

A P P E N D I X I

NOISE AND VIBRATIONAL ASSESSMENT

Environmental Noise & Vibration Assessment

Stanford University Belmont Campus DEIR

Belmont, California

BAC Job # 2023-068

Prepared For:

PlaceWorks

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Introduction

The proposed Stanford University Belmont Campus (project) is located at 1500 Ralston Avenue in Belmont, California. Existing land uses within the immediate project vicinity include a high school to the south (Notre Dame High School Belmont), elementary school to the west (Notre Dame Elementary School), a church to the southwest (Notre Dame de Namur Convent), a memory care facility to the southeast (Silverado Belmont Hills Memory Care Community), and single-family residential in all other directions. Additionally, a future proposed single-family residential development (Miramar Terrace) is located northeast of the project area. The project area and surrounding land uses are shown in Figure 1.

The project site is currently the campus of Notre Dame de Namur University (NDNU). The project consists of the construction and operation of a combination of academic facilities, associated academic support uses, and housing. The proposed project would increase the existing campus square footage to a total of 700,000 square feet. Although the precise locations of individual new buildings are not known at this time, the general development areas for proposed new buildings, structures, and building groups are illustrated in Figure 2.

The existing noise-sensitive land uses which would potentially be affected by the project consist of single-family residences, two schools (Notre Dame Elementary School and Notre Dame High School Belmont), a church (Notre Dame de Namur Convent), and a memory care facility (Silverado Belmont Memory Care Community).

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

Noise and Vibration Fundamentals

Noise

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

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

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

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

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}). The L_{eq} is the foundation of the day-night average noise descriptor, DNL (or L_{dn}), and shows very good correlation with community response to noise. 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.

Vibration

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

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

Human response to vibration is difficult to quantify. Vibration can be felt or heard well below the levels that produce any damage to structures. The duration of the event has an effect on human response, as does frequency. Generally, as the duration and vibration frequency increase, the potential for adverse human response increases.

According to the Transportation and Construction-Induced Vibration Guidance Manual (Caltrans, 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. However, traffic rarely generates vibration amplitudes high enough to cause structural or cosmetic damage.



Legend

Project Area (Approximate)

Long-Term Ambient Noise & Short-Term Vibration Monitoring Sites (4)

Short-Term Ambient Noise Monitoring Sites (2)

N

Scale (Feet)

0

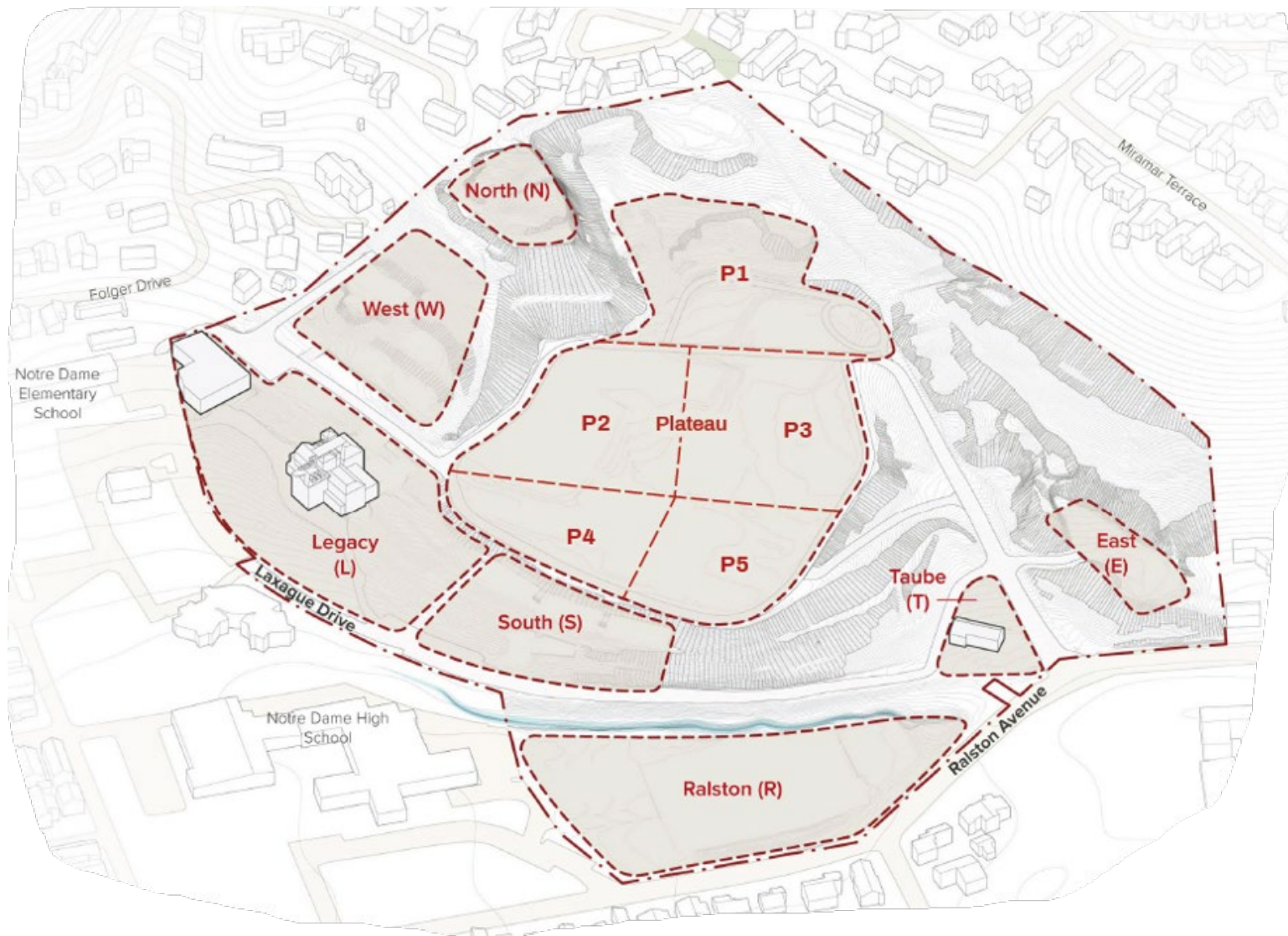
250

500

Stanford University Belmont Campus
Belmont, California

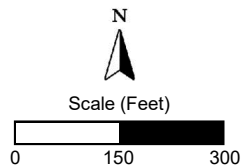
Project Area

Figure 1



Legend

- · — Project Area
- - - Development Areas



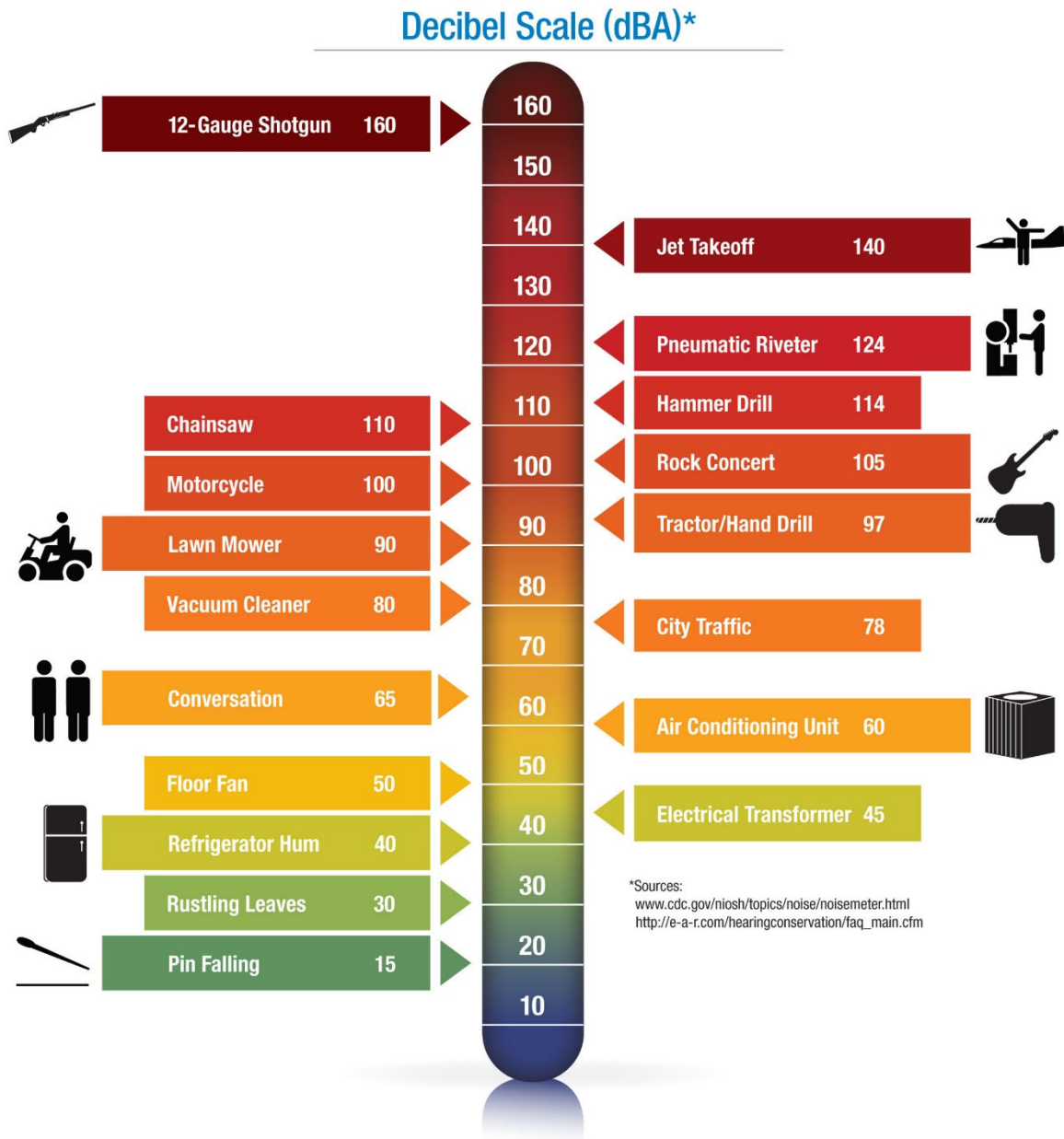
Stanford University Belmont Campus
Belmont, California

Proposed Development Area Plan

Figure 2



Figure 3
Noise Levels Associated with Common Noise Sources



Environmental Setting – Existing Ambient Noise and Vibration Environment

Existing 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 existing noise-sensitive land uses which would potentially be affected by the project consist of single-family residences, two schools (Notre Dame Elementary School and Notre Dame High School Belmont), a church (Notre Dame de Namur Convent), and a memory care facility (Silverado Belmont Memory Care Community). The locations of the identified existing noise-sensitive uses are shown in Figure 1.

Existing Overall Ambient Noise Environment within the Project Vicinity

The existing ambient noise environment within the project vicinity is defined primarily by traffic on local roadways (including Ralston Avenue), activities at residences (i.e., yard maintenance equipment), and by activities at nearby schools (e.g., playgrounds, playing fields, parking area movements, etc.). To generally quantify existing ambient noise environment within the project vicinity, BAC conducted long-term (96-hour) ambient noise level measurements at four (4) locations September 22-25, 2023. The long-term noise survey locations are shown in Figure 1. Photographs of the noise survey locations and equipment are provided in Appendix B.

BAC noise measurement site 1 was specifically selected to be representative of the ambient noise level environment at the nearest existing residential uses to the north and northwest of the project area. Noise measurement site 2 was specifically selected to be representative of the ambient noise level environment at the nearest existing residential uses to the northeast of the project area. Noise measurements obtained at site 3 are believed to be representative of the ambient noise level environment at the existing sensitive uses located adjacent to (or near) Ralston Avenue south and east of the project area. Finally, BAC noise measurement site 4 was specifically selected to be representative of the existing ambient noise level environment at the nearest sensitive receptors located west of the project area near Notre Dame Avenue.

Larson Davis Laboratories (LDL) Model 820 and LxT precision integrating sound level meters were used to complete the long-term noise level surveys at sites 1-4. The meters were calibrated immediately before use with an LDL Model CA200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all specifications of the American National Standards Institute requirements for Type 1 sound level meters (ANSI S1.4).

The results of the long-term ambient noise survey are shown numerically and graphically in Appendices C and D (respectively) and are summarized in Table 1.

Table 1
Summary of Long-Term Ambient Noise Survey Results – September 22-25, 2023¹

Survey Location ²	Date	DNL (dB)	Average Measured Hourly Noise Levels (dBA) ³			
			Daytime		Nighttime	
			L _{eq}	L _{max}	L _{eq}	L _{max}
Site 1: Northwest project boundary near residences	Friday, September 22 nd	46	45	60	37	50
	Saturday, September 23 rd	46	47	61	35	49
	Sunday, September 24 th	47	48	58	34	46
	Monday, September 25 th	50	50	61	38	54
Site 2: Northeast project boundary near residences	Friday, September 22 nd	51	46	61	44	52
	Saturday, September 23 rd	51	48	61	44	51
	Sunday, September 24 th	52	47	62	45	50
	Monday, September 25 th	53	49	60	46	51
Site 3: Southern project boundary along Ralson Ave	Friday, September 22 nd	69	68	84	60	80
	Saturday, September 23 rd	68	67	85	59	79
	Sunday, September 24 th	68	67	84	59	80
	Monday, September 25 th	68	67	84	59	78
Site 4: West of project area along Notre Dame Ave	Friday, September 22 nd	59	60	78	48	69
	Saturday, September 23 rd	57	56	77	48	69
	Sunday, September 24 th	54	55	75	44	66
	Monday, September 25 th	59	59	77	48	65
¹ Detailed summaries of the noise monitoring results are provided in Appendices C and D. ² Long-term ambient noise monitoring locations are identified in Figure 1. ³ Daytime hours: 7:00 AM to 10:00 PM Nighttime hours: 10:00 PM to 7:00 AM						

Source: BAC 2023.

As shown in Table 1, measured day-night average levels (DNL) and average measured hourly noise levels (L_{eq} and L_{max}) were generally consistent at each individual site throughout the monitoring period (i.e., relatively small range of measured levels). Table 1 data also indicate that measured ambient noise levels were highest at sites 3 and 4, which are believed to be attributed to traffic on adjacent roadways (Ralston Avenue and Notre Dame Avenue) and nearby school activities.

Existing Ambient Vibration Environment within the Project Vicinity

During BAC visits to the project site and noise monitoring locations, vibration levels were below the threshold of perception. Nonetheless, to quantify existing vibration levels within the project vicinity, BAC conducted short-term (15-minute) vibration measurements at the four (4) survey locations identified in Figure 1 on September 21st, 2023. Photographs of the vibration survey locations and equipment are provided in Appendix B. A Larson-Davis Laboratories Model 831 precision integrating sound level meter equipped with a vibration transducer was used to complete the measurements. The results are summarized in Table 2.

Table 2
Summary of Short-Term Ambient Vibration Survey Results – September 21st, 2023

Survey Location	Time	Measured Maximum Vibration Level, PPV (in/sec) ¹
Site 1: Northwest project boundary near residences	12:59 p.m.	<0.001
Site 2: Northeast project boundary near residences	12:10 p.m.	<0.001
Site 3: Southern project boundary along Ralson Ave	2:36 p.m.	0.012
Site 4: West of project area along Notre Dame Ave	1:38 p.m.	0.025
¹ PPV = Peak Particle Velocity (inches/second)		

Source: BAC 2023.

As shown in Table 2, measured maximum vibration levels within the project vicinity ranged from below 0.001 to 0.025 PPV in/sec. Table 2 data also indicate that the measured maximum vibration levels were highest at sites 3 and 4, which are believed to be attributed to vehicle passbys on adjacent roadways Ralston Avenue and Notre Dame Avenue.

Existing Traffic Noise Levels Along Project Area Roadway Network

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

Existing traffic data in the form of AM (ante meridiem) and MD (mid-day) peak hour intersection turning movements were obtained from the traffic impact analysis prepared by the project transportation consultant (Fehr & Peers). Those data were converted to average daily traffic (ADT) segment volumes by applying a factor of 5 to the sum of AM and PM peak hour conditions. Other inputs were obtained from BAC observations and noise measurement data. The existing traffic noise levels at the distances representing the nearest noise-sensitive land uses to the project area roadways and distances from the centerlines of selected roadways to the 60 dB, 65 dB and 70 dB DNL contours are summarized in Table 3. Appendix E-1 contains the FHWA Model inputs for existing conditions.

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

#	Roadway	Segment Description	DNL at Nearest Existing Sensitive Receptor	Distance to Contour (ft)		
				70 dB DNL	65 dB DNL	60 dB DNL
1	Ralston Ave	West of SR 92 WB Ramps	53	17	37	80
2	Ralston Ave	SR 92 WB Ramps to SR 92 EB Ramps	54	29	63	135
3	Ralston Ave	SR 92 EB Ramps to Christian Dr	62	37	80	173
4	Ralston Ave	Christian Dr to Hallmark Dr	62	46	99	213
5	Ralston Ave	Hallmark Dr to Belmont Canyon Rd	68	46	100	215
6	Ralston Ave	Belmont Canyon Rd to Tahoe Dr	68	47	100	216
7	Ralston Ave	Tahoe Dr to RMS Drwy 1	65	47	102	220
8	Ralston Ave	RMS Drwy 1 to RMS Drwy 2	55	22	48	104
9	Ralston Ave	RMS Drwy 2 to Davis Dr	69	51	110	236
10	Ralston Ave	Davis Dr to Cipriani Blvd	67	50	108	233
11	Ralston Ave	Cipriani Blvd to Alameda de las Pulgas	66	41	88	189
12	Ralston Ave	Alameda de las Pulgas to Notre Dame Ave	63	27	58	126
13	Ralston Ave	Notre Dame Ave to NDHS Drwy 1	55	13	27	58
14	Ralston Ave	NDHS Drwy 1 to NDHS Drwy 2	53	13	27	58
15	Ralston Ave	NDHS Drwy 2 to Chula Vista Dr	54	13	28	59
16	Ralston Ave	Chula Vista Dr to NDU Rd	57	15	33	70
17	Ralston Ave	NDU Rd to South Rd	63	33	71	153
18	Ralston Ave	South Rd to 6th Ave	55	12	26	56
19	Ralston Ave	6th Ave to El Camino Real	54	10	22	48
20	Ralston Ave	El Camino Real to Old County Rd	46	12	25	54
21	Ralston Ave	Old County Rd to Elmer St	50	14	30	65
22	Ralston Ave	Elmer St to Hiller St	56	15	33	71
23	Ralston Ave	Hiller St to US 101 SB Ramps	63	38	82	177
24	Ralston Ave	US 101 SB Ramps to US NB Ramps	65	43	93	201
25	Marine Pkwy	East of US NB Ramps	47	16	35	75
26	SR 92 WB Ramps	North of Ralston Ave	56	38	81	174
27	SR 92 EB Ramps	North of Ralston Ave	63	35	74	160
28	Christian Dr	North of Ralston Ave	51	4	9	19
29	Hallmark Dr	South of Ralston Ave	58	14	31	66
30	Belmont Canyon Rd	North of Ralston Ave	52	6	12	26
31	Tahoe Dr	South of Ralston Ave	52	5	10	22
32	RMS Drwy 1	South of Ralston Ave	45	1	2	5
33	Davis Dr	South of Ralston Ave	50	7	14	31
34	Cipriani Blvd	North of Ralston Ave	61	14	29	63
35	Continental Way	South of Ralston Ave	54	11	23	49
36	Alameda de las Pulgas	North of Ralston Ave	55	12	25	54
37	Alameda de las Pulgas	South of Ralston Ave	58	23	49	106
38	Notre Dame Ave	North of Ralston Ave	56	6	12	26
39	NDHS Drwy 2	North of Ralston Ave	42	3	6	13
40	Chula Vista Dr	South of Ralston Ave	59	10	21	46
41	NDU Rd	North of Ralston Ave	36	2	4	8
42	South Rd	North of Ralston Ave	50	3	8	16
43	6th Ave	North of Ralston Ave	43	2	4	10
44	6th Ave	South of Ralston Ave	52	5	11	24
45	El Camino Real	North of Ralston Ave	56	16	34	73

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

#	Roadway	Segment Description	DNL at Nearest Existing Sensitive Receptor	Distance to Contour (ft)		
				70 dB DNL	65 dB DNL	60 dB DNL
46	El Camino Real	South of Ralston Ave	62	31	68	146
47	Old County Rd	North of Ralston Ave	55	12	26	56
48	Old County Rd	South of Ralston Ave	52	8	18	38
49	Elmer St	South of Ralston Ave	46	2	5	11
50	Hiller St	North of Ralston Ave	56	11	25	53
51	Hiller St	South of Ralston Ave	42	1	3	7
52	US 101 SB Ramps	South of Ralston Ave	55	8	16	35
53	Island Pkwy	North of Ralston Ave	55	11	23	49
54	US 101 NB Ramps	North of Ralston Ave	64	38	81	174

Source: FHWA-RD-77-108 and Fehr & Peers. Appendix E-1 contains FHWA Model inputs for existing conditions.

Regulatory Setting: Criteria for Acceptable Noise and Vibration Exposure

Federal

There are no federal noise or vibration criteria which would be directly applicable to this project. However, the City of Belmont does not currently have policies for assessing impacts associated with increases in ambient noise levels from project-generated noise sources. As a result, the following federal noise criteria was applied to the project.

Federal Interagency Commission on Noise (FICON)

The Federal Interagency Commission on Noise (FICON) has developed a graduated scale for use in the assessment of project-related noise level increases. The criteria shown in Table 4 was developed by FICON as a means of developing thresholds for impact identification for project-related noise level increases. The FICON standards have been used extensively in recent years in the preparation of the noise sections of Environmental Impact Reports that have been certified in many California cities and counties.

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

Table 4
Significance of Changes in Cumulative Noise Exposure

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

Source: Federal Interagency Committee on Noise (FICON).

Based on the FICON research, as shown in Table 4, a 5 dB increase in noise levels due to a project is required for a finding of significant noise impact where ambient noise levels without the project are less than 60 dB DNL. Where pre-project ambient conditions are between 60 and 65 dB DNL, a 3 dB increase is applied as the standard of significance. Finally, in areas already exposed to higher noise levels, specifically pre-project noise levels in excess of 65 dB DNL, a 1.5 dB increase is considered by FICON as the threshold of significance.

State of California

California Environmental Quality Act (CEQA)

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

- a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or other applicable standards of other agencies.
- b) Generation of excessive groundborne vibration or groundborne noise levels.
- c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

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

California Department of Transportation (Caltrans)

The City of Belmont does not currently have adopted standards for groundborne vibration. As a result, the vibration impact criteria developed by the California Department of Transportation (Caltrans) was applied to the project. The Caltrans guidance criteria for building structure and vibration annoyance are presented in Tables 5 and 6, respectively.

Table 5
Caltrans Guidance for Building Structure Vibration Criteria

Structure and Condition	Limiting PPV (in/sec) ¹
Historic and some old buildings	0.5
Residential structures	0.5
New residential structures	1.0
Industrial buildings	2.0
Bridges	2.0
¹ PPV = Peak Particle Velocity	

Source: 2020 Caltrans Transportation and Construction Vibration Guidance Manual, Table 14.

Table 6
Caltrans Guidance for Vibration Annoyance Potential Criteria

Human Response	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Severe/very disturbing	2.0	0.4 to 3.6
Strongly perceptible	0.9	0.1
Distinctly perceptible	0.24	0.035
Barely/slightly perceptible	0.035	0.012
Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent sources include pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers and vibratory compaction equipment.		
PPV = Peak Particle Velocity		

Source: 2020 Caltrans Transportation and Construction Vibration Guidance Manual, Tables 4 & 6.

Local

City of Belmont 2035 General Plan

The Noise Element (Chapter 7) of the City of Belmont 2035 General Plan contains the city's noise-related policies. The specific policies which are generally applicable to this project are reproduced below:

Policies

- 7.1-1** Update the City's Noise Ordinance as needed to be in conformance with the General Plan policies and noise standards.
- 7.1-2** Use the Community Noise Level Exposure Standards shown in Table 7 (General Plan Table 7-1) as review criteria for new land uses. Require all new development that would be exposed to noise greater than the "normally acceptable" noise level range to reduce interior noise through design, sound insulation, or other measures.
- 7.1-3** Require noise-reducing mitigation to meet allowable outdoor and indoor noise exposure standards in Table 8 (General Plan Table 7-2). Noise mitigation measures that may be approved to achieve these noise level targets include but are not limited to the following:
- Construct facades with substantial weight and insulation;
 - Use sound-rated windows for primary sleeping and activity areas;
 - Use sound-rated doors for all exterior entries at primary sleeping and activity areas;
 - Use minimum setbacks and exterior barriers;
 - Use acoustic baffling of vents for chimneys, attic and gable ends; and
 - Install a mechanical ventilation system that provides fresh air under closed window conditions.
- 7.1-8** Continue to enforce applicable Federal and State Noise Insulation Standards (CCR, Title 24) and noise requirements.
- 7.1-10** Require developers of new development anticipated to generate a substantial amount of vibration during construction to implement mitigation practices to reduce vibration, which can include: operating heavy equipment as far as practical from residential uses; using smaller bulldozers (operating weight less than 20,000 pounds) when grading must occur within approximately 50 feet of residential uses or other vibration sensitive uses; and using quiet pile driving technology when feasible.
- 7.2-1** Use the noise-sensitive land uses and transportation noise sources table (Table 8) and Future Noise Contours map (Figure 4) as criteria to determine acceptability of noise-sensitive land uses. Do not permit new noise-sensitive uses—including schools, hospitals, and places of worship— where noise levels are "normally unacceptable" or higher, if alternative locations are available for the uses in the city.
- 7.3-1** Work with Caltrans, Caltrain, SamTrans, and other agencies to mitigate transportation-related noise impacts on residential areas and sensitive uses. This may include encouraging installation of sound barriers or bus stop relocation in selected locations.

Table 7
Noise Levels Associated with Common Noise Sources (General Plan Table 7-1)

Land Use Category	Common Noise Exposure <i>L_{dn}</i> or <i>CNEL</i> , dB						INTERPRETATION
	55	60	65	70	75	80	
Residential - Low Density Single Family, Duplex, Mobile Homes	Green	Yellow	Yellow	Yellow	Brown	Red	Normally Acceptable Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conversational construction, without any special noise insulation requirements.
Residential - Multi-Family	Green	Yellow	Yellow	Yellow	Brown	Red	
Transient Lodging - Motels, Hotels	Green	Yellow	Yellow	Yellow	Brown	Red	Conditionally Acceptable New constructions or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
Schools, Libraries, Churches, Hospitals, Nursing Homes	Green	Yellow	Yellow	Yellow	Brown	Red	
Auditoriums, Concert Halls, Amphitheaters	Green	Yellow	Yellow	Yellow	Brown	Red	Normally Unacceptable New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
Sports Arena, Outdoor Spectator Sports	Green	Yellow	Yellow	Yellow	Brown	Red	
Playgrounds, Neighborhood Parks	Green	Yellow	Yellow	Yellow	Brown	Red	Clearly Unacceptable New construction or development should generally not be undertaken.
Golf Courses, Riding Stables, Water Recreation, Cemeteries	Green	Yellow	Yellow	Yellow	Brown	Red	
Office Buildings, Businesses Commercial and Professional	Green	Yellow	Yellow	Yellow	Brown	Red	
Industrial, Manufacturing, Utilities, Agriculture	Green	Yellow	Yellow	Yellow	Brown	Red	

Source: Office of Planning and Research, State of California Draft General Plan Guidelines, 2015.

Table 8
Transportation (Non-Aircraft) Noise Sources (General Plan Table 7-2)

Noise-Sensitive Land Use ²	Outdoor Activity Areas ¹	Interior Spaces	
	DNL/CNEL, dB	DNL/CNEL, dB	Leq dB
Single-family Residential	60	45	---
Multi-family Residential	65	45	---
Transient Lodging	65	45	---
Hospitals, Nursing Homes	65	45	---
Theaters, Auditoriums, Music Halls	---	---	35
Churches, Meeting Halls	65	---	45
Office Buildings	---	---	45
Schools, Libraries, Museums	---	---	45

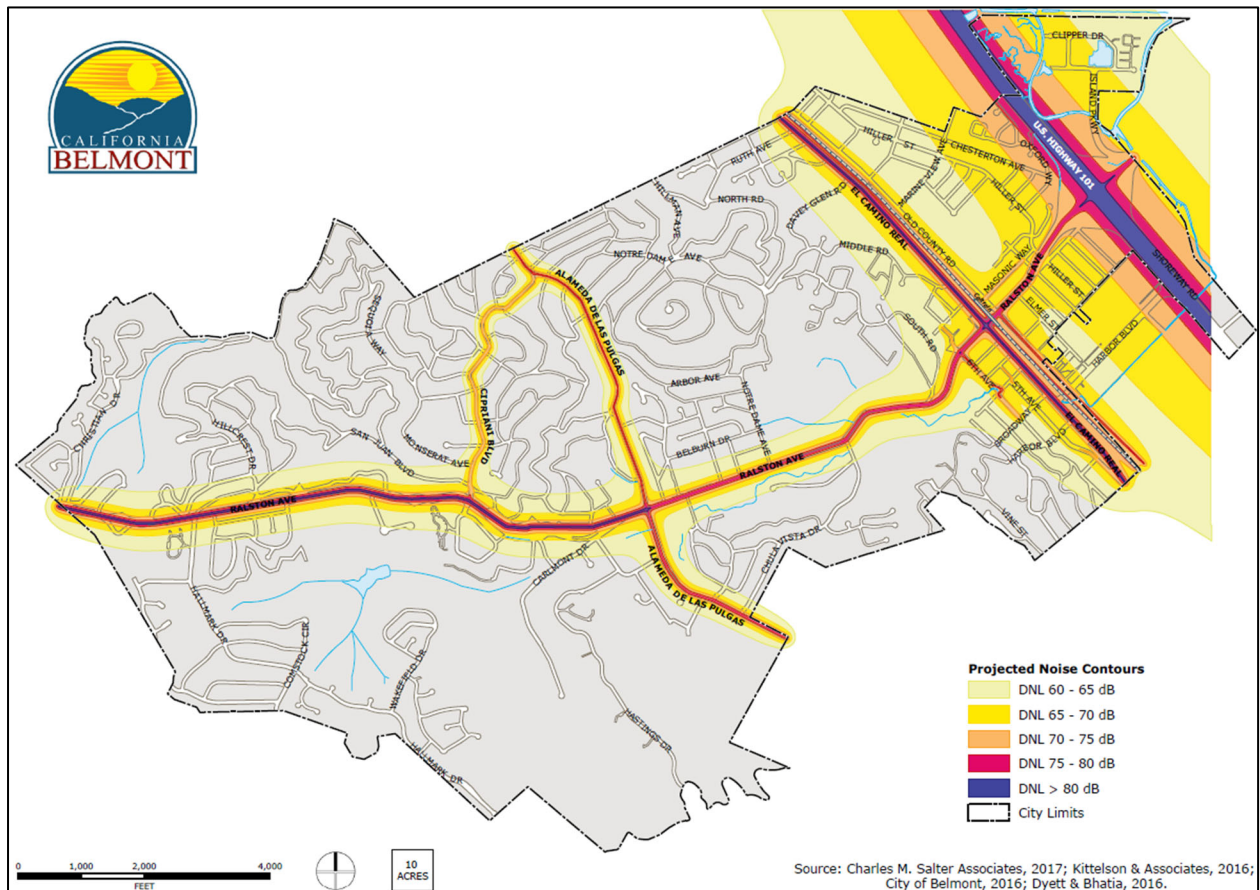
Notes:
 1. Outdoor activity areas generally include backyards of single-family residences and outdoor patios, decks, or common recreation areas of multi-family residences. Where the location of outdoor activity areas is unknown or is not applicable, the exterior noise level standard shall be applied to the property line of the receiving land use.
 2. As determined for a typical worst-case hour during periods of use.

Table 9
Stationary Noise Sources (General Plan Table 7-3)

	Daytime ²	Nighttime ³
Hourly Equivalent Sound Level (Leq), dBA	50	45
Maximum Sound Level (Lmax), dBA	70	65

Notes:
 1. Sound level measurements shall be made at a point on the receiving property nearest where the sound source at issue generates the highest sound level.
 2. Daytime is the period from 8 a.m. to sunset, Monday through Friday; and from 10 a.m. to sunset, Saturday, Sunday and Holidays.
 3. Nighttime is the period outside the hours of "daytime" above.

Figure 4
Future Noise Contours (General Plan Figure 7-3)



City of Belmont Municipal Code

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

15-102 Noise limitations.

- d) Construction activity. Notwithstanding subsection (c), construction activity noise is subject to the following regulations.
 - 1. Except as provided in subsection (d), all construction and related activities which require a city permit, including the use of powered equipment in connection with such activities, are allowed only during the hours of 8:00 a.m. to 5:00 p.m. Monday through Friday except Holidays, and 10:00 a.m. to 5:00 p.m. on Saturdays. All gasoline-powered construction equipment shall be equipped with an operating muffler or baffling system as originally provided by the manufacturer, and no modification to these systems is permitted.

15-103 Exceptions.

The following are exceptions to the noise limitations set forth in Section 15-102.

- b) Deliveries.
 - 2) Deliveries to other commercial and industrial businesses between the hours of 7:00 a.m. and 6:00 p.m. Monday through Friday and between the hours of 9:00 a.m. to 5:00 p.m. Saturdays, Sundays, and holidays.
 - 3) Deliveries to businesses described in subsections 1) and 2) above with a valid Conditional Use Permit (CUP) which regulates hours of operation must adhere to the approved hours as specified in the CUP.
- d) Garbage collection. Garbage collection by a franchisee at times consistent with the City's franchise agreement.

Impacts and Mitigation Measures

Thresholds of Significance

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

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or other applicable standards of other agencies; or
- Generation of excessive groundborne vibration or groundborne noise levels; or
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use

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

The following criteria established by the Federal Interagency Commission on Noise (FICON), California Department of Transportation (Caltrans), City of Belmont General Plan and City of Belmont Municipal Code were used to evaluate the significance of environmental noise and vibration resulting from the project:

- A significant noise impact would be identified if the project would expose persons to or generate noise levels that would exceed applicable noise criteria presented in the City of Belmont General Plan.
- A significant impact would be identified if project-generated off-site traffic would substantially increase noise levels at existing sensitive receptors in the vicinity. A substantial increase would be identified relative to the FICON noise level increase significance criteria presented in Table 4 of this report.

In terms of determining the temporary noise increase due to project on-site activities/operations and construction/demolition equipment at existing sensitive receptors in the vicinity, an impact would occur if those activities would noticeably increase ambient noise levels above background levels at those locations. The threshold of perception of the human ear is approximately 3 to 5 dB – a 5 dB change is considered to be clearly noticeable. For the analysis of project on-site activities and construction equipment noise level increases at existing sensitive receptors, a noticeable increase in ambient noise levels is assumed to occur where those activities would result in an increase by 5 dB or more over existing ambient noise levels.

- A significant impact would be identified if project construction equipment or proposed on-site activities would expose sensitive receptors to excessive groundborne vibration levels. Specifically, an impact would be identified if groundborne vibration levels due to these sources would exceed the Caltrans vibration impact criteria presented in this report.
- A significant impact would occur if noise from aircraft operations at San Francisco International Airport (SFO) or San Carlos Airport would expose people residing or working in the project area to noise in excess of applicable General Plan noise criteria.

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

With development of the project, traffic volumes on the local roadway network will increase. Those increases in daily traffic volumes will result in a corresponding increase in traffic noise levels at existing uses located along those roadways. Impacts 1 through 3 evaluate increases in off-site traffic noise levels which would result from the project.

Impact 1: Increases in Existing Traffic Noise due to the Project – Signal Scenario

The FHWA Traffic Noise Model (FHWA-RD-77-108) was used to quantify increases in existing traffic noise levels at the existing sensitive land uses nearest to the project area roadway network.

The FHWA Model predicts hourly L_{eq} values for free-flowing traffic conditions. Estimates of the hourly distribution of traffic for a typical 24-hour period were used to develop DNL values from L_{eq} values.

Traffic data in the form of peak hour intersection turning movements were obtained from the traffic impact analysis prepared by the project transportation consultant (Fehr & Peers). Those data were converted to Average Daily Traffic (ADT) segment volumes by applying a factor of 5 to the sum of AM and MD peak hour conditions. Other inputs were obtained from BAC observations and noise measurement data. Appendices E-1 and E-2 contain the FHWA Model inputs for existing no project and existing plus project with signal conditions, respectively. The existing no project and existing plus project with signal conditions traffic noise levels at the distances representing the nearest noise-sensitive land uses to the project area roadways are summarized in Table 10. Table 10 also shows the thresholds for determination of a significant traffic noise increase, whether the roadway segment contains sensitive uses, and whether or not significant noise impacts are identified for each segment.

Table 10
Predicted Traffic Noise Level Increases at Existing Noise-Sensitive Receptors – Existing vs. Existing Plus Project with Signal

#	Roadway	Segment Description	Predicted DNL (dB)			Significance Threshold ¹	Threshold Exceeded?	Sensitive Receptors Present? ²	Significant Impact Identified? ³
			E	E+PS	Increase				
1	Ralston Ave	West of SR 92 WB Ramps	53.2	53.2	0.0	5.0	No	Yes	No
2	Ralston Ave	SR 92 WB Ramps to SR 92 EB Ramps	53.8	53.8	0.0	5.0	No	Yes	No
3	Ralston Ave	SR 92 EB Ramps to Christian Dr	61.9	61.9	0.0	3.0	No	Yes	No
4	Ralston Ave	Christian Dr to Hallmark Dr	62.3	62.3	0.0	3.0	No	Yes	No
5	Ralston Ave	Hallmark Dr to Belmont Canyon Rd	68.3	68.3	0.0	1.5	No	Yes	No
6	Ralston Ave	Belmont Canyon Rd to Tahoe Dr	68.3	68.4	0.1	1.5	No	Yes	No
7	Ralston Ave	Tahoe Dr to RMS Drwy 1	65.1	65.2	0.1	1.5	No	Yes	No
8	Ralston Ave	RMS Drwy 1 to RMS Drwy 2	55.1	55.2	0.1	5.0	No	Yes	No
9	Ralston Ave	RMS Drwy 2 to Davis Dr	68.9	69.0	0.1	1.5	No	Yes	No
10	Ralston Ave	Davis Dr to Cipriani Blvd	67.4	67.4	0.0	1.5	No	Yes	No
11	Ralston Ave	Cipriani Blvd to Alameda de las Pulgas	66.0	66.5	0.5	1.5	No	Yes	No
12	Ralston Ave	Alameda de las Pulgas to Notre Dame Ave	62.9	63.0	0.1	3.0	No	Yes	No
13	Ralston Ave	Notre Dame Ave to NDHS Drwy 1	54.8	54.8	0.0	5.0	No	Yes	No
14	Ralston Ave	NDHS Drwy 1 to NDHS Drwy 2	53.4	53.5	0.1	5.0	No	Yes	No
15	Ralston Ave	NDHS Drwy 2 to Chula Vista Dr	54.4	54.5	0.1	5.0	No	Yes	No
16	Ralston Ave	Chula Vista Dr to NDU Rd	56.8	56.8	0.0	5.0	No	Yes	No
17	Ralston Ave	NDU Rd to South Rd	62.8	62.9	0.1	3.0	No	Yes	No
18	Ralston Ave	South Rd to 6th Ave	55.1	55.2	0.1	5.0	No	Yes	No
19	Ralston Ave	6th Ave to El Camino Real	53.8	53.9	0.1	5.0	No	Yes	No
20	Ralston Ave	El Camino Real to Old County Rd	45.5	45.6	0.1	5.0	No	Yes	No
21	Ralston Ave	Old County Rd to Elmer St	50.0	50.1	0.1	5.0	No	Yes	No
22	Ralston Ave	Elmer St to Hiller St	56.3	56.4	0.1	5.0	No	Yes	No
23	Ralston Ave	Hiller St to US 101 SB Ramps	62.8	62.9	0.1	3.0	No	Yes	No
24	Ralston Ave	US 101 SB Ramps to US NB Ramps	64.6	64.6	0.0	3.0	No	Yes	No
25	Marine Pkwy	East of US NB Ramps	47.0	47.0	0.0	5.0	No	Yes	No
26	SR 92 WB Ramps	North of Ralston Ave	56.5	56.5	0.0	5.0	No	Yes	No
27	SR 92 EB Ramps	North of Ralston Ave	63.1	63.1	0.0	3.0	No	Yes	No
28	Christian Dr	North of Ralston Ave	51.0	51.0	0.0	5.0	No	Yes	No
29	Hallmark Dr	South of Ralston Ave	58.0	58.0	0.0	5.0	No	Yes	No
30	Belmont Canyon Rd	North of Ralston Ave	52.0	52.0	0.0	5.0	No	Yes	No
31	Tahoe Dr	South of Ralston Ave	51.9	51.9	0.0	5.0	No	Yes	No
32	RMS Drwy 1	South of Ralston Ave	44.8	44.8	0.0	5.0	No	Yes	No
33	Davis Dr	South of Ralston Ave	50.2	50.2	0.0	5.0	No	Yes	No
34	Cipriani Blvd	North of Ralston Ave	61.5	61.5	0.0	3.0	No	Yes	No

Table 10
Predicted Traffic Noise Level Increases at Existing Noise-Sensitive Receptors – Existing vs. Existing Plus Project with Signal

#	Roadway	Segment Description	Predicted DNL (dB)			Significance Threshold ¹	Threshold Exceeded?	Sensitive Receptors Present? ²	Significant Impact Identified? ³
			E	E+PS	Increase				
35	Continental Way	South of Ralston Ave	53.9	53.9	0.0	5.0	No	Yes	No
36	Alameda de las Pulgas	North of Ralston Ave	54.6	54.5	-0.1	5.0	No	Yes	No
37	Alameda de las Pulgas	South of Ralston Ave	57.7	57.4	-0.3	5.0	No	Yes	No
38	Notre Dame Ave	North of Ralston Ave	55.8	55.8	0.0	5.0	No	Yes	No
39	NDHS Drwy 2	North of Ralston Ave	42.4	42.4	0.0	5.0	No	Yes	No
40	Chula Vista Dr	South of Ralston Ave	59.4	59.4	0.0	5.0	No	Yes	No
41	NDU Rd	North of Ralston Ave	35.7	40.3	4.6	5.0	No	Yes	No
42	South Rd	North of Ralston Ave	49.6	49.6	0.0	5.0	No	Yes	No
43	6th Ave	North of Ralston Ave	42.7	42.7	0.0	5.0	No	Yes	No
44	6th Ave	South of Ralston Ave	52.2	52.2	0.0	5.0	No	Yes	No
45	El Camino Real	North of Ralston Ave	56.0	56.0	0.0	5.0	No	Yes	No
46	El Camino Real	South of Ralston Ave	62.5	62.5	0.0	3.0	No	No	No
47	Old County Rd	North of Ralston Ave	55.3	55.4	0.1	5.0	No	Yes	No
48	Old County Rd	South of Ralston Ave	52.3	52.3	0.0	5.0	No	Yes	No
49	Elmer St	South of Ralston Ave	45.6	45.6	0.0	5.0	No	Yes	No
50	Hiller St	North of Ralston Ave	55.9	55.9	0.0	5.0	No	Yes	No
51	Hiller St	South of Ralston Ave	42.2	42.2	0.0	5.0	No	Yes	No
52	US 101 SB Ramps	South of Ralston Ave	55.0	55.0	0.0	5.0	No	Yes	No
53	Island Pkwy	North of Ralston Ave	55.3	55.3	0.0	5.0	No	No	No
54	US 101 NB Ramps	North of Ralston Ave	63.6	63.7	0.1	3.0	No	No	No

¹ Significance threshold as determined by FICON criteria contained in Table 4.
² Sensitive receptors identified in this analysis as single-family residence backyards, multi-family residence common outdoor areas, and school outdoor play areas.
³ A significant impact is identified only along segments where project-related traffic noise level increases would exceed threshold AND where sensitive receptors are present.

Source: FHWA-RD-77-108 with inputs from Fehr & Peers. Appendices E-1 & E-2 contain FHWA Model inputs.

Based on the analysis presented in Table 10, project-generated traffic noise level increases associated with existing no project vs. existing plus project with signal conditions would not result in significant noise impacts at existing noise-sensitive receptors located along the project area roadway network. As a result, this impact is identified as being ***less than significant***.

Impact 2: Increases in Existing Traffic Noise due to the Project – Roundabout Scenario

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

Traffic data in the form of peak hour intersection turning movements were obtained from the traffic impact analysis prepared by the project transportation consultant (Fehr & Peers). Those data were converted to Average Daily Traffic (ADT) segment volumes by applying a factor of 5 to the sum of AM and MD peak hour conditions. Other inputs were obtained from BAC observations and noise measurement data. Appendices E-1 and E-3 contain the FHWA Model inputs for existing no project and existing plus project with roundabout conditions, respectively. The existing no project and existing plus project with roundabout conditions traffic noise levels at the distances representing the nearest noise-sensitive land uses to the project area roadways are summarized in Table 11. Table 11 also shows the thresholds for determination of a significant traffic noise increase, whether the roadway segment contains sensitive uses, and whether or not significant noise impacts are identified for each segment.

Table 11
Predicted Traffic Noise Level Increases at Existing Noise-Sensitive Receptors – Existing vs. Existing Plus Project with Roundabout

#	Roadway	Segment Description	Predicted DNL (dB)			Significance Threshold ¹	Threshold Exceeded?	Sensitive Receptors Present? ²	Significant Impact Identified? ³
			E	E+PR	Increase				
1	Ralston Ave	West of SR 92 WB Ramps	53.2	53.2	0.0	5.0	No	Yes	No
2	Ralston Ave	SR 92 WB Ramps to SR 92 EB Ramps	53.8	53.8	0.0	5.0	No	Yes	No
3	Ralston Ave	SR 92 EB Ramps to Christian Dr	61.9	61.9	0.0	3.0	No	Yes	No
4	Ralston Ave	Christian Dr to Hallmark Dr	62.3	62.3	0.0	3.0	No	Yes	No
5	Ralston Ave	Hallmark Dr to Belmont Canyon Rd	68.3	68.3	0.0	1.5	No	Yes	No
6	Ralston Ave	Belmont Canyon Rd to Tahoe Dr	68.3	68.4	0.1	1.5	No	Yes	No
7	Ralston Ave	Tahoe Dr to RMS Drwy 1	65.1	65.2	0.1	1.5	No	Yes	No
8	Ralston Ave	RMS Drwy 1 to RMS Drwy 2	55.1	55.2	0.1	5.0	No	Yes	No
9	Ralston Ave	RMS Drwy 2 to Davis Dr	68.9	69.0	0.0	1.5	No	Yes	No
10	Ralston Ave	Davis Dr to Cipriani Blvd	67.4	67.4	0.0	1.5	No	Yes	No
11	Ralston Ave	Cipriani Blvd to Alameda de las Pulgas	66.0	66.5	0.5	1.5	No	Yes	No
12	Ralston Ave	Alameda de las Pulgas to Notre Dame Ave	62.9	63.0	0.1	3.0	No	Yes	No
13	Ralston Ave	Notre Dame Ave to NDHS Drwy 1	54.8	54.8	0.0	5.0	No	Yes	No
14	Ralston Ave	NDHS Drwy 1 to NDHS Drwy 2	53.4	53.5	0.1	5.0	No	Yes	No
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18	Ralston Ave	South Rd to 6th Ave	55.1	55.2	0.1	5.0	No	Yes	No
19	Ralston Ave	6th Ave to El Camino Real	53.8	53.9	0.1	5.0	No	Yes	No
20	Ralston Ave	El Camino Real to Old County Rd	45.5	45.6	0.1	5.0	No	Yes	No
21	Ralston Ave	Old County Rd to Elmer St	50.0	50.1	0.1	5.0	No	Yes	No
22	Ralston Ave	Elmer St to Hiller St	56.3	56.4	0.1	5.0	No	Yes	No
23	Ralston Ave	Hiller St to US 101 SB Ramps	62.8	62.9	0.1	3.0	No	Yes	No
24	Ralston Ave	US 101 SB Ramps to US NB Ramps	64.6	64.6	0.0	3.0	No	Yes	No
25	Marine Pkwy	East of US NB Ramps	47.0	47.0	0.0	5.0	No	Yes	No
26	SR 92 WB Ramps	North of Ralston Ave	56.5	56.5	0.0	5.0	No	Yes	No
27	SR 92 EB Ramps	North of Ralston Ave	63.1	63.1	0.0	3.0	No	Yes	No
28	Christian Dr	North of Ralston Ave	51.0	51.0	0.0	5.0	No	Yes	No
29	Hallmark Dr	South of Ralston Ave	58.0	58.0	0.0	5.0	No	Yes	No
30	Belmont Canyon Rd	North of Ralston Ave	52.0	52.0	0.0	5.0	No	Yes	No
31	Tahoe Dr	South of Ralston Ave	51.9	51.9	0.0	5.0	No	Yes	No
32	RMS Drwy 1	South of Ralston Ave	44.8	44.8	0.0	5.0	No	Yes	No
33	Davis Dr	South of Ralston Ave	50.2	50.2	0.0	5.0	No	Yes	No
34	Cipriani Blvd	North of Ralston Ave	61.5	61.5	0.0	3.0	No	Yes	No

Table 11
Predicted Traffic Noise Level Increases at Existing Noise-Sensitive Receptors – Existing vs. Existing Plus Project with Roundabout

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37	Alameda de las Pulgas	South of Ralston Ave	57.7	57.4	-0.3	5.0	No	Yes	No
38	Notre Dame Ave	North of Ralston Ave	55.8	55.8	0.0	5.0	No	Yes	No
39	NDHS Drwy 2	North of Ralston Ave	42.4	42.4	0.0	5.0	No	Yes	No
40	Chula Vista Dr	South of Ralston Ave	59.4	59.4	0.0	5.0	No	Yes	No
41	NDU Rd	North of Ralston Ave	35.7	40.3	4.6	5.0	No	Yes	No
42	South Rd	North of Ralston Ave	49.6	49.6	0.0	5.0	No	Yes	No
43	6th Ave	North of Ralston Ave	42.7	42.7	0.0	5.0	No	Yes	No
44	6th Ave	South of Ralston Ave	52.2	51.6	-0.6	5.0	No	Yes	No
45	El Camino Real	North of Ralston Ave	56.0	56.0	0.0	5.0	No	Yes	No
46	El Camino Real	South of Ralston Ave	62.5	62.5	0.0	3.0	No	No	No
47	Old County Rd	North of Ralston Ave	55.3	55.4	0.1	5.0	No	Yes	No
48	Old County Rd	South of Ralston Ave	52.3	52.3	0.0	5.0	No	Yes	No
49	Elmer St	South of Ralston Ave	45.6	45.6	0.0	5.0	No	Yes	No
50	Hiller St	North of Ralston Ave	55.9	55.9	0.0	5.0	No	Yes	No
51	Hiller St	South of Ralston Ave	42.2	42.2	0.0	5.0	No	Yes	No
52	US 101 SB Ramps	South of Ralston Ave	55.0	55.0	0.0	5.0	No	Yes	No
53	Island Pkwy	North of Ralston Ave	55.3	55.3	0.0	5.0	No	No	No
54	US 101 NB Ramps	North of Ralston Ave	63.6	62.6	-1.0	3.0	No	No	No

¹ Significance threshold as determined by FICON criteria contained in Table 4.
² Sensitive receptors identified in this analysis as single-family residence backyards, multi-family residence common outdoor areas, and school outdoor play areas.
³ A significant impact is identified only along segments where project-related traffic noise level increases would exceed threshold AND where sensitive receptors are present.

Source: FHWA-RD-77-108 with inputs from Fehr & Peers. Appendices E-1 & E-3 contain FHWA Model inputs.

Based on the analysis presented in Table 11, project-generated traffic noise level increases associated with existing no project vs. existing plus project with roundabout conditions would not result in significant noise impacts at existing noise-sensitive receptors located along the project area roadway network. As a result, this impact is identified as being ***less than significant***.

Impact 3: Increases in Existing Traffic Noise due to the Project – Current Infrastructure Scenario

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

Traffic data in the form of peak hour intersection turning movements were obtained from the traffic impact analysis prepared by the project transportation consultant (Fehr & Peers). Those data were converted to Average Daily Traffic (ADT) segment volumes by applying a factor of 5 to the sum of AM and MD peak hour conditions. Other inputs were obtained from BAC observations and noise measurement data. Appendices E-1 and E-4 contain the FHWA Model inputs for existing no project and existing plus project with current infrastructure conditions, respectively. The existing no project and existing plus project with current infrastructure conditions traffic noise levels at the distances representing the nearest noise-sensitive land uses to the project area roadways are summarized in Table 12. Table 12 also shows the thresholds for determination of a significant traffic noise increase, whether the roadway segment contains sensitive uses, and whether or not significant noise impacts are identified for each segment.

Table 12
Predicted Traffic Noise Level Increases at Existing Noise-Sensitive Receptors – Existing vs. Existing Plus Project with Current Infrastructure

#	Roadway	Segment Description	Predicted DNL (dB)			Significance Threshold ¹	Threshold Exceeded?	Sensitive Receptors Present? ²	Significant Impact Identified? ³
			E	E+CI	Increase				
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2	Ralston Ave	SR 92 WB Ramps to SR 92 EB Ramps	53.8	53.8	0.0	5.0	No	Yes	No
3	Ralston Ave	SR 92 EB Ramps to Christian Dr	61.9	61.9	0.0	3.0	No	Yes	No
4	Ralston Ave	Christian Dr to Hallmark Dr	62.3	62.3	0.0	3.0	No	Yes	No
5	Ralston Ave	Hallmark Dr to Belmont Canyon Rd	68.3	68.3	0.0	1.5	No	Yes	No
6	Ralston Ave	Belmont Canyon Rd to Tahoe Dr	68.3	68.4	0.1	1.5	No	Yes	No
7	Ralston Ave	Tahoe Dr to RMS Drwy 1	65.1	65.2	0.1	1.5	No	Yes	No
8	Ralston Ave	RMS Drwy 1 to RMS Drwy 2	55.1	55.2	0.1	5.0	No	Yes	No
9	Ralston Ave	RMS Drwy 2 to Davis Dr	68.9	69.0	0.1	1.5	No	Yes	No
10	Ralston Ave	Davis Dr to Cipriani Blvd	67.4	67.4	0.0	1.5	No	Yes	No
11	Ralston Ave	Cipriani Blvd to Alameda de las Pulgas	66.0	66.6	0.6	1.5	No	Yes	No
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25	Marine Pkwy	East of US NB Ramps	47.0	47.0	0.0	5.0	No	Yes	No
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34	Cipriani Blvd	North of Ralston Ave	61.5	61.5	0.0	3.0	No	Yes	No

Table 12
Predicted Traffic Noise Level Increases at Existing Noise-Sensitive Receptors – Existing vs. Existing Plus Project with Current Infrastructure

#	Roadway	Segment Description	Predicted DNL (dB)			Significance Threshold ¹	Threshold Exceeded?	Sensitive Receptors Present? ²	Significant Impact Identified? ³
			E	E+CI	Increase				
35	Continental Way	South of Ralston Ave	53.9	53.9	0.0	5.0	No	Yes	No
36	Alameda de las Pulgas	North of Ralston Ave	54.6	54.7	0.1	5.0	No	Yes	No
37	Alameda de las Pulgas	South of Ralston Ave	57.7	57.4	-0.3	5.0	No	Yes	No
38	Notre Dame Ave	North of Ralston Ave	55.8	55.8	0.0	5.0	No	Yes	No
39	NDHS Drwy 2	North of Ralston Ave	42.4	42.4	0.0	5.0	No	Yes	No
40	Chula Vista Dr	South of Ralston Ave	59.4	59.4	0.1	5.0	No	Yes	No
41	NDU Rd	North of Ralston Ave	35.7	38.5	2.8	5.0	No	Yes	No
42	South Rd	North of Ralston Ave	49.6	49.6	0.0	5.0	No	Yes	No
43	6th Ave	North of Ralston Ave	42.7	42.7	0.0	5.0	No	Yes	No
44	6th Ave	South of Ralston Ave	52.2	52.2	0.0	5.0	No	Yes	No
45	El Camino Real	North of Ralston Ave	56.0	56.0	0.0	5.0	No	Yes	No
46	El Camino Real	South of Ralston Ave	62.5	62.5	0.0	3.0	No	No	No
47	Old County Rd	North of Ralston Ave	55.3	55.4	0.0	5.0	No	Yes	No
48	Old County Rd	South of Ralston Ave	52.3	52.3	0.0	5.0	No	Yes	No
49	Elmer St	South of Ralston Ave	45.6	45.6	0.0	5.0	No	Yes	No
50	Hiller St	North of Ralston Ave	55.9	55.9	0.0	5.0	No	Yes	No
51	Hiller St	South of Ralston Ave	42.2	42.2	0.0	5.0	No	Yes	No
52	US 101 SB Ramps	South of Ralston Ave	55.0	55.0	0.0	5.0	No	Yes	No
53	Island Pkwy	North of Ralston Ave	55.3	55.3	0.0	5.0	No	No	No
54	US 101 NB Ramps	North of Ralston Ave	63.6	63.7	0.1	3.0	No	No	No

¹ Significance threshold as determined by FICON criteria contained in Table 4.
² Sensitive receptors identified in this analysis as single-family residence backyards, multi-family residence common outdoor areas, and school outdoor play areas.
³ A significant impact is identified only along segments where project-related traffic noise level increases would exceed threshold AND where sensitive receptors are present.

Source: FHWA-RD-77-108 with inputs from Fehr & Peers. Appendices E-1 & E-4 contain FHWA Model inputs.

Based on the analysis presented in Table 12, project-generated traffic noise level increases associated with existing no project vs. existing plus project with current infrastructure conditions would not result in significant noise impacts at existing noise-sensitive receptors located along the project area roadway network. As a result, this impact is identified as being ***less than significant***.

Noise Impacts from Proposed Development Areas at Existing Sensitive Uses

According to the provided project description and site plans, the project consists of eight (8) development areas within the project area. However, the precise locations of individual new buildings and uses within those areas have yet to be determined. The locations and names of the of the project development areas are shown in Figure 2. A brief description of each development area and anticipated noise sources within those areas is provided below.

Plateau Area (P)

This area in the northern and central part of the project site (the academic core) is the largest flat area on the within property. Some of the existing buildings in this zone include Gleason Gym, Chapel, New Hall, and Gellert Library – of which would be removed and replaced over time. Based on the details contained in the project description, and after a review of the proposed development area design, the primary noise sources associated with this zone are expected to be on-site traffic circulation on Notre Dame University Road and Laxague Drive, parking area movements, on-site delivery truck circulation, and new building mechanical equipment (HVAC).

Legacy Area (L)

This area is located in the western portion of the project area and includes Ralston Hall Mansion and Madison Art Center (carriage house) – both of which would be preserved. Based on the details contained in the project description, and after a review of the proposed development area design, the primary noise sources associated with this zone are expected to be on-site traffic circulation on connector roads to Notre Dame University Road and Laxague Drive, parking area movements, on-site delivery truck circulation, and (potential) outdoor event/ceremony-related activities (i.e., amplified music/speech and crowd noise).

West Area (W)

This area is located at the western boundary of the project area, directly adjacent to existing Belmont homes. Some of the existing buildings in this zone include Courtai, Namur, Gavin Hall, and the bookstore – all of which would be removed and replaced over time. Based on the details contained in the project description, and after a review of the proposed development area design, the primary noise sources associated with this zone are expected to be on-site traffic circulation on connector roads to Notre Dame University Road and Laxague Drive, parking area movements, on-site delivery truck circulation, and new building mechanical equipment (HVAC).

North Area (N)

This area is located on the most northern edge of the project site. Currently, there are no buildings in this area. Based on the details contained in the project description, and after a review of the proposed development area design, the primary noise sources associated with this zone are expected to be on-site traffic circulation on connector roads to Notre Dame University Road and Laxague Drive, parking area movements, and new building mechanical equipment (HVAC).

Ralston Area (R)

This area is located at the southern edge of the project site and currently includes Koret Field, an old theater building, some tennis courts, and parking. The theater building would be removed over time and Koret Field, tennis courts, and parking could be removed and upgraded over the lifetime of the project. As part of the proposed project, an access road via Ralson Avenue to the parcel on which Koret Field is located would be developed. Based on the details contained in the project description, and after a review of the proposed development area design, the primary noise sources associated with this zone are expected to be on-site traffic circulation on Laxague Drive and a new connector road from Ralston Avenue, on-site delivery truck circulation, and parking area movements. It should be noted that the proposed project does not include any additional public recreational or open space facilities. As a result, impacts of noise associated with existing recreational activities occurring within this zone are not considered in this assessment.

South Area (S)

This area is located right above the Ralston area and connects the Ralston and Plateau Areas. Some of the existing buildings in this zone include campus apartment buildings and academic/support buildings, such as Wilkie, Kane, Carrol, and Oaks. These buildings would be removed and replaced over time. Based on the details contained in the project description, and after a review of the proposed development area design, the primary noise sources associated with this zone are expected to be on-site traffic circulation on Laxague Drive, on-site delivery truck circulation, parking area movements, human speech within the common outdoor area near Laxague Drive, and new building mechanical equipment (HVAC).

Taube Area (T)

This area is located within the southeastern part of the project site, which includes the Taube Center (which would be preserved) and the primary entrance to the campus. Based on the details contained in the project description, and after a review of the proposed development area design, the primary noise sources associated with this zone are expected to be on-site traffic circulation on Notre Dame University Road and Laxague Drive, on-site delivery truck circulation, and parking area movements.

East Area (E)

This area is located within the easternmost portion of the project site and includes an existing parking lot. Based on the details contained in the project description, and after a review of the proposed development area design, the primary noise sources associated with this zone are

expected to be on-site traffic circulation from Notre Dame University Road to the East area parking lot, and parking area movements.

Applicable Noise Level Criteria

As noted in the Regulatory Setting section of this report, the City of Belmont General Plan establishes exterior noise level limits for noise-sensitive uses affected by non-transportation (stationary) noise sources, such as those that would occur within the project area on private property/roads. The General Plan exterior noise level standards for non-transportation noise sources are presented in Table 9 of this report. The noise level standards presented in Table 9 are to be applied at the property lines of noise-sensitive uses, which are defined by the General Plan (Noise Element) as residences, schools, churches, and hospitals. The closest off-site noise-sensitive uses to the project area have been identified as residential (existing and proposed future), school (elementary and high school), and a memory care facility. The locations of the nearest identified noise-sensitive uses are shown in Figure 1.

In terms of determining the temporary noise increase due to project on-site operations and construction activities at existing noise-sensitive uses in the vicinity, an impact would occur if those activities would noticeably increase ambient noise levels above background levels at those locations. The threshold of perception of the human ear is approximately 3 to 5 dB – a 5 dB change is considered to be clearly noticeable. For the analysis of project on-site operations and construction activity noise level increases at existing noise-sensitive uses, a noticeable increase in ambient noise levels is assumed to occur where those activities would result in an increase by 5 dB or more over existing ambient noise levels at those locations.

Finally, although the proposed development area plan contains the locations of the development areas (Figure 2), detailed plans illustrating locations of specific new uses and associated site-specific designs within those components have not yet been developed. It is expected that detailed development plans for all development areas will be reviewed at a future date as part of the City's project approval process. As a result, the following sections provide generalized analyses of on-site operations/activities noise exposure at nearby noise-sensitive uses.

Impact 3: On-Site Vehicle Circulation Noise at Off-Site Noise-Sensitive Uses

To quantify on-site traffic circulation noise levels at nearby existing residential uses, BAC utilized the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-77-108) with trip generation data contained in the project draft transportation impact study prepared by Fehr & Peers (*Stanford Belmont Campus Traffic Study – Draft Report, dated July 2023*). According to that data, the project is estimated to generate a total of 1,891 daily trips, with 182 AM peak hour trips, 154 Midday peak hour trips, and 182 PM peak hour trips. For the purposes of computing hourly average (L_{eq}) noise levels from project on-site vehicle circulation, worst-case estimated peak hour trips were used during daytime hours (182) and 50% of worst-case estimated peak hour trips were assumed during nighttime hours (91).

Figure 3-6 of the project description illustrates the proposed on-site vehicular circulation route. Based on the proposed on-site vehicle circulation route, the hourly trip generation data and assumptions above, an assuming an on-site vehicle speed of 15 mph (existing posted speed

limit), project on-site passenger vehicle circulation noise exposure at nearby off-site noise-sensitive uses was calculated and the results of those calculations are presented in Table 13.

Table 13
Predicted On-Site Passenger Vehicle Noise Levels at Off-Site Noise-Sensitive Uses

Receiver ¹	Predicted Noise Level, L_{eq} (dB) ^{2,3}		City Noise Standard, L_{eq} (dB)	
	Daytime	Nighttime	Daytime	Nighttime ⁴
Residential – N	33	30	50	45
Residential – NE (Existing)	34	31	50	45
Residential – NE (Proposed)	34	31	50	45
Residential – E	32	29	50	45
Residential – South	34	31	50	45
Residential – West	30	27	50	45
Residential – Northwest	31	28	50	45
Memory Care Facility	34	31	50	45
High School	40	37	50	--
Church	43	40	50	--
Elementary School	43	40	50	--

¹ Receiver locations shown in Figure 1.
² Predicted daytime and nighttime hourly L_{eq} based on 182 and 91 vehicle trips per hour, respectively.
³ Predicted noise levels projected from nearest proposed on-site circulation route to property line of receiver.
⁴ City nighttime noise level standards not applied at uses which aren't normally occupied during nighttime hours.

Source: BAC 2024.

It is reasonably assumed that on-site passenger vehicle circulation currently occurs on the project property (i.e., an existing no project noise source). However, with development of the project, on-site passenger vehicle circulation volumes would increase relative to existing conditions. As a result, project-generated on-site passenger vehicle circulation noise level exposure at existing off-site noise-sensitive uses was appropriately assessed relative to the City of Belmont General Plan hourly average (L_{eq}) noise level criteria rather than the maximum (L_{max}) noise level standard, as the maximum noise level (or highest instantaneous noise level) from a project-generated vehicle would be equivalent to that associated with an existing no project vehicle. As indicated in Table 13, worst-case peak hour project on-site passenger vehicle circulation noise level exposure is predicted to satisfy the applicable General Plan daytime and nighttime hourly average (L_{eq}) noise level standards at the identified nearby off-site noise-sensitive uses.

Table 1 of this report contains the results from the BAC long-term ambient noise surveys, which are believed to be generally representative of the existing ambient noise environments at the closest off-site noise-sensitive uses (identified in Figure 1). Using the lowest average measured hourly daytime and nighttime noise levels at each site during the 96-hour monitoring period (Table 1), and the results presented in Table 13, ambient plus project on-site passenger vehicle circulation noise level increases were calculated at the closest existing noise-sensitive uses. According to the results from that exercise, project-generated increases in ambient daytime hourly average noise levels are calculated to range from less than 0.1 to 0.3 dB L_{eq} at the nearest existing noise-sensitive uses. Additionally, project-generated increases in ambient nighttime hourly

average noise levels are calculated to range from less than 0.1 to 1.4 dB L_{eq} at the closest existing noise-sensitive uses. The calculated increases in ambient noise levels above be well below the applied increase significance criterion of 5 dB.

Because project-generated on-site passenger vehicle circulation noise level exposure is predicted to satisfy the applicable City of Belmont General Plan daytime and nighttime noise level criteria at nearby off-site noise-sensitive uses, and because predicted noise levels from those activities are not calculated to result in a significant increase in ambient noise levels at nearby existing noise-sensitive uses, this impact is identified as being ***less than significant***.

Impact 4: On-Site Delivery Truck Circulation Noise at Off-Site Noise-Sensitive Uses

According to the project description, the project would include on-site service routes throughout the campus for vehicles associated with loading, package deliveries, garbage and trash collection, and parking for maintenance and service. The proposed project service routes are illustrated in Figure 3-8 of the project description.

Based on a review of the proposed service routes, it is reasonably assumed the routes would primarily accommodate medium-duty delivery trucks (and vans), as circulation on the proposed service routes with heavy-duty larger semi-trucks does not appear be feasible given site constraints. To quantify noise levels generated by project on-site delivery truck circulation, BAC utilized file data obtained from measurements conducted by BAC of medium duty truck passbys. According to BAC file data, single-event medium truck passby noise levels are approximately 76 dB SEL at a reference distance of 50 feet.

For a conservative assessment of daily truck delivery noise levels at the project site, it was assumed that 8 medium duty trucks/vans could deliver products within campus on a typical busy day. To calculate hourly average (L_{eq}) noise level exposure from on-site truck circulation, it was assumed that the project could have 4 truck deliveries during the same worst-case busy daytime hour, and that 50% of those deliveries could occur during nighttime hours (2 deliveries). Based on the proposed on-site service route, the cited reference truck passby sound level data, and hourly delivery assumptions above, project on-site delivery truck circulation noise exposure at nearby off-site noise-sensitive uses was calculated and the results of those calculations are presented in Table 14.

Table 14
Predicted On-Site Truck Circulation Noise Levels at Off-Site Noise-Sensitive Uses

Receiver ¹	Predicted Noise Level, L_{eq} (dB) ^{2,3}		City Noise Standard, L_{eq} (dB)	
	Daytime	Nighttime	Daytime	Nighttime ⁴
Residential – N	28	25	50	45
Residential – NE (Existing)	34	31	50	45
Residential – NE (Proposed)	34	31	50	45
Residential – E	31	28	50	45
Residential – South	38	35	50	45
Residential – West	29	26	50	45
Residential – Northwest	37	34	50	45
Memory Care Facility	34	31	50	45
High School	46	43	50	--
Church	46	43	50	--
Elementary School	46	43	50	--

¹ Receiver locations shown in Figure 1.
² Predicted daytime and nighttime hourly L_{eq} based on 4 and 2 truck deliveries per hour, respectively.
³ Predicted noise levels projected from nearest proposed on-site service route to property line of receiver.
⁴ City nighttime noise level standards not applied at uses which aren't normally occupied during nighttime hours.

Source: BAC 2024.

It is reasonably assumed that on-site delivery truck circulation currently occurs on the project property (i.e., an existing no project noise source). However, with development of the project, the number of truck deliveries are expected to increase relative to existing conditions. As a result, project-generated on-site delivery truck circulation noise level exposure at existing off-site noise-sensitive uses was appropriately assessed relative to the City of Belmont General Plan hourly average (L_{eq}) noise level criteria rather than the maximum (L_{max}) noise level standard, as the maximum noise level (or highest instantaneous noise level) from a project-generated delivery truck would be equivalent to that associated with an existing no project delivery truck. Table 14 data indicate that project on-site delivery truck circulation noise level exposure is predicted to satisfy the applicable General Plan daytime and nighttime hourly average (L_{eq}) noise level standards at the identified nearby off-site noise-sensitive uses.

Table 1 of this report contains the results from the BAC long-term ambient noise surveys, which are believed to be generally representative of the existing ambient noise environments at the closest off-site noise-sensitive uses (identified in Figure 1). Using the lowest average measured hourly daytime and nighttime noise levels at each site during the 96-hour monitoring period (Table 1), and the results presented in Table 14, ambient plus project delivery truck circulation noise level increases were calculated at the closest existing noise-sensitive uses. According to the results from that exercise, project-generated increases in ambient daytime hourly average noise levels are calculated to range from less than 0.1 to 0.6 dB L_{eq} at the nearest existing noise-sensitive uses. Additionally, project-generated increases in ambient nighttime hourly average noise levels are calculated to range from less than 0.1 to 3.0 dB L_{eq} at the closest existing noise-sensitive uses. The calculated increases in ambient noise levels above would be below the applied increase significance criterion of 5 dB.

Because project-generated on-site delivery truck circulation noise level exposure is predicted to satisfy the applicable City of Belmont General Plan daytime and nighttime noise level criteria at nearby off-site noise-sensitive uses, and because predicted noise levels from those activities are not calculated to result in a significant increase in ambient noise levels at nearby existing noise-sensitive uses, this impact is identified as being **less than significant**.

Impact 5: Parking Area Movement Noise at Off-Site Noise-Sensitive Uses

The proposed project would include between 950 to 1,350 parking spaces, based on the amount of building square footage proposed. With each phase of development, Stanford would coordinate with the City of Belmont to determine the number of parking spaces needed. With each detailed development plan application, Stanford would propose vehicular and bicycle parking, including electric vehicle charging, proportional to the amount and type of development proposed. Figure 3-6 of the project description illustrates the potential parking locations and the vehicular circulation of the campus. Currently, it is not yet known whether the proposed parking will be in “above grade” or “below-grade” parking structures. Where appropriate, existing surface lots may continue to be utilized until such time that the development area of the surface lot is redeveloped.

According to BAC file data, individual parking lot movements generate an average sound exposure level (SEL) of approximately 65 dB at a distance of 50 feet. Those data include individual measurements of multiple vehicle types arriving and departing a parking area, including starting and stopping, car doors opening and closing, and person conversing as they entered and exited the vehicles. 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 must be known or assumed. Based on an SEL of 65 dB, given a parking area containing 100 vehicle stalls, and assuming all of those stalls could fill or empty during a given peak hour, an hourly average of 49 dB L_{eq} can be calculated at a distance of 50 feet.

Because site-specific development plans for future configurations of parking areas (including parking structures) within the project area are currently not known, and based on the proximity to nearby off-site noise-sensitive uses, it is possible that project-generated parking area noise exposure could exceed the applicable City of Belmont General Plan noise level criteria at nearby off-site noise-sensitive uses. Further, noise levels from those parking areas could potentially exceed existing ambient conditions at nearby noise-sensitive uses. As a result, this impact is identified as being **potentially significant**.

Mitigation for Impact 5:

To satisfy applicable City of Belmont General Plan noise level standards at nearby off-site noise-sensitive uses, and to ensure that project-generated noise does not result in a significant increase in ambient conditions at those sensitive uses, the following noise mitigation measure should be implemented:

- MM 5:** A site-specific noise impact study that addresses project parking area activities shall be completed by a qualified noise consultant once site-specific development plans for those areas are completed. The noise impact study shall include an analysis of project parking noise exposure at the nearest noise-sensitive uses. The

analysis shall include associated mitigation measures (as appropriate) to reduce project-related parking lot noise levels to a state of compliance with applicable City of Belmont General Plan noise level limits at nearby noise-sensitive receptors. The analysis shall also include associated mitigation measures (as appropriate) to ensure project-generated noise levels do not result in a significant increase in existing ambient conditions at nearby noise-sensitive uses.

Significance of Impact 5 after Mitigation: *Less than Significant*

Impact 6: HVAC Equipment Noise at Off-Site Noise-Sensitive Uses

Over the 30-year buildout horizon, Stanford may at times elect to occupy and upgrade existing structures for academic and academic support uses on the Belmont Campus. The campus currently contains a building square footage of approximately 318,000, but is proposing a total building square footage of approximately 700,000. The precise locations of individual new buildings are not known at this time and would be shown on subsequent detailed development plans submitted to the City of Belmont for review. The general development areas for proposed new buildings, structures and building groups are shown on Figure 3-3 of the project description (also provided as Figure 2 in this report).

The HVAC systems within future buildings of the project area will likely consist of packaged rooftop air conditioning systems. Such rooftop-mounted HVAC units typically stand about 4-5 feet tall. It is the experience of BAC that rooftop HVAC units frequently generate a noise level of approximately 55-60 dB L_{eq} at a reference distance of 100 feet from the building facade. Shielding of the equipment by building rooftop parapets is estimated to provide approximately 10 dB of noise level reduction, which would reduce the noise level to approximately 45-50 dB L_{eq} at 100 feet.

Because site-specific development plans for future locations (and configurations) of new buildings within the development areas are not currently known, and based on the proximity to nearby off-site noise-sensitive uses, it is possible that noise level exposure from HVAC systems of future buildings could exceed the applicable City of Belmont General Plan noise level criteria at nearby off-site noise-sensitive uses. Further, noise levels from those HVAC systems could potentially exceed existing ambient conditions at nearby noise-sensitive uses. As a result, this impact is identified as being **potentially significant**.

Mitigation for Impact 6:

To satisfy applicable City of Belmont General Plan noise level standards at nearby off-site noise-sensitive uses, and to ensure that project-generated noise does not result in a significant increase in ambient conditions at those sensitive uses, the following noise mitigation measure should be implemented:

- MM 6:** A site-specific noise impact study that addresses new HVAC systems shall be completed by a qualified noise consultant once site-specific development plans for future buildings are completed. The noise impact study shall include an analysis of HVAC equipment noise exposure at the nearest noise-sensitive uses. The

analysis shall include associated mitigation measures (as appropriate) to reduce project-related HVAC system noise levels to a state of compliance with applicable City of Belmont General Plan noise level limits at nearby noise-sensitive receptors. The analysis shall also include associated mitigation measures (as appropriate) to ensure project-generated noise levels do not result in a significant increase in existing ambient conditions at nearby noise-sensitive uses.

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

Impact 7: Outdoor Event Amplified Music & Crowd Noise at Off-Site Sensitive Uses

According to the project description, the Ralston Manor (located within the Legacy Area) would be renovated and used to host a variety of activities including events and ceremonies. Although the project description states that events and ceremonies will be held at the Ralston Manor, it is unclear whether such events and ceremonies could be held within a nearby outdoor area. Typical noise sources associated with outdoor events include amplified music/speech and crowd noise. The location of the Legacy Area is illustrated in Figure 2.

The noise level exposure associated with an event sound system setup is highly dependent on variables that include quality of sound system, volume level, distance to receiver, location of equipment and intervening screening, and speaker directionality. Further, noise level exposure associated with event crowd noise is highly dependent on the number of people in attendance and location of the crowd relative to the receiver. Due to the variability in the above noise sources, it is difficult to quantify event sound system and crowd noise levels with a reasonable degree of precision. Due to insufficient information on outdoor events at the Ralston Manor, and based on the proximity to nearby off-site noise-sensitive uses, it is possible that noise level exposure from outdoor events (should they be proposed) could exceed the applicable City of Belmont General Plan noise level criteria at nearby off-site noise-sensitive uses. Further, noise levels from those events could potentially exceed existing ambient conditions at nearby noise-sensitive uses. As a result, this impact is identified as being **potentially significant**.

Mitigation for Impact 7:

To satisfy applicable City of Belmont General Plan noise level standards at nearby off-site noise-sensitive uses, and to ensure that project-generated noise does not result in a significant increase in ambient conditions at those sensitive uses, the following noise mitigation measure should be implemented:

- MM 7:** Should outdoor events be proposed within the project area, a noise impact study that addresses event-generated activities shall be completed by a qualified noise consultant once event details are known. The noise impact study shall include an analysis of outdoor event noise exposure at the nearest noise-sensitive uses. The analysis shall include associated mitigation measures (as appropriate) to reduce project-related outdoor event noise levels to a state of compliance with applicable City of Belmont General Plan noise level limits at nearby noise-sensitive receptors. The analysis shall also include associated mitigation measures (as appropriate) to

ensure project-generated noise levels do not result in a significant increase in existing ambient conditions at nearby noise-sensitive uses.

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

Impact 8: Cumulative (Combined) Noise Levels at Off-Site Noise-Sensitive Uses

The calculated cumulative (combined) noise levels from analyzed project on-site operations at nearby off-site noise-sensitive uses (residential) are presented in Tables 15 and 16. It should be noted that due to the logarithmic nature of the decibel scale, the sum of two noise values which differ by 10 dB equates to an overall increase in noise levels of 0.4 dB. When the noise sources are equivalent, the sum would result in an overall increase in noise levels of 3 dB.

Table 15
Calculated Cumulative Project Noise Levels vs. City Daytime Hourly Average Noise Standard

Receiver ¹	Predicted Daytime Noise Level, Leq (dB)					Calculated Combined, Leq (dB)	City Daytime Noise Limit, Leq (dB)
	Vehicle Circ.	Truck Circ.	Parking Areas ²	HVAC ²	Event Music/Crowds ²		
Residential – N	33	28	N/A	N/A	N/A	34	50
Residential – NE (Existing)	34	34	N/A	N/A	N/A	37	50
Residential – NE (Proposed)	34	34	N/A	N/A	N/A	37	50
Residential – E	32	31	N/A	N/A	N/A	34	50
Residential – South	34	38	N/A	N/A	N/A	40	50
Residential – West	30	29	N/A	N/A	N/A	32	50
Residential – Northwest	31	37	N/A	N/A	N/A	38	50
Memory Care Facility	34	34	N/A	N/A	N/A	37	50
High School	40	46	N/A	N/A	N/A	47	50
Church	43	46	N/A	N/A	N/A	48	50
Elementary School	43	46	N/A	N/A	N/A	48	50

¹ Receiver locations shown in Figure 1.
² Noise levels were unable to be quantified for these sources at the current time.

Source: BAC 2024.

Table 16
Calculated Cumulative Project Noise Levels vs. City Nighttime Hourly Average Noise Standard

Receiver ¹	Predicted Nighttime Noise Level, L_{eq} (dB)					Calculated Combined, L_{eq} (dB)	City Nighttime Noise Limit, L_{eq} (dB) ³
	Vehicle Circ.	Truck Circ.	Parking Areas ²	HVAC ²	Event Music/Crowds ²		
Residential – N	30	24	N/A	N/A	N/A	31	45
Residential – NE (Existing)	31	31	N/A	N/A	N/A	34	45
Residential – NE (Proposed)	31	31	N/A	N/A	N/A	34	45
Residential – E	29	28	N/A	N/A	N/A	31	45
Residential – South	31	35	N/A	N/A	N/A	37	45
Residential – West	27	26	N/A	N/A	N/A	29	45
Residential – Northwest	28	34	N/A	N/A	N/A	35	45
Memory Care Facility	31	31	N/A	N/A	N/A	34	45
High School	37	43	N/A	N/A	N/A	44	--
Church	40	43	N/A	N/A	N/A	45	--
Elementary School	40	43	N/A	N/A	N/A	45	--

¹ Receiver locations shown in Figure 1.
² Noise levels were unable to be quantified for these sources at the current time.
³ City nighttime noise level standards not applied at uses which aren't normally occupied during nighttime hours.

Source: BAC 2024.

As indicated in Tables 15 and 16, cumulative noise level exposure from analyzed project on-site operations is predicted to satisfy the applicable General Plan daytime and nighttime hourly average (L_{eq}) noise level standards at the identified nearby off-site noise-sensitive uses.

Table 1 of this report contains the results from the BAC long-term ambient noise surveys, which are believed to be generally representative of the existing ambient noise environments at the closest off-site noise-sensitive uses (identified in Figure 1). Using the lowest average measured hourly daytime and nighttime noise levels at each site during the 96-hour monitoring period (Table 1), and the results presented in Tables 15 and 16, ambient plus cumulative project noise level increases were calculated at the closest existing noise-sensitive uses. According to the results from that exercise, cumulative project-generated increases in ambient daytime hourly average noise levels are calculated to range from less than 0.1 to 0.8 dB L_{eq} at the nearest existing noise-sensitive uses. Additionally, cumulative project-generated increases in ambient nighttime hourly average noise levels are calculated to range from less than 0.1 to 3.6 dB L_{eq} at the closest existing noise-sensitive uses. The calculated cumulative increases in ambient noise levels above would be below the applied increase significance criterion of 5 dB.

Cumulative (combined) noise level exposure from analyzed project on-site operations is calculated to satisfy the applicable City of Belmont General Plan daytime and nighttime noise level criteria at nearby off-site noise-sensitive uses. Further, cumulative noise levels from analyzed project on-site operations are not calculated to result in a significant increase in ambient noise levels at nearby existing noise-sensitive uses. However, depending on noise level exposure from the noise sources not quantified in this report (i.e., parking activities, HVAC equipment and outdoor amplified event music/speech), cumulative (combined) noise level exposure from project

on-site operations could potentially exceed applicable City of Belmont General Plan noise level criteria at nearby off-site noise-sensitive uses. Further, the cumulative contribution of noise including the identified unquantified on-site operations could potentially result in significant increases in ambient noise levels at nearby existing noise-sensitive uses. As a result, this impact is identified as being **potentially significant**.

Mitigation for Impact 8:

To satisfy applicable City of Belmont General Plan noise level standards at nearby off-site noise-sensitive uses, and to ensure that cumulative project-generated noise does not result in a significant increase in ambient conditions at those sensitive uses, the following two noise mitigation measures should be implemented:

MM 8A: The project shall implement Mitigation Measures 5, 6 and 7 (MM- 5, MM 6 and MM 7).

MM 8B: Following implementation of Mitigation Measure 8A, and based on the results from implementation of Mitigation Measure 8A, an analysis that addresses cumulative (combined) on-site operations noise shall be completed by a qualified noise consultant. The impact analysis shall include calculated cumulative noise level exposure from all analyzed on-site operations at the nearest noise-sensitive uses. The analysis shall include associated mitigation measures (as appropriate) to reduce cumulative project on-site operations noise levels to a state of compliance with applicable City of Belmont General Plan noise level limits at nearby noise-sensitive receptors. The analysis shall also include associated mitigation measures (as appropriate) to ensure that cumulative project on-site operations noise levels do not result in a significant increase in existing ambient conditions at nearby noise-sensitive uses.

Significance of Impact 8 after Mitigation: *Less than Significant*

Noise Impacts Associated with On-Site Utility Systems Construction Activities

The project site is served by public water supply, wastewater collection and treatment, and storm drainage facilities. Stanford would reuse and upgrade existing on-site utilities, where possible. Development of the Stanford Belmont Campus may also require installation of new utility improvements as deemed necessary. Necessary utility layouts would vary with each development area. Preliminary conceptual plans for water lines, sanitary sewer lines, and storm drain lines are provided in Figures 5-7 of this report (Figures 3-10, 3-11 and 3-12 of the project description).



Legend



Proposed Water



Approximate Point of Connection
to Existing Utility Line

Stanford University Belmont Campus
Belmont, California

Proposed Conceptual Water Line Plan

Figure 5





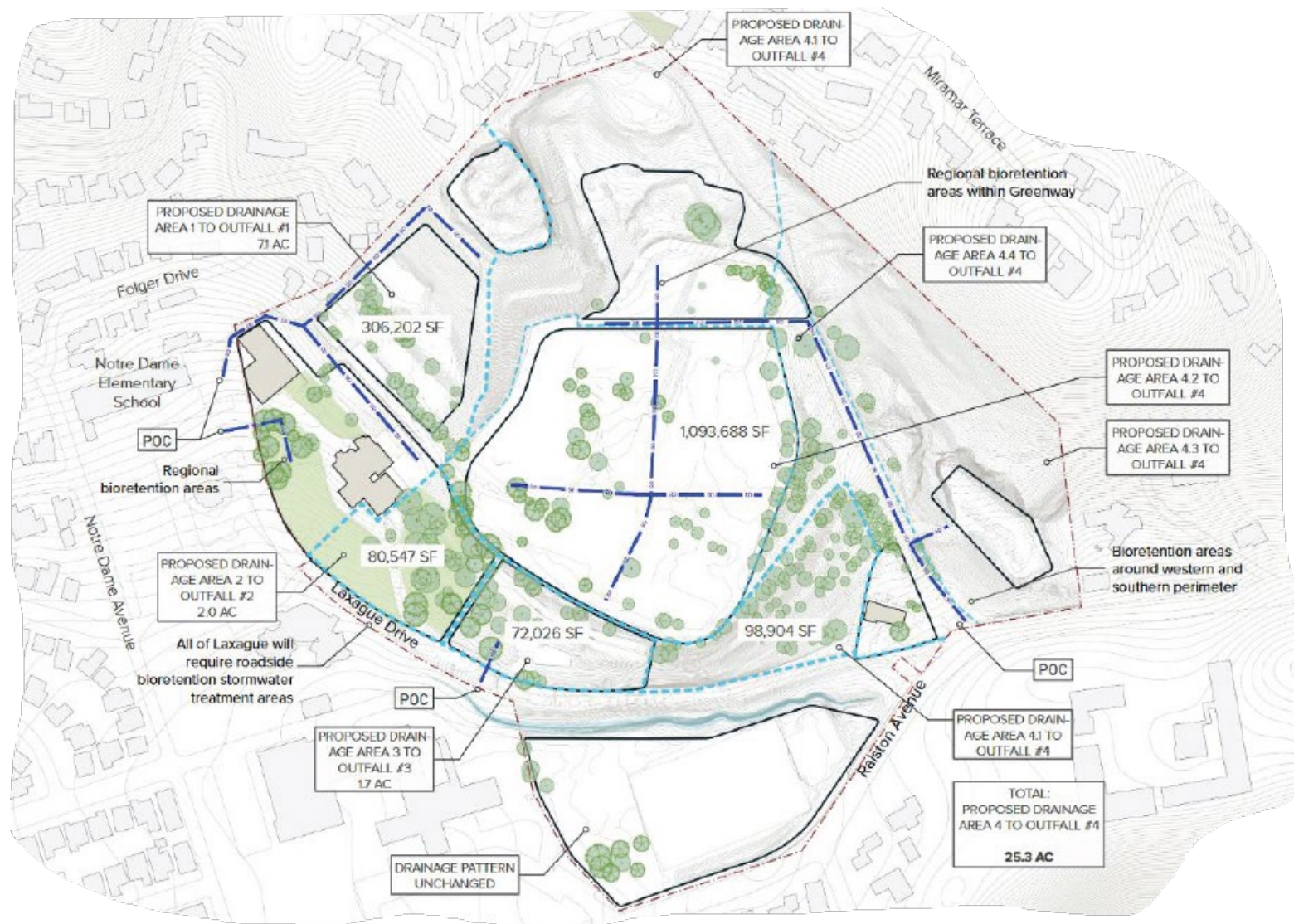
Legend

- SS — Existing Sewer
- SS — Proposed Sewer
- POC Approximate Point of Connection to Existing Utility Line

Stanford University Belmont Campus
Belmont, California

Proposed Conceptual Sewer Line Plan

Figure 6



Legend

- Proposed Watershed
- SD— Proposed Storm Drain
- POC Approximate point of connection to existing

Stanford University Belmont Campus
Belmont, California

Proposed Conceptual Storm Drain Line Plan

Figure 7

Impact 9: On-Site Utility Systems Construction Noise Off-Site Noise-Sensitive Uses

Heavy equipment associated with project on-site utility systems construction activities 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 work area would also vary depending upon the proximity of equipment activities to that point.

The nearest off-site noise-sensitive uses to the on-site water line work area have been identified as existing residential uses to the northwest, which property lines maintain a separation of approximately 40 feet from the area. The closest existing off-site noise-sensitive use to the on-site sanitary sewer line work area has been identified as Sisters of Notre Dame De Namur Church, which property line maintains a separation of approximately 50 feet from the area. Finally, the nearest existing noise-sensitive use to the project storm drain work area have been identified as existing residential uses to the northwest, which property lines maintain a separation of approximately 40 feet from the area.

Table 17 includes the range of maximum (L_{max}) noise levels for equipment commonly used in construction projects at full-power operation at a distance of 50 feet. It should be noted that not all of the activities/equipment identified in Table 17 would be required of the proposed on-site utility system construction. The Table 17 data also include predicted maximum equipment noise levels at the nearest identified existing noise-sensitive uses to a utility systems construction work area, which assume a standard spherical spreading loss of 6 dB per doubling of distance.

Table 17
Reference and Projected Noise Levels for Typical Construction Equipment

Equipment	Typical Maximum Noise Level at 50 Feet (dB)	Predicted Maximum Noise Levels Nearest Receptors (dB)		
		Water Line 40 ft	Sewer Line 50 ft	Storm Drain 40 ft
Backhoe	80	82	80	82
Compactor	82	84	82	84
Concrete mixer truck	85	87	85	87
Concrete pump	82	84	82	84
Concrete vibrator	76	78	76	78
Crane, mobile	83	85	83	85
Dozer	85	87	85	87
Dump truck	82	84	82	84
Flatbed truck	84	86	85	86
Front end loader	80	82	80	82
Paver	85	87	85	87
Pump	77	79	77	79
Saw	76	78	76	78
Shovel	82	84	82	84
Pickup truck	84	86	84	86
	Low	78	76	78
	High	87	85	87
	Average	83	82	83

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

Pursuant to City of Belmont Municipal Code Section 15-102, all construction and related activities which require a permit, including the use of powered equipment in connection with such activities, are allowed only during the hours of 8:00 a.m. to 5:00 p.m. Monday through Friday except Holidays, and 10:00 a.m. to 5:00 p.m. on Saturdays. Section 15-102 also states that all gasoline-powered construction equipment shall be equipped with an operating muffler or baffling system as originally provided by the manufacturer, and no modification to these systems is permitted. It is reasonably assumed for the purpose of this analysis that all project utility systems construction activities would occur pursuant to Municipal Code Section 15-102.

As shown in Table 17, worst-case project utility systems construction equipment maximum noise levels are projected to range from 76 to 87 dB at the property lines of nearby existing noise-sensitive uses. The predicted range of construction equipment maximum noise levels would exceed the City of Belmont General Plan daytime noise level standard of 70 dB L_{max} at the closest noise-sensitive uses included in this analysis.

In terms of determining the temporary noise increase due to project-related construction activities, an impact would occur if construction activity would noticeably increase ambient noise levels above background levels. The threshold of perception of the human ear is approximately 3 to 5 dB – a 5 dB change is considered to be clearly noticeable. For this analysis, a noticeable increase

in ambient noise levels is assumed to occur where noise levels increase by 5 dB or more over existing ambient noise levels.

Appendices C & D contain the results from the BAC long-term ambient noise surveys, which are believed to be generally representative of the existing ambient noise environments at nearby existing noise-sensitive uses. Using the highest average measured hourly maximum noise levels during construction hours required by Section 15-102, and the highest predicted construction equipment maximum noise levels shown in Table 17, ambient plus project utility systems construction noise level increases were calculated at the closest existing noise-sensitive uses. The results of those calculations indicate that increases in ambient maximum noise levels from the project sewer line construction activities would be approximately 2.0 dB L_{max} at the closest noise-sensitive use to the work area (Sisters of Notre Dame De Damur Church). However, increases in ambient maximum noise levels from project water line, sewer line, and storm drain construction activities are calculated to be as high as 14.8 dB L_{max} at the closest residential uses to the northwest. The calculated ambient maximum noise level increase of 14.8 dB L_{max} would exceed the applied increase significance criterion of 5 dB.

Based on the data presented in Table 17, project utility systems construction activities could result in an exceedance of the City of Belmont General Plan daytime maximum noise level standard of 70 dB L_{max} at a portion of the closest noise-sensitive uses to work areas. Further, project utility systems construction activities could result in substantial short-term increases over ambient maximum noise levels at nearby noise-sensitive uses. It should be noted that compliance with the time-of-day restrictions and noise muffling requirements contained in Municipal Code Section 15-102, as well as for execution of the noise-reducing policies included in the General Plan, would reduce impacts on nearby noise-sensitive receptors to the extent feasible. Nonetheless, based on the analysis provided above, this impact is identified as being **potentially significant**.

Mitigation for Impact 9:

To satisfy applicable City of Belmont General Plan noise level standards at nearby off-site noise-sensitive uses, and to ensure that project-generated noise does not result in a significant increase in ambient conditions at those sensitive uses, the following noise mitigation measure should be implemented:

- MM 9:** A site-specific noise impact study that addresses project on-site utility systems construction activities shall be completed by a qualified noise consultant once specific noise-generating construction activities/equipment is known/selected. The noise impact study shall include an analysis of on-site utility systems construction noise exposure at the nearest noise-sensitive uses. The analysis shall include associated mitigation measures (as appropriate) to reduce project on-site utility systems construction noise levels to a state of compliance with applicable City of Belmont General Plan noise level limits at nearby noise-sensitive receptors. The analysis shall also include associated mitigation measures (as appropriate) to ensure project utility systems construction noise levels do not result in a significant increase in existing ambient conditions at nearby noise-sensitive uses.

Significance of Impact 9 after Mitigation: *Less than Significant*

Noise Impacts Associated with On-Site Demolition & Construction Activities

Impact 10: Project Demolition & Construction Noise at Existing Off-Site Sensitive Uses

According to the project description, all structures, with the exception of Taube Center, Ralston Mansion and Madison Art Center (carriage house), would be removed over time and their square footage would be replaced. Proposed new development would occur in the designated development areas illustrated in Figure 2 of this report. During project demolition and construction, heavy equipment would be used for grading excavation, paving, and structure demolition/construction, which would increase ambient noise levels when in use. Noise levels would vary depending on the type of equipment used, how it is operated, and how well it is maintained. Noise exposure at any single point outside the project work area would also vary depending upon the proximity of equipment activities to that point.

Table 18 includes the range of maximum (L_{max}) noise levels for equipment commonly used in general construction projects at full-power operation at a distance of 50 feet. It should be noted that not all of these construction activities would be required of this project.

Table 18
Reference and Projected Noise Levels for Typical Construction Equipment

Equipment Description	Reference Maximum Noise Level at 50 Feet (dB)
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
Excavator	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: 2018 FTA Transit Noise and Vibration Impact Assessment Manual, Table 7-1 and BAC.

Pursuant to City of Belmont Municipal Code Section 15-102, all construction and related activities which require a permit, including the use of powered equipment in connection with such activities, are allowed only during the hours of 8:00 a.m. to 5:00 p.m. Monday through Friday except Holidays, and 10:00 a.m. to 5:00 p.m. on Saturdays. Section 15-102 also states that all gasoline-powered construction equipment shall be equipped with an operating muffler or baffling system as originally provided by the manufacturer, and no modification to these systems is permitted. It is reasonably assumed for the purpose of this analysis that all project demolition/construction activities would occur pursuant to Municipal Code Section 15-102.

As mentioned previously, all structures, with the exception of Taube Center, Ralston Mansion and Madison Art Center (carriage house), would be removed over time and their square footage would be replaced. The proposed new development would occur in the designated development areas illustrated in Figure 2. However, site-specific development plans for future locations (and configurations) of new buildings within the development areas are not currently known. Based on the proximity to nearby off-site noise-sensitive uses, it is possible that noise level exposure from demolition of existing structures and/or construction of future buildings within the project area could exceed the City of Belmont General Plan 70 dB L_{max} daytime noise level standard at nearby off-site noise-sensitive uses. Further, noise levels from project demolition/construction activities could potentially exceed existing ambient conditions at nearby noise-sensitive uses. As a result, this impact is identified as being **potentially significant**.

Mitigation for Impact 10:

To satisfy applicable City of Belmont General Plan noise level standards at nearby off-site noise-sensitive uses, and to ensure that project-generated noise does not result in a significant increase in ambient conditions at those sensitive uses, the following noise mitigation measure should be implemented:

- MM 10:** A site-specific noise impact study that addresses project demolition/construction activities shall be completed by a qualified noise consultant once site-specific development plans for future buildings are completed and specific noise-generating construction activities/equipment is known. The noise impact study shall include an analysis of demolition/construction noise exposure at the nearest noise-sensitive uses. The analysis shall include associated mitigation measures (as appropriate) to reduce project demolition/construction noise levels to a state of compliance with applicable City of Belmont General Plan noise level limits at nearby noise-sensitive receptors. The analysis shall also include associated mitigation measures (as appropriate) to ensure project demolition/construction noise levels do not result in a significant increase in existing ambient conditions at nearby noise-sensitive uses.

Significance of Impact 10 after Mitigation: *Less than Significant*

Vibration Impacts from On-Site Utility Systems Construction Activities

Impact 11: Project Utility Systems Construction Vibration at Off-Site Sensitive Uses

During project utility systems construction, heavy equipment would be used for grading, excavation, and paving, which would generate localized vibration in the immediate vicinity of the construction. Table 19 includes the range of vibration levels for equipment commonly used in general construction projects at a distance of 25 feet. The Table 19 data also include projected equipment vibration levels at the closest existing off-site structures to utility systems work areas (residences).

Table 19
Reference and Projected Construction Equipment Vibration Source Amplitudes

Equipment	Reference PPV at 25 (in/sec)	Projected Maximum Vibration Level, PPV (in/sec) ¹		
		Water Line 50 ft	Sewer Line 100 ft	Storm Drain 50 ft
Vibratory Roller	0.210	0.074	0.026	0.074
Hoe Ram	0.089	0.031	0.011	0.031
Large bulldozer	0.089	0.031	0.011	0.031
Caisson drilling	0.089	0.031	0.011	0.031
Loaded trucks	0.076	0.027	0.010	0.027
Jackhammer	0.035	0.012	0.004	0.012
Small bulldozer	0.003	0.001	<0.001	0.001

¹ PPV = Peak Particle Velocity (inch/second)

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

Policy 7.1-10 of the City of Belmont General Plan requires developers of new development anticipated to generate a substantial amount of vibration during construction to implement mitigation practices to reduce vibration, which can include: operating heavy equipment as far as practical from residential uses; using smaller bulldozers (operating weight less than 20,000 pounds) when grading must occur within approximately 50 feet of residential uses or other vibration sensitive uses; and using quiet pile driving technology when feasible. It is reasonably assumed for the purpose of this analysis that all project utility systems construction activities would occur pursuant to General Plan Policy 7.1-10.

The Table 19 data indicate that vibration levels generated from project on-site utility systems construction at the nearest existing off-site structures (residences) are predicted to be well below the Caltrans thresholds for damage to residential structures of 0.5 in/sec PPV shown in Table 5 of this report (building structure vibration criteria). In addition, the projected equipment vibration levels in Table 19 range from well below perceptible to slightly above the range of perceptible human response as defined by Caltrans in Table 6 (vibration annoyance potential threshold criteria). However, based on the analysis provided above, which includes required compliance with General Plan Policy 7.1-10 (implementation of construction vibration mitigation practices), project on-site utility systems construction activities are not expected to result in excessive groundborne vibration levels at nearby existing off-site structures.

Because vibration levels due to project on-site utility systems construction are not expected to result in excessive groundborne vibration levels at existing off-site sensitive uses, this impact is identified as being ***less than significant***.

Vibration Impacts from On-Site Project Construction/Demolition Activities

Impact 12: Project Demolition/Construction Vibration at Off-Site Sensitive Uses

Heavy equipment used for grading, excavation, paving, and building demolition/construction activities would generate localized vibration in the immediate vicinity of the work areas. Table 20 includes the range of vibration levels for equipment commonly used in general construction projects at a distance of 25 feet. The Table 20 data also include projected equipment vibration levels at the closest existing off-site sensitive structures to project development areas (i.e., residences, church buildings, school buildings, and memory care buildings).

Table 20
Reference and Projected Construction Equipment Vibration Source Amplitudes

Equipment	Reference PPV at 25 feet (in/sec)	Projected Maximum Vibration Level, PPV (in/sec) ¹							
		North Area 150 ft ²	South Area 230 ft ³	East Area 100 ft ²	West Area 75 ft ²	Legacy Area 100 ft ⁴	Ralston Area 130 ft ³	Taube Area 320 ft ⁵	Plateau Area 200 ft ²
Vibratory Roller	0.210	0.014	0.008	0.026	0.040	0.026	0.018	0.005	0.009
Hoe Ram	0.089	0.006	0.003	0.011	0.017	0.011	0.008	0.004	0.004
Large bulldozer	0.089	0.006	0.003	0.011	0.017	0.011	0.008	0.004	0.004
Caisson drilling	0.089	0.006	0.003	0.011	0.017	0.011	0.008	0.004	0.004
Loaded trucks	0.076	0.005	0.002	0.010	0.015	0.010	0.006	0.002	0.003
Jackhammer	0.035	0.002	0.001	0.001	0.007	0.001	0.003	<0.001	0.002
Small bulldozer	0.003	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001

¹ PPV = Peak Particle Velocity (inch/second)
² Closest off-site sensitive structure identified as a residence.
³ Closest off-site sensitive structure identified as a high school building.
⁴ Closest off-site sensitive structure identified as a church building.
⁵ Closest off-site sensitive structure identified as memory care facility building.

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

As mentioned previously, Policy 7.1-10 of the City of Belmont General Plan requires developers of new development anticipated to generate a substantial amount of vibration during construction to implement mitigation practices to reduce vibration, which can include: operating heavy equipment as far as practical from residential uses; using smaller bulldozers (operating weight less than 20,000 pounds) when grading must occur within approximately 50 feet of residential uses or other vibration sensitive uses; and using quiet pile driving technology when feasible. It is reasonably assumed for the purpose of this analysis that all project on-site demolition/construction activities would occur pursuant to General Plan Policy 7.1-10.

As shown in Table 20, vibration levels generated from project on-site demolition/construction at the nearest existing off-site structures are predicted to be well below the strictest Caltrans thresholds for damage to buildings of 0.5 in/sec PPV shown in Table 5 of this report (building

structure vibration criteria). Further, the projected equipment vibration levels in Table 19 range from well below perceptible to barely/slightly perceptible human response as defined by Caltrans in Table 6 (vibration annoyance potential threshold criteria). However, based on the analysis provided above, which includes required compliance with General Plan Policy 7.1-10 (implementation of construction vibration mitigation practices), project on-site demolition/construction activities are not expected to result in excessive groundborne vibration levels at nearby existing off-site structures.

Results from the ambient vibration level monitoring within the project vicinity (Table 2) indicate that measured vibration levels ranged from imperceptible to barely perceptible human response. Therefore, it is expected that the project would not result in the exposure of persons to excessive groundborne vibration levels at proposed uses of the project. Finally, it is the understanding of BAC that the project does not propose equipment that generates appreciable vibration.

Because vibration levels due to and upon the proposed project are not expected to result in excessive groundborne vibration levels at existing off-site sensitive uses, this impact is identified as being ***less than significant***.

Noise Impacts Upon the Development

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 conditions on a project's future users or residents. Nevertheless, the City of Belmont has policies that address existing/future conditions affecting the proposed project, which are discussed in the following section. The following section includes an assessment of future San Carlos Airport and San Francisco International Airport noise exposure at proposed uses within the project area.

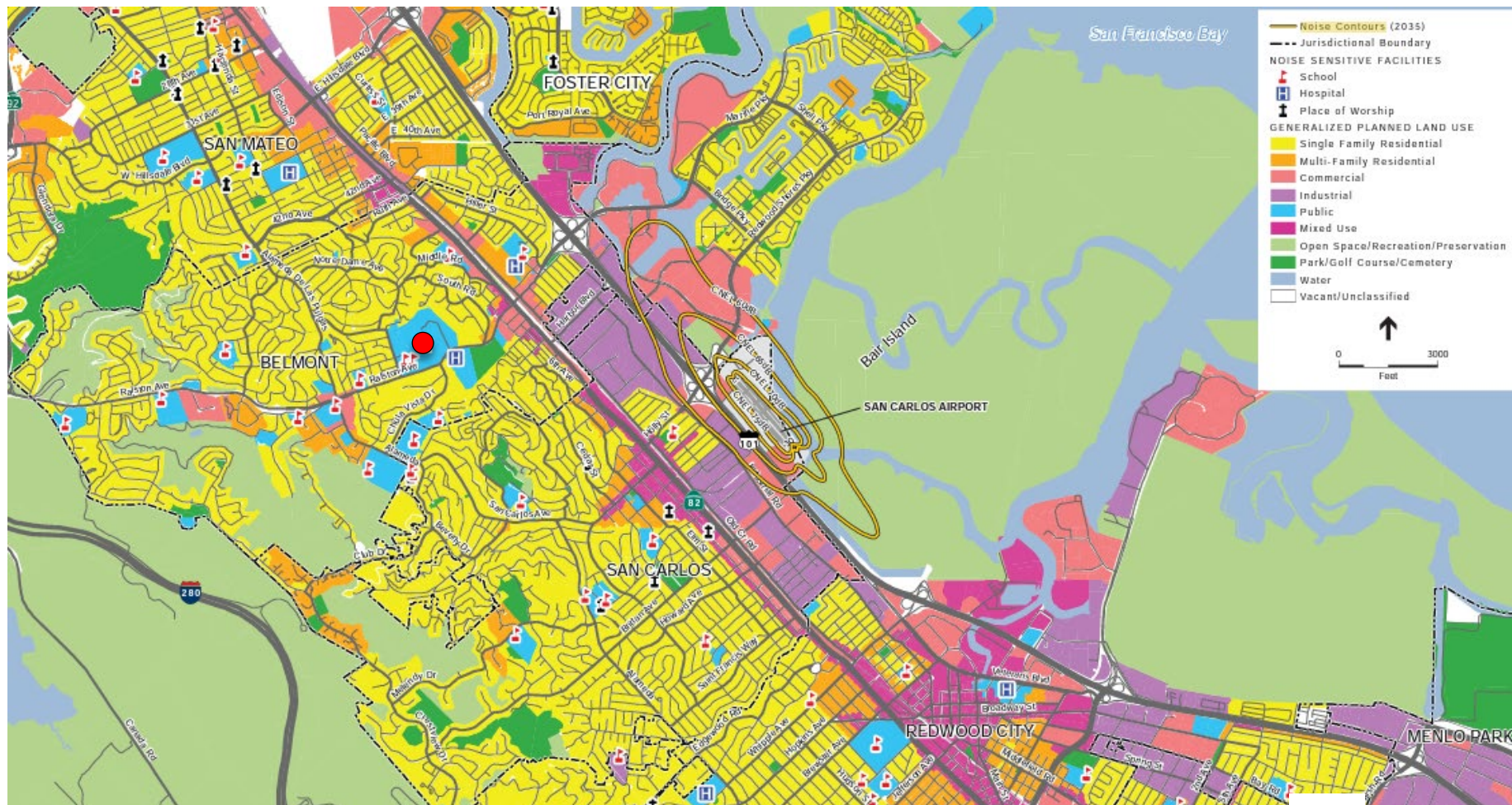
Impact 13: Airport Operations Noise Levels at the Project Site

The project site is located approximately 1.5 miles west of San Carlos Airport, and approximately 8 miles southeast of San Francisco International Airport. Figures 8 and 9 illustrate the airport locations relative to the Stanford Belmont Campus property.

The City of San Carlos General Plan establishes "normally acceptable" exterior noise level environments of up to 60 dB CNEL and 70 dB CNEL for residential uses and school uses (respectively) affected by transportation noise sources (i.e., aircraft). Additionally, the California Building Standards Code (Title 24 of the California Code of Regulations (CCR)) establishes an interior noise level limit of 45 dB in any habitable room.

According to Figure 4-2 (Future Conditions (2035) Aircraft Noise Contours) of the San Carlos Airport Land Use Compatibility Plan (provided as Figure 8 of this report), the project area is geographically located well outside of the 60 dB CNEL airport noise contours. Based on a review of Exhibit IV-4 (Airport Influence Area B – Southeast Side) of the San Francisco International Airport Land Use Compatibility Plan (provided as Figure 9 of this report), the project area is geographically located well outside of the 65 dB CNEL airport noise contours.

Based on the information above, and after consideration of the exterior to interior noise level reduction achieved within standard building construction (at least 25 dB with windows closed and approximately 15 dB with windows open), noise generated from normal aircraft operations at the San Carlos Airport and San Francisco International Airport are not expected to exceed applicable City of Belmont General Plan or California Building Standards Code exterior or interior noise level criteria at the proposed residential or school uses within the project area. As a result, this impact is identified as being ***less than significant***.



Legend



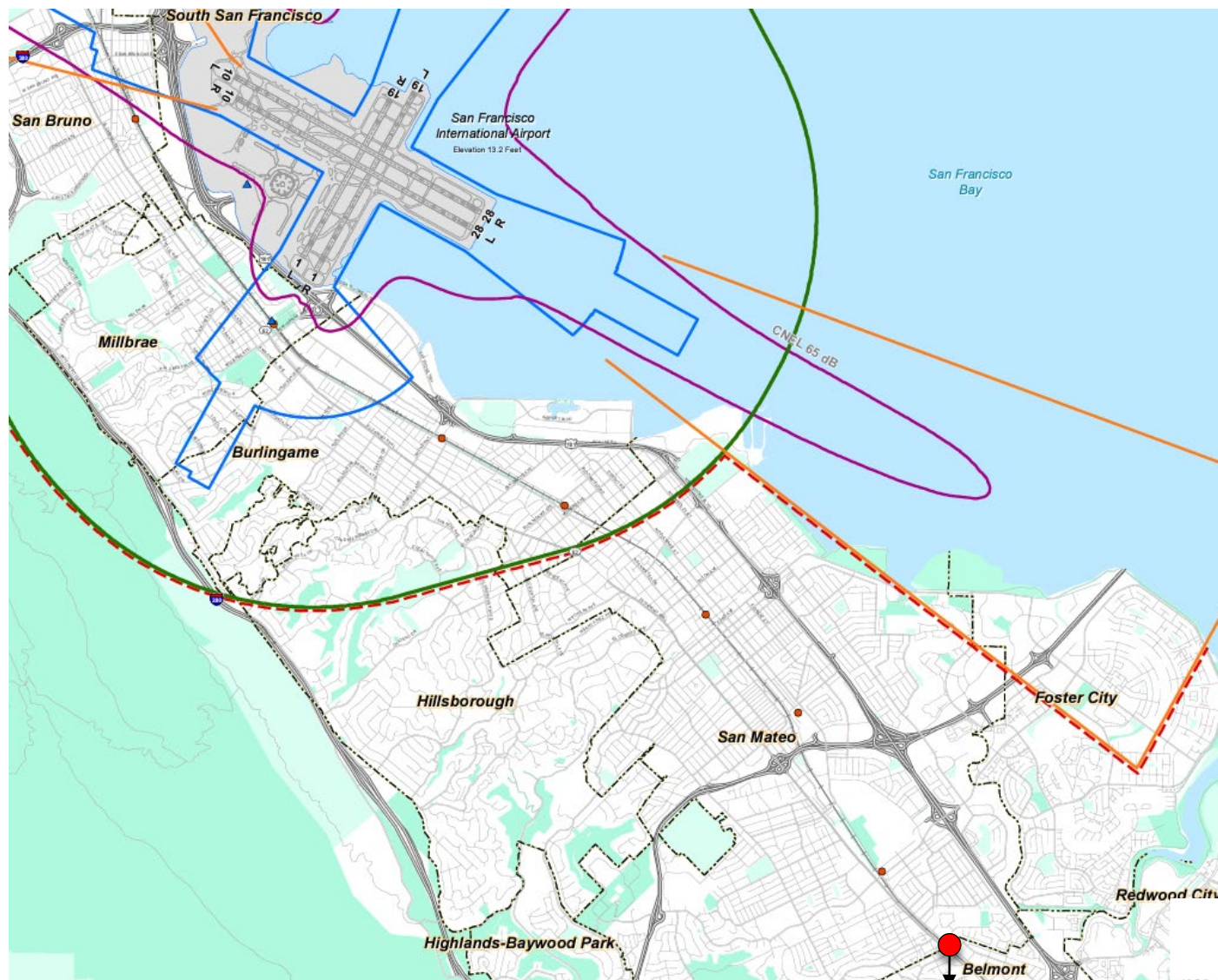
Stanford Belmont Campus

Stanford University Belmont Campus
Belmont, California

San Carlos Airport Future Aircraft Noise Contours

Figure 8





Legend



Stanford Belmont Campus

Stanford University Belmont Campus
Belmont, California

San Francisco International Airport
Airport Influence Area B – Southeast Side

Figure 9

This concludes BAC's noise and vibration assessment of the Stanford University Belmont Campus in Belmont, California. Please contact BAC at (530) 537-2328 or info@bacnoise.com if you have any comments or questions regarding this report.

Appendix A

Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound. A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.
IIC	Impact Insulation Class (IIC): A single-number representation of a floor/ceiling partition's impact generated noise insulation performance. The field-measured version of this number is the FIIC.
Ldn	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
Lmax	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.
RT₆₀	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.



A



B



C



D



E

Legend

- A: Site 1: Facing southwest towards noise and vibration monitoring equipment
- B: Site 2: Facing north towards noise and vibration monitoring equipment
- C: Site 3: Facing northeast along Ralston towards noise and vibration monitoring equipment
- D: Site 4: Facing vibration monitoring equipment towards school
- E: Site 4: Close up of vibration measurements on meter LCD screen

Stanford University Belmont Campus
Belmont, California

Field Survey Photographs

Appendix B

Appendix C-1
Long-Term Ambient Noise Monitoring Results - Site 1
Stanford University Belmont Campus - Belmont, California
Friday, September 22, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	36	53	32	30
1:00 AM	30	40	29	28
2:00 AM	41	65	28	27
3:00 AM	30	43	28	27
4:00 AM	32	42	30	27
5:00 AM	35	52	34	31
6:00 AM	39	50	38	35
7:00 AM	42	53	41	39
8:00 AM	43	59	42	40
9:00 AM	41	55	40	38
10:00 AM	42	59	40	38
11:00 AM	45	72	40	37
12:00 PM	42	57	41	38
1:00 PM	41	63	39	36
2:00 PM	43	60	40	36
3:00 PM	45	57	44	39
4:00 PM	50	61	48	46
5:00 PM	50	65	48	44
6:00 PM	46	56	44	41
7:00 PM	43	56	42	40
8:00 PM	46	69	40	39
9:00 PM	41	63	38	36
10:00 PM	37	52	36	35
11:00 PM	36	55	35	33

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	50	41	45	41	30	37
Lmax (Maximum)	72	53	60	65	40	50
L50 (Median)	48	38	42	38	28	32
L90 (Background)	46	36	39	35	27	30

Computed DNL (dB)	46
% Daytime Energy	92%
% Nighttime Energy	8%

GPS Coordinates	37°31'08.64"N
	122°17'10.99"W

Appendix C-2
Long-Term Ambient Noise Monitoring Results - Site 1
Stanford University Belmont Campus - Belmont, California
Saturday, September 23, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	34	47	33	31
1:00 AM	34	55	33	30
2:00 AM	31	41	30	29
3:00 AM	31	46	30	27
4:00 AM	30	43	28	27
5:00 AM	35	58	30	28
6:00 AM	34	48	32	30
7:00 AM	40	64	37	34
8:00 AM	39	58	37	35
9:00 AM	40	48	39	37
10:00 AM	52	65	46	40
11:00 AM	45	58	42	39
12:00 PM	42	67	39	36
1:00 PM	41	54	40	37
2:00 PM	43	55	42	39
3:00 PM	47	61	45	40
4:00 PM	50	60	49	45
5:00 PM	50	62	48	43
6:00 PM	42	58	40	37
7:00 PM	50	71	40	38
8:00 PM	48	72	39	37
9:00 PM	40	55	38	37
10:00 PM	39	54	38	36
11:00 PM	37	53	35	33

	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	39	47	39	30	35
Lmax (Maximum)	72	48	61	58	41	49
L50 (Median)	49	37	41	38	28	32
L90 (Background)	45	34	38	36	27	30

Computed DNL (dB)	46
% Daytime Energy	96%
% Nighttime Energy	4%

GPS Coordinates	37°31'08.64"N
	122°17'10.99"W

Appendix C-3
Long-Term Ambient Noise Monitoring Results - Site 1
Stanford University Belmont Campus - Belmont, California
Sunday, September 24, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	34	50	32	30
1:00 AM	33	46	31	29
2:00 AM	31	44	30	28
3:00 AM	31	39	30	28
4:00 AM	30	39	29	28
5:00 AM	30	40	29	27
6:00 AM	36	52	33	31
7:00 AM	40	62	36	34
8:00 AM	38	52	36	34
9:00 AM	40	56	37	34
10:00 AM	40	54	37	35
11:00 AM	43	58	41	38
12:00 PM	40	49	39	36
1:00 PM	47	61	44	39
2:00 PM	52	65	49	45
3:00 PM	54	65	52	48
4:00 PM	54	68	52	48
5:00 PM	50	62	48	41
6:00 PM	44	59	40	36
7:00 PM	41	56	39	37
8:00 PM	40	52	39	38
9:00 PM	38	48	37	36
10:00 PM	37	48	36	35
11:00 PM	38	54	35	34

	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	38	48	38	30	34
Lmax (Maximum)	68	48	58	54	39	46
L50 (Median)	52	36	42	36	29	32
L90 (Background)	48	34	39	35	27	30

Computed DNL (dB)	47
% Daytime Energy	97%
% Nighttime Energy	3%

GPS Coordinates	37°31'08.64"N
	122°17'10.99"W

Appendix C-4
Long-Term Ambient Noise Monitoring Results - Site 1
Stanford University Belmont Campus - Belmont, California
Monday, September 25, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	35	52	34	32
1:00 AM	33	41	33	31
2:00 AM	32	50	31	29
3:00 AM	41	67	31	29
4:00 AM	37	64	31	29
5:00 AM	34	47	33	29
6:00 AM	39	62	37	35
7:00 AM	42	53	41	38
8:00 AM	42	59	41	39
9:00 AM	40	54	39	36
10:00 AM	45	60	44	40
11:00 AM	46	57	44	41
12:00 PM	50	63	48	44
1:00 PM	51	67	48	42
2:00 PM	55	67	53	47
3:00 PM	55	69	53	49
4:00 PM	54	70	51	46
5:00 PM	54	66	53	47
6:00 PM	48	62	46	40
7:00 PM	44	57	43	41
8:00 PM	42	55	41	40
9:00 PM	42	56	41	39
10:00 PM	40	51	39	38
11:00 PM	40	51	39	38

	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	40	50	41	32	38
Lmax (Maximum)	70	53	61	67	41	54
L50 (Median)	53	39	46	39	31	34
L90 (Background)	49	36	42	38	29	32

Computed DNL (dB)	50
% Daytime Energy	97%
% Nighttime Energy	3%

GPS Coordinates	37°31'08.64"N
	122°17'10.99"W

Appendix C-5
Long-Term Ambient Noise Monitoring Results - Site 2
Stanford University Belmont Campus - Belmont, California
Friday, September 22, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	44	49	43	41
1:00 AM	40	44	39	36
2:00 AM	44	67	33	31
3:00 AM	34	47	31	29
4:00 AM	35	48	33	30
5:00 AM	38	47	36	32
6:00 AM	42	57	41	37
7:00 AM	46	57	45	43
8:00 AM	44	54	44	42
9:00 AM	45	60	44	41
10:00 AM	45	63	42	40
11:00 AM	43	55	42	39
12:00 PM	43	61	41	39
1:00 PM	43	64	41	39
2:00 PM	44	64	41	39
3:00 PM	44	60	42	40
4:00 PM	47	65	45	44
5:00 PM	48	66	46	44
6:00 PM	45	58	44	43
7:00 PM	46	55	46	43
8:00 PM	50	72	48	46
9:00 PM	47	65	46	45
10:00 PM	49	53	48	45
11:00 PM	48	56	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)	50	43	46	49	34	44
Lmax (Maximum)	72	54	61	67	44	52
L50 (Median)	48	41	44	48	31	39
L90 (Background)	46	39	42	45	29	36

Computed DNL (dB)	51
% Daytime Energy	71%
% Nighttime Energy	29%

GPS Coordinates	37°31'07.05"N
	122°16'58.68"W

Appendix C-6
Long-Term Ambient Noise Monitoring Results - Site 2
Stanford University Belmont Campus - Belmont, California
Saturday, September 23, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	44	51	44	42
1:00 AM	43	53	43	38
2:00 AM	42	47	40	37
3:00 AM	42	48	39	32
4:00 AM	34	49	32	30
5:00 AM	37	54	33	30
6:00 AM	37	49	36	32
7:00 AM	41	58	40	37
8:00 AM	43	60	42	39
9:00 AM	45	52	45	42
10:00 AM	43	53	42	40
11:00 AM	42	53	41	39
12:00 PM	47	65	41	38
1:00 PM	48	61	43	40
2:00 PM	53	65	50	44
3:00 PM	45	62	43	42
4:00 PM	48	65	46	44
5:00 PM	48	66	46	44
6:00 PM	43	59	43	41
7:00 PM	51	71	46	42
8:00 PM	52	71	49	47
9:00 PM	48	57	48	46
10:00 PM	50	58	50	48
11:00 PM	47	52	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)	53	41	48	50	34	44
Lmax (Maximum)	71	52	61	58	47	51
L50 (Median)	50	40	44	50	32	40
L90 (Background)	47	37	42	48	30	37

Computed DNL (dB)	51
% Daytime Energy	79%
% Nighttime Energy	21%

GPS Coordinates	37°31'07.05"N
	122°16'58.68"W

Appendix C-7
Long-Term Ambient Noise Monitoring Results - Site 2
Stanford University Belmont Campus - Belmont, California
Sunday, September 24, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	43	50	42	41
1:00 AM	43	57	43	41
2:00 AM	43	46	43	40
3:00 AM	37	44	33	31
4:00 AM	32	40	31	30
5:00 AM	34	43	32	29
6:00 AM	38	54	36	33
7:00 AM	45	71	39	37
8:00 AM	41	56	40	37
9:00 AM	42	59	40	38
10:00 AM	43	59	42	39
11:00 AM	45	59	43	40
12:00 PM	42	55	41	40
1:00 PM	45	64	43	40
2:00 PM	48	66	45	43
3:00 PM	48	58	47	45
4:00 PM	52	74	47	45
5:00 PM	47	64	45	42
6:00 PM	46	64	42	39
7:00 PM	48	65	47	40
8:00 PM	50	58	50	47
9:00 PM	50	55	50	46
10:00 PM	51	55	51	45
11:00 PM	49	58	48	41

	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	41	47	51	32	45
Lmax (Maximum)	74	55	62	58	40	50
L50 (Median)	50	39	44	51	31	40
L90 (Background)	47	37	41	45	29	37

Computed DNL (dB)	52
% Daytime Energy	74%
% Nighttime Energy	26%

GPS Coordinates	37°31'07.05"N
	122°16'58.68"W

Appendix C-8
Long-Term Ambient Noise Monitoring Results - Site 2
Stanford University Belmont Campus - Belmont, California
Monday, September 25, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	48	53	47	42
1:00 AM	43	50	39	34
2:00 AM	37	44	37	34
3:00 AM	36	45	35	33
4:00 AM	36	45	35	32
5:00 AM	38	50	36	32
6:00 AM	41	59	39	36
7:00 AM	44	61	43	40
8:00 AM	44	65	43	41
9:00 AM	43	57	41	39
10:00 AM	45	62	44	42
11:00 AM	45	56	44	42
12:00 PM	46	59	45	42
1:00 PM	45	55	44	42
2:00 PM	49	61	48	45
3:00 PM	50	61	48	46
4:00 PM	48	59	47	45
5:00 PM	48	57	47	45
6:00 PM	46	63	45	43
7:00 PM	52	62	52	43
8:00 PM	55	61	55	52
9:00 PM	53	62	52	49
10:00 PM	51	57	51	48
11:00 PM	50	57	48	46

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	55	43	49	51	36	46
Lmax (Maximum)	65	55	60	59	44	51
L50 (Median)	55	41	46	51	35	41
L90 (Background)	52	39	44	48	32	37

Computed DNL (dB)	53
% Daytime Energy	79%
% Nighttime Energy	21%

GPS Coordinates	37°31'07.05"N
	122°16'58.68"W

Appendix C-9
Long-Term Ambient Noise Monitoring Results - Site 3
Stanford University Belmont Campus - Belmont, California
Friday, September 22, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	56	74	38	34
1:00 AM	54	77	34	31
2:00 AM	54	82	32	30
3:00 AM	55	80	33	29
4:00 AM	58	82	37	30
5:00 AM	61	80	46	34
6:00 AM	63	80	58	43
7:00 AM	68	84	66	55
8:00 AM	67	81	64	57
9:00 AM	67	82	65	52
10:00 AM	67	83	65	53
11:00 AM	68	84	66	55
12:00 PM	68	86	66	57
1:00 PM	72	102	66	58
2:00 PM	68	87	67	59
3:00 PM	68	79	67	59
4:00 PM	68	81	67	60
5:00 PM	68	90	67	59
6:00 PM	67	78	67	58
7:00 PM	67	82	65	54
8:00 PM	66	86	63	49
9:00 PM	64	79	61	47
10:00 PM	63	81	57	42
11:00 PM	62	84	50	38

	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	64	68	63	54	60
Lmax (Maximum)	102	78	84	84	74	80
L50 (Median)	67	61	65	58	32	43
L90 (Background)	60	47	55	43	29	35

Computed DNL (dB)	69
% Daytime Energy	91%
% Nighttime Energy	9%

GPS Coordinates	37°30'54.78"N
	122°17'02.12"W

Appendix C-10
Long-Term Ambient Noise Monitoring Results - Site 3
Stanford University Belmont Campus - Belmont, California
Saturday, September 23, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	58	77	41	33
1:00 AM	55	77	42	33
2:00 AM	53	71	34	33
3:00 AM	56	84	34	30
4:00 AM	57	82	33	28
5:00 AM	58	80	39	27
6:00 AM	60	78	47	31
7:00 AM	63	81	58	44
8:00 AM	67	81	64	53
9:00 AM	67	84	66	58
10:00 AM	67	84	66	58
11:00 AM	68	80	67	58
12:00 PM	67	80	66	58
1:00 PM	67	83	66	57
2:00 PM	67	84	66	57
3:00 PM	67	86	66	55
4:00 PM	72	103	66	54
5:00 PM	67	88	65	55
6:00 PM	66	83	65	52
7:00 PM	66	82	64	50
8:00 PM	65	81	62	47
9:00 PM	65	90	60	45
10:00 PM	64	86	57	42
11:00 PM	61	77	49	37

	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	63	67	64	53	59
Lmax (Maximum)	103	80	85	86	71	79
L50 (Median)	67	58	64	57	33	42
L90 (Background)	58	44	53	42	27	33

Computed DNL (dB)	68
% Daytime Energy	91%
% Nighttime Energy	9%

GPS Coordinates	37°30'54.78"N
	122°17'02.12"W

Appendix C-11
Long-Term Ambient Noise Monitoring Results - Site 3
Stanford University Belmont Campus - Belmont, California
Sunday, September 24, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	59	82	42	33
1:00 AM	58	86	36	31
2:00 AM	55	77	33	31
3:00 AM	53	75	29	27
4:00 AM	53	72	30	27
5:00 AM	55	74	35	26
6:00 AM	58	75	44	33
7:00 AM	70	102	55	41
8:00 AM	65	81	61	47
9:00 AM	72	103	64	52
10:00 AM	68	93	65	54
11:00 AM	67	82	65	53
12:00 PM	67	83	65	56
1:00 PM	67	76	66	56
2:00 PM	67	81	65	55
3:00 PM	66	78	65	55
4:00 PM	66	82	65	55
5:00 PM	66	77	65	54
6:00 PM	65	79	63	50
7:00 PM	65	79	62	48
8:00 PM	64	84	60	45
9:00 PM	62	80	56	43
10:00 PM	61	81	49	39
11:00 PM	64	95	43	37

	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	62	67	64	53	59
Lmax (Maximum)	103	76	84	95	72	80
L50 (Median)	66	55	63	49	29	38
L90 (Background)	56	41	51	39	26	32

Computed DNL (dB)	68
% Daytime Energy	92%
% Nighttime Energy	8%

GPS Coordinates	37°30'54.78"N
	122°17'02.12"W

Appendix C-12
Long-Term Ambient Noise Monitoring Results - Site 3
Stanford University Belmont Campus - Belmont, California
Monday, September 25, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	56	79	36	34
1:00 AM	53	74	34	32
2:00 AM	51	73	33	32
3:00 AM	53	75	33	31
4:00 AM	56	78	37	30
5:00 AM	61	81	46	35
6:00 AM	64	82	58	43
7:00 AM	67	82	66	52
8:00 AM	67	80	66	57
9:00 AM	66	84	64	53
10:00 AM	67	82	65	54
11:00 AM	68	92	66	54
12:00 PM	67	79	66	55
1:00 PM	67	83	65	55
2:00 PM	68	93	66	58
3:00 PM	67	88	66	57
4:00 PM	68	82	67	60
5:00 PM	68	79	67	61
6:00 PM	67	83	66	57
7:00 PM	66	81	64	52
8:00 PM	67	90	62	49
9:00 PM	63	78	58	45
10:00 PM	61	82	48	43
11:00 PM	58	79	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	63	67	64	51	59
Lmax (Maximum)	93	78	84	82	73	78
L50 (Median)	67	58	65	58	33	41
L90 (Background)	61	45	55	43	30	36

Computed DNL (dB)	68
% Daytime Energy	92%
% Nighttime Energy	8%

GPS Coordinates	37°30'54.78"N
	122°17'02.12"W

Appendix C-13
Long-Term Ambient Noise Monitoring Results - Site 4
Stanford University Belmont Campus - Belmont, California
Friday, September 22, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	43	66	37	35
1:00 AM	40	67	38	36
2:00 AM	44	70	32	30
3:00 AM	32	45	31	29
4:00 AM	47	72	33	30
5:00 AM	42	66	36	33
6:00 AM	53	82	41	37
7:00 AM	61	80	49	43
8:00 AM	61	80	51	42
9:00 AM	55	74	43	39
10:00 AM	63	81	55	41
11:00 AM	55	78	44	39
12:00 PM	64	87	57	46
1:00 PM	58	77	44	40
2:00 PM	59	82	47	41
3:00 PM	62	83	57	47
4:00 PM	61	85	52	45
5:00 PM	59	74	49	43
6:00 PM	58	75	45	42
7:00 PM	55	71	48	42
8:00 PM	54	75	49	47
9:00 PM	52	70	45	43
10:00 PM	52	79	44	43
11:00 PM	49	72	43	41

	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	52	60	53	32	48
Lmax (Maximum)	87	70	78	82	45	69
L50 (Median)	57	43	49	44	31	37
L90 (Background)	47	39	43	43	29	35

Computed DNL (dB)	59
% Daytime Energy	96%
% Nighttime Energy	4%

GPS Coordinates	37°31'02.09"N
	122°17'19.97"W

Appendix C-14
Long-Term Ambient Noise Monitoring Results - Site 4
Stanford University Belmont Campus - Belmont, California
Saturday, September 23, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	48	68	43	41
1:00 AM	46	71	41	39
2:00 AM	43	65	42	41
3:00 AM	45	75	40	36
4:00 AM	35	45	33	29
5:00 AM	41	66	31	30
6:00 AM	45	68	34	31
7:00 AM	52	74	38	35
8:00 AM	53	77	39	37
9:00 AM	57	79	42	38
10:00 AM	56	71	46	39
11:00 AM	57	74	51	43
12:00 PM	61	82	53	43
1:00 PM	58	78	52	42
2:00 PM	56	77	43	39
3:00 PM	55	74	43	40
4:00 PM	56	79	45	42
5:00 PM	57	77	46	42
6:00 PM	55	75	42	39
7:00 PM	59	83	49	41
8:00 PM	55	79	45	43
9:00 PM	52	72	44	43
10:00 PM	53	80	44	42
11:00 PM	53	81	41	37

	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	56	53	35	48
Lmax (Maximum)	83	71	77	81	45	69
L50 (Median)	53	38	45	44	31	39
L90 (Background)	43	35	40	42	29	36

Computed DNL (dB)	57
% Daytime Energy	92%
% Nighttime Energy	8%

GPS Coordinates	37°31'02.09"N
	122°17'19.97"W

Appendix C-15
Long-Term Ambient Noise Monitoring Results - Site 4
Stanford University Belmont Campus - Belmont, California
Sunday, September 24, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	45	72	36	34
1:00 AM	41	70	34	33
2:00 AM	42	69	33	31
3:00 AM	42	69	33	31
4:00 AM	32	42	32	31
5:00 AM	41	65	32	29
6:00 AM	44	69	35	33
7:00 AM	48	69	38	36
8:00 AM	52	74	39	36
9:00 AM	56	77	41	36
10:00 AM	55	74	41	36
11:00 AM	55	72	44	39
12:00 PM	55	73	40	37
1:00 PM	56	72	44	39
2:00 PM	57	74	47	42
3:00 PM	56	79	47	44
4:00 PM	57	75	49	45
5:00 PM	56	82	45	41
6:00 PM	55	75	42	38
7:00 PM	52	72	49	40
8:00 PM	55	78	47	45
9:00 PM	51	73	44	42
10:00 PM	47	72	42	40
11:00 PM	47	70	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)	57	48	55	47	32	44
Lmax (Maximum)	82	69	75	72	42	66
L50 (Median)	49	38	44	42	32	35
L90 (Background)	45	36	40	40	29	34

Computed DNL (dB)	54
% Daytime Energy	95%
% Nighttime Energy	5%

GPS Coordinates	37°31'02.09"N
	122°17'19.97"W

Appendix C-16
Long-Term Ambient Noise Monitoring Results - Site 4
Stanford University Belmont Campus - Belmont, California
Monday, September 25, 2023

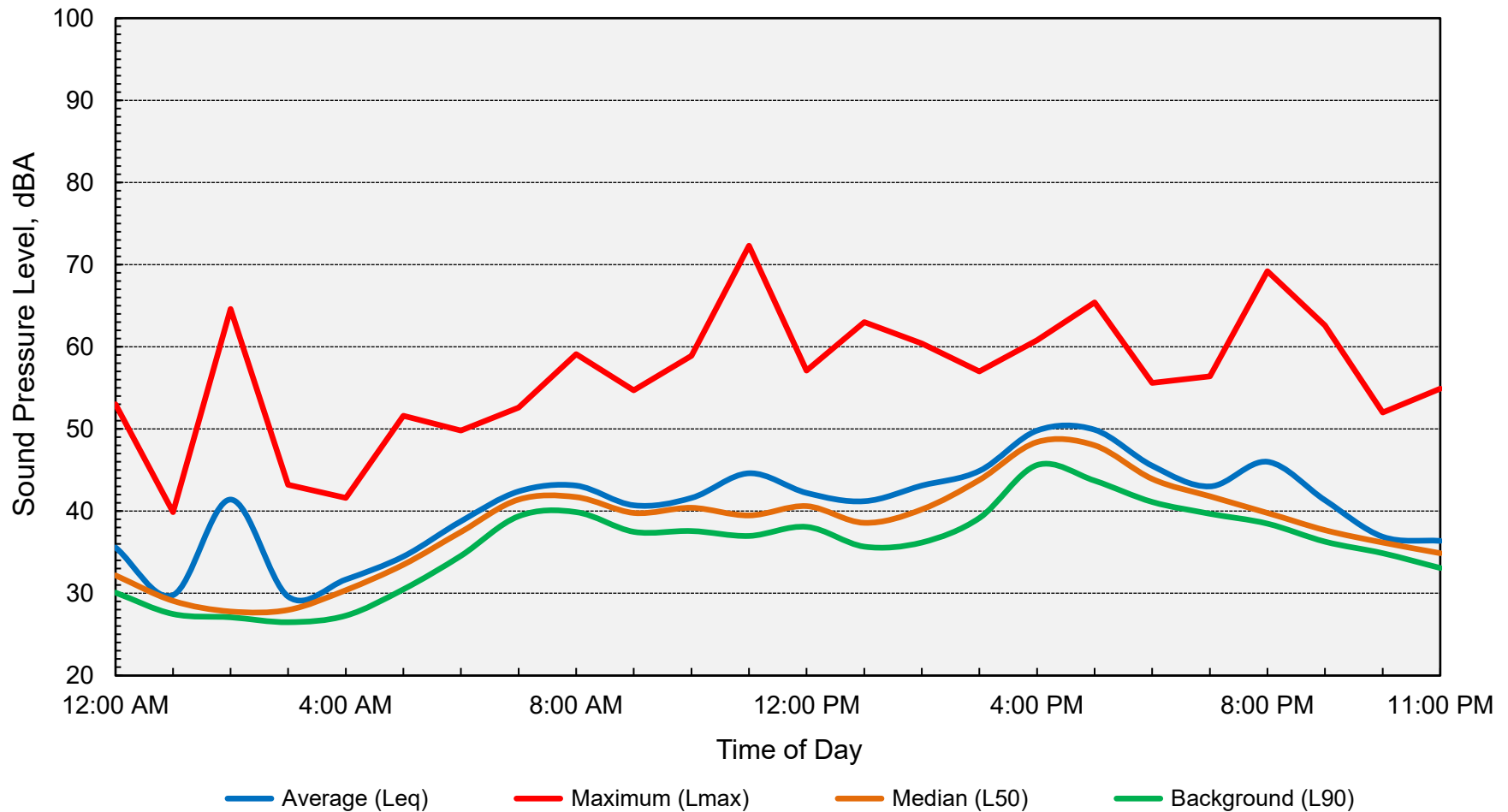
Hour	Leq	Lmax	L50	L90
12:00 AM	45	73	40	39
1:00 AM	43	68	39	38
2:00 AM	36	42	36	33
3:00 AM	33	45	32	30
4:00 AM	44	71	34	30
5:00 AM	47	70	36	33
6:00 AM	51	74	40	37
7:00 AM	60	77	48	40
8:00 AM	60	76	50	41
9:00 AM	56	77	44	40
10:00 AM	63	78	55	45
11:00 AM	56	75	44	41
12:00 PM	59	82	50	44
1:00 PM	60	80	55	48
2:00 PM	61	79	55	49
3:00 PM	61	81	55	47
4:00 PM	59	78	49	45
5:00 PM	58	75	48	44
6:00 PM	58	83	46	42
7:00 PM	56	76	52	45
8:00 PM	54	70	51	49
9:00 PM	54	74	52	49
10:00 PM	52	71	52	51
11:00 PM	52	68	52	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)	63	54	59	52	33	48
Lmax (Maximum)	83	70	77	74	42	65
L50 (Median)	55	44	50	52	32	40
L90 (Background)	49	40	45	51	30	38

Computed DNL (dB)	59
% Daytime Energy	95%
% Nighttime Energy	5%

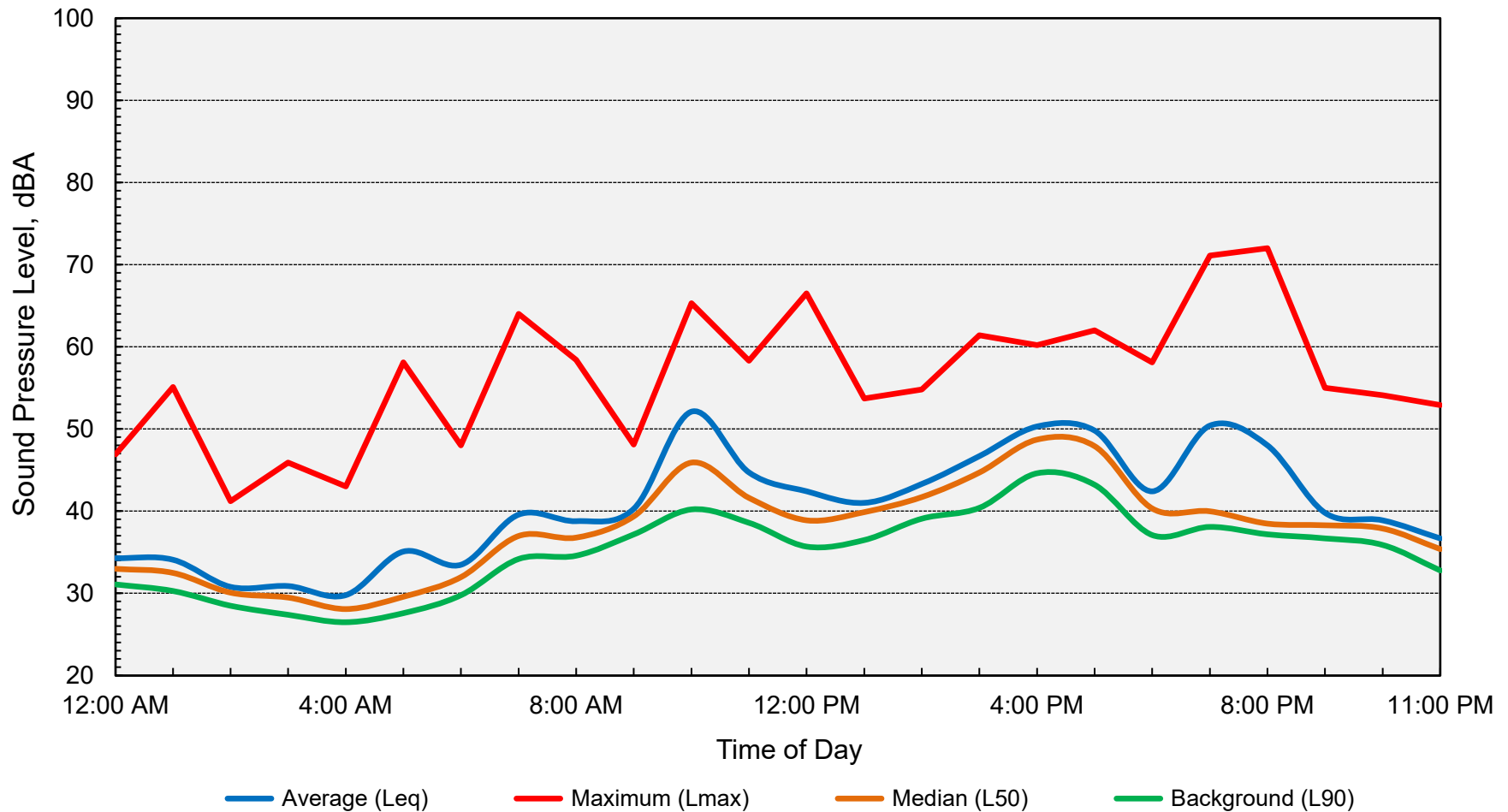
GPS Coordinates	37°31'02.09"N
	122°17'19.97"W

Appendix D-1
Long-Term Ambient Noise Monitoring Results - Site 1
Stanford University Belmont Campus - Belmont, California
Friday, September 22, 2023



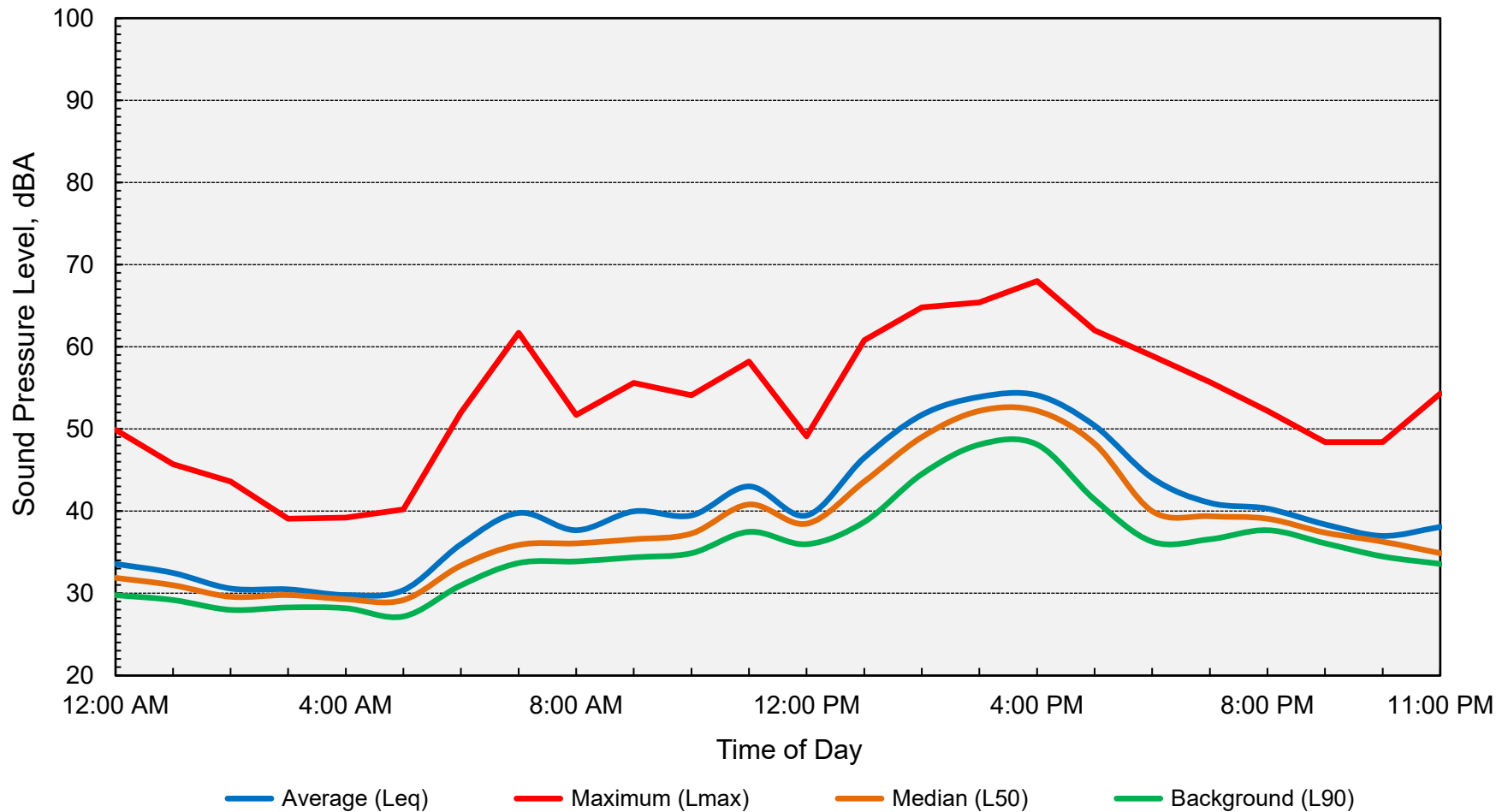
Computed DNL = 46 dB

Appendix D-2
Long-Term Ambient Noise Monitoring Results - Site 1
Stanford University Belmont Campus - Belmont, California
Saturday, September 23, 2023



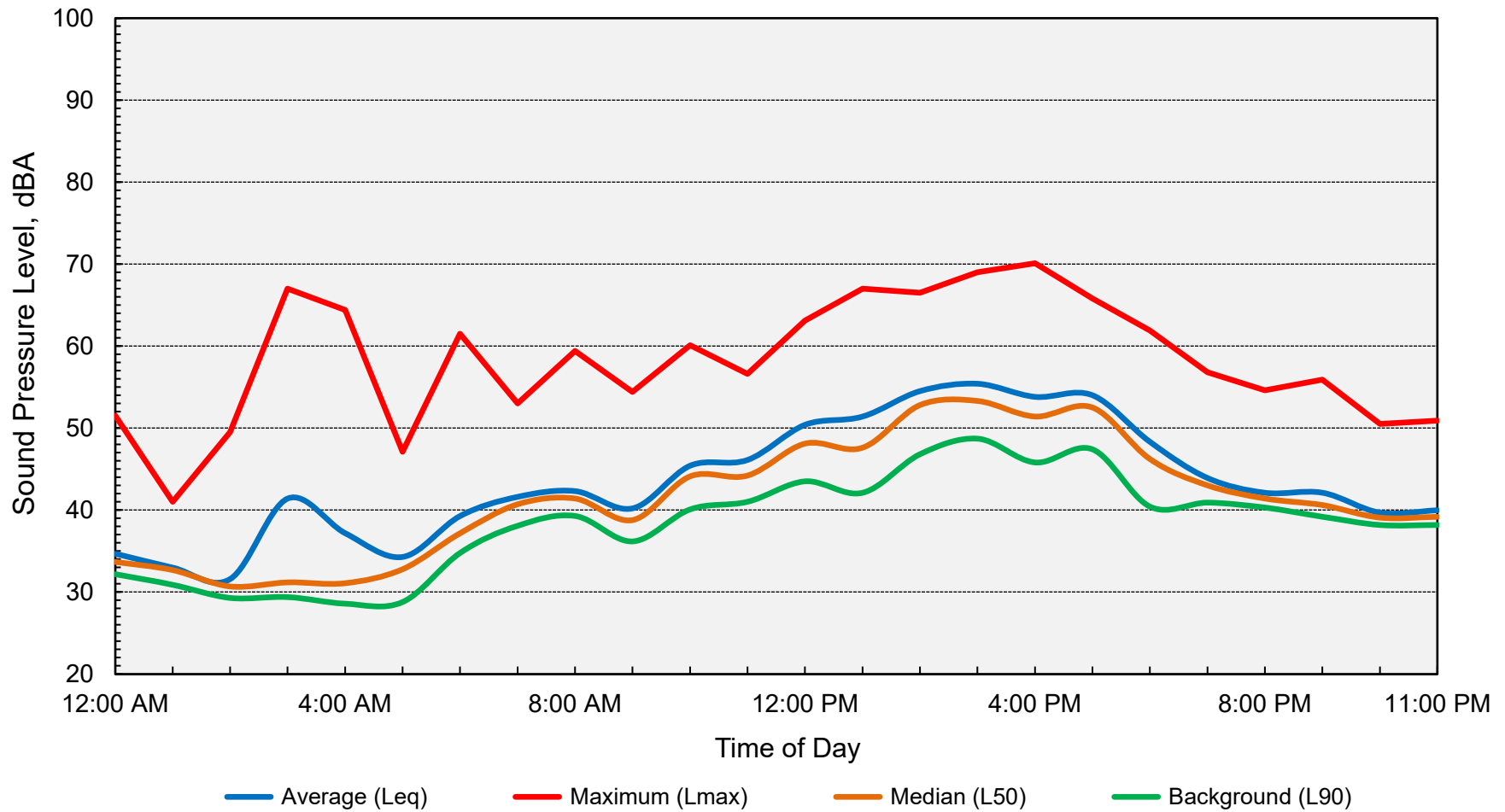
Computed DNL = 46 dB

Appendix D-3
Long-Term Ambient Noise Monitoring Results - Site 1
Stanford University Belmont Campus - Belmont, California
Sunday, September 24, 2023



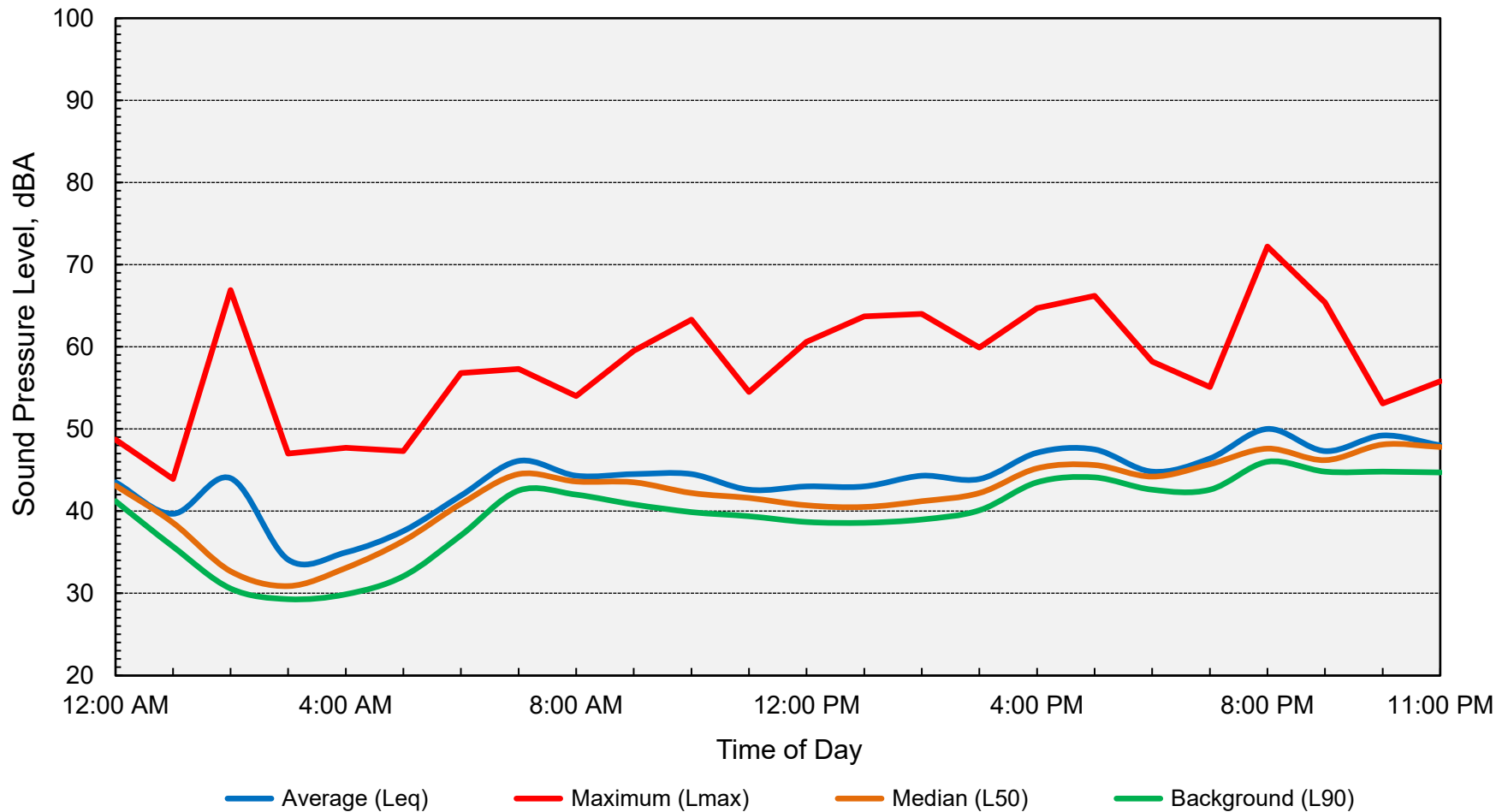
Computed DNL = 47 dB

Appendix D-4
Long-Term Ambient Noise Monitoring Results - Site 1
Stanford University Belmont Campus - Belmont, California
Monday, September 25, 2023



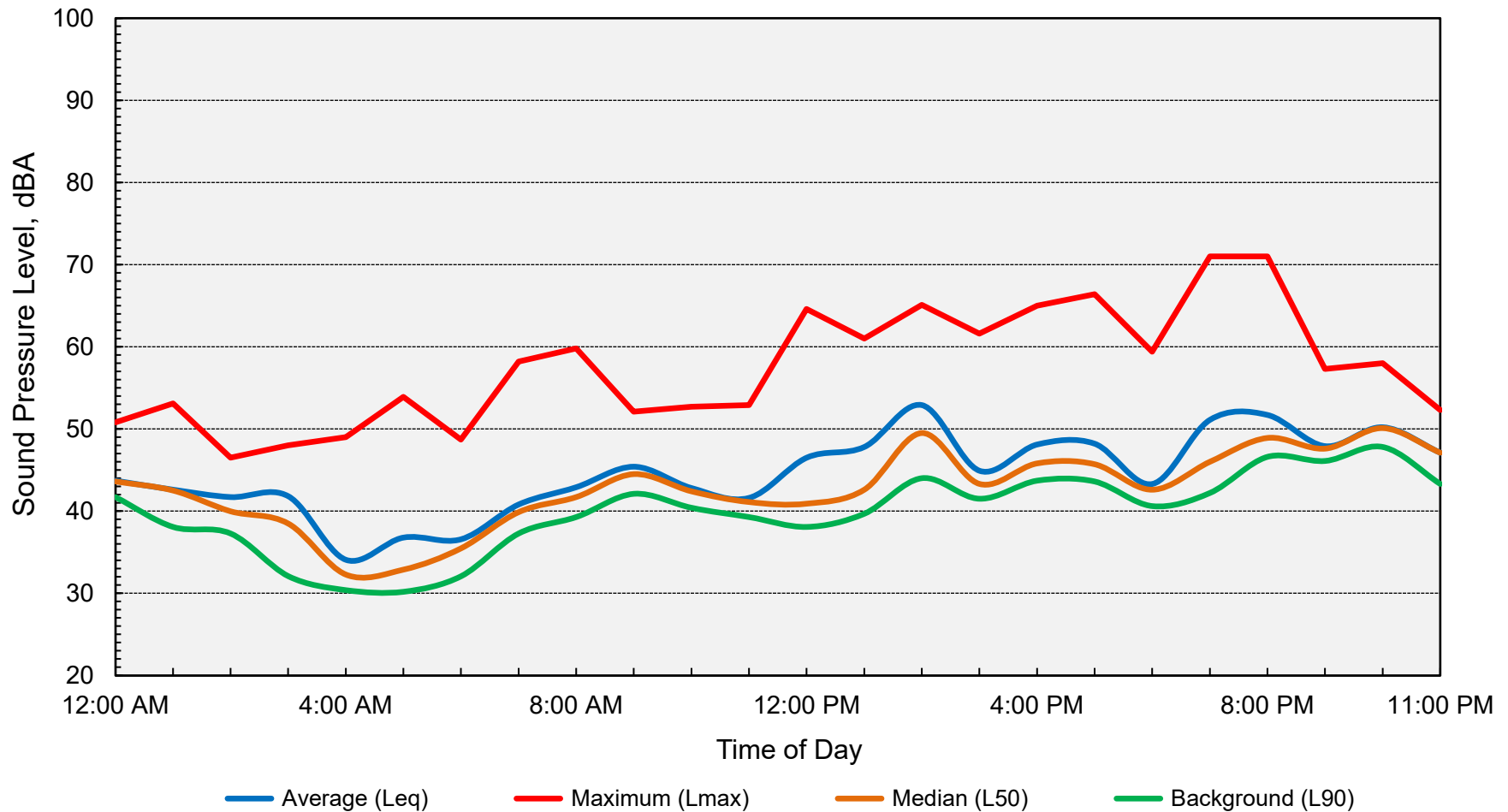
Computed DNL = 50 dB

Appendix D-5
Long-Term Ambient Noise Monitoring Results - Site 2
Stanford University Belmont Campus - Belmont, California
Friday, September 22, 2023



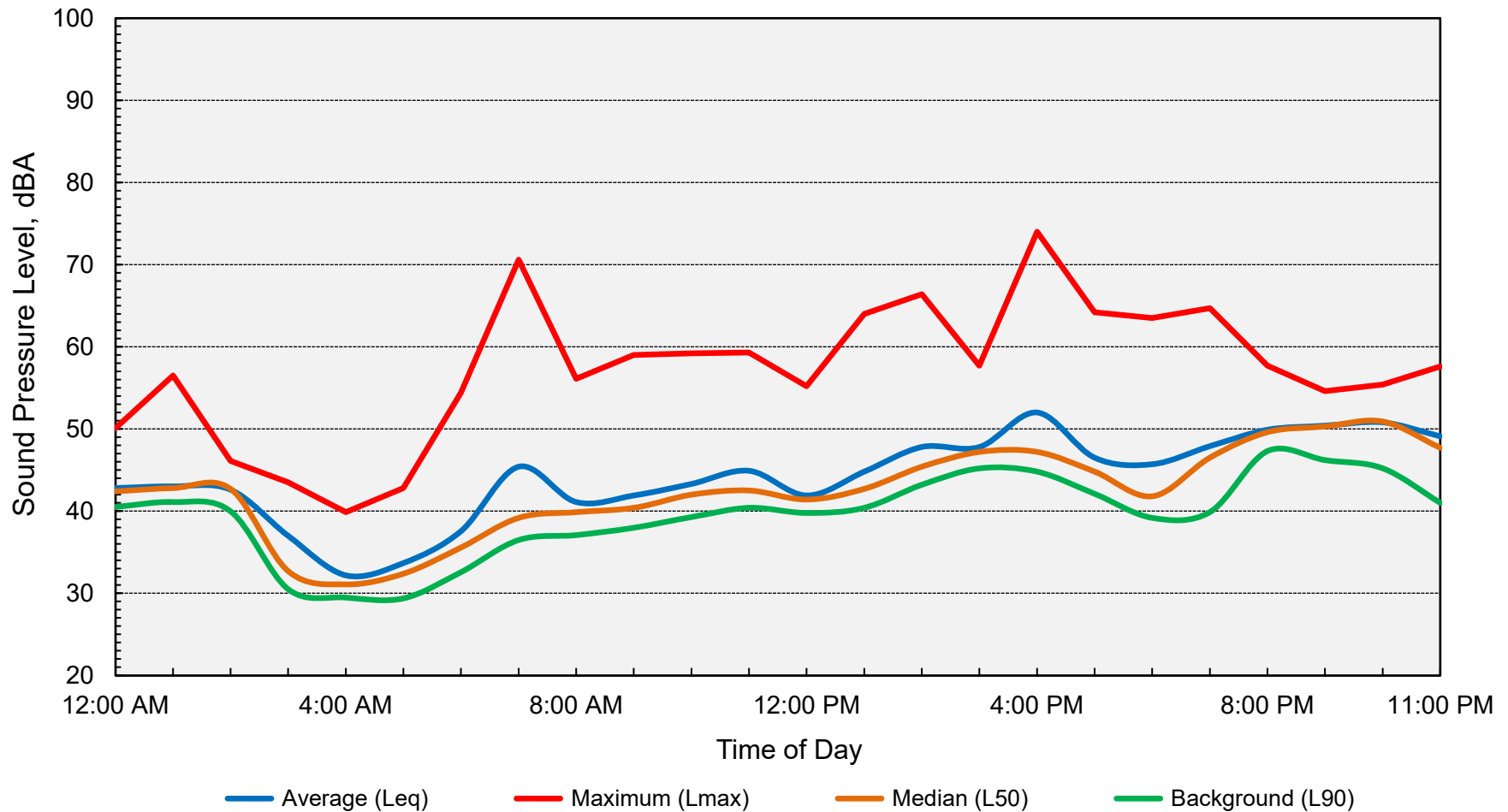
Computed DNL = 51 dB

Appendix D-6
Long-Term Ambient Noise Monitoring Results - Site 2
Stanford University Belmont Campus - Belmont, California
Saturday, September 23, 2023



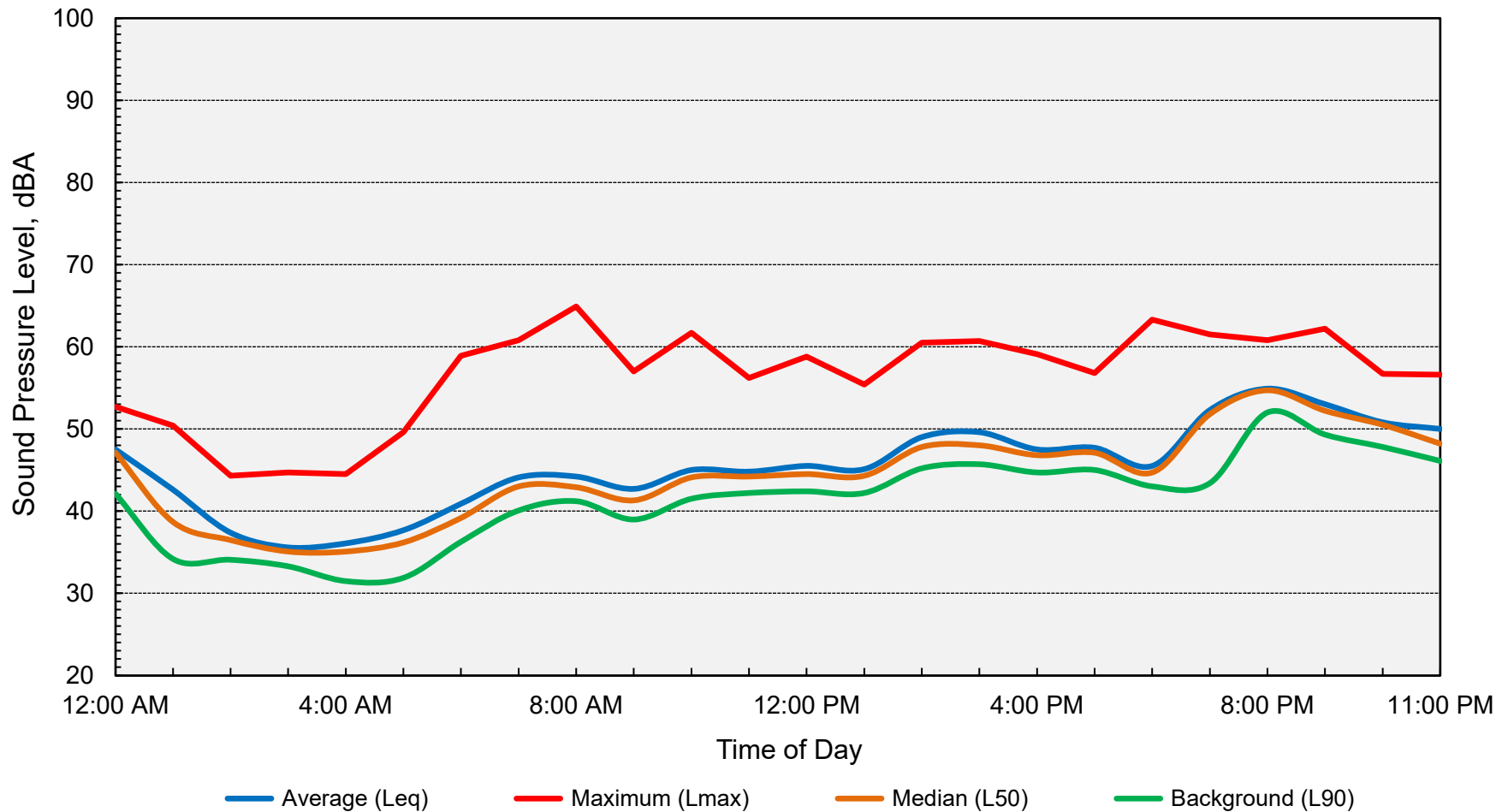
Computed DNL = 51 dB

Appendix D-7
Long-Term Ambient Noise Monitoring Results - Site 2
Stanford University Belmont Campus - Belmont, California
Sunday, September 24, 2023



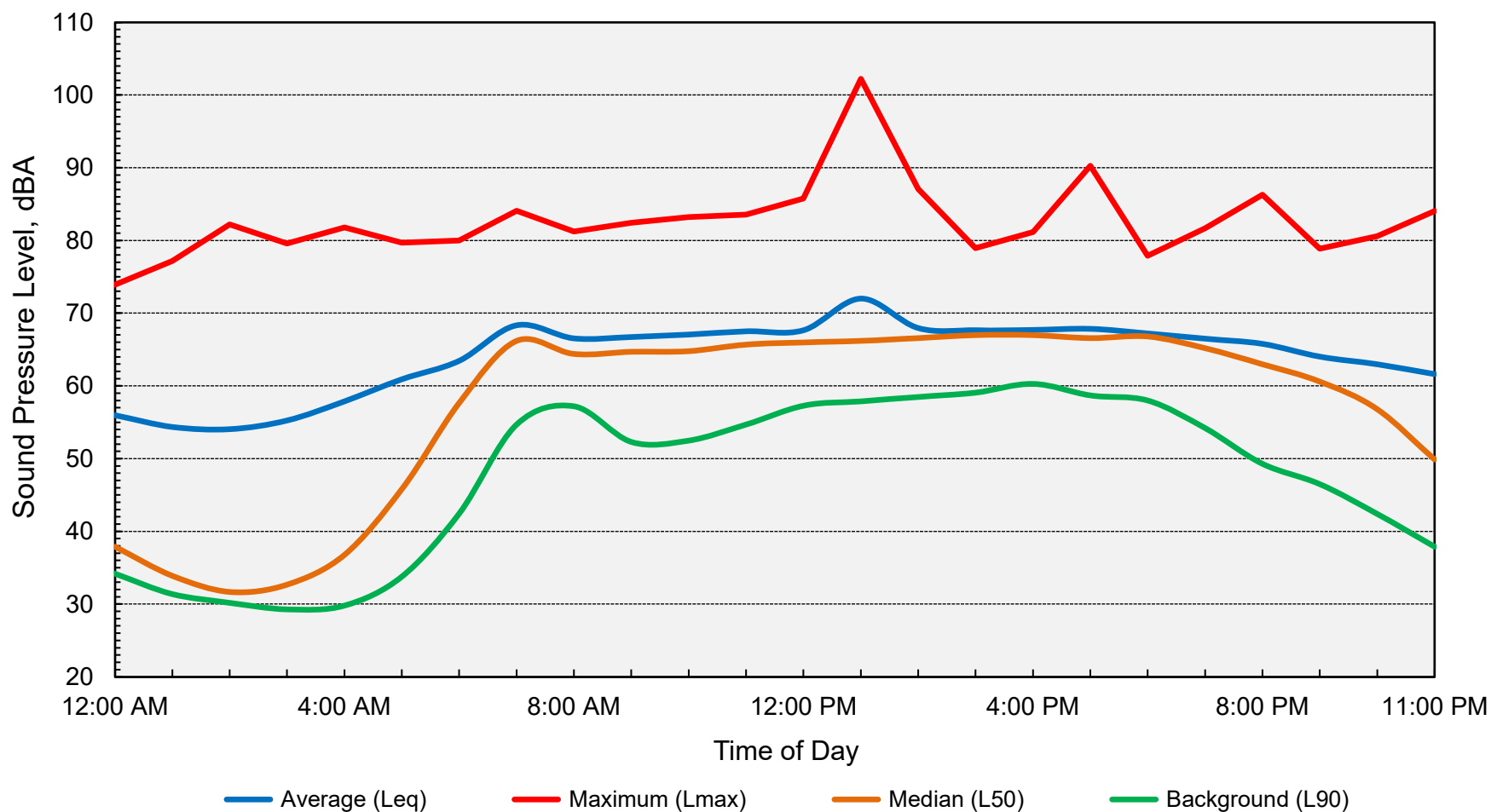
Computed DNL = 52 dB

Appendix D-8
Long-Term Ambient Noise Monitoring Results - Site 2
Stanford University Belmont Campus - Belmont, California
Monday, September 25, 2023



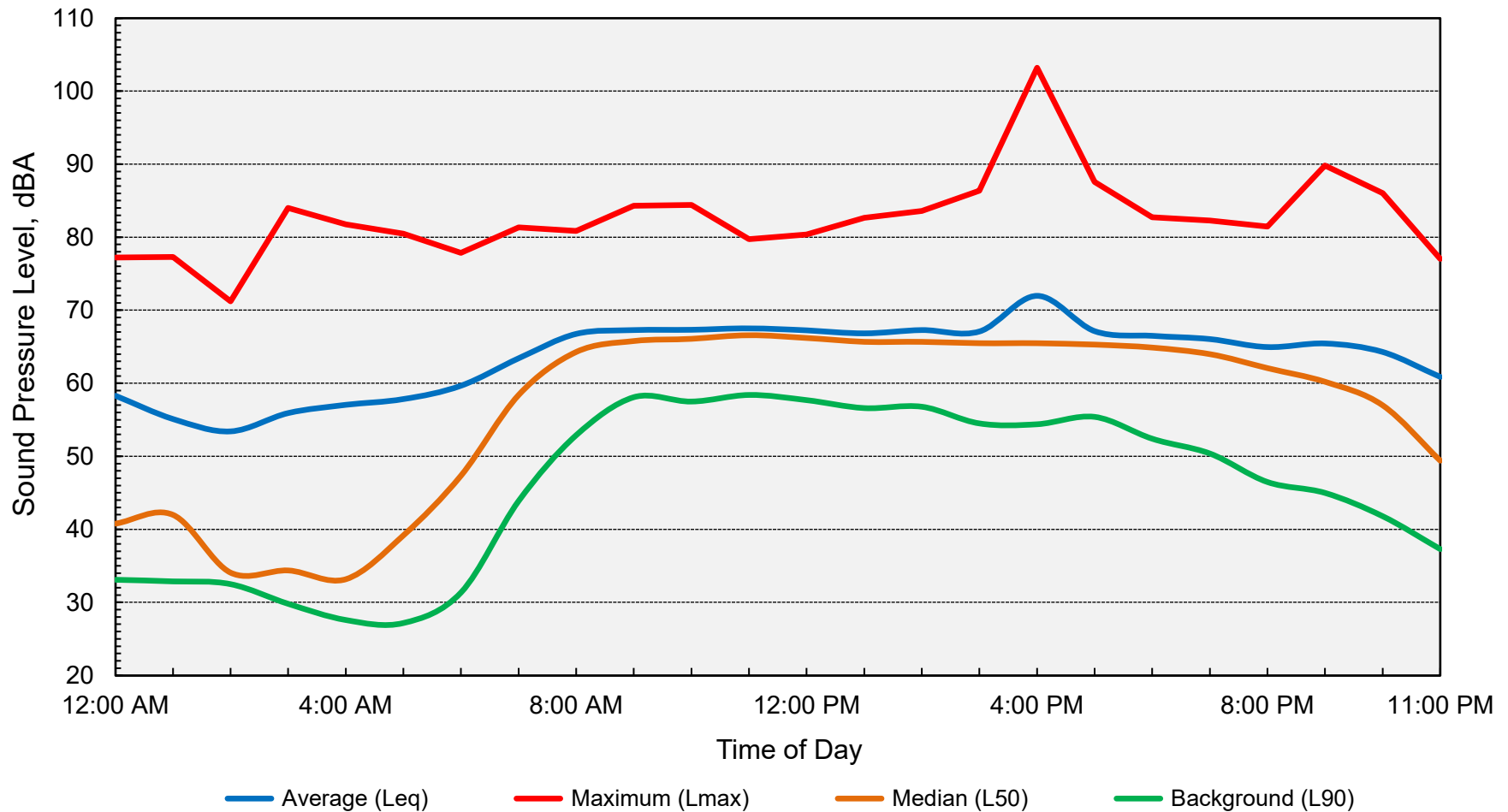
Computed DNL = 53 dB

Appendix D-9
Long-Term Ambient Noise Monitoring Results - Site 3
Stanford University Belmont Campus - Belmont, California
Friday, September 22, 2023



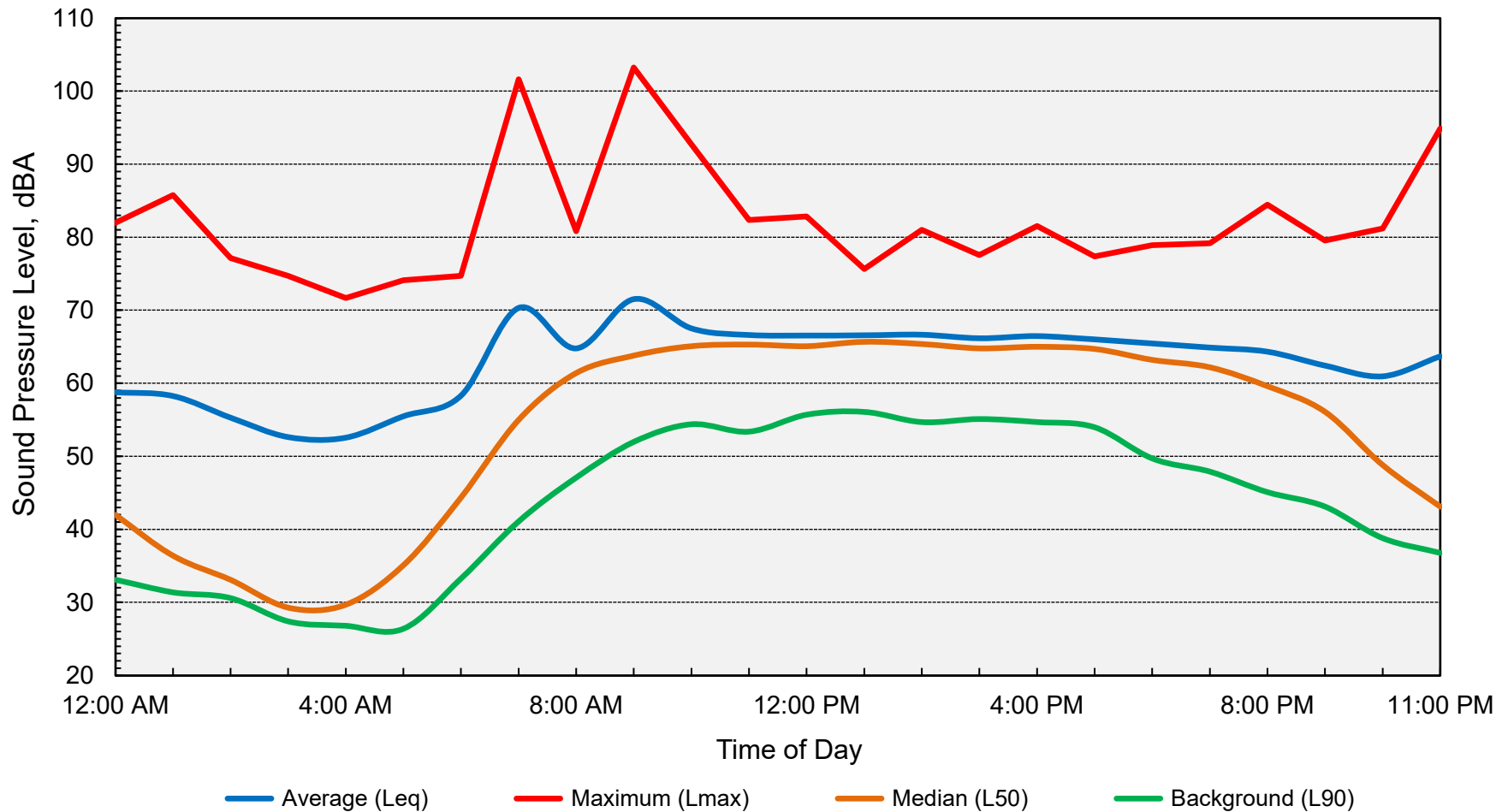
Computed DNL = 69 dB

Appendix D-10
Long-Term Ambient Noise Monitoring Results - Site 3
Stanford University Belmont Campus - Belmont, California
Saturday, September 23, 2023



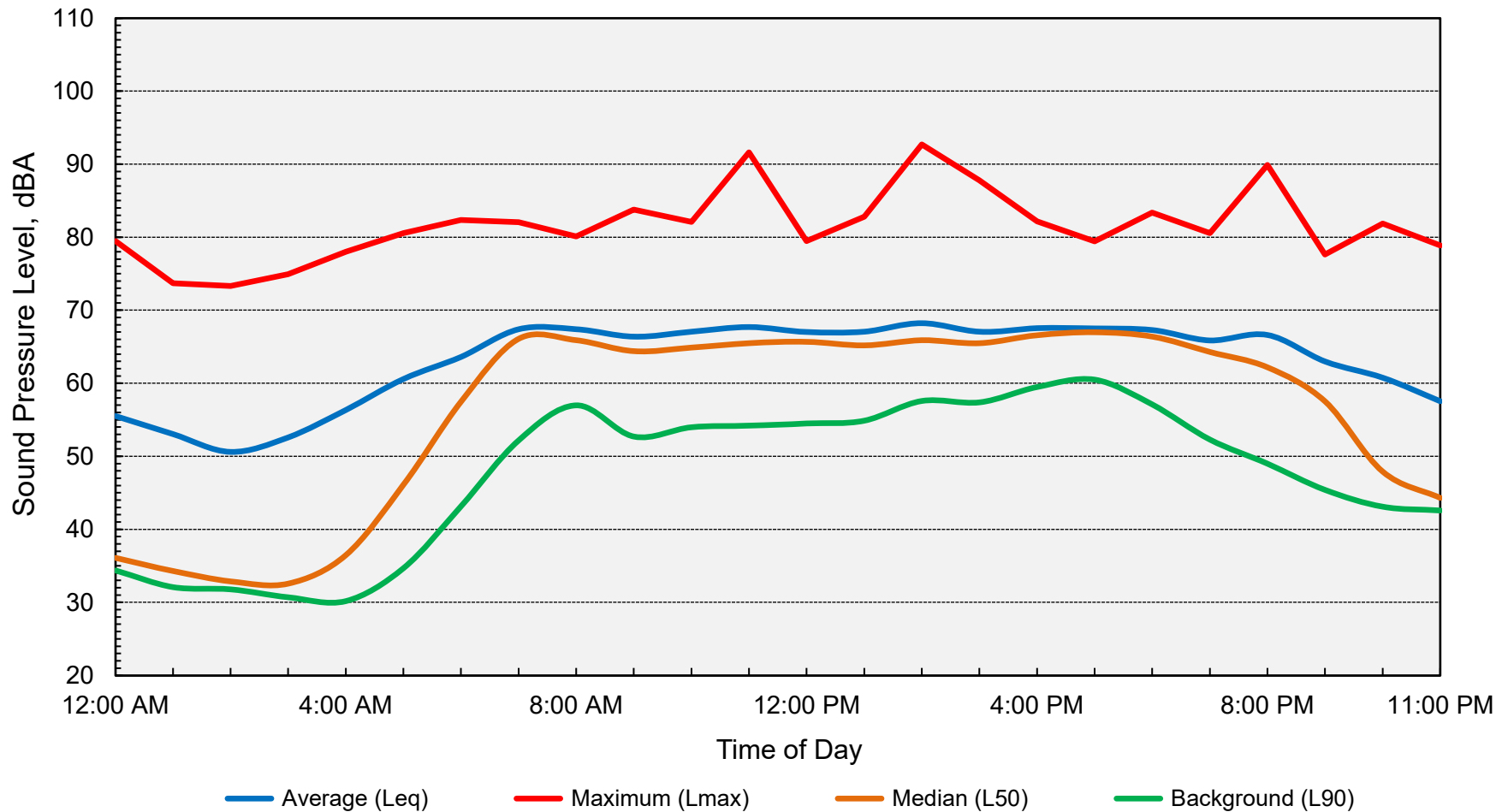
Computed DNL = 68 dB

Appendix D-11
Long-Term Ambient Noise Monitoring Results - Site 3
Stanford University Belmont Campus - Belmont, California
Sunday, September 24, 2023



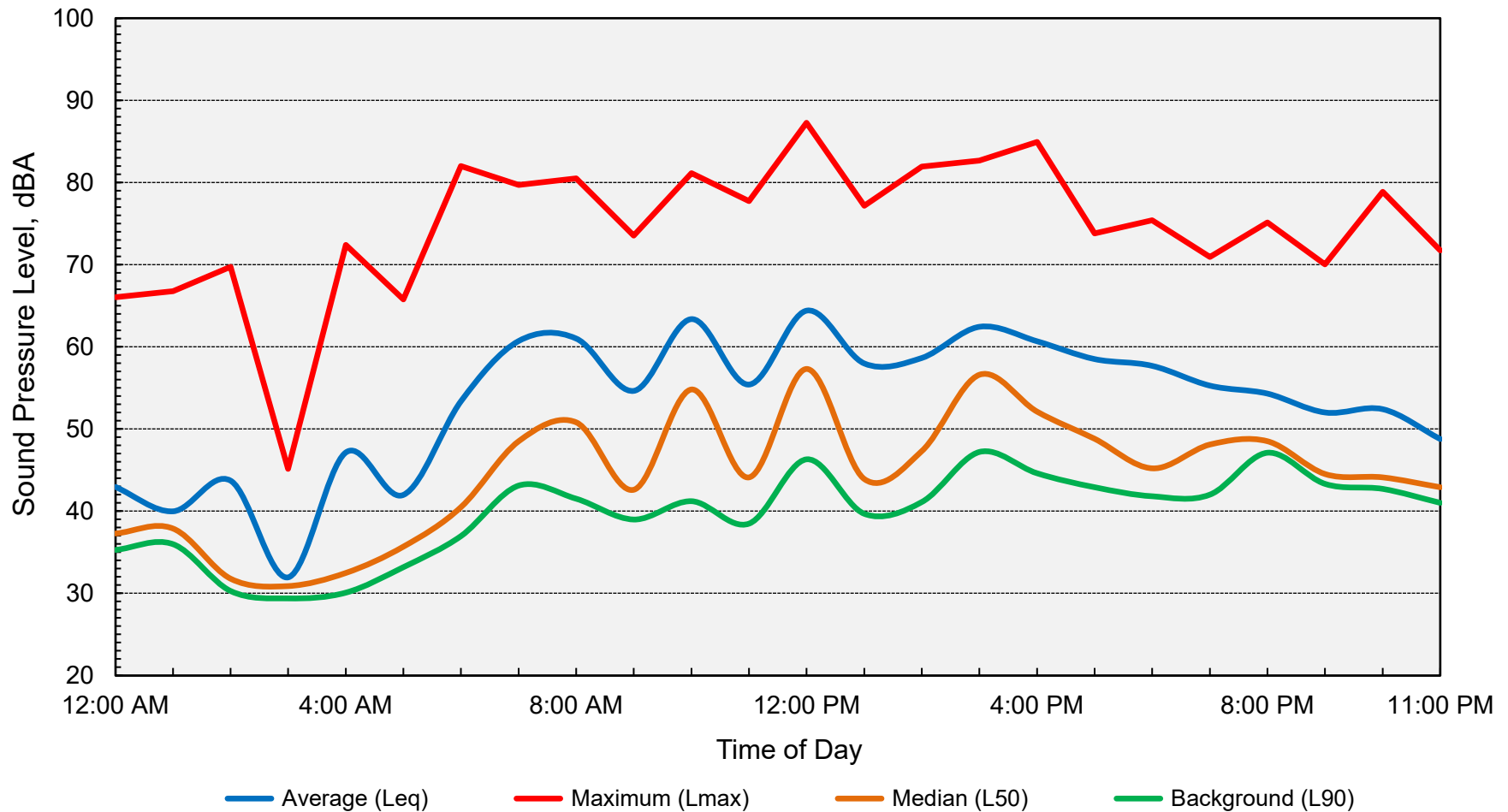
Computed DNL = 68 dB

Appendix D-12
Long-Term Ambient Noise Monitoring Results - Site 3
Stanford University Belmont Campus - Belmont, California
Monday, September 25, 2023



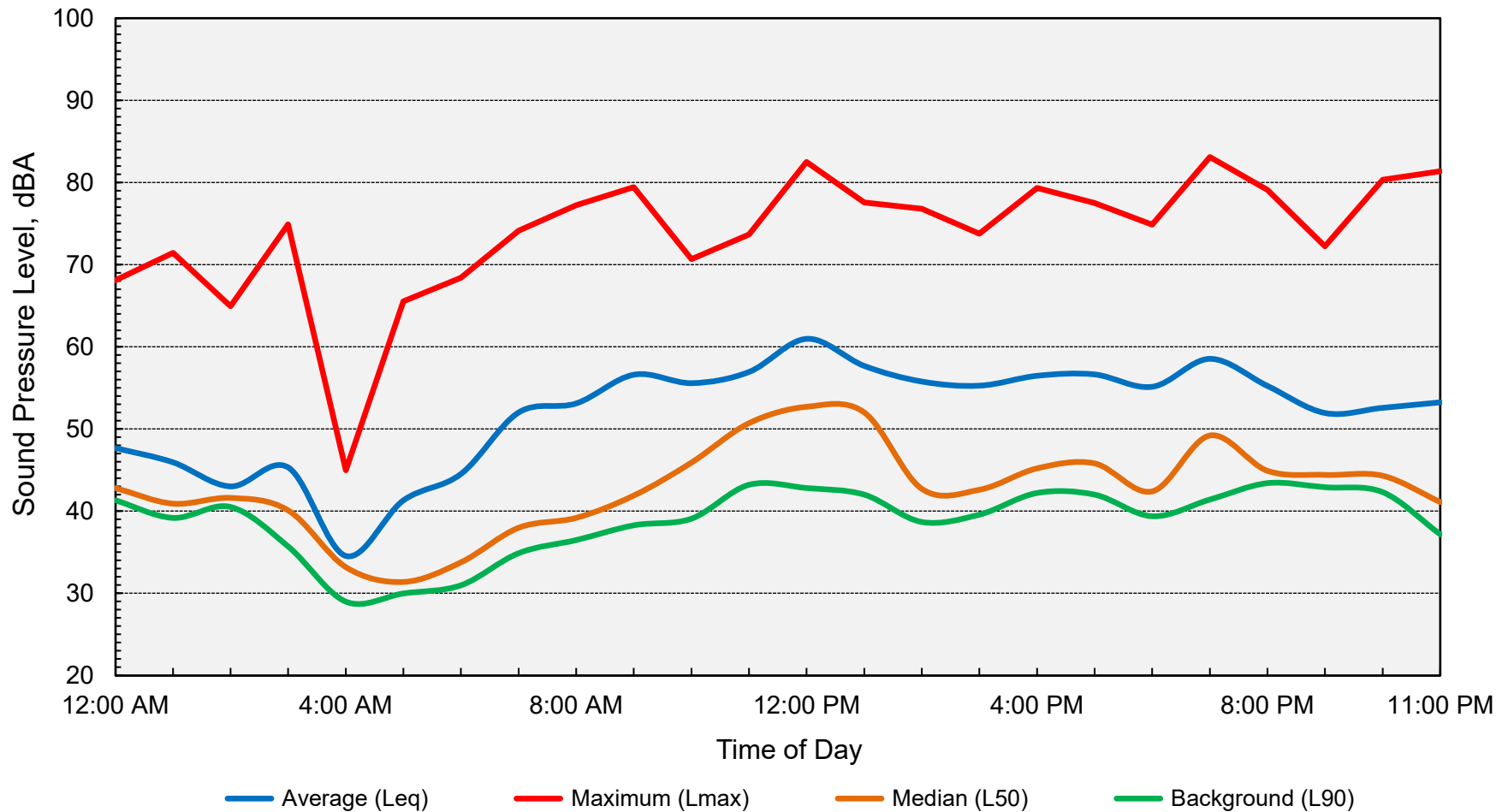
Computed DNL = 68 dB

Appendix D-13
Long-Term Ambient Noise Monitoring Results - Site 4
Stanford University Belmont Campus - Belmont, California
Friday, September 22, 2023



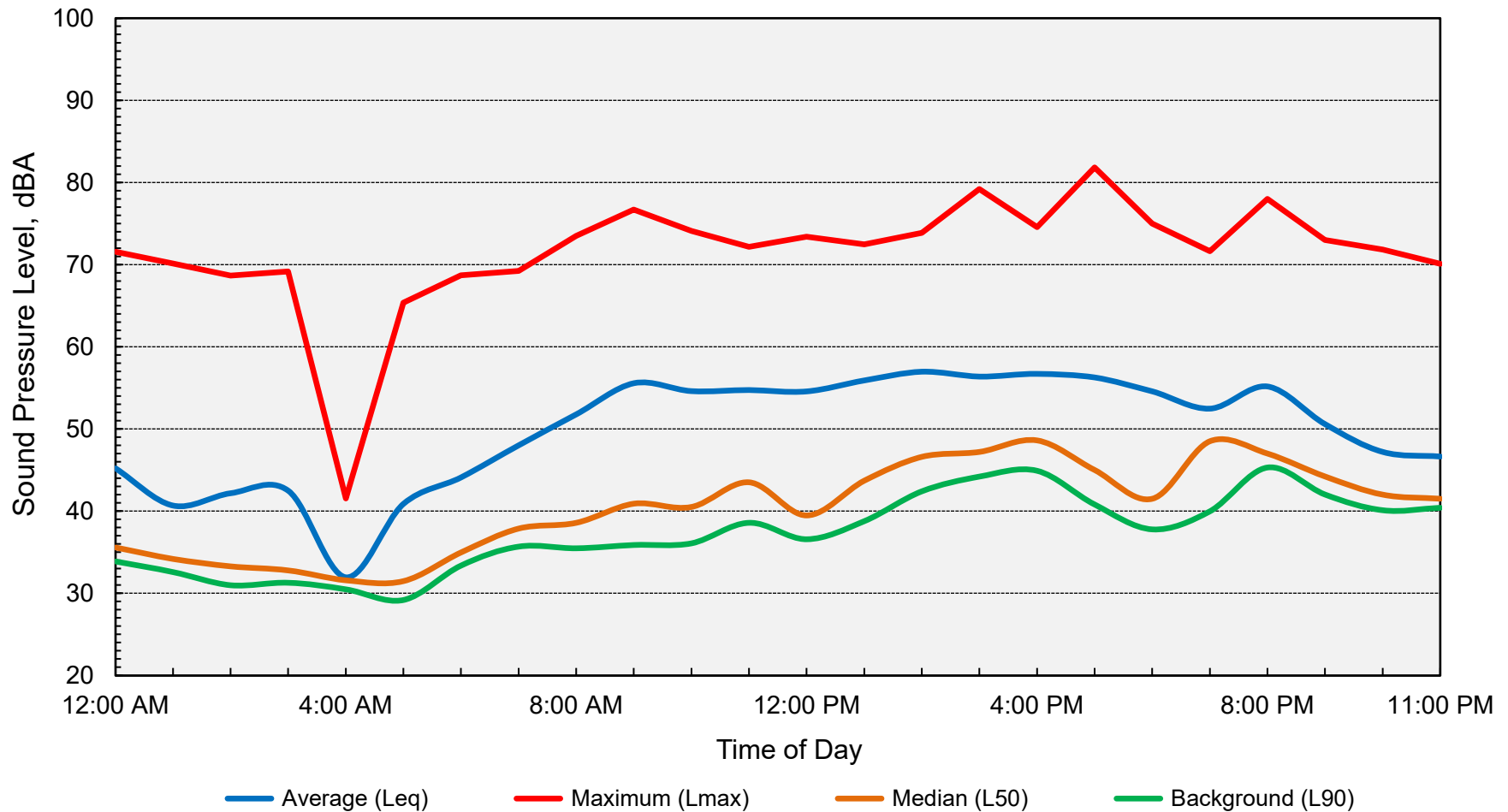
Computed DNL = 59 dB

Appendix D-14
Long-Term Ambient Noise Monitoring Results - Site 4
Stanford University Belmont Campus - Belmont, California
Saturday, September 23, 2023



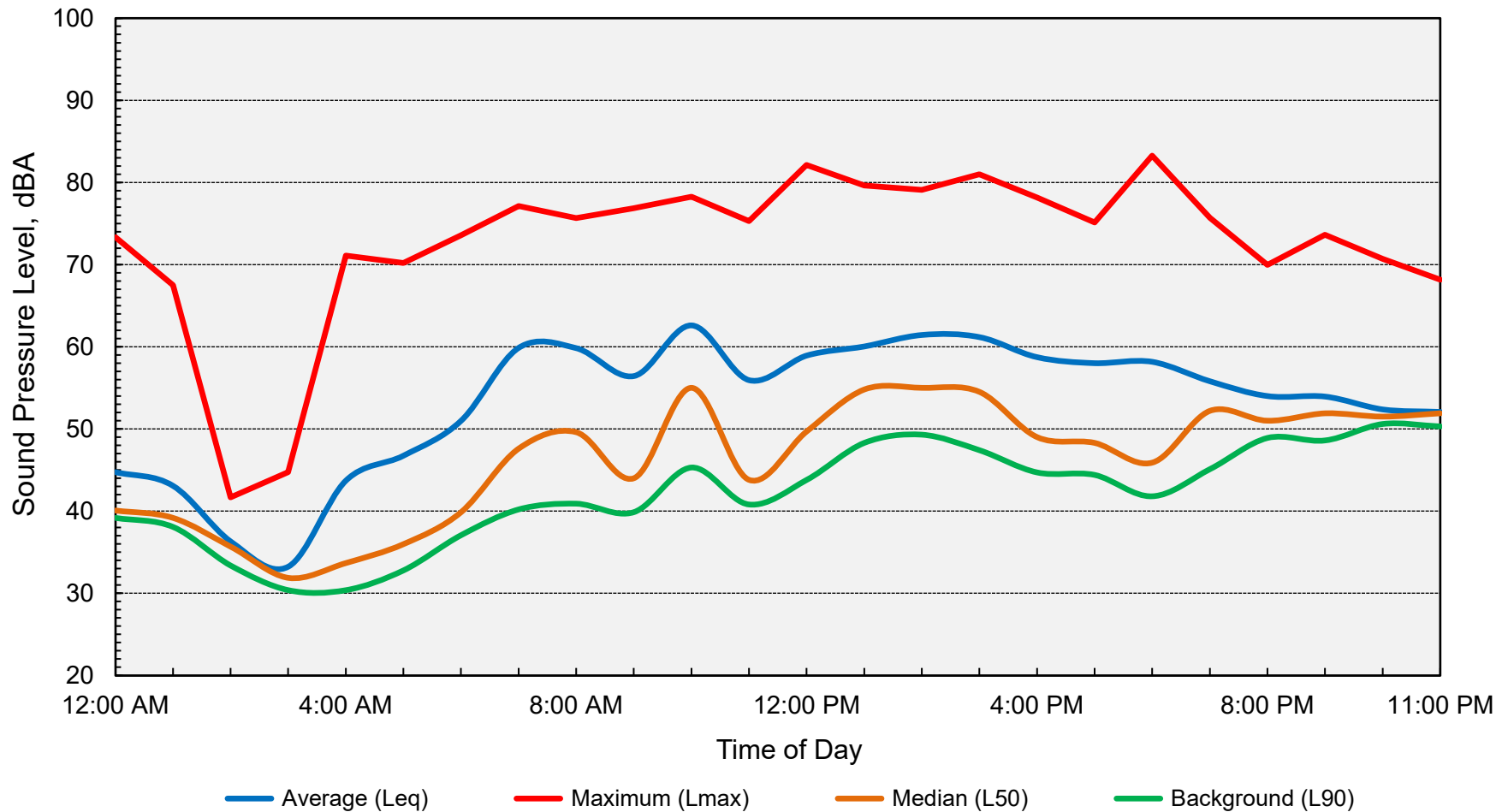
Computed DNL = 57 dB

Appendix D-15
Long-Term Ambient Noise Monitoring Results - Site 4
Stanford University Belmont Campus - Belmont, California
Sunday, September 24, 2023



Computed DNL = 54 dB

Appendix D-16
Long-Term Ambient Noise Monitoring Results - Site 4
Stanford University Belmont Campus - Belmont, California
Monday, September 25, 2023



Computed DNL = 59 dB

Appendix E-1
FHWA Highway Traffic Noise Prediction Model Inputs
Stanford University Belmont Campus
File Name: 01 Existing
Run Date: 3/7/2024



#	Roadway	Segment Description	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance to Receptor	Offset (dB)
1	Ralston Ave	West of SR 92 WB Ramps	6,420	83	17	2	1	35	225	0
2	Ralston Ave	SR 92 WB Ramps to SR 92 EB Ramps	14,200	83	17	2	1	35	350	0
3	Ralston Ave	SR 92 EB Ramps to Christian Dr	20,555	83	17	2	1	35	130	0
4	Ralston Ave	Christian Dr to Hallmark Dr	20,505	83	17	2	1	40	150	0
5	Ralston Ave	Hallmark Dr to Belmont Canyon Rd	20,820	83	17	2	1	40	60	0
6	Ralston Ave	Belmont Canyon Rd to Tahoe Dr	20,970	83	17	2	1	40	60	0
7	Ralston Ave	Tahoe Dr to RMS Drwy 1	21,485	83	17	2	1	40	100	0
8	Ralston Ave	RMS Drwy 1 to RMS Drwy 2	22,235	83	17	2	1	40	220	-5
9	Ralston Ave	RMS Drwy 2 to Davis Dr	23,985	83	17	2	1	40	60	0
10	Ralston Ave	Davis Dr to Cipriani Blvd	23,415	83	17	2	1	40	75	0
11	Ralston Ave	Cipriani Blvd to Alameda de las Pulgas	17,165	83	17	2	1	40	75	0
12	Ralston Ave	Alameda de las Pulgas to Notre Dame Ave	16,240	83	17	2	1	30	80	0
13	Ralston Ave	Notre Dame Ave to NDHS Drwy 1	16,215	83	17	2	1	30	130	-5
14	Ralston Ave	NDHS Drwy 1 to NDHS Drwy 2	16,150	83	17	2	1	30	160	-5
15	Ralston Ave	NDHS Drwy 2 to Chula Vista Dr	16,725	83	17	2	1	30	140	-5
16	Ralston Ave	Chula Vista Dr to NDU Rd	21,420	83	17	2	1	30	115	-5
17	Ralston Ave	NDU Rd to South Rd	21,775	83	17	2	1	30	100	0
18	Ralston Ave	South Rd to 6th Ave	22,080	83	17	2	1	25	120	-5
19	Ralston Ave	6th Ave to El Camino Real	17,370	83	17	2	1	25	125	-5
20	Ralston Ave	El Camino Real to Old County Rd	20,865	83	17	2	1	25	500	-5
21	Ralston Ave	Old County Rd to Elmer St	19,095	83	17	2	1	30	300	-5
22	Ralston Ave	Elmer St to Hiller St	21,875	83	17	2	1	30	125	-5
23	Ralston Ave	Hiller St to US 101 SB Ramps	27,120	83	17	2	1	30	115	0
24	Ralston Ave	US 101 SB Ramps to US NB Ramps	25,755	83	17	2	1	35	100	0
25	Marine Pkwy	East of US NB Ramps	18,355	83	17	2	1	35	550	-5
26	SR 92 WB Ramps	North of Ralston Ave	11,420	83	17	2	1	45	300	0
27	SR 92 EB Ramps	North of Ralston Ave	10,085	83	17	2	1	45	100	0
28	Christian Dr	North of Ralston Ave	1,440	83	17	1	1	25	75	0
29	Hallmark Dr	South of Ralston Ave	6,605	83	17	1	1	30	90	0
30	Belmont Canyon Rd	North of Ralston Ave	2,390	83	17	1	1	25	90	0
31	Tahoe Dr	South of Ralston Ave	1,785	83	17	1	1	25	75	0
32	RMS Drwy 1	South of Ralston Ave	1,750	83	17	1	1	5	50	0
33	Davis Dr	South of Ralston Ave	3,090	83	17	1	1	25	140	0
34	Cipriani Blvd	North of Ralston Ave	8,825	83	17	1	1	25	50	0
35	Continental Way	South of Ralston Ave	6,105	83	17	1	1	25	125	0
36	Alameda de las Pulgas	North of Ralston Ave	7,120	83	17	1	1	25	125	0
37	Alameda de las Pulgas	South of Ralston Ave	13,370	83	17	1	1	30	150	0
38	Notre Dame Ave	North of Ralston Ave	2,405	83	17	1	1	25	50	0
39	NDHS Drwy 2	North of Ralston Ave	2,115	83	17	1	1	15	200	0
40	Chula Vista Dr	South of Ralston Ave	5,435	83	17	1	1	25	50	0
41	NDU Rd	North of Ralston Ave	950	83	17	1	1	15	330	0
42	South Rd	North of Ralston Ave	1,155	83	17	1	1	25	80	0
43	6th Ave	North of Ralston Ave	1,545	83	17	2	1	25	135	-5
44	6th Ave	South of Ralston Ave	6,635	83	17	1	1	25	80	-5
45	El Camino Real	North of Ralston Ave	17,625	83	17	2	1	35	135	-5
46	El Camino Real	South of Ralston Ave	15,920	83	17	2	1	35	100	0
47	Old County Rd	North of Ralston Ave	6,995	83	17	2	1	25	115	0
48	Old County Rd	South of Ralston Ave	3,945	83	17	2	1	25	125	0
49	Elmer St	South of Ralston Ave	2,015	83	17	1	1	25	100	-5
50	Hiller St	North of Ralston Ave	6,825	83	17	1	1	25	100	0
51	Hiller St	South of Ralston Ave	930	83	17	1	1	25	100	-5
52	US 101 SB Ramps	South of Ralston Ave	6,450	83	17	2	1	45	75	-8
53	Island Pkwy	North of Ralston Ave	2,260	83	17	2	1	40	100	0
54	US 101 NB Ramps	North of Ralston Ave	11,410	83	17	2	1	45	100	0

Note: Offsets applied where existing shielding of noise-sensitive receptor outdoor area is present (intervening buildings or sound walls).

Appendix E-2
FHWA Highway Traffic Noise Prediction Model Inputs
Stanford University Belmont Campus
File Name: 02 Existing+Project Signal
Run Date: 3/7/2024



#	Roadway	Segment Description	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance to Receptor	Offset (dB)
1	Ralston Ave	West of SR 92 WB Ramps	6,420	83	17	2	1	35	225	0
2	Ralston Ave	SR 92 WB Ramps to SR 92 EB Ramps	14,265	83	17	2	1	35	350	0
3	Ralston Ave	SR 92 EB Ramps to Christian Dr	20,695	83	17	2	1	35	130	0
4	Ralston Ave	Christian Dr to Hallmark Dr	20,655	83	17	2	1	40	150	0
5	Ralston Ave	Hallmark Dr to Belmont Canyon Rd	20,970	83	17	2	1	40	60	0
6	Ralston Ave	Belmont Canyon Rd to Tahoe Dr	21,120	83	17	2	1	40	60	0
7	Ralston Ave	Tahoe Dr to RMS Drwy 1	21,635	83	17	2	1	40	100	0
8	Ralston Ave	RMS Drwy 1 to RMS Drwy 2	22,385	83	17	2	1	40	220	-5
9	Ralston Ave	RMS Drwy 2 to Davis Dr	24,135	83	17	2	1	40	60	0
10	Ralston Ave	Davis Dr to Cipriani Blvd	23,565	83	17	2	1	40	75	0
11	Ralston Ave	Cipriani Blvd to Alameda de las Pulgas	19,095	83	17	2	1	40	75	0
12	Ralston Ave	Alameda de las Pulgas to Notre Dame Ave	16,475	83	17	2	1	30	80	0
13	Ralston Ave	Notre Dame Ave to NDHS Drwy 1	16,450	83	17	2	1	30	130	-5
14	Ralston Ave	NDHS Drwy 1 to NDHS Drwy 2	16,385	83	17	2	1	30	160	-5
15	Ralston Ave	NDHS Drwy 2 to Chula Vista Dr	16,960	83	17	2	1	30	140	-5
16	Ralston Ave	Chula Vista Dr to NDU Rd	21,725	83	17	2	1	30	115	-5
17	Ralston Ave	NDU Rd to South Rd	22,340	83	17	2	1	30	100	0
18	Ralston Ave	South Rd to 6th Ave	22,645	83	17	2	1	25	120	-5
19	Ralston Ave	6th Ave to El Camino Real	17,940	83	17	2	1	25	125	-5
20	Ralston Ave	El Camino Real to Old County Rd	21,205	83	17	2	1	25	500	-5
21	Ralston Ave	Old County Rd to Elmer St	19,390	83	17	2	1	30	300	-5
22	Ralston Ave	Elmer St to Hiller St	22,165	83	17	2	1	30	125	-5
23	Ralston Ave	Hiller St to US 101 SB Ramps	27,410	83	17	2	1	30	115	0
24	Ralston Ave	US 101 SB Ramps to US NB Ramps	25,925	83	17	2	1	35	100	0
25	Marine Pkwy	East of US NB Ramps	18,400	83	17	2	1	35	550	-5
26	SR 92 WB Ramps	North of Ralston Ave	11,485	83	17	2	1	45	300	0
27	SR 92 EB Ramps	North of Ralston Ave	10,160	83	17	2	1	45	100	0
28	Christian Dr	North of Ralston Ave	1,440	83	17	1	1	25	75	0
29	Hallmark Dr	South of Ralston Ave	6,605	83	17	1	1	30	90	0
30	Belmont Canyon Rd	North of Ralston Ave	2,390	83	17	1	1	25	90	0
31	Tahoe Dr	South of Ralston Ave	1,785	83	17	1	1	25	75	0
32	RMS Drwy 1	South of Ralston Ave	1,750	83	17	1	1	5	50	0
33	Davis Dr	South of Ralston Ave	3,090	83	17	1	1	25	140	0
34	Cipriani Blvd	North of Ralston Ave	8,825	83	17	1	1	25	50	0
35	Continental Way	South of Ralston Ave	6,105	83	17	1	1	25	125	0
36	Alameda de las Pulgas	North of Ralston Ave	6,955	83	17	1	1	25	125	0
37	Alameda de las Pulgas	South of Ralston Ave	12,345	83	17	1	1	30	150	0
38	Notre Dame Ave	North of Ralston Ave	2,405	83	17	1	1	25	50	0
39	NDHS Drwy 2	North of Ralston Ave	2,115	83	17	1	1	15	200	0
40	Chula Vista Dr	South of Ralston Ave	5,505	83	17	1	1	25	50	0
41	NDU Rd	North of Ralston Ave	2,770	83	17	1	1	15	330	0
42	South Rd	North of Ralston Ave	1,155	83	17	1	1	25	80	0
43	6th Ave	North of Ralston Ave	1,545	83	17	2	1	25	135	-5
44	6th Ave	South of Ralston Ave	6,635	83	17	1	1	25	80	-5
45	El Camino Real	North of Ralston Ave	17,730	83	17	2	1	35	135	-5
46	El Camino Real	South of Ralston Ave	16,045	83	17	2	1	35	100	0
47	Old County Rd	North of Ralston Ave	7,025	83	17	2	1	25	115	0
48	Old County Rd	South of Ralston Ave	3,960	83	17	2	1	25	125	0
49	Elmer St	South of Ralston Ave	2,015	83	17	1	1	25	100	-5
50	Hiller St	North of Ralston Ave	6,830	83	17	1	1	25	100	0
51	Hiller St	South of Ralston Ave	930	83	17	1	1	25	100	-5
52	US 101 SB Ramps	South of Ralston Ave	6,495	83	17	2	1	45	75	-8
53	Island Pkwy	North of Ralston Ave	2,260	83	17	2	1	40	100	0
54	US 101 NB Ramps	North of Ralston Ave	11,535	83	17	2	1	45	100	0

Note: Offsets applied where existing shielding of noise-sensitive receptor outdoor area is present (intervening buildings or sound walls).

Appendix E-3
FHWA Highway Traffic Noise Prediction Model Inputs
Stanford University Belmont Campus
File Name: 03 Existing+Project Roundabout
Run Date: 3/7/2024



#	Roadway	Segment Description	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance to Receptor	Offset (dB)
1	Ralston Ave	West of SR 92 WB Ramps	6,420	83	17	2	1	35	225	0
2	Ralston Ave	SR 92 WB Ramps to SR 92 EB Ramps	14,265	83	17	2	1	35	350	0
3	Ralston Ave	SR 92 EB Ramps to Christian Dr	20,695	83	17	2	1	35	130	0
4	Ralston Ave	Christian Dr to Hallmark Dr	20,655	83	17	2	1	40	150	0
5	Ralston Ave	Hallmark Dr to Belmont Canyon Rd	20,970	83	17	2	1	40	60	0
6	Ralston Ave	Belmont Canyon Rd to Tahoe Dr	21,120	83	17	2	1	40	60	0
7	Ralston Ave	Tahoe Dr to RMS Drwy 1	21,635	83	17	2	1	40	100	0
8	Ralston Ave	RMS Drwy 1 to RMS Drwy 2	22,385	83	17	2	1	40	220	-5
9	Ralston Ave	RMS Drwy 2 to Davis Dr	24,135	83	17	2	1	40	60	0
10	Ralston Ave	Davis Dr to Cipriani Blvd	23,565	83	17	2	1	40	75	0
11	Ralston Ave	Cipriani Blvd to Alameda de las Pulgas	19,095	83	17	2	1	40	75	0
12	Ralston Ave	Alameda de las Pulgas to Notre Dame Ave	16,475	83	17	2	1	30	80	0
13	Ralston Ave	Notre Dame Ave to NDHS Drwy 1	16,450	83	17	2	1	30	130	-5
14	Ralston Ave	NDHS Drwy 1 to NDHS Drwy 2	16,385	83	17	2	1	30	160	-5
15	Ralston Ave	NDHS Drwy 2 to Chula Vista Dr	16,960	83	17	2	1	30	140	-5
16	Ralston Ave	Chula Vista Dr to NDU Rd	21,725	83	17	2	1	30	115	-5
17	Ralston Ave	NDU Rd to South Rd	22,340	83	17	2	1	30	100	0
18	Ralston Ave	South Rd to 6th Ave	22,645	83	17	2	1	25	120	-5
19	Ralston Ave	6th Ave to El Camino Real	17,935	83	17	2	1	25	125	-5
20	Ralston Ave	El Camino Real to Old County Rd	21,205	83	17	2	1	25	500	-5
21	Ralston Ave	Old County Rd to Elmer St	19,425	83	17	2	1	30	300	-5
22	Ralston Ave	Elmer St to Hiller St	22,165	83	17	2	1	30	125	-5
23	Ralston Ave	Hiller St to US 101 SB Ramps	27,410	83	17	2	1	30	115	0
24	Ralston Ave	US 101 SB Ramps to US NB Ramps	25,920	83	17	2	1	35	100	0
25	Marine Pkwy	East of US NB Ramps	18,400	83	17	2	1	35	550	-5
26	SR 92 WB Ramps	North of Ralston Ave	11,485	83	17	2	1	45	300	0
27	SR 92 EB Ramps	North of Ralston Ave	10,160	83	17	2	1	45	100	0
28	Christian Dr	North of Ralston Ave	1,440	83	17	1	1	25	75	0
29	Hallmark Dr	South of Ralston Ave	6,605	83	17	1	1	30	90	0
30	Belmont Canyon Rd	North of Ralston Ave	2,390	83	17	1	1	25	90	0
31	Tahoe Dr	South of Ralston Ave	1,785	83	17	1	1	25	75	0
32	RMS Drwy 1	South of Ralston Ave	1,750	83	17	1	1	5	50	0
33	Davis Dr	South of Ralston Ave	3,090	83	17	1	1	25	140	0
34	Cipriani Blvd	North of Ralston Ave	8,825	83	17	1	1	25	50	0
35	Continental Way	South of Ralston Ave	6,105	83	17	1	1	25	125	0
36	Alameda de las Pulgas	North of Ralston Ave	6,955	83	17	1	1	25	125	0
37	Alameda de las Pulgas	South of Ralston Ave	12,345	83	17	1	1	30	150	0
38	Notre Dame Ave	North of Ralston Ave	2,405	83	17	1	1	25	50	0
39	NDHS Drwy 2	North of Ralston Ave	2,115	83	17	1	1	15	200	0
40	Chula Vista Dr	South of Ralston Ave	5,505	83	17	1	1	25	50	0
41	NDU Rd	North of Ralston Ave	2,770	83	17	1	1	15	330	0
42	South Rd	North of Ralston Ave	1,155	83	17	1	1	25	80	0
43	6th Ave	North of Ralston Ave	1,545	83	17	2	1	25	135	-5
44	6th Ave	South of Ralston Ave	5,735	83	17	1	1	25	80	-5
45	El Camino Real	North of Ralston Ave	17,730	83	17	2	1	35	135	-5
46	El Camino Real	South of Ralston Ave	16,045	83	17	2	1	35	100	0
47	Old County Rd	North of Ralston Ave	7,060	83	17	2	1	25	115	0
48	Old County Rd	South of Ralston Ave	3,960	83	17	2	1	25	125	0
49	Elmer St	South of Ralston Ave	2,015	83	17	1	1	25	100	-5
50	Hiller St	North of Ralston Ave	6,830	83	17	1	1	25	100	0
51	Hiller St	South of Ralston Ave	930	83	17	1	1	25	100	-5
52	US 101 SB Ramps	South of Ralston Ave	6,495	83	17	2	1	45	75	-8
53	Island Pkwy	North of Ralston Ave	2,260	83	17	2	1	40	100	0
54	US 101 NB Ramps	North of Ralston Ave	9,120	83	17	2	1	45	100	0

Note: Offsets applied where existing shielding of noise-sensitive receptor outdoor area is present (intervening buildings or sound walls).

Appendix E-4
FHWA Highway Traffic Noise Prediction Model Inputs
Stanford University Belmont Campus
File Name: 04 Existing+Project Current Infrastructure
Run Date: 3/7/2024



#	Roadway	Segment Description	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance to Receptor	Offset (dB)
1	Ralston Ave	West of SR 92 WB Ramps	6,420	83	17	2	1	35	225	0
2	Ralston Ave	SR 92 WB Ramps to SR 92 EB Ramps	14,265	83	17	2	1	35	350	0
3	Ralston Ave	SR 92 EB Ramps to Christian Dr	20,695	83	17	2	1	35	130	0
4	Ralston Ave	Christian Dr to Hallmark Dr	20,655	83	17	2	1	40	150	0
5	Ralston Ave	Hallmark Dr to Belmont Canyon Rd	20,970	83	17	2	1	40	60	0
6	Ralston Ave	Belmont Canyon Rd to Tahoe Dr	21,120	83	17	2	1	40	60	0
7	Ralston Ave	Tahoe Dr to RMS Drwy 1	21,635	83	17	2	1	40	100	0
8	Ralston Ave	RMS Drwy 1 to RMS Drwy 2	22,385	83	17	2	1	40	220	-5
9	Ralston Ave	RMS Drwy 2 to Davis Dr	24,135	83	17	2	1	40	60	0
10	Ralston Ave	Davis Dr to Cipriani Blvd	23,565	83	17	2	1	40	75	0
11	Ralston Ave	Cipriani Blvd to Alameda de las Pulgas	19,450	83	17	2	1	40	75	0
12	Ralston Ave	Alameda de las Pulgas to Notre Dame Ave	16,475	83	17	2	1	30	80	0
13	Ralston Ave	Notre Dame Ave to NDHS Drwy 1	16,450	83	17	2	1	30	130	-5
14	Ralston Ave	NDHS Drwy 1 to NDHS Drwy 2	16,385	83	17	2	1	30	160	-5
15	Ralston Ave	NDHS Drwy 2 to Chula Vista Dr	16,960	83	17	2	1	30	140	-5
16	Ralston Ave	Chula Vista Dr to NDU Rd	21,725	83	17	2	1	30	115	-5
17	Ralston Ave	NDU Rd to South Rd	22,340	83	17	2	1	30	100	0
18	Ralston Ave	South Rd to 6th Ave	22,645	83	17	2	1	25	120	-5
19	Ralston Ave	6th Ave to El Camino Real	17,935	83	17	2	1	25	125	-5
20	Ralston Ave	El Camino Real to Old County Rd	21,205	83	17	2	1	25	500	-5
21	Ralston Ave	Old County Rd to Elmer St	19,390	83	17	2	1	30	300	-5
22	Ralston Ave	Elmer St to Hiller St	22,165	83	17	2	1	30	125	-5
23	Ralston Ave	Hiller St to US 101 SB Ramps	27,410	83	17	2	1	30	115	0
24	Ralston Ave	US 101 SB Ramps to US NB Ramps	25,925	83	17	2	1	35	100	0
25	Marine Pkwy	East of US NB Ramps	18,400	83	17	2	1	35	550	-5
26	SR 92 WB Ramps	North of Ralston Ave	11,485	83	17	2	1	45	300	0
27	SR 92 EB Ramps	North of Ralston Ave	10,160	83	17	2	1	45	100	0
28	Christian Dr	North of Ralston Ave	1,440	83	17	1	1	25	75	0
29	Hallmark Dr	South of Ralston Ave	6,605	83	17	1	1	30	90	0
30	Belmont Canyon Rd	North of Ralston Ave	2,390	83	17	1	1	25	90	0
31	Tahoe Dr	South of Ralston Ave	1,785	83	17	1	1	25	75	0
32	RMS Drwy 1	South of Ralston Ave	1,750	83	17	1	1	5	50	0
33	Davis Dr	South of Ralston Ave	3,090	83	17	1	1	25	140	0
34	Cipriani Blvd	North of Ralston Ave	8,825	83	17	1	1	25	50	0
35	Continental Way	South of Ralston Ave	6,105	83	17	1	1	25	125	0
36	Alameda de las Pulgas	North of Ralston Ave	7,310	83	17	1	1	25	125	0
37	Alameda de las Pulgas	South of Ralston Ave	12,345	83	17	1	1	30	150	0
38	Notre Dame Ave	North of Ralston Ave	2,405	83	17	1	1	25	50	0
39	NDHS Drwy 2	North of Ralston Ave	2,115	83	17	1	1	15	200	0
40	Chula Vista Dr	South of Ralston Ave	5,505	83	17	1	1	25	50	0
41	NDU Rd	North of Ralston Ave	1,815	83	17	1	1	15	330	0
42	South Rd	North of Ralston Ave	1,155	83	17	1	1	25	80	0
43	6th Ave	North of Ralston Ave	1,545	83	17	2	1	25	135	-5
44	6th Ave	South of Ralston Ave	6,635	83	17	1	1	25	80	-5
45	El Camino Real	North of Ralston Ave	17,730	83	17	2	1	35	135	-5
46	El Camino Real	South of Ralston Ave	16,045	83	17	2	1	35	100	0
47	Old County Rd	North of Ralston Ave	7,025	83	17	2	1	25	115	0
48	Old County Rd	South of Ralston Ave	3,960	83	17	2	1	25	125	0
49	Elmer St	South of Ralston Ave	2,015	83	17	1	1	25	100	-5
50	Hiller St	North of Ralston Ave	6,830	83	17	1	1	25	100	0
51	Hiller St	South of Ralston Ave	930	83	17	1	1	25	100	-5
52	US 101 SB Ramps	South of Ralston Ave	6,495	83	17	2	1	45	75	-8
53	Island Pkwy	North of Ralston Ave	2,260	83	17	2	1	40	100	0
54	US 101 NB Ramps	North of Ralston Ave	11,535	83	17	2	1	45	100	0

Note: Offsets applied where existing shielding of noise-sensitive receptor outdoor area is present (intervening buildings or sound walls).

