APPENDIX J
ENVIRONMENTAL NOISE AND VIBRATION ASSESSMENT

Environmental Noise & Vibration Assessment

7-Eleven Elder Creek Road & Power Inn Road

Sacramento, California

BAC Job #2025-032

Prepared For:

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April 15, 2026

BOLLARD
Acoustical Consultants

Legend

Project Site Boundary (Approximate Location)

Short-Term Ambient Noise & Vibration Survey Site

N

Scale (Feet)

0 100 200

7-Eleven Elder Creek Rd & Power Inn Rd
Sacramento, California

Project Area

Figure 1

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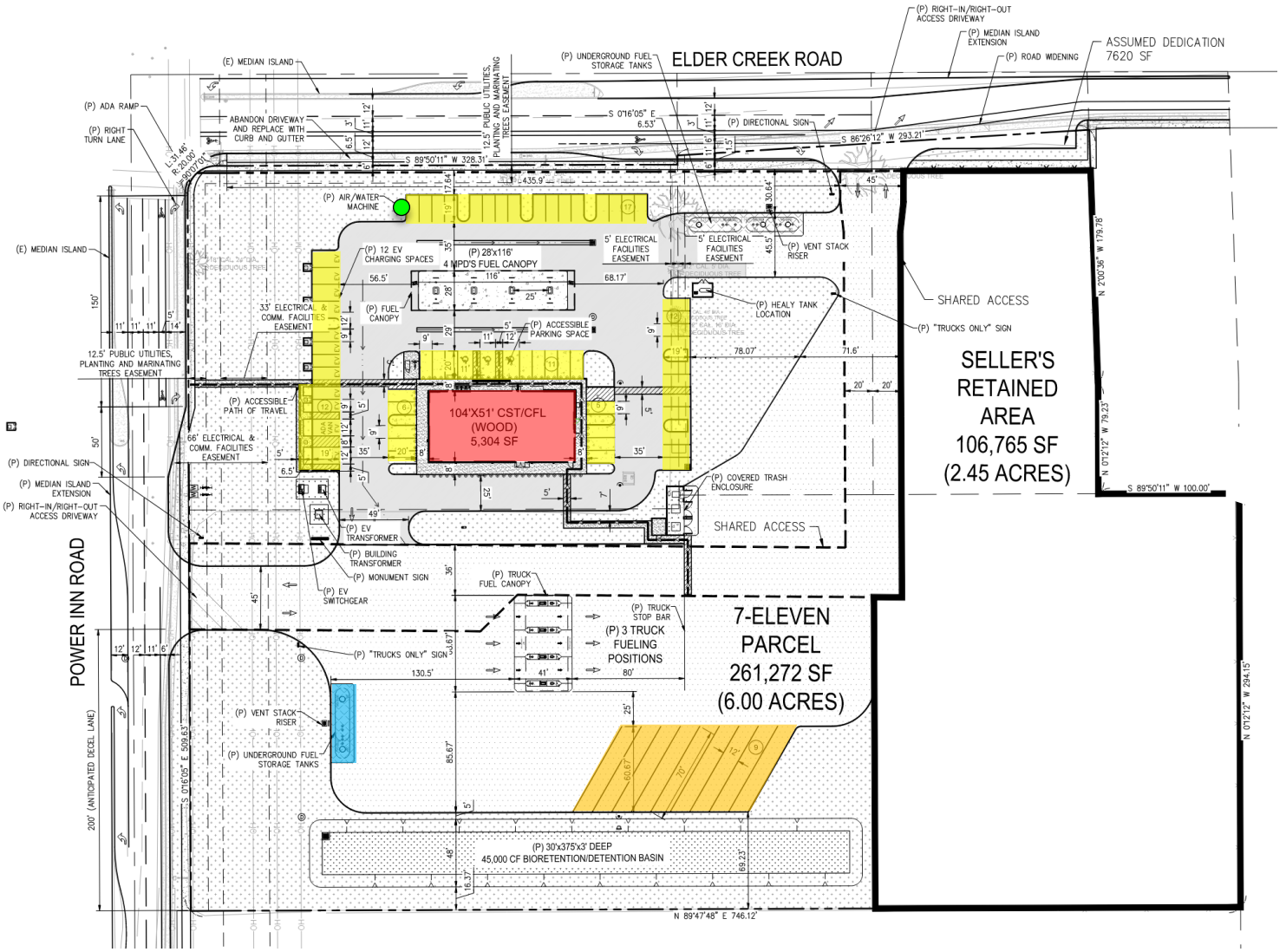

Dated: 7/2/2025

Legend

- Passenger Vehicle Parking Stalls
- Truck Parking Stalls
- C-Store Store Building
- Underground Fuel Storage Tanks
- Air/Water Unit

N

Scale (Feet)

0 100 200

7-Eleven Elder Creek Rd & Power Inn Rd

Sacramento, California

Conceptual Site Plan

Figure 2

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Introduction

The proposed 7-Eleven (project) is located on the southeast corner of Elder Creek Road and Power Inn Road in the City of Sacramento, California (APNs: 040-0101-003, -012, -013, and -020). The proposed project includes a lot line adjustment to create an approximately 6-acre parcel which would be developed with a convenience store and fuel station with direct access to Power Inn Road and Elder Creek Road (Development Area). Approximately 2.45 acres would be retained by the property owner (Seller's Retained Area) for future development under separate entitlement which is not part of the currently proposed project; however, as required by the City, potential minimal stormwater and erosion control improvements and/or water and sewer connections on the Seller's Retained Area may be implemented under the proposed project. A cross-access easement agreement would be recorded between the applicant and the seller on the Development Area parcel to memorialize traffic circulation and ingress/egress rights. Approximately 7,620 square feet along Elder Creek Road would be dedicated to the City (dedication area). Off-site roadway improvements along Power Inn Road and Elder Creek Road would improve circulation with the project incorporated. The south side of Elder Creek Road would be expanded to the eastern project site boundary to accommodate the project driveway and to add an acceleration space for vehicles and trucks leaving the project site. The existing sidewalks would be reconstructed to incorporate the roadway improvements. Adjacent zoning in the immediate project vicinity consists of a combination of industrial, commercial and single-family residential. The project area with aerial imagery is shown in Figure 1. The proposed project conceptual site plan is presented in Figure 2.

The purposes of this assessment are to quantify the existing noise and vibration environments, identify potential noise and vibration impacts resulting from the project, identify appropriate mitigation measures, and provide a quantitative and qualitative analysis of impacts associated with the project. Specifically, impacts are identified if project-related activities would cause a substantial increase in ambient noise levels at existing sensitive uses in the project vicinity, or if traffic or project-generated noise or vibration levels would exceed applicable federal, state, or City of Sacramento standards at nearby sensitive uses.

Noise and Vibration Fundamentals

Noise

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are designated as sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, or Hertz (Hz). Definitions of acoustical terminology are provided in Appendix A.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals of pressure) as a point of reference, defined as 0 dB. Other sound pressures are then compared to the reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be

expressed as 120 dB. Another useful aspect of the decibel scale is that changes in decibel levels correspond closely to human perception of relative loudness. Noise levels associated with common noise sources are provided in Figure 3.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by filtering the frequency response of a sound level meter by means of the standardized A-weighting network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}). The L_{eq} is the foundation of the day-night average noise descriptor, DNL (or L_{dn}), and shows very good correlation with community response to noise. The Day-Night Average sound level (DNL) is based upon the average noise level over a 24-hour day, with a +10-decibel weighting applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because DNL represents a 24-hour average, it tends to disguise short-term variations in the noise environment. DNL-based noise standards are commonly used to assess noise impacts associated with traffic, railroad, and aircraft noise sources.

Vibration

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that noise is generally considered to be pressure waves transmitted through air, while vibration is usually associated with transmission through the ground or structures. As with noise, vibration consists of amplitude and frequency. A person's response to vibration will depend on their individual sensitivity as well as the amplitude and frequency of the source.

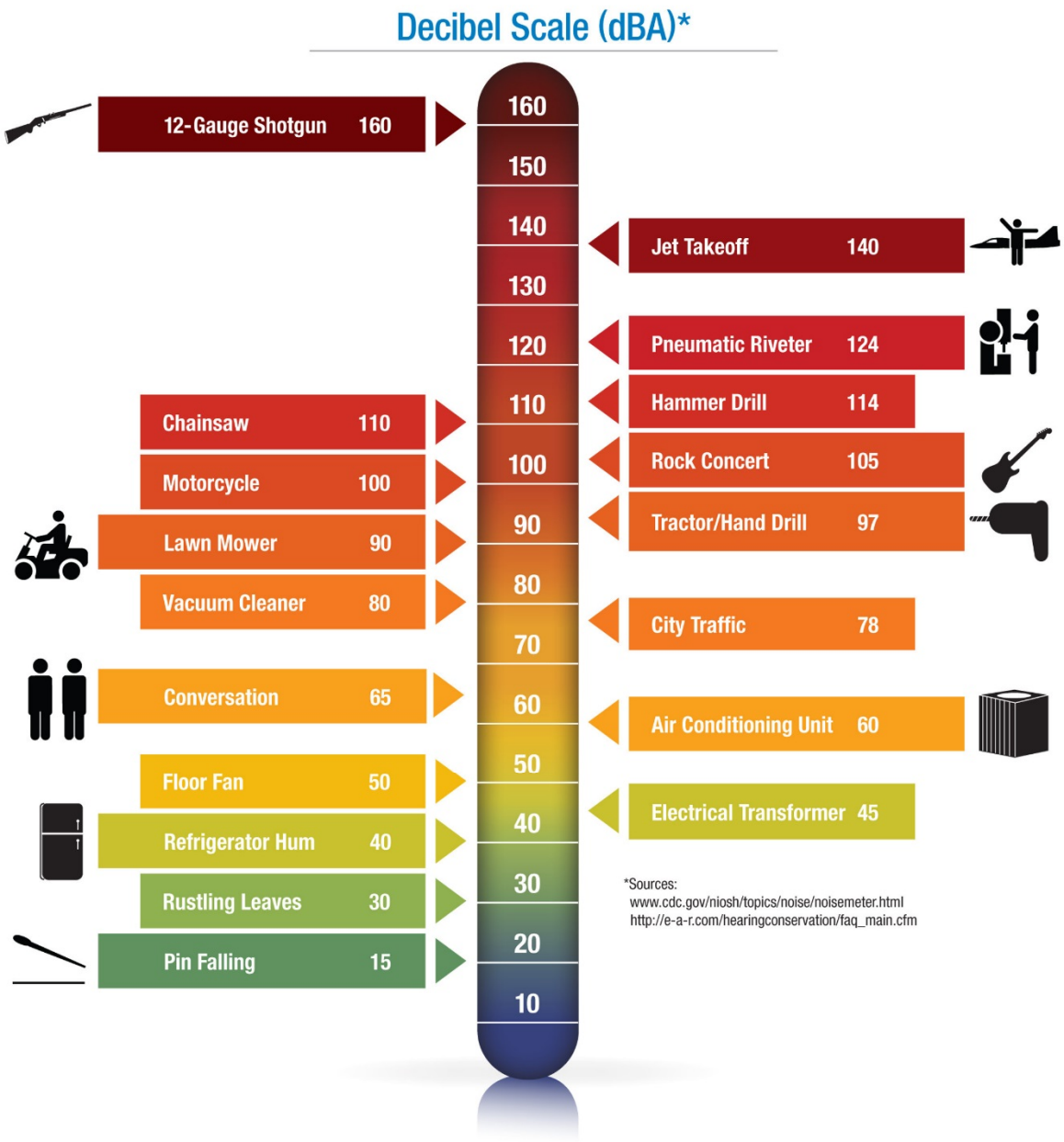
Vibration can be described in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration in terms of velocity in inches per second peak particle velocity (IPS, PPV) or root-mean-square (VdB, RMS). Standards pertaining to perception as well as damage to structures have been developed for vibration in terms of peak particle velocity as well as RMS velocities. As vibrations travel outward from the source, they excite the particles of rock and soil through which they pass and cause them to oscillate. Differences in subsurface geologic conditions and distance from the source of vibration will result in different vibration levels characterized by different frequencies and intensities. In all cases, vibration amplitudes will decrease with increasing distance. The maximum rate, or velocity of particle movement, is the commonly accepted descriptor of the vibration "strength".

Human response to vibration is difficult to quantify. Vibration can be felt or heard well below the levels that produce any damage to structures. The duration of the event influences human

response, as does frequency. Generally, as duration and vibration frequency increase, the potential for adverse human response increases.

According to the Transportation and Construction-Induced Vibration Guidance Manual (Caltrans, June 2004), operation of construction equipment and construction techniques generate ground vibration. Traffic traveling on roadways can also be a source of such vibration. At high enough amplitudes, ground vibration has the potential to damage structures and/or cause cosmetic damage. Ground vibration can also be a source of annoyance to individuals who live or work close to vibration-generating activities. However, traffic rarely generates vibration amplitudes high enough to cause structural or cosmetic damage.

Figure 3
Noise Levels Associated with Common Noise Sources



Environmental Setting – Existing Ambient Noise and Vibration Environment

Existing Noise-Sensitive Land Uses in the Project Vicinity

Noise-sensitive land uses are generally defined as locations where people reside or where the presence of unwanted sound could adversely affect the primary intended use of the land. Places where people live, sleep, recreate, worship, and study are generally considered to be sensitive to noise because intrusive noise can be disruptive to these activities.

The closest existing noise-sensitive uses to the project area have been identified as single-family residences located to the east, west and southwest. Industrial and commercial zoned parcels are located within the project vicinity, but such uses are typically not considered to be noise-sensitive (rather noise-generating). The project area and nearby land uses are shown in Figure 1.

Existing Overall Ambient Noise Environment within the Project Vicinity

The existing ambient noise environment within the project vicinity is defined primarily by noise from traffic on Elder Creek Road and Power Inn Road, and by nearby commercial operations. To generally quantify existing ambient noise environment within the project vicinity, BAC conducted short-term (2-hour) ambient noise level surveys on July 14th and 15th, 2025, at the two locations shown in Figure 1. Photographs of the noise survey locations are provided in Appendix B. Ambient noise measurement locations were specifically selected to be representative of the existing ambient noise level environments at the closest noise-sensitive (residential) receptors to the west and southwest (site 1), and east (site 2).

Larson Davis Laboratories (LDL) precision (Type 1) integrating sound level meters was used to complete the noise level measurements. The meters were calibrated immediately before use with an LDL Model CA200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all specifications of the American National Standards Institute requirements for Type 1 sound level meters (ANSI S1.4). The results of the short-term ambient noise surveys are shown in Table 1.

Table 1
Summary of Short-Term Ambient Noise Survey Results

Survey Location[1]	Date and Time Period[2]	Average Measured Hourly Noise Levels (dB)	
		L_{50}	L_{max}
Site 1: Southwest project area adjacent to APN: 040-0064-024	7/14/25: 7 am to 8 am (Daytime)	65	85
	7/14/25: 8 am to 9 am (Daytime)	65	96
	7/14/25: 2 pm to 3 pm (Daytime)	65	83
	7/14/25: 3 pm to 4 pm (Daytime)	66	86
	7/14/25: 8 pm to 9 pm (Daytime)	63	88
	7/14/25: 9 pm to 10 pm (Daytime)	63	80
	7/15/25: 2 am to 3 am (Nighttime)	55	78
	7/15/25: 3 am to 4 am (Nighttime)	57	82
Site 2: Northeast of project area adjacent to APN: 040-0101-019	7/14/25: 7 am to 8 am (Daytime)	67	81
	7/14/25: 8 am to 9 am (Daytime)	66	83
	7/14/25: 2 pm to 3 pm (Daytime)	65	93
	7/14/25: 3 pm to 4 pm (Daytime)	64	91
	7/14/25: 8 pm to 9 pm (Daytime)	59	79
	7/14/25: 9 pm to 10 pm (Daytime)	59	87
	7/15/25: 2 am to 3 am (Nighttime)	51	80
	7/15/25: 3 am to 4 am (Nighttime)	55	82

[1] Locations of ambient noise survey sites are shown in Figure 1.
[2] Daytime Hours: 7 am to 10 pm; Nighttime Hours: 10 pm to 7 am

Source: BAC 2025

Existing Ambient Vibration Environment within the Project Vicinity

During site visits on July 14th and 15th, 2025, BAC staff noted that vibration levels were below the threshold of perception within the project area and immediate project vicinity. Therefore, the existing vibration environment in the project area and immediate project vicinity is considered to be negligible.

Existing Traffic Noise Levels along Project Area Roadway Network

To predict traffic noise levels along existing roadway networks with multiple segments, modelling is commonly used rather than monitoring. The FHWA Traffic Noise Model (FHWA-RD-77-108) was used to quantify existing traffic noise levels at the existing sensitive land uses nearest to the project area roadway network. The FHWA Model was also used to quantify the distances to the 60, 65 and 70 dB DNL traffic noise contours for these roadways. The FHWA Model predicts hourly average (L_{eq}) values for free-flowing traffic conditions. Estimates of the hourly distribution of traffic for a typical 24-hour period were used to develop DNL values from L_{eq} values.

Existing traffic data in the form of AM and PM peak hour intersection turning movements were obtained from the traffic impact analysis prepared by the project transportation consultant, Fehr & Peers (*Transportation Operations Review of 7-Eleven Store and Gas Station at Power Inn Road and Elder Creek Road, August 30, 2022*). Those data were converted to Average Daily Traffic (ADT) segment volumes by applying a factor of 5 to the sum of AM and PM peak hour conditions. Other inputs were derived from BAC field observations, and file data for similar roadways. The

existing traffic noise levels at the distances representing the nearest noise-sensitive land uses to the project area roadways and distances from the centerlines of selected roadways to the 60 dB, 65 dB and 70 dB DNL contours are summarized in Table 2. Appendix C contains the FHWA Model inputs for Existing No Project conditions.

Table 2
Existing Traffic Noise Levels at Nearest Receptors and Distances to DNL Contours

#	Roadway	Segment Description	DNL (dB) at Sensitive Receptor	Distance to Contour (ft)		
				70 dB DNL	65 dB DNL	60 dB DNL
1	Elder Creek Rd	West of Power Inn Rd	64	32	68	147
2	Elder Creek Rd	Power Inn Rd to Project Drwy 1	69	40	87	187
3	Elder Creek Rd	East of Project Drwy 1	61	40	87	187
4	Power Inn Rd	North of Elder Creek Rd	68	55	119	257
5	Power Inn Rd	Elder Creek Rd to Project Drwy 2	71	55	118	254
6	Power Inn Rd	South of Project Drwy 2	68	56	120	259

[1] Sensitive receptors identified as single-family residences.

Source: FHWA-RD-77-108, Fehr & Peers, and BAC

Regulatory Setting

Standards for acceptable noise and vibration exposure in the City of Sacramento are contained within the City's General Plan and /or within the City's Municipal Code. The criteria which were applied to this project are reproduced below.

Federal

Federal Transit Administration (FTA)

Although no standardized criteria have been developed for assessing construction noise impacts, The Federal Transit Administration's *Transit Noise and Vibration Impact Assessment Manual* contains guidance for use in assessing potential noise associated with project construction.

Where local noise ordinances provide guidance with respect to construction noise, they typically relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. The following guidelines can be considered reasonable criteria for assessment: construction noise levels of 90 dBA L_{eq} and 80 dBA L_{eq}[1] at residential land uses during daytime and nighttime hours, respectively. If these criteria are exceeded, there may be adverse community reaction.

[1] Table 7-2 of the *Transit Noise and Vibration Impact Assessment Manual* (FTA Report No. 0123, September 2018)

Federal Interagency Commission on Noise (FICON)

The City of Sacramento does not currently have adopted policies for assessing the potential for noise impacts associated with increases in ambient noise levels from project-generated off-site traffic. As a result, criteria developed by the Federal Interagency Commission on Noise (FICON) was utilized in this assessment. Specifically, FICON has developed a graduated scale for use in the assessment of project-related noise level increases. The criteria shown in Table 3 were developed by FICON as a means of developing thresholds for impact identification for project-related noise level increases. The FICON standards have been used extensively in the preparation of the noise sections of Environmental Impact Reports that have been certified in many California cities and counties, including the City of Sacramento.

The use of the FICON standards is considered conservative relative to thresholds used by other agencies in the State of California. For example, the California Department of Transportation (Caltrans) requires a project-related traffic noise level increase of 12 dB for a finding of significance, and the California Energy Commission (CEC) considers project-related noise level increases between 5 to 10 dB significant, depending on local factors. Therefore, the use of the FICON standards, which set the threshold for finding of significant noise impacts as low as 1.5 dB, provides a very conservative approach to impact assessment for this project.

Table 3
Significance of Changes in Cumulative Noise Exposure

Ambient Noise Level (DNL) Without Project	Change in Ambient Noise Level (DNL) Due to Project
<60 dB	+5.0 dB or more
60 to 65 dB	+3.0 dB or more
>65 dB	+1.5 dB or more

Source: Federal Interagency Committee on Noise (FICON)

Based on the FICON research, as shown in Table 3, a 5 dB DNL increase in noise levels due to a project is required for a finding of significant noise impact where ambient noise levels without the project are less than 60 dB DNL. Where pre-project ambient conditions are between 60 dB DNL and 65 dB DNL, a 3 dB DNL increase is applied as the standard of significance (Table 3). Finally, in areas already exposed to higher noise levels, specifically pre-project noise levels in excess of 65 dB DNL, a 1.5 dB DNL increase is considered by FICON as the threshold of significance (Table 3).

Federal Transit Administration (FTA)

Policy ERC-10.5 of the Sacramento 2040 General Plan requires construction projects to comply with applicable vibration criteria for residential and commercial uses developed by the Federal Transit Administration (FTA). The FTA criteria applicable to damage and annoyance from vibration typically associated with construction activities are presented in Tables 4 and 5.

Table 4
FTA Criteria for Assessing Vibration Damage to Structures

Building Category	Level (VdB)[1]
I. Reinforced-concrete, steel or timber (no plaster)	102
II. Engineered concrete and masonry (no plaster)	98
III. Non-engineered timber and masonry buildings	94
IV. Buildings extremely susceptible to vibration damage	90
[1] RMS velocity in decibels (VdB) re 1 micro-inch/second	

Source: 2018 Federal Transit Administration Noise and Vibration Manual, Table 12-3

Table 5
Groundborne Vibration Impact Criteria for General Assessment

	Impact Levels (VdB)		
Land Use Category	Frequent Events[a]	Occasional Events[b]	Infrequent Events[c]
Category 1: Buildings where vibration would interfere with interior ops.	65	65	65
Category 2: Residences and buildings where people normally sleep	72	75	80
Category 3: Institutional land uses with primarily daytime uses	75	78	83
a. "Frequent Events" is defined as more than 70 vibration events of the same source per day. b. "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day. c. "Infrequent Events" is defined as fewer than 30 vibration events of the same source per day.			

Source: 2018 Federal Transit Administration, Transit Noise Impact and Vibration Assessment

State of California

California Environmental Quality Act (CEQA)

The State of California has established regulatory criteria that are applicable to this assessment. Specifically, Appendix G of the State of California Environmental Quality Act (CEQA) Guidelines are used to assess the potential significance of impacts pursuant to local General Plan policies, Municipal Code standards, or the applicable standards of other agencies. According to Appendix G of the CEQA guidelines, the project would result in a significant noise or vibration impact if the following occur:

A. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or other applicable standards of other agencies.

B. Generation of excessive groundborne vibration or groundborne noise levels.

C. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, the project would expose people residing or working in the project area to excessive noise levels.

It should be noted that audibility is not a test of significance according to CEQA. If this were the case, any project which added any audible amount of noise to the environment would be considered significant according to CEQA. Because every physical process creates noise, the use of audibility alone as significance criteria would be unworkable. CEQA requires a substantial increase in noise levels before noise impacts are identified, not simply an audible change.

It should be noted that the closest airport to the project area has been identified as Sacramento Executive Airport located in excess of four miles to the west. Because the project area is not within the vicinity of a private airstrip, an airport land use plan, or within two miles of a public airport, the last threshold listed above (criterion C) is not relevant and is not discussed further as there would be no potential for airport-related impacts associated with the project.

Local

Sacramento 2040 General Plan

The Environmental Resources and Constraints Element of the Sacramento 2040 General Plan contains the City's noise- and vibration-related policies. Specific policies of relevance to this assessment are reproduced below.

ERC-10.4 **Interior Noise Review for Multiple, Loud, Short-Term Events.** In cases where new development is proposed in areas subject to frequent, high-noise events (such as aircraft overflights, or train and truck passbys), the City shall evaluate interior noise impacts at proposed sensitive receptors. The evaluation shall incorporate measures necessary to meet the 45 dBA DNL standard.

ERC-10.5 **Interior Vibration Standards.** The City shall require construction projects that are anticipated to generate significant vibration levels to use appropriate methods (i.e., type of equipment, low-impact tools, modifying operations, increasing setback distance, vibration monitoring) to ensure acceptable interior vibration levels at nearby residential and commercial uses based on the current City or Federal Transit Administration (FTA) criteria.

ERC-10.9 **Construction Noise Controls.** The City shall limit the potential noise impacts of construction activities on surrounding land uses through noise regulations in the City Code that address permitted days and hours of construction equipment, and sound attenuation devices.

Sacramento Municipal Code

The provisions of the Sacramento Municipal Code of relevance to this assessment are reproduced below.

8.68.060 Exterior noise standards.

A. The following noise standards unless otherwise specifically indicated in this article shall apply to all agricultural and residential properties.

1. From 7:00 a.m. to 10:00 p.m. the exterior noise standard shall be 55 dBA.
2. From 10:00 p.m. to 7:00 a.m. the exterior noise standard shall be 50 dBA.

B. It is unlawful for any person at any location to create any noise which causes noise levels when measured on agricultural or residential property to exceed for the duration of time set forth following, the specified exterior noise standards in any one hour by:

Cumulative Duration of Sound	Noise Level Descriptor*	Allowance Decibels
Cumulative period of 30 minutes per hour	L_{50}	0
Cumulative period of 15 minutes per hour	L_{25}	+5
Cumulative period of 5 minutes per hour	L_{8}	+10
Cumulative period of 1 minutes per hour	L_{2}	+15
Level not to be exceeded for any time per hour	L_{max}	+20
*Added column by BAC		

C. Each of the noise limits specified in subsection B of this section shall be reduced by 5 dBA for impulsive or simple tone noises, or for noises consisting of speech or music.

D. If the ambient noise level exceeds that permitted by any of the first four noise limit categories specified in subsection B of this section, the allowable noise limit shall be increased in 5 dBA increments in each category to encompass the ambient noise level. If the ambient noise level exceeds the fifth noise limit category, the maximum ambient noise level shall be the noise limit for that category.

8.68.080 Exemptions.

The following activities shall be exempted from the provisions of this chapter:

A. Noise sources due to the erection (including excavation), demolition, alteration or repair of any building or structure between the hours of 7:00 a.m. and 6:00 p.m. on Monday, Tuesday, Wednesday, Thursday, Friday and Saturday, and between 9:00 a.m. to 6:00 p.m. on Sunday; provided, however, that the operation of an internal combustion engine shall not be exempt pursuant to this subsection if such engine is not equipped with suitable exhaust and intake silencers which are in good working order. The director of building inspections may permit work to be done during the hours not exempted by this subsection in the case of urgent necessity and in the interest of public health and welfare for a period not to exceed three days. Application for this exemption may be made in conjunction with the application for the work permit or during progress of the work.

Municipal Code Exterior Noise Level Limits Applied to Project On-Site Operations

As mentioned previously, the closest existing noise-sensitive uses have been identified as single-family residences located to the east and southwest of the project (shown in Figure 1). Section 8.68.060 of the Sacramento Municipal Code contains exterior noise limits for residential uses,

which would be applicable to project on-site operations noise. However, pursuant to Municipal Code Section 8.68.060.D, if ambient noise levels exceed permissible standards within the first four categories (L_{50}, L_{25}, L_8, L_2), the allowable noise exposure limits shall be increased in five (5) increments to encompass the ambient noise level. If ambient noise levels exceed the permissible standard within the fifth category (L_{max}), the allowable noise exposure limit shall be the ambient noise level. Comparison of ambient noise level data contained in Table 1 and Municipal Code Section 8.68.060 noise level standards revealed that the City's criteria are currently being exceeded at BAC measurement sites 1 and 2, which are believed to be representative of the ambient noise level environments at the nearby identified residences.

Based on the results from the BAC ambient noise survey (Table 1), and pursuant to Municipal Code Section 8.68.060.D ambient adjustment criteria, the following exterior noise level standards shown in Tables 6 and 7 have been applied to project on-site operations noise sources and assessed at the closest residential properties. Based on the experience of BAC, activities associated with project on-site operations would primarily occur throughout the course of a given hour (i.e., 30 minutes or more). As a result, the Municipal Code's median (L_{50}) noise level metric was applied to project on-site operations noise generation.

Table 6
Municipal Code Exterior Noise Level Limits Applied to the Project – Daytime Hours

APN	Representative Measurement Site	Measured Noise Level (dB)[1] L_{50}	Unadjusted Noise Standard (dB)[2] L_{50}	Adjusted for Ambient?	Adjusted Noise Standard (dB)[3] L_{50}
040-0064-024	1	63	**55**	Yes	65
040-0101-019	2	59		Yes	60

[1] Lowest measured hourly noise levels during daytime hours at measurement site during BAC noise surveys.
[2] Unadjusted Municipal Code daytime noise level limit (7 am to 10 pm).
[3] Applied daytime noise level limit based on BAC ambient noise survey and Municipal Code Section 8.68.060.D adjustment criteria.

Table 7
Municipal Code Exterior Noise Level Limits Applied to the Project – Nighttime Hours

APN	Representative Measurement Site	Measured Noise Level (dB)[1] L_{50}	Unadjusted Noise Standard (dB)[2] L_{50}	Adjusted for Ambient?	Adjusted Noise Standard (dB)[3] L_{50}
040-0064-024	1	55	**50**	Yes	55
040-0101-019	2	51		Yes	55

[1] Lowest measured hourly noise levels during nighttime hours at measurement site during BAC noise surveys.
[2] Unadjusted Municipal Code nighttime noise level limit (10 pm to 7 am).
[3] Applied nighttime noise level limit based on BAC ambient noise survey and Municipal Code Section 8.68.060.D adjustment criteria.

Impact Analysis

Thresholds of Significance

Based on CEQA guidelines and adopted City of Sacramento General Plan and Municipal Code noise standards, noise and vibration impacts at sensitive areas of existing uses in the project vicinity are considered significant if the following were to result from the project:

- Increases in exterior ambient noise levels resulting from project-generated off-site traffic of 5 dBA DNL or more where baseline (no project) ambient conditions at existing sensitive receptor locations are less than 60 dBA DNL (Table 3 FICON criteria).
- Increases in exterior ambient noise levels resulting from project-generated off-site traffic of 3 dBA DNL or more where baseline (no project) ambient conditions at existing sensitive receptor locations are between 60 dBA DNL and 65 dB DNL (Table 3 FICON criteria).
- Increases in exterior ambient noise levels resulting from project-generated off-site traffic of 1.5 dBA DNL or more where baseline (no project) ambient conditions at existing sensitive receptor locations exceed 65 dB DNL (Table 3 FICON criteria).
- In terms of determining the temporary noise increase due to project on-site operations (i.e., non-transportation noise sources) at existing sensitive receptors in the vicinity, an impact would occur if those activities would noticeably increase ambient noise levels above background levels at those locations. The threshold of perception of the human ear is approximately 3 to 5 dB – a 5 dB change is considered to be clearly noticeable. For the analysis of project on-site operations noise level increases at existing sensitive receptors, a noticeable increase in ambient noise levels is assumed to occur where those activities would result in an increase by 5 dB or more over existing ambient noise levels.
- Construction noise levels exceeding the FTA reasonable noise impact assessment criterion of 90 dBA L_{eq} during daytime hours and 80 dBA L_{eq} during nighttime hours.
- Vibration levels associated with project construction exceeding established FTA criteria for assessing vibration damage to structures (Table 4) or general assessment (Table 5).
- On-site operations noise levels exceeding Municipal Code Section 8.68.060 exterior noise level limits.

Noise Impacts Associated with Project-Generated Increases in Off-Site Traffic

With development of the project, traffic volumes on the local roadway network will increase. Those increases in daily traffic volumes will result in a corresponding increase in traffic noise levels at existing uses located along those roadways. Impact 1 evaluates increases in off-site traffic noise levels which would result from the project.

Impact 1: Increases in Existing Traffic Noise Levels due to the Project

The FHWA Traffic Noise Model (FHWA-RD-77-108) was used to quantify increases in existing traffic noise levels at the existing sensitive land uses nearest to the project area roadway network. The FHWA Model predicts hourly L_{eq} values for free-flowing traffic conditions. Estimates of the hourly distribution of traffic for a typical 24-hour period were used to develop DNL values from L_{eq} values.

Traffic data in the form of peak hour intersection turning movements were obtained from documentation prepared by the project transportation consultant, Fehr & Peers (*Transportation Operations Review of 7-Eleven Store and Gas Station at Power Inn Road and Elder Creek Road, August 30, 2022*). Those data were converted to Average Daily Traffic (ADT) segment volumes by applying a factor of 5 to the sum of AM and PM peak hour conditions. Other inputs were obtained from the project traffic impact analysis, BAC observations, and file data for similar roadways.

Appendices C and D contain the FHWA Model inputs for Existing and Existing Plus Project conditions. Table 8 shows the Existing and Existing Plus Project traffic noise levels at the distances representing the nearest existing noise-sensitive receptors to the roadway segments analyzed within the project roadway network. Table 8 also shows the thresholds for determination of a significant traffic noise increase, whether the roadway segment contains sensitive uses, and whether significant noise impacts are identified for each segment.

Table 8
Predicted Traffic Noise Level Increases at Existing Sensitive Receptors – Existing Conditions

#	Roadway	Segment Description	Predicted DNL (dB) E	Predicted DNL (dB) E+P	Increase (dB)	Significance Threshold (dB)[1]	Threshold Exceeded?	Sensitive Receptors Present?[2]	Significant Impact Identified?[3]
1	Elder Creek Rd	West of Power Inn Rd	64.4	64.9	0.5	3.0	No	**Yes**	No
2	Elder Creek Rd	Power Inn Rd to Project Drwy 1	68.6	68.9	0.3	1.5	No	No	No
3	Elder Creek Rd	East of Project Drwy 1	61.4	61.5	0.1	3.0	No	**Yes**	No
4	Power Inn Rd	North of Elder Creek Rd	68.0	68.5	0.5	1.5	No	**Yes**	No
5	Power Inn Rd	Elder Creek Rd to Project Drwy 2	70.6	70.7	0.1	1.5	No	**Yes**	No
6	Power Inn Rd	South of Project Drwy 2	68.1	68.1	0.0	1.5	No	**Yes**	No

[1] FICON increase significance thresholds provided Table 3 of this report.
[2] Sensitive receptors in this analysis identified as existing single-family residences.
[3] A significant impact is identified only along segments where the project-related traffic noise level increase would exceed applicable significance threshold AND where sensitive receptors are present along the roadway segment.

Source: FHWA-RD-77-108, Fehr & Peers and BAC

A significant impact would only be identified along roadway segments where the project-related traffic noise level increase would exceed the applied FICON significance threshold *and* where sensitive receptors are present along the roadway segment. As shown in Table 8, project-generated traffic is not calculated to exceed applied FICON increase significance criteria along the analyzed roadway segments. As a result, significant noise impacts were not identified along the analyzed roadway segments.

Off-Site Noise Impacts Associated with On-Site Operational Noise Sources

The project proposes the construction of a 5,304 square foot convenience store (c-store) building, fueling canopies for both passenger vehicles and semi-trucks, and parking areas for both passenger vehicles and semi-trucks in the 6-acre Development Area of the project site. It is the understanding of BAC that 24-hour operations are proposed for the c-store/passenger vehicle fueling station, semi-truck fueling station, and truck parking area components of the project. The locations of the identified project components are shown in Figure 2.

The primary on-site operations noise sources associated with the c-store/passenger vehicle fueling station component of the project have been identified as vehicle circulation, delivery truck circulation, truck delivery activities, an air/water unit, and building rooftop mechanical equipment. The primary on-site operations noise sources associated with the heavy truck parking area/truck fueling station component of the project have been identified as heavy truck idling, trailer-mounted refrigeration units (TRUs), and heavy truck circulation. Noise generated by those operations were quantified through a combination of reference noise level data and application of accepted noise modeling techniques. This section includes impact discussions for each of the above-identified on-site project noise sources, presented as Impacts 2 through 8, then followed by Impact 9 which presents predicted combined noise levels associated with the combination of each of the project's various noise sources.

The Sacramento Municipal Code exterior noise level limits presented in Tables 6 and 7 were applied to project on-site operations and assessed at the closest residential properties – APN: 040-0064-024 to the west, APN: 040-0063-017 to the southwest, and APN: 040-0101-019 to the east. In terms of determining the ambient noise increases due to project on-site operations, an impact would occur if those activities were to substantially increase ambient noise levels above background levels at existing sensitive receptors. As mentioned previously, the threshold of perception of the human ear is approximately 3 to 5 dB – a 5 dB change is considered to be clearly noticeable. For the analysis of increases in ambient noise levels associated with project on-site operations, a substantial increase in ambient noise levels is assumed to occur where those activities would result in an increase by 5 dB or more over existing ambient noise levels at the identified nearby residential properties.

Finally, a 2.45 acre portion of the project parcel is identified as Seller's Retained Area. It is the understanding of BAC that improvements within this area are not proposed as part of this project. As a result, the following section excludes analysis of potential noise impacts from on-site operations within the Seller's Retained Area.

Impact 2: On-Site Passenger Vehicle Circulation Noise Level Exposure

To quantify on-site passenger vehicle circulation noise exposure from the c-store/passenger vehicle fueling component of the project, BAC utilized the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-77-108) with project trip generation data contained in transportation impact study prepared by Fehr & Peers (*Transportation Operations Review of 7-Eleven Store and Gas Station at Power Inn Road and Elder Creek Road, August 30, 2022*). The FHWA Model was developed to predict hourly L_{eq} values for free-flowing traffic conditions and is considered to be accurate within 1.5 dB in most situations.

To quantify project on-site passenger vehicle circulation noise relative to the City's median noise level metric (L_{50}), it is necessary to identify the number of vehicle movements occurring during a typical busy hour of operations. According to transportation impact study, the c-store/passenger vehicle fueling component of the project is estimated to generate approximately 270 AM peak hour (gross) and 228 PM peak hour passenger vehicle trips (gross). For this analysis, it was conservatively assumed that the c-store/passenger vehicle fueling component of the project could generate 270 vehicle trips during a worst-case busy daytime or nighttime hour.

Based on the Fehr & Peers trip generation data and day/night distribution assumptions above, project on-site passenger vehicle circulation noise exposure at the property lines of the closest residential uses was calculated and the results of those calculations are presented in Table 9.

Table 9
Predicted Project On-Site Passenger Vehicle Noise Levels at Nearby Residential Uses

APN[1]	Distance (ft)[2]	Predicted Noise Level, L_{50} (dB)[3]	Adjusted City Noise Standard, L_{50} (dB)[4]	
			Daytime	Nighttime
040-0064-024 – W	160	35	**65**	**55**
040-0063-017 – SW	185	34	**65**	**55**
040-0101-019 – E	155	35	**60**	**55**

[1] Location of residential parcel is shown in Figure 1.
[2] Distance scaled from closest on-site passenger circulation route to residential property line using site plans & Google Earth.
[3] Predicted worst-case hourly noise level based on passenger vehicle trip data contained in traffic study.
[4] Adjusted City noise level limits based on Municipal Code adjustment criteria and results from BAC ambient surveys.

Source: BAC 2026

As shown in Table 9, project on-site passenger vehicle circulation noise levels are predicted to satisfy the adjusted Sacramento Municipal Code daytime and nighttime L_{50} noise level standards at the closest residential uses.

A significant increase would be identified if on-site project operations would result in an increase of 5 dB or more over ambient noise levels at existing nearby residential properties. Table 1 of this report contains the results from the BAC short-term ambient noise surveys at sites 1 and 2, which are considered to be representative of the existing ambient noise level environment at the closest residential uses. Using the lowest average measured hourly (L_{50}) daytime and nighttime noise levels at each monitoring site, ambient plus project on-site passenger vehicle circulation noise

level increases were calculated at the closest residential uses. The results of those calculations are presented in Tables 10 and 11.

Table 10
Increases in Ambient Daytime L_{50} Noise Levels at Residences – On-Site Vehicle Circulation

APN	Measured Daytime Ambient, L_{50} (dB)[1]	Project L_{50} (dB)[2]	Daytime Ambient + Project L_{50} (dB)[3]	Daytime Increase L_{50} (dB)[4]
040-0064-024 – W	63.4	35.0	63.4	<0.1
040-0063-017 – SW	63.4	34.0	63.4	<0.1
040-0101-019 – E	58.6	35.2	58.6	<0.1

[1] Lowest average measured hourly L50 daytime noise level from BAC noise surveys.
[2] Predicted noise level from Table 9.
[3] Logarithmic sum of measured ambient daytime noise level and predicted project noise level.
[4] Associated project-generated increase in ambient daytime noise level.

Source: BAC 2026

Table 11
Increases in Ambient Nighttime L_{50} Noise Levels at Residences – On-Site Vehicle Circulation

APN	Measured Nighttime Ambient, L_{50} (dB)[1]	Project L_{50} (dB)[2]	Nighttime Ambient + Project L_{50} (dB)[3]	Nighttime Increase L_{50} (dB)[4]
040-0064-024 – W	54.6	34.8	54.6	<0.1
040-0063-017 – SW	54.6	34.0	54.6	<0.1
040-0101-019 – E	51.4	35.2	51.5	0.1

[1] Lowest average measured hourly L50 nighttime noise level from BAC noise surveys.
[2] Predicted noise level from Table 9.
[3] Logarithmic sum of measured ambient nighttime noise level and predicted project noise level.
[4] Associated project-generated increase in ambient nighttime noise level.

Source: BAC 2026

Based on the analysis provided above, project on-site passenger vehicle circulation would not result in noise levels exceeding the City's noise level thresholds nor would it result in increases in ambient noise levels exceeding 5 dB at the closest existing noise-sensitive receptors.

Impact 3: On-Site Truck Circulation Noise Level Exposure

As mentioned previously, it is the experience of BAC that deliveries of products to c-stores such as the one proposed by the project occur at the front or sides of the store building with medium-duty vendor trucks/vans. However, the c-store component of the project will also receive deliveries from heavy fueling trucks for the purpose of refilling the underground storage tanks. It is expected that on-site truck circulation within the heavy truck fueling/truck parking area component of the project will primarily consist of heavy trucks, including deliveries associated with refilling the underground fuel storage tanks. The locations of the c-store, heavy truck parking area, and underground fuel storage tanks for both components are shown in Figure 2.

Heavy truck arrivals and departures, and on-site circulation will occur at low speeds. To predict noise levels generated by on-site truck circulation, BAC utilized file data obtained from

measurements conducted by BAC of heavy and medium duty truck passbys. According to BAC file data, heavy truck passbys have a Sound Exposure Level (SEL) of approximately 83 dB at a reference distance of 50 feet. BAC file data also indicates that medium truck passbys have an SEL of approximately 76 at a reference distance of 50 feet.

To predict project delivery truck on-site circulation noise levels for comparison against the City's L_{50} noise descriptor standard, it was conservatively assumed that 2 heavy fueling trucks (underground tank refilling – both components) and 2 medium duty trucks/vans (c-store component) could have deliveries to the project site during the same worst-case busy hour. To predict heavy truck fueling/truck parking component related on-site circulation noise levels for comparison against the City's L_{50} noise descriptor standard, BAC utilized truck trip generation data provided in the Fehr & Peers transportation study (*Transportation Operations Review of 7-Eleven Store and Gas Station at Power Inn Road and Elder Creek Road, August 30, 2022*). The Fehr & Peers report indicates that the truck fueling component is estimated to generate approximately 25 AM peak hour and 24 PM peak hour truck trips. For this analysis, it was assumed that 25 truck trips could occur within the same busy daytime or nighttime hour.

Based on the Fehr & Peers truck trip generation data and BAC delivery truck assumptions provided under Impact 4, project on-site truck circulation noise exposure at the property lines of the closest residential uses was calculated and the results of those calculations are presented in Table 12.

Table 12
Predicted Project On-Site Truck Circulation Noise Levels at Nearby Residential Uses

APN[1]	Distance (ft)[2]	Predicted Noise Level, L_{50} (dB)[3]	Adjusted City Noise Standard, L_{50} (dB)[4]	
			Daytime	Nighttime
040-0064-024 – W	160	41	**65**	**55**
040-0063-017 – SW	185	40	**65**	**55**
040-0101-019 – E	155	41	**60**	**55**

[1] Location of residential parcel is shown in Figure 1.
[2] Distance scaled from nearest on-site truck circulation lane to residential property line using site plans & Google Earth.
[3] Predicted noise level based on truck trip generation data contained in Fehr & Peers traffic study and BAC assumptions.
[4] Adjusted City noise level limits based on Municipal Code adjustment criteria and results from BAC ambient surveys.

Source: BAC 2026

Table 12 data indicates that project on-site truck circulation noise levels are predicted to satisfy the adjusted Sacramento Municipal Code daytime and nighttime L_{50} noise level standards at the closest residential uses.

Using the lowest average measured hourly (L_{50}) daytime and nighttime noise levels at each monitoring site, ambient plus project on-site truck circulation noise level increases were calculated at the closest residential uses, and the results are presented in Tables 13 and 14.

Table 13
Increases in Ambient Daytime L_{50} Noise Levels at Residences – On-Site Truck Circulation

APN	Measured Daytime Ambient, L_{50} (dB)[1]	Project L_{50} (dB)[2]	Daytime Ambient + Project L_{50} (dB)[3]	Daytime Increase L_{50} (dB)[4]
040-0064-024 – W	63.4	51.7	63.7	0.3
040-0063-017 – SW	63.4	50.5	63.6	0.2
040-0101-019 – E	58.6	52.0	59.5	0.9

[1] Lowest average measured hourly L50 daytime noise level from BAC noise surveys.
[2] Predicted noise level from Table 12.
[3] Logarithmic sum of measured ambient daytime noise level and predicted project noise level.
[4] Associated project-generated increase in ambient daytime noise level.

Source: BAC 2026

Table 14
Increases in Ambient Nighttime L_{50} Noise Levels at Residences – On-Site Truck Circulation

APN	Measured Nighttime Ambient, L_{50} (dB)[1]	Project L_{50} (dB)[2]	Nighttime Ambient + Project L_{50} (dB)[3]	Nighttime Increase L_{50} (dB)[4]
040-0064-024 – W	54.6	51.7	56.3	1.7
040-0063-017 – SW	54.6	50.5	55.9	1.3
040-0101-019 – E	51.4	52.0	54.5	3.1

[1] Lowest average measured hourly L50 nighttime noise level from BAC noise surveys.
[2] Predicted noise level from Table 12.
[3] Logarithmic sum of measured ambient nighttime noise level and predicted project noise level.
[4] Associated project-generated increase in ambient nighttime noise level.

Source: BAC 2026

Based on the analysis provided above, project on-site truck circulation would not result in noise levels exceeding the City's noise level thresholds nor would it result in increases in ambient noise levels exceeding 5 dB at the closest existing noise-sensitive receptors.

Impact 4: Truck Delivery Activity Noise Level Exposure

It is the experience of BAC that deliveries of products to c-stores such as the one proposed by the project occur at the front or sides of the store building with medium-duty vendor trucks/vans. The primary noise sources associated with delivery activities are trucks stopping (air brakes), trucks backing into position (back-up alarms), and pulling away from the loading/unloading area (engines).

For a conservative assessment of daily truck delivery noise levels at the proposed c-store, it was assumed that 4 medium duty trucks/vans could deliver products to the store on a typical busy day. To predict noise levels for comparison against the City's median (L_{50}) noise descriptor standard, it was assumed that 2 medium duty trucks could have store deliveries during the same worst-case busy hour.

BAC file data indicates that noise levels associated with medium-duty truck delivery activities (including side-step vans) are approximately 76 dB SEL at 100 feet. Given 2 medium duty truck

deliveries during any given hour and an SEL of 76 dB, the noise level computes to 43 dB L_{50} at a reference distance of 100 feet. Based on the reference noise level data and operations assumptions cited above, project c-store component truck delivery activity noise exposure at the property lines of the closest residential uses was calculated and the results of those calculations are presented in Table 15.

Table 15
Predicted Project Truck Delivery Activity Noise Levels at Nearby Residential Uses

APN[1]	Distance (ft)[2]	Predicted Noise Level, L_{50} (dB)[3]	Adjusted City Noise Standard, L_{50} (dB)[4]	
			Daytime	Nighttime
040-0064-024 – W	220	37	**65**	**55**
040-0063-017 – SW	325	33	**65**	**55**
040-0101-019 – E	315	34	**60**	**55**

[1] Location of residential parcel is shown in Figure 1.
[2] Distance scaled from closest potential delivery area to residential property line using site plans & Google Earth.
[3] Predicted worst-case noise level based on 2 medium truck deliveries in a given hour.
[4] Adjusted City noise level limits based on Municipal Code adjustment criteria and results from BAC ambient surveys.

Source: BAC 2026

As indicated in Table 15, project truck delivery activity noise levels are predicted to satisfy the adjusted Sacramento Municipal Code daytime and nighttime L_{50} noise level standards at the closest residential uses. Using the lowest average measured hourly (L_{50}) daytime and nighttime noise levels at each monitoring site, ambient plus project truck delivery activity noise level increases were calculated at the closest residential uses, and the results are presented in Tables 16 and 17.

Table 16
Increases in Ambient Daytime L_{50} Noise Levels at Residences – Truck Delivery Activities

APN	Measured Daytime Ambient, L_{50} (dB)[1]	Project L_{50} (dB)[2]	Daytime Ambient + Project L_{50} (dB)[3]	Daytime Increase L_{50} (dB)[4]
040-0064-024 – W	63.4	36.6	63.4	<0.1
040-0063-017 – SW	63.4	33.2	63.4	<0.1
040-0101-019 – E	58.6	33.5	58.6	<0.1

[1] Lowest average measured hourly L50 daytime noise level from BAC noise surveys.
[2] Predicted noise level from Table 15.
[3] Logarithmic sum of measured ambient daytime noise level and predicted project noise level.
[4] Associated project-generated increase in ambient daytime noise level.

Source: BAC 2026

Table 17
Increases in Ambient Nighttime L_{50} Noise Levels at Residences – Truck Delivery Activities

APN	Measured Nighttime Ambient, L_{50} (dB)[1]	Project L_{50} (dB)[2]	Nighttime Ambient + Project L_{50} (dB)[3]	Nighttime Increase L_{50} (dB)[4]
040-0064-024 – W	54.6	36.6	54.7	0.1
040-0063-017 – SW	54.6	33.2	54.6	<0.1
040-0101-019 – E	51.4	33.5	51.5	0.1

[1] Lowest average measured hourly L50 nighttime noise level from BAC noise surveys.
[2] Predicted noise level from Table 15.
[3] Logarithmic sum of measured ambient nighttime noise level and predicted project noise level.
[4] Associated project-generated increase in ambient nighttime noise level.

Source: BAC 2026

Based on the analysis provided above, project truck delivery activities would not result in noise levels exceeding the City's noise level thresholds nor would it result in increases in ambient noise levels exceeding 5 dB at the closest existing noise-sensitive receptors.

Impact 5: Air/Water Unit Noise Level Exposure

The project c-store component proposes the installation of an air/water unit for patron usage. The proposed location of the air/water unit for the c-store component is shown in Figure 2. To quantify project air/water unit noise for the purpose of this analysis, noise measurements conducted by BAC in recent years of fueling station air/water units within the greater Sacramento Area were utilized. The results of the BAC measurements indicate that the air/water unit noise was measured to have a maximum noise level of approximately 65 dB L_{max} at distance of 10 feet from the equipment. Conservatively assuming 30 minutes of continuous air/water unit operation during a given daytime or nighttime hour, the resulting median (L_{50}) noise level is calculated to be approximately 3 dB less than the BAC-measured maximum (L_{max}) noise level.

Based on the reference noise level data and operations assumptions cited above, project air/water unit noise exposure at the property lines of the closest residential uses was calculated and the results of those calculations are presented in Table 18.

Table 18
Predicted Project Air/Water Unit Noise Levels at Nearby Residential Uses

APN[1]	Distance (ft)[2]	Predicted Noise Level, L_{50} (dB)[3]	Adjusted City Noise Standard, L_{50} (dB)[4]	
			Daytime	Nighttime
040-0064-024 – W	335	32	**65**	**55**
040-0063-017 – SW	450	29	**65**	**55**
040-0101-019 – E	485	28	**60**	**55**

[1] Location of residential parcel is shown in Figure 1.
[2] Distance scaled from air/water unit to residential property line using site plans & Google Earth.
[3] Predicted noise level based on 30 minutes of continuous operation in a given hour.
[4] Adjusted City noise level limits based on Municipal Code adjustment criteria and results from BAC ambient surveys.

Source: BAC 2026

Table 18 data indicates that project air/water unit noise levels are predicted to satisfy the adjusted Sacramento Municipal Code daytime and nighttime L_{50} noise level standards at the closest residential uses.

Using the lowest average measured hourly (L_{50}) daytime and nighttime noise levels at each monitoring site, ambient plus project air/water unit noise level increases were calculated at the closest residential uses, and the results are presented in Tables 19 and 20.

Table 19
Increases in Ambient Daytime L_{50} Noise Levels at Residences – Air/Water Unit

APN	Measured Daytime Ambient, L_{50} (dB)[1]	Project L_{50} (dB)[2]	Daytime Ambient + Project L_{50} (dB)[3]	Daytime Increase L_{50} (dB)[4]
040-0064-024 – W	63.4	31.5	63.4	<0.1
040-0063-017 – SW	63.4	28.9	63.4	<0.1
040-0101-019 – E	58.6	28.3	58.6	<0.1

[1] Lowest average measured hourly L50 daytime noise level from BAC noise surveys.
[2] Predicted noise level from Table 18.
[3] Logarithmic sum of measured ambient daytime noise level and predicted project noise level.
[4] Associated project-generated increase in ambient daytime noise level.

Source: BAC 2026

Table 20
Increases in Ambient Nighttime L_{50} Noise Levels at Residences – Air/Water Unit

APN	Measured Nighttime Ambient, L_{50} (dB)[1]	Project L_{50} (dB)[2]	Nighttime Ambient + Project L_{50} (dB)[3]	Nighttime Increase L_{50} (dB)[4]
040-0064-024 – W	54.6	31.5	54.6	<0.1
040-0063-017 – SW	54.6	28.9	54.6	<0.1
040-0101-019 – E	51.4	28.3	51.4	<0.1

[1] Lowest average measured hourly L50 nighttime noise level from BAC noise surveys.
[2] Predicted noise level from Table 18.
[3] Logarithmic sum of measured ambient nighttime noise level and predicted project noise level.
[4] Associated project-generated increase in ambient nighttime noise level.

Source: BAC 2026

Based on the analysis provided above, project air/water unit operation would not result in noise levels exceeding the City's noise level thresholds nor would it result in increases in ambient noise levels exceeding 5 dB at the closest existing noise-sensitive receptors.

Impact 6: Rooftop Mechanical Equipment Noise Level Exposure

Rooftop mechanical equipment (HVAC) for the proposed c-store building will consist of a combination of rooftop units, condensing units, exhaust fans, and a gravity ventilator. Brief descriptions of rooftop mechanical equipment proposed for a recently approved similar-sized 7-Eleven c-store in Northern California are provided below. It is the understanding of BAC that the proposed 7-Eleven c-store building will have the same or very similar equipment as outlined below.

Rooftop Units

Three rooftop units consisting of two models manufactured by Carrier (Models 48GCSN09 and 48GCSN12) would be installed. According to equipment manufacturer specification documentation, provided in Appendix E-1 of this report, reference sound power levels for the proposed rooftop unit models range from 82 dB to 87 dB.

Condensing Units

A total of 10 air-handling units (10 different models) consisting of three manufacturers (FBD, Hoshinzaki and Bohn) would be installed on the building rooftop. Specific models and associated reference sound power levels are as follows:

- FBD Model FBD-DRC: 77 dB
- FBD Model FBD-SRC: 77 dB
- Hoshizaki Model URC-5F: 77 dB
- Bohn Model BCH0005MBACZC0329: 73 dB
- Bohn Model BCH0008LBACZ: 77 dB
- Bohn Model BCH0008MBAXZA0900: 77 dB
- Bohn Model BCH0020MBACZA0000: 73 dB
- Bohn Model BCH0030MCACZA0900: 73 dB
- Bohn Model BCH0022LCACZA0900: 77 dB
- Bohn Model BCH0060MCACZA0900: 73 dB

Exhaust Fans

Two exhaust fans consisting of one model manufactured by Greenheck (Model G-070-E) would be installed on the building rooftop. According to equipment manufacturer specification documentation, provided in Appendix E-2 of this report, the reference sound pressure level for the exhaust fan model is approximately 1.5 sones.

Gravity Ventilator

One gravity ventilator manufactured by Greenheck (Model GRSR) would be installed on the building rooftop. According to equipment manufacturer specification documentation, provided in Appendix E-3 of this report, the reference sound pressure level for the exhaust fan model is approximately 6 sones.

For this analysis, it was conservatively assumed that all rooftop-mounted mechanical equipment as outlined above would be in operation concurrently (believed to be worst-case noise exposure). Based on this operations assumption, the surrogate 7-Eleven c-store building rooftop mechanical plans/mechanical schedule outlined above, and using the cited equipment manufacturer reference sound level data above, combined project rooftop-mounted mechanical equipment noise exposure at the property lines of the closest residential uses was calculated. The results of those calculations are presented in Table 21.

Table 21
Predicted Project HVAC Noise Levels at Nearby Residential Uses

APN[1]	Distance (ft)[2]	Predicted Noise Level, L_{50} (dB)[3]	Adjusted City Noise Standard, L_{50} (dB)[4]	
			Daytime	Nighttime
040-0064-024 – W	290	42	**65**	**55**
040-0063-017 – SW	350	40	**65**	**55**
040-0101-019 – E	375	39	**60**	**55**

[1] Location of residential parcel is shown in Figure 1.
[2] Distance scaled from closest c-store building facade to residential property line using site plans & Google Earth.
[3] Predicted noise level based on continuous combined equipment operation throughout a given hour.
[4] Adjusted City noise level limits based on Municipal Code adjustment criteria and results from BAC ambient surveys.

Source: BAC 2026

As shown in Table 21, project HVAC noise levels are predicted to satisfy the adjusted Sacramento Municipal Code daytime and nighttime L_{50} noise level standards at the closest residential uses.

Using the lowest average measured hourly (L_{50}) daytime and nighttime noise levels at each monitoring site, ambient plus project HVAC noise level increases were calculated at the closest residential uses, and the results are presented in Tables 22 and 23.

Table 22
Increases in Ambient Daytime L_{50} Noise Levels at Residences – HVAC

APN	Measured Daytime Ambient, L_{50} (dB)[1]	Project L_{50} (dB)[2]	Daytime Ambient + Project L_{50} (dB)[3]	Daytime Increase L_{50} (dB)[4]
040-0064-024 – W	63.4	41.5	63.4	<0.1
040-0063-017 – SW	63.4	39.8	63.4	<0.1
040-0101-019 – E	58.6	39.2	58.6	<0.1

[1] Lowest average measured hourly L50 daytime noise level from BAC noise surveys.
[2] Predicted noise level from Table 21.
[3] Logarithmic sum of measured ambient daytime noise level and predicted project noise level.
[4] Associated project-generated increase in ambient daytime noise level.

Source: BAC 2026

Table 23
Increases in Ambient Nighttime L_{50} Noise Levels at Residences – HVAC

APN	Measured Nighttime Ambient, L_{50} (dB)[1]	Project L_{50} (dB)[2]	Nighttime Ambient + Project L_{50} (dB)[3]	Nighttime Increase L_{50} (dB)[4]
040-0064-024 – W	54.6	41.5	54.8	0.2
040-0063-017 – SW	54.6	39.8	54.7	0.1
040-0101-019 – E	51.4	39.2	51.7	0.3

[1] Lowest average measured hourly L50 nighttime noise level from BAC noise surveys.
[2] Predicted noise level from Table 21.
[3] Logarithmic sum of measured ambient nighttime noise level and predicted project noise level.
[4] Associated project-generated increase in ambient nighttime noise level.

Source: BAC 2026

Based on the analysis provided above, project HVAC equipment operations would not result in noise levels exceeding the City's noise level thresholds nor would it result in increases in ambient noise levels exceeding 5 dB at the closest existing noise-sensitive receptors.

Impact 7: Transport Refrigeration Unit (TRU) Noise Level Exposure

As mentioned previously, the project proposes a total of nine (9) truck parking stalls. Trailer-mounted Transport Refrigeration Units (TRUs, also commonly referred to as "reefers"), control the environment of temperature-sensitive freight transported in semi-trailers. TRU-equipped trailers can store many products, including food, plants, medicines, chemicals, artwork, and more. According to the California Air Resources Board (Draft Technology Assessment: Non-Truck Transport Refrigeration Units Workshop – May 2022), approximately 42,000 trailer-mounted TRU's operate in California on a given day. Based on California Energy Commission data, trailer-mounted TRUs may account for approximately 16% of trucks on California highways. Accordingly, it was assumed for purpose of this analysis that approximately 16% of trucks utilizing the project truck parking component of the project would be equipped with operating TRUs.

Figure 4 below shows a photograph of a typical trailer-mounted TRU, which is attached to the front of a trailer facing forward. TRUs are typically powered by diesel engines, although TRUs may also be powered by electricity (i.e., shore power). Electrically powered TRUs are referred to as eTRUs. With an eTRU, the compressor part of the refrigeration system is powered by an electric motor at least part of the time, thereby resulting in lower noise emissions than diesel powered TRUs. In some cases, an electric motor is used exclusively. If an electrical power source disconnection happens, the system can be run on diesel and switch back to electricity when an outlet is available. It is not known at this time what percentage of TRUs operating within the project truck parking area would be eTRUs, but given the greater energy efficiency of eTRUs, it is probable that their use will become increasingly widespread. Figure 5 shows a photograph of an eTRU.

Figure 4: Photograph of a Trailer-Mounted Transport Refrigeration Unit (TRU)

Figure 5: Photograph of Trailer-Mounted Electric Transport Refrigeration Unit (eTRU)

BAC noise level measurement data indicates that diesel TRUs and eTRUs generate average noise levels of approximately 63 dB and 56 dB (respectively) at a reference distance of 100 feet with a direct view of the TRU. As shown in Figures 4 and 5, positions located behind the trailer are shielded from view of the TRU by the trailer itself and are, therefore, exposed to lower noise levels. Similarly, trailers parked adjacent to each other will provide sideline shielding.

As mentioned above, the project proposes a total of nine (9) truck parking stalls. Assuming approximately 16% of the trucks utilizing the truck parking stalls would have trailer-mounted TRUs, two (2) TRU's could theoretically be operating concurrently within the project truck parking area. BAC utilized these assumptions with the reference sound pressure levels for TRUs cited above to predict TRU noise generation at the at the property lines of closest residential uses. The results of those calculations are presented in Table 24.

Table 24
Predicted Project Truck Refrigeration Unit Noise Levels at Nearby Residential Uses

APN[1]	Distance (ft)[2]	Predicted TRU Noise Level, L_{50} (dB)[3,4]		Adjusted City Noise Standard, L_{50} (dB)[5]	
		Electric	Diesel	Daytime	Nighttime
040-0064-024 – W	460	41	48	**65**	**55**
040-0063-017 – SW	445	41	48	**65**	**55**
040-0101-019 – E	330	46	53	**60**	**55**

[1] Location of residential parcel is shown in Figure 1.
[2] Distance scaled from center of truck parking area to residential property line using site plans & Google Earth.
[3] Predicted noise level based on continuous combined exposure from 2 diesel or 2 electric TRUs in truck parking area.
[4] Offsets ranging from -3 dB to -5 dB were applied where off-axis (sideline) exposure at residential properties would be present.
[5] Adjusted City noise level limits based on Municipal Code adjustment criteria and results from BAC ambient surveys.

Source: BAC 2026

Table 24 data indicates that noise level exposure associated with diesel TRUs or eTRUs within the project truck parking area is predicted to satisfy the adjusted Sacramento Municipal Code daytime and nighttime L_{50} noise level standards at the closest residential uses. Using the lowest average measured hourly (L_{50}) daytime and nighttime noise levels at each monitoring site, ambient plus project TRU noise level increases were calculated at the closest residential uses, and the results are presented in Tables 25 and 26. Because it is not known which TRU type will be used in the project truck parking stalls, the results presented in Tables 25 and 26 conservatively utilize predicted noise levels from diesel TRUs.

Table 25
Increases in Ambient Daytime L_{50} Noise Levels at Residences – Diesel TRUs

APN	Measured Daytime Ambient, L_{50} (dB)[1]	Project L_{50} (dB)[2]	Daytime Ambient + Project L_{50} (dB)[3]	Daytime Increase L_{50} (dB)[4]
040-0064-024 – W	63.4	47.8	63.5	0.1
040-0063-017 – SW	63.4	48.0	63.5	0.1
040-0101-019 – E	58.6	52.6	59.6	1.0

[1] Lowest average measured hourly L50 daytime noise level from BAC noise surveys.
[2] Predicted noise level from Table 24.
[3] Logarithmic sum of measured ambient daytime noise level and predicted project noise level.
[4] Associated project-generated increase in ambient daytime noise level.

Source: BAC 2026

Table 26
Increases in Ambient Nighttime L_{50} Noise Levels at Residences – Diesel TRUs

APN	Measured Nighttime Ambient, L_{50} (dB)[1]	Project L_{50} (dB)[2]	Nighttime Ambient + Project L_{50} (dB)[3]	Nighttime Increase L_{50} (dB)[4]
040-0064-024 – W	54.6	47.8	55.4	0.8
040-0063-017 – SW	54.6	48.0	55.5	0.9
040-0101-019 – E	51.4	52.6	55.1	3.7

[1] Lowest average measured hourly L50 nighttime noise level from BAC noise surveys.
[2] Predicted noise level from Table 24.
[3] Logarithmic sum of measured ambient nighttime noise level and predicted project noise level.
[4] Associated project-generated increase in ambient nighttime noise level.

Source: BAC 2026

Based on the analysis provided above, project truck TRU operations would not result in noise levels exceeding the City's noise level thresholds nor would it result in increases in ambient noise levels exceeding 5 dB at the closest existing noise-sensitive receptors.

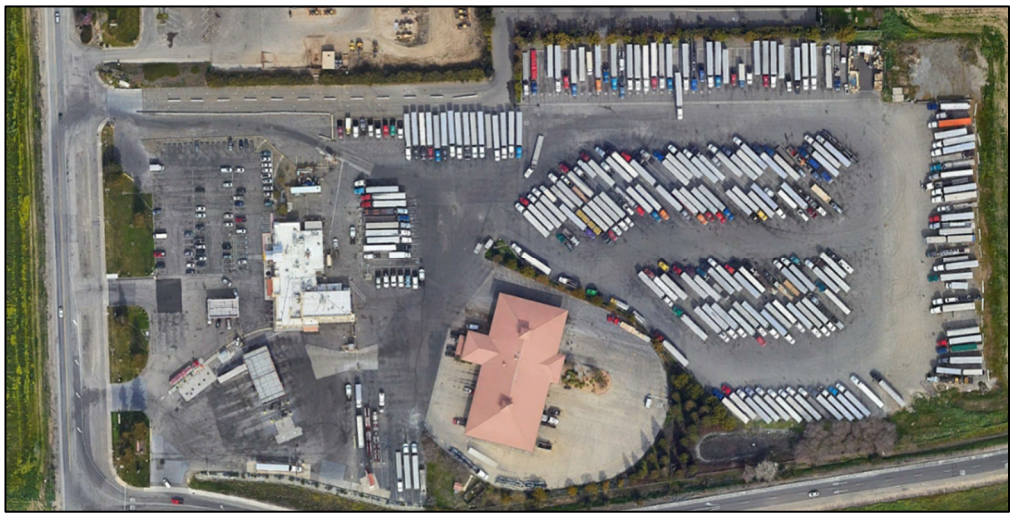
Impact 8: Truck Idling Noise Level Exposure

The site plans indicate that the project proposes a total of nine (9) truck parking stalls. The truck parking stalls would be located on the southeast side of the project area, as shown in Figure 2.

The idling of heavy truck engines to allow operation of cab heaters or air-conditioners while the vehicle is parked for state-mandated rest periods is a common practice. BAC utilized noise level

data collected at various locations in Northern California to quantify the noise emissions of idling heavy trucks. Those measurements indicate that the noise generated during truck idling is affected by the age of the truck (newer technology trucks are quieter) and the engine rpm during idle. Noise measurements of multiple trucks of various ages idling concurrently at the 49'er Travel Plaza in Sacramento, California conducted by BAC for this assessment indicate that an average noise level of 61 dBA L_{eq}/L_{50} can be expected at a reference distance of 100 feet from the idling trucks. The 49'er Travel Plaza was selected for measurement as it is considered reasonably representative of operations at the proposed project site due to its size. Figure 6 below shows an aerial image of the 49'er Travel Plaza.

Figure 6: 49'er Travel Plaza in Sacramento, California



For a conservative assessment of potential project noise impacts resulting from heavy truck idling it was assumed that idling of parked heavy trucks would occur within all nine (9) of the proposed truck parking stalls. This assumption was used with the typical reference sound pressure level cited above for idling heavy trucks to predict noise levels at the property lines of the closest residential uses, and the results of that analysis are presented in Table 27.

Table 27
Predicted Project Truck Idling Noise Levels at Nearby Residential Uses

APN[1]	Distance (ft)[2]	Predicted Noise Level, L_{50} (dB)[3]	Adjusted City Noise Standard, L_{50} (dB)[4]	
			Daytime	Nighttime
040-0064-024 – W	460	48	**65**	**55**
040-0063-017 – SW	445	48	**65**	**55**
040-0101-019 – E	330	51	**60**	**55**

[1] Location of residential parcel is shown in Figure 1.
[2] Distance scaled from center of truck parking area to residential property line using site plans & Google Earth.
[3] Predicted noise level based on continuous combined truck idling in all 9 stalls throughout a given hour.
[4] Adjusted City noise level limits based on Municipal Code adjustment criteria and results from BAC ambient surveys.

Source: BAC 2026

As indicated in Table 27, worst-case project truck idling noise levels are predicted to satisfy the adjusted Sacramento Municipal Code daytime and nighttime L_{50} noise level standards at the closest residential uses.

Using the lowest average measured hourly (L_{50}) daytime and nighttime noise levels at each monitoring site, ambient plus project truck idling noise level increases were calculated at the closest residential uses, and the results are presented in Tables 28 and 29.

Table 28
Increases in Ambient Daytime L_{50} Noise Levels at Residences – Truck Idling

APN	Measured Daytime Ambient, L_{50} (dB)[1]	Project L_{50} (dB)[2]	Daytime Ambient + Project L_{50} (dB)[3]	Daytime Increase L_{50} (dB)[4]
040-0064-024 – W	63.4	47.7	63.5	0.1
040-0063-017 – SW	63.4	48.0	63.5	0.1
040-0101-019 – E	58.6	50.6	59.2	0.6

[1] Lowest average measured hourly L50 daytime noise level from BAC noise surveys.
[2] Predicted noise level from Table 27.
[3] Logarithmic sum of measured ambient daytime noise level and predicted project noise level.
[4] Associated project-generated increase in ambient daytime noise level.

Source: BAC 2026

Table 29
Increases in Ambient Nighttime L_{50} Noise Levels at Residences – Truck Idling

APN	Measured Nighttime Ambient, L_{50} (dB)[1]	Project L_{50} (dB)[2]	Nighttime Ambient + Project L_{50} (dB)[3]	Nighttime Increase L_{50} (dB)[4]
040-0064-024 – W	54.6	47.7	55.4	0.8
040-0063-017 – SW	54.6	48.0	55.5	0.9
040-0101-019 – E	51.4	50.6	54.0	2.6

[1] Lowest average measured hourly L50 nighttime noise level from BAC noise surveys.
[2] Predicted noise level from Table 27.
[3] Logarithmic sum of measured ambient nighttime noise level and predicted project noise level.
[4] Associated project-generated increase in ambient nighttime noise level.

Source: BAC 2026

Based on the analysis provided above, truck idling within the proposed designated truck parking area would not result in noise levels exceeding the City's noise level thresholds nor would it result in increases in ambient noise levels exceeding 5 dB at the closest existing noise-sensitive receptors.

Impact 9: Combined On-Site Operations Noise Level Exposure

Calculated combined noise levels from analyzed on-site operations at the property lines of the closest residential uses are presented in Table 30. It should be noted that due to the logarithmic nature of the decibel scale, the sum of two noise values which differ by 10 dB equates to an overall increase in noise levels of 0.4 dB. When the noise sources are equivalent, the sum would result in an overall increase in noise levels of 3 dB.

Table 30
Calculated Combined On-Site Operations Noise Levels at Residential Uses

APN	Predicted On-Site Operations Noise Level, L_{50} (dB)[1]							Calculated Combined, L_{50} (dB)[2]	Adjusted City Noise Limit, L_{50} (dB)[3]	
	Vehicle Circ.	Truck Circ.	Truck Deliveries	Air/Water	HVAC	Truck TRUs	Truck Idling		Daytime	Nighttime
040-0064-024-W	35	52	37	31	42	48	48	55	**65**	**55**
040-0063-017-SW	34	50	33	29	40	48	48	54	**65**	**55**
040-0101-019-E	35	52	33	28	39	53	51	57	**60**	**55**

[1] Predicted L50 noise levels presented in Impacts 2-8.
[2] Calculated combined L50 noise level exposure from analyzed on-site operations.
[3] Adjusted City noise level limits based on Municipal Code adjustment criteria and results from BAC ambient surveys.
Red = Adjusted City noise level limit is calculated to be exceeded

Source: BAC 2026

Table 30 data indicates that noise level exposure associated with combined on-site operations is calculated to satisfy the adjusted Sacramento Municipal Code daytime L_{50} noise level standards at the closest residential uses but exceed the adjusted Municipal Code nighttime L_{50} noise level limit at the closest residential use to the east (APN: 040-0101-019).

Using the lowest average measured hourly (L_{50}) daytime and nighttime noise levels at each monitoring site, ambient plus combined project on-site operations noise level increases were calculated at the closest residential uses. The results of those calculations are presented in Tables 31 and 32.

Table 31
Increases in Ambient Daytime L_{50} Noise Levels at Residential Uses – Combined Operations

APN	Measured Daytime Ambient, L_{50} (dB)[1]	Combined Project L_{50} (dB)[2]	Daytime Ambient + Project L_{50} (dB)[3]	Daytime Increase L_{50} (dB)[4]
040-0064-024-W	63.4	54.6	63.9	0.5
040-0063-017-SW	63.4	54.0	63.9	0.5
040-0101-019-E	58.6	56.7	60.8	2.2

[1] Lowest average measured hourly L50 daytime noise level from BAC noise surveys.
[2] Calculated combined noise level from Table 30.
[3] Logarithmic sum of measured ambient daytime noise level and combined project noise level.
[4] Associated project-generated increase in ambient daytime noise level.

Source: BAC 2026

Table 32
Increases in Ambient Nighttime L_{50} Noise Levels at Residential Uses – Combined Operations

APN	Measured Nighttime Ambient, L_{50} (dB)[1]	Combined Project L_{50} (dB)[2]	Nighttime Ambient + Project L_{50} (dB)[3]	Nighttime Increase L_{50} (dB)[4]
040-0064-024-W	54.6	54.6	57.6	3.0
040-0063-017-SW	54.6	54.0	57.3	2.7
040-0101-019-E	51.4	56.7	57.9	6.5

[1] Lowest average measured hourly L50 nighttime noise level from BAC noise surveys.
[2] Calculated combined noise level from Table 30.
[3] Logarithmic sum of measured ambient nighttime noise level and combined project noise level.
[4] Associated project-generated increase in ambient nighttime noise level.
Red = increase is calculated to exceed 5 dB

Source: BAC 2026

As shown in Table 30, the calculated combined on-site operations noise level of 57 dB L_{50} at the closest residential use to the east (APN: 040-0101-019) would exceed the adjusted Sacramento Municipal Code nighttime 55 dB L_{50} noise level limit. Additionally, the calculated combined project-generated nighttime increase of 6.5 dB L_{50} at the closest residential use to the east (APN: 040-0101-019) would exceed 5 dB (Table 32).

To reduce combined project operations noise level exposure to a state of compliance with the adjusted Municipal Code nighttime 55 dB L_{50} noise level limit at APN: 040-0101-019, and to reduce combined project-generated increases in ambient L_{50} nighttime noise levels to below 5 dB at that property, one of the two following specific noise reduction measures could be implemented:

1. The construction of a solid noise barrier (sound wall) having a minimum height of 6-feet at the location illustrated in Figure 7. The noise barrier could take the form of a CMU/masonry wall or precast concrete panels. Other materials may be acceptable but should be reviewed by an acoustical consultant prior to construction. Construction of a 6-foot-tall noise barrier as outlined above is calculated to reduce noise levels from truck TRUs and truck idling within the designated truck parking area by approximately 5 dB at the property line of APN: 040-0101-019 to the east.

   OR

2. The construction of a solid noise barrier (sound wall) having a minimum height of 6-feet at the location illustrated in Figure 8. The noise barrier could take the form of a CMU/masonry wall or precast concrete panels. Other materials may be acceptable but should be reviewed by an acoustical consultant prior to construction. Construction of a 6-foot-tall noise barrier as outlined above is calculated to reduce noise levels from truck TRUs and truck idling within the designated truck parking area by approximately 6 dB at the property line of APN: 040-0101-019 to the east.

Tables 33-36 show calculated combined on-site operations noise level exposure at APN: 040-0101-019 with implementation of either of the two noise reduction measures as outlined above (options 1 or 2), compliance with the adjusted Municipal Code nighttime L_{50} noise level standard, and a reduction in combined project-generated increases in ambient nighttime L_{50} noise levels to below 5 dB. It should be noted that implementation of option 2 as outlined above would further reduce noise levels from all analyzed on-site operations noise sources at APN: 040-0101-019.

Table 33
Calculated Combined On-Site Operations Noise Levels with Implementation of Noise Reduction Measure – Option 1

	Predicted On-Site Operations Noise Level, L_{50} (dB)[1]								
APN	Vehicle Circ.	Truck Circ.	Truck Deliveries	Air/Water	HVAC	Truck TRUs	Truck Idling	Calculated Combined, L_{50} (dB)[2]	Adjusted City Nighttime Noise Limit, L_{50} (dB)[3]
040-00101-019-E	35	52	33	28	39	48	46	54	**55**

[1] Predicted L50 noise levels presented in Impacts 2-8.
[2] Calculated combined L50 noise level exposure from analyzed on-site operations with implementation of noise reduction measure option 1.
[3] Adjusted City noise level limit based on Municipal Code adjustment criteria and results from BAC ambient survey.

Source: BAC 2026

Table 34
Combined Increase in Ambient Nighttime L_{50} Noise Levels with Implementation of Noise Reduction Measure – Option 1

APN	Measured Nighttime Ambient, L_{50} (dB)[1]	Combined Project L_{50} (dB)[2]	Nighttime Ambient + Project L_{50} (dB)[3]	Nighttime Increase L_{50} (dB)[4]
040-0101-019-E	51.4	54.3	56.1	4.7

[1] Lowest average measured hourly L50 nighttime noise level from BAC noise survey.
[2] Calculated combined noise level with implementation of noise reduction measure option 1.
[3] Logarithmic sum of measured ambient nighttime noise level and (mitigated) combined project noise level.
[4] Associated (mitigated) project-generated increase in ambient nighttime noise level.

Source: BAC 2026

Table 35
Calculated Combined On-Site Operations Noise Levels with Implementation of Noise Reduction Measure – Option 2

APN	Predicted On-Site Operations Noise Level, L_{50} (dB)[1]							Calculated Combined, L_{50} (dB)[2]	Adjusted City Nighttime Noise Limit, L_{50} (dB)[3]
	Vehicle Circ.	Truck Circ.	Truck Deliveries	Air/Water	HVAC	Truck TRUs	Truck Idling		
040-00101-019-E	35	52	33	28	39	47	45	54	**55**

[1] Predicted L50 noise levels presented in Impacts 2-8.
[2] Calculated combined L50 noise level exposure from analyzed on-site operations with implementation of noise reduction measure option 2.
[3] Adjusted City noise level limit based on Municipal Code adjustment criteria and results from BAC ambient survey.

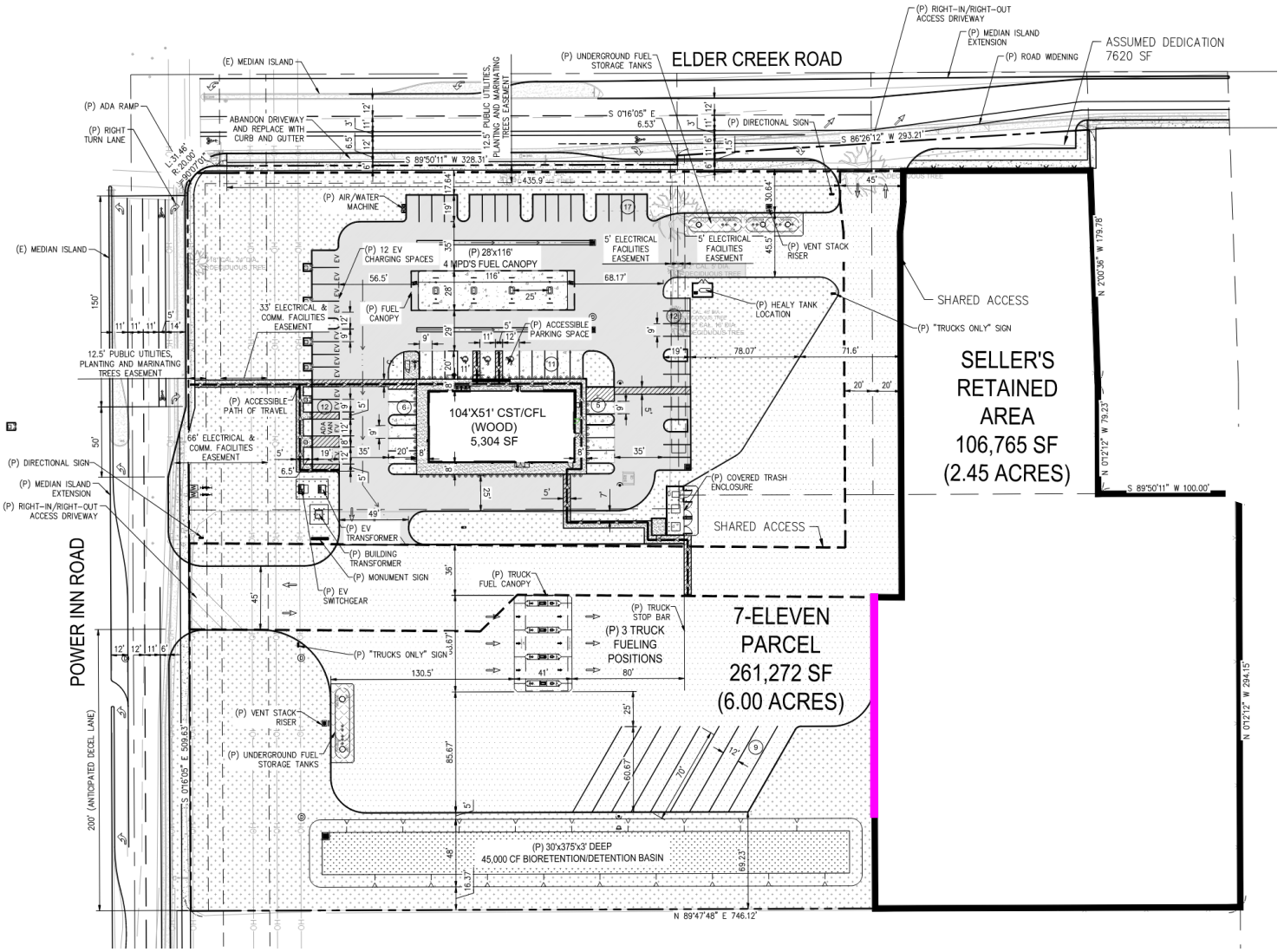
Source: BAC 2026

Table 36
Combined Increase in Ambient Nighttime L_{50} Noise Levels with Implementation of Noise Reduction Measure – Option 2

APN	Measured Nighttime Ambient, L_{50} (dB)[1]	Combined Project L_{50} (dB)[2]	Nighttime Ambient + Project L_{50} (dB)[3]	Nighttime Increase L_{50} (dB)[4]
040-0101-019-E	51.4	53.9	55.9	4.5

[1] Lowest average measured hourly L50 nighttime noise level from BAC noise survey.
[2] Calculated combined noise level with implementation of noise reduction measure option 2.
[3] Logarithmic sum of measured ambient nighttime noise level and (mitigated) combined project noise level.
[4] Associated (mitigated) project-generated increase in ambient nighttime noise level.

Source: BAC 2026



Dated: 7/2/2025

Legend

6' Noise Barrier (Truck Parking Area Noise Reduction Measure – Option 1)

N

Scale (Feet)

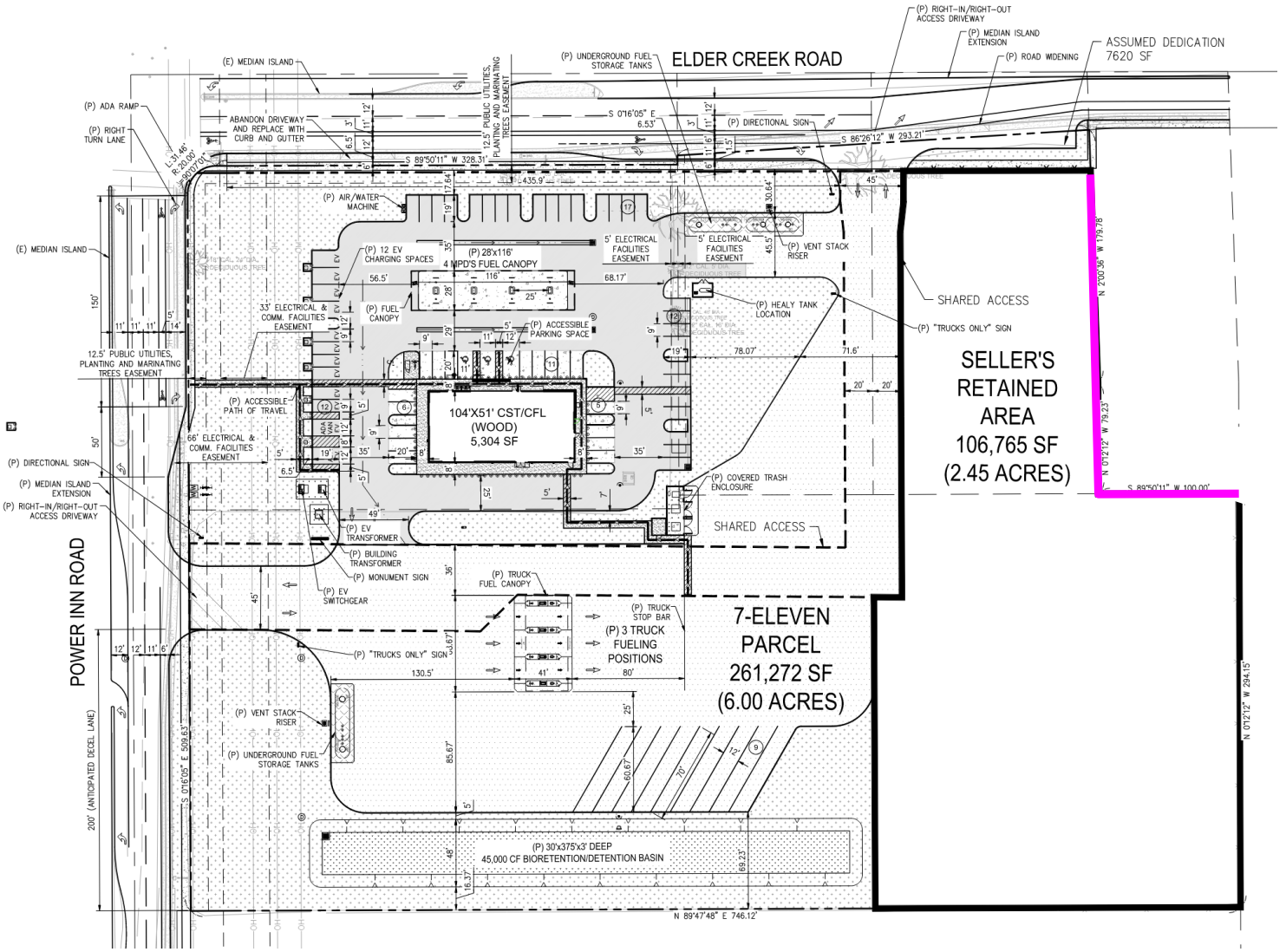
0 100 200

7-Eleven Elder Creek Rd & Power Inn Rd
Sacramento, California

Noise Reduction Measure – Option 1

Figure 7

BOLLARD Acoustical Consultants



Dated: 7/2/2025

Legend

6' Noise Barrier (Truck Parking Area Noise Reduction Measure – Option 2)

N

Scale (Feet)

0 100 200

7-Eleven Elder Creek Rd & Power Inn Rd
Sacramento, California

Noise Reduction Measure – Option 2

Figure 8

BOLLARD Acoustical Consultants

Noise Impacts Associated with Project Construction Activities

Impact 10: Project Construction Activities/Operations Noise Level Exposure

During construction, the 6-acre Development Area would be cleared and graded and excavation for underground utilities, foundations, and underground storage tanks would occur. While not currently proposed, all or part of the 2.45-acre Seller's Retained Area could be cleared and graded, and excavation to install water and sewer connections and/or stormwater and erosion control improvements in the Seller's Retained Area could occur under the proposed project if required by the City. Trenching in the off-site roadway improvement areas may be needed for utility connections in Power Inn Road and Elder Creek Road. Ground disturbance associated with off-site roadway improvements would be minimal and would be associated with reconstructing the existing raised medians to be extended, the addition of the northbound dedicated right-turn lane along Power Inn Road, and sidewalk improvements along both Power Inn Road and Elder Creek Road adjacent to the project site.

During project construction, heavy equipment would be used for grading, excavation, paving and building construction. These activities would increase ambient noise levels in the immediate project vicinity. Construction noise levels generated at the project site would vary depending on the type and amount of equipment in use at any time, the location where that equipment is operating, and how well the equipment is maintained. Noise exposure at existing sensitive receptors would also vary depending on the proximity of equipment activities to the receptor, the degree of shielding present between the construction equipment and receptor (e.g., soundwalls, intervening topography, atmospheric absorption, ground attenuation, etc.).

Tables 37 and 38 include ranges of maximum noise levels for equipment commonly used in general construction projects at full-power operation at 50 feet. It should be noted that not all the construction equipment/activities identified in Tables 37 and 38 would be required of this project.

Table 37
Maximum Reference Noise Levels for Common Construction Equipment
On-Site Development Area and Seller's Retained Area

Equipment Description	Maximum Noise Level at 50 Feet (dBA)
Air compressor	80
Backhoe	80
Ballast equalizer	82
Ballast ramper	83
Compactor	82
Concrete mixer	85
Concrete pump	82
Concrete vibrator	76
Grader	85
Impact wrench	85
Jack hammer	88
Loader	80
Paver	85
Pump	77
Rail saw	90
Saw	76
Scarifier	83
Scraper	85
Shovel	82
Spike driver	77
Tie cutter	84
Tie inserter	85
Trencher	74
Truck – large	84
Truck – pickup	55

Source: 2018 Federal Transit Administration Noise and Vibration Impact Assessment Manual, Table 7-1

Table 38
Maximum Reference Noise Levels for Common Construction Equipment
Off-Site Roadway Improvements

Equipment Description	Maximum Noise Level at 50 Feet (dBA)
Concrete mixer	85
Dozer	85
Jack hammer	88
Loader	80
Paver	85
Shovel	82
Trencher	74
Truck – large	84
Truck – pickup	55

Source: 2018 Federal Transit Administration Noise and Vibration Impact Assessment Manual, Table 7-1

As noted in the Regulatory Setting section of this report, Section 8.68.080.A. of the Sacramento Municipal Code exempts noise associated with the erection (including excavation), demolition, alteration or repair of any building or structure between the hours of 7:00 a.m. and 6:00 p.m. on Monday, Tuesday, Wednesday, Thursday, Friday and Saturday, and between the hours of 9:00 a.m. to 6:00 p.m. on Sunday provided that the operation of an internal combustion engine shall not be exempt pursuant to this subsection if such engine is not equipped with suitable exhaust

and intake silencers in good working order. It is reasonably assumed for the purpose of this analysis that on-site project construction activities would be performed in compliance with Municipal Code Section 8.68.080.A. Therefore, noise associated with project on-site construction equipment and activities would be exempt from compliance with Sacramento Municipal Code noise level standards. Although Municipal Code Section 8.68.080.A would exempt on-site project construction noise, the following section includes an analysis of project construction noise relative to compliance with Federal Transit Administration (FTA) noise level criteria for guidance in the assessment of construction noise.

The residences constructed on APNs: 040-0064-024 and 040-0063-017 to the west and southwest maintain a separation of approximately 140 feet and 115 feet away (respectively) from where construction activities could occur within the Development Area of the project site, and approximately 40 feet from the Power Inn Road Off-Site Roadway Improvement Area. The residence constructed on APN: 040-0101-019 is located approximately 165 feet east of where construction activities would occur within the Development Area of the project site, approximately 15 feet from the Seller's Retained Area, and approximately 25 feet from Elder Creek Road. The distances from these existing noise-sensitive receptors to the most significant sources of on-site construction would vary depending on the phase of construction. For a general assessment of potential construction noise impacts, the FTA recommends utilizing the noise emission levels shown in Table 37, adjusting those levels for the percentage of the hour the equipment would be operating, correcting for distance by assuming mobile equipment operates at the center of the project, and considering ground effects where appropriate.

For this project, there will be periods of time when the construction equipment is located closer to noise-sensitive receptors than the effective center of the project site, so calculating construction noise from the center of the site is not considered appropriate for this evaluation. However, because the noisiest construction equipment tends to be mobile (i.e. earthmoving equipment), calculating construction noise levels using the closest point of construction activity to the noise-sensitive receptors is also not considered appropriate. For this construction noise evaluation, distances of 240 feet was conservatively assumed for the Development Area (APN: 040-0064-024), 215 feet was conservatively assumed for the Development Area (APN: 040-0063-017), 265 feet for the Development Area (APN: 040-0101-019), 80 feet for the Seller's Retained Area (APN: 040-0101-019), 65 feet or the Power Inn Road Off-Site Roadway Improvement Area (APNs: 040-0064-024 and 040-0063-017), and 35 feet for the Elder Creek Road Off-Site Roadway Improvement Area (APN: 040-0101-019).

Using the distance assumptions cited above, conservative estimates of project construction noise levels at nearby residential receptors were calculated using the Federal Highway Administration's Roadway Construction Noise Model (RCNM) and the results of those calculations with equipment operations assumptions are presented in Tables 39-42.

Table 39
Predicted Construction Noise Levels – On-Site Development Area

APN	Distance (ft)	Predicted Noise Level, L_{eq} (dB)
040-0064-024-W	240	71
040-0063-017-SW	215	72
040-0101-019-E	265	70
[1] Predicted levels conservatively assume concurrent, combined operations of a dozer, front loader, compactor, backhoe and grader.		

Source: RCNM and BAC

Table 40
Predicted Construction Noise Levels – On-Site Seller's Retained Area

APN	Distance (ft)	Predicted Noise Level, L_{eq} (dB)
040-0101-019-E	80	80
[1] Predicted levels conservatively assume concurrent, combined operations of a dozer, front loader, compactor, backhoe and grader.		

Source: RCNM and BAC

Table 41
Predicted Construction Noise Levels
Power Inn Road Off-Site Roadway Improvements

APN	Distance (ft)	Predicted Noise Level, L_{eq} (dB)
040-0064-024-W	40	86
040-0063-017-SW	40	86
[1] Predicted levels conservatively assume concurrent, combined operations of a dozer, front loader, concrete mixer and jackhammer.		

Source: RCNM and BAC

Table 42
Predicted Construction Noise Levels
Elder Creek Road Off-Site Roadway Improvements

APN	Distance (ft)	Predicted Noise Level, L_{eq} (dB)
040-0101-019-E	35	88
[1] Predicted levels conservatively assume concurrent, combined operations of a dozer, front loader, concrete mixer and jackhammer.		

Source: RCNM and BAC

As outlined in the Regulatory Setting of this assessment, the FTA establishes noise level limits of 90 dB L_{eq} during daytime hours and 80 dB L_{eq} during nighttime hours for residential uses affected by construction projects. As shown in Tables 39-42, conservative estimates of project construction noise levels ranging from 70 dB L_{eq} to 88 dB L_{eq} at the closest residential receptors would be below FTA daytime noise level standard of 90 dB L_{eq}. As mentioned previously, Section 8.68.080 of the Sacramento Municipal Code exempts construction activities from compliance with applicable City noise standards provided those activities occur between the hours of 7:00 a.m. and 6:00 p.m., Monday through Saturday, and between 9:00 a.m. and 6:00 p.m. on Sunday.

Based on the analysis above, project on-site and off-site construction activities are not expected to result in a noise impact (i.e., adverse community reaction) at the closest existing noise-sensitive land uses as defined by federal criteria (FTA). Nonetheless, to reduce the potential for annoyance at nearby sensitive uses, the following measures should be incorporated into project on-site construction operations:

- All on-site project construction activities shall occur pursuant to the hours and days exempted by Sacramento Municipal Code Section 8.68.080, and/or hours and days required by the City of Sacramento.
- The project should utilize temporary construction noise control measures including the use of temporary noise barriers, or other appropriate measures as mitigation for noise generated during construction of projects.
- All noise-producing project equipment and vehicles using internal-combustion engines should be equipped with manufacturers-recommended mufflers and be maintained in good working condition.
- All mobile or fixed noise-producing equipment used on the project site that are regulated for noise output by a federal, state, or local agency should comply with such regulations while in the course of project activity.
- Electrically powered equipment should be used instead of pneumatic or internal-combustion-powered equipment, where feasible.
- Material stockpiles and mobile equipment staging, parking, and maintenance areas should be located as far as practicable from noise-sensitive receptors.
- Project area and site access road speed limits should be established and enforced during the construction period.

Vibration Impacts Associated with Project Activities

Impact 11: Vibration Generated by On-Site Project Construction & Operations

During project construction, heavy equipment would be used for grading, excavation, paving, and building construction, which would generate localized vibration in the immediate vicinity of the construction. Policy ERC-10.5 of the Sacramento 2040 General Plan requires all construction projects that are anticipated to generate significant vibration levels to use appropriate methods (i.e., type of equipment, low-impact tools, modifying operations, increasing setback distance,

vibration monitoring) to ensure acceptable interior vibration levels at nearby residential and commercial uses based on the current City or Federal Transit Administration (FTA) criteria.

The closest existing residential or commercial structures to the Development Area of the project site have been identified as the ARCO gas station c-store building to the west (commercial) and the residences constructed on APNs: 040-0064-024 to the west, 040-0063-017 to the southwest, and 040-0101-019 to the east. Table 43 includes the range of vibration levels for equipment commonly used in general residential construction projects at 25 feet. Table 43 data also include projected equipment vibration levels at the nearest existing residential and commercial structures to the Development Area the project site.

Table 43
Reference and Projected Vibration Source Amplitudes for Construction Equipment
Development Area

Equipment	Reference Maximum Vibration Level at 25 feet, VdB (rms)	Projected Maximum Vibration Level, VdB (rms)[1]			
		ARCO C-Store (230)	Residence – W (140)	Residence – SW (115)	Residence – E (165)
Vibratory roller	94	61	67	70	64
Hoe ram	87	58	60	62	59
Large bulldozer	87	58	60	62	59
Caisson drilling	87	58	60	62	59
Loaded trucks	86	58	60	61	58
Jackhammer	79	57	58	58	57
Small bulldozer	58	<55	<55	<55	<55

[1] RMS velocity in decibels (VdB) re 1 micro-inch/second.

Source: 2018 FTA Transit Noise and Vibration Impact Assessment Manual and BAC calculations

Based on the data presented in Table 43, construction activity vibration levels generated within the Development Area are predicted to be well below the FTA threshold for damage to engineered structures (98 VdB) at 25 feet from those activities. Table 43 data also indicates that Development Area construction-related vibration levels are predicted to range from below threshold of human perception (65 VdB) to slightly above that threshold (70 VdB) at the closest existing structures. Based on the analysis provided above, construction equipment vibration levels generated from within the Development Area are expected to remain below the strictest FTA vibration impact criteria contained in Tables 4 and 5 of this report and are not expected to result in excessive groundborne vibration levels at nearby existing structures.

Operation of equipment could occur in the Seller's Retained Area to clear and grade the area, and trenching to install utility connections, if needed. Roadway improvements along the south side of Elder Creek Road would require equipment, including a jackhammer to remove existing pavement and sidewalks. Vibration-generating equipment used for those activities could consist of a small bulldozer with a maximum vibration level of 58 VdB at 25 feet and a jackhammer with a maximum vibration level of 79 VdB at 25 feet. The nearest existing residential structure is approximately 15 feet east of the Seller's Retained Area and 25 feet from Elder Creek Road (APN: 040-0101-019). If a jackhammer is used to remove existing pavement and sidewalks to expand Elder Creek Road, it would be within the existing developed areas of the roadway and roadway

frontage, more than 25 feet from the existing residential structure. Maximum vibration levels that could be generated from operation of equipment in the Seller's Retained Area and/or along Elder Creek Road are expected to remain below the FTA criteria for assessing vibration damage to non-engineered timber and masonry buildings (Category III; 94 VdB) and below the FTA's groundborne vibration impact criteria for frequent, occasional, and infrequent events (Category 2, 72 VdB for frequent events, 75 VdB for occasional events, and 80 VdB for infrequent events) at the residence. Vibratory rollers like those in Table 43 are typically used for large-scale paving projects, such as wide roadways/highways and large parking lots. Given the limited size of the Elder Creek Road expansion area requiring repaving, the contractor would likely use smaller equipment such as a plate compactor or walk-behind vibratory roller, which generate substantially less vibration than the large vibratory rollers shown in Table 43.

During site visits for noise monitoring equipment deployment and retrieval, existing vibration levels within the project area and immediate project vicinity were imperceptible by BAC field staff. Therefore, it is expected that the project would not result in the exposure of people to excessive groundborne vibration levels at proposed uses of the development.

Finally, the project proposes the construction of a c-store, fueling pumps, and a heavy truck parking facility. While traffic/trucks traveling on roadways are a source of vibration, these sources rarely generate vibration amplitudes high enough to cause structural or cosmetic damage. Further, vibration levels generated by project on-site traffic/truck passbys will be at low speed and are expected to dissipate rapidly with distance. Based on the information above, project on-site operations are not expected to generate appreciable vibration.

Vibration levels due to and upon the project are expected to be satisfactory relative to the applicable FTA vibration impact criteria for damage to structures and annoyance.

This concludes BAC's noise and vibration assessment of the proposed 7-Eleven Elder Creek Road & Power Inn Road project in Sacramento, CA. Please contact BAC at (530) 537-2328 or dariog@bacnoise.com if you have any comments or questions regarding this report.

Appendix A
Acoustical Terminology

Acoustics The science of sound.

Ambient Noise The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.

Attenuation The reduction of an acoustic signal.

A-Weighting A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.

Decibel or dB Fundamental unit of sound. A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.

CNEL Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.

Frequency The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.

IIC Impact Insulation Class (IIC): A single-number representation of a floor/ceiling partition's impact generated noise insulation performance. The field-measured version of this number is the FIIC.

L_{dn} Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.

L_{eq} Equivalent or energy-averaged sound level.

L_{max} The highest root-mean-square (RMS) sound level measured over a given period of time.

Loudness A subjective term for the sensation of the magnitude of sound.

Masking The amount (or the process) by which the threshold of audibility is for one sound is raised by the presence of another (masking) sound.

Noise Unwanted sound.

Peak Noise The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the "Maximum" level, which is the highest RMS level.

RT_{60} The time it takes reverberant sound to decay by 60 dB once the source has been removed.

STC Sound Transmission Class (STC): A single-number representation of a partition's noise insulation performance. This number is based on laboratory-measured, 16-band (1/3-octave) transmission loss (TL) data of the subject partition. The field-measured version of this number is the FSTC.

Legend

A Site 1: Looking west towards APN: 040-0064-024, noise monitoring equipment and Power Inn Rd (7/15/25 @ 7:40 AM)

B Site 1: Looking south along Power Inn Rd towards noise and vibration monitoring equipment (7/15/25 @ 2:50 PM)

C Site 1: Looking west towards APN: 040-0064-024, noise monitoring equipment and Power Inn Rd (7/14/25 @ 8:20 PM)

D Site 2: Looking east towards APN: 040-0101-019 and vibration monitoring equipment (7/15/25 @ 3:45 PM)

7-Eleven Elder Creek Rd & Power Inn Rd
Sacramento, California

Field Survey Photographs

Appendix B-1

BOLLARD Acoustical Consultants

Legend

A Site 2: Looking north towards noise monitoring equipment and Elder Creek Rd (7/14/25 @ 8:07 PM)

B Site 2: Looking east towards APN: 040-0101-019 and noise monitoring equipment (7/14/25 @ 8:08 PM)

C Site 2: Looking south towards noise monitoring equipment and project area (7/15/25 @ 4:20 AM)

D Site 2: Looking east towards APN: 040-0101-019 and noise monitoring equipment (7/15/25 @ 7:50 AM)

7-Eleven Elder Creek Rd & Power Inn Rd
Sacramento, California

Field Survey Photographs

Appendix B-2

BOLLARD Acoustical Consultants

Appendix C
FHWA Highway Traffic Noise Prediction Model Inputs
7-Eleven Elder Creek Rd Power Inn Rd
Existing No Project Conditions
Run Date: 3/20/2026

Segment ID	Roadway	Roadway Segment	ADT	Day %	Night %	Medium Truck %	Heavy Truck %	Speed	Distance to Receptor (ft)	Offset (dB)
1	Elder Creek Rd	West of Power Inn Rd	9,095	80	20	2	2	40	75	0
2	Elder Creek Rd	Power Inn Rd to Project Drwy 1	10,055	80	20	2	2	45	50	0
3	Elder Creek Rd	East of Project Drwy 1	10,070	80	20	2	2	45	150	0
4	Power Inn Rd	North of Elder Creek Rd	16,215	80	20	2	2	45	75	0
5	Power Inn Rd	Elder Creek Rd to Project Drwy 2	15,955	80	20	2	2	45	50	0
6	Power Inn Rd	South of Project Drwy 2	16,375	80	20	2	2	45	75	0

Notes: 1. Noise-sensitive receptors identified in this analysis are existing single-family residences.

Appendix D
FHWA Highway Traffic Noise Prediction Model Inputs
7-Eleven Elder Creek Rd Power Inn Rd
Existing+Project Conditions
Run Date: 3/20/2026

Segment ID	Roadway	Roadway Segment	ADT	Day %	Night %	Medium Truck %	Heavy Truck %	Speed	Distance to Receptor (ft)	Offset (dB)
1	Elder Creek Rd	West of Power Inn Rd	10,285	80	20	2	2	40	75	0
2	Elder Creek Rd	Power Inn Rd to Project Drwy 1	10,755	80	20	2	2	45	50	0
3	Elder Creek Rd	East of Project Drwy 1	10,190	80	20	2	2	45	150	0
4	Power Inn Rd	North of Elder Creek Rd	18,080	80	20	2	2	45	75	0
5	Power Inn Rd	Elder Creek Rd to Project Drwy 2	16,290	80	20	2	2	45	50	0
6	Power Inn Rd	South of Project Drwy 2	16,555	80	20	2	2	45	75	0

Notes: 1. Noise-sensitive receptors identified in this analysis are existing single-family residences.

Appendix E-1
Rooftop Unit Specification Sheet

Performance Summary For RTU-1

Project: 7-Eleven Site 1056100 01/02/2025
Prepared By: 03:32PM

Combustion Fan Motor FLA (ea):	**0.48**
Power Supply MCA:	**52**
Power Supply MOCP (Fuse or HACR):	**60**
Disconnect Size FLA:	**54**
Disconnect Size LRA:	**235**
Electrical Convenience Outlet:	**None**
Outdoor Fan [Qty / FLA (ea)]:	**1 / 7.4**

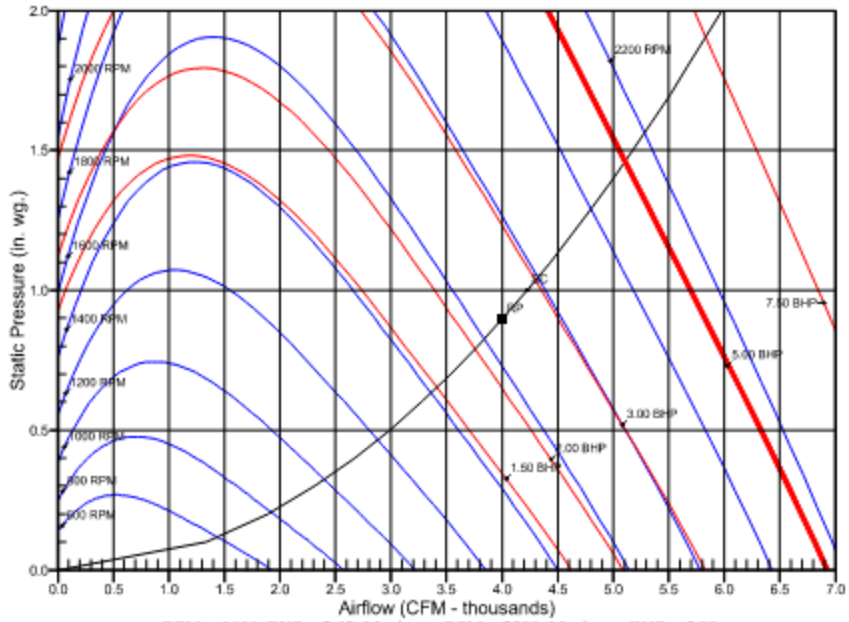
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	92.4	86.7	85.9
125 Hz	86.0	81.4	87.9
250 Hz	81.2	74.6	85.6
500 Hz	78.6	71.1	84.4
1000 Hz	79.6	69.9	82.8
2000 Hz	76.1	64.6	78.5
4000 Hz	70.6	55.4	74.9
8000 Hz	62.7	48.7	72.5
A-Weighted	83.6	74.6	87.0

Fan Curve



RPM = 1666 BHP = 2.42 Maximum RPM = 2200 Maximum BHP = 5.00
SC - System Curve RP - Rated Point

Appendix E-1 cont.
Rooftop Unit Specification Sheet

Performance Summary For RTU-2

Project: 7-Eleven Site 1056100 — 01/02/2025
Prepared By: — 03:32PM

Indoor Fan Motor FLA (Total):	**6.4**
Combustion Fan Motor FLA (ea):	**0.48**
Power Supply MCA:	**43**
Power Supply MOCP (Fuse or HACR):	**50**
Disconnect Size FLA:	**45**
Disconnect Size LRA:	**215**
Electrical Convenience Outlet:	**None**
Outdoor Fan [Qty / FLA (ea)]:	**2 / 1.5**

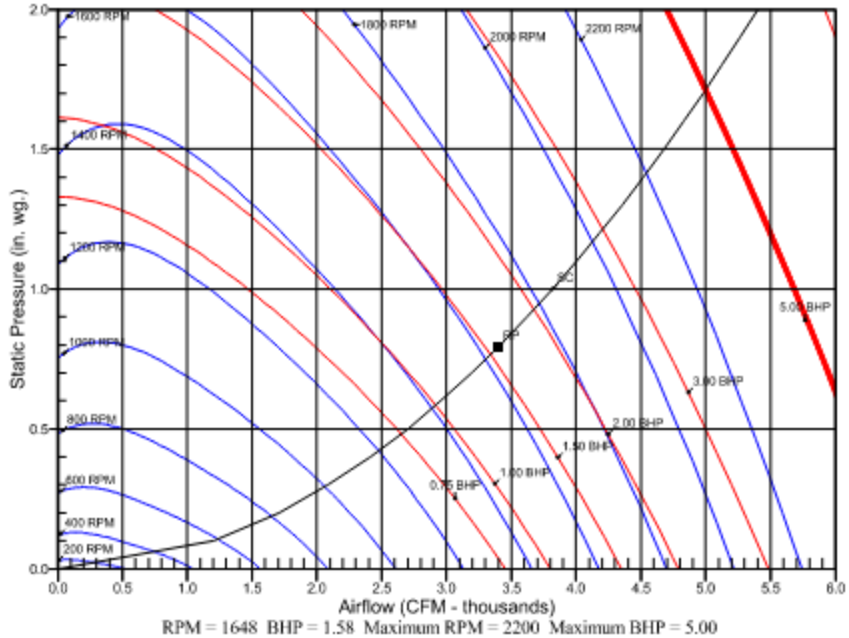
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	87.2	83.1	88.6
125 Hz	82.9	78.0	85.0
250 Hz	77.6	71.3	81.6
500 Hz	74.4	67.0	79.5
1000 Hz	75.7	67.3	77.4
2000 Hz	71.8	61.1	74.1
4000 Hz	67.3	53.8	71.0
8000 Hz	58.2	48.0	66.3
A-Weighted	79.6	71.4	82.0

Fan Curve



RPM = 1648 BHP = 1.58 Maximum RPM = 2200 Maximum BHP = 5.00
SC - System Curve RP - Rated Point

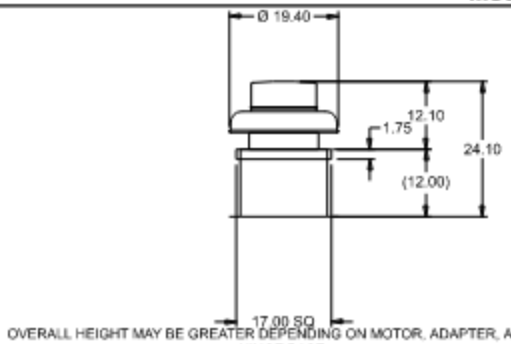
Appendix E-2
Exhaust Fan Specification Sheet

GREENHECK
Building Value in Air.

Printed Date: 01/14/2025
Job: 7-Eleven Site #1056100
Mark: EF-2
Model: G-070-E

Model: G-070-E

Direct Drive Centrifugal Roof Exhaust Fan



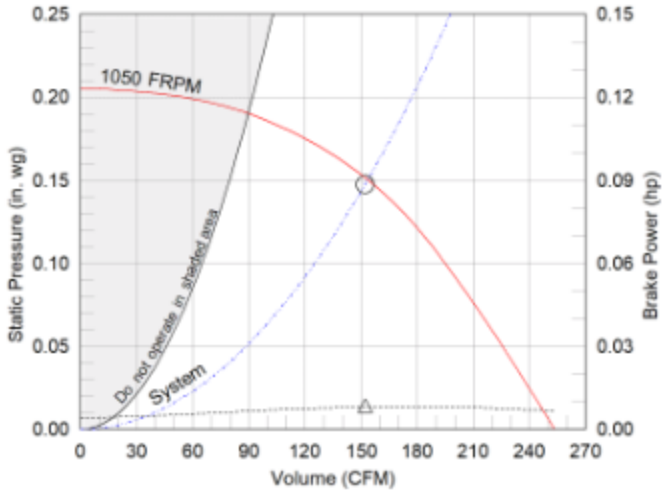
OVERALL HEIGHT MAY BE GREATER DEPENDING ON MOTOR, ADAPTER, AND/OR HINGE BASE.

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	17
Weight w/ Acc's (lb)	23
Weight w/ Acc's and Curb (lb)	37
Standard Curb Cap Size (in.)	17 x 17
Optional Damper (in.)	8 x 8
Roof Opening (in.)	13.5 x 13.5

Performance	
Requested Volume (CFM)	140
Actual Volume (CFM)	152
Total External SP (in. wg)	0.147
Fan RPM	1050
Operating Power (hp)	0.01
Elevation (ft)	489
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Tip Speed (ft/min)	2,233
Static Eff. (%)	45

Misc Fan Data	
Fan Energy Index (FEI)	-
Outlet Velocity (ft/min)	390

Motor	
Motor Mounted	Yes
Size (hp)	1/100 (or greater)
Voltage/Cycle/Phase	115/60/1
Enclosure	ODP
Motor RPM	1050
Efficiency Rating	Standard
Windings	1



△ Operating Bhp point
○ Operating point at Total External SP
Fan curve
System curve
Brake horsepower curve

Static Pressure Calculations

External SP	0.125 in. wg
Direct Drive RPM Adjustment	0.022 in. wg
Total External SP	0.147 in. wg

Notes:

All dimensions shown are in units of in.
*Please consult factory for actual motor amp draw
LwA - A weighted sound power level, based on ANSI S1.4
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per Octave band at 5 ft - dBA levels are not licensed by AMCA International
Sones - calculated using ANSI/AMCA 301 at 5 ft

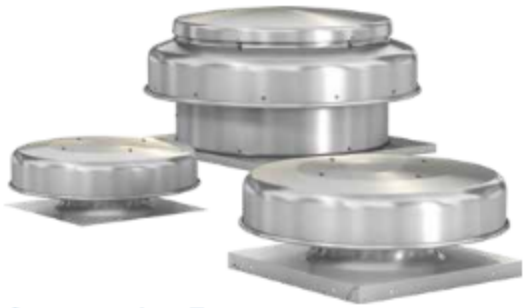
Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	62	58	49	39	35	32	24	23	46	35	1.5

Appendix E-3
Gravity Ventilator Specification Sheet

Spun Aluminum Model GRSI/GRSR/GRSF

GREENHECK
Building Value in Air.



Construction Features

When you buy a Greenheck gravity ventilator, you receive a ventilator with the industry's best performance and durability for intake (model GRSI) or relief (model GRSR) for natural gravity or positive pressure systems. Exceptional low silhouette design and construction features make this unit a rugged, efficient, and economical air inlet or outlet.

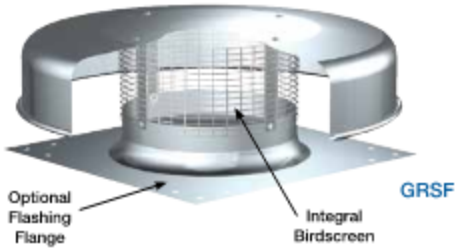
- Broadest performance in the industry, up to 18,400 cfm (31,300 m^3/hr)
- Most advanced weather protection of any ventilator in its class
- Greenheck subjects these products to extensive life testing, ensuring the ventilator will provide years of reliable performance
- All aluminum exterior for corrosion-resistant construction
- Integral birdscreen to prevent the entry of birds and/or small objects
- Built-in curb cap with prepunched holes for easy attachment to roof curbs
- Optional built-in flashing flange (model GRSF) with prepunched holes for quick and easy installations without a roof curb.

Use the GRS with the following accessories:

Gravity or motorized dampers to ensure weather tightness.

Prefab curbs to reduce installation time.

Protective coatings to extend the life of the unit or blend its color with other equipment.

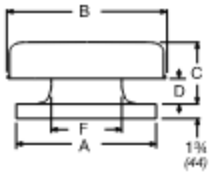


Dimensions

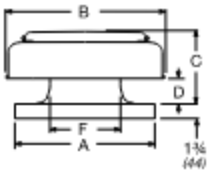
Model Size	A	B	C	D	E	F	Damper Size	Curb Thickness	Shroud Thickness	Unit Weight
8	19 (483)	20½ (521)	7¾ (184)	1½ (38)	20½ (514)	8¼ (210)	8 x 8 (203 x 203)	0.051 (1.3)	0.051 (1.3)	7 (3)
10	19 (483)	20½ (521)	7¾ (197)	2 (51)	20¼ (514)	10¼ (260)	10 x 10 (254 x 254)	0.051 (1.3)	0.051 (1.3)	8 (4)
12	22 (559)	29 (737)	10 (254)	3½ (89)	23½ (591)	12¼ (311)	12 x 12 (305 x 305)	0.064 (1.6)	0.064 (1.6)	10 (5)
15	22 (559)	29 (737)	10 (254)	3½ (89)	23½ (591)	14¼ (362)	16 x 16 (406 x 406)	0.064 (1.6)	0.064 (1.6)	13 (6)
16	26 (660)	29 (737)	11 (279)	4¼ (108)	27½ (692)	16¼ (413)	16 x 16 (406 x 406)	0.064 (1.6)	0.064 (1.6)	16 (7)
18	30 (762)	35½ (902)	9¾ (248)	1¾ (44)	31¼ (794)	20¼ (514)	18 x 18 (457 x 457)	0.064 (1.6)	0.064 (1.6)	19 (9)
20	30 (762)	35½ (902)	11¼ (286)	3¾ (95)	31¼ (794)	20¼ (514)	18 x 18 (457 x 457)	0.064 (1.6)	0.064 (1.6)	24 (11)
24	34 (864)	38¼ (972)	11 (279)	4 (102)	35¼ (895)	24½ (622)	24 x 24 (610 x 610)	0.064 (1.6)	0.064 (1.6)	29 (13)
30	40 (1016)	48 (1219)	18¾ (476)	5⅞ (138)	-	30½ (775)	30 x 30 (762 x 762)	0.064 (1.6)	0.064 (1.6)	35 (16)
36	46 (1168)	56¾ (1441)	21½ (540)	10 (254)	-	36½ (927)	36 x 36 (914 x 914)	0.064 (1.6)	0.080 (2.0)	45 (20)
42	52 (1321)	63¼ (1607)	24¼ (616)	11¼ (286)	-	42½ (1089)	42 x 42 (1067 x 1067)	0.064 (1.6)	0.080 (2.0)	60 (27)
48	58 (1473)	72 (1829)	26¼ (667)	11¼ (286)	-	48½ (1232)	48 x 48 (1219 x 1219)	0.064 (1.6)	0.080 (2.0)	80 (36)

All dimensions are in inches (millimeters) and the weight in pounds (kilograms). NOTE: Sizes GRS-8 through 24 have a one-piece cover and shroud. Access is gained through the removal of screws. Sizes GRS-30 through 48 have a removable cover, separate from the shroud, to facilitate maintenance and servicing of dampers.

GRSI/GRSR Sizes 8 - 24



GRSI/GRSR - Sizes 30 - 48



GRSF - Sizes 8 - 24 with Optional Flashing Flange