# ACOUSTICAL ANALYSIS

## FBT TRUCKING YARD
## 75 EAST WHITE LANE
## BAKERSFIELD, CALIFORNIA

**WJVA Project No. 23-09**

**PREPARED FOR**

**SWANSON ENGINEERING, INC.**
**2000 OAK STREET, SUITE 150**
**BAKERSFIELD, CA 93301**

**PREPARED BY**

**WJV ACOUSTICS, INC.**
**VISALIA, CALIFORNIA**

wjv acoustics

**APRIL 12, 2023**

# INTRODUCTION

The project site is a trucking facility, located at 75 E. White Lane, in Bakersfield. The proposed trucking yard will be used for the parking of tractor trailer rigs for independent contractor haulers. Many of the truckers haul their loads cross-country on multi-day trips. They leave and return at all hours of the day and night. Once they return, they park their rigs until the next job has been assigned, which may be multiple days. Many bring their personal cars to the yard, park their cars, then depart for their assignments in their rigs.

The site will have two entrance/exit gates. One is on East White Lane. The other feeds directly onto South Union Avenue. There will be no access onto Pacheco Road. A concrete block wall has been constructed along Pacheco to minimize vandalism and increase security for the site. The site will have lighting installed, along with security cameras to detect and deter illegal activity.

Two 12'x40' Commercial Coaches will be installed – one at each gated entrance. These coaches will be manned by a security guard/site manager to control traffic entering and leaving the site. The gates will be open during the day, and closed at night. The security guard will be able to open the gates for the small number of trucks entering after hours.

In association with this Site Plan Review, a Zone Change is being submitted to change the zoning from M-3 to M-2, in order to allow this trucking yard. There is currently a pavement/cement recycling facility operating on the site that is allowed in an M-3 zone district. That operation will cease once their lease is up, and the zone change to M-2 becomes effective.

There are two areas on the site listed as "Public Facilities" on the General Plan. These areas will remain unimproved until the General Plan designation is changed. The north area will have an access road cut through it, but no buildings or truck parking will be allowed in that area.

This report is based upon the project site plan prepared by Swanson Engineering, Inc. (dated 6-23-21), operations data provided by the applicant, as well as reference and on-site ambient noise measurements obtained by WJV Acoustics, Inc. (WJVA). Revisions to the site plan, operations data or other project-related information available to WJVA at the time the analysis was prepared may require a reevaluation of the findings and/or recommendations of the report. The Project Site Plan is provided as Figure 1.

Appendix A provides a description of the acoustical terminology used in this report. Unless otherwise stated, all sound levels reported are in A-weighted decibels (dB). A-weighting de-emphasizes the very low and very high frequencies of sound in a manner similar to the human ear. Most community noise standards utilize A-weighting, as it provides a high degree of correlation with human annoyance and health effects. Appendix B provides typical A-weighted sound levels for common noise sources.

## NOISE EXPOSURE CRITERIA

The applicable standards for noise levels that apply to this project are contained within Chapter VII of the Metropolitan Bakersfield General Plan adopted in 2002. No federal or state noise standards are applicable to this project.

The Metropolitan Bakersfield General Plan establishes noise level criteria in terms of the Community Noise Equivalent Level (CNEL) metric. The CNEL is the time-weighted energy average noise level for a 24-hour day, with a 4.77 dB penalty added to noise levels occurring during the evening hours (7:00 p.m.-10:00 p.m.) and a 10 dB penalty added to noise levels occurring during the nighttime hours (10:00 p.m.-7:00 a.m.). The CNEL represents cumulative exposure to noise over an extended period of time and is therefore calculated based upon *annual average* conditions.

The Noise Element establishes a land use compatibility criterion of 65 dB CNEL for exterior noise levels in outdoor activity areas of new residential developments. The intent of the exterior noise level requirement is to provide an acceptable noise environment for outdoor activities and recreation.

The Noise Element also requires that interior noise levels attributable to exterior noise sources not exceed 45 dB CNEL. The intent of the interior noise level standard is to provide an acceptable noise environment for indoor communication and sleep.

For non-transportation noise sources (e.g., commercial/industrial activities), the noise element applies hourly exterior noise level performance standards at the location of residential or other noise-sensitive land uses. The standards address the statistical distribution of noise over time, allow for progressively shorter periods of exposure to levels of increasing loudness and are 5 dB more restrictive during the nighttime hours of 10:00 p.m. to 7:00 a.m. It should be noted, vehicle movements off public roadways and on private property are considered non-transportation noise sources. It should be noted, truck and vehicle movements occurring off public roadways are considered stationary noise sources. Table I summarizes the exterior noise level standards of the noise element for non-transportation (stationary) sources.

**TABLE I**

**HOURLY NOISE LEVEL PERFORMANCE STANDARDS**
**METROPOLITAN BAKERSFIELD GENERAL PLAN**

| Category | Cumulative # Min/Hr. ($L_n$) | Daytime (7 am-10 pm) | Nighttime (10 pm-7 am) |
|---|---|---|---|
| 1 | 30 ($L_{50}$) | 55 | 50 |
| 2 | 15 ($L_{25}$) | 60 | 55 |
| 3 | 5 ($L_{8.3}$) | 65 | 60 |
| 4 | 1 ($L_{1.7}$) | 70 | 65 |
| 5 | 0 ($L_{max}$) | 75 | 70 |

Source: Metropolitan Bakersfield General Plan

## EXISTING NOISE ENVIRONMENT

The project site is located in the general southeast Bakersfield area. The project site is generally bound by E. White Lane to the north, S. Union Avenue to the west, E. Pacheco Road to the south, and the Central Branch Kern Island Canal to the east. Existing land uses in the project vicinity include industrial land uses (existing truck facility) and a fire station to the north, multi-family residential land uses to the northwest (northeast corner of S. Union Avenue and E. White Lane), industrial land uses (existing trucking facility) and residential land uses (Royal Estates Mobile Home Park) to the west along S. Union Avenue, and single-family residential land uses to the south, along E. Pacheco Road. Existing land uses to the east of the project site are generally industrial.

Existing sources of noise at noise-sensitive land uses in the vicinity of the project site are dominated by traffic noise associated with vehicles on S. Union Avenue, E. White Lane, and E. Pacheco Road. Additional sources of noise include existing industrial land uses and aircraft noise associated with Bakersfield Municipal Airport, which is located approximately 1000 feet northeast of the project site.

Long-term (24-hour) ambient noise level measurements were conducted on March 23, 2023 at three (3) locations (site LT-1, LT-2 and LT-3) in the project vicinity (and in the vicinity of the adjacent residentially-zoned land uses). Noise levels were measured for a continuous period of 24 hours. The ambient noise monitoring sites and project vicinity are provided as Figure 2.

Noise monitoring equipment consisted of Larson-Davis Laboratories Model LDL-820 sound level analyzers equipped with B&K Type 4176 1/2" microphones. The equipment complies with the specifications of the American National Standards Institute (ANSI) for Type I (Precision) sound level meters. The meters were calibrated with a B&K Type 4230 acoustic calibrator to ensure the accuracy of the measurements.

Site LT-1 was located along the project site western property line, adjacent to S. Union Avenue. There were no truck parking activities occurring in the vicinity of the noise meter during the 24-hour noise monitoring period. Noise levels measured at LT-1 were associated with existing vehicle traffic along S. Union Avenue, and are representative of existing ambient noise levels at residential land uses (Royal Estates Mobile Home Park) located west of the project site, along S. Union Avenue.

Noise level measurements were conducted in terms of the applicable City of Bakersfield statistical performance standard noise metrics (provided above as Table I). Table II provides the hourly noise level measurement data at site LT-1, for the 24-hour measurement period. Figure 3 graphically provides the measured noise levels at site LT-1 over each of the 24-hour measurement period. Figure 4 provides a photograph of noise measurement site LT-1.

**TABLE II**

**SUMMARY OF 24-HOUR NOISE LEVEL MEASUREMENTS, LT-1**
**FBT TRUCKING YARD**
**MARCH 23, 2023**

| Time | A-Weighted Decibels, dB, $L_{eq}$ (one-hour average) | | | | |
|---|---|---|---|---|---|
| | LT-1 | | | | |
| | $L_{max}$ | $L_2$ | $L_8$ | $L_{25}$ | $L_{50}$ |
| 12:00 a.m. | 76.8 | 70.1 | 66.9 | 61.4 | 53.2 |
| 1:00 a.m. | 73.8 | 69.1 | 65.9 | 58.5 | 49.7 |
| 2:00 a.m. | 76.3 | 68.9 | 65.0 | 57.7 | 49.6 |
| 3:00 a.m. | 77.7 | 71.4 | 67.2 | 60.4 | 52.2 |
| 4:00 a.m. | 76.8 | 71.9 | 68.8 | 64.1 | 57.8 |
| 5:00 a.m. | 78.3 | 73.3 | 70.5 | 66.7 | 61.3 |
| 6:00 a.m. | 85.5 | 74.1 | 72.0 | 68.6 | 64.1 |
| 7:00 a.m. | 80.5 | 77.4 | 75.0 | 72.2 | 68.8 |
| 8:00 a.m. | 79.0 | 74.8 | 73.0 | 70.5 | 67.2 |
| 9:00 a.m. | 80.3 | 74.5 | 72.7 | 70.1 | 66.9 |
| 10:00 a.m. | 90.7 | 78.4 | 74.9 | 71.6 | 68.8 |
| 11:00 a.m. | 84.4 | 74.4 | 72.5 | 69.7 | 66.7 |
| 12:00 p.m. | 87.9 | 74.9 | 73.1 | 70.8 | 67.4 |
| 1:00 p.m. | 86.4 | 75.0 | 73.4 | 71.2 | 67.8 |
| 2:00 p.m. | 80.1 | 74.9 | 73.6 | 71.6 | 68.9 |
| 3:00 p.m. | 82.3 | 75.5 | 73.7 | 71.1 | 68.1 |
| 4:00 p.m. | 97.6 | 75.4 | 73.6 | 71.3 | 68.8 |
| 5:00 p.m. | 88.4 | 75.6 | 73.9 | 71.3 | 68.6 |
| 6:00 p.m. | 79.0 | 74.2 | 72.2 | 70.0 | 66.9 |
| 7:00 p.m. | 86.1 | 73.9 | 71.9 | 69.3 | 65.9 |
| 8:00 p.m. | 87.5 | 73.8 | 71.5 | 68.4 | 64.3 |
| 9:00 p.m. | 81.3 | 72.3 | 70.4 | 67.3 | 62.7 |
| 10:00 p.m. | 79.2 | 71.6 | 69.0 | 64.9 | 59.7 |
| 11:00 p.m. | 80.1 | 71.3 | 67.9 | 63.3 | 56.2 |
| Average Daytime | 84.8 | 75.0 | 73.0 | 70.4 | 67.2 |
| Average Nighttime | 78.3 | 71.3 | 68.1 | 62.8 | 56.0 |

Source: WJV Acoustics, Inc.

Reference to Table II indicate that existing noise levels in the vicinity of the residentially zoned property (Royal Estates Mobile Home Park) adjacent to the project site already exceed applicable City of Bakersfield noise level standards (for stationary noise sources) in every statistical category, during both daytime and nighttime hours. This is due to high traffic volumes along S. Union Avenue.

Site LT-2 was located along the project site southern property line, adjacent to E. Pacheco Road. There were no truck parking activities occurring in the vicinity of the noise meter during the 24-hour noise monitoring period. Noise levels measured at LT-2 were associated with existing vehicle traffic along E. Pacheco Road, and are representative of existing ambient noise levels at residential land uses (single-family residential) located southern portion of the project site, along E. Pacheco Road.

Table III provides the hourly noise level measurement data at site LT-2, for the 24-hour measurement period. Figure 5 graphically provides the measured noise levels at site LT-2 over each of the 24-hour measurement period. Figure 6 provides a photograph of noise measurement site LT-2.

**TABLE III**

**SUMMARY OF 24-HOUR NOISE LEVEL MEASUREMENTS, LT-2**
**FBT TRUCKING YARD**
**MARCH 23, 2023**

| Time | A-Weighted Decibels, dB, $L_{eq}$ (one-hour average) | | | | |
|---|---|---|---|---|---|
| | LT-1 | | | | |
| | $L_{max}$ | $L_2$ | $L_8$ | $L_{25}$ | $L_{50}$ |
| 12:00 a.m. | 79.2 | 69.5 | 60.0 | 51.2 | 49.2 |
| 1:00 a.m. | 73.8 | 66.8 | 57.0 | 49.5 | 46.8 |
| 2:00 a.m. | 77.3 | 65.8 | 53.6 | 47.5 | 45.7 |
| 3:00 a.m. | 79.0 | 70.2 | 59.7 | 51.9 | 48.6 |
| 4:00 a.m. | 79.3 | 71.4 | 64.1 | 52.8 | 49.7 |
| 5:00 a.m. | 81.8 | 72.9 | 68.9 | 59.1 | 52.2 |
| 6:00 a.m. | 90.5 | 73.9 | 70.5 | 63.8 | 55.6 |
| 7:00 a.m. | 88.1 | 74.2 | 71.4 | 66.1 | 58.7 |
| 8:00 a.m. | 87.3 | 73.7 | 70.6 | 65.8 | 57.8 |
| 9:00 a.m. | 88.7 | 72.0 | 68.9 | 63.8 | 56.3 |
| 10:00 a.m. | 86.5 | 72.8 | 69.0 | 63.7 | 56.5 |
| 11:00 a.m. | 81.0 | 72.7 | 68.9 | 62.4 | 53.7 |
| 12:00 p.m. | 73.2 | 71.5 | 69.3 | 64.4 | 56.9 |
| 1:00 p.m. | 77.4 | 73.1 | 70.8 | 66.1 | 58.2 |
| 2:00 p.m. | 85.2 | 74.3 | 71.6 | 67.4 | 60.0 |
| 3:00 p.m. | 80.8 | 73.8 | 70.4 | 66.2 | 59.9 |
| 4:00 p.m. | 82.3 | 73.3 | 70.8 | 67.3 | 61.7 |
| 5:00 p.m. | 83.5 | 72.9 | 70.2 | 66.3 | 60.1 |
| 6:00 p.m. | 83.0 | 72.9 | 69.7 | 64.7 | 57.9 |
| 7:00 p.m. | 80.9 | 72.3 | 68.8 | 62.9 | 55.2 |
| 8:00 p.m. | 81.7 | 72.1 | 68.6 | 63.1 | 56.0 |
| 9:00 p.m. | 81.2 | 72.1 | 67.8 | 59.0 | 53.8 |
| 10:00 p.m. | 77.6 | 70.5 | 64.8 | 55.6 | 51.9 |
| 11:00 p.m. | 78.8 | 70.3 | 63.9 | 52.6 | 50.1 |
| Average Daytime | 82.7 | 72.9 | 69.8 | 64.6 | 57.5 |
| Average Nighttime | 79.7 | 70.1 | 62.5 | 53.8 | 50.0 |

Source: WJV Acoustics, Inc.

Reference to Table III indicate that existing noise levels in the vicinity of the residentially zoned property (Royal Estates Mobile Home Park) adjacent to the project site already exceed applicable City of Bakersfield noise level standards (for stationary noise sources) in every statistical category (with the exception of the $L_{25}$ nighttime standard), during both daytime and nighttime hours. This is due to high traffic volumes along E. Pacheco Road.

Site LT-3 was located along the project site northern property line, adjacent to E. White Lane. There were no truck parking activities occurring in the vicinity of the noise meter during the 24-hour noise monitoring period. Noise levels measured at LT-3 were associated with existing vehicle traffic along E. White Lane, and are representative of existing ambient noise levels at residential land uses (multi-family residential) located northern portion of the project site, along E. White Lane.

Table IV provides the hourly noise level measurement data at site LT-3, for the 24-hour measurement period. Figure 7 graphically provides the measured noise levels at site LT-3 over each of the 24-hour measurement period. Figure 8 provides a photograph of noise measurement site LT-3.

**TABLE IV**

**SUMMARY OF 24-HOUR NOISE LEVEL MEASUREMENTS, LT-3**
**FBT TRUCKING YARD**
**MARCH 23, 2023**

| Time | A-Weighted Decibels, dB, $L_{eq}$ (one-hour average) | | | | |
|---|---|---|---|---|---|
| | LT-1 | | | | |
| | $L_{max}$ | $L_2$ | $L_8$ | $L_{25}$ | $L_{50}$ |
| 12:00 a.m. | 76.5 | 70.3 | 63.3 | 53.2 | 50.9 |
| 1:00 a.m. | 82.8 | 69.6 | 62.6 | 52.8 | 50.7 |
| 2:00 a.m. | 79.7 | 69.3 | 57.6 | 51.3 | 49.8 |
| 3:00 a.m. | 90.2 | 74.1 | 65.6 | 54.6 | 51.2 |
| 4:00 a.m. | 80.7 | 73.6 | 68.6 | 57.4 | 53.2 |
| 5:00 a.m. | 81.8 | 74.4 | 70.6 | 62.2 | 54.6 |
| 6:00 a.m. | 81.8 | 76.1 | 73.3 | 68.0 | 60.2 |
| 7:00 a.m. | 84.0 | 77.1 | 74.9 | 71.7 | 67.4 |
| 8:00 a.m. | 92.3 | 77.8 | 74.7 | 71.0 | 66.7 |
| 9:00 a.m. | 83.4 | 77.2 | 74.3 | 70.5 | 66.2 |
| 10:00 a.m. | 88.8 | 77.0 | 74.3 | 70.7 | 66.9 |
| 11:00 a.m. | 82.4 | 76.2 | 73.7 | 70.0 | 65.7 |
| 12:00 p.m. | 84.2 | 77.4 | 74.0 | 70.6 | 66.5 |
| 1:00 p.m. | 84.0 | 77.6 | 75.2 | 71.8 | 67.4 |
| 2:00 p.m. | 83.9 | 77.7 | 75.6 | 72.6 | 68.6 |
| 3:00 p.m. | 92.8 | 76.9 | 74.8 | 72.0 | 68.7 |
| 4:00 p.m. | 99.4 | 76.9 | 74.7 | 71.8 | 68.4 |
| 5:00 p.m. | 84.1 | 76.4 | 74.7 | 71.9 | 68.5 |
| 6:00 p.m. | 84.1 | 76.2 | 73.8 | 70.3 | 65.9 |
| 7:00 p.m. | 79.9 | 75.4 | 72.9 | 68.9 | 63.7 |
| 8:00 p.m. | 85.0 | 75.2 | 72.7 | 68.4 | 62.6 |
| 9:00 p.m. | 85.3 | 74.8 | 71.7 | 66.1 | 58.9 |
| 10:00 p.m. | 85.5 | 74.3 | 69.9 | 63.2 | 55.9 |
| 11:00 p.m. | 80.0 | 73.6 | 68.5 | 58.3 | 52.7 |
| Average Daytime | 86.2 | 76.7 | 74.1 | 70.6 | 66.1 |
| Average Nighttime | 82.1 | 72.8 | 66.7 | 57.9 | 53.2 |

Source: WJV Acoustics, Inc.

Reference to Table IV indicate that existing noise levels in the vicinity of the residentially zoned property (E. White Lane) north of the project site already exceed applicable City of Bakersfield noise level standards (for stationary noise sources) in every statistical category, during both daytime and nighttime hours. This is due to high traffic volumes along E. White Lane.

# PROJECT-RELATED NOISE LEVELS

The proposed project would entail a truck parking facility for tractor trailers storage when independent drivers are not on the road. The site will have two entrance/exit gates. One entrance/exit via E. White Lane and a second via S. Union Avenue. Patrons could access the site to collect or drop off their trucks at any hours of the day or night. There will be no repair facility or truck driving school associated with the project, and the site would be utilized for truck parking and storage purposes only. As such, noise sources associated with the project would be limited to truck and vehicle movements within the project site.

**TRUCK PARKING OPERATIONS-**

The project would expand existing truck parking and storage operations, to the undeveloped northern portion of the overall project site. Trucks would enter and exit the project site, as needed. The truck parking facility is accessible 24 hours per day, 7 days per week.

Noise associated with truck parking and storage operations are generally limited to noise associated with on-site vehicle movements as well as the release of air brakes. WJVA has conducted measurements of the noise levels produced by slowly moving trucks for a number of studies. Such truck movements would be expected to produce noise levels in the range of 61-77 dBA at a distance of 50 feet. The range in measured truck noise levels is due to differences in the size of trucks, their speed of movement and whether they have refrigeration units in operation during the pass-by. Maximum noise levels produced by the truck as it released the air brakes were measured to be in the range of 78-80 dB at the reference distance of 50 feet from the truck. This is a brief noise which lasts approximately three to four seconds after the truck comes to a complete stop.

The closest sensitive receptor (residential land use) to the proposed truck storage and parking operations are located at a setback distance of approximately 150 feet to the south (E. Pacheco Road), approximately 300 feet to the west (S. Union Avenue) and approximately 600 feet to the north (E. White Lane). At the setback distance of 150 feet, noise levels associated with truck movements would be in the range of approximately 52-68 dB and noise levels associated with the release of air brakes would be in the range of approximately 68-71 dB.

The applicable nighttime (10 pm to 7 am) maximum noise level standard is 70 dB. Noise levels associated with airbrake release could be up to 71 dB at a distance of 150 feet (approximate distance of the southernmost project site area to residential land uses located along the south side of E. Pacheco Road). There is an existing 6–7-foot CMU block wall constructed along the project site southern property line. This concrete wall would be expected to provide a minimum of 5 dB of noise attenuation, resulting in overall maximum project-related noise levels in the range of approximately 47-66 dB $L_{max}$. Such levels do not exceed any applicable daytime or nighttime noise level standards. Additionally, such levels are below existing (without project) ambient noise levels in the vicinity of all nearby sensitive receptor locations. Mitigation measures are therefore not required for project compliance with applicable City of Bakersfield noise level standards.

## CONCLUSIONS AND RECOMMENDATIONS

WJVA conducted ambient noise level measurements in the project vicinity, for a continuous period of 24 hours. Additionally, WJVA has conducted reference noise level measurements of numerous truck movements, truck passbys, truck air brake releases, and all noise associated with trucking-related projects. The noise level measurement data (described in detail above) demonstrate that the project would not be expected to exceed any applicable daytime or nighttime City of Bakersfield noise level standards at any nearby sensitive receptor locations (residentially zoned properties).

Existing ambient noise levels (as measured at ambient sites LT-1, LT-2, and LT-3) demonstrate that existing ambient noise levels in the project vicinity (and in the vicinity of existing sensitive receptors in the vicinity) are already elevated as a result of high volumes of vehicle traffic along E. White Lane, S. Union Avenue and E. Pacheco Road. Noise levels associated with the project (truck parking and storage operations) would not be expected to exceed existing ambient noise levels in the vicinity of nearby sensitive receptors.

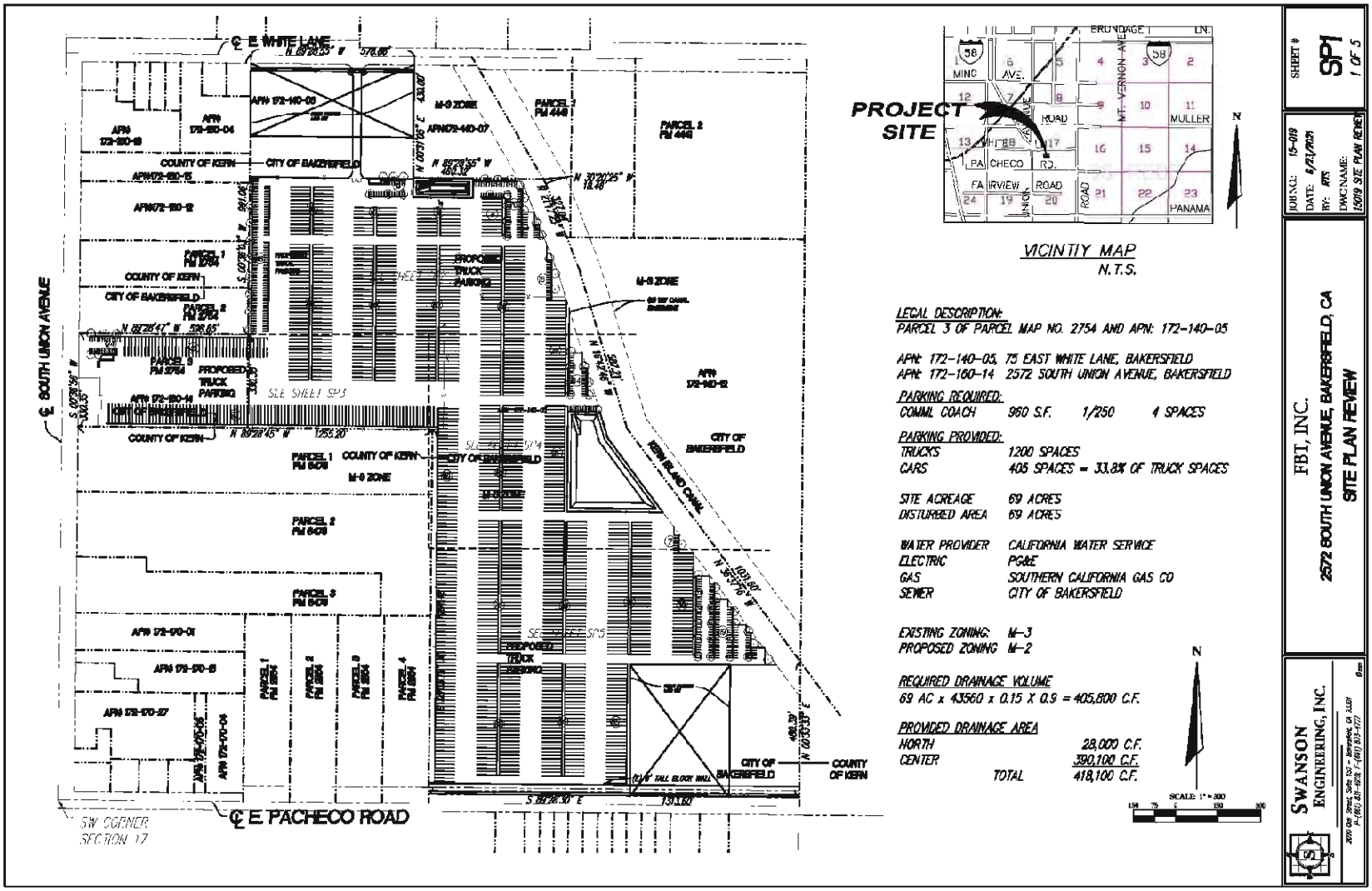
The foregoing conclusions and recommendations are based upon the best information known to WJV Acoustics, Inc. (WJVA) at the time the study was prepared concerning the proposed site plan and proposed operational activities. Any significant changes to the information used for this analysis will require a reevaluation of the findings of this report. Additionally, any significant future changes in noise regulations or other factors beyond WJVA's control may result in long-term noise results different from those described by this analysis.

Respectfully submitted,

Walter J. Van Groningen
President

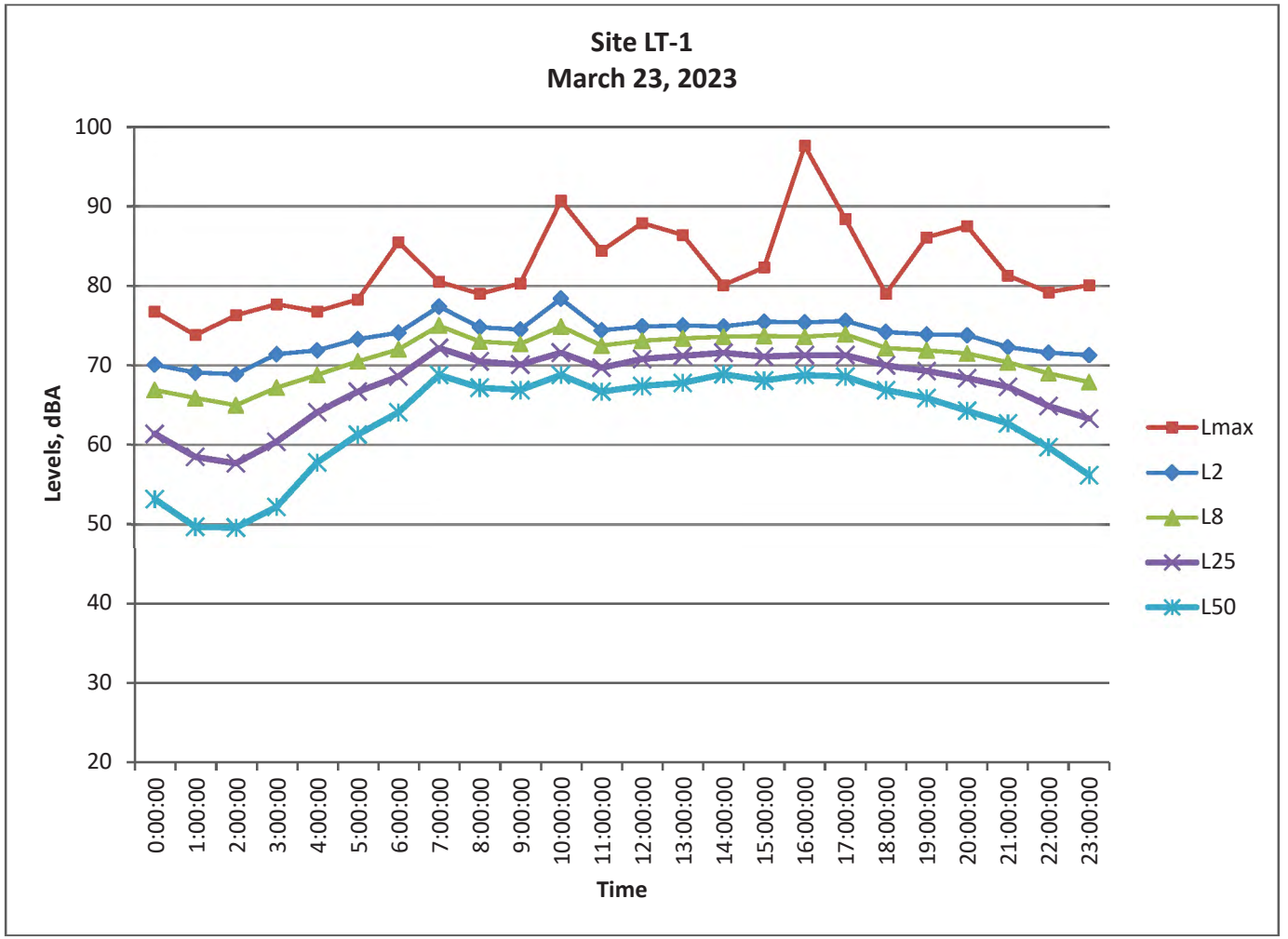
WJV:wjv

## FIGURE 1: SITE PLAN



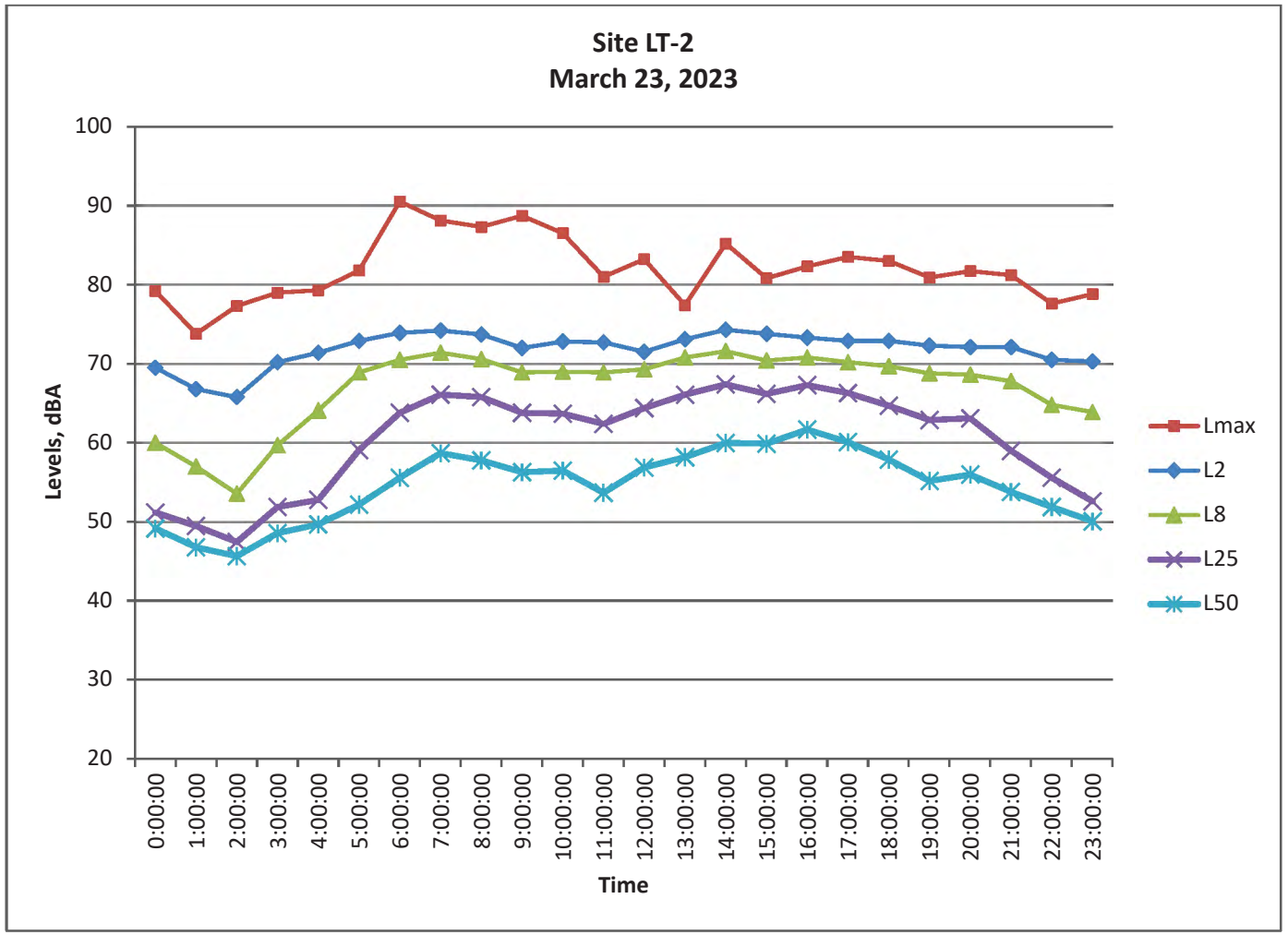
## FIGURE 2: PROJECT SITE VICINITY AND NOISE MEASUREMENT LOCATION

## FIGURE 3: NOISE LEVELS AT SITE LT-1



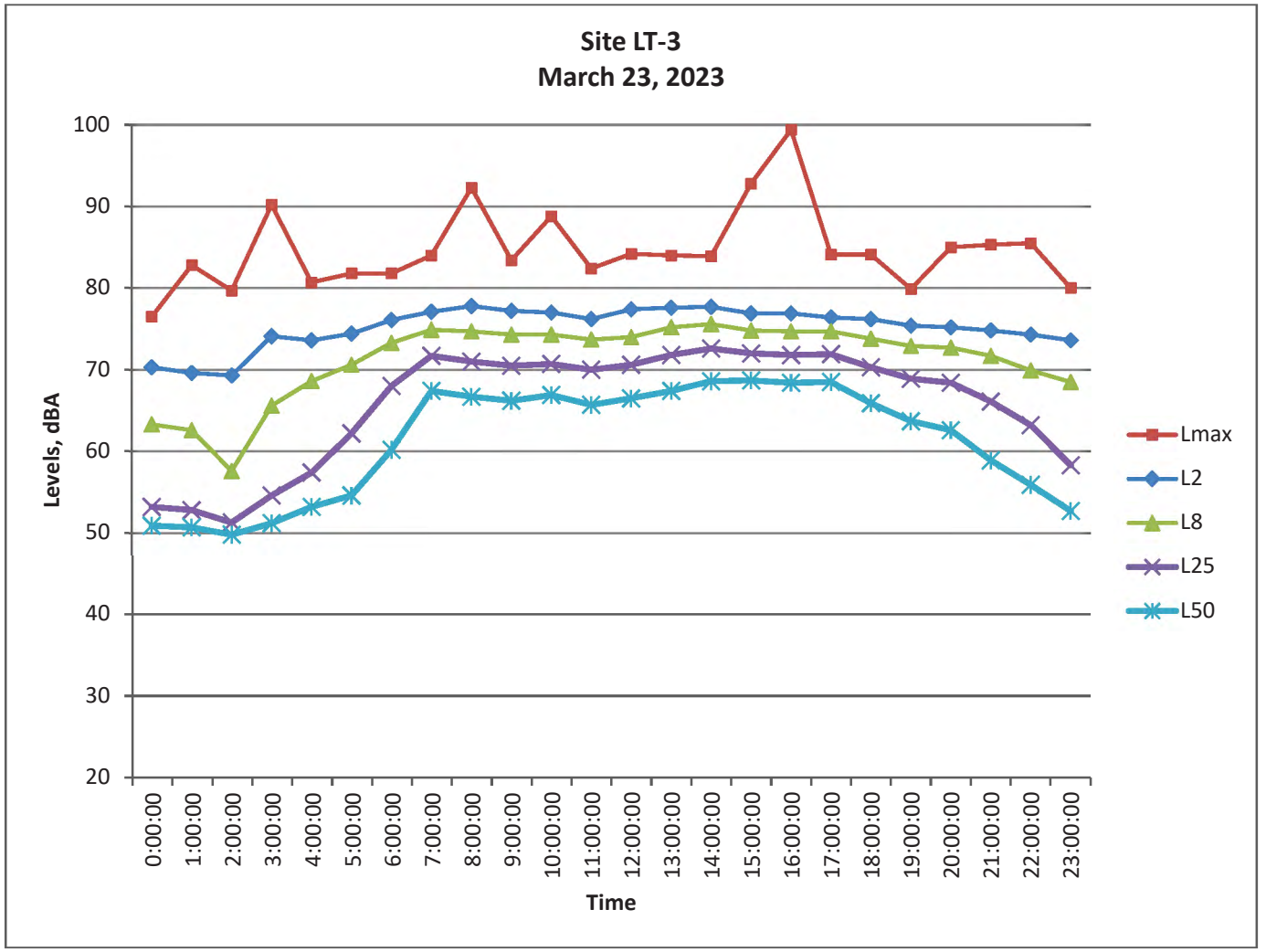
## FIGURE 4: NOISE MEASUREMENT SITE LT-1

## FIGURE 5: NOISE LEVELS AT SITE LT-2



## FIGURE 6: NOISE MEASUREMENT SITE LT-2

## FIGURE 7: NOISE LEVELS AT SITE LT-3



## FIGURE 8: NOISE MEASUREMENT SITE LT-3

# APPENDIX A

## ACOUSTICAL TERMINOLOGY

**AMBIENT NOISE LEVEL:** The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

**CNEL:** Community Noise Equivalent Level. The average equivalent sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night before 7:00 a.m. and after 10:00 p.m.

**DECIBEL, dB:** A unit for 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, which is 20 micropascals (20 micronewtons per square meter).

**DNL/$L_{dn}$:** Day/Night Average Sound Level. The average equivalent sound level during a 24-hour day, obtained after addition of ten decibels to sound levels in the night after 10:00 p.m. and before 7:00 a.m.

**$L_{eq}$:** Equivalent Sound Level. The sound level containing the same total energy as a time varying signal over a given sample period. $L_{eq}$ is typically computed over 1, 8 and 24-hour sample periods.

**NOTE:** The CNEL and DNL represent daily levels of noise exposure averaged on an annual basis, while $L_{eq}$ represents the average noise exposure for a shorter time period, typically one hour.

**$L_{max}$:** The maximum noise level recorded during a noise event.

**$L_n$:** The sound level exceeded "n" percent of the time during a sample interval ($L_{90}$, $L_{50}$, $L_{10}$, etc.). For example, $L_{10}$ equals the level exceeded 10 percent of the time.

## A-2

## ACOUSTICAL TERMINOLOGY

**NOISE EXPOSURE CONTOURS:** Lines drawn about a noise source indicating constant levels of noise exposure. CNEL and DNL contours are frequently utilized to describe community exposure to noise.

**NOISE LEVEL REDUCTION (NLR)**: The noise reduction between indoor and outdoor environments or between two rooms that is the numerical difference, in decibels, of the average sound pressure levels in those areas or rooms. A measurement of "noise level reduction" combines the effect of the transmission loss performance of the structure plus the effect of acoustic absorption present in the receiving room.

**SEL or SENEL:** Sound Exposure Level or Single Event Noise Exposure Level. The level of noise accumulated during a single noise event, such as an aircraft overflight, with reference to a duration of one second. More specifically, it is the time-integrated A-weighted squared sound pressure for a stated time interval or event, based on a reference pressure of 20 micropascals and a reference duration of one second.

**SOUND LEVEL:** 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 response of the human ear and gives good correlation with subjective reactions to noise.

**SOUND TRANSMISSION CLASS (STC):** The single-number rating of sound transmission loss for a construction element (window, door, etc.) over a frequency range where speech intelligibility largely occurs.

# APPENDIX B
## EXAMPLES OF SOUND LEVELS