APPENDIX H

ENVIRONMENTAL NOISE AND VIBRATION IMPACT ASSESSMENT

Environmental Noise and Vibration Assessment

Stone-Beetland Mixed-Use Development

Sacramento, California

BAC Job # 2022-004

Prepared For:

JP Land Holdings, LLC.

Mr. Clifton Taylor
1478 Stone Point Drive, Suite 100
Roseville, CA 95661

Prepared By:

Bollard Acoustical Consultants, Inc.

Paul Bollard, President

April 7, 2023

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Introduction

The Stone-Beetland (Project) area is located on an approximately 141-acre site in the City of Sacramento bounded by Detroit Boulevard Neighborhood to the northeast, Sacramento Regional Transit (RT) Blue Line Light Rail to the east, and Cosumnes River Boulevard to the south. The Project area is currently zoned for residential and agricultural uses (R-1, R1-A, A). The project consists of the rezoning and development of a mixed-use community containing residential uses of various densities, commercial, commercial/residential mixed-use, park, and open space uses. The project area location and preliminary project land use plan are shown on Figures 1 and 2, respectively.

Bollard Acoustical Consultants, Inc. (BAC) was retained by the project applicant to prepare this noise and vibration evaluation for the project. The specific objectives of this evaluation are provided in the following section.

Objectives of This Analysis

The objectives of this analysis are as follows:

- To provide background information pertaining to the effects of noise & vibration.
- To identify existing sensitive land uses in the project area vicinity.
- To quantify existing ambient noise levels and identify ambient sources of vibration at those nearest noise-sensitive land uses.
- To identify the City of Sacramento noise & vibration standards which would be most applicable to this project.
- To predict project-related noise & vibration levels at off-site sensitive areas, and to compare those levels against the applicable noise & vibration standards per California Environmental Quality Act (CEQA) guidelines.
- To evaluate consistency of the sensitive land uses proposed within the project area with City of Sacramento 2030 General Plan noise and vibration standards.
- To recommend mitigation, as necessary, to ensure compliance with the applicable project noise & vibration standards.
- To summarize the results of this analysis into a report for eventual use in the development of the project environmental documents.

Legend

- Project Border (Approximate)
- Long-term Noise Measurement Locations
- Short-term Noise & Vibration Measurement Locations
- Short-term Vibration Measurement Locations

N

Scale (Feet)

0 500 1000

Stone Beetland

Sacramento, California

Project Area & Noise Survey Sites

Figure 1

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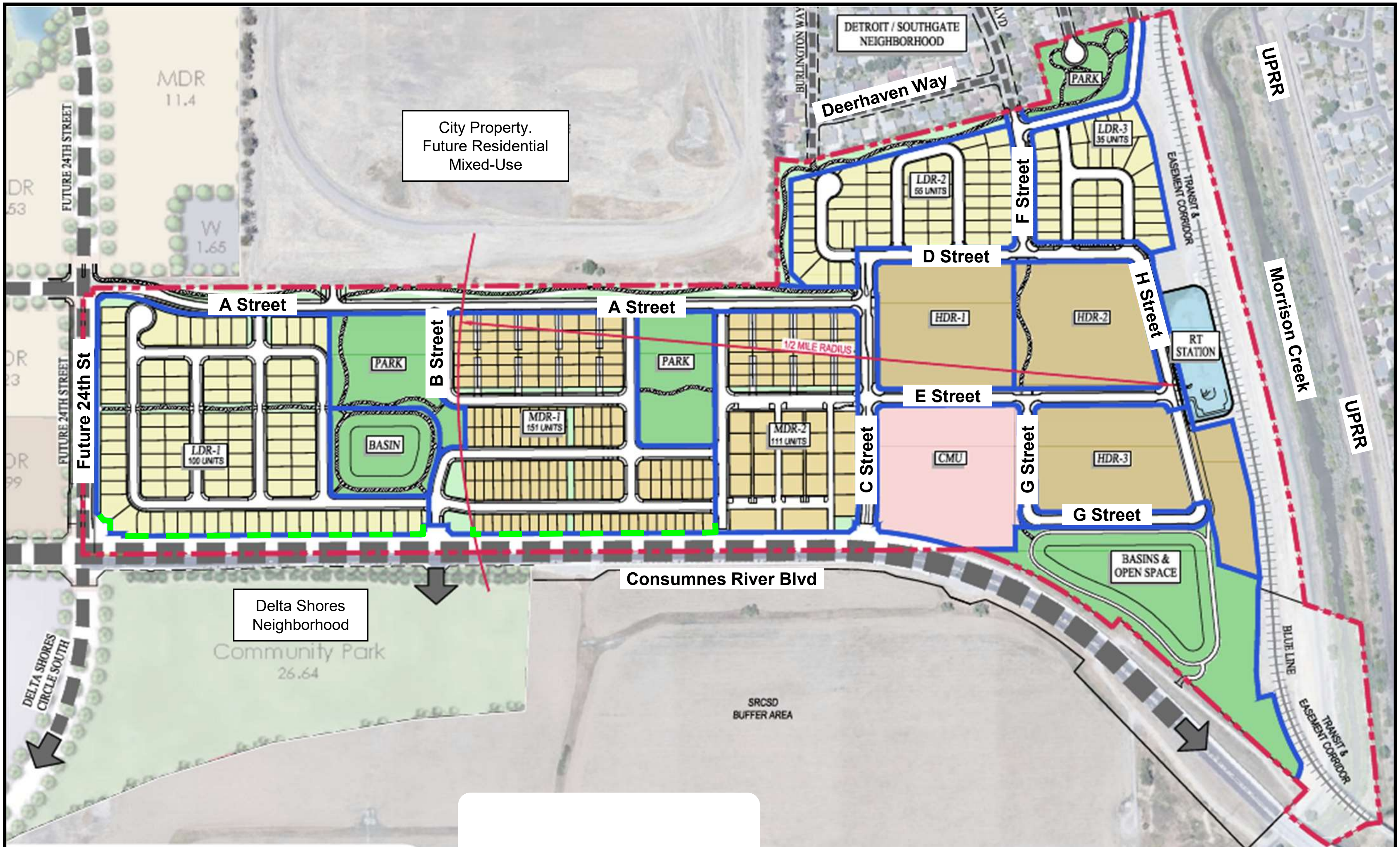


Legend

Recommended 6' Traffic Noise Barriers

Recommended Window Construction Upgrades: STC 32 (Upper-Floors Only)

N

Scale (Feet)

0 225 450

Stone Beetland

Sacramento, California

Site Plan

Figure 2

BOLLARD Acoustical Consultants

Noise Fundamentals & Terminology

General

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.

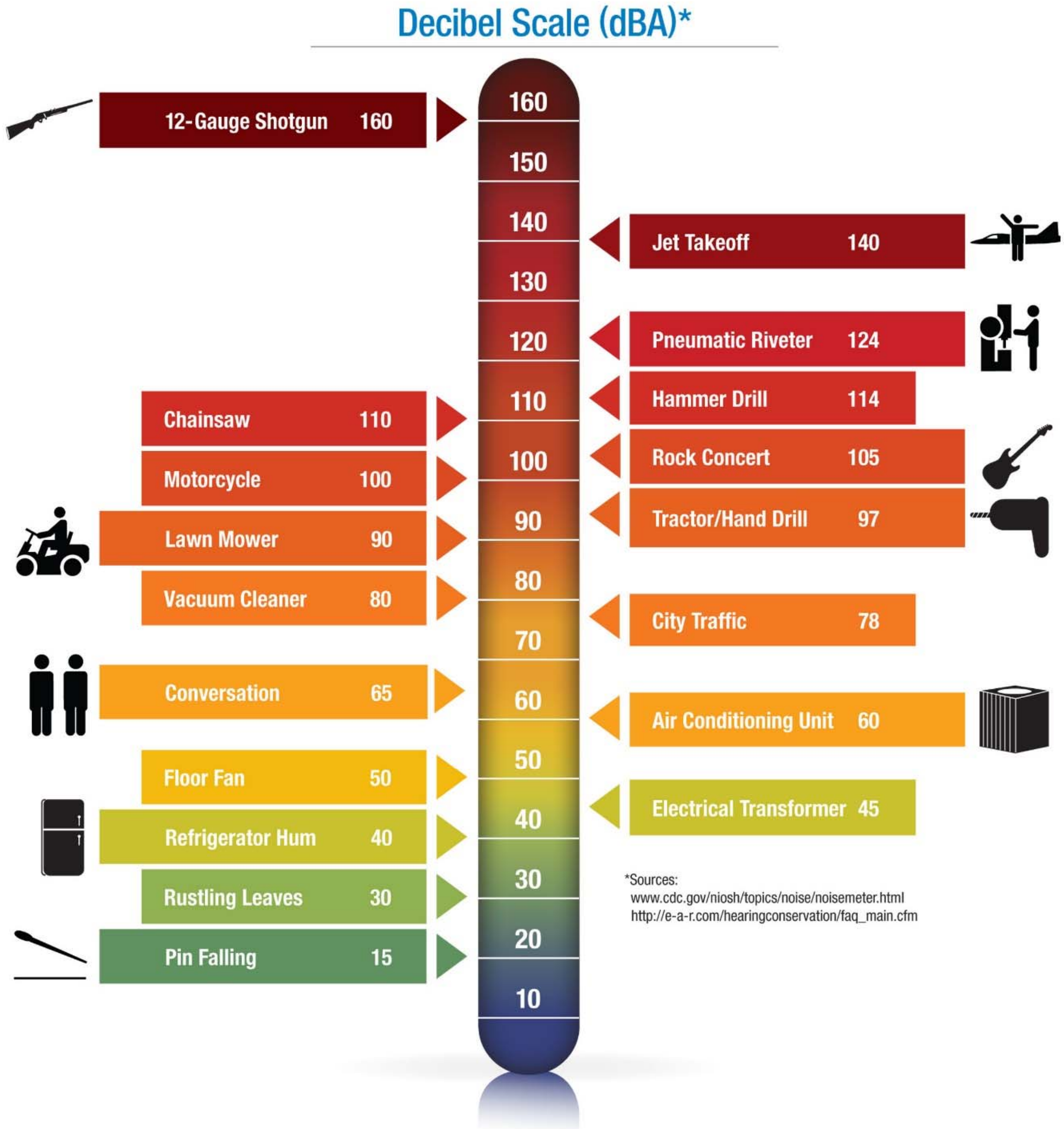
Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals of pressure) as a point of reference, defined as 0 dB. Other sound pressures are then compared 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.

A-Weighting and Noise Metrics

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. DNL is based on the average noise level over a 24-hour day, with a +10-decibel weighting applied to noise occurring during nighttime (10:00 PM to 7:00 AM) hours. The nighttime penalty is based on 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.

Figure 3
Noise Levels Associated with Common Noise Sources



The City of Sacramento General Plan utilizes DNL for the assessment of land use compatibility for a variety of land use designations. The Sacramento City Code utilizes a graduated set of standards based on the duration of a one-hour period in which the intrusive sound is present (L_n–based standards). The City's noise standards are discussed in detail later in this report.

In addition to applying the applicable County noise standards to this Project, the California Environmental Quality Act (CEQA) requires that noise impacts be assessed relative to ambient noise levels that are present without the project. As a result, ambient noise surveys were conducted, and comparisons of Project to No-Project noise levels were made to assess noise impacts.

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. Under CEQA, a significant impact may occur when there is a *substantial* increase in noise levels, not simply an audible change. The discussion of what constitutes a substantial change in noise environments, both existing and cumulative, is provided in the Regulatory Setting section of this report.

Effects of Noise on People

The effects of noise on people can be divided into three categories:

1. Subjective effects of annoyance, nuisance, dissatisfaction;
2. Interference with activities such as speech, sleep, and learning; and
3. Physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the third category. There is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Generally, most noise is generated by transportation systems, primarily motor vehicles, aircraft, and railroads. Prominent sources of indoor noise are office equipment, factory machinery, appliances, power tools, lighting hum, and audio entertainment systems. An important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment (or ambient noise) to which one has adapted. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise levels, the following relationships occur (Caltrans, 2013):

- Under controlled conditions in an acoustics laboratory, the trained healthy human ear is able to discern changes in sound levels of 1 dBA;
- Outside such controlled conditions, the trained ear can detect changes of 2 dBA in normal environmental noise;
- It is widely accepted that the average healthy ear, however, can barely perceive noise level changes of 3 dBA;

Noise Attenuation over Distance

Stationary "point" sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate of approximately 6+ dBA per doubling of distance from the source, depending upon environmental conditions (i.e., atmospheric conditions and noise barriers, either vegetative or manufactured, etc.). Widely distributed noises, such as a large industrial facility, spread over many acres or a street with moving vehicles (a "line" or "moving point" source), would typically attenuate at a lower rate, approximately 4 to 6 dBA per doubling distance from the source (also dependent upon environmental conditions) (Caltrans, 2013). Noise from large construction sites (with heavy equipment moving dirt and trucks entering and exiting the site daily) would have characteristics of both "point" and "line" sources, so attenuation would generally range between 4.5 and 7.5 dBA per doubling of distance. Atmospheric absorption of sound varies depending on temperature and relative humidity, as well as the frequency content of the noise source. In general, "average day" atmospheric conditions result in attenuation at a rate of approximately 1.5 dB per thousand feet of distance (SAE ARP 866A, 1975).

Vibration Fundamentals & Terminology

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. In terms of RMS velocities, vibration levels below approximately 65 VdB are typically considered to be below the threshold of perception.

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.

According to the Transportation and Construction-Induced Vibration Guidance Manual (Caltrans, April 2020), 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.

Existing Environment

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 sensitive receptors to the project area consist primarily of existing and future residential uses. Existing residential developments are to the north and east of the project area. However, the existing residential development to the east is separated from the project area by the Union Pacific Railroad (UPRR), Morrison Creek, and open space. Future residential developments are proposed to the west and north-west of the project area as part of the Delta Shores development.

Noise Sources Affecting the Project Vicinity

The existing ambient noise environment in the immediate project vicinity is defined primarily by Cosumnes River Boulevard traffic to the south, the Regional Transit (RT) Light Rail tracks immediately east of the project area, and Union Pacific Railroad (UPRR) operations further east of the RT Light Rail. Evaluations of each of the major noise sources affecting the project vicinity and the overall ambient noise environment within the project vicinity from all sources are evaluated below.

Existing Overall Ambient Noise Environment within the Project area Vicinity

To quantify existing ambient noise environment within the Project area and Project vicinity, BAC conducted short-term ambient noise surveys at two locations on March 2, 2022 and long-term (continuous), ambient noise level measurements at four locations between February 28 and March 4, 2022. The long-term surveys spanned a 5-day, Monday through Friday, monitoring period at each location.

Noise measurement site LT-1 was selected to be representative of the existing UPRR noise levels behind the existing residential development to the east. Microphone heights of 5 and 10 feet were used at Site LT-1 to represent locations behind and above the existing railroad sound wall at that location. Site LT-2 was selected to represent the Light Rail and UPRR noise on the Project area. Sites LT-3 and LT-4 were selected to represent Cosumnes River Boulevard traffic noise. The noise measurement sites are shown on Figure 1. The short-term sites were selected to be representative of ambient conditions at the existing residential development to the north and Light Rail noise exposure at the eastern boundary of the site. Photographs of the noise survey locations are provided in Appendix B.

Larson Davis Laboratories (LDL) precision integrating sound level meters were used to complete the noise level measurements. The meters were calibrated immediately before and after 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 long-term noise level measurement survey results are summarized in Table 1. The detailed results of the long-term ambient noise survey are contained in Appendix C in tabular format and graphically in Appendix D. The short-term noise level measurement results are summarized in Table 2.

Table 1
Summary of Long-Term Ambient Noise Level Measurement Results[1]
Stone-Beetland Project – Sacramento, California

				Average Measured Hourly Noise Levels (dBA)			
				Daytime[3]		Nighttime[4]	
Site[2]	Height	Date[5]	DNL	L_{50}	L_{max}	L_{50}	L_{max}
LT-1	5’	Monday, February 28	51	47	63	44	57
		Tuesday, March 1	58	58	69	48	59
		Wednesday, March 2	56	52	68	49	60
		Thursday, March 3	55	50	64	49	62
		Friday, March 4	57	55	70	50	55
LT-1	10’	Monday, February 28	54	49	66	47	58
		Tuesday, March 1	66	56	67	60	71
		Wednesday, March 2	56	50	64	50	65
		Thursday, March 3	63	58	66	57	67
		Friday, March 4	-	-	-	-	-
LT-2	5’	Monday, February 28	55	51	67	48	66
		Tuesday, March 1	57	52	69	50	66
		Wednesday, March 2	57	53	69	50	66
		Thursday, March 3	57	52	69	50	63
		Friday, March 4	59	57	76	51	64
LT-3	5’	Monday, February 28	61	56	76	55	79
		Tuesday, March 1	62	57	74	55	73
		Wednesday, March 2	61	56	76	54	71
		Thursday, March 3	65	62	76	58	75
		Friday, March 4	73	67	84	66	74
LT-4	5’	Monday, February 28	62	57	75	55	71
		Tuesday, March 1	62	57	75	56	69
		Wednesday, March 2	62	56	74	55	71
		Thursday, March 3	61	55	73	55	69
		Friday, March 4	63	61	72	55	68

1 Detailed summaries of the noise monitoring results are provided in graphically in Appendix C.
2 Long-term ambient noise monitoring conducted from February 28 to March 4, 2022. Noise measurement locations are identified on Figure 1.
3 Daytime hours: 7:00 AM to 10:00 PM
4 Nighttime hours: 10:00 PM to 7:00 AM
5 Data collected on February 28 and March 4 is not a full 24-hour period.
Source: Bollard Acoustical Consultants, Inc. (2022)

The Table 1 data indicate that measured day-night average noise levels (DNL) were highest at Sites LT-1 and LT-4, which were heavily influenced by noise from UPRR operations and Consumnes River Boulevard traffic, respectively.

Table 2
Short-Term Ambient Noise Level Measurement Results – March 2, 2022
Stone-Beetland Project – Sacramento, California

Site	Duration	Time	Average Measured Hourly Noise Levels (dBA)		
			L_{50}	L_{eq}	L_{max}
ST-1	30 minutes	11:20 – 11:50 AM	43	57	80
ST-2	30 minutes	3:16 – 3:46 PM	47	50	68

Noise measurement locations are identified on Figure 1.
Source: Bollard Acoustical Consultants, Inc. (2022)

The short-term noise survey results shown in Table 2 data indicate that the ambient noise environment at the existing residences on Deerhaven Way was fairly low during the survey period, with measured average and maximum levels of 50 and 68 dBA, respectively. The short-term survey results at Site ST-1 were higher due to the proximity of that site to the RT Light Rail tracks.

Existing Traffic Noise Levels Along Project Area Roadway Network

The existing traffic noise environment on the project site is defined by Cosumnes River Boulevard traffic. Traffic on residential streets to the north is insignificant compared to Cosumnes River Boulevard traffic.

In addition to the assessment of potential noise impacts affecting the project site, CEQA also requires that the noise impacts caused by the project be considered. As a result, noise impacts resulting from increases in off-site traffic noise levels along the roadways which would provide access to the project site are also evaluated.

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 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 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 average daily traffic volumes (ADT) were obtained from the project transportation impact study prepared by Fehr & Peers. The existing traffic noise levels at the distances representing the nearest existing and proposed 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 3. Appendix E contains the FHWA Model inputs for existing conditions. The actual distances to noise level contours may vary from the distances shown in Table 3 due to factors such as roadway elevation, curvature, grade, and shielding from local topography or structures.

Table 3
Existing Traffic Noise Levels at Nearest Receptors and Distances to DNL Contours

#	Roadway	From	To	DNL at Nearest Sensitive Receptor [dB]	Distance to Contour [ft]		
					70 dB DNL	65 dB DNL	60 dB DNL
1	Meadowview Rd	29th Street	Detroit Blvd	70.0	60	129	278
2	Meadowview Rd	Detroit Blvd	Railroad	71.4	62	133	286
3	Detroit Blvd	Meadowview Rd	Laurie Way	61.3	13	28	61
4	Detroit Blvd	Laurie Way	Reel Cir	57.2	7	15	33
5	Detroit Blvd	Reel Cir	Ann Arbor Way	55.8	6	12	26
6	Detroit Blvd	Ann Arbor Way	Burlington Way	45.8	1	3	6
7	Cosumnes River Blvd	Delta Shores Cir (W)	Delta Shores Cir (E)	70.9	92	199	428
8	Cosumnes River Blvd	Delta Shores Cir (E)	Railroad	54.5	39	83	179
9	Cosumnes River Blvd	Railroad	Franklin Blvd	54.5	39	83	179
10	Delta Shores Cir	Cosumnes River Blvd (W)	Cosumnes River Blvd (E)	60.4	14	30	64

Source: FHWA-RD-77-108 with inputs from project traffic impact study. Appendix E contains FHWA model inputs.

Existing Ambient Vibration Environment

To generally quantify existing vibration levels at representative locations within the project site, BAC conducted short-term (15-minute) vibration measurements at four (4) locations within the Project area as shown on Figure 1. Photographs of the vibration survey locations 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 system was calibrated in the field prior to use to ensure the accuracy of the measurements. The ambient vibration monitoring results are summarized in Table 4.

Table 4
Summary of Ambient Vibration Monitoring Results – March 2, 2022

Site[1]	Time	Average Measured Vibration Level, VdB ()[1]
V-1	11:22 AM	43
V-2	10:36 AM	39
V-3	12:21 PM	39
V-4	3:16 PM	32

[1]Vibration measurement sites are shown on Figure 1.
Source: Bollard Acoustical Consultants, Inc. (2022)

The Table 4 data indicate that measured average vibration levels at the project area were below the 65 VdB threshold of perception, which is consistent with the BAC staff observations.

Criteria for Acceptable Noise and Vibration Exposure

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, a significant noise or vibration impact may occur if the Project results in:

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, would the project expose people residing or working in the project area to excessive noise levels.

City of Sacramento 2035 General Plan

The General Plan focuses on the effect that noise from various sources has on the community. The noise element of the City of Sacramento 2035 General Plan is intended to ensure that noise control is incorporated into the planning process and to achieve and maintain appropriate noise levels for existing and proposed land uses. The following policies of the City of Sacramento 2035 General Plan relating to noise would apply to the proposed project:

- **Policy EC 3.1.1 Exterior Noise Standards.** The City shall require noise mitigation for all development where the exterior noise standards exceed those shown in Table 5 (Table EC-1 of the General Plan), to the extent feasible.

- **Policy EC 3.1.2 Exterior Incremental Noise Standards.** The City shall require mitigation for all development that increases existing noise levels by more than the allowable increment as shown in Table 6 (Table EC-2 of the General Plan), to the extent feasible.

- **Policy EC 3.1.3 Interior Noise Standards.** The City shall require new development to include noise mitigation to assure acceptable interior noise levels appropriate to the land use type: 45 dBA L_{dn} for residential, transient lodgings, hospitals, nursing homes and other uses where people normally sleep; and 45 dBA L_{eq} (peak hour) for office buildings and similar uses.

Table 5
Exterior Noise Compatibility Standards for Various Land Uses

Land Use Type	Highest Level of Noise Exposure that is Regarded as "Normally Acceptable"[1] (L_{dn}[2] or CNEL[3])[4]
Residential – Low Density Single Family, Duplex, Mobile Homes	60 dBA[5,6]
Residential – Multi-family	65 dBA
Urban Residential Infill[7] and Mixed-Use Projects[8]	70 dBA
Transient Lodging–Motels, Hotels	65 dBA
Schools, Libraries, Churches, Hospitals, Nursing Homes	70 dBA
Auditoriums, Concert Halls, Amphitheaters	Mitigation based on site–specific study
Sports Arena, Outdoor Spectator Sports	Mitigation based on site–specific study
Playgrounds, Neighborhood Parks	70 dBA
Golf Courses, Riding Stables, Water Recreation, Cemeteries	75 dBA
Office Buildings–Business, Commercial, and Professional	70 dBA
Industrial, Manufacturing, Utilities, Agriculture	75 dBA

Source: Governor's Office of Planning and Research, State of California General Plan Guidelines 2003, October 2003
[1] As defined in the Guidelines, "Normally Acceptable" means that the "specified land use is satisfactory, based upon the assumption that any building involved is of normal conventional construction, without any special noise insulation requirements."
[2] L_{dn} or Day Night Average Level is an average 24-hour noise measurement that factors in day and night noise levels.
[3] CNEL or Community Noise Equivalent Level measurements are a weighted average of sound levels gathered throughout a 24-hour period.
[4] These standards shall not apply to balconies or small attached patios in multi-stories multi-family structures.
[5] dBA or A-weighted decibel, a measure of noise intensity.
[6] The exterior noise standard for the residential area west of McClellan Airport known as McClellan Heights/Parker Homes is 65 dBA.
[7] With land use designations of Central Business District, Urban Neighborhood (Low, Medium, or High) Urban Center (Low or High), Urban Corridor (Low or High).
[8] All mixed-use projects located anywhere in the City of Sacramento.

- **Policy EC 3.1.4 Interior Noise Review for Multiple, Loud Short-Term Events.** In cases where new development is proposed in areas subject to frequent, high-noise events (such as aircraft overflights, or train and truck pass-bys), the City shall evaluate substantiated noise impacts on any sensitive receptors from such events when considering whether to approve the development proposal, taking into account potential for sleep disturbance, undue annoyance, and interruption in conversation, to ensure that the proposed development is compatible within the context of its surroundings.

- **Policy EC 3.1.5 Interior Vibration Standards.** The City shall require construction projects anticipated to generate a significant amount of vibration to ensure acceptable interior vibration levels at nearby residential and commercial uses based on the current City or Federal Transit Administration (FTA) criteria.

- **Policy EC 3.1.6 Effects of Vibration.** The City shall consider potential effects of vibration when reviewing new residential and commercial projects that are proposed in the vicinity of rail lines or Light Rail lines.

- **Policy EC 3.1.7 Vibration.** The City shall require an assessment of the damage potential of vibration-induced construction activities, highways, and rail lines in close proximity to historic buildings and archaeological sites and require all feasible mitigation measures be implemented to ensure no damage would occur.

- **Policy EC 3.1.8 Operational Noise.** The City shall require mixed-use, commercial and industrial projects to mitigate operational noise impacts to adjoining sensitive uses when operational noise thresholds are exceeded.

- **Policy EC 3.1.9 Compatibility with Park and Recreation Uses.** The City shall limit the hours of operation of parks and active recreation areas in residential areas to minimize disturbance to residences.

- **Policy EC 3.1.10 Construction Noise.** The City shall require development projects subject to discretionary approval to assess potential construction noise impacts on nearby sensitive uses and to minimize impacts on these uses to the extent feasible.

Table 6
Allowable Incremental Noise Increases

Residences and buildings where people normally sleep[1]		Institutional land uses with primarily daytime and evening uses[2]	
Existing L_{dn}	Allowable Noise Increment	Existing L_{dn}	Allowable Noise Increment
45	8	45	12
50	5	50	9
55	3	55	6
60	2	60	5
65	1	65	4
70	1	70	4
75	0	75	1
80	0	80	0

Notes:
[1] This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
[2] This category includes schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material.
Source: City of Sacramento. 2009. Sacramento 2030 General Plan Master Environmental Impact Report. Certified March 3, 2009

- **Policy EC 3.1.11 Alternatives to Sound Walls.** The City shall encourage the use of design strategies and other noise reduction methods along transportation corridors in lieu of sound walls to mitigate noise impacts and enhance aesthetics.

Sacramento City Code

The City of Sacramento Noise Ordinance (Section 8.68 of the Sacramento City Code) states that it is unlawful for any person at any location within the City to create any noise that causes ambient noise levels at an affected receptor to exceed the noise standards shown in Table 7. The Table 7 standards are specifically applicable to sources of noise which can be controlled at the local level. The Table 7 standards do not apply to traffic, aircraft or railroad noise exposure as control of noise from those sources is subject to state or Federal oversight, and not subject to local control.

Table 7
Noise Ordinance Standards Applicable at Exterior Spaces of Residential Uses

Cumulative Duration of Intrusive Sound	Noise Metric	Daytime, dB	Nighttime, dB
Cumulative period of 30 minutes per hour	L_{50}	55	50
Cumulative period of 15 minutes per hour	L_{25}	60	55
Cumulative period of 5 minutes per hour	L_{08}	65	60
Cumulative period of 1 minute per hour	L_{02}	70	65
Level not to be exceeded for any time during hour	L_{max}	75	70

Notes: Daytime is defined as 7 a.m. to 10 p.m. and Nighttime is defined as 10 p.m. to 7 a.m.
Each of the noise limits specified above shall be reduced by 5 dBA for impulsive or simple tone noise or for noises consisting of speech or music. If the existing ambient noise levels exceed that permitted in the first four noise-limit categories, the allowable limit shall be increased in 5 dB increments to encompass the ambient.
Source: City of Sacramento Noise Ordinance. www.qcode.us/codes/sacramento/view.php?topic=8-8_68-ii&frames=off.

With respect to construction noise, the City of Sacramento Noise Ordinance (Section 8.68.080d) exempts noise generated by construction activities from the standards identified above in Table 7, as follows:

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

With respect to noise generated at neighborhood parks, the City of Sacramento Noise Ordinance (Section 8.68.080b) specifically exempts noise generated by activities conducted at parks or public playgrounds, provided such parks and playgrounds are owned and operated by a public entity.

Railroad Single-Event Noise Level Criteria

As noted in City of Sacramento General Plan Policy EC 3.1.4, in cases where new development is proposed in areas subject to frequent, high-noise events (such as train pass-bys), the City shall evaluate noise impacts on any sensitive receptors from such events when considering whether to approve the development proposal, taking into account potential for sleep disturbance, undue annoyance, and interruption in conversation, to ensure that the proposed development is compatible within the context of its surroundings. The City of Sacramento General Plan does not, however, provide a quantifiable threshold against which single-event noise impacts are to be evaluated.

Studies of sleep disturbance have indicated that an interior Sound Exposure Level (SEL) of 65 dBA resulted in an average percentage of awakening of approximately 2% of the population. Because 2% of the population can be expected to regularly awaken due a variety of factors not related to noise, the use of an interior SEL threshold of 65 dBA for the assessment of single-event impacts within residences is both reasonable and scientifically defensible.

Vibration Standards

The City of Sacramento Noise Element Policies EC 3.1.5 through EC 3.1.7 pertain to vibration, referencing the Federal Transit Administration (FTA) guidelines (FTA Noise and Vibration Manual), as being appropriate. The FTA guidelines identify vibration levels of 98 VdB as being the threshold at which damage to engineered timber and masonry buildings could occur and 75 VdB at the threshold at which annoyance from frequent vibration events would occur.

Noise & Vibration Standards Applied to this Assessment

According to the City of Sacramento Planning Department (Johnson), for purposes of this noise evaluation in support of the CEQA Initial Study, impacts due to noise may be considered significant if construction and/or implementation of the Proposed Project would result in the following impacts that remain significant after implementation of general plan policies:

- Result in exterior noise levels in the project area that are above the upper value of the normally acceptable category for various land uses due to the project's noise level increases;
- Result in residential interior noise levels of 45 dBA Ldn or greater caused by noise level increases due to the project;
- Result in construction noise levels that exceed the standards in the City of Sacramento Noise Ordinance;
- Permit existing and/or planned residential and commercial areas to be exposed to vibration-peak-particle velocities greater than 0.5 inches per second due to project construction;
- Permit adjacent residential and commercial areas to be exposed to vibration peak particle velocities greater than 0.5 inches per second due to highway traffic and rail operations; or

- Permit historic buildings and archaeological sites to be exposed to vibration-peak-particle velocities greater than 0.2 inches per second due to project construction and highway traffic.

Noise Impacts and Mitigation Measures

Noise Impacts from Project-Generated Increases in Off-Site Traffic Noise Levels

With development of the project, traffic volumes on the local roadway network will increase. Those increases in Average Daily Traffic (ADT) volumes will result in a corresponding increase in traffic noise levels at existing sensitive uses located along those roadways. The vacant City Property identified on Figure 2 may be developed prior to this proposed project. Therefore, two (2) baseline scenarios were evaluated for the existing condition: Existing and Existing + City Property Project.

The FHWA Traffic Noise Model (FHWA-RD-77-108) was used to quantify increases in baseline 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. The FHWA Model was used with traffic input data from the transportation impact analysis prepared by Fehr & Peers, Inc. to predict project traffic noise level increases relative to Existing, Existing + City, and no project conditions.

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

The *Existing* and *Existing + 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 normally acceptable threshold for residential noise exposure, whether the roadway segment contains sensitive uses, and whether or not the project-related traffic noise increases would result in the residential threshold being exceeded (where it is not currently exceeded). Appendix E contains the FHWA Model inputs for existing and existing plus project conditions.

Factors such as roadway elevation, curvature, grade, and shielding from local topography or structures, or elevated receivers may affect actual traffic noise propagation. Along roadway segments where existing noise barriers are present, the degree of shielding provided by those barriers was estimated and included in the Table 8 results.

The data in Table 8 indicate that project-generated traffic noise level increases would not result in significant noise impacts along the project-area roadway segments where sensitive receptors are currently located. Therefore, off-site traffic noise impacts related to increases in traffic resulting from the implementation of the project (existing vs. existing plus project conditions) are identified as being ***less than significant***.

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

#	Roadway	From	To	Predicted DNL, dBA			Residential Significance Threshold[1]	Threshold Exceeded due to Project?	Sensitive Receptors Present?[2]	Significant Impact Identified?[3]
				Existing	Existing + Project	Increase				
1	Meadowview Rd	29th Street	Detroit Blvd	70.0	70.1	0.1	60	No	Yes	No
2	Meadowview Rd	Detroit Blvd	Railroad	71.4	71.5	0.1	60	No	Yes	No
3	Detroit Blvd	Meadowview Rd	Laurie Way	61.3	62.3	1.0	60	No	Yes	No
4	Detroit Blvd	Laurie Way	Reel Cir	57.2	59.0	1.8	60	No	Yes	No
5	Detroit Blvd	Reel Cir	Ann Arbor Way	55.8	58.1	2.3	60	No	Yes	No
6	Detroit Blvd	Ann Arbor Way	Burlington Way	45.8	56.6	10.8	60	No	Yes	No
7	Cosumnes River Blvd	Delta Shores Cir (W)	Delta Shores Cir I	70.9	71.6	0.7	60	No	No	No
8	Cosumnes River Blvd	Delta Shores CI(E)	Railroad	54.5	55.0	0.5	60	No	Yes	No
9	Cosumnes River Blvd	Railroad	Franklin Blvd	54.5	55.3	0.8	60	No	Yes	No
10	Delta Shores Cir	Cosumnes River Blvd (W)	Cosumnes River Blvd (E)	60.4	61.1	0.7	60	No	No	No

Notes

1. Significance threshold is maximum normally acceptable noise level for residential land uses (i.e. 60 dB DNL for single family residential and 65 dB DNL for multi-family residential).
2. Sensitive receptors were considered to be residences of all densities, schools, & transient lodging facilities.
3. A significant impact is identified only along segments where the project-related traffic noise level increase would exceed the significance threshold AND where sensitive receptors are present along the roadway segment. The noise impact is insignificant if the Existing condition already exceeds the City's noise standards as summarized in column: Residential Significance Threshold.

Source: FHWA-RD-77-108 with inputs from project traffic impact study. Appendix E contains FHWA Model inputs.

Noise Impacts from Project Components on Existing Sensitive Uses

Impact 2: Commercial Mixed-Use Noise at Existing Sensitive Uses

The location of the proposed commercial mixed-use area within the Stone-Beetland Project is shown on Figure 2. As indicated in Figure 2, the proposed commercial mixed-use area would be buffered from existing residential uses by distance and by intervening uses proposed within the project site. As a result, noise generated within the commercial mixed-use area is predicted to be well below the applicable City Code noise standards shown in Table 7 and well below existing ambient noise levels at the existing residential uses located in the general project vicinity. Therefore, ***this impact is identified as being less than significant.***

Impact 3: Park Activity Noise at Existing Sensitive Uses

With the exception of the small park proposed within the northeast corner of the Stone-Beetland development, the proposed parks would be separated from existing noise-sensitive uses (residences) by distance, intervening roadways, and intervening residences proposed within the project area. As a result, noise levels generated within the proposed park areas are predicted to be below existing ambient noise levels at the existing residential uses located in the general project vicinity. In addition, the size of the park proposed within the northeast corner of the project site is such that it would likely be used primarily for passive recreation activities which do not generate appreciable noise levels (i.e. walking, picnic, reading, etc.). Finally, the City of Sacramento Noise Ordinance (Section 8.68.080) specifically exempts noise generated by activities conducted at parks or public playgrounds, provided such parks and playgrounds are owned and operated by a public entity. As a result, this impact is identified as being ***less than significant.***

Noise & Vibration Impacts from Proposed Project On-Site Construction Activities

Impact 4: On-Site Construction Noise at Existing Sensitive Uses

During project construction, heavy equipment would be used for demolition, clearing, 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 on the proximity of equipment activities to that location. The nearest existing residences are located adjacent to the northern project boundary, within approximately 50 feet of project construction activities.

Table 9 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 9
Construction Equipment Reference Noise Levels and Predicted Noise Levels at 25 Feet

Equipment Description	Maximum Noise Level at 50 Feet (dBA)
Air compressor	80
Backhoe	80
Ballast equalizer	82
Ballast tamper	83
Compactor	82
Concrete mixer	85
Concrete pump	82
Concrete vibrator	76
Crane, mobile	83
Dozer	85
Generator	82
Grader	85
Impact wrench	85
Loader	80
Paver	85
Pneumatic tool	85
Pump	77
Saw	76
Scarifier	83
Scraper	85
Shovel	82
Spike driver	77
Tie cutter	84
Tie handler	80
Tie inserter	85
Truck	84

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

Based on the equipment noise levels in Table 9, worst-case on-site project construction equipment maximum noise levels at the nearest existing noise-sensitive uses are expected to range from approximately 76 to 85 dB while construction equipment is operating near the site boundaries closest to those residences. Thus, some construction activities occurring within the project area would result in substantial short-term increases over ambient maximum noise levels at the nearest existing sensitive uses.

City of Sacramento Noise Ordinance (Section 8.68.080, D) offers an exemption for construction noise provided that the certain activities occur during specified hours and days of the week. Provided construction activities within the project area occur pursuant to Sacramento City Code section 8.68.080(d), project construction activities would be exempt, and this impact would be considered less than significant. However, if construction activities are proposed during the hours not exempted by the City Code, noise levels generated by construction activities could result in annoyance at nearby existing residential uses. As a result, ***noise impacts associated with project on-site construction activities are identified as being potentially significant***.

Mitigation for Impact 4

MM-1: The following measures shall be incorporated into the project on-site construction operations:

- Noise-generating construction activities within the Plan area shall occur pursuant to the hours and days outlined in Municipal Code Section 6.68.080(d).
- 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 uses.
- Project area and site access road speed limits shall be established and enforced during the construction period.
- Nearby residences shall be notified of construction schedules so that arrangements can be made, if desired, to limit their exposure to short-term increases in ambient noise levels.
- In the event that unusual circumstances or emergencies prevent certain project construction activities from complying with the Municipal Code Section 6.68.090(e) then a noise control plan shall be developed to ensure that sufficient mitigation is implemented during project construction to ensure adverse noise impacts are avoided.

Significance of Impact 4 after Mitigation: ***Less Than Significant***

Impact 5: On-Site Construction Vibration at Existing Sensitive Uses

As noted in Impact 4, 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 identified existing structures (newer engineered residences which are not highly susceptible to damage by vibration) are located approximately 50 feet from where construction activities would occur within the Project area.

Table 10 includes the range of vibration levels for equipment commonly used in general construction projects at a distance of 25 feet. The Table 10 data also include predicted equipment vibration levels at a distance of 50 feet from proposed construction activities.

Table 10
Vibration Source Levels for Construction Equipment

Equipment	Maximum Vibration Velocity Level at 25 feet		Predicted Maximum Vibration Velocity Level at 50 feet	
	VdB (rms)	PPV (Inches / Second)	VdB (rms)	PPV (Inches / Second)
Vibratory Roller	94	0.21	84	0.07
Hoe Ram	87	0.09	77	0.03
Large bulldozer	87	0.09	77	0.03
Loaded trucks	86	0.08	76	0.03
Jackhammer	79	0.04	69	0.01
Small bulldozer	58	0.01	48	<0.01

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

As shown in Table 10, vibration levels generated from on-site construction activities are predicted to be below thresholds for damage to engineered residential structures (98 VdB and 0.5 ips, PPV) at a distance of 50 feet from those activities. However, while construction-related vibration levels are generally predicted to be below levels considered to be annoying (75 VdB) at the nearest residences, some construction activities could result in short-term periods of annoyance by exceeding the 75 VdB threshold. As a result, ***this impact is considered to be potentially significant.***

Mitigation for Impact 5

MM-2: Refrain from utilizing vibratory rollers within 100 feet of existing residences and hoe rams and large bulldozers within 75 feet of existing residences.

Significance of Impact 6 after Mitigation: ***Less than Significant***

Noise Impacts Upon Proposed Sensitive Uses within the Project

The California Supreme Court issued an opinion in *California Building Industry Association v. Bay Area Air Quality Management District (2015)* holding that CEQA is primarily concerned with the impacts of a project *on* the environment and generally does not require agencies to analyze the impact of existing or future conditions on a project's future users or residents. Nevertheless, the Sacramento 2035 General Plan contains policies that address acceptable noise exposure at future sensitive uses developed within the City. As a result, noise and vibration impacts upon the project are evaluated for General Plan consistency in the following section.

On-Site Noise Impacts from Traffic

Impact 6: Future Exterior Traffic Noise Levels at Proposed Sensitive Uses

The project proposes development of residential uses of varying densities. While the interior spaces of residential uses share the same noise-sensitivity regardless of density, the noise-sensitivity of exterior areas varies according to the type of proposed residential use. For example, in single-family residential developments, the noise-sensitive exterior spaces where the City's exterior noise standards are applied are commonly considered to be backyards. Within higher density residential developments, such as apartments, the City's exterior noise standards are applied at common outdoor usage areas such as pool or park spaces rather than individual patios or balconies. Furthermore, the "normally acceptable" DNL also varies depending on land use type (Table 5).

The FHWA Model was used with *Existing + City + Project* scenario traffic data, described previously in the report in section *Noise Impacts from Project Increases in Off-Site Traffic*, to predict distances to future traffic noise at nearest proposed noise-sensitive receptors. To evaluate future traffic conditions for comparison against the Table 5 standards, this analysis assumed a doubling of traffic over time, which would result in a 3 dB DNL increase relative to existing traffic volumes.

Detailed FHWA Model inputs for the internal roadways and existing roadways that would affect project development are provided in Appendix E. Cross-sections of future roadways proposed within the Project area were used to determine the distances from the roadway centerlines to the nearest proposed outdoor activity areas along each roadway segment. Table 11 shows the predicted future traffic noise exposure at the nearest proposed residential locations along each roadway segment and a comparison of those predicted levels against the applicable General Plan exterior noise standards (Table 5).

Table 11
Predicted Future Traffic Noise Levels along Roadways Affecting Development within the Project Area

No	Roadway	From	To	Dist. To Nearest Noise-Sensitive Receptor [ft][1]	Future Traffic DNL[2]	Noise Standards, DNL	Standard Exceeded?[3]
1	Cosumnes River Blvd	Delta Shores Cir (E)	Railroad	80	75	60-65	Yes
2	24th Street	A Street	Cosumnes River Blvd	60	64	60	Yes
3	A Street	24th Street	West park boundary	50	63	60	Yes
4	A Street	West park boundary	B Street	50	61	70	No
5	A Street	B Street	C Street	50	65	65	No
6	B Street	A Street	Cosumnes River Blvd	50	61	60-70	Yes
7	C Street	D Street	E Street	55	65	65	No
8	C Street	E Street	Cosumnes River Blvd	55	69	65	Yes
9	D Street	East of C Street	N/A	50	63	60-65	Yes
10	E Street	East of C Street	N/A	50	66	65	Yes

Notes
1. The distance from the roadway segment centerline to the nearest potential location for an outdoor activity area based on preliminary site plans.
2. The Day/Night Average Level (DNL) computed at the distance cited in the "Distance" column.
3. If the predicted DNL at the nearest potential outdoor activity areas exceeds the City's exterior noise level standards as defined in Table 5, then this column is flagged as "Yes".

Source: FHWA-RD-77-108 with inputs from project traffic impact study. Appendix E contains FHWA Model inputs.

As indicated in Table 11, predicted future traffic noise level exposure is predicted to exceed the noise standards applicable to the various land uses along six (6) roadway segments. Although the conceptual project site plans contain the general locations of the proposed single-family residential uses, the specific locations of the individual residences and outdoor activity areas had not been specified at the time of this writing. This is also true of the designs for the medium-density and high-density residential uses proposed within the project development. Because residential outdoor activity areas could be located in areas where future traffic noise exposure is predicted to exceed the applicable exterior noise standards shown in Table 5, ***this impact is identified as being potentially significant.***

Mitigation for Impact 6

To satisfy the City of Sacramento General Plan exterior noise level standards at the outdoor activity areas of future residential uses proposed within the project area, the following noise mitigation measures should be considered either singularly or in combination during project design, depending on the level of sound attenuation required. At proposed residential locations adjacent to Consumnes River Boulevard, it is probable that a combination of the following measures would be required:

MM-3: Residential outdoor activity areas shall be located beyond the applicable 60 DNL contours for single-family residences and beyond the 65 DNL contour for common outdoor activity areas of multi-family residences.

OR

MM-4: Residential outdoor activity areas proposed within the 65 dBA DNL noise contour distances shown in Table 15 shall be screened from view of the roadway by intervening structures or sound barriers. If sound barriers are proposed, project-specific grading plans shall be reviewed to determine the location and heights of barriers necessary to achieve compliance with the City's noise standards. With the exception of single-family residences proposed adjacent to Consumnes River Boulevard, noise barriers along other roadways would not need to exceed 6 feet in height to provide the required traffic noise attenuation.

If noise barriers are to be constructed within the Project area, the traffic noise barriers shall take the form of a masonry wall, earthen berm, or combination of the two, or, if reviewed and approved by an acoustical consultant as providing comparable performance prior to construction, other materials may be acceptable (i.e., wood or wood composite fence with overlapping slat construction).

OR

MM-5: Single-family residences shall be oriented such that the front of the residence faces the roadway segment where levels exceeding the applicable noise standard would occur, thereby using the residence to shield the backyard from the roadway and creating a larger setback between the roadway centerline and backyard outdoor activity area.

Significance of Impact 6 after Mitigation: ***Less than Significant***

Impact 7: Future Interior Traffic Noise Levels at Proposed Sensitive Uses

Based upon years of experience and testing conducted by BAC, standard building construction (stucco siding, STC-27 windows, door weather-stripping, exterior wall insulation, composition plywood roof), typically results in an exterior to interior noise reduction of at least 25 dBA with windows closed and approximately 15 dB with windows open. Therefore, provided predicted future traffic noise exposure at residential building facades does not exceed 70 dBA DNL, standard construction would be adequate to reduce interior noise levels to a state of compliance with the City's 45 dBA DNL interior noise level standard.

As indicated in Table 11, with the exception of residences constructed adjacent to Consumnes River Boulevard, future traffic noise levels are not predicted to exceed 70 dBA DNL at any residential areas within the project site. Therefore, construction upgrades would not be required at those residential areas where future traffic noise exposure is not predicted to exceed 70 DNL. At residential uses proposed adjacent to Consumnes River Boulevard, it is probable that future traffic noise exposure would exceed the County's 45 dBA DNL interior noise level standard without mitigation, particularly at upper floor locations which would not likely be shielded from view of roadways by sound walls (where required). As a result, this impact is identified as being **potentially significant**.

Mitigation Impact 7:

MM-6: At locations where residential building facades are proposed in future noise environments exceeding 70 dBA DNL, project plans shall be reviewed by a qualified acoustical consultant to ensure that appropriate construction upgrades (typically higher-rated STC values for windows) are specified to ensure compliance with the County's interior noise standard.

Significance of Impact 7 after Mitigation: ***Less than Significant***

Noise Impacts from Light Rail and Heavy Rail Operations

Impact 8: Noise Generated by UPRR Operations

Noise monitoring site LT-1 was located 130 feet from the UPRR tracks at the position indicated on Figure 1. The highest measured DNL at that the 10-foot high monitoring location at LT-1 was 66 DNL. The nearest proposed residential uses to the UPRR tracks consist of the low-density residential uses in the northeast area of the project site and the high-density residential uses in the southeast area of the project site. These proposed residential uses are approximately 500 feet from the UPRR tracks. At that distance, the computed DNL for UPRR operations compute to 56 DNL at the exterior areas of the proposed residential uses and 31 DNL at the interior areas of the proposed residential uses. These levels would be satisfactory relative to the City of Sacramento 60/65 DNL exterior standards for single-family and multi-family residential uses, as well as the 45 dB DNL interior noise standard for all residential uses. ***As a result, this impact is considered less than significant.***

Impact 9: Noise Generated by Regional Transit Light Rail Operations

The project proposes both low-density and high-density residential uses in close proximity to the RT Light Rail tracks and the Morrison Creek station. Operational information obtained from the Regional Transit website (http://www.sacrt.com/schedules/) were used to identify the number of daily Light Rail train passbys of the project site during both daytime and nighttime periods. BAC utilized single-event noise level data for RT Light Rail passbys collected at monitoring site ST-1 (See Figure 1) with the operational data to compute DNL and SEL values at the nearest proposed residences within the Stone-Beetland project to the RT Light Rail tracks. Table 12 contains the predicted RT Light Rail noise levels at the project site.

Table 12
Predicted Future Light Rail Noise Levels at Nearest Proposed Residences[1]
Stone-Beetland Project – Sacramento, California

Proposed Residential Location	Distance from Center of Light Rail Tracks[2]	Computed DNL	Computed SEL
Northern Low Density Residential	135	54	77
Central High Density Residential	285	49	73
Southern High Density Residential	60	59	83

Notes:
[1] Predicted future Light Rail noise levels based on information obtained from the current SacRT Blue Line train schedule, and a reference SEL of 80 dB at a distance of 90 feet.
[2] Distances measured from indicated location to the center of the Light Rail tracks.
Source: Bollard Acoustical Consultants, Inc. (2022)

As shown in Table 12, noise levels from SacRT Light Rail operations are predicted to comply with the City of Sacramento exterior standards of 60 dB DNL at the low density residential area nearest to the RT tracks and 65 dB DNL at the high density residential areas nearest to the RT tracks. As a result, no adverse noise impacts are identified relative to the City of Sacramento General Plan DNL standards. After accounting for the minimum 25 dB of noise attenuation provided by the building facades of the proposed residential uses, interior DNL noise levels would range from 24 to 34 dB, which are well within compliance of the City's 45 dB DNL interior noise standard applicable to new residential uses.

Table 12 also indicates that computed Sound Exposure Levels (SEL) at the exterior building facades of the nearest proposed residences to the RT tracks would range from 73 to 83 dB, depending on proximity to the tracks. After accounting for the minimum 25 dB of noise attenuation provided by the building facades of the proposed residential uses interior SEL noise levels would range from 48 to 58 dB. Because this range of levels is below the 65 dB SEL criteria for the onset of sleep disturbance, no adverse noise impacts are identified relative to single-event noise.

Because Regional Transit Light Rail operations are predicted to satisfy the City's General Plan exterior and interior noise standards at the nearest residences proposed to the RT tracks, and because single-event noise levels within those residences would be below the criteria for sleep disturbance, ***this impact is identified as less than significant.***

Vibration Impacts from Light Rail and Heavy Rail Operations

Impact 10: Vibration Generated by UPRR Operations

The nearest proposed residential uses within the Stone-Beetland development are located approximately 500 feet from the existing UPRR tracks to the east. Railroad vibration levels are typically below thresholds for damage to structures and annoyance at a distance of 100 feet from the tracks. At a distance of 500 feet from the tracks, railroad vibration levels would be in excess of 20 VdB below levels expected at 100 feet, which would result in vibration levels well below thresholds required for damage to structures or annoyance. Therefore, ***this impact is identified as less than significant.***

Impact 11: Vibration Generated by Light Rail Operations

To quantify Light Rail vibration levels from potential future operations adjacent to the project site, BAC utilized vibration data collected at short-term vibration monitoring site V-1. The vibration measurement site was located approximately 90 feet from the center of the Light Rail tracks. A Larson-Davis Laboratories Model LxT precision integrating sound level meter equipped with a vibration transducer was used to complete the measurements. The measured typical vibration level associated with light rail train passbys was 66 VdB at the measurement site. At the nearest proposed residences to the tracks (HDR in southeastern area of site – 60 feet from tracks), the computed vibration level computes to 71 VdB.

Based on the current SacRT Blue Line route schedule, an average of 135 trains will pass the project site during a typical weekday. Based on this level of activity, the corresponding FTA numerical standard of 72 VdB for "frequent events" (>70 events per day) affecting residences and buildings where people normally sleep (Category 2) would be applicable to this project. The predicted Light Rail train passby vibration levels would therefore be satisfactory relative to the applicable 72 VdB FTA vibration standard and this impact is identified ***as less than significant.***

Noise Impacts from Proposed Commercial / Mixed Use Activities at Proposed Sensitive Uses

Impact 12: Commercial Mixed-Use Noise at Proposed Sensitive Uses

Based on the experience and data collected by BAC on various commercial uses, typical noise sources which can be expected consist of parking lot movements, truck deliveries, fast-food drive-throughs, and mechanical heating, ventilating and air-conditioning equipment (HVAC).

Specific plans for the commercial uses which would be located within the Commercial Mixed-Use (CMU) portion of the project area have yet to be developed. Furthermore, the specific commercial tenants and types of noise generation associated with those tenants are similarly unknown at the time of this writing. As a result, a detailed prediction of the noise generation of the future commercial uses and the effects of that noise generation on residences constructed within the CMU area and residences proposed adjacent to the CMU area cannot be completed at this time. However, given the potential noise generation of such commercial activities, the possibility exists for exceedance of the applicable Sacramento City Code noise standards at future residential uses constructed within the Stone-Beetland development. Therefore, ***this impact is identified as being potentially significant.***

Mitigation for Impact 12:

To ensure that the applicable Sacramento City Code exterior and interior daytime and nighttime noise level standards are satisfied at noise-sensitive uses proposed within this development, the following noise mitigation measure should be implemented:

MM-7: A site specific noise impact study that addresses Commercial Mixed-Use activities shall be completed by a qualified noise consultant once site-specific development plans are completed. The noise impact study shall include an analysis of Commercial Mixed-Use parking, truck delivery, drive-through lane (if applicable), and HVAC noise exposure at the nearest proposed noise-sensitive uses (residential). The analysis shall include associated mitigation measures (as appropriate) to reduce commercial noise levels to a state of compliance with applicable Sacramento City Code exterior and interior noise level limits at nearby proposed sensitive receptors. Such measures could include, but are not limited to, increasing setbacks between sensitive uses and parking areas, construction of noise barriers where appropriate, and incorporation of upgraded residential building construction.

Significance of Impact 12 after Mitigation: ***Less than Significant***

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.

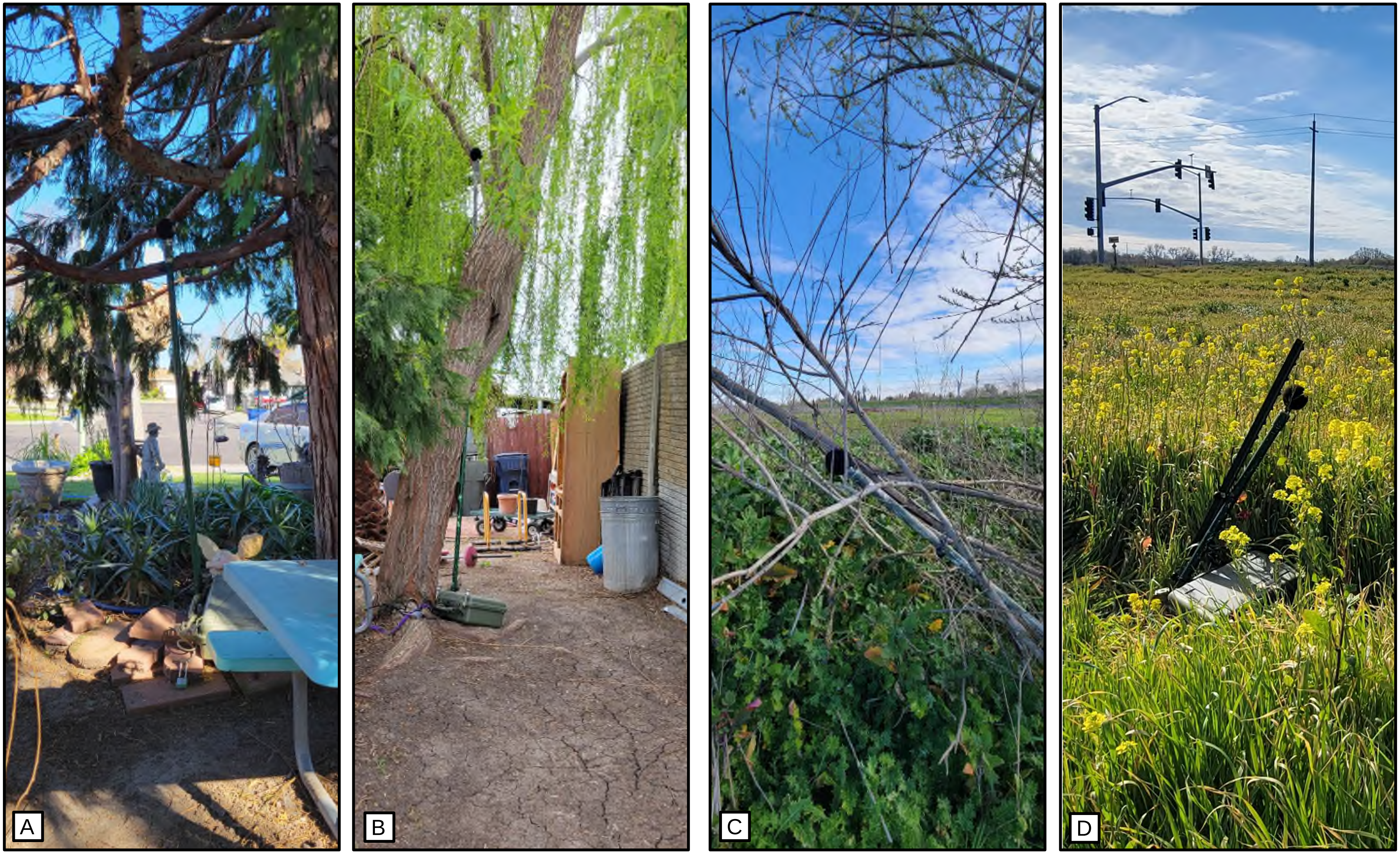
Masking The amount (or the process) by which the threshold of audibility is for one sound is raised by the presence of another (masking) sound.

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 LT-1: 5 Feet
- B Site LT-1: 10 Feet
- C Site LT-2
- D Site LT-3

Stone Beetland

Sacramento, California

Photographs of Long-term Noise Survey Locations

Appendix B-1

BOLLARD Acoustical Consultants

Legend

- A Sites ST-1 & V-1
- B Sites ST-1 & V-1
- C Sites ST-2 & V-4
- D Sites ST-2 & V-4

Stone Beetland

Sacramento, California

Photographs of Short-term Noise & Vibration Survey Locations

Appendix B-2

BOLLARD Acoustical Consultants

Legend

- A Site V-2
- B Site V-3

Stone Beetland

Sacramento, California

Photographs of Short-term Vibration Survey Locations

Appendix B-3

BOLLARD Acoustical Consultants

Appendix C-1
Long-Term Ambient Noise Monitoring Results - Site LT-1: 10'
Stone Beetland - Sacramento, California
Monday, February 28, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM				
1:00 AM				
2:00 AM				
3:00 AM				
4:00 AM				
5:00 AM				
6:00 AM				
7:00 AM				
8:00 AM				
9:00 AM				
10:00 AM				
11:00 AM				
12:00 PM				
1:00 PM				
2:00 PM				
3:00 PM	51	66	46	39
4:00 PM	50	69	45	40
5:00 PM	50	65	46	42
6:00 PM	51	68	47	44
7:00 PM	50	67	46	44
8:00 PM	47	69	45	43
9:00 PM	46	59	45	44
10:00 PM	46	58	45	43
11:00 PM	47	58	45	43

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	51	46	49	47	46	47
Lmax (Maximum)	69	59	66	58	58	58
L50 (Median)	47	45	46	45	45	45
L90 (Background)	44	39	42	43	43	43

Computed DNL, dB	54
% Daytime Energy	75%
% Nighttime Energy	25%

GPS Coordinates	38°28'6.55"N
	121°27'43.01"W

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Appendix C-2
Long-Term Ambient Noise Monitoring Results - Site LT-1: 10'
Stone Beetland - Sacramento, California
Tuesday, March 1, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	44	57	43	42
1:00 AM	42	59	41	39
2:00 AM	43	59	42	39
3:00 AM	63	84	44	42
4:00 AM				
5:00 AM				
6:00 AM				
7:00 AM	47	64	46	44
8:00 AM	45	62	45	43
9:00 AM	46	64	44	41
10:00 AM	46	65	44	42
11:00 AM	44	55	43	41
12:00 PM	63	85	44	42
1:00 PM	47	54	46	44
2:00 PM	49	62	49	47
3:00 PM	64	88	51	49
4:00 PM	53	65	53	51
5:00 PM	50	66	49	46
6:00 PM	51	68	48	44
7:00 PM	58	73	56	45
8:00 PM	55	68	52	43
9:00 PM	50	69	46	41
10:00 PM	63	83	57	48
11:00 PM	61	81	50	42

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	64	44	56	63	42	60
Lmax (Maximum)	88	54	67	84	57	71
L50 (Median)	56	43	48	57	41	46
L90 (Background)	51	41	44	48	39	42

Computed DNL, dB	66
% Daytime Energy	44%
% Nighttime Energy	56%

GPS Coordinates	38°28'6.55"N 121°27'43.01"W

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Appendix C-3
Long-Term Ambient Noise Monitoring Results - Site LT-1: 10'
Stone Beetland - Sacramento, California
Wednesday, March 2, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	52	71	47	43
1:00 AM	51	67	47	44
2:00 AM	48	61	47	44
3:00 AM	49	61	48	46
4:00 AM	49	63	47	45
5:00 AM	49	67	46	44
6:00 AM	49	65	46	44
7:00 AM	47	65	45	44
8:00 AM	48	65	45	43
9:00 AM	44	63	43	41
10:00 AM	43	54	43	40
11:00 AM	45	60	43	41
12:00 PM	44	59	44	42
1:00 PM	46	56	45	44
2:00 PM	48	67	47	45
3:00 PM	51	70	50	47
4:00 PM	53	65	52	51
5:00 PM	59	81	50	45
6:00 PM	49	67	45	40
7:00 PM	46	60	42	38
8:00 PM	48	68	43	39
9:00 PM	48	66	46	39
10:00 PM	49	69	46	43
11:00 PM	50	63	47	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)	59	43	50	52	48	50
Lmax (Maximum)	81	54	64	71	61	65
L50 (Median)	52	42	45	48	46	47
L90 (Background)	51	38	43	46	43	44

Computed DNL, dB	56
% Daytime Energy	66%
% Nighttime Energy	34%

GPS Coordinates	38°28'6.55"N 121°27'43.01"W

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Appendix C-4
Long-Term Ambient Noise Monitoring Results - Site LT-1: 10'
Stone Beetland - Sacramento, California
Thursday, March 3, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	49	64	47	44
1:00 AM	49	71	45	43
2:00 AM	50	66	47	44
3:00 AM	48	63	45	43
4:00 AM	47	60	45	43
5:00 AM	65	86	46	44
6:00 AM	46	62	45	44
7:00 AM	48	67	44	41
8:00 AM	63	83	44	42
9:00 AM	42	54	41	39
10:00 AM	41	53	40	39
11:00 AM	42	58	41	40
12:00 PM	41	50	41	39
1:00 PM	44	56	43	41
2:00 PM	64	84	46	45
3:00 PM	50	64	48	46
4:00 PM	51	67	49	48
5:00 PM	64	85	50	48
6:00 PM				
7:00 PM				
8:00 PM				
9:00 PM				
10:00 PM				
11:00 PM				

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	64	41	58	65	46	57
Lmax (Maximum)	85	50	66	86	60	67
L50 (Median)	50	40	44	47	45	46
L90 (Background)	48	39	42	44	43	44

Computed DNL, dB	63
% Daytime Energy	71%
% Nighttime Energy	29%

GPS Coordinates	38°28'6.55"N 121°27'43.01"W

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Appendix C-5
Long-Term Ambient Noise Monitoring Results - Site LT-1: 5'
Stone Beetland - Sacramento, California
Monday, February 28, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM				
1:00 AM				
2:00 AM				
3:00 AM				
4:00 AM				
5:00 AM				
6:00 AM				
7:00 AM				
8:00 AM				
9:00 AM				
10:00 AM				
11:00 AM				
12:00 PM				
1:00 PM				
2:00 PM				
3:00 PM	49	67	43	35
4:00 PM	48	70	42	36
5:00 PM	47	62	43	39
6:00 PM	48	63	44	41
7:00 PM	46	61	44	42
8:00 PM	44	62	43	41
9:00 PM	44	58	43	42
10:00 PM	44	53	43	42
11:00 PM	45	60	44	42

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	49	44	47	45	44	44
Lmax (Maximum)	70	58	63	60	53	57
L50 (Median)	44	42	43	44	43	43
L90 (Background)	42	35	39	42	42	42

Computed DNL, dB	51
% Daytime Energy	76%
% Nighttime Energy	24%

GPS Coordinates	38°28'6.55"N 121°27'43.01"W

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Appendix C-6
Long-Term Ambient Noise Monitoring Results - Site LT-1: 5'
Stone Beetland - Sacramento, California
Tuesday, March 1, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	42	55	41	40
1:00 AM	40	52	39	37
2:00 AM	41	57	40	37
3:00 AM	56	76	42	41
4:00 AM	43	51	43	42
5:00 AM	46	56	46	44
6:00 AM	49	71	47	45
7:00 AM	56	75	47	46
8:00 AM	46	67	45	43
9:00 AM	68	88	44	37
10:00 AM	43	67	39	36
11:00 AM	45	68	38	35
12:00 PM	54	78	38	34
1:00 PM	45	64	39	33
2:00 PM	45	63	41	35
3:00 PM	57	79	41	33
4:00 PM	47	65	42	35
5:00 PM	47	61	42	38
6:00 PM	46	62	43	40
7:00 PM	57	78	45	42
8:00 PM	44	59	43	41
9:00 PM	46	66	45	43
10:00 PM	45	59	44	43
11:00 PM	44	54	44	43

	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	43	58	56	40	48
Lmax (Maximum)	88	59	69	76	51	59
L50 (Median)	47	38	42	47	39	43
L90 (Background)	46	33	38	45	37	41

Computed DNL, dB	58
% Daytime Energy	93%
% Nighttime Energy	7%

GPS Coordinates	38°28'6.55"N 121°27'43.01"W

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Appendix C-7
Long-Term Ambient Noise Monitoring Results - Site LT-1: 5'
Stone Beetland - Sacramento, California
Wednesday, March 2, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	45	57	44	42
1:00 AM	43	55	43	41
2:00 AM	43	49	43	42
3:00 AM	55	77	43	42
4:00 AM	45	51	44	43
5:00 AM	47	55	46	45
6:00 AM	50	73	49	47
7:00 AM	58	80	50	48
8:00 AM	48	67	45	41
9:00 AM	47	63	44	41
10:00 AM	55	68	53	42
11:00 AM	53	67	50	41
12:00 PM	47	73	42	36
1:00 PM	58	77	54	45
2:00 PM	55	78	47	40
3:00 PM	50	68	44	39
4:00 PM	48	72	43	40
5:00 PM	44	60	43	39
6:00 PM	46	59	44	42
7:00 PM	46	63	43	41
8:00 PM	45	61	43	42
9:00 PM	46	59	44	43
10:00 PM	45	61	44	43
11:00 PM	46	60	45	43

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	58	44	52	55	43	49
Lmax (Maximum)	80	59	68	77	49	60
L50 (Median)	54	42	46	49	43	45
L90 (Background)	48	36	41	47	41	43

Computed DNL, dB	56
% Daytime Energy	79%
% Nighttime Energy	21%

GPS Coordinates	38°28'6.55"N 121°27'43.01"W

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Appendix C-8
Long-Term Ambient Noise Monitoring Results - Site LT-1: 5'
Stone Beetland - Sacramento, California
Thursday, March 3, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	45	62	43	42
1:00 AM	42	47	42	41
2:00 AM	41	59	41	40
3:00 AM	43	57	43	42
4:00 AM	45	60	44	43
5:00 AM	46	69	44	42
6:00 AM	49	72	47	45
7:00 AM	49	62	49	48
8:00 AM	54	78	46	41
9:00 AM	47	63	41	36
10:00 AM	43	59	39	34
11:00 AM	46	68	40	35
12:00 PM	46	58	45	36
1:00 PM	46	61	43	38
2:00 PM	46	63	44	41
3:00 PM	47	60	45	42
4:00 PM	47	68	44	41
5:00 PM	47	59	45	42
6:00 PM	47	60	43	40
7:00 PM	44	59	42	40
8:00 PM	58	78	44	43
9:00 PM	44	66	43	42
10:00 PM	44	60	43	41
11:00 PM	56	75	42	40

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	58	43	50	56	41	49
Lmax (Maximum)	78	58	64	75	47	62
L50 (Median)	49	39	43	47	41	43
L90 (Background)	48	34	40	45	40	42

Computed DNL, dB	55
% Daytime Energy	67%
% Nighttime Energy	33%

GPS Coordinates	38°28'6.55"N
	121°27'43.01"W

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Appendix C-9
Long-Term Ambient Noise Monitoring Results - Site LT-1: 5'
Stone Beetland - Sacramento, California
Friday, March 4, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	41	49	41	40
1:00 AM	40	49	39	39
2:00 AM	41	50	40	39
3:00 AM	41	52	40	39
4:00 AM	41	50	40	39
5:00 AM	57	77	44	42
6:00 AM	47	59	46	44
7:00 AM	49	66	47	46
8:00 AM	58	80	46	45
9:00 AM	52	65	47	44
10:00 AM				
11:00 AM				
12:00 PM				
1:00 PM				
2:00 PM				
3:00 PM				
4:00 PM				
5:00 PM				
6:00 PM				
7:00 PM				
8:00 PM				
9:00 PM				
10:00 PM				
11:00 PM				

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	58	49	55	57	40	50
Lmax (Maximum)	80	65	70	77	49	55
L50 (Median)	47	46	47	46	39	41
L90 (Background)	46	44	45	44	39	40

Computed DNL, dB	57
% Daytime Energy	84%
% Nighttime Energy	16%

GPS Coordinates	38°28'6.55"N 121°27'43.01"W

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Appendix C-10
Long-Term Ambient Noise Monitoring Results - Site LT-2
Stone Beetland - Sacramento, California
Monday, February 28, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM				
1:00 AM				
2:00 AM				
3:00 AM				
4:00 AM				
5:00 AM				
6:00 AM				
7:00 AM				
8:00 AM				
9:00 AM				
10:00 AM				
11:00 AM				
12:00 PM				
1:00 PM	48	67	44	39
2:00 PM	47	61	46	41
3:00 PM	50	67	47	42
4:00 PM	53	68	51	47
5:00 PM	53	67	51	47
6:00 PM	54	80	49	46
7:00 PM	51	66	48	46
8:00 PM	49	64	47	45
9:00 PM	48	65	46	44
10:00 PM	47	65	45	42
11:00 PM	48	66	45	42

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	54	47	51	48	47	48
Lmax (Maximum)	80	61	67	66	65	66
L50 (Median)	51	44	48	45	45	45
L90 (Background)	47	39	44	42	42	42

Computed DNL, dB	55
% Daytime Energy	77%
% Nighttime Energy	23%

GPS Coordinates	38°27'50.81"N 121°27'49.35"W

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Appendix C-11
Long-Term Ambient Noise Monitoring Results - Site LT-2
Stone Beetland - Sacramento, California
Tuesday, March 1, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	44	61	44	41
1:00 AM	44	62	42	39
2:00 AM	43	54	43	39
3:00 AM	53	75	45	43
4:00 AM	48	68	45	43
5:00 AM	51	69	49	47
6:00 AM	52	72	49	47
7:00 AM	57	73	51	50
8:00 AM	53	67	51	49
9:00 AM	53	68	48	45
10:00 AM	50	66	48	44
11:00 AM	50	65	47	44
12:00 PM	50	71	46	43
1:00 PM	49	67	45	41
2:00 PM	49	66	46	42
3:00 PM	53	70	47	43
4:00 PM	52	67	50	46
5:00 PM	54	68	51	48
6:00 PM	52	68	51	47
7:00 PM	53	73	50	47
8:00 PM	50	66	47	44
9:00 PM	52	75	49	46
10:00 PM	51	66	49	46
11:00 PM	48	63	47	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)	57	49	52	53	43	50
Lmax (Maximum)	75	65	69	75	54	66
L50 (Median)	51	45	49	49	42	46
L90 (Background)	50	41	45	47	39	43

Computed DNL, dB	57
% Daytime Energy	76%
% Nighttime Energy	24%

GPS Coordinates	38°27'50.81"N 121°27'49.35"W

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Appendix C-12
Long-Term Ambient Noise Monitoring Results - Site LT-2
Stone Beetland - Sacramento, California
Wednesday, March 2, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	46	62	44	42
1:00 AM	46	63	45	42
2:00 AM	47	61	46	44
3:00 AM	51	71	46	44
4:00 AM	49	65	48	46
5:00 AM	52	70	49	47
6:00 AM	53	66	52	49
7:00 AM	55	70	53	52
8:00 AM	53	65	50	46
9:00 AM	52	67	48	45
10:00 AM	53	73	48	44
11:00 AM	50	68	45	41
12:00 PM	50	67	47	44
1:00 PM	52	67	50	46
2:00 PM	52	76	48	44
3:00 PM	54	70	51	47
4:00 PM	55	69	54	50
5:00 PM	54	66	52	48
6:00 PM	54	69	52	49
7:00 PM	52	69	50	48
8:00 PM	52	65	50	48
9:00 PM	52	71	49	46
10:00 PM	51	69	49	46
11:00 PM	50	66	48	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)	55	50	53	53	46	50
Lmax (Maximum)	76	65	69	71	61	66
L50 (Median)	54	45	50	52	44	47
L90 (Background)	52	41	46	49	42	45

Computed DNL, dB	57
% Daytime Energy	76%
% Nighttime Energy	24%

GPS Coordinates	38°27'50.81"N 121°27'49.35"W

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Appendix C-13
Long-Term Ambient Noise Monitoring Results - Site LT-2
Stone Beetland - Sacramento, California
Thursday, March 3, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	46	61	44	42
1:00 AM	45	53	45	43
2:00 AM	46	58	45	43
3:00 AM	47	61	45	43
4:00 AM	50	70	47	45
5:00 AM	52	65	50	47
6:00 AM	54	68	52	50
7:00 AM	55	67	54	53
8:00 AM	57	76	52	47
9:00 AM	53	75	49	46
10:00 AM	51	72	45	40
11:00 AM	47	67	42	38
12:00 PM	47	68	42	39
1:00 PM	50	65	48	43
2:00 PM	50	62	49	45
3:00 PM	51	63	50	47
4:00 PM	52	65	51	47
5:00 PM	54	70	52	48
6:00 PM	51	71	49	46
7:00 PM	51	67	49	45
8:00 PM	51	75	49	45
9:00 PM	49	67	47	44
10:00 PM	49	66	47	44
11:00 PM	51	65	45	42

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	57	47	52	54	45	50
Lmax (Maximum)	76	62	69	70	53	63
L50 (Median)	54	42	48	52	44	47
L90 (Background)	53	38	45	50	42	44

Computed DNL, dB	57
% Daytime Energy	74%
% Nighttime Energy	26%

GPS Coordinates	38°27'50.81"N 121°27'49.35"W

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Appendix C-14
Long-Term Ambient Noise Monitoring Results - Site LT-2
Stone Beetland - Sacramento, California
Friday, March 4, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	46	59	43	39
1:00 AM	46	72	42	38
2:00 AM	45	61	43	39
3:00 AM	43	56	41	38
4:00 AM	49	64	45	41
5:00 AM	55	69	52	47
6:00 AM	56	66	56	52
7:00 AM	58	76	56	53
8:00 AM	58	81	55	52
9:00 AM	55	72	52	49
10:00 AM				
11:00 AM				
12:00 PM				
1:00 PM				
2:00 PM				
3:00 PM				
4:00 PM				
5:00 PM				
6:00 PM				
7:00 PM				
8:00 PM				
9:00 PM				
10:00 PM				
11:00 PM				

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	58	55	57	56	43	51
Lmax (Maximum)	81	72	76	72	56	64
L50 (Median)	56	52	55	56	41	46
L90 (Background)	53	49	51	52	38	42

Computed DNL, dB	59
% Daytime Energy	87%
% Nighttime Energy	13%

GPS Coordinates	38°27'50.81"N 121°27'49.35"W

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Appendix C-15
Long-Term Ambient Noise Monitoring Results - Site LT-3
Stone Beetland - Sacramento, California
Monday, February 28, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM				
1:00 AM				
2:00 AM				
3:00 AM				
4:00 AM				
5:00 AM				
6:00 AM				
7:00 AM				
8:00 AM				
9:00 AM				
10:00 AM				
11:00 AM				
12:00 PM				
1:00 PM	51	72	47	41
2:00 PM	51	74	47	40
3:00 PM	54	75	49	43
4:00 PM	55	72	54	48
5:00 PM	58	72	56	51
6:00 PM	61	86	57	52
7:00 PM	57	75	55	50
8:00 PM	57	78	54	49
9:00 PM	55	77	52	48
10:00 PM	54	76	50	45
11:00 PM	56	82	49	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)	61	51	56	56	54	55
Lmax (Maximum)	86	72	76	82	76	79
L50 (Median)	57	47	52	50	49	50
L90 (Background)	52	40	47	45	44	45

Computed DNL, dB	61
% Daytime Energy	69%
% Nighttime Energy	31%

GPS Coordinates	38°27'52.90"N 121°28'6.13"W

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Appendix C-16
Long-Term Ambient Noise Monitoring Results - Site LT-3
Stone Beetland - Sacramento, California
Tuesday, March 1, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	50	68	46	43
1:00 AM	48	64	43	38
2:00 AM	50	74	44	40
3:00 AM	52	72	47	42
4:00 AM	55	74	50	44
5:00 AM	59	86	54	49
6:00 AM	59	75	57	52
7:00 AM	61	84	59	54
8:00 AM	56	78	54	50
9:00 AM	54	75	51	45
10:00 AM	53	67	50	43
11:00 AM	52	69	50	43
12:00 PM	55	78	50	43
1:00 PM	52	73	49	42
2:00 PM	54	74	50	44
3:00 PM	54	69	52	46
4:00 PM	57	74	55	49
5:00 PM	58	73	56	52
6:00 PM	58	69	57	52
7:00 PM	58	73	56	52
8:00 PM	57	73	54	49
9:00 PM	59	84	56	50
10:00 PM	58	81	54	48
11:00 PM	52	65	49	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)	61	52	57	59	48	55
Lmax (Maximum)	84	67	74	86	64	73
L50 (Median)	59	49	53	57	43	49
L90 (Background)	54	42	48	52	38	44

Computed DNL, dB	62
% Daytime Energy	69%
% Nighttime Energy	31%

GPS Coordinates	38°27'52.90"N 121°28'6.13"W

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Appendix C-17
Long-Term Ambient Noise Monitoring Results - Site LT-3
Stone Beetland - Sacramento, California
Wednesday, March 2, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	54	79	46	41
1:00 AM	49	67	45	42
2:00 AM	48	67	46	43
3:00 AM	53	72	48	45
4:00 AM	54	71	50	46
5:00 AM	57	71	54	48
6:00 AM	58	71	57	52
7:00 AM	59	78	56	52
8:00 AM	57	81	53	47
9:00 AM	54	79	51	45
10:00 AM	52	69	48	41
11:00 AM	54	77	50	44
12:00 PM	53	75	51	44
1:00 PM	55	74	53	46
2:00 PM	55	77	52	46
3:00 PM	56	71	54	48
4:00 PM	58	75	57	51
5:00 PM	59	74	57	53
6:00 PM	58	71	57	53
7:00 PM	58	80	55	51
8:00 PM	56	80	54	49
9:00 PM	56	81	53	48
10:00 PM	54	70	51	46
11:00 PM	51	69	47	43

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	59	52	56	58	48	54
Lmax (Maximum)	81	69	76	79	67	71
L50 (Median)	57	48	53	57	45	49
L90 (Background)	53	41	48	52	41	45

Computed DNL, dB	61
% Daytime Energy	74%
% Nighttime Energy	26%

GPS Coordinates	38°27'52.90"N
	121°28'6.13"W

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Appendix C-18
Long-Term Ambient Noise Monitoring Results - Site LT-3
Stone Beetland - Sacramento, California
Thursday, March 3, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	49	64	46	42
1:00 AM	50	73	46	43
2:00 AM	52	76	45	42
3:00 AM	52	75	47	42
4:00 AM	54	75	49	44
5:00 AM	57	71	54	50
6:00 AM	66	87	57	52
7:00 AM	66	86	58	53
8:00 AM	70	91	55	48
9:00 AM	54	72	51	45
10:00 AM	51	70	47	40
11:00 AM	50	70	45	39
12:00 PM	50	73	45	40
1:00 PM	52	73	47	42
2:00 PM	52	71	49	43
3:00 PM	53	73	50	46
4:00 PM	68	89	52	47
5:00 PM	66	85	52	47
6:00 PM	54	75	50	46
7:00 PM	52	67	50	45
8:00 PM	51	71	49	45
9:00 PM	52	70	49	45
10:00 PM	53	78	50	45
11:00 PM	51	75	48	42

	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	50	62	66	49	58
Lmax (Maximum)	91	67	76	87	64	75
L50 (Median)	58	45	50	57	45	49
L90 (Background)	53	39	45	52	42	44

Computed DNL, dB	65
% Daytime Energy	83%
% Nighttime Energy	17%

GPS Coordinates	38°27'52.90"N 121°28'6.13"W

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Appendix C-19
Long-Term Ambient Noise Monitoring Results - Site LT-3
Stone Beetland - Sacramento, California
Friday, March 4, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	48	64	45	39
1:00 AM	48	72	43	37
2:00 AM	48	67	43	38
3:00 AM	45	72	41	37
4:00 AM	49	69	45	40
5:00 AM	56	81	52	46
6:00 AM	75	93	57	51
7:00 AM	72	93	58	53
8:00 AM	57	75	56	51
9:00 AM	57	84	53	48
10:00 AM				
11:00 AM				
12:00 PM				
1:00 PM				
2:00 PM				
3:00 PM				
4:00 PM				
5:00 PM				
6:00 PM				
7:00 PM				
8:00 PM				
9:00 PM				
10:00 PM				
11:00 PM				

	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	57	67	75	45	66
Lmax (Maximum)	93	75	84	93	64	74
L50 (Median)	58	53	56	57	41	47
L90 (Background)	53	48	51	51	37	41

Computed DNL, dB	73
% Daytime Energy	67%
% Nighttime Energy	33%

GPS Coordinates	38°27'52.90"N
	121°28'6.13"W

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Appendix C-20
Long-Term Ambient Noise Monitoring Results - Site LT-4
Stone Beetland - Sacramento, California
Monday, February 28, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM				
1:00 AM				
2:00 AM				
3:00 AM				
4:00 AM				
5:00 AM				
6:00 AM				
7:00 AM				
8:00 AM				
9:00 AM				
10:00 AM				
11:00 AM				
12:00 PM				
1:00 PM				
2:00 PM	54	72	51	45
3:00 PM	56	76	53	47
4:00 PM	56	68	55	49
5:00 PM	58	74	57	51
6:00 PM	59	79	57	53
7:00 PM	58	83	56	52
8:00 PM	59	85	55	52
9:00 PM	55	67	53	51
10:00 PM	55	70	54	51
11:00 PM	55	73	52	49

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	59	54	57	55	55	55
Lmax (Maximum)	85	67	75	73	70	71
L50 (Median)	57	51	55	54	52	53
L90 (Background)	53	45	50	51	49	50

Computed DNL, dB	62
% Daytime Energy	74%
% Nighttime Energy	26%

GPS Coordinates	38°27'52.24"N
	121°28'47.34"W

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Appendix C-21
Long-Term Ambient Noise Monitoring Results - Site LT-4
Stone Beetland - Sacramento, California
Tuesday, March 1, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	52	66	49	45
1:00 AM	48	62	44	40
2:00 AM	50	63	48	44
3:00 AM	54	73	52	49
4:00 AM	55	73	53	50
5:00 AM	58	71	57	53
6:00 AM	60	76	58	55
7:00 AM	60	76	59	55
8:00 AM	56	66	55	51
9:00 AM	53	70	51	45
10:00 AM	53	71	50	43
11:00 AM	52	69	50	43
12:00 PM	53	75	50	44
1:00 PM	53	75	50	43
2:00 PM	54	74	50	44
3:00 PM	56	80	53	46
4:00 PM	58	78	55	48
5:00 PM	59	81	56	50
6:00 PM	57	67	57	52
7:00 PM	59	82	57	52
8:00 PM	57	76	55	50
9:00 PM	59	84	56	51
10:00 PM	57	75	55	52
11:00 PM	55	66	54	50

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	60	52	57	60	48	56
Lmax (Maximum)	84	66	75	76	62	69
L50 (Median)	59	50	53	58	44	52
L90 (Background)	55	43	48	55	40	49

Computed DNL, dB	62
% Daytime Energy	67%
% Nighttime Energy	33%

GPS Coordinates	38°27'52.24"N
	121°28'47.34"W

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Appendix C-22
Long-Term Ambient Noise Monitoring Results - Site LT-4
Stone Beetland - Sacramento, California
Wednesday, March 2, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	55	78	53	49
1:00 AM	51	66	49	44
2:00 AM	51	71	48	45
3:00 AM	52	66	49	46
4:00 AM	54	67	52	48
5:00 AM	58	74	55	51
6:00 AM	58	68	57	52
7:00 AM	59	72	59	57
8:00 AM	56	74	53	47
9:00 AM	55	74	52	47
10:00 AM	53	72	50	43
11:00 AM	52	74	50	43
12:00 PM	54	79	51	43
1:00 PM	55	74	52	45
2:00 PM	54	71	51	44
3:00 PM	57	73	54	46
4:00 PM	59	74	57	50
5:00 PM	58	72	57	52
6:00 PM	58	74	57	52
7:00 PM	58	79	56	53
8:00 PM	56	71	55	52
9:00 PM	57	81	55	52
10:00 PM	56	73	55	52
11:00 PM	55	75	54	50

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	59	52	56	58	51	55
Lmax (Maximum)	81	71	74	78	66	71
L50 (Median)	59	50	54	57	48	52
L90 (Background)	57	43	48	52	44	49

Computed DNL, dB	62
% Daytime Energy	70%
% Nighttime Energy	30%

GPS Coordinates	38°27'52.24"N 121°28'47.34"W

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Appendix C-23
Long-Term Ambient Noise Monitoring Results - Site LT-4
Stone Beetland - Sacramento, California
Thursday, March 3, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	52	66	51	48
1:00 AM	50	64	48	44
2:00 AM	50	67	46	43
3:00 AM	53	73	48	44
4:00 AM	54	69	52	46
5:00 AM	58	70	56	53
6:00 AM	59	69	58	54
7:00 AM	58	68	58	55
8:00 AM	56	74	54	49
9:00 AM	56	70	54	49
10:00 AM	54	75	50	44
11:00 AM	52	74	48	43
12:00 PM	52	68	50	45
1:00 PM	54	71	52	47
2:00 PM	56	69	54	48
3:00 PM	56	77	54	49
4:00 PM	56	71	55	49
5:00 PM	57	75	55	49
6:00 PM	55	77	54	49
7:00 PM	55	71	54	48
8:00 PM	54	74	53	49
9:00 PM	55	74	53	49
10:00 PM	55	78	52	49
11:00 PM	52	64	50	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)	58	52	55	59	50	55
Lmax (Maximum)	77	68	73	78	64	69
L50 (Median)	58	48	53	58	46	51
L90 (Background)	55	43	48	54	43	47

Computed DNL, dB	61
% Daytime Energy	65%
% Nighttime Energy	35%

GPS Coordinates	38°27'52.24"N 121°28'47.34"W

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Appendix C-24
Long-Term Ambient Noise Monitoring Results - Site LT-4
Stone Beetland - Sacramento, California
Friday, March 4, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	50	68	48	44
1:00 AM	49	68	47	43
2:00 AM	50	71	47	43
3:00 AM	49	63	47	43
4:00 AM	52	65	51	45
5:00 AM	58	72	57	52
6:00 AM	60	68	60	56
7:00 AM	62	72	61	57
8:00 AM	60	71	59	54
9:00 AM				
10:00 AM				
11:00 AM				
12:00 PM				
1:00 PM				
2:00 PM				
3:00 PM				
4:00 PM				
5:00 PM				
6:00 PM				
7:00 PM				
8:00 PM				
9:00 PM				
10:00 PM				
11:00 PM				

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	62	60	61	60	49	55
Lmax (Maximum)	72	71	72	72	63	68
L50 (Median)	61	59	60	60	47	51
L90 (Background)	57	54	55	56	43	47

Computed DNL, dB	63
% Daytime Energy	87%
% Nighttime Energy	13%

GPS Coordinates	38°27'52.24"N 121°28'47.34"W

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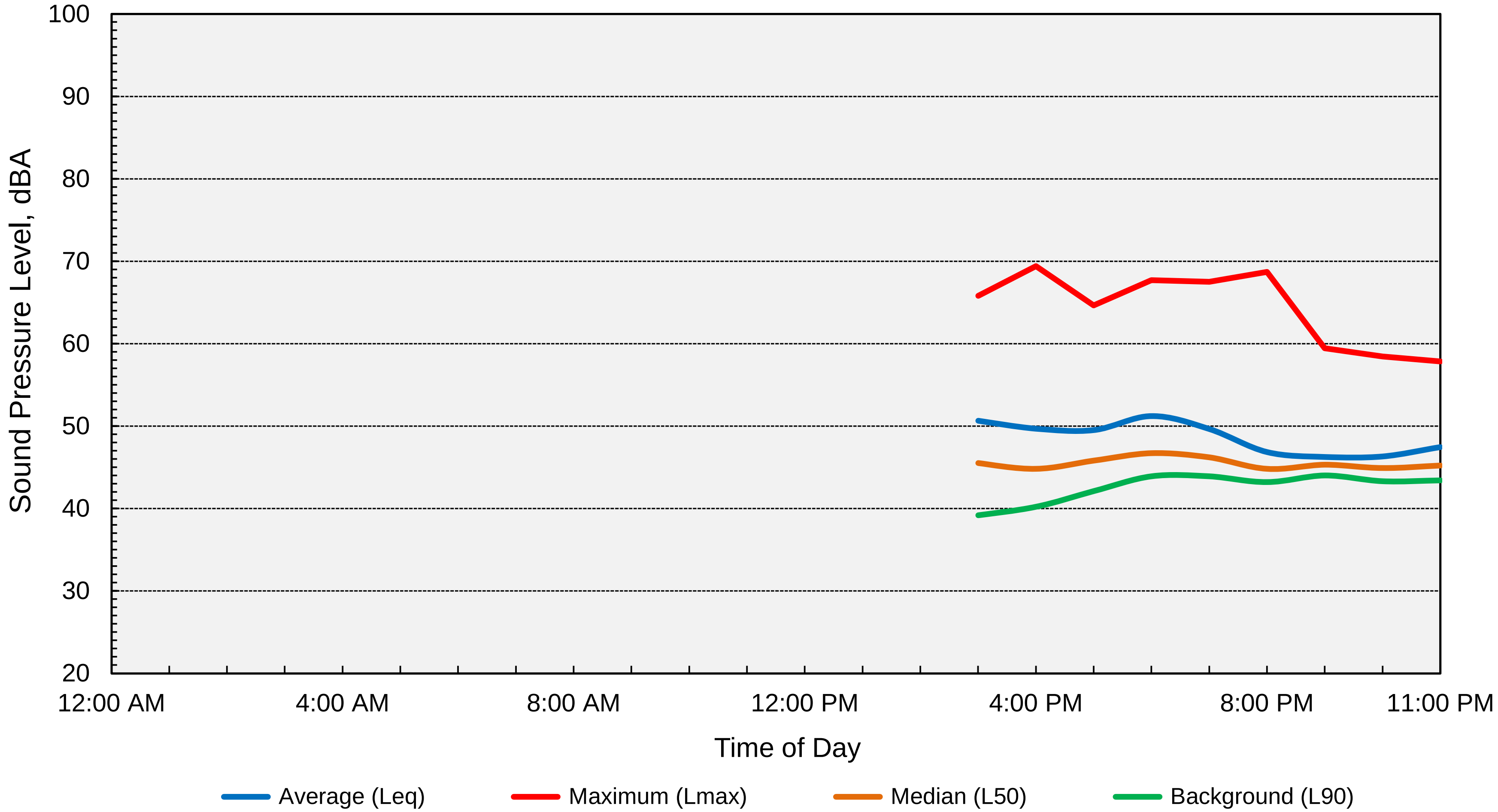
Appendix D-1
Long-Term Ambient Noise Monitoring Results - Site LT-1: 10'
Stone Beetland - Sacramento, California
Monday, February 28, 2022



Computed DNL = 54 dB

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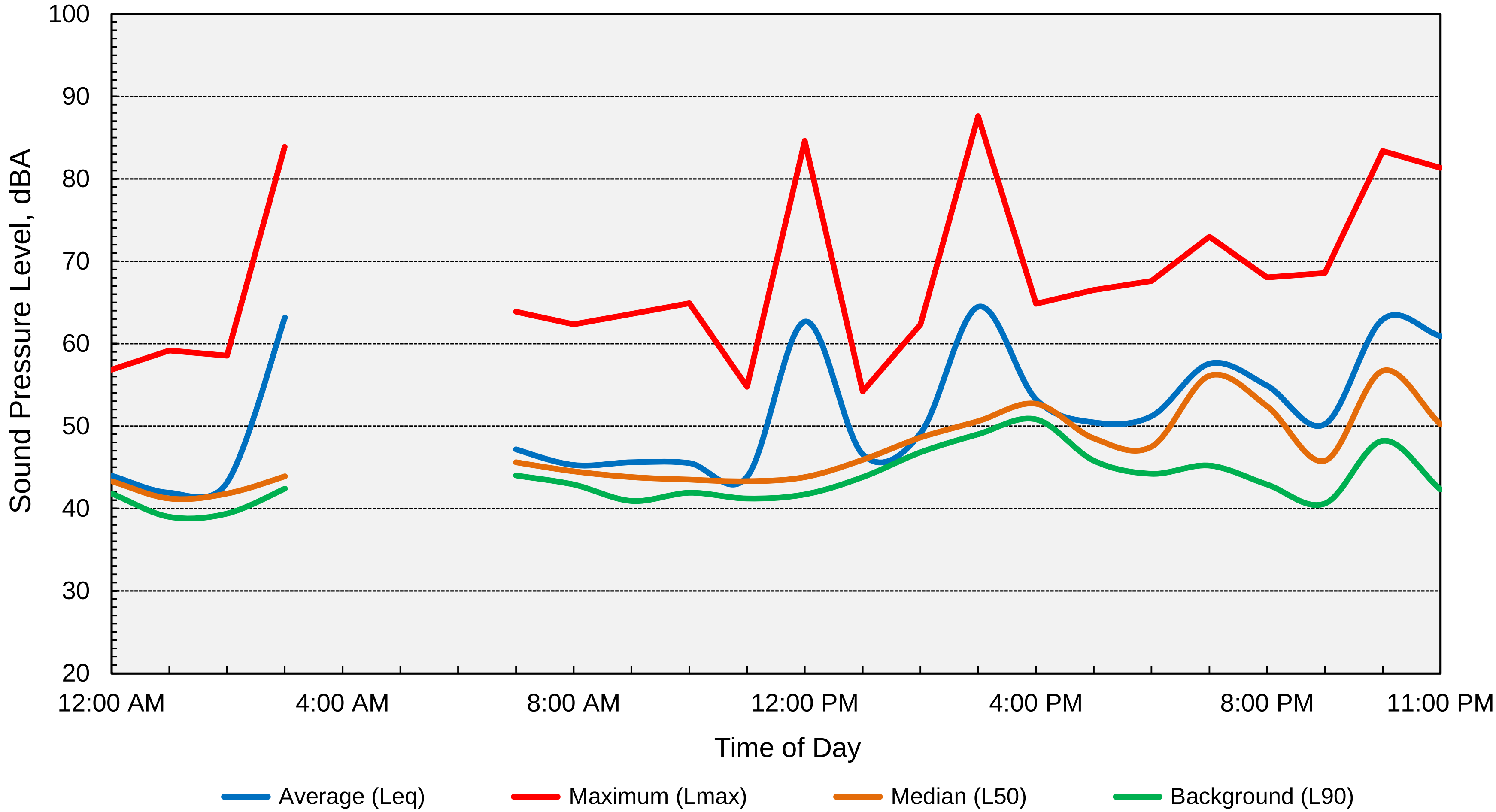
Appendix D-2
Long-Term Ambient Noise Monitoring Results - Site LT-1: 10'
Stone Beetland - Sacramento, California
Tuesday, March 1, 2022



Computed DNL = 64 dB

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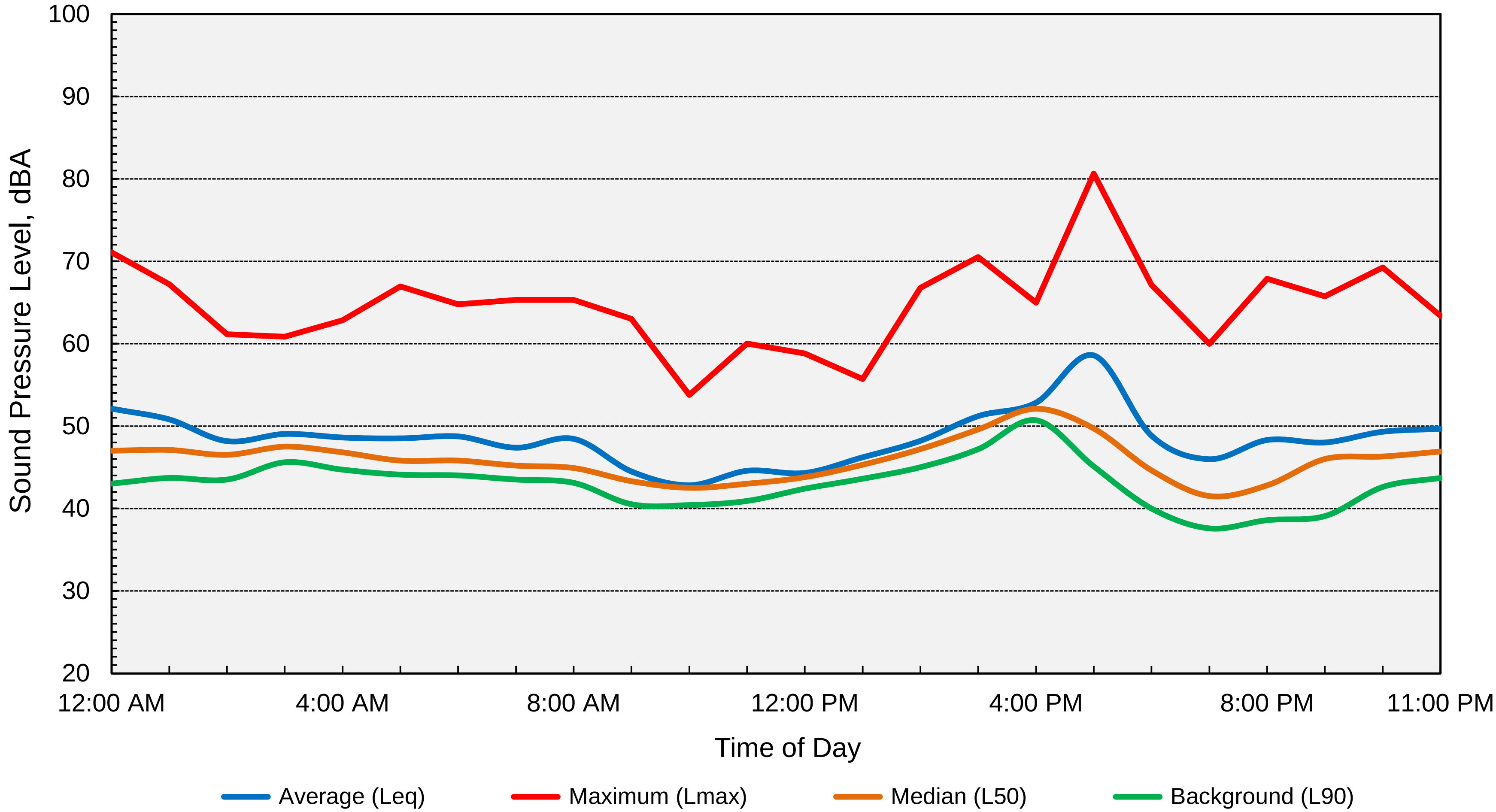
Appendix D-3
Long-Term Ambient Noise Monitoring Results - Site LT-1: 10'
Stone Beetland - Sacramento, California
Wednesday, March 2, 2022



Computed DNL = 56 dB

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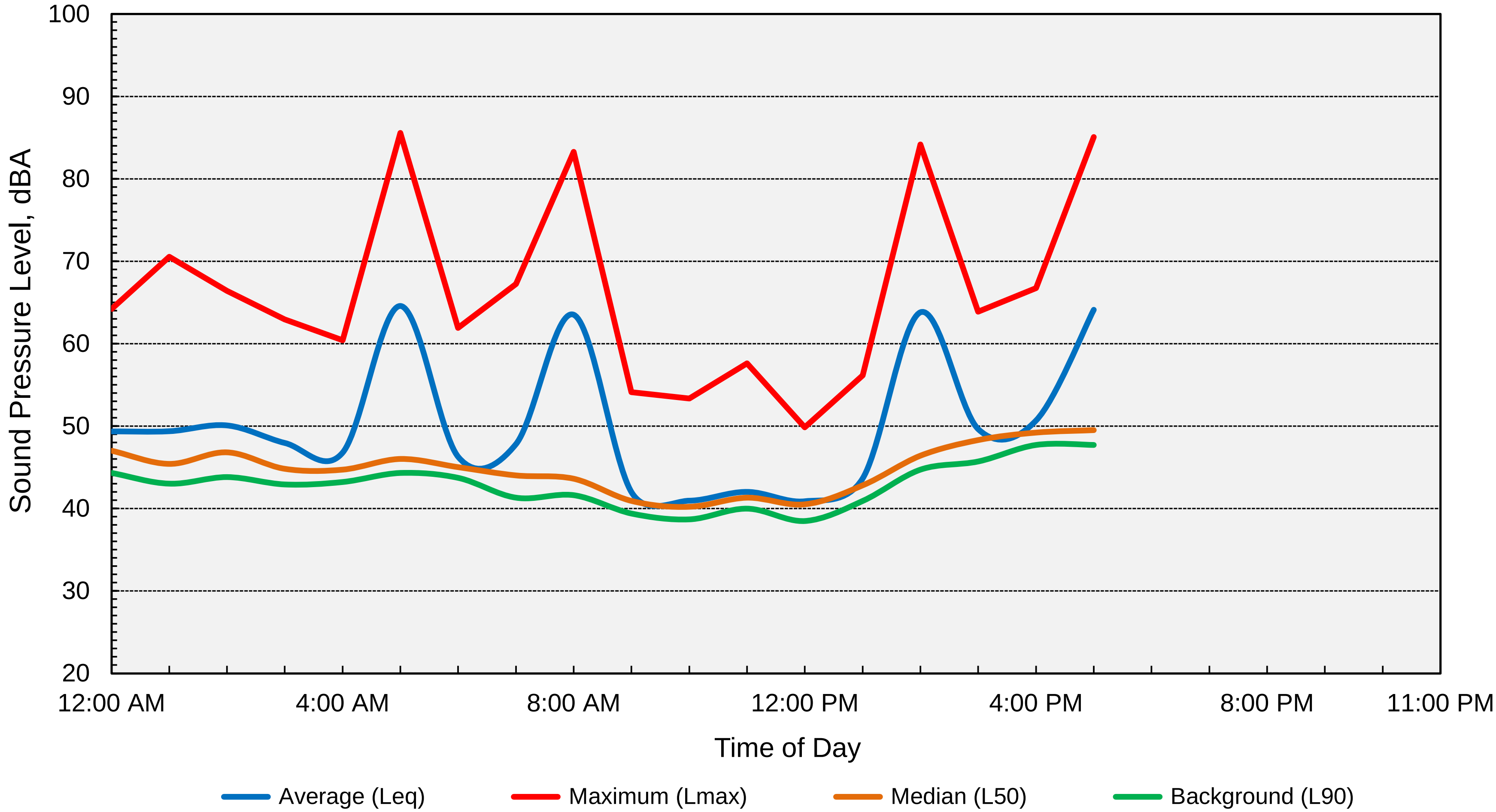
Appendix D-4
Long-Term Ambient Noise Monitoring Results - Site LT-1: 10'
Stone Beetland - Sacramento, California
Thursday, March 3, 2022



Computed DNL = 62 dB

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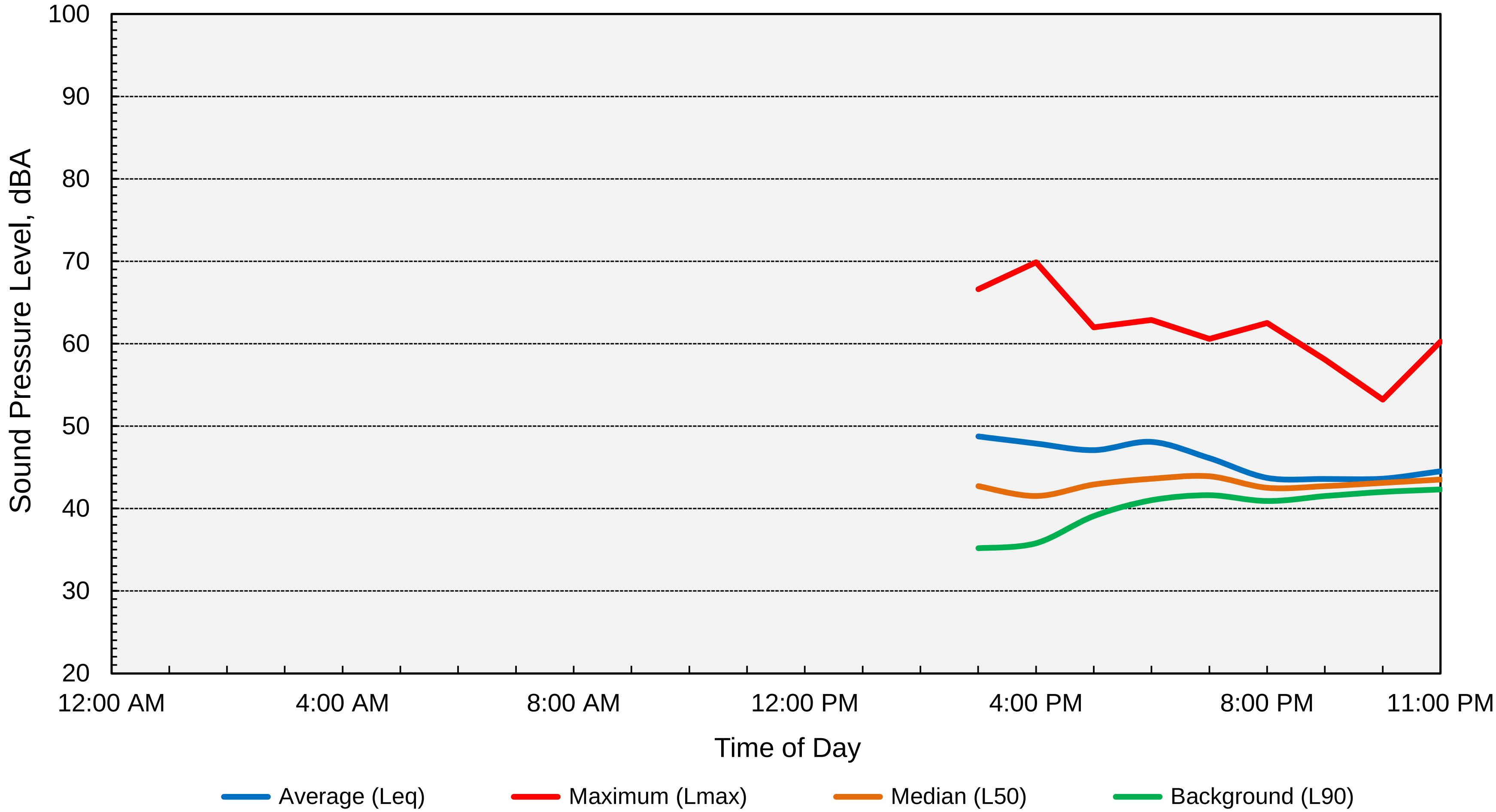
Appendix D-5
Long-Term Ambient Noise Monitoring Results - Site LT-1: 5'
Stone Beetland - Sacramento, California
Monday, February 28, 2022



Computed DNL = 51 dB

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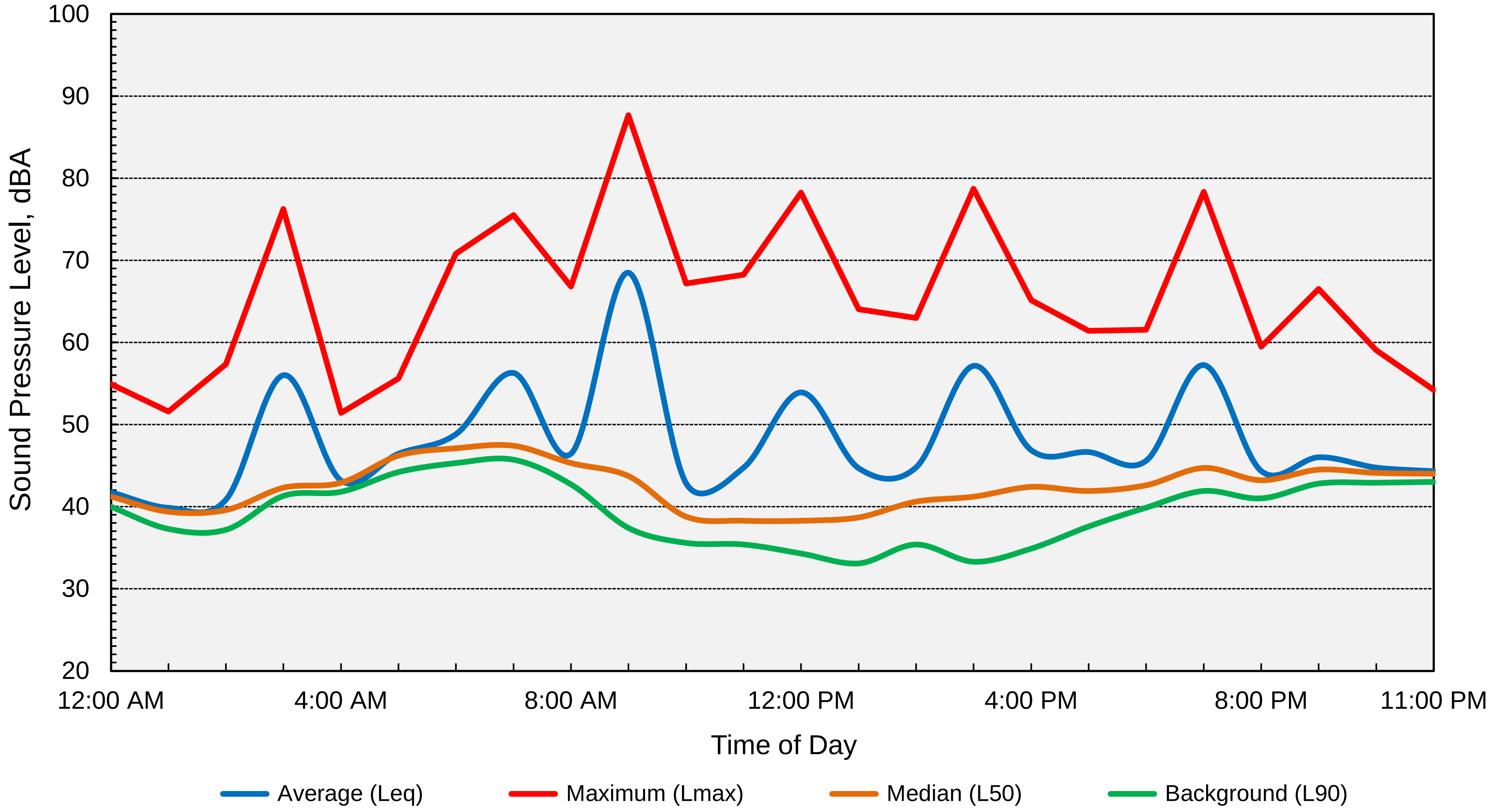
Appendix D-6
Long-Term Ambient Noise Monitoring Results - Site LT-1: 5'
Stone Beetland - Sacramento, California
Tuesday, March 1, 2022



Computed DNL = 58 dB

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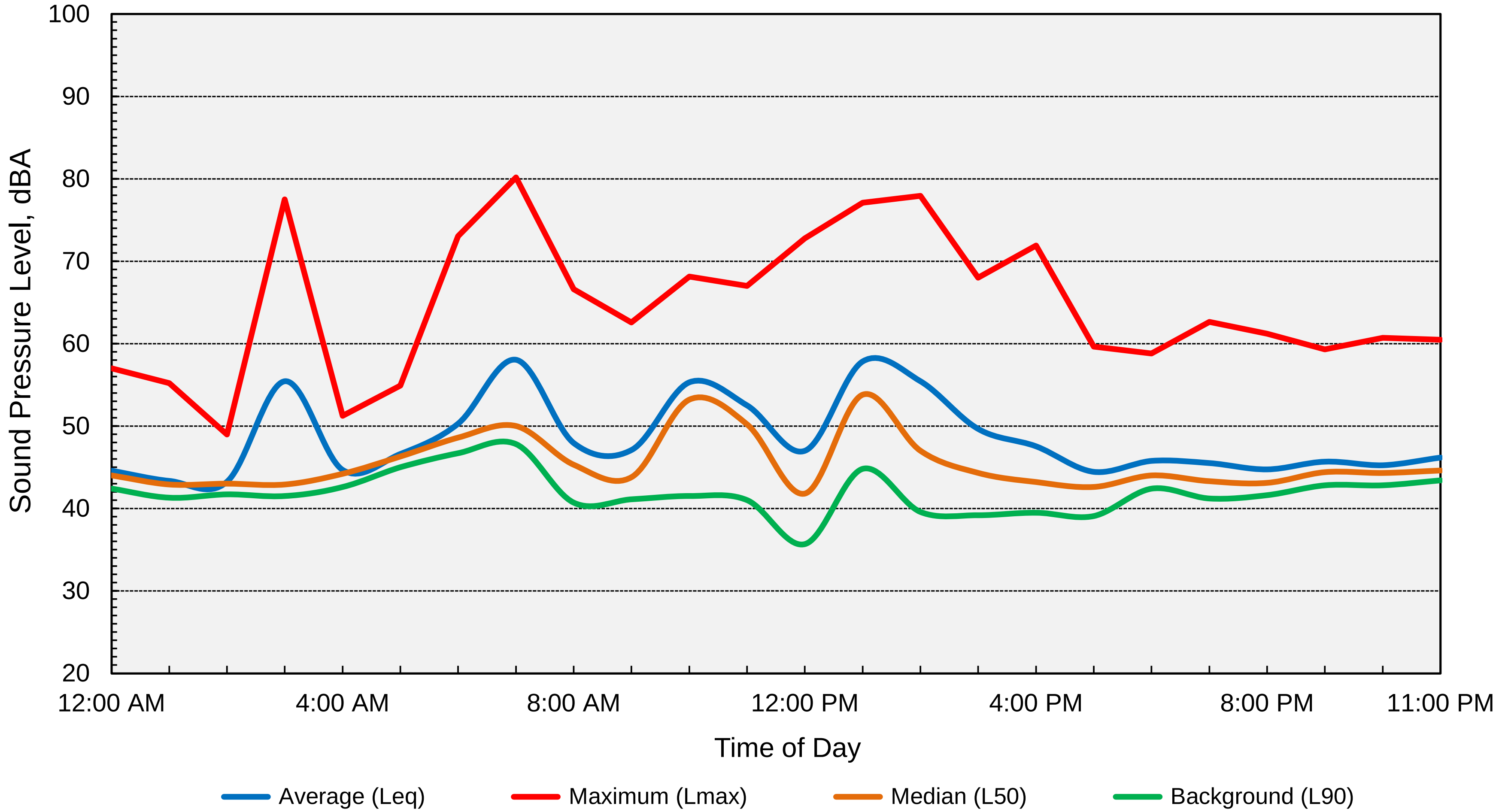
Appendix D-7
Long-Term Ambient Noise Monitoring Results - Site LT-1: 5'
Stone Beetland - Sacramento, California
Wednesday, March 2, 2022



Computed DNL = 56 dB

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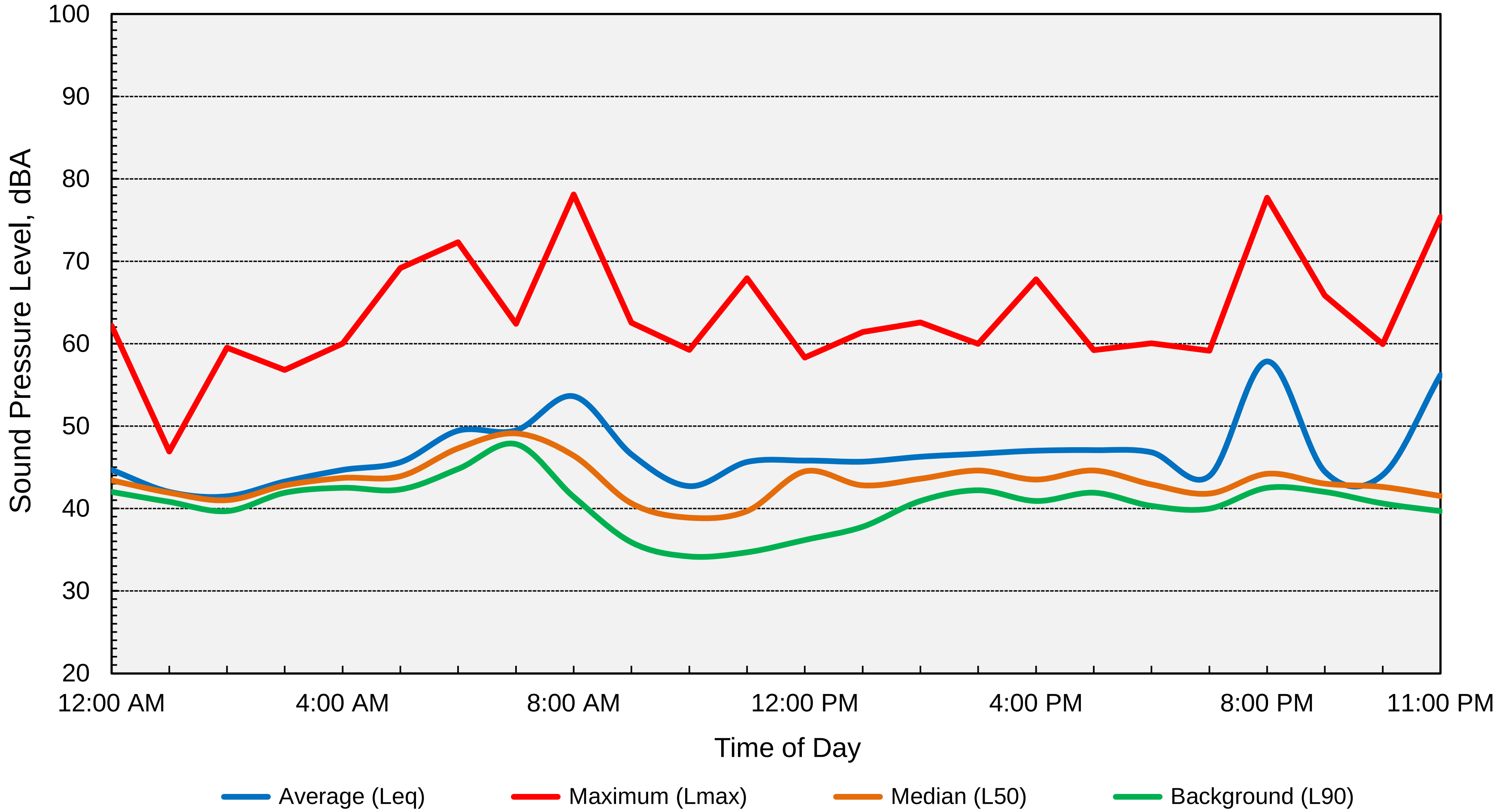
Appendix D-8
Long-Term Ambient Noise Monitoring Results - Site LT-1: 5'
Stone Beetland - Sacramento, California
Thursday, March 3, 2022



Computed DNL = 55 dB

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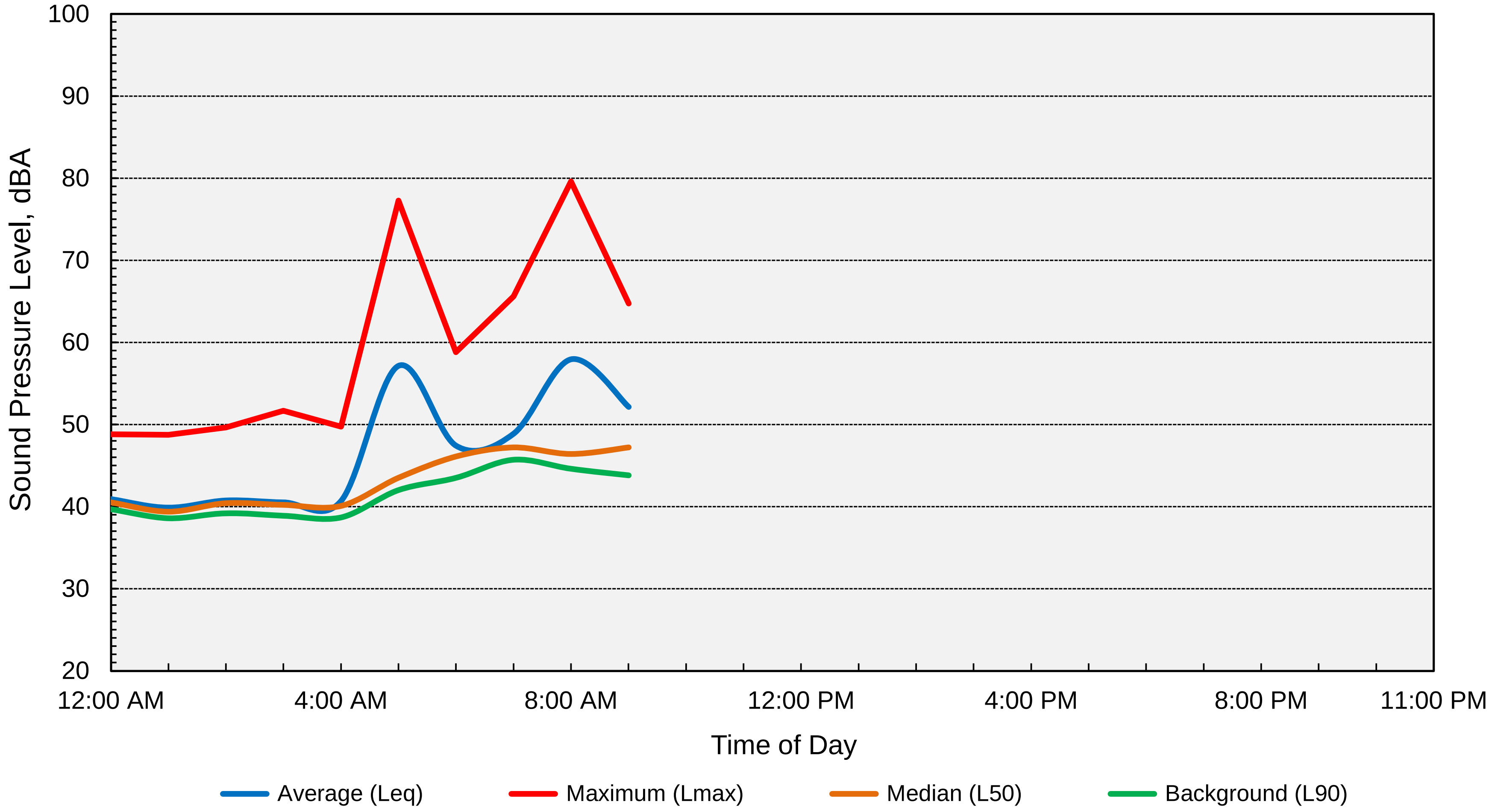
Appendix D-9
Long-Term Ambient Noise Monitoring Results - Site LT-1: 5'
Stone Beetland - Sacramento, California
Friday, March 4, 2022



Computed DNL = 55 dB

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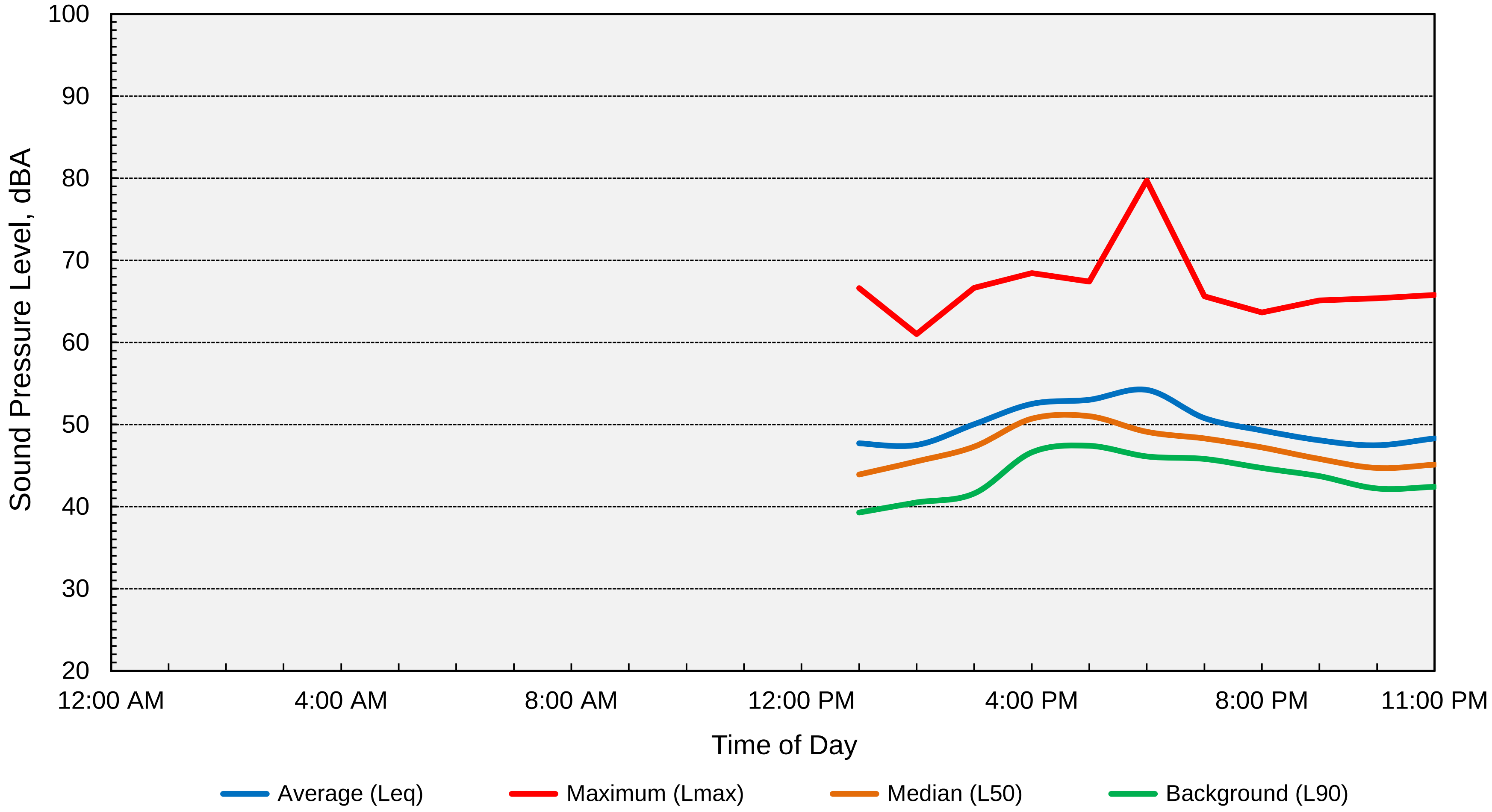
Appendix D-10
Long-Term Ambient Noise Monitoring Results - Site LT-2
Stone Beetland - Sacramento, California
Monday, February 28, 2022



Computed DNL = 55 dB

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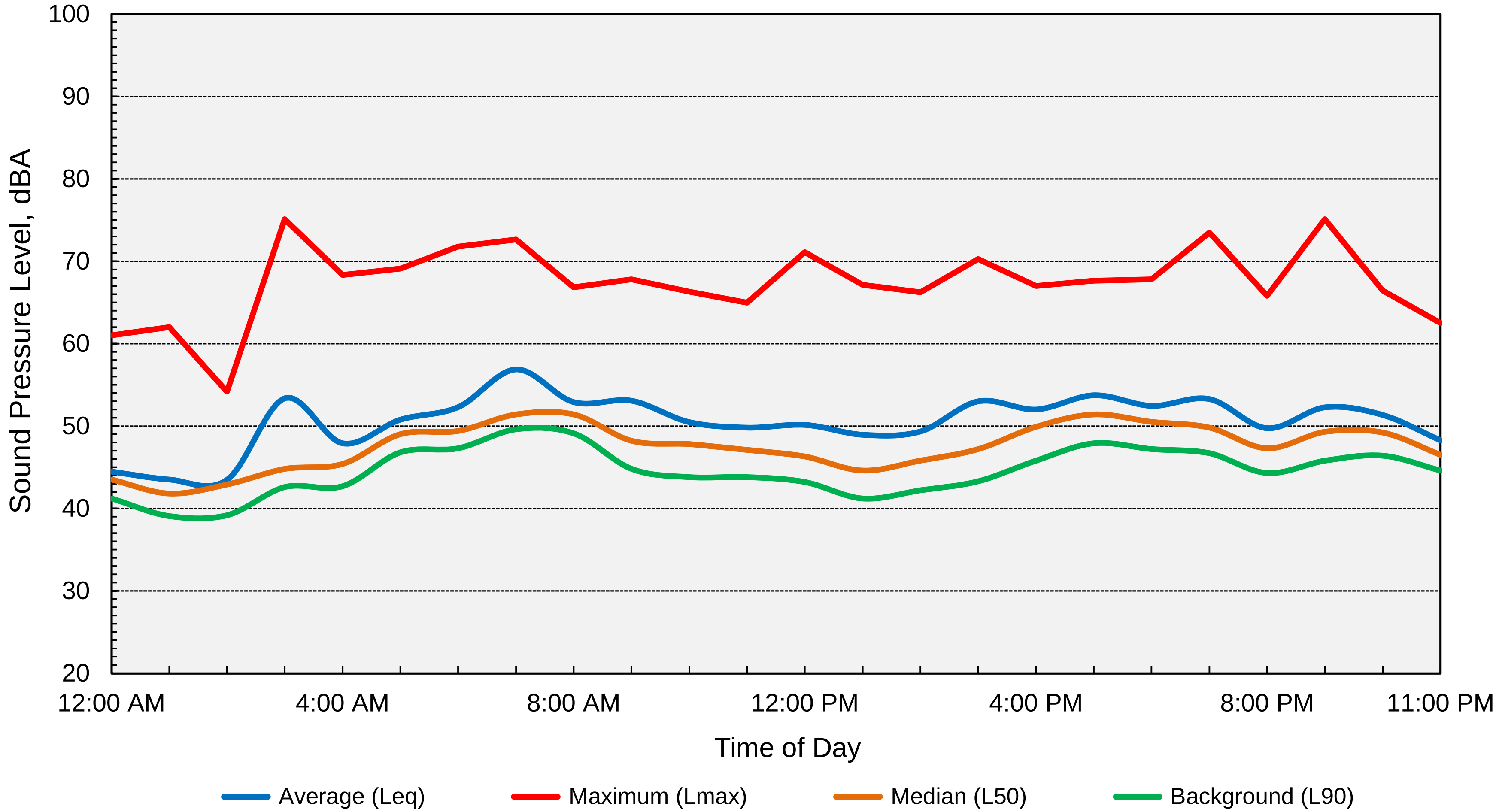
Appendix D-11
Long-Term Ambient Noise Monitoring Results - Site LT-2
Stone Beetland - Sacramento, California
Tuesday, March 1, 2022



Computed DNL = 57 dB

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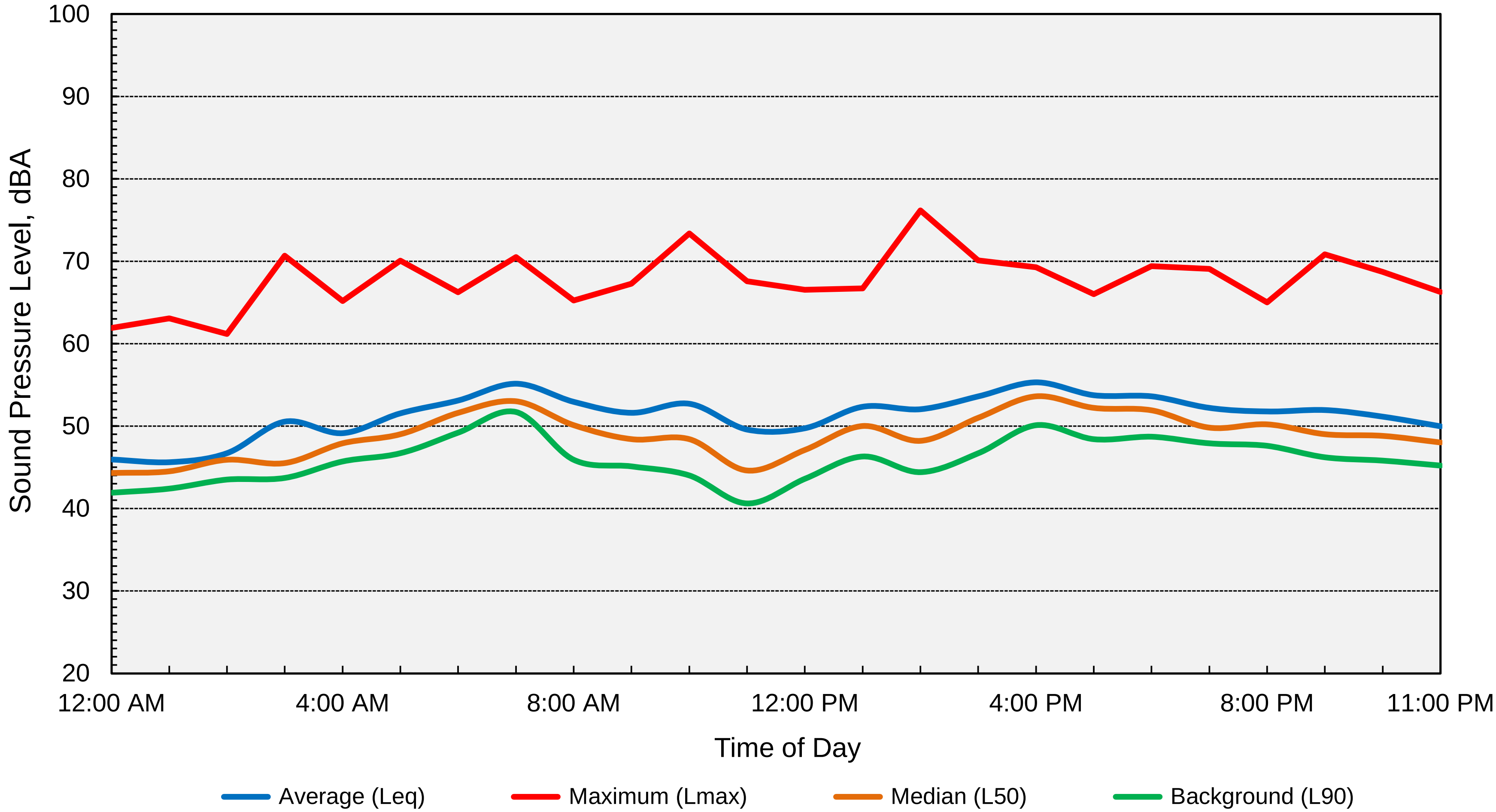
Appendix D-12
Long-Term Ambient Noise Monitoring Results - Site LT-2
Stone Beetland - Sacramento, California
Wednesday, March 2, 2022



Computed DNL = 57 dB

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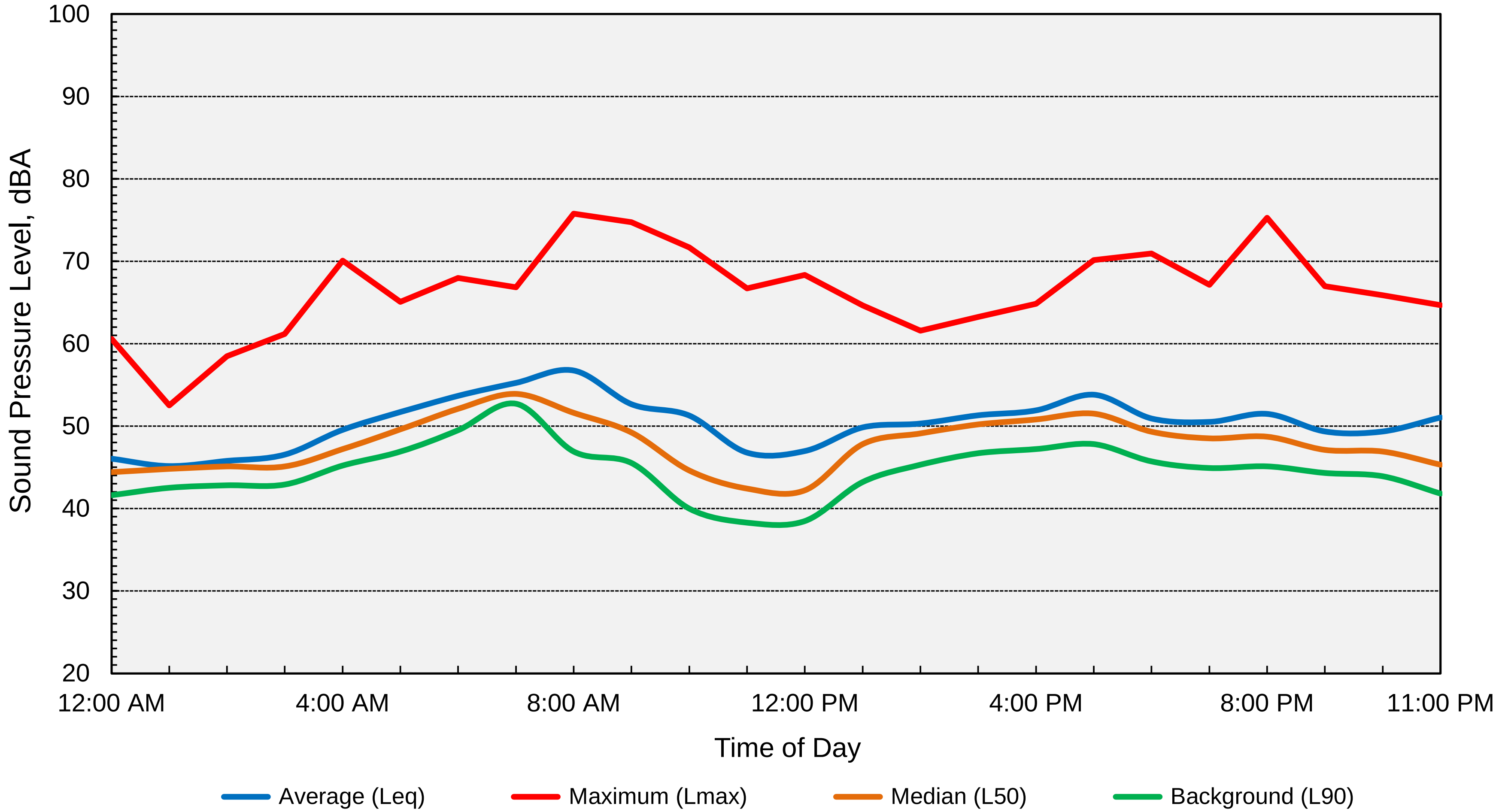
Appendix D-13
Long-Term Ambient Noise Monitoring Results - Site LT-2
Stone Beetland - Sacramento, California
Thursday, March 3, 2022



Computed DNL = 57 dB

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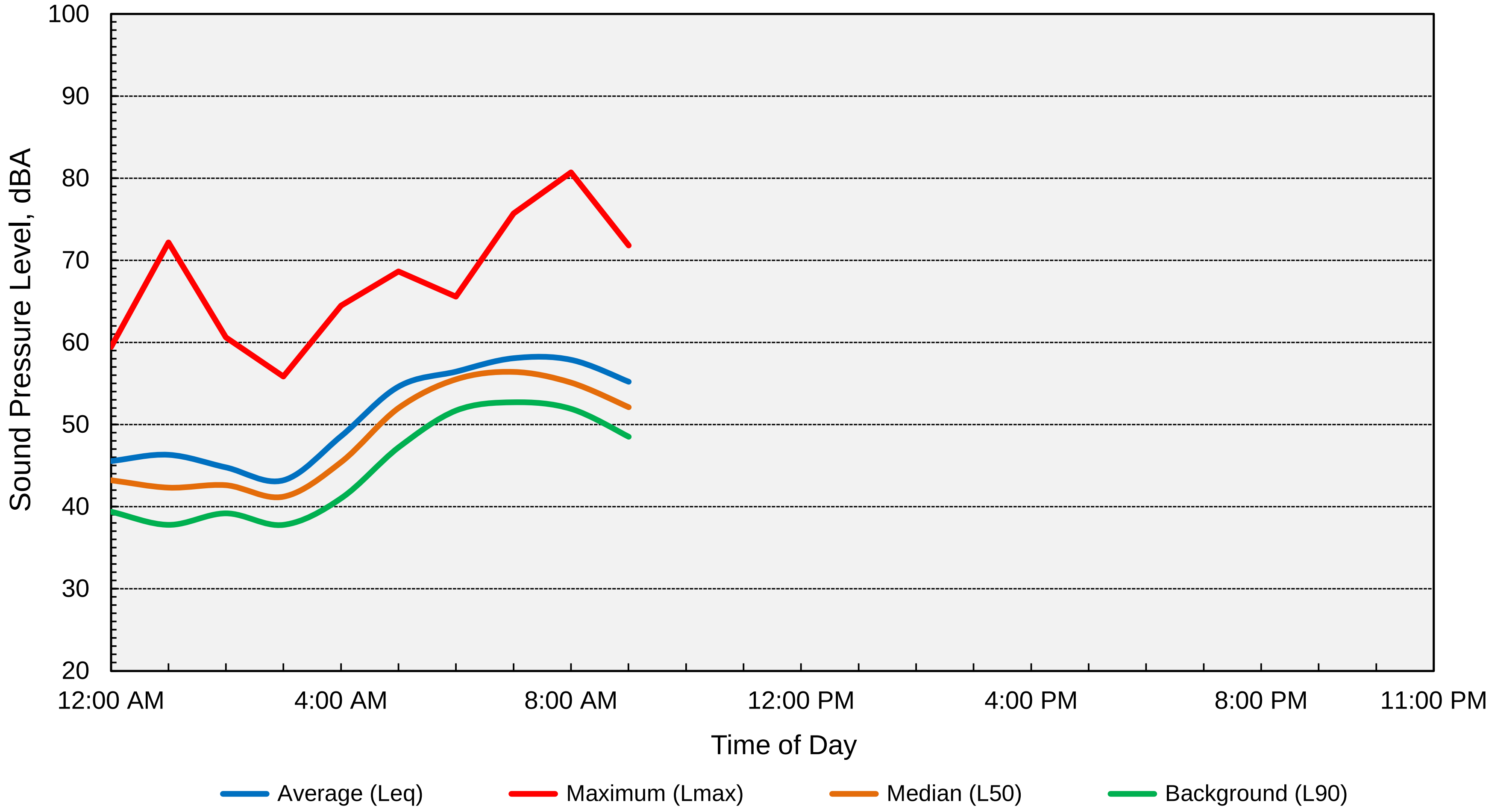
Appendix D-14
Long-Term Ambient Noise Monitoring Results - Site LT-2
Stone Beetland - Sacramento, California
Friday, March 4, 2022



Computed DNL = 59 dB

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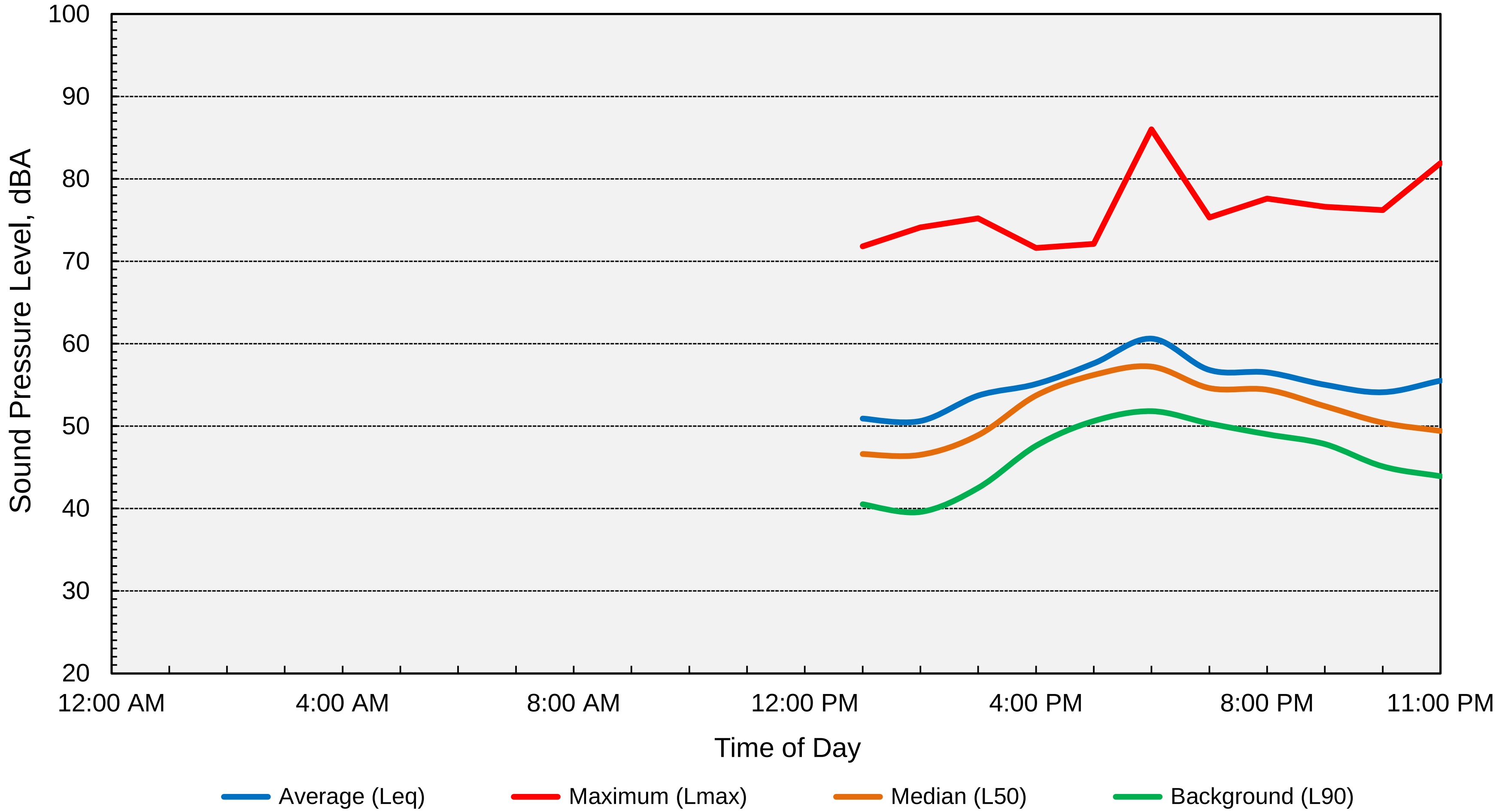
Appendix D-15
Long-Term Ambient Noise Monitoring Results - Site LT-3
Stone Beetland - Sacramento, California
Monday, February 28, 2022



Computed DNL = 61 dB

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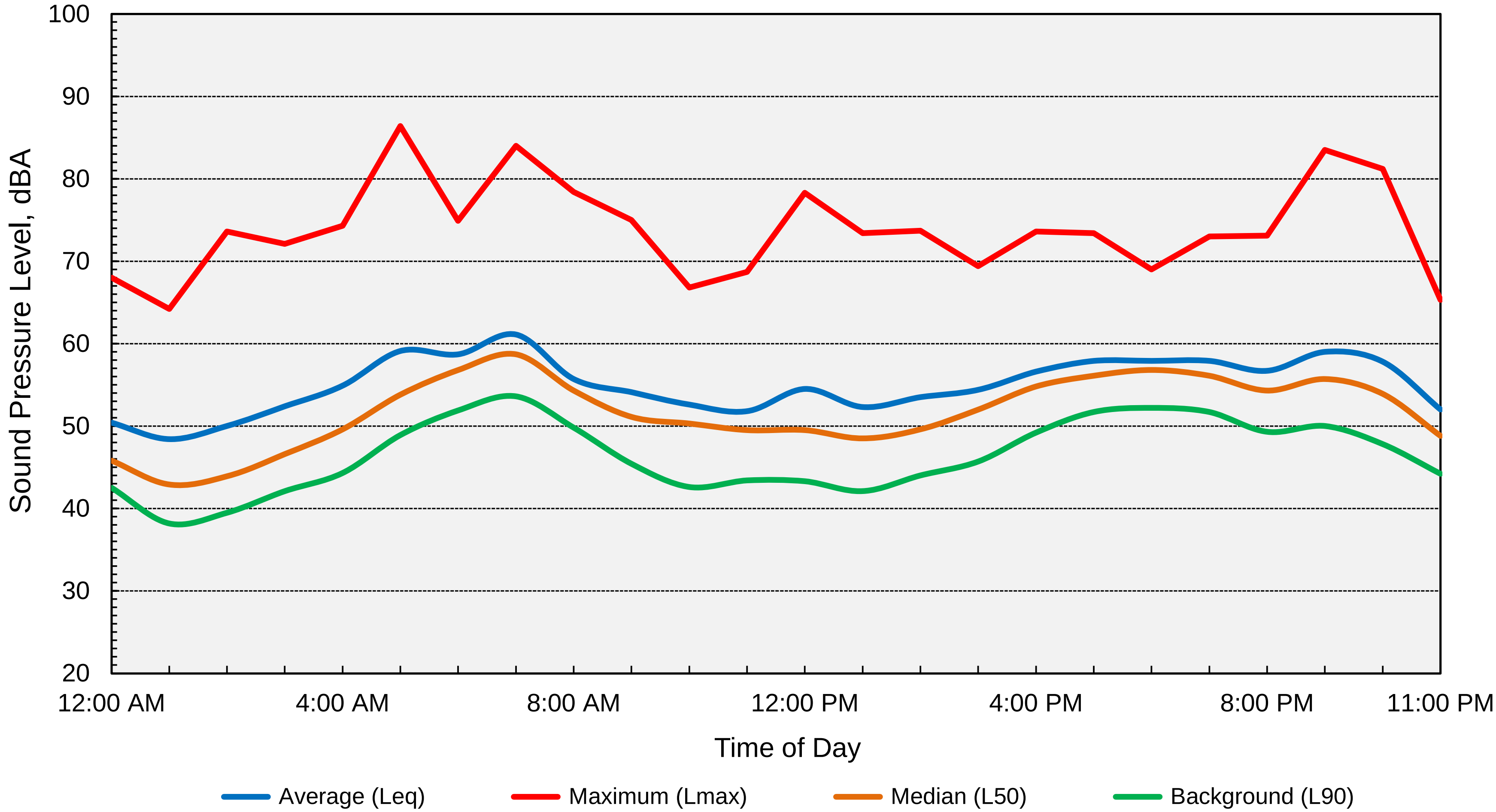
Appendix D-16
Long-Term Ambient Noise Monitoring Results - Site LT-3
Stone Beetland - Sacramento, California
Tuesday, March 1, 2022



Computed DNL = 62 dB

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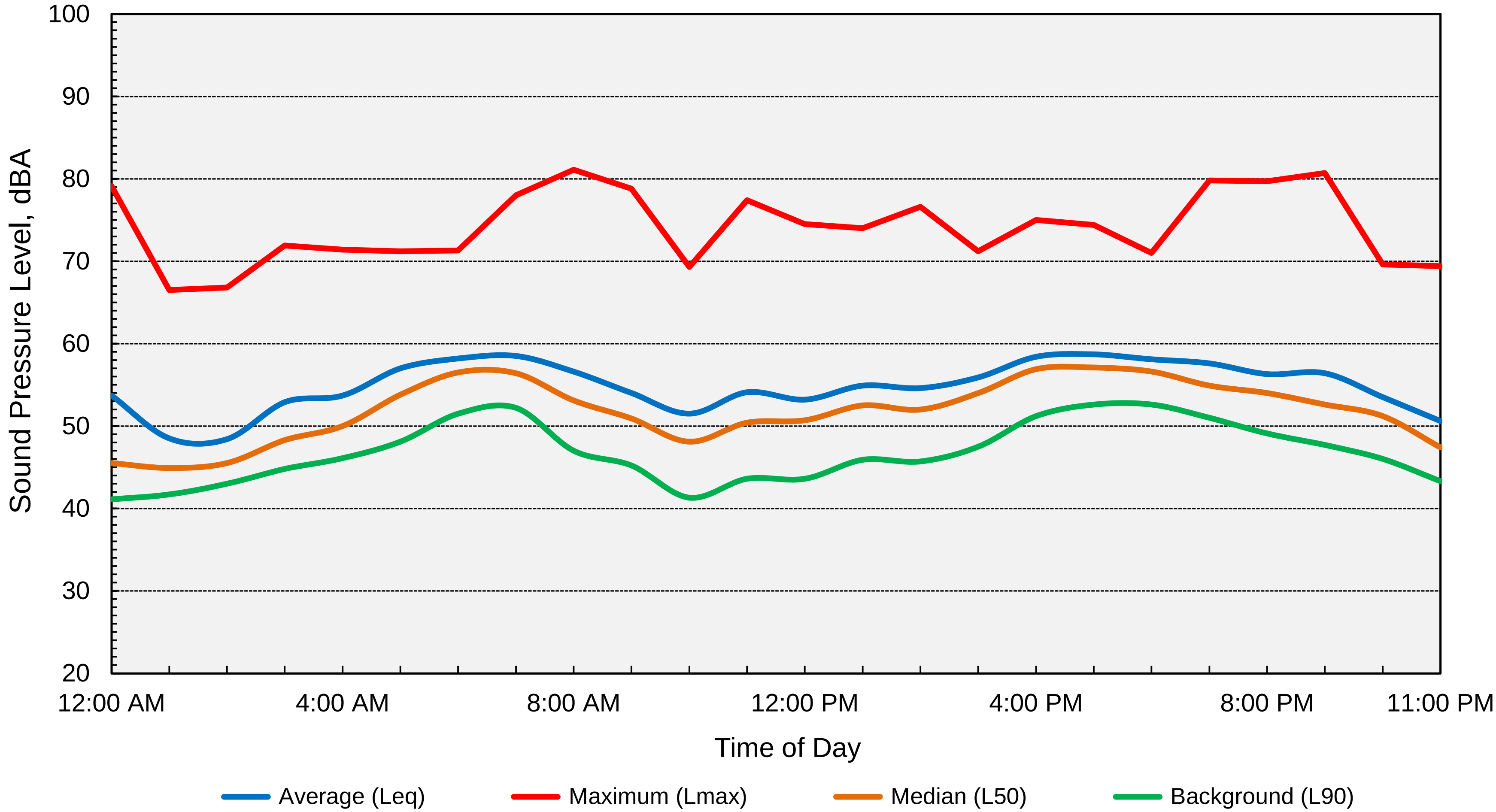
Appendix D-17
Long-Term Ambient Noise Monitoring Results - Site LT-3
Stone Beetland - Sacramento, California
Wednesday, March 2, 2022



Computed DNL = 61 dB

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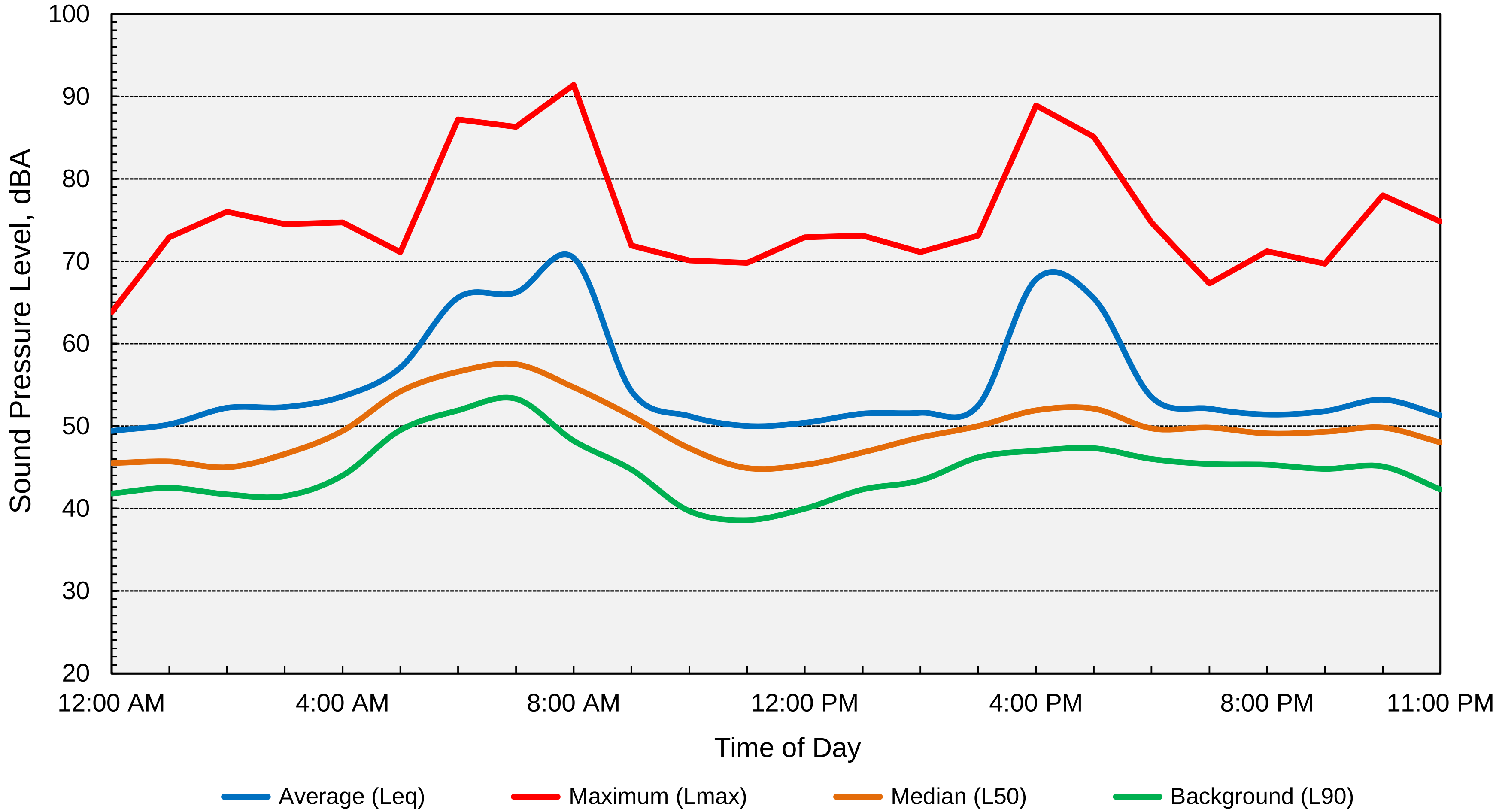
Appendix D-18
Long-Term Ambient Noise Monitoring Results - Site LT-3
Stone Beetland - Sacramento, California
Thursday, March 3, 2022



Computed DNL = 65 dB

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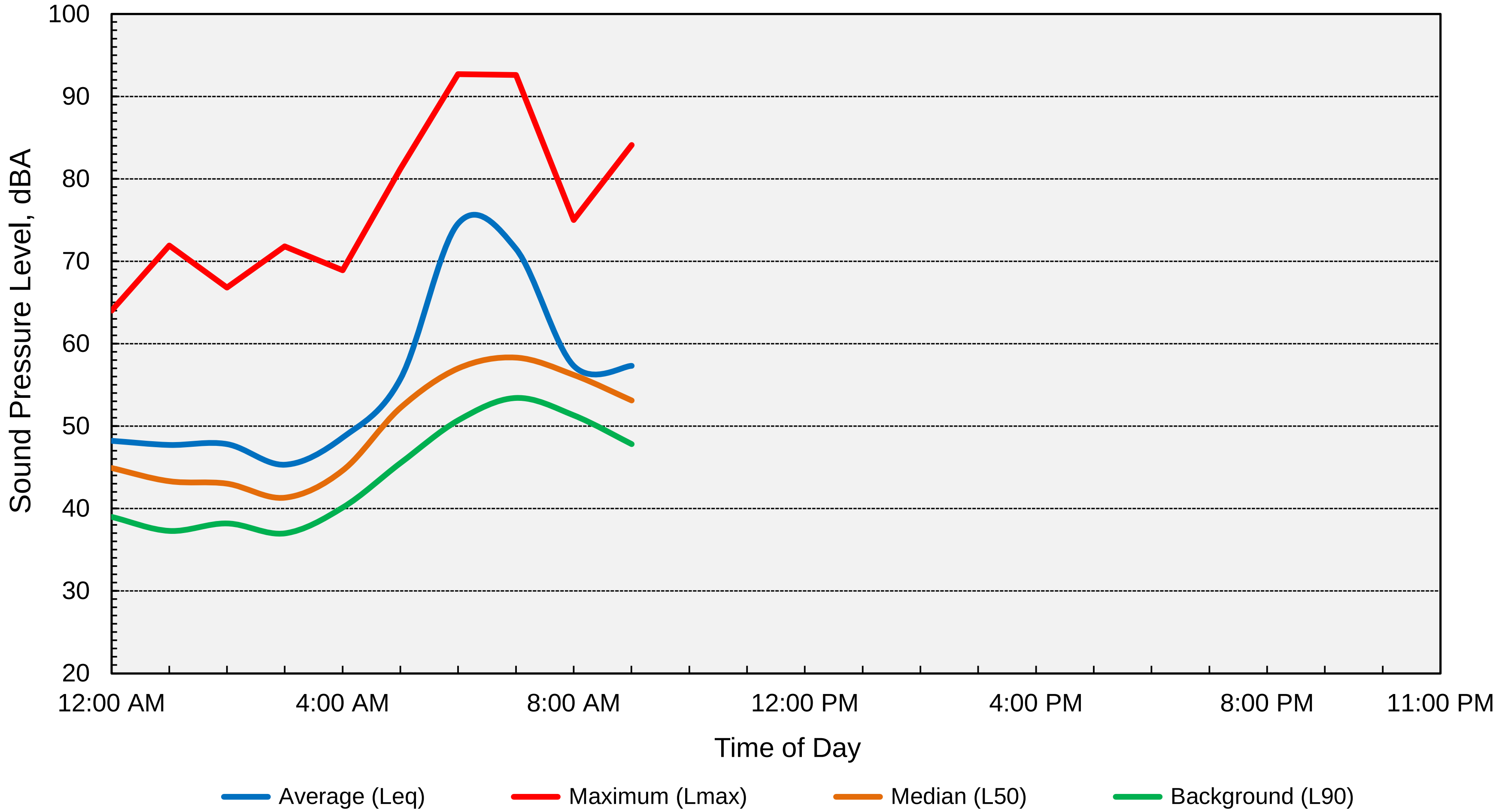
Appendix D-19
Long-Term Ambient Noise Monitoring Results - Site LT-3
Stone Beetland - Sacramento, California
Friday, March 4, 2022



Computed DNL = 73 dB

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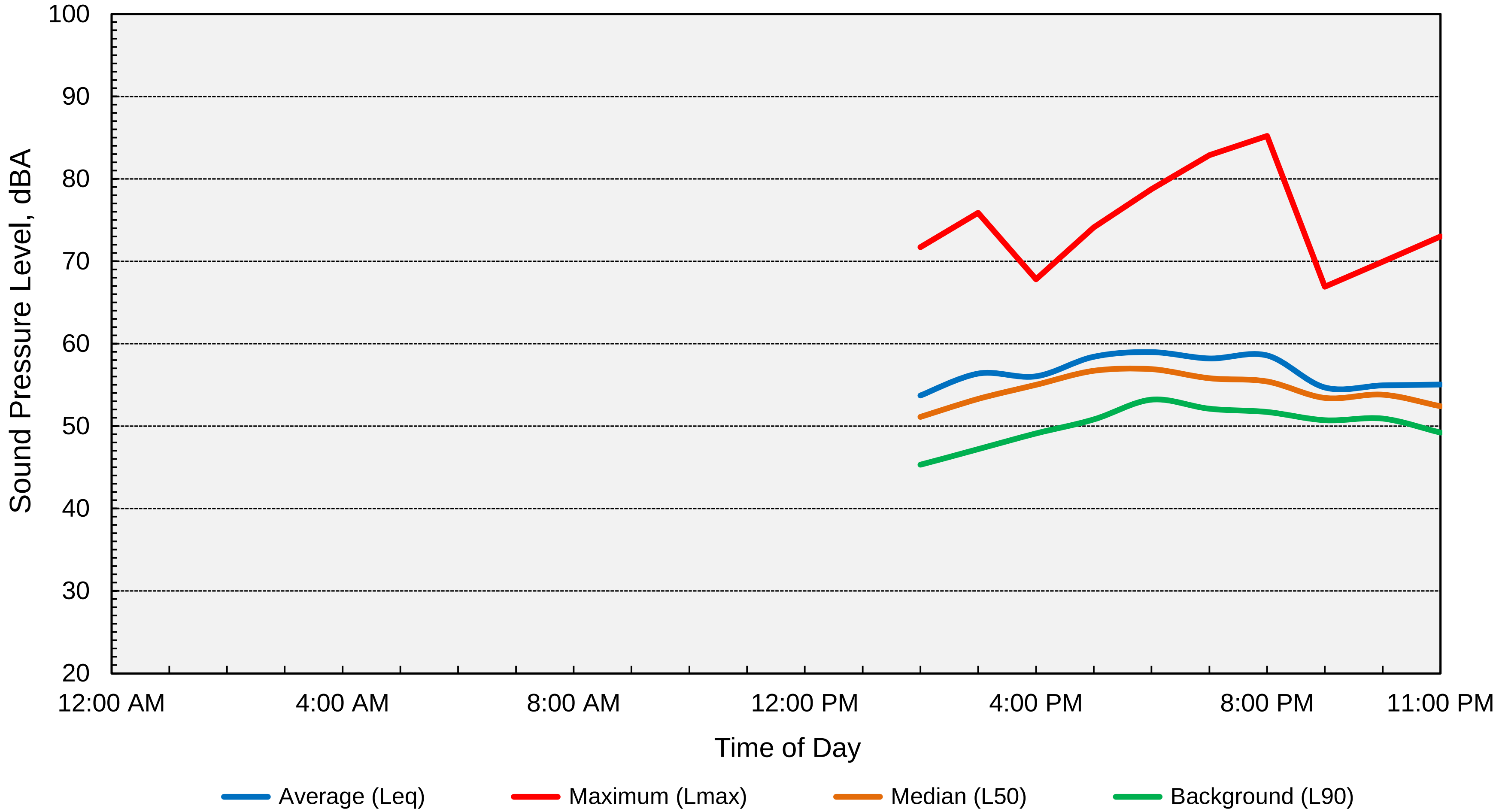
Appendix D-20
Long-Term Ambient Noise Monitoring Results - Site LT-4
Stone Beetland - Sacramento, California
Monday, February 28, 2022



Computed DNL = 62 dB

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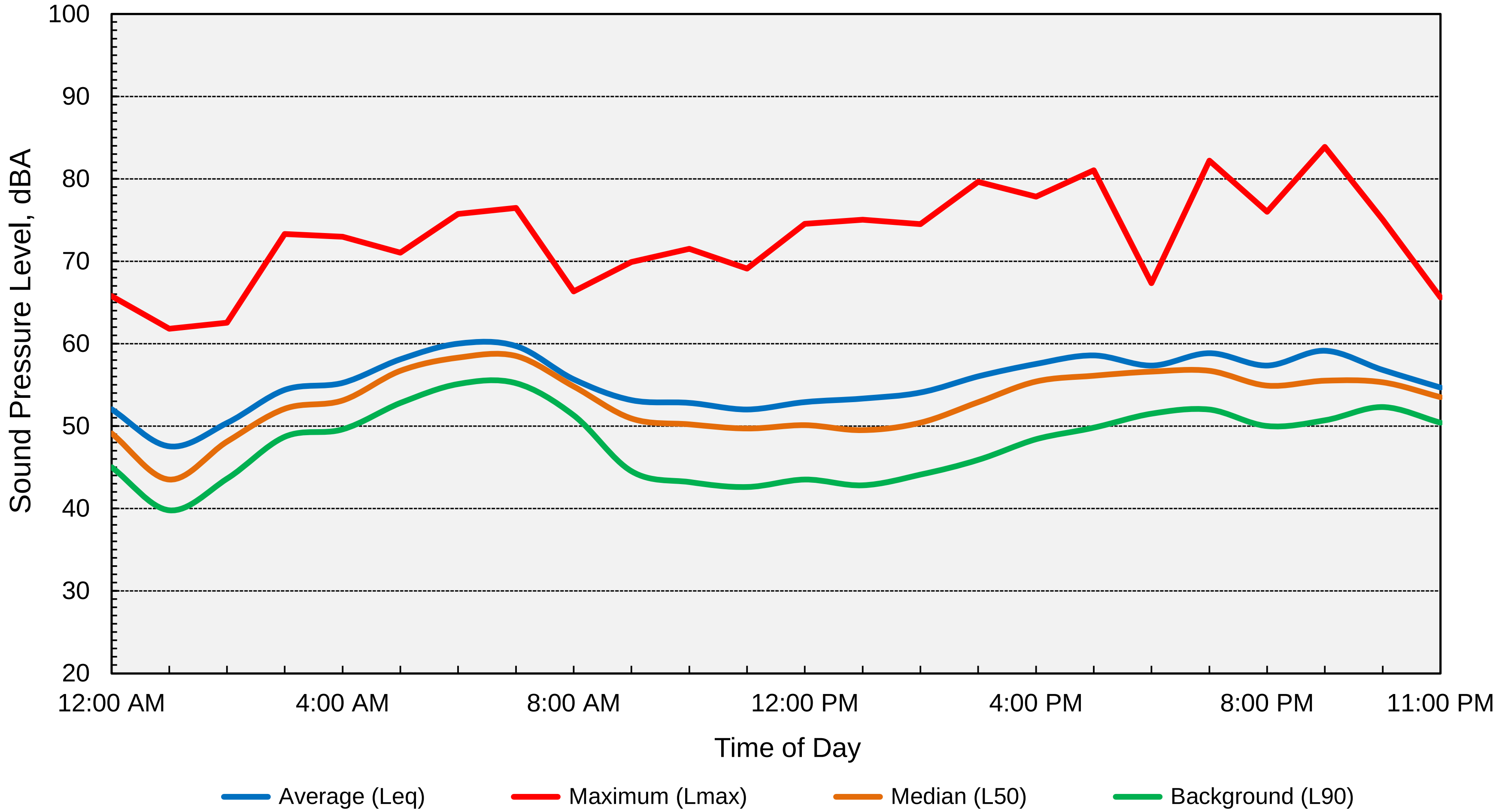
Appendix D-21
Long-Term Ambient Noise Monitoring Results - Site LT-4
Stone Beetland - Sacramento, California
Tuesday, March 1, 2022



Computed DNL = 62 dB

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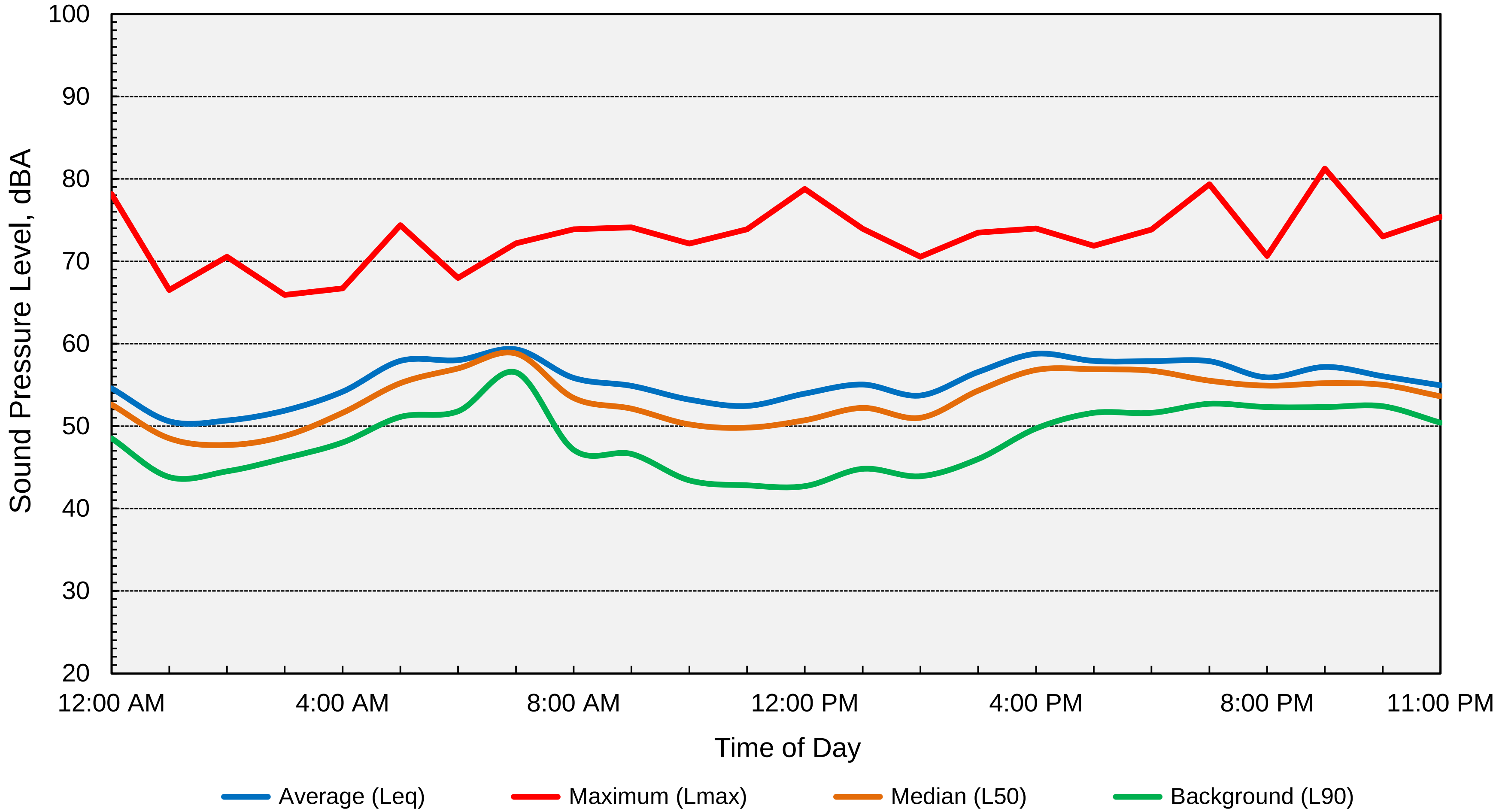
Appendix D-22
Long-Term Ambient Noise Monitoring Results - Site LT-4
Stone Beetland - Sacramento, California
Wednesday, March 2, 2022



Computed DNL = 62 dB

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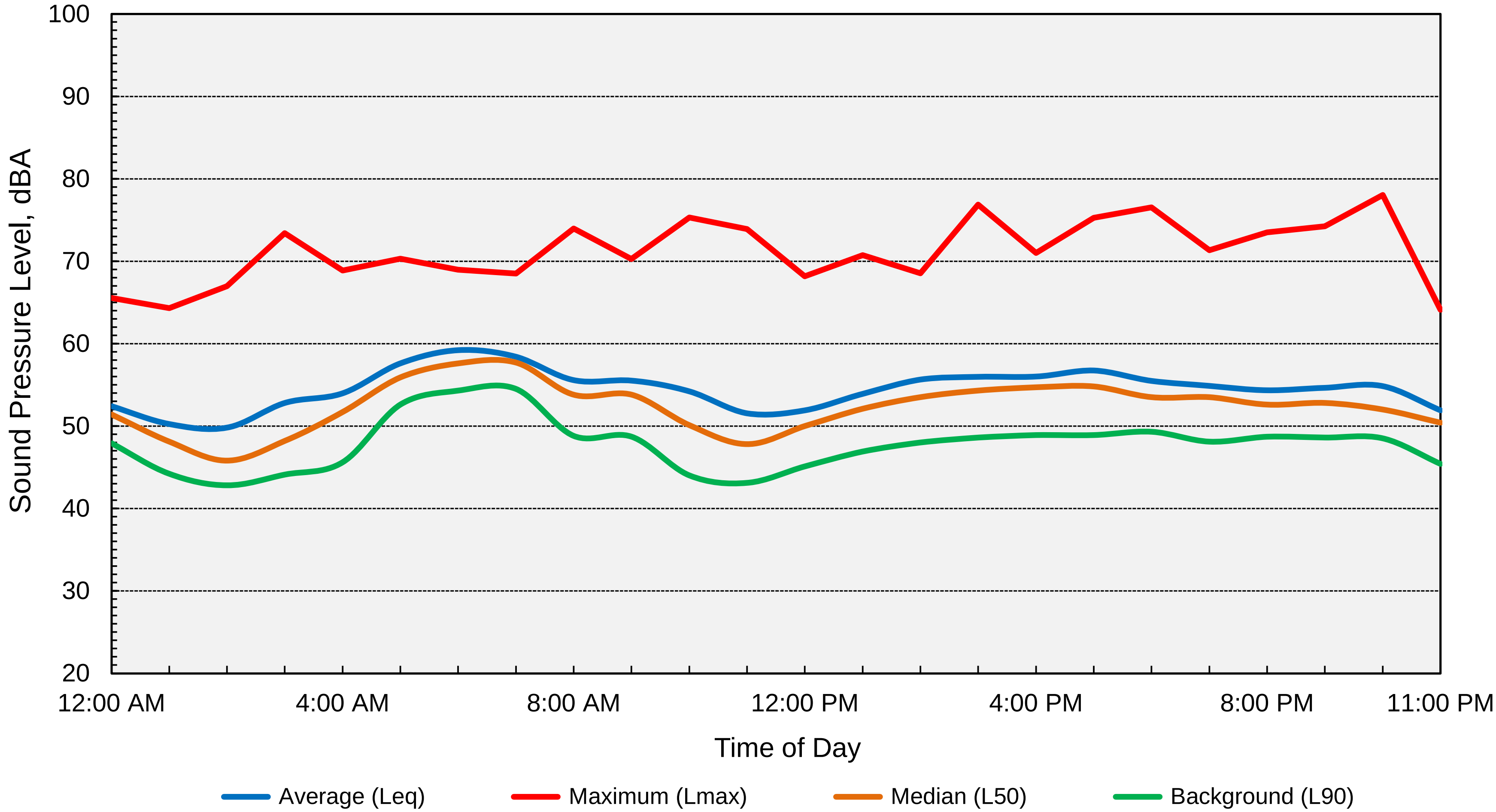
Appendix D-23
Long-Term Ambient Noise Monitoring Results - Site LT-4
Stone Beetland - Sacramento, California
Thursday, March 3, 2022



Computed DNL = 61 dB

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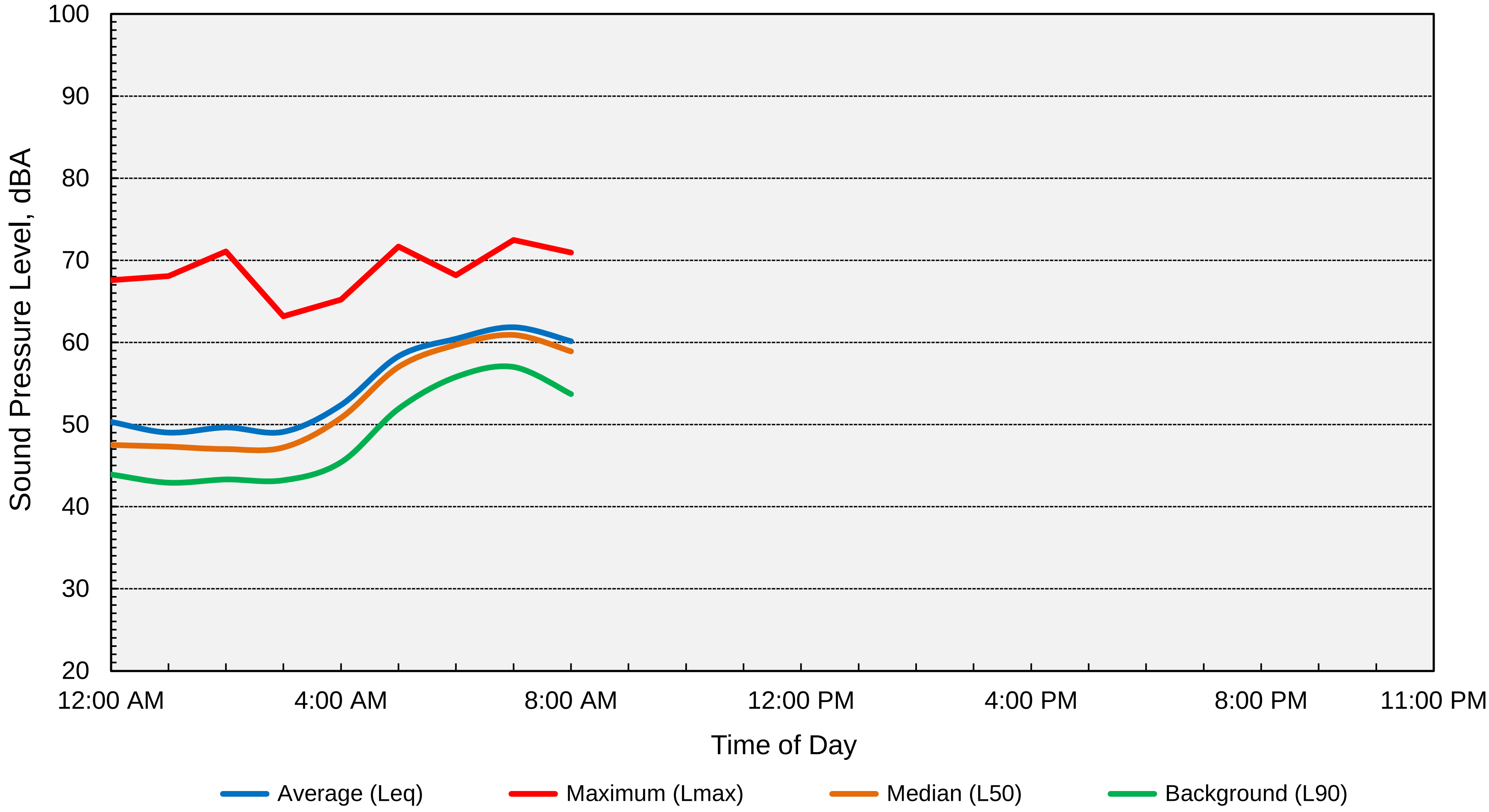
Appendix D-24
Long-Term Ambient Noise Monitoring Results - Site LT-4
Stone Beetland - Sacramento, California
Friday, March 4, 2022



Computed DNL = 63 dB

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Appendix E-1

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2022-004
Description: Existing
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Meadowview Rd	29th Street to Detroit Blvd	27,700	80		20	2	1	40	60	
2	Meadowview Rd	Detroit Blvd to RR	28,900	80		20	2	1	40	50	
3	Detroit Blvd	Meadowview Rd to Laurie Way	5,000	80		20	2	1	30	40	
4	Detroit Blvd	Laurie Way to Reel Cir	2,800	80		20	2	1	30	40	
5	Detroit Blvd	Reel Cir to Ann Arbor Way	2,000	80		20	2	1	30	40	
6	Detroit Blvd	Ann Arbor Way to Burlington Way	200	80		20	2	1	30	50	
7	Cosumnes River Blvd	Delta Shores Cir (W) to Delta Shores Cir (E)	24,000	80		20	2	1	55	3000	
8	Cosumnes River Blvd	Delta Shores Cir (W) to RR	25,900	80		20	2	1	55	420	-6
9	Cosumnes River Blvd	RR to Franklin Blvd	25,900	80		20	2	1	55	420	-6
10	Delta Shores Cir	South of Cosumnes River Blvd	2,300	80		20	2	1	45	3000	
11	24th Street (DNE)	A Street to Cosumnes River Blvd	0	80			2	1	45	100	
12	A Street (DNE)	24th Street to West of Park	0	80			2	1	35	100	
13	A Street (DNE)	West of Park to B Street	0	80			2	1	35	100	
14	A Street (DNE)	B Street to C Street	0	80			2	1	35	100	
15	B Street (DNE)	A Street to Cosumnes River Blvd	0	80			2	1	30	100	
16	C Street (DNE)	D Street to E Street	0	80			2	1	35	100	
17	C Street (DNE)	E Street to Cosumnes River Blvd	0	80			2	1	35	100	
18	D Street (DNE)	East of C Street	0	80			2	1	30	100	
19	E Street (DNE)	East of C Street	0	80			2	1	30	100	

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Appendix E-2

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2022-004
Description: Existing + Project (nearest existing receptors)
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Meadowview Rd	29th Street to Detroit Blvd	28,300	80		20	2	1	40	60	
2	Meadowview Rd	Detroit Blvd to RR	29,500	80		20	2	1	40	50	
3	Detroit Blvd	Meadowview Rd to Laurie Way	6,200	80		20	2	1	30	40	
4	Detroit Blvd	Laurie Way to Reel Cir	4,200	80		20	2	1	30	40	
5	Detroit Blvd	Reel Cir to Ann Arbor Way	3,400	80		20	2	1	30	40	
6	Detroit Blvd	Ann Arbor Way to Burlington Way	2,400	80		20	2	1	30	50	
7	Cosumnes River Blvd	Delta Shores Cir (W) to Delta Shores Cir (E)	27,900	80		20	2	1	55	3000	
8	Cosumnes River Blvd	Delta Shores Cir (W) to RR	29,700	80		20	2	1	55	420	-6
9	Cosumnes River Blvd	RR to Franklin Blvd	31,500	80		20	2	1	55	420	-6
10	Delta Shores Cir	South of Cosumnes River Blvd	2,700	80		20	2	1	45	3000	
11	24th Street	A Street to Cosumnes River Blvd	800	80		20	2	1	45	100	
12	A Street	24th Street to West of Park	800	80		20	2	1	35	100	
13	A Street	West of Park to B Street	800	80		20	2	1	35	100	
14	A Street	B Street to C Street	1,200	80		20	2	1	35	100	
15	B Street	A Street to Cosumnes River Blvd	1,500	80		20	2	1	30	100	
16	C Street	D Street to E Street	2,400	80		20	2	1	35	100	
17	C Street	E Street to Cosumnes River Blvd	9,500	80		20	2	1	35	100	
18	D Street	East of C Street	2,300	80		20	2	1	30	100	
19	E Street	East of C Street	7,700	80		20	2	1	30	100	

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Appendix E-3

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2022-004
Description: Existing + Project + City Property
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Meadowview Rd	29th Street to Detroit Blvd	28,700	80		20	2	1	40	60	
2	Meadowview Rd	Detroit Blvd to RR	30,100	80		20	2	1	40	50	
3	Detroit Blvd	Meadowview Rd to Laurie Way	7,200	80		20	2	1	30	40	
4	Detroit Blvd	Laurie Way to Reel Cir	5,200	80		20	2	1	30	40	
5	Detroit Blvd	Reel Cir to Ann Arbor Way	4,400	80		20	2	1	30	40	
6	Detroit Blvd	Ann Arbor Way to Burlington Way	3,400	80		20	2	1	30	50	
7	Cosumnes River Blvd	Delta Shores Cir (W) to Delta Shores Cir (E)	29,900	80		20	2	1	55	1250	
8	Cosumnes River Blvd	Delta Shores Cir (W) to RR	29,700	80		20	2	1	55	980	
9	Cosumnes River Blvd	RR to Franklin Blvd	34,500	80		20	2	1	55	420	-6
10	Delta Shores Cir	South of Cosumnes River Blvd	2,900	80		20	2	1	45	1300	
11	24th Street	A Street to Cosumnes River Blvd	3,000	80		20	2	1	45	600	
12	A Street	24th Street to West of Park	3,000	80		20	2	1	35	80	
13	A Street	West of Park to B Street	1,700	80		20	2	1	35	80	
14	A Street	B Street to C Street	5,100	80		20	2	1	35	80	
15	B Street	A Street to Cosumnes River Blvd	1,500	80		20	2	1	30	100	
16	C Street	D Street to E Street	5,400	80		20	2	1	35	330	
17	C Street	E Street to Cosumnes River Blvd	12,500	80		20	2	1	35	600	
18	D Street	East of C Street	3,300	80		20	2	1	30	330	
19	E Street	East of C Street	7,700	80		20	2	1	30	610	

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Appendix E-4

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2022-004
Description: Project Only (distance to nearest existing/city development receptor)
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Meadowview Rd	29th Street to Detroit Blvd	600	80		20	2	1	40	60	
2	Meadowview Rd	Detroit Blvd to RR	600	80		20	2	1	40	50	
3	Detroit Blvd	Meadowview Rd to Laurie Way	1,200	80		20	2	1	30	40	
4	Detroit Blvd	Laurie Way to Reel Cir	1,400	80		20	2	1	30	40	
5	Detroit Blvd	Reel Cir to Ann Arbor Way	1,400	80		20	2	1	30	40	
6	Detroit Blvd	Ann Arbor Way to Burlington Way	2,200	80		20	2	1	30	50	
7	Cosumnes River Blvd	Delta Shores Cir (W) to Delta Shores Cir (E)	3,900	80		20	2	1	55	1250	
8	Cosumnes River Blvd	Delta Shores Cir (W) to RR	3,800	80		20	2	1	55	980	
9	Cosumnes River Blvd	RR to Franklin Blvd	5,600	80		20	2	1	55	420	-6
10	Delta Shores Cir	South of Cosumnes River Blvd	400	80		20	2	1	45	1300	
11	24th Street	A Street to Cosumnes River Blvd	800	80		20	2	1	45	600	
12	A Street	24th Street to West of Park	800	80		20	2	1	35	80	
13	A Street	West of Park to B Street	800	80		20	2	1	35	80	
14	A Street	B Street to C Street	1,200	80		20	2	1	35	80	
15	B Street	A Street to Cosumnes River Blvd	1,500	80		20	2	1	30	100	
16	C Street	D Street to E Street	2,400	80		20	2	1	35	330	
17	C Street	E Street to Cosumnes River Blvd	9,500	80		20	2	1	35	600	
18	D Street	East of C Street	2,300	80		20	2	1	30	330	
19	E Street	East of C Street	7,700	80		20	2	1	30	610	

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Appendix E-5

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Data Input Sheet

Project #: 2022-004
Description: Existing + City Property (distance to nearest existing/city development receptor)
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Meadowview Rd	29th Street to Detroit Blvd	28,100	80		20	2	1	40	60	
2	Meadowview Rd	Detroit Blvd to RR	29,500	80		20	2	1	40	50	
3	Detroit Blvd	Meadowview Rd to Laurie Way	6,000	80		20	2	1	30	40	
4	Detroit Blvd	Laurie Way to Reel Cir	3,800	80		20	2	1	30	40	
5	Detroit Blvd	Reel Cir to Ann Arbor Way	3,000	80		20	2	1	30	40	
6	Detroit Blvd	Ann Arbor Way to Burlington Way	1,200	80		20	2	1	30	50	
7	Cosumnes River Blvd	Delta Shores Cir (W) to Delta Shores Cir (E)	26,000	80		20	2	1	55	1250	
8	Cosumnes River Blvd	Delta Shores Cir (W) to RR	25,900	80		20	2	1	55	980	
9	Cosumnes River Blvd	RR to Franklin Blvd	28,900	80		20	2	1	55	420	-6
10	Delta Shores Cir	South of Cosumnes River Blvd	2,500	80		20	2	1	45	1300	
11	24th Street	A Street to Cosumnes River Blvd	2,200	80		20	2	1	45	600	
12	A Street	24th Street to West of Park	2,200	80		20	2	1	35	80	
13	A Street	West of Park to B Street	900	80		20	2	1	35	80	
14	A Street	B Street to C Street	3,900	80		20	2	1	35	80	
15	B Street (DNE)	A Street to Cosumnes River Blvd	0	80			2	1	30	100	
16	C Street	D Street to E Street	3,000	80		20	2	1	35	330	
17	C Street	E Street to Cosumnes River Blvd	3,000	80		20	2	1	35	600	
18	D Street	East of C Street	1,000	80		20	2	1	30	330	
19	E Street (DNE)	East of C Street	0	80			2	1	30	610	

Appendix E-6

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2022-004
Description: Existing + Project + City Property (distance to nearest proposed receptors)
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Cosumnes River Blvd	Delta Shores Cir (W) to RR	29,700	80		20	2	1	55	80	
2	24th Street	A Street to Cosumnes River Blvd	3,000	80		20	2	1	45	60	
3	A Street	24th Street to West of Park	3,000	80		20	2	1	35	50	
4	A Street	West of Park to B Street	1,700	80		20	2	1	35	50	
5	A Street	B Street to C Street	5,100	80		20	2	1	35	50	
6	B Street	A Street to Cosumnes River Blvd	1,500	80		20	2	1	30	50	
7	C Street	D Street to E Street	5,400	80		20	2	1	35	55	
8	C Street	E Street to Cosumnes River Blvd	12,500	80		20	2	1	35	55	
9	D Street	East of C Street	3,300	80		20	2	1	30	50	
10	E Street	East of C Street	7,700	80		20	2	1	30	50	