Environmental Noise & Vibration Assessment

Raising Cane's Store #991

Morgan Hill, California

BAC Job # 2023-160

Prepared For:

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CEQA Checklist

NOISE AND VIBRATION **– Would the Project Result in:**	**NA – Not Applicable**	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Generation of 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 applicable standards of other agencies?				**X**	
b) Generation of excessive groundborne vibration or groundborne noise levels?				**X**	
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, would the project expose people residing or working in the project area to excessive noise levels?					**X**

Introduction

The proposed Raising Cane's Store #991 (project) is located at the intersection of Cochrane Road and Butterfield Boulevard in the City of Morgan Hill, California (APN: 726-058-002/1). The project consists of the construction of a new quick-service restaurant (QSR) building, a small outdoor patio dining area, a two-lane drive-thru lane, and associated parking stalls. Land uses in the immediate project vicinity include existing single-family residential and commercial to the north, existing multi-family residential to the west, and future commercial to the south and east. The project area with aerial imagery is shown in Figure 1. The project 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 Morgan Hill 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 an 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 has an effect on human response, as does frequency. Generally, as the 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.

Legend

- Project Parcel Boundary (Approximate)
- Long-Term Noise & Short-Term Vibration Measurement Sites
- Short-Term Vibration Measurement Site

N

Scale (Feet)

0 50 100

Raising Cane's Store #991

Morgan Hill, California

Project Area

Figure 1

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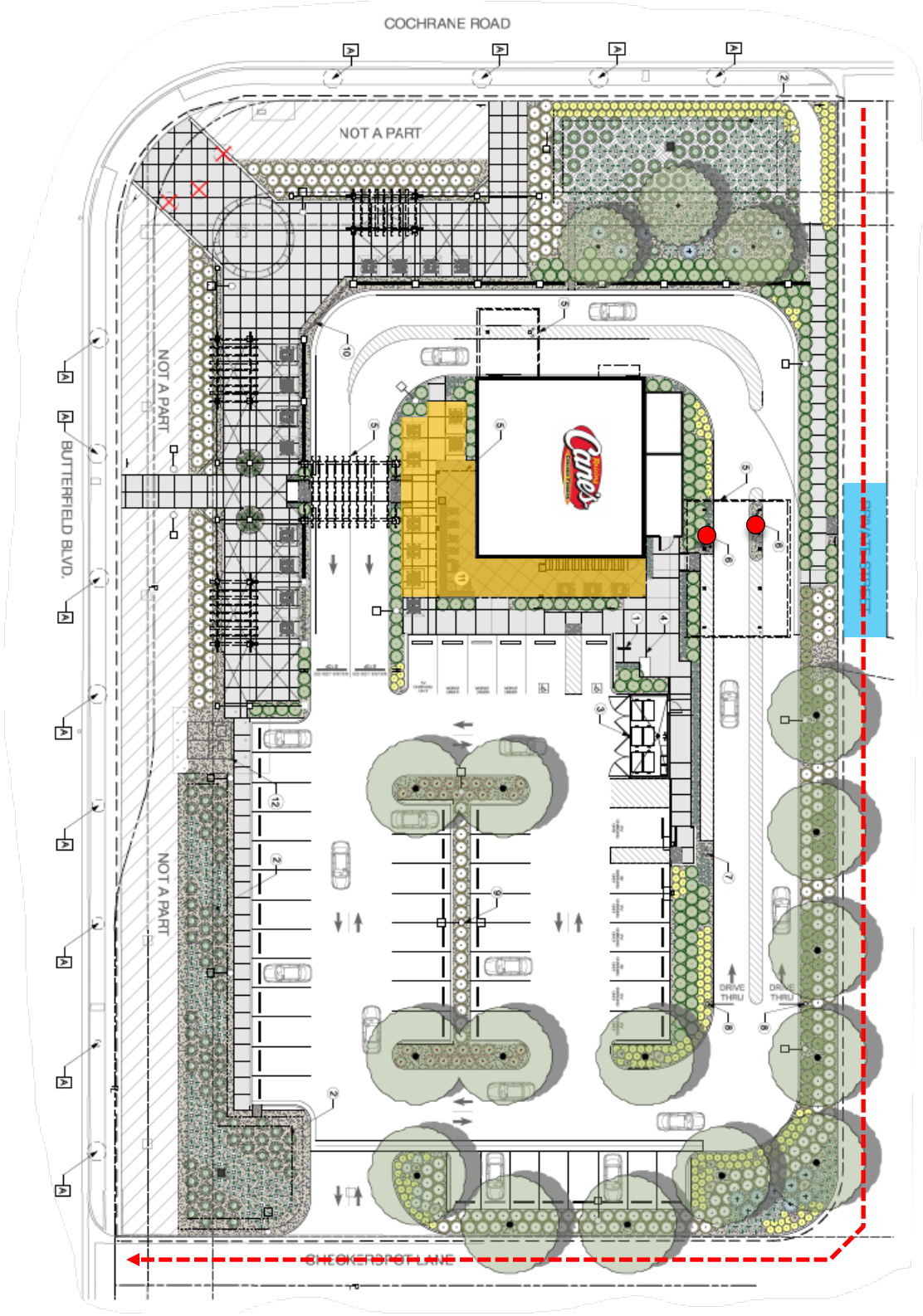

Legend

- Drive-Through Speaker Posts (2)
- Outdoor Patio Area
- Truck Delivery Area
- On-Site Delivery Truck Circulation Route

Scale (Feet)

0 25 50

Raising Cane's Store #991

Morgan Hill, California

Site Plan

Figure 2

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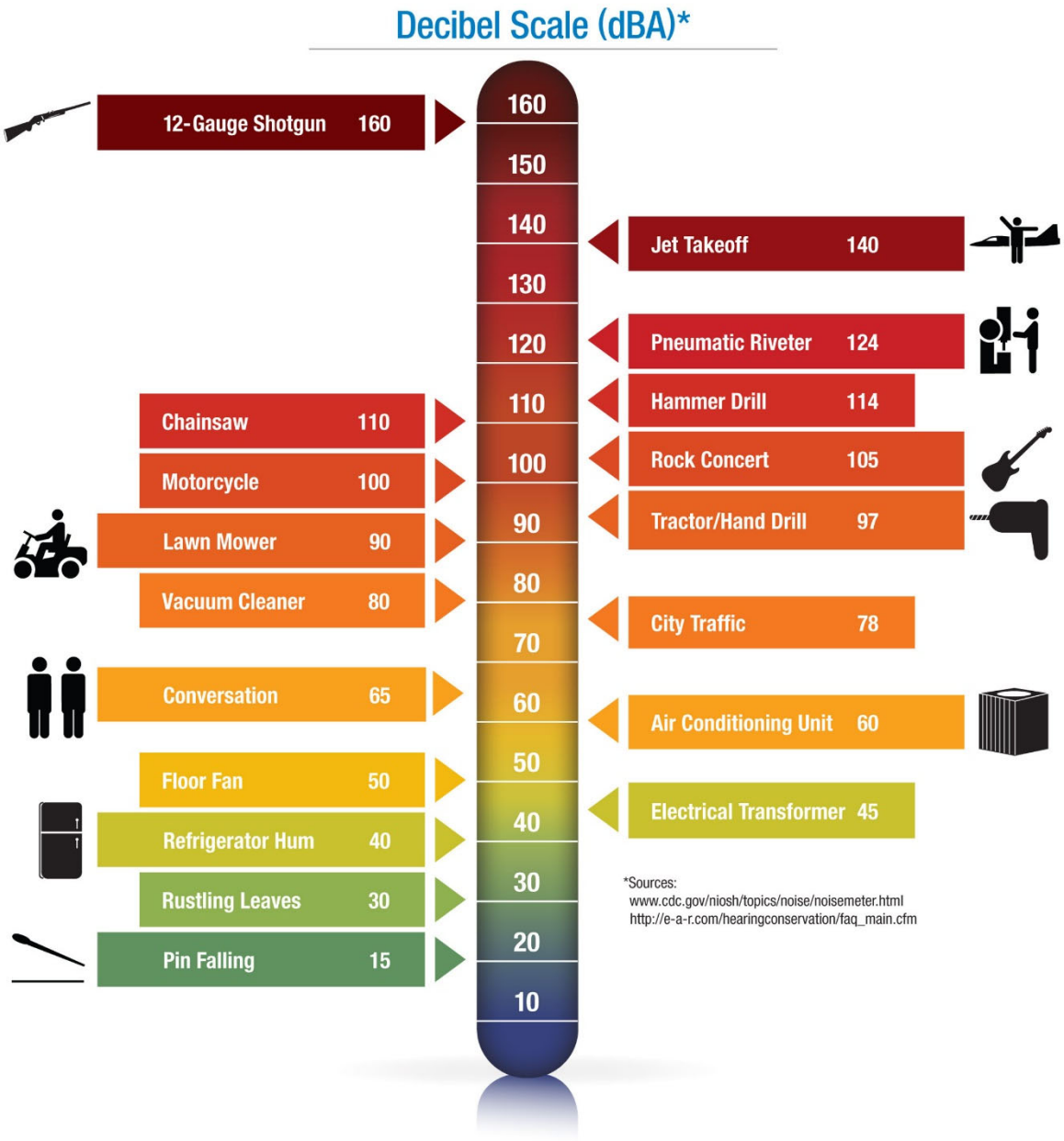
Figure 3
Noise Levels Associated with Common Noise Sources



Regulatory Setting: Criteria for Acceptable Noise and Vibration Exposure

Federal

There are no federal noise or vibration criteria which would be directly applicable to this project. However, the City of Morgan Hill does not currently have adopted numeric standards for groundborne vibration. As a result, the following federal noise criteria was applied to the project.

Federal Transit Administration

Vibration impact criteria developed by the Federal Transit Administration (FTA) were applied to the project. The FTA criteria applicable to damage and annoyance from vibration typically associated with construction activities are presented in Tables 1 and 2.

Table 1
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: Federal Transit Administration Noise and Vibration Manual, Table 12-3.

Table 2
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[d]	65[d]	65[d]
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.
d. This criterion limit is based on levels that are acceptable for most moderately-sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels.

Source: Federal Transit Administration, Transit Noise Impact and Vibration Assessment, May 2006.

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.

Local

Morgan Hill 2035 General Plan

The Safety, Services, and Infrastructure Element of the Morgan Hill 2035 General Plan contains goals and policies to ensure that city residents are not subjected to noise beyond acceptable levels. The General Plan goals and policies which are applicable to the project are reproduced below.

GOAL SSI-8

Prevention of noise from interfering with human activities or causing health problems.

Policies

SSI-8.1 **Exterior Noise Level Standards.** Require new development projects to be designed and constructed to meet acceptable exterior noise level standards (Table 3 of this report), as follows:

- Apply a maximum exterior noise level of 60 dBA DNL in residential areas where outdoor use is a major consideration (e.g., backyards in single-family housing developments and recreation areas in multi-family housing projects). Where the City determines that providing a DNL of 60 dBA or lower cannot be achieved after the application of reasonable and feasible mitigation, a DNL of 65 dBA may be permitted.

- Indoor noise levels should not exceed a DNL of 45 dBA in new residential housing units.
- Noise levels in new residential development exposed to an exterior DNL of 60 dBA or greater should be limited to a maximum instantaneous noise level (e.g., trucks on busy streets, train warning whistles) in bedrooms of 50 dBA. Maximum instantaneous noise levels in all other habitable rooms should not exceed 55 dBA. The maximum outdoor noise level for new residences near the railroad shall be 70 dBA DNL, recognizing that train noise is characterized by relatively few loud events.

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

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

SSI-8.4 **Office Noise Level Standards.** Interior noise levels in office buildings should be maintained at 45 dB L_{eq} (hourly average) or less, rather than 45 dB DNL (daily average).

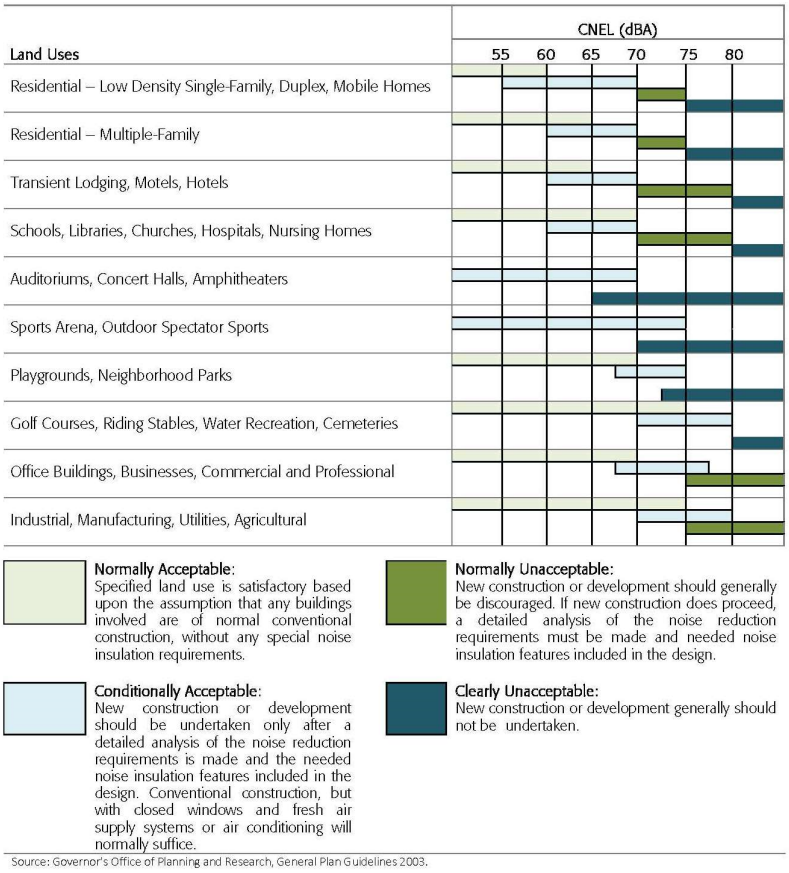
SSI-8.5 **Traffic Noise Level Standards.** Consider noise level increases resulting from traffic associated with new projects significant if: a) the noise level increase is 5 dBA DNL or greater, with a future noise level of less than 60 dBA DNL, or b) the noise level increase is 3 dBA DNL or greater,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

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

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

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

Table 3
State of California Land Use Compatibility Guidelines for Community Noise Environments



Source: Governor's Office of Planning and Research, General Plan Guidelines 2003.

Morgan Hill Municipal Code

The provisions of the Morgan Hill Municipal Code which would be most applicable to this project are reproduced below.

Chapter 8.28 of the Municipal Code provides an enumeration of unlawful noise sources (i.e., animals, birds, auto body repairs, blowers, fans, combustion engines, construction activities, exhausts, loudspeakers). Chapter 8.28 does not, however, provide quantitative performance standards. Section 8.28.040(D) exempts construction noise provided the activities are limited to a specific time frame. Section 8.28.040(D) is reproduced below:

> "Construction activities" are defined as including but not limited to excavation, grading, paving, demolition, construction, alteration or repair of any building, site, street or highway, delivery, or removal of construction material to a site, or movement of construction materials on a site. Construction activities are prohibited other than between the hours of seven a.m. and eight p.m., Monday through Friday and between the hours of nine a.m. to six p.m. on Saturday. Construction activities may not occur on Sundays or federal holidays. No third person, including but not limited to landowners, construction company owners, contractors,

subcontractors, or employers, shall permit or allow any person working on construction activities which are under their ownership, control, or direction to violate this provision.

Section 18.76.090 of the Municipal Code establishes acceptable noise level criteria for non-transportation noise sources. The City's quantitative exterior noise standards are provided below in Table 4. According to conversations with City of Morgan Hill planning staff in the preparation of noise assessments in previous years, the Table 4 standards are interpreted as being hourly average (L_{eq}) noise level standards.

Table 4
Noise Level Performance Standards

Receiving Land Use	Maximum Noise Level at Lot Line of Receiving Use[1,2]
Industrial and Wholesale	70 dBA
Commercial	65 dBA
Residential or Public/Quasi Public	60 dBA

[1] The planning commission may allow an additional 5 dBA noise level at the lot line if the maximum noise level shown above cannot be achieved with reasonable and feasible mitigation.
[2] Noise standards shown above do not apply to noise generated by vehicle traffic in the public right-of way or from temporary construction, demolition, and vehicles that enter or leave the site of the noise-generating use (e.g., construction equipment, trains, trucks).

Source: Morgan Hill Municipal Code, Section 18.76.090, Table 18.76-1.

Finally, Municipal Code Section 18.76.130 states that vibration transmitted through the ground that is discernible without instruments at the lot line of the establishment or use is prohibited. However, vibrations from temporary construction and vehicles that enter and leave the lot (e.g., construction equipment, trains, trucks, etc.) are exempt from this standard.

Environmental Setting – Existing Ambient Noise and Vibration Environment

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 nearest existing noise-sensitive uses to the project have been identified as a single-family residence to the north, and multi-family residential uses to the west and southwest. The locations of the existing residential 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 Cochrane Road and Butterfield Boulevard. To generally quantify existing ambient noise environment within the project vicinity, BAC conducted long-term (96-hour) ambient noise

level measurements at two (2) locations January 4th through January 7th, 2024. The long-term noise survey locations are shown in Figure 1, identified as sites 1 and 2. Photographs of the noise survey locations are provided in Appendix B.

Larson Davis Laboratories (LDL) Models 820 precision integrating sound level meters were 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 ambient noise level survey results are summarized below in Table 5.

Table 5
Summary of Long-Term Ambient Noise Survey Results – January 4-7, 2024

			Average Measured Hourly Noise Levels (dB)[2]			
			Daytime[3]		Nighttime[3]	
Site Description[1]	Date	DNL (dB)	L_{eq}	L_{max}	L_{eq}	L_{max}
Site 1: North of project area near single-family residential use	1/4/24	69	66	85	61	80
	1/5/24	69	66	85	62	81
	1/6/24	69	67	83	61	81
	1/7/24	68	66	86	60	79
Site 2: West of project area near multi-family residential uses	1/4/24	68	67	87	58	76
	1/5/24	67	67	85	58	77
	1/6/24	66	65	86	57	75
	1/7/24	64	63	86	56	75

[1] Noise monitoring locations are identified in Figure 1. Survey site photos are presented in Appendix B.
[2] Detailed summaries of the noise monitoring results are provided in Appendices C and D.
[3] Daytime: 7:00 AM to 10:00 PM | Nighttime: 10:00 PM to 7:00 AM

Source: BAC 2024.

BAC noise survey site 1 is believed to be representative of the existing ambient noise level environment at the single-family residential use to the north of the project. Noise level measurements obtained at site 2 are believed to be representative of the existing ambient noise level environments at the closest multi-family residential uses to the west and southwest. As shown in Table 5, measured day-night average levels (DNL) and average measured hourly median (L_{eq}) and maximum (L_{max}) noise levels were generally consistent at each survey site during the 96-hour monitoring period (i.e., relatively small range of measured values).

Existing Ambient Vibration Environment within the Project Vicinity

During BAC site visits on January 3rd and January 8th, 2024, vibration levels were below the threshold of perception within the project vicinity. Nonetheless, to quantify existing vibration levels in the project vicinity, BAC conducted a short-term (15-minute) vibration measurements on January 8th, 2024, at the locations shown in Figure 1. Photographs of the vibration survey equipment and sites are provided in Appendix B. A Larson-Davis Laboratories Model LxT precision integrating sound level meter equipped with a vibration transducer was used to complete the measurements. The results are summarized in Table 6.

Table 6
Summary of Short-Term Ambient Vibration Survey Results – January 8, 2024

Survey Location	Time	Highest Measured Vibration Level (VdB)
Site 1: North of project area near single-family residential use	10:43 a.m.	56
Site 2: West of project area near multi-family residential uses	11:08 a.m.	54
Site A: Centrally located within project area	11:39 a.m.	55

Source: BAC 2024.

Table 6 data indicate that measured vibration levels were below the threshold of human perception (65 dB VdB), which is consistent with BAC field observations.

Existing Traffic Noise Levels along the 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 PM peak hour intersection turning movements were obtained from the project traffic transportation consultant (Hexagon Transportation Consultants, Inc.). Those data were converted to Average Daily Traffic (ADT) segment volumes by applying a factor of 10 to PM peak hour conditions. Other inputs were obtained from BAC observations and noise measurement data. 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 7. Appendix E contains the FHWA Model inputs for existing conditions.

Table 7
Existing Traffic Noise Levels at Nearest Sensitive Receptors and Distances to DNL Contours

#	Roadway	Segment Description	DNL at Nearest Sensitive Receptor	Distance to Contour (ft)		
				70 dB DNL	65 dB DNL	60 dB DNL
1	Cochrane Rd	West of Monterey Hwy	59	10	21	46
2	Cochrane Rd	Monterey Rd to Butterfield Blvd	65	65	140	302
3	Cochrane Rd	Butterfield Blvd to Woodview Ave	64	60	130	280
4	Cochrane Rd	Woodview Ave to Sutter Blvd	63	54	115	249
5	Cochrane Rd	Sutter Blvd to Cochrane Plza	65	69	148	319
6	Cochrane Rd	Cochrane Plza to US 101 SB Ramps	69	86	186	401
7	Cochrane Rd	US 101 SB Ramps to US 101 NB Ramps	60	70	151	325
8	Cochrane Rd	East of US 101 NB Ramps	65	62	133	286
9	Monterey Hwy	North of Cochrane Rd	65	74	160	344
10	Monterey Hwy	South of Cochrane Rd	65	54	116	250
11	Butterfield Blvd	South of Cochrane Rd	67	49	106	228
12	Woodview Ave	North of Cochrane Rd	50	5	10	22
13	Skipper Ln	South of Cochrane Rd	50	5	10	22
14	Sutter Blvd	North of Cochrane Rd	52	5	10	22
15	Sutter Blvd	Cochrane Rd to Checkerspot Ln	60	22	48	103
16	Sutter Blvd	South of Checkerspot Ln	63	24	51	111
17	Checkerspot Ln	West of Sutter Blvd	42	3	6	14
18	Checkerspot Ln	East of Sutter Blvd	58	8	18	39
19	Madrone Pkwy	North of Cochrane Rd	63	26	56	121
20	Cochrane Plza	South of Cochrane Rd	59	10	21	46
21	US 101 SB Ramps	South of Cochrane Rd	68	70	151	326
22	US 101 NR Ramps	North of Cochrane Rd	58	30	65	140

Source: FHWA-RD-77-108 and Hexagon. Appendix E contains modeling inputs for existing no project conditions.

Impacts and Mitigation Measures

Thresholds of Significance

For the purposes of this report, a noise and vibration impact is considered significant if the project would result in:

- 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; or
- Generation of excessive groundborne vibration or groundborne noise levels; or
- 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.

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. Therefore, the last threshold listed above is not discussed further.

The following criteria established by the Federal Transit Administration (FTA), Morgan Hill General Plan, and Morgan Hill Municipal Code were used to evaluate the significance of environmental noise and vibration resulting from the project:

- A significant noise impact would be identified if the project would expose persons to or generate noise levels that would exceed applicable noise criteria presented in the Morgan Hill General Plan or Morgan Hill Municipal Code.

- A significant impact would be identified if project-generated off-site traffic, on-site commercial operations, or on-site construction activities would substantially increase noise levels at existing sensitive receptors in the vicinity. A substantial increase from project-generated off-site traffic noise levels would be identified relative to the numeric increase significance criteria contained in Policy SSI-8.5 of the Morgan Hill General Plan.

  General Plan Policy SSI-8.6 states that noise levels produced by stationary noise sources associated with new projects shall be considered significant if they substantially exceed existing ambient noise levels. However, Policy SSI-8.6 does not contain numeric increase significance criteria. In terms of determining the temporary noise increase due to project on-site operations and construction activities (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 commercial operations and construction activity 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.

- A significant impact would be identified if on-site project construction activities or project operations would expose existing or proposed sensitive receptors to excessive groundborne vibration levels. Specifically, an impact would be identified if groundborne vibration levels due to these sources would exceed FTA vibration impact criteria.

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. Impacts 1 and 2 evaluate increases in off-site traffic noise levels which would result from the project.

Pursuant to Policy SSI-8.5 of the Morgan Hill General Plan, traffic noise level increases from new projects are considered significant if: a) the noise level increase is 5 dB DNL or greater, with a future noise level of less than 60 dB DNL, or b) the noise level increase is 3 dB DNL or greater, with a future noise level of 60 dB DNL or greater.

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 PM peak hour intersection turning movements were provided by the project transportation consultant (Hexagon Transportation Consultants, Inc.). Those data were converted to Average Daily Traffic (ADT) segment volumes by applying a factor of 10 to PM peak hour conditions. Other inputs were obtained from BAC field observations and aerial imagery. Appendices E and F contain the FHWA Model inputs for existing no project and existing plus project conditions, respectively. The existing and existing plus project traffic noise levels at the distances representing the nearest sensitive land uses to the project area roadways are summarized in Table 8. Table 8 also shows the thresholds for determination of a significant traffic noise increase, whether the roadway segment contains sensitive uses, and whether or not significant noise impacts are identified for each segment.

Table 8
Predicted Traffic Noise Level Increases at Existing Sensitive Receptors – Existing vs. Existing Plus Project Conditions

#	Roadway	Segment Description	Predicted DNL (dB)			Significance Threshold[1]	Threshold Exceeded?	Sensitive Receptors Present?[2]	Significant Impact Identified?[3]
			E	E+P	Increase				
1	Cochrane Rd	West of Monterey Hwy	59.5	59.5	0.0	5.0	No	No	No
2	Cochrane Rd	Monterey Rd to Butterfield Blvd	64.6	64.6	0.1	3.0	No	**Yes**	No
3	Cochrane Rd	Butterfield Blvd to Woodview Ave	64.1	64.1	0.0	3.0	No	No	No
4	Cochrane Rd	Woodview Ave to Sutter Blvd	63.3	63.4	0.1	3.0	No	No	No
5	Cochrane Rd	Sutter Blvd to Cochrane Plza	64.9	65.0	0.0	3.0	No	No	No
6	Cochrane Rd	Cochrane Plza to US 101 SB Ramps	69.0	69.1	0.0	3.0	No	No	No
7	Cochrane Rd	US 101 SB Ramps to US 101 NB Ramps	60.2	60.2	0.0	3.0	No	No	No
8	Cochrane Rd	East of US 101 NB Ramps	65.4	65.4	0.0	3.0	No	**Yes**	No
9	Monterey Hwy	North of Cochrane Rd	65.4	65.4	0.0	3.0	No	**Yes**	No
10	Monterey Hwy	South of Cochrane Rd	65.3	65.4	0.1	3.0	No	**Yes**	No
11	Butterfield Blvd	South of Cochrane Rd	67.3	67.3	0.1	3.0	No	**Yes**	No
12	Woodview Ave	North of Cochrane Rd	49.6	49.6	0.0	5.0	No	No	No
13	Skipper Ln	South of Cochrane Rd	50.2	51.8	1.6	5.0	No	No	No
14	Sutter Blvd	North of Cochrane Rd	52.0	52.0	0.0	5.0	No	No	No
15	Sutter Blvd	Cochrane Rd to Checkerspot Ln	60.2	60.2	0.0	3.0	No	No	No
16	Sutter Blvd	South of Checkerspot Ln	62.5	62.5	0.0	3.0	No	No	No
17	Checkerspot Ln	West of Sutter Blvd	42.5	42.8	0.4	5.0	No	No	No
18	Checkerspot Ln	East of Sutter Blvd	58.5	58.5	0.0	5.0	No	No	No
19	Madrone Pkwy	North of Cochrane Rd	63.1	63.1	0.0	3.0	No	No	No
20	Cochrane Plza	South of Cochrane Rd	59.4	59.4	0.0	5.0	No	No	No
21	US 101 SB Ramps	South of Cochrane Rd	67.7	67.7	0.0	3.0	No	No	No
22	US 101 NR Ramps	North of Cochrane Rd	57.7	57.7	0.0	5.0	No	No	No

[1] Significance thresholds contained in General Plan Policy SSI-8.5.
[2] Sensitive receptors identified in this analysis include residences, churches and schools.
[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 with inputs from Hexagon. Appendices E & F contain modeling inputs for existing no project and existing plus project conditions.

As indicated in Table 8, project-generated traffic noise level increases would not result in significant noise impacts at existing sensitive receptors located along the project area roadway network relative to increase significance criteria contained in Policy SSI-8.5 of the Morgan Hill General Plan. As a result, this impact is identified as being ***less than significant***.

Impact 2: Increases in Cumulative Traffic Noise Levels due to the Project

The FHWA Traffic Noise Model (FHWA-RD-77-108) was used to quantify increases in future (cumulative) traffic noise levels at the nearest existing sensitive land uses to the project area roadway network. This analysis first assesses whether a cumulative roadway noise impact would occur by comparing the cumulative with project conditions to existing conditions. If a cumulative roadway noise impact is identified, it is further evaluated to assess whether the proposed project would make a cumulatively considerable contribution to the cumulative impact. This process is completed through a comparison of the roadway noise associated with the cumulative with project scenario against the cumulative no-project scenario. Appendices G and H contain the FHWA Model inputs for cumulative no project and cumulative plus project conditions, respectively.

Table 9 compares the cumulative with project traffic noise levels against existing no project traffic noise levels and includes a determination regarding whether the corresponding increase in traffic noise exposure over time is considerable. Table 10 compares cumulative with project against cumulative no-project conditions to determine if the project's contribution to the cumulative noise environment is considerable.

Table 9
Predicted Traffic Noise Level Increases at Existing Sensitive Receptors – Existing vs. Cumulative Plus Project Conditions

#	Roadway	Segment Description	Predicted DNL (dB)			Significance Threshold[1]	Threshold Exceeded?	Sensitive Receptors Present?[2]	Significant Impact Identified?[3]
			E	C+P	Increase				
1	Cochrane Rd	West of Monterey Hwy	59.5	59.5	0.0	5.0	No	No	No
2	Cochrane Rd	Monterey Rd to Butterfield Blvd	64.6	65.9	1.3	3.0	No	**Yes**	No
3	Cochrane Rd	Butterfield Blvd to Woodview Ave	64.1	65.1	1.1	3.0	No	No	No
4	Cochrane Rd	Woodview Ave to Sutter Blvd	63.3	64.3	1.0	3.0	No	No	No
5	Cochrane Rd	Sutter Blvd to Cochrane Plza	64.9	65.9	1.0	3.0	No	No	No
6	Cochrane Rd	Cochrane Plza to US 101 SB Ramps	69.0	70.0	0.9	3.0	No	No	No
7	Cochrane Rd	US 101 SB Ramps to US 101 NB Ramps	60.2	61.5	1.3	3.0	No	No	No
8	Cochrane Rd	East of US 101 NB Ramps	65.4	67.1	1.7	3.0	No	**Yes**	No
9	Monterey Hwy	North of Cochrane Rd	65.4	66.6	1.2	3.0	No	**Yes**	No
10	Monterey Hwy	South of Cochrane Rd	65.3	66.4	1.0	3.0	No	**Yes**	No
11	Butterfield Blvd	South of Cochrane Rd	67.3	69.0	1.8	3.0	No	**Yes**	No
12	Woodview Ave	North of Cochrane Rd	49.6	49.6	0.0	5.0	No	No	No
13	Skipper Ln	South of Cochrane Rd	50.2	54.4	4.1	5.0	No	No	No
14	Sutter Blvd	North of Cochrane Rd	52.0	52.8	0.7	5.0	No	No	No
15	Sutter Blvd	Cochrane Rd to Checkerspot Ln	60.2	61.5	1.3	3.0	No	No	No
16	Sutter Blvd	South of Checkerspot Ln	62.5	62.9	0.4	3.0	No	No	No
17	Checkerspot Ln	West of Sutter Blvd	42.5	44.7	2.2	5.0	No	No	No
18	Checkerspot Ln	East of Sutter Blvd	58.5	55.3	-3.2	5.0	No	No	No
19	Madrone Pkwy	North of Cochrane Rd	63.1	64.0	0.9	3.0	No	No	No
20	Cochrane Plza	South of Cochrane Rd	59.4	59.4	0.1	5.0	No	No	No
21	US 101 SB Ramps	South of Cochrane Rd	67.7	67.8	0.1	3.0	No	No	No
22	US 101 NR Ramps	North of Cochrane Rd	57.7	59.5	1.8	5.0	No	No	No

[1] Significance thresholds contained in General Plan Policy SSI-8.5.

[2] Sensitive receptors identified in this analysis include residences, churches and schools.

[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 with inputs from Hexagon. Appendices E & H contain modeling inputs for existing no project and cumulative plus project conditions.

Table 10
Predicted Traffic Noise Level Increases at Existing Sensitive Receptors – Cumulative vs. Cumulative Plus Project Conditions

#	Roadway	Segment Description	Predicted DNL (dB)			Significance Threshold[1]	Threshold Exceeded?	Sensitive Receptors Present?[2]	Significant Impact Identified?[3]
			C	C+P	Increase				
1	Cochrane Rd	West of Monterey Hwy	59.5	59.5	0.0	5.0	No	No	No
2	Cochrane Rd	Monterey Rd to Butterfield Blvd	65.8	65.9	0.0	3.0	No	**Yes**	No
3	Cochrane Rd	Butterfield Blvd to Woodview Ave	65.1	65.1	0.0	3.0	No	No	No
4	Cochrane Rd	Woodview Ave to Sutter Blvd	64.3	64.3	0.1	3.0	No	No	No
5	Cochrane Rd	Sutter Blvd to Cochrane Plza	65.9	65.9	0.0	3.0	No	No	No
6	Cochrane Rd	Cochrane Plza to US 101 SB Ramps	70.0	70.0	0.0	3.0	No	No	No
7	Cochrane Rd	US 101 SB Ramps to US 101 NB Ramps	61.5	61.5	0.0	3.0	No	No	No
8	Cochrane Rd	East of US 101 NB Ramps	67.1	67.1	0.0	3.0	No	**Yes**	No
9	Monterey Hwy	North of Cochrane Rd	66.6	66.6	0.0	3.0	No	**Yes**	No
10	Monterey Hwy	South of Cochrane Rd	66.3	66.4	0.0	3.0	No	**Yes**	No
11	Butterfield Blvd	South of Cochrane Rd	69.0	69.0	0.0	3.0	No	**Yes**	No
12	Woodview Ave	North of Cochrane Rd	49.6	49.6	0.0	5.0	No	No	No
13	Skipper Ln	South of Cochrane Rd	53.5	54.4	0.8	5.0	No	No	No
14	Sutter Blvd	North of Cochrane Rd	52.8	52.8	0.0	5.0	No	No	No
15	Sutter Blvd	Cochrane Rd to Checkerspot Ln	61.5	61.5	0.0	3.0	No	No	No
16	Sutter Blvd	South of Checkerspot Ln	62.9	62.9	0.0	3.0	No	No	No
17	Checkerspot Ln	West of Sutter Blvd	44.6	44.7	0.1	5.0	No	No	No
18	Checkerspot Ln	East of Sutter Blvd	55.3	55.3	0.0	5.0	No	No	No
19	Madrone Pkwy	North of Cochrane Rd	64.0	64.0	0.0	3.0	No	No	No
20	Cochrane Plza	South of Cochrane Rd	59.4	59.4	0.0	5.0	No	No	No
21	US 101 SB Ramps	South of Cochrane Rd	67.8	67.8	0.0	3.0	No	No	No
22	US 101 NR Ramps	North of Cochrane Rd	59.5	59.5	0.0	5.0	No	No	No

[1] Significance thresholds contained in General Plan Policy SSI-8.5.
[2] Sensitive receptors identified in this analysis include residences, churches and schools.
[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 with inputs from Hexagon. Appendices G & F contain modeling inputs for cumulative no project and cumulative plus project conditions.

Based on the analysis presented in Tables 9 and 10, off-site traffic noise impacts related to project-generated increases in traffic are identified as ***less than significant*** relative to increase significance criteria contained in Policy SSI-8.5 of the Morgan Hill General Plan.

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

The project consists of the construction and operation of a Raising Cane's Store #991 with drive-through services. It is the understanding of BAC that the project proposes restaurant operations (including drive-through services) during the hours of 9:00 a.m. to 3:30 a.m. seven days a week. The primary noise sources associated with project on-site operations have been identified as parking lot movements, drive-thru operations (vehicle passages and amplified menu speaker board), on-site vehicle circulation, outdoor dining area noise (including music), delivery truck circulation and delivery activities, and mechanical equipment (HVAC). Analyses of each of the identified project noise sources at nearby existing residential uses are provided in the following section.

For noise generated by on-site operations, Section 18.76.090 of the Morgan Hill Municipal Code establishes a property line exterior noise level standard of 60 dB L_{eq} for residential uses. Satisfaction of the City's noise level criterion at the closest residential uses would ensure compliance with the City's noise level limit at residential uses located farther away.

Impact 3: Parking Area Noise at Nearest Noise-Sensitive Uses

As a means of determining potential noise exposure due to project parking lot activities, Bollard Acoustical Consultants, Inc. (BAC) utilized specific parking lot noise level measurements conducted by BAC. Specifically, a series of individual noise measurements were conducted of multiple vehicle types arriving and departing a parking area, including engines starting and stopping, car doors opening and closing, and persons conversing as they entered and exited the vehicles. The results of those measurements revealed that individual parking lot movements generated mean noise levels of approximately 70 dB SEL at a reference distance of 50 feet.

To compute hourly average (L_{eq}) noise levels generated by parking lot activities, the approximate number of hourly operations and distance to parking stalls is required. According to the project site plans, the project proposes approximately 50 parking stalls. It was conservatively assumed for the purpose of this analysis that all proposed parking stalls could either fill or empty during a given peak hour (although it is likely that parking area activity would be more spread out). The hourly average noise level generated by parking lot movements is computed using the following formula:

$$Peak\ Hour\ L_{eq} = 70+10*log\ (N) - 35.6$$

Where 70 is the mean Sound Exposure Level (SEL) for an automobile parking lot arrival or departure, N is the number of parking lot operations in a given hour (50), and 35.6 is 10 times the logarithm of the number of seconds in an hour. Using the information provided above, and assuming standard spherical spreading loss (-6 dB per doubling of distance), project parking activity noise exposure at the property lines of the nearest residential uses was calculated and the results of those calculations are presented in Table 11.

Table 11
Predicted Parking Area Noise Levels at Nearest Residential Uses

Receiver[1]	Direction	Assessment Location	Predicted Noise Level, L_{eq} (dB)[2]
Single-Family Residential	North	Property Line	34
Multi-Family Residential	West	Property Line	39
Multi-Family Residential	Southwest	Property Line	38

[1] Locations of residential uses are shown in Figure 1.
[2] Worst-case predicted parking area noise levels from all 50 proposed stalls emptying or filling during a given hour.

Source: BAC 2024.

As shown in Table 11, worst-case project parking area noise is predicted to satisfy the applicable Municipal Code 60 dB L_{eq} exterior noise level standard at the property lines of the closest residential uses.

Appendices C & D of this report contain the results from the BAC ambient noise surveys at sites 1 and 2, which are believed to be representative of the ambient noise environments at the existing residential uses to the north, west and southwest of the project. Using the lowest average measured hourly (L_{eq}) noise levels at sites 1 and 2 during the hours of operations proposed by the project (9:00 a.m. to 3:30 a.m.), ambient plus project parking area noise level increases were calculated at the residential uses to north, west and southwest. According to the results from that exercise, project-generated increases in ambient noise levels are calculated to be less than 0.1 dB L_{eq} at the closest residential uses during daytime hours of operation (9:00 a.m. to 10:00 p.m.). During proposed nighttime hours of operations (10:00 p.m. to 3:30 a.m.), project-generated increases in ambient noise levels are calculated to range from less than 0.1 dB L_{eq} to 0.5 dB L_{eq} at those nearby residential uses. The calculated increases in ambient noise levels cited above are well below the applied increase significance criterion of 5 dB.

Because noise exposure from project parking area activities is predicted to satisfy applicable Morgan Hill Municipal Code noise level criterion at the closest residential uses, and because noise level exposure from parking activities is not calculated to significantly increase ambient noise levels at those sensitive receivers, this impact is identified as being ***less than significant.***

Impact 4: Drive-Thru Operations Noise at Nearest Noise-Sensitive Uses

According to the project site plan, the proposed drive-through will have two (2) amplified menu speaker posts. Specifically, it is the understanding of BAC that the project proposes two (2) HME SPP2 speaker posts.

To quantify the noise emissions of the proposed drive-through speaker usage, BAC utilized noise level measurement data published by the speaker manufacturer (HM Electronics, Inc.). According to the manufacturers noise level data sheet, presented as Appendix I, the proposed HME SPP2 speaker post can incorporate automatic volume control (AVC), which adjusts outbound volume based on the ambient noise level environment. For example, assuming an outdoor ambient noise level of 45 dB, the speaker will adjust the volume of the system to 45 dB for a resulting overall

sound level of 48 dB at a distance of 4 feet. Without the AVC option, the speaker reference noise level is 72 dB at 4 feet. To quantify the noise emissions of the proposed drive-through vehicle passages, BAC utilized noise measurement data collected for similar drive-through operations in the greater Sacramento area in recent years. BAC file data indicates that drive-through vehicle passages, including vehicle idling, have median and maximum noise levels of 60 dB L_{eq} at a distance of 5 feet.

Using the BAC drive-through vehicle passby data and speaker manufacturer noise level measurements presented above, and assuming standard spherical spreading loss (-6 dB per doubling of distance), data were projected from the proposed drive-through lane and speaker posts to the property lines of the nearest residential uses. The results of those projections are presented in Table 12. The results presented in Table 12 include conservative predictions of project drive-through speaker noise levels (i.e., AVC option not enabled).

Table 12
Predicted Drive-Through Noise Levels at Nearest Residential Uses

Receiver[1]	Direction	Assessment Location	Predicted Noise Level, L_{eq} (dB)[2]	
			Speakers[3]	Vehicles
Single-Family Residential	North	Property Line	38	28
Multi-Family Residential	West	Property Line	33	29
Multi-Family Residential	Southwest	Property Line	36	24

[1] Locations of residential uses are shown in Figure 1.
[2] Combined noise level from two speakers in operation simultaneously (worst-case).
[3] Predicted combined speaker noise level with AVC option not enabled.

Source: BAC 2024.

Table 12 data indicate that project drive-through operations noise is predicted to satisfy the applicable Municipal Code 60 dB L_{eq} exterior noise level standard at the property lines of the closest residential uses. It should be noted that activation of the drive-through speaker model's AVC option would further reduce speaker noise level exposure at nearby noise-sensitive uses.

Using the lowest average measured hourly (L_{eq}) noise levels at sites 1 and 2 during the hours of operations proposed by the project (9:00 a.m. to 3:30 a.m.), ambient plus project drive-through operations noise level increases were calculated at the residential uses to north, west and southwest. According to the results from that exercise, project-generated increases in ambient noise levels are calculated to be less than 0.1 dB L_{eq} at the closest residential uses during daytime hours of operation (9:00 a.m. to 10:00 p.m.). During proposed nighttime hours of operations (10:00 p.m. to 3:30 a.m.), project-generated increases in ambient noise levels are calculated to range from 0.1 dB L_{eq} to 0.3 dB L_{eq} at those nearby residential uses. The calculated increases in ambient noise levels cited above are well below the applied increase significance criterion of 5 dB.

Because noise exposure from project drive-through operations is predicted to satisfy applicable Morgan Hill Municipal Code noise level criterion at the closest residential uses, and because noise

level exposure from drive-through operations is not calculated to significantly increase ambient noise levels at those sensitive receivers, this impact is identified as being ***less than significant.***

Impact 5: On-Site Passenger Vehicle Circulation Noise at Nearby Sensitive Uses

To quantify project on-site passenger vehicle circulation noise exposure, BAC utilized specific automobile passby noise level measurements conducted by BAC. Specifically, a series of individual noise measurements were conducted of multiple vehicle types arriving and departing a parking area. The results of those measurements revealed that individual vehicle passbys generated mean noise levels of approximately 70 dB SEL at a reference distance of 50 feet.

To compute hourly average (L_{eq}) noise levels generated by project on-site vehicle circulation, the approximate number of hourly operations is required. According to the provided trip generation estimates prepared by the project traffic consultant (Hexagon Transportation Consultants, Inc.), the project is estimated to generate up to 96 vehicle trips during an PM peak hour. For the purpose of this analysis, worst-case estimated peak hour trip generation (96 vehicles) was assumed during proposed daytime hours of operation (9:00 a.m. to 10:00 p.m.), and 50% of worst-case estimated peak hour trip generation (48 vehicles) was reasonably assumed during proposed nighttime hours of operation (10:00 a.m. to 3:30 a.m.). Based on the trip generation estimates and operations assumptions above, and assuming standard spherical spreading loss (-6 dB per doubling of distance), worst-case project on-site passenger vehicle circulation noise exposure at the property lines of the nearest residential uses was calculated and the results of those calculations are presented in Table 13.

It should be noted that the results presented in Table 13 conservatively assume that worse-case busy hour vehicle trip generation could all occur within an on-site drive lane located closest to a residential use. However, it is more likely that on-site vehicle circulation would be more evenly distributed.

Table 13
Predicted On-Site Passenger Vehicle Circulation Noise Levels at Nearest Residential Uses

Receiver[1]	Direction	Assessment Location	Predicted Noise Level, L_{eq} (dB)[2,3]	
			Daytime	Nighttime
Single-Family Residential	North	Property Line	46	43
Multi-Family Residential	West	Property Line	46	43
Multi-Family Residential	Southwest	Property Line	48	45

[1] Locations of residential uses are shown in Figure 1.
[2] Predicted daytime noise level based on 96 vehicle trips during a given daytime hour of operations.
[3] Predicted nighttime noise level based on 48 vehicle trips during a given nighttime hour of operations.

Source: BAC 2024.

As indicated in Table 13, predicted worst-case project on-site passenger vehicle circulation noise levels would satisfy the applicable Municipal Code 60 dB L_{eq} exterior noise level standard at the property lines of the closest residential uses.

Using the lowest average measured hourly (L_{eq}) noise levels at sites 1 and 2 during the hours of operations proposed by the project (9:00 a.m. to 3:30 a.m.), ambient plus project on-site vehicle circulation noise level increases were calculated at the residential uses to north, west and southwest. According to the results from that exercise, project-generated increases in ambient noise levels are calculated to range from 0.1 dB L_{eq} to 0.3 dB L_{eq} at the closest residential uses during daytime hours of operation (9:00 a.m. to 10:00 p.m.). During proposed nighttime hours of operations (10:00 p.m. to 3:30 a.m.), project-generated increases in ambient noise levels are calculated to range from 0.3 dB L_{eq} to 1.6 dB L_{eq} at those nearby residential uses. The calculated increases in ambient noise levels cited above are well below the applied increase significance criterion of 5 dB.

Because noise exposure from project on-site passenger vehicle circulation is predicted to satisfy applicable Morgan Hill Municipal Code noise level criterion at the closest residential uses, and because noise level exposure from on-site vehicle circulation is not calculated to significantly increase ambient noise levels at those sensitive receivers, this impact is identified as being ***less than significant.***

Impact 6: Outdoor Dining Area Noise at Nearest Noise-Sensitive Uses

According to the provided site plans, the project proposes an outdoor seating area (patio) for restaurant patrons. The location of the outdoor dining area is shown in Figure 2.

To quantify outdoor dining area noise, BAC utilized file data from the SoundPLAN noise modeling software program (Version 9.0). According to the modeling program (catalog emission #173), restaurant dining areas with music have a reference sound level of 82 dB at a distance of 1 meter. Based on the reference sound level data above, and assuming standard spherical spreading loss (-6 dB per doubling of distance), project outdoor dining area noise was projected at the property lines of the nearest residential uses. The results of those projections are presented in Table 14.

Table 14
Predicted Outdoor Dining Area Noise Levels at Nearest Residential Uses

Receiver[1]	Direction	Assessment Location	Predicted Noise Level, L_{eq} (dB)[2]
Single-Family Residential	North	Property Line	44
Multi-Family Residential	West	Property Line	46
Multi-Family Residential	Southwest	Property Line	44

[1] Locations of residential uses are shown in Figure 1.
[2] Predicted noise levels based on a reference sound level of 82 dB at a distance of 1 meter (3.3 feet).

Source: BAC 2024.

Table 14 data indicate that predicted outdoor dining area noise levels would satisfy the applicable Municipal Code 60 dB L_{eq} exterior noise level standard at the property lines of the closest residential uses.

Using the lowest average measured hourly (L_{eq}) noise levels at sites 1 and 2 during the hours of operations proposed by the project (9:00 a.m. to 3:30 a.m.), ambient plus project outdoor dining area noise level increases were calculated at the residential uses to north, west and southwest. According to the results from that exercise, project-generated increases in ambient noise levels are calculated to range from less than 0.1 dB L_{eq} to 0.2 dB L_{eq} at the closest residential uses during daytime hours of operation (9:00 a.m. to 10:00 p.m.). During proposed nighttime hours of operations (10:00 p.m. to 3:30 a.m.), project-generated increases in ambient noise levels are calculated to range from 0.4 dB L_{eq} to 2.1 dB L_{eq} at those nearby residential uses. The calculated increases in ambient noise levels cited above are well below the applied increase significance criterion of 5 dB.

Because noise exposure from the project outdoor dining area is predicted to satisfy applicable Morgan Hill Municipal Code noise level criterion at the closest residential uses, and because noise level exposure from the outdoor dining area is not calculated to significantly increase ambient noise levels at those sensitive receivers, this impact is identified as being ***less than significant.***

Impact 7: On-Site Truck Circulation Noise at Nearest Noise-Sensitive Uses

According to the provided site plans, deliveries of product to the restaurant will occur at a designated delivery area. The location of the proposed truck delivery area and on-site truck circulation route is shown in Figure 2.

On-site truck passbys are expected to be relatively brief and 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, single-event heavy and medium truck passby noise levels are approximately 83 and 76 dB SEL (respectively) at a reference distance of 50 feet.

To calculate hourly average (L_{eq}) noise level exposure from truck circulation, it was assumed that the project could have 1 heavy truck and 1 medium duty truck delivery during the same hour. Based on the hourly delivery truck assumptions above, and SEL's of 83 and 76 dB per passby, the combined hourly average noise level generated by project on-site delivery truck circulation computes to 48 dB L_{eq} at a reference distance of 50 feet from the passby route during the worst-case hour of deliveries.

Based on the reference noise level data and operations assumptions presented above, and assuming standard spherical spreading loss (-6 dB per doubling of distance), project on-site truck circulation noise exposure at the property lines of the nearest residential uses was calculated and the results of those calculations are presented in Table 15.

Table 15
Predicted On-Site Truck Circulation Noise Levels at Nearest Residential Uses

Receiver[1]	Direction	Assessment Location	Predicted Noise Level, L_{eq} (dB)[2]
Single-Family Residential	North	Property Line	37
Multi-Family Residential	West	Property Line	37
Multi-Family Residential	Southwest	Property Line	39

[1] Locations of residential uses are shown in Figure 1.
[2] Predicted noise level based on 1 heavy truck and 1 medium truck delivery within the same hour.

Source: BAC 2024.

As shown in Table 15, predicted on-site truck circulation noise levels would satisfy the applicable Municipal Code 60 dB L_{eq} exterior noise level standard at the property lines of the closest residential uses.

Using the lowest average measured hourly (L_{eq}) noise levels at sites 1 and 2 during the hours of operations proposed by the project (9:00 a.m. to 3:30 a.m.), ambient plus project on-site truck circulation noise level increases were calculated at the residential uses to north, west and southwest. According to the results from that exercise, project-generated increases in ambient noise levels are calculated to be less than 0.1 dB L_{eq} at the closest residential uses during daytime hours of operation (9:00 a.m. to 10:00 p.m.). During proposed nighttime hours of operations (10:00 p.m. to 3:30 a.m.), project-generated increases in ambient noise levels are calculated to range from 0.1 dB L_{eq} to 0.4 dB L_{eq} at those nearby residential uses. The calculated increases in ambient noise levels cited above are well below the applied increase significance criterion of 5 dB.

Because noise exposure from project on-site truck circulation is predicted to satisfy applicable Morgan Hill Municipal Code noise level criterion at the closest residential uses, and because noise level exposure from on-site truck circulation is not calculated to significantly increase ambient noise levels at those sensitive receivers, this impact is identified as being ***less than significant.***

Impact 8: Truck Delivery Noise at Nearest Noise-Sensitive Uses

According to the project description, the restaurant will receive deliveries of fresh chicken every 24 hours, as well as for deliveries associated with laundry pickup/drop-offs throughout the week. The proposed location of the delivery truck unloading/loading area is shown in Figure 2.

The primary noise sources associated with delivery activities are trucks stopping (air brakes), trucks backing into position (back-up alarms), and trucks pulling away from the unloading/loading area (revving engines). BAC file data indicate that noise levels associated with medium-(including side-step vans) and heavy-duty truck deliveries are approximately 83 dB SEL at a distance of 100 feet. To calculate hourly average (L_{eq}) noise level exposure from truck deliveries, it was reasonably assumed that the project could have 1 heavy truck and 1 medium duty truck deliveries during the same hour. Based on the hourly delivery assumptions above and an SEL of

83 dB, the hourly average noise level computes to 50 dB L_{eq} at a reference distance of 100 feet during the worst-case hour of deliveries.

Using the reference noise level data and operations assumptions presented above, and assuming standard spherical spreading loss (-6 dB per doubling of distance), project truck delivery activity noise exposure at the property lines of the nearest residential uses was calculated and the results of those calculations are presented in Table 16.

Table 16
Predicted Truck Delivery Noise Levels at Nearest Residential Uses

Receiver[1]	Direction	Assessment Location	Predicted Noise Level, L_{eq} (dB)[2]
Single-Family Residential	North	Property Line	42
Multi-Family Residential	West	Property Line	40
Multi-Family Residential	Southwest	Property Line	39

[1] Locations of residential uses are shown in Figure 1.
[2] Predicted noise level based on 1 heavy truck and 1 medium truck delivery within the same hour.

Source: BAC 2024.

Table 16 data indicate that predicted truck delivery noise levels would satisfy the applicable Municipal Code 60 dB L_{eq} exterior noise level standard at the property lines of the closest residential uses.

Using the lowest average measured hourly (L_{eq}) noise levels at sites 1 and 2 during the hours of operations proposed by the project (9:00 a.m. to 3:30 a.m.), ambient plus project truck delivery activity noise level increases were calculated at the residential uses to north, west and southwest. According to the results from that exercise, project-generated increases in ambient noise levels are calculated to range from less than 0.1 dB L_{eq} to 0.1 dB L_{eq} at the closest residential uses during daytime hours of operation (9:00 a.m. to 10:00 p.m.). During proposed nighttime hours of operations (10:00 p.m. to 3:30 a.m.), project-generated increases in ambient noise levels are calculated to range from 0.2 dB L_{eq} to 0.6 dB L_{eq} at those nearby residential uses. The calculated increases in ambient noise levels cited above are well below the applied increase significance criterion of 5 dB.

Because noise exposure from project truck delivery activity is predicted to satisfy applicable Morgan Hill Municipal Code noise level criterion at the closest residential uses, and because noise level exposure from that activity is not calculated to significantly increase ambient noise levels at those sensitive receivers, this impact is identified as being ***less than significant.***

Impact 9: Mechanical Equipment (HVAC) Noise at Nearest Noise-Sensitive Uses

Heating, ventilating, and air conditioning (HVAC) requirements for the restaurant will most likely be met using packaged roof-mounted systems. As a means of determining noise exposure due to rooftop mechanical equipment, BAC utilized reference file data collected for previous studies. BAC reference file data for HVAC systems indicate that a 12.5-ton packaged unit can be expected to generate an A-weighted sound power level of 85 dB.

Using the sound power data stated above, and assuming standard spherical spreading loss (-6 dB per doubling of distance), project HVAC equipment noise exposure at the property lines of the nearest residential uses was calculated and the results of those calculations are presented in Table 17.

Table 17
Predicted HVAC Equipment Noise Levels at Nearest Residential Uses

Receiver[1]	Direction	Assessment Location	Predicted Noise Level, L_{eq} (dB)
Single-Family Residential	North	Property Line	38
Multi-Family Residential	West	Property Line	38
Multi-Family Residential	Southwest	Property Line	35

[1] Locations of residential uses are shown in Figure 1.

Source: BAC 2024.

As indicated in Table 17, project HVAC equipment noise levels are predicted to satisfy the applicable Municipal Code 60 dB L_{eq} exterior noise level standard at the property lines of the closest residential uses.

Using the lowest average measured hourly (L_{eq}) noise levels at sites 1 and 2 during the hours of operations proposed by the project (9:00 a.m. to 3:30 a.m.), ambient plus project HVAC equipment noise level increases were calculated at the residential uses to north, west and southwest. According to the results from that exercise, project-generated increases in ambient noise levels are calculated to be less than 0.1 dB L_{eq} at the closest residential uses during daytime hours of operation (9:00 a.m. to 10:00 p.m.). During proposed nighttime hours of operations (10:00 p.m. to 3:30 a.m.), project-generated increases in ambient noise levels are calculated to range from 0.1 dB L_{eq} to 0.4 dB L_{eq} at those nearby residential uses. The calculated increases in ambient noise levels cited above are well below the applied increase significance criterion of 5 dB.

Because noise exposure from project HVAC equipment is predicted to satisfy applicable Morgan Hill Municipal Code noise level criterion at the closest residential uses, and because noise level exposure from that equipment is not calculated to significantly increase ambient noise levels at those sensitive receivers, this impact is identified as being ***less than significant.***

Impact 10: Cumulative On-Site Operations Noise at Nearest Residential Uses

The calculated cumulative (combined) noise levels from analyzed on-site operations at the property lines of the nearest residential uses are presented in Tables 18 and 19. 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 18
Calculated Cumulative On-Site Noise Levels at Nearest Residential Uses – Daytime Hours

	Predicted Exterior Noise Levels, L_{eq} (dB)							
Receiver	Parking	Drive-Through[1]	Vehicle Circ.	Outdoor Patio	Truck Circ.	Truck Deliveries	HVAC	Cumulative, L_{eq} (dB)[2]
SFR-North	34	39	46	44	37	42	38	50
MFR-West	39	38	46	46	37	40	38	51
MFR-Southwest	38	36	48	44	39	39	35	15

[1] Combined noise levels from drive-through operations sources (i.e., menu speakers and vehicles).
[2] Calculated cumulative noise levels based on predicted noise levels presented in Impacts 3-9.

Source: BAC 2024.

Table 19
Calculated Cumulative On-Site Noise Levels at Nearest Residential Uses – Nighttime Hours

	Predicted Exterior Noise Levels, L_{eq} (dB)							
Receiver	Parking	Drive-Through[1]	Vehicle Circ.	Outdoor Patio	Truck Circ.	Truck Deliveries	HVAC	Cumulative, L_{eq} (dB)[2]
SFR-North	34	39	43	44	37	42	38	49
MFR-West	39	38	43	46	37	40	38	50
MFR-Southwest	38	36	45	44	39	39	35	49

[1] Combined noise levels from drive-through operations sources (i.e., menu speakers and vehicles).
[2] Calculated cumulative noise levels based on predicted noise levels presented in Impacts 3-9.

Source: BAC 2024.

Tables 18 and 19 data indicate that calculated cumulative (combined) noise level exposure from analyzed project on-site operations would satisfy the applicable Municipal Code 60 dB L_{eq} exterior noise level standard at the property lines of the closest residential uses.

Using the lowest average measured hourly (L_{eq}) noise levels at sites 1 and 2 during the hours of operations proposed by the project (9:00 a.m. to 3:30 a.m.), ambient plus cumulative project operations noise level increases were calculated at the residential uses to north, west and southwest. According to the results from that exercise, cumulative project-generated increases in ambient noise levels are calculated to range from than 0.2 dB L_{eq} to 0.6 dB L_{eq} at the closest residential uses during daytime hours of operation (9:00 a.m. to 10:00 p.m.). During proposed nighttime hours of operations (10:00 p.m. to 3:30 a.m.), cumulative project-generated increases in ambient noise levels are calculated to range from 1.0 dB L_{eq} to 3.9 dB L_{eq} at those nearby residential uses. The calculated increases in ambient noise levels cited above are below the applied increase significance criterion of 5 dB.

Because cumulative (combined) noise exposure from project on-site operations is predicted to satisfy applicable Morgan Hill Municipal Code noise level criterion at the closest residential uses, and because cumulative noise level exposure from those operations is not calculated to

significantly increase ambient noise levels at those sensitive receivers, this impact is identified as being ***less than significant.***

Noise Impacts Associated with Project Construction Activities

Impact 11: Project Construction Noise at Adjacent Commercial Land Uses

During project construction activities, heavy equipment would be used for grading excavation, paving, and building construction, which would increase ambient noise levels when in use. Noise levels would vary depending on the type of equipment used, how it is operated, and how well it is maintained. Noise exposure at any single point outside the project work area would also vary depending upon the proximity of equipment activities to that point.

Table 20 includes the range of maximum noise levels for equipment commonly used in general construction projects at full-power operation at a distance of 50 feet. Not all of these construction activities would be required of this project. Table 20 data also include predicted maximum (L_{max}) equipment noise levels at the nearest noise-sensitive uses (i.e., residential), which assume a standard spherical spreading loss of 6 dB per doubling of distance.

Table 20
Reference and Projected Noise Levels for Typical Construction Equipment

Equipment	Reference Noise Level at 50 Feet, L_{max} (dB)	Projected Noise Level, L_{max} (dB) SFR-North (150 ft)	MFR-West (140 ft)	MFR-Southwest (140 ft)
Air compressor	80	70	71	71
Backhoe	80	70	71	71
Ballast equalizer	82	72	73	73
Ballast tamper	83	73	74	74
Compactor	82	72	73	73
Concrete mixer	85	75	76	76
Concrete pump	82	72	73	73
Concrete vibrator	76	66	67	67
Crane, mobile	83	73	74	74
Dozer	85	75	76	76
Excavator	85	75	76	76
Generator	82	72	73	73
Grader	85	75	76	76
Impact wrench	85	75	76	76
Loader	80	70	71	71
Paver	85	75	76	76
Pneumatic tool	85	75	76	76
Pump	77	67	68	68
Saw	76	66	67	67
Scarifier	83	73	74	74
Scraper	85	75	76	76
Shovel	82	72	73	73
Spike driver	77	67	68	68
Tie cutter	84	74	75	75
Tie handler	80	70	71	71
Tie inserter	85	75	76	76
Truck	84	74	75	75
	Low	66	67	67
	High	75	76	76
	Average	71	72	72

Source: 2018 FTA Noise and Vibration Impact Assessment Manual, Table 7-1 and BAC calculations.

As noted in the Regulatory Setting Section of this report, Section 8.28.040(D) of the Morgan Hill Municipal Code exempts construction noise provided that such activities do not occur during set hours. Specifically, construction activities are prohibited other than between the hours of 7:00 a.m. and 8:00 p.m., Monday through Friday and between the hours of 9:00 a.m. to 6:00 p.m. on Saturday. Further, construction activities may not occur on Sundays or federal holidays. It is reasonably assumed for the purposes of this analysis that all on-site noise-generating project construction equipment and activities would occur pursuant to Municipal Code Section 8.28.040(D) and would thereby be exempt from Municipal Code noise level criteria.

However, noise from heavy equipment operations during on-site construction activities would add to the noise environment in the immediate vicinity of the work area. In terms of determining the temporary noise increase due to project-related construction activities, an impact would occur if those activities were to noticeably increase ambient noise levels above background levels at nearby noise-sensitive uses (i.e., residential). As mentioned previously in this report, 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 this analysis, a noticeable increase in ambient noise levels is assumed to occur where noise levels increase by 5 dB or more over existing ambient noise levels.

As mentioned previously, BAC ambient noise measurements obtained at site 1 and 2 are believed to be representative of the ambient noise environments at the existing residential uses to the north, west and southwest of the project. The results of those noise measurements are contained in Appendix C & D of this report. Using the lowest average measured maximum (L_{max}) noise levels at sites 1 and 2 during the daytime hours exempted by the Municipal Code, and the highest predicted construction equipment maximum noise levels shown in Table 20, ambient plus project construction equipment noise level increases were calculated at the nearby residential uses. According to the results from that exercise, project-generated increases in ambient daytime noise levels are calculated to range from 1.9 dB L_{max} to 2.1 dB L_{max} at the closest residential uses. The calculated increases in ambient daytime noise levels indicated above are well below the applied increase significance criterion of 5 dB.

Based on the analysis and results provided above, this impact is identified as being ***less than significant***. Nonetheless, to the reduce the potential for annoyance at nearby existing noise-sensitive uses, the following measures should be incorporated into project on-site construction operations:

- All on-site noise-generating construction activities shall occur pursuant to Section 8.28.040(D) of the Morgan Hill Municipal Code.
- The project shall 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 shall 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 shall comply with such regulations while in the course of project activity.
- Electrically powered equipment shall be used instead of pneumatic or internal-combustion-powered equipment, where feasible.
- Material stockpiles and mobile equipment staging, parking, and maintenance areas shall be located as far as practicable from noise-sensitive receptors.
- Project area and site access road speed limits shall be established and enforced during the construction period.

Vibration Impacts Associated with Project Activities

Impact 12: 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. The nearest existing structures have been identified as relatively newer engineered residences (not highly susceptible to damage by vibration).

Table 21 includes the range of vibration levels for equipment commonly used in general residential construction projects at a distance of 25 feet. Table 21 data also include projected equipment vibration levels at the nearest existing structures to the project area (i.e., residences).

Table 21
Reference and Projected Vibration Source Amplitudes for Construction Equipment

Equipment	Reference Maximum Vibration Level at 25 feet, VdB (rms)	Projected Maximum Vibration Level, VdB (rms)[1]		
		SFR-North (190 ft)	MFR-West (140 ft)	MFR-Southwest (175 ft)
Vibratory Roller	94	62	65	63
Hoe Ram	87	58	61	59
Large bulldozer	87	58	61	59
Caisson drilling	87	58	61	59
Loaded trucks	86	57	60	57
Jackhammer	79	56	58	56
Small bulldozer	58	<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.

Section 18.76.130 of the Morgan Hill Municipal Code states that vibration transmitted through the ground that is discernible without instruments at the lot line of the establishment or use is prohibited. However, vibrations from temporary construction and vehicles that enter and leave the lot (e.g., construction equipment, trucks, etc.) are exempt from this standard.

Based on the data presented in Table 21, vibration levels generated from on-site construction activities are predicted to be below the FTA threshold for damage to engineered structures (98

VdB) at a distance of 25 feet from those activities. Further, construction-related vibration levels are predicted to be at the low-end threshold of human perception (65 VdB) or below at the closest existing residences (Table 21). Based on the analysis provided above, on-site construction within the project area is not expected to result in excessive groundborne vibration levels at nearby existing residences.

Results from the ambient vibration level measurement survey conducted within the project area indicate that average measured vibration levels were below the 65 VdB threshold of perception (Table 6). Therefore, it is expected that the project would not result in the exposure of persons to excessive groundborne vibration levels at proposed uses of the project.

Finally, the project proposes the construction of a commercial use. It is the experience of BAC that commercial uses such as the one proposed by the project do not typically have equipment that generates appreciable vibration.

Because 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 impact is considered to be ***less than significant***.

This concludes BAC's noise and vibration assessment of the Raising Cane's Store #991 project in Morgan Hill, California. 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: Noise survey equipment, facing south towards Cochrane Rd and project site

B Site 1: Vibration survey equipment, facing south towards Cochrane Rd and project site

Raising Cane's Store #991
Morgan Hill, CA

Noise & Vibration Survey Photographs

Appendix B-1

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Legend

A Site 2: Noise survey equipment, facing east towards Butterfield Blvd and project site

B Site 2: Vibration survey equipment, facing north along Butterfield Blvd

Raising Cane's Store #991
Morgan Hill, CA

Noise & Vibration Survey Photographs

Appendix B-2

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Legend

A Site A: Noise and vibration survey equipment, facing north towards Cochrane Rd

B Site A: Noise and vibration survey equipment, facing east towards commercial uses

Raising Cane's Store #991
Morgan Hill, CA

Noise & Vibration Survey Photographs

Appendix B-3

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Appendix C-1
Long-Term Ambient Noise Monitoring Results - Site 1
Raising Cane's Store #991 - Morgan Hill, California
Thursday, January 04, 2024

Hour	Leq	Lmax	L50	L90
12:00 AM	59	84	46	43
1:00 AM	57	79	46	43
2:00 AM	56	75	47	44
3:00 AM	56	78	47	45
4:00 AM	61	81	53	49
5:00 AM	63	80	59	52
6:00 AM	65	79	62	55
7:00 AM	67	89	62	56
8:00 AM	66	81	62	54
9:00 AM	66	84	62	52
10:00 AM	66	84	62	53
11:00 AM	67	89	64	54
12:00 PM	66	87	62	53
1:00 PM	66	83	62	53
2:00 PM	67	89	63	54
3:00 PM	66	82	62	54
4:00 PM	66	90	62	56
5:00 PM	68	89	64	57
6:00 PM	66	84	62	55
7:00 PM	66	85	61	52
8:00 PM	65	79	60	51
9:00 PM	64	79	59	50
10:00 PM	63	84	55	47
11:00 PM	61	82	51	44

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	68	64	66	65	56	61
Lmax (Maximum)	90	79	85	84	75	80
L50 (Median)	64	59	62	62	46	52
L90 (Background)	57	50	53	55	43	47

Computed DNL (dB)	69
% Daytime Energy	84%
% Nighttime Energy	16%

GPS Coordinates	37° 8'53.56"N
	121°39'37.26"W

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Appendix C-2
Long-Term Ambient Noise Monitoring Results - Site 1
Raising Cane's Store #991 - Morgan Hill, California
Friday, January 05, 2024

Hour	Leq	Lmax	L50	L90
12:00 AM	59	84	45	41
1:00 AM	56	77	43	39
2:00 AM	55	74	43	38
3:00 AM	57	75	45	40
4:00 AM	62	89	49	42
5:00 AM	63	79	58	48
6:00 AM	65	82	61	54
7:00 AM	66	83	61	54
8:00 AM	66	88	61	54
9:00 AM	66	86	62	55
10:00 AM	66	89	61	53
11:00 AM	66	80	62	54
12:00 PM	65	78	62	54
1:00 PM	66	88	62	54
2:00 PM	66	84	63	55
3:00 PM	66	82	63	55
4:00 PM	66	87	63	56
5:00 PM	66	84	63	55
6:00 PM	66	86	62	55
7:00 PM	66	86	62	55
8:00 PM	66	87	61	55
9:00 PM	68	97	61	55
10:00 PM	64	80	59	53
11:00 PM	63	85	56	51

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	68	65	66	65	55	62
Lmax (Maximum)	97	78	85	89	74	81
L50 (Median)	63	61	62	61	43	51
L90 (Background)	56	53	54	54	38	45

Computed DNL (dB)	69
% Daytime Energy	82%
% Nighttime Energy	18%

GPS Coordinates	37° 8'53.56"N
	121°39'37.26"W

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Appendix C-3
Long-Term Ambient Noise Monitoring Results - Site 1
Raising Cane's Store #991 - Morgan Hill, California
Saturday, January 06, 2024

Hour	Leq	Lmax	L50	L90
12:00 AM	59	75	51	46
1:00 AM	58	77	51	47
2:00 AM	58	77	51	48
3:00 AM	57	79	49	46
4:00 AM	60	79	53	50
5:00 AM	62	83	53	49
6:00 AM	63	82	57	51
7:00 AM	65	83	60	54
8:00 AM	65	80	61	55
9:00 AM	66	85	61	54
10:00 AM	67	86	62	55
11:00 AM	66	81	63	55
12:00 PM	66	83	63	55
1:00 PM	66	81	63	54
2:00 PM	66	81	63	55
3:00 PM	69	89	64	56
4:00 PM	70	85	67	59
5:00 PM	67	79	64	57
6:00 PM	67	78	64	56
7:00 PM	66	81	63	54
8:00 PM	66	85	61	52
9:00 PM	65	84	60	51
10:00 PM	65	90	57	49
11:00 PM	64	87	55	46

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	70	65	67	65	57	61
Lmax (Maximum)	89	78	83	90	75	81
L50 (Median)	67	60	62	57	49	53
L90 (Background)	59	51	55	51	46	48

Computed DNL (dB)	69
% Daytime Energy	85%
% Nighttime Energy	15%

GPS Coordinates	37° 8'53.56"N
	121°39'37.26"W

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Appendix C-4
Long-Term Ambient Noise Monitoring Results - Site 1
Raising Cane's Store #991 - Morgan Hill, California
Sunday, January 07, 2024

Hour	Leq	Lmax	L50	L90
12:00 AM	62	85	49	44
1:00 AM	59	77	48	43
2:00 AM	56	76	47	44
3:00 AM	55	74	46	43
4:00 AM	58	77	47	44
5:00 AM	59	79	49	46
6:00 AM	60	79	53	48
7:00 AM	64	91	55	49
8:00 AM	64	86	59	53
9:00 AM	65	80	60	53
10:00 AM	65	79	61	53
11:00 AM	66	84	61	53
12:00 PM	65	87	61	53
1:00 PM	68	96	62	54
2:00 PM	66	84	62	53
3:00 PM	66	86	62	53
4:00 PM	66	83	62	54
5:00 PM	66	80	62	55
6:00 PM	67	82	63	54
7:00 PM	66	83	61	53
8:00 PM	67	95	60	53
9:00 PM	65	89	59	51
10:00 PM	62	82	55	50
11:00 PM	61	82	52	47

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	68	64	66	62	55	60
Lmax (Maximum)	96	79	86	85	74	79
L50 (Median)	63	55	61	55	46	49
L90 (Background)	55	49	53	50	43	45

Computed DNL (dB)	68
% Daytime Energy	88%
% Nighttime Energy	12%

GPS Coordinates	37° 8'53.56"N
	121°39'37.26"W

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Appendix C-5
Long-Term Ambient Noise Monitoring Results - Site 2
Raising Cane's Store #991 - Morgan Hill, California
Thursday, January 04, 2024

Hour	Leq	Lmax	L50	L90
12:00 AM	53	72	45	42
1:00 AM	50	68	45	42
2:00 AM	49	67	45	42
3:00 AM	52	69	46	43
4:00 AM	56	78	51	47
5:00 AM	60	81	56	51
6:00 AM	63	79	59	53
7:00 AM	66	94	60	54
8:00 AM	64	84	59	53
9:00 AM	63	83	58	51
10:00 AM	64	89	58	52
11:00 AM	67	90	60	53
12:00 PM	64	83	60	53
1:00 PM	71	101	60	53
2:00 PM	68	92	62	53
3:00 PM	72	100	65	56
4:00 PM	69	91	65	58
5:00 PM	70	97	65	56
6:00 PM	64	85	59	53
7:00 PM	69	100	57	51
8:00 PM	60	76	56	50
9:00 PM	59	80	55	50
10:00 PM	61	90	53	49
11:00 PM	57	80	49	45

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	72	59	67	63	49	58
Lmax (Maximum)	101	76	90	90	67	76
L50 (Median)	65	55	60	59	45	50
L90 (Background)	58	50	53	53	42	46

Computed DNL (dB)	68
% Daytime Energy	94%
% Nighttime Energy	6%

GPS Coordinates	37° 8'48.96"N
	121°39'38.65"W

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Appendix C-6
Long-Term Ambient Noise Monitoring Results - Site 2
Raising Cane's Store #991 - Morgan Hill, California
Friday, January 05, 2024

Hour	Leq	Lmax	L50	L90
12:00 AM	53	73	45	43
1:00 AM	49	68	43	40
2:00 AM	48	68	43	40
3:00 AM	54	80	44	42
4:00 AM	54	79	48	43
5:00 AM	60	79	54	46
6:00 AM	63	84	58	52
7:00 AM	65	87	59	52
8:00 AM	64	80	59	53
9:00 AM	65	85	59	53
10:00 AM	63	84	59	52
11:00 AM	64	84	59	53
12:00 PM	64	83	59	53
1:00 PM	64	79	59	53
2:00 PM	67	86	62	54
3:00 PM	73	105	64	54
4:00 PM	68	92	64	56
5:00 PM	69	94	63	55
6:00 PM	63	84	59	53
7:00 PM	63	86	58	53
8:00 PM	72	104	58	54
9:00 PM	62	87	58	54
10:00 PM	59	75	56	52
11:00 PM	60	86	55	52

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	73	62	67	63	48	58
Lmax (Maximum)	105	79	88	86	68	77
L50 (Median)	64	58	60	58	43	50
L90 (Background)	56	52	53	52	40	46

Computed DNL (dB)	67
% Daytime Energy	93%
% Nighttime Energy	7%

GPS Coordinates	37° 8'48.96"N
	121°39'38.65"W

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Appendix C-7
Long-Term Ambient Noise Monitoring Results - Site 2
Raising Cane's Store #991 - Morgan Hill, California
Saturday, January 06, 2024

Hour	Leq	Lmax	L50	L90
12:00 AM	55	74	51	47
1:00 AM	54	76	51	47
2:00 AM	54	67	51	48
3:00 AM	52	71	49	46
4:00 AM	57	82	53	50
5:00 AM	55	70	53	50
6:00 AM	58	74	55	51
7:00 AM	61	88	57	54
8:00 AM	61	78	57	54
9:00 AM	62	85	57	53
10:00 AM	62	81	57	52
11:00 AM	64	87	57	52
12:00 PM	66	92	58	52
1:00 PM	65	89	58	52
2:00 PM	65	93	58	52
3:00 PM	67	91	61	51
4:00 PM	69	85	65	58
5:00 PM	66	82	61	55
6:00 PM	64	82	59	54
7:00 PM	66	93	59	54
8:00 PM	63	82	56	51
9:00 PM	62	80	56	49
10:00 PM	60	84	54	47
11:00 PM	58	78	50	44

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	69	61	65	60	52	57
Lmax (Maximum)	93	78	86	84	67	75
L50 (Median)	65	56	58	55	49	52
L90 (Background)	58	49	53	51	44	48

Computed DNL (dB)	66
% Daytime Energy	92%
% Nighttime Energy	8%

GPS Coordinates	37° 8'48.96"N
	121°39'38.65"W

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Appendix C-8
Long-Term Ambient Noise Monitoring Results - Site 2
Raising Cane's Store #991 - Morgan Hill, California
Sunday, January 07, 2024

Hour	Leq	Lmax	L50	L90
12:00 AM	56	78	48	43
1:00 AM	56	80	45	41
2:00 AM	51	70	45	42
3:00 AM	50	68	44	41
4:00 AM	50	70	45	42
5:00 AM	52	71	47	44
6:00 AM	56	75	50	46
7:00 AM	59	82	52	48
8:00 AM	61	81	56	51
9:00 AM	62	87	57	52
10:00 AM	64	92	57	52
11:00 AM	63	85	58	52
12:00 PM	66	91	58	52
1:00 PM	64	88	58	53
2:00 PM	63	86	58	52
3:00 PM	63	81	58	52
4:00 PM	62	80	58	52
5:00 PM	65	90	58	54
6:00 PM	64	87	58	53
7:00 PM	63	90	57	51
8:00 PM	63	88	56	51
9:00 PM	60	81	54	50
10:00 PM	57	75	52	49
11:00 PM	60	89	51	47

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	66	59	63	60	50	56
Lmax (Maximum)	92	80	86	89	68	75
L50 (Median)	58	52	57	52	44	47
L90 (Background)	54	48	52	49	41	44

Computed DNL (dB)	64
% Daytime Energy	90%
% Nighttime Energy	10%

GPS Coordinates	37° 8'48.96"N
	121°39'38.65"W

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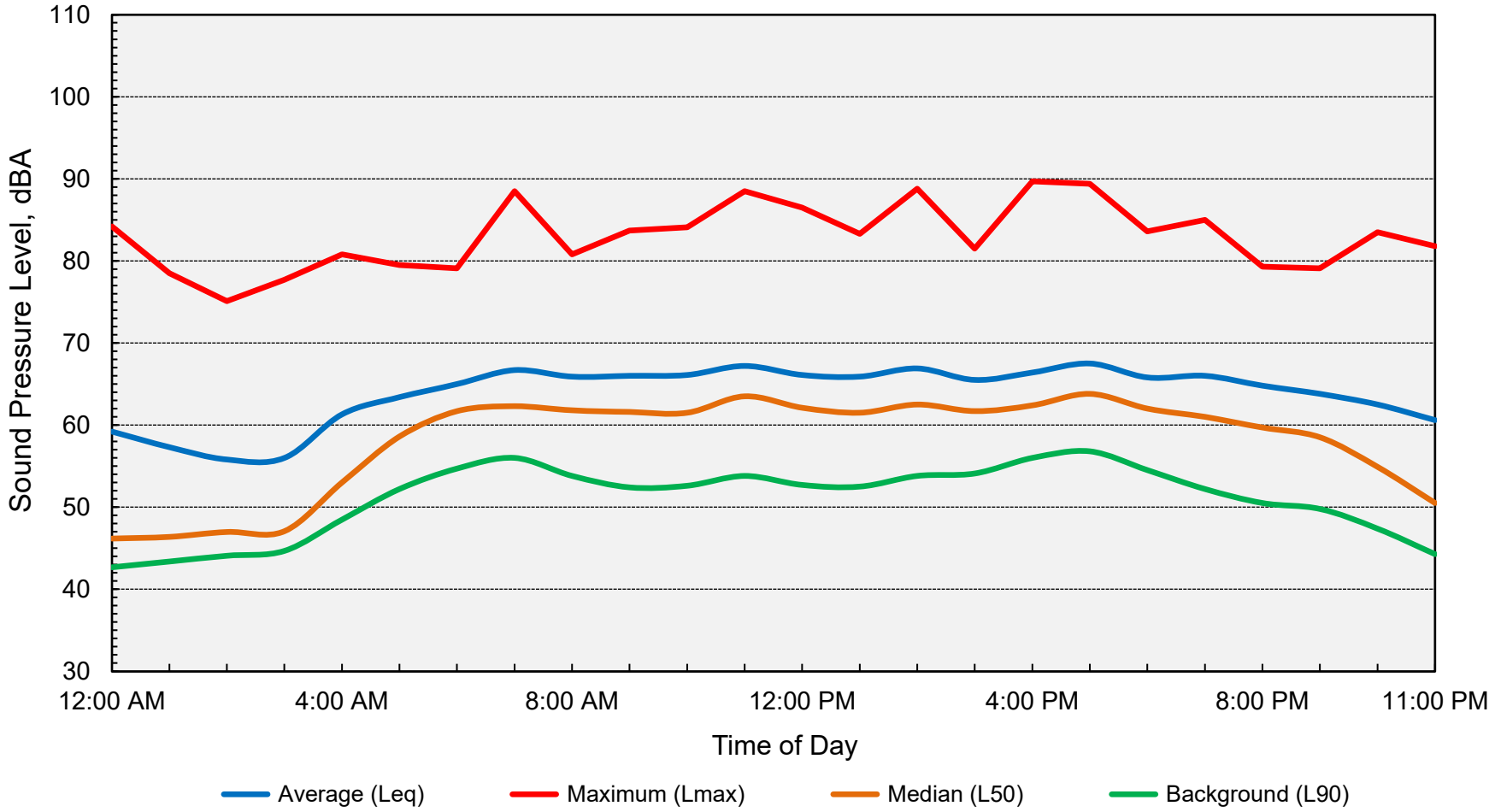
Appendix D-1
Long-Term Ambient Noise Monitoring Results - Site 1
Raising Cane's Store #991 - Morgan Hill, California
Thursday, January 04, 2024



Computed DNL = 69 dB

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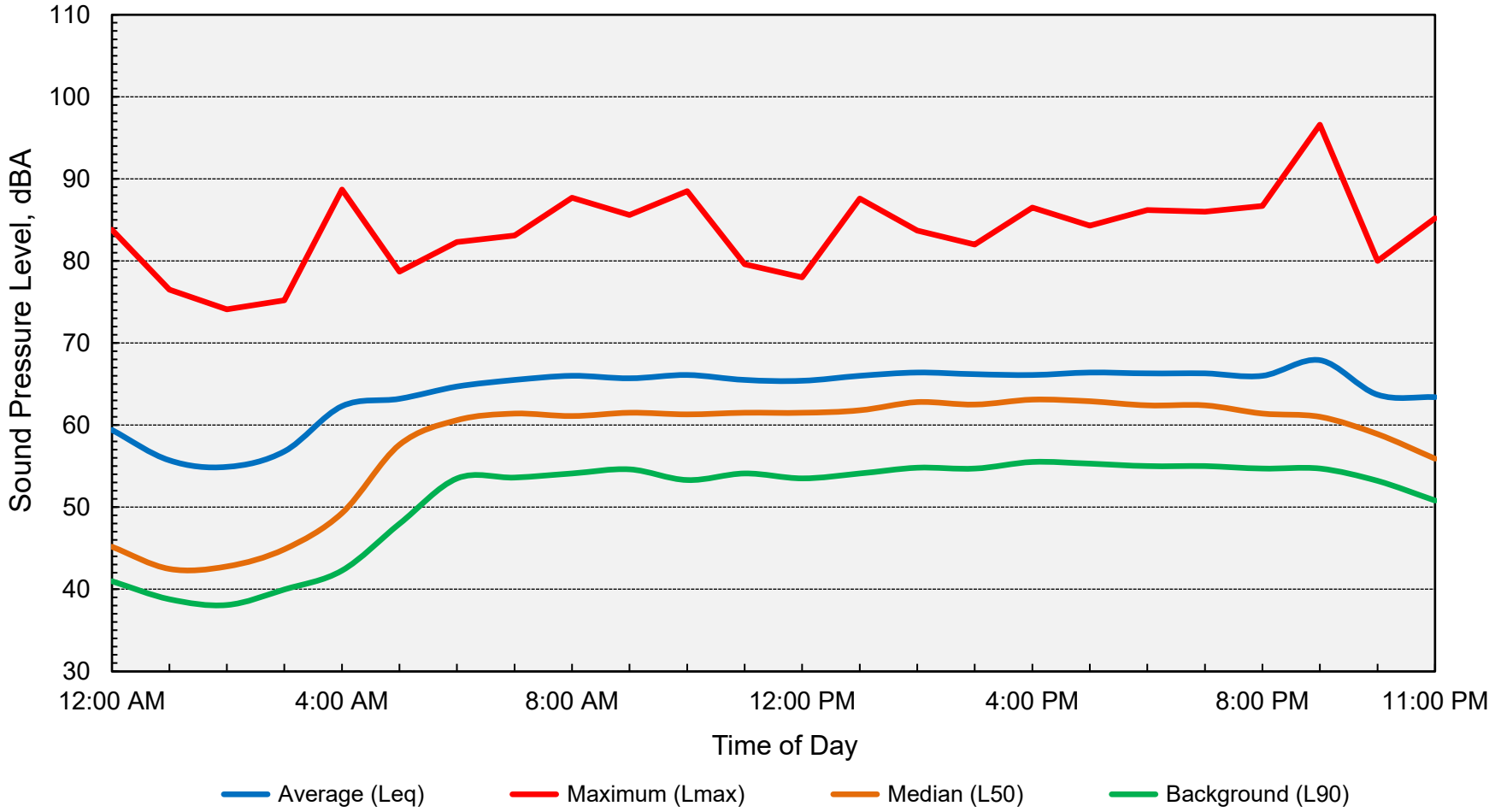
Appendix D-2
Long-Term Ambient Noise Monitoring Results - Site 1
Raising Cane's Store #991 - Morgan Hill, California
Friday, January 05, 2024



Computed DNL = 69 dB

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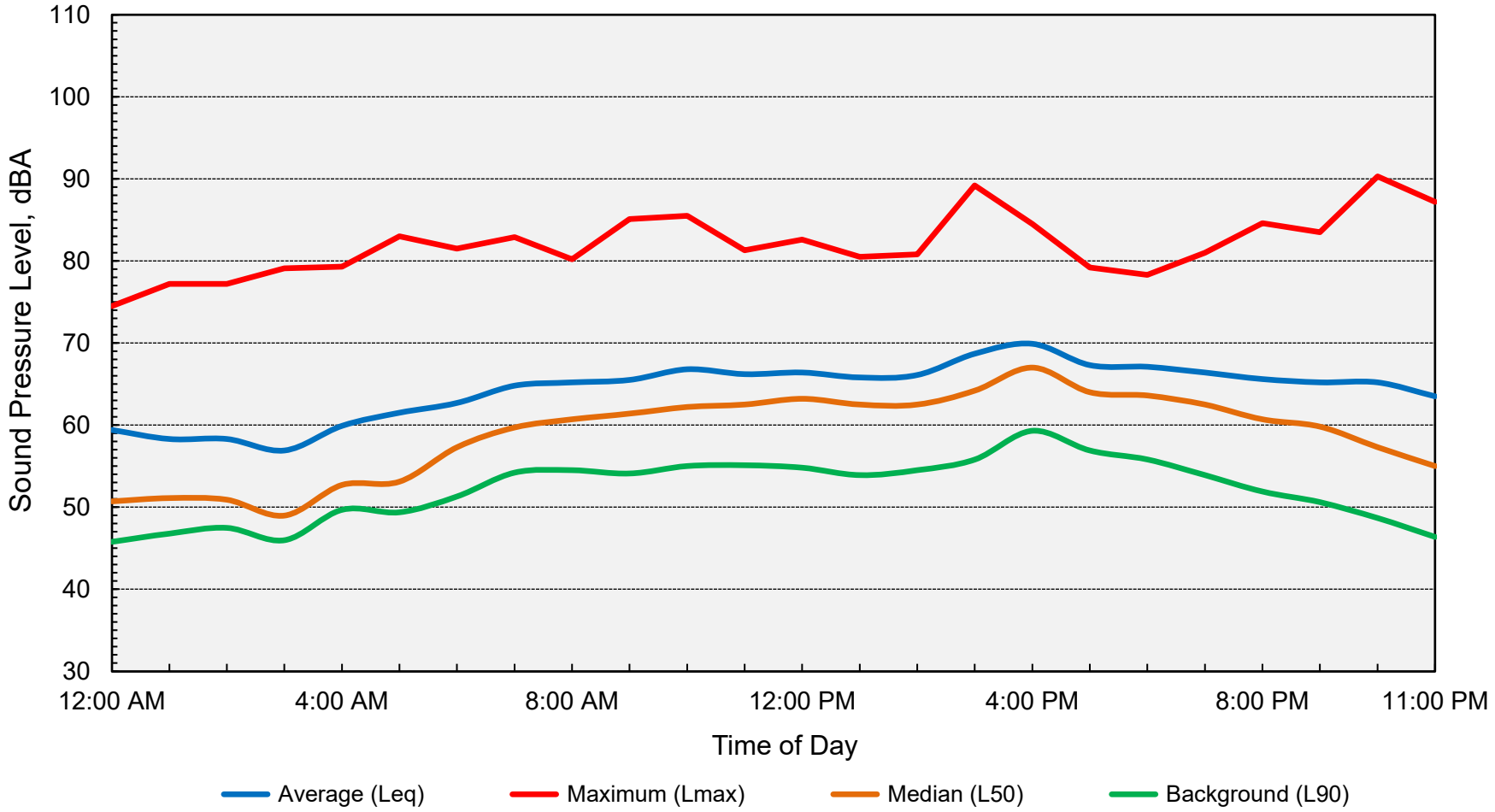
Appendix D-3
Long-Term Ambient Noise Monitoring Results - Site 1
Raising Cane's Store #991 - Morgan Hill, California
Saturday, January 06, 2024



Computed DNL = 69 dB

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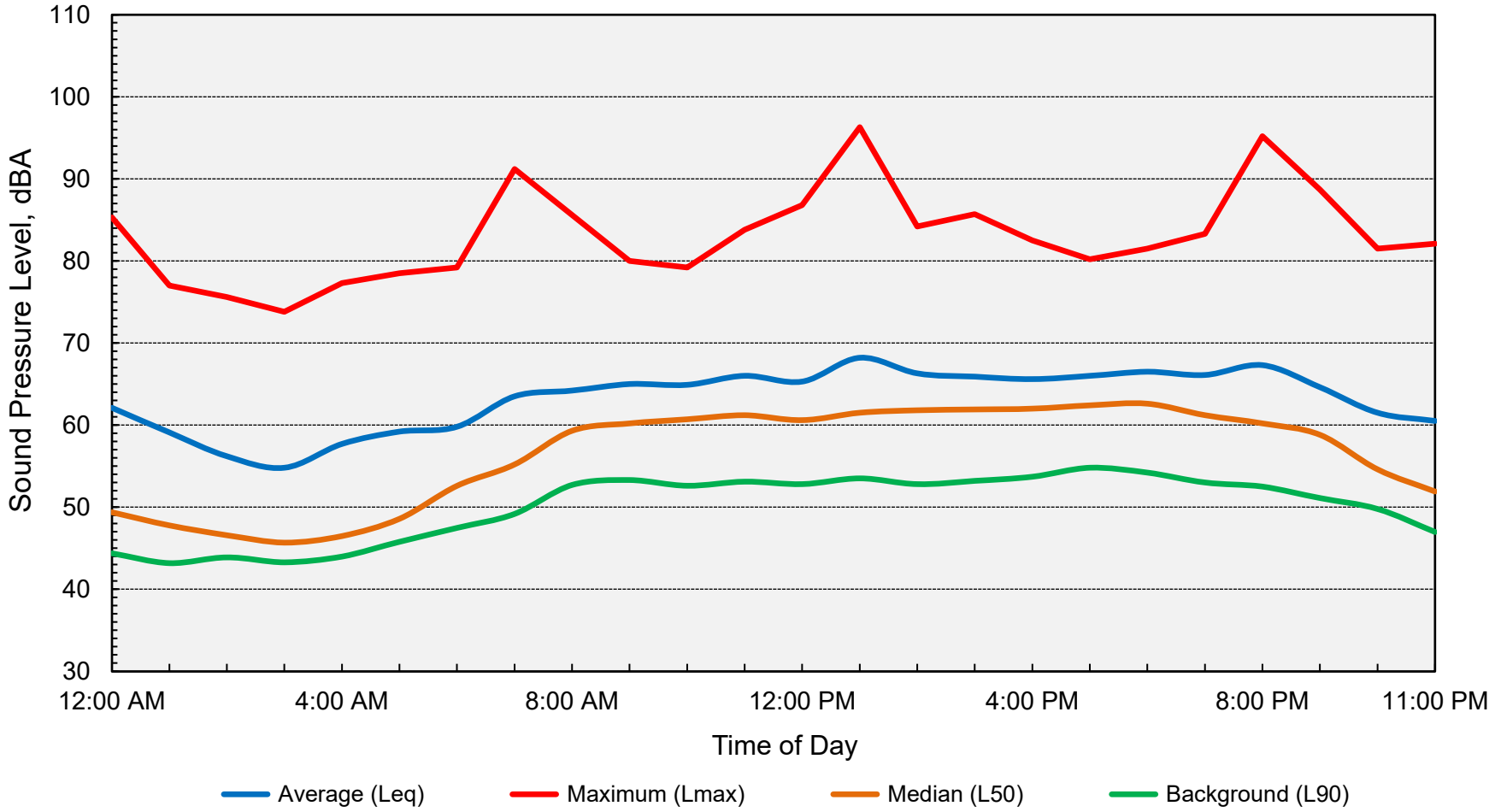
Appendix D-4
Long-Term Ambient Noise Monitoring Results - Site 1
Raising Cane's Store #991 - Morgan Hill, California
Sunday, January 07, 2024



Computed DNL = 68 dB

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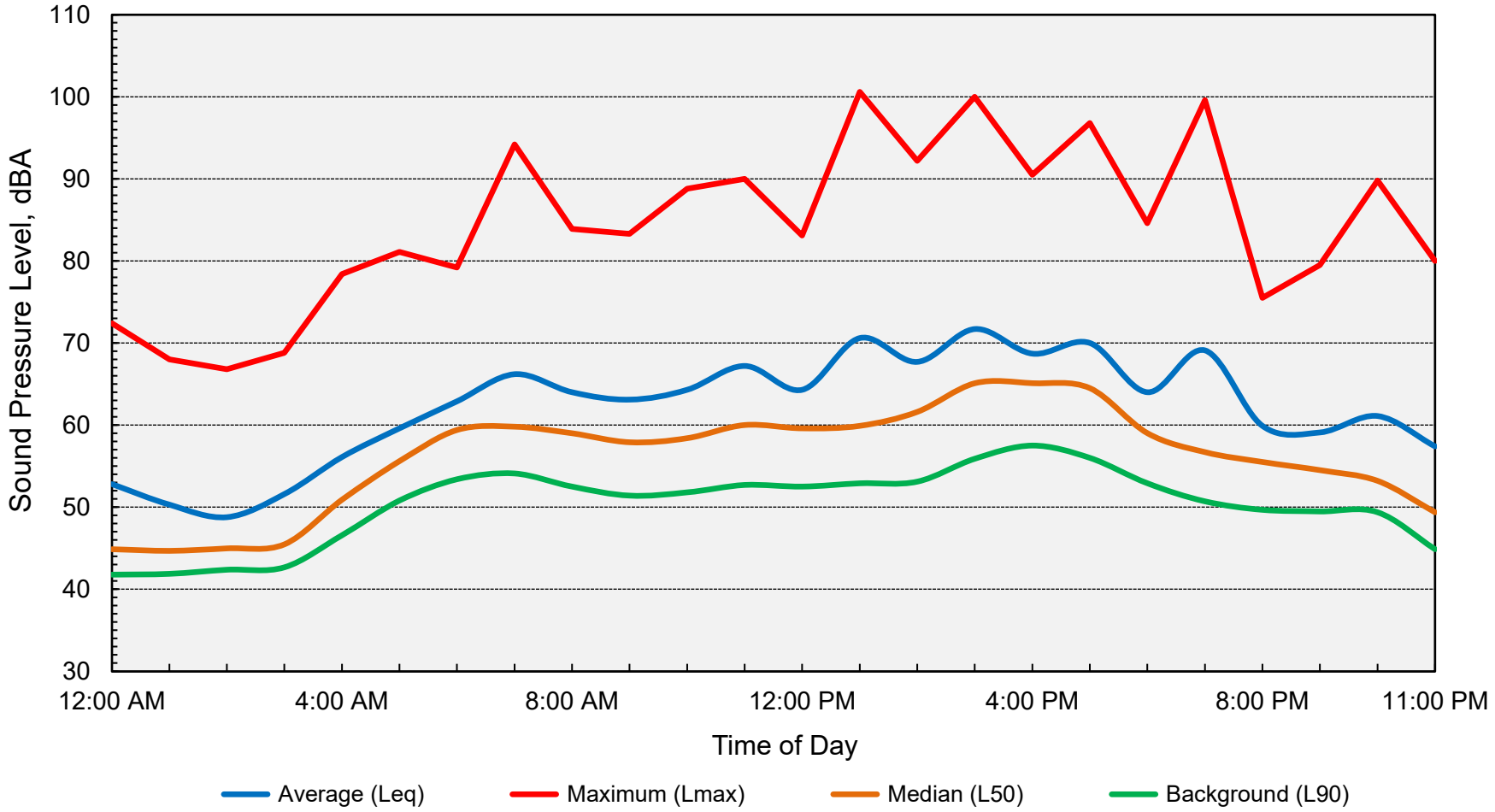
Appendix D-5
Long-Term Ambient Noise Monitoring Results - Site 2
Raising Cane's Store #991 - Morgan Hill, California
Thursday, January 04, 2024



Computed DNL = 68 dB

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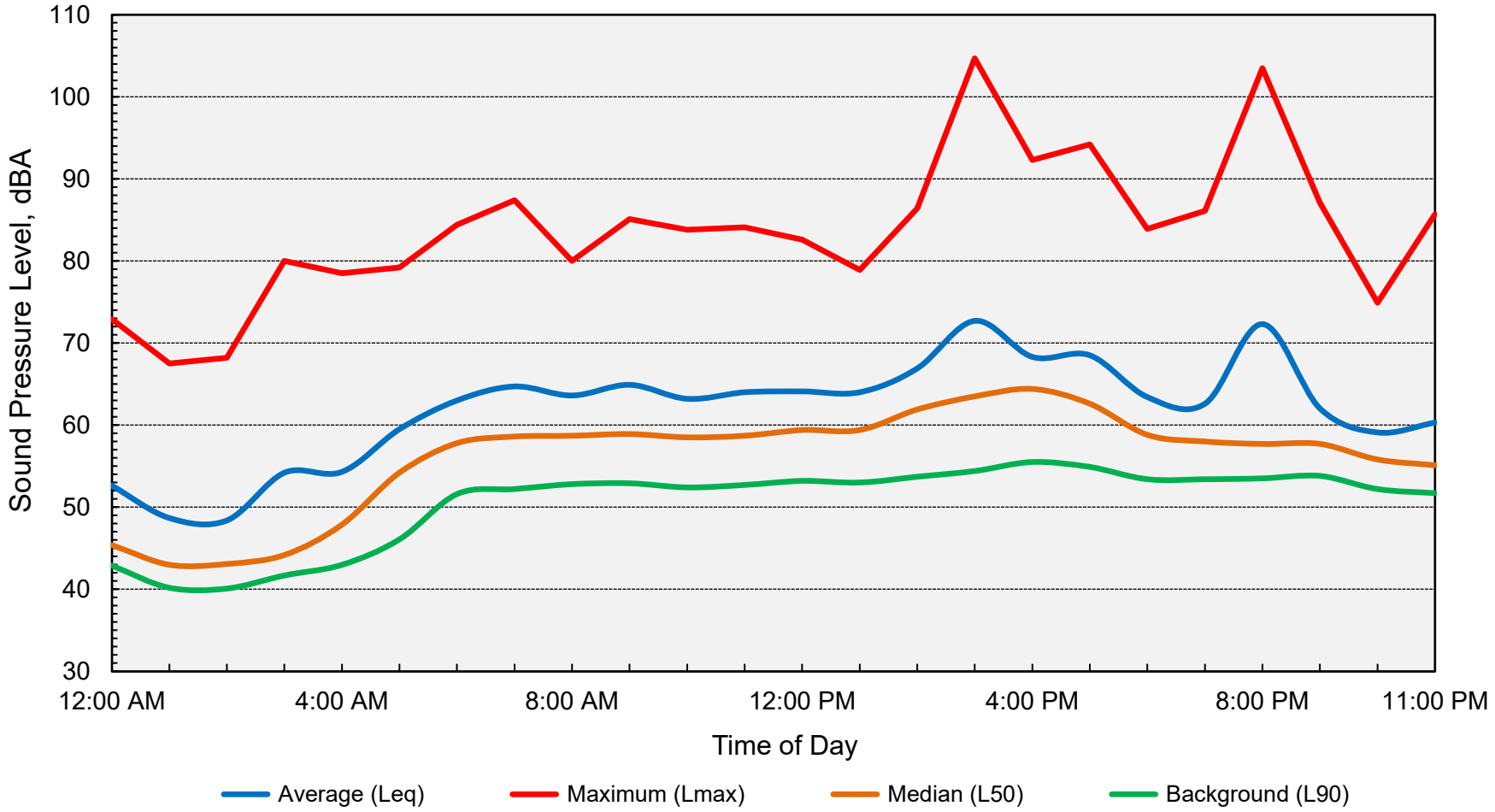
Appendix D-6
Long-Term Ambient Noise Monitoring Results - Site 2
Raising Cane's Store #991 - Morgan Hill, California
Friday, January 05, 2024



Computed DNL = 67 dB

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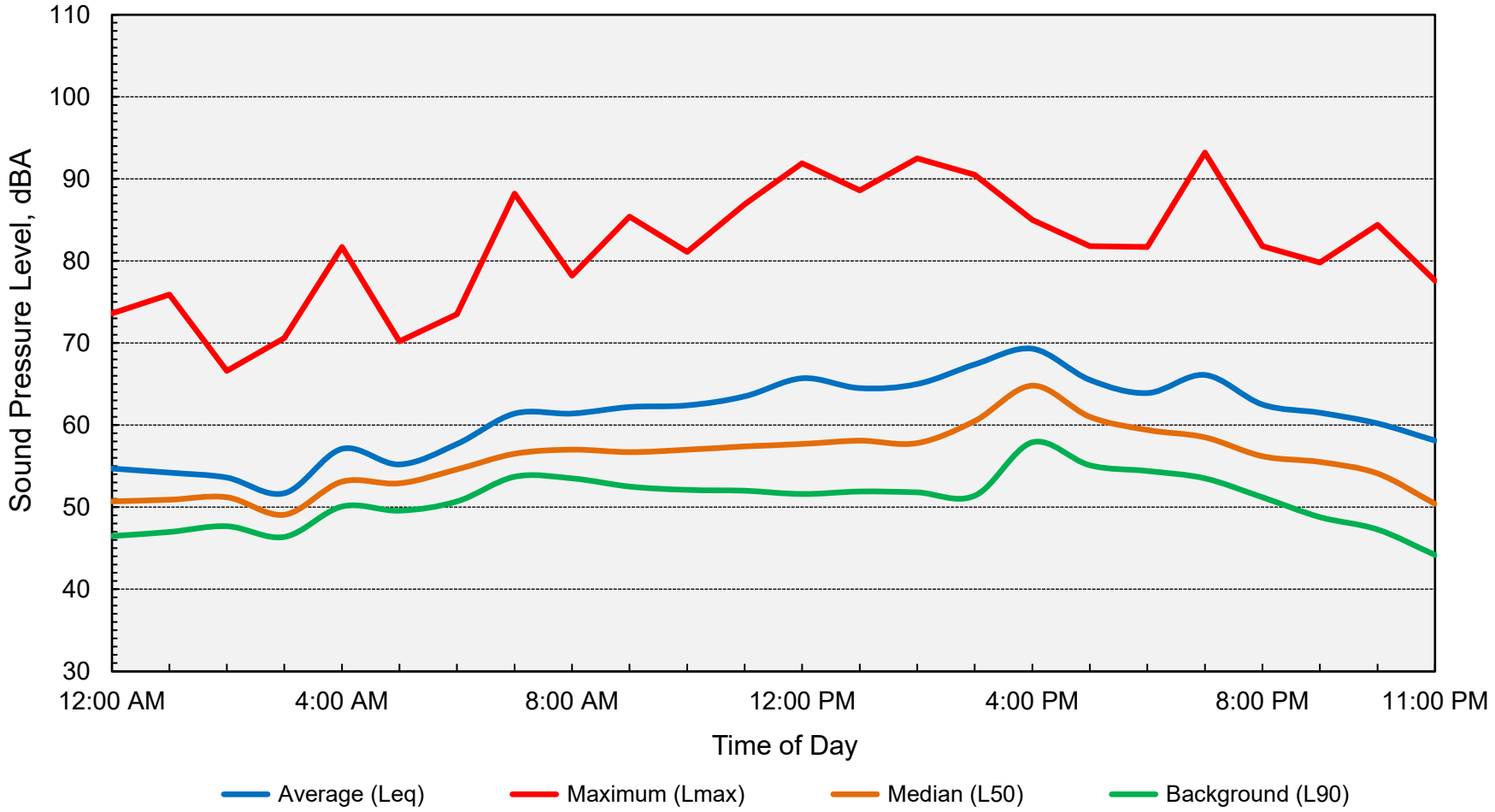
Appendix D-7
Long-Term Ambient Noise Monitoring Results - Site 2
Raising Cane's Store #991 - Morgan Hill, California
Saturday, January 06, 2024



Computed DNL = 66 dB

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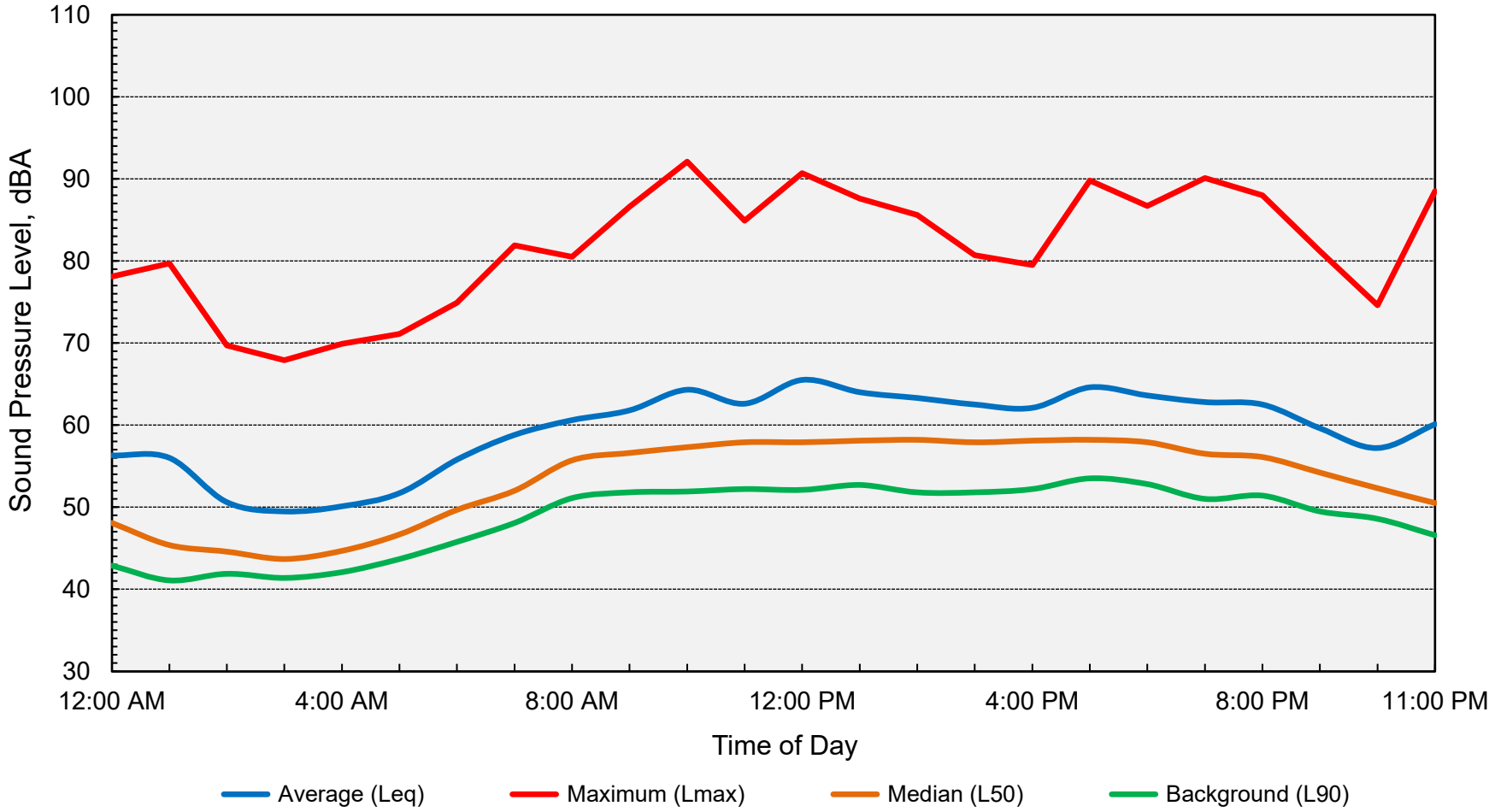
Appendix D-8
Long-Term Ambient Noise Monitoring Results - Site 2
Raising Cane's Store #991 - Morgan Hill, California
Sunday, January 07, 2024



Computed DNL = 64 dB

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Appendix E
FHWA Highway Traffic Noise Prediction Model Inputs
Project: Raising Cane's Store #991
File Name: Existing No Project
Run Date: 1/17/2024

#	Roadway	Description	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance to Receptor	Offset (dB)
1	Cochrane Rd	West of Monterey Hwy	3,510	80	20	1	2	25	50	0
2	Cochrane Rd	Monterey Hwy to Butterfield Blvd	20,640	80	20	2	2	45	150	0
3	Cochrane Rd	Butterfield Blvd to Woodview Ave	18,480	80	20	2	2	45	150	0
4	Cochrane Rd	Woodview Ave to Sutter Blvd	15,440	80	20	2	2	45	150	0
5	Cochrane Rd	Sutter Blvd to Cochrane Plza	22,430	80	20	2	2	45	150	0
6	Cochrane Rd	Cochrane Plza to US 101 SB Ramps	31,610	80	20	2	2	45	100	0
7	Cochrane Rd	US 101 SB Ramps to US 101 NB Ramps	23,060	80	20	2	2	45	315	0
8	Cochrane Rd	East of US 101 NR Ramps	19,080	80	20	2	2	45	125	0
9	Monterey Hwy	North of Cochrane Rd	25,150	80	20	2	2	45	150	0
10	Monterey Hwy	South of Cochrane Rd	15,550	80	20	2	2	45	110	0
11	Butterfield Blvd	South of Cochrane Rd	13,600	80	20	2	2	45	75	0
12	Woodview Ave	North of Cochrane Rd	720	80	20	2	2	35	110	0
13	Skipper Ln	South of Cochrane Rd	1,190	80	20	1	2	25	100	0
14	Sutter Blvd	North of Cochrane Rd	700	80	20	2	2	35	75	0
15	Sutter Blvd	Cochrane Rd to Checkerspot Ln	7,110	80	20	2	2	35	100	0
16	Sutter Blvd	South of Checkerspot Ln	7,910	80	20	2	2	35	75	0
17	Chekerspot Ln	West of Sutter Blvd	560	80	20	1	2	25	200	0
18	Chekerspot Ln	East of Sutter Blvd	3,960	80	20	1	1	25	50	0
19	Madrone Pkwy	North of Cochrane Rd	9,430	80	20	1	2	35	75	0
20	Cochrane Plza	South of Cochrane Rd	4,920	80	20	1	1	25	50	0
21	US 101 SB Ramps	South of Cochrane Rd	8,010	80	20	2	2	70	100	0
22	US 101 NB Ramps	North of Cochrane Rd	2,250	80	20	2	2	70	200	0

Appendix F
FHWA Highway Traffic Noise Prediction Model Inputs
Project: Raising Cane's Store #991
File Name: Existing+Project
Run Date: 1/17/2024

#	Roadway	Description	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance to Receptor	Offset (dB)
1	Cochrane Rd	West of Monterey Hwy	3,510	80	20	1	2	25	50	0
2	Cochrane Rd	Monterey Hwy to Butterfield Blvd	20,890	80	20	2	2	45	150	0
3	Cochrane Rd	Butterfield Blvd to Woodview Ave	18,590	80	20	2	2	45	150	0
4	Cochrane Rd	Woodview Ave to Sutter Blvd	15,690	80	20	2	2	45	150	0
5	Cochrane Rd	Sutter Blvd to Cochrane Plza	22,620	80	20	2	2	45	150	0
6	Cochrane Rd	Cochrane Plza to US 101 SB Ramps	31,810	80	20	2	2	45	100	0
7	Cochrane Rd	US 101 SB Ramps to US 101 NB Ramps	23,160	80	20	2	2	45	315	0
8	Cochrane Rd	East of US 101 NR Ramps	19,100	80	20	2	2	45	125	0
9	Monterey Hwy	North of Cochrane Rd	25,190	80	20	2	2	45	150	0
10	Monterey Hwy	South of Cochrane Rd	15,760	80	20	2	2	45	110	0
11	Butterfield Blvd	South of Cochrane Rd	13,820	80	20	2	2	45	75	0
12	Woodview Ave	North of Cochrane Rd	720	80	20	2	2	35	110	0
13	Skipper Ln	South of Cochrane Rd	1,710	80	20	1	2	25	100	0
14	Sutter Blvd	North of Cochrane Rd	700	80	20	2	2	35	75	0
15	Sutter Blvd	Cochrane Rd to Checkerspot Ln	7,050	80	20	2	2	35	100	0
16	Sutter Blvd	South of Checkerspot Ln	7,880	80	20	2	2	35	75	0
17	Chekerspot Ln	West of Sutter Blvd	610	80	20	1	2	25	200	0
18	Chekerspot Ln	East of Sutter Blvd	3,980	80	20	1	1	25	50	0
19	Madrone Pkwy	North of Cochrane Rd	9,430	80	20	1	2	35	75	0
20	Cochrane Plza	South of Cochrane Rd	4,920	80	20	1	1	25	50	0
21	US 101 SB Ramps	South of Cochrane Rd	8,060	80	20	2	2	70	100	0
22	US 101 NB Ramps	North of Cochrane Rd	2,250	80	20	2	2	70	200	0

Appendix G
FHWA Highway Traffic Noise Prediction Model Inputs
Project: Raising Cane's Store #991
File Name: Cumulative No Project
Run Date: 1/17/2024

#	Roadway	Description	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance to Receptor	Offset (dB)
1	Cochrane Rd	West of Monterey Hwy	3,510	80	20	1	2	25	50	0
2	Cochrane Rd	Monterey Hwy to Butterfield Blvd	27,610	80	20	2	2	45	150	0
3	Cochrane Rd	Butterfield Blvd to Woodview Ave	23,440	80	20	2	2	45	150	0
4	Cochrane Rd	Woodview Ave to Sutter Blvd	19,280	80	20	2	2	45	150	0
5	Cochrane Rd	Sutter Blvd to Cochrane Plza	28,190	80	20	2	2	45	150	0
6	Cochrane Rd	Cochrane Plza to US 101 SB Ramps	39,000	80	20	2	2	45	100	0
7	Cochrane Rd	US 101 SB Ramps to US 101 NB Ramps	31,310	80	20	2	2	45	315	0
8	Cochrane Rd	East of US 101 NR Ramps	28,160	80	20	2	2	45	125	0
9	Monterey Hwy	North of Cochrane Rd	32,820	80	20	2	2	45	150	0
10	Monterey Hwy	South of Cochrane Rd	19,480	80	20	2	2	45	110	0
11	Butterfield Blvd	South of Cochrane Rd	20,250	80	20	2	2	45	75	0
12	Woodview Ave	North of Cochrane Rd	720	80	20	2	2	35	110	0
13	Skipper Ln	South of Cochrane Rd	2,540	80	20	1	2	25	100	0
14	Sutter Blvd	North of Cochrane Rd	830	80	20	2	2	35	75	0
15	Sutter Blvd	Cochrane Rd to Checkerspot Ln	9,670	80	20	2	2	35	100	0
16	Sutter Blvd	South of Checkerspot Ln	8,670	80	20	2	2	35	75	0
17	Chekerspot Ln	West of Sutter Blvd	910	80	20	1	2	25	200	0
18	Chekerspot Ln	East of Sutter Blvd	1,910	80	20	1	1	25	50	0
19	Madrone Pkwy	North of Cochrane Rd	11,520	80	20	1	2	35	75	0
20	Cochrane Plza	South of Cochrane Rd	4,960	80	20	1	1	25	50	0
21	US 101 SB Ramps	South of Cochrane Rd	8,110	80	20	2	2	70	100	0
22	US 101 NB Ramps	North of Cochrane Rd	3,420	80	20	2	2	70	200	0

Appendix H
FHWA Highway Traffic Noise Prediction Model Inputs
Project: Raising Cane's Store #991
File Name: Cumulative+Project
Run Date: 1/17/2024

#	Roadway	Description	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance to Receptor	Offset (dB)
1	Cochrane Rd	West of Monterey Hwy	3,510	80	20	1	2	25	50	0
2	Cochrane Rd	Monterey Hwy to Butterfield Blvd	27,860	80	20	2	2	45	150	0
3	Cochrane Rd	Butterfield Blvd to Woodview Ave	23,550	80	20	2	2	45	150	0
4	Cochrane Rd	Woodview Ave to Sutter Blvd	19,550	80	20	2	2	45	150	0
5	Cochrane Rd	Sutter Blvd to Cochrane Plza	28,400	80	20	2	2	45	150	0
6	Cochrane Rd	Cochrane Plza to US 101 SB Ramps	39,200	80	20	2	2	45	100	0
7	Cochrane Rd	US 101 SB Ramps to US 101 NB Ramps	31,410	80	20	2	2	45	315	0
8	Cochrane Rd	East of US 101 NR Ramps	28,180	80	20	2	2	45	125	0
9	Monterey Hwy	North of Cochrane Rd	32,860	80	20	2	2	45	150	0
10	Monterey Hwy	South of Cochrane Rd	19,690	80	20	2	2	45	110	0
11	Butterfield Blvd	South of Cochrane Rd	20,470	80	20	2	2	45	75	0
12	Woodview Ave	North of Cochrane Rd	720	80	20	2	2	35	110	0
13	Skipper Ln	South of Cochrane Rd	3,080	80	20	1	2	25	100	0
14	Sutter Blvd	North of Cochrane Rd	830	80	20	2	2	35	75	0
15	Sutter Blvd	Cochrane Rd to Checkerspot Ln	9,610	80	20	2	2	35	100	0
16	Sutter Blvd	South of Checkerspot Ln	8,640	80	20	2	2	35	75	0
17	Chekerspot Ln	West of Sutter Blvd	940	80	20	1	2	25	200	0
18	Chekerspot Ln	East of Sutter Blvd	1,910	80	20	1	1	25	50	0
19	Madrone Pkwy	North of Cochrane Rd	11,520	80	20	1	2	35	75	0
20	Cochrane Plza	South of Cochrane Rd	4,980	80	20	1	1	25	50	0
21	US 101 SB Ramps	South of Cochrane Rd	8,160	80	20	2	2	70	100	0
22	US 101 NB Ramps	North of Cochrane Rd	3,420	80	20	2	2	70	200	0

Appendix I
Drive-Through Speaker Reference Noise Level Data

HME

Customer Driven

Memo

Re: Drive-Thru Sound Pressure Levels From the Menu Board or Speaker Post

The sound pressure levels from the menu board or speaker post are as follows:

1. Sound pressure level (SPL) contours (A weighted) were measured on a typical HME SPP2 speaker post. The test condition was for pink noise set to 84 dBA at 1 foot in front of the speaker. All measurements were conducted outside with the speaker post placed 8 feet from a non-absorbing building wall and at an oblique angle to the wall. These measurements should not be construed to guarantee performance with any particular speaker post in any particular environment. They are typical results obtained under the conditions described above.

2. The SPL levels are presented for different distances from the speaker post:

Distance from the Speaker (Feet)	SPL (dBA)
1 foot	84 dBA
2 feet	78 dBA
4 feet	72 dBA
8 feet	66 dBA
16 feet	60 dBA
32 feet	54 dBA

3. The above levels are based on factory recommended operating levels, which are preset for HME components and represent the optimum level for drive-thru operations in the majority of the installations.

Also, HME incorporates automatic volume control (AVC) into many of our Systems. AVC will adjust the outbound volume based on the outdoor, ambient noise level. When ambient noise levels naturally decrease at night, AVC will reduce the outbound volume on the system. See below for example:

Distance from Outside Speaker	Decibel Level of standard system with 45 dB of outside noise without AVC	Decibel level of standard system with 45 dB of outside noise with AVC active
1 foot	84 dBA	60 dBA
2 feet	78 dBA	54 dBA
4 feet	72 dBA	48 dBA
8 feet	66 dBA	42 dBA
16 feet	60 dBA	36 dBA

If there are any further questions regarding this issue please contact HME customer service at 1-800-848-4468.

Thank you for your interest in HME's products.

HM Electronics, Inc. | 14110 Stowe Drive | Poway, CA 92064
phone: 800.848.4468 | fax: 858.452.7207 | www.hme.com