APPENDIX T

ENVIRONMENTAL NOISE AND VIBRATION ASSESSMENT

Environmental Noise & Vibration Assessment – EIR

Point Molate Mixed Use Project

Richmond, California

BAC Job # 2019-143

Prepared For:

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Introduction

The proposed Point Molate Mixed Use Project (project) is located on the San Pablo Peninsula within the City of Richmond, California. The project site is bounded by the San Francisco Bay to the west, open space to the north and south, and the Chevron Richmond refinery to the east. The project area and conceptual land use plan are shown on Figures 1 and 2, respectively.

The project applicant is proposing a modified mix of land uses and intensities on the Point Molate Site based on alternatives evaluated in an FEIR completed in 2011. The "modified project" (project) proposed by the applicant consists of the mixed use development of approximately 80 acres of the Point Molate Site that includes a variety of residential and commercial uses, and transportation and utility infrastructure improvements. The project is proposed to be divided into eight planning areas, which are shown on Figure 2. The planning areas, identified as A-H, depict the outer limits of where development could occur, and may ultimately include some open space within those areas. Figure 3 shows the project site and vicinity with the proposed infrastructure work areas.

The following section discusses the existing noise and vibration environment in the project area, and identifies potential impacts and mitigation measures associated with the project. Specifically, this section analyzes potential noise and vibration impacts associated with the project upon nearby receptors within the project vicinity relative to applicable federal, state and local noise and vibration criteria, and to the existing ambient noise and vibration environment. This section also analyzes potential project noise and vibration impacts upon the sensitive receptors proposed within the project area.

Environmental Setting

Noise Fundamentals and Terminology

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard, and thus are called sound. Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB. Another useful aspect of the decibel scale is that changes in levels (dB) correspond closely to human perception of relative loudness. Appendix A contains definitions of Acoustical Terminology. Figure 4 shows common noise levels associated with various sources.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by weighing the frequency response of a sound level meter by means of the standardized A-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 in decibels.

Community noise is commonly described in terms of the "ambient" noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}) over a given time period (usually one hour). The L_{eq} is the foundation of the Day-Night Average Level noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

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

Vibration

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

Vibration can be described in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration in terms of velocity in inches per second peak particle velocity (IPS, PPV) or root-mean-square (VdB, RMS). Standards pertaining to perception as well as damage to structures have been developed for vibration in terms of peak particle velocity as well as RMS velocities.

As vibrations travel outward from the source, they excite the particles of rock and soil through which they pass and cause them to oscillate. Differences in subsurface geologic conditions and distance from the source of vibration will result in different vibration levels characterized by different frequencies and intensities. In all cases, vibration amplitudes will decrease with increasing distance. The maximum rate, or velocity of particle movement, is the commonly accepted descriptor of the vibration "strength".

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

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

Point Molate Mixed Use Project
Richmond, California

Project Area

Figure 1

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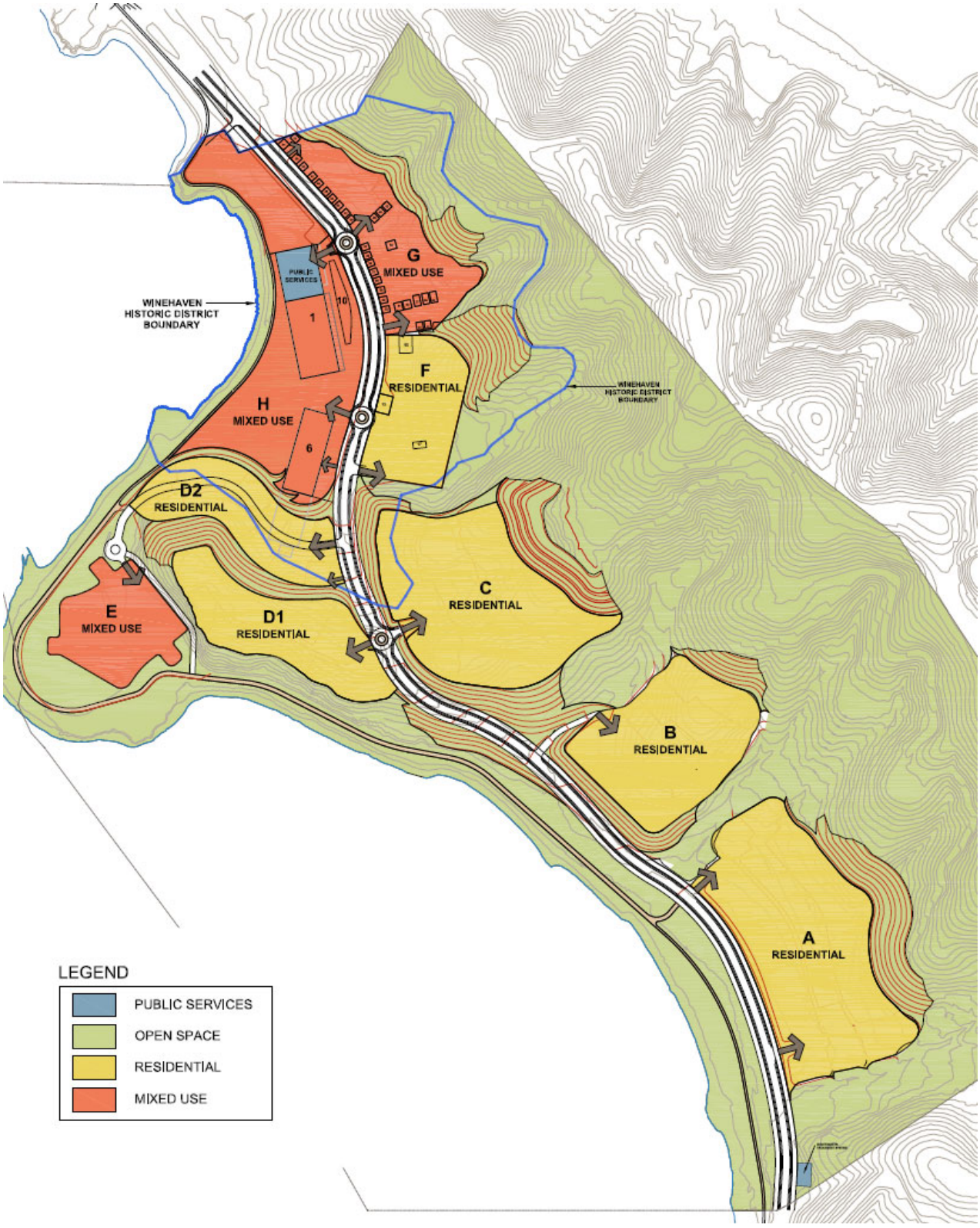

Conceptual Land Use Plan

Point Molate Mixed Use Project
Richmond, California

N

Scale (Feet)

0 300 600

Figure 2

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Site and Vicinity

Point Molate Mixed Use Project
Richmond, California

Figure 3

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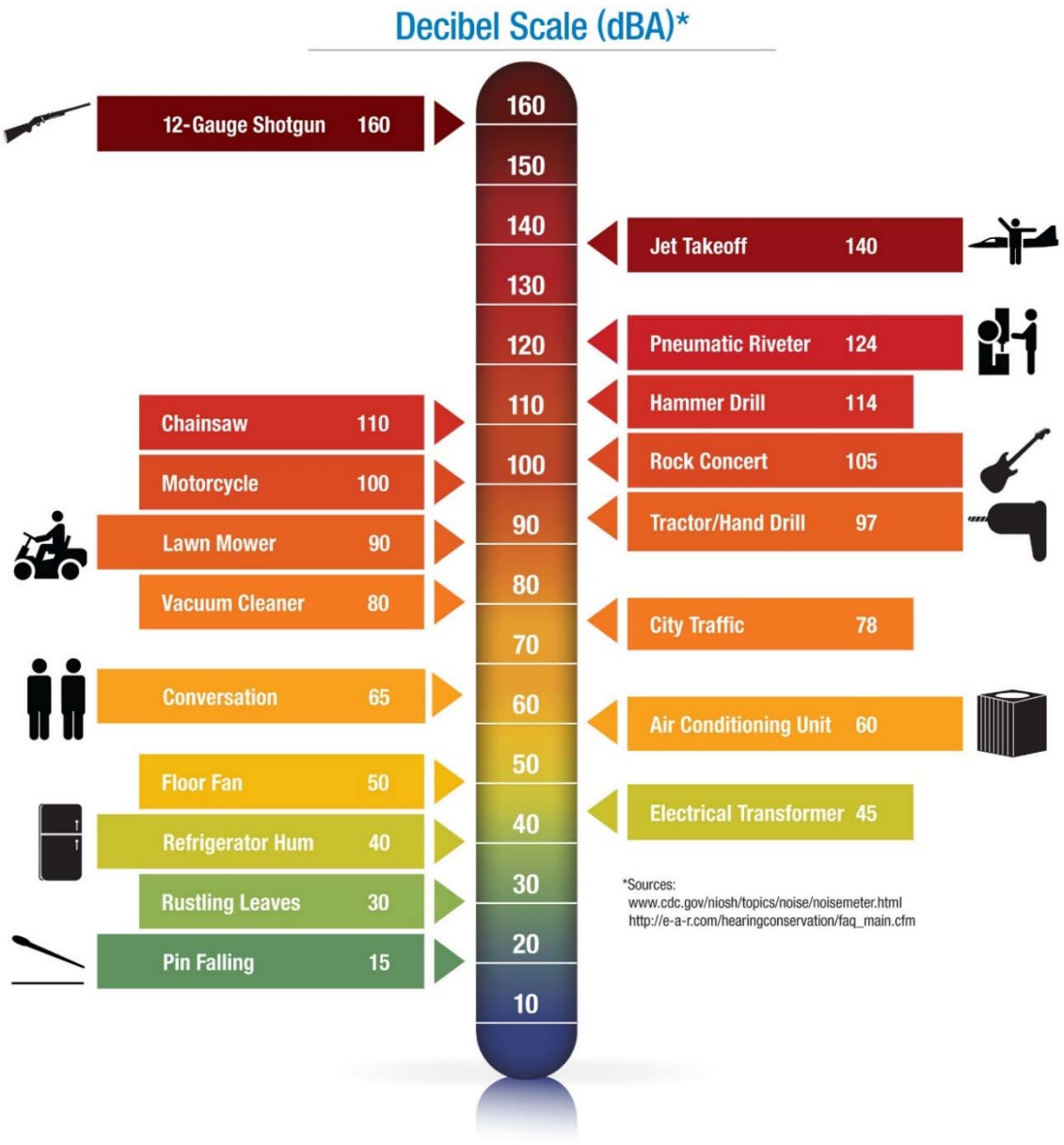
Figure 4

Noise Levels Associated with Common Noise Sources



Regulatory Setting: Criteria for Acceptable Noise and Vibration Exposure

This noise analysis is prepared pursuant to the California Environmental Quality Act (CEQA) guidelines. The CEQA guidelines specifically require that a project's noise impacts be evaluated relative to both the ***increase*** in noise level which would result from the project as well as compliance with locally adopted ***maximum*** noise standards. The CEQA guidelines also require an assessment of project impacts related to groundborne vibration.

The City of Richmond does not have a specific policy or standard for assessing noise impacts associated with ***increases*** in ambient noise levels from project-generated sources. Specifically, no numeric thresholds for assessing the significance of project-related ***increases*** in ambient noise levels are provided within the City's General Plan Noise Element, Noise Ordinance, or Zoning Code. The City's General Plan and Ordinances do contain specific numeric standards for ***maximum*** acceptable noise exposure, but they do not contain numeric standards for ***increases*** in noise associated with a project. Because CEQA requires that the significance of noise impacts be evaluated relative the ***increase*** in noise resulting from a project, where the local jurisdiction does not have such adopted thresholds, reasonable thresholds from other jurisdictions must be considered. As a result, the following section describes thresholds for assessing the significance of project-related increases using federal research conducted by the Federal Interagency Commission on Noise (FICON). The City's adopted noise standards are utilized for assessing impacts relative to maximum noise standards.

In addition, the City of Richmond does not currently have adopted standards for groundborne vibration. As a result, criteria developed by the State of California Department of Transportation (Caltrans) are utilized to assess the significance of vibration impacts associated with this project.

The following sections present Federal, state, and local noise criteria which are appropriate for assessing noise and vibration impacts related to this project.

Federal

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 1 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 by the authors of this section 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 are 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 1
Significance of Changes in Cumulative Noise Exposure

Ambient Noise Level Without Project (Ldn or CNEL)	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 1, 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. Where pre-project ambient conditions are between 60 and 65 dB, 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, a 1.5 dB increase is considered by FICON as the threshold of significance.

As noted previously, 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 unacceptable according to CEQA. Because every physical process creates noise, whether by the addition of a single vehicle on a roadway, or a tractor in an agricultural field, the use of audibility alone as significance criteria would be unworkable. CEQA requires a substantial increase in ambient noise levels before noise impacts are identified, not simply an audible change.

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 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 in other applicable local, state, or federal standards?

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?

California Code of Regulations

The State Building Code (Part 2, Title 24) of the California Code of Regulations provides that, consistent with local land use standards, residential structures located in noise critical areas, such as proximity to highways, county roads, city streets, railroads, rapid transit lines, airports, or industrial areas shall be designed to prevent the intrusion of exterior noises beyond the prescribed interior noise level of 45 dB measured as Community Noise Exposure Level (CNEL) or day-night average levels (L_{dn}). Residential structures to be located where the L_{dn} or CNEL exceeds 60 dB shall require an acoustical analysis showing that the proposed design will achieve the prescribed allowable interior noise level.

California Department of Transportation (Caltrans)

The California Department of Transportation (Caltrans) criteria applicable to damage and annoyance potential from transient and continuous vibration that is usually associated with construction activity are presented in Tables 2 and 3. Equipment or activities typical of continuous vibration include: excavation equipment, static compaction equipment, tracked vehicles, traffic on a highway, vibratory pile drivers, pile-extraction equipment, and vibratory compaction equipment. Equipment or activities typical of single-impact (transient) or low-rate repeated impact vibration include: impact pile drivers, blasting, drop balls, "pogo stick" compactors, and crack-and-seat equipment (California Department of Transportation 2013).

Table 2
Guideline Vibration Damage Potential Threshold Criteria

Structure and Condition	Maximum PPV (inches/second)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.20	0.10
Historic and some old buildings	0.50	0.25
Older residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial/commercial buildings	2.00	0.50

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

PPV = Peak Particle Velocity

Source: California Department of Transportation, Transportation and Construction Vibration Guidance Manual (2013).

Table 3
Guideline Vibration Annoyance Potential Criteria

Human Response	Maximum PPV (inches/second)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.40	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.90	0.10
Severe	2.00	0.40

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

PPV = Peak Particle Velocity

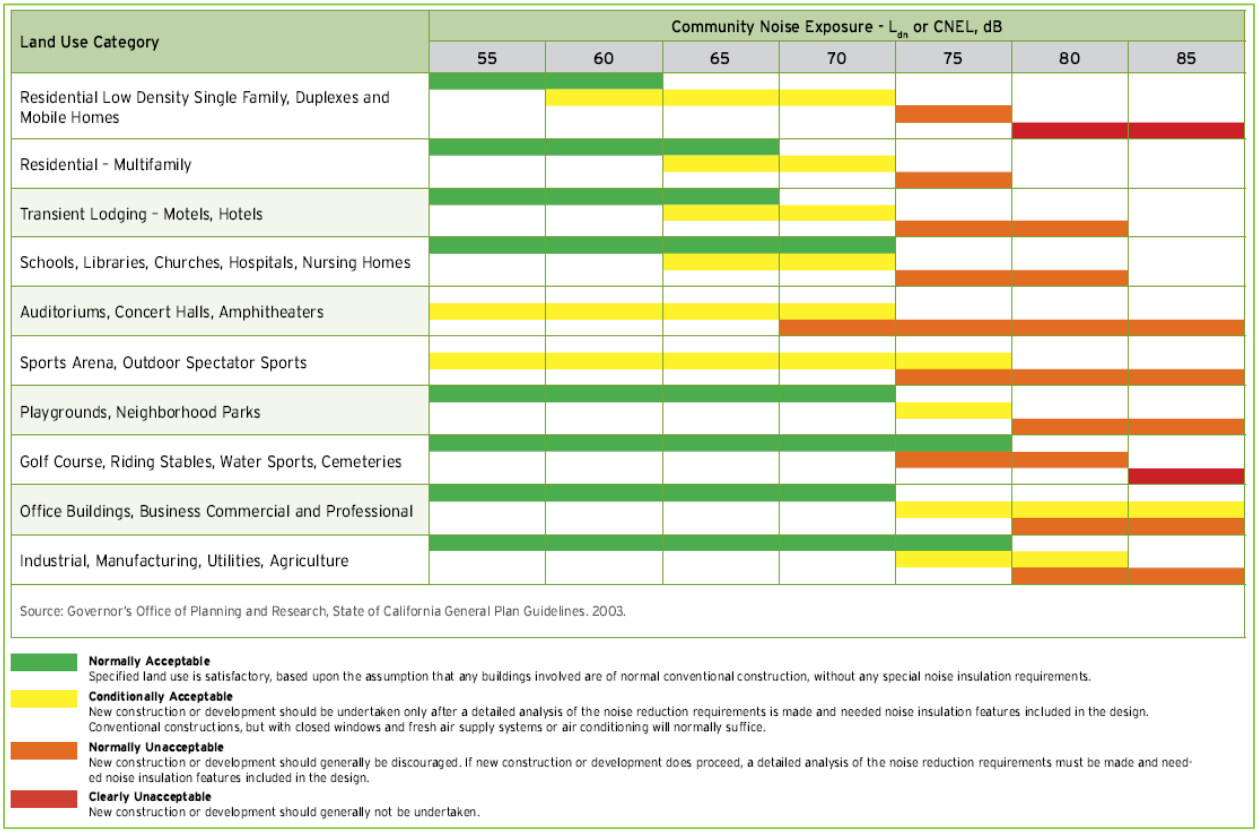
Source: California Department of Transportation, Transportation and Construction Vibration Guidance Manual (2013).

Local Regulations

Richmond General Plan 2030

The Public Safety and Noise Element of the Richmond General Plan 2030 contains goals, policies and actions to ensure that city residents are not subjected to noise beyond acceptable levels. The City has adopted the land use compatibility matrix presented in the State of California General Plan Guidelines, which is shown in Table 4.

Table 4
Noise Exposure Land Use Compatibility Standards



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

The General Plan goals, policies and actions which would be most applicable to this project are reproduced below.

GOAL SN4 **Acceptable Noise Levels**

Achieve noise levels consistent with acceptable standards and reduce or eliminate objectionable noise sources. Prevent where possible, or mitigate noise impacts from industries, roadways, railroads and businesses in residential areas and sensitive uses in the community. In addition, apply new technology, buffers and other solutions to reduce excessive noise.

Policy SN4.1 ***Noise Levels***

Work with regulatory agencies to monitor and enforce noise standards in the community.

Reduce or mitigate objectionable noise sources and require new noise sources to comply with noise standards. Regulate both indoor and outdoor noise levels to protect health and safety. Use a combination of noise

standards and existing noise levels to determine impacts and mitigation measures.

Policy SN4.2 Land Use Compatibility

Minimize conflicts between land uses to protect wetlands, marshlands, and creeks, human and environmental health and safety, preserve community character and retain job generating activities that have long-term viability.

Types, intensities, and ranges of use and development should be compatible with existing uses and should minimize or eliminate conflicts that adversely impact wetlands, marshlands, creeks, mudflats, public safety, human or environmental health or generate nuisances. All new development must avoid or mitigate to the greatest extent feasible potential negative impacts such as noise, odors, and pollution.

Consistent with the City's Industrial Buffer Zone Ordinance, prohibit the location of residential uses in the area between Harbour Way South and Marina Way South, and between Interstate 580 and Hall Avenue.

Encourage existing larger industries that have surplus land to develop modern industrial parks that could attract new and existing industries and facilitate a reduction of existing and future land use conflicts.

New development should complement the character and scale of existing neighborhoods, cultural resources, historic structures and landscapes. In particular, existing industrial and residential uses can successfully coexist through well-conceived circulation and urban design strategies including buffers (which may be in the form of sound walls and/or enclosed buildings and appropriate transitional habitat zones between wetlands, marshlands, creeks, and mudflats) and transitional uses, rerouting of truck traffic, and design components that mark transitions in land use. Similar to other cities that host mixed uses, consider requiring land use covenants for new development in areas where new uses may generate a perception of conflict with existing uses. Require sufficient visual open space and/or landscaped screening between industrial operations and adjacent residential or recreational activities in order to create adequate buffers.

Policy SN4.3 Transportation-Related Noise

Monitor changes in technology that will prevent and mitigate transportation-related noise impacts on residential and sensitive uses in the community.

Support traffic and freeway improvements that will reduce noise impacts of vehicles. Alternatives to sound walls should be considered where possible.

Action SN4.A Noise Study Report Requirement

Require proposed commercial and industrial uses with potential noise and vibration-producing activities or new noise-sensitive uses that locate in an area with day-night average sound level (L_{dn}) of 55 or greater to provide noise study reports. The report should identify noise mitigation measures that limit noise to an acceptable level compared to existing conditions.

Action SN4.B Noise Study Guidelines

Regularly review and update guidelines for the analysis of noise impacts and conflicts in the community. Ensure that the effect of brief loud noises such as locomotive horns are analyzed and that noise limitations include a maximum acceptable noise level for noises of short duration for interior sleeping areas of residential and other uses. Use the noise analysis to review development proposals to assure consistency with noise standards. Consider the following measures for mitigating noise impacts on adjacent properties:

- Screen and control noise sources such as parking, outdoor activities and mechanical equipment.
- Use technology to reduce noise impacts instances where setbacks cannot be increased.
- Use state of the art noise-abating materials technology and construction standards and double or triple glazed windows to meet noise standards.
- Control hours of operation, including deliveries and trash pickup to minimize noise impacts.
- Use the Future Noise Contours data and Municipal Code on noise to determine if additional noise studies are needed.

Action SN4.C Noise Ordinance

Regularly review and update the noise ordinance to regulate noise-generating activities and proposed developments near noise-generating activities based upon changes in state law. Where feasible, limit the impact of noise sources on noise-sensitive uses and consider noise and vibration

impacts in land use planning decisions. Require mitigation of potential noise impacts on adjacent properties. Enforce the Land Use Compatibility Standards presented in the State of California's General Plan Guidelines when siting new uses in existing noise environments. Require new residential development and other noise-sensitive uses near railroad crossings or other sources of brief loud noise to be analyzed for noise compatibility using standards based on both 24-hour averages and maximum instantaneous interior noise levels to determine the noise effects on sleep disturbance and other essential human functions. Encourage projects to use site planning and building orientation principles as well as state-of-the-art noise-abating materials, technology and construction standards to minimize noise.

Reduce noise levels generated by roadways, railroads and other facilities by: encouraging the California Department of Transportation (Caltrans) to institute noise reduction measures on existing and future freeways to lessen noise impacts on areas immediately adjacent to the freeway; encouraging public agencies to ensure that their programs are consistent with those of the City as they relate to noise control; and urging strict enforcement of current federal railroad noise emission standards by the U.S. Department of Transportation.

Action SN4.E Construction Traffic Plan Guidelines

Maintain guidelines for preparing traffic plans to mitigate noise, traffic, and dust during major construction activity. Continue to require construction traffic plans for all developments of ten or more homes or commercial projects larger than five acres in size to regulate vehicle speeds, dust and noise mitigation, hours of operation, phased fencing plans and safety standards. The plan should ensure the safety of the public and employees during construction of major projects.

City of Richmond Municipal Code

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

CHAPTER 9.52 COMMUNITY NOISE ORDINANCE

9.52.060 Persistent noises.

Failure to comply with the following provisions shall constitute a nuisance and violation of this chapter:

a) All construction equipment powered by internal combustion engines shall be properly muffled and maintained.

b) Unnecessary idling of internal combustion engines is prohibited.

c) All stationary noise-generating construction equipment such as tree grinders and air compressors are to be located as far as is practical from existing residences.

d) Quiet construction equipment, particularly air compressors, are to be selected whenever possible.

e) Use of pile drivers, sources of impulsive sound and jack hammers shall be prohibited on Sundays and holidays, except for emergencies or as approved in advance by the Building Official.

9.52.100 Exterior noise limits.

a) It shall be unlawful to maintain, permit, allow or suffer any use or activity that creates noise levels which exceed the following standards:

Zoning District	Maximum Noise Level in dBA (levels not to be exceeded more than 30 minutes in any hour)		Maximum Noise Level in dBA (levels not to be exceeded more than 5 minutes in any hour)
	Measured at Property Line or District Boundary	Measured at Any Boundary of a Residential Zone	Between 10 PM and 7 AM, Measured at Any Boundary of a Residential Zone[2]
Single-Family Residential	55	--	--
Multi-Family Residential	55	--	--
Commercial	70	60	50 or ambient noise level
Lt. Industrial and Office Flex[1]	70	60	50 or ambient noise level
Heavy and Marine Industrial	75	65	50 or ambient noise level
Public Facilities and Community Use	65	60	50 or ambient noise level
Open Space and Recreational Districts	65	60	50 or ambient noise level

[1] M-1 and M-2 the measurement will be at property lines.

[2] Restricted hours may be modified through condition of an approval conditional use permit.

Source: City of Richmond Municipal Code, Section 9.52.100

b) In determining whether any noise exceeds the maximum exterior noise limits set forth in this section, measurements shall be taken at the property line of the property from which the noise emanates, except that for noise emanating from property in an M-3 or M-4 zoning district, measurement shall be taken at boundary of the zoning district in which the property is located.

c) No person shall operate or cause to be operated within a dwelling unit, any source of sound that causes the sound level when measured inside a neighboring receiving dwelling unit to exceed the allowable noise level, for any period of time.

d) In the event the noise, as judged by the enforcing authority, contains a steady, pure tone such as a whine, screech or hum, or is an impulsive sound such as hammering or riveting, or contains music or speech, the standard limits set forth above shall be reduced by 5 decibels.

e) The exterior noise limits for any source of noise within any residential zone shall be reduced by 10 dBA between 10:00 p.m. and 7:00 a.m. The exterior noise limits for any source of noise in any zone other than a residential zone shall be reduced between 10:00 p.m. and 7:00 a.m. so that when measured at the property line of a "noise-sensitive use" the noise does not exceed 50 dBA.

9.52.110 Temporary construction activity.

Where technically and economically feasible, temporary construction activity shall be conducted in such a manner that the maximum sound levels at affected properties shall not exceed the following dBA levels:

a) Mobile construction equipment – Maximum sound levels for non-scheduled, intermittent and short-term operation of less than 15 days.

	Zoning Districts		
	Single-Family Residential	**Multi-Family Residential**	**Commercial & Industrial**
Weekdays, 7:00 a.m. to 7:00 p.m.	75 dBA	80 dBA	85 dBA
Weekends, including holidays 9:00 a.m. to 8:00 p.m.	60 dBA	65 dBA	70 dBA

b) Stationary Construction Equipment – Maximum sound levels:

	Zoning Districts		
	Single-Family Residential	**Multi-Family Residential**	**Commercial & Industrial**
Weekdays, 7:00 a.m. to 7:00 p.m.	60 dBA	65 dBA	70 dBA
Weekends, including holidays 9:00 a.m. to 8:00 p.m.	55 dBA	60 dBA	65 dBA

ARTICLE 15.04.605 NOISE

15.04.605.010 Purpose

The purpose of this Article is to establish standards for maximum noise limits and procedures for enforcing them to ensure that the General Plan limits on noise exposure and land use compatibility policies are achieved and maintained.

15.04.605.020 Exemptions

This article does not apply to:

a) **Emergencies.** The emission of sound for the purpose of alerting persons to the existence of an emergency, or the emission of sound in the performance of emergency work.

b) **Warning Devices.** Warning devices necessary for the protection of the public safety, such as police, fire, and ambulance sirens.

c) **Special Events.** Occasional outdoor gatherings, public dances, shows, and sporting and entertainment events, provided that such events are conducted pursuant to a permit or license issued by the City.

d) **Religious Institutions and Other Similar Organizations.** Unamplified bells, chimes, or other similar devices used by religious institutions and other houses of religious worship.

e) **Municipal Solid Waste Collection.** Collection of solid waste, vegetative waste, and recyclable materials by the City of under contract with the City.

f) **Public Works Construction Projects, Maintenance, and Repair.** Street, utility, and similar construction projects undertaken by or under contract to or direction of the City, or the State of California or a public utility regulated by the California Public Utilities Commission, as well as maintenance and repair operations conducted by such parties, including street sweeping, debris and litter removal, removal of downed wires, restoring electrical service, repairing traffic signals, unplugging sewers, vacuuming catch basins, repairing of damaged poles, removal of abandoned vehicles, repairing of water hydrants and mains, gas lines, oil lines, sewers, storm drains, roads, and sidewalks.

g) **Utility Facilities.** Facilities including without limitation 60-cycle electric power transformers and related equipment, sewer lift stations, municipal wells, and pumping stations.

15.04.605.030 General Standard

No person shall make, or cause to suffer, or permit to be made upon any public property, public right-of-way or private property, any excessive noise, annoying noise, amplified sound or vibrations that are physically annoying to reasonable persons of normal sensitivity or that are so harsh or so prolonged or unnatural or unusual in their use, time or place as to cause or contribute to the unnecessary and unreasonable discomfort of any persons of normal sensitivity located at the lot line of the property from which these noises emanate or that interfere with the peace and comfort of residents or their guests, or the operators or customers in places of business in the vicinity, or that may detrimentally or adversely affect such residences or places of business. The purpose of this standard is to establish the principles and context for the

application of noise limits, standards for noise exposure and land use compatibility, and requirements for reasonable noise attenuation measures, all which are intended to protect noise sensitive uses from excessive noise exposure from other uses.

15.04.605.040 Noise Limits

a) Designated Noise Zones. The land uses listed below are assigned to the following noise zones:

1. **Noise Zone 1:** All hospitals, libraries, churches, and low-density and medium-density residential uses.

2. **Noise Zone 2:** Outdoor sports and recreation uses, parks and playgrounds, including such sport, recreation, park and playground areas at schools.

3. **Noise Zone 3:** All high-density multi-family residential, mixed-use, professional office, schools, and public institutional properties.

4. **Noise Zone 4:** All commercial uses, excluding professional office and mixed-use development.

5. **Noise Zone 5:** All industrial uses.

b) Exterior and Interior Noise Standards.

1. The noise standards established in Table 15.04.605.040, unless otherwise specifically indicated, shall apply to all land within a designated noise zone. They are intended to express limits on regularly occurring noise for the specified time periods, average over an hour, and do not apply to incidental, infrequent, or unexpected noise, which are subject to Chapter 9.52 (Community Noise Ordinance) and to unamplified human voices. The general prohibitions and specific prohibitions contained in Chapter 9.52, along with the provisions for persistent noises in that Chapter, apply to all land uses and activities in the City, and, in the case of a conflict, the more restrictive provisions apply.

2. No use or activity shall create any noise or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person which causes the noise level when measured on any property within designated noise zones to exceed the applicable noise standard, unless the activity is exempt or a specific regulation applies.

3. In the event that the noise source and the affected property are within different noise zones, the noise standards of the affected property shall apply.

4. These noise standards may justify denial of an application and/or imposition of reasonable conditions of approval, including noise attenuation measures (see Section 15.024.605.080) to minimize or eliminate incompatibilities. Proposals for new development that would cause a specified standard to be exceeded may only be approved if the project would provide a substantial benefit to the City.

Table 15.04.605.040 Noise Standards, dBA – Noise Levels for a Time Period not Exceeding

			Minutes/Hour				
Noise Zone	**Location**	**Time Period**	**15**	**10**	**5**	**1**	**0**
1	Exterior	7 AM – 10 PM	60	65	70	75	75
		10 PM – 7 AM	50	55	60	65[1]	70
	Interior	7 AM – 10 PM	--	--	55	60	65
		10 PM – 7 AM	--	--	45	50	55
2	Exterior	7 AM – 10 PM	65	70	75	80	80
		10 PM – 7 AM	50	55	60	65	70
3	Exterior	Any time	65	70	75	75	75
	Interior	Any time	--	--	55	60	65
4	Exterior	Any time	60	65	70	75	80
	Interior	Any time	--	--	55	60	65
5	Exterior	Any time	70	75	80	85	90
	Interior	Any time	OSHA Standards Apply				65

1 This standard does not apply to private balconies of multi-family residences. Multi-family developments with balconies that do not meet the 65 CNEL are required to provide occupancy disclosure notices to all future tenants regarding potential noise impacts.

5. The noise exposure limits specified in Table 15.04.605.040 do not apply to noise generated by automobile traffic or other mobile noise sources in the public right-of-way.

6. In the event the measured ambient noise level exceeds the applicable noise level standard in any category above, the applicable standards shall be adjusted so as to equal the ambient noise level – see Section 15.04.605.0850(C).

15.04.605.050 Noise Exposure – Land Use Requirements and Limitations

Table 15.04.605.050, Noise Exposure – Land Requirements and Limitations, describes the requirements and limitations of various land uses within the listed Day/Night Average Sound Level (L_{dn}) ranges.

Table 15.04.605.050 Noise Exposure – Land Use Requirements and Limitations		
Land Use	**Day/Night Average Sound Level, Ldn**	**Requirements and Limitations**
Residential (1): Low-Density Single Family, Duplexes and Manufactured Housing	Less than 65	Normally acceptable
	65 to 75	Conditionally acceptable, acoustic study and noise attenuation measures required
	Over 75	Unacceptable, acoustic study and noise attenuation measures required.
Residential Multi-Family and Transient Lodging	Less than 70	Normally acceptable
	Over 70	Conditionally acceptable, acoustic study and noise attenuation measures required
Schools, Libraries, Churches, Hospitals, Residential Facility, Playgrounds, Neighborhood Parks, Commercial and Office	Less than 70	Normally acceptable
	70 and Over	Conditionally acceptable, acoustic study and noise attenuation measures required
Industrial, Manufacturing and Utilities, Golf Courses, Riding Stables, Water Sports, and Cemeteries	Less than 75	Normally acceptable
	75 and Over	Conditionally acceptable, acoustic study and noise attenuation measures required; avoid uses involving concentrations of people

Table 15.04.605.050 Notes:

1. New residential development in noise impacted areas are subject to the following noise levels:

    a. For new single-unit residential development, maintain a standard of 60 L_{dn} for exterior noise in private use areas.

    b. For new multi-unit residential development, maintain a standard of 65 L_{dn} in community outdoor recreation areas. Noise standards are not applied to private decks and balconies and shall be considered on a case-by-case basis in the Mixed Use Districts.

    c. Where new residential units (single and multi-family) would be exposed to intermittent noise levels generated during train operations, maximum railroad noise levels inside homes shall not exceed 45 dBA in bedrooms or 55 dBA in other occupied spaces. These single event limits are only applicable where there are normally four or more train operations per day.

15.04.605.060 Additional Regulations for Specific Activities

a) General construction noise shall be limited to weekdays from 7:00 a.m. to 6:00 p.m. Pile driving and similar loud activities shall be limited to weekdays from 8:00 a.m. to 5:00 p.m. General construction noise on projects repairing, renovating, or adding to residential structures with one to five dwelling units shall be limited to the hours of 7:00 a.m. to 8:00 p.m. Monday through Friday and 9:00 a.m. to 6:00 p.m. on Saturdays, Sundays and federal

holidays. Pre-construction activities, including loading and unloading, cleaning of mechanical toilets, deliveries, truck idling, backup beeps, yelling, and radios also are limited to these construction noise hours.

1. No noise-producing construction activities shall be permitted outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the Building Official or his or her authorized representative.

2. More restrictive construction noise hours may be established as a condition of approval of an administrative use permit or a conditional use permit when appropriate, given the surrounding neighborhood, the type of noise, or other unique factors.

3. Trucks, vehicles, and equipment that are making or are involved with material deliveries, loading or transfer of materials, equipment service, maintenance of any devices or appurtenances for or within any construction project in the City shall not be operated or driven on City streets outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the Building Official.

4. Any waiver granted shall take the potential noise impacts upon the surrounding neighborhood and the larger community into consideration.

5. No construction or agricultural activity shall be permitted outside of these hours that creates construction noise, except in emergencies, including maintenance work on the City rights-of-way that might be required.

15.04.605.070 Noise Measurement

Noise shall be measured with a sound level meter that meets the standards of the American Standards Institute. Noise levels shall be measured in decibels (dBA) on a sound level meter using the A-weighted filter network. Exterior noise shall be measured at the lot line. Interior noise shall be measured in the center of a habitable room with an exterior window on the side of the building with the loudest ambient exterior noise. All noise measurements shall be made when there is no noise source present inside the room at a point five feet above floor level. A calibration check of the instrument shall be made at the time any noise measurement is made. Excluded from these standards are occasional sounds generated by the movement of railroad equipment or warning devices.

15.04.605.080 Acoustical Studies – When Required

a) **Scope of Study.** The Zoning Administrator shall require an acoustical study, to be paid for by the applicant, that includes field measurement of noise levels for any proposed project that would locate a noise source with the potential to increase noise levels to levels exceeding limits in Table 15.04.605.050 or locate a noise sensitive land use near an existing known or potentially known intrusive noise source, such as a railroad crossing, freeway, or industrial facility. Acoustical studies must identify noise sources and magnitudes, describe

existing and future noise exposure, and propose mitigation measures for any on-site generated noise in order to ensure that the noise exposure limits in Table 15.04.605.050 are not exceeded.

b) **For Residential Development.** Acoustical studies for new residential development and other noise sensitive uses near railroad crossings or other sources of brief loud noise must include an analysis of both 24-hour average noise and maximum instantaneous noise on interior noise levels and any effects on sleep disturbance and other essential human functions. The study shall also evaluate the effectiveness of potential mitigation measures, including noise-abating materials, technology and construction standards to minimize noise from these sources.

c) **Establishing Ambient Noise.** When the Director has determined that there could be cause to make adjustments to the standards, an acoustical study shall be performed to establish ambient noise levels. In order to determine if adjustments to the standards should be made upwards, a minimum 24-hour duration noise measurement shall be conducted. The noise measurements shall collect data utilizing noise metrics that are consistent with the noise standards presented in Table 15.04.605.050. An arithmetic average of ambient noise levels during the three loudest hours should be made to demonstrate that ambient noise levels regularly exceed the noise standards.

15.04.605.090 Noise Attenuation Measures

Any project subject to the acoustic study requirements of Section 15.04.605.070 (Noise Measurement) may be required as a condition of approval to incorporate noise attenuation measures deemed necessary to ensure that noise standards are not exceeded.

a) New noise-sensitive uses in Noise Zone 1 must incorporate noise-attenuation measures to achieve and maintain an interior noise level as listed in Table 15.04.605.040. Commercial and industrial uses are exempt from this requirement.

b) Noise-attenuation measures identified in an acoustical study must be incorporated into the project to the extent feasible to reduce noise at the lot line and on the site of noise sensitive use in Noise Zone 1 to acceptable levels, conforming to the noise exposure limits in Table 15.04.605.040.

c) The preferred noise attenuation measures are those based on site planning and building orientation along with state-of-the-art noise-abating materials, technology and construction standards to minimize noise. The use of noise barriers for attenuation will be considered only after all feasible design-related noise measures have been incorporated into the project. Where noise barriers are used, they must provide noise reduction to meet the limits in Table 15.04.605.040.

15.04.605.100 Equipment Maintenance for Noise Control

New and existing heating, ventilation, and air conditioning equipment and other commercial/industrial equipment must be adequately maintained in proper working order so that noise levels emitted by such equipment do not create noise levels on the site of a noise-sensitive use in Noise Zone 1 exceeding applicable limits in Table 15.04.605.040. The Zoning Administrator may require noise shielding or insulation for such equipment if the operation of the equipment results in objectionable noise levels at adjacent properties.

Environmental Setting – Existing Ambient Noise and Vibration Environment

Noise-Sensitive Receptors in the Project Vicinity

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

The nearest noise-sensitive receptors to the project area consist of a residential neighborhood and boat residences. The residential neighborhood is located approximately 1 mile to the southeast of the project area. The boat residences are located at Point San Pablo Yacht Harbor, approximately 0.50 miles to the north of the project area. Figure 1 shows the locations of these receptors. It should be noted that both of the areas containing the nearest noise-sensitive receptors are substantially shielded from the project site by intervening topography.

Existing Traffic Noise Levels along Project Area Roadway Network

The FHWA Traffic Noise Model (FHWA-RD-77-108) was used to develop existing noise contours expressed in terms of L_{dn} for major roadways within the project study area. 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 L_{dn} values from L_{eq} values.

Traffic data in the form of AM and PM peak hour movements for existing conditions in the project area roadway network were obtained from the project transportation impact analysis completed by Abrams Associates (August 13, 2019). Average daily traffic (ADT) volumes were conservatively estimated by applying a factor of 10 to AM peak hour conditions. Existing ADT volumes for I-580 and I-80 were obtained from published Caltrans traffic counts (2017). Using these data and the FHWA model, traffic noise levels were calculated. The traffic noise level at 100 feet from the roadway centerline and distances from the centerlines of selected roadways to the 60 dB, 65 dB, and 70 dB L_{dn} contours are summarized in Table 5.

In many cases, the actual distances to noise level contours may vary from the distances predicted by the FHWA model. Factors such as roadway curvature, roadway grade, shielding

from local topography or structures, elevated roadways, or elevated receivers may affect actual sound propagation.

It is also recognized that existing sensitive land uses within the project vicinity are located varying distances from the centerlines of the local roadway network. The 100 foot reference distance is utilized in this analysis to provide a reference position at which changes in existing and future traffic noise levels resulting from the project can be evaluated. Appendix B-1 contains the FWHA model inputs for existing conditions.

Table 5
Existing Traffic Noise Modeling Results

Segment	Intersection	Direction	L_{dn} 100 Feet from Roadway	Distance to Contour (feet)		
				70 dB L_{dn}	65 dB L_{dn}	60 dB L_{dn}
1	Castro St / I-580 WB Ramps	North	65	44	95	204
2		South	64	40	87	188
3		East	58	16	35	74
4		West	53	7	16	35
5	Marine St / E Standard Ave	North	57	13	27	59
6		South	N/A*	N/A*	N/A*	N/A*
7		East	59	17	38	81
8		West	55	10	22	46
9	Canal Blvd / I-580 WB Ramps	North	63	34	74	158
10		South	62	29	63	136
11		East	55	10	21	46
12		West	57	13	29	62
13	Canal Blvd / I-580 EB Ramps	North	62	29	63	135
14		South	60	21	46	98
15		East	61	24	51	110
16		West	56	11	23	50
17	I-580 WB Off-Ramp / Cutting Blvd	North	46	3	6	12
18		South	54	8	17	37
19		East	61	27	57	124
20		West	61	27	58	126
21	Hoffman Blvd / Cutting Blvd	North	55	10	21	46
22		South	59	17	37	81
23		East	58	15	32	70
24		West	60	21	46	98
25	Harbour Way S / I-580 WB Ramp	North	61	27	58	125
26		South	60	20	44	95
27		East	57	13	28	61
28		West	N/A*	N/A*	N/A*	N/A*
29	Harbour Way S / Cutting Blvd	North	61	27	58	124
30		South	61	27	58	125
31		East	60	22	48	103
32		West	61	24	51	109
33	Marina Bay Prkwy / I-580 WB Ramp	North	63	33	72	154
34		South	63	36	78	169

Table 5
Existing Traffic Noise Modeling Results

Segment	Intersection	Direction	L_{dn} 100 Feet from Roadway	Distance to Contour (feet)		
				70 dB L_{dn}	65 dB L_{dn}	60 dB L_{dn}
35		East	58	17	36	78
36		West	36	1	1	2
37	Marina Bay Prkwy / I-580 EB Ramp	North	63	33	72	155
38		South	64	39	83	179
39		East	58	17	37	79
40		West	61	25	55	118
41	Marina Bay Prkwy / Cutting Blvd	North	62	29	62	134
42		South	62	31	67	144
43		East	63	33	71	154
44		West	62	27	59	127
45	I-580 WB Ramp / Regatta Blvd	North	N/A*	N/A*	N/A*	N/A*
46		South	53	8	17	36
47		East	58	16	35	76
48		West	58	17	36	78
49	Regatta Blvd / Meade St	North	58	16	35	75
50		South	50	5	10	22
51		East	61	27	57	123
52		West	61	27	58	126
53	Carlson Blvd / Cutting Blvd	North	62	28	61	131
54		South	62	29	62	134
55		East	62	31	67	145
56		West	63	35	76	164
57	S 49th St / Cutting Blvd	North	54	8	18	38
58		South	57	14	30	65
59		East	63	32	69	150
60		West	62	29	63	135
61	I-80 SB/EB Ramp / Cutting Blvd	North	60	23	50	108
62		South	N/A*	N/A*	N/A*	N/A*
63		East	63	36	78	168
64		West	63	33	70	151
65	Harbour Way / Macdonald Ave	North	60	23	49	104
66		South	61	26	56	121
67		East	60	21	44	96
68		West	59	20	42	91
69	Richmond Prkwy / Macdonald Ave	North	68	72	155	333
70		South	68	70	152	327
71		East	57	13	29	61
72		West	31	0	1	1
73	Richmond Prkwy / Barrett Ave	North	68	74	159	343
74		South	68	72	154	333
75		East	59	18	39	85
76		West	N/A*	N/A*	N/A*	N/A*
77	Richmond Prkwy / Hensley St	North	65	44	95	204
78		South	65	45	98	210

Table 5
Existing Traffic Noise Modeling Results

Segment	Intersection	Direction	L_{dn} 100 Feet from Roadway	Distance to Contour (feet) 70 dB L_{dn}	65 dB L_{dn}	60 dB L_{dn}
79		East	50	4	9	20
80		West	34	0	1	2
81	Richmond Prkwy / W Gertrude Ave	North	69	90	193	417
82		South	69	91	196	423
83		East	54	9	19	41
84		West	45	2	5	10
85	Richmond Prkwy / Parr Blvd	North	69	86	185	398
86		South	69	89	191	413
87		East	54	9	20	42
88		West	52	6	13	28
89	San Pablo Ave / Richmond Prkwy	North	65	44	95	205
90		South	63	32	68	147
91		East	69	82	177	381
92		West	69	89	191	411
93	Blume Dr / Richmond Prkwy	North	64	40	87	186
94		South	63	32	69	149
95		East	67	66	142	305
96		West	69	87	188	405
97	I-80 NB/EB Ramp / Fitzgerald Dr	North	N/A*	N/A*	N/A*	N/A*
98		South	56	12	26	56
99		East	61	24	52	112
100		West	61	25	54	117
101	Canal Blvd / W Ohio Ave	North	68	69	148	319
102		South	66	57	124	266
103		East	47	13	28	60
104		West	40	15	32	69
105	Chevron / Stenmark Dr	North	48	3	6	13
106		South	43	1	2	5
107		East	69	4	8	17
108		West	69	2	4	8
109	Richmond Prkwy / Pittsburg Ave	North	52	88	190	410
110		South	69	90	193	416
111		East	52	6	14	30
112		West	45	2	5	10
113	Goodrick Ave / Richmond Prkwy	North	43	2	3	7
114		South	54	8	18	38
115		East	69	89	193	415
116		West	69	86	185	399
117	Castro St / E Standard Dr	North	57	13	28	60
118		South	56	11	23	50
119		East	56	12	27	58
120		West	58	16	34	72
121**	I-580 – Toll Area to County Line	--	75	218	470	1,012
122**	I-580 – Bayview Ave to Erlandson St	--	76	255	548	1,181

Table 5
Existing Traffic Noise Modeling Results

Segment	Intersection	Direction	L_{dn} 100 Feet from Roadway	Distance to Contour (feet)		
				70 dB L_{dn}	65 dB L_{dn}	60 dB L_{dn}
123**	I-80 – North of Richmond Prkwy	--	82	611	1,317	2,837
124**	I-80 – South of Richmond Prkwy	--	82	594	1,279	2,756

**N/A = Roadway segments for which no traffic data was provided.*

***Segments not included in traffic impact study.*

Source: FHWA-RD-77-108 with inputs from Abrams Associates and Caltrans traffic counts. A complete listing of traffic model inputs for existing conditions is provided in Appendix B-1.

Existing Overall Ambient Noise Environment within the Project Vicinity

The ambient noise environment within the immediate project vicinity is defined primarily by noise from traffic on Interstate 580. During field visits by BAC staff, it was observed that noise generated by the San Rafael Rock Quarry located approximately 3 miles to the northwest was inaudible. Similarly, due to the substantial intervening topography between the project site and the Chevron industrial complex to the east, noise generated by the Chevron complex was inaudible at the project site.

To generally quantify existing ambient noise levels within the project vicinity, four long-term (144-hour) ambient noise surveys were conducted from July 31 to August 5, 2019 and five short-term (15-minute) ambient noise surveys were conducted on July 30, 2019. The long- and short-term noise survey locations are shown on Figure 1. Photographs of the noise survey locations are provided in Appendix C.

Larson Davis Laboratories (LDL) Model 820 and 831 precision integrating sound level meters were used to complete the noise level measurement surveys. The meters were calibrated before and after use with an LDL Model CA200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all specifications of the American National Standards Institute requirements for Type 1 sound level meters (ANSI S1.4).

The noise level measurement survey results are summarized in Table 6. The detailed results of the ambient noise survey are contained in Appendix D in tabular format and graphically in Appendix E. A summary of the short-term noise measurement results is provided in Table 7.

Table 6
Long-Term Noise Level Measurement Results – July 31 to August 5, 2019[1]

Site[2]	Description	Date	L_{dn}	Average Measured Hourly Noise Levels, dBA[3]			
				Daytime[4]		Nighttime[5]	
				L_{eq}	L_{max}	L_{eq}	L_{max}
1	Western end of project area	7/31/19	56	53 (48-56)	61 (55-75)	49 (46-51)	57 (53-67)
		8/1/19	58	51 (43-54)	60 (51-74)	52 (44-59)	60 (54-77)
		8/2/19	56	52 (48-59)	64 (54-83)	50 (45-53)	61 (51-85)
		8/3/19	55	51 (47-55)	64 (52-79)	47 (45-50)	55 (51-61)
		8/4/19	58	52 (48-56)	62 (55-73)	51 (47-54)	60 (56-69)
		8/5/19	58	51 (45-53)	59 (53-67)	52 (45-55)	59 (51-69)
2	Northern end of project area	7/31/19	55	51 (46-54)	63 (57-72)	48 (45-50)	57 (51-62)
		8/1/19	55	49 (43-52)	62 (56-66)	48 (45-50)	59 (55-64)
		8/2/19	55	51 (48-55)	65 (59-73)	48 (43-50)	58 (52-62)
		8/3/19	54	51 (56-54)	65 (58-72)	47 (44-49)	57 (55-61)
		8/4/19	55	50 (56-52)	63 (58-72)	48 (45-51)	60 (57-70)
		8/5/19	55	50 (46-53)	63 (58-70)	48 (45-50)	59 (56-63)
3	Northern end of project area	7/31/19	54	50 (46-54)	67 (60-75)	47 (45-49)	60 (55-66)
		8/1/19	54	48 (45-52)	65 (59-71)	47 (46-48)	64 (57-70)
		8/2/19	54	50 (47-53)	67 (61-75)	48 (43-50)	61 (58-64)
		8/3/19	53	50 (56-54)	69 (61-82)	46 (44-48)	60 (55-64)
		8/4/19	56	49 (56-51)	68 (62-79)	49 (47-52)	65 (61-73)
		8/5/19	55	49 (46-50)	67 (63-78)	49 (46-50)	63 (58-69)
4	Southern end of project area	7/31/19	58	54 (47-57)	62 (55-66)	51 (48-55)	59 (55-62)
		8/1/19	57	52 (45-55)	61 (54-71)	50 (46-54)	59 (56-64)
		8/2/19	56	52 (49-57)	62 (56-67)	49 (46-51)	59 (57-64)
		8/3/19	56	52 (51-53)	62 (57-74)	49 (46-52)	57 (54-59)
		8/4/19	56	51 (47-55)	60 (56-66)	49 (47-51)	60 (55-65)
		8/5/19	58	53 (49-55)	59 (56-66)	51 (48-54)	60 (54-65)

[1] Detailed summaries of the noise monitoring results are provided in Appendices D and E.
[2] Measurement locations are identified on Figure 1.
[3] Noise levels presented in terms of: Average (Low-High)
[4] Daytime hours: 7:00 AM to 10:00 PM
[5] Nighttime hours: 10:00 PM to 7:00 AM
Source: Bollard Acoustical Consultants, Inc., 2019

Table 7
Short-Term Noise Level Measurement Results – July 30, 2019

Site[1]	Description	Time of Day	Measured Noise Levels, dB	
			L_{eq}	L_{max}
A	North of project area – Point San Pablo Yacht Harbor	12:00 PM	46	60
B	South of project area – intersection of Western Drive and Ocean Avenue	1:36 PM	58	79
C	South of project area – 700 Ocean Avenue	1:57 PM	50	69
D	South of project area – intersection of Marine Street and Tewksbury Avenue	2:35 PM	62	68

[1] Measurement locations are identified on Figure 1.

Source: Bollard Acoustical Consultants, Inc., 2019

As shown in Table 6, measured average noise levels were highest at Sites 1 and 4. This was most likely due to the proximity of the measurement sites relative to Interstate 580. The noise level measurements conducted at Sites 1-4 were intended to quantify the existing general ambient noise environment within the project area, including the noise generation of traffic on Interstate 580.

Results from the short-term noise surveys at Sites A-D (Table 7) indicate that the measured average ambient noise levels ranged from 46 to 62 dB while the maximum noise levels ranged from 60 to 79 dB. Maximum noise levels were caused by local traffic.

Existing Ambient Vibration Environment

During a site visit on July 30, 2019, vibration levels were below the threshold of perception at the project site. Nonetheless, to quantify existing baseline vibration levels within the project area, BAC conducted short-term (10-minute) vibration measurements within and near the project area on July 30, 2019. The vibration measurements were conducted at long-term noise measurement Sites 1-4 as well as at the short-term noise measurement Sites A-D, shown on Figure 1. Photographs of the vibration measurement equipment and locations are shown in Appendix C.

A Larson-Davis Laboratories Model LxT precision integrating sound level meter equipped with a vibration transducer was used to complete the measurements. The results are summarized in Table 8.

Table 8
Ambient Vibration Monitoring Results – July 30, 2019

Site[1]	Time of Day	Average Measured Vibration Level, PPV (inches/second)[2]
1	10:46 AM	<0.001
2	10:08 AM	<0.001
3	10:28 AM	0.009
4	11:09 AM	<0.001
A	12:01 PM	<0.001
B	1:36 PM	<0.001
C	1:58 PM	<0.001
D	2:16 PM	<0.001

[1] Measurement locations are shown on Figure 1.

[2] VdB RMS refers to root-mean-square measurements of vibration velocity, reported in decibels.

Source: Bollard Acoustical Consultants, Inc., 2019

The Table 8 data indicate that measured average vibration levels within the project area (Sites 1-4) ranged from less than 0.001 to 0.009 in/sec PPV, while measured average vibration levels in the immediate project vicinity (Sites A-D) were less than 0.001 in/sec PPV.

Impacts and Mitigation Measures

Thresholds of Significance

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

- Generation of 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 in other applicable local, state, or federal standards; 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 project site is not located within the vicinity of a private airstrip, airport land use plan, or within two miles of a public airport; therefore, the last threshold listed above is not discussed further. CEQA requires the identification of significant noise impacts if the project would result in substantial permanent or temporary increases in noise.

The following criteria based on standards established by the Federal Interagency Commission on Noise (FICON), California Code of Regulations, California Department of Transportation (Caltrans), Richmond General Plan 2030, and Richmond 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 standards presented in the Richmond General Plan 2030 or Richmond Municipal Code.

- A significant impact would be identified if off-site traffic or if the cumulative noise exposure from on-site activities generated by the project would substantially increase noise levels at sensitive receptors in the vicinity. A substantial increase would be identified relative to the FICON standards provided in Table 1.

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

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

With development of the project site, 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. The FHWA Model was used with traffic input data obtained from the transportation impact analysis (prepared by Abrams Associates Traffic Engineering, Inc.) to predict project traffic noise level increases relative to Existing, Baseline, and Cumulative project and no-project conditions. It should be noted that the traffic input data obtained from the transportation impact analysis is considered to be conservative since the analysis was based on a higher density of development than is currently proposed.

The following analysis does not consider increases in traffic noise levels due to the project on I-580 or I-80. According to the trip generation summary (Abrams Associates), the proposed project would generate approximately 1,000 peak hour vehicle trips – which equates to approximately 11,000 vehicle trips per day. The transportation impact analysis indicates that the highest percentage of project trip distribution on I-580 will occur on the Bayview Avenue to Erlandson Street section of roadway (41% of the total project traffic or approximately 4,500 daily vehicle trips). In addition, the highest percentage of project trip distribution on I-80 will occur north of Richmond Parkway (16% or approximately 1,750 daily vehicle trips). Published Caltrans traffic counts for the year 2017 indicate those segments of I-580 and I-80 currently experience average daily traffic volumes of approximately 100,000 and 198,000, respectively.

Based on the existing traffic volumes discussed above, the FHWA Model predicts existing traffic noise levels along those segments of I-580 and I-80 of 78.5 and 81.5 dB L_{dn} at a distance of 100 feet, respectively. After the addition of project-generated daily vehicle trips as indicated above, the FHWA Model predicts traffic noise levels along those segments I-580 and I-80 of 78.7 and 81.5 dB L_{dn}, respectively. The associated increases in traffic noise levels resulting

from the project computes to 0.2 dBA for I-580 and 0.0 dBA for I-80 – which would be well below the FICON criteria provided in Table 1. As a result, a more detailed analysis of off-site traffic noise impacts along I-580 and I-80 due to the project was not warranted.

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

Traffic data in the form of AM and PM peak hour movements for Existing and Existing Plus Project conditions in the project area roadway network were obtained from the project transportation impact analysis completed by Abrams Associates (August 13, 2019). Average daily traffic (ADT) volumes were conservatively estimated by applying a factor of 10 to AM peak hour conditions.

Existing versus Existing Plus Project traffic noise levels on the local roadway network are shown in Table 9. The following section includes an assessment of predicted traffic noise levels relative to the FICON increase significance noise criteria identified in Table 1. The Table 9 data are provided in terms of L_{dn} at a standard distance of 100 feet from the centerlines of the project-area roadways. Appendix B contains the FWHA model inputs.

Table 9
Traffic Noise Modeling Results and Project-Related Traffic Noise Increases
Existing Conditions

Segment	Intersection	Direction	Traffic Noise Level at 100 feet, dB L_{dn}			Substantial Increase?
			E	E+P	Increase	
1	Castro St / I-580 WB Ramps	North	64.6	65.0	0.4	No
2		South	64.1	64.1	0.0	No
3		East	58.1	58.7	0.6	No
4		West	53.1	53.1	0.0	No
5	Marine St / E Standard Ave	North	56.6	56.6	0.0	No
6		South	N/A*	N/A*	N/A*	N/A*
7		East	58.6	59.1	0.5	No
8		West	55.0	56.0	1.0	No
9	Canal Blvd / I-580 WB Ramps	North	63.0	63.3	0.3	No
10		South	62.0	62.3	0.3	No
11		East	55.0	55.0	0.0	No
12		West	56.8	57.2	0.4	No
13	Canal Blvd / I-580 EB Ramps	North	62.0	62.3	0.3	No
14		South	59.9	60.1	0.2	No
15		East	60.6	60.6	0.0	No
16		West	55.5	57.0	1.5	No
17	I-580 WB Off-Ramp / Cutting Blvd	North	46.2	46.2	0.0	No
18		South	53.5	53.5	0.0	No
19		East	61.4	61.5	0.1	No
20		West	61.5	61.6	0.1	No
21	Hoffman Blvd / Cutting Blvd	North	54.9	55.3	0.4	No
22		South	58.6	58.7	0.1	No
23		East	57.6	57.7	0.1	No
24		West	59.9	59.9	0.0	No

Table 9
Traffic Noise Modeling Results and Project-Related Traffic Noise Increases
Existing Conditions

Segment	Intersection	Direction	Traffic Noise Level at 100 feet, dB L_{dn}			Substantial Increase?
			E	E+P	Increase	
25	Harbour Way S / I-580 WB Ramp	North	61.5	61.5	0.0	No
26		South	59.7	59.8	0.1	No
27		East	56.8	56.8	0.0	No
28		West	N/A*	N/A*	N/A*	N/A*
29	Harbour Way S / Cutting Blvd	North	61.4	61.5	0.1	No
30		South	61.4	61.5	0.1	No
31		East	60.2	60.2	0.0	No
32		West	60.6	60.7	0.1	No
33	Marina Bay Prkwy / I-580 WB Ramp	North	62.8	63.0	0.2	No
34		South	63.4	63.5	0.1	No
35		East	58.4	58.4	0.0	No
36		West	35.7	35.7	0.0	No
37	Marina Bay Prkwy / I-580 EB Ramp	North	62.9	63.0	0.1	No
38		South	63.8	63.8	0.0	No
39		East	58.4	58.4	0.0	No
40		West	61.1	61.2	0.1	No
41	Marina Bay Prkwy / Cutting Blvd	North	61.9	62.0	0.1	No
42		South	62.4	62.5	0.1	No
43		East	62.8	62.9	0.1	No
44		West	61.5	61.5	0.0	No
45	I-580 WB Ramp / Regatta Blvd	North	N/A*	N/A*	N/A*	N/A*
46		South	53.4	53.7	0.3	No
47		East	58.2	58.3	0.1	No
48		West	58.4	58.4	0.0	No
49	Regatta Blvd / Meade St	North	58.1	58.2	0.1	No
50		South	50.2	50.2	0.0	No
51		East	61.4	61.5	0.1	No
52		West	61.5	61.5	0.0	No
53	Carlson Blvd / Cutting Blvd	North	61.8	61.8	0.0	No
54		South	61.9	61.9	0.0	No
55		East	62.4	62.5	0.1	No
56		West	63.2	63.3	0.1	No
57	S 49th St / Cutting Blvd	North	53.7	53.7	0.0	No
58		South	57.2	57.2	0.0	No
59		East	62.6	62.7	0.1	No
60		West	62.0	62.1	0.1	No
61	I-80 SB/EB Ramp / Cutting Blvd	North	60.5	60.5	0.0	No
62		South	N/A*	N/A*	N/A*	N/A*
63		East	63.4	63.5	0.1	No
64		West	62.7	62.8	0.1	No
65	Harbour Way / Macdonald Ave	North	60.3	60.3	0.0	No
66		South	61.2	61.3	0.1	No
67		East	59.7	59.8	0.1	No
68		West	59.4	59.5	0.1	No

Table 9
Traffic Noise Modeling Results and Project-Related Traffic Noise Increases
Existing Conditions

Segment	Intersection	Direction	Traffic Noise Level at 100 feet, dB L_{dn}			Substantial Increase?
			E	E+P	Increase	
69	Richmond Prkwy / Macdonald Ave	North	67.8	68.0	0.2	No
70		South	67.7	67.9	0.2	No
71		East	56.8	56.9	0.1	No
72		West	30.9	30.9	0.0	No
73	Richmond Prkwy / Barrett Ave	North	68.0	68.2	0.2	No
74		South	67.8	68.0	0.2	No
75		East	58.9	58.9	0.0	No
76		West	N/A*	N/A*	N/A*	N/A*
77	Richmond Prkwy / Hensley St	North	64.7	65.0	0.3	No
78		South	64.8	65.2	0.4	No
79		East	49.5	49.5	0.0	No
80		West	33.9	33.9	0.0	No
81	Richmond Prkwy / W Gertrude Ave	North	69.3	69.5	0.2	No
82		South	69.4	69.6	0.2	No
83		East	54.1	54.1	0.0	No
84		West	45.2	45.2	0.0	No
85	Richmond Prkwy / Parr Blvd	North	69.0	69.2	0.2	No
86		South	69.2	69.5	0.3	No
87		East	54.4	54.4	0.0	No
88		West	51.7	51.7	0.0	No
89	San Pablo Ave / Richmond Prkwy	North	64.7	64.7	0.0	No
90		South	62.5	62.5	0.0	No
91		East	68.7	69.0	0.3	No
92		West	69.2	69.5	0.3	No
93	Blume Dr / Richmond Prkwy	North	64.1	64.2	0.1	No
94		South	62.6	62.6	0.0	No
95		East	67.3	67.4	0.1	No
96		West	69.1	69.3	0.2	No
97	I-80 NB/EB Ramp / Fitzgerald Dr	North	N/A*	N/A*	N/A*	N/A*
98		South	56.2	56.2	0.0	No
99		East	60.7	60.8	0.1	No
100		West	61.0	61.1	0.1	No
101	Canal Blvd / W Ohio Ave	North	67.6	67.8	0.2	No
102		South	66.4	66.7	0.3	No
103		East	56.6	56.6	0.0	No
104		West	57.6	57.6	0.0	No
105	Chevron / Stenmark Dr	North	46.9	46.9	0.0	No
106		South	39.9	39.9	0.0	No
107		East	48.4	60.6	12.2	Yes
108		West	43.4	60.4	17.0	Yes
109	Richmond Prkwy / Pittsburg Ave	North	69.2	69.4	0.2	No
110		South	69.3	69.5	0.2	No
111		East	52.2	52.2	0.0	No
112		West	45.2	45.2	0.0	No

Table 9
Traffic Noise Modeling Results and Project-Related Traffic Noise Increases
Existing Conditions

Segment	Intersection	Direction	Traffic Noise Level at 100 feet, dB L_{dn}			Substantial Increase?
			E	E+P	Increase	
113	Goodrick Ave / Richmond Prkwy	North	42.6	42.6	0.0	No
114		South	53.7	53.7	0.0	No
115		East	69.3	69.5	0.2	No
116		West	69.0	69.3	0.3	No
117	Castro St / E Standard Dr	North	56.6	56.6	0.0	No
118		South	55.5	55.9	0.4	No
119		East	56.4	57.4	1.0	No
120		West	57.9	58.4	0.5	No

**N/A = Roadway segments for which no traffic data was provided.*
Source: FHWA-RD-77-108 with inputs from Abrams Associates. Appendix B contains the FHWA model inputs.

The data in Table 9 indicate that the proposed project's contribution to traffic noise level increases is predicted to exceed the FICON substantial increase criteria along two roadway segments evaluated in the existing conditions analysis. Specifically, the roadway segments east and west of the Chevron and Stenmark Drive intersection are predicted to have existing plus project traffic noise levels of approximately 61 and 60 dB L_{dn} at a distance of 100 feet from the roadway centerline, respectively. However, additional analysis of those roadway segments revealed that they are located within industrial areas – for which the City of Richmond General Plan and Municipal Code establish a normally acceptable noise level standard of 75 dB L_{dn}. Further, no residences or other sensitive land uses were identified along those roadway segments.

Because the predicted existing plus project noise levels are well within compliance of the applicable General Plan and Municipal Code noise level limits along the roadways containing substantial noise level increases, and because there are no identified sensitive receptors along those roadway segments, off-site traffic noise impacts related to increases in traffic resulting from the implementation of the project are identified as being ***less than significant***.

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

Traffic data in the form of AM and PM peak hour movements for Baseline and Baseline Plus Project conditions in the project area roadway network were obtained from the project transportation impact analysis completed by Abrams Associates (August 13, 2019). Average daily traffic (ADT) volumes were conservatively estimated by applying a factor of 10 to AM peak hour conditions.

Baseline versus Baseline Plus Project traffic noise levels on the local roadway network are shown in Table 10. The following section includes an assessment of predicted traffic noise levels relative to the FICON increase significance noise criteria identified in Table 1. The Table

10 data are provided in terms of L_{dn} at a standard distance of 100 feet from the centerlines of the project-area roadways. Appendix B contains the FWHA model inputs.

Table 10
Traffic Noise Modeling Results and Project-Related Traffic Noise Increases
Baseline Conditions

Segment	Intersection	Direction	Traffic Noise Level at 100 feet, dB L_{dn}			Substantial Increase?
			B	B+P	Increase	
1	Castro St / I-580 WB Ramps	North	64.8	65.1	0.3	No
2		South	64.2	64.2	0.0	No
3		East	58.2	58.8	0.6	No
4		West	53.2	53.2	0.0	No
5	Marine St / E Standard Ave	North	56.7	56.7	0.0	No
6		South	N/A*	N/A*	N/A*	N/A*
7		East	58.8	59.2	0.4	No
8		West	55.1	56.1	1.0	No
9	Canal Blvd / I-580 WB Ramps	North	63.1	63.4	0.3	No
10		South	62.1	62.4	0.3	No
11		East	55.1	55.1	0.0	No
12		West	57.0	57.3	0.3	No
13	Canal Blvd / I-580 EB Ramps	North	62.1	62.4	0.3	No
14		South	60.0	60.3	0.3	No
15		East	60.7	60.7	0.0	No
16		West	55.7	57.1	1.4	No
17	I-580 WB Off-Ramp / Cutting Blvd	North	46.3	46.3	0.0	No
18		South	53.7	53.7	0.0	No
19		East	61.5	61.6	0.1	No
20		West	61.6	61.8	0.2	No
21	Hoffman Blvd / Cutting Blvd	North	55.1	55.4	0.3	No
22		South	58.7	58.8	0.1	No
23		East	57.8	57.8	0.0	No
24		West	60.0	60.0	0.0	No
25	Harbour Way S / I-580 WB Ramp	North	61.6	61.7	0.1	No
26		South	59.8	59.9	0.1	No
27		East	56.9	56.9	0.0	No
28		West	N/A*	N/A*	N/A*	N/A*
29	Harbour Way S / Cutting Blvd	North	61.5	61.6	0.1	No
30		South	61.6	61.6	0.0	No
31		East	60.3	60.3	0.0	No
32		West	60.7	60.9	0.2	No
33	Marina Bay Prkwy / I-580 WB Ramp	North	62.9	63.1	0.2	No
34		South	63.5	63.7	0.2	No
35		East	58.5	58.5	0.0	No
36		West	35.7	35.7	0.0	No
37	Marina Bay Prkwy / I-580 EB Ramp	North	63.0	63.1	0.1	No
38		South	63.9	64.0	0.1	No
39		East	58.6	58.6	0.0	No
40		West	61.2	61.3	0.1	No

Table 10
Traffic Noise Modeling Results and Project-Related Traffic Noise Increases
Baseline Conditions

Segment	Intersection	Direction	Traffic Noise Level at 100 feet, dB L_{dn}			Substantial Increase?
			B	B+P	Increase	
41	Marina Bay Prkwy / Cutting Blvd	North	62.0	62.1	0.1	No
42		South	62.5	62.7	0.2	No
43		East	62.9	63.0	0.1	No
44		West	61.7	61.7	0.0	No
45	I-580 WB Ramp / Regatta Blvd	North	N/A*	N/A*	N/A*	N/A*
46		South	53.5	53.8	0.3	No
47		East	58.3	58.4	0.1	No
48		West	58.5	58.5	0.0	No
49	Regatta Blvd / Meade St	North	58.2	58.3	0.1	No
50		South	50.3	50.3	0.0	No
51		East	61.5	61.6	0.1	No
52		West	61.6	61.7	0.1	No
53	Carlson Blvd / Cutting Blvd	North	61.9	61.9	0.0	No
54		South	62.1	62.1	0.0	No
55		East	62.5	62.6	0.1	No
56		West	63.3	63.4	0.1	No
57	S 49th St / Cutting Blvd	North	53.8	53.8	0.0	No
58		South	57.4	57.4	0.0	No
59		East	62.8	62.9	0.1	No
60		West	62.1	62.2	0.1	No
61	I-80 SB/EB Ramp / Cutting Blvd	North	60.6	60.6	0.0	No
62		South	N/A*	N/A*	N/A*	N/A*
63		East	63.5	63.6	0.1	No
64		West	62.8	62.9	0.1	No
65	Harbour Way / Macdonald Ave	North	60.4	60.5	0.1	No
66		South	61.4	61.4	0.0	No
67		East	59.8	59.9	0.1	No
68		West	59.5	59.6	0.1	No
69	Richmond Prkwy / Macdonald Ave	North	68.0	68.1	0.1	No
70		South	67.8	68.1	0.3	No
71		East	57.0	57.1	0.1	No
72		West	30.9	30.9	0.0	No
73	Richmond Prkwy / Barrett Ave	North	68.2	68.3	0.1	No
74		South	68.0	68.1	0.1	No
75		East	59.1	59.1	0.0	No
76		West	N/A*	N/A*	N/A*	N/A*
77	Richmond Prkwy / Hensley St	North	64.8	65.1	0.3	No
78		South	65.0	65.3	0.3	No
79		East	49.6	49.6	0.0	No
80		West	33.9	33.9	0.0	No
81	Richmond Prkwy / W Gertrude Ave	North	69.4	69.7	0.3	No
82		South	69.5	69.8	0.3	No
83		East	54.3	54.3	0.0	No
84		West	45.2	45.2	0.0	No

Table 10
Traffic Noise Modeling Results and Project-Related Traffic Noise Increases
Baseline Conditions

Segment	Intersection	Direction	Traffic Noise Level at 100 feet, dB L_{dn}			Substantial Increase?
			B	B+P	Increase	
85	Richmond Prkwy / Parr Blvd	North	69.1	69.4	0.3	No
86		South	69.4	69.6	0.2	No
87		East	54.5	54.5	0.0	No
88		West	51.8	51.8	0.0	No
89	San Pablo Ave / Richmond Prkwy	North	64.8	64.8	0.0	No
90		South	62.7	62.7	0.0	No
91		East	68.8	69.1	0.3	No
92		West	69.3	69.6	0.3	No
93	Blume Dr / Richmond Prkwy	North	64.2	64.3	0.1	No
94		South	62.7	62.7	0.0	No
95		East	67.4	67.6	0.2	No
96		West	69.2	69.5	0.3	No
97	I-80 NB/EB Ramp / Fitzgerald Dr	North	N/A*	N/A*	N/A*	N/A*
98		South	56.3	56.3	0.0	No
99		East	60.9	60.9	0.0	No
100		West	61.2	61.2	0.0	No
101	Canal Blvd / W Ohio Ave	North	67.7	67.9	0.2	No
102		South	66.5	66.8	0.3	No
103		East	56.8	56.8	0.0	No
104		West	57.7	57.7	0.0	No
105	Chevron / Stenmark Dr	North	47.0	47.0	0.0	No
106		South	39.9	39.9	0.0	No
107		East	48.4	60.6	12.2	Yes
108		West	43.4	60.4	17.0	Yes
109	Richmond Prkwy / Pittsburg Ave	North	69.3	69.6	0.3	No
110		South	69.4	69.6	0.2	No
111		East	52.3	52.3	0.0	No
112		West	45.2	45.2	0.0	No
113	Goodrick Ave / Richmond Prkwy	North	42.6	42.6	0.0	No
114		South	53.9	53.9	0.0	No
115		East	69.4	69.6	0.2	No
116		West	69.1	69.4	0.3	No
117	Castro St / E Standard Dr	North	56.8	56.8	0.0	No
118		South	55.6	56.0	0.4	No
119		East	56.5	57.5	1.0	No
120		West	58.0	58.5	0.5	No

**N/A = Roadway segments for which no traffic data was provided.*
Source: FHWA-RD-77-108 with inputs from Abrams Associates. Appendix B contains the FHWA model inputs.

The data in Table 10 indicate that the proposed project's contribution to traffic noise level increases is predicted to exceed the FICON substantial increase criteria along two roadway segments evaluated in the baseline conditions analysis. Specifically, the roadway segments east and west of the Chevron and Stenmark Drive intersection are predicted to have baseline

plus project traffic noise levels of approximately 61 and 60 dB L_{dn} at a distance of 100 feet from the centerline of the roadway, respectively. However, additional analysis of those roadway segments revealed that they are located within industrial areas – for which the City of Richmond General Plan and Municipal Code establish a normally acceptable noise level standard of 75 dB L_{dn}. Further, no residences or other sensitive land uses were identified along those roadway segments.

Because the predicted baseline plus project noise levels are well within compliance of the applicable General Plan and Municipal Code noise level limits along the roadways containing substantial noise level increases, and because sensitive receptors were not identified along those roadway segments, off-site traffic noise impacts related to increases in traffic resulting from the implementation of the project are identified as being ***less than significant***.

Impact 3: Increases in Cumulative Traffic Noise Levels due to the Project

Traffic data in the form of AM and PM peak hour movements for Cumulative and Cumulative Plus Project conditions in the project area roadway network were obtained from the project transportation impact analysis completed by Abrams Associates (August 13, 2019). Average daily traffic (ADT) volumes were conservatively estimated by applying a factor of 10 to AM peak hour conditions.

Cumulative versus Cumulative Plus Project traffic noise levels on the local roadway network are shown in Table 11. The following section includes an assessment of predicted traffic noise levels relative to the FICON increase significance noise criteria identified in Table 1. The Table 11 data are provided in terms of L_{dn} at a standard distance of 100 feet from the centerlines of the project-area roadways. Appendix B contains the FWHA model inputs.

Table 11
Traffic Noise Modeling Results and Project-Related Traffic Noise Increases
Cumulative Conditions

Segment	Intersection	Direction	Traffic Noise Level at 100 feet, dB L_{dn}			Substantial Increase?
			C	C+P	Increase	
1	Castro St / I-580 WB Ramps	North	65.2	65.4	0.2	No
2		South	64.6	64.6	0.0	No
3		East	58.6	59.1	0.5	No
4		West	53.6	53.6	0.0	No
5	Marine St / E Standard Ave	North	57.1	57.1	0.0	No
6		South	N/A*	N/A*	N/A*	N/A*
7		East	59.1	59.6	0.5	No
8		West	55.5	56.4	0.9	No
9	Canal Blvd / I-580 WB Ramps	North	63.5	63.8	0.3	No
10		South	62.5	62.8	0.3	No
11		East	55.5	55.5	0.0	No
12		West	57.4	57.7	0.3	No
13	Canal Blvd / I-580 EB Ramps	North	62.5	62.8	0.3	No
14		South	60.4	60.6	0.2	No

Table 11
Traffic Noise Modeling Results and Project-Related Traffic Noise Increases
Cumulative Conditions

Segment	Intersection	Direction	Traffic Noise Level at 100 feet, dB L_{dn}			Substantial Increase?
			C	C+P	Increase	
15		East	61.1	61.1	0.0	No
16		West	56.1	57.4	1.3	No
17	I-580 WB Off-Ramp / Cutting Blvd	North	46.7	46.7	0.0	No
18		South	54.0	54.0	0.0	No
19		East	61.9	62.0	0.1	No
20		West	62.0	62.1	0.1	No
21	Hoffman Blvd / Cutting Blvd	North	55.4	55.8	0.4	No
22		South	59.1	59.2	0.1	No
23		East	58.2	58.2	0.0	No
24		West	60.4	60.4	0.0	No
25	Harbour Way S / I-580 WB Ramp	North	62.0	62.1	0.1	No
26		South	60.2	60.3	0.1	No
27		East	57.3	57.3	0.0	No
28		West	N/A*	N/A*	N/A*	N/A*
29	Harbour Way S / Cutting Blvd	North	61.9	62.0	0.1	No
30		South	62.0	62.0	0.0	No
31		East	60.7	60.7	0.0	No
32		West	61.1	61.2	0.1	No
33	Marina Bay Prkwy / I-580 WB Ramp	North	63.3	63.5	0.2	No
34		South	63.9	64.0	0.1	No
35		East	58.9	58.9	0.0	No
36		West	35.7	35.7	0.0	No
37	Marina Bay Prkwy / I-580 EB Ramp	North	63.4	63.5	0.1	No
38		South	64.3	64.4	0.1	No
39		East	59.0	59.0	0.0	No
40		West	61.6	61.7	0.1	No
41	Marina Bay Prkwy / Cutting Blvd	North	62.4	62.5	0.1	No
42		South	62.9	63.0	0.1	No
43		East	63.3	63.4	0.1	No
44		West	62.1	62.1	0.0	No
45	I-580 WB Ramp / Regatta Blvd	North	N/A*	N/A*	N/A*	N/A*
46		South	53.9	54.2	0.3	No
47		East	58.7	58.8	0.1	No
48		West	58.9	58.9	0.0	No
49	Regatta Blvd / Meade St	North	58.6	58.7	0.1	No
50		South	50.6	50.6	0.0	No
51		East	61.9	62.0	0.1	No
52		West	62.0	62.1	0.1	No
53	Carlson Blvd / Cutting Blvd	North	62.3	62.3	0.0	No
54		South	62.5	62.5	0.0	No
55		East	62.9	63.0	0.1	No
56		West	63.7	63.8	0.1	No
57	S 49th St / Cutting Blvd	North	54.2	54.2	0.0	No
58		South	57.8	57.8	0.0	No

Table 11
Traffic Noise Modeling Results and Project-Related Traffic Noise Increases
Cumulative Conditions

Segment	Intersection	Direction	Traffic Noise Level at 100 feet, dB L_{dn}			Substantial Increase?
			C	C+P	Increase	
59		East	63.1	63.2	0.1	No
60		West	62.5	62.6	0.1	No
61	I-80 SB/EB Ramp / Cutting Blvd	North	61.0	61.0	0.0	No
62		South	N/A*	N/A*	N/A*	N/A*
63		East	63.9	64.0	0.1	No
64		West	63.2	63.3	0.1	No
65	Harbour Way / Macdonald Ave	North	60.8	60.8	0.0	No
66		South	61.7	61.8	0.1	No
67		East	60.2	60.3	0.1	No
68		West	59.9	60.0	0.1	No
69	Richmond Prkwy / Macdonald Ave	North	68.4	68.5	0.1	No
70		South	68.2	68.4	0.2	No
71		East	57.4	57.5	0.1	No
72		West	30.9	30.9	0.0	No
73	Richmond Prkwy / Barrett Ave	North	68.6	68.7	0.1	No
74		South	68.3	68.5	0.2	No
75		East	59.5	59.5	0.0	No
76		West	N/A*	N/A*	N/A*	N/A*
77	Richmond Prkwy / Hensley St	North	65.2	65.5	0.3	No
78		South	65.4	65.7	0.3	No
79		East	50.0	50.0	0.0	No
80		West	33.9	33.9	0.0	No
81	Richmond Prkwy / W Gertrude Ave	North	69.8	70.0	0.2	No
82		South	69.9	70.1	0.2	No
83		East	54.7	54.7	0.0	No
84		West	45.7	45.7	0.0	No
85	Richmond Prkwy / Parr Blvd	North	69.5	69.7	0.2	No
86		South	69.8	70.0	0.2	No
87		East	54.9	54.9	0.0	No
88		West	52.2	52.2	0.0	No
89	San Pablo Ave / Richmond Prkwy	North	65.2	65.2	0.0	No
90		South	63.1	63.1	0.0	No
91		East	69.2	69.5	0.3	No
92		West	69.7	70.0	0.3	No
93	Blume Dr / Richmond Prkwy	North	64.6	64.7	0.1	No
94		South	63.1	63.1	0.0	No
95		East	67.8	67.9	0.1	No
96		West	69.6	69.8	0.2	No
97	I-80 NB/EB Ramp / Fitzgerald Dr	North	N/A*	N/A*	N/A*	N/A*
98		South	56.7	56.7	0.0	No
99		East	61.3	61.3	0.0	No
100		West	61.6	61.6	0.0	No
101	Canal Blvd / W Ohio Ave	North	68.1	68.3	0.2	No
102		South	66.9	67.2	0.3	No

Table 11
Traffic Noise Modeling Results and Project-Related Traffic Noise Increases
Cumulative Conditions

Segment	Intersection	Direction	Traffic Noise Level at 100 feet, dB L_{dn}			Substantial Increase?
			C	C+P	Increase	
103		East	57.2	57.2	0.0	No
104		West	58.1	58.1	0.0	No
105	Chevron / Stenmark Dr	North	47.4	47.4	0.0	No
106		South	40.4	40.4	0.0	No
107		East	48.9	60.7	11.8	Yes
108		West	43.9	60.4	16.5	Yes
109	Richmond Prkwy / Pittsburg Ave	North	69.7	69.9	0.2	No
110		South	69.8	70.0	0.2	No
111		East	52.6	52.6	0.0	No
112		West	45.4	45.4	0.0	No
113	Goodrick Ave / Richmond Prkwy	North	42.6	42.6	0.0	No
114		South	54.2	54.2	0.0	No
115		East	69.8	70.0	0.2	No
116		West	69.5	69.8	0.3	No
117	Castro St / E Standard Dr	North	57.1	57.1	0.0	No
118		South	56.0	56.3	0.3	No
119		East	56.9	57.8	0.9	No
120		West	58.4	58.9	0.5	No

**N/A = Roadway segments for which no traffic data was provided.*
Source: FHWA-RD-77-108 with inputs from Abrams Associates. Appendix B contains the FHWA model inputs.

The data in Table 11 indicate that the proposed project's contribution to traffic noise level increases is predicted to exceed the FICON substantial increase criteria along two roadway segments evaluated in the cumulative conditions analysis. Specifically, the roadway segments east and west of the Chevron and Stenmark Drive intersection are predicted to have cumulative plus project traffic noise levels of approximately 61 and 60 dB L_{dn} at a distance of 100 feet from the roadway centerline, respectively. However, additional analysis of those roadway segments revealed that they are located within industrial areas – for which the City of Richmond General Plan and Municipal Code establish a normally acceptable noise level standard of 75 dB L_{dn}. Further, no residences or other sensitive land uses were identified along those roadway segments.

Because the predicted cumulative plus project noise levels are well within compliance of the applicable General Plan and Municipal Code noise level limits along the roadways containing substantial noise level increases, and because there are no identified sensitive receptors along those roadway segments, off-site traffic noise impacts related to increases in traffic resulting from the implementation of the project are identified as being ***less than significant***.

Noise Impacts Associated with Proposed Off-Site Infrastructure Improvements

Off-site infrastructure improvements may be necessary to implement the project. According to the project Notice of Preparation (NOP), off-site infrastructure improvements may include:

- Widening of Stenmark Drive from eastern project area boundary to connection at freeway (I-580).

- Undergrounding or relocating utility power poles along Stenmark Drive from the easterly boundary to freeway connection (I-580) to accommodate completion of anticipated improvements to Stenmark Drive.

- Installation of a new force main along a proposed segment of the San Francisco Bay Trail or Stenmark Drive and Western Drive to bring sanitary sewer service to the project site from an existing sewer line at the intersection of Tewksbury Avenue and Contra Costa Street in Point Richmond. A new sanitary lift station may be required on Marine Street.

During the infrastructure improvements, noise from heavy equipment operations would add to the noise environment in the immediate project vicinity.

Impact 4: Off-Site Infrastructure Improvement Noise – Transportation

According to the project NOP, the project may include the widening of Stenmark Drive from the eastern project area boundary to the I-580 connection. Heavy equipment associated with these 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 project work area would also vary depending upon the proximity of equipment activities to that point.

The nearest existing noise-sensitive receptors to the transportation/utility infrastructure improvement work area along Stenmark Drive have been identified as residences to the southeast. Specifically, the nearest residence of this neighborhood maintains a separation of approximately 2,000 feet from project work area along Stenmark Drive.

Table 12 includes the range of maximum noise levels for equipment commonly used in roadway improvement projects at full-power operation at a distance of 50 feet. The Table 12 data also include predicted maximum equipment noise levels at the nearest identified sensitive receptors to the work area located approximately 2,000 feet away, which assume a standard spherical spreading loss of 6 dB per doubling of distance.

Table 12
Typical Construction Equipment Noise

Equipment Description	Typical Maximum Noise Level at 50 Feet, dBA	Predicted Maximum Noise Level at 2,000 Feet, dBA
Concrete mixer truck	85	53
Concrete saw	90	58
Dump truck	84	52
Flatbed truck	84	52
Front end loader	80	48
Generator (more than 25 kVA)	82	50
Paver	85	53
Pickup truck	55	23

Source: Federal Highway Administration 2006

Based on the equipment noise levels in Table 12, the results from the short-term noise measurements at Site B (Table 6), and including consideration of significant screening that would be provided by intervening topography (conservatively assumed provide a minimum of 10 dB of noise level reduction), worst-case project construction equipment noise exposure from transportation improvements along Stenmark Drive are expected to range from less than 20 dB to approximately 48 dB – which would be well below measured ambient noise levels at the nearest residences. Further, worst-case noise exposure from Stenmark Drive transportation improvements at the nearest sensitive receptors is also expected be well below applicable City of Richmond noise level limits for single-family residential uses (65 dB). As a result, this impact is considered to be ***less than significant***.

Impact 5: Off-Site Infrastructure Improvement Noise – Utilities

According to the project NOP, the project may include the undergrounding or relocating of utility power poles, the installation of a new force main, and the installation of a new lift station. The work would primarily occur along Stenmark Drive from the eastern project area boundary to the I-580 connection. Figure 3 shows the locations of the utility improvements.

Section 15.04.605.020 of the City of Richmond Municipal Code provides exemptions to noise levels generated from certain activities. Specifically, Section 15.04.605.020(g) provides an exemption to the emission of equipment noise levels related to utility facilities including sewer lift stations, municipal wells, and pumping stations. However, the noise levels associated with the *construction* of the project utility infrastructure improvements would not be exempt. Heavy equipment associated with these 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 project work area would also vary depending upon the proximity of equipment activities to that point.

The nearest existing noise-sensitive receptors to the wastewater infrastructure improvement work areas have been identified as residences along Western Drive, Tewksbury Avenue, Ocean Drive, and Marine Street – located as close as 50 feet away. As indicated in Table 12,

maximum noise levels for commonly used heavy construction equipment ranges from 55 to 90 dB at a distance of 50 feet. Although noise levels in those ranges would generally fall within the range of measured maximum noise levels at the nearest residences (Sites B-D), it is possible that a portion of the heavy equipment associated with project wastewater treatment infrastructure improvements could result in temporary short-term increases over ambient maximum noise levels at those residences. Further, it is possible that those noise levels could exceed the applicable City of Richmond noise level limits. As a result, this impact is considered to be ***potentially significant***.

Mitigation Impact 5:

In order to satisfy applicable City of Richmond noise level limits at existing sensitive receptors, the following construction-related noise mitigation measures should be implemented:

MM 5:

- All construction equipment powered by internal combustion engines shall be properly muffled and maintained. (Municipal Code Section 9.52.060)
- Prohibit the unnecessary idling of internal combustion engines. (Municipal Code Section 9.52.060)
- All stationary noise-generating construction equipment such as tree grinders and air compressors are to be located as far as is practical from existing residences. (Municipal Code Section 9.52.060)
- Quiet construction equipment, particularly air compressors, are to be selected whenever possible. (Municipal Code Section 9.52.060)
- Use of pile drivers, sources of impulsive sound and jack hammers shall be prohibited on Sundays and holidays, except for emergencies or as approved in advance by the Building Official. (Municipal Code Section 9.52.060)
- General construction activities should be limited to daytime hours (7:00 a.m. to 6:00 p.m.), Monday through Friday and pile driving and similar loud activities shall be limited to weekdays from 8:00 a.m. to 5:00 p.m. Pre-construction activities, including loading and unloading, cleaning of mechanical toilets, deliveries, truck idling, backup beeps, yelling, and radios also are limited to these construction hours.
    - o No noise-producing construction activities shall be permitted outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the Building Official or his or her authorized representative.
    - o Trucks, vehicles, and equipment that are making or are involved with material deliveries, loading or transfer of materials, equipment service, maintenance of any devices or appurtenances for or within any construction project in the City shall not be operated or driven on City streets outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the Building Official. (Municipal Code Section 15.04.605.060)

- All mobile or fixed noise-producing equipment used that are regulated for noise output by a federal, state, or local agency shall comply with such regulations while in the course of project activity.
- Electrically powered equipment shall be used instead of pneumatic or internal-combustion-powered equipment, where feasible.
- Material stockpiles and mobile equipment staging, parking, and maintenance areas shall be located as far as practicable from noise-sensitive receptors.
- Project work area speed limits shall be established and enforced during the construction period.
- Nearby sensitive receptors shall be notified of construction schedules so that arrangements can be made, if desired, to limit their exposure to short-term increases in ambient noise levels.
- Any engine-powered construction equipment located adjacent to residential uses for more than five days shall be shielded from those uses by temporary barriers.

Significance after Mitigation: *Less than Significant*

Noise Impacts Associated with On-Site Project Commercial Operations

According to the project conceptual land use plan shown on Figure 2, the project proposes mixed use planning areas within the development (Planning Areas E, G and H). It is our understanding that the commercial component within those mixed use areas would consist of retail/office uses. The primary noise sources associated with retail/offices uses are typically roof-mounted air handling units associated with building heating, ventilation and air-conditioning (HVAC), and refuse collection.

Impact 6: Project HVAC Noise at Existing Noise-Sensitive Receptors

Retail/office uses would bring the possibility of noise conflicts due to operations of roof-mounted air handling units associated with building HVAC equipment. The noise levels produced by HVAC systems vary with the capacities of the units, as well as with individual unit design.

The nearest identified existing noise-sensitive receptor is located approximately 3,200 feet from the nearest proposed mixed use planning area within the project site. At this distance, project commercial HVAC noise levels would be immeasurable over the ambient noise environment at the closest sensitive receptor. As a result, this impact is considered to be ***less than significant***.

Impact 7: Project Refuse Collection Noise at Existing Noise-Sensitive Receptors

The proposed retail/offices uses of the project would include refuse collection activities. Noise levels due to typical refuse trucks may be as high as 84 dB at a distance of 50 feet. Noise conflicts may arise when garbage pickup occurs adjacent to proposed residential uses at nighttime or early morning. Nighttime refuse handling could produce noise levels affecting sleep.

The nearest identified existing noise-sensitive receptor is located approximately 3,200 feet from the nearest proposed mixed use planning area within the project site. At this distance, project commercial refuse collection noise levels would be immeasurable over the ambient noise environment at the closest sensitive receptor. As a result, this impact is considered to be ***less than significant***.

Noise Impacts Associated with On-Site Project Wastewater Treatment Facility

Impact 8: Project Wastewater Treatment Facility Operational Noise at Existing Noise-Sensitive Receptors

According to the Point Molate Preliminary Water and Wastewater Master Plan (prepared by BKF Engineers), the project could include the installation of a new on-site sanitary sewer treatment facility. The new on-site facility, which would be located at the southern end of the project area, would operate as a standalone treatment system for the project's sanitary sewer needs.

The Preliminary Water and Wastewater Master Plan indicates that the on-site wastewater treatment facility would be located approximately 1 mile away from the nearest existing sensitive receptor. Noise level measurements conducted at the Auburn California wastewater treatment plant indicate that average noise levels of approximately 50 dBA at a distance of 500 feet from the plant would be typical. At the nearest residences located 1 mile away, noise exposure from normal operations at the on-site wastewater treatment facility would be approximately 30 dBA prior to consideration of shielding by intervening topography. After consideration of such shielding, operational noise levels would be immeasurable over the ambient noise environment at the closest sensitive receptor and completely inaudible. As a result, this impact is considered to be ***less than significant***.

Noise Impacts Associated with On-Site Project Construction Activities

Impact 9: Project Construction Noise at Existing Noise-Sensitive Receptors

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

The nearest noise-sensitive receptors to the proposed planning areas where construction would occur have been identified as boat residences at the Point San Pablo Yacht Harbor (north) and a residential development (southeast). The Point San Pablo Yacht Harbor and nearest residence to the south are located approximately 3,200 and 5,500 feet from construction activities which would occur within the project area, respectively.

Between the project site and the San Pablo Yacht Harbor, there is an existing hill measuring 229 feet above sea level which would provide substantial shielding of project construction

activities. Using industry standard algorithms for computing attenuation due to topographic shielding, this intervening hill is predicted to reduce construction noise by 19 dBA at the Yacht Harbor.

Between the project site and the nearest existing residences in Point Richmond located over a mile away, there is an existing hill measuring 197 feet above sea level which would provide substantial shielding of project construction activities. Using industry standard algorithms for computing attenuation due to topographic shielding, this intervening hill is also predicted to reduce on-site project construction noise by 19 dBA at these nearest residences.

Table 13 includes the range of maximum noise levels for equipment commonly used in general construction projects at full-power operation at a distance of 50 feet. Not all of these construction activities would be required of this project. The Table 13 data also include predicted maximum equipment noise levels at the nearest identified sensitive receptors to the proposed planning areas located approximately 3,200 and 5,500 feet away, which assume a standard spherical spreading loss of 6 dB per doubling of distance.

Table 13
Typical Construction Equipment Noise

Equipment Description	Maximum Noise Level at 50 Feet, dBA	Predicted Maximum Noise Level, dBA	
		At 3,200 Feet	At 5,500 Feet
Auger drill rig	85	49	44
Backhoe	80	44	39
Bar bender	80	44	39
Boring jack power unit	80	44	39
Compactor (ground)	80	44	39
Compressor (air)	80	44	39
Concrete batch plant	83	47	42
Concrete mixer truck	85	49	44
Concrete pump truck	82	46	41
Concrete saw	90	54	49
Crane (mobile or stationary)	85	49	44
Dozer	85	49	44
Dump truck	84	48	43
Excavator	85	49	44
Flatbed truck	84	48	43
Front end loader	80	44	39
Generator (more than 25 kVA)	82	46	41
Grader	85	49	44
Hydra break ram	90	54	49
Jackhammer	85	49	44
Mounted impact hammer	90	54	49
Paver	85	49	44
Pickup truck	55	<20	<20
Pneumatic tools	85	49	44
Pumps	77	41	36

Table 13
Typical Construction Equipment Noise

Equipment Description	Maximum Noise Level at 50 Feet, dBA	Predicted Maximum Noise Level, dBA	
		At 3,200 Feet	At 5,500 Feet
Rock drill	85	49	44
Scraper	85	49	44
Soil mix drill rig	80	44	39
Tractor	84	48	43
Vacuum street sweeper	80	44	39
Vibratory concrete mixer	80	44	39

Source: Federal Highway Administration 2006

The construction noise levels shown in Table 13 do not include the aforementioned 19 dB of additional construction noise attenuation which will be provided by intervening topography. Even without consideration of that shielding, worst-case on-site project construction equipment noise exposure are expected to range from less than 20 dB to approximately 44 dB – which would be well below measured ambient noise levels at the nearest sensitive receptors. After inclusion of the additional 19 dBA of attenuation provided by intervening topography, construction noise levels would be imperceptible at the nearest receptors. Further, worst-case project construction noise exposure at the nearest sensitive receptors is also expected be well below applicable City of Richmond noise level limits for single-family residential uses (65 dB). As a result, this impact is considered to be ***less than significant***.

Vibration Impacts Due to Project

Impact 10: Vibration Generated by On-Site Project Construction Activities

During project construction, heavy equipment would be used for grading excavation, paving, and building construction, which would generate localized vibration in the immediate vicinity of the construction. As mentioned previously, the nearest sensitive receptors are located approximately 3,200 and 5,500 feet from construction activities which would occur within the project area.

Table 14 includes the range of vibration levels for equipment commonly used in general construction projects at a distance of 50 feet. The Table 14 data also include predicted equipment vibration levels at the nearest identified sensitive receptors to the proposed planning areas located approximately 3,200 and 5,500 feet away.

Table 14
Vibration Source Levels for Construction Equipment

Equipment	Maximum PPV (inches/second)[1]		
	Maximum PPV at 50 Feet[2]	Predicted PPV at 3,200 Feet	Predicted PPV at 5,500 Feet
Hoe ram	0.0315	<0.0001	<0.0001
Large bulldozer	0.0315	<0.0001	<0.0001
Caisson drilling	0.0315	<0.0001	<0.0001
Loaded trucks	0.0269	<0.0001	<0.0001
Jackhammer	0.0124	<0.0001	<0.0001
Small bulldozer	0.0011	<0.0001	<0.0001

[1] PPV = Peak Particle Velocity
[2] Reference vibration level obtained from the Federal Transit Administration (FTA), Transit Noise and Vibration Impact Assessment Manual (2018).

Vibration levels generated from on-site construction activities at the nearest off-site sensitive receptors are predicted to be well below the Caltrans thresholds for damage to structures of 0.5 in/sec PPV shown in Table 2. Further, the predicted vibration levels are well below the Caltrans thresholds for annoyance presented in Table 3. Therefore, on-site construction within the project area would not result in excessive groundborne vibration levels at nearby existing off-site sensitive receptors.

As indicated in Table 8, the measured average vibration levels within the project area and in the immediate project vicinity were well below the Caltrans criteria (ranged from less than 0.0001 to 0.009 in/sec PPV). Therefore, the project would not result in the exposure of persons to excessive groundborne vibration levels at the project site.

Because vibration levels due to and upon the proposed project will satisfy the Caltrans groundborne impact vibration criteria, this impact is considered to be ***less than significant***.

Impact 11: Vibration Generated by Off-Site Infrastructure Improvements

During project transportation and wastewater treatment infrastructure improvements, heavy equipment would be used, which would generate localized vibration in the immediate vicinity of the construction. The worst-case vibration exposure from off-site heavy equipment activities would occur at the sensitive receptors (residences) located along Western Drive, Tewksbury Avenue, Ocean Drive, and Marine Street – located as close as 50 feet away.

According to the reference vibration levels for construction equipment presented in Table 14, vibration levels associated with typical construction equipment range from 0.0011 to 0.0315 at a distance of 50 feet. Based on this data, vibration levels generated from activities within the off-site infrastructure improvement work areas would be below the Caltrans thresholds for damage to structures of 0.5 in/sec PPV at the nearest sensitive receptors. The Table 14 data further indicates that vibration exposure at the nearest receptors would be below the Caltrans thresholds for annoyance.

Because vibration level exposure due to the project would satisfy the Caltrans groundborne impact vibration criteria, this impact is considered to be ***less than significant***

Noise Impacts upon the Project – Informational Purposes

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 Richmond has policies that address existing/future conditions affecting the proposed project, which are discussed in the following section. Thus, the following section includes assessments of future traffic, commercial, and construction-related noise exposure at proposed noise-sensitive receptors within the project area and recommended conditions to ensure consistency with City noise requirements.

Issue 1: Future Traffic Noise Levels at Project Sensitive Receptors

According to the project conceptual land use plan shown on Figure 2, the project proposes residential uses within the development (Planning Areas A-D and F). Although the project conceptual land use plan identifies the general locations of the residential planning areas, the specific locations of residences and associated outdoor areas are not included.

According to the data presented in Table 11, future day/night (L_{dn}) traffic noise exposure on the segment of Stenmark Road within the project area is predicted to be approximately 60 dB L_{dn} at a distance of 100 feet from the roadway centerline. Because it is likely that residential uses will be constructed within that distance, traffic noise levels at those residences could exceed the City of Richmond General Plan exterior and interior noise level standards of 60 and 45 dB L_{dn}, respectively.

Recommendation 1:

In order to satisfy applicable City of Richmond noise level limits at proposed sensitive receptors, the following noise mitigation measure should be implemented:

RM 1: A site specific traffic noise impact study that addresses both exterior and interior noise levels at proposed noise-sensitive land uses within the project site should be completed by a qualified noise consultant once specific proposals for such sensitive developments are filed. The analysis should include associated mitigation measures (as appropriate) to reduce traffic noise levels to a state of compliance with applicable City of Richmond noise level limits.

Specific mitigation measures could include but are not limited to the following:

- The construction of solid noise barriers that effectively attenuate traffic noise exposure to a state of compliance with the applicable City of Richmond noise limits at proposed sensitive receptors.

- Site designs that incorporate building shielding at outdoor areas.

- Upgrade window and door construction of residences proposed nearest to the roadway or from which the roadway would be visible.

Issue 2: Project Commercial Noise Levels at Proposed Sensitive Receptors

According to the project conceptual land use plan, the project proposes mixed use planning areas within the project site (Planning Areas E, G and H). It is our understanding that the commercial component within those mixed use areas would consist of retail/office uses. Retail/office uses would bring the possibility of noise impacts associated with operations of roof-mounted air handling units associated with building heating, ventilation and air-conditioning (HVAC), refuse collection, and truck deliveries.

Depending upon the location and equipment configuration, it is possible that noise exposure from the proposed retail/office uses of the development could exceed applicable noise level limits established in Section 15.04.605.040 of the City of Richmond Municipal Code at nearby proposed sensitive receptors developed within the project site.

Recommendation 2:

In order to satisfy applicable City of Richmond noise level limits at proposed sensitive receptors, the following noise mitigation measure should be implemented:

RM 2: A site specific noise impact study that addresses proposed commercial noise sources should be completed by a qualified noise consultant once specific proposals for such plans are filed. The noise impact study should include an analysis of HVAC equipment noise exposure, commercial loading docks (if applicable), parking areas, refuse collection, truck deliveries, and other noise-generating commercial activities which may occur within the project area. The analysis should include associated mitigation measures (as appropriate) to reduce commercial noise levels to a state of compliance with applicable City of Richmond noise level limits at nearby proposed sensitive receptors.

Specific mitigation measures could include but are not limited to the following:

- Ensure that noise exposure associated with the selected mechanical equipment satisfies the applicable City noise level limits at proposed sensitive receptors.

- The construction of localized noise barriers around mechanical equipment that effectively attenuate noise exposure to a state of compliance with the applicable City noise limits at proposed sensitive receptors.

- Locate mechanical equipment on the rooftop of commercial buildings away from sensitive receptors (to the extent feasible), and screen the equipment behind building parapets.

- Limit the hours of operation for noise sources that are predicted to exceed the applicable City noise level limits at proposed sensitive receptors.

- Refuse dumpsters and commercial loading and unloading areas shall be located as far as reasonably possible from the outdoor activity areas of proposed residential buildings. Refuse containers shall also be located such that buildings shield nearby residential uses from noise generated by loading/unloading operations and garbage collection activities.

- Upgrade window and door construction of residences proposed nearest to commercial activities such as delivery truck routes and refuse collection areas to reduce the potential for nighttime sleep disturbance.

Issue 3: Project Wastewater Treatment Facility Operational Noise at Proposed Sensitive Receptors

According to the Point Molate Preliminary Water and Wastewater Master Plan (prepared by BKF Engineers), the project could include the installation of a new on-site sanitary sewer treatment facility. The new on-site facility, which would be located at the southern end of the project area, would operate as a standalone treatment system for the project's sanitary sewer needs. The Preliminary Water and Wastewater Master Plan indicates that the on-site wastewater treatment facility would be located approximately 350 feet from the nearest proposed residential uses (Planning Area A).

Depending upon the equipment configuration, it is possible that noise levels from project wastewater treatment facility operations could exceed applicable noise level limits established in Section 15.04.605.040 of the City of Richmond Municipal Code at nearby proposed sensitive receptors.

Recommendation 3:

In order to satisfy applicable City of Richmond noise level limits at proposed sensitive receptors, the following noise mitigation measure should be implemented:

RM 3: A site specific noise impact study that addresses project wastewater treatment facility noise exposure should be completed by a qualified noise consultant once specific proposals for such plans are filed. The noise impact study should include an analysis of facility operational equipment noise level exposure at the nearest proposed sensitive receptors. The analysis should include associated mitigation measures (as appropriate) to reduce facility noise levels to a state of compliance with applicable City of Richmond noise level limits at those receptors.

Specific mitigation measures could include but are not limited to the following:

- Ensure that noise exposure associated with the selected facility equipment satisfies the applicable City noise level limits at proposed sensitive receptors.

- The construction of solid noise barriers around the perimeter of the facility equipment area that effectively attenuate equipment noise exposure to a state of compliance with the applicable City noise limits at proposed sensitive receptors.

Issue 4: Project Construction Noise at Proposed Noise-Sensitive Receptors

According to the project description, the project would be constructed continuously over the course of several years. However, it is possible that some planning areas of the project could be completed and open while other areas are being constructed. Should this occur, it is possible that the heavy equipment used in project construction could increase ambient noise levels at nearby sensitive receptors within the project area.

During project construction, heavy equipment would be used within the project area for grading excavation, paving, and building construction. Activities involved in typical construction would generate maximum noise levels, as indicated in Table 15, ranging from 55 to 90 dB at a distance of 50 feet. Not all of these construction activities would be required of this project.

Table 15
Typical Construction Equipment Noise

Equipment Description	Maximum Noise Level at 50 feet, dBA
Auger drill rig	85
Backhoe	80
Bar bender	80
Boring jack power unit	80
Compactor (ground)	80
Compressor (air)	80
Concrete batch plant	83
Concrete mixer truck	85
Concrete pump truck	82
Concrete saw	90
Crane (mobile or stationary)	85
Dozer	85
Dump truck	84
Excavator	85
Flatbed truck	84
Front end loader	80
Generator (more than 25 kVA)	82
Grader	85
Hydra break ram	90
Jackhammer	85
Mounted impact hammer (hoe ram)	90
Paver	85
Pickup truck	55
Pneumatic tools	85
Pumps	77
Rock drill	85
Scraper	85
Soil mix drill rig	80
Tractor	84
Vacuum street sweeper	80
Vibratory concrete mixer	80

Source: Federal Highway Administration 2006

Although construction activities would be temporary in nature, they could result in short-term increases in ambient noise levels at nearby sensitive receptors within the project area.

Recommendation 4:

To minimize the potential for adverse reaction to project construction noise, at sensitive receptors within the project area, the following construction noise control measures should be implemented:

RM 4:

- All construction equipment powered by internal combustion engines shall be properly muffled and maintained. (Municipal Code Section 9.52.060)
- Prohibit the unnecessary idling of internal combustion engines. (Municipal Code Section 9.52.060)
- All stationary noise-generating construction equipment such as tree grinders and air compressors are to be located as far as is practical from existing residences. (Municipal Code Section 9.52.060)
- Quiet construction equipment, particularly air compressors, are to be selected whenever possible. (Municipal Code Section 9.52.060)
- Use of pile drivers, sources of impulsive sound and jack hammers shall be prohibited on Sundays and holidays, except for emergencies or as approved in advance by the Building Official. (Municipal Code Section 9.52.060)
- General construction activities should be limited to daytime hours (7:00 a.m. to 6:00 p.m.), Monday through Friday and pile driving and similar loud activities shall be limited to weekdays from 8:00 a.m. to 5:00 p.m. Pre-construction activities, including loading and unloading, cleaning of mechanical toilets, deliveries, truck idling, backup beeps, yelling, and radios also are limited to these construction hours.
    - No noise-producing construction activities shall be permitted outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the Building Official or his or her authorized representative.
    - Trucks, vehicles, and equipment that are making or are involved with material deliveries, loading or transfer of materials, equipment service, maintenance of any devices or appurtenances for or within any construction project in the City shall not be operated or driven on City streets outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the Building Official. (Municipal Code Section 15.04.605.060)
- All mobile or fixed noise-producing equipment used that are regulated for noise output by a federal, state, or local agency shall comply with such regulations while in the course of project activity.
- Electrically powered equipment shall be used instead of pneumatic or internal-combustion-powered equipment, where feasible.
- Material stockpiles and mobile equipment staging, parking, and maintenance areas shall be located as far as practicable from noise-sensitive receptors.
- Project work area speed limits shall be established and enforced during the construction period.
- Nearby sensitive receptors shall be notified of construction schedules so that arrangements can be made, if desired, to limit their exposure to short-term increases in ambient noise levels.

- Any engine-powered construction equipment located adjacent to residential uses for more than five days shall be shielded from those uses by temporary barriers.

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.
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.
RT_{60}	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
Sabin	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin.
SEL	A rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy of the event into a 1-s time period.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.

Appendix B-1
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 01 Existing
Model Run Date: 8/23/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
1	Castro Street / I-580 WB Ramps	North	10,050	80	20	2	1	50	100
2		South	8,860	80	20	2	1	50	100
3		East	5,240	80	20	2	1	35	100
4		West	1,670	80	20	2	1	35	100
5	Marine Street / E Standard Avenue	North	3,700	80	20	2	1	35	100
6		South							
7		East	5,940	80	20	2	1	35	100
8		West	2,580	80	20	2	1	35	100
9	Canal Boulevard / I-580 WB Ramps	North	16,250	80	20	2	1	35	100
10		South	12,920	80	20	2	1	35	100
11		East	2,570	80	20	2	1	35	100
12		West	3,940	80	20	2	1	35	100
13	Canal Boulevard / I-580 EB Ramps	North	12,790	80	20	2	1	35	100
14		South	7,950	80	20	2	1	35	100
15		East	9,360	80	20	2	1	35	100
16		West	2,920	80	20	2	1	35	100
17	I-580 WB Off-Ramp / Cutting Boulevard	North	340	80	20	2	1	35	100
18		South	1,830	80	20	2	1	35	100
19		East	11,200	80	20	2	1	35	100
20		West	11,510	80	20	2	1	35	100
21	Hoffman Boulevard / Cutting Boulevard	North	2,530	80	20	2	1	35	100
22		South	5,890	80	20	2	1	35	100
23		East	4,730	80	20	2	1	35	100
24		West	7,930	80	20	2	1	35	100
25	Harbour Way S / I-580 WB Off-Ramp	North	11,440	80	20	2	1	35	100
26		South	7,560	80	20	2	1	35	100
27		East	3,880	80	20	2	1	35	100
28		West							
29	Harbour Way S / Cutting Boulevard	North	11,250	80	20	2	1	35	100
30		South	11,340	80	20	2	1	35	100
31		East	8,470	80	20	2	1	35	100
32		West	9,300	80	20	2	1	35	100
33	Marina Bay Parkway / I-580 WB Off-Ramp	North	15,600	80	20	2	1	35	100
34		South	17,860	80	20	2	1	35	100

Appendix B-1
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 01 Existing
Model Run Date: 8/23/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
35	Marina Bay Parkway / I-580 WB Off-Ramp	East	5,650	80	20	2	1	35	100
36		West	30	80	20	2	1	35	100
37	Marina Bay Parkway / I-580 EB Off-Ramp	North	15,750	80	20	2	1	35	100
38		South	19,590	80	20	2	1	35	100
39		East	5,690	80	20	2	1	35	100
40		West	10,390	80	20	2	1	35	100
41	Marina Bay Parkway / Cutting Boulevard	North	12,650	80	20	2	1	35	100
42		South	14,060	80	20	2	1	35	100
43		East	15,560	80	20	2	1	35	100
44		West	11,630	80	20	2	1	35	100
45	I-580 WB Ramps / Regatta Boulevard	North							
46		South	1,770	80	20	2	1	35	100
47		East	5,400	80	20	2	1	35	100
48		West	5,630	80	20	2	1	35	100
49	Regatta Boulevard / Meade Street	North	5,280	80	20	2	1	35	100
50		South	850	80	20	2	1	35	100
51		East	11,140	80	20	2	1	35	100
52		West	11,510	80	20	2	1	35	100
53	Carlson Boulevard / Cutting Boulevard	North	12,270	80	20	2	1	35	100
54		South	12,710	80	20	2	1	35	100
55		East	14,170	80	20	2	1	35	100
56		West	17,110	80	20	2	1	35	100
57	S 49th Street / Cutting Boulevard	North	1,900	80	20	2	1	35	100
58		South	4,300	80	20	2	1	35	100
59		East	14,910	80	20	2	1	35	100
60		West	12,850	80	20	2	1	35	100
61	I-80 SB/EB Off-Ramp / Cutting Boulevard	North	9,140	80	20	2	1	35	100
62		South							
63		East	17,770	80	20	2	1	35	100
64		West	15,110	80	20	2	1	35	100
65	Harbour Way / Macdonald Avenue	North	8,710	80	20	2	1	35	100
66		South	10,800	80	20	2	1	35	100
67		East	7,630	80	20	2	1	35	100
68		West	7,080	80	20	2	1	35	100

Appendix B-1
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 01 Existing
Model Run Date: 8/23/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
69	Richmond Parkway / Macdonald Avenue	North	20,970	80	20	2	1	50	100
70		South	20,410	80	20	2	1	50	100
71		East	3,930	80	20	2	1	35	100
72		West	10	80	20	2	1	35	100
73	Richmond Parkway / Barrett Avenue	North	21,930	80	20	2	1	50	100
74		South	20,920	80	20	2	1	50	100
75		East	6,390	80	20	2	1	35	100
76		West							
77	Richmond Parkway / Hensley Street	North	10,080	80	20	2	1	50	100
78		South	10,510	80	20	2	1	50	100
79		East	730	80	20	2	1	35	100
80		West	20	80	20	2	1	35	100
81	Richmond Parkway / W Gertrude Avenue	North	29,350	80	20	2	1	50	100
82		South	30,040	80	20	2	1	50	100
83		East	2,120	80	20	2	1	35	100
84		West	270	80	20	2	1	35	100
85	Richmond Parkway / Parr Boulevard	North	27,340	80	20	2	1	50	100
86		South	28,900	80	20	2	1	50	100
87		East	2,250	80	20	2	1	35	100
88		West	1,210	80	20	2	1	35	100
89	San Pablo Avenue / Richmond Parkway	North	23,970	80	20	2	1	35	100
90		South	14,590	80	20	2	1	35	100
91		East	25,650	80	20	2	1	50	100
92		West	28,770	80	20	2	1	50	100
93	Blume Drive / Richmond Parkway	North	20,760	80	20	2	1	35	100
94		South	14,890	80	20	2	1	35	100
95		East	18,370	80	20	2	1	50	100
96		West	28,160	80	20	2	1	50	100
97	I-80 NB/EB Off-Ramp / Fitzgerald Drive	North							
98		South	3,390	80	20	2	1	35	100
99		East	9,660	80	20	2	1	35	100
100		West	10,370	80	20	2	1	35	100
101	Canal Boulevard / W Ohio Avenue	North	19,660	80	20	2	1	50	100
102		South	14,990	80	20	2	1	50	100

Appendix B-1
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 01 Existing
Model Run Date: 8/23/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
103	Canal Boulevard / W Ohio Avenue	East	3,760	80	20	2	1	35	100
104		West	4,670	80	20	2	1	35	100
105	Chevron / Stenmark Drive	North	400	80	20	2	1	35	100
106		South	80	80	20	2	1	35	100
107		East	560	80	20	2	1	35	100
108		West	180	80	20	2	1	35	100
109	Richmond Parkway / Pittsburg Avenue	North	28,640	80	20	2	1	50	100
110		South	29,230	80	20	2	1	50	100
111		East	1,340	80	20	2	1	35	100
112		West	270	80	20	2	1	35	100
113	Goodrick Avenue / Richmond Parkway	North	150	80	20	2	1	35	100
114		South	1,930	80	20	2	1	35	100
115		East	29,170	80	20	2	1	50	100
116		West	27,490	80	20	2	1	50	100
117	Castro Street / E Standard Drive	North	3,750	80	20	2	1	35	100
118		South	2,910	80	20	2	1	35	100
119		East	3,580	80	20	2	1	35	100
120		West	5,000	80	20	2	1	35	100
121*	I-580 - Toll Area to Western Ave	West	82,000	80	20	2	4	50	100
122*	I-580 - Bayview Ave to Erlandson St	West	100,000	80	20	2	4	50	100
123*	I-80 - Richmond Prkwy to Appian Way	North	198,500	80	20	2	3	70	100
124*	I-80 - Richmond Prkwy to Hilltop Dr	South	190,100	80	20	2	3	70	100

Note: Blank cells represent roadways for which no traffic data was provided.
*Roadway segments not included in project traffic impact study.

Appendix B-2
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 02 Existing Plus Project
Model Run Date: 8/22/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
1	Castro Street / I-580 WB Ramps	North	10,820	80	20	2	1	50	100
2		South	8,860	80	20	2	1	50	100
3		East	6,010	80	20	2	1	35	100
4		West	1,670	80	20	2	1	35	100
5	Marine Street / E Standard Avenue	North	3,700	80	20	2	1	35	100
6		South							
7		East	6,610	80	20	2	1	35	100
8		West	3,250	80	20	2	1	35	100
9	Canal Boulevard / I-580 WB Ramps	North	17,260	80	20	2	1	35	100
10		South	13,880	80	20	2	1	35	100
11		East	2,570	80	20	2	1	35	100
12		West	4,270	80	20	2	1	35	100
13	Canal Boulevard / I-580 EB Ramps	North	13,750	80	20	2	1	35	100
14		South	8,420	80	20	2	1	35	100
15		East	9,360	80	20	2	1	35	100
16		West	4,070	80	20	2	1	35	100
17	I-580 WB Off-Ramp / Cutting Boulevard	North	340	80	20	2	1	35	100
18		South	1,830	80	20	2	1	35	100
19		East	11,550	80	20	2	1	35	100
20		West	11,860	80	20	2	1	35	100
21	Hoffman Boulevard / Cutting Boulevard	North	2,770	80	20	2	1	35	100
22		South	6,060	80	20	2	1	35	100
23		East	4,800	80	20	2	1	35	100
24		West	7,930	80	20	2	1	35	100
25	Harbour Way S / I-580 WB Off-Ramp	North	11,630	80	20	2	1	35	100
26		South	7,750	80	20	2	1	35	100
27		East	3,880	80	20	2	1	35	100
28		West							
29	Harbour Way S / Cutting Boulevard	North	11,410	80	20	2	1	35	100
30		South	11,530	80	20	2	1	35	100
31		East	8,470	80	20	2	1	35	100
32		West	9,650	80	20	2	1	35	100
33	Marina Bay Parkway / I-580 WB Off-Ramp	North	16,140	80	20	2	1	35	100
34		South	18,400	80	20	2	1	35	100

Appendix B-2
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 02 Existing Plus Project
Model Run Date: 8/22/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
35	Marina Bay Parkway / I-580 WB Off-Ramp	East	5,650	80	20	2	1	35	100
36		West	30	80	20	2	1	35	100
37	Marina Bay Parkway / I-580 EB Off-Ramp	North	16,090	80	20	2	1	35	100
38		South	19,760	80	20	2	1	35	100
39		East	5,690	80	20	2	1	35	100
40		West	10,720	80	20	2	1	35	100
41	Marina Bay Parkway / Cutting Boulevard	North	12,830	80	20	2	1	35	100
42		South	14,600	80	20	2	1	35	100
43		East	15,920	80	20	2	1	35	100
44		West	11,630	80	20	2	1	35	100
45	I-580 WB Ramps / Regatta Boulevard	North							
46		South	1,910	80	20	2	1	35	100
47		East	5,540	80	20	2	1	35	100
48		West	5,630	80	20	2	1	35	100
49	Regatta Boulevard / Meade Street	North	5,420	80	20	2	1	35	100
50		South	850	80	20	2	1	35	100
51		East	11,400	80	20	2	1	35	100
52		West	11,630	80	20	2	1	35	100
53	Carlson Boulevard / Cutting Boulevard	North	12,270	80	20	2	1	35	100
54		South	12,710	80	20	2	1	35	100
55		East	14,530	80	20	2	1	35	100
56		West	17,470	80	20	2	1	35	100
57	S 49th Street / Cutting Boulevard	North	1,900	80	20	2	1	35	100
58		South	4,300	80	20	2	1	35	100
59		East	15,270	80	20	2	1	35	100
60		West	13,210	80	20	2	1	35	100
61	I-80 SB/EB Off-Ramp / Cutting Boulevard	North	9,140	80	20	2	1	35	100
62		South							
63		East	18,130	80	20	2	1	35	100
64		West	15,470	80	20	2	1	35	100
65	Harbour Way / Macdonald Avenue	North	8,800	80	20	2	1	35	100
66		South	10,960	80	20	2	1	35	100
67		East	7,810	80	20	2	1	35	100
68		West	7,190	80	20	2	1	35	100

Appendix B-2
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 02 Existing Plus Project
Model Run Date: 8/22/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
69	Richmond Parkway / Macdonald Avenue	North	21,870	80	20	2	1	50	100
70		South	21,420	80	20	2	1	50	100
71		East	4,040	80	20	2	1	35	100
72		West	10	80	20	2	1	35	100
73	Richmond Parkway / Barrett Avenue	North	22,830	80	20	2	1	50	100
74		South	21,820	80	20	2	1	50	100
75		East	6,390	80	20	2	1	35	100
76		West							
77	Richmond Parkway / Hensley Street	North	10,980	80	20	2	1	50	100
78		South	11,410	80	20	2	1	50	100
79		East	730	80	20	2	1	35	100
80		West	20	80	20	2	1	35	100
81	Richmond Parkway / W Gertrude Avenue	North	31,020	80	20	2	1	50	100
82		South	31,710	80	20	2	1	50	100
83		East	2,120	80	20	2	1	35	100
84		West	270	80	20	2	1	35	100
85	Richmond Parkway / Parr Boulevard	North	29,010	80	20	2	1	50	100
86		South	30,570	80	20	2	1	50	100
87		East	2,250	80	20	2	1	35	100
88		West	1,210	80	20	2	1	35	100
89	San Pablo Avenue / Richmond Parkway	North	24,140	80	20	2	1	35	100
90		South	14,590	80	20	2	1	35	100
91		East	27,150	80	20	2	1	50	100
92		West	30,440	80	20	2	1	50	100
93	Blume Drive / Richmond Parkway	North	21,520	80	20	2	1	35	100
94		South	14,890	80	20	2	1	35	100
95		East	19,110	80	20	2	1	50	100
96		West	29,660	80	20	2	1	50	100
97	I-80 NB/EB Off-Ramp / Fitzgerald Drive	North							
98		South	3,390	80	20	2	1	35	100
99		East	9,750	80	20	2	1	35	100
100		West	10,460	80	20	2	1	35	100
101	Canal Boulevard / W Ohio Avenue	North	20,670	80	20	2	1	50	100
102		South	16,000	80	20	2	1	50	100

Appendix B-2
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 02 Existing Plus Project
Model Run Date: 8/22/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
103	Canal Boulevard / W Ohio Avenue	East	3,760	80	20	2	1	35	100
104		West	4,670	80	20	2	1	35	100
105	Chevron / Stenmark Drive	North	400	80	20	2	1	35	100
106		South	80	80	20	2	1	35	100
107		East	9,400	80	20	2	1	35	100
108		West	9,020	80	20	2	1	35	100
109	Richmond Parkway / Pittsburg Avenue	North	30,310	80	20	2	1	50	100
110		South	30,900	80	20	2	1	50	100
111		East	1,340	80	20	2	1	35	100
112		West	270	80	20	2	1	35	100
113	Goodrick Avenue / Richmond Parkway	North	150	80	20	2	1	35	100
114		South	1,930	80	20	2	1	35	100
115		East	30,840	80	20	2	1	50	100
116		West	29,160	80	20	2	1	50	100
117	Castro Street / E Standard Drive	North	3,750	80	20	2	1	35	100
118		South	3,150	80	20	2	1	35	100
119		East	4,490	80	20	2	1	35	100
120		West	5,670	80	20	2	1	35	100

Note: Blank cells represent roadways for which no traffic data was provided.

Appendix B-3
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 03 Baseline
Model Run Date: 8/22/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
1	Castro Street / I-580 WB Ramps	North	10,350	80	20	2	1	50	100
2		South	9,140	80	20	2	1	50	100
3		East	5,390	80	20	2	1	35	100
4		West	1,720	80	20	2	1	35	100
5	Marine Street / E Standard Avenue	North	3,820	80	20	2	1	35	100
6		South							
7		East	6,120	80	20	2	1	35	100
8		West	2,660	80	20	2	1	35	100
9	Canal Boulevard / I-580 WB Ramps	North	16,750	80	20	2	1	35	100
10		South	13,320	80	20	2	1	35	100
11		East	2,650	80	20	2	1	35	100
12		West	4,060	80	20	2	1	35	100
13	Canal Boulevard / I-580 EB Ramps	North	13,180	80	20	2	1	35	100
14		South	8,190	80	20	2	1	35	100
15		East	9,640	80	20	2	1	35	100
16		West	3,010	80	20	2	1	35	100
17	I-580 WB Off-Ramp / Cutting Boulevard	North	350	80	20	2	1	35	100
18		South	1,890	80	20	2	1	35	100
19		East	11,540	80	20	2	1	35	100
20		West	11,860	80	20	2	1	35	100
21	Hoffman Boulevard / Cutting Boulevard	North	2,610	80	20	2	1	35	100
22		South	6,070	80	20	2	1	35	100
23		East	4,880	80	20	2	1	35	100
24		West	8,180	80	20	2	1	35	100
25	Harbour Way S / I-580 WB Off-Ramp	North	11,790	80	20	2	1	35	100
26		South	7,790	80	20	2	1	35	100
27		East	4,000	80	20	2	1	35	100
28		West							
29	Harbour Way S / Cutting Boulevard	North	11,600	80	20	2	1	35	100
30		South	11,680	80	20	2	1	35	100
31		East	8,730	80	20	2	1	35	100
32		West	9,590	80	20	2	1	35	100
33	Marina Bay Parkway / I-580 WB Off-Ramp	North	16,070	80	20	2	1	35	100
34		South	18,400	80	20	2	1	35	100

Appendix B-3
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 03 Baseline
Model Run Date: 8/22/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
35	Marina Bay Parkway / I-580 WB Off-Ramp	East	5,820	80	20	2	1	35	100
36		West	30	80	20	2	1	35	100
37	Marina Bay Parkway / I-580 EB Off-Ramp	North	16,220	80	20	2	1	35	100
38		South	20,180	80	20	2	1	35	100
39		East	5,860	80	20	2	1	35	100
40		West	10,700	80	20	2	1	35	100
41	Marina Bay Parkway / Cutting Boulevard	North	13,040	80	20	2	1	35	100
42		South	14,480	80	20	2	1	35	100
43		East	16,030	80	20	2	1	35	100
44		West	11,990	80	20	2	1	35	100
45	I-580 WB Ramps / Regatta Boulevard	North							
46		South	1,820	80	20	2	1	35	100
47		East	5,560	80	20	2	1	35	100
48		West	5,800	80	20	2	1	35	100
49	Regatta Boulevard / Meade Street	North	5,430	80	20	2	1	35	100
50		South	870	80	20	2	1	35	100
51		East	11,470	80	20	2	1	35	100
52		West	11,850	80	20	2	1	35	100
53	Carlson Boulevard / Cutting Boulevard	North	12,640	80	20	2	1	35	100
54		South	13,100	80	20	2	1	35	100
55		East	14,590	80	20	2	1	35	100
56		West	17,630	80	20	2	1	35	100
57	S 49th Street / Cutting Boulevard	North	1,960	80	20	2	1	35	100
58		South	4,440	80	20	2	1	35	100
59		East	15,360	80	20	2	1	35	100
60		West	13,240	80	20	2	1	35	100
61	I-80 SB/EB Off-Ramp / Cutting Boulevard	North	9,420	80	20	2	1	35	100
62		South							
63		East	18,310	80	20	2	1	35	100
64		West	15,570	80	20	2	1	35	100
65	Harbour Way / Macdonald Avenue	North	8,970	80	20	2	1	35	100
66		South	11,130	80	20	2	1	35	100
67		East	7,850	80	20	2	1	35	100
68		West	7,290	80	20	2	1	35	100

Appendix B-3
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 03 Baseline
Model Run Date: 8/22/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
69	Richmond Parkway / Macdonald Avenue	North	21,600	80	20	2	1	50	100
70		South	21,020	80	20	2	1	50	100
71		East	4,050	80	20	2	1	35	100
72		West	10	80	20	2	1	35	100
73	Richmond Parkway / Barrett Avenue	North	22,600	80	20	2	1	50	100
74		South	21,550	80	20	2	1	50	100
75		East	6,590	80	20	2	1	35	100
76		West							
77	Richmond Parkway / Hensley Street	North	10,380	80	20	2	1	50	100
78		South	10,830	80	20	2	1	50	100
79		East	750	80	20	2	1	35	100
80		West	20	80	20	2	1	35	100
81	Richmond Parkway / W Gertrude Avenue	North	30,240	80	20	2	1	50	100
82		South	30,950	80	20	2	1	50	100
83		East	2,180	80	20	2	1	35	100
84		West	270	80	20	2	1	35	100
85	Richmond Parkway / Parr Boulevard	North	28,170	80	20	2	1	50	100
86		South	29,780	80	20	2	1	50	100
87		East	2,310	80	20	2	1	35	100
88		West	1,240	80	20	2	1	35	100
89	San Pablo Avenue / Richmond Parkway	North	24,700	80	20	2	1	35	100
90		South	15,040	80	20	2	1	35	100
91		East	26,420	80	20	2	1	50	100
92		West	29,640	80	20	2	1	50	100
93	Blume Drive / Richmond Parkway	North	21,390	80	20	2	1	35	100
94		South	15,340	80	20	2	1	35	100
95		East	18,940	80	20	2	1	50	100
96		West	29,010	80	20	2	1	50	100
97	I-80 NB/EB Off-Ramp / Fitzgerald Drive	North							
98		South	3,490	80	20	2	1	35	100
99		East	9,950	80	20	2	1	35	100
100		West	10,680	80	20	2	1	35	100
101	Canal Boulevard / W Ohio Avenue	North	20,260	80	20	2	1	50	100
102		South	15,450	80	20	2	1	50	100

Appendix B-3
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 03 Baseline
Model Run Date: 8/22/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
103	Canal Boulevard / W Ohio Avenue	East	3,880	80	20	2	1	35	100
104		West	4,810	80	20	2	1	35	100
105	Chevron / Stenmark Drive	North	410	80	20	2	1	35	100
106		South	80	80	20	2	1	35	100
107		East	570	80	20	2	1	35	100
108		West	180	80	20	2	1	35	100
109	Richmond Parkway / Pittsburg Avenue	North	29,500	80	20	2	1	50	100
110		South	30,110	80	20	2	1	50	100
111		East	1,380	80	20	2	1	35	100
112		West	270	80	20	2	1	35	100
113	Goodrick Avenue / Richmond Parkway	North	150	80	20	2	1	35	100
114		South	1,980	80	20	2	1	35	100
115		East	30,040	80	20	2	1	50	100
116		West	28,310	80	20	2	1	50	100
117	Castro Street / E Standard Drive	North	3,860	80	20	2	1	35	100
118		South	2,990	80	20	2	1	35	100
119		East	3,680	80	20	2	1	35	100
120		West	5,150	80	20	2	1	35	100

Note: Blank cells represent roadways for which no traffic data was provided.

Appendix B-4
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 04 Baseline Plus Project
Model Run Date: 8/22/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
1	Castro Street / I-580 WB Ramps	North	11,120	80	20	2	1	50	100
2		South	9,140	80	20	2	1	50	100
3		East	6,160	80	20	2	1	35	100
4		West	1,720	80	20	2	1	35	100
5	Marine Street / E Standard Avenue	North	3,820	80	20	2	1	35	100
6		South							
7		East	6,790	80	20	2	1	35	100
8		West	3,330	80	20	2	1	35	100
9	Canal Boulevard / I-580 WB Ramps	North	17,760	80	20	2	1	35	100
10		South	14,280	80	20	2	1	35	100
11		East	2,650	80	20	2	1	35	100
12		West	4,390	80	20	2	1	35	100
13	Canal Boulevard / I-580 EB Ramps	North	14,140	80	20	2	1	35	100
14		South	8,660	80	20	2	1	35	100
15		East	9,640	80	20	2	1	35	100
16		West	4,160	80	20	2	1	35	100
17	I-580 WB Off-Ramp / Cutting Boulevard	North	350	80	20	2	1	35	100
18		South	1,890	80	20	2	1	35	100
19		East	11,890	80	20	2	1	35	100
20		West	12,210	80	20	2	1	35	100
21	Hoffman Boulevard / Cutting Boulevard	North	2,850	80	20	2	1	35	100
22		South	6,240	80	20	2	1	35	100
23		East	4,950	80	20	2	1	35	100
24		West	8,180	80	20	2	1	35	100
25	Harbour Way S / I-580 WB Off-Ramp	North	11,980	80	20	2	1	35	100
26		South	7,980	80	20	2	1	35	100
27		East	4,000	80	20	2	1	35	100
28		West							
29	Harbour Way S / Cutting Boulevard	North	11,760	80	20	2	1	35	100
30		South	11,870	80	20	2	1	35	100
31		East	8,730	80	20	2	1	35	100
32		West	9,940	80	20	2	1	35	100
33	Marina Bay Parkway / I-580 WB Off-Ramp	North	16,610	80	20	2	1	35	100
34		South	18,940	80	20	2	1	35	100

Appendix B-4
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 04 Baseline Plus Project
Model Run Date: 8/22/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
35	Marina Bay Parkway / I-580 WB Off-Ramp	East	5,820	80	20	2	1	35	100
36		West	30	80	20	2	1	35	100
37	Marina Bay Parkway / I-580 EB Off-Ramp	North	16,560	80	20	2	1	35	100
38		South	20,350	80	20	2	1	35	100
39		East	5,860	80	20	2	1	35	100
40		West	11,030	80	20	2	1	35	100
41	Marina Bay Parkway / Cutting Boulevard	North	13,220	80	20	2	1	35	100
42		South	15,020	80	20	2	1	35	100
43		East	16,390	80	20	2	1	35	100
44		West	11,990	80	20	2	1	35	100
45	I-580 WB Ramps / Regatta Boulevard	North							
46		South	1,960	80	20	2	1	35	100
47		East	5,700	80	20	2	1	35	100
48		West	5,800	80	20	2	1	35	100
49	Regatta Boulevard / Meade Street	North	5,570	80	20	2	1	35	100
50		South	870	80	20	2	1	35	100
51		East	11,730	80	20	2	1	35	100
52		West	11,970	80	20	2	1	35	100
53	Carlson Boulevard / Cutting Boulevard	North	12,640	80	20	2	1	35	100
54		South	13,100	80	20	2	1	35	100
55		East	14,950	80	20	2	1	35	100
56		West	17,990	80	20	2	1	35	100
57	S 49th Street / Cutting Boulevard	North	1,960	80	20	2	1	35	100
58		South	4,440	80	20	2	1	35	100
59		East	15,720	80	20	2	1	35	100
60		West	13,600	80	20	2	1	35	100
61	I-80 SB/EB Off-Ramp / Cutting Boulevard	North	9,420	80	20	2	1	35	100
62		South							
63		East	18,670	80	20	2	1	35	100
64		West	15,930	80	20	2	1	35	100
65	Harbour Way / Macdonald Avenue	North	9,060	80	20	2	1	35	100
66		South	11,290	80	20	2	1	35	100
67		East	8,030	80	20	2	1	35	100
68		West	7,400	80	20	2	1	35	100

Appendix B-4
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 04 Baseline Plus Project
Model Run Date: 8/22/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
69	Richmond Parkway / Macdonald Avenue	North	22,500	80	20	2	1	50	100
70		South	22,030	80	20	2	1	50	100
71		East	4,160	80	20	2	1	35	100
72		West	10	80	20	2	1	35	100
73	Richmond Parkway / Barrett Avenue	North	23,500	80	20	2	1	50	100
74		South	22,450	80	20	2	1	50	100
75		East	6,590	80	20	2	1	35	100
76		West							
77	Richmond Parkway / Hensley Street	North	11,280	80	20	2	1	50	100
78		South	11,730	80	20	2	1	50	100
79		East	750	80	20	2	1	35	100
80		West	20	80	20	2	1	35	100
81	Richmond Parkway / W Gertrude Avenue	North	31,910	80	20	2	1	50	100
82		South	32,620	80	20	2	1	50	100
83		East	2,180	80	20	2	1	35	100
84		West	270	80	20	2	1	35	100
85	Richmond Parkway / Parr Boulevard	North	29,840	80	20	2	1	50	100
86		South	31,450	80	20	2	1	50	100
87		East	2,310	80	20	2	1	35	100
88		West	1,240	80	20	2	1	35	100
89	San Pablo Avenue / Richmond Parkway	North	24,870	80	20	2	1	35	100
90		South	15,040	80	20	2	1	35	100
91		East	27,920	80	20	2	1	50	100
92		West	31,310	80	20	2	1	50	100
93	Blume Drive / Richmond Parkway	North	22,150	80	20	2	1	35	100
94		South	15,340	80	20	2	1	35	100
95		East	19,680	80	20	2	1	50	100
96		West	30,510	80	20	2	1	50	100
97	I-80 NB/EB Off-Ramp / Fitzgerald Drive	North							
98		South	3,490	80	20	2	1	35	100
99		East	10,040	80	20	2	1	35	100
100		West	10,770	80	20	2	1	35	100
101	Canal Boulevard / W Ohio Avenue	North	21,270	80	20	2	1	50	100
102		South	16,460	80	20	2	1	50	100

Appendix B-4
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 04 Baseline Plus Project
Model Run Date: 8/22/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
103	Canal Boulevard / W Ohio Avenue	East	3,880	80	20	2	1	35	100
104		West	4,810	80	20	2	1	35	100
105	Chevron / Stenmark Drive	North	410	80	20	2	1	35	100
106		South	80	80	20	2	1	35	100
107		East	9,410	80	20	2	1	35	100
108		West	9,020	80	20	2	1	35	100
109	Richmond Parkway / Pittsburg Avenue	North	31,170	80	20	2	1	50	100
110		South	31,780	80	20	2	1	50	100
111		East	1,380	80	20	2	1	35	100
112		West	270	80	20	2	1	35	100
113	Goodrick Avenue / Richmond Parkway	North	150	80	20	2	1	35	100
114		South	1,980	80	20	2	1	35	100
115		East	31,710	80	20	2	1	50	100
116		West	29,980	80	20	2	1	50	100
117	Castro Street / E Standard Drive	North	3,860	80	20	2	1	35	100
118		South	3,230	80	20	2	1	35	100
119		East	4,590	80	20	2	1	35	100
120		West	5,820	80	20	2	1	35	100

Note: Blank cells represent roadways for which no traffic data was provided.

Appendix B-5
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 05 Cumulative
Model Run Date: 8/22/2019

BOLLARD Acoustical

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
1	Castro Street / I-580 WB Ramps	North	11,320	80	20	2	1	50	100
2		South	10,000	80	20	2	1	50	100
3		East	5,900	80	20	2	1	35	100
4		West	1,880	80	20	2	1	35	100
5	Marine Street / E Standard Avenue	North	4,180	80	20	2	1	35	100
6		South							
7		East	6,690	80	20	2	1	35	100
8		West	2,910	80	20	2	1	35	100
9	Canal Boulevard / I-580 WB Ramps	North	18,330	80	20	2	1	35	100
10		South	14,570	80	20	2	1	35	100
11		East	2,900	80	20	2	1	35	100
12		West	4,440	80	20	2	1	35	100
13	Canal Boulevard / I-580 EB Ramps	North	14,420	80	20	2	1	35	100
14		South	8,950	80	20	2	1	35	100
15		East	10,540	80	20	2	1	35	100
16		West	3,290	80	20	2	1	35	100
17	I-580 WB Off-Ramp / Cutting Boulevard	North	380	80	20	2	1	35	100
18		South	2,070	80	20	2	1	35	100
19		East	12,620	80	20	2	1	35	100
20		West	12,970	80	20	2	1	35	100
21	Hoffman Boulevard / Cutting Boulevard	North	2,850	80	20	2	1	35	100
22		South	6,630	80	20	2	1	35	100
23		East	5,330	80	20	2	1	35	100
24		West	8,950	80	20	2	1	35	100
25	Harbour Way S / I-580 WB Off-Ramp	North	12,900	80	20	2	1	35	100
26		South	8,520	80	20	2	1	35	100
27		East	4,380	80	20	2	1	35	100
28		West							
29	Harbour Way S / Cutting Boulevard	North	12,680	80	20	2	1	35	100
30		South	12,780	80	20	2	1	35	100
31		East	9,550	80	20	2	1	35	100
32		West	10,490	80	20	2	1	35	100
33	Marina Bay Parkway / I-580 WB Off-Ramp	North	17,590	80	20	2	1	35	100
34		South	20,130	80	20	2	1	35	100

Appendix B-5
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 05 Cumulative
Model Run Date: 8/22/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
35	Marina Bay Parkway / I-580 WB Off-Ramp	East	6,370	80	20	2	1	35	100
36		West	30	80	20	2	1	35	100
37	Marina Bay Parkway / I-580 EB Off-Ramp	North	17,740	80	20	2	1	35	100
38		South	22,070	80	20	2	1	35	100
39		East	6,410	80	20	2	1	35	100
40		West	11,700	80	20	2	1	35	100
41	Marina Bay Parkway / Cutting Boulevard	North	14,260	80	20	2	1	35	100
42		South	15,850	80	20	2	1	35	100
43		East	17,540	80	20	2	1	35	100
44		West	13,110	80	20	2	1	35	100
45	I-580 WB Ramps / Regatta Boulevard	North							
46		South	2,000	80	20	2	1	35	100
47		East	6,090	80	20	2	1	35	100
48		West	6,350	80	20	2	1	35	100
49	Regatta Boulevard / Meade Street	North	5,930	80	20	2	1	35	100
50		South	940	80	20	2	1	35	100
51		East	12,550	80	20	2	1	35	100
52		West	12,960	80	20	2	1	35	100
53	Carlson Boulevard / Cutting Boulevard	North	13,830	80	20	2	1	35	100
54		South	14,340	80	20	2	1	35	100
55		East	15,960	80	20	2	1	35	100
56		West	19,290	80	20	2	1	35	100
57	S 49th Street / Cutting Boulevard	North	2,140	80	20	2	1	35	100
58		South	4,860	80	20	2	1	35	100
59		East	16,800	80	20	2	1	35	100
60		West	14,480	80	20	2	1	35	100
61	I-80 SB/EB Off-Ramp / Cutting Boulevard	North	10,300	80	20	2	1	35	100
62		South							
63		East	20,020	80	20	2	1	35	100
64		West	17,020	80	20	2	1	35	100
65	Harbour Way / Macdonald Avenue	North	9,820	80	20	2	1	35	100
66		South	12,180	80	20	2	1	35	100
67		East	8,600	80	20	2	1	35	100
68		West	7,980	80	20	2	1	35	100

Appendix B-5
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 05 Cumulative
Model Run Date: 8/22/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
69	Richmond Parkway / Macdonald Avenue	North	23,630	80	20	2	1	50	100
70		South	22,990	80	20	2	1	50	100
71		East	4,430	80	20	2	1	35	100
72		West	10	80	20	2	1	35	100
73	Richmond Parkway / Barrett Avenue	North	24,710	80	20	2	1	50	100
74		South	23,570	80	20	2	1	50	100
75		East	7,200	80	20	2	1	35	100
76		West							
77	Richmond Parkway / Hensley Street	North	11,350	80	20	2	1	50	100
78		South	11,840	80	20	2	1	50	100
79		East	810	80	20	2	1	35	100
80		West	20	80	20	2	1	35	100
81	Richmond Parkway / W Gertrude Avenue	North	33,080	80	20	2	1	50	100
82		South	33,860	80	20	2	1	50	100
83		East	2,380	80	20	2	1	35	100
84		West	300	80	20	2	1	35	100
85	Richmond Parkway / Parr Boulevard	North	30,810	80	20	2	1	50	100
86		South	32,570	80	20	2	1	50	100
87		East	2,520	80	20	2	1	35	100
88		West	1,360	80	20	2	1	35	100
89	San Pablo Avenue / Richmond Parkway	North	27,030	80	20	2	1	35	100
90		South	16,460	80	20	2	1	35	100
91		East	28,900	80	20	2	1	50	100
92		West	32,430	80	20	2	1	50	100
93	Blume Drive / Richmond Parkway	North	23,400	80	20	2	1	35	100
94		South	16,780	80	20	2	1	35	100
95		East	20,730	80	20	2	1	50	100
96		West	31,730	80	20	2	1	50	100
97	I-80 NB/EB Off-Ramp / Fitzgerald Drive	North							
98		South	3,820	80	20	2	1	35	100
99		East	10,880	80	20	2	1	35	100
100		West	11,680	80	20	2	1	35	100
101	Canal Boulevard / W Ohio Avenue	North	22,170	80	20	2	1	50	100
102		South	16,910	80	20	2	1	50	100

Appendix B-5
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 05 Cumulative
Model Run Date: 8/22/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
103	Canal Boulevard / W Ohio Avenue	East	4,250	80	20	2	1	35	100
104		West	5,270	80	20	2	1	35	100
105	Chevron / Stenmark Drive	North	450	80	20	2	1	35	100
106		South	90	80	20	2	1	35	100
107		East	640	80	20	2	1	35	100
108		West	200	80	20	2	1	35	100
109	Richmond Parkway / Pittsburg Avenue	North	32,270	80	20	2	1	50	100
110		South	32,930	80	20	2	1	50	100
111		East	1,500	80	20	2	1	35	100
112		West	280	80	20	2	1	35	100
113	Goodrick Avenue / Richmond Parkway	North	150	80	20	2	1	35	100
114		South	2,160	80	20	2	1	35	100
115		East	32,850	80	20	2	1	50	100
116		West	30,960	80	20	2	1	50	100
117	Castro Street / E Standard Drive	North	4,220	80	20	2	1	35	100
118		South	3,270	80	20	2	1	35	100
119		East	4,030	80	20	2	1	35	100
120		West	5,640	80	20	2	1	35	100

Note: Blank cells represent roadways for which no traffic data was provided.

Appendix B-6
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 06 Cumulative Plus Project
Model Run Date: 8/22/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
1	Castro Street / I-580 WB Ramps	North	12,090	80	20	2	1	50	100
2		South	10,000	80	20	2	1	50	100
3		East	6,670	80	20	2	1	35	100
4		West	1,880	80	20	2	1	35	100
5	Marine Street / E Standard Avenue	North	4,180	80	20	2	1	35	100
6		South							
7		East	7,360	80	20	2	1	35	100
8		West	3,580	80	20	2	1	35	100
9	Canal Boulevard / I-580 WB Ramps	North	19,340	80	20	2	1	35	100
10		South	15,530	80	20	2	1	35	100
11		East	2,900	80	20	2	1	35	100
12		West	4,770	80	20	2	1	35	100
13	Canal Boulevard / I-580 EB Ramps	North	15,380	80	20	2	1	35	100
14		South	9,420	80	20	2	1	35	100
15		East	10,540	80	20	2	1	35	100
16		West	4,440	80	20	2	1	35	100
17	I-580 WB Off-Ramp / Cutting Boulevard	North	380	80	20	2	1	35	100
18		South	2,070	80	20	2	1	35	100
19		East	12,970	80	20	2	1	35	100
20		West	13,320	80	20	2	1	35	100
21	Hoffman Boulevard / Cutting Boulevard	North	3,090	80	20	2	1	35	100
22		South	6,800	80	20	2	1	35	100
23		East	5,400	80	20	2	1	35	100
24		West	8,950	80	20	2	1	35	100
25	Harbour Way S / I-580 WB Off-Ramp	North	13,090	80	20	2	1	35	100
26		South	8,710	80	20	2	1	35	100
27		East	4,380	80	20	2	1	35	100
28		West							
29	Harbour Way S / Cutting Boulevard	North	12,840	80	20	2	1	35	100
30		South	12,970	80	20	2	1	35	100
31		East	9,550	80	20	2	1	35	100
32		West	10,840	80	20	2	1	35	100
33	Marina Bay Parkway / I-580 WB Off-Ramp	North	18,130	80	20	2	1	35	100
34		South	20,670	80	20	2	1	35	100

Appendix B-6
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 06 Cumulative Plus Project
Model Run Date: 8/22/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
35	Marina Bay Parkway / I-580 WB Off-Ramp	East	6,370	80	20	2	1	35	100
36		West	30	80	20	2	1	35	100
37	Marina Bay Parkway / I-580 EB Off-Ramp	North	18,080	80	20	2	1	35	100
38		South	22,240	80	20	2	1	35	100
39		East	6,410	80	20	2	1	35	100
40		West	12,030	80	20	2	1	35	100
41	Marina Bay Parkway / Cutting Boulevard	North	14,440	80	20	2	1	35	100
42		South	16,390	80	20	2	1	35	100
43		East	17,900	80	20	2	1	35	100
44		West	13,110	80	20	2	1	35	100
45	I-580 WB Ramps / Regatta Boulevard	North							
46		South	2,140	80	20	2	1	35	100
47		East	6,230	80	20	2	1	35	100
48		West	6,350	80	20	2	1	35	100
49	Regatta Boulevard / Meade Street	North	6,070	80	20	2	1	35	100
50		South	940	80	20	2	1	35	100
51		East	12,810	80	20	2	1	35	100
52		West	13,080	80	20	2	1	35	100
53	Carlson Boulevard / Cutting Boulevard	North	13,830	80	20	2	1	35	100
54		South	14,340	80	20	2	1	35	100
55		East	16,320	80	20	2	1	35	100
56		West	19,650	80	20	2	1	35	100
57	S 49th Street / Cutting Boulevard	North	2,140	80	20	2	1	35	100
58		South	4,860	80	20	2	1	35	100
59		East	17,160	80	20	2	1	35	100
60		West	14,840	80	20	2	1	35	100
61	I-80 SB/EB Off-Ramp / Cutting Boulevard	North	10,300	80	20	2	1	35	100
62		South							
63		East	20,380	80	20	2	1	35	100
64		West	17,380	80	20	2	1	35	100
65	Harbour Way / Macdonald Avenue	North	9,910	80	20	2	1	35	100
66		South	12,340	80	20	2	1	35	100
67		East	8,780	80	20	2	1	35	100
68		West	8,090	80	20	2	1	35	100

Appendix B-6
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 06 Cumulative Plus Project
Model Run Date: 8/22/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
69	Richmond Parkway / Macdonald Avenue	North	24,530	80	20	2	1	50	100
70		South	24,000	80	20	2	1	50	100
71		East	4,540	80	20	2	1	35	100
72		West	10	80	20	2	1	35	100
73	Richmond Parkway / Barrett Avenue	North	25,610	80	20	2	1	50	100
74		South	24,470	80	20	2	1	50	100
75		East	7,200	80	20	2	1	35	100
76		West							
77	Richmond Parkway / Hensley Street	North	12,250	80	20	2	1	50	100
78		South	12,740	80	20	2	1	50	100
79		East	810	80	20	2	1	35	100
80		West	20	80	20	2	1	35	100
81	Richmond Parkway / W Gertrude Avenue	North	34,750	80	20	2	1	50	100
82		South	35,530	80	20	2	1	50	100
83		East	2,380	80	20	2	1	35	100
84		West	300	80	20	2	1	35	100
85	Richmond Parkway / Parr Boulevard	North	32,480	80	20	2	1	50	100
86		South	34,240	80	20	2	1	50	100
87		East	2,520	80	20	2	1	35	100
88		West	1,360	80	20	2	1	35	100
89	San Pablo Avenue / Richmond Parkway	North	27,200	80	20	2	1	35	100
90		South	16,460	80	20	2	1	35	100
91		East	30,400	80	20	2	1	50	100
92		West	34,100	80	20	2	1	50	100
93	Blume Drive / Richmond Parkway	North	24,160	80	20	2	1	35	100
94		South	16,780	80	20	2	1	35	100
95		East	21,470	80	20	2	1	50	100
96		West	33,230	80	20	2	1	50	100
97	I-80 NB/EB Off-Ramp / Fitzgerald Drive	North							
98		South	3,820	80	20	2	1	35	100
99		East	10,970	80	20	2	1	35	100
100		West	11,770	80	20	2	1	35	100
101	Canal Boulevard / W Ohio Avenue	North	23,180	80	20	2	1	50	100
102		South	17,920	80	20	2	1	50	100

Appendix B-6
FHWA Highway Traffic Noise Prediction Model Data Inputs
Point Molate Mixed Use Project
File Name: 2019-143 06 Cumulative Plus Project
Model Run Date: 8/22/2019

Segment	Intersection	Direction	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
103	Canal Boulevard / W Ohio Avenue	East	4,250	80	20	2	1	35	100
104		West	5,270	80	20	2	1	35	100
105	Chevron / Stenmark Drive	North	450	80	20	2	1	35	100
106		South	90	80	20	2	1	35	100
107		East	9,480	80	20	2	1	35	100
108		West	9,040	80	20	2	1	35	100
109	Richmond Parkway / Pittsburg Avenue	North	33,940	80	20	2	1	50	100
110		South	34,600	80	20	2	1	50	100
111		East	1,500	80	20	2	1	35	100
112		West	280	80	20	2	1	35	100
113	Goodrick Avenue / Richmond Parkway	North	150	80	20	2	1	35	100
114		South	2,160	80	20	2	1	35	100
115		East	34,520	80	20	2	1	50	100
116		West	32,630	80	20	2	1	50	100
117	Castro Street / E Standard Drive	North	4,220	80	20	2	1	35	100
118		South	3,510	80	20	2	1	35	100
119		East	4,940	80	20	2	1	35	100
120		West	6,310	80	20	2	1	35	100

Note: Blank cells represent roadways for which no traffic data was provided.

Legend

- A ST-A: 37°57'43.67"N, 122°25'6.90"W
- B ST-B: 37°55'49.21"N, 122°23'49.83"W
- C ST-C: 37°55'42.46"N, 122°23'38.90"W
- D ST-D: 37°55'48.03"N, 122°23'30.34"W

Note: Short-term monitoring completed on July 30, 2019.

Point Molate Mixed Use Project
Richmond, California

Photographs of Short-Term Noise and Vibration Survey Locations

Appendix C-1

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Legend

- A LT-1: 37°56'53.22"N, 122°25'8.65"W
- B LT-2: 37°57'9.07"N, 122°24'59.06"W
- C LT-3: 37°57'12.78"N, 122°25'6.28"W
- D LT-4: 37°56'36.27"N, 122°24'34.94"W

Note: Long-term monitoring completed on July 30 - August 6, 2019.

Point Molate Mixed Use Project
Richmond, California

Photographs of Long-Term Noise and Vibration Survey Locations

Appendix C-2

BOLLARD Acoustical Consultants

Appendix D-1
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-1
Wednesday, July 31, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	51	60	50	48
1:00 AM	50	58	49	47
2:00 AM	48	56	47	45
3:00 AM	46	57	46	44
4:00 AM	48	54	48	45
5:00 AM	51	67	50	48
6:00 AM	51	55	51	50
7:00 AM	50	60	50	48
8:00 AM	50	63	49	48
9:00 AM	49	56	49	48
10:00 AM	49	59	49	47
11:00 AM	49	61	48	46
12:00 PM	56	75	51	49
1:00 PM	53	58	53	51
2:00 PM	54	60	54	53
3:00 PM	55	60	55	54
4:00 PM	55	60	55	53
5:00 PM	55	65	55	54
6:00 PM	54	61	54	53
7:00 PM	52	57	52	50
8:00 PM	52	58	51	48
9:00 PM	48	55	48	46
10:00 PM	48	53	47	45
11:00 PM	48	54	47	45

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	56	48	53	51	46	49
Lmax (Maximum)	75	55	61	67	53	57
L50 (Median)	55	48	51	51	46	48
L90 (Background)	54	46	50	50	44	46

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

GPS Coordinates	37°56'53.22"N
	122°25'8.65"W

BOLLARD
Acoustical Consultants

Appendix D-2
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-1
Thursday, August 01, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	47	55	47	46
1:00 AM	48	55	48	46
2:00 AM	46	54	46	44
3:00 AM	48	56	48	46
4:00 AM	49	54	49	47
5:00 AM	54	76	51	49
6:00 AM	59	77	51	49
7:00 AM	51	56	51	50
8:00 AM	50	55	50	48
9:00 AM	50	63	48	47
10:00 AM	53	64	52	49
11:00 AM	54	60	53	52
12:00 PM	53	62	52	50
1:00 PM	50	55	50	49
2:00 PM	51	57	51	49
3:00 PM	50	62	49	47
4:00 PM	52	74	50	48
5:00 PM	50	64	48	46
6:00 PM	49	57	48	46
7:00 PM	45	58	45	42
8:00 PM	45	58	43	41
9:00 PM	43	51	42	41
10:00 PM	44	56	43	41
11:00 PM	48	57	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)	54	43	51	59	44	52
Lmax (Maximum)	74	51	60	77	54	60
L50 (Median)	53	42	49	51	43	48
L90 (Background)	52	41	47	49	41	46

Computed Ldn, dB	58
% Daytime Energy	55%
% Nighttime Energy	45%

GPS Coordinates	37°56'53.22"N
	122°25'8.65"W

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Appendix D-3
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-1
Friday, August 02, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	50	59	49	46
1:00 AM	47	57	46	44
2:00 AM	46	61	45	43
3:00 AM	45	56	44	42
4:00 AM	47	51	47	44
5:00 AM	50	59	49	48
6:00 AM	53	85	49	48
7:00 AM	49	71	48	47
8:00 AM	53	74	49	47
9:00 AM	49	54	49	48
10:00 AM	59	83	49	48
11:00 AM	52	70	51	49
12:00 PM	52	68	50	49
1:00 PM	51	65	51	48
2:00 PM	52	65	52	48
3:00 PM	53	63	53	51
4:00 PM	52	60	52	51
5:00 PM	52	60	51	47
6:00 PM	49	57	49	47
7:00 PM	48	57	48	46
8:00 PM	50	62	49	47
9:00 PM	49	58	48	46
10:00 PM	51	59	50	48
11:00 PM	52	60	51	49

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	59	48	52	53	45	50
Lmax (Maximum)	83	54	64	85	51	61
L50 (Median)	53	48	50	51	44	48
L90 (Background)	51	46	48	49	42	46

Computed Ldn, dB	56
% Daytime Energy	76%
% Nighttime Energy	24%

GPS Coordinates	37°56'53.22"N
	122°25'8.65"W

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Acoustical Consultants

Appendix D-4
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-1
Saturday, August 03, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	48	54	47	46
1:00 AM	47	54	47	45
2:00 AM	45	52	44	43
3:00 AM	46	59	45	42
4:00 AM	46	55	46	44
5:00 AM	48	53	47	45
6:00 AM	50	61	49	48
7:00 AM	50	53	50	48
8:00 AM	51	57	50	49
9:00 AM	50	58	50	48
10:00 AM	50	61	49	47
11:00 AM	51	72	48	47
12:00 PM	54	73	50	48
1:00 PM	52	73	48	46
2:00 PM	51	69	50	48
3:00 PM	52	56	51	50
4:00 PM	53	65	52	50
5:00 PM	51	66	50	47
6:00 PM	52	65	51	50
7:00 PM	55	79	48	46
8:00 PM	49	61	48	45
9:00 PM	47	52	46	45
10:00 PM	47	51	47	45
11:00 PM	48	55	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	47	51	50	45	47
Lmax (Maximum)	79	52	64	61	51	55
L50 (Median)	52	46	49	49	44	47
L90 (Background)	50	45	48	48	42	45

Computed Ldn, dB	55
% Daytime Energy	81%
% Nighttime Energy	19%

GPS Coordinates	37°56'53.22"N
	122°25'8.65"W

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Appendix D-5
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-1
Sunday, August 04, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	48	58	47	45
1:00 AM	53	61	53	50
2:00 AM	54	61	53	50
3:00 AM	49	59	46	43
4:00 AM	50	59	49	45
5:00 AM	52	63	51	48
6:00 AM	52	69	51	49
7:00 AM	50	57	50	48
8:00 AM	50	55	50	49
9:00 AM	56	73	52	50
10:00 AM	53	59	52	51
11:00 AM	53	70	52	51
12:00 PM	52	59	52	50
1:00 PM	51	59	51	49
2:00 PM	52	58	52	51
3:00 PM	52	63	52	50
4:00 PM	51	66	50	49
5:00 PM	50	63	49	46
6:00 PM	49	69	46	44
7:00 PM	49	57	48	45
8:00 PM	51	59	51	49
9:00 PM	48	58	47	45
10:00 PM	47	57	47	44
11:00 PM	50	56	50	48

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	56	48	52	54	47	51
Lmax (Maximum)	73	55	62	69	56	60
L50 (Median)	52	46	50	53	46	50
L90 (Background)	51	44	48	50	43	47

Computed Ldn, dB	58
% Daytime Energy	65%
% Nighttime Energy	35%

GPS Coordinates	37°56'53.22"N
	122°25'8.65"W

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Appendix D-6
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-1
Monday, August 05, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	54	61	53	50
1:00 AM	53	62	53	50
2:00 AM	55	63	54	50
3:00 AM	48	56	47	45
4:00 AM	49	55	48	45
5:00 AM	52	59	52	50
6:00 AM	52	69	52	49
7:00 AM	52	64	52	51
8:00 AM	52	55	52	50
9:00 AM	53	58	53	52
10:00 AM	52	57	52	51
11:00 AM	49	53	48	47
12:00 PM	49	63	48	47
1:00 PM	48	55	48	46
2:00 PM	51	57	51	48
3:00 PM	52	60	51	50
4:00 PM	53	64	53	50
5:00 PM	51	63	51	48
6:00 PM	52	67	51	47
7:00 PM	49	55	49	46
8:00 PM	45	57	44	41
9:00 PM	45	55	44	43
10:00 PM	46	51	45	44
11:00 PM	45	52	45	42

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	53	45	51	55	45	52
Lmax (Maximum)	67	53	59	69	51	59
L50 (Median)	53	44	50	54	45	50
L90 (Background)	52	41	48	50	42	47

Computed Ldn, dB	58
% Daytime Energy	58%
% Nighttime Energy	42%

GPS Coordinates	37°56'53.22"N
	122°25'8.65"W

BOLLARD
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Appendix D-7
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-2
Wednesday, July 31, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	49	58	48	46
1:00 AM	49	58	48	45
2:00 AM	48	58	45	43
3:00 AM	45	54	44	42
4:00 AM	46	51	46	44
5:00 AM	50	60	49	47
6:00 AM	50	62	50	48
7:00 AM	48	61	48	46
8:00 AM	49	62	49	47
9:00 AM	48	57	48	46
10:00 AM	48	63	47	45
11:00 AM	47	62	46	44
12:00 PM	50	66	49	47
1:00 PM	51	68	51	49
2:00 PM	52	63	52	50
3:00 PM	54	64	53	52
4:00 PM	54	61	53	52
5:00 PM	54	70	54	52
6:00 PM	54	61	53	52
7:00 PM	52	72	51	48
8:00 PM	49	63	48	45
9:00 PM	46	59	45	44
10:00 PM	47	56	46	44
11:00 PM	47	54	46	44

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	54	46	51	50	45	48
Lmax (Maximum)	72	57	63	62	51	57
L50 (Median)	54	45	50	50	44	47
L90 (Background)	52	44	48	48	42	45

Computed Ldn, dB	55
% Daytime Energy	76%
% Nighttime Energy	24%

GPS Coordinates	37°57'9.07"N
	122°24'59.06"W

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Appendix D-8
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-2
Thursday, August 01, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	49	56	46	44
1:00 AM	47	55	46	43
2:00 AM	46	57	46	43
3:00 AM	47	56	46	44
4:00 AM	47	60	47	45
5:00 AM	50	61	49	48
6:00 AM	50	64	49	48
7:00 AM	49	62	49	47
8:00 AM	49	63	49	47
9:00 AM	49	66	48	46
10:00 AM	51	65	50	48
11:00 AM	52	65	51	50
12:00 PM	52	63	51	49
1:00 PM	51	59	50	48
2:00 PM	51	59	50	48
3:00 PM	48	65	47	46
4:00 PM	49	58	49	47
5:00 PM	49	64	48	46
6:00 PM	48	62	47	45
7:00 PM	46	59	44	42
8:00 PM	44	58	42	39
9:00 PM	43	56	42	41
10:00 PM	45	62	44	42
11:00 PM	47	60	46	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)	52	43	49	50	45	48
Lmax (Maximum)	66	56	62	64	55	59
L50 (Median)	51	42	48	49	44	47
L90 (Background)	50	39	46	48	42	45

Computed Ldn, dB	55
% Daytime Energy	70%
% Nighttime Energy	30%

GPS Coordinates	37°57'9.07"N
	122°24'59.06"W

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Appendix D-9
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-2
Friday, August 02, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	49	59	46	44
1:00 AM	45	55	44	42
2:00 AM	44	62	43	42
3:00 AM	43	57	42	41
4:00 AM	46	52	46	43
5:00 AM	48	61	47	45
6:00 AM	49	57	48	47
7:00 AM	50	68	48	46
8:00 AM	50	68	48	46
9:00 AM	49	65	48	47
10:00 AM	54	73	50	48
11:00 AM	51	62	50	48
12:00 PM	51	67	50	48
1:00 PM	52	66	51	49
2:00 PM	52	66	51	48
3:00 PM	55	64	54	52
4:00 PM	53	65	52	50
5:00 PM	50	59	50	48
6:00 PM	50	59	49	47
7:00 PM	50	66	49	47
8:00 PM	49	61	49	46
9:00 PM	48	62	47	45
10:00 PM	49	58	49	47
11:00 PM	50	58	49	47

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	55	48	51	50	43	48
Lmax (Maximum)	73	59	65	62	52	58
L50 (Median)	54	47	50	49	42	46
L90 (Background)	52	45	48	47	41	44

Computed Ldn, dB	55
% Daytime Energy	79%
% Nighttime Energy	21%

GPS Coordinates	37°57'9.07"N
	122°24'59.06"W

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Appendix D-10
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-2
Saturday, August 03, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	49	55	47	45
1:00 AM	46	57	45	43
2:00 AM	44	56	43	41
3:00 AM	45	59	43	41
4:00 AM	45	56	44	42
5:00 AM	45	60	45	43
6:00 AM	48	61	48	46
7:00 AM	49	70	48	46
8:00 AM	49	63	49	47
9:00 AM	49	60	49	46
10:00 AM	49	60	49	46
11:00 AM	51	63	50	48
12:00 PM	54	72	49	48
1:00 PM	52	68	49	47
2:00 PM	52	67	51	49
3:00 PM	51	72	50	48
4:00 PM	51	62	50	48
5:00 PM	50	63	49	48
6:00 PM	51	66	50	48
7:00 PM	51	72	48	46
8:00 PM	49	62	48	45
9:00 PM	46	58	46	45
10:00 PM	47	56	46	45
11:00 PM	47	57	46	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)	54	46	51	49	44	47
Lmax (Maximum)	72	58	65	61	55	57
L50 (Median)	51	46	49	48	43	45
L90 (Background)	49	45	47	46	41	43

Computed Ldn, dB	54
% Daytime Energy	81%
% Nighttime Energy	19%

GPS Coordinates	37°57'9.07"N
	122°24'59.06"W

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Appendix D-11
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-2
Sunday, August 04, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	49	61	45	44
1:00 AM	49	60	47	45
2:00 AM	50	60	48	46
3:00 AM	45	57	44	41
4:00 AM	46	58	45	43
5:00 AM	48	59	47	45
6:00 AM	51	70	49	46
7:00 AM	49	63	48	46
8:00 AM	49	63	49	47
9:00 AM	50	67	50	48
10:00 AM	51	61	50	49
11:00 AM	52	72	51	49
12:00 PM	52	60	51	49
1:00 PM	51	61	50	48
2:00 PM	50	60	49	48
3:00 PM	50	64	50	48
4:00 PM	51	67	50	48
5:00 PM	48	63	47	45
6:00 PM	48	61	46	41
7:00 PM	49	62	48	45
8:00 PM	49	58	48	45
9:00 PM	46	63	45	43
10:00 PM	46	58	45	44
11:00 PM	47	60	47	45

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	52	46	50	51	45	48
Lmax (Maximum)	72	58	63	70	57	60
L50 (Median)	51	45	49	49	44	47
L90 (Background)	49	41	47	46	41	44

Computed Ldn, dB	55
% Daytime Energy	70%
% Nighttime Energy	30%

GPS Coordinates	37°57'9.07"N
	122°24'59.06"W

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Appendix D-12
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-2
Monday, August 05, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	49	57	48	46
1:00 AM	48	58	47	44
2:00 AM	49	59	47	45
3:00 AM	45	57	44	42
4:00 AM	47	62	46	44
5:00 AM	50	60	49	47
6:00 AM	50	63	50	48
7:00 AM	51	64	50	48
8:00 AM	50	64	49	48
9:00 AM	51	68	50	49
10:00 AM	51	65	50	49
11:00 AM	49	60	48	46
12:00 PM	48	63	47	45
1:00 PM	47	60	47	45
2:00 PM	50	58	50	48
3:00 PM	53	64	52	50
4:00 PM	53	58	53	51
5:00 PM	53	65	53	51
6:00 PM	50	60	50	46
7:00 PM	48	66	47	45
8:00 PM	46	59	45	42
9:00 PM	47	70	46	44
10:00 PM	46	56	46	44
11:00 PM	46	56	45	44

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	53	46	50	50	45	48
Lmax (Maximum)	70	58	63	63	56	59
L50 (Median)	53	45	49	50	44	47
L90 (Background)	51	42	47	48	42	45

Computed Ldn, dB	55
% Daytime Energy	73%
% Nighttime Energy	27%

GPS Coordinates	37°57'9.07"N
	122°24'59.06"W

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Appendix D-13
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-3
Wednesday, July 31, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	49	60	48	46
1:00 AM	48	65	47	44
2:00 AM	47	62	46	44
3:00 AM	45	56	44	42
4:00 AM	45	55	45	43
5:00 AM	48	60	47	44
6:00 AM	48	66	47	45
7:00 AM	48	71	46	44
8:00 AM	48	72	46	44
9:00 AM	47	60	46	45
10:00 AM	47	71	45	43
11:00 AM	46	65	44	42
12:00 PM	49	64	47	45
1:00 PM	51	68	50	48
2:00 PM	52	61	52	50
3:00 PM	54	75	53	51
4:00 PM	52	67	51	50
5:00 PM	52	62	51	50
6:00 PM	52	65	51	50
7:00 PM	50	63	49	46
8:00 PM	49	68	47	45
9:00 PM	47	66	46	45
10:00 PM	47	62	46	45
11:00 PM	47	57	46	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)	54	46	50	49	45	47
Lmax (Maximum)	75	60	67	66	55	60
L50 (Median)	53	44	48	48	44	46
L90 (Background)	51	42	47	46	42	44

Computed Ldn, dB	54
% Daytime Energy	76%
% Nighttime Energy	24%

GPS Coordinates	37°57'12.78"N
	122°25'6.28"W

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Appendix D-14
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-3
Thursday, August 01, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	47	69	46	45
1:00 AM	47	59	46	44
2:00 AM	46	57	44	43
3:00 AM	47	62	45	43
4:00 AM	47	63	47	45
5:00 AM	48	63	47	46
6:00 AM	48	70	46	45
7:00 AM	48	59	47	45
8:00 AM	47	64	46	44
9:00 AM	48	67	46	44
10:00 AM	50	62	48	46
11:00 AM	52	64	50	48
12:00 PM	51	71	50	47
1:00 PM	49	68	48	46
2:00 PM	49	62	48	44
3:00 PM	47	71	44	42
4:00 PM	47	62	46	43
5:00 PM	48	65	45	42
6:00 PM	47	64	45	42
7:00 PM	45	65	42	39
8:00 PM	45	62	41	38
9:00 PM	47	61	46	45
10:00 PM	47	69	45	44
11:00 PM	48	66	47	44

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	52	45	48	48	46	47
Lmax (Maximum)	71	59	65	70	57	64
L50 (Median)	50	41	46	47	44	46
L90 (Background)	48	38	44	46	43	44

Computed Ldn, dB	54
% Daytime Energy	68%
% Nighttime Energy	32%

GPS Coordinates	37°57'12.78"N
	122°25'6.28"W

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Appendix D-15
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-3
Friday, August 02, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	49	58	48	46
1:00 AM	47	60	46	44
2:00 AM	45	58	44	42
3:00 AM	43	60	42	41
4:00 AM	45	61	44	42
5:00 AM	47	63	46	44
6:00 AM	46	64	46	44
7:00 AM	47	70	45	43
8:00 AM	49	66	45	43
9:00 AM	47	63	46	45
10:00 AM	52	75	47	45
11:00 AM	50	66	49	46
12:00 PM	50	68	48	46
1:00 PM	50	70	48	45
2:00 PM	51	74	48	45
3:00 PM	53	66	53	50
4:00 PM	50	70	49	47
5:00 PM	48	65	47	44
6:00 PM	47	65	46	43
7:00 PM	47	65	45	44
8:00 PM	50	65	48	46
9:00 PM	50	61	49	47
10:00 PM	50	63	49	47
11:00 PM	50	60	49	47

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	53	47	50	50	43	48
Lmax (Maximum)	75	61	67	64	58	61
L50 (Median)	53	45	47	49	42	46
L90 (Background)	50	43	45	47	41	44

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

GPS Coordinates	37°57'12.78"N
	122°25'6.28"W

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Appendix D-16
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-3
Saturday, August 03, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	48	59	48	46
1:00 AM	46	55	46	44
2:00 AM	44	59	42	41
3:00 AM	45	63	43	42
4:00 AM	44	59	43	41
5:00 AM	47	64	44	42
6:00 AM	46	62	45	44
7:00 AM	46	62	45	44
8:00 AM	47	61	46	45
9:00 AM	47	63	46	44
10:00 AM	49	69	46	44
11:00 AM	49	70	47	46
12:00 PM	50	69	48	46
1:00 PM	48	63	46	45
2:00 PM	51	78	48	46
3:00 PM	54	82	48	47
4:00 PM	49	63	48	46
5:00 PM	48	62	47	45
6:00 PM	51	81	47	46
7:00 PM	51	76	46	42
8:00 PM	49	67	47	45
9:00 PM	48	65	47	46
10:00 PM	48	60	47	46
11:00 PM	48	62	47	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)	54	46	50	48	44	46
Lmax (Maximum)	82	61	69	64	55	60
L50 (Median)	48	45	47	48	42	45
L90 (Background)	47	42	45	46	41	43

Computed Ldn, dB	53
% Daytime Energy	77%
% Nighttime Energy	23%

GPS Coordinates	37°57'12.78"N
	122°25'6.28"W

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Appendix D-17
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-3
Sunday, August 04, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	48	61	46	45
1:00 AM	51	68	50	47
2:00 AM	52	73	50	48
3:00 AM	47	62	44	41
4:00 AM	47	61	45	42
5:00 AM	50	68	46	43
6:00 AM	48	62	46	45
7:00 AM	46	63	45	43
8:00 AM	47	63	45	44
9:00 AM	49	70	47	46
10:00 AM	49	67	48	47
11:00 AM	50	62	49	47
12:00 PM	51	64	50	48
1:00 PM	51	70	49	47
2:00 PM	49	68	48	46
3:00 PM	49	70	47	46
4:00 PM	49	69	46	45
5:00 PM	47	68	44	41
6:00 PM	47	70	42	39
7:00 PM	46	67	44	41
8:00 PM	51	79	47	46
9:00 PM	49	68	48	47
10:00 PM	49	63	48	47
11:00 PM	50	62	49	48

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	51	46	49	52	47	49
Lmax (Maximum)	79	62	68	73	61	65
L50 (Median)	50	42	47	50	44	47
L90 (Background)	48	39	45	48	41	45

Computed Ldn, dB	56
% Daytime Energy	62%
% Nighttime Energy	38%

GPS Coordinates	37°57'12.78"N
	122°25'6.28"W

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Appendix D-18
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-3
Monday, August 05, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	50	62	50	48
1:00 AM	50	58	49	47
2:00 AM	50	60	49	46
3:00 AM	46	62	45	43
4:00 AM	47	67	45	43
5:00 AM	49	69	47	46
6:00 AM	48	59	47	45
7:00 AM	50	70	48	46
8:00 AM	48	63	47	46
9:00 AM	49	63	49	47
10:00 AM	49	65	48	47
11:00 AM	47	69	45	44
12:00 PM	47	67	44	43
1:00 PM	46	71	44	43
2:00 PM	48	64	47	44
3:00 PM	50	68	50	48
4:00 PM	50	64	50	48
5:00 PM	50	68	49	47
6:00 PM	49	65	48	45
7:00 PM	48	71	46	43
8:00 PM	46	63	43	40
9:00 PM	50	78	47	46
10:00 PM	47	65	47	46
11:00 PM	47	61	46	44

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	50	46	49	50	46	49
Lmax (Maximum)	78	63	67	69	58	63
L50 (Median)	50	43	47	50	45	47
L90 (Background)	48	40	45	48	43	45

Computed Ldn, dB	55
% Daytime Energy	64%
% Nighttime Energy	36%

GPS Coordinates	37°57'12.78"N
	122°25'6.28"W

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Appendix D-19
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-4
Wednesday, July 31, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	48	58	47	45
1:00 AM	48	57	47	45
2:00 AM	48	59	47	45
3:00 AM	48	59	48	45
4:00 AM	52	60	52	49
5:00 AM	55	62	55	52
6:00 AM	55	60	55	53
7:00 AM	52	59	52	50
8:00 AM	53	62	53	52
9:00 AM	51	55	51	49
10:00 AM	51	59	51	50
11:00 AM	51	61	51	49
12:00 PM	53	61	53	51
1:00 PM	55	66	55	53
2:00 PM	57	64	56	55
3:00 PM	57	62	57	56
4:00 PM	56	63	56	54
5:00 PM	57	63	57	55
6:00 PM	57	65	57	55
7:00 PM	52	64	51	49
8:00 PM	51	60	49	46
9:00 PM	47	64	47	45
10:00 PM	49	55	49	47
11:00 PM	49	59	49	47

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	57	47	54	55	48	51
Lmax (Maximum)	66	55	62	62	55	59
L50 (Median)	57	47	53	55	47	50
L90 (Background)	56	45	51	53	45	48

Computed Ldn, dB	58
% Daytime Energy	77%
% Nighttime Energy	23%

GPS Coordinates	37°56'36.27"N
	122°24'34.94"W

BOLLARD
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Appendix D-20
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-4
Thursday, August 01, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	48	56	47	46
1:00 AM	46	56	46	44
2:00 AM	47	57	46	44
3:00 AM	48	61	48	45
4:00 AM	51	59	51	47
5:00 AM	53	60	53	52
6:00 AM	54	62	54	53
7:00 AM	54	58	54	53
8:00 AM	53	58	53	52
9:00 AM	53	71	53	51
10:00 AM	55	62	55	53
11:00 AM	54	64	54	53
12:00 PM	54	62	54	52
1:00 PM	52	65	51	50
2:00 PM	52	65	51	50
3:00 PM	51	58	50	49
4:00 PM	52	58	52	50
5:00 PM	51	64	51	49
6:00 PM	51	58	51	49
7:00 PM	49	57	49	47
8:00 PM	46	61	46	43
9:00 PM	45	54	44	43
10:00 PM	46	57	45	44
11:00 PM	49	64	48	45

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	55	45	52	54	46	50
Lmax (Maximum)	71	54	61	64	56	59
L50 (Median)	55	44	51	54	45	49
L90 (Background)	53	43	50	53	44	47

Computed Ldn, dB	57
% Daytime Energy	72%
% Nighttime Energy	28%

GPS Coordinates	37°56'36.27"N
	122°24'34.94"W

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Appendix D-21
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-4
Friday, August 02, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	49	59	47	45
1:00 AM	47	57	46	44
2:00 AM	46	59	45	43
3:00 AM	46	58	45	43
4:00 AM	49	59	48	45
5:00 AM	51	57	51	49
6:00 AM	51	61	51	49
7:00 AM	50	56	50	49
8:00 AM	50	56	50	49
9:00 AM	51	63	51	50
10:00 AM	51	67	51	49
11:00 AM	52	63	51	49
12:00 PM	53	67	53	51
1:00 PM	52	65	51	49
2:00 PM	53	66	51	49
3:00 PM	57	67	56	54
4:00 PM	53	59	53	51
5:00 PM	51	61	51	47
6:00 PM	49	57	49	47
7:00 PM	50	57	50	47
8:00 PM	52	65	51	47
9:00 PM	50	61	49	47
10:00 PM	50	64	49	47
11:00 PM	49	57	49	47

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	57	49	52	51	46	49
Lmax (Maximum)	67	56	62	64	57	59
L50 (Median)	56	49	51	51	45	48
L90 (Background)	54	47	49	49	43	46

Computed Ldn, dB	56
% Daytime Energy	77%
% Nighttime Energy	23%

GPS Coordinates	37°56'36.27"N
	122°24'34.94"W

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Appendix D-22
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-4
Saturday, August 03, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	48	54	47	45
1:00 AM	46	58	45	43
2:00 AM	46	54	45	43
3:00 AM	46	59	46	43
4:00 AM	47	56	46	44
5:00 AM	49	55	49	46
6:00 AM	52	58	51	50
7:00 AM	52	60	52	50
8:00 AM	52	61	52	51
9:00 AM	52	58	52	50
10:00 AM	52	58	51	49
11:00 AM	52	60	51	50
12:00 PM	52	62	51	50
1:00 PM	51	57	51	50
2:00 PM	53	65	53	51
3:00 PM	53	66	52	51
4:00 PM	53	61	53	51
5:00 PM	52	59	52	51
6:00 PM	51	63	51	50
7:00 PM	52	74	50	46
8:00 PM	52	62	51	50
9:00 PM	51	58	51	49
10:00 PM	51	57	51	50
11:00 PM	50	58	50	48

	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	51	52	52	46	49
Lmax (Maximum)	74	57	62	59	54	57
L50 (Median)	53	50	52	51	45	48
L90 (Background)	51	46	50	50	43	46

Computed Ldn, dB	56
% Daytime Energy	77%
% Nighttime Energy	23%

GPS Coordinates	37°56'36.27"N
	122°24'34.94"W

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Appendix D-23
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-4
Sunday, August 04, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	49	60	49	46
1:00 AM	49	60	48	46
2:00 AM	48	61	47	45
3:00 AM	47	61	46	44
4:00 AM	48	60	47	45
5:00 AM	50	65	49	47
6:00 AM	51	63	51	49
7:00 AM	52	59	52	50
8:00 AM	53	59	53	51
9:00 AM	54	65	53	52
10:00 AM	55	61	54	53
11:00 AM	53	60	53	52
12:00 PM	54	61	53	52
1:00 PM	51	65	51	50
2:00 PM	51	56	51	50
3:00 PM	51	63	51	49
4:00 PM	50	66	49	48
5:00 PM	49	59	49	48
6:00 PM	47	57	47	45
7:00 PM	47	56	46	45
8:00 PM	49	61	48	47
9:00 PM	48	56	48	47
10:00 PM	49	55	49	47
11:00 PM	49	56	49	48

	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	47	51	51	47	49
Lmax (Maximum)	66	56	60	65	55	60
L50 (Median)	54	46	51	51	46	48
L90 (Background)	53	45	49	49	44	46

Computed Ldn, dB	56
% Daytime Energy	74%
% Nighttime Energy	26%

GPS Coordinates	37°56'36.27"N
	122°24'34.94"W

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Appendix D-24
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-4
Monday, August 05, 2019

Hour	Leq	Lmax	L50	L90
12:00 AM	50	65	49	47
1:00 AM	48	59	48	46
2:00 AM	50	64	48	46
3:00 AM	49	60	48	46
4:00 AM	51	61	51	48
5:00 AM	54	63	54	52
6:00 AM	54	60	54	53
7:00 AM	54	61	54	53
8:00 AM	55	58	55	53
9:00 AM	55	58	55	54
10:00 AM	55	58	55	54
11:00 AM	53	57	52	51
12:00 PM	53	66	52	51
1:00 PM	53	57	53	52
2:00 PM	54	60	54	53
3:00 PM	54	64	54	53
4:00 PM	54	60	54	52
5:00 PM	53	57	52	51
6:00 PM	54	58	54	52
7:00 PM	51	56	50	49
8:00 PM	49	59	49	45
9:00 PM	50	56	50	48
10:00 PM	50	54	50	48
11:00 PM	48	55	48	45

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	55	49	53	54	48	51
Lmax (Maximum)	66	56	59	65	54	60
L50 (Median)	55	49	53	54	48	50
L90 (Background)	54	45	51	53	45	48

Computed Ldn, dB	58
% Daytime Energy	74%
% Nighttime Energy	26%

GPS Coordinates	37°56'36.27"N
	122°24'34.94"W

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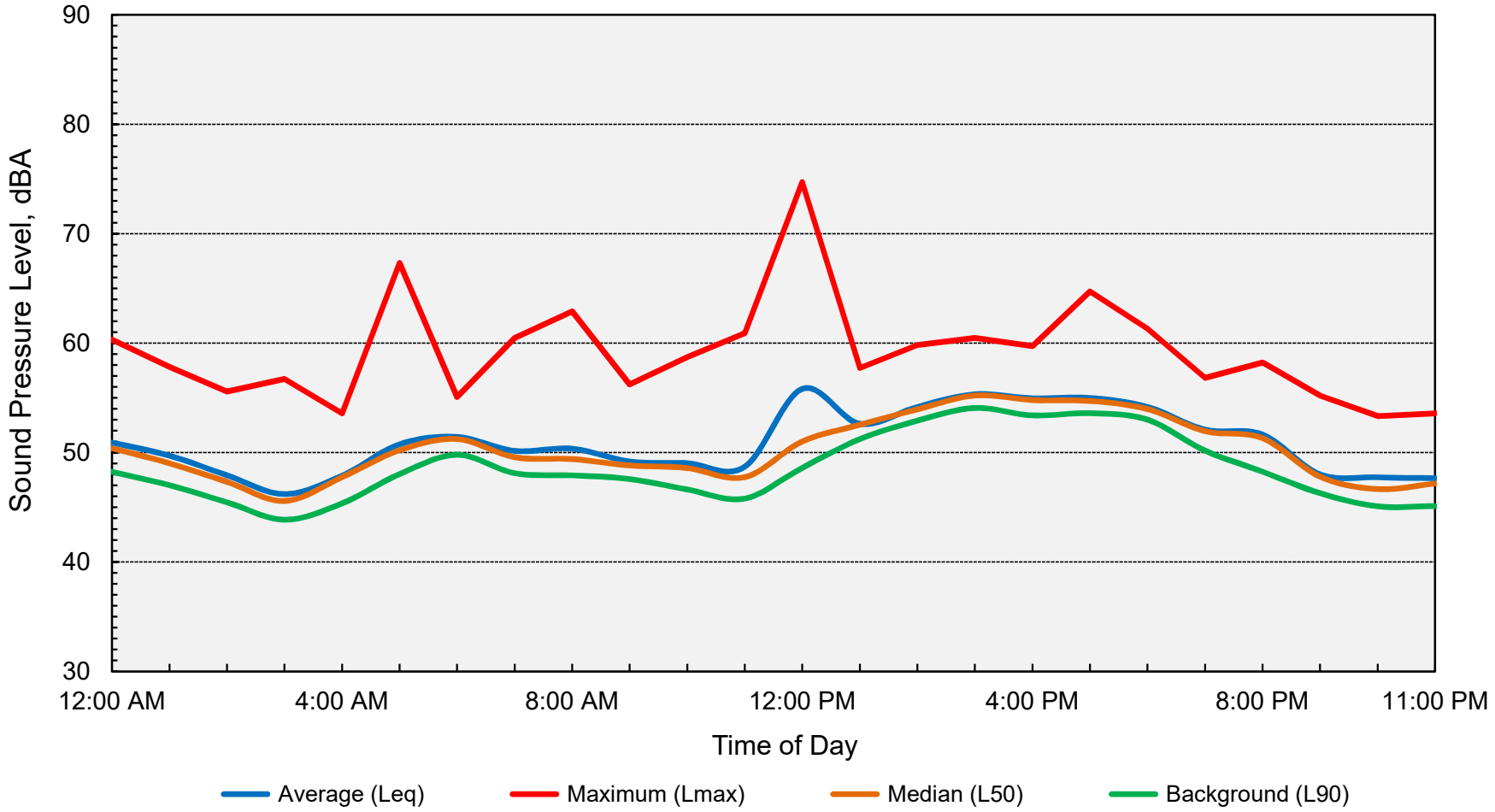
Appendix E-1
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-1
Wednesday, July 31, 2019



Computed Ldn = 56 dB

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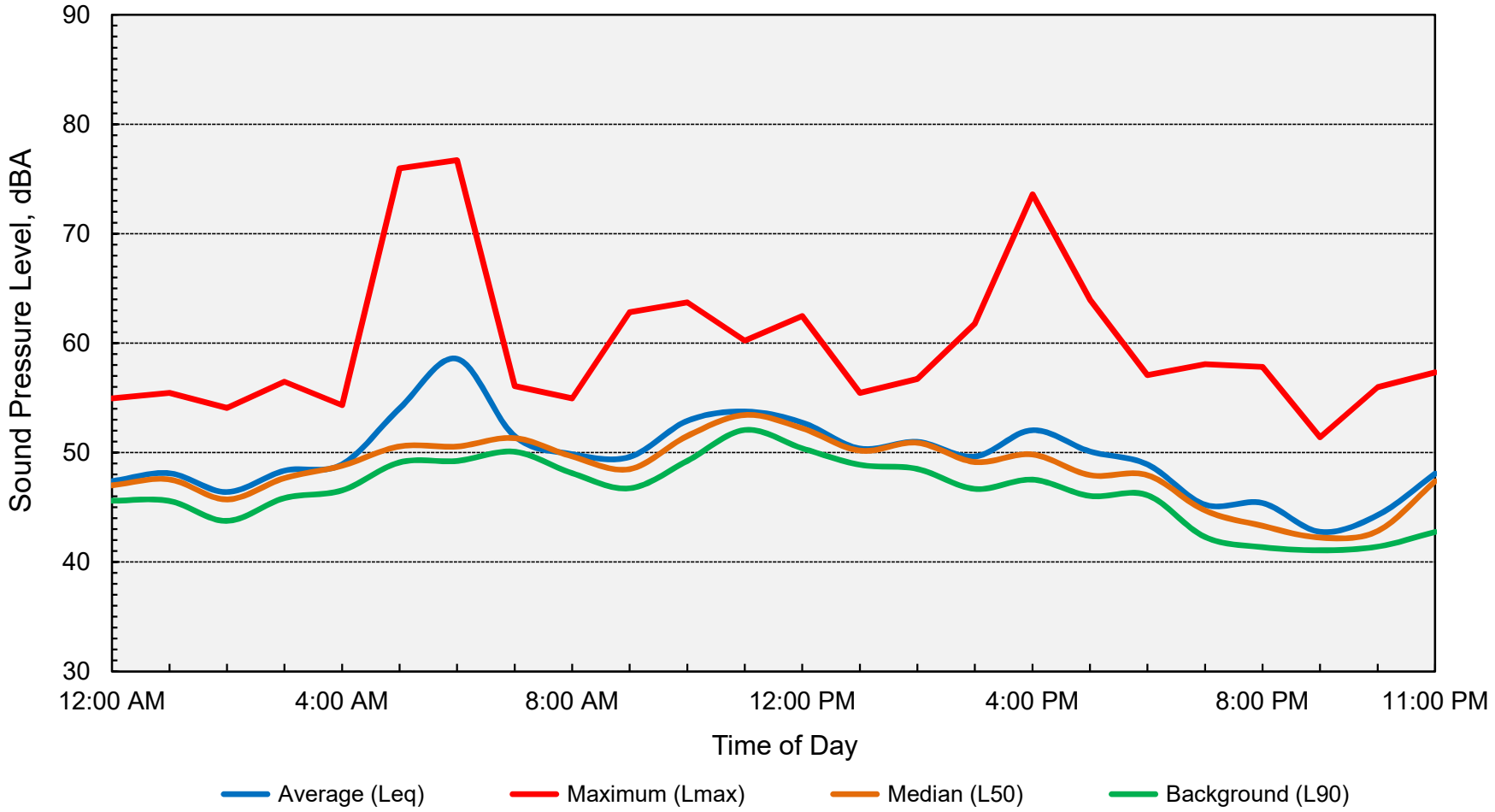
Appendix E-2
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-1
Thursday, August 01, 2019



Computed Ldn = 58 dB

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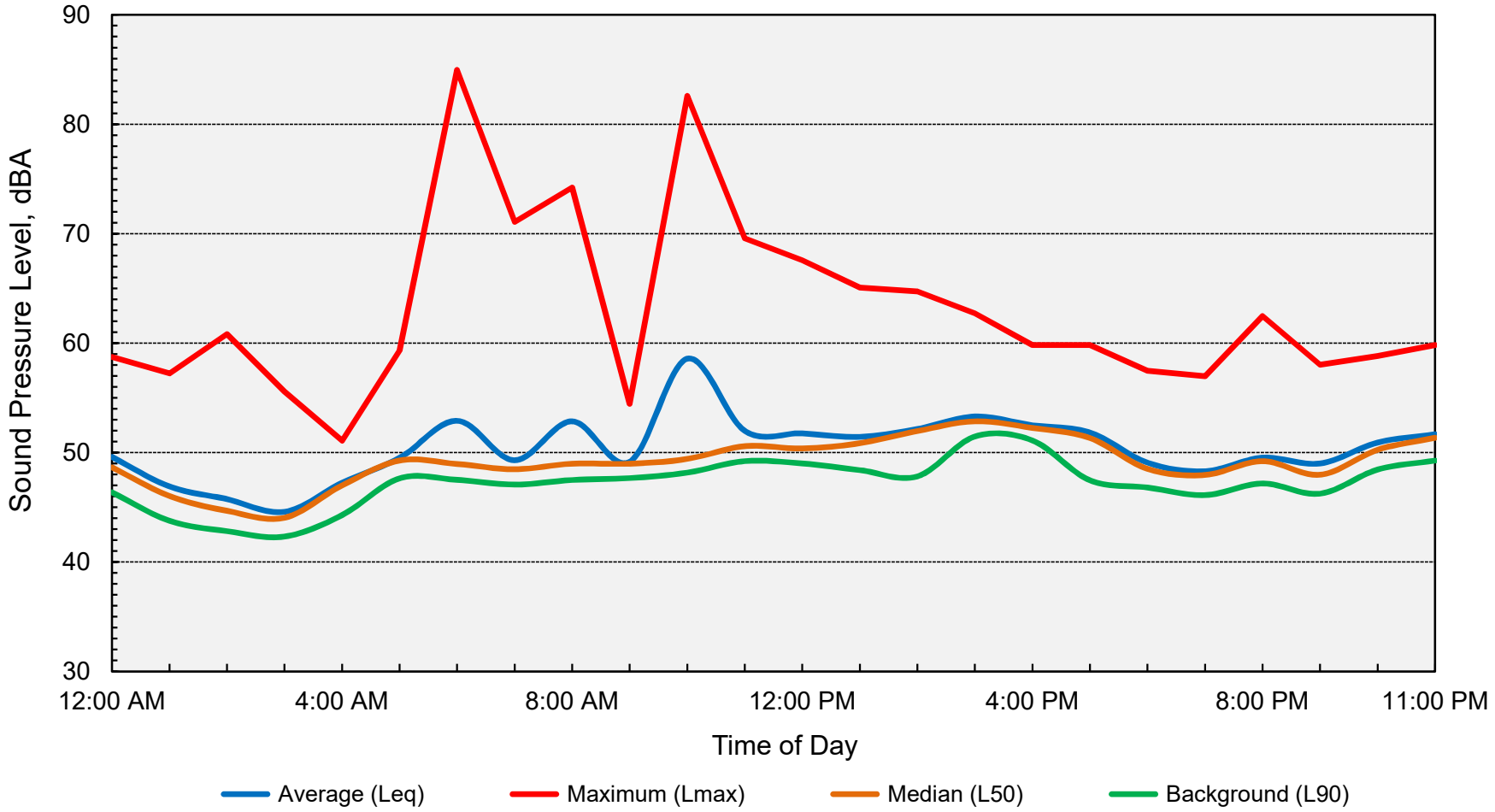
Appendix E-3
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-1
Friday, August 02, 2019



Computed Ldn = 56 dB

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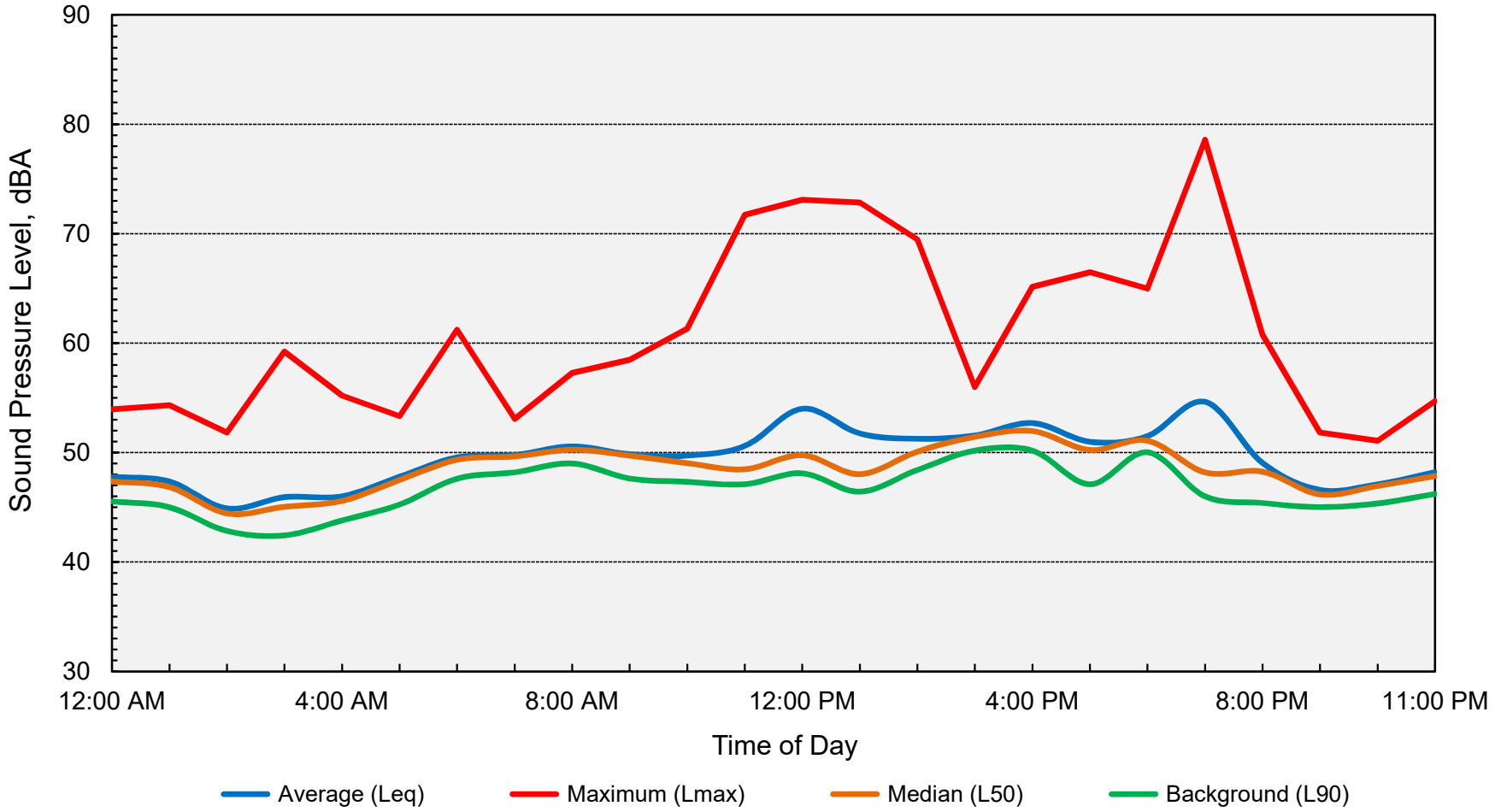
Appendix E-4
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-1
Saturday, August 03, 2019



Computed Ldn = 55 dB

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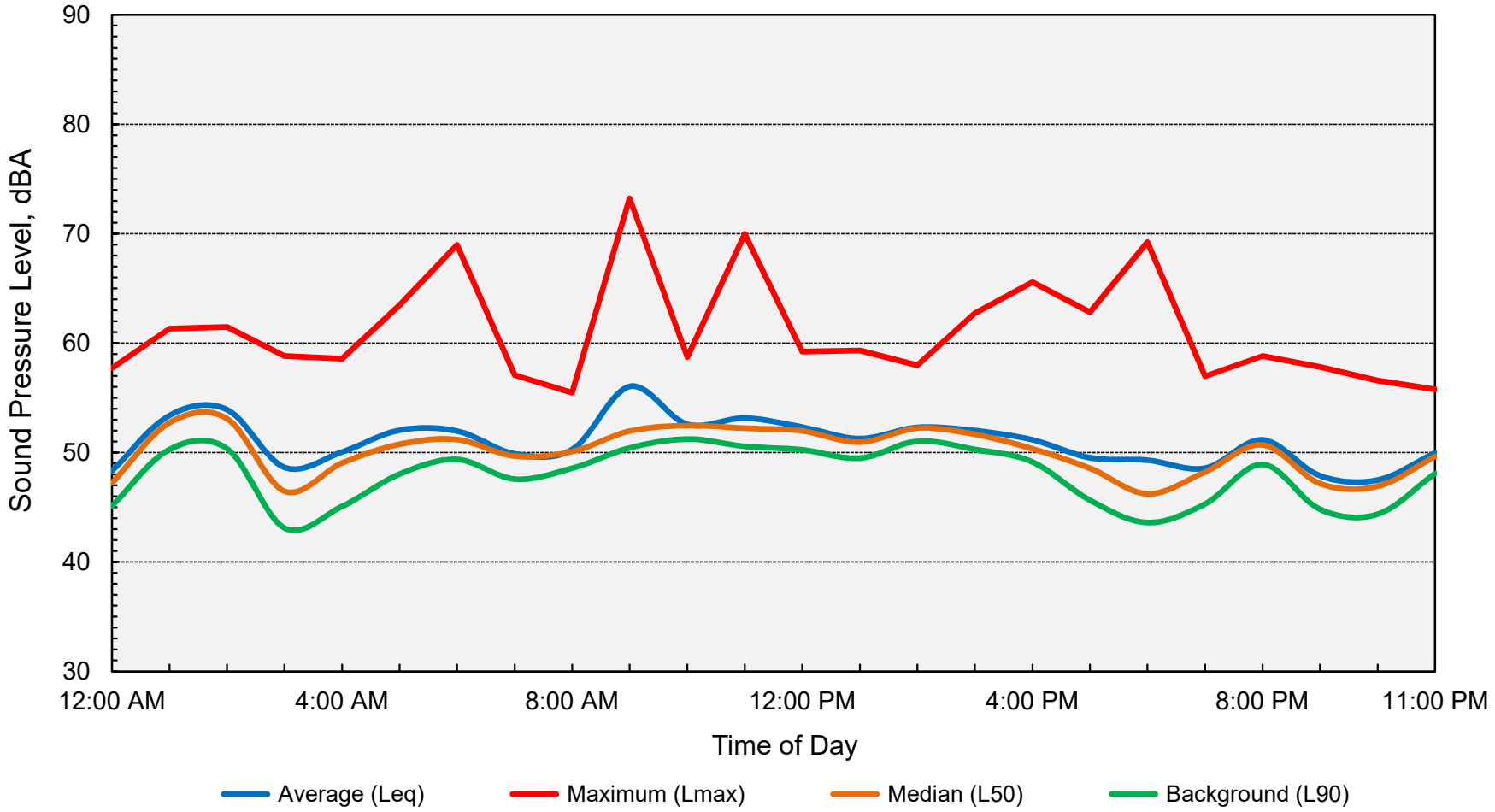
Appendix E-5
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-1
Sunday, August 04, 2019



Computed Ldn = 58 dB

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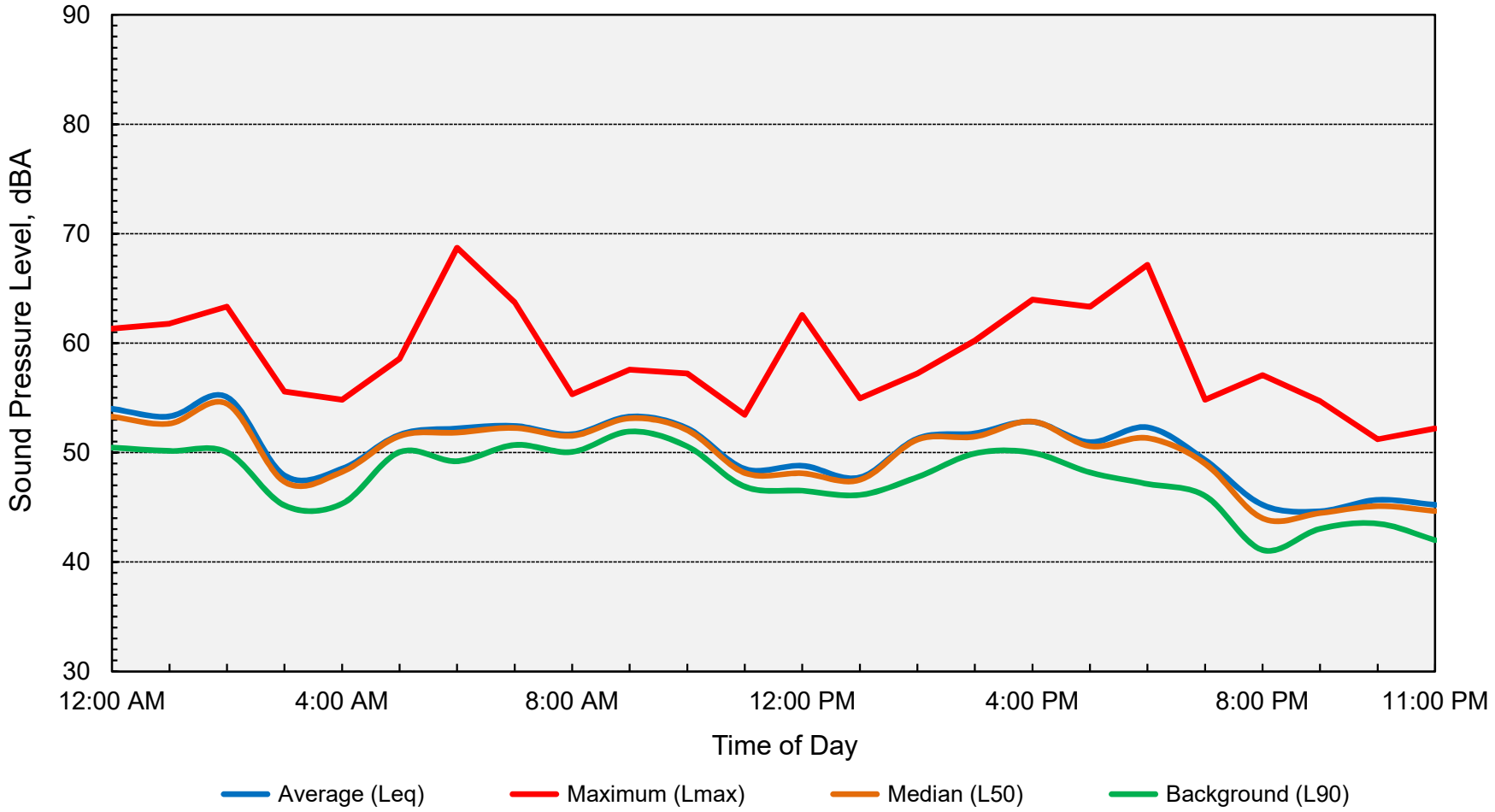
Appendix E-6
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-1
Monday, August 05, 2019



Computed Ldn = 58 dB

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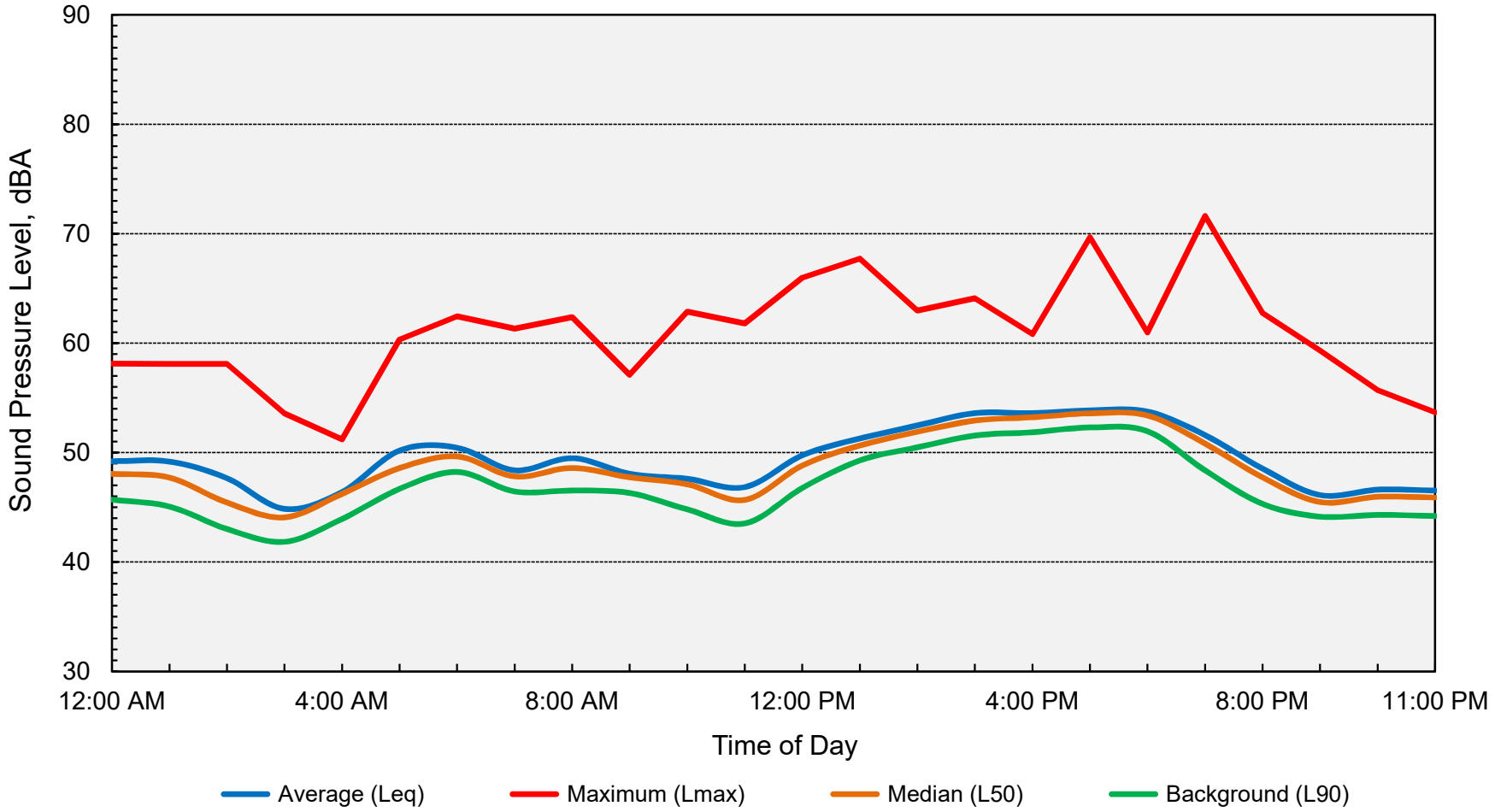
Appendix E-7
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-2
Wednesday, July 31, 2019



Computed Ldn = 55 dB

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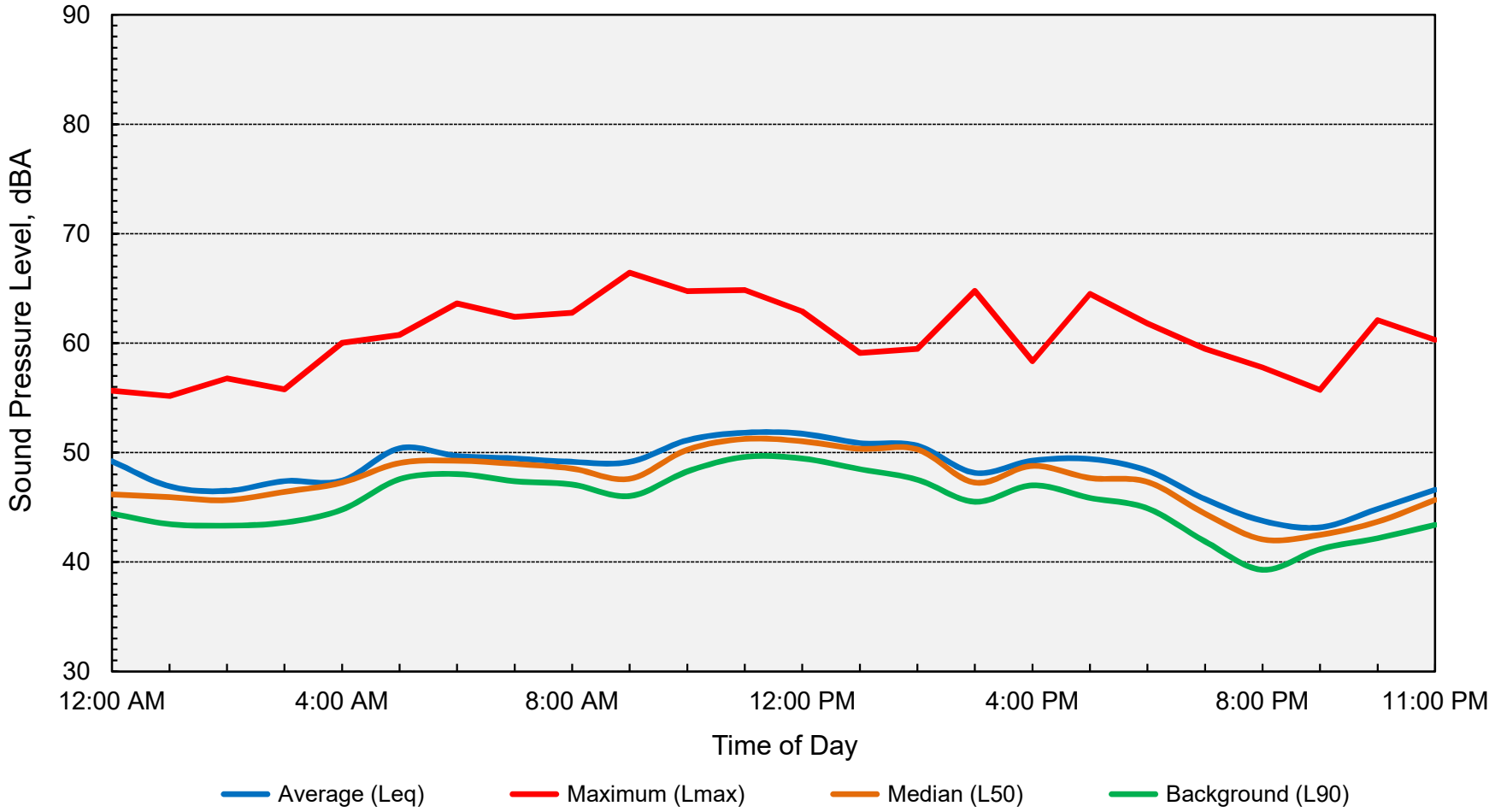
Appendix E-8
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-2
Thursday, August 01, 2019



Computed Ldn = 55 dB

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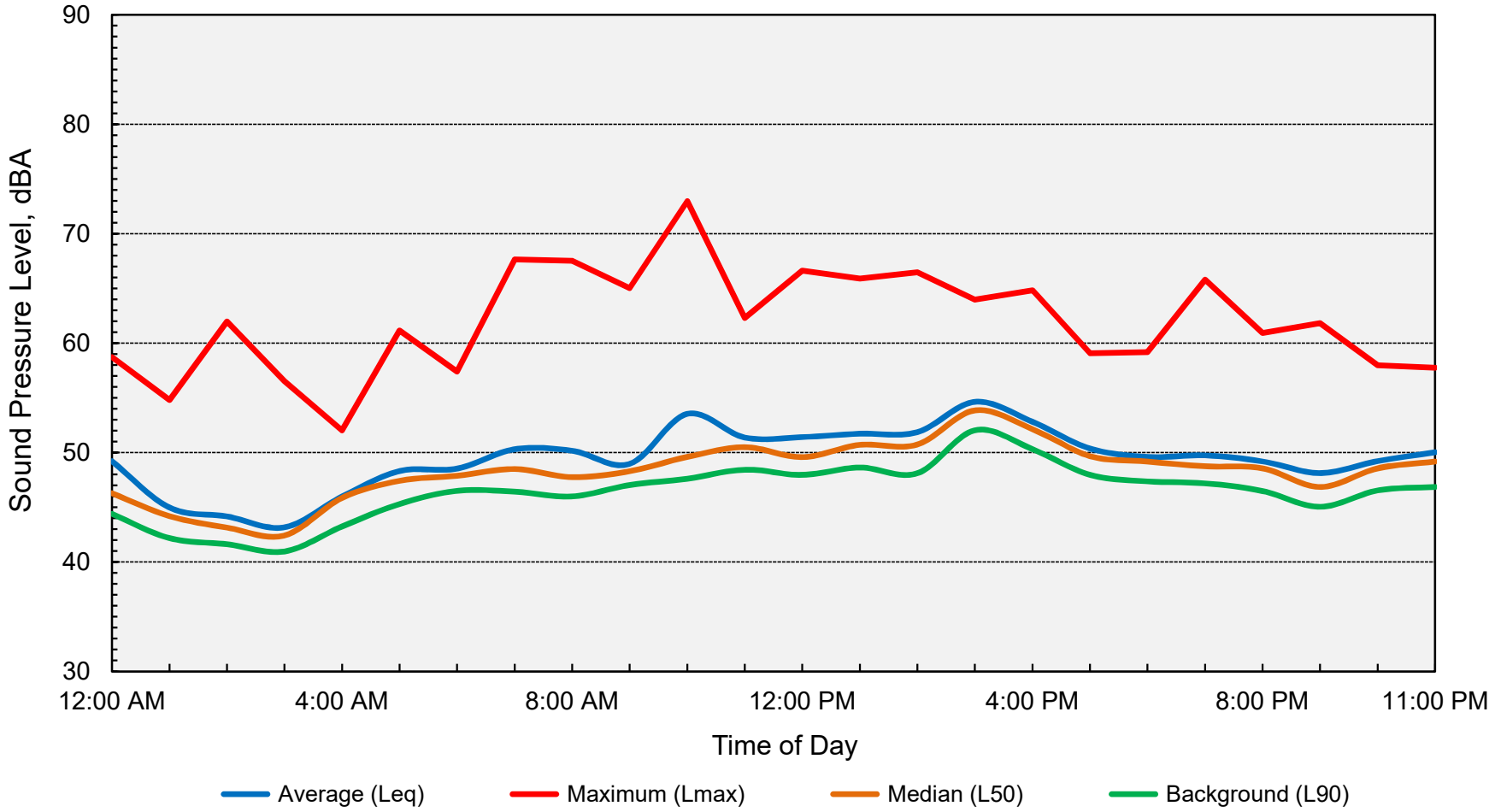
Appendix E-9
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-2
Friday, August 02, 2019



Computed Ldn = 55 dB

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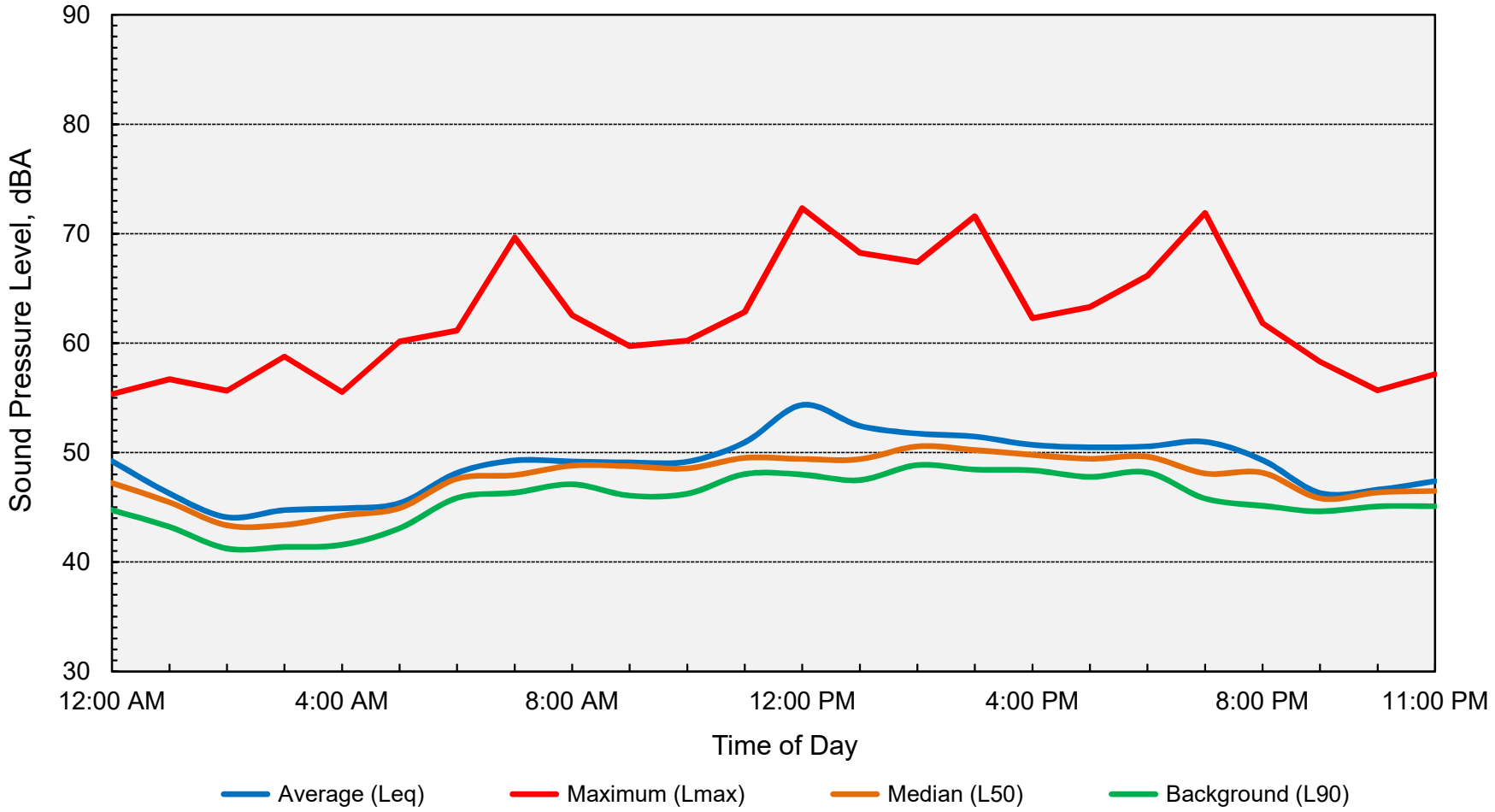
Appendix E-10
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-2
Saturday, August 03, 2019



Computed Ldn = 54 dB

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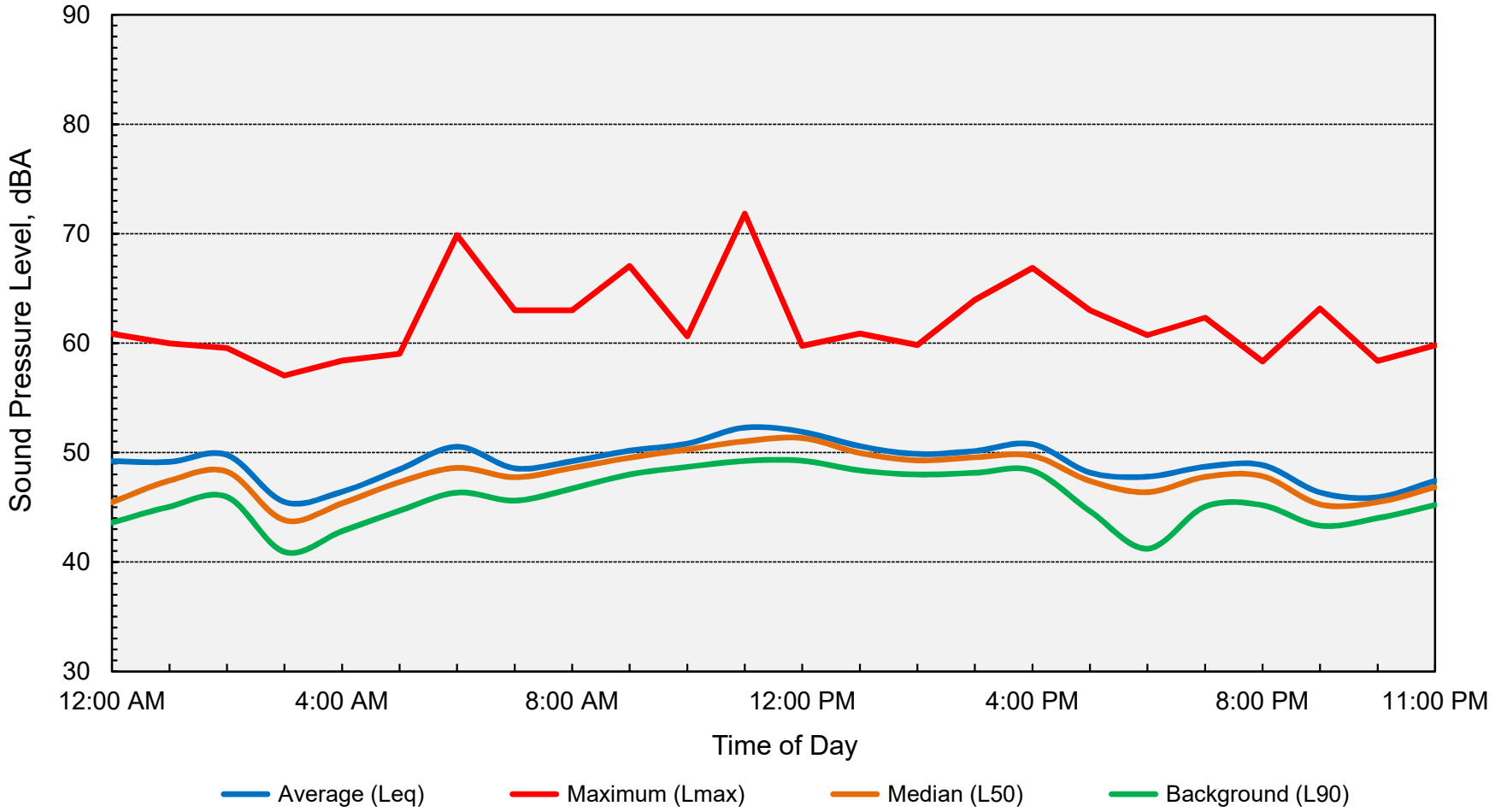
Appendix E-11
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-2
Sunday, August 04, 2019



Computed Ldn = 55 dB

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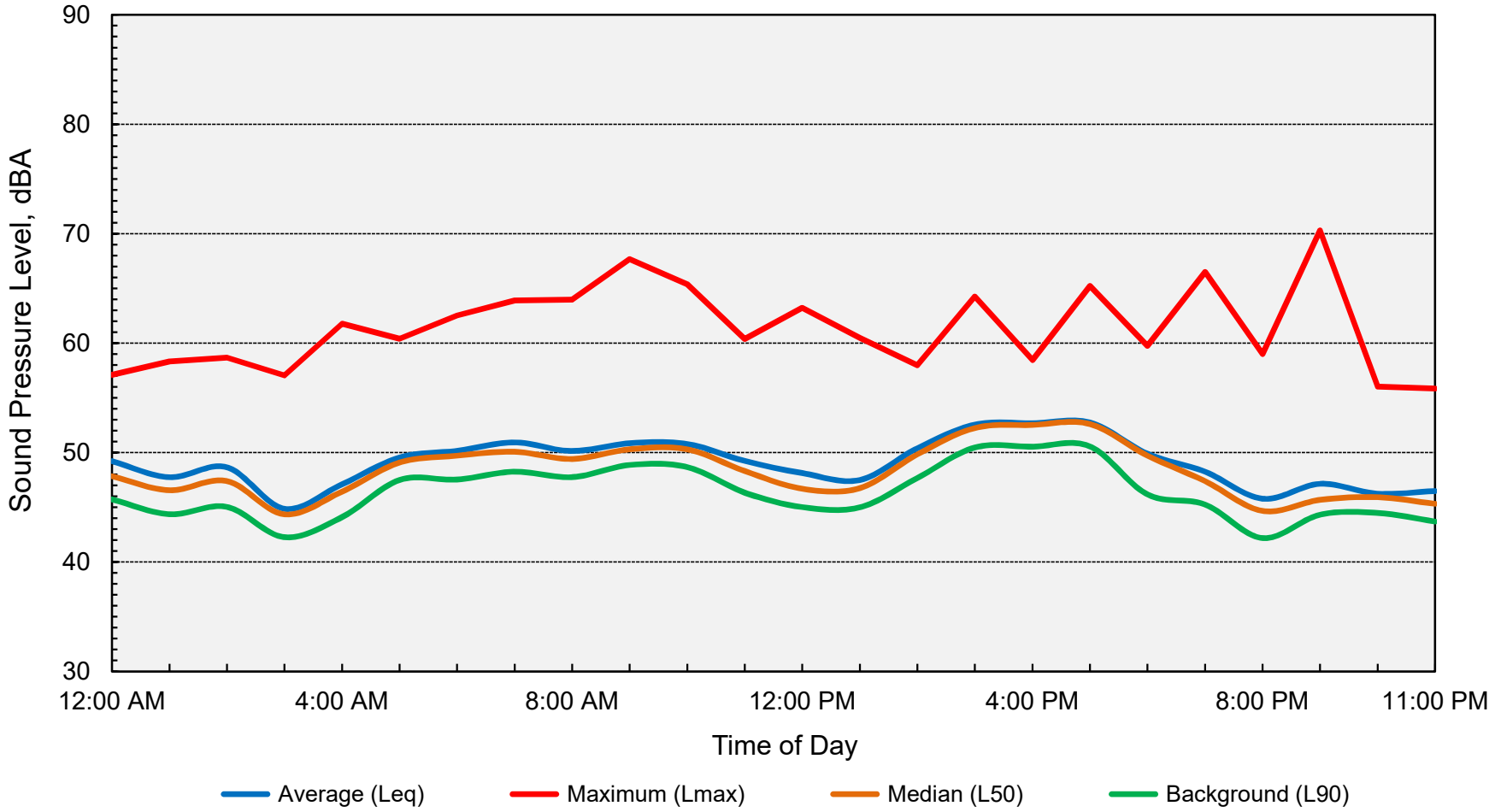
Appendix E-12
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-2
Monday, August 05, 2019



Computed Ldn = 55 dB

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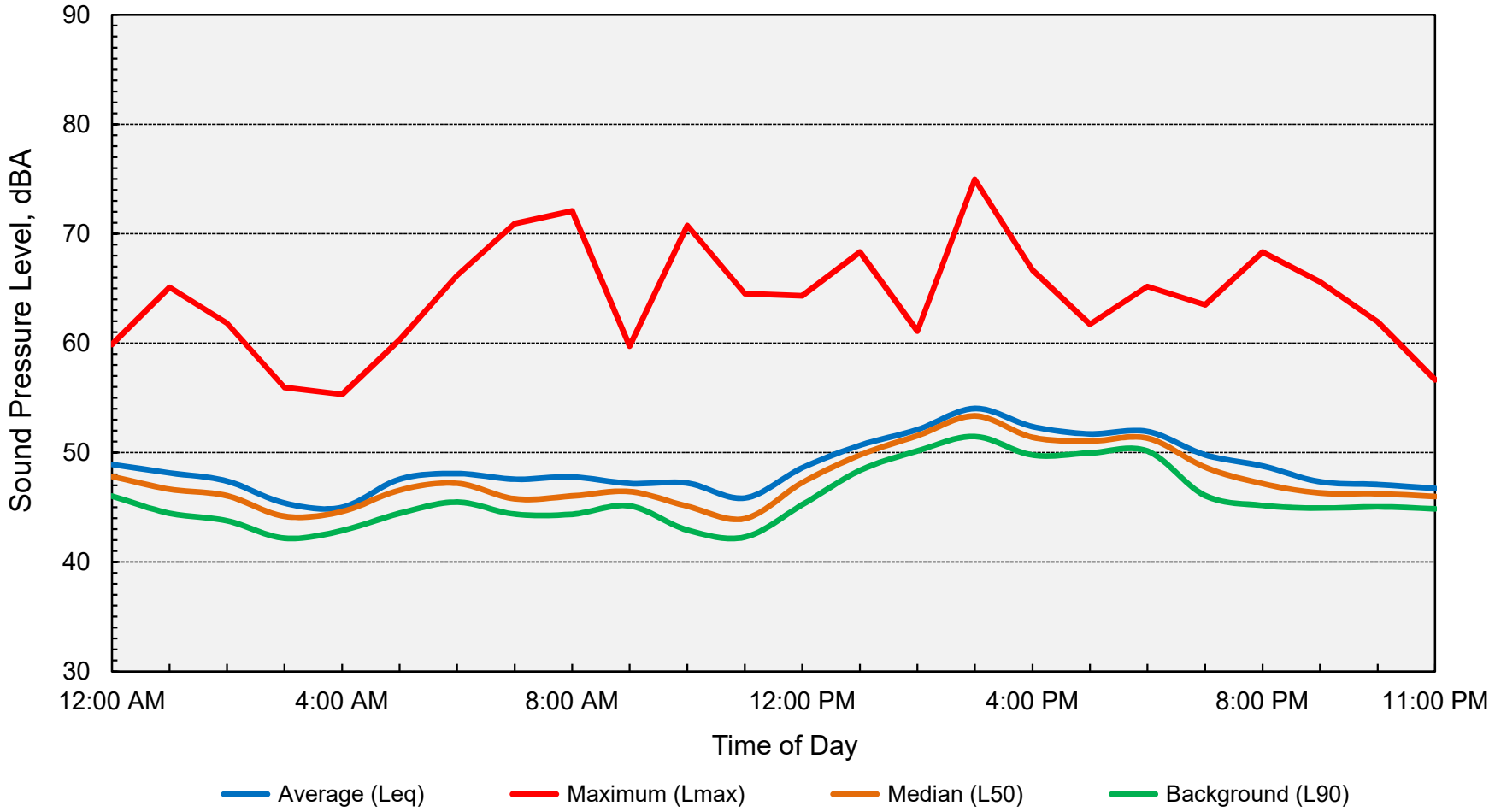
Appendix E-13
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-3
Wednesday, July 31, 2019



Computed Ldn = 54 dB

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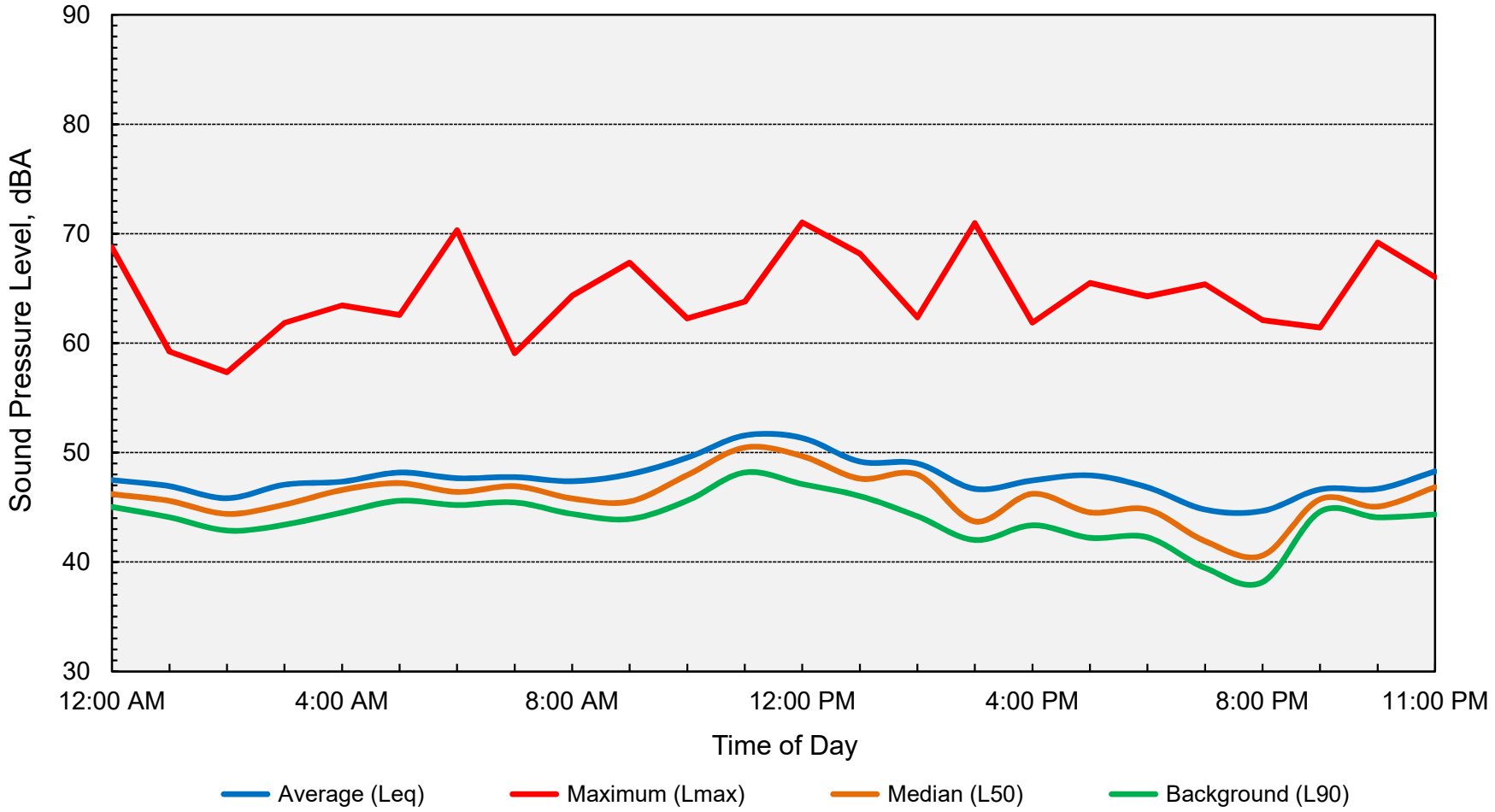
Appendix E-14
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-3
Thursday, August 01, 2019



Computed Ldn = 54 dB

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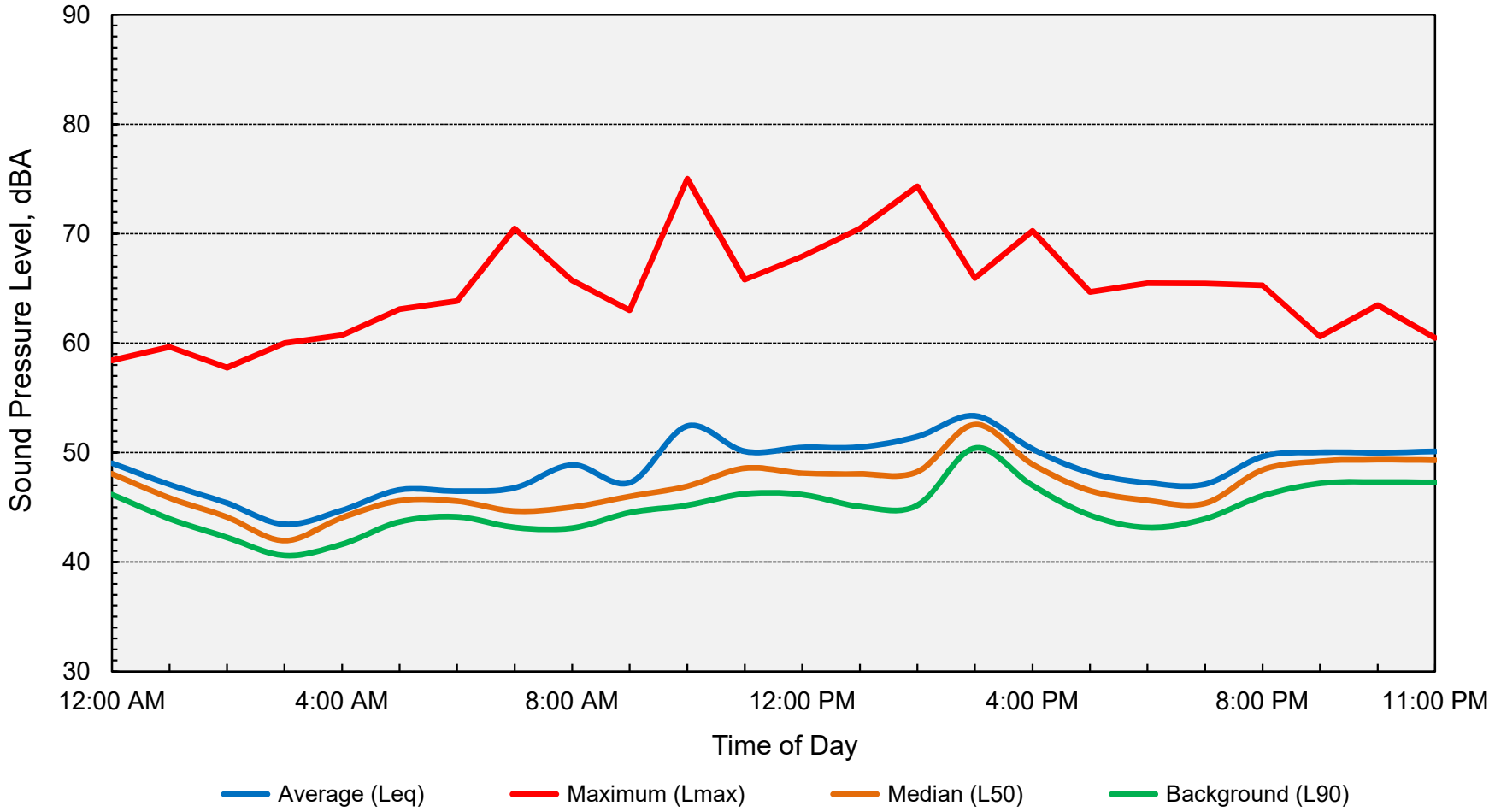
Appendix E-15
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-3
Friday, August 02, 2019



Computed Ldn = 54 dB

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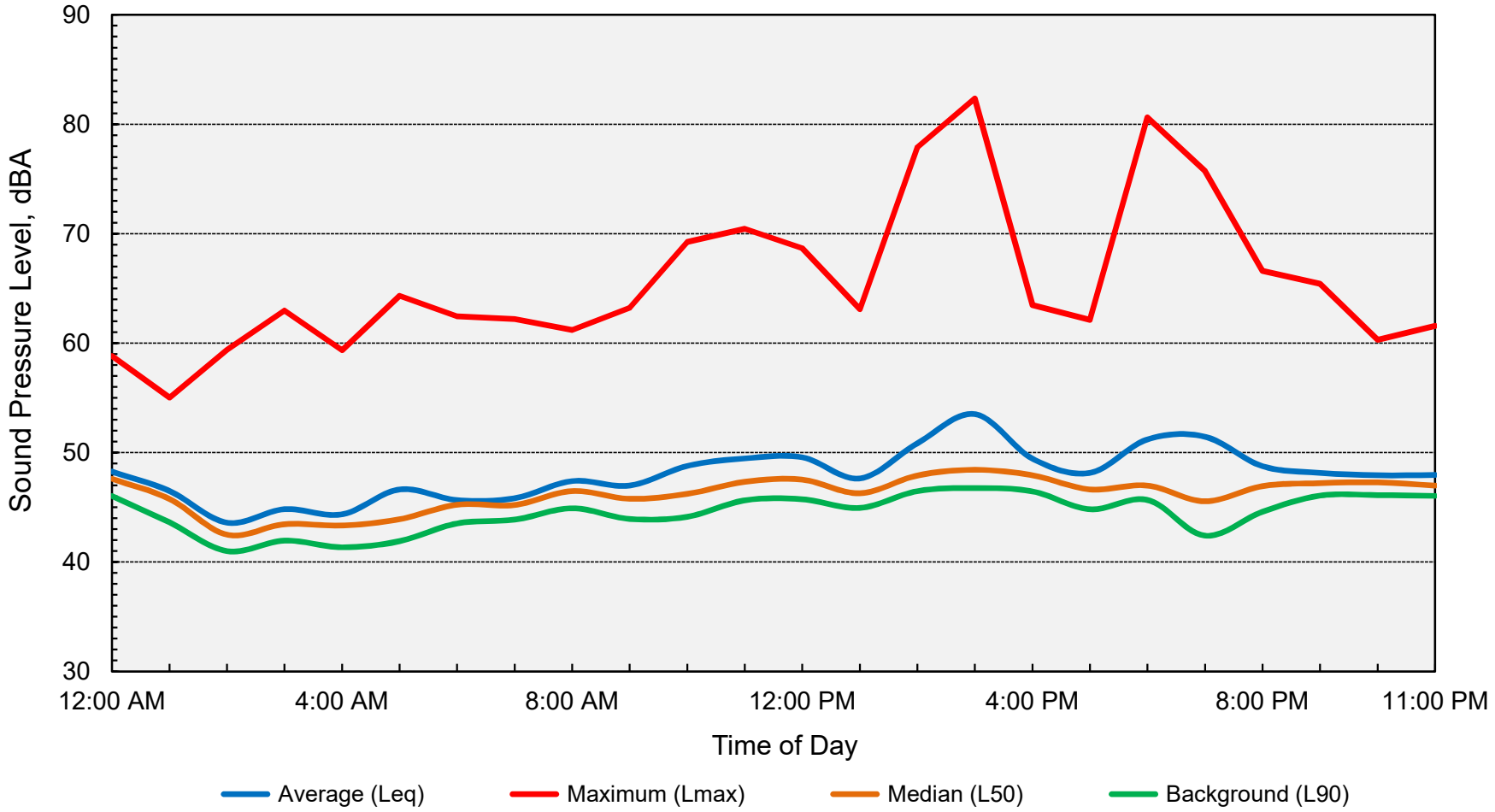
Appendix E-16
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-3
Saturday, August 03, 2019



Computed Ldn = 53 dB

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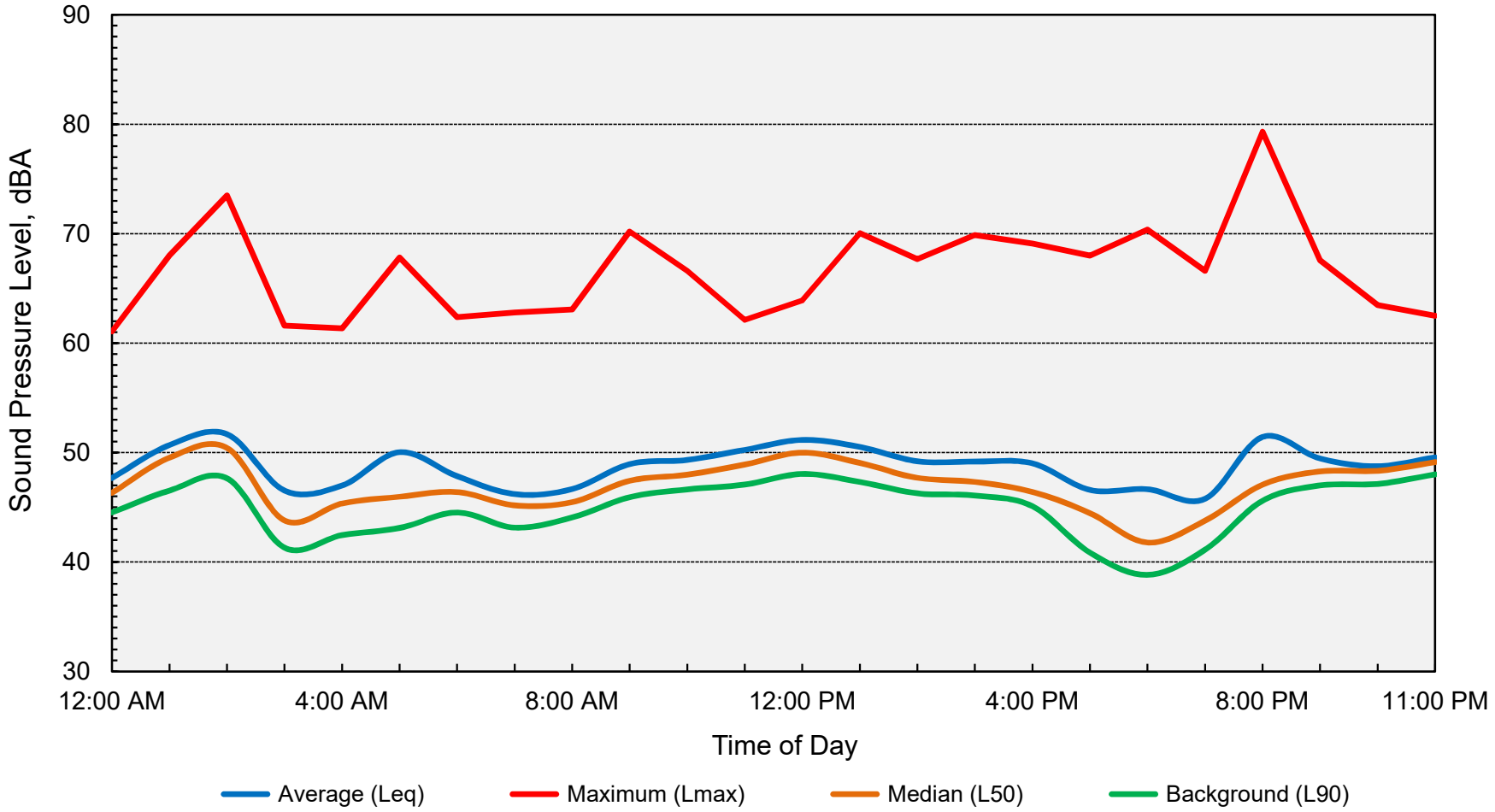
Appendix E-17
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-3
Sunday, August 04, 2019



Computed Ldn = 56 dB

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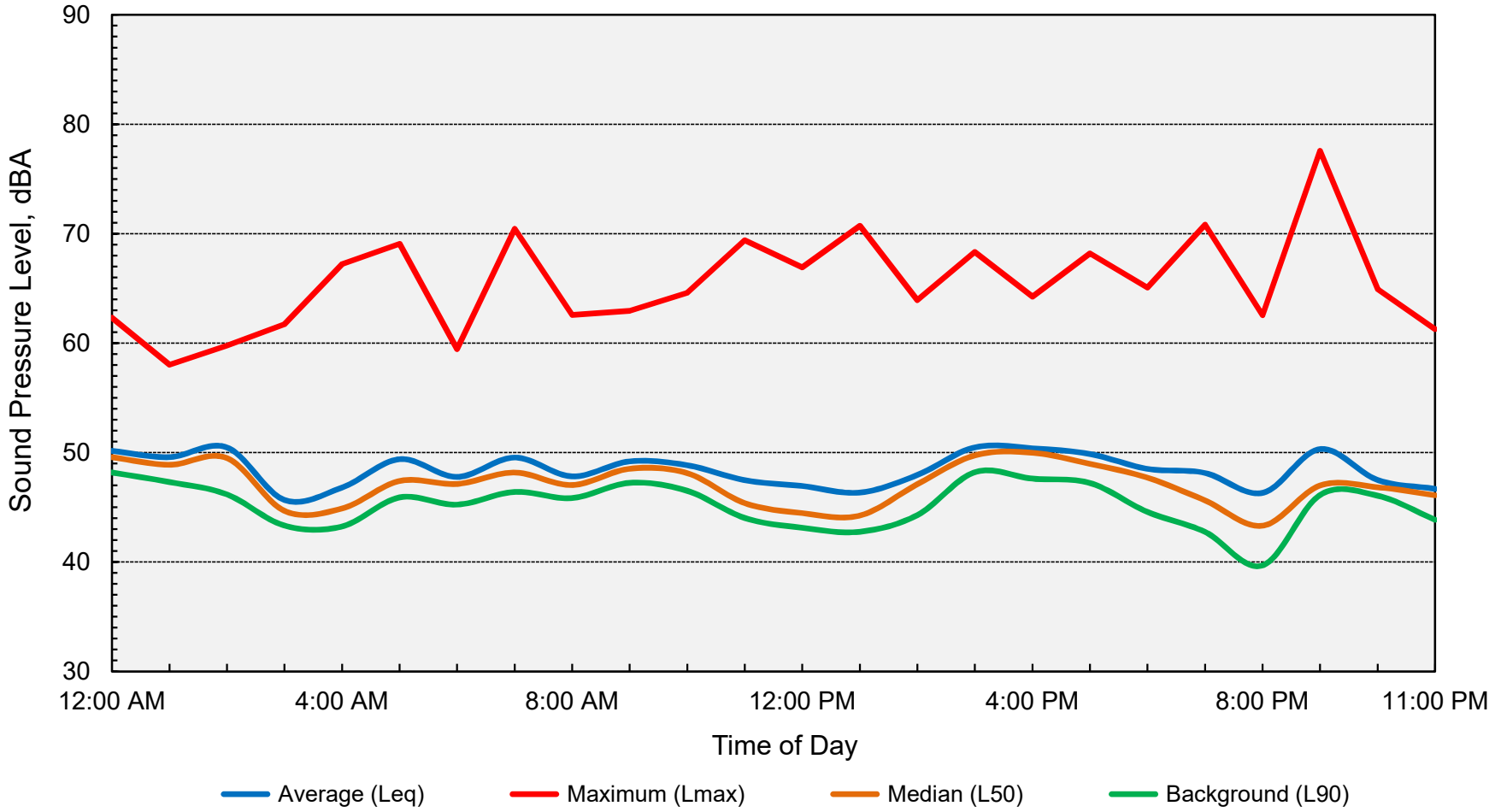
Appendix E-18
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-3
Monday, August 05, 2019



Computed Ldn = 55 dB

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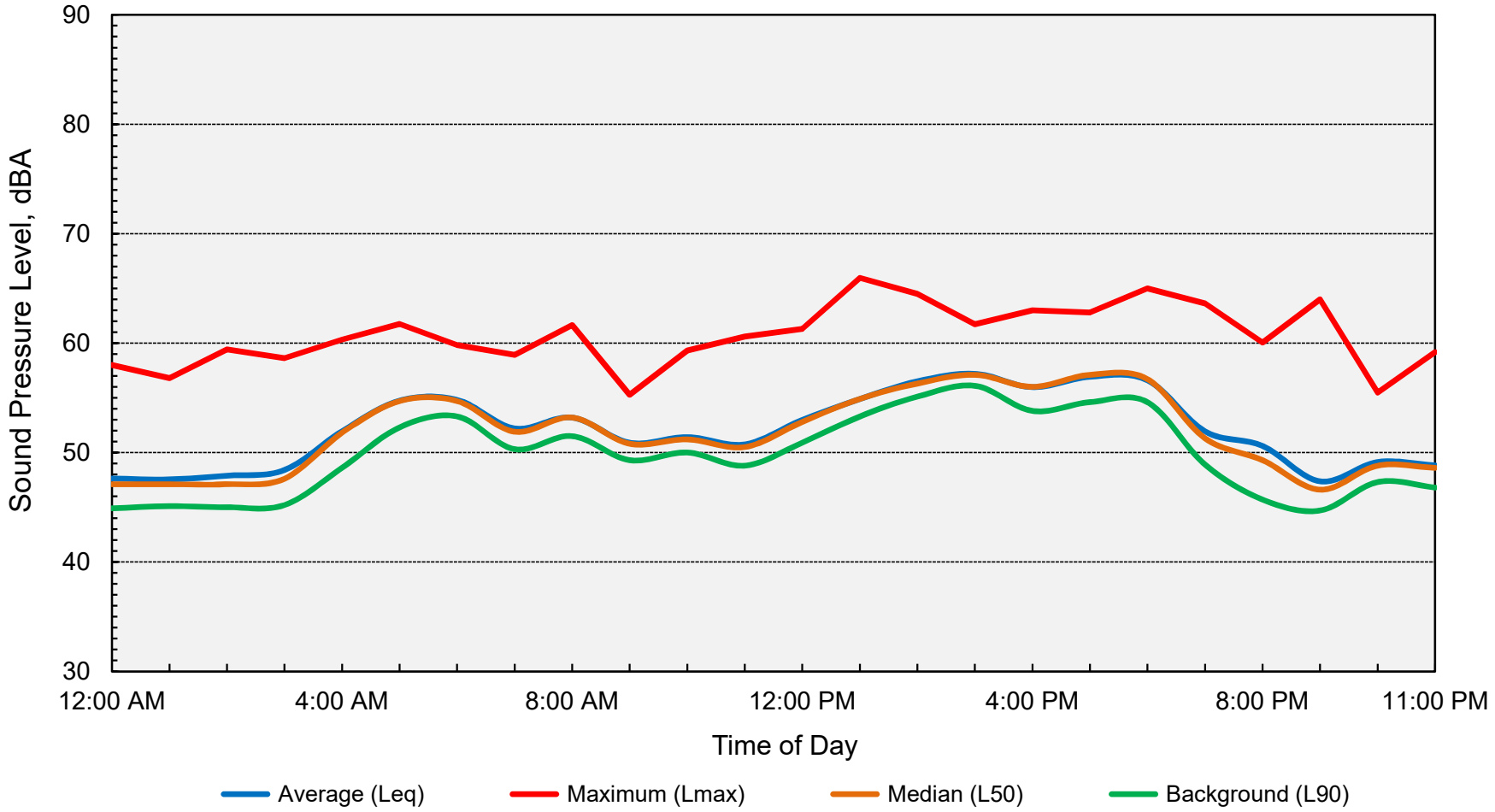
Appendix E-19
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-4
Wednesday, July 31, 2019



Computed Ldn = 58 dB

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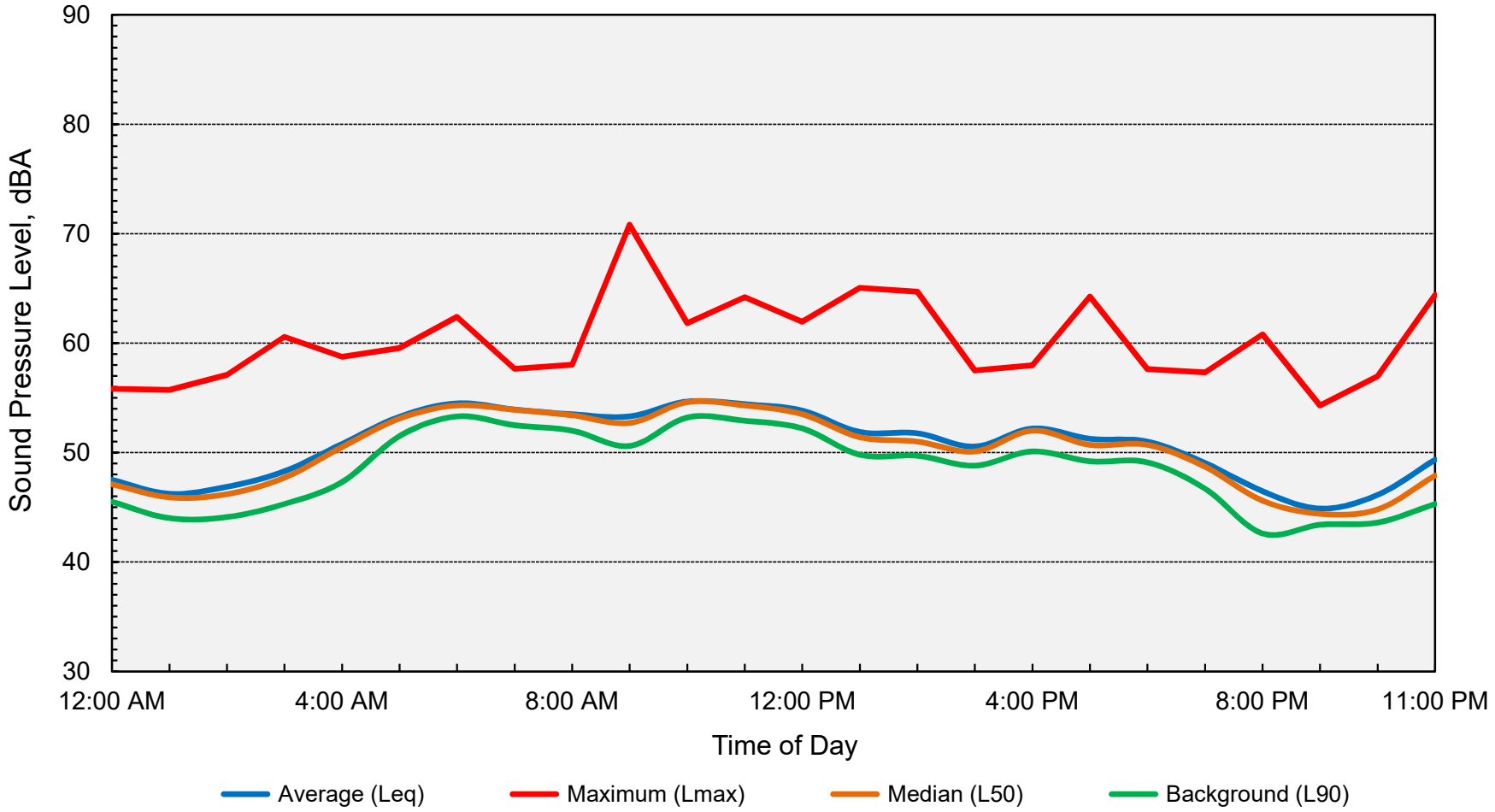
Appendix E-20
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-4
Thursday, August 01, 2019



Computed Ldn = 57 dB

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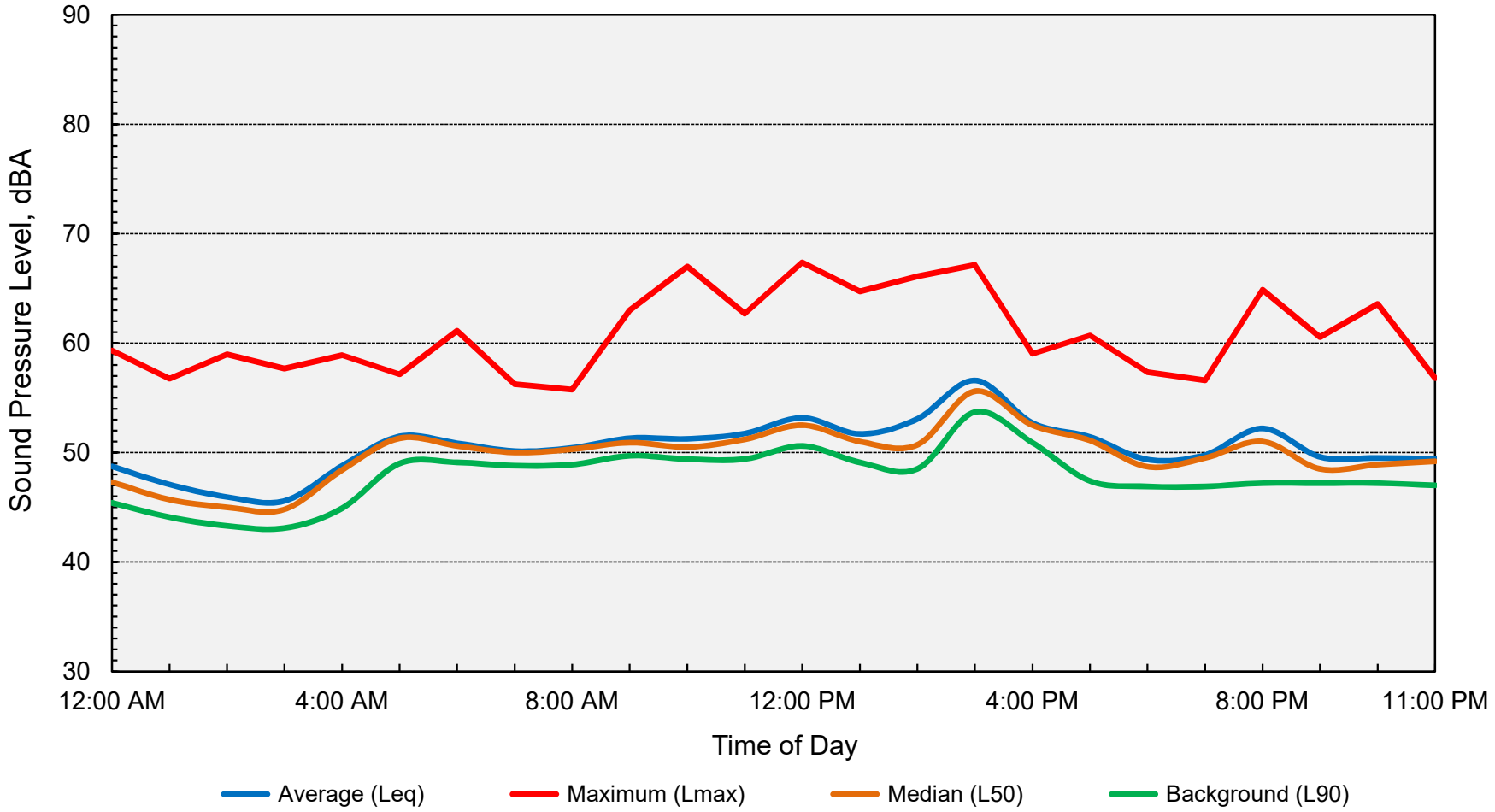
Appendix E-21
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-4
Friday, August 02, 2019



Computed Ldn = 56 dB

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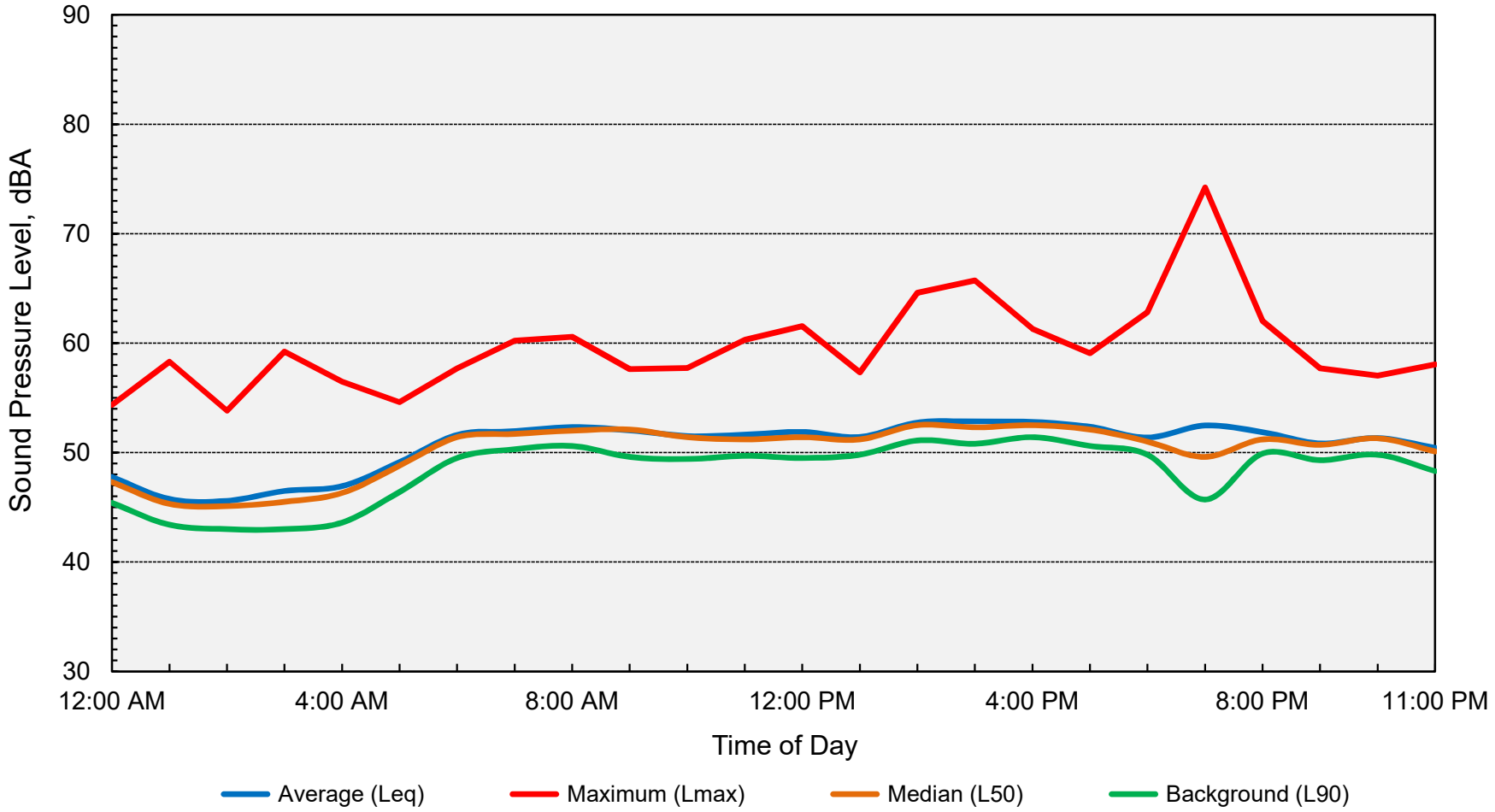
Appendix E-22
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-4
Saturday, August 03, 2019



Computed Ldn = 56 dB

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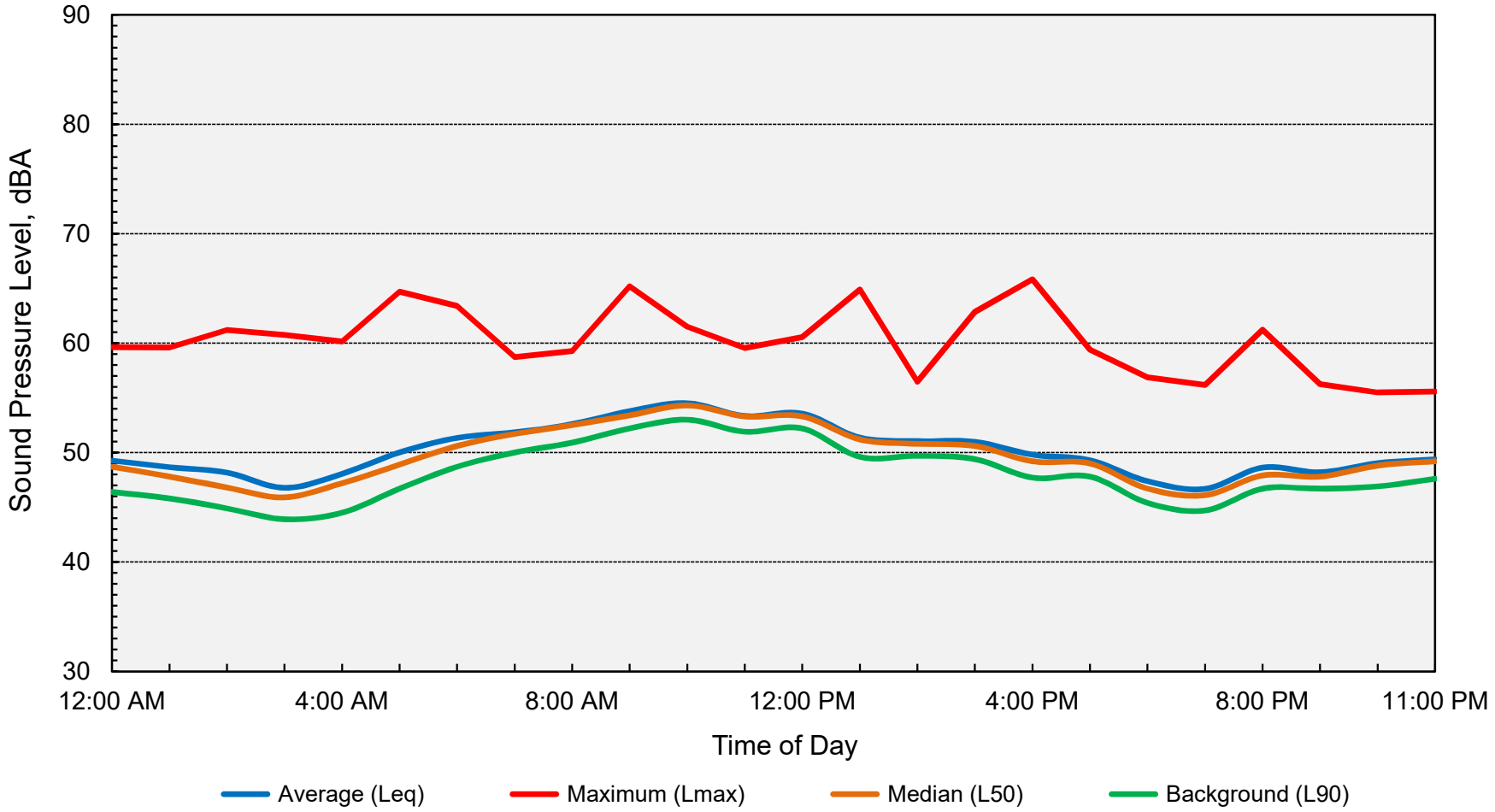
Appendix E-23
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-4
Sunday, August 04, 2019



Computed Ldn = 56 dB

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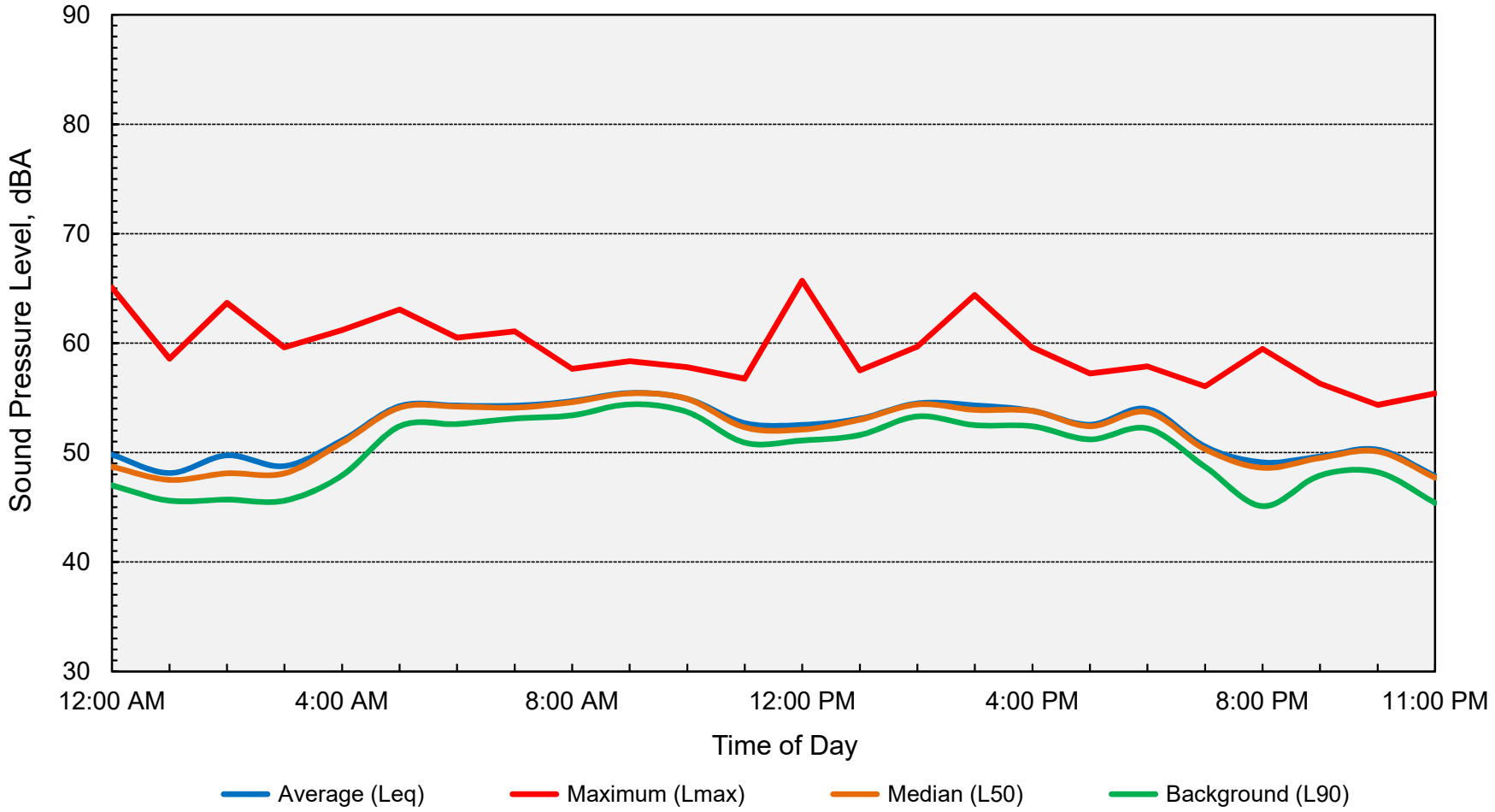
Appendix E-24
Ambient Noise Monitoring Results
Point Molate Mixed-Use Project - Richmond, California - Site LT-4
Monday, August 05, 2019



Computed Ldn = 58 dB

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