Hoover Street District Yard Demolition and New Power District Yard Project

Noise and Vibration Technical Report

Prepared for

LADWP
111 N. Hope Street
Los Angeles, CA 90012

June 2021

Hoover Street District Yard Demolition and New Power District Yard Project

Noise and Vibration Technical Report

Prepared for
LADWP
111 N. Hope Street
Los Angeles, CA 90012

June 2021

80 South Lake Avenue
Suite 570
Pasadena, CA 91101
626.204.6170
www.esassoc.com

ESA

Bend	Oakland	San Francisco
Camarillo	Orlando	Santa Monica
Delray Beach	Pasadena	Sarasota
Destin	Petaluma	Seattle
Irvine	Portland	Sunrise
Los Angeles	Sacramento	Tampa
Miami	San Diego	

D160626.01

TABLE OF CONTENTS

Noise and Vibration Technical Report

Appendices

Page

List of Figures

List of Tables

Hoover Street District Yard Demolition and New Power District Yard Project

Noise and Vibration Technical Report

Executive Summary

The purpose of this Noise and Vibration Technical Report is to evaluate the potential short- and long-term noise and vibration impacts resulting from implementation of the proposed Hoover Street District Yard Demolition and New Power District Yard Project (project). The project site is located northwest of downtown Los Angeles, in the City of Los Angeles. The project site is bound by Clinton Street to the south, Commonwealth Avenue to the west, residential uses to the north, and North Hoover Street to the east. The proposed project would construct an approximately 31,939 square foot (sf) District Office building, Supply Chain Services (SCS) Warehouse, and Fleet Maintenance facility for a total of 99,043 square feet (sf). The proposed project would also provide 10,350 sf of outdoor storage facilities and a fueling station. The fueling station would provide unleaded and diesel fueling services. The proposed project would provide 157 subterranean parking spaces and 23 surface-level parking spaces that would all be equipped with EV chargers.

The report analyzes the potential for the proposed project to conflict with applicable noise and vibration regulations, standards, and thresholds. The findings of the analyses are summarized as follows:

- Construction activities would result in sporadic, and temporary noise increases adjacent to the Project area, which would exceed established thresholds. With implementation of the technically feasible mitigation measures, construction noise would be reduced and impacts would be less than significant.
- The Project's noise impacts on existing development from operational on-site stationary noise sources and off-site traffic noise would be less than significant.
- Construction activities would result in sporadic, temporary vibration effects adjacent to the Project area, which would exceed established thresholds for human annoyance. However, with implementation of the mitigation measures, construction vibration impacts related to human annoyance would be less than significant.
- Construction activities would not result in temporary vibration effects that would exceed established thresholds for structural damage. This, short-term vibration impacts related to structural damage would be less than significant.
- Project operation would not generate excessive vibration levels at nearby sensitive receptor locations. Thus, long-term vibration impacts would be less than significant.

1. Introduction

ESA has conducted an acoustical study with respect to potential noise and vibration impacts with construction activities, surface transportation, and other aspects of project operations that are noise and vibration intensive and that have the potential to impact neighboring noise sensitive land uses. The objectives of this noise study are to:

a. Quantify the existing ambient noise environment at the project site;

b. Evaluate the construction and operational noise and vibration impacts to nearby noise sensitive receptors (i.e., residential uses) based on applicable City standards and thresholds;

c. Provide, if needed, noise mitigation measures as required to meet applicable noise regulations and standards, as specified by the City of Los Angeles.

1.1 Existing Conditions

The project is located within the East Hollywood area and within the northeastern portion of the City of Los Angeles. The project is bounded by Clinton Street to the south, Commonwealth Avenue to the west, residential uses to the north, and North Hoover Street to the east, and residential development to the north. Specifically, the project is located in Section 18 of Township 1 South, Range 13 West on the Hollywood U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle. The project site is shown in **Figure 1**.

2. Project Description

Los Angeles Department of Water and Power (LADWP) is proposing the Hoover Street District Yard Demolition and New Power District Yard Project (proposed project) at 611 North Hoover Street in Los Angeles California. The proposed project would demolish the aging infrastructure on site and construct a new maintenance yard for transmission line maintenance activities. The new facility would include a District Office building, Supply Chain Services (SCS) Warehouse, and Fleet Maintenance facility for a total of 99,043 square feet (sf). The proposed project would also provide 10,350 sf of outdoor storage facilities and a fueling station. The fueling station would provide unleaded and diesel fueling services. The proposed project would provide 157 subterranean parking spaces and 23 surface-level parking spaces that would all be equipped with EV chargers. **Figure 2** shows the project site.

2.1 Construction

Construction staging during implementation of the Data Gap Work Plan starting in 2021 would occur in an offsite parking lane, as permitted by the City of Los Angeles. When construction of the proposed facility initiates again in 2026 and after completion of the subterranean parking structure in 2027, construction staging would be moved onto the project site through 2028 as explained in Section 1.4 *Project Overview* of the project's IS/MND. Construction activities would commence with Implementation of the Data Gap Work Plan, demolition of the existing structures and pavement, followed by excavation and soil remediation, site preparation, installation of drainage and utilities; and building construction and application of architectural coatings. The first six months of the construction period would involve implementation of the Data Gap Work

Figure 1 Regional and Project Location

Figure 2 Proposed Site Layout

Plan. During the excavation and soil remediation phase, approximately 50,000 cubic yards of soil would be excavated and hauled off site for disposal. It is estimated that approximately 32,000 CY would be contaminated soil requiring disposal at an approved landfill. The contaminated soil would likely be disposed of at the Kettleman Hills Landfill, a hazardous waste landfill facility located in the San Joaquin Valley in Kern County. During the site preparation phase, approximately 88,380 sf of the project site would be paved. Construction staging during implementation of the Data Gap Work Plan starting in 2021 would occur in an offsite parking lane, as permitted by the City of Los Angeles. When construction of the proposed facility initiates again in 2026 and after completion of the subterranean parking structure in 2027, construction staging would be moved onto the project site. Utility connections for both electricity and water would remain in place. Electricity is currently distributed through a 50KVA transformer. Water is currently provided through a 4-inch domestic pipe, which is connected to an 8-inch water main that is located in Hoover Street.

For the subsurface parking structure, a drilling auger would be used to set soldier piles and vertical (steel) beams for the construction of an 88,380 sf subterranean parking lot. The total depths of excavation activity could extend as deep as 50 feet bgs. A total of 270 soldier piles are required and would be spaced every 4 feet. Due to the depth of the subterranean parking lot, it is anticipated that two soldier piles would be drilled and filled each day. The construction of the subterranean parking lot would require the use of a drilling rig for approximately 75 days. During the grading phase of construction, this project would include up to 24 haul trucks per day transporting excavated soils to their appropriate location. The subterranean parking structure would then be completed with steel-rebar and concrete floors, ceiling, and walls. During project construction, access to the project site would be provided via North Hoover Street only. Once the subterranean parking lot is completed, construction workers would access the site via Clinton Street and park in the subterranean lot. Excavation and shoring for the subsurface parking structure is tentatively scheduled to commence in fall 2026 and is expected to require 4 to 5 months to complete. Following excavation and shoring, the concrete deck would be poured. Therefore, the parking deck would be completed by early 2027, so that construction staging and worker parking can be moved onsite.

Construction-related traffic on the local roadways would occur, and the daily maximum number of one-way vehicle trips is estimated to be 218. This includes worker trips, heavy-duty trucks hauling construction debris away from project site and/or delivery construction materials to the project site. Construction vehicles would exit the facility from North Hoover Street and head to the landfill using the US-101 N and CA-170 N. All existing project site staff would be relocated to an alternative maintenance yard, as all street lighting maintenance would be relocated to another facility. Upon completion of surface construction activities, the onsite monitoring well network would be reinstalled. The purpose of the groundwater monitoring system is to monitor the progress of groundwater cleanup and identify when the cleanup has been completed to the satisfaction of the Regional Water Quality Control Board (RWQCB). Up to 15 groundwater monitoring wells would be installed at locations that would not interfere with the District Yard operations. Upon completion of groundwater cleanup, the monitoring wells would be sealed in place by filling the wells with a bentonite-cement grout. The reinstallation of the well network would require submitting a work plan to the RWQCB for their review and approval.

Consistent with the Los Angeles Municipal Code, construction is expected to occur between the hours of 7:00 a.m. and 9:00 p.m. on Monday through Friday. No nighttime construction would occur outside of allowable hours, and no construction would occur on Saturdays, Sundays or federal holidays.

The number of construction workers and construction equipment would vary throughout the construction phase in order to maintain an effective schedule of completion. It is estimated that during the construction period the number of workers that would be onsite would range from approximately 10 to 75.

2.2 Operation

The proposed project would increase the number of employees at the project site from 52 to approximately 102 full time staff. Of the 102 new full time employees, 20 would be office staff, 79 would be fleet staff, and 3 would be fleet maintenance staff. The project would not increase the number of fleet vehicles stationed on site during project operation. The site currently maintains 39 fleet vehicles consisting of pick-up trucks, aerial bucket trucks, a small auger digger, pitman boom trucks, temporary transformer trailers, forklifts, dodge sedans, a stake bed truck, and a step van. Staff hours on Mondays and Fridays begin at 6:30 a.m. and conclude at 4:00 p.m. Staff hours from Tuesday through Thursday begin at 6:30 a.m. and conclude at 4:30 p.m. Staff hours on Saturday begin at 6:00 a.m. and conclude at 4:30 p.m. Staff would also work a Sunday shift every other week that would begin at 6:00 a.m. and conclude at 4:30 p.m. In the event of an emergency situation, the proposed facility would operate as a 24-hour facility for the duration of the emergency event.

All entrances to the site would be gated with card reader access. Security offices would be located on the 1st floor lobby of the District Office Building to monitor pedestrian and vehicle access onto the site. Facility maintenance staff would support all maintenance activities. Visitors and outside vehicles would be required to check in with an on-site security officer in order to gain site access.

3. Environmental Setting

3.1 Noise Principles and Descriptors

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air). Noise is generally defined as unwanted sound (i.e., loud, unexpected, or annoying sound). Acoustics is defined as the physics of sound. In acoustics, the fundamental scientific model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. Acoustics addresses primarily the propagation and control of sound.

Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) that is measured in decibels (dB), which is the standard unit of sound amplitude measurement. The dB scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound, with 0 dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude. When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to this frequency range. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that deemphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to these extremely low and extremely high frequencies. This method of frequency filtering or weighting is referred to as A-weighting, expressed in units of A-weighted decibels (dBA), which is typically applied to community noise measurements. Some representative common outdoor and indoor noise sources and their corresponding A-weighted noise levels are shown in **Figure 3**.

3.2 Noise Exposure and Community Noise

An individual's noise exposure is a measure of noise over a period of time; a noise level is a measure of noise at a given instant in time, as presented in Figure 3. However, noise levels rarely persist at constant levels over a long period of time. Rather, community noise varies continuously over a period of time with respect to the sound sources contributing to the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with many of the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources, such as changes in traffic volume. What makes community noise variable throughout a day, besides the slowly changing background noise, is the addition of short-duration, single-event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual.

These successive additions of sound to the community noise environment change the community noise level from instant to instant, requiring the noise exposure to be measured over periods of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. The following noise descriptors are used to characterize environmental noise levels over time, which are applicable to the proposed project.

L_{eq}: The equivalent sound level over a specified period of time, typically, 1 hour ($L_{eq(1)}$). The L_{eq} may also be referred to as the average sound level.

L_{max}: The maximum, instantaneous noise level experienced during a given period of time.

Figure 3 Decibel Scale and Common Noise Sources

L_{min}: The minimum, instantaneous noise level experienced during a given period of time.

L_x: The noise level exceeded a percentage of a specified time period. For instance, L_{50} and L_{90} represent the noise levels that are exceeded 50 percent and 90 percent of the time, respectively.

L_{dn}: The average A-weighted noise level during a 24-hour day, obtained after an addition of 10 dB to measured noise levels between the hours of 10:00 p.m. to 7:00 a.m. to account nighttime noise sensitivity. The L_{dn} is also termed the day-night average noise level (DNL).

CNEL: The Community Noise Equivalent Level (CNEL) is the average A-weighted noise level during a 24-hour day that includes an addition of 5 dB to measured noise levels between the hours of 7:00 a.m. to 10:00 p.m. and an addition of 10 dB to noise levels between the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively.

3.3 Effects of Noise on People

Noise is generally loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity that is a nuisance or disruptive. The effects of noise on people can be placed into four general categories:

- Subjective effects (e.g., dissatisfaction, annoyance);
- Interference effects (e.g., communication, sleep, and learning interference);
- Physiological effects (e.g., startle response); and
- Physical effects (e.g., hearing loss).

Although exposure to high noise levels has been demonstrated to cause physical and physiological effects, the principal human responses to typical environmental noise exposure are related to subjective effects and interference with activities. Interference effects interrupt daily activities and include interference with human communication activities, such as normal conversations, watching television, telephone conversations, and interference with sleep. Sleep interference effects can include both awakening and arousal to a lesser state of sleep.

With regard to the subjective effects, the responses of individuals to similar noise events are diverse and influenced by many factors, including the type of noise, the perceived importance of the noise, the appropriateness of the noise to the setting, the duration of the noise, the time of day and the type of activity during which the noise occurs, and individual noise sensitivity. Overall, there is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction on people. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise. Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted (i.e., comparison to the ambient noise environment). In general, the more a new noise level exceeds the previously existing ambient noise level, the less acceptable the new noise level will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships generally occur:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- Outside of the laboratory, a 3 dBA change in noise levels is considered to be a barely perceivable difference;
- A change in noise levels of 5 dBA is considered to be a readily perceivable difference; and
- A change in noise levels of 10 dBA is subjectively heard as doubling of the perceived loudness.

These relationships occur in part because of the logarithmic nature of sound and the decibel scale. The human ear perceives sound in a non-linear fashion, hence, the dBA scale was developed. Because the dBA scale is based on logarithms, two noise sources do not combine in a simple additive fashion, but rather logarithmically. Under the dBA scale, a doubling of sound energy corresponds to a 3 dBA increase. In other words, when two sources are each producing sound of the same loudness, the resulting sound level at a given distance would be approximately 3 dBA higher than one of the sources under the same conditions. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA. Under the dB scale, three sources of equal loudness together produce a sound level of approximately 5 dBA louder than one source, and ten sources of equal loudness together produce a sound level of approximately 10 dBA louder than the single source.

3.4 Noise Attenuation

When noise propagates over a distance, the noise level reduces with distance depending on the type of noise source and the propagation path. Noise from a localized source (i.e., point source) propagates uniformly outward in a spherical pattern, referred to as "spherical spreading." Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (i.e., reduce) at a rate between 6 dBA for acoustically "hard" sites and 7.5 dBA for "soft" sites for each doubling of distance from the reference measurement, as their energy is continuously spread out over a spherical surface (e.g., for hard surfaces, 80 dBA at 50 feet attenuates to 74 at 100 feet, 68 dBA at 200 feet, etc.). Hard sites are those with a reflective surface between the source and the receiver, such as asphalt or concrete surfaces or smooth bodies of water. No excess ground attenuation is assumed for hard sites and the reduction in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source. Soft sites have an absorptive ground surface, such as soft dirt, grass, or scattered bushes and trees, which in addition to geometric spreading, provides an excess ground attenuation value of 1.5 dBA (per doubling distance).

Roadways and highways consist of several localized noise sources on a defined path, and hence are treated as "line" sources, which approximate the effect of several point sources. Noise from a line source propagates over a cylindrical surface, often referred to as "cylindrical spreading." Line sources (e.g., traffic noise from vehicles) attenuate at a rate between 3 dBA for hard sites and 4.5 dBA for soft sites for each doubling of distance from the reference measurement.[1]

[1] California Department of Transportation (Caltrans), *Technical Noise Supplement* (TeNS). September, 2013.

Therefore, noise due to a line source attenuates less with distance than that of a point source with increased distance.

Additionally, receptors located downwind from a noise source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Atmospheric temperature inversion (i.e., increasing temperature with elevation) can increase sound levels at long distances (e.g., more than 500 feet). Other factors such as air temperature, humidity, and turbulence can also have significant effects on noise levels.

3.5 Fundamentals of Vibration

Vibration can be interpreted as energy transmitted in waves through the ground or man-made structures, which generally dissipate with distance from the vibration source. Because energy is lost during the transfer of energy from one particle to another, vibration becomes less perceptible with increasing distance from the source.

As described in the Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment*, ground-borne vibration can be a serious concern for nearby neighbors of a transit system route or maintenance facility, causing buildings to shake and rumbling sounds to be heard.[2] In contrast to airborne noise, ground-borne vibration is not a common environmental problem, as it is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of ground-borne vibration are trains, heavy trucks traveling on rough roads, and construction activities, such as blasting, pile-driving, and operation of heavy earth-moving equipment.

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal in inches per second (in/sec), and is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is defined as the average of the squared amplitude of the signal and is most frequently used to describe the effect of vibration on the human body. Decibel notation (VdB) is commonly used to measure RMS. The relationship of PPV to RMS velocity is expressed in terms of the "crest factor," defined as the ratio of the PPV amplitude to the RMS amplitude. PPV is typically a factor of 1.7 to 6 times greater than RMS vibration velocity.[3] The decibel notation VdB acts to compress the range of numbers required to describe vibration. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors for vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick), and vibration sensitive equipment.

The effects of ground-borne vibration include movement of the building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. In extreme cases, the vibration can cause damage to buildings. Building damage is not a factor for most projects, with the occasional exception of blasting and pile-driving during construction.

2 FTA, 2006. Transit Noise and Vibration Impact Assessment. May.
3 FTA, 2006. Transit Noise and Vibration Impact Assessment. May.

Annoyance from vibration often occurs when the vibration levels exceed the threshold of perception by only a small margin. A vibration level that causes annoyance will be well below the damage threshold for normal buildings. The FTA measure of the threshold of architectural damage for conventional sensitive structures is 0.2 in/sec PPV.[4]

In residential areas, the background vibration velocity level is usually around 50 VdB (approximately 0.0013 in/sec PPV), which is well below the vibration velocity level threshold of perception for humans, which is approximately 65 VdB. A vibration velocity level of 75 VdB is considered to be the approximate dividing line between barely perceptible and distinctly perceptible levels for many people.[5]

3.6 Existing Conditions

Some land uses are considered more sensitive to noise than others due to the amount of noise exposure and the types of activities typically involved at the receptor location. The City of Los Angeles CEQA Thresholds Guide (*L.A. CEQA Thresholds Guide*) states that residences, schools, motels and hotels, libraries, religious institutions, hospitals, nursing homes, and parks are generally more sensitive to noise than commercial and industrial land uses. Existing noise sensitive uses within 500 feet of the project site include the following:

- Residential Uses: Single and multi-family residential units to the north along Melrose Avenue, east along Commonwealth Avenue, and south along Clinton Street.
- Residential Uses: Single- and multi-family residential uses are located to the north and east of the project site, along North Hoover Street.

All other noise-sensitive uses regulated by the City of Los Angeles are located at greater distances from the project site and would experience lower noise levels from potential sources of noise on the project site due to distance loss.

Existing Ambient Daytime Noise Levels

The predominant existing noise source surrounding the project site is roadway noise from Hoover Street to the east, Clinton Street to the south, and Commonwealth Avenue to the west. U.S.-101 is located approximately 0.25 mile to the south. Secondary noise sources include general commercial- and residential- related activities, such as loading dock/delivery truck activities, trash compaction, landscape services and refuse service activities.

Ambient noise measurements were conducted at four locations, representing the nearby land uses in the vicinity of the project site to establish conservative ambient noise levels. The measurement locations along with existing development and nearby future development are shown on **Figure 4**. Long-term (24-hour) measurements were conducted at locations R1 and R2 and short-term (15-minute) measurements were conducted at locations R3 and R4. Ambient sound

4 FTA, 2006. Transit Noise and Vibration Impact Assessment. May.

5 FTA, 2006. Transit Noise and Vibration Impact Assessment. May.

Figure 4 Noise Measurement Locations

measurements were conducted from Tuesday, July 18 to Wednesday, July 19, 2017 to establish ambient conditions in the project vicinity. Noise measurements were conducted using Larson Davis (LD) LXT1 Sound Level Meters (SLM) and LD 820 SLM. The LD LXT1 and LD 820 SLMs are a Type 1 standard instrument as defined in the American National Standard Institute (ANSI) S1.4. All instruments were calibrated and operated according to the applicable manufacturer specification. The microphone was placed at a height of 5 feet above the local grade, at the following locations as shown in Figure 4:

- Measurement Location R1: represents the existing noise environment of single- and multi-family residential uses south of the project site along Clinton Street. The SLM was placed on the southern boundary of the project site. Noise measurements were taken for a 24-hour period at this location.
- Measurement Location R2: represents the existing noise environment of single-family residential uses west and north of the project site along Commonwealth Avenue. The SLM was placed at the northwestern corner of the project site. Noise measurements were taken for a 24-hour period at this location.
- Measurement Location R3: represents the existing noise environment of single- and multi-family residential uses north and east of the project site along Hoover Street. The SLM was placed at approximately 160 feet south of the northeastern corner of Hoover Street and Melrose Avenue. Noise measurements were taken for a 15-minute period at this location.
- Measurement Location R4: represents the existing noise environment of single- and multi-family residential uses west of the project site along Commonwealth Avenue. The SLM was placed at approximately 100 feet north of the northeastern corner of Commonwealth Avenue and Clinton Street. Noise measurements were taken for a 15-minute period at this location

A summary of noise measurement data is provided in **Table 1**. As shown in Table 1, the existing daytime noise levels ranged from 58 dBA to 66 dBA L_{eq} and average nighttime noise levels ranged from 52 dBA to 56 dBA L_{eq}.

Existing Roadway Noise Levels Off-Site

Existing roadway noise levels were calculated for eight roadway segments located in the vicinity of the project site. The roadway segments selected for analysis are considered to be those that are expected to be the most directly impacted by project-related traffic, which, for the purpose of this analysis, includes the roadways that are located near and immediately adjacent to the project site. These roadways, when compared to roadways located further away from the project site, would experience the greatest percentage increase in traffic generated by the project (as distances are increased from the project site, traffic is spread out over a greater geographic area and its effects are reduced).

Calculation of the existing roadway noise levels was accomplished using the Federal Highway Administration's (FHWA's) Highway Noise Prediction Model and traffic volumes at the study intersections analyzed in the project's Traffic Impact Study (TIS) prepared by Fehr & Peers. [6] The model calculates the average noise level at specific locations based on traffic volumes, average speeds, and site environmental conditions. The average daily noise levels along these

6 Fehr & Peers, *Transportation Impact Study for the Hoover Street District Yard Demolition Project,* July 2019.

roadway segments are presented in **Table 2**. As shown in Table 2, existing roadway noise levels ranged from 62.0 dBA to 70.6 dBA CNEL.

TABLE 1
SUMMARY OF AMBIENT NOISE MEASUREMENTS

	Measured Ambient Noise Levels[a] (dBA)			
Location, Duration, Existing Land Uses and, Date of Measurements	**Daytime (7 A.M. to 10 P.M.) Hourly L_{eq}**	**Daytime Average Hourly L_{eq}**	**Nighttime (10 P.M. to 7 A.M.) Hourly L_{eq}**	**Nighttime Average Hourly L_{eq}**
R1 7/18/17 12:00 p.m. to 7/19/17 12:00 p.m.	59 – 65	62	52 – 58	56
R2 7/18/17 12:00 p.m. to 7/19/17 12:00 p.m.	53 – 66	59	46 – 54	52
R3 7/18/17 10:45 a.m. to 11:00 a.m.	65	N/A	N/A	N/A
R4 7/18/17 10:25 a.m. to 10:40 p.m.	58	N/A	N/A	N/A

[a] Detailed measured noise data, including hourly Leq levels, are included in Appendix A.

SOURCE: ESA, 2021.

TABLE 2
EXISTING ROADWAY NOISE LEVELS

Roadway Segment	Existing Land Uses Located Along Roadway Segment	dBA CNEL[a]
Hoover Street		
Between Santa Monica Boulevard and Melrose Avenue	Residential	65.6
Between Melrose Avenue and Temple Street	Residential	66.5
Melrose Avenue		
Between Vermont Avenue and Virgil Avenue	Residential/Commercial	67.6
Between Virgil Avenue and Hoover Street	Residential/Commercial	65.0
Virgil Avenue		
North of Melrose Avenue	Residential/Commercial	69.4
Between Melrose Avenue and Clinton Street	Residential/Commercial	70.6
Clinton Street		
West of Virgil Avenue	Residential/Commercial	62.4
East of Virgil Avenue	Residential	62.7

[a] Based on noise levels at property lines of adjacent uses along roadways.

SOURCE: ESA, 2021.

Existing Groundborne Vibration Levels

Aside from periodic construction work that may occur throughout the City, sources of groundborne vibration in the project site vicinity may include heavy-duty vehicular travel (e.g., refuse trucks, delivery trucks, etc.) on local roadways. Truck traffic at a distance of 50 feet typically generate groundborne vibration velocity levels of approximately 0.006 inches per sec PPV.[7]

3.7 Regulatory Setting

Detailed below is a discussion of the relevant regulatory setting and noise regulations, plans, and policies applicable to the proposed project.

Federal

Federal Noise Standards

Under the authority of the Noise Control Act of 1972, the United States Environmental Protection Agency (USEPA) established noise emission criteria and testing methods published in Parts 201 through 205 of Title 40 of the Code of Federal Regulations (CFR) that apply to some transportation equipment (e.g., interstate rail carriers, medium trucks, and heavy trucks) and construction equipment. In 1974, the USEPA issued guidance levels for the protection of public health and welfare in residential land use areas[8] of an outdoor L_{dn} of 55 dBA and an indoor L_{dn} of 45 dBA. These guidance levels are not considered as standards or regulations and were developed without consideration of technical or economic feasibility. There are no federal noise standards that directly regulate environmental noise related to the construction or operation of the proposed project.

Under the Occupational Safety and Health Act of 1970 (29 U.S.C. §1919 et seq.), the Occupational Safety and Health Administration (OSHA) has adopted regulations designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise level exposure as a function of the amount of time during which the worker is exposed. The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, ensuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation.

Federal Vibration Guidelines

The FTA has adopted vibration standards that are used to evaluate potential building damage related to construction activities. The vibration damage criteria adopted by the FTA are shown in **Table 3.**

7 FTA, *Transit Noise and Vibration Impact Assessment*. May 2006.
8 USEPA, *EPA Identifies Noise Levels Affecting Health and Welfare*. April 1974.

TABLE 3
CONSTRUCTION VIBRATION DAMAGE CRITERIA

Building Category	PPV (in/sec)
I. Reinforced-concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

SOURCE: FTA, Transit Noise and Vibration Impact Assessment. May, 2006.

The FTA has also adopted standards associated with human annoyance for ground-borne vibration impacts for the following three land-use categories: Vibration Category 1 – High Sensitivity, Vibration Category 2 – Residential, and Vibration Category 3 – Institutional. The FTA defines Category 1 as buildings where vibration would interfere with operations within the building, including vibration-sensitive research and manufacturing facilities, hospitals with vibration-sensitive equipment, and university research operations. Vibration-sensitive equipment includes, but is not limited to, electron microscopes, high-resolution lithographic equipment, and normal optical microscopes. Category 2 refers to all residential land uses and any buildings where people sleep, such as hotels and hospitals. Category 3 refers to institutional land uses such as schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment but still have the potential for activity interference. The vibration thresholds associated with human annoyance for these three land-use categories are shown in **Table 4**. No thresholds have been adopted or recommended for commercial and office uses.

TABLE 4
GROUND-BORNE VIBRATION IMPACT CRITERIA FOR GENERAL ASSESSMENT

Land Use Category	Frequent Events[a]	Occasional Events[b]	Infrequent Events[c]
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB[d]	65 VdB[d]	65 VdB[d]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

[a] "Frequent Events" is defined as more than 70 vibration events of the same source per day.
[b] "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.
[c] "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day.
[d] This criterion is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.

SOURCE: FTA, Transit Noise and Vibration Impact Assessment. May, 2006.

State

California Noise Standards

The State of California does not have statewide standards for environmental noise, but the California Department of Health Services (DHS) has established guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. The purpose of these guidelines is to maintain acceptable noise levels in a community setting for different land use types. Noise compatibility by different land uses types is categorized into four general levels: "normally acceptable," "conditionally acceptable," "normally unacceptable," and "clearly unacceptable." For instance, a noise environment ranging from 50 dBA CNEL to 65 dBA CNEL is considered to be "normally acceptable" for multi-family residential uses, while a noise environment of 75 dBA CNEL or above for multi-family residential uses is considered to be "clearly unacceptable." In addition, California Government Code Section 65302(f) requires each county and city in the State to prepare and adopt a comprehensive long-range general plan for its physical development, with Section 65302(g) requiring a noise element to be included in the general plan. The noise element must: (1) identify and appraise noise problems in the community; (2) recognize Office of Noise Control guidelines; and (3) analyze and quantify current and projected noise levels.

The state has also established noise insulation standards for new multi-family residential units, hotels, and motels that would be subject to relatively high levels of transportation-related noise. These requirements are collectively known as the California Noise Insulation Standards (Title 24, California Code of Regulations). The noise insulation standards set forth an interior standard of 45 dBA CNEL in any habitable room. They require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to noise levels greater than 60 dBA CNEL. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

Local

In California, local regulation of noise involves implementation of general plan policies and noise ordinance standards. Local general plans identify general principles intended to guide and influence development plans, and noise ordinances set forth the specific standards and procedures for addressing particular noise sources and activities. General plans recognize that different types of land uses have different sensitivities toward their noise environment; residential areas are considered to be the most sensitive type of land use to noise and industrial/commercial areas are considered to be the least sensitive.

City of Los Angeles

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. 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 5**, a CNEL value of 77 dBA is the upper limit of what is considered a "conditionally acceptable" noise environment for office buildings, although the upper limit of what is considered "normally acceptable" for office buildings is set at 70 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 5
CITY OF LOS ANGELES LAND USE COMPATIBILITY FOR COMMUNITY NOISE

	Community Noise Exposure CNEL (dBA)			
Land Use	**Normally Acceptable**	**Conditionally Acceptable**	**Normally Unacceptable**	**Clearly Unacceptable**
Single-Family, Duplex, Mobile Homes	50 to 60	55 to 70	70 to 75	Above 70
Multi-Family Homes	50 to 65	60 to 70	70 to 75	Above 70
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 to 70	60 to 70	70 to 80	Above 80
Transient Lodging—Motels, Hotels	50 to 65	60 to 70	70 to 80	Above 80
Auditoriums, Concert Halls, Amphitheaters	—	50 to 70	—	Above 65
Sports Arena, Outdoor Spectator Sports	—	50 to 75	—	Above 70
Playgrounds, Neighborhood Parks	50 to 70	—	67 to 75	Above 72
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 to 75	—	70 to 80	Above 80
Office Buildings, Business and Professional Commercial	50 to 70	67 to 77	Above 75	—
Industrial, Manufacturing, Utilities, Agriculture	50 to 75	70 to 80	Above 75	—

Normally Acceptable: Specified land use is satisfactory, based upon 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.

SOURCE: City of Los Angeles CEQA Thresholds Guide, 2006.

Municipal Code

The City's Noise Regulation is provided in Chapter XI of the Los Angeles Municipal Code (LAMC). Section 111.02 of the LAMC provides procedures and criteria for the measurement of the sound level of "offending" noise sources. In accordance with the LAMC, a noise level increase of 5 dBA over the existing average ambient noise level at an adjacent property line is considered a noise violation. To account for people's increased tolerance for short-duration noise events, the Noise Regulation provides a 5 dBA allowance for noise sources occurring more than five but less than fifteen minutes in any one-hour period and an additional 5 dBA allowance (total of 10 dBA) for noise sources occurring five minutes or less in any one-hour period.[9]

The LAMC indicates that in cases where the actual ambient conditions are not known, the City's presumed daytime (7:00 A.M. to 10:00 P.M.) and nighttime (10:00 P.M. to 7:00 A.M.) minimum ambient noise levels as defined in Section 111.03 of the LAMC should be used. The presumed

9 LAMC, Chapter XI, Article I, Section 111.02-(b).

ambient noise levels for these areas as set forth in the LAMC Section 111.03 are provided in **Table 6**. For residential-zoned areas, the presumed ambient noise level is 50 dBA during the daytime and 40 dBA during the nighttime.

Section 112.02 limits increases in noise levels from air conditioning, refrigeration, heating, pumping and filtering equipment. Such equipment may not be operated in such manner as to create any noise which would cause the noise level on the premises of any other occupied property, or, if a condominium, apartment house, duplex, or attached business, within any adjoining unit, to exceed the ambient noise level by more than five (5) decibels.

TABLE 6
CITY OF LOS ANGELES PRESUMED AMBIENT NOISE LEVELS

Zone	Daytime Hours (7 A.M. to 10 P.M.) dBA (Leq)	Nighttime Hours (10 P.M. to 7 A.M.) dBA (Leq)
Residential	50	40
Commercial	60	55
Manufacturing (M1, MR1, and MR2)	60	55
Heavy Manufacturing (M2 and M3)	65	65

SOURCE: City of Los Angeles Municipal Code Section 112.03

Section 112.05 of the LAMC sets a maximum noise level for construction equipment of 75 dBA at a distance of 50 feet when operated within 500 feet of a residential zone. Compliance with this standard is only required where “technically feasible.”[10] Section 41.40 of the LAMC prohibits construction between the hours of 9:00 P.M. and 7:00 A.M. Monday through Friday, 6:00 P.M. and 8:00 A.M. on Saturday, and at any time on Sunday (i.e., construction is allowed Monday through Friday between 7:00 A.M. to 9:00 P.M.; and Saturdays and National Holidays between 8:00 A.M. to 6:00 P.M.). In general, the City’s Department of Building and Safety enforces noise ordinance provisions relative to equipment and the Los Angeles Police Department enforces provisions relative to noise generated by people.

Section 113.01 of LAMC prohibits collecting or disposing of rubbish or garbage, to operate any refuse disposal truck, or to collect, load, pick up, transfer, unload, dump, discard, or dispose of any rubbish or garbage, as such terms are defined in Section 66.00 of LAMC, within 200 feet of any residential building between the hours of 9:00 P.M. and 6:00 A.M. of the following day, unless a permit therefore has been duly obtained beforehand from the Board of Police Commissioners.

[10] In accordance with the City’s Noise Ordinances, “technically feasible” means that the established noise limitations can be complied with at a project site, with the use of mufflers, shields, sound barriers, and/or other noise reduction devices or techniques employed during the operation of equipment.

4. Impacts and Mitigation Measures

This section describes the impact analysis relating to noise and vibration impacts for the proposed project, and the methods and applicable thresholds used to determine the impacts of the proposed project.

4.1 Methodology

Construction Noise Levels

Project construction noise levels were estimated using the FHWA's Roadway Construction Noise Model (RCNM) and construction equipment information provided by LADWP. Potential noise levels were identified for the nearest sensitive receptors located offsite based on their respective distances from the project site. To present a conservative impact analysis, the estimated noise levels were calculated for a scenario in which all construction equipment was assumed to be operating simultaneously and some construction equipment would be located at the construction area nearest to the affected receptors. These assumptions represent the worst-case noise scenario because construction activities would typically be spread out throughout the project site and would be located further away from the affected receptors. The estimated noise levels at the affected receptors were then analyzed against the construction noise standards established in the City Municipal Code.

Roadway Noise Levels

Offsite construction-related traffic noise levels were calculated based on traffic information provided in the TIS.[11] The roadway segments selected for analysis are expected to be most directly impacted by construction-related traffic, which, for the purpose of this analysis, includes the roadways that are nearest to the project site and adjacent to the identified noise-sensitive receptors. The noise levels were calculated using the FHWA-RD-77-108 model based on construction-related traffic volumes provided in the TIS.

Onsite Stationary Source Noise Levels

During operation of the proposed project, noise levels would be generated onsite by stationary noise sources such as rooftop mechanical equipment, parking facilities, and the loading dock area. The noise levels generated by these stationary sources are assessed based on the City's Municipal Code requirements and measured data, and their impacts on the nearby offsite receptors are determined based on their distance from these receptors.

Parking related noise levels were estimated utilizing methodology recommended by FTA for the general assessment of stationary transit noise source. Using this methodology, the following FTA equation for a parking lot was utilized to estimate the project's peak hourly noise level generated by onsite parking lot activity:

$L_{eq}(h) = SEL_{ref} + 10\log(NA/1000) - 35.6$, where

$L_{eq}(h)$ = hourly L_{eq} noise level at 50 feet

11 Fehr & Peers, *Transportation Impact Study for the Hoover Street District Yard Demolition Project,* July 2019.

SEL_{ref} = reference noise level for stationary noise source represented in sound exposure level (SEL) at 50 feet

N_A = number of automobiles per hour

The noise levels determined at the offsite, noise-sensitive receptors are then compared to the stationary source noise significance thresholds identified in the City's Municipal Code.

Groundborne Vibration Levels

Groundborne vibration levels resulting from construction activities at the project site were estimated using data published by the FTA in its *Transit Noise and Vibration Impact Assessment* document.[12] Potential vibration levels resulting from construction of the proposed project are identified for offsite locations that are sensitive to vibration (i.e., existing residential buildings) based on their distance from construction activities.

4.2 Thresholds of Significance

Appendix G of the CEQA Guidelines provides a set of screening questions that address impacts with regard to noise and vibration impacts. These questions are as follows:

Would the project result in:

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

Construction

The *L.A. CEQA Thresholds Guide* states that a determination of significance with regard to construction noise shall be made on a case-by-case basis, considering the following factors:

- Construction activities lasting more than one day would exceed existing ambient exterior noise levels by 10 dBA or more at a noise-sensitive use;
- Construction activities lasting more than 10 days in a three-month period would exceed existing ambient exterior noise levels by 5 dBA or more at a noise-sensitive use; or
- Construction activities would exceed the ambient noise level by 5 dBA at a noise-sensitive use between the hours of 9:00 P.M. and 7:00 A.M. Monday through Friday, before 8:00 A.M. or after 6:00 P.M. on Saturday, or at any time on Sunday.

Construction activities would occur over a period longer than 10 days for the full duration of construction. Therefore, the corresponding threshold of significance used in the construction

[12] FTA, *Transit Noise and Vibration Impact Assessment*. May 2006.

noise analysis is an increase in the ambient exterior noise levels of 5 dBA L_{eq} or more at a noise sensitive use.

It should also be noted that the *L.A. CEQA Thresholds Guide* contains screening criteria, including (1) whether construction activities occur within 500 feet of a noise sensitive use; and (2) whether construction occurs between the hours of 9:00 P.M. and 7:00 P.M. Monday through Friday, before 8:00 A.M. or after 6:00 P.M. on Saturday, or anytime on Sunday. A "no" response to these questions indicates that there would normally be no significant construction noise impacts from the project.

Construction Vibration

The City has not adopted a significance threshold to assess vibration impacts during construction. Thus, the FTA standards described above are used to evaluate potential impacts related to project construction. Generally, the threshold for human annoyance (72 VdB) is used to evaluate the significance of all vibration impacts at off-site sensitive uses. The standards for off-site residential buildings are 0.2 in/s PPV in accordance with FTA's criteria.

The City has not adopted a significance threshold to assess long-term vibration impacts, such as those potentially arising from operation of the project. Vehicles passing by off-site sensitive uses are the primary source of long-term project-related vibration. For the residential structures, the criterion of 72 VdB, has been selected.

Operational Noise

In the context of the above questions from Appendix G of the CEQA Guidelines, the following thresholds of significance are applied to the project, as set forth in the *L.A. CEQA Thresholds Guide* and the City's Noise Regulations, with the more restrictive provisions of the two applied. The project would have a significant impact from operations if:

- The project causes the ambient noise levels measured at the property line of affected uses to increase by 3 dBA in CNEL to or within the "normally unacceptable" or "clearly unacceptable" category;
- The project causes the ambient noise levels measured at the property line of affected uses to increase by 5 dBA in CNEL or greater; or
- Project-related operational on-site (i.e., non-roadway) noise sources such as outdoor building mechanical/electrical equipment, outdoor activities, or parking facilities increase the ambient noise level (L_{eq}) at noise sensitive uses by 5 dBA L_{eq}.

In summary, for operational noise, the threshold of significance for onsite operations is an increase in ambient noise level of 5 dBA L_{eq} at an adjacent property line, in accordance with the LAMC. The LAMC does not apply to the off-site traffic (i.e., vehicle traveling on public roadways). Therefore, the significance threshold for off-site traffic noise associated with Project operations is based on the *L.A. CEQA Thresholds Guide*. In addition, the thresholds for composite noise levels (onsite and offsite sources) are also based on the *L.A. CEQA Thresholds Guide*, which is an increase in the ambient noise level of 3 dBA or 5 dBA in CNEL (depending on the existing conditions at the affected noise sensitive land use) for the project's composite noise (both project-related onsite and offsite sources) at affected uses. The threshold of significance used in the operational noise analysis for offsite operations is an increase in ambient noise level by 3 dBA or 5 dBA in CNEL (depending on the existing conditions at the affected noise sensitive land use) for the Project's composite noise (both project-related onsite and offsite sources).

In assessing impacts related to noise in this section, LADWP will use Appendix G as the thresholds of significance. The criteria identified above from the *L.A. CEQA Thresholds Guide* will be used where applicable and relevant to assist in applying the Appendix G thresholds.

4.3 Project Impacts

Impact NOI-1: Project operation would not result in the generation of a substantial permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance. However, on-site project construction activities would result in the generation of substantial temporary increase in ambient noise levels in excess of established standards and would result in potentially significant impacts. (Potentially Significant)

Construction Noise

Onsite Construction Noise

Construction of the proposed project would require the use of heavy equipment during the demolition, grading, foundation installation, and building construction activities at the project site. During each stage of development, there would be a different mix of equipment. As such, construction activity noise levels at and near the project site would fluctuate depending on the particular type, number, and duration of use of the various pieces of construction equipment.

Individual pieces of construction equipment anticipated during project construction could produce maximum noise levels of 74 dBA to 90 dBA L_{max} at a reference distance of 50 feet from the noise source, as shown in **Table 7**. These maximum noise levels would occur when equipment is operating at full power. The estimated usage factor for the equipment is based on FHWA's RCNM User Guide and is also shown in Table 7.[13]

TABLE 7
CONSTRUCTION EQUIPMENT NOISE LEVELS

Construction Equipment	Estimated Usage Factor, %	Noise Level at 50 Feet (dBA, Lmax)
Air Compressors	50%	78
Cement and Mortar Mixer	40%	79
Concrete Saw	20%	90
Crane	40%	81
Excavator	40%	81
Forklift	10%	75
Paver	50%	77

13 Federal Highway Administration, Roadway Construction Noise Model User's Guide, 2006.

Construction Equipment	Estimated Usage Factor, %	Noise Level at 50 Feet (dBA, Lmax)
Paving Equipment	20%	90
Roller	20%	80
Rubber Tired Dozer	40%	82
Rubber Tired Loader	40%	79
Skid Steer Loader (Small Excavator)	40%	80
Sweeper/Scrubber	10%	82
Tractor/Loader/Backhoe	25%	80
Welder	40%	74

FHWA, 2006.

During project construction, the nearest and most notable offsite sensitive receptors that would be exposed to increased noise levels would be the existing residential uses located in proximity to the project site. Specifically, the nearest offsite noise sensitive receptors include the following:

- R1: Existing single- and multi-family residences are located approximately 55 feet south of the project site along Clinton Street;
- R2: Existing single- and multi-family residences are located approximately 15 feet north of the project site along Commonwealth Avenue;
- R3: Existing single- and multi-family residences are located approximately 15 feet north and approximately 70 feet northeast of the project site along Hoover Street; and
- R4: Existing single- and multi-family residences are located approximately 55 feet west of the project site along Commonwealth Avenue.

Over the course of a construction day, the highest noise levels would be generated when multiple pieces of construction equipment are operated concurrently. As discussed previously, the project's estimated construction noise levels were calculated for a scenario in which all construction equipment were assumed to be operating simultaneously with some construction equipment located at the construction area nearest the affected receptors to present a conservative impact analysis. The estimated noise levels at the offsite sensitive receptors were calculated using the FHWA's RCNM, and were based on a maximum concurrent operation of nine pieces of equipment (i.e., cranes, tractor/loader/backhoe, forklift, generator sets, welders, etc.) which is considered a worst-case evaluation because the project would use less overall equipment on a daily basis, and as such would generate lower noise levels. In addition, the noise levels were estimated including the assumption that there would be phase overlap. **Table 8** shows the estimated construction noise levels that would occur at the nearest offsite sensitive uses during a peak day of construction activity at the project site.

TABLE 8
ESTIMATED CONSTRUCTION NOISE LEVELS AT OFFSITE SENSITIVE USES

Offsite Sensitive Land Uses	Location	Nearest Distance from Construction Activity to Noise Receptor (ft.)[1]	Estimated Maximum Construction Noise Levels (dBA L_{eq})	Significance Threshold[2]	Exceed Significance Threshold?
R1	South of the project site along Clinton Street	55	83	67	Yes
R2	North of the project site along Commonwealth Avenue	15	94	64	Yes
R3	North of the project site along Hoover Street	15	94	70	Yes
R3	Northeast of the project site along Hoover Street	70	81	70	Yes
R4	West of the project site along Commonwealth Avenue	55	83	63	Yes

1 The distance represents the nearest construction area on the project site to the property line of the offsite receptor.
2 The significance threshold is the daytime ambient noise levels as shown in Table 1 plus 5 dBA.

SOURCE: ESA, 2021.

As shown in Table 8, the peak day construction noise levels experienced by the offsite sensitive receptors would range from 81 dBA L_{eq} at the residences located to the northeast of the project site to 94 dBA L_{eq} at the residences located north of the project site along Commonwealth Avenue and Hoover Street. Thus, construction activities associated with the proposed project would generate episodic noise levels exceeding the significance thresholds of 67 dBA at R1 (average daytime noise level of 62 dBA plus 5 dBA), 64 dBA at R2 (average daytime noise level of 59 dBA plus 5 dBA), 70 dBA at R3 (ambient noise level of 65 dBA plus 5 dBA), and 63 dBA at R4 (ambient noise level of 58 dBA plus 5 dBA).

As such, the project would have a potentially significant construction noise impact on residential uses located to the north, south, west, northwest, and northeast of the project site. Mitigation measures are therefore prescribed to reduce construction noise impacts to these sensitive noise receptors, as presented below in Subsection 4.4, *Mitigation Measures*.

Offsite Construction Traffic Noise

Delivery truck and haul truck trips would occur throughout the construction period. The haul route for the proposed project would most likely be along Hoover Street to the US-101. Trucks are expected to be staged offsite and dispatched to the project site as needed. The maximum number of construction-related trips would be generated during the overlap of building construction, paving, and architectural coating. An estimated maximum vehicle trips for offsite construction traffic noise of approximately 120 worker's vehicle trips and 62 truck trips would occur per day.[14]

[14] This maximum offsite construction traffic noise traffic on the local roadways would occur with approximately 120 worker's vehicle trips and 62 truck trips even though this is less than the daily maximum number of one-way

The project's trips would generate noise levels of approximately 59.3 dBA L_{eq} at property lines of adjacent uses along Hoover Street. As shown in the Appendices at the end of this report, the existing noise level along Hoover Street between Santa Monica Boulevard and Melrose Avenue was approximately 64.6 dBA L_{eq}. Noise levels of 59.3 dBA L_{eq} generated by construction-related traffic would increase the ambient noise levels along Hoover Street by approximately 1.0 dBA. This increase in sound level would be below an increase of 5.0 dBA CNEL in an area characterized by conditionally acceptable noise levels (see Table 5). Therefore, off-site construction traffic noise impacts would be less than significant.

Temporary Increases in Ambient Noise Levels

As discussed previously, the project's construction activities would exceed the significance threshold at the existing offsite sensitive uses. As set forth in Section 4.2 above, a project would have a significant impact on noise levels from construction if the project would exceed the ambient noise levels by 5 dBA or more at a noise-sensitive use. Based on the measured noise levels at the nearest offsite sensitive receptors to the project site that are shown in Table 1, it was determined that construction noise levels would exceed the ambient noise levels by 5 dBA at the offsite sensitive receptors. Thus, short-term noise impacts from construction would be potentially significant at these sensitive offsite locations. Mitigation measures are therefore prescribed to reduce construction noise impacts to these sensitive noise receptors, as presented below in Subsection 4.4, *Mitigation Measures*.

As discussed previously, the project's construction trips would result in increases in sound level below the threshold of an increase of 5.0 dBA CNEL. As such, construction noise impacts associated with construction vehicles would be less than significant, no mitigations are required.

Operational Noise

Impacts Under Existing Traffic Baseline Conditions

Existing roadway noise levels were calculated along various arterial segments adjacent to the project site. Roadway noise attributable to project development was calculated using the traffic noise model previously described and was compared to baseline noise levels that would occur under the "No Project" condition.

Project impacts are shown in **Table 9**. As indicated, the maximum increase in project-related traffic noise levels over existing traffic noise levels would be 0.4 dBA CNEL, which would occur along Melrose Avenue between Vermont Avenue and Virgil Avenue and along Clinton Street, east of Virgil Avenue. This increase in sound level would be well below a "clearly noticeable" increase of 5.0 dBA CNEL in an area characterized by normally acceptable noise levels (see Table 5), and the increase in sound level would be substantially lower at the remaining roadway segments analyzed. The project-related traffic noise increases would be less than the threshold and, therefore, less than significant.

---

vehicle trips that is estimated to be 218 as described above, since this is made up of 190 worker trips and 28 truck trips and truck trips generate more noise than worker trips as they are heavy duty trucks compared to worker vehicles.

TABLE 9
OFFSITE TRAFFIC NOISE IMPACTS – EXISTING (2019) WITH PROJECT CONDITIONS

	Calculated Traffic Noise Levels CNEL (dBA)[a]			
Roadway Segment	**Existing (A)**	**Existing with Project (B)**	**Project Increment (B-A)**	**Exceed Threshold?**
Hoover Street				
Between Santa Monica Boulevard and Melrose Avenue	65.6	65.7	0.1	No
Between Melrose Avenue and Temple Street	66.5	66.5	0.0	No
Melrose Avenue				**No**
Between Vermont Avenue and Virgil Avenue	67.6	68.0	0.4	No
Between Virgil Avenue and Hoover Street	65.0	65.0	0.0	No
Virgil Avenue				
North of Melrose Avenue	69.4	69.4	0.0	No
Between Melrose Avenue and Clinton Street	70.6	70.7	0.1	No
Clinton Street				**No**
West of Virgil Avenue	62.4	62.7	0.3	
East of Virgil Avenue	62.7	63.1	0.4	No

[a] Based on noise levels at property lines of adjacent uses along roadways.

SOURCE: ESA, 2021.

Impacts Under Future (2023) Traffic Conditions

Future roadway noise levels were also calculated along various arterial segments adjacent to the project as compared to future 2023 traffic noise levels that would occur with implementation of the cumulative projects identified in the TIS prepared by Fehr & Peers. Project impacts are shown in **Table 10**. As indicated, the maximum increase in project-related traffic noise levels over the future traffic noise levels would be 0.4 dBA CNEL, which would occur along Clinton Street, east of Virgil Avenue. This increase in sound level would be less than a “clearly noticeable” increase of 5.0 dBA CNEL in an area characterized by normally acceptable noise levels (see Table 5), and the increase in sound would be substantially lower at the remaining roadway segments analyzed. The project-related traffic noise increases, when measured against the 2021 future conditions, would be less than the threshold and, therefore, impacts would be less than significant.

TABLE 10
OFFSITE TRAFFIC NOISE IMPACTS – FUTURE (2021) WITH PROJECT CONDITIONS

	Calculated Traffic Noise Levels CNEL (dBA)[a]			
Roadway Segment	**Future (A)**	**Future with Project (B)**	**Project Increment (B-A)**	**Exceed Threshold?**
Hoover Street				
Between Santa Monica Boulevard and Melrose Avenue	65.9	66.0	0.1	No
Between Melrose Avenue and Temple Street	66.7	66.7	0.0	No
Melrose Avenue				
Between Vermont Avenue and Virgil Avenue	67.8	67.9	0.1	No
Between Virgil Avenue and Hoover Street	65.3	65.3	0.0	No
Virgil Avenue				
North of Melrose Avenue	69.7	69.7	0.0	No
Between Melrose Avenue and Clinton Street	70.9	70.9	0.0	No
Clinton Street				
West of Virgil Avenue	62.6	62.9	0.3	
East of Virgil Avenue	62.9	63.3	0.4	No

[a] Based on noise levels at property lines of adjacent uses along roadways.

SOURCE: ESA, 2021.

Mechanical Equipment

The operation of mechanical equipment typical for developments like the project, such as air conditioners, fans, generators, and related equipment may generate audible noise levels. Mechanical equipment is typically located on rooftops or within buildings, and is shielded from nearby land uses to attenuate noise and avoid conflicts with adjacent uses. In addition, all mechanical equipment would be designed with appropriate noise control devices, such as sound attenuators, acoustics louvers, or sound screen/parapet walls to comply with noise limitation requirements provided in Section 112.02 of the LAMC, which limits the noise from such equipment causing an increase in the ambient noise level by more than 5 dBA. The project would install mechanical equipment that would generate noise levels below this threshold consistent with applicable regulatory requirements. Therefore, operation of mechanical equipment would not exceed the City's thresholds of significance and impacts would be less than significant.

Parking Facilities

The project would include approximately 25 parking spaces in aboveground parking and one floor of underground parking. Surface parking lots are located along Hoover Street.

Sources of noise associated with parking lots typically include engines accelerating, doors slamming, car alarms, tire squeals, and people talking. Noise levels at the parking lots would fluctuate throughout the day with the amount of vehicle and human activity. Noise levels would generally be the highest in the morning and evening peak traffic hours when the largest number of automobiles would enter and exit the parking facility.

For the purpose of providing a conservative, quantitative estimate of the noise levels that would be generated from vehicles entering and exiting the project's parking structure, the methodology recommended by FTA for the general assessment of stationary transit noise sources is used (discussed in the Methodology Section).

Based on the project's TIS prepared by Fehr & Peers,[15] the project is forecasted to generate 304 net daily vehicle trips, including an anticipated 142 trips during P.M. peak hour. The A.M. peak hour would generate a total of 40 trips. Using the FTA's reference noise level of 92 dBA SEL[16] at 50 feet from the noise source for a parking lot, it was determined that the project's highest peak hour vehicle trips, which would be 142 trips during the P.M. peak hour, would generate noise levels of approximately 48 dBA, L_{eq} at 50 feet from the project's parking entrance. The nearest noise sensitive use to the parking lot would be approximately 15 feet, at measurement location R2 and R3. Based on this distance, the vehicle related noise levels would be approximately 58.4 dBA L_{eq}. All other noise sensitive uses would experience lower parking structure noise levels. Parking related noise levels would increase the ambient noise level of 65 dBA L_{eq} at R3 by 0.9 dBA, which would be well below the significance threshold of a 5 dBA increase. As such, impacts would be less than significant.

Permanent Increases in Ambient Noise

The existing noise environment in the project area is dominated by traffic noise from nearby roadways, as well as nearby commercial and residential activities. Long-term operation of the proposed project would not have a significant effect on the community noise environment in proximity to the project site. Noise sources that would have potential noise impacts include: off-site vehicle traffic, mechanical (i.e., air-conditioning) equipment, and parking structure. Motor vehicle travel on local roadways attributable to the proposed project would have a less than significant impact on community noise levels. Noise levels associated with on-site operations (e.g., parking and mechanical equipment) are also considered less than significant. As such, noise impacts would be less than significant.

Impact NOI-2: The project would not generate excessive ground-borne vibration or ground-borne noise levels during construction or operation that would result in building damage. However, onsite construction activities involving heavy equipment such as a large bulldozer at the project boundary would expose persons to vibration levels in excess of human annoyance standards. (Potentially Significant)

Construction Vibration

Construction activities at the project site have the potential to generate low levels of groundborne vibration as the operation of heavy equipment (i.e., dozer, excavators, grader, tractor/loader/backhoe, and haul trucks, etc.) generates vibrations that propagate though the ground and diminish in intensity with distance from the source. No high-impact activities, such as pile driving or blasting, would be used during project construction. The nearest offsite receptors

---

[15] Fehr & Peers, *Transportation Impact Study for the Hoover Street District Yard Demolition Project,* July 2019.

[16] FTA, Transit Noise and Vibration Impact Assessment. May 2006.

to the project site that could be exposed to vibration levels generated from project construction include single- and multi-family residential uses north, west, and south of the project site. Groundborne vibrations from construction activities very rarely reach the levels that can damage structures, but they may be perceived in buildings very close to a construction site.

The PPV vibration velocities for several types of construction equipment that can generate perceptible vibration levels are identified in **Table 11,** *Vibration Source Levels for Construction Equipment*. Based on the information presented in Table 11, vibration velocities could range from 0.003 to 0.089 in/sec PPV at 25 feet from the source of activity.

TABLE 11
VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

	Approximate PPV (in/sec)					Approximate RMS (VdB)				
Equipment	**25 Feet**	**50 Feet**	**60 Feet**	**75 Feet**	**100 Feet**	**25 Feet**	**50 Feet**	**60 Feet**	**75 Feet**	**100 Feet**
Large Bulldozer	0.089	0.031	0.024	0.017	0.011	87	78	76	73	69
Hoe Ram	0.089	0.031	0.024	0.017	0.011	87	78	76	73	69
Caisson Drilling	0.089	0.031	0.024	0.017	0.011	87	78	76	73	69
Loaded Trucks	0.076	0.027	0.020	0.015	0.010	86	77	75	72	68
Jackhammer	0.035	0.012	0.009	0.007	0.004	79	70	68	65	61
Small Bulldozer	0.003	0.001	0.0008	0.0006	0.0004	58	49	47	44	40

SOURCE: FTA, Transit Noise and Vibration Impact Assessment, May 2006; ESA, 2021.

Table 12, *Groundborne Vibration Levels at Offsite Sensitive Uses Compared to Caltrans' Vibration Damage Potential Threshold*, shows the estimated construction-related groundborne vibration levels that could occur at the nearest offsite structures during construction at the project site and a comparison to the identified significance threshold.

As shown in Table 12, the vibration velocities forecasted to occur at the offsite sensitive receptors could potentially be up to 0.191 in/s PPV at the nearest residential structures north of the project site along Hoover Street and Commonwealth Avenue.

Based on the information shown in Table 12 which shows an estimated PPV of 0.191 in/s at 15 feet, none of the existing offsite residential structures located to the north, west, and south of the project site would be exposed to continuous/frequent intermittent groundborne vibration levels exceeding the FTA's 0.2 in/s criteria as shown in Table 3 for non-engineered timber and masonry buildings, which would be considered for residential structures. As such, the vibration impacts at these residential structures would be less than significant.

TABLE 12
GROUNDBORNE VIBRATION LEVELS AT OFFSITE SENSITIVE USES COMPARED TO FTA'S VIBRATION DAMAGE POTENTIAL THRESHOLD

Offsite Sensitive Land Use	Approximate Distance to Project Site (ft.)[a]	Estimated PPV (in/sec)/VdB	FTA's Vibration Potential Criteria, PPV (in/sec)/VdB[c]	Exceed FTA's Vibration Threshold? (Yes or No)
R1: South of the project site along Clinton Street	55	0.027/77	0.2/72	No/Yes
R2: North of the project site along Commonwealth Avenue	15	0.192/94	0.2/72	No/Yes
R3: North and northeast of the project site along Hoover Street	15	0.192/94	0.2/72	No/Yes
R4: West of the project site along Commonwealth Avenue	55	0.027/77	0.2/72	No/Yes

ft. = feet
in/sec = inches per second.

[a] Approximate distances are measured from the nearest construction area within the project site where vibration levels would be generated to the nearest offsite structure.
[b] Although the residences are located directly north of and up against the project site, it is anticipated that the construction area where off-road equipment would operate would be located at a minimum of fifteen feet from the residential structures.
[C] FTA's Vibration Damage Potential Criteria were taken from Table 3 and Table 4.

SOURCE: ESA, 2021.

With respect to human annoyance, the *L.A. CEQA Thresholds Guide* identifies residential areas as noise-sensitive land uses. Currently, these types of sensitive uses that are located in the project site vicinity include the single- and multi-family residential uses that are located to the north, west, and south of the project site. Under the FTA's ground-borne vibration annoyance potential criteria (refer to Table 4), vibration levels of 72 VdB for frequent events would be considered a vibration criterion for human annoyance. As shown in Table 12, the single- and multi-family residential receptors located north of the project site along Hoover Street and Commonwealth Avenue would be exposed to vibration levels of 94 VdB and the single- and multi-family residential receptors located south and west of the project site would be exposed to vibration levels of 77 VdB, which would exceed the FTA's 72 VdB criterion for human annoyance, when construction activities occur near the property line.

Smaller equipment operating along the property line would result in noise vibration levels below the 72 VdB . The vibration levels would exceed the significance threshold only when heavy equipment, such as a larger dozer and heavy truck, operates along the boundary of the construction site, exceeding the 72 VdB criterion intermittently and for generally very short durations. Thus, vibration impacts related to human annoyance would be potentially significant with the use of heavy equipment such as a large dozer along the project boundary. Mitigation measures are therefore prescribed to reduce construction vibration impacts to these sensitive noise receptors, as presented below in Subsection 4.4, *Mitigation Measures*.

Impact NOI-3: The project would not expose people residing or working in the project area to excessive noise levels (for a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport). (No Impact)

The project is not located within an airport land use plan and is not within two miles of a public use airport or within the vicinity of a private airstrip. The nearest public airport is Bob Hope Airport located at 2627 N. Hollywood Way in the City of Burbank, and is approximately 8 miles north of the project area. Therefore, the project would not expose people in the project vicinity to excessive noise levels from airport use. No impact would occur.

4.4 Mitigation Measures

Construction Noise

As stated above, construction-related noise has the potential to result in a significant noise impact at nearby residences. However, the following mitigation measures would reduce construction-related noise to a less-than-significant level:

> **Mitigation Measure NOI-1:** The LADWP/contractor shall provide a temporary 20-foot-tall construction fence equipped with noise blankets rated to achieve sound level reductions of at least 24 dBA between the project site and the residences to the north. The LADWP/contractor shall provide a temporary 20-foot-tall construction fence equipped with noise blankets rated to achieve sound level reductions of at least 21 dBA between the project site and the residences to the northeast. The LADWP/contractor shall provide a temporary 13-foot-tall construction fence equipped with noise blankets rated to achieve sound level reductions of at least 15 dBA between the project site and the residences to the west and south. Temporary noise barriers shall be used to block the line-of-sight between the construction equipment and the noise-sensitive receptors during early project construction phases (up to the start of framing) when the use of heavy equipment is prevalent. Noise barriers shall be heavy-duty materials such as at least 10 once per square yard vinyl-coated-polyester (VCP) quilted to sound absorber. All noise barrier material types are equally effective, acoustically, if they have this density. Noise barrier shall have a minimum sound transmission class (STC) of 25 and noise reduction coefficient (NRC) of 0.75.[17, 18]

> **Mitigation Measure NOI-2:** During project construction, all construction equipment, fixed or mobile, shall be operated with closed engine doors, if so equipped, and shall include properly operating and maintained residential-grade mufflers consistent with manufacturers' standards. For example, absorptive mufflers are generally considered commercially available, state-of-the-art noise reduction for heavy duty equipment.[19] Most of the noise from construction equipment originates from the intake and exhaust portions of the engine cycle. According to FHWA, use of adequate mufflers systems can achieve

17 Sound Transmission Class (STC) is an integer rating of how well a wall attenuates airborne sound and Noise Reduction Coefficient (NRC) is a scalar representation of the amount of sound energy absorbed upon striking a wall.

18 M David Egan, Architectural Acoustics, Chapter 2 and Chapter 4, March, 1988.

19 United Muffler Corp: https://www.unitedmuffler.com/; Auto-jet Muffler Corp: http://mandrelbending-tubefabrication.com/OEM/catalogpages/construction_off_road.php. Accessed August 2017.

reductions in noise levels of up to 10 dBA.[20] The contractor shall use muffler systems that provide a minimum reduction of 8 dBA compared to the same equipment without an installed muffler system, reducing maximum construction noise levels.

Construction Vibration

As stated above, construction-related vibration has the potential to result in a significant noise impact related to human annoyance at receptor locations to the north. Thus, the following mitigation measures are prescribed to minimize construction-related vibration impacts:

> **Mitigation Measure NOI-3:** The operation of construction equipment that generates high levels of vibration, such as large bulldozers and loaded trucks, shall be prohibited within 85 feet of existing residential structures located north, south, and east of the project site during project construction. Instead, small rubber tired bulldozers not exceeding 310 horsepower shall be used within 85 feet of existing residential structures located north, south, and east of the project site during demolition, grading, and excavation operations. The use of smaller rubber tired bulldozers would result in vibration levels of 65 VdB at the residential buildings to the north, south, and east of the project site, which would not exceed FTA's vibration criteria of 72 VdB for frequent events.

5. Conclusion

Construction noise and vibration levels associated with the proposed project would exceed the significance threshold at the offsite sensitive locations. Implementation of Mitigation Measures NOI-1 and NOI-2 would reduce construction noise levels from 94 dBA L_{eq} to 62 dBA L_{eq} at off-site sensitive receptor locations R2 and R3. Construction noise levels at R1 and R4 would be reduced to approximately 60 dBA L_{eq}. Thus, the project's potentially significant construction noise impact would be reduced to a less-than-significant level with implementation of mitigation measures.

With implementation of Mitigation Measure NOI-3, vibration levels from construction equipment would be reduced to approximately 71 VdB from a large dozer, which is below the significance threshold of 72 VdB for human annoyance. As such, construction vibration impacts related to human annoyance would be reduced to less-than-significant levels with implementation of mitigation measures.

Operation of the proposed project would not expose persons to, or generate noise and vibration levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, Therefore, operational noise and vibration impacts would be less than significant.

20 Federal Highway Administration. Special Report – Measurement, Prediction, and Mitigation: Chapter 4 Mitigation. https://www.fhwa.dot.gov/Environment/noise/construction_noise/special_report/hcn04.cfm. Accessed August 2017

6. References

California Department of Transportation (Caltrans), *Technical Noise Supplement* (TeNS). September, 2013.

Caltrans, *Transportation and Construction Vibration Guidance Manual*. September 2013.

City of Los Angeles, *L.A. CEQA Threshold Guide*, 2006.

Federal Highway Administration, *Roadway Construction Noise Model User's Guide*, 2006.

Fehr & Peers, *Transportation Impact Study for the Hoover Street District Yard Demolition Project*, July 2019.

Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, May 2006.

USEPA, *EPA Identifies Noise Levels Affecting Health and Welfare*. April 1974.

Appendix A
Ambient Noise Data

Appendix B
Construction Noise Calculations

Appendix C
Off-Site Construction Traffic Noise Calculations

Appendix D
Off-Site Traffic Noise Calculations