

**Visalia Center Phase I**  
**Visalia, California**

Draft Environmental Noise Assessment

28 June 2019

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Salter Project Number: 18-0566

## **INTRODUCTION**

This report summarizes our environmental noise assessment for the Visalia Center Phase I project located in the northeast corner of the intersection of North Dinuba Boulevard and Shannon Parkway in Visalia, California. The project is applying for a conditional use permit for a gas station, convenience store, car wash with vacuum stations, and fast food restaurant. The intent of this assessment is to quantify the noise environment, and noise levels from the proposed operations, and compare them with applicable City and State standards. Readers less familiar with the fundamental concepts of environmental acoustics should refer to Appendix A, attached. Following is a summary of our findings:

1. Estimated noise from car wash and vacuum station activity is consistent with the City's goals as outlined in the General Plan and Municipal Code.
2. Rooftop mechanical equipment should be selected and designed to meet the 45 dB(A) noise limit at the nearest adjacent residences.
3. Estimated project-generated traffic noise associated with the project is expected to increase environmental noise (DNL) in the community by 1 dB, which is less than significant.
4. Incorporating exterior windows and doors with sound insulation ratings of approximately STC 28 will reduce estimated traffic noise to the CALGreen criterion of  $L_{eq}(h)$  50 dB indoors. If the convenience store and deli will be leased as individual and separate spaces, then the CALGreen code will require an STC 40 separation wall.

## **SITE AND PROJECT DESCRIPTION**

The 6.09-acre site, currently an orchard, is surrounded by two residences to the north, the Riverway Sports Park to the west, commercial buildings including a Target store and Vallarta Supermarket to the south, and currently agricultural land to the east (see Figure 1, attached). We understand a future multi-family development is planned for the land to the east, beyond the Visalia Center Phase II project which will consist of one retail and three 2-story medical buildings. These residences will be approximately 500 feet and farther from the site. The nearest adjacent residences are located approximately 50 feet and farther to the north.

The gas station will be open 24-hours per day with eight fueling stations. The commercial building will be divided into a 3,300 square foot convenience store and a 2,000 square foot deli. Hours for the fast food restaurant are not yet known. The car wash will include a 100-foot tunnel with twelve 15-horsepower dryers. There will be fourteen vacuum stations powered by a 60-horsepower vacuum "producer" located in an enclosed equipment room at the end of the car wash tunnel. The site will also include surface parking and landscaped areas. Access to the project will be provided via driveways along both North Dinuba Boulevard and Shannon Parkway.

## **ACOUSTICAL CRITERIA**

### ***Visalia General Plan***

The Safety and Noise chapter of the Visalia General Plan has adopted the following guidelines for perceived changes in noise exposure:

- Except under special conditions, a change in sound level of 1 dB cannot be perceived;
- A 3 dB change is considered a just noticeable difference;
- A 5 dB change is required before any noticeable change in community response would be expected. A 5 dB increase is often considered a significant impact;
- A 10 dB increase is subjectively heard as an approximate doubling in loudness and almost always

causes an adverse community response.

Table 8-3 of the General Plan identifies the outdoor noise level goals for noise-sensitive land uses including residences. For reference, the City of Visalia does not consider commercial uses to be noise-sensitive. In summary, it identifies DNL 65 dB as the outdoor noise level goal for residences.

Table 8-4 of the General Plan provides limits for stationary noise sources as follows:

|  | Daytime (7:00 AM to 10:00 PM) | Nighttime (10:00 PM to 7:00 AM) |
|--|-------------------------------|---------------------------------|
| Hourly Equivalent Sound Level (Leq(h)) | 50 dB                         | 45 dB                           |
| Maximum Sound Level (Lmax)             | 70 dB                         | 65 dB                           |

\* As determined at the property line of the receiving noise-sensitive use

Policy N-P-4 of the General Plan states the following: *Where new development of industrial, commercial or other noise generating land uses (including roadways, railroads, and airports) may result in noise levels that exceed the noise level exposure criteria established by Tables 8-2 and 8-3, require a noise study to determine impacts, and require developers to mitigate these impacts in conformance with Tables 8-2 and 8-3 as a condition of permit approval through appropriate means. Noise mitigation may include but are not limited to:*

- *Screen and control noise source, such as parking and loading facilities, outdoor activities, and mechanical equipment;*
- *Increase setbacks for noise sources from adjacent dwellings;*
- *Retain fences, walls, and landscaping that serve as noise buffers;*
- *Use soundproofing materials and double-glazed windows;*
- *Use open space, building orientation and design, landscaping and running water to mask sounds; and*
- *Control hours of operation, including deliveries and trash pickup, to minimize noise impacts.*

### **Visalia Municipal Code**

Section 8.36.040 of the Visalia Municipal Code includes exterior noise standards which are based on the cumulative duration of noise as follows:

- A. *It is unlawful for any person at any location within the city to create any noise, or to allow the creation of any noise, on property owned, leased, occupied or otherwise controlled by such person which causes the exterior noise level, when measured at the property line of any affected noise sensitive land use, to exceed any of the categorical noise level standards as set forth in the following table:*

Noise Level Standards<sup>1</sup>

| Category | Cumulative Number of minutes in any one-hour time period | Evening and Daytime (dB)<br>6:00 AM to 7:00 PM | Nighttime (dB)<br>7:00 PM to 6:00 AM |
|----------|--|--|--------------------------------------|
| 1        | 30   | 50   | 45                                   |
| 2        | 15   | 55   | 50                                   |
| 3        | 5  | 60   | 55                                   |
| 4        | 1  | 65   | 60                                   |
| 5        | 0  | 70   | 65                                   |

- B. *In the event the measured ambient noise level without the alleged offensive source in operation exceeds an applicable noise level standard in any category above, the applicable standard or standards shall be adjusted so as to equal the ambient noise level.*
- C. *Each of the noise level standards specified above shall be reduced by five dB for pure tone noises,*

<sup>1</sup> We understand the City of Visalia does not consider the commercial use planned for the site to the south to be noise-sensitive.

*noises consisting primarily of speech or music, or for recurring impulsive noises.*

### **California Green Building Standards Code (CALGreen)**

The acoustic requirements set forth in CALGreen code Section 5.507.4 are summarized as follows:<sup>2</sup>

- 5.507.4.1 & 2 – Exterior Noise Transmission (alternative prescriptive and performance methods)
  - Applies to buildings exposed to exterior average hourly levels of Leq-1hr 65 dB or higher
  - Prescriptive Method – Exterior wall and roof-ceiling assemblies shall have a composite STC<sup>3</sup> of 45 with minimum STC 40 windows
  - Performance Method – Exterior wall and roof-ceiling assemblies shall reduce average hourly levels to Leq-1hr 50 dB in occupied areas during any hour of operation
- 5.507.4.3 – Interior Sound Transmission – Walls separating commercial tenant spaces from other tenant and common or public space must have STC ratings of 40 or higher

### **EXISTING NOISE ENVIRONMENT**

To quantify existing noise levels at the site, two monitors continuously measured noise levels for a multi-day period between 25 and 28 September 2018. In addition, one 20-minute “spot” measurement was conducted, and the data was compared with the corresponding time period of the multi-day monitors to estimate noise levels at the location. The monitors were located along North Dinuba Boulevard and Shannon Parkway, and the noise environment was dominated by roadway traffic. Table 1, below, summarizes the existing measured noise levels in terms of Day/Night Average Sound Level (DNL), and highest hourly average sound levels (Leq(h)) during daytime hours. Figure 1, attached, shows the approximate measurement locations.

Table 1: Existing Noise Environment

| Site | Location  | Date/Time                           | DNL   | Leq(h) |
|------|---|-------------------------------------|-------|--------|
| L1   | North Dinuba Boulevard Monitor<br>Approx. 80' from roadway center   | 25 to 28<br>September 2018          | 72 dB | 74 dB  |
| L2   | Shannon Parkway Monitor<br>Approx. 75' from roadway centerline      |                                     | 63 dB | 65 dB  |
| S1   | North Dinuba Boulevard Spot<br>Approx. 105' from roadway centerline | 25 September 2018<br>6:00 – 6:20 pm | 70 dB | 72 dB  |

### **ANALYSIS AND RECOMMENDATIONS**

This assessment analyses noise from vehicular traffic associated with the project, including at the fast food drive through, rooftop mechanical equipment, and noise from the planned car wash and vacuums, based on the noise standards outlined in the Visalia General Plan, Municipal Code, and CALGreen as summarized above.

#### ***Project Generated Traffic***

The Traffic Impact Analysis created for this project by A&M Consulting Engineers on 19 December 2018 contains existing and forecasted traffic volumes for roadways affected by the project. In summary, PM peak hour traffic volumes for North Dinuba Boulevard are estimated to increase by 19-percent, and PM peak hour traffic volumes for Shannon Parkway are expected to increase by 26-percent in the timeframe

<sup>2</sup> Part 11: 2016 California Green Building Standards Code, Nonresidential Mandatory Measures, Section 5.507.4.

<sup>3</sup> STC (Sound Transmission Class) – A single-number rating defined in ASTM E90 that quantifies the airborne sound insulating performance of a partition under laboratory conditions. Increasing STC ratings correspond to improved airborne sound insulation.

of the project. This corresponds with approximately a 1-decibel increase in environmental noise levels (DNL), which is defined as imperceptible and therefore is less than significant.

Gasoline delivery trucks will enter and exit the site via Shannon Parkway and fill underground tanks in the northern portion of the site. Trucks are expected to travel within approximately 50 feet of adjacent residences to the north. Measurement data from other projects suggest that truck noise may be on the order of 70 to 75 dB(A) at this distance, and maximum levels from air brake releases will be louder. Note that these will not meet the stationary noise level limits outlined in the Municipal Code and General Plan.

### ***Rooftop Mechanical Equipment***

This analysis anticipates the convenience store and deli building, and the fast food restaurant, will each include a rooftop air handling unit and exhaust fans(s). The buildings will be located approximately 40 and 225 feet from the residential property line to the north, respectively. For reference, the planned residences to the east are over 700 feet from these sources. Assuming all equipment will operate simultaneously during the day or night, the allowable noise level is 45 dB at the residential property line.

Mechanical equipment will need to be selected and located to meet the 45 dB property line noise limit. Calculations should take into account equipment height and shielding parapet walls and will need to be determined during the design phase when equipment is selected. If needed, noise reduction options may include equipment selection, location, localized barriers, and/or equipment enclosures.

### ***Car Wash and Vacuums***

As indicated above, a car wash is planned for the southern portion of the site at a distance of approximately 225 feet from the residential property line to the north (see Figure 1, attached). The vacuums will consist of fourteen vacuum stations with claw and crevis attachment tools powered by a central 60 horsepower Vacutech T4 producer. The producer will be located in an equipment closure on the western end of the car wash tunnel equipment building at over 300 feet from the nearest residences to the north. As shown in Figure 1, the vehicle stations will be 280 feet and farther from the nearest residence to the north. For reference, the car wash tunnel, vacuum stations, and vacuum producer will all be located over 500 feet from the planned residences to the east. Operational information and assumptions for noise generation, used in this analysis, are summarized as follows:

- The planned convenience store and deli building will block the line-of-sight between the car wash tunnel, vacuum producer, and vacuum stations, and residences to the north
- The car wash tunnel will include twelve Macneil Tech 15 HP drying blowers, which will dominate noise from car wash activities
- Manufacturer-provided data is as follows<sup>4</sup>:
  - The blowers will generate 85 dB(A) at a distance of 10 feet from the tunnel exit (noise levels at the entrance will be lower)
  - The vacuum producer enclosure will have CMU block walls with a shed roof and solid metal doors; this unit, with the enclosure, will generate 69 dB(A) at a distance of 10 feet
  - Noise from the claw and crevis vacuum tools will be 76 and 79 dB(A) at 10 feet, respectively
- The planned hours of operation for the car wash and vacuums will be daily from 5:00 AM to 12:00 AM (midnight)
- The car wash will serve 80 to 100 vehicle cycles per day, with 15 to 20 vehicles during peak hours

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<sup>4</sup> The manufacturer will be responsible for confirming that building and enclosure design limits noise generation to the levels provided.

(this analysis assumes no more than 9 vehicles per hour during nighttime hours)

- Car wash blowers will operate for 90 seconds per vehicle cycle; therefore, they will operate a maximum of 27 cumulative minutes per hour during peak hours
- Up to seven claw and crevis tools may be used simultaneously for a cumulative total of 30 minutes during a peak hour (this analysis assumes no more than two claw and crevis tools will operate simultaneously for a cumulative total of 10 minutes during nighttime hours)

Table 2, below, compares estimated noise levels from the car wash and vacuums with the General Plan goals and Municipal Code criteria outlined above. The receiver is understood to be a person standing at-grade at the location of nearest adjacent residential house to the north. Nighttime hours are considered to be between 7:00 PM and 6:00 AM, consistent with the Municipal Code.

Table 2: Estimated Car Wash and Vacuum Operational Noise at Nearest Residences

|  | Car Wash<br>(Day / Night) | Vacuums<br>(Day / Night) | Cumulative    |
|--|---------------------------|--------------------------|---------------|
| Instantaneous Noise Level                      |                           |                          |               |
| Estimated Level                                | 49 dB (A)                 | 49 / 44 dB(A)            | 52 / 50 dB(A) |
| Municipal Code Limit (day / night)             | 55 / 50 dB                |                          |               |
| Meets City Goal                                | Yes                       |                          |               |
| Highest Hourly Equivalent Sound Level (Leq(h)) |                           |                          |               |
| Cumulative Duration (minutes)                  | 30 / 14                   | 30 / 10                  |               |
| Estimated Level                                | 46 / 43 dB(A)             | 47 / 40 dB(A)            | 49 / 45 dB(A) |
| General Plan Goal (day / night)                | 50 / 45 dB                |                          |               |
| Meets City Goal                                | Yes                       |                          |               |

As shown in Table 2 above, estimated operational noise from the car wash and vacuums meets the City's instantaneous and hourly noise levels criteria. The corresponding estimated day/night average sound level at the nearest residence is DNL 51 dB(A), which is within the City's DNL 65 dB(A) goal and would increase environmental noise by less than 1 dB(A) which is considered imperceptible and therefore less than significant.

### ***Fast Food Restaurant***

The fast food restaurant will include an ordering speaker located approximately 265 feet from the residential property line to the north. We have not received noise data for this speaker. Data provided for other projects has been in the range of 70 to 72 dB(A) at a reference distance of 4 feet. Adjusting for the distance to the residences to the north, corresponding levels would be on the order of 34 to 36 dB(A), which are well within the City's allowable limits for both daytime and nighttime operation. Therefore, this assessment does not identify that noise reduction measures will be needed.

### ***CALGreen***

Estimated hourly average traffic noise levels at the planned fast food restaurant, and convenience store and deli, are approximately 73 to 70 dB(A), respectively. Estimates suggest that using an insulated glazing unit with a sound insulation rating of STC 28 or higher will reduce traffic noise to the CALGreen criterion of  $L_{eq}(h)$  50 dB indoors. If the convenience store and deli will be leased as individual and separate spaces, then the CALGreen code will require an STC 40 separation wall. This could be achieved with a single stud assembly with batt insulation in stud cavities, one-layer of gypsum board on one side and two-layers on the other.

## **APPENDIX A**

### ***Fundamental Concepts of Environmental Noise***

This section provides background information to aid in understanding the technical aspects of this report.

Three dimensions of environmental noise are important in determining subjective response. These are:

- The intensity or level of the sound
- The frequency spectrum of the sound
- The time-varying character of the sound

Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dB), with 0 dB corresponding roughly to the threshold of hearing.

The "frequency" of a sound refers to the number of complete pressure fluctuations per second in the sound. The unit of measurement is the cycle per second (cps) or hertz (Hz). Most of the sounds, which we hear in the environment, do not consist of a single frequency, but of a broad band of frequencies, differing in level. The name of the frequency and level content of a sound is its sound spectrum. A sound spectrum for engineering purposes is typically described in terms of octave bands, which separate the audible frequency range (for human beings, from about 20 to 20,000 Hz) into ten segments.

Many rating methods have been devised to permit comparisons of sounds having quite different spectra. Surprisingly, the simplest method correlates with human response practically as well as the more complex methods. This method consists of evaluating all of the frequencies of a sound in accordance with a weighting that progressively de-emphasizes the importance of frequency components below 1000 Hz and above 5000 Hz. This frequency weighting reflects the fact that human hearing is less sensitive at low frequencies and at extreme high frequencies relative to the mid-range.

The weighting system described above is called "A-weighting", and the level so measured is called the "A-weighted sound level" or "A-weighted noise level." The unit of A-weighted sound level is sometimes abbreviated "dBA." In practice, the sound level is conveniently measured using a sound level meter that includes an electrical filter corresponding to the A-weighting characteristic. All noise levels included in this report are A-weighted. All U.S. and international standard sound level meters include such a filter. Typical sound levels found in the environment and in industry are shown in Figure A1.

Although a single sound level value may adequately describe environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise is a conglomeration of distant noise sources, which results in a relatively steady background noise having no identifiable source. These distant sources may include traffic, wind in trees, industrial activities, etc. and are relatively constant from moment to moment. As natural forces change or as human activity follows its daily cycle, the sound level may vary slowly from hour to hour. Superimposed on this slowly varying background is a succession of identifiable noisy events of brief duration. These may include nearby activities such as single vehicle pass-bys, aircraft flyovers, etc. which cause the environmental noise level to vary from instant to instant.

To describe the time-varying character of environmental noise, statistical noise descriptors were developed. "L10" is the A-weighted sound level equaled or exceeded during 10 percent of a stated time period. The L10 is considered a good measure of the maximum sound levels caused by discrete noise events. "L50" is the A-weighted sound level that is equaled or exceeded 50 percent of a stated time

period; it represents the median sound level. The "L90" is the A-weighted sound level equaled or exceeded during 90 percent of a stated time period and is used to describe the background noise.

As it is often cumbersome to quantify the noise environment with a set of statistical descriptors, a single number called the average sound level or " $L_{eq}$ " is now widely used. The term " $L_{eq}$ " originated from the concept of a so-called equivalent sound level which contains the same acoustical energy as a varying sound level during the same time period. In simple but accurate technical language, the  $L_{eq}$  is the average A-weighted sound level in a stated time period. The  $L_{eq}$  is particularly useful in describing the subjective change in an environment where the source of noise remains the same but there is change in the level of activity. Widening roads and/or increasing traffic are examples of this kind of situation.

In determining the daily measure of environmental noise, it is important to account for the different response of people to daytime and nighttime noise. During the nighttime, exterior background noise levels are generally lower than in the daytime; however, most household noise also decreases at night, thus exterior noise intrusions again become noticeable. Further, most people trying to sleep at night are more sensitive to noise. To account for human sensitivity to nighttime noise levels, a special descriptor was developed. The descriptor is called the DNL or  $L_{dn}$  (Day-Night Average Sound Level), which represents the 24-hour average sound level with a penalty for noise occurring at night. The  $L_{dn}$  computation divides the 24-hour day into two periods: daytime (7:00 am to 10:00 pm); and nighttime (10:00 pm to 7:00 am). The nighttime sound levels are assigned a 10 dB penalty prior to averaging with daytime hourly sound levels.

For highway noise environments, the average noise level during the peak hour traffic volume is approximately equal to the DNL.

The effects of noise on people can be listed in three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as startle, hearing loss

The sound levels associated with environmental noise usually produce effects only in the first two categories. Unfortunately, there has never been a completely predictable measure for the subjective effects of noise nor of the corresponding reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise over time.

Thus, an important factor in assessing a person's subjective reaction is to compare the new noise environment to the existing noise environment. In general, the more a new noise exceeds the existing, the less acceptable the new noise will be judged.

With regard to increases in noise level, knowledge of the following relationships will be helpful in understanding the quantitative sections of this report:

Except in carefully controlled laboratory experiments, a change of only 1 dB in sound level cannot be perceived. Outside of the laboratory, a 3 dB change is considered a just-noticeable difference. A change in level of at least 5 dB is required before any noticeable change in community response would be expected. A 10 dB change is subjectively heard as approximately a doubling in loudness, and would almost certainly cause an adverse community response.



A-WEIGHTED  
SOUND PRESSURE LEVEL,  
IN DECIBELS

|   |            |   |   |
|---|------------|---|---|
|   | <b>140</b> | } | THRESHOLD OF PAIN                                     |
|   | <b>130</b> |   |   |
| CIVIL DEFENSE SIREN (100')<br>JET TAKEOFF (200')        | <b>120</b> |   |   |
| RIVETING MACHINE  | <b>110</b> |   | ROCK MUSIC BAND                                       |
| DIESEL BUS (15')  | <b>100</b> |   | PILEDRIVER (50')<br>AMBULANCE SIREN (100')            |
| BAY AREA RAPID TRANSIT<br>TRAIN PASSBY (10')            | <b>90</b>  |   | BOILER ROOM   |
| OFF HIGHWAY VEHICLE (50')<br>PNEUMATIC DRILL (50')      | <b>80</b>  |   | PRINTING PRESS PLANT<br>GARBAGE DISPOSAL IN THE HOME  |
| SF MUNI LIGHT-RAIL VEHICLE (35')<br>FREIGHT CARS (100') | <b>70</b>  |   | INSIDE SPORTS CAR, 50 MPH                             |
| VACUUM CLEANER (10')<br>SPEECH (1')                     | <b>60</b>  |   | DATA PROCESSING CENTER<br>DEPARTMENT STORE            |
| LARGE TRANSFORMER (200')<br>AVERAGE RESIDENCE           | <b>50</b>  |   | PRIVATE BUSINESS OFFICE<br>LIGHT TRAFFIC (100')       |
|   | <b>40</b>  |   | TYPICAL MINIMUM NIGHTTIME<br>LEVELS—RESIDENTIAL AREAS |
| SOFT WHISPER (5')                                       | <b>30</b>  |   |   |
| RUSTLING LEAVES   | <b>20</b>  |   | RECORDING STUDIO                                      |
| THRESHOLD OF HEARING                                    | <b>10</b>  | } | MOSQUITO (3')   |
|   | <b>0</b>   |   |   |

(100') = DISTANCE IN FEET  
BETWEEN SOURCE  
AND LISTENER

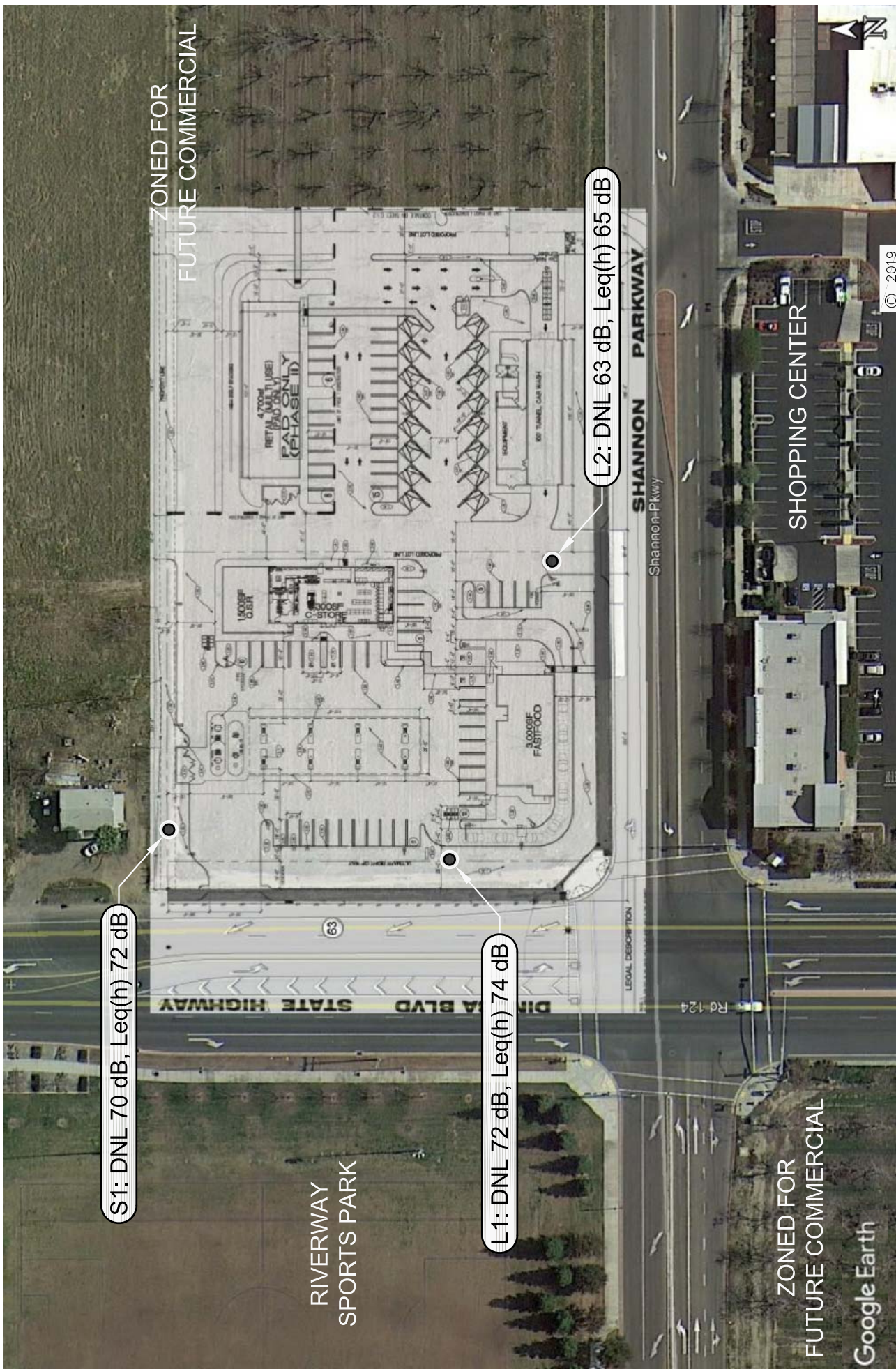
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TYPICAL SOUND LEVELS  
MEASURED IN THE  
ENVIRONMENT AND INDUSTRY

FIGURE A1

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FIGURE 1

VISALIA CENTER GAS STATION AND CAR WASH  
 SITE PLAN SHOWING MEASUREMENT LOCATIONS  
 AND MEASURED NOISE LEVELS

Salter #  
 18-0566

WRS/JMR  
 06.28.19