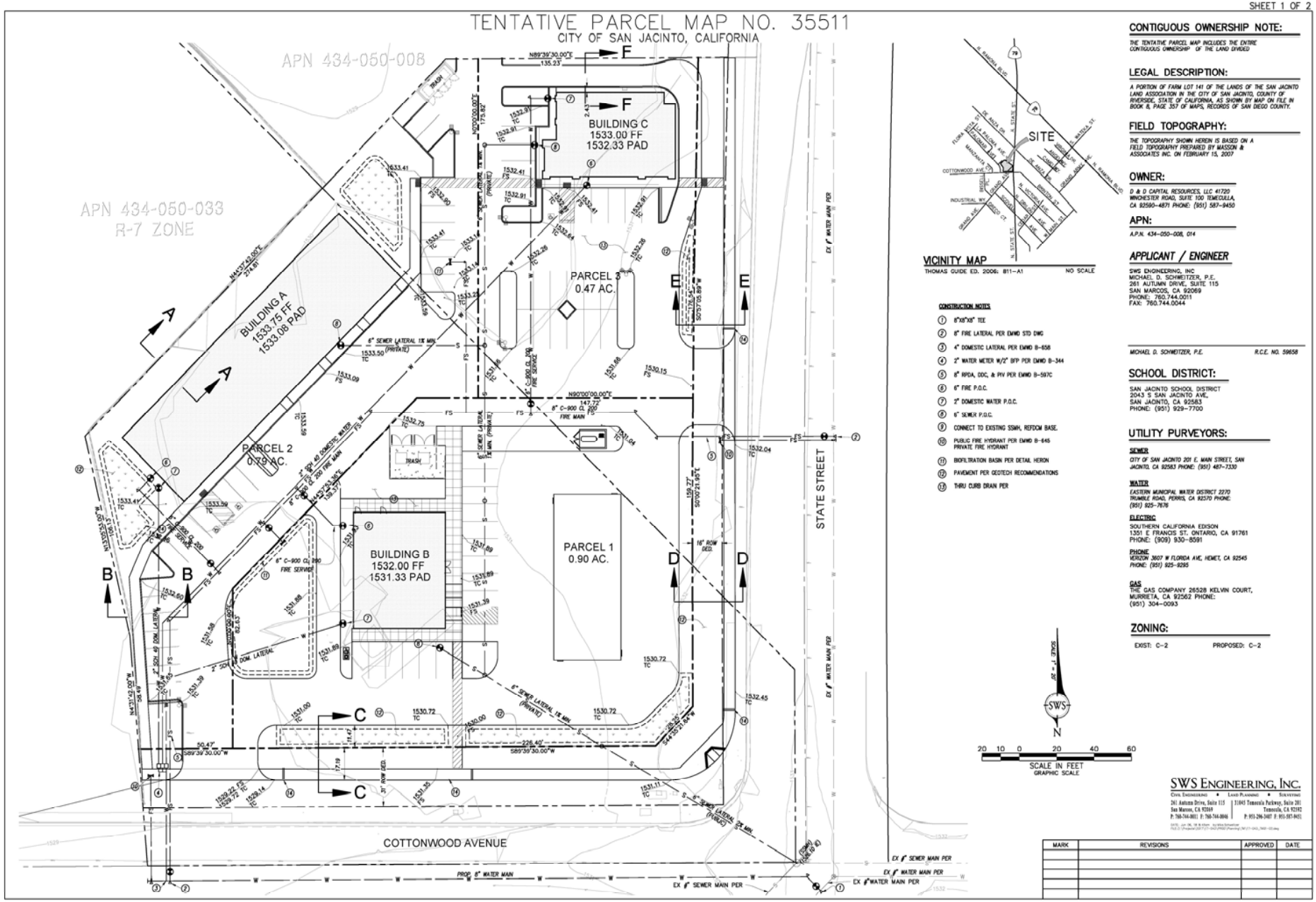

Figure 2— Site Plan

Sound pressure level is measured on a logarithmic scale with the 0 dB level based on the lowest detectable sound pressure level that people can perceive (an audible sound that is not zero sound pressure level). Based on the logarithmic scale, a doubling of sound energy is equivalent to an increase of 3 dBA, and a sound that is 10 dBA less than the ambient sound level has no effect on ambient noise. Because of the nature of the human ear, a sound must be about 10 dBA greater than the reference sound to be judged as twice as loud. In general, a 3 dBA change in community noise levels is noticeable, while 1-2 dB changes generally are not perceived. Quiet suburban areas typically have noise levels in the range of 40-50 dBA, while arterial streets are in the 50-60+ dBA range. Normal conversational levels are in the 60-65 dBA range, and ambient noise levels greater than 65 dBA can interrupt conversations. Noise levels typically attenuate (or drop off) at a rate of 6 dBA per doubling of distance from point sources (i.e., industrial machinery). Noise from lightly traveled roads typically attenuates at a rate of about 4.5 dBA per doubling of distance. Noise from heavily traveled roads typically attenuates at about 3 dBA per doubling of distance. Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The manner in which older homes in California were constructed (approximately 30 years old or older) generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units and office buildings construction to California Energy Code standards is generally 30 dBA or more (HMMH, 2006).

In addition to the actual instantaneous measurement of sound levels, the duration of sound is important since sounds that occur over a long period of time are more likely to be an annoyance or cause direct physical damage or environmental stress. One of the most frequently used noise metrics that considers both duration and sound power level is the equivalent noise level (Leq). The Leq is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). Typically, Leq is summed over a one-hour period. Lmax is the highest RMS (root mean squared) sound pressure level within the measuring period, and Lmin is the lowest RMS sound pressure level within the measuring period.

The time period in which noise occurs is also important since noise that occurs at night tends to be more disturbing than that which occurs during the day. Community noise is usually measured using Day-Night Average Level (Ldn), which is the 24-hour average noise level with a 10-dBA penalty for noise occurring during nighttime (10 p.m. to 7 a.m.) hours, or Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a 5 dBA penalty for noise occurring from 7 p.m. to 10 p.m. and a 10 dBA penalty for noise occurring from 10 p.m. to 7 a.m. Noise levels described by Ldn and CNEL usually do not differ by more than 1 dB. Daytime Leq levels are louder than Ldn or CNEL levels; thus, if the Leq meets noise standards, the Ldn and CNEL are also met.

Sensitive Receptors

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with each of these uses. Urban areas contain a variety of land use and development types that are noise sensitive including residences, schools, churches, hospitals and convalescent care facilities. The closest sensitive receptors are mobile homes located in the neighborhood adjacent to and west of the site.

Project Site Setting

The project area is a mix of residential and commercial uses. Thus, the most common and primary sources of noise in the project site vicinity are motor vehicles (e.g., automobiles and trucks) on Cottonwood Avenue and State Street. Motor vehicle noise is of concern because where a high number of individual events occur, it can create a sustained noise level. Aircraft overflights occur but do not noticeably contribute to the ambient noise environment.

To gather data on the general noise environment at the project site, two weekday morning 15-minute noise measurements were taken on July 18, 2018. Site 1 is located at the southwest corner adjacent to the mobile home park. Site 2 is located at the northwest corner of the site. Both sites are intended to approximate existing ambient noise conditions at the mobile home residences located adjacent to the western property line. The measurements were taken using an ANSI Type II integrating sound level meter. The predominant noise source was traffic. The temperature during monitoring was 75 degrees Fahrenheit with no perceptible wind.

During monitoring, 64 cars/light trucks, four medium (two-axles and six wheels) and two heavy (18-wheel) trucks passed Site 1. A total of 319 cars/light truck, 15 medium trucks and three heavy trucks passed Site 2. Table 1 identifies the noise measurement locations and measured noise levels. Monitoring locations are shown in Figure 3. As shown, the Leq was 57.0 dBA at Site 1 and 54.7 dBA at Site 2. The monitoring data sheet is provided as Appendix A.

Table 1
Noise Monitoring Results

Measurement Location	Primary Noise Source	Sample Time	Leq (dBA)
1. Project site adjacent to the mobile home residential neighborhood	Traffic	Weekday morning	57.0
2. Northwest corner of project site adjacent to mobile homes and State Street.	Traffic	Weekday morning	54.7

Source: Field visit using ANSI Type II Integrating sound level meter.

Regulatory Setting

The Federal Noise Control Act (1972) addressed the issue of noise as a threat to human health and welfare. To implement the Federal Noise Control Act, the U.S. Environmental Protection

Figure 3—Monitoring Sites

Agency (EPA) undertook a number of studies related to community noise in the 1970s. The EPA found that 24-hour averaged noise levels less than 70 dBA would avoid measurable hearing loss, levels of less than 55 dBA outdoors and 45 dBA indoors would prevent activity interference and annoyance (EPA 1974).

The U.S. Department of Housing and Urban Development (HUD) published a Noise Guidebook for use in implementing the Department's noise policy. In general, HUD's goal is exterior noise levels that are less than or equal to 55 dBA Ldn. The goal for interior noise levels is 45 dBA Ldn. HUD suggests that attenuation be employed to achieve this level, where feasible, with a special focus on sensitive areas of homes, such as bedrooms (HUD 2011).

Title 24 of the California Code of Regulations (CCR) establishes standards governing interior noise levels that apply to all new single-family and multi-family residential units in California. These standards require that acoustical studies be performed before construction at building locations where the existing Ldn exceeds 60 dBA. Such acoustical studies are required to establish mitigation measures that will limit maximum Ldn levels to 45 dBA in any habitable room. Although there are no generally applicable interior noise standards pertinent to all uses, many communities in California have adopted an Ldn of 45 as an upper limit on interior noise in all residential units.

In addition, the State of California General Plan Guidelines (OPR 2003), provides guidance for noise compatibility. The guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

City of San Jacinto Noise Ordinance

Section 8.040.090 (A) of the City of San Jacinto Municipal Code allows construction activities between the hours of 7:00 a.m. and 7:00 p.m. Monday through Saturday. No construction is allowed on Sunday or federal holidays. Construction occurring consistent with these provisions is exempt from noise regulations.

Section 8.040.040 (A) of the San Jacinto Municipal Code states the maximum exterior noise level for mobile home parks is 65 dBA Leq from 7:00 a.m. and 10:00 p.m. and 50 dBA Leq from 10:00 p.m. to 7:00 a.m. Section 8.040.050 (A) states the maximum interior noise level for mobile home parks is 45 dBA Leq from 7:00 a.m. and 10:00 p.m. and 40 dBA Leq from 10:00 p.m. to 7:00 a.m.

Vibration Standards

Vibration is a unique form of noise as the energy is transmitted through buildings, structures and the ground whereas audible noise energy is transmitted through the air. Thus, vibration is generally felt rather than heard. The ground motion caused by vibration is measured as peak particle velocity (PPV) in inches per second and is referenced as vibration decibels (VdB) for the

purpose of evaluating the potential for adverse construction-related impacts. The vibration velocity level threshold of perception for humans is a PPV of approximately 0.01 inches/second which equates to 65 VdB. A vibration velocity of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels.

The City of San Jacinto Municipal Code and General Plan Noise Element do not provide vibration standards. The Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment* (May 2006) uses a threshold of 65 VdB for buildings where low ambient vibration is essential for interior operations. These buildings include hospitals and recording studios. A threshold of 72 VdB is used for residences and buildings where people normally sleep (i.e., hotels and rest homes). A threshold of 75 VdB is used for institutional land uses where activities occur primarily during the daytime (i.e., churches and schools). The threshold used for the proposed project is 72 VdB as single-family residences are the nearest sensitive receptors to the site.

With respect to potential ground-borne vibration impacts on structures, the FTA states that ground-borne vibration levels in excess of PPV 0.2 inches/second (100 VdB) could damage fragile buildings and levels in excess of PPV 0.12 inches/second (95 VdB) could damage extremely fragile historic buildings. No historic buildings occur on the site or are known to occur near the site. The closest structures are the mobile home residences located adjacent to and west of the site. These are not considered fragile or historic buildings; however, to conservatively estimate potential vibration impacts, a PPV of 0.2 inches per second (100 VdB) is used herein.

Construction activities such as blasting, pile driving, demolition, deep excavation and drilling have the potential to generate the highest level of ground vibration. The proposed project will not require blasting, pile driving, demolition of any existing structures or drilling. Excavation and compaction of soils will be required for the building slabs and foundations. Parking lot surface grading would also be required to prepare soils to accommodate the base material and asphalt pavement. Potential impacts are identified based on the use of typical grading equipment and distance from the neighboring structures.

IMPACT ANALYSIS

Methodology and Significance Thresholds

Construction noise estimates are based upon noise levels reported by the Federal Transit Administration, Office of Planning and Environment, and the distance to nearby sensitive receptors. Reference noise levels from that document were used to estimate noise levels at nearby sensitive receptors based on a standard noise attenuation rate of 6 dB per doubling of distance (line-of-sight method of sound attenuation).

The proposed project would be a new use; thus, traffic noise levels associated with existing and future traffic on Cottonwood Avenue and State Street were based on the difference in volumes

between existing conditions and the proposed use referenced in the Traffic Impact Assessment. A doubling of traffic volumes would be required to cause a noticeable increase (3 dBA) in the Leq associated with traffic noise.

Temporary Construction Noise

The main sources of noise during construction activities would include heavy machinery used during, grading and clearing the site, as well as equipment used during building construction and paving. Table 2 demonstrates the typical noise levels associated with heavy construction equipment. As shown, average noise levels associated with the use of heavy equipment at construction sites can range from about 81 to 95 dBA at 25 feet from the source, depending upon the types of equipment in operation at any given time and phase of construction (Hanson, Towers, and Meister, May 2006).

Table 2
Typical Construction Equipment Noise Levels

Equipment Onsite	Typical Level (dBA) 25 Feet from the Source	Typical Level (dBA) 50 Feet from the Source	Typical Level (dBA) 100 Feet from the Source
Air Compressor	84	78	64
Backhoe	84	78	64
Bobcat Tractor	84	78	64
Concrete Mixer	85	79	73
Bulldozer	88	82	76
Jack Hammer	95	89	83
Pavement Roller	86	80	74
Street Sweeper	88	82	76
Man Lift	81	75	69
Dump Truck	82	76	70

Source: Noise levels based on FHWA Roadway Construction Noise Model (2006) Users Guide Table 1.
Noise levels based on actual maximum measured noise levels at 50 feet (Lmax).
Noise levels assume a noise attenuation rate of 6 dBA per doubling of distance.

Noise-sensitive uses near the project site are existing mobile homes located adjacent to and west of the site. Table 3 shows typical maximum construction noise levels at various distances from construction activity, based on a standard noise attenuation rate of 6 dBA per doubling of distance. The noise level used to estimate the maximum noise level that could occur is based on use of a bulldozer as it is likely to be the noisiest type of equipment used over a sustained period of time in proximity to neighboring residences during site preparation activities. Actual noise levels will fluctuate throughout the day but may periodically exceed 88 dBA at the property lines depending on the type and location of equipment used and whether multiple pieces of equipment are operating simultaneously in the same area.

As referenced, Section 8.040.090 (A) of the City of San Jacinto Municipal Code allows construction activities between the hours of 7:00 a.m. and 7:00 p.m. Monday through Saturday. No construction is allowed on Sunday or federal holidays. Construction occurring consistent with these provisions is exempt from noise regulations.

Table 3
Typical Maximum Construction Noise Levels at Various Distances from Project Construction

Distance from Construction	Maximum Noise Level at Receptor (dBA)
25 feet	88
50 feet	82
100 feet	76
250 feet	70
500 feet	64
1,000 feet	58

Temporary Construction-Related Vibration

Activities associated with retail, restaurant and fueling operations do not generate vibration. Thus, this discussion focuses on temporary vibration caused by construction. The residential structures to the west are located approximately 25 feet from the property line and active grading area. Based on the information presented in Table 5, vibration levels from operation of a large bulldozer would be approximately 87 VdB (0.089 inches/second) or less at 25 feet (Caltrans 2013). As discussed, a PPV of 0.2 inches/second (100 VdB) is the vibration energy required to damage fragile historic buildings. While vibration from grading may be perceived at neighboring residences west of the site, the vibration energy would be well below that required to cause structural damage.

Vibration levels may temporarily exceed the groundborne velocity threshold level of 72 VdB for residences and/or buildings where people sleep. Maximum vibration levels could be 75-77 VdB. However, as long as construction occurs within the prescribed hours referenced above, temporary vibration impacts would be considered adverse, but **less than significant.**

Table 4
Vibration Source Levels for Construction Equipment

Equipment	Approximate VdB				
	25 Feet	50 Feet	60 Feet	75 Feet	100 Feet
Large Bulldozer	87	81	79	77	75
Loaded Trucks	86	80	78	76	74
Jackhammer	79	73	71	69	67
Small Bulldozer	58	52	50	48	46

Source: Federal Railroad Administration, 1998

Long-Term Operational Noise Exposure

Long-term operation of the proposed project was evaluated for potential exterior traffic related impacts caused by increased traffic volumes associated with the project as well as interior noise levels caused by traffic.

Exterior Traffic Noise. Traffic is the primary noise source that would be generated by the proposed project. Existing measured noise levels do not exceed the exterior residential standard at the sensitive properties located adjacent and west of the site. Thus, whether a traffic-related noise impact would occur is based on whether project traffic, when added to the existing traffic, would cause the Leq to noticeably increase (+3 dBA) or exceed the 65-dBA exterior standard referenced in the San Jacinto Municipal Code.

The roadway network adjacent to the project site (Cottonwood Avenue and State Street) was modeled using the Federal Highway Administration Traffic Noise Model (TNM) version 2.5 software (see Appendix A). The model calculates traffic noise at receiver locations based on traffic volumes, travel speed, mix of vehicle types operating on the roadways (i.e., cars/trucks, medium trucks and heavy trucks) and related factors. Traffic volumes and vehicle mix on Cottonwood Avenue and State Street used to calibrate TNM were based on vehicle counts obtained during the monitoring period. The 15 minute counts were multiplied by four to obtain hourly traffic counts. The model was calibrated based on traffic counts during monitoring to calculate noise levels that are +/- 2 dBA those measured on-site and reported in Table 1.

Traffic volumes for peak hour project operation were obtained from the Traffic Impact Study prepared by Linscott, Law and Greenspan, Inc. (May 2018). State Street is a four-lane, divided roadway oriented north-south and borders the project site to the east. The posted speed limit on State Street is 45 miles per hour (mph). Cottonwood Avenue is a two-lane, divided east-west roadway that borders the project site to the south. The posted speed limit on Cottonwood Avenue is 45 mph.

Peak hour project trips were added to baseline conditions to determine whether the Leq at the following receivers would noticeably change or exceed 65-dBA as a result of project-related traffic:

1. Mobile home residence located adjacent to the southwest corner of the project site;
2. Mobile home residence located adjacent to the northwest corner of the site;

Commercial uses are located to the south and southeast, vacant land is located to the north and east across State Street. Thus, any noise impacts associated with the project would be concentrated at the above referenced receptors. A 4-foot high concrete block wall is located along western property boundary between the site and adjacent mobile homes. This does provide some noise attenuation from traffic on either State Street or Cottonwood Avenue; and thus, was incorporated into the traffic model. The receiver locations are shown in Figure 4. Existing noise levels are shown in Table 5. As shown, the daytime hourly average (Leq) exceeds the 65 dBA standard at receivers 1, 5 and 6 under baseline conditions.

Table 5
Modeled Noise Levels

Receptor	Existing Leq	Exceed Standard?	With Project Leq	dBA Change	Significant Impact
Site 1 – Mobile Home adjacent to SW corner of site	60.9	No	61.1	+0.2	No
Site 2 – Mobile Home adjacent to NW corner of site	56.4	No	56.6	+0.2	No

To calculate project-related noise effects, project peak hour traffic volumes as provided in the Traffic Impact Assessment were added to baseline traffic conditions. A project related noise impact would occur under conditions where the project causes an Leq exceeding the 65 dBA standard to noticeably increase (+3 dBA) or an Leq under the standard to exceed the standard. As shown in Table 5, traffic associated with the project would add less than one decibel to the existing Leq at the receivers modeled. The proposed project would have no perceptible impact on traffic-related sound levels at receivers in proximity to the site.

Interior Traffic Noise. California Energy Code Title 24 standards specify construction methods and materials that result in energy efficient structures and up to a 30 dBA reduction in exterior noise levels (assuming windows are closed). This includes operation of mechanical ventilation (e.g. heating and air conditioning), in combination with standard building construction that includes dual-glazed windows with a minimum Sound Transmission Class (STC) rating of 26 or higher. When windows are open, the insertion loss drops to about 10 dBA.

The mobile homes located adjacent and west of the site are unlikely to have been constructed consistent with current Title 24 standards and the interior decibel reduction may be less than the 30-dBA referenced above. However, the project will have no perceptible effect on exterior noise levels; thus, regardless of the insertion loss associated with the building structures, interior noise levels at neighboring single-family residences to the east and the mobile home park to the south would not be adversely affected by project related traffic.

Figure 4—Receiver Sites

In addition to traffic noise, on-site noise sources would include operation of a drive thru speaker(s) and roof top heating, ventilation and air conditioning (HVAC) equipment. The following discussion addresses potential noise impacts associated with those uses.

Drive Thru Window Speakers. Speaker noise is a variable noise source and subject to change based on volume settings. The drive thru menu board and speaker would be located along the east side of the building site proposed for construction in proximity to the northern site boundary. Menu board/speaker noise is assumed to project north, south and east. The building would screen noise projection to the west. The restaurant would be located approximately 175 feet east of Receiver 2. Reference noise levels range from 58 to 65-dBA at 30 feet from the source (Illingsworth & Rodkin, 2010); thus, speaker noise would attenuate to approximately 53 dBA at Receiver 2. This would be an intermittent source with levels that are less than or similar to modeled traffic noise. However, speaker noise may be audible at adjacent residences throughout the day and evening as traffic volumes fluctuate. As referenced, speaker noise would attenuate to below baseline conditions at the property line and would be less than the 65-dBA daytime and standard. However, an Leq of 53 dBA would exceed the 50 dBA nighttime (i.e., 10:00 p.m. to 7:00 a.m.) standard. To avoid adverse impacts associated with use of the drive-thru speaker, as a condition of project approval, it is recommended that drive thru speaker volume be set to a level that is inaudible beyond the immediate drive thru lane, order and pick up window.

HVAC Systems. The HVAC systems proposed for use on the site has not been specified and noise levels vary depending on the size of the system. However, multiple HVAC systems will be installed on the roof-top of each building. HVAC noise levels can be expected to range from 60 to 70 dBA at 5 feet from the roof top equipment and ventilation openings (Illingsworth & Rodkin, 2011). It is assumed that each building would have roof parapets to provide aesthetic relief and screen rooftop equipment from view. The parapets would break the line of site between the HVAC units and the receivers west of and below the buildings. This typically results in a 10 dBA or greater noise level reduction. Assuming HVAC units are installed at the center of the roof top, or approximately 60 feet from the receivers located along the eastern property line, a 70-dBA reference noise level would attenuate to approximately 53-dBA at 40 feet from the source. This would less than daytime ambient conditions and the 65-dBA standard. Nighttime noise levels could exceed the 50-dBA standard. With installation of a roof parapet or shroud around each HVAC unit, nighttime noise levels would be approximately 43-dBA which is less than the 50-dBA standard.

Auto Repair Operations. As referenced, Building A may be occupied by an auto care/repair facility. Noise associated with these types of facilities are similar to other commercial businesses including those that would be operating on the project site (i.e., engine noise and car horns). Noise sources specific to auto repair facilities would include air compressors, impact wrenches and other air-driven tools and industrial vacuums. This type of equipment can generate noise levels in excess of 95-100 dBA at the source. However, use of this type of equipment is intermittent and typically for short periods of time. Therefore, while noise may be audible outside the service bays, it is not a sustained noise source.

As proposed, Building A would be located adjacent to the mobile homes located west of the site; however, the repair bays would be located on the east/southeast side of the building and all repair work would be confined to the building. No repair work would occur outside the building. The rear and side building walls and roof structure will typically provide 25-30 dBA of attenuation for properties located to the west. The nearest receiver is approximately 50 feet from the center of the Building A pad. Assuming noise levels associated with an impact wrench are 100 dBA at 5 feet would attenuate to 80 dBA at 50 feet from the source. The building attenuation would reduce noise levels an additional 25 dBA or to 55 dBA. The noise standard for mobile home parks is 65 dBA Leq during daytime hours (7:00 am to 10:00 pm). Intermittent noise levels associated with operation of the auto repair could be 55 dBA at the nearest receivers; however, the average noise level over the course of a work day would likely be consistent with background noise levels associated with traffic operation and less than the standard for mobile home parks referenced above.

CONCLUSION

The proposed project is not expected to have an adverse operational noise impacts. Section 8.040.090 (A) of the City of San Jacinto Municipal Code allows construction activities between the hours of 7:00 a.m. and 7:00 p.m. Monday through Saturday. No construction is allowed on Sunday or federal holidays. Construction occurring consistent with these provisions is exempt from noise regulations.

The existing 65 dBA Leq standard at the two receivers modeled is not exceeded under existing conditions. The proposed project would have a 0.2 dBA increase in the Leq at modeled receivers. The project would not cause an noticeable increase in Leq at receivers where this standard is exceeded or cause the Leq to increase above 65 dBA at receivers currently at or below the standard. Assuming a 30 dBA reduction in noise levels between exterior and interior levels, the interior standard would be met at all receivers with operation of the proposed project. Thus, a less than significant noise impact would occur.

To avoid adverse impacts associated with use of the drive-thru speaker, as a condition of project approval, it is recommended that drive thru speaker volume be set to a level that is inaudible beyond the immediate drive thru lane, order and pick up window. HVAC systems could exceed the 50-dBA nighttime standard. With installation of a roof parapet or shroud around each HVAC unit, nighttime noise levels would be approximately 43-dBA which is less than the 50-dBA standard.

REFERENCES

City of San Jacinto Municipal Code, Section 8.040.090 (A) and Section 8.040.040 (A).

Federal Highway Administration. *Roadway Construction Noise Model. 2006.* Users Guide Table 1.

Federal Highway Administration, Transportation Noise Model Version 2.5, 2004.

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Appendix A

Monitoring Data Sheet and Modeling Results

FIELD NOISE MEASUREMENT DATA

Project Name: SAN JACINTO RETAIL Page 1 of
Project #: Day / Date My Name.

Sound Level Meter	Calibrator	Weather Meter
Model # PICO1124	Model #	Model # Serial #
Serial #	Serial #	
Weighting: (A) / C / Flat	Pre-Test: ____ dBA SPL	Terrain: Hard / Soft / Mixed
Response: (Slow) / Fast / Impl	Post-Test: ____ dBA SPL	Topo: (Flat) / Hilly (describe)
Windscreen: (Yes) / No		Wind: (Steady) / Gusty

ID	Time Start	Time Stop	Leq	Lmin	Lmax	L10	L50	L90	Wind Spd/ Dir (mph)	Temp (°F)	RH (%)	Bar Psr (in Hg)	Cloud Cover (%)
1	7:25	7:40	57.0						0	75			40
2	7:45	8:00	54.7										

Roadway Name	COTTONWOOD	STATE	Location(s) / GPS Reading(s):
Speed (post/obs)	40	45	
Number of Lanes	2	4	
Width (pave/row)	36	60	
1- or 2- way	2	2	
Grade	0%	0%	
Bus Stops	NO	NO	
Stoplights	YES	YES	
Street Parking	NO	NO	
Automobiles	104	319	
Medium Trucks	4	15	
Heavy Trucks	2	3	

Other Noise Sources: distant (aircraft) / (roadway traffic) / trains / landscaping / rustling leaves / children playing / dogs barking / birds vocalizing

Notes and Sketches on Reverse

Site 1 - Southwest Corner

Start Date	7/18/2018
Start Time	7:23:49 AM
End Time	7:38:48 AM
Duration	00:14:59
Meas Mode	Single
Input Range	Low
Input Type	Mic
SPL Time Weight	Slow
LN% Freq Weight	dBA
Overload	No
UnderRange	No
Sensitivity	18.44mV/Pa

LZeq	70.8
LCeq	69.6
LAeq	57.0
LZSmax	85.7
LCSmax	85.0
LASmax	71.5
LZSmin	62.7
LCSmin	60.4
LASmin	43.9
LZE	100.3
LCE	99.1
LAE	86.5
LZpeak	99.0
LCpeak	97.0
LApeak	85.2
1%	65.9
2%	64.6
5%	62.4
8%	61.2
10%	60.8
25%	57.5
50%	53.8
90%	47.0
95%	46.0
99%	44.7

Site 2 - Northwest Corner

Start Date	7/18/2018
Start Time	7:44:35 AM
End Time	7:59:34 AM
Duration	00:14:59
Meas Mode	Single
Input Range	Low
Input Type	Mic
SPL Time Weight	Slow
LN% Freq Weight	dBA
Overload	No
UnderRange	No
Sensitivity	18.44mV/Pa

LZeq	71.5
LCeq	70.5
LAeq	54.7
LZSmax	85.1
LCSmax	82.9
LASmax	73.3
LZSmin	60.5
LCSmin	58.3
LASmin	41.7
LZE	101.0
LCE	100.0
LAE	84.2
LZpeak	100.2
LCpeak	95.2
LApeak	85.3
1%	61.8
2%	60.9
5%	59.8
8%	58.2
10%	57.5
25%	54.4
50%	50.9
90%	45.9
95%	44.7
99%	42.2

<Organization?>
<Analysis By?>

18 July 2018
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: Existing Conditions
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	60.9	66	60.9	10	----	60.9	0.0	8	-8.0
Receiver2	2	1	0.0	56.4	66	56.4	10	----	56.4	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	2	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

<Organization?>
<Analysis By?>

18 July 2018
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: With Project
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	61.1	66	61.1	10	----	61.1	0.0	8	-8.0
Receiver2	2	1	0.0	56.6	66	56.6	10	----	56.6	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	2	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0