APPENDIX I

Noise Study

Noise Study

for the

Crenshaw Crossing Project

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EXECUTIVE SUMMARY

This Noise Study assesses and discusses the potential noise and vibration impacts that may occur with the Crenshaw Crossing Project (Project), located in the City of Los Angeles (City), California. The analysis describes the existing environment in the Project area; estimates future noise and vibration levels at surrounding land uses resulting from construction and operation of the Project; and identifies the potential for significant impacts. An evaluation of the Project's contribution to potential cumulative noise impacts is also provided. The study summarizes the potential for the Project to conflict with applicable noise and vibration regulations, standards, and thresholds. The findings of the analyses are as follows:

- Construction activities would potentially result in short-term and temporary noise impacts to nearby noise-sensitive receptors due to on-site construction equipment and activities. Implementation of noise-attenuation techniques, implementation of **Mitigation Measure MM NOI-1** and placement of the construction-staging area and earthmoving equipment away from noise-sensitive sites would lower construction noise levels.
- Construction of the Project would generate sporadic, temporary vibration effects adjacent to the Project area but would not be expected to exceed the significance thresholds with implementation of **Mitigation Measure MM NOI-2**
- Noise associated with cumulative construction activities would be reduced to the degree reasonably and technically feasible through proposed recommended measures for each individual project and compliance with locally adopted and enforced noise ordinances. Given that construction activities would be required to comply with the City's allowable hours and would be temporary, construction-related noise would not be significant.
- Noise associated with cumulative operational sources would not be significant.
- Due to the rapid attenuation characteristics of ground-borne vibration and the distance of the cumulative projects to the Project site, no potential exists for cumulative construction- or operational-related impacts with respect to ground-borne vibration.

INTRODUCTION

The purpose of this Noise Study is to assess and discuss the impact of potential noise impacts that may occur with the Crenshaw Crossing Project, located in Los Angeles, California. The noise report analyzes short-term noise and ground-borne vibration impacts associated with the Project. The report also discusses the applicable federal, State, and local noise and vibration regulations; the applicable noise and vibration thresholds; the methodology used to analyze potential noise and vibration impacts; and the modeled roadway noise.

Project Description

The Project site is comprised of six parcels generally bounded by W. Exposition Boulevard to the north, W. Obama Boulevard to the south, S. Bronson venue to the east, and S. Victoria Avenue to the west, with Crenshaw Boulevard bisecting the two blocks.

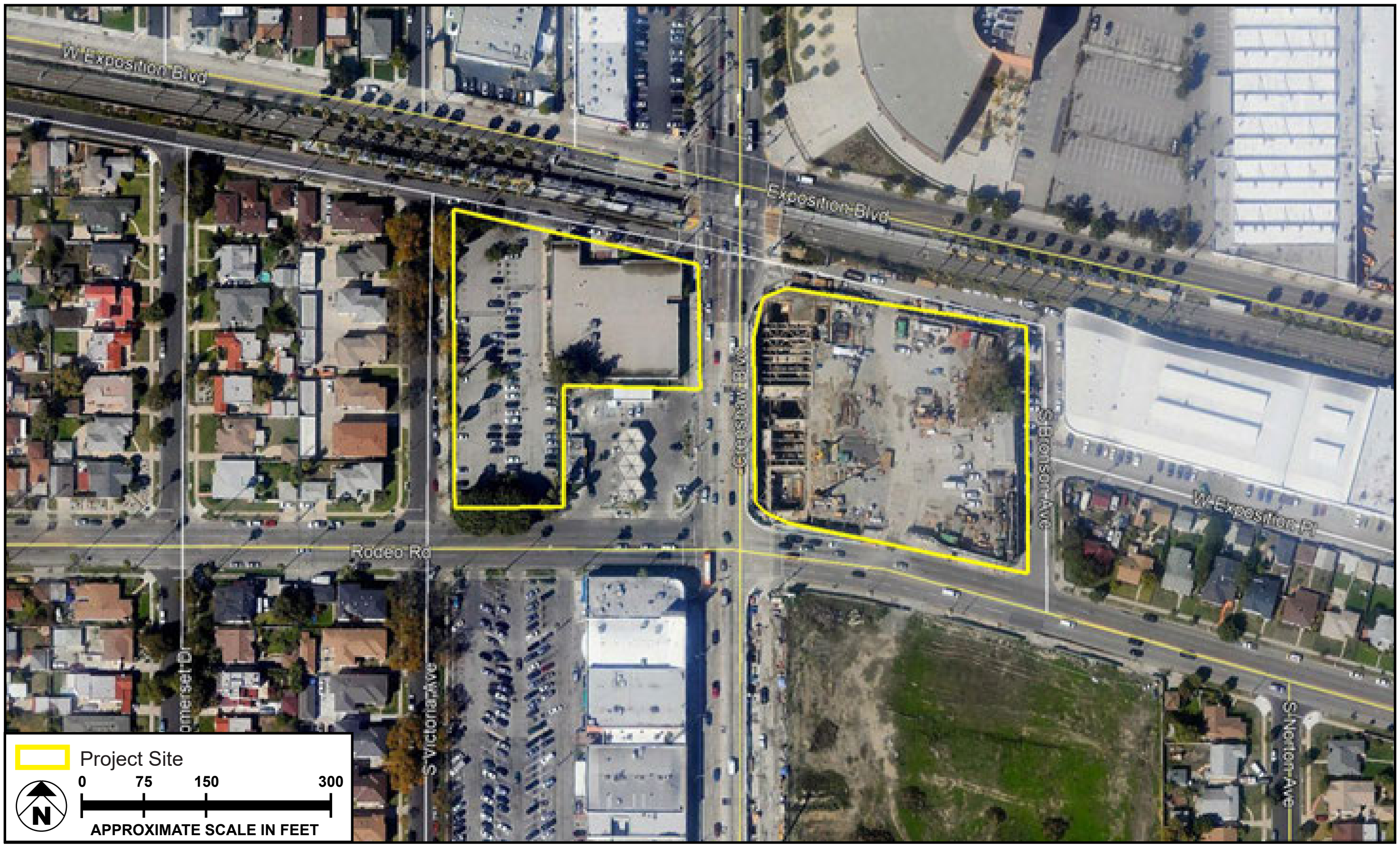
Site A is west of Crenshaw Boulevard and is located at 3606 & 3633 W Exposition Boulevard and is comprised of one lot with the Assessor Parcel Number (APN) 5046-022-900. Site B is east of Crenshaw Boulevard located at 3630 S Crenshaw Boulevard; 3502 & 3510 W Exposition Boulevard and 3631 & 3633 S Bronson Avenue; 3515 & 3519 W Obama Boulevard and 3642, 3644, & 3646 S Crenshaw Boulevard; 3505 W Obama Boulevard; 3635, 3639, & 3645 S Bronson Ave and 3501 W Obama Boulevard. The Project Site is located within the Crenshaw Corridor Specific Plan, Subarea A, in the West Adams - Baldwin Hills – Leimert Area in the City, as shown in **Figure 1: Regional and Local Vicinity.** The Project site is located south of the Santa Monica (I-10) Freeway and west of the Harbor Freeway (Interstate-110/State Route 110).

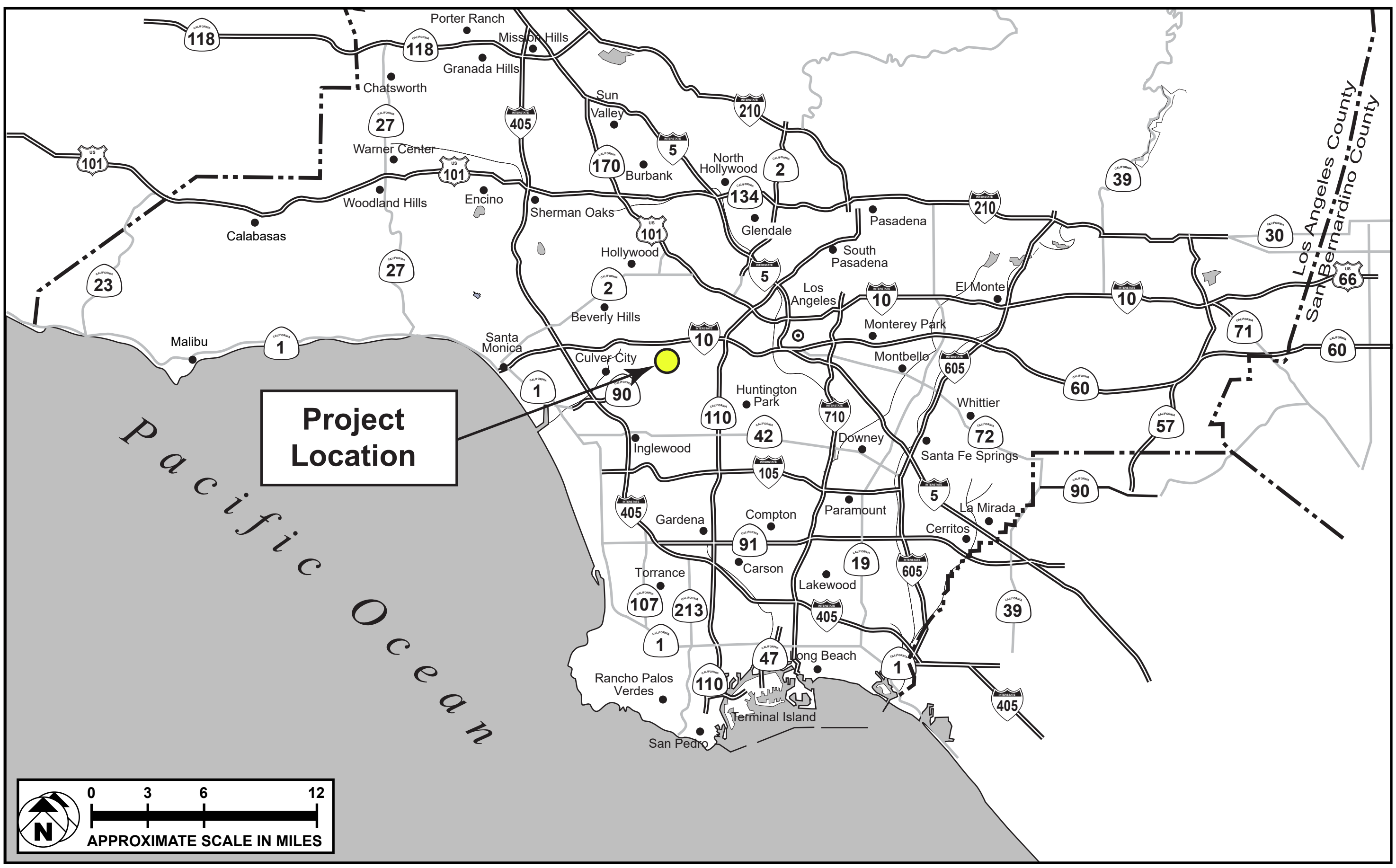
The proposed Project includes a mixed-use development consisting of approximately 380,112 square feet of floor area, made up of approximately 339,116 square feet for the residential component within 401 residential units and approximately 40,996 square feet for the commercial and community spaces component. Of the total floor area, approximately 206,803 square feet would be provided on Site A, while 173,309 square feet would be provided on Site B. The residential component would be located above the commercial uses on floors four (4) through eight (8) on Site A, and on floors three (3) through eight (8) on Site B. Also, a low-rise, three-story residential portion of Site A would be located along Victoria Avenue that would provide a transitional buffer between the lower-density residential uses across the Project site and the Project's higher density and commercial uses.

NOISE DESCRIPTORS

Fundamentals of Sound

Because the human ear does not respond uniformly to sounds at all frequencies, sound-pressure level alone is not a reliable indicator of loudness. For example, the human ear is less sensitive to low and high frequencies than to the medium frequencies that more closely correspond to human speech. In response to the sensitivity of the human ear to certain sound frequencies, the A-weighted noise level, referenced in units of dBA, was developed to better correspond with people's subjective judgment of sound levels. To support assessing a community reaction to noise, scales have been developed that average sound-pressure levels over time and quantify the result in terms of a single numerical descriptor. Several scales have been developed that address community noise levels. The equivalent sound level (Leq) is the average A-weighted sound level measured over a given time interval. Leq can be measured over any period but is typically measured for 1-minute, 15-minute, 1-hour, or 24-hour periods.





SOURCE: Google Earth - 2019; Meridian Consultants, LLC - 2019

FIGURE 1

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Regional and Local Vicinity Map

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Table 1: Noise Descriptors identifies various noise descriptors developed to measure sound levels over different periods of time.

Table 1
Noise Descriptors

Term	Definition
Decibel (dB)	The unit for measuring the volume of sound equal to 10 times the logarithm (base 10) of the ratio of the pressure of a measure sound to a reference pressure.
A-weighted decibel (dBA)	A sound measurement scale that adjusts the pressure of individual frequencies according to human sensitivities. The scale accounts for the fact that the region of highest sensitivity for the human ear is between 2,000 and 4,000 cycles per second (hertz).
Hertz (Hz)	The frequency of the pressure vibration, which is measured in cycles per second.
Kilo hertz (kHz)	One thousand cycles per second.
Equivalent sound level (Leq)	The sound level containing the same total energy as a time varying signal over a given time period. The Leq is the value that expresses the time averaged total energy of a fluctuating sound level. Leq can be measured over any time period, but is typically measured for 1-minute, 15-minute, 1-hour, or 24-hour periods.
Community noise equivalent level (CNEL)	A rating of community noise exposure to all sources of sound that differentiates between daytime, evening, and nighttime noise exposure. These adjustments add 5 dBA for the evening, 7:00 PM to 10:00 PM, and add 10 dBA for the night, 10:00 PM to 7:00 AM. The 5- and 10-dB penalties are applied to account for increased noise sensitivity during the evening and nighttime hours. The logarithmic effect of adding these penalties to the 1-hour Leq measurements typically results in a CNEL measurement that is within approximately 3 dBA of the peak-hour Leq.[a]
Nighttime (Lnight)	Lnight is the average noise exposure during the hourly periods from 10:00 PM to 7:00 AM.
Sound pressure level	The sound pressure is the force of sound on a surface area perpendicular to the direction of the sound. The sound pressure level is expressed in dB.
Ambient noise	The level of noise that is all encompassing within a given environment, being usually a composite of sounds from many and varied sources near to and far from the observer. No specific source is identified in the ambient environment.

[a] *California Department of Transportation,* Technical Noise Supplement; A Technical Supplement to the Traffic Noise Analysis Protocol, *(Sacramento, California: November 2009), pp. N51–N54.*

A doubling of sound energy results in a 3 dBA increase in sound, which means that a doubling of sound wave energy (e.g., doubling the volume of traffic on a roadway) would result in a barely perceptible change in sound level. In general, changes in a noise level of less than 3 dBA are not noticed by the human ear.[1] Changes from 3 to 5 dBA may be noticed by some individuals who are extremely sensitive to changes in noise. An increase of greater than 5 dBA is readily noticeable, while the human ear perceives a 10 dBA increase in sound level to be a doubling of sound volume.

Noise sources can generally be categorized in two types: (1) point sources, such as stationary equipment; and (2) line sources, such as a roadway. Sound generated by a point source typically diminishes (attenuates) at a rate of 6 dBA for each doubling of distance from the source to the receptor at acoustically hard sites, and at a rate of 7.5 dBA at acoustically soft sites.[2] A hard, or reflective, site consists of asphalt, concrete, or very hard-packed soil, which does not provide any excess ground-effect attenuation. An acoustically soft or absorptive site is characteristic of normal earth and most ground with vegetation. As an example, a 60-dBA noise level measured at 50 feet from a point source at an acoustically hard site would be 54 dBA at 100 feet from the source and 48 dBA at 200 feet from the source. Noise from the same point source at an acoustically soft site would be 52.5 dBA at 100 feet and 45 dBA at 200 feet from the source. Sound generated by a line source typically attenuates at a rate of 3 dBA and 4.5 dBA per doubling of distance from the source to the receptor for hard and soft sites, respectively.[3] Noise levels generated by a variety of activities are shown in **Figure 2: Common Noise Levels**. Man-made or natural barriers can also attenuate sound levels, as illustrated in **Figure 3: Noise Attenuation by Barriers**.

Fundamentals of Vibration

Vibration is commonly defined as an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The peak particle velocity (PPV) or root-mean-square (RMS) velocity is typically used to describe vibration amplitudes. PPV is defined as the maximum instantaneous peak of the vibration signal, while RMS is defined as the square root of the average of the squared amplitude of the signal. PPV is typically used for evaluating potential building damage, whereas RMS is typically more suitable for evaluating human response to ground-borne vibration. The RMS vibration velocity level can be presented in inches per second (ips) or in VdB (a decibel unit referenced to 1 microinch per second). Commonly, ground-borne vibration generated by man-made activities (i.e., road traffic, construction) attenuates rapidly with distance from the source of the vibration.

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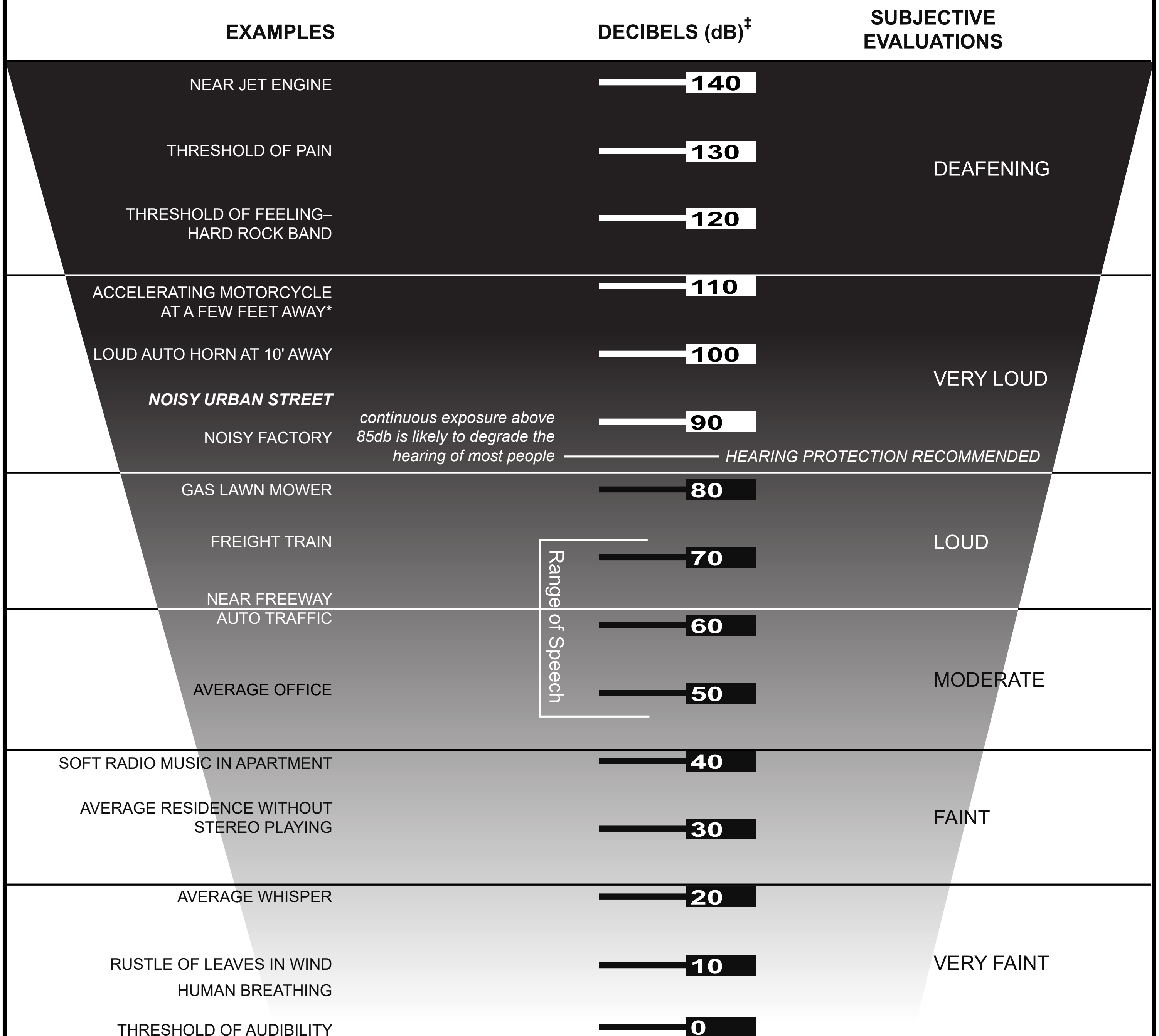
1 US Department of Transportation, Federal Highway Administration (USDOT FHWA), *Fundamentals and Abatement of Highway Traffic Noise* (Springfield, VA: Author, September 1980), 81.
2 USDOT FHWA, *Fundamentals and Abatement,* 97.
3 USDOT FHWA, *Fundamentals and Abatement,* 97.



** NOTE: 50' from motorcycle equals noise at about 2000' from a four-engine jet aircraft.*

‡NOTE: dB are "average" values as measured on the A–scale of a sound–level meter.

FIGURE 2

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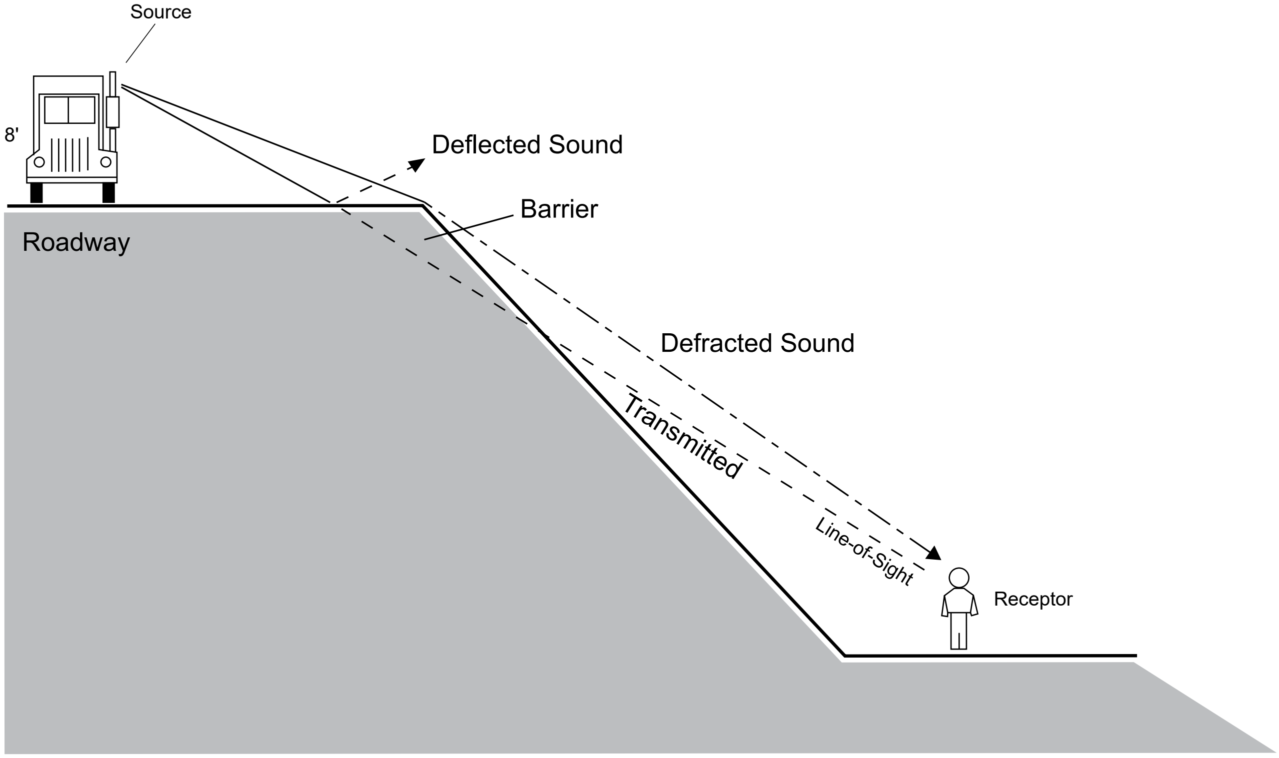
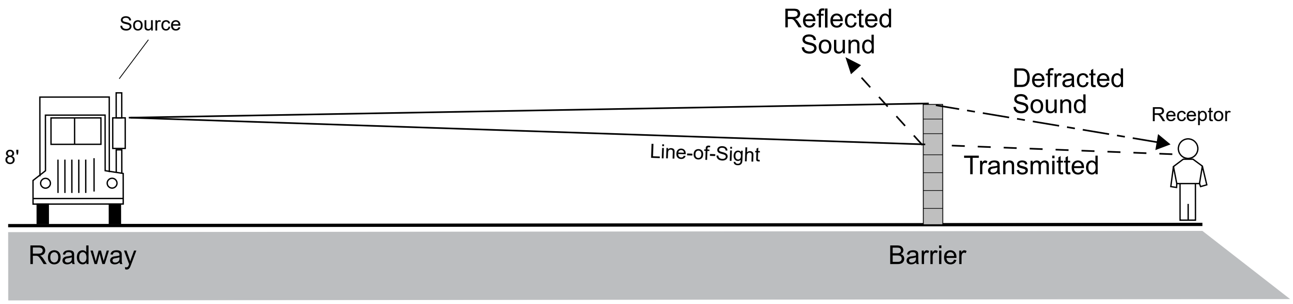
Common Noise Levels



"Barrier Effect" Resulting from Differences in Elevation.



"Barrier Effect" Resulting from Typical Soundwall.

FIGURE 3

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Noise Attenuation by Barriers

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The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for many people. Most perceptible indoor vibration is caused by sources within buildings such as the operation of mechanical equipment, the movement of people, or the slamming of doors. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration from traffic is barely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration velocity, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings.

NOISE STANDARDS

Guidelines for Noise-Compatible Land Uses

The City has adopted local guidelines based in part on the community noise compatibility guidelines established by the State Department of Health Services for use in assessing the compatibility of various land use types with a range of noise levels. These guidelines are set forth in the *L.A. CEQA Thresholds Guide* in terms of the CNEL.[4] CNEL guidelines for specific land uses are classified into four categories: (1) normally acceptable; (2) conditionally acceptable; (3) normally unacceptable; and (4) clearly unacceptable. As shown in **Table 2: City of Los Angeles Land Use Compatibility for Community Noise**, a CNEL value of 70 dBA is the upper limit of what is considered a conditionally acceptable noise environment for multifamily homes, although the upper limit of what is considered "normally acceptable" for these uses are 65 dBA CNEL. New development should generally be discouraged within the "normally unacceptable" or "clearly unacceptable" categories. However, if new development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Table 2
City of Los Angeles Land Use Compatibility for Community Noise

	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Land Use	**Community Noise Exposure CNEL (dBA)**			
Single-Family, Duplex, Mobile Homes	50–60	55–70	70–75	Above 70
Multi-Family Homes	50–65	60–70	70–75	Above 70
Schools, Libraries, Churches, Hospitals, Nursing Homes	50–70	60–70	70–80	Above 80
Transient Lodging—Motels, Hotels	50–65	60–70	70–80	Above 80
Auditoriums, Concert Halls, Amphitheaters	—	50–70	—	Above 65
Sports Arena, Outdoor Spectator Sports	—	50–75	—	Above 70
Playgrounds, Neighborhood Parks	50–70	—	67–75	Above 72

4 City of Los Angeles, *L.A. CEQA Thresholds Guide.*

Land Use	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
	Community Noise Exposure CNEL (dBA)			
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50–75	—	70–80	Above 80
Office Buildings, Business and Professional Commercial	50–70	67–77	Above 75	—
Industrial, Manufacturing, Utilities, Agriculture	50–75	70–80	Above 75	—

Source: City of Los Angeles, L.A. CEQA Thresholds Guide *(2006).*
Notes:
Normally Acceptable: Specified land use is satisfactory, based on the assumption that any buildings involved are of normal conventional construction without any special noise-insulation requirements.
Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise-insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.
Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise-reduction requirements must be made and needed noise-insulation features included in the design.
Clearly Unacceptable: New construction or development should generally not be undertaken.

City of Los Angeles General Plan Noise Element

The City's General Plan Noise Element identifies sources of noise and provides objectives and policies to ensure that noise from various sources does not create an unacceptable noise environment. The following Noise Element policies and objectives are applicable to the Project:[5]

Objective 2 (Nonairport): reduce or eliminate nonairport related intrusive noise, especially relative to noise sensitive uses.

Policy 2.2: Enforce and/or implement applicable city, State and federal regulations intended to mitigate proposed noise producing activities, reduce intrusive noise and alleviate noise that is deemed a public nuisance.

Objective 3 (Land Use Development): reduce or eliminate noise impacts associated with proposed development of land and changes in land use.

Policy 3.1: Develop land use policies and programs that will reduce or eliminate potential and existing noise impacts.

City of Los Angeles General Noise Ordinance

The Los Angeles Municipal Code (LAMC) indicates that in cases where the actual ambient conditions are not known, the City's presumed daytime (7:00 AM to 10:00 PM) and nighttime (10:00 PM to 7:00 AM)

5 City of Los Angeles, *General Plan,* "Noise Element" (adopted February 3, 1999).

minimum ambient noise levels as defined in Section 111.02 of the LAMC should be used. The presumed ambient noise levels for these areas set forth in the LAMC Sections 111.02 and 112.05 are provided in **Table 3: City of Los Angeles Presumed Ambient Noise Levels.**

Table 3
City of Los Angeles Presumed Ambient Noise Levels

Zone	Daytime Hours (7:00 AM to 10:00 PM) dBA (Leq)	Nighttime Hours (10:00 PM to 7:00 AM) dBA (Leq)
Residential	50	40
Commercial	60	55
Manufacturing (M1, MR1, and MR2)	60	55
Heavy Manufacturing (M2 and M3)	65	65

Source: Los Angeles Municipal Code, sec. 111.03.

Section 41.40 of the LAMC regulates noise from demolition and construction activities. More specifically, Section 41.40 prohibits construction activity and repair work where the use of any power tool, device, or equipment would disturb persons occupying sleeping quarters in any dwelling hotel, apartment, or other place of residence between the hours of 9:00 PM to 7:00 AM Monday through Friday, and between 6:00 PM and 8:00 AM on Saturday. All such activities are prohibited on Sundays and all federal holidays.

Section 112.05 of the LAMC also specifies the maximum noise level of construction machinery that can be generated in any residential zone of the City or within 500 feet thereof. Specifically, any construction machinery may not generate a maximum noise level exceeding 75 dBA at 50 feet from the equipment. However, the above noise limitation does not apply where compliance is technically infeasible. LAMC Section 112.05 defines technical infeasibility to mean that "said noise limitations cannot be complied with despite the use of mufflers, shields, sound barriers and/or other noise reduction device or techniques during the operation of the equipment."

SIGNIFICANCE THRESHOLDS

Construction Noise

The *L.A. CEQA Thresholds Guide*[6] defines the following significance thresholds for construction activities lasting more than 10 days in a 3-month period or occurring during the hours of 9:00 PM and 7:00 AM Monday through Friday, before 8:00 AM or after 6:00 PM on Saturday, or anytime on Sunday:

- On-site Project construction activities cause the exterior ambient noise level to increase by 5 dBA or more at a noise-sensitive use, as measured at the property line of any sensitive use.
- Off-site Project construction traffic causes the exterior ambient noise level to increase by 5 dBA CNEL or more at a noise-sensitive use, as measured at the property line of any sensitive use.

Operation Noise

Operational noise impacts are evaluated for Project-related off-site roadway traffic noise impacts and on-site stationary source noise from on-site activities and equipment.

- The Project would cause any ambient noise levels to increase by 5 dBA CNEL or more and the resulting noise falls on a noise-sensitive land use within an area categorized as either "normally acceptable" or "conditionally acceptable" (see to **Table 2** above) for description of these categories); or cause ambient noise levels to increase by 3 dBA CNEL or more and the resulting noise falls on a noise-sensitive land use within an area categorized as either "normally acceptable" or "clearly unacceptable."
- Project-related operational (i.e., nonroadway) noise sources such as outdoor activities, building mechanical/electrical equipment, etc., increase ambient noise level by 5 dBA, causing a violation of the City Noise Ordinance.

Ground-Borne Vibration

The City has not adopted a significance threshold to assess vibration impacts during construction. Thus, the Caltrans *Transportation and Construction Vibration Guidance Manual*[7] is used as a screening tool to assess the potential for adverse vibration effects related to structural damage.

- **Potential Building Damage.** Project construction activities cause ground-borne vibration levels to exceed 0.5 ips PPV at the nearest off-site residential buildings.

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6 City of Los Angeles, *L.A. CEQA Threshold Guide* (2006), accessed October 2019, http://www.environmentla.org/programs/Thresholds/Complete%20Threshold%20Guide%202006.pdf.

7 Caltrans, *Transportation and Construction Vibration Guidance Manual* (September 2013), accessed October 2019, https://cityofdavis.org/home/showdocument?id=4521.

METHODOLOGY

Ambient Noise Measurements

Noise-level monitoring was conducted by Meridian Consultants on September 12, 2019, at three locations within the Project area vicinity, as shown in **Figure 4: Noise Monitoring Locations.** Noise-level monitoring was conducted for 15-minute intervals at each location using a Larson Davis Model 831 sound-level meter. This meter satisfies the American National Standards Institute (ANSI) standard for general environmental noise measurement instrumentation. The ANSI specifies several types of sound-level meters according to their precision. Types 1, 2, and 3 are referred to as "precision," "general-purpose," and "survey" meters, respectively. Most measurements carefully taken with a Type 1 sound-level meter will have a margin of error not exceeding 1 dB.

The Larson Davis Model 831 is a Type 1 precision sound-level meter. This meter meets all requirements of ANSI S1.4-1983 and ANSI1.43-1997 Type 1 standards, as well as International Electrotechnical Commission (IEC) IEC61672-1 Ed. 1.0, IEC60651 Ed 1.2, and IEC60804 Type 1, Group X standards.

The sound-level meter was located approximately 5 feet above ground and was covered with a Larson Davis windscreen. The sound-level meter was field calibrated with an external calibrator prior to operation.

Construction Scenario

Project construction would begin in second quarter of 2021 and is expected to be completed by second quarter of 2023. Construction would occur over four phases: (1) demolition; (2) grading; (3) building construction; (4) architectural coating; and (5) paving.

Each phase of construction would result in varying levels of intensity and a number of construction personnel. The construction workforce would consist of approximately 28 worker trips per day and 1,829 total hauling trips during demolition; 40 worker trips per day and 3,362 total hauling trips during grading; 302 worker trips per day and 50 vendor trips per day during building construction; 60 worker trip per day during architectural coating; and 50 worker trips per day during paving.

Ground-Borne Vibration

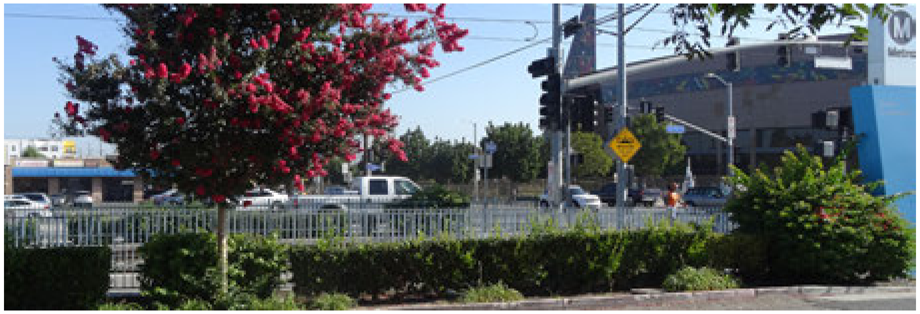
Ground-borne vibration impacts were evaluated by identifying potential vibration sources, estimating the distance between vibration sources and surrounding structure locations and surrounding structure locations and vibration sensitive receptors, and making a significance determination based on the significance thresholds.

Roadway Noise

Traffic noise levels were modeled using the FHWA Noise Prediction Model (FHWA-RD-77-108). This model calculates the average noise level in dB(A) CNEL along a given roadway segment based on traffic volumes, vehicle mix, posted speed limits, roadway geometry, and site conditions. The model calculates noise associated with a specific line source and the results characterize noise generated by motor vehicle traffic along the specific roadway segment. According to data collected by Caltrans, California automobile noise is 0.8 to 1.0 dB(A) louder than national levels, while medium and heavy truck noise is 0.3 to 3.0 dB(A) quieter than national levels.[8] Roadway traffic data was obtained from the traffic impact study for the Project. Noise levels were evaluated with respect to the following modeled traffic scenarios:

- Existing Conditions
- Future (2023) Conditions
- Future (2023) plus Project Conditions

8 Rudolf W. Hendriks, *California Vehicle Noise Emission Levels,* NTIS, FHWA/CA/TL-87/03 (1987).



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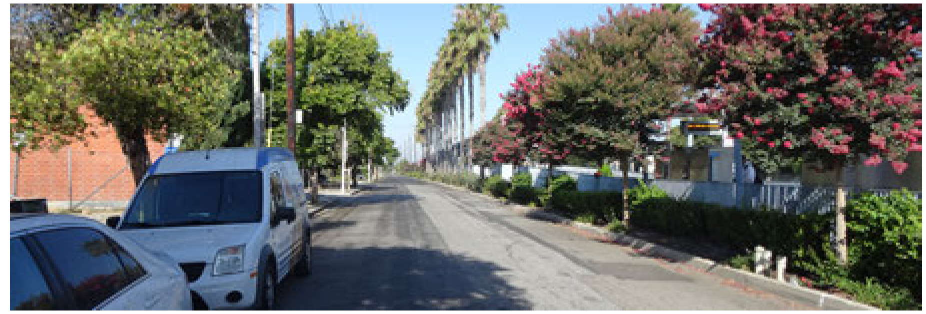

West

South

East

SOURCE: Google Earth - 2019

FIGURE **4a**

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Noise Monitoring Location (Site 1)

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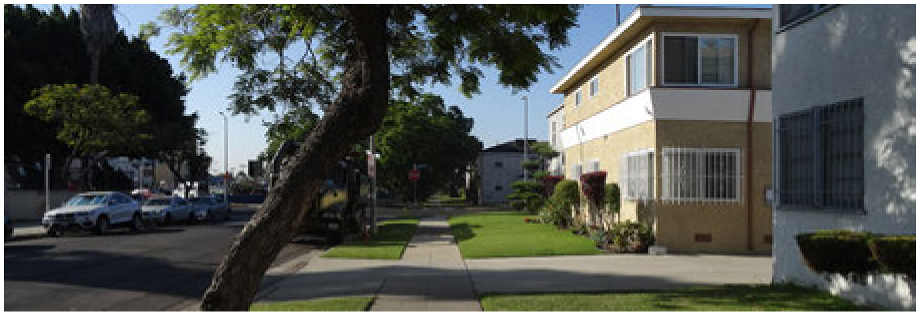
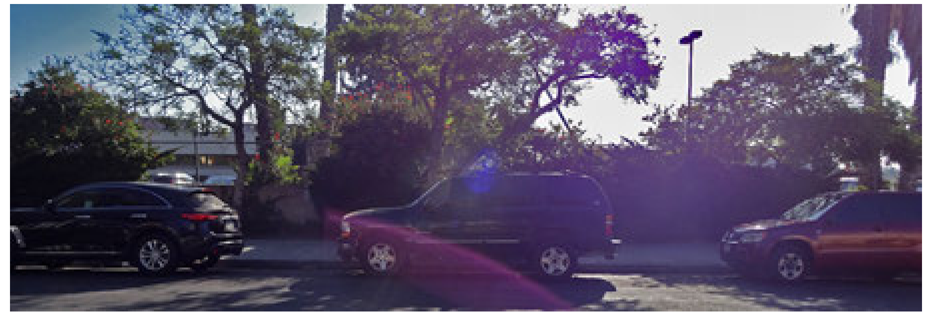
North

West



South



East

SOURCE: Google Earth - 2019

FIGURE **4b**

Meridian Consultants

Noise Monitoring Location (Site 2)

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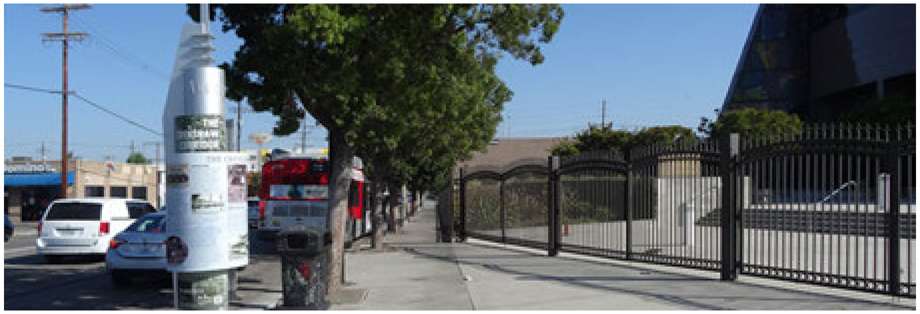
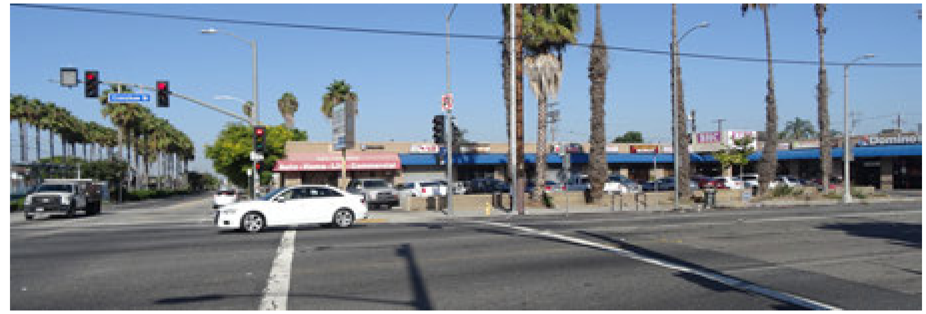


North



West

South

East

SOURCE: Google Earth - 2019

FIGURE **4c**

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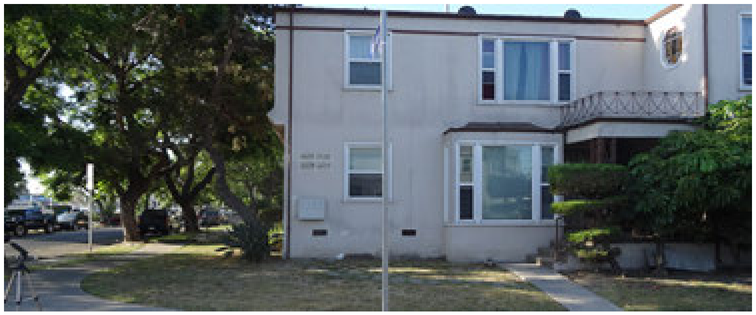
Noise Monitoring Location (Site 3)

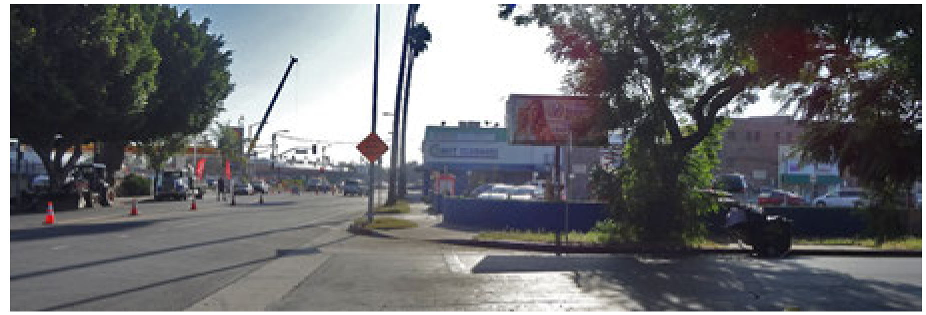
253-001-19

North

West



South



East

SOURCE: Google Earth - 2019

FIGURE **4d**

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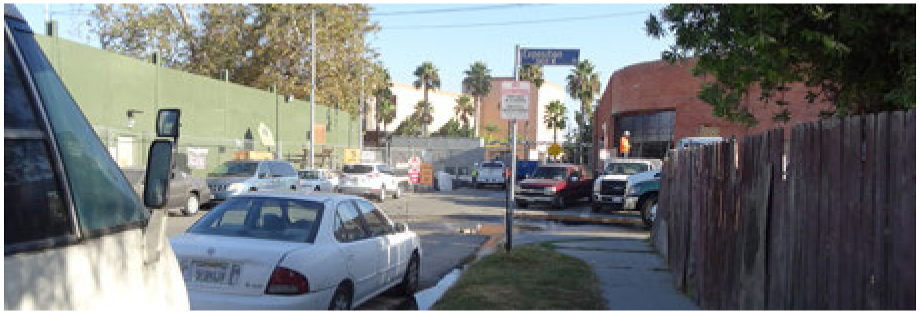
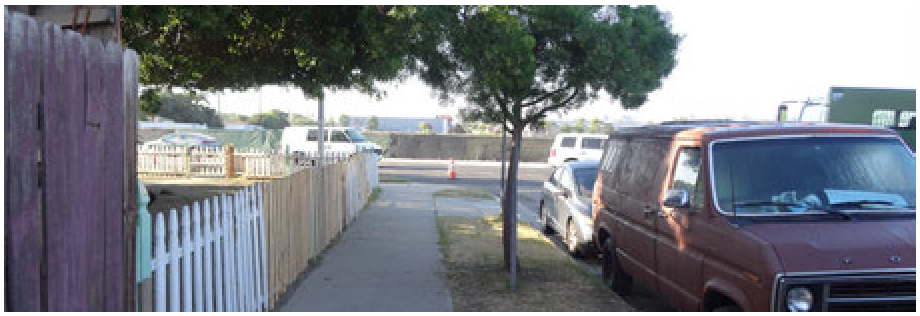
Noise Monitoring Location (Site 4)

253-001-19

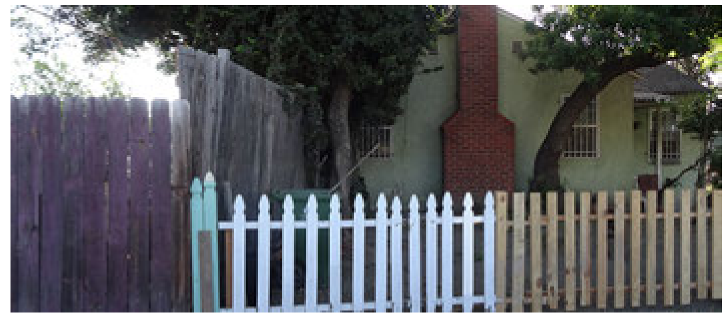


North

West



South



East

SOURCE: Google Earth - 2019

FIGURE **4e**

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Noise Monitoring Location (Site 5)

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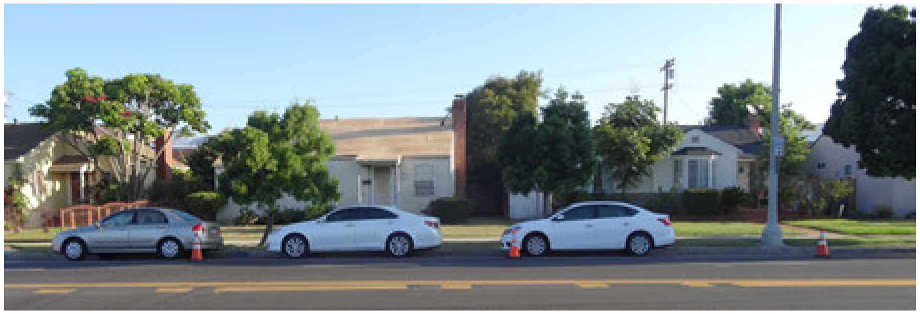
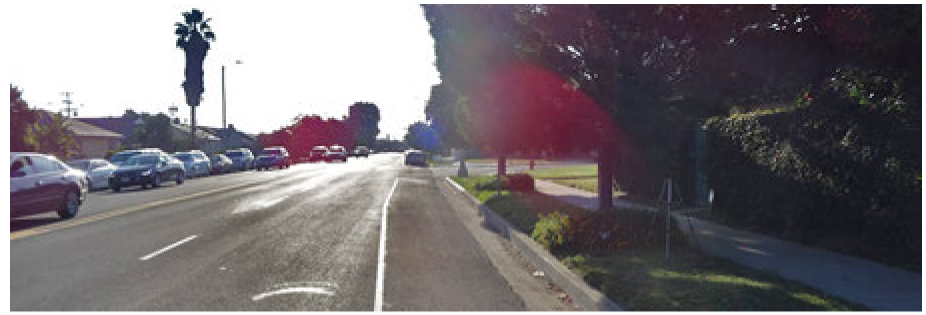


North

West

South



East

SOURCE: Google Earth - 2019

FIGURE **4f**

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Noise Monitoring Location (Site 6)

253-001-19

North

West

South

East

SOURCE: Google Earth - 2019

FIGURE **4g**

Meridian Consultants

Noise Monitoring Location (Site 7)

253-001-19

EXISTING CONDITIONS

Ambient Noise Levels

Short-term sound monitoring was conducted at seven (7) locations to measure the ambient sound environment in the Project vicinity. Measurements were taken over 15-minute intervals at each location during the AM peak hour on September 12, 2019, as indicated in **Table 4: Ambient Noise Measurements**. **Figure 4** depicts locations where ambient noise measurements were conducted. As shown in **Table 4,** ambient noise levels ranged from a low of 55.7 dBA along S. Victoria Avenue, between W. Exposition Boulevard and Obama Boulevard (Site 2) to a high of 70.1 dBA northeast corner of Crenshaw Boulevard and Exposition Boulevard (Site 3).

Table 4
Ambient Noise Measurements

Location Number/Description		Nearest Use	Presumed Ambient Noise Level	dBA Leq
1	Southwest corner of Crenshaw Boulevard and Exposition Boulevard	Commercial	60	67.2
2	Along S. Victoria Avenue, between W. Exposition Boulevard and Obama Boulevard	Residential	50	55.7
3	Northeast corner of Crenshaw Boulevard and Exposition Boulevard	Commercial	60	70.1
4	Corner of Rodeo Road and S. Victoria Avenue	Residential	50	66.7
5	Corner of S. Bronson Avenue and Rodeo Road	Residential	50	61.0
6	Along Rodeo Road between Crenshaw Boulevard and S. Norton Avenue	Residential	50	68.4
7	Corner of S. Victoria Avenue and W. Exposition Boulevard	Residential	50	66.9

*Source: Refer to **Attachment A** for noise monitoring data sheets.*
Notes: dBA = A-weighted decibels; Leq = average equivalent sound level.

Existing Roadway Noise

To characterize the ambient roadway noise environment near the Project Site, noise prediction modeling was conducted based on vehicular traffic volumes along nearby roadway segments. Existing roadway noise levels were modeled using the Federal Highway Administration Highway Prediction Noise Model (FHWA-RD-77-108). This model calculates the average noise level in dB(A) CNEL at a given roadway segment based on traffic volumes, vehicle mix, average speeds, roadway geometry, and site conditions. The noise model assumes a "hard" site condition (i.e., providing for the minimum amount of sound attenuation allowed by the traffic noise model, a 3 dB(A) noise reduction per doubling of distance) and assumes no barriers between the roadway and receivers. Traffic noise levels were calculated for sensitive receptors at distances of 75 feet from the center of the roadway. The noise prediction model used daily traffic volumes to determine average daily trips (ADTs) along the analyzed roadway segments. The estimated existing roadway noise levels are provided in **Table 5: Existing Roadway Noise Levels.**

Note that these calculated noise levels only consider the traffic volumes along the identified street segment and do not include other noise sources that may contribute to the ambient noise level at that location. The purpose of these calculations is to compare existing to future based specifically on the traffic volume for each roadway segment.

As shown in **Table 5**, the existing weekday vehicle-generated noise levels along roadway segments near the Project site range from a low of 39.3 dBA CNEL along S. Victoria Avenue north of Lower Exposition Blvd (Intersection 3) to a high of 66.3 dBA CNEL along S. Crenshaw Blvd north of Upper Exposition Blvd, at a distance of 75 feet from the center of the roadway.

Table 5
Existing Roadway Noise Levels

Intersection	Roadway Segment	Time Period	Existing (dBA CNEL)
S. Crenshaw Blvd			
1	North of Upper Exposition Blvd	AM	66.3
		PM	65.7
	South of Upper Exposition Blvd	AM	66.1
		PM	65.8
2	North of Obama Blvd	AM	66.1
		PM	66.1
	South of Obama Blvd	AM	64.9
		PM	65.5
S. Victoria Ave			
3	North of Lower Exposition Blvd	AM	39.3

Intersection	Roadway Segment	Time Period	Existing (dBA CNEL)
		PM	42.5
	South of Lower Exposition Blvd	AM	47.0
		PM	44.0
4	North of Obama Blvd	AM	47.1
		PM	45.6
	South of Obama Blvd	AM	50.2
		PM	50.0
Upper Exposition Blvd			
1	East of S. Crenshaw Blvd	AM	57.5
		PM	57.9
	West of S. Crenshaw Blvd	AM	56.6
		PM	57.4
Obama Blvd			
2	East of S. Crenshaw Blvd	AM	62.3
		PM	61.1
	West of S. Crenshaw Blvd	AM	61.4
		PM	61.5
Lower Exposition Blvd			
3	East of S. Victoria Avenue	AM	46.0
		PM	45.8
	West of S. Victoria Avenue	AM	45.1
		PM	45.8
Obama Blvd			
4	East of S. Victoria Avenue	AM	62.8
		PM	63.2
	West of S. Victoria Avenue	AM	62.7
		PM	63.0

Source: Source: Refer to ***Attachment B*** *for roadway noise worksheets.*

Vibration Conditions

Based on field observations, the primary source of existing ground-borne vibration in the vicinity of the Project site is vehicle traffic on local roadways. According to the Federal Transit Administration,[9] typical

9 Federal Transit Administration, *Transit Noise and Vibration Impact Assessment,* FTA report no. 0123 (September 2018), accessed October 2019, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf.

road traffic–induced vibration levels are unlikely to be perceptible by people. Trucks and buses typically generate ground-borne vibration velocity levels of approximately 63 VdB (at a 50-foot distance), and these levels could reach 72 VdB when trucks and buses pass over bumps in the road. A vibration level of 72 VdB is above the 60 VdB level of perceptibility.

NOISE ANALYSIS

Construction

On-Site Construction Noise

Construction activities that would occur during the construction phases (demolition, grading, building construction, architectural coating, and paving) would generate both steady-state and episodic noise that would be heard both on and off the Project site. Each phase involves the use of different types of construction equipment and, therefore, has its own distinct noise characteristics. The Project would be constructed using typical construction techniques; no blasting, impact pile driving, or jackhammers would be required.

Typical maximum noise levels and duty cycles of representative types of equipment that would potentially be used during construction for this Project are presented in **Table 6: Typical Maximum Noise Levels for Project Construction Equipment**. Construction equipment noise would not be constant because of the variations of power, cycles, and equipment locations. For maximum noise events, this analysis considers equipment operating at the edge of the property line of the Project site.

Table 6
Typical Maximum Noise Levels for Project Construction Equipment

Equipment Description	Typical Duty Cycle (%)	Spec Lmax (dBA)	Actual Lmax (dBA)
Air Compressor	40	80.0	77.7
Bore/Drill Rigs	40	80.0	77.6
Cement and Mortar Mixers	40	85.0	78.8
Concrete mixer	40	85.0	78.8
Concrete/Industrial saw	20	90.0	89.6
Crane	16	85.0	80.6
Crushing/Proc. Equipment	20	85.0	79.1
Dumpers/Tenders	40	84.0	76.5
Excavator	40	85.0	80.7
Forklifts	40	85.0	N/A
Generator	50	82.0	80.6
Graders	40	85.0	N/A

Equipment Description	Typical Duty Cycle (%)	Spec Lmax (dBA)	Actual Lmax (dBA)
Other Construction Equipment	50	85.0	N/A
Loaders	40	80.0	79.1
Forklift	40	85.0	N/A
Paver	50	85.0	77.2
Plate Compactors	20	80.0	83.2
Roller	20	85.0	80.0
Surfacing Equipment	50	85.0	N/A
Skid Steer Loaders	40	80.0	79.1
Sweepers/Scrubbers	10	80.0	81.6
Tractors	40	84.0	N/A
Trenchers	50	82.0	80.4

Source: FHWA Roadway Construction Noise Model (RCNM) version 1.1
Note: N/A = not available.

As mentioned previously, sound generated by a construction noise source typically diminishes at a rate of 6 dBA over hard surfaces, such as asphalt, and 7.5 dBA over soft surfaces, such as vegetation, for each doubling of distance. Barriers—such as walls, berms, or buildings, and elevation differences—can also reduce sound levels by up to 20 dBA.[10]

The potential noise impact generated during construction depends on the phase of construction and the percentage of time the equipment operates over the workday. However, construction noise estimates used for the analysis are representative of worst-case conditions because it is unlikely that all the equipment contained on site would operate simultaneously. As would be the case for construction of most land use development projects, construction of the proposed Project would require the use of heavy-duty equipment with the potential to generate audible noise above the ambient background noise level. The noise levels at the multifamily residential uses adjacent to the site from construction activity are shown in **Table 6: Construction Maximum Noise Estimates.** As shown, construction noise levels would result in a maximum increase of 35.6 dBA above the significance threshold without implementation of any noise reduction measures.

10 Caltrans, *Technical Noise Supplement* (1998), 33–40, 123–131.

Table 7
Construction Maximum Noise Estimates

Site	Distance from Project Site (feet)	Construction Noise Levels (dBA)	Ambient Noise Leq (dBA)	Significance Threshold (dBA)	Maximum Increase over Significance Threshold without Mitigation Measures (dBA)
2	30	96.3	55.7	60.7	+35.6
4	100	85.9	66.7	71.7	+14.2
5	35	95.7	61.0	66.0	+29.7
6	200	82.6	68.4	73.4	+9.2
7	155	90.6	66.9	71.9	+18.7

Source: FHWA, RCNM, version. 1.1.
*Refer to **Attachment C** for Construction Noise Worksheets*

Pursuant to Section 41.40 of the LAMC, construction would be limited to the hours between 7:00 AM and 9:00 PM, Monday through Friday, and between 8:00 AM and 6:00 PM on Saturday. No construction activities would occur on Sundays or federal holidays. All construction related noise would be required to comply with the provisions of Section 112.05 of the LAMC. Pursuant to Section 112.05, the operation of any powered equipment or powered hand tool that produces a maximum noise level exceeding 75 dBA at a distance of 50 feet from the source of the noise between the hours of 7:00 AM to 9:00 PM when the source is located within 500 feet of a residential zone. Compliance with Section 112.05 of the LAMC includes the use of mufflers, shields, sound barriers, and/or other noise reduction devices or techniques. **Mitigation Measure MM NOI-1** would include a construction management plan which specifies that all construction equipment, fixed or mobile, will be equipped with properly operating and maintained mufflers and other state-required noise attenuation devices; identify the maximum distance between construction equipment staging areas and occupied residential areas; and require the use of electric air compressors and similar power tools. Optimal muffler systems for all equipment and the break in line of sight to a sensitive receptor would reduce construction noise levels by approximately 10 dB or more.[11] Limiting construction equipment generating noise levels in excess of 87 dBA operating simultaneously with other pieces of equipment generating noise levels below 87 dBA would reduce construction noise levels by 5 dBA. Limiting the number of noise-generating heavy-duty off-road construction equipment (e.g., dozers, excavators, loaders, etc.) to one third of the anticipated equipment fleet[12] operated simultaneously

11 FHWA, *Special Report—Measurement, Prediction, and Mitigation*, updated June 2017, accessed October 2019, https://www.fhwa.dot.gov/Environment/noise/construction_noise/special_report/hcn04.cfm.
12 Demolition = 11 pieces of equipment; Grading/Excavation = 18 pieces of equipment; Building Construction = 26 pieces of equipment; Paving = 20 pieces of equipment.

on the Project site within 75 feet of off-site noise sensitive receptors would reduce construction noise levels by approximately 14 dBA.

Temporary abatement techniques include the use of temporary and/or movable shielding for both specific and nonspecific operations. An example of such a barrier utilizes noise curtains in conjunction with trailers to create an easily movable, temporary noise barrier system. A noise barrier can achieve a 5 dB noise level reduction when it is tall enough to break the line-of-sight to the receiver. After it breaks the line-of-sight, it can achieve approximately 1.5 dB of additional noise level reduction for each one (1) meter (3.3 feet) of barrier height.[13] Therefore, an approximately 15-foot tall construction noise barrier would reduce construction noise levels by a minimum 7 dB. Compliance with Section 112.05, construction noise levels would be reduced by a minimum of 36 dB, dependent on the construction activity and height of the temporary noise barrier used.

A sign, legible at a distance of 50 feet, will be posted at the project construction site providing a contact name and a telephone number where residents can inquire about the construction process and register complaints. This sign will indicate the dates and duration of construction activities. In conjunction with this required posting, a noise disturbance coordinator will be identified to address construction noise concerns received. The contact name and the telephone number for the noise disturbance coordinator will be posted on the sign. The coordinator will be responsible for responding to any local complaints about construction noise and will notify the City to determine the cause and implement reasonable measures to the complaint, as deemed acceptable by the City.

The Project would comply with the City's Noise Ordinance as it relates to construction equipment by limiting activities to occur between 7:00 AM to 7:00 PM. Compliance with the City's Noise Ordinance and implementation of **Mitigation Measure NOI-1** would ensure construction noise levels would be reduced to the extent feasible; thus construction noise levels would not be considered significant.

Off-Site Construction Noise

Construction of the Project would require haul and vendor truck trips to and from the site to export soil and delivery supplies to the site. Trucks traveling to and from the Project site would be required to travel along a haul route approved by the City. At the maximum, approximately 3,362 total hauling trips would take place during grading, which total to approximately 8 haul truck trips per work day.

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13 FHWA, Special Report – Measurement, Prediction, and Mitigation, updated June 2017, accessed October 2019, https://www.fhwa.dot.gov/Environment/noise/construction_noise/special_report/hcn04.cfm

Loaded trucks exiting Site A from W. Obama Boulevard would head east toward Crenshaw Boulevard and make a left onto Crenshaw Boulevard. Loaded trucks exiting Site B from W. Obama Boulevard would head west toward Crenshaw Boulevard and make a right onto Crenshaw Boulevard. Loaded trucks would merge onto I-10 E/Santa Monica Freeway toward CA-110 N, 5 N/Golden State Freeway and take exit toward Sylmar. Loaded trucks would head toward Sunshine Canyon Landfill where they would unload material.

Noise associated with construction truck trips were estimated using the Caltrans FHWA Traffic Noise Model based on the maximum number of truck trips in a day. Project truck trips which includes medium- and heavy-duty trucks would generate noise levels of approximately 42.3 to 50.8 dBA, respectively, measured at a distance of 75 feet along S. Crenshaw Boulevard. As shown in **Table 5,** existing roadway noise levels along Crenshaw Boulevard ranged from 64.9 – 66.3 dBA CNEL during the AM and PM peak hour. The noise level increases from truck trips would be below the significance threshold of 5 dBA.

Construction Vibration

Table 8: Construction Vibration Levels Estimates – Building Damage present construction vibration impacts associated with on-site construction in terms of building damage. As shown in **Table 8**, the forecasted vibration levels due to on-site construction activities would exceed the building damage significance threshold of 0.12 ppv at Site 2 and 5 due to the use of pile drivers and vibratory rollers. With implementation of **Mitigation Measure MM NOI-2**, pile drivers would not be utilized during construction. In addition, **MM NOI-2** would limit the use of vibratory rollers to a minimum of 40 feet from the nearest sensitive receptor would reduce vibration levels to below the significance threshold of 0.12 PPV ips.

Table 8
On-Site Construction Vibration Impacts – Building Damage

Site	Estimated Vibration Velocity Levels at the Nearest Off-Site Structures from the Project Construction Equipment							Significance Threshold (PPV ips)	Significant Impact without Mitigation?	Significant Impact with Mitigation?
	Pile Driver (impact)	Vibratory Roller	Large Bulldozer	Caisson Drilling	Loaded Trucks	Jack-hammer	Small bulldozer			
FTA Reference Vibration Levels at 25 feet										
	0.644	*0.210*	*0.089*	*0.089*	*0.076*	*0.035*	*0.003*	–		
2	0.490	0.160	0.068	0.068	0.058	0.027	0.001	0.12	**Yes**	No
4	0.081	0.026	0.011	0.011	0.010	0.004	0.000	0.12	No	No
5	0.389	0.127	0.054	0.054	0.046	0.021	0.002	0.12	**Yes**	No
6	0.028	0.009	0.004	0.004	0.003	0.002	0.000	0.12	No	No

Site	Estimated Vibration Velocity Levels at the Nearest Off-Site Structures from the Project Construction Equipment							Significance Threshold (PPV ips)	Significant Impact without Mitigation?	Significant Impact with Mitigation?
	Pile Driver (impact)	Vibratory Roller	Large Bulldozer	Caisson Drilling	Loaded Trucks	Jack-hammer	Small bulldozer			
7	0.042	0.014	0.006	0.006	0.005	0.002	0.000	0.12	No	No

Source: US Department of Transportation, Federal Transportation Authority, Transit Noise and Vibration Impact Assessment
*Source: Refer to **Attachment D** for construction vibration worksheets.*
Note:

Operation

Roadway Noise

Table 9: Future Year (2023) plus Project shows the change in CNEL from future traffic volumes and from traffic generated by the Project. As shown in **Table 9,** the maximum roadway noise level increase along existing roadways would be 4.5 dBA CNEL along S. Victoria Avenue north of Obama Boulevard (Intersection 4) during the afternoon (PM) peak hour. As identified in **Table 2** above, normally acceptable noise levels for single-family residences ranges from 50 – 60 dBA CNEL. Roadway noise levels along Intersection 4 would result in 50.9 dBA CNEL with this increase and would be within the land use compatibility guidelines. Therefore, impacts related to roadway noise would be less than significant.

Table 9
Future (2023) plus Project

Intersection	Roadway Segment	Time Period	Future (2023)	Future (2023) plus Project	Difference
S. Crenshaw Blvd					
1	North of Upper Exposition Blvd	AM	66.6	66.7	+0.1
		PM	66.2	66.3	+0.1
	South of Upper Exposition Blvd	AM	66.4	66.5	+0.1
		PM	66.2	66.4	+0.2
2	North of Obama Blvd	AM	66.4	66.5	+0.1
		PM	66.5	66.6	+0.1
	South of Obama Blvd	AM	65.2	65.3	+0.1
		PM	65.9	66.1	+0.2
S. Victoria Ave					
3	North of Lower Exposition Blvd	AM	39.6	N/A	N/A
		PM	42.8	N/A	N/A

Intersection	Roadway Segment	Time Period	Future (2023)	Future (2023) plus Project	Difference
	South of Lower Exposition Blvd	AM	47.2	47.9	+0.7
		PM	44.2	47.1	+2.9
4	North of Obama Blvd	AM	47.3	50.2	+2.9
		PM	46.4	50.9	+4.5
	South of Obama Blvd	AM	50.5	50.5	0.0
		PM	50.2	50.2	0.0
Upper Exposition Blvd					
1	East of S. Crenshaw Blvd	AM	57.7	57.7	0.0
		PM	58.1	58.1	0.0
	West of S. Crenshaw Blvd	AM	56.9	57.0	+0.1
		PM	57.8	57.8	0.0
Obama Blvd					
2	East of S. Crenshaw Blvd	AM	62.6	62.8	+0.2
		PM	61.5	62.2	+0.7
	West of S. Crenshaw Blvd	AM	61.6	61.9	+0.3
		PM	61.8	62.3	+0.5
Lower Exposition Blvd					
3	East of S. Victoria Avenue	AM	46.2	N/A	N/A
		PM	46.0	N/A	N/A
	West of S. Victoria Avenue	AM	45.3	47.9	+2.6
		PM	46.0	47.1	+2.9
Obama Blvd					
4	East of S. Victoria Avenue	AM	63.0	63.3	+0.3
		PM	63.5	63.9	+0.4
	West of S. Victoria Avenue	AM	63.0	63.1	+0.1
		PM	63.3	63.4	+0.1

*Source: Source: Refer to **Attachment B** for roadway noise worksheets.*

Fixed Mechanical Equipment Noise

The Project would introduce various stationary noise sources, including heating, ventilation, and air conditioning systems, which would be located either on the roof, the side of a structure, or on the ground. All Project mechanical equipment would be required to be designed with appropriate noise-control devices, such as sound attenuators, acoustics louvers, or sound screens/parapet walls, to comply with noise-limitation requirements provided in LAMC Section 112.02, which prohibits the noise from such equipment from causing an increase in the ambient noise level of more than 5 dB. Therefore, operation of mechanical equipment on the Project building would not exceed the City's threshold of significance.

CUMULATIVE NOISE

For purposes of this analysis, development of the related projects will be considered to contribute to cumulative noise impacts. Noise, by definition, is a localized phenomenon and drastically reduces as distance from the source increases. As a result, only related projects and growth in the general area of the Project site would contribute to cumulative noise impacts. Cumulative construction-noise impacts have the potential to occur when multiple construction projects in the local area generate noise within the same time frame and contribute to the local ambient noise environment. It is expected that, as with the Project, the related projects would implement best management practices, which would minimize any noise-related nuisances during construction. Therefore, the combined construction-noise impacts of the related projects and the Project's contribution would not cause a significant cumulative impact.

With regard to stationary sources, cumulative significant noise impacts may result from cumulative development. Stationary sources of noise that could be introduced in the area by cumulative projects could include mechanical equipment, loading docks, and parking lots. Given that these projects would be required to adhere to the City's noise standards, all stationary sources would be required to have shielding or other noise-abatement measures so as not to cause a substantial increase in ambient noise levels. Moreover, due to distance, it is unlikely that noise from multiple cumulative projects would interact to create a significant combined noise impact. As such, it is not anticipated that a significant cumulative increase in permanent ambient noise levels would occur.

MITIGATION MEASURES

The following mitigation measures would reduce construction noise and vibration impacts to a less than significant level:

MM NOI-1 Construction Management Plan

- Construction Management Plan specifies that all construction equipment, fixed or mobile, will be equipped with properly operating and maintained mufflers and other state-required noise attenuation devices; identify the maximum distance between construction equipment staging areas and occupied residential areas; and require the use of electric air compressors and similar power tools.
- Optimal muffler systems for all equipment and the break in line of sight to a sensitive receptor would reduce construction noise levels by approximately 10 dB or more.

- Limit construction equipment generating noise levels in excess of 87 dBA operating simultaneously with other pieces of equipment generating noise levels below 87 dBA.

- Limit the number of noise generating heavy-duty off-road construction equipment (e.g., dozers, excavators, loaders, etc.) to one third of the anticipated equipment fleet operated simultaneously on the Project site within 75 feet of off-site noise sensitive receptors.

- Temporary abatement techniques include the use of temporary and/or movable shielding for both specific and nonspecific operations. An example of such a barrier utilizes noise curtains in conjunction with trailers to create an easily movable, temporary noise barrier system. A noise barrier can achieve a 5 dB noise level reduction when it is tall enough to break the line-of-sight to the receiver. After it breaks the line-of-sight, it can achieve approximately 1.5 dB of additional noise level reduction for each one (1) meter (3.3 feet) of barrier height.[14] Therefore, an approximately 15-foot tall construction noise barrier would reduce construction noise levels by a minimum 7 dB.

- A sign, legible at a distance of 50 feet, will be posted at the project construction site providing a contact name and a telephone number where residents can inquire about the construction process and register complaints. This sign will indicate the dates and duration of construction activities. In conjunction with this required posting, a noise disturbance coordinator will be identified to address construction noise concerns received. The contact name and the telephone number for the noise disturbance coordinator will be posted on the sign. The coordinator will be responsible for responding to any local complaints about construction noise and will notify the City to determine the cause and implement reasonable measures to the complaint, as deemed acceptable by the City.

MM NOI-2 Construction Vibration

- Pile drivers would not be utilized during construction.

- Limit the use of vibratory rollers to a minimum of 40 feet from the nearest sensitive receptor

14 FHWA, Special Report – Measurement, Prediction, and Mitigation, updated June 2017, accessed October 2019, https://www.fhwa.dot.gov/Environment/noise/construction_noise/special_report/hcn04.cfm

ATTACHMENT A

Noise Monitoring Data Sheets

Monitoring Location: Site 1
Monitoring Date: 9/12/2019

Monitoring Period

Time	LAeq	LApeak	LASmax
9:14:44	61.2	81.1	67.7
9:15:44	58.8	78.0	62.9
9:16:44	59.7	83.1	63.7
9:17:44	60.5	84.5	67.7
9:18:44	63.3	86.1	73.0
9:19:44	66.1	89.6	74.1
9:20:44	61.9	89.6	70.6
9:21:44	64.3	91.1	73.8
9:22:44	61.9	85.0	68.9
9:23:44	58.8	76.4	64.9
9:24:44	62.7	83.4	68.6
9:25:44	59.6	79.3	68.6
9:26:44	61.9	86.9	73.1
9:27:44	77.7	102.9	89.5
9:28:44	65.3	88.4	74.3
9:29:44	57.2	73.2	60.9

15-minute LAeq **67.2**

Monitoring Location: Site 2
Monitoring Date: 9/12/2019

Monitoring Period

Time	LAeq	LApeak	LASmax
8:56:48	53.9	82.2	56.2
8:57:48	57.3	79.7	65.7
8:58:48	57.5	81.8	67.6
8:59:48	54.9	71.4	59.3
9:00:48	54.0	74.2	62.8
9:01:48	53.5	73.8	58.5
9:02:48	56.9	75.9	60.6
9:03:48	56.9	80.4	66.1
9:04:48	55.5	74.4	60.1
9:05:48	57.3	79.1	66.4
9:06:48	53.5	73.7	57.7
9:07:48	56.3	75.6	60.6
9:08:48	54.7	77.6	61.0
9:09:48	55.8	72.1	58.8
9:10:48	53.6	71.8	57.8
9:11:48	55.0	70.5	58.3

15-minute LAeq **55.7**

Monitoring Location: Site 3
Monitoring Date: 9/12/2019

Monitoring Period

Time	LAeq	LApeak	LASmax
9:34:06	69.5	90.0	72.9
9:35:06	68.5	90.5	73.2
9:36:06	66.6	85.4	73.6
9:37:06	69.5	90.1	73.4
9:38:06	68.7	90.1	75.1
9:39:06	69.6	89.5	76.9
9:40:06	63.4	87.3	69.4
9:41:06	70.0	87.8	73.9
9:42:06	69.5	96.7	78.2
9:43:06	70.9	95.4	74.3
9:44:06	71.8	96.7	82.5
9:45:06	70.8	91.0	75.4
9:46:06	69.8	92.5	76.2
9:47:06	71.7	94.2	77.8
9:48:06	67.4	85.4	73.0
9:49:06	74.5	89.8	76.3

15-minute LAeq **70.1**

Monitoring Location: Site 4
Monitoring Date: 9/12/2019

Monitoring Period

Time	LAeq	LApeak	LASmax
8:38:05	65.8	86.0	71.9
8:39:05	61.6	82.0	68.9
8:40:05	66.5	87.6	73.3
8:41:05	68.2	88.4	78.2
8:42:05	66.6	85.7	77.2
8:43:05	68.0	90.9	75.8
8:44:05	63.4	81.4	68.5
8:45:05	64.6	90.4	70.2
8:46:05	68.8	91.3	76.3
8:47:05	65.0	87.5	74.4
8:48:05	67.1	89.3	75.4
8:49:05	70.9	89.3	80.0
8:50:05	65.8	84.6	72.2
8:51:05	64.4	88.3	72.3
8:52:05	64.3	84.9	70.7
8:53:05	67.4	94.9	74.5

15-minute LAeq **66.7**

Monitoring Location: Site 5
Monitoring Date: 9/12/2019

Monitoring Period

Time	LAeq	LApeak	LASmax
8:18:23	63.8	90.7	72.2
8:19:23	64.2	93.5	72.9
8:20:23	66.6	94.2	73.0
8:21:23	65.4	94.8	75.7
8:22:23	60.4	92.1	71.8
8:23:23	56.9	87.7	66.9
8:24:23	58.4	85.8	67.9
8:25:23	54.6	82.2	62.0
8:26:23	56.0	79.3	58.8
8:27:23	56.2	76.5	63.2
8:28:23	56.9	92.1	65.6
8:29:23	59.8	94.1	69.4
8:30:23	58.8	83.1	63.8
8:31:23	56.9	81.6	63.4
8:32:23	55.5	83.8	63.3
8:33:23	57.7	84.6	63.3

15-minute LAeq **61.0**

Monitoring Location: Site 6
Monitoring Date: 9/12/2019

Monitoring Period

Time	LAeq	LApeak	LASmax
7:59:12	63.0	80.8	67.5
8:00:12	68.1	88.9	75.2
8:01:12	67.8	89.8	75.6
8:02:12	67.7	92.3	76.8
8:03:12	67.3	87.9	73.9
8:04:12	75.5	101.4	89.8
8:05:12	68.2	88.5	74.5
8:06:12	71.1	97.9	82.9
8:07:12	68.0	90.9	76.4
8:08:12	64.9	89.6	74.7
8:09:12	64.8	88.5	73.8
8:10:12	66.5	86.6	73.6
8:11:12	66.5	88.0	74.6
8:12:12	65.0	87.2	73.2
8:13:12	65.7	87.9	74.0
8:14:12	63.9	80.0	66.2

15-minute LAeq **68.4**

Monitoring Location: Site 7
Monitoring Date: 9/12/2019

Monitoring Period

Time	LAeq	LApeak	LASmax
9:52:17	66.9	91.2	75.5
9:53:17	58.4	78.1	62.6
9:54:17	73.2	100.2	87.2
9:55:17	61.8	82.9	68.7
9:56:17	67.7	94.2	75.7
9:57:17	62.7	82.9	70.2
9:58:17	66.4	92.0	74.6
9:59:17	55.9	81.9	67.7
10:00:17	66.5	93.8	74.2
10:01:17	61.2	96.6	67.8
10:02:17	70.4	93.1	81.3
10:03:17	54.0	75.0	60.3
10:04:17	64.6	87.4	72.4
10:05:17	68.6	98.2	78.4
10:06:17	66.5	88.8	75.0
10:07:17	67.2	88.0	73.1

15-minute LAeq **66.9**

ATTACHMENT B

Roadway Noise Worksheets

Project Name | rev. (Date)

Weekday AM Peak Hour Volumes

Intersection: 1

Crenshaw Blvd & Upper Exposition Blvd

If Peak Hour = 6% of ADT, Scaling Factor = 16.667
If Peak Hour = 7% of ADT, Scaling Factor = 14.286
If Peak Hour = 8% of ADT, Scaling Factor = 12.5
If Peak Hour = 9% of ADT, Scaling Factor = 11.111
If Peak Hour = 10% of ADT, Scaling Factor = 10

Crenshaw Blvd

Southbound

	right	through	left
Existing	6	1,067	30
Future (2023)	7	1,138	24
Future (2023) wi	7	1,157	24

Upper Exposition Bl

Eastbound

	left	through	right
Existing	13	59	30
Future (2023)	16	60	33
Future (2023) wi	16	60	36

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Westbound

	right	through	left
Existing	126	249	22
Future (2023)	143	264	32
Future (2023) wi	143	264	32

Northbound

	left	through	right
Existing	55	1,421	12
Future (2023)	59	1,527	6
Future (2023) wi	63	1,555	7

ADT

Road	Crenshaw Blvd		Upper Exposition Blvd	
Leg	North of	South of	East of	West of
Cross Street	Upper Exposition Blvd		Crenshaw Blvd	
Existing	21,304.0	20,856.0	3,984.0	3,296.0
Future (2023)	22,840.0	22,360.0	4,232.0	3,512.0
Future (2023) wit	23,216.0	22,800.0	4,240.0	3,568.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0

2
NOISE LEVEL CONTOURS - Existing Plus Project Weekday Off-Site ADT Volumes

ROADWAY NAME Segment	Land Use	Lanes	Median Width	ADT Volume	Design Speed (mph)	Dist. from Center tc Receptor	Alpha Factor (1	Barrier Attn. dB(A)	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	dB(A) CNEL	Traffic Volumes Day	Eve	Night	MTd	HTd	MTe	HTe	MTn	HTn	Ref. Energy Levels A	MT	HT	Dist Adj	Ld A	MT	HT	Total	Le A	MT	HT	Total	Ln A	MT	HT	Total
Crenshaw Blvd n/o Upper																																				
Existing		5	0	21,304	40	75	0	0	1.8%	0.7%	66.3	####	####	####	335	133	19	4	29	12	67.4	76.3	81.2	-1.6	65.7	57.8	58.7	67.0	62.7	50.3	48.5	63.1	49.5	48.4	49.4	53.9
Future (2023)		5	0	22,840	40	75	0	0	1.8%	0.7%	66.6	####	####	####	359	142	21	5	31	13	67.4	76.3	81.2	-1.6	66.0	58.1	59.0	67.3	63.0	50.6	48.8	63.4	49.8	48.7	49.7	54.2
Future (2023) with Project		5	0	23,216	40	75	0	0	1.8%	0.7%	66.7	####	####	####	365	145	21	5	31	13	67.4	76.3	81.2	-1.6	66.1	58.2	59.0	67.4	63.1	50.6	48.9	63.5	49.9	48.8	49.8	54.3
Crenshaw Blvd s/o Upper																																				
Existing		4	0	20,856	40	75	0	0	1.8%	0.7%	66.1	####	####	####	328	130	19	4	28	12	67.4	76.3	81.2	-1.7	65.5	57.6	58.5	66.8	62.5	50.1	48.3	62.9	49.3	48.2	49.2	53.7
Future (2023)		4	0	22,360	40	75	0	0	1.8%	0.7%	66.4	####	####	####	352	139	20	4	30	13	67.4	76.3	81.2	-1.7	65.8	58.0	58.8	67.1	62.8	50.4	48.6	63.2	49.6	48.5	49.5	54.0
Future (2023) with Project		4	0	22,800	40	75	0	0	1.8%	0.7%	66.5	####	####	####	359	142	21	5	31	13	67.4	76.3	81.2	-1.7	65.9	58.0	58.9	67.2	62.9	50.5	48.7	63.3	49.7	48.6	49.6	54.1
Upper Exposition Blvd e/o																																				
Existing		2	0	3,984	35	75	0	0	1.8%	0.7%	57.5	####	506	382	63	25	4	1	5	2	65.1	74.8	80.0	-1.8	56.5	49.4	50.6	58.2	53.6	41.9	40.5	54.0	40.4	40.0	41.4	45.4
Future (2023)		2	0	4,232	35	75	0	0	1.8%	0.7%	57.7	####	537	406	67	26	4	1	6	2	65.1	74.8	80.0	-1.8	56.8	49.7	50.9	58.4	53.8	42.1	40.7	54.3	40.6	40.2	41.7	45.7
Future (2023) with Project		2	0	4,240	35	75	0	0	1.8%	0.7%	57.7	####	538	407	67	26	4	1	6	2	65.1	74.8	80.0	-1.8	56.8	49.7	50.9	58.4	53.8	42.1	40.7	54.3	40.6	40.3	41.7	45.7
Upper Exposition Blvd w/o																																				
Existing		2	0	3,296	35	75	0	0	1.8%	0.7%	56.6	####	419	316	52	21	3	1	4	2	65.1	74.8	80.0	-1.8	55.7	48.6	49.8	57.3	52.7	41.0	39.6	53.2	39.5	39.2	40.6	44.6
Future (2023)		2	0	3,512	35	75	0	0	1.8%	0.7%	56.9	####	446	337	55	22	3	1	5	2	65.1	74.8	80.0	-1.8	56.0	48.9	50.1	57.6	53.0	41.3	39.9	53.5	39.8	39.4	40.9	44.8
Future (2023) with Project		2	0	3,568	35	75	0	0	1.8%	0.7%	57.0	####	453	343	56	22	3	1	5	2	65.1	74.8	80.0	-1.8	56.1	49.0	50.2	57.7	53.1	41.4	40.0	53.6	39.9	39.5	40.9	44.9

(1) Alpha Factor: Coefficient of absorption relating to the effects of the ground surface. An alpha factor of 0 indicates that the site is an acoustically "hard" site such as aspalt. An alpha factor of 0.5 indicates that the site is an acoustically "soft" site such as vegetative ground cover.

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Project Name rev. (Date)
Weekday PM Peak Hour Volumes

Intersection: 1
Crenshaw Blvd & Upper Exposition Blvd

If Peak Hour = 6% of ADT, Scaling Factor = 16.667
If Peak Hour = 7% of ADT, Scaling Factor = 14.286
If Peak Hour = 8% of ADT, Scaling Factor = 12.5
If Peak Hour = 9% of ADT, Scaling Factor = 11.111
If Peak Hour = 10% of ADT, Scaling Factor = 10

ADT

Road	Crenshaw Blvd		Upper Exposition Blvd	
Leg	North of	South of	East of	West of
Cross Street	Upper Exposition Blvd		Crenshaw Blvd	
Existing	18,648.0	19,520.0	4,416.0	3,976.0
Future (2023)	20,752.0	21,520.0	4,672.0	4,272.0
Future (2023) wit	21,296.0	22,144.0	4,672.0	4,352.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0

Crenshaw Blvd

Southbound

	right	through	left
Existing	7	1,074	36
Future (2023)	10	1,200	47
Future (2023) wi	10	1,238	47

Upper Exposition Bl

Eastbound

	left	through	right
Existing	6	237	112
Future (2023)	8	250	121
Future (2023) wi	8	250	126

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Westbound

	right	through	left
Existing	74	110	74
Future (2023)	80	116	64
Future (2023) wi	80	116	64

Northbound

	left	through	right
Existing	25	1,134	21
Future (2023)	29	1,249	27
Future (2023) wi	34	1,279	27

2

NOISE LEVEL CONTOURS - Existing Plus Project Weekday Off-Site ADT Volumes

ROADWAY NAME Segment	Land Use	Lanes	Median Width	ADT Volume	Design Speed (mph)	Dist. from Center tc Receptor	Alpha Factor (1	Barrier Attn. dB(A)	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	dB(A) CNEL	Traffic Volumes Day	Eve	Night	MTd	HTd	MTe	HTe	MTn	HTn	Ref. Energy Levels A	MT	HT	Dist Adj	Ld A	MT	HT	Total	Le A	MT	HT	Total	Ln A	MT	HT	Total
Crenshaw Blvd n/o Upper																																				
Existing		5	0	18,648	40	75	0	0	1.8%	0.7%	65.7	####	2,368	1,790	293	116	17	4	25	11	67.4	76.3	81.2	-1.6	65.1	57.3	58.1	66.5	62.1	49.7	47.9	62.5	49.0	47.8	48.9	53.3
Future (2023)		5	0	20,752	40	75	0	0	1.8%	0.7%	66.2	####	2,636	1,992	327	129	19	4	28	12	67.4	76.3	81.2	-1.6	65.6	57.7	58.6	66.9	62.6	50.1	48.4	63.0	49.4	48.3	49.3	53.8
Future (2023) with Project		5	0	21,296	40	75	0	0	1.8%	0.7%	66.3	####	2,705	2,044	335	133	19	4	29	12	67.4	76.3	81.2	-1.6	65.7	57.8	58.7	67.0	62.7	50.3	48.5	63.1	49.5	48.4	49.4	53.9
Crenshaw Blvd s/o Upper																																				
Existing		4	0	19,520	40	75	0	0	1.8%	0.7%	65.8	####	2,479	1,874	307	122	18	4	26	11	67.4	76.3	81.2	-1.7	65.2	57.4	58.2	66.6	62.2	49.8	48.0	62.6	49.0	47.9	49.0	53.4
Future (2023)		4	0	21,520	40	75	0	0	1.8%	0.7%	66.2	####	2,733	2,066	339	134	20	4	29	12	67.4	76.3	81.2	-1.7	65.6	57.8	58.6	67.0	62.7	50.2	48.4	63.1	49.5	48.3	49.4	53.9
Future (2023) with Project		4	0	22,144	40	75	0	0	1.8%	0.7%	66.4	####	2,812	2,126	348	138	20	4	30	12	67.4	76.3	81.2	-1.7	65.8	57.9	58.7	67.1	62.8	50.3	48.6	63.2	49.6	48.5	49.5	54.0
Upper Exposition Blvd e/o																																				
Existing		2	0	4,416	35	75	0	0	1.8%	0.7%	57.9	3,431	561	424	69	28	4	1	6	2	65.1	74.8	80.0	-1.8	57.0	49.9	51.1	58.6	54.0	42.3	40.9	54.5	40.8	40.4	41.8	45.8
Future (2023)		2	0	4,672	35	75	0	0	1.8%	0.7%	58.1	3,630	593	449	74	29	4	1	6	3	65.1	74.8	80.0	-1.8	57.2	50.1	51.3	58.8	54.2	42.5	41.2	54.7	41.0	40.7	42.1	46.1
Future (2023) with Project		2	0	4,672	35	75	0	0	1.8%	0.7%	58.1	3,630	593	449	74	29	4	1	6	3	65.1	74.8	80.0	-1.8	57.2	50.1	51.3	58.8	54.2	42.5	41.2	54.7	41.0	40.7	42.1	46.1
Upper Exposition Blvd w/o																																				
Existing		2	0	3,976	35	75	0	0	1.8%	0.7%	57.4	3,089	505	382	63	25	4	1	5	2	65.1	74.8	80.0	-1.8	56.5	49.4	50.6	58.1	53.5	41.8	40.5	54.0	40.3	40.0	41.4	45.4
Future (2023)		2	0	4,272	35	75	0	0	1.8%	0.7%	57.8	3,319	543	410	67	27	4	1	6	2	65.1	74.8	80.0	-1.8	56.8	49.7	50.9	58.5	53.9	42.2	40.8	54.3	40.7	40.3	41.7	45.7
Future (2023) with Project		2	0	4,352	35	75	0	0	1.8%	0.7%	57.8	3,382	553	418	68	27	4	1	6	2	65.1	74.8	80.0	-1.8	56.9	49.8	51.0	58.5	53.9	42.2	40.9	54.4	40.7	40.4	41.8	45.8

(1) Alpha Factor: Coefficient of absorption relating to the effects of the ground surface. An alpha factor of 0 indicates that the site is an acoustically "hard" site such as aspalt. An alpha factor of 0.5 indicates that the site is an acoustically "soft" site such as vegetative ground cover.

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Project Name rev. (Date)
Weekday AM Peak Hour Volumes

Intersection: 2
Crenshaw Blvd & Obama Blvd

If Peak Hour = 6% of ADT, Scaling Factor = 16.667
If Peak Hour = 7% of ADT, Scaling Factor = 14.286
If Peak Hour = 8% of ADT, Scaling Factor = 12.5
If Peak Hour = 9% of ADT, Scaling Factor = 11.111
If Peak Hour = 10% of ADT, Scaling Factor = 10

ADT

Road	Crenshaw Blvd		Obama Blvd	
Leg	North of	South of	East of	West of
Cross Street	Obama Blvd		Crenshaw Blvd	
Existing	20,824.0	15,704.0	11,792.0	9,552.0
Future (2023)	22,320.0	16,776.0	12,568.0	10,112.0
Future (2023) wit	22,760.0	17,264.0	13,280.0	10,840.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0

Crenshaw Blvd

Southbound

	right	through	left
Existing	167	865	65
Future (2023)	181	927	71
Future (2023) wi	187	927	87

Obama Blvd

Eastbound

	left	through	right
Existing	102	334	35
Future (2023)	110	350	37
Future (2023) wi	125	367	70

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Westbound

	right	through	left
Existing	454	532	71
Future (2023)	491	561	81
Future (2023) wi	509	576	94

Northbound

	left	through	right
Existing	24	950	18
Future (2023)	25	1,010	17
Future (2023) wi	30	1,010	27

2

NOISE LEVEL CONTOURS - Existing Plus Project Weekday Off-Site ADT Volumes

ROADWAY NAME Segment	Land Use	Lanes	Median Width	ADT Volume	Design Speed (mph)	Dist. from Center to Receptor	Alpha Factor (1)	Barrier Attn. dB(A)	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	dB(A) CNEL
Crenshaw Blvd n/o Obama											
Existing		4	0	20,824	40	75	0	0	1.8%	0.7%	66.1
Future (2023)		4	0	22,320	40	75	0	0	1.8%	0.7%	66.4
Future (2023) with Project		4	0	22,760	40	75	0	0	1.8%	0.7%	66.5
Crenshaw Blvd s/o Obama											
Existing		4	0	15,704	40	75	0	0	1.8%	0.7%	64.9
Future (2023)		4	0	16,776	40	75	0	0	1.8%	0.7%	65.2
Future (2023) with Project		4	0	17,264	40	75	0	0	1.8%	0.7%	65.3
Obama Blvd e/o Crenshaw											
Existing		4	0	11,792	35	75	0	0	1.8%	0.7%	62.3
Future (2023)		4	0	12,568	35	75	0	0	1.8%	0.7%	62.6
Future (2023) with Project		4	0	13,280	35	75	0	0	1.8%	0.7%	62.8
Obama Blvd w/o Crenshaw											
Existing		4	0	9,552	35	75	0	0	1.8%	0.7%	61.4
Future (2023)		4	0	10,112	35	75	0	0	1.8%	0.7%	61.6
Future (2023) with Project		4	0	10,840	35	75	0	0	1.8%	0.7%	61.9

Segment	Traffic Volumes Day	Eve	Night	MTd	HTd	MTe	HTe	MTn	HTn	Ref. Energy Levels A	MT	HT	Dist Adj	Ld A	MT	HT	Total	Le A	MT	HT	Total	Ln A	MT	HT	Total
Crenshaw Blvd n/o Obama																									
Existing	####	2,645	1,999	328	130	19	4	28	12	67.4	76.3	81.2	-1.7	65.5	57.6	58.5	66.8	62.5	50.1	48.3	62.9	49.3	48.2	49.2	53.7
Future (2023)	####	2,835	2,143	351	139	20	4	30	13	67.4	76.3	81.2	-1.7	65.8	57.9	58.8	67.1	62.8	50.4	48.6	63.2	49.6	48.5	49.5	54.0
Future (2023) with Project	####	2,891	2,185	358	142	21	5	31	13	67.4	76.3	81.2	-1.7	65.9	58.0	58.9	67.2	62.9	50.4	48.7	63.3	49.7	48.6	49.6	54.1
Crenshaw Blvd s/o Obama																									
Existing	####	1,994	1,508	247	98	14	3	21	9	67.4	76.3	81.2	-1.7	64.3	56.4	57.2	65.6	61.3	48.8	47.1	61.7	48.1	47.0	48.0	52.5
Future (2023)	####	2,131	1,610	264	105	15	3	23	9	67.4	76.3	81.2	-1.7	64.6	56.7	57.5	65.9	61.6	49.1	47.4	62.0	48.4	47.2	48.3	52.8
Future (2023) with Project	####	2,193	1,657	272	108	16	3	23	10	67.4	76.3	81.2	-1.7	64.7	56.8	57.7	66.0	61.7	49.2	47.5	62.1	48.5	47.4	48.4	52.9
Obama Blvd e/o Crenshaw																									
Existing	9,162	1,498	1,132	186	74	11	2	16	7	65.1	74.8	80.0	-1.7	61.4	54.3	55.5	63.0	58.4	46.7	45.3	58.9	45.2	44.8	46.2	50.2
Future (2023)	9,765	1,596	1,207	198	78	11	2	17	7	65.1	74.8	80.0	-1.7	61.6	54.5	55.7	63.3	58.7	47.0	45.6	59.1	45.5	45.1	46.5	50.5
Future (2023) with Project	####	1,687	1,275	209	83	12	3	18	7	65.1	74.8	80.0	-1.7	61.9	54.8	56.0	63.5	58.9	47.2	45.8	59.4	45.7	45.3	46.7	50.7
Obama Blvd w/o Crenshaw																									
Existing	7,422	1,213	917	150	60	9	2	13	5	65.1	74.8	80.0	-1.7	60.4	53.4	54.6	62.1	57.5	45.8	44.4	57.9	44.3	43.9	45.3	49.3
Future (2023)	7,857	1,284	971	159	63	9	2	14	6	65.1	74.8	80.0	-1.7	60.7	53.6	54.8	62.3	57.7	46.0	44.6	58.2	44.5	44.1	45.6	49.6
Future (2023) with Project	8,423	1,377	1,041	171	68	10	2	15	6	65.1	74.8	80.0	-1.7	61.0	53.9	55.1	62.6	58.0	46.3	44.9	58.5	44.8	44.4	45.9	49.9

(1) Alpha Factor: Coefficient of absorption relating to the effects of the ground surface. An alpha factor of 0 indicates that the site is an acoustically "hard" site such as aspalt. An alpha factor of 0.5 indicates that the site is an acoustically "soft" site such as vegetative ground cover.

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Project Name rev. (Date)
Weekday PM Peak Hour Volumes

Intersection: 2
Crenshaw Blvd & Obama Blvd

If Peak Hour = 6% of ADT, Scaling Factor = 16.667
If Peak Hour = 7% of ADT, Scaling Factor = 14.286
If Peak Hour = 8% of ADT, Scaling Factor = 12.5
If Peak Hour = 9% of ADT, Scaling Factor = 11.111
If Peak Hour = 10% of ADT, Scaling Factor = 10

ADT

Road	Crenshaw Blvd		Obama Blvd	
Leg	North of	South of	East of	West of
Cross Street	Obama Blvd		Crenshaw Blvd	
Existing	20,656.0	18,112.0	9,000.0	9,896.0
Future (2023)	22,840.0	20,000.0	9,864.0	10,576.0
Future (2023) wit	23,464.0	20,800.0	11,624.0	11,856.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0

Crenshaw Blvd

Southbound

	right	through	left
Existing	107	1,180	108
Future (2023)	119	1,293	130
Future (2023) wi	140	1,265	180

Obama Blvd

Eastbound

	left	through	right
Existing	184	528	64
Future (2023)	197	564	67
Future (2023) wi	213	588	123

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Westbound

	right	through	left
Existing	100	313	55
Future (2023)	113	332	62
Future (2023) wi	154	359	103

Northbound

	left	through	right
Existing	41	903	21
Future (2023)	43	1,003	32
Future (2023) wi	59	981	69

2

NOISE LEVEL CONTOURS - Existing Plus Project Weekday Off-Site ADT Volumes

ROADWAY NAME Segment	Land Use	Lanes	Median Width	ADT Volume	Design Speed (mph)	Dist. from Center tc Receptor	Alpha Factor (1	Barrier Attn. dB(A)	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	dB(A) CNEL
Crenshaw Blvd n/o Obama											
Existing		4	0	20,656	40	75	0	0	1.8%	0.7%	66.1
Future (2023)		4	0	22,840	40	75	0	0	1.8%	0.7%	66.5
Future (2023) with Project		4	0	23,464	40	75	0	0	1.8%	0.7%	66.6
Crenshaw Blvd s/o Obama											
Existing		4	0	18,112	40	75	0	0	1.8%	0.7%	65.5
Future (2023)		4	0	20,000	40	75	0	0	1.8%	0.7%	65.9
Future (2023) with Project		4	0	20,800	40	75	0	0	1.8%	0.7%	66.1
Obama Blvd e/o Crenshaw											
Existing		4	0	9,000	35	75	0	0	1.8%	0.7%	61.1
Future (2023)		4	0	9,864	35	75	0	0	1.8%	0.7%	61.5
Future (2023) with Project		4	0	11,624	35	75	0	0	1.8%	0.7%	62.2
Obama Blvd w/o Crenshaw											
Existing		4	0	9,896	35	75	0	0	1.8%	0.7%	61.5
Future (2023)		4	0	10,576	35	75	0	0	1.8%	0.7%	61.8
Future (2023) with Project		4	0	11,856	35	75	0	0	1.8%	0.7%	62.3

Segment	Traffic Volumes Day	Eve	Night	MTd	HTd	MTe	HTe	MTn	HTn	Ref. Energy Levels A	MT	HT	Dist Adj	Ld A	MT	HT	Total	Le A	MT	HT	Total	Ln A	MT	HT	Total
Crenshaw Blvd n/o Obama																									
Existing	####	2,623	1,983	325	129	19	4	28	12	67.4	76.3	81.2	-1.7	65.5	57.6	58.4	66.8	62.5	50.0	48.3	62.9	49.3	48.2	49.2	53.7
Future (2023)	####	2,901	2,193	359	142	21	5	31	13	67.4	76.3	81.2	-1.7	65.9	58.0	58.9	67.2	62.9	50.5	48.7	63.3	49.7	48.6	49.6	54.1
Future (2023) with Project	####	2,980	2,253	369	146	21	5	32	13	67.4	76.3	81.2	-1.7	66.0	58.2	59.0	67.4	63.0	50.6	48.8	63.4	49.8	48.7	49.8	54.2
Crenshaw Blvd s/o Obama																									
Existing	####	2,300	1,739	285	113	16	4	25	10	67.4	76.3	81.2	-1.7	64.9	57.0	57.9	66.2	61.9	49.5	47.7	62.3	48.7	47.6	48.6	53.1
Future (2023)	####	2,540	1,920	315	125	18	4	27	11	67.4	76.3	81.2	-1.7	65.3	57.5	58.3	66.7	62.3	49.9	48.1	62.7	49.1	48.0	49.1	53.5
Future (2023) with Project	####	2,642	1,997	327	130	19	4	28	12	67.4	76.3	81.2	-1.7	65.5	57.6	58.5	66.8	62.5	50.1	48.3	62.9	49.3	48.2	49.2	53.7
Obama Blvd e/o Crenshaw																									
Existing	6,993	1,143	864	142	56	8	2	12	5	65.1	74.8	80.0	-1.7	60.2	53.1	54.3	61.8	57.2	45.5	44.1	57.7	44.0	43.6	45.1	49.0
Future (2023)	7,664	1,253	947	155	62	9	2	13	6	65.1	74.8	80.0	-1.7	60.6	53.5	54.7	62.2	57.6	45.9	44.5	58.1	44.4	44.0	45.5	49.4
Future (2023) with Project	9,032	1,476	1,116	183	72	11	2	16	7	65.1	74.8	80.0	-1.7	61.3	54.2	55.4	62.9	58.3	46.6	45.2	58.8	45.1	44.8	46.2	50.2
Obama Blvd w/o Crenshaw																									
Existing	7,689	1,257	950	156	62	9	2	13	6	65.1	74.8	80.0	-1.7	60.6	53.5	54.7	62.2	57.6	45.9	44.5	58.1	44.4	44.1	45.5	49.5
Future (2023)	8,218	1,343	1,015	166	66	10	2	14	6	65.1	74.8	80.0	-1.7	60.9	53.8	55.0	62.5	57.9	46.2	44.8	58.4	44.7	44.3	45.8	49.7
Future (2023) with Project	9,212	1,506	1,138	187	74	11	2	16	7	65.1	74.8	80.0	-1.7	61.4	54.3	55.5	63.0	58.4	46.7	45.3	58.9	45.2	44.8	46.3	50.2

(1) Alpha Factor: Coefficient of absorption relating to the effects of the ground surface. An alpha factor of 0 indicates that the site is an acoustically "hard" site such as aspalt. An alpha factor of 0.5 indicates that the site is an acoustically "soft" site such as vegetative ground cover.

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Project Name rev. (Date)
Weekday AM Peak Hour Volumes

Intersection: 3
Victoria Ave & Lower Exposition Blvd

If Peak Hour = 6% of ADT, Scaling Factor = 16.667
If Peak Hour = 7% of ADT, Scaling Factor = 14.286
If Peak Hour = 8% of ADT, Scaling Factor = 12.5
If Peak Hour = 9% of ADT, Scaling Factor = 11.111
If Peak Hour = 10% of ADT, Scaling Factor = 10

ADT

Road	Victoria Ave		Lower Exposition Blvd	
Leg	North of	South of	East of	West of
Cross Street	Lower Exposition Blvd		Victoria Ave	
Existing	112.0	656.0	520.0	424.0
Future (2023)	120.0	688.0	544.0	440.0
Future (2023) wit	0.0	800.0	0.0	800.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0

Victoria Ave

Southbound

	right	through	left
Existing		12	2
Future (2023)		13	2
Future (2023) with Project			

Lower Exposition Bl

Eastbound

	left	through	right
Existing		23	7
Future (2023)		24	7
Future (2023) with Project			32

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Westbound

	right	through	left
Existing			
Future (2023)			
Future (2023) with Project			

Northbound

	left	through	right
Existing	23		40
Future (2023)	24		42
Future (2023) wi	68		

2

NOISE LEVEL CONTOURS - Existing Plus Project Weekday Off-Site ADT Volumes

ROADWAY NAME Segment	Land Use	Lanes	Median Width	ADT Volume	Design Speed (mph)	Dist. from Center to Receptor	Alpha Factor (1)	Barrier Attn. dB(A)	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	dB(A) CNEL	Traffic Volumes Day	Eve	Night	MTd	HTd	MTe	HTe	MTn	HTn	Ref. Energy Levels A	MT	HT	Dist Adj	Ld A	MT	HT	Total	Le A	MT	HT	Total	Ln A	MT	HT	Total
Victoria Blvd n/o Lower																																				
Existing		1	0	112	25	75	0	0	1.8%	0.7%	39.3	87	14	11	2	1	0	0	0	0	59.4	71.1	78.7	-1.8	36.8	31.6	35.3	39.8	33.8	24.1	25.1	34.8	20.6	22.2	26.0	28.3
Future (2023)		1	0	120	25	75	0	0	1.8%	0.7%	39.6	93	15	12	2	1	0	0	0	0	59.4	71.1	78.7	-1.8	37.1	31.9	35.6	40.1	34.1	24.4	25.4	35.1	20.9	22.5	26.3	28.6
Future (2023) with Project		1	0	0	25	75	0	0	1.8%	0.7%	#NUM!	0	0	0	0	0	0	0	0	0	59.4	71.1	78.7	-1.8	####	####	####	####	####	####	####	####	####	####	####	####
Victoria Blvd s/o Lower																																				
Existing		1	0	656	25	75	0	0	1.8%	0.7%	47.0	510	83	63	10	4	1	0	1	0	59.4	71.1	78.7	-1.8	44.5	39.3	42.9	47.5	41.5	31.7	32.8	42.4	28.3	29.9	33.7	36.0
Future (2023)		1	0	688	25	75	0	0	1.8%	0.7%	47.2	535	87	66	11	4	1	0	1	0	59.4	71.1	78.7	-1.8	44.7	39.5	43.2	47.7	41.7	31.9	33.0	42.6	28.5	30.1	33.9	36.2
Future (2023) with Project		1	0	800	25	75	0	0	1.8%	0.7%	47.9	622	102	77	13	5	1	0	1	0	59.4	71.1	78.7	-1.8	45.3	40.2	43.8	48.4	42.4	32.6	33.6	43.3	29.2	30.7	34.6	36.9
Lower Exposition Blvd e/o																																				
Existing		1	0	520	25	75	0	0	1.8%	0.7%	46.0	404	66	50	8	3	0	0	1	0	59.4	71.1	78.7	-1.8	43.5	38.3	41.9	46.5	40.5	30.7	31.8	41.4	27.3	28.8	32.7	35.0
Future (2023)		1	0	544	25	75	0	0	1.8%	0.7%	46.2	423	69	52	9	3	0	0	1	0	59.4	71.1	78.7	-1.8	43.7	38.5	42.1	46.7	40.7	30.9	32.0	41.6	27.5	29.0	32.9	35.2
Future (2023) with Project		1	0	0	25	75	0	0	1.8%	0.7%	#NUM!	0	0	0	0	0	0	0	0	0	59.4	71.1	78.7	-1.8	####	####	####	####	####	####	####	####	####	####	####	####
Lower Exposition Blvd w/o																																				
Existing		1	0	424	25	75	0	0	1.8%	0.7%	45.1	329	54	41	7	3	0	0	1	0	59.4	71.1	78.7	-1.8	42.6	37.4	41.0	45.6	39.6	29.8	30.9	40.5	26.4	28.0	31.8	34.1
Future (2023)		1	0	440	25	75	0	0	1.8%	0.7%	45.3	342	56	42	7	3	0	0	1	0	59.4	71.1	78.7	-1.8	42.7	37.6	41.2	45.8	39.8	30.0	31.0	40.7	26.6	28.1	32.0	34.3
Future (2023) with Project		1	0	800	25	75	0	0	1.8%	0.7%	47.9	622	102	77	13	5	1	0	1	0	59.4	71.1	78.7	-1.8	45.3	40.2	43.8	48.4	42.4	32.6	33.6	43.3	29.2	30.7	34.6	36.9

(1) Alpha Factor: Coefficient of absorption relating to the effects of the ground surface. An alpha factor of 0 indicates that the site is an acoustically "hard" site such as aspalt. An alpha factor of 0.5 indicates that the site is an acoustically "soft" site such as vegetative ground cover.

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Project Name rev. (Date)
Weekday PM Peak Hour Volumes

Intersection: 3
Victoria Ave & Lower Exposition Blvd

If Peak Hour = 6% of ADT, Scaling Factor = 16.667
If Peak Hour = 7% of ADT, Scaling Factor = 14.286
If Peak Hour = 8% of ADT, Scaling Factor = 12.5
If Peak Hour = 9% of ADT, Scaling Factor = 11.111
If Peak Hour = 10% of ADT, Scaling Factor = 10

ADT

Road	Victoria Ave		Lower Exposition Blvd	
Leg	North of	South of	East of	West of
Cross Street	Lower Exposition Blvd		Victoria Ave	
Existing	232.0	328.0	504.0	504.0
Future (2023)	248.0	344.0	528.0	528.0
Future (2023) wit	0.0	680.0	0.0	680.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0

Victoria Ave

Southbound

	right	through	left
Existing		14	15
Future (2023)		15	16
Future (2023) with Project			

Lower Exposition Bl

Eastbound

	left	through	right
Existing		42	15
Future (2023)		44	16
Future (2023) with Project			64

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Westbound

	right	through	left
Existing			
Future (2023)			
Future (2023) with Project			

Northbound

	left	through	right
Existing	6		6
Future (2023)	6		6
Future (2023) wi	21		

2

NOISE LEVEL CONTOURS - Existing Plus Project Weekday Off-Site ADT Volumes

ROADWAY NAME Segment	Land Use	Lanes	Median Width	ADT Volume	Design Speed (mph)	Dist. from Center to Receptor	Alpha Factor (1)	Barrier Attn. dB(A)	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	dB(A) CNEL
Victoria Blvd n/o Lower											
Existing		1	0	232	25	75	0	0	1.8%	0.7%	42.5
Future (2023)		1	0	248	25	75	0	0	1.8%	0.7%	42.8
Future (2023) with Project		1	0	0	25	75	0	0	1.8%	0.7%	#NUM!
Victoria Blvd s/o Lower											
Existing		1	0	328	25	75	0	0	1.8%	0.7%	44.0
Future (2023)		1	0	344	25	75	0	0	1.8%	0.7%	44.2
Future (2023) with Project		1	0	680	25	75	0	0	1.8%	0.7%	47.1
Lower Exposition Blvd e/o											
Existing		1	0	504	25	75	0	0	1.8%	0.7%	45.8
Future (2023)		1	0	528	25	75	0	0	1.8%	0.7%	46.0
Future (2023) with Project		1	0	0	25	75	0	0	1.8%	0.7%	#NUM!
Lower Exposition Blvd w/o											
Existing		1	0	504	25	75	0	0	1.8%	0.7%	45.8
Future (2023)		1	0	528	25	75	0	0	1.8%	0.7%	46.0
Future (2023) with Project		1	0	680	25	75	0	0	1.8%	0.7%	47.1

Segment	Traffic Volumes Day	Eve	Night	MTd	HTd	MTe	HTe	MTn	HTn	Ref. Energy Levels A	MT	HT	Dist Adj	Ld A	MT	HT	Total	Le A	MT	HT	Total	Ln A	MT	HT	Total
Victoria Blvd n/o Lower																									
Existing	180	29	22	4	1	0	0	0	0	59.4	71.1	78.7	-1.8	40.0	34.8	38.4	43.0	37.0	27.2	28.3	37.9	23.8	25.3	29.2	31.5
Future (2023)	193	31	24	4	2	0	0	0	0	59.4	71.1	78.7	-1.8	40.3	35.1	38.7	43.3	37.3	27.5	28.6	38.2	24.1	25.6	29.5	31.8
Future (2023) with Project	0	0	0	0	0	0	0	0	0	59.4	71.1	78.7	-1.8	####	####	####	####	####	####	####	####	####	####	####	####
Victoria Blvd s/o Lower																									
Existing	255	42	31	5	2	0	0	0	0	59.4	71.1	78.7	-1.8	41.5	36.3	39.9	44.5	38.5	28.7	29.8	39.4	25.3	26.8	30.7	33.0
Future (2023)	267	44	33	5	2	0	0	0	0	59.4	71.1	78.7	-1.8	41.7	36.5	40.1	44.7	38.7	28.9	30.0	39.6	25.5	27.1	30.9	33.2
Future (2023) with Project	528	86	65	11	4	1	0	1	0	59.4	71.1	78.7	-1.8	44.6	39.5	43.1	47.7	41.7	31.9	32.9	42.6	28.5	30.0	33.9	36.2
Lower Exposition Blvd e/o																									
Existing	392	64	48	8	3	0	0	1	0	59.4	71.1	78.7	-1.8	43.3	38.2	41.8	46.4	40.4	30.6	31.6	41.3	27.2	28.7	32.6	34.9
Future (2023)	410	67	51	8	3	0	0	1	0	59.4	71.1	78.7	-1.8	43.5	38.4	42.0	46.6	40.6	30.8	31.8	41.5	27.4	28.9	32.8	35.1
Future (2023) with Project	0	0	0	0	0	0	0	0	0	59.4	71.1	78.7	-1.8	####	####	####	####	####	####	####	####	####	####	####	####
Lower Exposition Blvd w/o																									
Existing	392	64	48	8	3	0	0	1	0	59.4	71.1	78.7	-1.8	43.3	38.2	41.8	46.4	40.4	30.6	31.6	41.3	27.2	28.7	32.6	34.9
Future (2023)	410	67	51	8	3	0	0	1	0	59.4	71.1	78.7	-1.8	43.5	38.4	42.0	46.6	40.6	30.8	31.8	41.5	27.4	28.9	32.8	35.1
Future (2023) with Project	528	86	65	11	4	1	0	1	0	59.4	71.1	78.7	-1.8	44.6	39.5	43.1	47.7	41.7	31.9	32.9	42.6	28.5	30.0	33.9	36.2

(1) Alpha Factor: Coefficient of absorption relating to the effects of the ground surface. An alpha factor of 0 indicates that the site is an acoustically "hard" site such as aspalt. An alpha factor of 0.5 indicates that the site is an acoustically "soft" site such as vegetative ground cover.

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Project Name rev. (Date)

Weekday AM Peak Hour Volumes

Intersection: 4

Victoria Ave & Obama Blvd

If Peak Hour = 6% of ADT, Scaling Factor = 16.667

If Peak Hour = 7% of ADT, Scaling Factor = 14.286

If Peak Hour = 8% of ADT, Scaling Factor = 12.5

If Peak Hour = 9% of ADT, Scaling Factor = 11.111

If Peak Hour = 10% of ADT, Scaling Factor = 10

ADT

Road	Victoria Ave		Obama Blvd	
Leg	North of	South of	East of	West of
Cross Street	Obama Blvd		Victoria Ave	
Existing	680.0	1,360.0	9,656.0	9,584.0
Future (2023)	712.0	1,464.0	10,256.0	10,144.0
Future (2023) wit	1,368.0	1,464.0	10,984.0	10,408.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0

Victoria Ave

Southbound

	right	through	left
Existing	5	4	7
Future (2023)	5	4	7
Future (2023) wi	13	4	62

Obama Blvd

Eastbound

	left	through	right
Existing	13	419	13
Future (2023)	14	442	14
Future (2023) wi	18	452	14

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Westbound

	right	through	left
Existing	15	701	15
Future (2023)	16	744	20
Future (2023) wi	31	755	20

Northbound

	left	through	right
Existing	47	41	50
Future (2023)	49	43	53
Future (2023) wi	49	43	53

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NOISE LEVEL CONTOURS - Existing Plus Project Weekday Off-Site ADT Volumes

ROADWAY NAME Segment	Land Use	Lanes	Median Width	ADT Volume	Design Speed (mph)	Dist. from Center tc Receptor	Alpha Factor (1	Barrier Attn. dB(A)	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	dB(A) CNEL
Victoria Blvd n/o Obama											
Existing		1	0	680	25	75	0	0	1.8%	0.7%	47.1
Future (2023)		1	0	712	25	75	0	0	1.8%	0.7%	47.3
Future (2023) with Project		1	0	1,368	25	75	0	0	1.8%	0.7%	50.2
Victoria Blvd s/o Obama Blvd											
Existing		1	0	1,360	25	75	0	0	1.8%	0.7%	50.2
Future (2023)		1	0	1,464	25	75	0	0	1.8%	0.7%	50.5
Future (2023) with Project		1	0	1,464	25	75	0	0	1.8%	0.7%	50.5
Obama Blvd e/o Victoria											
Existing		4	0	9,656	40	75	0	0	1.8%	0.7%	62.8
Future (2023)		4	0	10,256	40	75	0	0	1.8%	0.7%	63.0
Future (2023) with Project		4	0	10,984	40	75	0	0	1.8%	0.7%	63.3
Obama Blvd w/o Victoria											
Existing		4	0	9,584	40	75	0	0	1.8%	0.7%	62.7
Future (2023)		4	0	10,144	40	75	0	0	1.8%	0.7%	63.0
Future (2023) with Project		4	0	10,408	40	75	0	0	1.8%	0.7%	63.1

Segment	Traffic Volumes Day	Eve	Night	MTd	HTd	MTe	HTe	MTn	HTn	Ref. Energy Levels A	MT	HT	Dist Adj	Ld A	MT	HT	Total	Le A	MT	HT	Total	Ln A	MT	HT	Total
Victoria Blvd n/o Obama																									
Existing	528	86	65	11	4	1	0	1	0	59.4	71.1	78.7	-1.8	44.6	39.5	43.1	47.7	41.7	31.9	32.9	42.6	28.5	30.0	33.9	36.2
Future (2023)	553	90	68	11	4	1	0	1	0	59.4	71.1	78.7	-1.8	44.8	39.7	43.3	47.9	41.9	32.1	33.1	42.8	28.7	30.2	34.1	36.4
Future (2023) with Project	1,063	174	131	22	9	1	0	2	1	59.4	71.1	78.7	-1.8	47.7	42.5	46.1	50.7	44.7	34.9	36.0	45.6	31.5	33.0	36.9	39.2
Victoria Blvd s/o Obama Blvd																									
Existing	1,057	173	131	21	8	1	0	2	1	59.4	71.1	78.7	-1.8	47.6	42.5	46.1	50.7	44.7	34.9	35.9	45.6	31.5	33.0	36.9	39.2
Future (2023)	1,138	186	141	23	9	1	0	2	1	59.4	71.1	78.7	-1.8	48.0	42.8	46.4	51.0	45.0	35.2	36.3	45.9	31.8	33.3	37.2	39.5
Future (2023) with Project	1,138	186	141	23	9	1	0	2	1	59.4	71.1	78.7	-1.8	48.0	42.8	46.4	51.0	45.0	35.2	36.3	45.9	31.8	33.3	37.2	39.5
Obama Blvd e/o Victoria																									
Existing	7,503	1,226	927	152	60	9	2	13	5	67.4	76.3	81.2	-1.7	62.2	54.3	55.1	63.5	59.2	46.7	45.0	59.6	46.0	44.8	45.9	50.4
Future (2023)	7,969	1,303	985	161	64	9	2	14	6	67.4	76.3	81.2	-1.7	62.4	54.6	55.4	63.8	59.4	47.0	45.2	59.8	46.2	45.1	46.2	50.6
Future (2023) with Project	8,535	1,395	1,054	173	69	10	2	15	6	67.4	76.3	81.2	-1.7	62.7	54.9	55.7	64.1	59.7	47.3	45.5	60.1	46.5	45.4	46.5	50.9
Obama Blvd w/o Victoria																									
Existing	7,447	1,217	920	151	60	9	2	13	5	67.4	76.3	81.2	-1.7	62.1	54.3	55.1	63.5	59.1	46.7	44.9	59.5	46.0	44.8	45.9	50.3
Future (2023)	7,882	1,288	974	160	63	9	2	14	6	67.4	76.3	81.2	-1.7	62.4	54.5	55.3	63.7	59.4	46.9	45.2	59.8	46.2	45.1	46.1	50.6
Future (2023) with Project	8,087	1,322	999	164	65	9	2	14	6	67.4	76.3	81.2	-1.7	62.5	54.6	55.5	63.8	59.5	47.0	45.3	59.9	46.3	45.2	46.2	50.7

(1) Alpha Factor: Coefficient of absorption relating to the effects of the ground surface. An alpha factor of 0 indicates that the site is an acoustically "hard" site such as aspalt. An alpha factor of 0.5 indicates that the site is an acoustically "soft" site such as vegetative ground cover.

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Project Name rev. (Date)

Weekday PM Peak Hour Volumes

Intersection: 4

Victoria Ave & Obama Blvd

If Peak Hour = 6% of ADT, Scaling Factor = 16.667
If Peak Hour = 7% of ADT, Scaling Factor = 14.286
If Peak Hour = 8% of ADT, Scaling Factor = 12.5
If Peak Hour = 9% of ADT, Scaling Factor = 11.111
If Peak Hour = 10% of ADT, Scaling Factor = 10

ADT

Road	Victoria Ave		Obama Blvd	
Leg	North of	South of	East of	West of
Cross Street	Obama Blvd		Victoria Ave	
Existing	480.0	1,304.0	10,608.0	10,184.0
Future (2023)	568.0	1,360.0	11,392.0	10,888.0
Future (2023) wit	1,608.0	1,360.0	12,600.0	11,168.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0

Victoria Ave

Southbound

	right	through	left
Existing	10	18	12
Future (2023)	11	19	17
Future (2023) wi	5	19	94

Obama Blvd

Eastbound

	left	through	right
Existing	3	744	23
Future (2023)	3	795	24
Future (2023) wi	16	810	24

N
W E
S

Westbound

	right	through	left
Existing	9	470	45
Future (2023)	13	504	47
Future (2023) wi	59	517	47

Northbound

	left	through	right
Existing	23	8	46
Future (2023)	24	8	48
Future (2023) wi	24	8	48

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NOISE LEVEL CONTOURS - Existing Plus Project Weekday Off-Site ADT Volumes

ROADWAY NAME Segment	Land Use	Lanes	Median Width	ADT Volume	Design Speed (mph)	Dist. from Center tc Receptor	Alpha Factor (1	Barrier Attn. dB(A)	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	dB(A) CNEL
Victoria Blvd n/o Obama											
Existing		1	0	480	25	75	0	0	1.8%	0.7%	45.6
Future (2023)		1	0	568	25	75	0	0	1.8%	0.7%	46.4
Future (2023) with Project		1	0	1,608	25	75	0	0	1.8%	0.7%	50.9
Victoria Blvd s/o Obama Blvd											
Existing		1	0	1,304	25	75	0	0	1.8%	0.7%	50.0
Future (2023)		1	0	1,360	25	75	0	0	1.8%	0.7%	50.2
Future (2023) with Project		1	0	1,360	25	75	0	0	1.8%	0.7%	50.2
Obama Blvd e/o Victoria											
Existing		4	0	10,608	40	75	0	0	1.8%	0.7%	63.2
Future (2023)		4	0	11,392	40	75	0	0	1.8%	0.7%	63.5
Future (2023) with Project		4	0	12,600	40	75	0	0	1.8%	0.7%	63.9
Obama Blvd w/o Victoria											
Existing		4	0	10,184	40	75	0	0	1.8%	0.7%	63.0
Future (2023)		4	0	10,888	40	75	0	0	1.8%	0.7%	63.3
Future (2023) with Project		4	0	11,168	40	75	0	0	1.8%	0.7%	63.4

Segment	Traffic Volumes Day	Eve	Night	MTd	HTd	MTe	HTe	MTn	HTn	Ref. Energy Levels A	MT	HT	Dist Adj	Ld A	MT	HT	Total	Le A	MT	HT	Total	Ln A	MT	HT	Total
Victoria Blvd n/o Obama																									
Existing	373	61	46	8	3	0	0	1	0	59.4	71.1	78.7	-1.8	43.1	38.0	41.6	46.1	40.1	30.4	31.4	41.1	26.9	28.5	32.4	34.7
Future (2023)	441	72	55	9	4	1	0	1	0	59.4	71.1	78.7	-1.8	43.8	38.7	42.3	46.9	40.9	31.1	32.2	41.8	27.7	29.2	33.1	35.4
Future (2023) with Project	1,249	204	154	25	10	1	0	2	1	59.4	71.1	78.7	-1.8	48.4	43.2	46.8	51.4	45.4	35.6	36.7	46.3	32.2	33.8	37.6	39.9
Victoria Blvd s/o Obama Blvd																									
Existing	1,013	166	125	21	8	1	0	2	1	59.4	71.1	78.7	-1.8	47.5	42.3	45.9	50.5	44.5	34.7	35.8	45.4	31.3	32.8	36.7	39.0
Future (2023)	1,057	173	131	21	8	1	0	2	1	59.4	71.1	78.7	-1.8	47.6	42.5	46.1	50.7	44.7	34.9	35.9	45.6	31.5	33.0	36.9	39.2
Future (2023) with Project	1,057	173	131	21	8	1	0	2	1	59.4	71.1	78.7	-1.8	47.6	42.5	46.1	50.7	44.7	34.9	35.9	45.6	31.5	33.0	36.9	39.2
Obama Blvd e/o Victoria																									
Existing	8,242	1,347	1,018	167	66	10	2	14	6	67.4	76.3	81.2	-1.7	62.6	54.7	55.5	63.9	59.6	47.1	45.4	60.0	46.4	45.3	46.3	50.8
Future (2023)	8,852	1,447	1,094	179	71	10	2	15	6	67.4	76.3	81.2	-1.7	62.9	55.0	55.8	64.2	59.9	47.4	45.7	60.3	46.7	45.6	46.6	51.1
Future (2023) with Project	9,790	1,600	1,210	198	79	11	3	17	7	67.4	76.3	81.2	-1.7	63.3	55.5	56.3	64.7	60.3	47.9	46.1	60.7	47.1	46.0	47.1	51.5
Obama Blvd w/o Victoria																									
Existing	7,913	1,293	978	160	64	9	2	14	6	67.4	76.3	81.2	-1.7	62.4	54.5	55.4	63.7	59.4	47.0	45.2	59.8	46.2	45.1	46.1	50.6
Future (2023)	8,460	1,383	1,045	171	68	10	2	15	6	67.4	76.3	81.2	-1.7	62.7	54.8	55.7	64.0	59.7	47.2	45.5	60.1	46.5	45.4	46.4	50.9
Future (2023) with Project	8,678	1,418	1,072	176	70	10	2	15	6	67.4	76.3	81.2	-1.7	62.8	54.9	55.8	64.1	59.8	47.4	45.6	60.2	46.6	45.5	46.5	51.0

(1) Alpha Factor: Coefficient of absorption relating to the effects of the ground surface. An alpha factor of 0 indicates that the site is an acoustically "hard" site such as aspalt. An alpha factor of 0.5 indicates that the site is an acoustically "soft" site such as vegetative ground cover.

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

ATTACHMENT C

Construction Noise Worksheets

Phase	Equipment	Quantity	Site 2 30 feet	Site 4 100 feet	Site 5 35 feet	Site 6 200 feet	Site 7 155 feet
Demolition	Air Compressors	1	78.1	67.7	76.8	61.6	63.9
	Bore/Drill Rigs	2	84.8	74.4	83.5	68.3	70.6
	Concrete/Industrial Saws	2	90	79.6	88.7	73.6	75.8
	Crushing/Proc. Equipment	1	86.4	76	85.1	69.9	72.2
	Excavators	1	81.2	70.7	79.8	64.7	66.9
	Generator Sets	1	82.1	71.6	80.7	65.6	67.8
	Other Construction Equipment	2	89.4	79	88.1	73	75.2
	Rubber Tired Loaders	1	79.6	69.1	78.2	63.1	65.3
	SUM		**94.9**	**84.4**	**93.5**	**78.4**	**80.6**
Grading	Dumpers/Tenders	2	79.9	69.5	78.6	63.4	65.7
	Excavators	4	87.2	76.7	85.8	70.7	72.9
	Graders	2	88.5	78	87.1	72	74.2
	Plate Compactors	2	83.7	73.2	82.3	67.2	69.4
	Skid Steer Loaders	2	82.6	72.1	81.2	66.1	68.3
	Tractors/Loaders/Backhoes	2	87.5	77	86.1	71	73.2
	Trenchers	2	84.8	74.3	83.5	68.3	70.5
	SUM		**94.2**	**83.7**	**92.8**	**77.7**	**79.9**
Building Construction	Air Compressors	8	87.2	76.7	85.8	70.7	72.9
	Bore/Drill Rigs	2	84.8	74.4	83.5	68.3	70.6
	Cement and Mortar Mixers	12	75.8	73.6	88.7	79.6	90
	Cranes	2	80	69.6	78.7	63.6	65.8
	Forklifts	4	91.5	81	90.1	75	77.2
	Generator Sets	2	85.1	74.6	83.7	68.6	70.8
	Other General Industrial Equipment	2	89.4	79	88.1	73	75.2
	Tractors/Loaders/Backhoes	2	87.5	77	86.1	71	73.2
	SUM		**96.2**	**85.9**	**95.7**	**82.6**	**90.6**
Paving	Air Compressors	2	81.1	70.7	79.8	64.7	66.9
	Cement and Mortar Mixers	4	85.3	74.8	83.9	68.8	71
	Concrete/Industrial Saws	2	90	79.6	88.7	73.6	75.8
	Forklifts	2	88.5	78	87.1	72	74.2
	Other General Industrial Equipment	2	89.4	79	88.1	73	75.2
	Paving Equipment	2	81.7	71.2	80.3	65.2	67.4
	Surfacing Equipment	1	81.2	70.7	79.8	64.7	66.9
	Sweepers/Scrubbers	1	76	65.6	74.7	59.5	61.8
	Tractors/Loaders/Backhoes	2	87.5	77	86.1	71	73.2
	Trenchers	2	84.8	74.3	83.5	68.3	70.5
	SUM		**96.3**	**85.8**	**94.9**	**79.8**	**82.0**
Architectural Coating	Air Compressors	1	**78.1**	**67.7**	**76.8**	**61.6**	**63.9**

ATTACHMENT D

Construction Vibration Worksheets

Crenshaw Crossing
Construction Vibration Model
(Site 2)

Equipment		Pieces of Equipment	PPV at 25 feet (in/sec)	Distance from Equipment	PPV at adjusted distance	RMS velocity amplitude in in/sec at adjusted distance[a]	RMS Vibration level in VdB at adjusted distance
Caisson drilling		1	0.089	30	0.068	0.017	85
Jackhammer		1	0.035	30	0.027	0.007	76
Large bulldozer		1	0.089	30	0.068	0.017	85
Loaded trucks		1	0.076	30	0.058	0.014	83
Pile Drive (impact)		1	0.644	30	0.490	0.122	102
Vibratory Roller		1	0.210	60	0.056	0.014	83
Small bulldozer		1	0.003	30	0.002	0.001	55

*** Suggested Vibration Thresholds per the Federal Transit Administration, United States Department of Transportation, Transit Noise and Vibration Impact Assessment (FTA-VA-90-1003-06), May 2006, pg. 12-12.**

-Fragile Buildings- 0.20 in/sec

Crenshaw Crossing
Construction Vibration Model
Site 4

Equipment		Pieces of Equipment	PPV at 25 feet (in/sec)	Distance from Equipment	PPV at adjusted distance	RMS velocity amplitude in in/sec at adjusted distance[a]	RMS Vibration level in VdB at adjusted distance
Caisson drilling		1	0.089	100	0.011	0.003	69
Jackhammer		1	0.035	100	0.004	0.001	61
Large bulldozer		1	0.089	100	0.011	0.003	69
Loaded trucks		1	0.076	100	0.010	0.002	68
Pile Drive (impact)		1	0.644	100	0.081	0.020	86
Vibratory Roller		1	0.210	100	0.026	0.007	76
Small bulldozer		1	0.003	100	0.000	0.000	39

*** Suggested Vibration Thresholds per the Federal Transit Administration, United States Department of Transportation, Transit Noise and Vibration Impact Assessment (FTA-VA-90-1003-06), May 2006, pg. 12-12.**

-Fragile Buildings- 0.20 in/sec

Crenshaw Crossing
Construction Vibration Model
(Site 5)

Equipment		Pieces of Equipment	PPV at 25 feet (in/sec)	Distance from Equipment	PPV at adjusted distance	RMS velocity amplitude in in/sec at adjusted distance[a]	RMS Vibration level in VdB at adjusted distance
Caisson drilling		1	0.089	35	0.054	0.013	83
Jackhammer		1	0.035	35	0.021	0.005	74
Large bulldozer		1	0.089	35	0.054	0.013	83
Loaded trucks		1	0.076	35	0.046	0.011	81
Pile Drive (impact)		1	0.644	35	0.389	0.097	100
Vibratory Roller		1	0.210	50	0.074	0.019	85
Small bulldozer		1	0.003	35	0.002	0.000	53

*** Suggested Vibration Thresholds per the Federal Transit Administration, United States Department of Transportation, Transit Noise and Vibration Impact Assessment (FTA-VA-90-1003-06), May 2006, pg. 12-12.**

-Fragile Buildings- 0.20 in/sec

Crenshaw Crossing
Construction Vibration Model
(Site 6)

Equipment		Pieces of Equipment	PPV at 25 feet (in/sec)	Distance from Equipment	PPV at adjusted distance	RMS velocity amplitude in in/sec at adjusted distance[a]	RMS Vibration level in VdB at adjusted distance
Caisson drilling		1	0.089	200	0.004	0.001	60
Jackhammer		1	0.035	200	0.002	0.000	52
Large bulldozer		1	0.089	200	0.004	0.001	60
Loaded trucks		1	0.076	200	0.003	0.001	58
Pile Drive (impact)		1	0.644	200	0.028	0.007	77
Vibratory Roller		1	0.210	200	0.009	0.002	67
Small bulldozer		1	0.003	200	0.000	0.000	30

*** Suggested Vibration Thresholds per the Federal Transit Administration, United States Department of Transportation, Transit Noise and Vibration Impact Assessment (FTA-VA-90-1003-06), May 2006, pg. 12-12.**

-Fragile Buildings- 0.20 in/sec

Crenshaw Crossing
Construction Vibration Model
(Site 7)

Equipment		Pieces of Equipment	PPV at 25 feet (in/sec)	Distance from Equipment	PPV at adjusted distance	RMS velocity amplitude in in/sec at adjusted distance[a]	RMS Vibration level in VdB at adjusted distance
Caisson drilling		1	0.089	155	0.006	0.001	63
Jackhammer		1	0.035	155	0.002	0.001	55
Large bulldozer		1	0.089	155	0.006	0.001	63
Loaded trucks		1	0.076	155	0.005	0.001	62
Pile Drive (impact)		1	0.644	155	0.042	0.010	80
Vibratory Roller		1	0.210	155	0.014	0.003	71
Small bulldozer		1	0.003	155	0.000	0.000	34

*** Suggested Vibration Thresholds per the Federal Transit Administration, United States Department of Transportation, Transit Noise and Vibration Impact Assessment (FTA-VA-90-1003-06), May 2006, pg. 12-12.**

-Fragile Buildings- 0.20 in/sec