Environmental Noise Assessment

West Roseville Marketplace

Roseville, California

BAC Job # 2022-012

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Introduction

The West Roseville Marketplace (project) is located on the northeast corner of Pleasant Grove Boulevard and Fiddyment Road in Roseville, California. The project consists of a Safeway shopping center with retail, restaurant drive-through, and gas station uses. Existing land uses in the immediate project vicinity include single-and multi-family residential to the north, church to the east, and single-family residential to the west. The project area with aerial imagery is shown in Figure 1. The project site plan is presented as Figure 2.

Due to the proximity of the project to adjacent noise-sensitive uses, Bollard Acoustical Consultants, Inc. (BAC) was retained to prepare an assessment of potential noise impacts associated with the project. Specifically, the purposes of this assessment are to quantify noise levels associated with project on-site operations, to assess the state of compliance of those noise levels with applicable City of Roseville noise criteria, and if necessary, to recommend measures to reduce those noise levels to acceptable limits at the nearest existing noise-sensitive uses.

Noise Fundamentals and Terminology

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 thus are called sound. 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 allows a million-fold increase in pressure to be expressed as 120 dB. Another useful aspect of the decibel scale is that changes in levels (dB) correspond closely to human perception of relative loudness. Appendix A contains definitions of Acoustical Terminology. Figure 3 shows common noise levels associated with various sources.

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 weighing the frequency response of a sound level meter by means of the standardized A-weighing 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 in decibels.

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}) over a given time period (usually one hour). The L_{eq} is the foundation of the Day-Night Average Level noise descriptor, DNL or L_{dn}, and shows very good correlation with community response to noise.

Legend

- Project Boundary (Approximate)
- Existing 6' Masonry Walls (Noise Barriers)
- Long-Term Noise Measurement Locations
- Representative Residential Receivers

N

Scale (Feet)

0 75 150

West Roseville Marketplace

Roseville, California

Project Area

Figure 1

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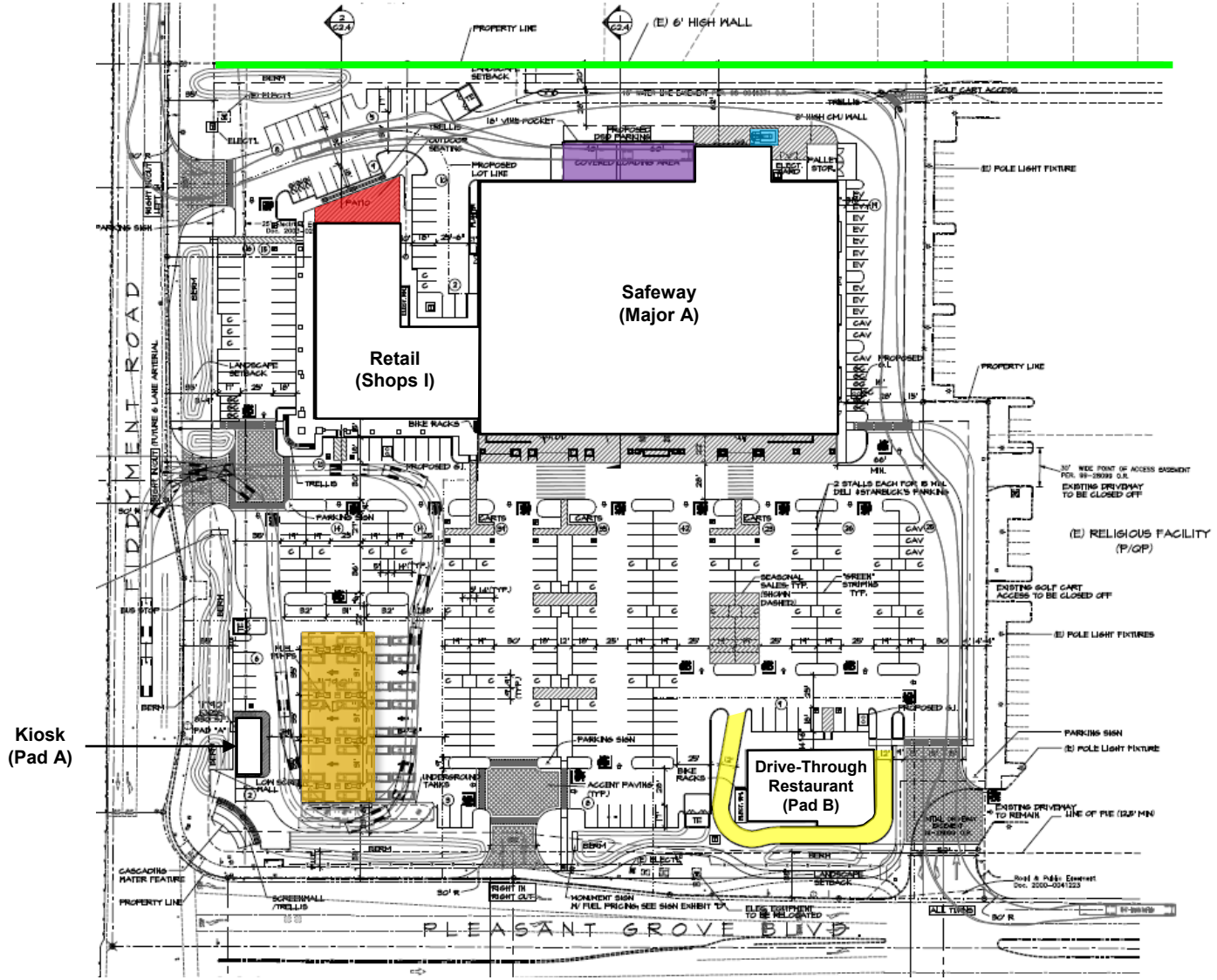

Legend

- Existing 6' Masonry Wall (Noise Barrier)
- Safeway Loading Dock Area
- Gas Station Fueling Area
- Restaurant Drive-Through Lane
- Outdoor Patio Area
- Trash Compactor

N

Scale (Feet)

0 50 100

West Roseville Marketplace

Roseville, California

Project Site Plan

Figure 2

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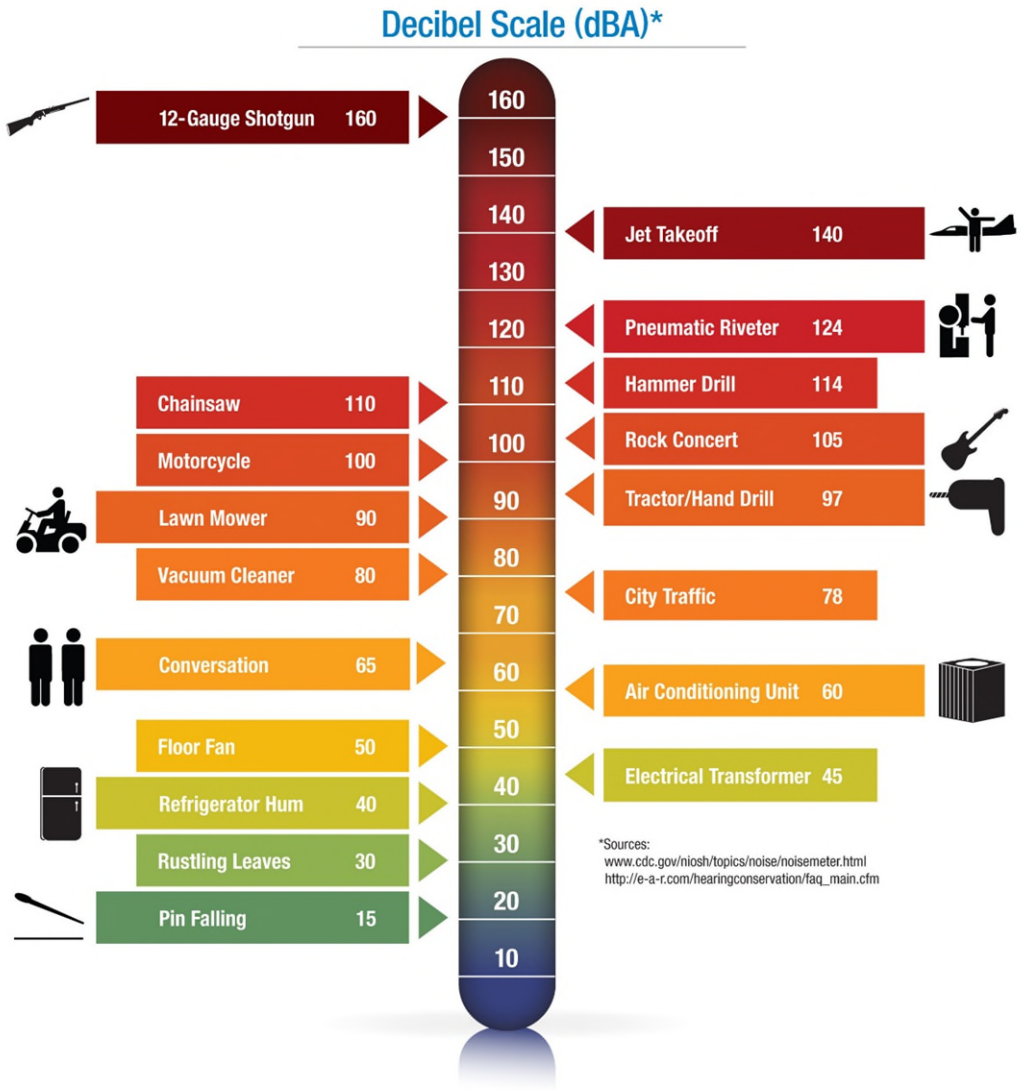
Figure 3
Typical A-Weighted Sound Levels of Common Noise Sources



The Day-Night Average Level (DNL or L_{dn}) is based upon the average noise level over a 24-hour day, with a +10-decibel weighting applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because DNL represents a 24-hour average, it tends to disguise short-term variations in the noise environment. DNL-based noise standards are commonly used to assess noise impacts associated with traffic, railroad, and aircraft noise sources.

Existing Ambient Noise Environment within Project Vicinity

The existing ambient noise environment in the immediate project vicinity is defined primarily by traffic on Pleasant Grove Boulevard and Fiddyment Road. To generally quantify the existing ambient noise level environment within the project vicinity, BAC conducted long-term (96-hour) noise level measurements at four (4) locations February 25-28, 2022. The noise survey locations are shown on Figure 1, identified as sites LT-1 though LT-4. Photographs of the noise level survey locations are provided in Appendix B.

Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meters were used for the ambient noise level survey. The meters were calibrated immediately before and after use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4). The results of the long-term ambient noise level survey are shown numerically and graphically in Appendices C and D (respectively) and are summarized below in Table 1.

Table 1
Summary of Long-Term Ambient Noise Measurement Results – February 25-28, 2022[1]

			Average Measured Hourly Noise Levels (dB)[3]			
			Daytime[4]		Nighttime[5]	
Site Description[2]	Date	DNL (dB)	L_{eq}	L_{max}	L_{eq}	L_{max}
LT-1: North project boundary at multi-family residential uses	2/25/22	60	57 (55-59)	73 (68-84)	53 (46-59)	68 (63-83)
	2/26/22	58	54 (52-57)	73 (67-87)	51 (48-54)	69 (64-74)
	2/27/22	58	54 (52-57)	73 (68-83)	51 (45-55)	71 (63-83)
	2/28/22	59	56 (54-59)	73 (68-81)	52 (45-57)	66 (59-69)
LT-2: North project boundary at single-family residential uses	2/25/22	59	54 (46-58)	68 (60-76)	52 (44-57)	66 (58-74)
	2/26/22	56	49 (46-52)	65 (58-77)	50 (47-52)	65 (59-74)
	2/27/22	57	51 (44-56)	67 (57-77)	51 (41-57)	66 (56-81)
	2/28/22	59	54 (47-58)	70 (57-78)	52 (45-57)	65 (59-77)
LT-3: West of project site at single-family residential uses	2/25/22	72	68 (66-70)	85 (81-96)	64 (60-69)	80 (75-86)
	2/26/22	70	66 (65-68)	84 (80-89)	63 (61-65)	80 (78-87)
	2/27/22	70	66 (65-72)	83 (78-99)	62 (60-64)	83 (76-94)
	2/28/22	71	68 (65-70)	86 (82-99)	64 (59-69)	80 (78-83)
LT-4: Eastern project boundary at church use	2/25/22	59	58 (50-67)	68 (62-85)	50 (44-56)	64 (60-69)
	2/26/22	55	53 (51-56)	69 (63-81)	48 (43-52)	63 (56-77)
	2/27/22	56	53 (49-56)	70 (63-83)	49 (41-54)	63 (54-73)
	2/28/22	58	55 (51-60)	71 (61-87)	50 (43-55)	62 (55-71)

[1] Detailed summaries of the noise monitoring results are provided in Appendices C and D.
[2] Long-term ambient noise monitoring locations are identified on Figure 1.
[3] Data presented in terms of: Average (Low-High).
[4] Daytime: 7:00 a.m. to 10:00 p.m.
[5] Nighttime: 10:00 p.m. to 7:00 a.m.
Source: Bollard Acoustical Consultants, Inc. (2022)

As indicated in Table 1, average measured hourly noise levels were generally consistent at each site throughout the monitoring period (i.e., small range in measured levels). The Table 1 data also indicate that average measured hourly noise levels were highest at site LT-4, which is believed to be due to the proximity of the site relative to Fiddyment Road.

Criteria for Acceptable Noise Exposure

Roseville General Plan 2035

The Noise Element of the Roseville General Plan 2035 establishes non-transportation noise exposure limits as summarized below in Table 1 (Table IX-3 of the Noise Element). These limits are applicable to non-transportation noise sources, such as those proposed by project on-site operations. The General Plan noise level criteria is presented in Table 2.

Table 2
Performance Standards for Non-Transportation Sources
(As Measured at the Property Line of Noise-Sensitive Uses)

	Noise Level (dBA)	
	Daytime	Nighttime
Noise Level Descriptor (dBA)	(7:00 a.m. to 10:00 p.m.)	(10:00 p.m. to 7:00 a.m.)
Hourly L_{eq}	55	45
Maximum Level L_{max}	75	65

Notes:
-Each of the noise level standards specified above shall be reduced by 5 dB for pure tone noises, noise consisting primarily of speech or music, or for recurring impulsive noises. Such noises are generally considered by residents to be particularly annoying and are a primary source of noise complaints.
-These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).
-No standards have been included for interior noise levels. Standard construction practices should, with exterior noise levels identified, result in acceptable interior noise levels.
Source: Roseville General Plan 2035, Noise Element, Table IX-3

Noise Standards Applicable to the Project

The primary noise sources associated with the project have been identified as delivery truck loading dock activities, on-site truck circulation, restaurant drive-through operations, parking lot movements, rooftop mechanical equipment (HVAC), outdoor patio conversation, and trash compactor operation.

For the purposes of this assessment, it was conservatively assumed that normal hours of operation for the businesses within the development could occur during both daytime and nighttime hours. However, it is the understanding of BAC that all delivery truck activities within the development will be restricted to daytime hours only (7:00 a.m. to 10:00 p.m.). Finally, the footnote in Table 2 states that each of the noise level limits shall be reduced by 5 dB for noises consisting of speech or music, which would be applicable to the drive-through restaurant's menu speaker post and outdoor patio (i.e., patron conversation) noise sources. Based on the

information above, the Roseville General Plan noise level standards applied to the project are provided in Table 3.

Table 3
Noise Level Standards Applied to the Project

	Applicable Noise Level Standard (dBA)			
	Daytime (7:00 a.m. to 10:00 p.m.)		Nighttime (10:00 p.m. to 7:00 a.m.)	
Noise Source	**L_{eq}**	**L_{max}**	**L_{eq}**	**L_{max}**
Loading Dock Activities	55	75	--	--
On-Site Truck Circulation	55	75	--	--
Drive-Through Menu Speaker	50	70	40	60
Drive-Through Vehicle Passbys	55	75	45	65
Parking Lot Movements	55	75	45	65
Rooftop HVAC Equipment	55	75	45	65
Trash Compaction Operations	55	75	45	65
Outdoor Patio Conversation	50	70	40	60

Source: Roseville General Plan 2035, Noise Element, Table IX-3

The General Plan noise level standards are to be applied at the property lines of noise-sensitive uses. Pursuant to the General Plan Noise Element, noise-sensitive uses generally include residential, schools, and hospitals. As a result, the noise level limits shown in Table 3 above were applied at the property lines of the nearest residential uses to the project. The nearest residential uses are represented as receivers R-1 through R-3 on Figure 1. Satisfaction with the General Plan noise level standards at the closest residential uses would ensure compliance with the noise level criteria at residential uses located farther away.

Evaluation of Project-Generated Noise Levels

As mentioned previously, the primary noise sources associated with the project have been identified as delivery truck loading dock activities, on-site truck circulation, restaurant drive-through operations, parking lot movements, rooftop mechanical equipment (HVAC), outdoor patio conversation, and trash compactor operation. Predicted noise levels resulting from each of these sources at the nearest residential uses are evaluated in the following sections.

Predicted project-generated noise levels at the nearest existing residential uses include consideration of the screening that would be provided by existing 6' masonry walls. The locations of the existing 6' noise barriers are illustrated on Figures 1 and 2. It is estimated that the existing sound walls would provide approximately 5 dB of project-generated noise level reduction at the nearest existing residential uses.

Loading Dock Activities

The project proposes a 2-bay loading dock area at the rear (north side) of the Safeway grocery store (Major A). The location of the grocery store loading dock area is shown on Figure 2. The

primary noise sources associated with the loading dock area have been identified as heavy and medium-duty trucks stopping (air brakes), backing into the loading bays (back-up alarms), and pulling away from the dock area (revving engines).

To quantify the noise generated by Safeway loading dock operations, BAC utilized noise level data obtained from BAC field measurements of a commercial warehouse facility. According to BAC measurement data, loading dock hourly average (L_{eq}) and maximum (L_{max}) noise levels are approximately 60 dB L_{eq} and 75-80 dB L_{max} at a reference distance of 50 feet. The BAC noise level measurements captured 3 heavy truck arrivals and departures (with unloading activities), and 4 medium-duty truck deliveries.

Based on reference noise levels of 60 dB L_{eq} and 80 dB L_{max}, and assuming standard spherical spreading loss (-6 dB per doubling of distance), loading dock noise exposure at the property lines of the nearest residential uses (receivers R-1 through R-3) was predicted and the results of those predictions are presented in Table 4.

Table 4
Predicted Loading Dock Activity Noise Levels at Nearest Residential Uses

Receiver[1]	Land Use	Distance from Loading Dock Area (ft)[2]	Predicted Noise Levels (dB)	
			L_{eq}	L_{max}
R-1	Multi-Family Res.	100	49	69
R-2	Single-Family Res.	75	51	71
R-3	Single-Family Res.	450	36	56
General Plan Daytime Noise Standards (dB)			**55**	**75**

[1] Nearest residential uses are represented as receivers R-1 through R-3 on Figure 1.
[2] Distances scaled from loading dock area to residential property lines using provided site plans.
Source: Bollard Acoustical Consultants, Inc. (2022)

As indicated in Table 4, loading dock noise levels are predicted to satisfy the applicable Roseville General Plan daytime hourly average (L_{eq}) and maximum (L_{max}) noise level standards at the property lines of the nearest residential uses. The predicted compliance includes consideration of attenuation that would be provided by existing 6' sound walls, as discussed in this report. Further, the predicted loading dock noise levels in Table 4 are below or within the range of measured daytime hourly average and maximum noise levels within the vicinity of those nearest residential uses (Table 1). As a result, no further consideration of loading dock noise mitigation measures would be warranted for this aspect of the project.

On-Site Delivery Truck Circulation

The project site will receive deliveries of product from both heavy and medium duty trucks. The on-site truck circulation routes are shown on the project site plan.

Based on the experience of BAC in similar commercial projects, it is estimated that the project could receive daily deliveries from to 5 heavy trucks (3 Safeway grocery store trucks, 2 Safeway gas station fuel tankers) and 14 medium trucks (combination of all project tenants). Based on

these estimations, the following conservative assumptions were made regarding deliveries at the businesses of the development:

- Safeway (Major A): 2 heavy trucks / 2 medium trucks during worst-case hour
- Retail (Shops I): 3 medium trucks during worst-case hour
- Gas Station and Kiosk (Pad A): 1 heavy truck / 1 medium truck during worst-case hour
- Drive-Through Restaurant (Pad B): 1 medium truck during worst-case hour

Truck passbys are expected to be relatively brief and will occur at low speeds. To predict noise levels generated by truck passbys, BAC utilized file data obtained from measurements conducted by BAC of heavy and medium duty truck passbys. According to BAC file data, single-event heavy truck passby noise levels are approximately 74 dB L_{max} and 83 dB SEL at a reference distance of 50 feet. BAC file data also indicate that single-event medium truck passby noise levels are approximately 66 dB L_{max} and 76 SEL at a reference distance of 50 feet.

Based on the worst-case hour truck delivery assumptions discussed above, the following delivery truck hourly average (L_{eq}) and maximum (L_{max}) reference noise levels at a distance of 50 feet from the truck passby routes were computed:

- Safeway (Major A): 51 dB L_{eq} (maximum of 74 dB L_{max})
- Retail (Shops I): 45 dB L_{eq} (maximum of 66 dB L_{max})
- Gas Station and Kiosk (Pad A): 49 dB L_{eq} (maximum of 74 dB L_{max})
- Drive-Through Restaurant (Pad B): 40 dB L_{eq} (maximum of 66 dB L_{max})

Based the reference noise levels above, and assuming standard spherical spreading loss (-6 dB per doubling of distance), on-site delivery truck circulation noise exposure at the property lines of the nearest residential uses (receivers R-1 through R-3) was predicted and the results of those predictions are presented in Tables 5-8.

Table 5
Predicted On-Site Delivery Truck Circulation Noise Levels at Residential Uses – Safeway

Receiver[1]	Land Use	Distance from Truck Route (ft)[2]	Predicted Noise Levels (dBA)	
			L_{eq}	L_{max}
R-1	Multi-Family Res.	30	51	73
R-2	Single-Family Res.	30	51	73
R-3	Single-Family Res.	180	35	58
Applicable General Plan Daytime Noise Standards (dB)			**55**	**75**

[1] Nearest residential uses are represented as receivers R-1 through R-3 on Figure 1.
[2] Distances scaled from proposed on-site truck circulation lane to residential property lines using site plan.
Source: Bollard Acoustical Consultants, Inc. (2022)

Table 6
Predicted On-Site Delivery Truck Circulation Noise Levels at Residential Uses – Retail

Receiver[1]	Land Use	Distance from Truck Route (ft)[2]	Predicted Noise Levels (dBA)	
			L_{eq}	L_{max}
R-1	Multi-Family Res.	125	32	53
R-2	Single-Family Res.	320	24	45
R-3	Single-Family Res.	200	28	49
Applicable General Plan Daytime Noise Standard (dB)			**55**	**75**

[1] Nearest residential uses are represented as receivers R-1 through R-3 on Figure 1.
[2] Distances scaled from proposed on-site truck circulation lane to residential property lines using site plan.
Source: Bollard Acoustical Consultants, Inc. (2022)

Table 7
Predicted On-Site Delivery Truck Circulation Noise Levels at Residential Uses – Gas Station

Receiver[1]	Land Use	Distance from Truck Route (ft)[2]	Predicted Noise Levels (dBA)	
			L_{eq}	L_{max}
R-1	Multi-Family Res.	320	28	53
R-2	Single-Family Res.	430	25	50
R-3	Single-Family Res.	200	32	57
Applicable General Plan Daytime Noise Standard (dB)			**55**	**75**

[1] Nearest residential uses are represented as receivers R-1 through R-3 on Figure 1.
[2] Distances scaled from on-site truck circulation lane to residential property lines using provided site plans.
Source: Bollard Acoustical Consultants, Inc. (2022)

Table 8
Predicted On-Site Delivery Truck Circulation Noise Levels at Residential Uses – Restaurant

Receiver[1]	Land Use	Distance from Truck Route (ft)[2]	Predicted Noise Levels (dBA)	
			L_{eq}	L_{max}
R-1	Multi-Family Res.	480	16	41
R-2	Single-Family Res.	470	16	42
R-3	Single-Family Res.	580	14	40
Applicable General Plan Daytime Noise Standard (dB)			**55**	**75**

[1] Nearest residential uses are represented as receivers R-1 through R-3 on Figure 1.
[2] Distances scaled from proposed on-site truck circulation lane to residential property lines using site plan.
Source: Bollard Acoustical Consultants, Inc. (2022)

As shown in Tables 5-8, on-site delivery truck circulation noise levels are predicted to satisfy the applicable Roseville General Plan daytime hourly average (L_{eq}) and maximum (L_{max}) noise level standards at the property lines of the nearest residential uses. The predicted compliance includes consideration of attenuation that would be provided by existing 6' sound walls, as discussed in this report. Additionally, the predicted truck circulation noise levels in Tables 5-8 are below or within the range of measured daytime hourly average and maximum noise levels within the vicinity

of those nearest residential uses (Table 1). As a result, no further consideration of on-site truck circulation noise mitigation measures would be warranted for this aspect of the project.

Restaurant Drive-Through Operations

According to the project site plan, the restaurant proposed on Pad B will have a wrap-around drive-through lane. The location of the drive-through lane is shown on Figure 2.

At the time of writing this report, it is unknown whether the proposed drive-through will have an amplified speaker menu board/post. For the purposes of this analysis, it was conservatively assumed that the drive-through would have an amplified drive-through speaker menu board. To quantify the noise emissions of project drive-through speaker usage and vehicle passages, noise level measurement data from similar drive-thru facilities collected by BAC in the greater Sacramento region in recent years were utilized. Table 9 contains the reference sound levels used to assess compliance with Roseville General Plan noise standards for this project.

Table 9
Reference Drive-Through Noise Levels

Noise Source	Measured Noise Levels (dB)	
	Average (L_{eq})	Maximum (L_{max})
Speaker[1]	63 dB at 10 feet	67 dB at 10 feet
Vehicles[2]	60 dB at 5 feet	70 dB at 5 feet

[1] Speaker noise level data obtained from measurements conducted at a drive-through restaurant located at 2845 Bell Road in Auburn, California in 2018.
[2] Vehicle noise level data obtained from previous BAC drive-through noise studies.

Using the BAC drive-through vehicle passby data and speaker noise level data presented in Table 9, and assuming standard spherical spreading loss (-6 dB per doubling of distance), data were projected to the property lines of the nearest residential uses (receivers R-1 through R-3). The results of those projections are provided in Table 10.

Table 10
Predicted Restaurant Drive-Through Noise Levels at Nearest Residential Uses

Receiver[1]	Distance from Source (ft)[2]		Predicted Noise Levels (dB)[3]			
			Speaker		Vehicles	
	Speaker	Vehicles	L_{eq}	L_{max}	L_{eq}	L_{max}
R-1	535	520	23	27	15	25
R-2	520	510	24	28	15	25
R-3	630	615	22	26	13	23
Applicable General Plan Daytime Noise Standard (dB)			50	70	55	75
Applicable General Plan Nighttime Noise Standard (dB)			40	60	45	65

[1] Nearest residential uses are represented as receivers R-1 through R-3 on Figure 1.
[2] Distances scaled from drive-through lane and speaker area to residential property lines using site plan.
[3] Predicted noise levels include consideration of screening that would be provided by proposed intervening on-site structures, where applicable.
Source: Bollard Acoustical Consultants, Inc. (2022)

The Table 10 data indicate that restaurant drive-through operations noise levels are predicted to satisfy the applicable Roseville General Plan daytime and nighttime hourly average (L_{eq}) and maximum (L_{max}) noise level standards at the property lines of the nearest residential uses. The predicted compliance includes consideration of attenuation that would be provided by existing 6' sound walls, as discussed in this report. In addition, the predicted drive-through noise levels in Table 10 are below the range of measured daytime and nighttime hourly average and maximum noise levels within the vicinity of those nearest residential uses (Table 1). As a result, no further consideration of drive-through operations noise mitigation measures would be warranted for this aspect of the project.

Parking Area Movements

As a means of determining potential noise exposure due to project parking area activities, BAC utilized specific parking lot noise level measurements conducted by BAC. Specifically, a series of individual noise measurements were conducted of multiple vehicle types arriving and departing a parking area, including engines starting and stopping, car doors opening and closing, and persons conversing as they entered and exited the vehicles. The results of those measurements revealed that individual parking lot movements generated mean noise levels of approximately 70 dB SEL at a reference distance of 50 feet. The maximum noise level associated with parking lot activity typically did not exceed 65 dB L_{max} at the same reference distance.

To compute hourly average (L_{eq}) noise levels generated by parking activities, the approximate number of hourly operations in any given area and distance to the effective noise center of those activities is required. Based on the provided site plan, the nearest proposed parking stalls to receiver R-1 are located adjacent to the retail uses (Shops I) of the project (approximately 65 spaces). The closest parking stalls to receiver R-2 are associated with the retails uses and the eastside of the Safeway grocery store building (combined 53 spaces). Finally, the nearest parking stalls to the residential uses to the west of the project, represented by receiver R-3, are associated with the retail uses, gas station, and a portion of the Safeway grocery store (combined 100 spaces). However, receiver R-3 would also receive noise exposure from parking movements at the gas station fuel pumps. Assuming each vehicle spends five minutes at a fuel dispenser (of which there are 16), this would calculate to approximately 192 vehicle movements per hour at maximum capacity. Parking activity noise exposure was determined using the following equation:

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

Where 70 is the SEL for a single automobile parking operation, N is the number of parking operations in a peak hour, and 35.6 is 10 times the logarithm of the number of seconds in an hour. Using the information provided above, and assuming standard spherical spreading loss (-6 dB per doubling of distance), worse-case parking activity noise exposure at the property lines of the nearest residential uses (receivers R-1 through R-3) was predicted and the results of those predictions are presented in Table 11.

Table 11
Predicted Worse-Case Parking Area Noise Levels at Nearest Residential Uses

Receiver[1]	Land Use	Predicted Combined Parking Area Noise Levels (dB)[2]	
		L_{eq}	L_{max}
R-1	Multi-Family Residential	39	62
R-2	Single-Family Residential	35	56
R-3	Single-Family Residential	40	52
Applicable General Plan Daytime Noise Standards (dB)		**55**	**75**
Applicable General Plan Nighttime Noise Standards (dB)		**45**	**65**

[1] Nearest residential uses are represented as receivers R-1 through R-3 on Figure 1.
[2] Predicted noise levels based on distances from nearest parking stalls to receivers and peak hour movement assumptions and calculations, as discussed in this report.
Source: Bollard Acoustical Consultants, Inc. (2022)

As indicated in Table 11, worse-case parking area noise levels are predicted to satisfy the applicable Roseville General Plan daytime and nighttime hourly average (L_{eq}) and maximum (L_{max}) noise level standards at the property lines of the nearest residential uses. The predicted compliance includes consideration of attenuation that would be provided by existing 6' sound walls, as discussed in this report. Additionally, the predicted worse-case parking area noise levels in Table 11 are below the range of measured daytime and nighttime hourly average and maximum noise levels within the vicinity of those nearest residential uses (Table 1). It should be noted that parking lot activity at the project site is expected to be significantly less during nighttime hours. Nonetheless, based on the analysis and results presented above, no further consideration of parking area noise mitigation measures would be warranted for this aspect of the project.

Rooftop Mechanical Equipment (HVAC)

Heating, ventilating, and air conditioning (HVAC) requirements for the proposed Safeway grocery store will most likely be met using a packaged roof-mounted systems. Such mechanical equipment would be shielded from view of nearby existing residential uses by the building's rooftop parapets. Noise from rooftop mechanical equipment has been measured by BAC to be approximately 45 dB at a reference distance of 100 feet from the building rooftops of similar grocery store buildings, including shielding provided by the building parapets.

Assuming standard spherical spreading loss (-6 dB per doubling of distance), project HVAC equipment noise exposure at the property lines of the nearest residential uses (receivers R-1 through R-3) was predicted and the results of those predictions are presented in Table 12. Because mechanical equipment operation typically generates sustained, steady-state, noise levels, impacts of rooftop mechanical equipment are assessed in this study relative to the Roseville General Plan hourly average (L_{eq}) noise level standards.

Table 12
Predicted Rooftop HVAC Equipment Noise Levels at Nearest Residential Uses

Receiver[1]	Land Use	Distance from Building Rooftop (ft)[2]	Predicted Noise Levels, L_{eq} (dB)
R-1	Multi-Family Res.	100	40
R-2	Single-Family Res.	100	40
R-3	Single-Family Res.	390	28
Applicable General Plan Daytime Noise Standard (dB)			**55**
Applicable General Plan Nighttime Noise Standard (dB)			**45**

[1] Nearest residential uses are represented as receivers R-1 through R-3 on Figure 1.
[2] Distances scaled from building rooftop to residential property lines using provided site plan.
Source: Bollard Acoustical Consultants, Inc. (2022)

The Table 12 data indicate that rooftop HVAC equipment noise levels are predicted to satisfy the applicable Roseville General Plan daytime and nighttime hourly average (L_{eq}) noise level standards at the property lines of the nearest residential uses. The predicted compliance includes consideration of attenuation that would be provided by existing 6' sound walls, as discussed in this report. In addition, the predicted HVAC equipment noise levels in Table 12 are below the range of measured daytime and nighttime hourly average noise levels within the vicinity of those nearest residential uses (Table 1). It should be noted that HVAC equipment usage at the project site is expected to be reduced during nighttime hours. Nonetheless, based on the analysis and results presented above, no further consideration of HVAC equipment noise mitigation measures would be warranted for this aspect of the project.

Trash Compactor Operations

According to the project site plans, a trash compactor is proposed to be located at the rear (north side) of the Safeway grocery store. The proposed location of the grocery store trash compactor is shown on Figure 2.

Information for proposed trash compactor (i.e., make and model) was not available at the time of writing this report. To quantify the noise emissions of project's trash compactor, BAC utilized sound level data for a trash compactor model analyzed by BAC in 2016 for a similar-sized shopping center developed in San Jose, California (North Park Plaza). Specifically, sound level data from a Three Marathon Mini-MAC Model 3A trash compactor was utilized in this analysis. According to the manufacturer's specification sheet, this specific commercial trash compactor model has a reference sound level of 70 dB L_{max} or less at a distance of 5 feet (dependent upon orientation to equipment). Based on the reference sound level above, and assuming standard spherical spreading loss (-6 dB per doubling of distance), trash compactor noise levels at the property lines of the nearest residential uses (receivers R-1 through R-3) was predicted and the results of those predictions are presented in Table 13.

It is reasonably assumed that trash compactor operations will be relatively brief and would occur no more than approximately 10 minutes of a given hour. Based on this assumption, impacts of

project trash compactor operations are assessed in this study relative to the Roseville General Plan hourly average (L_{max}) noise level standards.

Table 13
Predicted Trash Compactor Noise Levels at Nearest Residential Uses

Receiver[1]	Land Use	Distance from Equipment (ft)[2]	Predicted Noise Levels, L_{max} (dB)
R-1	Multi-Family Res.	140	36
R-2	Single-Family Res.	60	43
R-3	Single-Family Res.	600	23
Applicable General Plan Daytime Noise Standards (dB)			**75**
Applicable General Plan Nighttime Noise Standards (dB)			**65**

[1] Nearest residential uses are represented as receivers R-1 through R-3 on Figure 1.
[2] Distances scaled from proposed trash compactor to residential property lines using provided site plan.
Source: Bollard Acoustical Consultants, Inc. (2022)

Based on the results provided in Table 13, project trash compactor noise levels are expected to satisfy the applicable Roseville General Plan daytime and nighttime maximum (L_{max}) noise level standards at the property lines of the nearest residential uses. The results in Table 13 include consideration of attenuation that would be provided by existing 6' sound walls, as discussed in this report. Additionally, the trash compactor noise levels in Table 13 are well below the range of measured daytime and nighttime maximum noise levels within the vicinity of those nearest residential uses (Table 1). As a result, no further consideration of trash compactor mitigation measures would be warranted for this aspect of the project.

Outdoor Patio Conversation

The project proposes an outdoor patio area for patrons on the north side of the retails uses (Shops I). The location of the patio area is shown on Figure 2. The primary noise source associated with the proposed outdoor patio has been identified as patron speech/conversation.

Based on the proposed size of the area, it was assumed for the purposes of this analysis that the outdoor patio could accommodate approximately 30 people. To quantify outdoor patio area noise levels at the nearest uses, BAC utilized reference file data for persons speaking in normal and raised voices (normal voice = 57 dB per person at 3 feet and raised voice = 64 dB per person at 3 feet). Based on an outdoor patio of 30 people, the cited BAC file data above, and assuming standard spherical spreading loss (-6 dB per doubling of distance), outdoor patio noise exposure at the property lines of the nearest residential uses (receivers R-1 through R-3) was predicted and the results of those predictions are presented in Table 14.

Table 14
Predicted Outdoor Patio Conversation Noise Levels at Nearest Residential Uses

Receiver[1]	Land Use	Distance from Outdoor Patio (ft)[2]	Predicted Noise Levels (dBA)	
			L_{eq}	L_{max}
R-1	Multi-Family Res.	110	35	42
R-2	Single-Family Res.	220	29	36
R-3	Single-Family Res.	290	27	34
Applicable General Plan Daytime Noise Standards (dB)			**50**	**70**
Applicable General Plan Nighttime Noise Standards (dB)			**40**	**60**

[1] Nearest residential uses are represented as receivers R-1 through R-3 on Figure 1.
[2] Distances scaled from outdoor patio area to residential property lines using provided site plan.
Source: Bollard Acoustical Consultants, Inc. (2022)

The Table 14 data indicate that outdoor patio conversation noise levels are predicted to satisfy the applicable Roseville General Plan daytime and nighttime hourly average (L_{eq}) and maximum (L_{max}) noise level standards at the property lines of the nearest residential uses. The predicted compliance includes consideration of attenuation that would be provided by existing 6' sound walls, as discussed in this report. In addition, the predicted patio conversation noise levels in Table 14 are below the range of measured daytime and nighttime hourly average and maximum noise levels within the vicinity of those nearest residential uses (Table 1). As a result, no further consideration of outdoor patio conversation noise mitigation measures would be warranted for this aspect of the project.

Conclusions & Recommendations

Based on the analysis and results presented in this assessment, noise levels associated with operations at the proposed West Roseville Marketplace are predicted to comply with the applicable Roseville General Plan noise level standards at the property lines of the nearest residential uses. The predicted compliance includes consideration of attenuation that would be provided by existing 6' sound walls, as discussed in this report. It should be noted that to ensure compliance of the General Plan's noise level criteria, all on-site operations associated with delivery trucks (e.g., loading dock activities, truck circulation, etc.) should be limited to daytime hours only (7:00 a.m. to 10:00 p.m.), as proposed.

These conclusions are based on the site plan shown on Figure 2, BAC measurement data and operations assumptions, and equipment manufacturer sound level data. Deviations from the above-mentioned resources could cause actual noise levels to differ from those predicted in this assessment.

This concludes BAC's environmental noise assessment of operations at the West Roseville Marketplace located in Roseville, California. Please contact BAC at (530) 537-2328 or dariog@bacnoise.com with any questions regarding this assessment.

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.

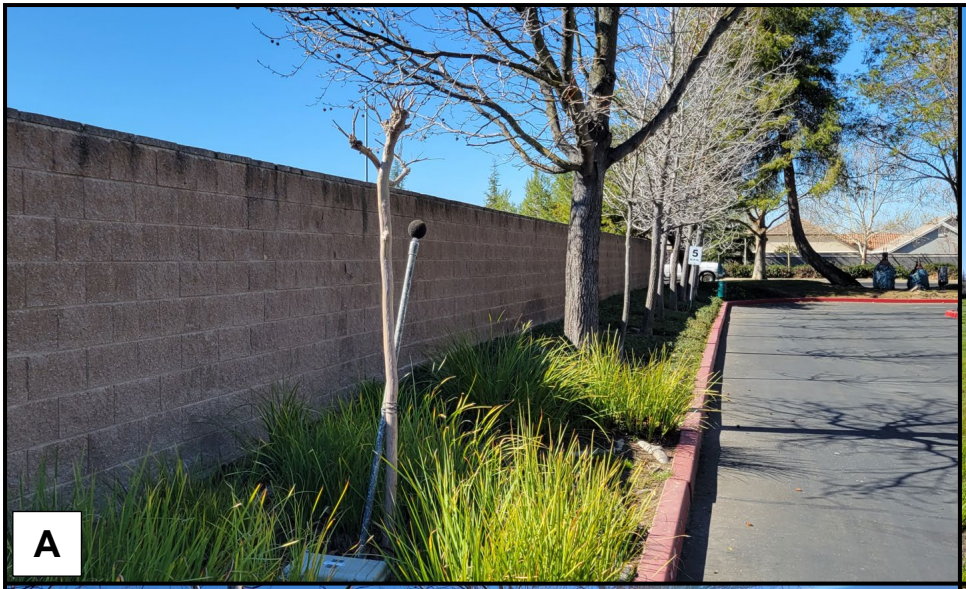
Masking The amount (or the process) by which the threshold of audibility is for one sound is raised by the presence of another (masking) sound.

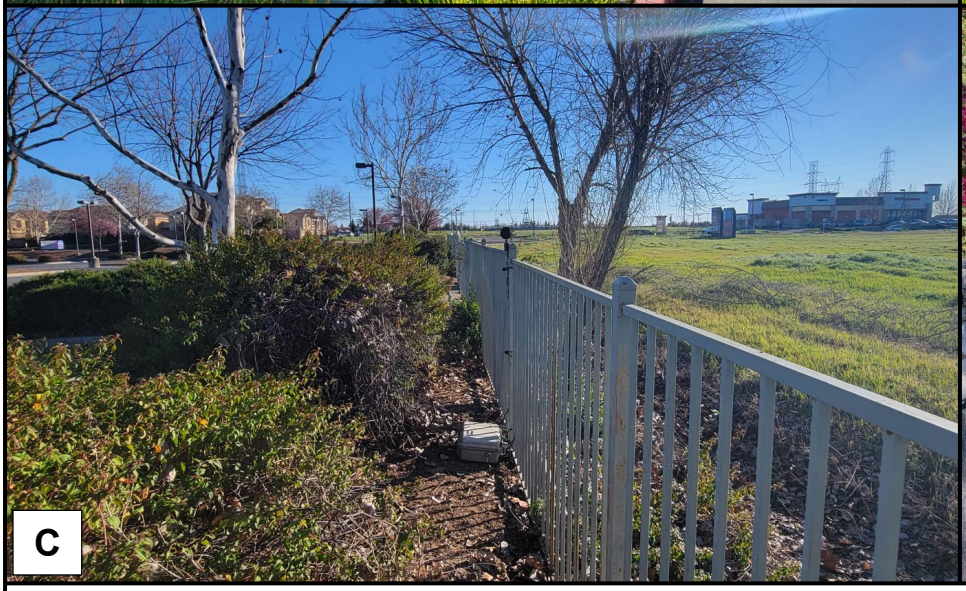
Noise Unwanted sound.

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: LT-1: Facing west along residential property line and sound wall
B: LT-2: Facing west along residential property line
C: LT-3: Facing northeast along sound wall towards Fiddyment Road and project site
D: LT-4: Facing south along property line of church use

Noise monitoring equipment

West Roseville Marketplace
Roseville, California

Noise Survey Photographs

Appendix B

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Appendix C-1
Long-Term Ambient Noise Monitoring Results - Site LT-1
West Roseville Marketplace - Roseville, California
Friday, February 25, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	48	65	45	40
1:00 AM	47	67	43	38
2:00 AM	47	63	42	38
3:00 AM	46	63	41	37
4:00 AM	50	65	46	41
5:00 AM	55	71	52	46
6:00 AM	59	83	55	51
7:00 AM	59	73	56	52
8:00 AM	57	69	54	49
9:00 AM	59	75	55	53
10:00 AM	58	75	55	45
11:00 AM	55	74	51	44
12:00 PM	55	74	51	44
1:00 PM	57	84	51	43
2:00 PM	55	72	51	43
3:00 PM	55	74	52	45
4:00 PM	55	71	52	44
5:00 PM	55	68	52	46
6:00 PM	57	70	55	51
7:00 PM	56	71	55	52
8:00 PM	58	78	56	52
9:00 PM	55	71	53	50
10:00 PM	54	71	52	48
11:00 PM	52	69	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)	59	55	57	59	46	53
Lmax (Maximum)	84	68	73	83	63	68
L50 (Median)	56	51	53	55	41	47
L90 (Background)	53	43	47	51	37	43

Computed DNL, dB	60
% Daytime Energy	80%
% Nighttime Energy	20%

GPS Coordinates	38°46'5.24"N
	121°21'28.40"W

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Appendix C-2
Long-Term Ambient Noise Monitoring Results - Site LT-1
West Roseville Marketplace - Roseville, California
Saturday, February 26, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	52	74	48	44
1:00 AM	49	64	44	39
2:00 AM	49	70	44	38
3:00 AM	48	67	43	38
4:00 AM	48	64	44	38
5:00 AM	50	71	47	41
6:00 AM	54	71	50	46
7:00 AM	54	68	51	46
8:00 AM	54	71	50	44
9:00 AM	54	80	49	44
10:00 AM	54	70	51	45
11:00 AM	54	69	51	44
12:00 PM	54	70	51	44
1:00 PM	55	78	50	44
2:00 PM	54	70	50	43
3:00 PM	55	82	49	42
4:00 PM	57	87	50	44
5:00 PM	54	76	50	44
6:00 PM	54	74	50	45
7:00 PM	53	68	49	44
8:00 PM	52	67	48	44
9:00 PM	53	72	49	44
10:00 PM	52	68	49	44
11:00 PM	51	72	48	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)	57	52	54	54	48	51
Lmax (Maximum)	87	67	73	74	64	69
L50 (Median)	51	48	50	50	43	46
L90 (Background)	46	42	44	46	38	41

Computed DNL, dB	58
% Daytime Energy	79%
% Nighttime Energy	21%

GPS Coordinates	38°46'5.24"N
	121°21'28.40"W

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Appendix C-3
Long-Term Ambient Noise Monitoring Results - Site LT-1
West Roseville Marketplace - Roseville, California
Sunday, February 27, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	51	70	46	41
1:00 AM	51	73	44	37
2:00 AM	51	83	39	35
3:00 AM	45	63	39	34
4:00 AM	46	63	41	35
5:00 AM	50	74	46	40
6:00 AM	51	70	48	44
7:00 AM	53	78	49	45
8:00 AM	52	70	48	42
9:00 AM	52	68	48	41
10:00 AM	52	71	48	40
11:00 AM	54	74	50	43
12:00 PM	53	76	50	42
1:00 PM	57	83	50	45
2:00 PM	53	68	50	44
3:00 PM	55	81	51	45
4:00 PM	53	70	50	44
5:00 PM	53	75	49	42
6:00 PM	54	69	51	46
7:00 PM	55	74	53	49
8:00 PM	55	70	54	49
9:00 PM	55	73	52	48
10:00 PM	55	80	50	43
11:00 PM	50	67	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)	57	52	54	55	45	51
Lmax (Maximum)	83	68	73	83	63	71
L50 (Median)	54	48	50	50	39	44
L90 (Background)	49	40	44	44	34	39

Computed DNL, dB	58
% Daytime Energy	78%
% Nighttime Energy	22%

GPS Coordinates	38°46'5.24"N
	121°21'28.40"W

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Appendix C-4
Long-Term Ambient Noise Monitoring Results - Site LT-1
West Roseville Marketplace - Roseville, California
Monday, February 28, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	49	65	46	39
1:00 AM	47	66	43	36
2:00 AM	45	59	41	35
3:00 AM	49	64	45	37
4:00 AM	51	67	47	42
5:00 AM	54	69	52	48
6:00 AM	57	69	55	51
7:00 AM	59	69	57	53
8:00 AM	56	68	53	47
9:00 AM	55	70	51	45
10:00 AM	55	76	50	43
11:00 AM	56	81	50	44
12:00 PM	54	75	51	44
1:00 PM	55	72	51	44
2:00 PM	56	81	52	45
3:00 PM	55	70	52	45
4:00 PM	56	81	52	45
5:00 PM	55	75	52	47
6:00 PM	56	70	53	49
7:00 PM	56	68	55	51
8:00 PM	58	76	55	51
9:00 PM	55	71	52	48
10:00 PM	52	65	49	45
11:00 PM	51	66	48	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	54	56	57	45	52
Lmax (Maximum)	81	68	73	69	59	66
L50 (Median)	57	50	52	55	41	47
L90 (Background)	53	43	47	51	35	42

Computed DNL, dB	59
% Daytime Energy	80%
% Nighttime Energy	20%

GPS Coordinates	38°46'5.24"N
	121°21'28.40"W

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Appendix C-5
Long-Term Ambient Noise Monitoring Results - Site LT-2
West Roseville Marketplace - Roseville, California
Friday, February 25, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	47	58	45	39
1:00 AM	46	66	43	35
2:00 AM	46	61	42	35
3:00 AM	44	60	41	35
4:00 AM	48	64	46	40
5:00 AM	54	68	53	47
6:00 AM	57	74	56	53
7:00 AM	58	67	57	53
8:00 AM	54	69	54	48
9:00 AM	51	61	48	45
10:00 AM	48	76	45	42
11:00 AM	46	60	45	42
12:00 PM	48	74	45	42
1:00 PM	47	72	44	40
2:00 PM	46	66	44	41
3:00 PM	47	61	45	42
4:00 PM	48	61	46	43
5:00 PM	52	67	51	46
6:00 PM	56	72	55	52
7:00 PM	57	71	56	53
8:00 PM	58	74	57	54
9:00 PM	55	71	54	52
10:00 PM	54	67	53	50
11:00 PM	52	74	51	47

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	58	46	54	57	44	52
Lmax (Maximum)	76	60	68	74	58	66
L50 (Median)	57	44	50	56	41	48
L90 (Background)	54	40	46	53	35	42

Computed DNL, dB	59
% Daytime Energy	70%
% Nighttime Energy	30%

GPS Coordinates	38°46'5.17"N
	121°21'25.70"W

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Appendix C-6
Long-Term Ambient Noise Monitoring Results - Site LT-2
West Roseville Marketplace - Roseville, California
Saturday, February 26, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	50	61	49	45
1:00 AM	47	60	44	38
2:00 AM	47	59	44	37
3:00 AM	47	68	44	37
4:00 AM	48	61	45	37
5:00 AM	50	64	47	41
6:00 AM	52	70	51	47
7:00 AM	50	63	48	45
8:00 AM	50	74	45	43
9:00 AM	49	69	47	44
10:00 AM	49	66	47	44
11:00 AM	49	63	47	44
12:00 PM	48	58	46	42
1:00 PM	47	59	45	42
2:00 PM	46	58	45	42
3:00 PM	47	66	45	42
4:00 PM	52	77	47	44
5:00 PM	49	64	48	44
6:00 PM	51	63	49	46
7:00 PM	51	66	49	45
8:00 PM	50	69	48	45
9:00 PM	50	65	49	45
10:00 PM	51	71	49	45
11:00 PM	51	74	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)	52	46	49	52	47	50
Lmax (Maximum)	77	58	65	74	59	65
L50 (Median)	49	45	47	51	44	47
L90 (Background)	46	42	44	47	37	41

Computed DNL, dB	56
% Daytime Energy	61%
% Nighttime Energy	39%

GPS Coordinates	38°46'5.17"N
	121°21'25.70"W

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Appendix C-7
Long-Term Ambient Noise Monitoring Results - Site LT-2
West Roseville Marketplace - Roseville, California
Sunday, February 27, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	50	67	47	42
1:00 AM	51	74	45	37
2:00 AM	43	69	36	30
3:00 AM	41	56	37	30
4:00 AM	46	59	41	31
5:00 AM	50	69	47	40
6:00 AM	49	59	48	43
7:00 AM	48	65	46	42
8:00 AM	46	66	44	40
9:00 AM	44	57	42	39
10:00 AM	44	64	42	39
11:00 AM	46	66	43	41
12:00 PM	49	77	44	41
1:00 PM	48	67	44	41
2:00 PM	46	58	44	41
3:00 PM	48	68	45	41
4:00 PM	48	64	46	42
5:00 PM	49	63	47	44
6:00 PM	54	73	52	47
7:00 PM	56	70	55	52
8:00 PM	56	72	55	51
9:00 PM	55	74	53	50
10:00 PM	57	81	51	44
11:00 PM	51	64	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)	56	44	51	57	41	51
Lmax (Maximum)	77	57	67	81	56	66
L50 (Median)	55	42	47	51	36	45
L90 (Background)	52	39	43	44	30	38

Computed DNL, dB	57
% Daytime Energy	65%
% Nighttime Energy	35%

GPS Coordinates	38°46'5.17"N
	121°21'25.70"W

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Appendix C-8
Long-Term Ambient Noise Monitoring Results - Site LT-2
West Roseville Marketplace - Roseville, California
Monday, February 28, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	50	62	48	39
1:00 AM	47	64	44	36
2:00 AM	45	59	42	32
3:00 AM	49	63	46	36
4:00 AM	51	70	49	44
5:00 AM	54	63	54	51
6:00 AM	57	77	56	53
7:00 AM	58	64	57	53
8:00 AM	49	57	49	45
9:00 AM	49	71	47	43
10:00 AM	47	64	45	42
11:00 AM	51	73	46	43
12:00 PM	48	61	46	42
1:00 PM	47	66	45	42
2:00 PM	50	75	46	42
3:00 PM	50	69	48	44
4:00 PM	51	73	49	45
5:00 PM	54	75	51	48
6:00 PM	56	71	55	51
7:00 PM	58	76	57	53
8:00 PM	57	78	56	53
9:00 PM	55	74	54	51
10:00 PM	52	63	51	47
11:00 PM	51	63	49	45

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	58	47	54	57	45	52
Lmax (Maximum)	78	57	70	77	59	65
L50 (Median)	57	45	50	56	42	49
L90 (Background)	53	42	46	53	32	43

Computed DNL, dB	59
% Daytime Energy	70%
% Nighttime Energy	30%

GPS Coordinates	38°46'5.17"N
	121°21'25.70"W

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Appendix C-9
Long-Term Ambient Noise Monitoring Results - Site LT-3
West Roseville Marketplace - Roseville, California
Friday, February 25, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	62	75	54	45
1:00 AM	61	80	52	41
2:00 AM	60	76	50	40
3:00 AM	61	84	48	36
4:00 AM	64	85	57	47
5:00 AM	67	86	62	56
6:00 AM	69	82	66	59
7:00 AM	70	84	68	60
8:00 AM	69	83	66	57
9:00 AM	68	81	65	55
10:00 AM	68	85	65	53
11:00 AM	67	85	64	52
12:00 PM	67	85	63	50
1:00 PM	69	96	64	52
2:00 PM	69	90	65	52
3:00 PM	68	87	65	55
4:00 PM	68	82	65	54
5:00 PM	68	84	65	56
6:00 PM	67	82	65	58
7:00 PM	66	82	64	58
8:00 PM	67	86	64	59
9:00 PM	66	87	63	57
10:00 PM	65	77	62	56
11:00 PM	64	79	60	54

	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	66	68	69	60	64
Lmax (Maximum)	96	81	85	86	75	80
L50 (Median)	68	63	65	66	48	57
L90 (Background)	60	50	55	59	36	48

Computed DNL, dB	72
% Daytime Energy	78%
% Nighttime Energy	22%

GPS Coordinates	38°46'2.70"N
	121°21'32.12"W

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Appendix C-10
Long-Term Ambient Noise Monitoring Results - Site LT-3
West Roseville Marketplace - Roseville, California
Saturday, February 26, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	63	82	58	51
1:00 AM	62	87	53	43
2:00 AM	62	83	53	42
3:00 AM	61	78	52	41
4:00 AM	61	79	53	41
5:00 AM	62	79	57	48
6:00 AM	65	78	60	54
7:00 AM	67	87	62	52
8:00 AM	67	83	63	52
9:00 AM	68	89	63	52
10:00 AM	67	84	63	53
11:00 AM	66	86	63	50
12:00 PM	66	81	63	51
1:00 PM	66	80	63	52
2:00 PM	66	83	63	52
3:00 PM	67	89	64	53
4:00 PM	67	88	64	53
5:00 PM	66	81	64	55
6:00 PM	66	82	62	55
7:00 PM	65	84	62	54
8:00 PM	65	83	61	53
9:00 PM	65	82	61	54
10:00 PM	64	78	61	54
11:00 PM	63	79	59	51

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	68	65	66	65	61	63
Lmax (Maximum)	89	80	84	87	78	80
L50 (Median)	64	61	63	61	52	56
L90 (Background)	55	50	53	54	41	47

Computed DNL, dB	70
% Daytime Energy	79%
% Nighttime Energy	21%

GPS Coordinates	38°46'2.70"N
	121°21'32.12"W

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Appendix C-11
Long-Term Ambient Noise Monitoring Results - Site LT-3
West Roseville Marketplace - Roseville, California
Sunday, February 27, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	64	94	56	47
1:00 AM	64	89	55	42
2:00 AM	62	89	48	35
3:00 AM	60	76	49	35
4:00 AM	60	79	51	37
5:00 AM	61	81	55	45
6:00 AM	63	78	58	51
7:00 AM	65	87	59	50
8:00 AM	65	82	59	49
9:00 AM	66	81	62	50
10:00 AM	66	82	62	49
11:00 AM	66	86	62	49
12:00 PM	65	83	62	48
1:00 PM	72	99	62	49
2:00 PM	66	80	62	50
3:00 PM	66	87	62	50
4:00 PM	66	82	63	51
5:00 PM	65	81	63	52
6:00 PM	66	84	63	56
7:00 PM	65	78	63	57
8:00 PM	65	79	62	57
9:00 PM	65	79	61	55
10:00 PM	64	80	59	50
11:00 PM	62	83	57	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)	72	65	66	64	60	62
Lmax (Maximum)	99	78	83	94	76	83
L50 (Median)	63	59	62	59	48	54
L90 (Background)	57	48	51	51	35	44

Computed DNL, dB	70
% Daytime Energy	80%
% Nighttime Energy	20%

GPS Coordinates	38°46'2.70"N
	121°21'32.12"W

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Appendix C-12
Long-Term Ambient Noise Monitoring Results - Site LT-3
West Roseville Marketplace - Roseville, California
Monday, February 28, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	62	79	56	46
1:00 AM	59	78	50	40
2:00 AM	59	80	49	37
3:00 AM	62	80	53	42
4:00 AM	64	83	57	50
5:00 AM	66	81	62	56
6:00 AM	69	81	66	60
7:00 AM	70	86	68	61
8:00 AM	70	86	67	58
9:00 AM	69	86	65	55
10:00 AM	68	90	64	53
11:00 AM	69	95	64	53
12:00 PM	67	82	63	52
1:00 PM	70	100	64	52
2:00 PM	68	86	65	52
3:00 PM	69	82	65	53
4:00 PM	68	86	66	55
5:00 PM	68	87	65	57
6:00 PM	67	82	64	57
7:00 PM	66	83	63	58
8:00 PM	65	82	62	57
9:00 PM	66	82	62	56
10:00 PM	63	83	59	53
11:00 PM	63	79	58	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)	70	65	68	69	59	64
Lmax (Maximum)	100	82	86	83	78	80
L50 (Median)	68	62	64	66	49	57
L90 (Background)	61	52	55	60	37	48

Computed DNL, dB	71
% Daytime Energy	81%
% Nighttime Energy	19%

GPS Coordinates	38°46'2.70"N
	121°21'32.12"W

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Appendix C-13
Long-Term Ambient Noise Monitoring Results - Site LT-4
West Roseville Marketplace - Roseville, California
Friday, February 25, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	45	65	42	38
1:00 AM	44	63	40	36
2:00 AM	46	62	42	37
3:00 AM	45	62	42	36
4:00 AM	48	67	45	40
5:00 AM	51	60	50	45
6:00 AM	56	69	55	52
7:00 AM	58	66	57	53
8:00 AM	67	85	60	51
9:00 AM	53	67	51	47
10:00 AM	51	63	50	46
11:00 AM	50	65	49	44
12:00 PM	51	64	50	46
1:00 PM	51	72	49	45
2:00 PM	50	67	49	45
3:00 PM	52	65	51	47
4:00 PM	53	67	52	48
5:00 PM	54	69	54	49
6:00 PM	55	71	54	51
7:00 PM	56	68	55	52
8:00 PM	55	71	55	51
9:00 PM	53	62	52	49
10:00 PM	51	63	51	47
11:00 PM	49	69	48	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)	67	50	58	56	44	50
Lmax (Maximum)	85	62	68	69	60	64
L50 (Median)	60	49	52	55	40	46
L90 (Background)	53	44	48	52	36	41

Computed DNL, dB	59
% Daytime Energy	90%
% Nighttime Energy	10%

GPS Coordinates	38°46'1.57"N
	121°21'22.43"W

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Appendix C-14
Long-Term Ambient Noise Monitoring Results - Site LT-4
West Roseville Marketplace - Roseville, California
Saturday, February 26, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	47	57	46	41
1:00 AM	44	56	42	38
2:00 AM	44	64	40	36
3:00 AM	43	58	40	35
4:00 AM	44	60	42	36
5:00 AM	47	59	44	39
6:00 AM	52	69	51	47
7:00 AM	52	65	51	48
8:00 AM	52	81	50	46
9:00 AM	51	70	50	45
10:00 AM	52	68	51	47
11:00 AM	53	72	52	48
12:00 PM	52	67	51	47
1:00 PM	52	70	50	46
2:00 PM	51	63	50	47
3:00 PM	52	68	51	46
4:00 PM	56	77	53	49
5:00 PM	53	64	52	47
6:00 PM	53	66	53	49
7:00 PM	53	66	52	49
8:00 PM	53	67	52	48
9:00 PM	51	65	50	45
10:00 PM	51	77	48	44
11:00 PM	48	65	47	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)	56	51	53	52	43	48
Lmax (Maximum)	81	63	69	77	56	63
L50 (Median)	53	50	51	51	40	44
L90 (Background)	49	45	47	47	35	40

Computed DNL, dB	55
% Daytime Energy	84%
% Nighttime Energy	16%

GPS Coordinates	38°46'1.57"N
	121°21'22.43"W

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Appendix C-15
Long-Term Ambient Noise Monitoring Results - Site LT-4
West Roseville Marketplace - Roseville, California
Sunday, February 27, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	50	64	47	42
1:00 AM	50	73	45	39
2:00 AM	43	64	39	34
3:00 AM	41	54	39	34
4:00 AM	44	57	41	35
5:00 AM	49	65	47	40
6:00 AM	50	59	49	45
7:00 AM	50	64	49	46
8:00 AM	51	70	49	45
9:00 AM	49	63	48	44
10:00 AM	49	73	47	43
11:00 AM	50	65	49	46
12:00 PM	51	69	49	46
1:00 PM	56	83	50	47
2:00 PM	51	67	50	45
3:00 PM	52	69	50	46
4:00 PM	53	67	52	48
5:00 PM	54	69	53	49
6:00 PM	54	73	53	49
7:00 PM	55	69	54	51
8:00 PM	55	76	53	50
9:00 PM	54	73	52	48
10:00 PM	54	73	50	45
11:00 PM	48	58	47	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)	56	49	53	54	41	49
Lmax (Maximum)	83	63	70	73	54	63
L50 (Median)	54	47	50	50	39	45
L90 (Background)	51	43	47	45	34	40

Computed DNL, dB	56
% Daytime Energy	80%
% Nighttime Energy	20%

GPS Coordinates	38°46'1.57"N
	121°21'22.43"W

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Appendix C-16
Long-Term Ambient Noise Monitoring Results - Site LT-4
West Roseville Marketplace - Roseville, California
Monday, February 28, 2022

Hour	Leq	Lmax	L50	L90
12:00 AM	47	61	45	38
1:00 AM	44	55	41	37
2:00 AM	43	58	40	35
3:00 AM	48	66	45	37
4:00 AM	51	71	49	43
5:00 AM	52	59	52	49
6:00 AM	55	64	54	51
7:00 AM	57	64	56	53
8:00 AM	53	61	53	49
9:00 AM	53	72	51	46
10:00 AM	53	76	50	46
11:00 AM	52	75	50	45
12:00 PM	52	69	50	46
1:00 PM	51	66	50	46
2:00 PM	54	75	51	47
3:00 PM	53	67	52	49
4:00 PM	55	71	54	50
5:00 PM	60	87	54	50
6:00 PM	55	67	55	51
7:00 PM	56	70	56	53
8:00 PM	55	68	54	51
9:00 PM	53	70	52	48
10:00 PM	50	57	49	45
11:00 PM	48	64	47	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)	60	51	55	55	43	50
Lmax (Maximum)	87	61	71	71	55	62
L50 (Median)	56	50	52	54	40	47
L90 (Background)	53	45	49	51	35	42

Computed DNL, dB	58
% Daytime Energy	83%
% Nighttime Energy	17%

GPS Coordinates	38°46'1.57"N
	121°21'22.43"W

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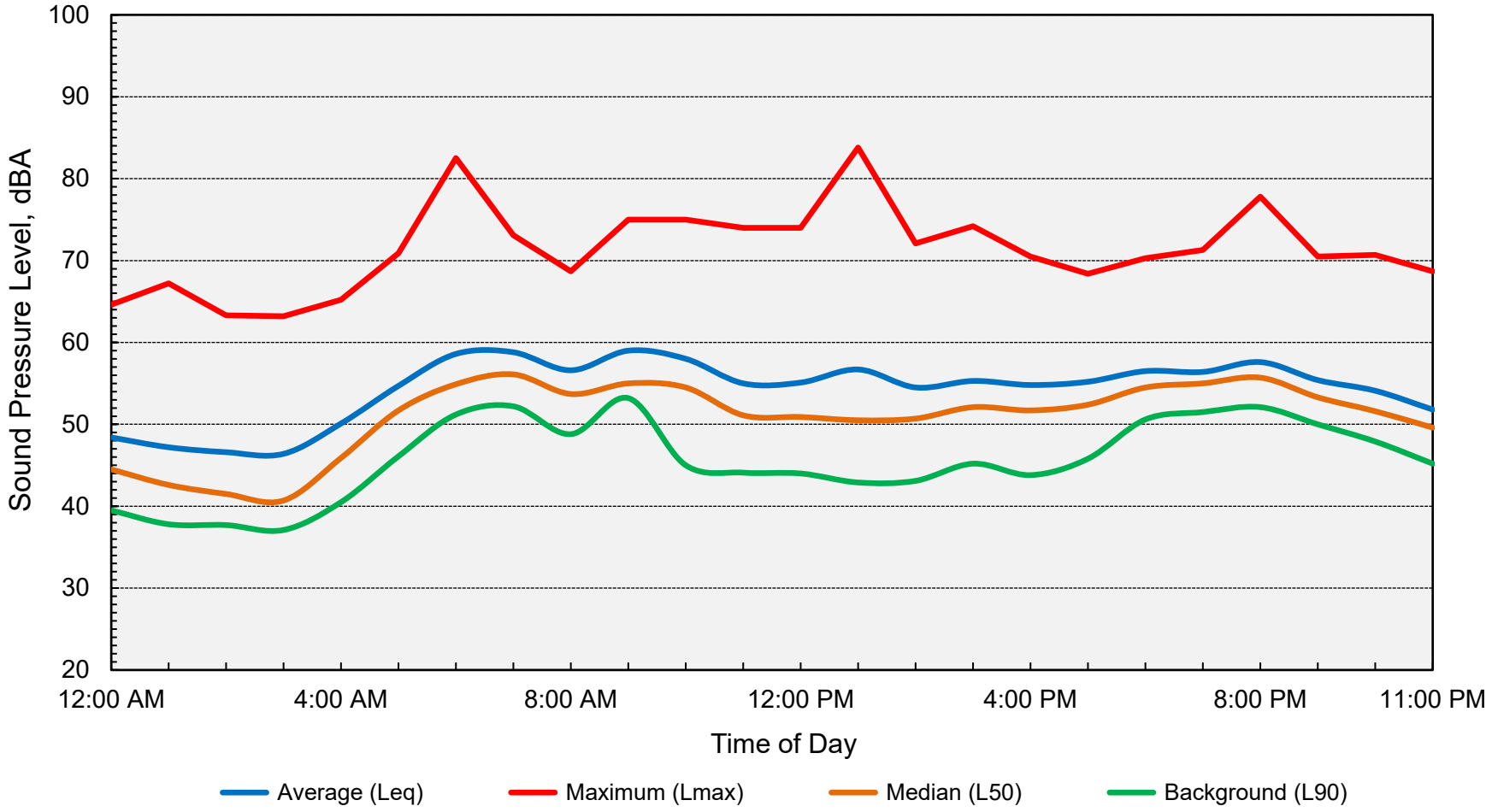
Appendix D-1
Long-Term Ambient Noise Monitoring Results - Site LT-1
West Roseville Marketplace - Roseville, California
Friday, February 25, 2022



Computed DNL = 60 dB

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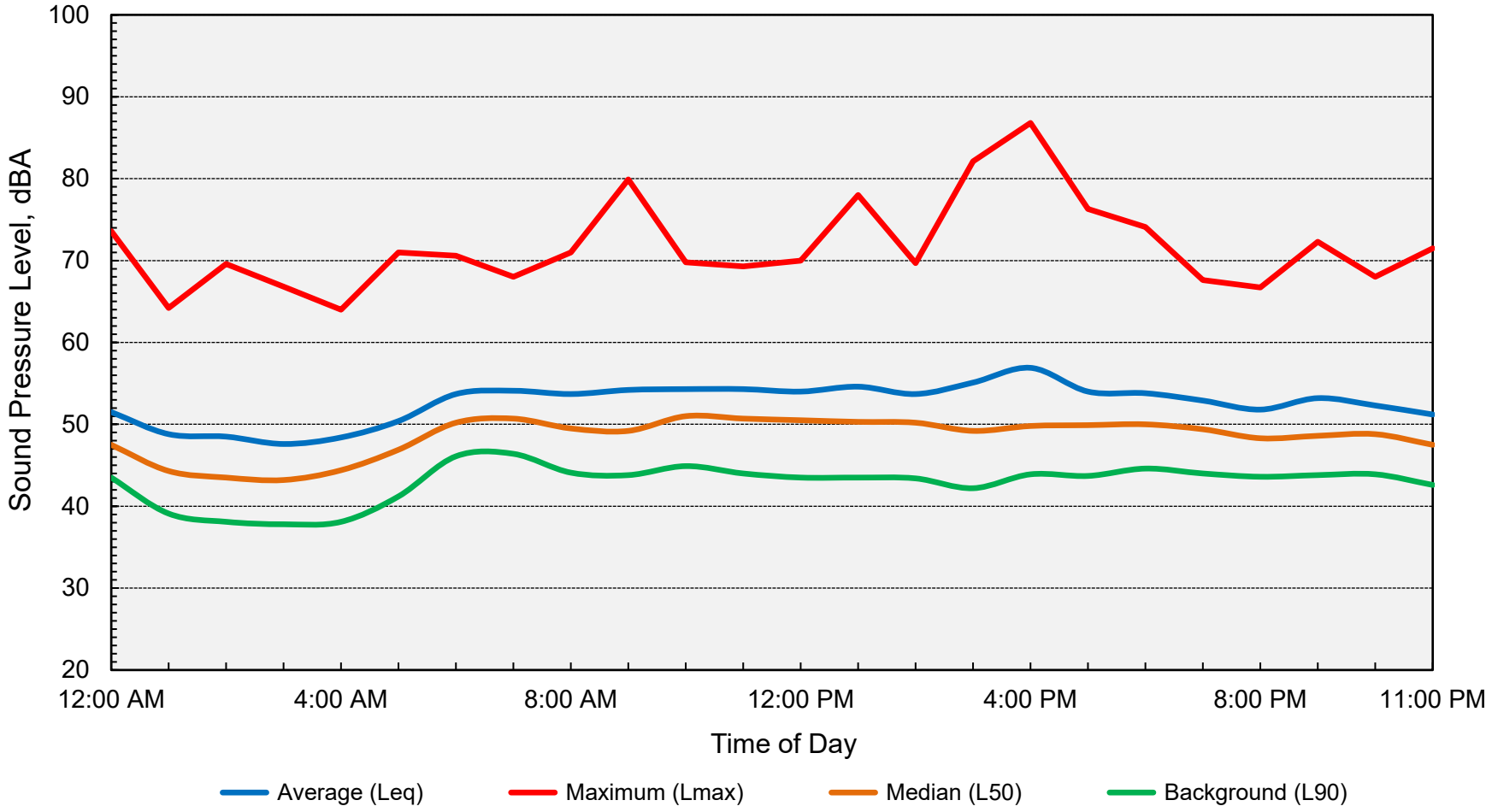
Appendix D-2
Long-Term Ambient Noise Monitoring Results - Site LT-1
West Roseville Marketplace - Roseville, California
Saturday, February 26, 2022



Computed DNL = 58 dB

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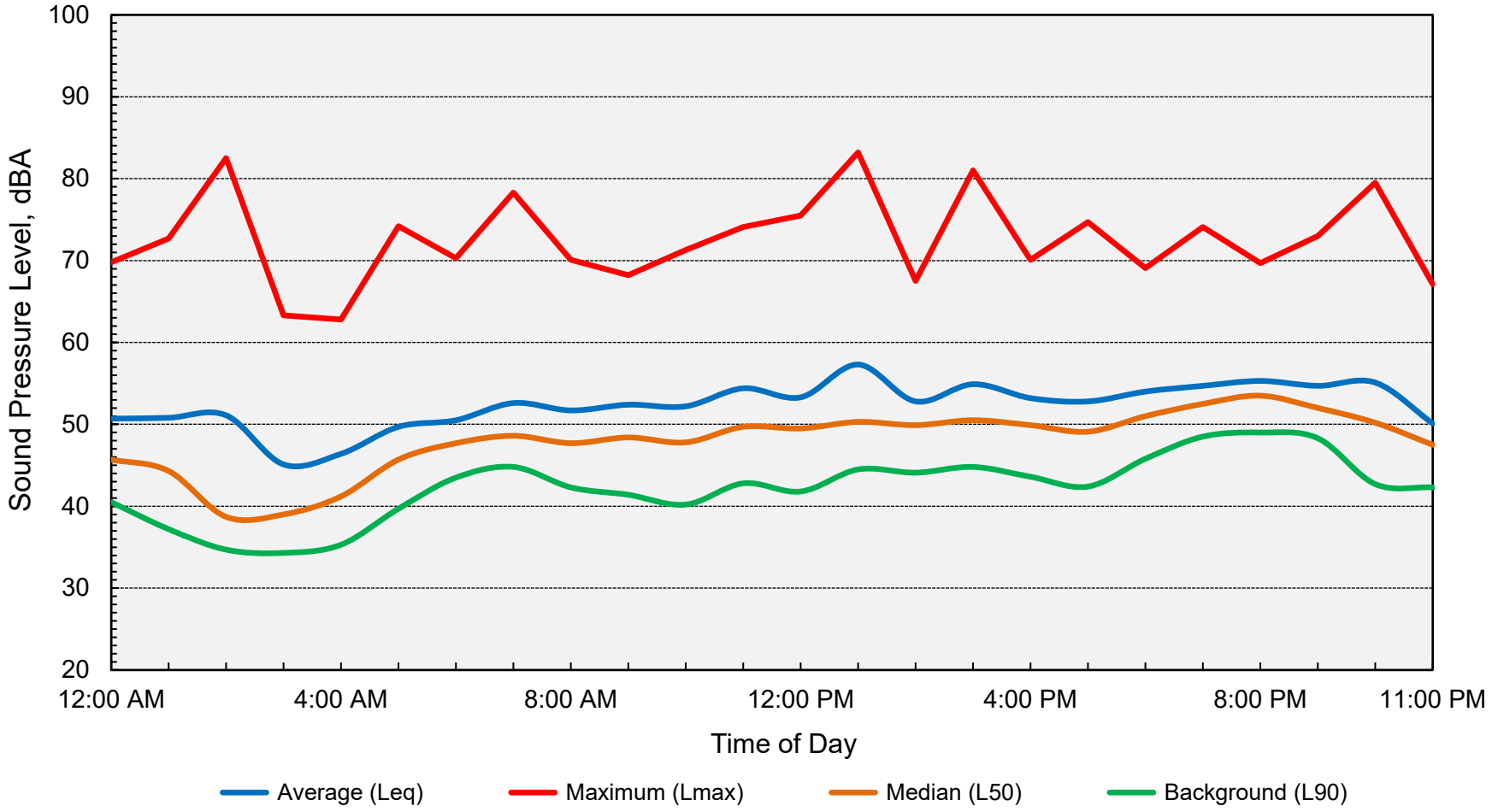
Appendix D-3
Long-Term Ambient Noise Monitoring Results - Site LT-1
West Roseville Marketplace - Roseville, California
Sunday, February 27, 2022



Computed DNL = 58 dB

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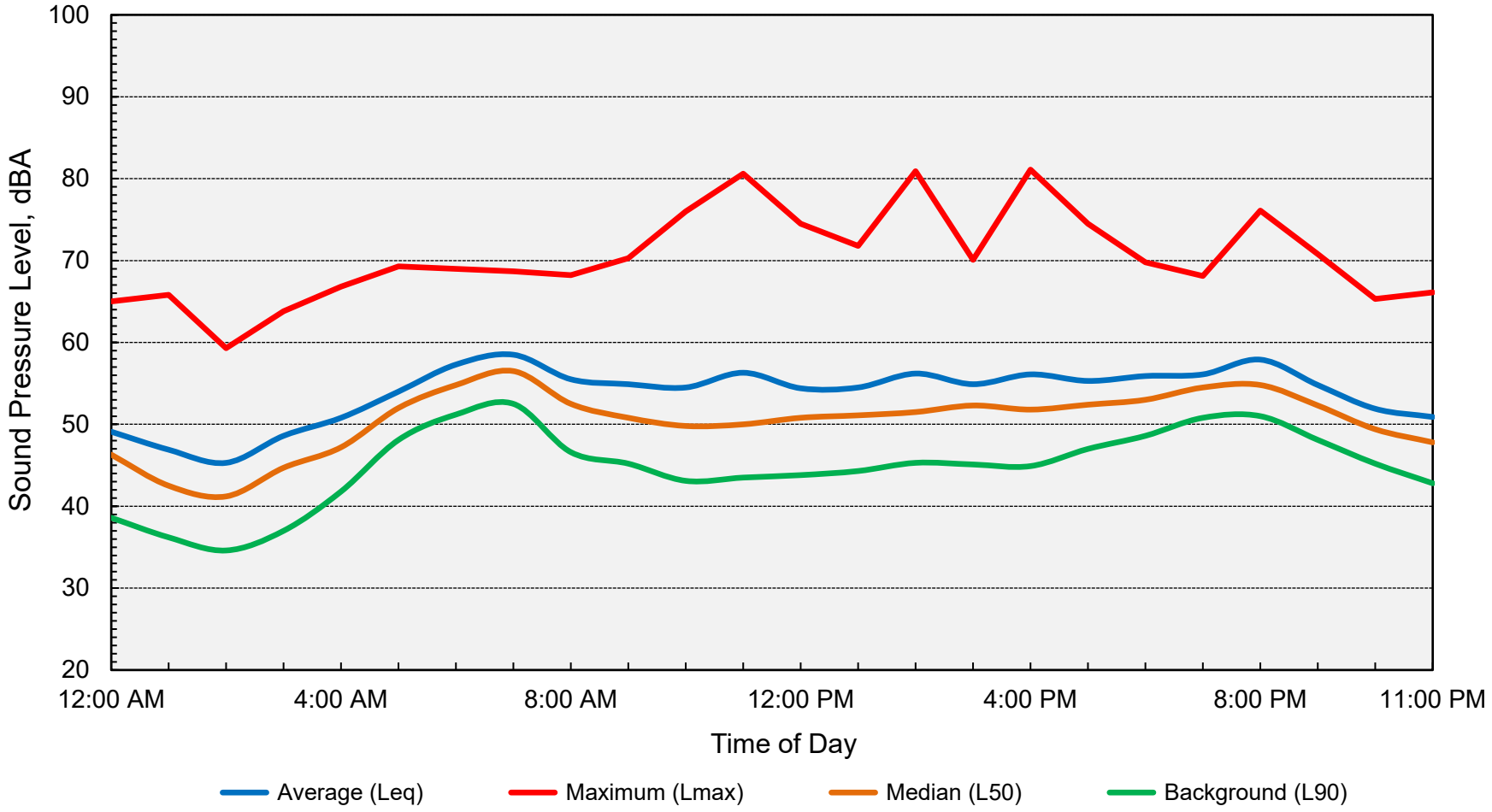
Appendix D-4
Long-Term Ambient Noise Monitoring Results - Site LT-1
West Roseville Marketplace - Roseville, California
Monday, February 28, 2022



Computed DNL = 59 dB

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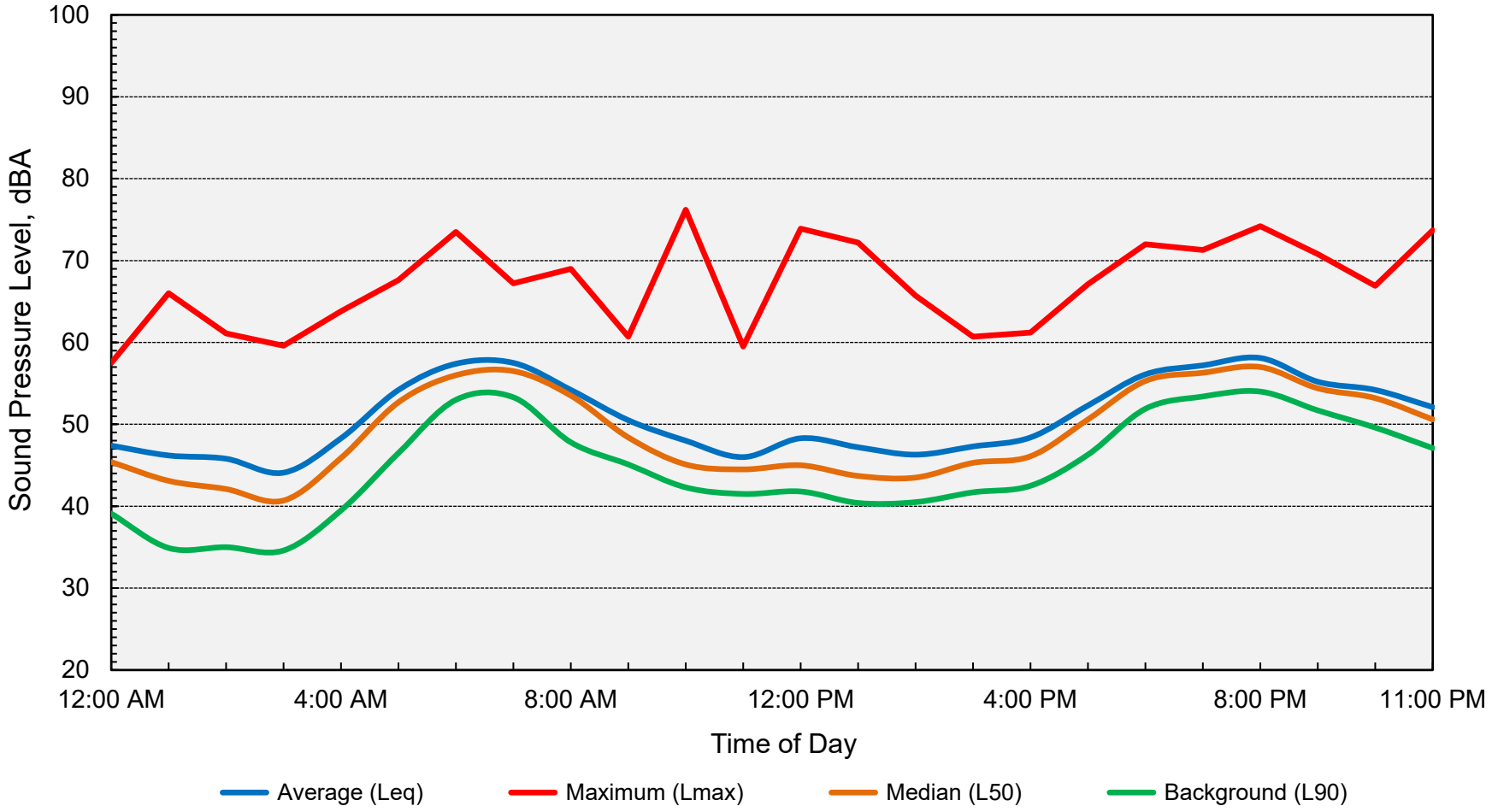
Appendix D-5
Long-Term Ambient Noise Monitoring Results - Site LT-2
West Roseville Marketplace - Roseville, California
Friday, February 25, 2022



Computed DNL = 59 dB

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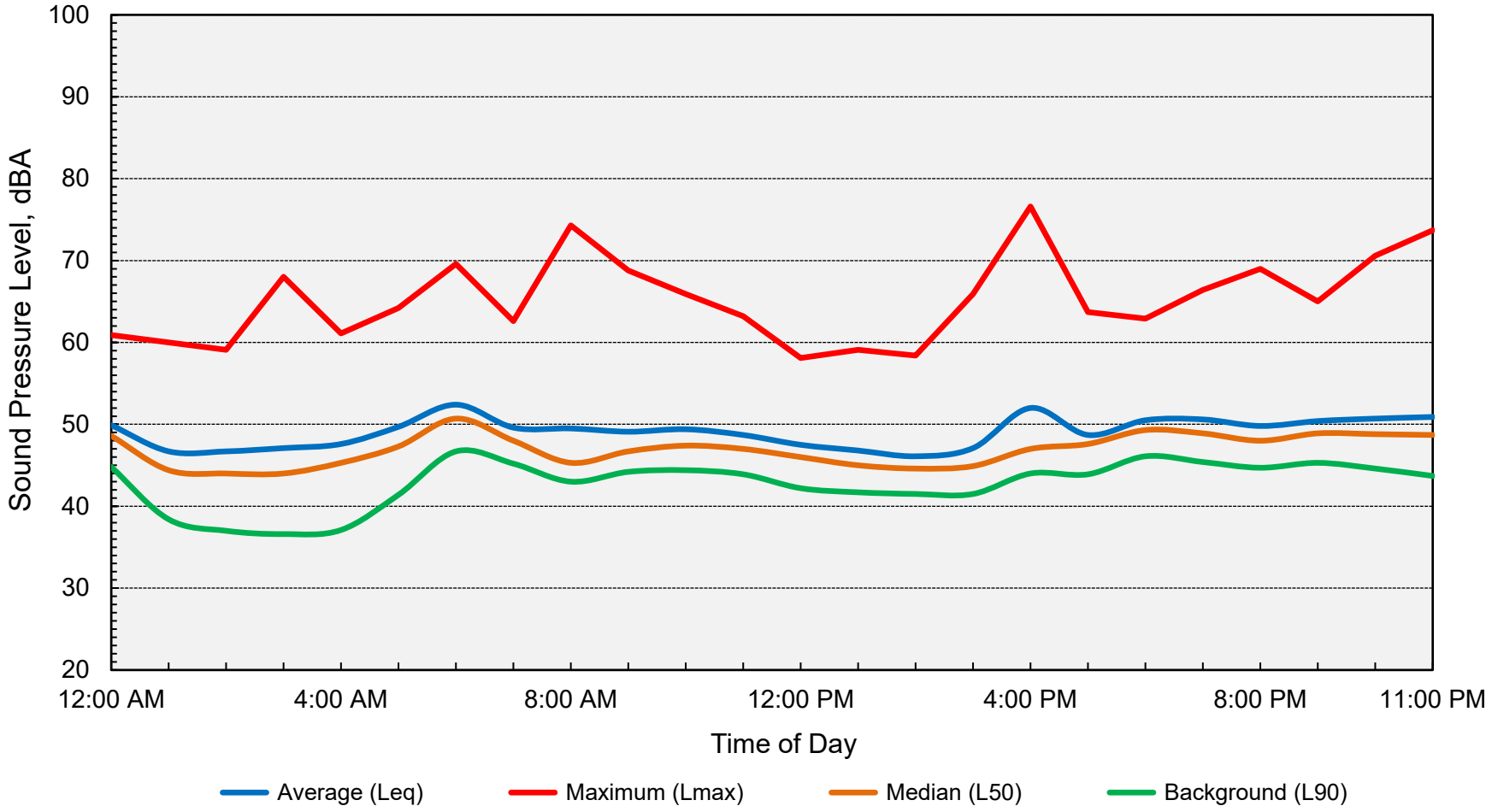
Appendix D-6
Long-Term Ambient Noise Monitoring Results - Site LT-2
West Roseville Marketplace - Roseville, California
Saturday, February 26, 2022



Computed DNL = 56 dB

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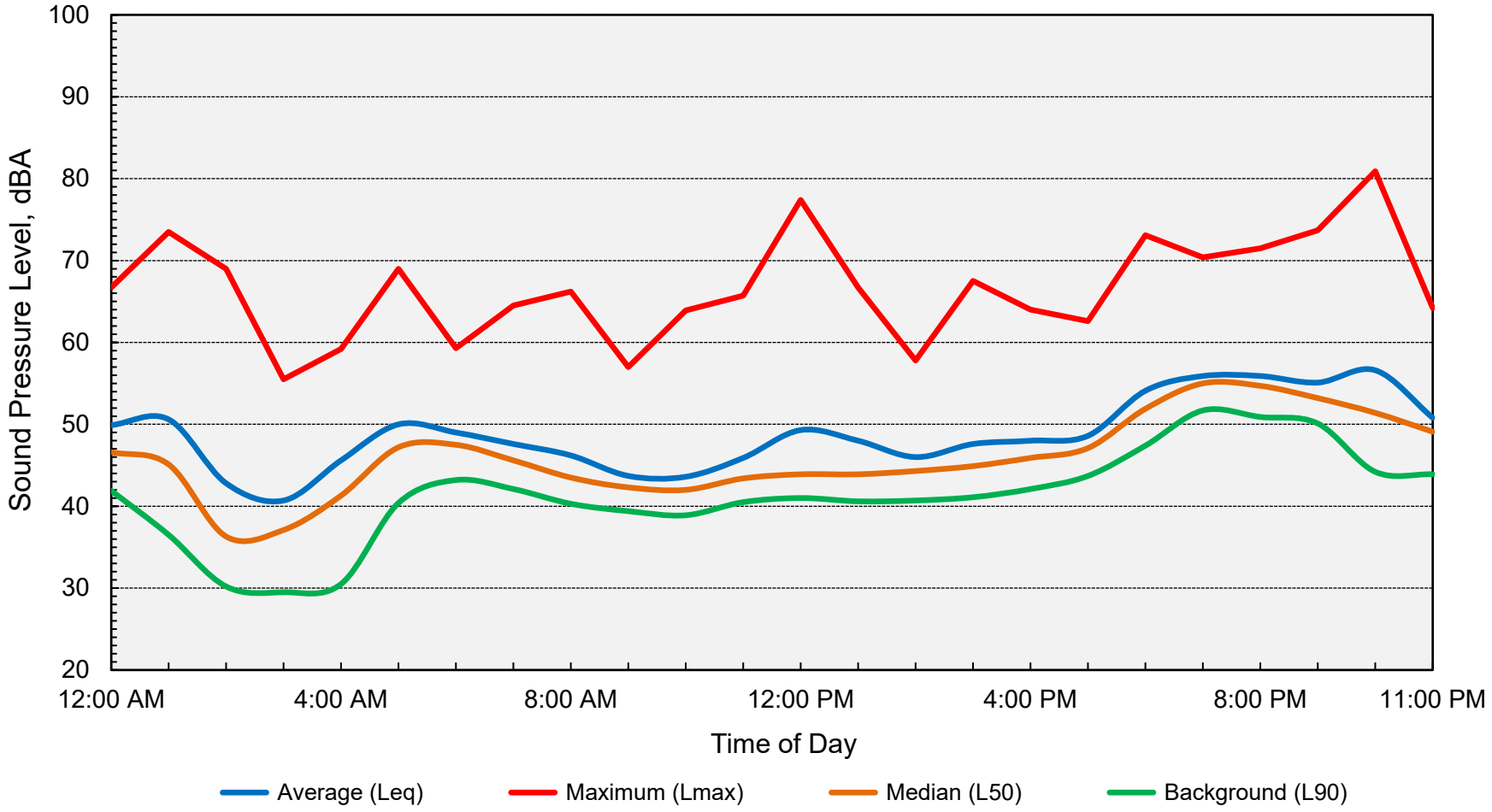
Appendix D-7
Long-Term Ambient Noise Monitoring Results - Site LT-2
West Roseville Marketplace - Roseville, California
Sunday, February 27, 2022



Computed DNL = 57 dB

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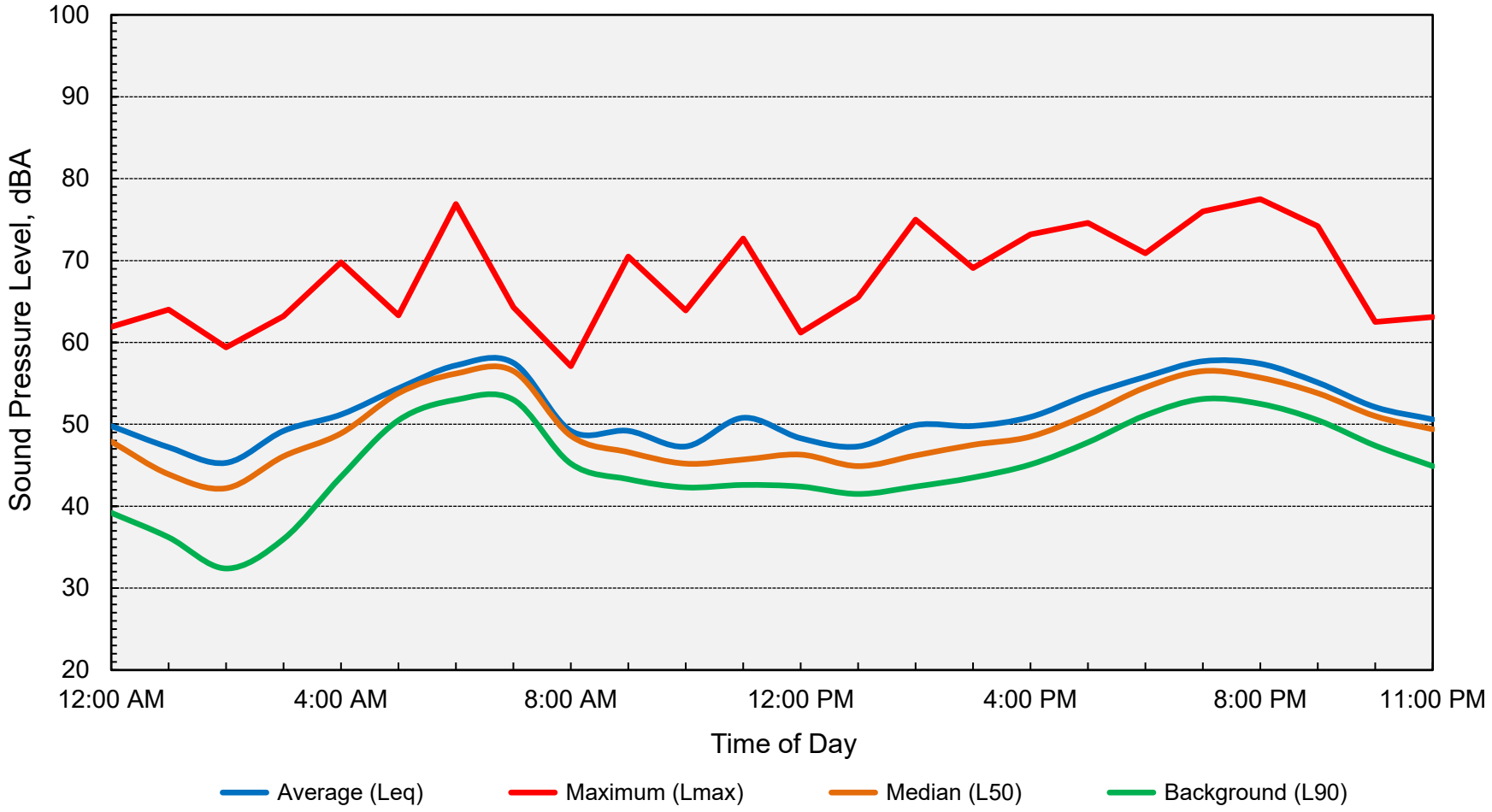
Appendix D-8
Long-Term Ambient Noise Monitoring Results - Site LT-2
West Roseville Marketplace - Roseville, California
Monday, February 28, 2022



Computed DNL = 59 dB

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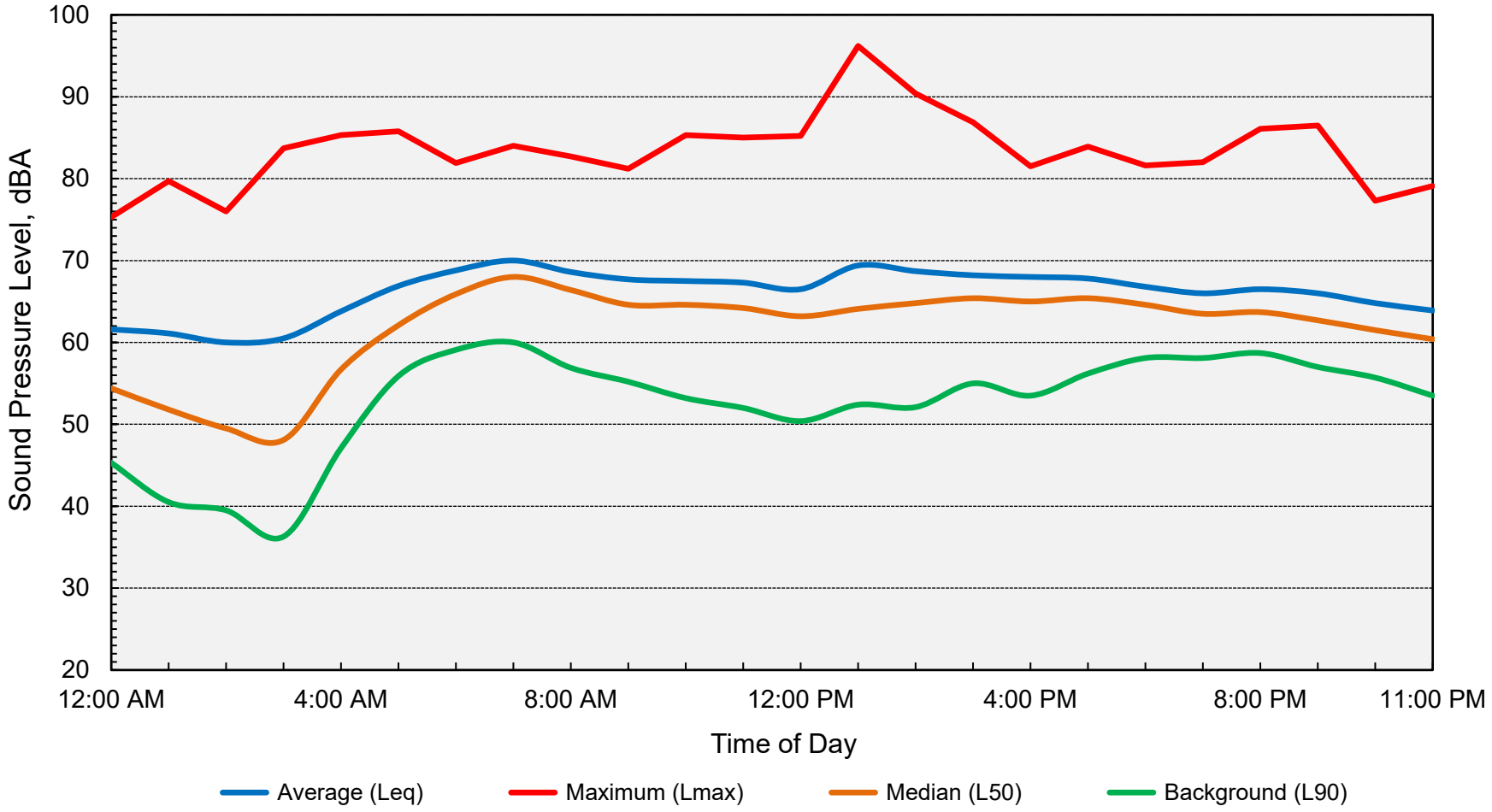
Appendix D-9
Long-Term Ambient Noise Monitoring Results - Site LT-3
West Roseville Marketplace - Roseville, California
Friday, February 25, 2022



Computed DNL = 72 dB

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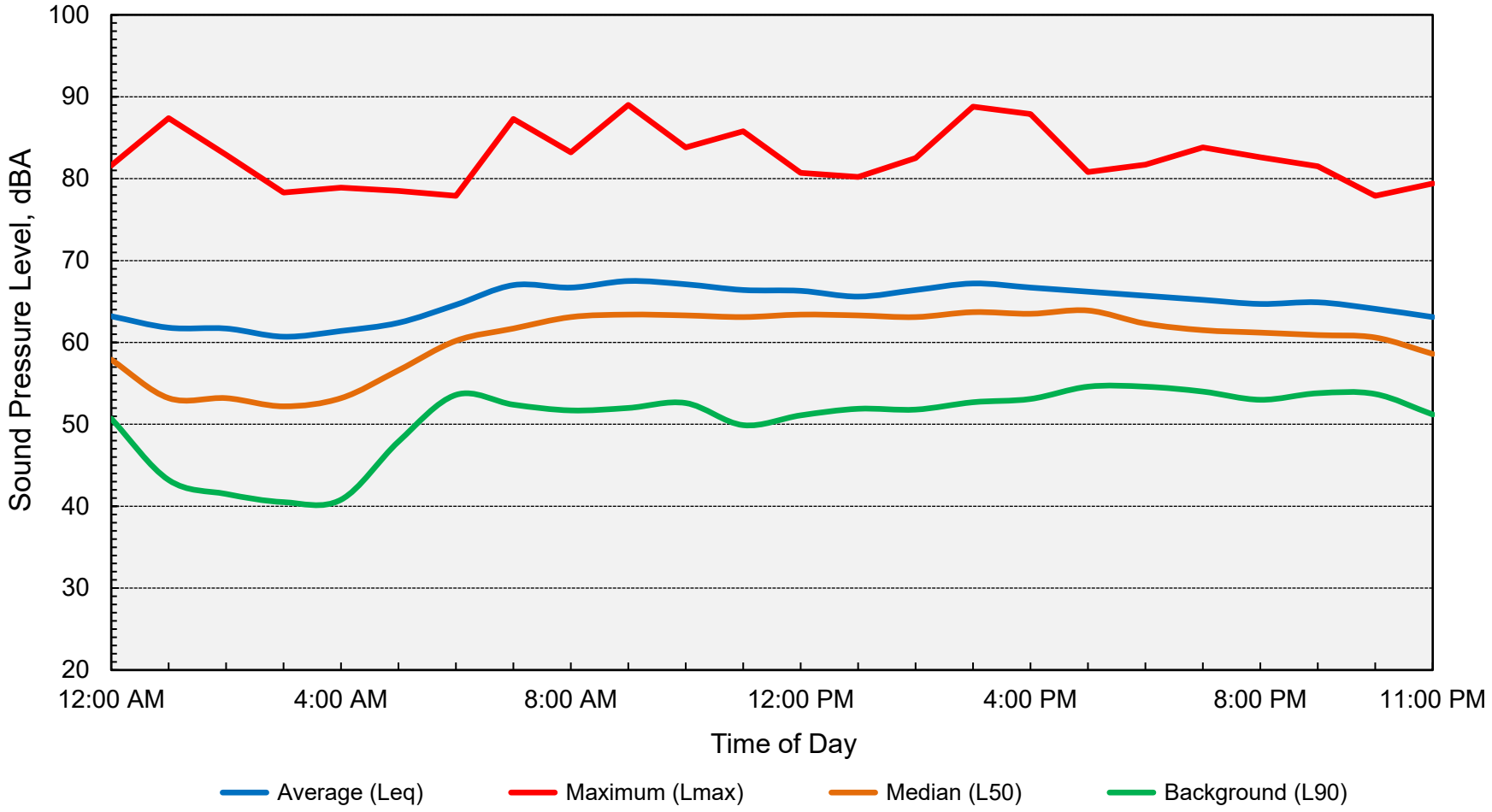
Appendix D-10
Long-Term Ambient Noise Monitoring Results - Site LT-3
West Roseville Marketplace - Roseville, California
Saturday, February 26, 2022



Computed DNL = 70 dB

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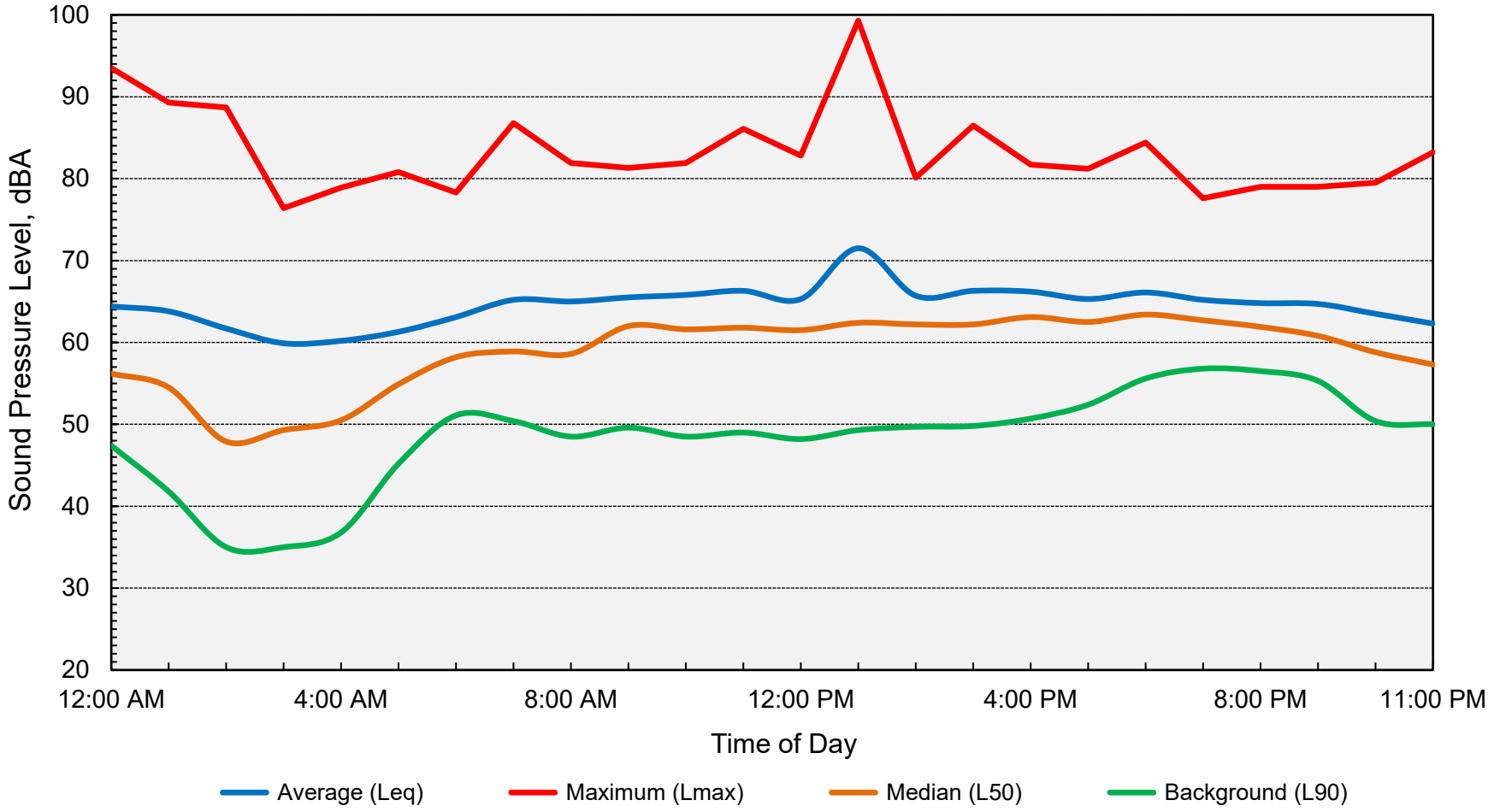
Appendix D-11
Long-Term Ambient Noise Monitoring Results - Site LT-3
West Roseville Marketplace - Roseville, California
Sunday, February 27, 2022



Computed DNL = 70 dB

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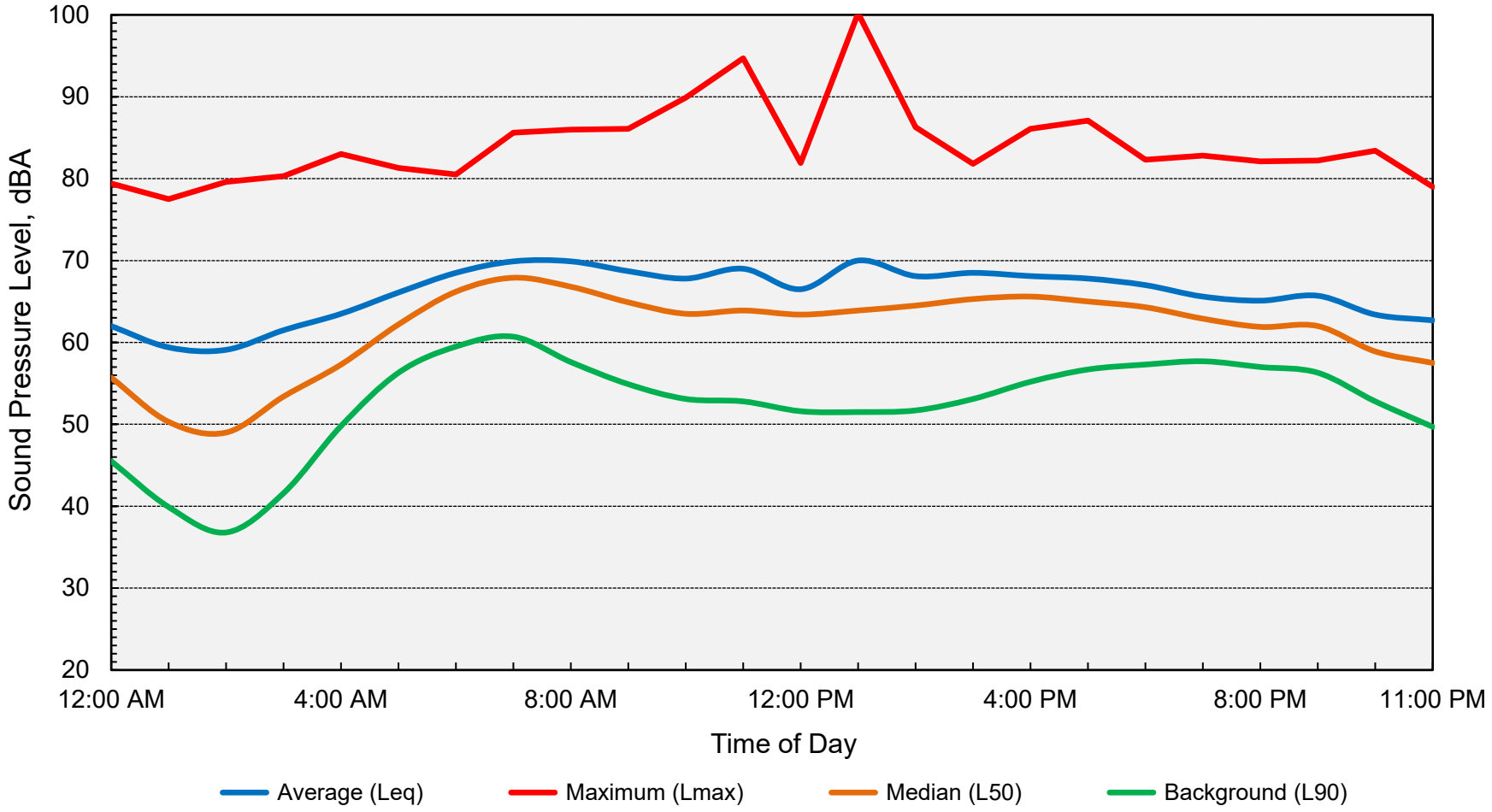
Appendix D-12
Long-Term Ambient Noise Monitoring Results - Site LT-3
West Roseville Marketplace - Roseville, California
Monday, February 28, 2022



Computed DNL = 71 dB

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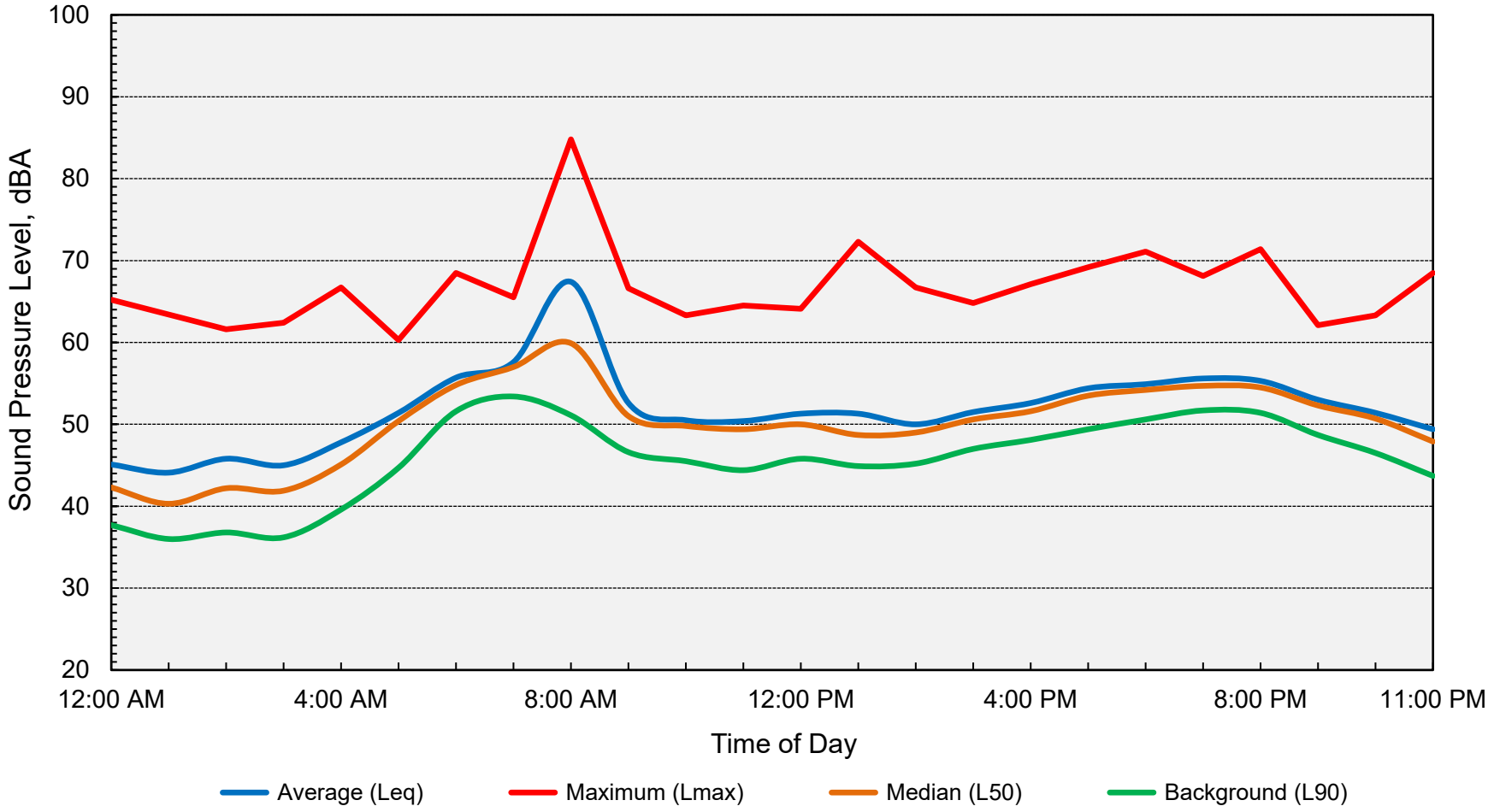
Appendix D-13
Long-Term Ambient Noise Monitoring Results - Site LT-4
West Roseville Marketplace - Roseville, California
Friday, February 25, 2022



Computed DNL = 59 dB

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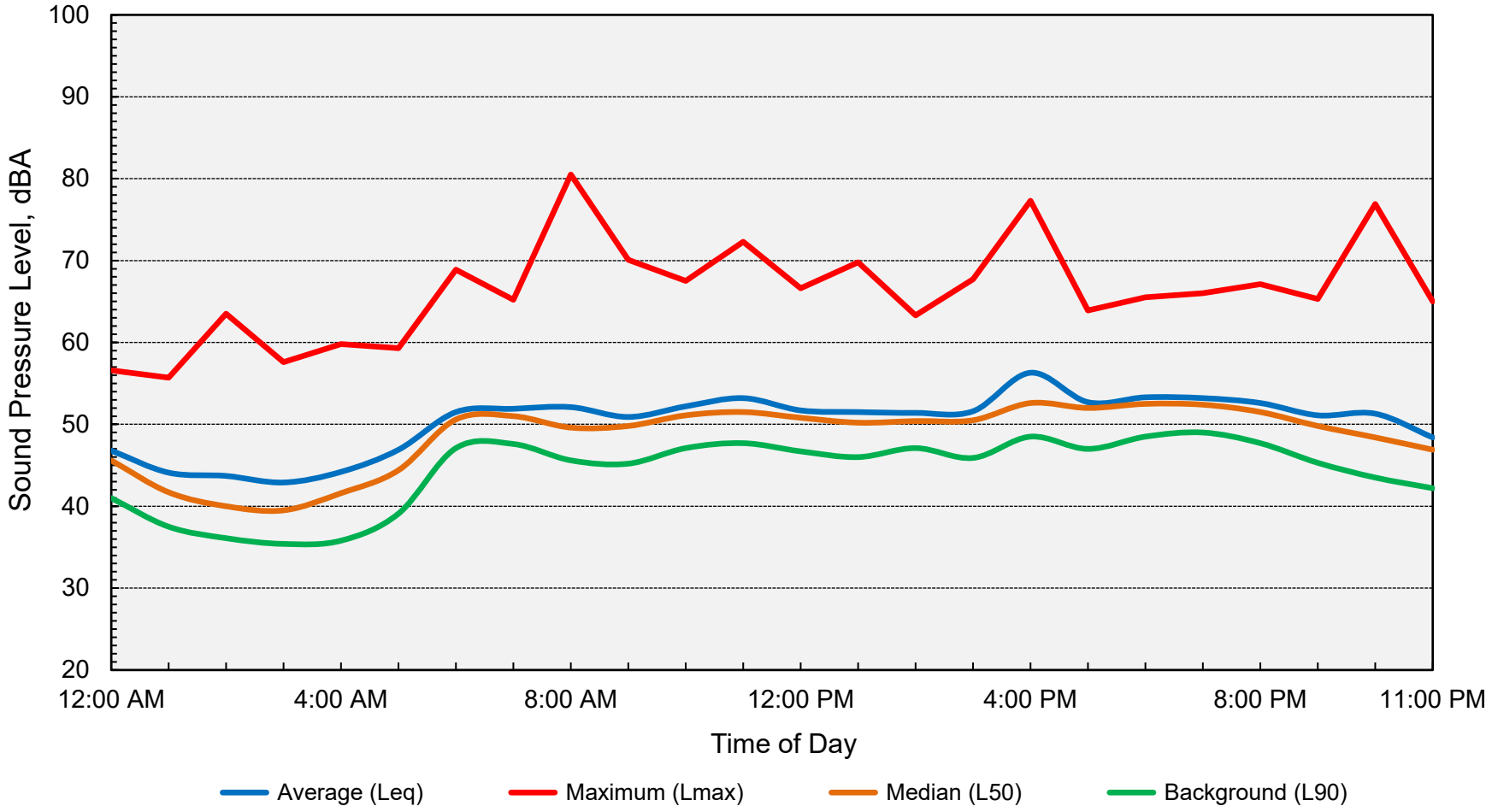
Appendix D-14
Long-Term Ambient Noise Monitoring Results - Site LT-4
West Roseville Marketplace - Roseville, California
Saturday, February 26, 2022



Computed DNL = 55 dB

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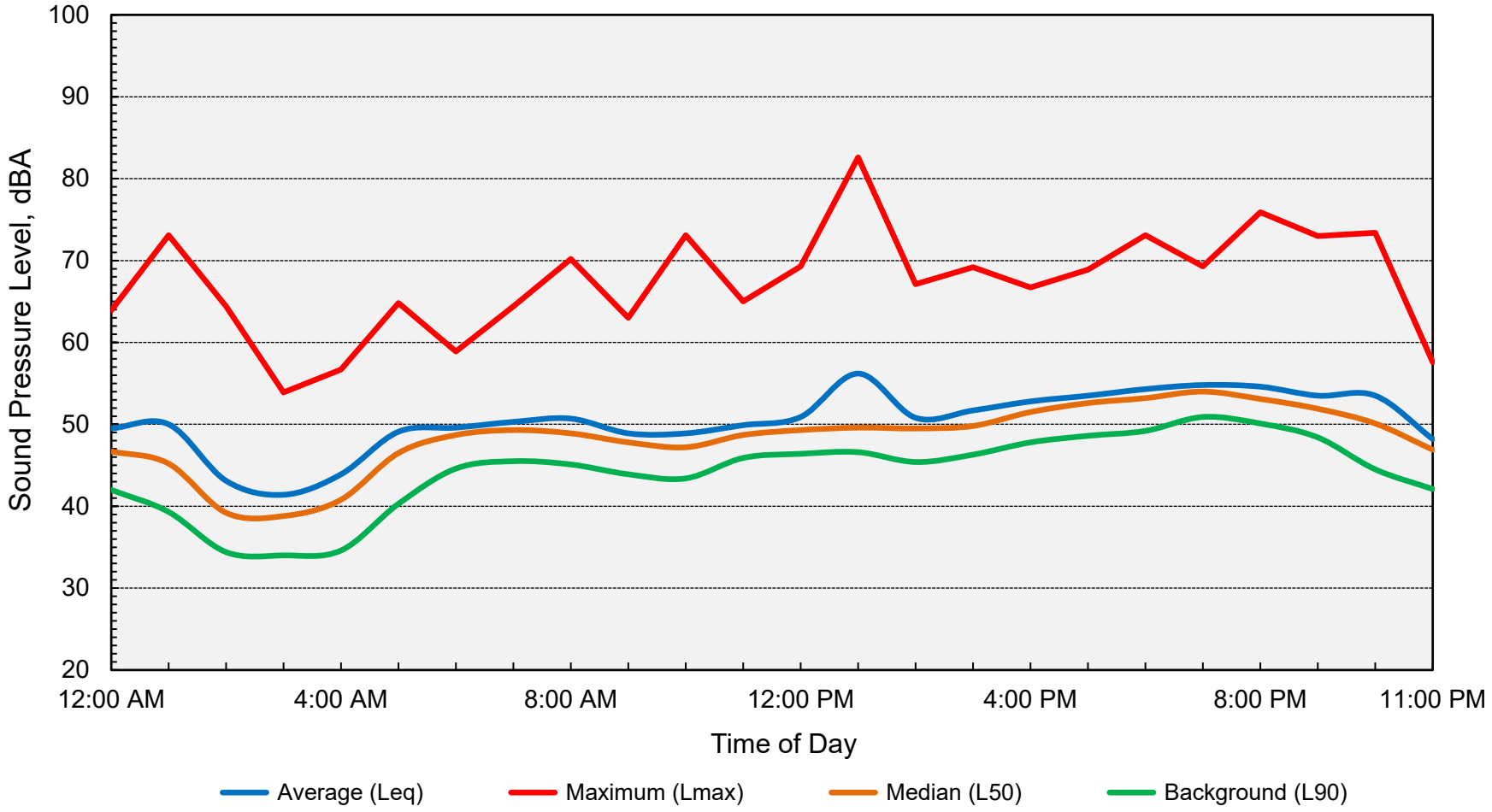
Appendix D-15
Long-Term Ambient Noise Monitoring Results - Site LT-4
West Roseville Marketplace - Roseville, California
Sunday, February 27, 2022



Computed DNL = 56 dB

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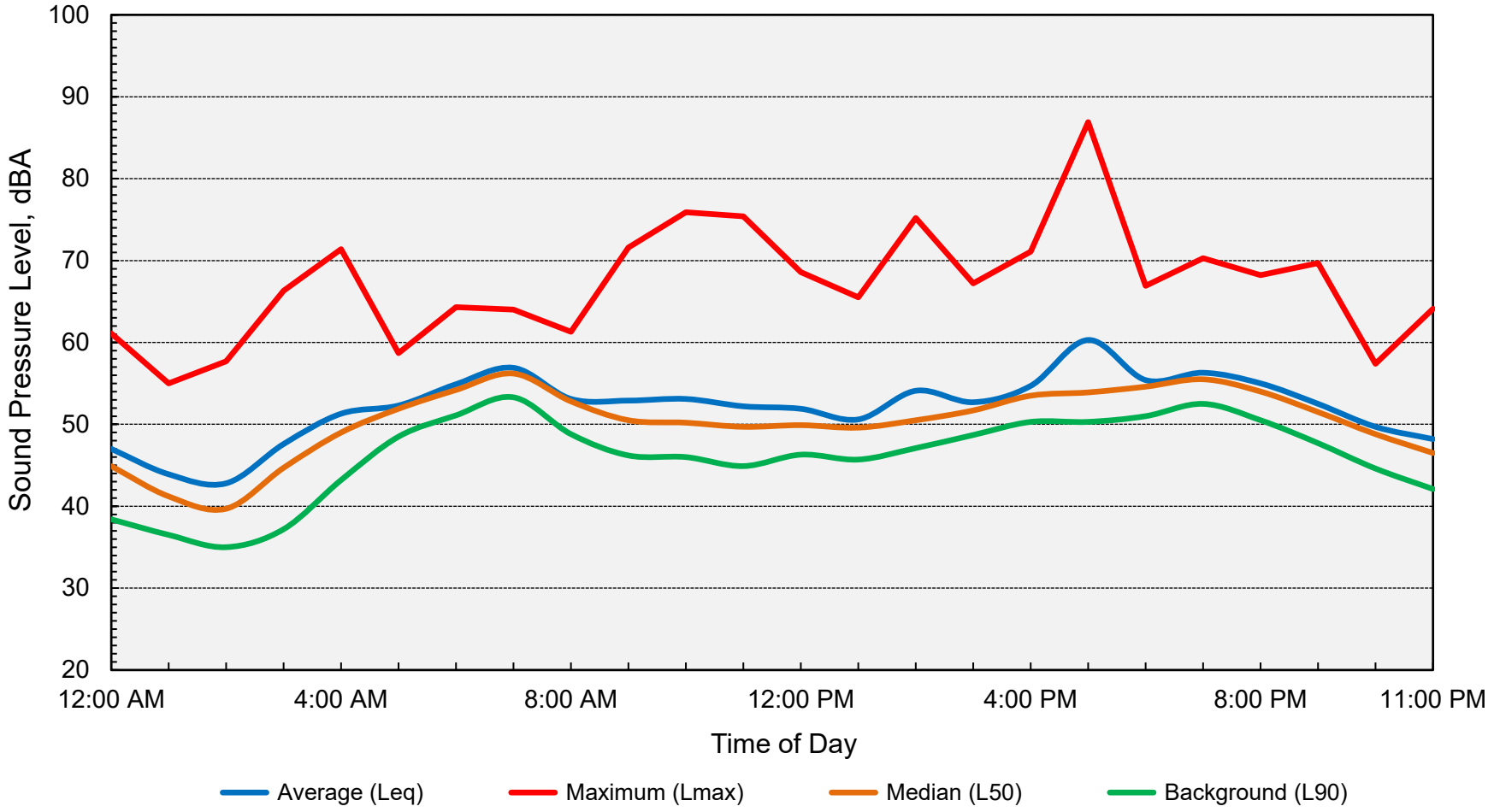
Appendix D-16
Long-Term Ambient Noise Monitoring Results - Site LT-4
West Roseville Marketplace - Roseville, California
Monday, February 28, 2022



Computed DNL = 58 dB

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