# Appendix J

## Noise and Vibration Impact Analysis

# NOISE AND VIBRATION IMPACT ANALYSIS

# $4^{th}$ AND HEWITT PROJECT

# LOS ANGELES, CALIFORNIA

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# EXECUTIVE SUMMARY

The Project would develop an 18-story office and commercial building located on an approximately 1.31-acre parcel at the intersection of E. 4th Street and S. Hewitt Street, in the City Los Angeles, California (City). The Project Site currently includes the 7,800-square foot (sf) building at the corner of Colyton Street and E. 4th Street that was formerly occupied by the Architecture and Design (A+D) Museum building, which would remain in place, as well as the 1,000-sf storage building associated with the 7,800-sf building, approximately 6,030 sf of office and related garage/storage space, and approximately 39,751 sf of surface parking lots, which would be demolished.

Ambient noise levels were established with field measurement data. Construction noise impacts were calculated using the Federal Highway Administration (FHWA) Roadway Construction Noise Model and evaluated using the City's Noise Ordinance standards provided in Ordinance Number 144,311 of the Los Angeles Municipal Code (LAMC). Construction vibration impacts were calculated using Federal Transit Administration (FTA) data and methodology and were evaluated using FTA criteria. Construction traffic was evaluated using the City's Noise Ordinance standards. Operational traffic noise was evaluated using the California specific vehicle noise curves (CALVENO) in the federal roadway noise model (the FHWA Highway Traffic Noise Prediction Model, FHWA RD 77-108). Operational stationary noise impacts were evaluated by identifying the noise levels generated from each activity and the receptor distance from the activity. The hourly Leq noise level from each noise source at sensitive receptor property lines was compared to ambient noise readings plus 5 dBA, or the City's minimum ambient noise levels plus 5 dBA, in accordance with the City's protocol. Distances between stationary noise sources and surrounding sensitive receptor locations were measured and noise levels at sensitive receptors were then calculated based on the standard point source noise-distance attenuation factor. Parking related noise levels were estimated by using the methodology recommended by the FTA for the general assessment of stationary transit noise source.

For Project construction, it was assumed as a worst-case scenario that all equipment for a given construction phase could simultaneously operate at the construction boundary. To be conservative, it was assumed that all structures adjacent to and across the street from the Project would fall into Building Category IV - buildings extremely susceptible to vibrations. It was assumed that Project garage ventilation fans would use the preset maximum speed. Construction of Related Projects in the Project vicinity were assumed to occur concurrently with construction of the Project.

Project design features **NOI-PDF-1 through NOI-PDF-5** would reduce construction noise levels. Regardless, a significant off-road construction equipment noise impact would occur at the residential roof-mounted trailer located at 428 S. Hewitt Street. Mitigation measure (MM) **NOI-MM-1** would not reduce noise levels below the level of significance and would be contingent on approval of an off-site property owner. Off-road construction equipment noise impacts would also occur at 442 Colyton Street and 449 S. Hewitt Street and there would be no feasible mitigation. Therefore, the off-road construction equipment noise impact would still be significant and unavoidable. On-road vehicular construction noise impacts would be less than significant, but when combined with off-road construction equipment noise, the composite construction noise levels would also be significant at 428 S. Hewitt Street, 442 Colyton Street, and 449 S. Hewitt Street. Even with implementation of NOI-MM-1, these impacts would be significant and unavoidable. Impacts related to potential building damage from construction vibration would occur at 418 Colyton Street, 424 Colyton Street, and 427 S. Hewitt Street. Mitigation Measures **NOI-MM-2, NOI-MM-3, and NOI-MM-4** would implement a pre-construction survey, shoring plan, and structural monitoring program, which would substantially reduce the potential for the Project's construction-related vibration building damage. However, because these mitigation measures require the consent of other neighboring property owners, who may not agree to implement all components of the recommended mitigation measures as stated herein, implementation of the provided mitigation measures cannot be guaranteed. Thus, it is conservatively concluded that building damage impacts on the structures located at 418 Colyton Street, 424 Colyton Street, and 427 S. Hewitt Street would be significant and unavoidable. The Project's on-road vehicular construction traffic would have a less than significant impact related to potential building damage, but a significant impact related to human annoyance.

During operations, the Project would have a less than significant traffic noise impact. Operational noise from the parking structure; heating, ventilation, and air-conditioning (HVAC) equipment; loading and trash collection, and garage ventilations fans would be less than significant individually and when they operate simultaneously. HVAC equipment noise would be reduced by screening in accordance with **NOI-PDF-6**.

A significant cumulative construction noise impact would occur at 428 S. Hewitt Street, the live/work land use at 442 Colyton Street, and the live/work use at 449 S. Hewitt Street[1] but not at any other sensitive uses. This impact would be reduced by LAMC compliance and the implementation of NOI-MM-1 but would remain significant and unavoidable. Cumulative vehicular construction noise impacts would be less than significant. Composite construction noise impacts from the combined operation of off-road construction equipment and on-road vehicles would result in a cumulative impact at 428 S. Hewitt Street, 442 Colyton Street and 449 S. Hewitt Street. This impact would remain significant and unavoidable after the implementation of NOI-MM-1. Regarding construction vibration from off-road construction equipment, the Project would not have significant cumulative impact related to potential vibration building damage or human annoyance due to vibration from off-road construction. Regarding construction vibration from on-road truck hauling, the Project would not have significant cumulative impact related to potential vibration building damage but would have a cumulative impact related to human annoyance due to vibration. When operational, the Project would not have significant cumulative impacts related to traffic noise, stationary noise sources, or operational vibration.

[1] The primary land use at 449 S. Hewitt Street was most recently a restaurant. The prior use at the time that the Notice of Preparation of the Project Environmental Impact Report and Initial Study were prepared was a live/work unit (based on real estate listings indicating artist in residence). For purposes of providing a conservative analysis, this study evaluates this property as a sensitive receptor (live/work unit).

# NOISE AND VIBRATION SETTING

## NOISE BACKGROUND

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise is commonly defined as unwanted sound. Sound can be characterized by a variety of parameters that describe the rates of oscillation of sound waves, the distance between successive troughs or crests, the speed of propagation, and the pressure level or energy content of a given sound wave. In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. The unit of sound pressure ratioed to an assumed zero sound level is called a decibel (dB).

Because sound or noise can vary in intensity by over one million times within the range of human hearing, a logarithmic loudness scale similar to the Richter Scale is used to keep sound intensity numbers at a convenient and manageable level. Since the human ear is not equally sensitive to all sound frequencies within the entire spectrum, noise levels at maximum human sensitivity are factored more heavily into sound descriptions in a process called "A-weighting", written as dB(A) or dBA. Any further reference to decibels in this discussion written as "dB" should be understood to be A-weighted.

Sound waves generated by a point source tend to form spherical wavefronts that propagate by radiating outward from their original point source in spherical pressure waves of ever-increasing areas. This process is referred to as “spherical divergence” or “spreading.” The same sound energy distributed over an ever-increasing spherical area is responsible for reducing the sound’s energy per unit area by one-quarter for each doubling of distance, which corresponds to a noise level decrease of 6 dBA per doubling of distance.[2]

Time variations in noise exposure are typically expressed in terms of a steady-state energy level equal to the energy content of the time varying period (called Leq), or, alternately, as a statistical description of the sound level that is exceeded over some fraction of a given observation period. Lmax and Lmin are the highest and lowest values measured by a sound level meter during the monitoring interval.

Since the sensitivity to noise increases during the evening and at night, and because excessive noise interferes with the ability to sleep, 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet time noise events. The Community Noise Equivalent Level, CNEL, is the average equivalent A-weighted sound level during a 24-hour day and is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 p.m. – 10:00 p.m.) noise levels and a 10 dB addition to nocturnal (10:00 p.m. – 7:00 a.m.) noise levels. The Day/Night Average Sound Level, Ldn, is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period. A Ldn or CNEL standard is required by State law.[3] It should be

[2] Caltrans. 2009. Technical Noise Supplement. November.
[3] State of California, Governor’s Office of Planning and Research. 2017. General Plan Guidelines.

noted that, as described in the Noise Element of the City of Los Angeles General Plan (Noise Element), the CNEL is already A-weighted; therefore, "A" does not typically appear when the CNEL and dB are referenced together.

## GROUNDBORNE VIBRATION

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Vibration is normally associated with activities such as railroads or vibration-intensive stationary sources, but it can also be associated with construction equipment, such as jackhammers, pile drivers, and hydraulic hammers. Vibration displacement is the distance that a point on a surface moves away from its original static position. The instantaneous speed that a point on a surface moves is described as the velocity, and the rate of change of the speed is described as the acceleration. Each of these descriptors can be used to correlate vibration to building damage, and acceptable equipment vibration levels.

Construction activities generate groundborne vibration when heavy equipment travels over unpaved surfaces or when it is engaged in soil movement. The effects of groundborne vibration include discernible movement of building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. Vibration-related problems generally occur due to resonances in the structural components of a building, because structures amplify groundborne vibration. Within the "soft" sedimentary surfaces of much of Southern California, ground vibration is quickly damped out. Groundborne vibration is almost never annoying to people who are outdoors.[4]

Vibration is best measured in velocity and acceleration. The peak particle velocity (PPV) or the root mean square (RMS) velocity is usually used to describe vibration amplitudes. The PPV is defined as the maximum instantaneous peak of the vibration signal and RMS is defined as the square root of the average of the squared amplitude of the signal. The PPV is more appropriate for evaluating potential building damage. The unit for PPV velocity is normally inches per second (in/sec). Another vibration descriptor, often used for describing annoyance levels, is presented and discussed in VdB units (the vibration velocity level in dB scale), in order to compress the range of numbers required to describe the vibration. In this study, all PPV and RMS velocity levels are in in/sec and all vibration levels are in VdB relative to one microinch per second. Typically, groundborne vibration generated by human activities attenuates rapidly with distance from the source of the vibration. Thresholds for vibration induced architectural damage and annoyance levels are addressed later in this report.

## BASELINE NOISE LEVELS

The Project is located on an approximately 1.31-acre parcel at the intersection of 4th Street and S. Hewitt Street, in the City Los Angeles, California (City). The Project Site currently includes the 7,800-square foot (sf) building at the corner of Colyton Street and E. 4th Street that was formerly

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

occupied by the A+D Museum, which would remain in place, as well as 1,000 sf of storage space associated with the 7,800-sf building, approximately 6,030 sf of office and related garage/storage space, and approximately 39,751 sf of surface parking lots, which would be demolished. Noise measurements were taken in order to document existing baseline levels in the area, both for noise-sensitive receptors adjacent to the Project Site, as well as to determine Project Site compatibility with land uses proposed by the Project, which include office and restaurant spaces in addition to above and below ground parking. Long term (24 hour) measurements were taken by Giroux & Associates on May 21 and 22, 2017, at two on-site locations. One location captures on-site noise exposure at the perimeter closest to a major roadway, representing the highest ambient noise loading. The other measurement, at the interior of the Project Site, was selected to represent the lowest ambient on-site noise loading. The results of the measurements are shown in **Table 1, 4th and Hewitt Project Long Term Noise Monitoring Data Summaries (dBA)**, and a map of the locations is shown in **Figure 1, Noise Measurement Locations**.

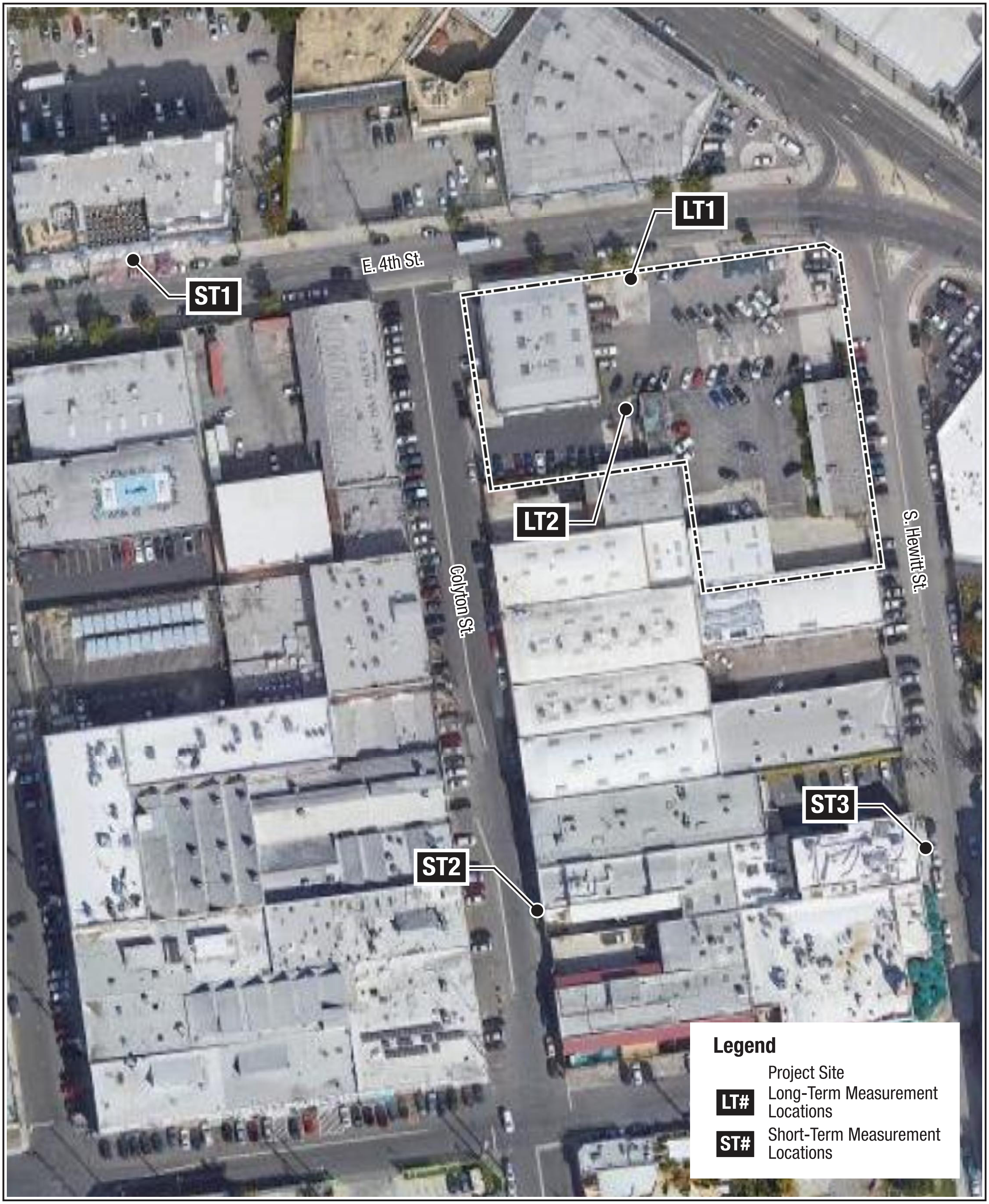
**Table 1**
**4th and Hewitt Project Long Term Noise Monitoring Data Summaries (dBA)**

| Hour | LT-1: E. 4th Street | | | LT-2: Site Interior | | |
|---|---|---|---|---|---|---|
| | Leq | Lmax | Lmin | Leq | Lmax | Lmin |
| 14:00-15:00 | 68 | 78 | 52 | 56 | 67 | 50 |
| 15:00-16:00 | 71 | 94 | 50 | 57 | 64 | 49 |
| 16:00-17:00 | 74 | 98 | 51 | 62 | 84 | 50 |
| 17:00-18:00 | 70 | 82 | 52 | 61 | 69 | 51 |
| 18:00-19:00 | 69 | 83 | 49 | 60 | 70 | 50 |
| 19:00-20:00 | 67 | 82 | 49 | 58 | 72 | 51 |
| 20:00-21:00 | 66 | 83 | 50 | 57 | 73 | 50 |
| 21:00-22:00 | 65 | 77 | 51 | 58 | 70 | 51 |
| 22:00-23:00 | 73 | 90 | 51 | 61 | 83 | 50 |
| 23:00-24:00 | 64 | 77 | 51 | 66 | 82 | 51 |
| 0:00-1:00 | 62 | 76 | 50 | 54 | 62 | 49 |
| 1:00-2:00 | 62 | 82 | 50 | 54 | 70 | 49 |
| 2:00-3:00 | 61 | 78 | 49 | 53 | 69 | 47 |
| 3:00-4:00 | 60 | 77 | 48 | 52 | 65 | 46 |
| 4:00-5:00 | 62 | 77 | 48 | 55 | 66 | 46 |
| 5:00:6:00 | 66 | 81 | 52 | 60 | 79 | 49 |
| 6:00-7:00 | 68 | 82 | 52 | 60 | 69 | 51 |
| 7:00-8:00 | 69 | 84 | 53 | 59 | 72 | 50 |
| 8:00-9:00 | 69 | 76 | 51 | 59 | 68 | 48 |
| 9:00-10:00 | 69 | 80 | 53 | 59 | 65 | 51 |
| 10:00-11:00 | 68 | 80 | 57 | 58 | 68 | 52 |
| 11:00-12:00 | 68 | 74 | 62 | 57 | 67 | 53 |
| 12:00-13:00 | 68 | 76 | 57 | 58 | 68 | 51 |
| 13:00-14:00 | 69 | 86 | 54 | 59 | 74 | 50 |

Source: Giroux & Associates. May 2017.

Averages:
LT-1: Average Daytime 4th St: 68.7 dBA Leq Average Nighttime 4th Street 64.2 dBA Leq
LT-2: Average Daytime Site Interior: 58.3 dBA Leq Average Nighttime Site Interior: 57.2 dBA Leq

CNEL:
LT-1: CNEL at 4th St: 73.1 dBA CNEL
LT-2: CNEL at Site Interior: 65.8 dBA CNEL




Aerial Source: Google Satellite Imagery, April 25, 2019.

4TH AND HEWITT PROJECT – NOISE AND VIBRATION IMPACT ANALYSIS

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# Noise Measurement Locations

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FIGURE 1

The predominant existing noise source surrounding the Project Site is vehicle traffic, including buses and trucks, traveling on the roadways. Other existing sources of noise in the vicinity of the Project Site include restaurants with outdoor dining along the western and eastern sides of South Hewitt Street between East 4th Street and East 5th Street; the Arts District Park at South Hewitt Street and East 5th Street; and the Arts District Dog Park at East 4th Street and Molino Street; as well as pedestrian activity and intermittent construction activity. At the northern Project Site perimeter, directly adjacent to E. 4th Street at LT-1, the measured noise level was approximately 73.1 dBA CNEL. Within the Project Site interior, existing noise at LT-2 was measured at 65.8 dBA CNEL. Such levels are compatible with the Project land uses.

The noise monitoring along E. 4th Street showed Leqs are variable, ranging from 68 to 74 dBA Leq daytime and 60 to 74 dBA Leq at night. The average daytime noise level is 68.7 dBA Leq and the average nighttime noise level is 64.2 dBA Leq.

As discussed later in this document, the City's most stringent noise thresholds are a not-to-exceed noise standard of ambient noise plus 5 dBA. Therefore, adjacent to this Project, on E. 4th Street, the not-to-exceed daytime noise standard is based on the measured noise levels: 73.7 dBA Leq (68.7 dBA + 5 dBA) and the nighttime not to exceed noise standard is based on the minimum ambient noise levels: 70.0 dBA Leq at night (65 dBA + 5 dBA). Near the site interior, the not-to-exceed noise standard is based on the minimum ambient noise levels: 70.0 dBA Leq daytime (65 dBA + 5 dBA) and 70 dBA Leq at night (65 dBA + 5 dBA).

To augment the long-term noise readings, short term noise (15-minute) readings were taken at three locations on Thursday, November 23, 2019, which are shown in **Table 2, 4th and Hewitt Project Short Term Noise Monitoring Data Summaries** and Figure 1. Measurements were made at the sidewalk in front of each indicated building. Because these readings are near building façades that cause reflection, the measurements may be overstated.

**Table 2**
**4th and Hewitt Project Short Term Noise Monitoring Data Summaries**

| Number | Location | Leq | Lmax | Lmin |
|---|---|---|---|---|
| **ST-1** | **825 E. 4th Street** | 74 | 82 | 56 |
| **ST-2** | **442 Colyton Street** | 63 | 78 | 48 |
| **ST-3** | **449 S. Hewitt Street** | 61 | 84 | 50 |
| Source: Giroux & Associates. November 2019. | | | | |

## EXISTING ROADWAY NOISE LEVELS

Existing roadway noise levels were calculated for 58 roadway segments located in the vicinity of the Project Site and are summarized in **Table 3, Existing Roadway Noise Levels**. The roadway segments selected for analysis are located near and immediately adjacent to the Project Site. When compared to roadways located farther away from the Project Site, these roadways would experience the greatest increase in Project traffic generated, since traffic disperses onto multiple roadways farther away from the Project Site. Existing roadway noise levels were calculated using the Federal Highway Administration's (FHWA's) Traffic Noise Prediction Model, FHWA RD 77-

108 with the CALVENO and traffic volumes for roadway segments analyzed in the Project's traffic study. Traffic noise model inputs are shown in **Appendix D-1, Traffic Noise - Existing Conditions (2017)**.

**Table 3**
**Existing Roadway Noise Levels**

| Roadway | | Noise Level (dB CNEL) |
|---|---|---|
| **1st St.** | W of Vignes | **66.3** |
| | E of Vignes | **66.8** |
| **Vignes** | N of 1st | **57.2** |
| | S of 1st | **56.7** |
| **3rd St.** | Central to Alameda | **66.2** |
| **4th Pl.** | E of Alameda | **64.5** |
| **4th St.** | W of Central | **64.8** |
| | Central - Alameda | **65.2** |
| | E of Alameda | **67.2** |
| | W of Merrick | **66.5** |
| | E of Merrick | **69.6** |
| **6th St.** | W of Central | **65.5** |
| | Central - Alameda | **66.9** |
| | Alameda - Mateo | **66.8** |
| | E of Mateo | **66.0** |
| **7th St.** | W of Central | **64.6** |
| | Central - Alameda | **64.6** |
| | Alameda - Mateo | **64.5** |
| | Mateo - Santa Fe | **64.0** |
| | E of Santa Fe | **64.9** |
| **2nd St.** | W of Alameda | **61.5** |
| | E of Alameda | **59.6** |
| **Central Ave.** | N of 3rd | **67.1** |
| | 3rd-4th | **68.2** |
| | 4th-6th | **67.6** |
| | 6th-7th | **68.0** |
| | S of 7th | **68.3** |
| **Alameda St.** | N of 2nd | **69.0** |
| | 2nd-3rd | **69.1** |
| | 3rd-4th | **69.2** |
| | 4th-6th | **68.7** |
| | 6th-7th | **68.8** |
| | S of 7th | **68.7** |
| **Merrick** | N of 4th | **55.1** |
| **Molino** | S of 4th | **52.5** |
| **Mateo** | N of 6th | **58.3** |
| | 6th-7th | **58.6** |
| **Santa Fe Ave.** | N of 7th | **62.9** |
| | 7th-8th | **65.4** |
| | S of 8th | **66.4** |
| **Olympic** | W of Alameda | **68.1** |
| | E of Alameda | **69.5** |
| **Alameda St.** | N of Olympic | **69.0** |

| Roadway | | Noise Level (dB CNEL) |
|---|---|---|
| | S of Olympic | **69.1** |
| **Boyle Ave.** | N of E. 4th Street | **63.2** |
| | E. 4th - Whittier | **64.3** |
| | S of Whittier | **65.7** |
| **Soto St.** | N of E. 4th | **67.8** |
| | S of E. 4th | **68.2** |
| **E. 4th St.** | W of U.S.-101 NB Off-Ramp | **69.0** |
| | U.S.-101 NB Off-Ramp - Boyle | **68.9** |
| | Boyle - I-5 SB Ramps | **69.7** |
| | I-5 SB Ramps - I-5 NB Ramps | **69.8** |
| | I-5 NB Ramps - Soto | **68.7** |
| | E of Soto | **68.7** |
| **Whittier Blvd.** | W of Boyle | **67.7** |
| | E of Boyle | **67.5** |
| Source: Giroux & Associates and Envicom Corporation. April 2022 (Revised). | | |

## EXISTING GROUNDBORNE VIBRATION LEVELS

There are almost constant background vibrations within most urban environments, most of which are imperceptible except to extremely sensitive monitoring equipment. Ground vibration is generally only of concern if it annoys people or damages structures.

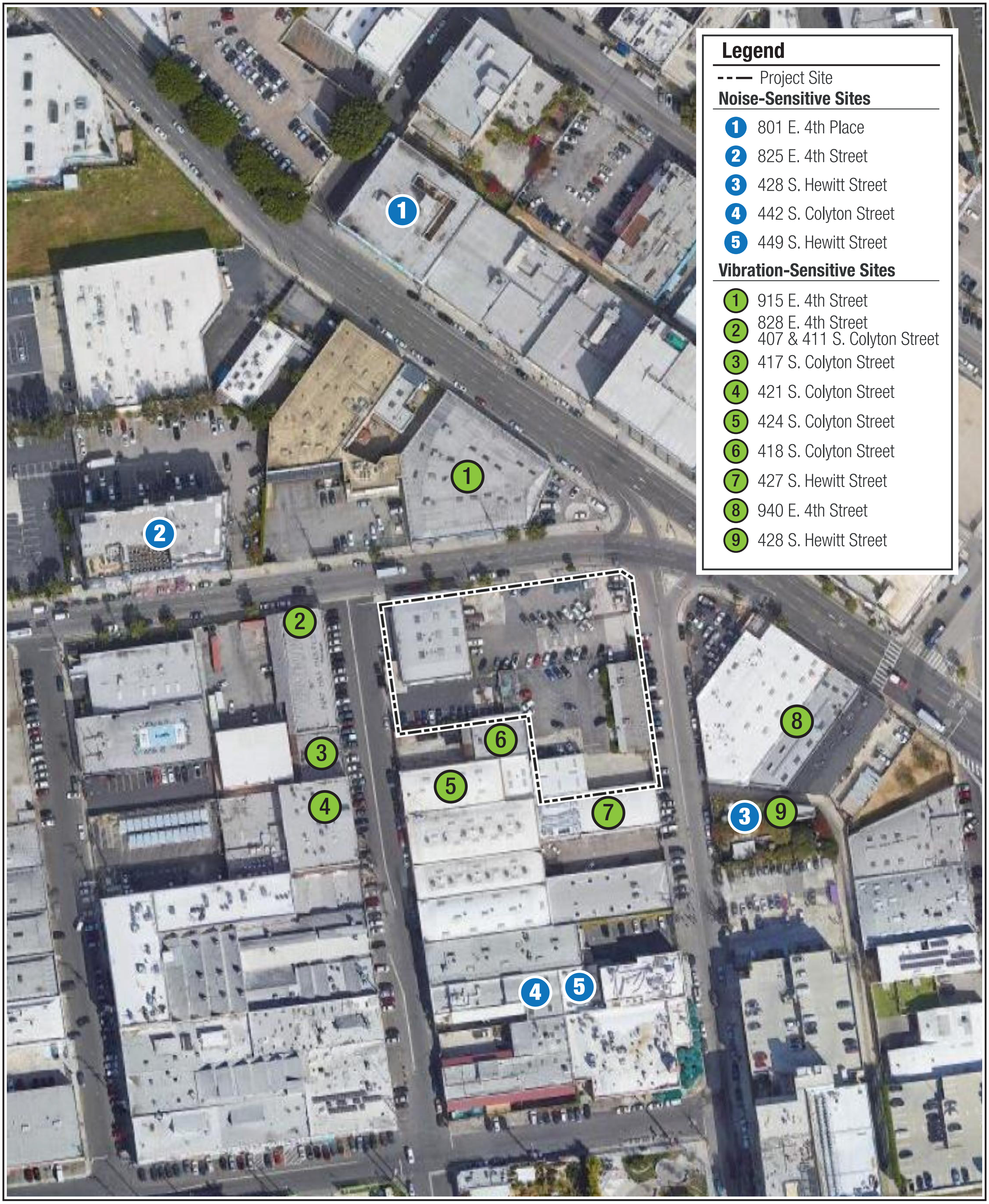
Aside from periodic construction work occurring throughout the City, the likely sources of groundborne vibration in the Project Site vicinity would be heavy-duty vehicular travel (e.g., refuse trucks, delivery trucks, and transit buses) on local roadways. According to the FTA, it is unusual for vibration from vehicular sources (including buses and trucks) to be perceptible, even in locations close to major roads.[5]

Annoyance from vibration often occurs when the vibration levels exceed the threshold of perception by only a small margin. This would be much below any damage threshold.

## EXISTING SENSITIVE RECEPTORS

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 2006 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. Noise sensitive uses are evaluated for construction as well as operational impacts. There are five existing noise sensitive uses within 500 feet of the Project Site, as indicated below. However, two uses are adjacent to each other and share the same setback distance and were therefore treated as a single location. Sources of impact to sensitive use properties include construction and operational noise. Noise and vibration-sensitive uses are shown in **Figure 2, Noise and Vibration-Sensitive Uses**.

[5] FTA Office of Planning and Environment. 2006. Transit Noise and Vibration Impact Assessment. May.




Aerial Source: Google Satellite Imagery, April 25, 2019.



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# Noise and Vibration-Sensitive Uses

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FIGURE 2

**Project Adjacent Noise Sensitive Uses:**

- **428 S. Hewitt Street** is a two-story structure with commercial uses as well as a rooftop-mounted single trailer located 80 feet southeast of the Project Site. This analysis includes this mobile home as the closest (most noise-impacted) sensitive receptor. The two-story structure is a contributor to the potential Downtown Los Angeles Industrial Historic District and was built in 1904; however, it is not individually historic under CEQA.[6] The trailer is not a permanent structure, is not a part of the two-story building itself, and is not of historic value. The representative measurement location is ST-3, 449 S. Hewitt Street.
- **825 E. 4th Street** is a 6-story multi-unit residential building located on the northeast corner of Seaton and 4th Streets, 200 feet northwest of the Project Site. The representative measurement location is ST-1, 825 E. 4th Street.
- **442 Colyton Street** is a live/work building (based on real estate listings indicating artist in residence at the time the Notice of Preparation and Initial Study were prepared) located more than 200 feet south of the Project Site.[7] However, this structure is separated from the Project Site with two or more intervening buildings and therefore is not considered as noise impacted as the first two land uses listed above. The representative measurement location is ST-2, 442 Colyton Street.
- **449 S. Hewitt Street** served most recently as a live/work space and then restaurants[8] and is located adjacent to 442 Colyton street with a shared property line, located more than 200 feet south of the Project Site. However, this structure is separated from the Project Site with two or more intervening buildings and therefore is not considered as noise impacted as the first two land uses listed above. The representative measurement location is ST-3, 449 S. Hewitt Street.
- **801 E. 4th Place** is occupied by Art Share LA, which includes artist residents and is located 350 feet north of the Project Site. There are several intervening structures and two roads (4th Street and 4th Place) between this use and the Project Site; therefore, this is not considered as noise impacted as the first two uses listed above. The representative measurement location is ST-1, 825 E. 4th Street.

**Vibration Sensitive Uses:**

Vibration impacts from construction could impact adjacent, fragile, structures even if the land uses occupying the structures are not considered sensitive (e.g., residential). Although vibration impacts diminish rapidly with distance from the vibration source, potential building damage could occur.

Most structures within immediate proximity to the Project Site were originally constructed to be industrial or manufacturing buildings. Several of the structures located in the Project vicinity have

6 Historic Resources Group. 2022. Historical Resources Technical Report for the 4th and Hewitt Project. February.
7 Property Shark. 442 Colyton Street, Los Angeles, CA 90013. Available at: https://www.propertyshark.com/mason/Property/16335598/442-Colyton-St-Los-Angeles-CA-90013/. Accessed December 27, 2021.
8 At the time that the Notice of Preparation and Initial Study were prepared, this land use was identified as a live/work building.

been identified as contributors to the potential Downtown Los Angeles Industrial Historic District, which is a historical resource in its entirety, as defined by CEQA. However, the contributing buildings in closest proximity to the Project Site, which were also described in the Historical Resources Technical Report for the 4th and Hewitt Project, are not individually designated as historic resources as defined by CEQA.[9]

Structures Immediately Adjacent to the Project Site:

- **418 Colyton Street** is located immediately south of the Project Site along the western façade. This is a one-story industrial warehouse building constructed in 1960, with a flat roof of rolled asphalt. The walls of the structure are comprised of concrete block.
- **424 Colyton Street** is located on two parcels south of the Project Site and 418 Colyton Street. This is a vernacular industrial building constructed in 1930 that now includes creative office space. The exterior is comprised of brick and stucco and includes windows and roll down metal doors. The structure is a contributor to the potential Downtown Los Angeles Industrial Historic District, but it is not individually historic as defined by CEQA.[10] This is a commercial property that is currently vacant.
- **427 S. Hewitt Street** is occupied by a vernacular industrial building constructed in 1920 that now includes office and retail space. It is located immediately south of the Project Site between E. 4th and E. 5th Streets and faces east onto S. Hewitt Street. The building is one story in height. The exterior is brick and includes garage door openings. This analysis includes this structure as the closest (most vibration-impacted) sensitive receptor. The structure is a contributor to the potential Downtown Los Angeles Industrial Historic District, but it is not individually historic as defined by CEQA.[11]

Structures Across the Street from the Project Site:

- **940 E. 4th Street** is a one-story industrial building with a concrete and stucco exterior located at 940 E. 4th Street and constructed in 1963. It is occupied by a trucking company and is located 60 feet to the east of the Project Site across S. Hewitt Street on the corner of E. 4th Street and S. Hewitt Street.
- **417 Colyton Street** is a one-story industrial building with a masonry exterior constructed in 1950 occupied by manufacturing uses. It is located 65 feet to the west of the Project Site across Colyton Street and immediately south of 828 E. 4th Street between E. 4th and 5th Streets.
- **915 E. 4th Street** is an industrial building constructed in 1922 occupied by an automotive repair garage. It is located 70 feet to the north of the Project Site across E. 4th Street on the corner of E. 4th Street and E. 4th Place. The building is one story with a concrete exterior. There are four garage openings on the northeastern elevation and two on the south elevation; all have roll down metal doors.

[9] Historic Resources Group. 2022. Historical Resources Technical Report for the 4th and Hewitt Project. February.
[10] Historic Resources Group. 2022. Historical Resources Technical Report for the 4th and Hewitt Project. February.
[11] Historic Resources Group. 2022. Historical Resources Technical Report for the 4th and Hewitt Project. February.

- **828 E. 4th Street, 407 Colyton Street, and 411 Colyton Street** are multiple parcels with one vernacular industrial building constructed in 1932 occupied with creative production uses (The Container Yard) located 65 feet from the commercial structure at the southwest corner of Colyton and E. 4th Streets, across Colyton Street from the Project Site to the west. There are four large openings on the east elevation; three have roll down metal doors covered by metal security bars, and one is infilled with concrete block. The structure is a contributor to the potential Downtown Los Angeles Industrial Historic District.[12]
- **421 Colyton Street** is located 85 feet from the Project Site, across Colyton Street. It is developed with a three-story brick vernacular industrial building, constructed in 1909, including office and warehouse/storage space. The structure is a contributor to the potential Downtown Los Angeles Industrial Historic District.[13]
- **428 S. Hewitt Street** is a two-story structure with commercial uses as well as a rooftop-mounted single trailer located 80 feet southeast of the Project Site. The two-story structure is a contributor to the potential Downtown Los Angeles Industrial Historic District and was built in 1904.[14] The trailer is not a permanent structure, is not a part of the two-story building itself, and is not of historic value.

All other noise-sensitive uses regulated by the City are located at greater distances from the Project Site, and therefore, would experience lower noise and vibration levels from the noise sources on the Project Site, due to the attenuation of noise and vibration with distance.

This study evaluates the construction and operational noise and vibrational impacts at the above receptors and evaluates significance relative to applicable noise standards and regulations. Mitigation measures are provided where necessary.

## THRESHOLDS OF SIGNIFICANCE

### VIBRATION GUIDELINES

There are no adopted City standards of significance thresholds for vibration. Because vibration is typically not an issue, very few jurisdictions have adopted vibration significance thresholds. The vibration descriptor commonly used to determine structural damage is the PPV, which is defined as the maximum instantaneous positive or negative peak of the vibration signal, usually measured in in/sec. The FTA has adopted vibration criteria that are used to evaluate potential structural damage to buildings by building category from construction activities. The vibration damage criteria adopted by the FTA are shown in **Table 4**, **Construction Vibration Damage Criteria**. If these limits are exceeded during construction, there is a risk of cosmetic damage as well as structural damage to buildings.

[12] Historic Resources Group. 2022. Historical Resources Technical Report for the 4th and Hewitt Project. February.
[13] Historic Resources Group. 2022. Historical Resources Technical Report for the 4th and Hewitt Project. February.
[14] Historic Resources Group. 2022. Historical Resources Technical Report for the 4th and Hewitt Project. February.

**Table 4**
**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. Nonengineered timber and masonry buildings | 0.2 |
| IV. Buildings extremely susceptible to vibration | 0.12 |
| Source: FTA. 2006. Transit Noise and Vibration Impact Assessment. May. | |

Potential damage to buildings and structures adjacent to the Project Site were assessed based on FTA criteria for building and structural damage as listed above. The vibration criteria that are recommended by this Report to avoid or limit damage risk to the properties that would be affected during construction are:

- 0.12 in/sec PPV for historic properties
- 0.20 in/sec PPV for non-historic properties

Several of the structures located in the Project vicinity have been identified as contributors to the potential Downtown Los Angeles Industrial Historic District and therefore are considered historic resources for purposes of this analysis in that the structures would be sensitive to the effects of vibration.

For cases of extreme fragility or where a very high importance factor is desired, the lowest vibration limit that should be set is the maximum ambient level of vibration in the building. This level can be determined by monitoring vibrations in the building for a period of time during normal, day-to-day activities before construction begins.

A modern categorization of damage is as follows:

- Cosmetic: The formation of hairline cracks on drywall surfaces or the growth of existing cracks in plaster or drywall surfaces; formation of hairline cracks in mortar joints of brick/concrete blocks.
- Minor: The formation of large cracks or loosening and falling of plaster or drywall surfaces, or cracks through bricks/concrete blocks.
- Major: Damage to structural elements of the building, cracks in support columns, loosening joints, splaying of masonry cracks, etc.

In most documents, the term "threshold damage vibration level" is defined as the highest vibration level at which no cosmetic, minor, or major damage occurs.[15]

[15] National Cooperative Highway Research Program (NCHRP). 2012. 25-25/Task 72 Current Practices to Address Construction Vibration and Potential Effects to Historic Buildings Adjacent to Transportation Project. Available at: http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP25-25(72)_FR.pdf. Accessed April 12, 2021.

The vibration thresholds discussed above relate mostly to structural protection rather than human annoyance. Groundborne vibration related to human annoyance is generally related to velocity levels expressed in the dB notation of VdB, the RMS velocity of a vibrating object. RMS velocities are expressed in units of vibration decibels.

According to the FTA, one of the challenges in developing suitable criteria for groundborne vibration is that there has been relatively little research into human response to vibration and, specifically, human annoyance. The FTA study discussed below, was based on rapid transit systems, primarily trains. The FTA criteria were developed specifically to apply to long-term or permanent operational groundborne vibration from transit projects (e.g., commuter rail), not from temporary events, such as construction activities. Nevertheless, the human response to a range of transient vibration, according to FTA, is as follows in **Table 5**, **Human Response to Transient Vibration**.

**Table 5**
**Human Response to Transient Vibration**

| | |
|---|---|
| 65 VdB - | Threshold of Human Perception |
| 72 VdB - | Annoyance Due to Frequent Events[a] |
| 75 VdB | Annoyance Due to Occasional Events[b] |
| 80 VdB - | Infrequent Events[c] |

[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.

Source: Federal Transit Administration. 2018. Transit Noise and Vibration Impact Assessment Manual (Ground-borne Vibration Impact Levels for Category 2: Residences and Buildings Where People Normally Sleep). September.

For building vibration, the threshold of perception for humans is approximately 65 VdB. Although the perceptibility threshold is approximately 65 VdB, human response to vibration is not usually substantial unless the vibration exceeds 70 VdB. The damage risk threshold for typical buildings is 100 VdB.

Regarding annoyance criteria, building construction activities that cause groundborne vibration levels to exceed 72 VdB (the annoyance threshold for frequent events) is considered to be significant at off-site residential uses. For off-site trucking, the threshold of 72 VdB for frequent events (more than 70 events per day) would be considered significant as there are as many as 120 truck trips (coming and going) per day.

## NOISE GUIDELINES

### City of Los Angeles General Plan Noise Element

**Table 6, City of Los Angeles Land Use Compatibility for Community Noise**, shows the noise/land use compatibility guidelines for City land uses as contained in the Noise Element. Exposures up to 67 dB CNEL for commercial uses are considered "normally acceptable." Levels of up to 77 dB CNEL are considered “conditionally acceptable” if all measures to reduce such exposure have been taken. Noise levels above 77 dB CNEL are considered normally unacceptable except in unusual circumstances. (As previously described, the CNEL is already A-weighted; therefore, “A” does not typically appear when the CNEL and dB are referenced together.) These standards apply primarily to any outdoor uses such as dining patios, green space, gardens, etc. Such standards allow for both outdoor conversational or contemplative comfort, as well as allowing indoor uses to be negatively impacted by outdoor noise without use of any enhanced structural noise reductions.

The 2006 L.A. CEQA Thresholds Guide provides criteria for evaluating the noise impacts of a project as shown in **Table 7, CEQA Noise Exposure Guidelines (dB)**. Similar to the Noise Element, office and commercial uses are “normally acceptable” up to a CNEL of 70 dB and “conditionally acceptable” to a level of 77 dB CNEL.

**Table 6**
**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, 2006 L.A. CEQA Thresholds Guide, 2006.

Sources: City of Los Angeles. 2006. City of Los Angeles L.A. CEQA Thresholds Guide: Your Resource for Preparing CEQA Analyses in Los Angeles (L.A. CEQA Thresholds Guide). City of Los Angeles. 1999. Noise Element of the City of Los Angeles General Plan (Adopted).

**Table 7**
**CEQA Noise Exposure Guidelines (dB)**

| Land Use | Normally Acceptable[a] | Conditionally Acceptable[b] | Normally Unacceptable[c] | Clearly Unacceptable[d] |
|---|---|---|---|---|
| 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 |
| 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: California Department of Health Services, as referenced in the 2006 City of Los Angeles L.A. CEQA Thresholds Guide: Your Resource for Preparing CEQA Analyses in Los Angeles, Page I.2-4.

Notes:
[a] 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.
[b] 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.
[c] 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.
[d] Clearly Unacceptable: New construction or development should generally not be undertaken.

### Los Angeles Municipal Code (Noise Ordinance)

The City's noise standards for non-transportation sources are articulated in Chapter XI of the LAMC added by Ordinance No. 144,311 (the Noise Ordinance). The Noise Ordinance regulates noise from one land use crossing the property line of an adjacent property line. Chapter XI of the LAMC restricts the level of noise that one type of land use or activity may broadcast across an adjacent land use. Noise Ordinance standards are stated with respect to ambient levels found without the contribution of an identified noise source. If ambient levels are low, Section 111.03 of the LAMC establishes presumed ambient noise levels as a function of zoning and times of day. **Table 8**, **City of Los Angeles Municipal Code Sound Level "A" Decibels**, shows the presumed ambient noise levels to be used as an evaluation baseline if no on-site monitoring data is available.

The ambient noise as defined by the Noise Ordinance is the measured noise level averaged over a period of at least 15 minutes. The baseline ambient noise shall be the actual measured ambient noise level or the City's presumed ambient noise level (shown in Table 8), whichever is greater. If the measured ambient noise level is not known, the City's presumed ambient levels are used as the baseline.

These Noise Ordinance numerical standards apply to "stationary" sources of noise generation (mechanical equipment such as air conditioning, refrigeration, heating, pumping, etc.) or of vehicles operating on private property, such as noise from a parking garage. A number of special noise generation activities have specific prohibitions as to time, manner or place. If such activities are not specifically prohibited by ordinance, the noise constraint for general stationary sources is that they may not increase the ambient level by more than 5 dBA above ambient (measured or presumed minimum levels shown in **Table 8, City of Los Angeles Municipal Code Sound Level "A" Decibels.**

**Table 8**
**City of Los Angeles Municipal Code Sound Level "A" Decibels**

| Zone | Presumed Minimum Ambient Noise Level [dBA] | |
|---|---|---|
| | Day | Night |
| A1, A2, RA, RE, RS, RD, RW1, RW2, R1, R2, R3, R4, and R5 | 50 | 40 |
| P, PB, CR, C1, C1.5, C2, C4, C5, and CM | 60 | 55 |
| M1, MR1, and MR2 | 60 | 55 |
| M2 and M3 | 65 | 65 |

Source: LAMC, Chapter XI, Section 111.03 (amended by Ordinance No. 156,363, Effective 3/29/82).

Notes:
Daytime levels are to be used from 7:00 a.m. to 10:00 p.m. and nighttime levels from 10:00 p.m. to 7:00 a.m.).
At the boundary line between two zones, the presumed ambient noise level of the quieter zone shall be used.

These procedures recognize and account for perceived differences in the nuisance level of different types of noise and/or noise sources. Specifically, the procedures provide for a penalty of 5 dBA for steady, high-pitched noise or repeated impulsive noises to account for the nuisance nature of these types of noise. Conversely, the procedures provide a credit of 5 dBA 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, as short-term noise events are typically less of a nuisance than sustained noise levels.

**California Environmental Quality Act Appendix G Significance Criteria**

According to Appendix G, Environmental Checklist, of the California Environmental Quality Act (CEQA), noise impacts of a project are considered significant if the project would result in:

a. The 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?
b. The generation of excessive groundborne vibration or groundborne noise levels.

c. Excessive noise exposure for people residing or working in the project area if the is project is 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.

In addition, the 2006 City of Los Angeles L.A. CEQA Thresholds Guide: Your Resource for Preparing CEQA Analyses in Los Angeles (Thresholds Guide) offers additional criteria for evaluating noise impacts, including that a project would normally have a significant impact on noise levels from construction if:

1) Construction activities lasting more than one day would exceed existing ambient exterior noise levels by 10 dBA or more at a noise sensitive use;
2) 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
3) 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.

In addition, the Thresholds Guide states that Project operations would normally have a significant impact on noise levels from operations if they cause the ambient noise level measured at the property line of affected uses to increase by 3 dB in CNEL to or within the "normally unacceptable" or "clearly unacceptable" category, or any 5 dB or greater noise increase, as specified in Table 7, CEQA Noise Exposure Guidelines. As shown in Table 6, City of Los Angeles Noise Compatibility Threshold**s**, noise levels of up to 70 dB CNEL are considered "conditionally acceptable" for residential uses. Therefore**,** an increase of +3 dB CNEL in traffic noise would be considered a significant impact if the total noise along the affected segment also exceeds 70 dB CNEL (within the City's "normally unacceptable" noise compatibility category for noise-sensitive land uses).

Two characteristic noise sources are typically identified with land use intensification such as that proposed for the Project. Construction activities, especially heavy equipment, would create short-term noise increases near the Project Site. Such impacts may be important for possible nearby noise-sensitive receptors, such as existing residential uses. Upon completion, Project-related traffic would cause an incremental increase in noise levels throughout the Project area. Traffic noise impacts are generally analyzed both to ensure that the Project would not adversely impact the acoustic environment of the surrounding community, as well as to ensure that the Project Site is not exposed to an unacceptable level of noise resulting from the ambient noise environment acting on the Project.

## METHODOLOGY

Stationary noise impacts were evaluated by identifying the noise levels generated from each activity and the receptor distance from the activity. The hourly Leq noise level from each noise source at sensitive receptor property lines was determined based on ambient noise readings plus +5 dBA in accordance with the City's protocol. This noise level was compared to the noise level of each activity at each sensitive use. The following steps were undertaken to calculate outdoor stationary point-source noise impacts:

1. Ambient noise levels at surrounding sensitive receptor locations were estimated based on field measurement data (see Tables 1 and 2);
2. Distances between stationary noise sources and surrounding sensitive receptor locations were measured using Project architectural drawings, Google Earth, and Project Site plans;
3. Stationary-source noise levels were then calculated for each sensitive receptor location based on the standard point source noise-distance attenuation factor of 6.0 dBA for each doubling of distance;
4. Noise level increases were compared to the stationary source noise significance thresholds identified below;
5. For outdoor mechanical equipment, the operation of any and all outdoor mechanical equipment would be subject to the noise control requirements of the City's Noise Ordinance and municipal codes;
6. Parking related noise levels were estimated by using the methodology recommended by the FTA for the general assessment of stationary transit noise source.[16] Using the methodology, the Project's peak hourly noise level that would be generated by the on-site parking levels was estimated using the following FTA equation for a parking structure:

Leq(h) = SELref + 10log(NA/1000) – 35.6, where

Leq(h) = hourly Leq noise level at 50 feet

SELref = reference noise level for stationary noise source represented in sound exposure level (SEL) at 50 feet

NA = number of automobiles per hour

# NOISE AND VIBRATION IMPACT ANALYSIS

## CONSTRUCTION PERIOD NOISE AND VIBRATION IMPACTS

For this analysis, a noise impact is considered potentially significant if Project construction activities extend beyond the Noise Ordinance time limits for construction or if construction-related noise levels exceed the Noise Ordinance noise level standards unless it is technically infeasible to comply with the standards despite the use of noise reduction devices or techniques, per LAMC

[16] Federal Transit Administration. 2018. Transit Noise and Vibration Impact Assessment Manual. September.

Section 112.05, which is discussed in detail below. The Project entails demolition of several small on-site structures and 39,751 sf of surface parking lot. The Project proposes to develop an 18-story building, with approximately 327,976 sf of office space and 8,149 sf of ground level commercial uses (Office Building), on an approximately 1.31-acre low-intensity site at the southwest intersection of 4th Street and S. Hewitt Street. Mechanical equipment would be located on the 18th floor (rooftop level).

Construction noise levels would vary at any given receptor depending on the construction phase, equipment type, duration of use, distance between the noise source and receptor, and the presence or absence of barriers between the noise source and receptor.

The City limits construction activities to the hours of 7:00 a.m. and 9:00 p.m. on weekdays and 8:00 a.m. to 6:00 p.m. on any Saturday. Construction is not permitted on any national holiday or on any Sunday.

In addition, LAMC Section 112.05 specifies the maximum noise level of powered equipment or powered hand tools. Use of any powered equipment or powered hand tool that produces a maximum noise level exceeding 75 dBA at a distance of 50 feet from construction and industrial machinery is prohibited. However, the above noise limitation does not apply where compliance is technically infeasible (LAMC Section 112.05). "Technically infeasible" means that the above noise limitation cannot be complied with despite the use of mufflers, shields, sound barriers and/or any other noise reduction device or techniques during the operation of equipment. An inability to reduce construction equipment noise exposure to 75 dBA or less at any off-site, noise sensitive use could be considered a significant, but temporary, noise impact.

Finally, a project would also have a significant impact on noise levels during the construction period if 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-Road Construction Equipment**

Construction of the Project is planned to begin in 2022 and conclude in 2025. Details for each phase of construction for the proposed commercial development are not yet known. However, construction activities proposed for similar projects typically include demolition, grading, construction of the building shells, interior finishing, and landscaping. Construction equipment, such as compactors, bulldozers, excavators, backhoes, loaders, and assorted other hand tools and professional grade equipment would likely be used.

The following Project Design Features are prescribed to reduce construction noise levels at sensitive receptor locations:

**NOI-PDF-1:** All capable diesel-powered construction vehicles will be equipped with exhaust mufflers, aftermarket dampening system or other suitable noise reduction devices.

**NOI-PDF-2:** Power construction equipment (including combustion engines), fixed or mobile, will be equipped with state-of-the-art noise shielding and muffling devices (consistent with manufacturers' standards). All equipment will be properly maintained to ensure that no additional noise, due to worn or improperly maintained parts, would be generated.

**NOI-PDF-3:** Grading and construction contractors will use rubber-tired equipment rather than metal-tracked equipment.

**NOI-PDF-4:** An on-site construction manager will be responsible for responding to local complaints about construction noise. Notices will be sent to residential units within 500 feet of the construction site and signs will be posted at the construction site that list the telephone number for the on-site construction manager.

**NOI-PDF-5:** Construction supervisors will be informed of Project-specific noise requirements, noise issues for sensitive land uses adjacent to the Project construction Site, and/or equipment operations to ensure compliance with the required regulations and best practices.

These features would reduce the Projects' off-road construction equipment noise impacts to the extent feasible, at various times during construction. However, they were not included in the calculations of the Project construction noise levels, because when applied, the numerical reduction cannot be accurately determined. Therefore, the noise levels reported for off-road construction are conservative, as they would be reduced with the application of Project Design Features NOI-PDF-1 through NOI-PDF-5.

In 2006, the FHWA published the Roadway Construction Noise Model that includes a national database of construction equipment reference noise emissions levels. In addition, the database provides an acoustical usage factor to estimate the fraction of time each piece of construction equipment is operating at full power during a construction phase. The usage factor is a key input variable that is used to calculate the average Leq noise levels.

**Table 9, Off-Road Construction Equipment Noise Levels**, identifies highest ($L_{max}$) noise levels associated with each type of the probable equipment fleet and the extent of use. Accounting for equipment usage (usage factor) hourly levels are represented as $L_{eq}$. The table is organized by construction activity and equipment associated with each activity. Construction equipment noise calculation worksheets are shown in **Appendix A, Construction Noise Levels**.

**Table 9**
**Off-Road Construction Equipment Noise Levels**

| Phase Name | Equipment | Usage Factor [a] | Measured Noise @ 50 feet (dBA Lmax) [b] | Average Noise Level @ 50 feet (dBA Leq)[c] | Quantity | Total (dBA Leq) |
|---|---|---|---|---|---|---|
| Demolition | Dozer | 40% | 82 | 78 | 1 | 85 |
| | Concrete Saw | 20% | 90 | 83 | 1 | |
| | Loader/Backhoe | 37% | 78 | 74 | 3 | |

| Phase Name | Equipment | Usage Factor [a] | Measured Noise @ 50 feet (dBA Lmax) [b] | Average Noise Level @ 50 feet (dBA Leq)[c] | Quantity | Total (dBA Leq) |
|---|---|---|---|---|---|---|
| Grading | Grader | 40% | 85 | 81 | 1 | 85 |
| | Loader/Backhoe | 37% | 78 | 74 | 3 | |
| | Dozer | 40% | 82 | 78 | 1 | |
| | Excavator | 40% | 81 | 77 | 1 | |
| Building Construction | Forklift | 20% | 75 | 68 | 1 | 82 |
| | Generator Set | 50% | 81 | 78 | 1 | |
| | Loader/Backhoe | 37% | 78 | 74 | 1 | |
| | Crane | 16% | 81 | 73 | 1 | |
| | Welder | 46% | 74 | 71 | 3 | |
| Paving | Paver | 50% | 77 | 74 | 1 | 81 |
| | Cement Mixer | 20% | 80 | 73 | 1 | |
| | Loader/Backhoe | 37% | 78 | 74 | 1 | |
| | Paving Equipment | 40% | 76 | 72 | 1 | |
| | Roller | 38% | 80 | 76 | 1 | |

Source: Giroux & Associates and Envicom Corporation. April 2022 (Revised).

[a] Usage factor is the percentage of time the equipment operates at full power.
[b] Federal Highway Administration. 2006. Roadway Construction Noise Model User's Guide. January.
[c] Results are rounded.

Quantitatively, the primary noise prediction equation is expressed as follows for the hourly average noise level (Leq), at distance D between the source and receiver (dBA):

Leq = Lmax @ 50' – 20 log (D/50') + 10 log (U.F%/100) – I.L.(bar)

Where:

Lmax @ 50' is the published reference noise level at 50 feet,

U.F.% is the usage factor for full power operation per hour, and

I.L.(bar) is the insertion loss for intervening barriers, if applicable.

Spherically radiating point sources of noise emissions are atmospherically attenuated by a factor of 6 dBA per doubling of distance. The potential for construction-related noise to adversely affect nearby residential receptors would depend on the location and proximity of construction activities to these receptors. Noise levels from individual pieces of construction equipment would typically range from 68 to 83 dBA Leq at a distance of 50 feet. The highest noise levels generated by Project construction activities would typically range from 81 to 85 dBA Leq at a distance of 50 feet from the noise source if all equipment for a given phase operated at the Project boundary. These assumptions represent the worst-case noise scenario, because construction activities would typically be spread out throughout the Project Site and thus some equipment would be farther away from the affected receptors.

The closest off-site noise sensitive use is a roof-mounted trailer at 428 S. Hewitt Street. This use is approximately 80 feet from the closest Project perimeter. At this distance, as shown in **Table 10, Off-Road Construction Equipment Noise Levels at Closest Off-Site Sensitive Uses**, construction noise levels could be as high as 81 dBA for a one-hour Leq. This would be above the recommended noise threshold of 75 dBA. Construction equipment noise calculation worksheets for sensitive receptor locations are shown in Appendix A, Construction Noise Levels.

**Table 10**
**Off-Road Construction Equipment Noise Levels at Closest Off-Site Sensitive Uses**

| Phase | 428 S. Hewitt Street (dBA) | 825 E. 4th Street (dBA)[a] | 442 Colyton and 449 S. Hewitt Streets[a] (dBA) | Art Share LA at 801 E. 4th Place[a] (dBA) |
|---|---|---|---|---|
| **Demolition** | 81 | 63 | 63 | 58 |
| **Grading** | 81 | 63 | 63 | 58 |
| **Construction** | 78 | 70 | 70 | 65 |
| **Paving** | 77 | 69 | 69 | 64 |

[a] Receptors are partially shielded from the Project construction Site by multiple existing buildings. A 10 dBA reduction by shielding was taken but only during grading and demolition while equipment operates at ground level, based on guidance from the FHWA Manual for Highway Noise and Land Use (Federal Highway Administration. The Audible Landscape:

A Manual for Highway Noise and Land Use. https://www.fhwa.dot.gov/ENVIRonment/noise/noise_compatible_planning/federal_approach/audible_landscape/al04.cfm. Accessed April 7, 2021). No reduction during construction phase was taken where the work height can be 18-stories high.

Construction noise is also significant if construction operations lasting more than 10 days could exceed existing ambient exterior noise levels by 5 dBA or more at the property line. For the Project, existing ambient noise levels are shown in Tables 1 and 2. A potentially significant impact would occur if the ambient noise level plus Project construction noise level exceeded the ambient noise level by more than +5 dBA Leq. This analysis is shown in **Table 11, Estimate of Off-Road Construction Equipment Noise Levels at Existing Off-Site Sensitive Receptors**.

**Table 11**
**Estimate of Off-Road Construction Equipment Noise Levels at Existing Off-Site Sensitive Receptors**

| Address | Distance from Site (feet) | Phase | Estimated Project Construction Noise Levels (dBA Leq) | Existing Ambient Noise Levels (dBA Leq) | Project Construction Plus Ambient (dBA Leq) | Project Increment (dBA Leq) | Exceeds 5 dBA? |
|---|---|---|---|---|---|---|---|
| **428 S. Hewitt Street** | 80 | Demolition | 81 | 65 | 81.1 | 16.1 | Yes |
| | | Grading | 81 | 65 | 81.1 | 16.1 | Yes |
| | | Construction | 78 | 65 | 78.2 | 13.2 | Yes |
| | | Paving | 77 | 65 | 77.3 | 12.3 | Yes |
| **825 E. 4th Street** | 200 | Demolition | 63 | 74 | 74.3 | 0.3 | No |
| | | Grading | 63 | 74 | 74.3 | 0.3 | No |
| | | Construction | 70 | 74 | 75.5 | 1.5 | No |
| | | Paving | 69 | 74 | 75.2 | 1.2 | No |
| **442 Colyton Street** | 200 | Demolition | 63 | 65 | 67.1 | 2.1 | No |
| | | Grading | 63 | 65 | 67.1 | 2.1 | No |
| | | Construction | 70 | 65 | 71.2 | 6.2 | Yes |
| | | Paving | 69 | 65 | 70.5 | 5.5 | Yes |

| Address | Distance from Site (feet) | Phase | Estimated Project Construction Noise Levels (dBA Leq) | Existing Ambient Noise Levels (dBA Leq) | Project Construction Plus Ambient (dBA Leq) | Project Increment (dBA Leq) | Exceeds 5 dBA? |
|---|---|---|---|---|---|---|---|
| **449 S. Hewitt Street** | 200 | Demolition | 63 | 65 | 67.1 | 2.1 | No |
| | | Grading | 63 | 65 | 67.1 | 2.1 | No |
| | | Construction | 70 | 65 | 71.2 | 6.2 | Yes |
| | | Paving | 69 | 65 | 70.5 | 5.5 | Yes |
| **Art Share LA at 801 E 4th Place** | 350 | Demolition | 58 | 74 | 74.1 | 0.1 | No |
| | | Grading | 58 | 74 | 74.1 | 0.1 | No |
| | | Construction | 65 | 74 | 74.5 | 0.5 | No |
| | | Paving | 64 | 74 | 74.4 | 0.4 | No |
| Source: Giroux & Associates and Envicom Corporation. April 2022 (Revised). | | | | | | | |

As shown in Table 11 above*,* the roof-mounted trailer at 428 S. Hewitt Street may experience construction noise levels in excess of ambient noise +5 dBA. When equipment operates above ground level during the building construction and paving stages, the live/work land use at 442 Colyton Street and the live/work use at 449 S. Hewitt Street may also experience construction noise levels in excess of ambient noise +5 dBA. All other noise-sensitive locations are shown to be below the stated threshold.

The most effective method of noise mitigation is erecting a noise barrier blocking the line-of-sight between the source and receiver. There is no technically feasible way to erect a temporary barrier from the ground to the height of the of the Project rooftop. However, during demolition and grading, as well as during portions of the building construction and paving phases, a temporary barrier around the trailer on the roof may be feasible and would reduce noise levels when construction equipment operates at or below existing grade level. A 10 dBA reduction would be required to reduce construction noise below the level of significance during some of the phases of construction, which could be provided by NOI-MM-1 when construction equipment operates at or below the existing ground level.

**NOI-MM-1:** Subject to off-site property owner agreement, a temporary construction barrier on the rooftop of 428 S. Hewitt Street, near the edge of the rooftop facing the Project Site shall be erected during the Project demolition and grading phases and when equipment is used on the ground floor during building construction and paving. The barrier shall be least four feet in height and constructed of a material with a Sound Transmission Class (STC) rating of at least STC-30 (such as acoustic panels or sound barrier products) or a transmission loss of at least 20 decibels (dB) at 500 hertz (such as 1/2-inch plywood). In addition to the rooftop barrier, a temporary construction barrier of approximately 300 feet in length and 24 feet in height, located at the eastern edge and southeastern corner of the Project Site, and constructed of a material with a rating of STC-35 or greater (such as acoustic panels or sound barrier products) or providing a transmission loss of at least 25 dB at 500 hertz (such as 3/4-inch plywood), shall be erected during the Project demolition and grading phases and when equipment is used on the ground floor during building construction and paving.

The rooftop noise barrier would be capable of up to a 10 dBA noise reduction and the ground floor barrier would be capable of up to a 15 dBA noise reduction based on equations for barrier insertion loss from the FTA Transit Noise and Vibration Impact Assessment Manual.[17] **Table 12, Mitigated Off-Road Construction Equipment Noise Levels at 428 S. Hewitt Street** shows mitigated construction equipment noise levels at 428 S. Hewitt Street with an on-site ground floor barrier (located at the eastern edge and southern corner of the Project Site), with an off-site rooftop barrier, and with both the on-site ground floor barrier and the off-site rooftop barrier together of the barriers. As shown on Table 12, the application of both the on-site ground floor barrier and the off-site rooftop barrier located off-site would not reduce noise levels below the level of significance at 428 S. Hewitt Street during building construction of the second through fifth floors and during paving of the second through fifth floors. In addition, as the neighboring property owner may not agree to the off-site rooftop barrier, the impact would remain significant and unavoidable. At 442 Colyton Street and 449 S. Hewitt Street, it would also be infeasible to construct a noise barrier within the Project Site that would block the line of sight between construction of the higher floors of the Office Building and the receptors, and there is also a lack of space for a barrier at the southern property line due to the presence of existing buildings immediately adjacent to the limits of excavation activity. Mitigated construction equipment noise calculation worksheets are shown in **Appendix B-1, Mitigated Off-Road Construction Equipment Noise Levels**. Noise barrier calculations are shown in **Appendix B-2, Noise Barrier Calculations**.

**Table 12**
**Mitigated Off-Road Construction Equipment Noise Levels at 428 S. Hewitt Street**

| Phase | Unmitigated Noise Levels (dBA $L_{eq}$) | | On-Site Ground Floor Barrier (dBA $L_{eq}$) | | Off-Site Rooftop Barrier (dBA $L_{eq}$) | | On-Site Ground Floor Barrier and Off-Site Rooftop Barrier (dBA $L_{eq}$) | |
|---|---|---|---|---|---|---|---|---|
| | Unmitigated Noise Level | Increase Above Ambient | Mitigated Noise Level | Increase Above Ambient | Mitigated Noise Level | Increase Above Ambient | Mitigated Noise Level | Increase Above Ambient |
| Demolition | **81**[c] | **16.1** | 66 | 3.5 | 71 | **7.0** | 56 | 0.5 |
| Grading | **81** | **16.1** | 66 | 3.5 | 71 | **7.0** | 56 | 0.5 |
| Construction (1st Floor) | **78** | **13.2** | 63 | 2.1 | 68 | 4.8 | 53 | 0.3 |
| Construction (2nd-18th Floors)[a] | **78** | **13.2** | 74 | **9.5** | 74 | **9.5** | 73 | **8.6** |
| Paving (1st Floor) | **77** | **12.3** | 62 | 1.8 | 67 | 4.1 | 52 | 0.2 |
| Paving (2nd-5th Floors)[b] | **77** | **12.3** | **76** | **11.3** | **76** | **11.3** | **76** | **11.3** |

[17] FTA. 2018. Transit Noise and Vibration Impact Assessment Manual.

<table>
<tr><th rowspan="2">Phase</th><th colspan="2">Unmitigated Noise Levels (dBA $L_{eq}$)</th><th colspan="2">On-Site Ground Floor Barrier (dBA $L_{eq}$)</th><th colspan="2">Off-Site Rooftop Barrier (dBA $L_{eq}$)</th><th colspan="2">On-Site Ground Floor Barrier and Off-Site Rooftop Barrier (dBA $L_{eq}$)</th></tr>
<tr><th>Unmitigated Noise Level</th><th>Increase Above Ambient</th><th>Mitigated Noise Level</th><th>Increase Above Ambient</th><th>Mitigated Noise Level</th><th>Increase Above Ambient</th><th>Mitigated Noise Level</th><th>Increase Above Ambient</th></tr>
<tr><td colspan="9">Sources: Giroux & Associates. November 2019. Envicom Corporation. April 2022 (Revised).<br>Note: Barrier insertion loss was subtracted where applicable, based on equations for barrier insertion loss from Federal Transit Administration. 2018. Transit Noise and Vibration Impact Assessment Manual.<br>[a] When building construction occurs at upper floors, it was assumed that forklifts, generator sets, and loader/backhoes would remain at the ground floor and be shielded, while the work-tool interaction of the crane and the welders would occur above ground level and be unshielded.<br>[b] When paving occurs at upper floors, it was assumed loader/backhoes would remain at the ground floor and be shielded, while the remaining equipment would operate above ground level and be unshielded.<br>[c] Numbers in bold indicate an exceedance of the construction noise threshold due to the generation of noise levels above 75 dBA at a sensitive receptor or due to a 5 dBA or more exceedance of existing ambient exterior noise levels at a sensitive receptor during operations lasting more than 10 days.</td></tr>
</table>

Construction noise levels at the closest noise-sensitive land uses; the rooftop-mounted trailer at 428 S. Hewitt Street, 442 Colyton Street, and 449 S. Hewitt Street, would remain significant and unavoidable, even with implementation of the mitigation measure. (Mitigation is not set forth for the impacts at 442 Colyton Street and 449 S. Hewitt Street, because, as stated above, it would be infeasible to construct a noise barrier within the Project Site that would block the line of site between construction of the higher floors of the Office Building and the receptors, and there is also insufficient space for a barrier along the southern property line due to the presence of existing buildings adjacent to the limits of demolition, excavation, and construction activity.)

**On-Road Vehicular Construction Noise**

Delivery truck and haul trucks would travel to and from the Project Site throughout the construction period. The worst-case scenario would be hauling trucks during the grading phase, using typical dump trucks with a capacity of approximately 14 - 20 cubic yards. Delivery truck trips during other phases would be less numerous, and worker trips would consist of automobiles which are substantially quieter than heavy trucks. The proposed haul destination is Azusa Land Reclamation Landfill in Azusa. Loaded trucks would exit the site onto E. 4th Street and/or S. Hewitt Street, E. 4th Place, Alameda Street, and Commercial Street. From Commercial Street, trucks would travel on United States Route 101 (U.S.-101) south, Interstate 10 (I-10) east, I-605 north, and I-210 east, major highways on which the Project trucks would not increase noise levels. Trucks would exit I-210 east onto major roadways on which they would not increase noise levels (Irwindale Avenue and West Gladstone Street; already used for landfill ingress and egress). In addition, the landfill is located in an industrial area. Empty trucks would exit the landfill onto these same major roadways and then travel on I-210 west, 1-605 south, I-10 west, and U.S.-101 north. Empty trucks would exit U.S.-101 onto Alameda Street, and travel south on Alameda Street, east on E. 4th Street, and possibly south on S. Hewitt Street. The estimated maximum number of haul trips per peak day would be 120. This analysis is based on the January 12, 2018 haul hours that were approved by the City of Los Angeles Department of Transportation (LADOT), which were

9:00 a.m. to 3:30 p.m. on weekdays (6.5-hour window) and 8:00 a.m. to 6:00 p.m. (10-hour window) on Saturdays. Spreading the 120 trips over a 6.5-hour window would equal approximately 18 truck trips per hour or one truck every 3.25 minutes.[18] It is unlikely that delivery trucks would be louder than hauling trucks and worker trips would consist of automobile trips, which are substantially quieter than trucks. Therefore, the highest noise levels from vehicular construction noise would occur during truck hauling.

As shown in **Table 13, On-Road Vehicular Construction Noise Impact**, the Project's truck trips would generate maximum noise levels of approximately 63 dBA Leq along each roadway. On-road construction trips would not exceed the significance thresholds along the truck routes, which are 70 dB and 79 dB based on 5 dB increase above the measured ambient noise levels at 449 S. Hewitt Street and 825 E. 4th Street and the City's minimum ambient noise levels. No construction or truck haul activities would occur at night.

**Table 13**
**On-Road Vehicular Construction Noise Impact**

| Roadway Segment | Roadway Width | Construction Traffic (dBA Leq) | Significance Threshold (dBA Leq) [a] | Exceeds Threshold |
|---|---|---|---|---|
| S. Hewitt Street | 60 ft | 63 | 70 | No |
| E. 4th Place | 80 ft | 63 | 79 | No |
| S. Alameda Street | 90 ft | 63 | 79 | No |

Source: Giroux & Associates and Envicom Corporation. April 2022 (Revised).

[a] The thresholds are based on 5 dB above the existing measured ambient noise levels shown on Table 2 or the minimum ambient noise levels shown in Table 8. As Table 2 shows, ST-3 at 449 South Hewitt Street measured a 61 dBA Leq, but Table 8 shows the City's minimum ambient noise level is 65 dBA Leq for parcels zoned M3, resulting in a threshold of 70 dBA Leq in the vicinity. ST-1 at 825 East 4th Street showed a noise level 74 dB Leq, resulting in a threshold of 79 dBA Leq in the vicinity.

### Composite Construction Noise Levels

**Table 14, Composite Construction Noise Levels**, shows the composite construction noise impact of the combined effect of the Project's on- and off-road construction noise sources at each sensitive receptor. Three sensitive uses would experience noise levels in excess of the 5-dBA noise increase threshold as a result of the Project's composite on- and off-road construction activities; 428 S. Hewitt Street, 442 Colyton Street, and 449 S. Hewitt Street. It is primarily construction noise and

[18] During preparation of this Draft EIR and after circulation of the Notice of Preparation (NOP), LADOT revised allowable haul hours to Monday through Friday, 9:00 a.m. to 3:00 p.m.; and Saturdays, 8:00 a.m. to 4 p.m., resulting in a difference of 2.5 hours per week. The change would result in one truck every 3 minutes instead of every 3.25 minutes, 20 trucks per hour rather than 18 trucks per hour, which would result in a negligible noise increase. In terms of average noise levels, this 11.1 percent increase in hourly trucks would equal an increase of approximately 0.5-dB Leq in Project-related truck noise, relative to this activity under the previous haul hours, which is imperceptible by humans even in controlled laboratory conditions. The haul route would utilize highways and major local roadways with existing high traffic volumes (e.g., 424 a.m. peak hour vehicle trips on East 4th Street, east of Alameda, based on the intersection turn volumes in the Project TIS). Therefore, the Project truck hauling (with either 20 trucks per hour or 18 trucks per hour) would not double the amount of vehicle trips in a given hour or day, which would be necessary to cause a 3 dBA change in ambient noise levels, which is considered to be a barely perceivable difference.

not haul truck noise that would influence the composite significant impact. Noise increases at 825 E. 4th Street and 801 E. 4th Place would remain below this threshold. Mitigation Measure NOI-MM-1 would have the capacity to reduce composite construction noise levels at 428 S. Hewitt Street by reducing off-road equipment noise levels with one or more barriers, as shown in **Table 15, Mitigated Composite Construction Noise Levels at 428 S. Hewitt Street**. However, as shown on Table 15, the application of both the on-site ground floor barrier and the off-site rooftop barrier located off-site would not reduce noise levels below the level of significance at 428 S. Hewitt Street during building construction of the second through fifth floors and paving of the second through fifth floors. In addition, as the neighboring property owner may not agree to the off-site rooftop barrier, the impact would remain significant and unavoidable. Composite construction noise levels at 442 Colyton Street and 449 S. Hewitt Street would remain significant because of off-road equipment noise levels and the lack of feasible mitigation to reduce impacts to less than significant levels. Therefore, the combination of construction and haul truck noise at sensitive uses is a significant and unavoidable impact. Mitigated composite construction noise calculation worksheets are shown in **Appendix B-3, Mitigated Composite Construction Noise Levels**.

**Table 14**
**Composite Construction Noise Levels**

| Receptor | Ambient (dBA Leq) | Construction Noise (dBA Leq) | Maximum Construction Vehicle (Haul Truck) Noise (dBA Leq) | New Ambient (dBA Leq) | Increase (dBA Leq) | Exceeds 5 dBA Threshold? |
|---|---|---|---|---|---|---|
| 428 S. Hewitt Street | 65 | 81 | 63 | 81.2 | 16.2 | Yes |
| 825 E. 4th Street | 74 | 70 | 63 | 75.7 | 1.7 | No |
| 442 Colyton Street | 65 | 70 | 63 | 71.8 | 6.8 | Yes |
| 449 S. Hewitt Street | 65 | 70 | 63 | 71.8 | 6.8 | Yes |
| Art Share LA at 801 E. 4th Place | 74 | 65 | 63 | 74.8 | 0.8 | No |
| Source: Giroux & Associates and Envicom Corporation. April 2022 (Revised). | | | | | | |

**Table 15**
**Mitigated Composite Construction Noise Levels at 428 S. Hewitt Street**

| Phase | Unmitigated Noise Levels (dBA $L_{eq}$) | | On-Site Ground Floor Barrier (dBA $L_{eq}$) | | Off-Site Rooftop Barrier (dBA $L_{eq}$) | | On-Site Ground Floor Barrier and Off-Site Rooftop Barrier (dBA $L_{eq}$) | |
|---|---|---|---|---|---|---|---|---|
| | Unmitigated Noise Level | Increase Above Ambient | Mitigated Noise Level | Increase Above Ambient | Mitigated Noise Level | Increase Above Ambient | Mitigated Noise Level | Increase Above Ambient |
| Demolition | **81**[c] | **16.3** | 68 | 4.7 | 72 | **7.6** | 64 | 2.5 |
| Grading | **81** | **16.0** | 68 | 4.5 | 71 | **7.4** | 64 | 2.4 |
| Construction (1st Floor) | **78** | **13.0** | 66 | 3.4 | 69 | **5.4** | 63 | 2.3 |
| Construction (2nd-18th Floors)[a] | **78** | **13.0** | 74 | **9.4** | 74 | **9.8** | 74 | **9.3** |

| Phase | Unmitigated Noise Levels (dBA $L_{eq}$) | | On-Site Ground Floor Barrier (dBA $L_{eq}$) | | Off-Site Rooftop Barrier (dBA $L_{eq}$) | | On-Site Ground Floor Barrier and Off-Site Rooftop Barrier (dBA $L_{eq}$) | |
|---|---|---|---|---|---|---|---|---|
| | Unmitigated Noise Level | Increase Above Ambient | Mitigated Noise Level | Increase Above Ambient | Mitigated Noise Level | Increase Above Ambient | Mitigated Noise Level | Increase Above Ambient |
| Paving (1st Floor) | **77** | **12.2** | 65 | 3.2 | 68 | **5.0** | 63 | 2.2 |
| Paving (2nd-5th Floors)[b] | **77** | **12.2** | **76** | **11.4** | **76** | **11.5** | **76** | **11.4** |

Source: Giroux & Associates and Envicom Corporation. April 2022 (Revised).

Note: Barrier insertion loss was subtracted where applicable, based on equations for barrier insertion loss from the Federal Transit Administration. 2018. Transit Noise and Vibration Impact Assessment Manual.

[a] When building construction occurs at upper floors, it was assumed that forklifts, generator sets, and loader/backhoes would remain at the ground floor and be shielded, while the work-tool interaction of the crane and the welders would occur above ground level and be unshielded.

[b] When paving occurs at upper floors, it was assumed loader/backhoes would remain at the ground floor and be shielded, while the remaining equipment would operate above ground level and be unshielded.

[c] Numbers in bold indicate an exceedance of the construction noise threshold due to the generation of noise levels above 75 dBA at a sensitive receptor or due to a 5 dBA or more exceedance of existing ambient exterior noise levels at a sensitive receptor during operations lasting more than 10 days.

### Off-Road Construction Activity Vibration

Potential damage to buildings and structures along the alignment was assessed based on how the structures are built. FTA criteria for building and structural damage is in Table 4, Construction Vibration Damage Criteria. Although the adjacent structures are not sensitive uses but rather manufacturing, they are older, and some have been noted as contributing to the potential Downtown Industrial Historic District. To be conservative, it was assumed that all structures adjacent to and across the street from the Project would fall into Building Category IV - buildings extremely susceptible to vibrations. The impact threshold would be 0.12 in/sec PPV.

Below these damage thresholds there is virtually no risk of building damage. The FTA lists predicted vibration levels generated by a select list of construction equipment. **Table 16, Estimated Vibration Levels During Construction**, provides the vibration levels predicted to be generated by the equipment fleet to be utilized during Project construction. Construction vibration calculation worksheets are shown in **Appendix C, Construction Vibration Levels**.

**Table 16**
**Estimated Vibration Levels During Construction**

| Equipment | PPV at 5 ft (in/sec) | PPV at 10 ft (in/sec) | PPV at 25 ft (in/sec) [a] | PPV at 50 ft (in/sec) |
|---|---|---|---|---|
| Large Bulldozer | 0.995 | 0.352 | 0.089 | 0.031 |
| Loaded trucks | 0.850 | 0.300 | 0.076 | 0.027 |
| Jackhammer | 0.391 | 0.138 | 0.035 | 0.012 |
| Small Bulldozer | 0.034 | 0.012 | 0.003 | 0.001 |
| Source: Giroux & Associates and Envicom Corporation. April 2022 (Revised). | | | | |
| [a] FTA. 2006. Transit Noise and Vibration Impact Assessment. May. | | | | |
| Note: Only data for the above equipment list is available. | | | | |

Minimum distances from construction equipment where PPV levels would be less than 0.12 in/sec are shown in **Table 17**, **Minimum Distances for Vibration Building Damage**. When construction equipment is within these distances the PPV level would exceed thresholds and could have a vibratory impact on buildings. Due to the close proximity to the receiving structures, construction equipment would be located within those distances at adjacent structures.

**Table 17**
**Minimum Distances for Vibration Building Damage**

| Equipment | Distance to Impact (Threshold of 0.2 in/sec PPV) (ft) | Distance to Impact (Threshold of 0.12 in/sec PPV) (ft) |
|---|---|---|
| Large Bulldozer | 15 | 20 |
| Loaded trucks | 13 | 18 |
| Jackhammer | 8 | 11 |
| Small Bulldozer | 2 | 2 |
| Source: Giroux & Associates and Envicom Corporation. April 2022 (Revised). | | |

The calculation to determine PPV at a given distance is:

PPVdistance = PPVref*(25/D)^n

Where:

PPVdistance = the peak particle velocity in in/sec of the equipment adjusted for distance,

PPVref = the reference vibration level in in/sec at 25 feet, and

D = the distance from the equipment to the receiver.
n = factor for soil attenuation

The Thresholds Guide identifies residential areas as sensitive land uses. The closest adjacent residential use is the rooftop trailer at 428 S. Hewitt Street, which is 80 feet from the closest Project Site boundary. Therefore, Project-adjacent sensitive residential uses have a minimal 80-foot distance separation. All other sensitive receptors have a greater setback.

There are several older manufacturing/industrial structures immediately adjacent to the Project Site that are considered to be fragile although they are not sensitive land uses. With regard to fragile building damage that is associated with vibration effects, the following properties have the indicated setbacks:

<u>Within 5-10 feet of the Project Site:</u>

- 418 Colyton Street.
- 424 Colyton Street.
- 427 S. Hewitt Street.

<u>Across the Street of the Project Site:</u>

- 940 E. 4th Street - 60 feet from the Project Site.
- 417 Colyton Street - 65-feet from the Project Site.
- 915 E. 4th Street - 70 feet from the Project Site.
- 828 E. 4th Street, 407 Colyton Street, and 411 Colyton Street - 65 feet from the Project Site.
- 421 Colyton Street - 85 feet from the Project Site.
- 428 S. Hewitt Street - 80 feet from the Project Site.

As shown in Table 16, Estimated Vibration Levels During Construction, the structures immediately adjacent to the Project Site may experience vibration that exceeds the adopted building damage threshold of 0.12 in/sec PPV if equipment is operated at the shared property line. All of the structures across the street would experience vibration below the stated building damage thresholds of 0.12 in/sec PPV for fragile buildings. The adjacent buildings are of such an age that they may be considered sensitive to the structural effects of vibration, and some are considered part of the potential Downtown Industrial Historic District.[19] Vibration annoyance was not considered, based on the commercial and industrial nature of the land uses. As the closest vibration-sensitive receptors to the Project Site may experience significant vibration that exceeds the building damage threshold of 0.12 in/sec PPV, the following mitigation measures are required to reduce the potential for vibration damage.

**NOI-MM-2:** Prior to demolition, the Applicant shall retain the services of a structural engineer or other qualified professional to conduct pre-construction surveys to document the current physical conditions of the following identified vibration-sensitive receptors: 418 Colyton Street, 424 Colyton Street, and 427 S. Hewitt Street.

[19] Historic Resources Group. 2022. Historical Resource Technical Report for the 4th and Hewitt Project. February.

**NOI-MM-3:** Prior to the issuance of grading permits, the Applicant shall retain the services of a structural engineer or other qualified professional to prepare a demolition and shoring plan to ensure the proper protection and treatment of the properties at 418 Colyton Street, 424 Colyton Street, and 427 S. Hewitt Street during construction. The plan shall include appropriate measures to protect these properties from damage due to demolition of existing structures, excavation or other ground-disturbing activities, vibration, soil settlement, and general construction activities. The plan shall be submitted to the Los Angeles Department of City Planning's Office of Historic Resources for review and approval.

**NOI-MM-4:** Prior to the issuance of grading permits, the Applicant shall retain the services of an acoustical engineer or other qualified professional to develop and implement a structural monitoring program during construction. The performance standards of the structural monitoring program shall include the following:

- Documentation, consisting of video and/or photographic documentation of accessible and visible areas on the exterior of the receptor buildings (refer to NOI-MM-2).
- A registered civil engineer, certified engineering geologist, or vibration control engineer shall review the appropriate vibration criteria for the identified vibration receptors, taking into consideration their age, construction, condition, and other factors related to vibration sensitivity in order to develop additional recommendations for the structural monitoring program.
- Vibration sensors shall be installed on and/or around the identified vibration receptors to monitor for horizontal and vertical movement. These sensors shall remain in place for the duration of excavation, shoring, and grading phases.
- The vibration sensors shall be equipped with real-time warning system capabilities that can immediately alert construction supervisors when monitored vibration levels approach or exceed threshold limits. The registered civil engineer, certified engineering geologist, or vibration control engineer shall determine the appropriate limits.
- Should an exceedance of vibration thresholds occur, work in the vicinity of the affected area shall be halted and the respective vibration receptor shall be inspected for any damage. Results of the inspection shall be logged. In the event that damage occurs, the damage shall be repaired in consultation with a qualified preservation consultant. In the event of an exceedance, feasible steps to reduce vibratory levels shall be undertaken, such as halting/staggering concurrent activities and utilizing lower-vibratory techniques.

Mitigation Measures NOI-MM-2, NOI-MM-3, and MOI-MM-4 would implement a pre-construction survey, shoring plan, and comprehensive structural monitoring program for the most proximate vibration-sensitive receptors (418 Colyton Street, 424 Colyton Street, and 427 S. Hewitt Street) to the Project Site. These measures would substantially reduce the potential for the Project's construction-related vibrations to damage these structures. However, because these mitigation measures require the consent of other property owners, who may not agree to implement all components of the recommended mitigation measures as stated herein, implementation of the provided mitigation measures cannot be guaranteed. Thus, it is conservatively concluded that vibration impacts related to potential building damage on the structures located at 418 Colyton Street, 424 Colyton Street, and 427 S. Hewitt Street would be significant and unavoidable. Project approval would not exempt the construction contractor, Project Applicant, or other responsible parties from a duty to avoid building damage to off-site buildings during construction, nor would it exempt them from liability for building damage to off-site buildings if such damage were to occur. As approval of adjacent property owners needed for the implementation of NOI-MM-2, NOI-MM-3, and NOI-MM-4 cannot be guaranteed, the Project's significant construction-period vibration impact on adjacent structures associated with off-road equipment use would remain significant and unavoidable.

With respect to potential human annoyance impacts, FTA's Transit Noise and Vibration Impact Assessment identifies residential and institutional buildings as vibration sensitive receptors. Under the FTA's vibration criteria for potential human annoyance, vibration levels exceeding 72 VdB would be considered a human annoyance impact.

The two closest sensitive residential receptors to the Project Site are the rooftop trailer at 428 S. Hewitt (approximately 80 feet from the Project Site) and the multi-family structure at 825 E. 4th Street (approximately 200 feet from the Project Site). As shown in **Table 18, Vibration Annoyance for Construction Equipment at Multiple Distances**, 80 feet from the Project Site, the construction vibration level at 428 S. Hewitt Street would be 72 VdB or less and at 825 E. 4th Street the vibration levels would be 60 VdB or less. Therefore, vibration would not exceed the FTA's 72 VdB human annoyance criterion for frequent events. Construction related vibration nuisance to off-site sensitive uses would be less than significant.

**Table 18**
**Vibration Annoyance for Construction Equipment at Multiple Distances**

| Equipment | VdB at 25 feet [a] | VdB at 50 feet | VdB at 60 feet | VdB at 80 feet | VdB at 200 feet |
|---|---|---|---|---|---|
| Large Bulldozer | 87 | 78 | 76 | 72 | 60 |
| Loaded trucks | 86 | 77 | 75 | 71 | 59 |
| Jackhammer | 79 | 70 | 68 | 64 | 52 |
| Small Bulldozer | 58 | 49 | 47 | 43 | 31 |

Source: Giroux & Associates and Envicom Corporation. April 2022 (Revised).

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

**On-Road Vehicular Vibration Impact**

Delivery truck and haul trucks would travel to and from the Project Site throughout the construction period, and in addition to noise, these vehicles may generate vibration for receptors along their haul routes. This analysis is based on the January 12, 2018 haul hours that were approved by the LADOT, which were 9:00 a.m. to 3:30 p.m. on weekdays (6.5-hour window) and 8:00 a.m. to 6:00 p.m. (10-hour window) on Saturdays. Spreading the 120 trips over a 6.5-hour window would equal approximately 18 truck trips per hour or one truck every 3.25 minutes. According to the FTA, buses and trucks rarely create vibration that exceeds 70 VdB unless there are bumps due to frequent potholes in the road.[20] A typical truck operating on paved roads may generate vibration of approximately 63 VdB and 0.00565 in/sec PPV at a location that is 50 feet from the truck.[21] According to the FTA, typical road traffic-induced vibration levels are unlikely to be perceptible by people, and it is also unusual for vibration, even from sources such as buses and trucks, to be perceptible, even in locations close to major roads.[22] Because the Project is located in an urban area, localized traffic may largely mask potential Project impacts along area roadways; nevertheless, truck vibration impacts were analyzed.

Haul route roadway right-of-way widths (including sidewalks) are as follows: S. Hewitt Street – 60 feet, 4th Place – 80 feet, and Alameda Street – 90 feet. The sensitive use at 428 S. Hewitt Street is not on the haul route as it is just south of the Project Site and trucks would be heading north on S. Hewitt Street and east on 4th Street. In addition, the sensitive use is on the roof of the two-story structure and it is unlikely that vibration would resonate to that location. This is the only sensitive use near the S. Hewitt Street portion of the haul route.

As shown in **Table 19, Haul Route Truck Vibration Impacts**, all sensitive uses along the construction haul route, other than S. Hewitt Street, are typically at least 25 feet from the center of the nearest travel lane, taking into consideration sidewalks, setbacks, and/or on-street parking. Along 4th Place for example, the only sensitive use is Art Share LA which minimally has a 25-foot setback from the center of the nearest through traffic lane. Haul route structures may experience groundborne vibration levels of approximately 0.022 in/sec PPV, below the fragile building damage threshold criterion of 0.12 in/sec PPV and a nuisance vibration level of 72 VdB would not exceed the human annoyance threshold of 72 VdB.

**Table 19**
**Haul Route Truck Vibration Impacts**

| Receptor | Location | Vibration Loaded Truck Damage (in/sec PPV) | Exceeds Damage Threshold? | Vibration Loaded Truck Annoyance (VdB) | Exceeds Annoyance Threshold? |
|---|---|---|---|---|---|
| **428 S. Hewitt Street** | Not on route | - | - | - | - |
| **825 E. 4th Street** | 25 feet from closest travel lane | 0.022 in/sec PPV | No | 72 VdB | No |

[20] FTA. 2018. Transit Noise and Vibration Impact Assessment Manual. September.
[21] FTA. 2018. Transit Noise and Vibration Impact Assessment Manual. September. Figure 5-4.
[22] FTA. 2006. Transit Noise and Vibration Assessment, Page 7-1. May.

| Receptor | Location | Vibration Loaded Truck Damage (in/sec PPV) | Exceeds Damage Threshold? | Vibration Loaded Truck Annoyance (VdB) | Exceeds Annoyance Threshold? |
|---|---|---|---|---|---|
| **442 Colyton and 449 S. Hewitt Streets** | Not on route | - | - | - | - |
| **Art Share LA at 801 E. 4th Place** | 25 feet from closest travel lane | 0.022 in/sec PPV | No | 72 VdB | No |
| Source: Giroux & Associates and Envicom Corporation. April 2022 (Revised). | | | | | |

Therefore, the Project would not result in the exposure of structures to excessive groundborne damage vibration from on-road construction vehicles. In addition, further along the haul route, vibration levels would also be below the fragile building damage threshold criterion of 0.12 in/sec PPV (e.g., at 15 feet, vibration levels would be 0.034 in/sec PPV). Vibration impacts to vibration-sensitive receptors nearby and further along the haul route with respect to building damage from trucks traveling along the anticipated haul routes would be less than significant.

The estimated groundborne nuisance vibration from on-road trucks would not exceed the 72 VdB significance criteria for residential uses at the nearest vibration-sensitive uses. However, along the full extent of the haul route there may be vibration-sensitive receptors within 25 feet of the center of the of the nearest travel lane at which vibration would exceed the 72 VdB significance criteria for residential uses and would potentially exceed the 75 VdB significance criteria for institutional land uses. In addition, roadways along the haul route may not be smooth. Therefore, it is conservatively concluded that the Project's off-site haul could result in the exposure of persons to excessive groundborne annoyance levels. Vibration impacts with respect to human annoyance resulting from construction trucks traveling along the anticipated haul routes would be significant without mitigation. There are no feasible mitigation measures to reduce the potential vibration human annoyance impacts. Although this would be temporary, intermittent, and limited to when vehicles are traveling within 25 feet of an impacted structure or on uneven roadways (i.e., with potholes), this human annoyance vibration impact would remain significant and unavoidable.[23]

[23] LADOT recently revised allowable haul hours to Monday through Friday, 9:00 a.m. to 3:00 p.m.; and Saturdays, 8:00 a.m. to 4 p.m. This change would result in 20 trucks per hour rather than 18 trucks per hour. The change would result in one truck every 3 minutes instead of every 3.25 minutes. An increase in the number of trucks would not increase the peak vibration levels experienced by sensitive receptors, because vibration levels do not combine in the same manner as noise levels. The number of vibration events in a given time frame would increase, but only slightly, and there would be substantial existing heavy truck traffic on the highways and major local roadways that the revised haul route would be expected to utilize. Along the revised haul route, even the smallest setbacks from the travel lanes of roadways would ensure that vibration levels would remain below the below the fragile building damage threshold criterion of 0.12 in/sec PPV (e.g., at 15 feet, vibration levels would be 0.034 in/sec PPV) and would remain less than significant. The estimated groundborne nuisance vibration from on-road trucks would still not exceed the 72 VdB significance criteria for residential uses at the nearest vibration-sensitive uses to the Project Site. However, along the full extent of the revised haul route, there may be vibration-sensitive receptors within 25 feet of the center of the of the nearest travel lane at which vibration would still potentially exceed the 72 VdB significance criteria for residential uses and the 75 VdB significance criteria for vibration-sensitive institutional land uses. In addition, roadways along the revised haul route may not be smooth. Therefore, vibration impacts with respect to human annoyance resulting from construction trucks traveling along the revised haul route would remain significant and unavoidable, as there are no feasible mitigation measures.

## OPERATIONAL PERIOD NOISE AND VIBRATION IMPACTS

### Traffic Noise

Long-term noise concerns from the increase of commercial office uses at the Project Site center primarily on vehicular noise emissions on Project area roadways. These concerns are addressed using the CALVENO in the Federal roadway noise model (the FHWA Highway Traffic Noise Prediction Model, FHWA-RD-77-108). The model calculates the Leq noise level for a preference set of input conditions, and then makes a series of adjustments for site-specific traffic volumes, distances, roadway speeds, or noise barriers. Model inputs and results are shown in Appendix D-1, Traffic Noise - Existing Conditions (2017), **Appendix D-2, Traffic Noise - Existing With Project Conditions (2017), Appendix D-3, Traffic Noise - Future Without Project Conditions (2025), Appendix D-4, Traffic Noise - Future With Project Conditions (2025)**. Increase calculations are shown in **Appendix D-5, Traffic Noise - Impacts.**

**Table 20, Traffic Noise Impacts Analysis (CNEL in dB at 50 feet from Centerline*)***, summarizes the 24-hour CNEL level at 50 feet from the roadway centerline area for 46 area roadway segments. The analysis used data provided in the Transportation Impact Study for the 4th & Hewitt Project, Los Angeles, California (TIS), prepared by Gibson Transportation Consulting, Inc. (2022), as updated by Gibson Transportation Consulting, Inc. in the Transportation Assessment for the 4th and Hewitt Project (Transportation Assessment) (2021).[24] For purposes of the noise analysis, four of the traffic scenarios analyzed were utilized; existing conditions without the Project, existing conditions with Project, future without the Project, and future with the Project.

As shown in **Table 21, Project-Related Traffic Noise Impacts (CNEL in dB at 50 feet from Centerline)***,* the Project itself would not cause any of the analyzed roadway segments to incur more than a +0.9 dB impact, which would occur on E. 4th Place east of S. Alameda ("existing"). As traffic volumes are generally already high in the Project area's urban setting, and because the Project would not result in many trips relative to existing traffic volumes, there is little noise impact from the Project trips along the analyzed roadway segments. The next largest traffic noise increase attributed to the Project is +0.4 dB CNEL at E. 4th Place east of S. Alameda ("future") followed by +0.3 dB CNEL, which would occur on E. 4th Street, west of Merrick ("existing"). Out of the 57 roadway segments analyzed, over half would experience no discernable impact (<0.1 dB) as a result of Project trips. No Project related traffic noise impact exceeds the significance threshold of either a) a +3.0 dB increase to or within the "normally unacceptable" (70 dB CNEL) or "clearly unacceptable" (75 dB CNEL) noise compatibility category or b) a +5 dB or greater traffic noise increase. Traffic noise impacts associated with operation of the Project are less than significant.

[24] As discussed in the December 2021 Transportation Assessment for the 4th and Hewitt Project, since preparation of the TIS, the City of Los Angeles Department of Transportation released an updated version of the Transportation Assessment Guidelines (TAG) (July 2020), and the Project buildout year was also revised from 2023 to 2025. However, the CEQA analysis methodology and impact thresholds remain consistent with the 2019 TAG and the findings of the TIS remain unchanged. However, as the buildout year of the Project was revised, this analysis utilizes updated data from the 2021 Transportation Assessment to analyze traffic-related noise conditions.

## Table 20
## Traffic Noise Impacts Analysis
## (CNEL in dB at 50 feet from Centerline)

| Roadway Segment | | Existing | Existing + Project | Future | Future + Project |
|---|---|---|---|---|---|
| E. 1st St. | W of S. Vignes | 66.3 | 66.3 | 66.7 | 66.7 |
| | E of S. Vignes | 66.8 | 66.8 | 67.3 | 67.3 |
| S. Vignes St. | N of E. 1st | 57.2 | 57.2 | 57.5 | 57.5 |
| | S of E. 1st | 56.7 | 56.7 | 57.2 | 57.2 |
| E. 3rd St. | S. Central to S. Alameda | 66.2 | 66.3 | 68.3 | 68.4 |
| E. 4th Pl. | E of S. Alameda | 64.5 | 65.4 | 67.7 | 68.1 |
| E. 4th St. | W of S. Central | 64.8 | 64.9 | 66.1 | 66.1 |
| | S. Central - S. Alameda | 65.2 | 65.3 | 66.4 | 66.4 |
| | E of S. Alameda | 67.2 | 67.4 | 68.5 | 68.6 |
| | W of Merrick | 66.5 | 66.8 | 68.2 | 68.3 |
| | E of Merrick | 69.6 | 69.8 | 71.6 | 71.7 |
| E. 6th St. | W of S. Central | 65.5 | 65.5 | 67.6 | 67.6 |
| | S. Central - S. Alameda | 66.9 | 66.9 | 68.8 | 68.8 |
| | S. Alameda - Mateo | 66.8 | 66.8 | 69.9 | 69.9 |
| | E. of Mateo | 66.0 | 66.0 | 67.1 | 67.2 |
| E. 7th St. | W of S. Central | 64.6 | 64.6 | 66.6 | 66.6 |
| | S. Central - S. Alameda | 64.6 | 64.6 | 66.9 | 66.9 |
| | S. Alameda - Mateo | 64.5 | 64.5 | 67.2 | 67.2 |
| | Mateo - S. Santa Fe | 64.0 | 64.0 | 67.2 | 67.2 |
| | E of S. Santa Fe | 64.9 | 64.8 | 67.8 | 67.8 |
| E. 2nd St. | W of S. Alameda | 61.5 | 61.5 | 62.0 | 62.0 |
| | E of S. Alameda | 59.6 | 59.6 | 60.5 | 60.5 |
| S. Central Ave. | N of E. 3rd | 67.1 | 67.1 | 67.5 | 67.5 |
| | E. 3rd-E. 4th | 68.2 | 68.2 | 69.0 | 69.0 |
| | E. 4th- 6th | 67.6 | 67.6 | 68.3 | 68.3 |
| | E. 6th-E. 7th | 68.0 | 68.0 | 69.3 | 69.3 |
| | S of E. 7th | 68.3 | 68.3 | 69.1 | 69.1 |
| S. Alameda St. | N of E. 2nd | 69.0 | 69.2 | 70.5 | 70.6 |
| | E. 2nd-E. 3rd | 69.1 | 69.3 | 70.6 | 70.7 |
| | E. 3rd-E .4th | 69.2 | 69.4 | 71.0 | 71.2 |
| | E. 4th-E. 6th | 68.7 | 68.9 | 70.8 | 70.9 |
| | E. 6th-E. 7th | 68.8 | 69.0 | 70.3 | 70.4 |
| | S of E. 7th | 68.7 | 68.9 | 70.2 | 70.3 |
| Merrick | N of E. 4th | 55.1 | 55.1 | 55.5 | 55.5 |
| Molino | S of E. 4th | 52.5 | 52.5 | 59.1 | 59.1 |
| Mateo | N of E. 6th | 58.3 | 58.4 | 60.7 | 60.7 |
| | E 6th-E. 7th | 58.6 | 58.7 | 60.3 | 60.4 |
| S. Santa Fe Ave. | N of E. 7th | 62.9 | 62.8 | 65.2 | 65.2 |
| | E 7th- E. 8th | 65.4 | 65.3 | 66.5 | 66.5 |
| | S of E. 8th | 66.4 | 66.4 | 67.4 | 67.4 |
| E. Olympic | W of S. Alameda | 68.1 | 68.1 | 69.2 | 69.2 |
| | E of S. Alameda | 69.5 | 69.5 | 70.7 | 70.7 |
| S. Alameda St. | N of E. Olympic | 69.0 | 69.1 | 70.4 | 70.5 |
| | S of E. Olympic | 69.1 | 69.2 | 70.3 | 70.4 |
| Boyle Ave. | N of E. 4th Street | 63.2 | 63.3 | 63.6 | 63.6 |
| | E. 4th – Whittier | 64.3 | 64.3 | 64.6 | 64.6 |

| Roadway Segment | | Existing | Existing + Project | Future | Future + Project |
|---|---|---|---|---|---|
| | S of Whittier | 65.7 | 65.7 | 66.0 | 66.0 |
| Soto St. | N of E. 4th | 67.8 | 67.8 | 68.1 | 68.1 |
| | S of E. 4th | 68.2 | 68.2 | 68.6 | 68.6 |
| E. 4th St. | W of U.S.-101 NB Off-Ramp | 69.0 | 69.2 | 70.8 | 70.9 |
| | U.S.-101 NB Off-Ramp – Boyle | 68.9 | 69.0 | 70.4 | 70.5 |
| | Boyle - I-5 SB Ramps | 69.7 | 69.8 | 70.8 | 70.8 |
| | I-5 SB Ramps - I-5 NB Ramps | 69.8 | 69.8 | 70.5 | 70.6 |
| | I-5 NB Ramps - Soto | 68.7 | 68.7 | 69.2 | 69.3 |
| | E of Soto | 68.7 | 68.7 | 69.1 | 69.1 |
| Whittier Blvd. | W of Boyle | 67.7 | 67.8 | 68.4 | 68.4 |
| | E of Boyle | 67.5 | 67.5 | 68.1 | 68.2 |
| Source: Giroux & Associates and Envicom Corporation. April 2022 (Revised). | | | | | |

**Table 21**
**Project-Related Traffic Noise Impacts**
**(CNEL in dB at 50 feet from Centerline)**

| Roadway Segment | | Existing Impact (Difference Between Existing and Existing + Project) | Future Impact (Difference Between Future and Future + Project) |
|---|---|---|---|
| E. 1st St. | W of S. Vignes | 0.0 | 0.0 |
| | E of S. Vignes | 0.0 | 0.0 |
| S. Vignes | N of E. 1st | 0.0 | 0.0 |
| | S of E. 1st | 0.0 | 0.0 |
| E. 3rd St. | S. Central to S. Alameda | 0.1 | 0.1 |
| E. 4th Pl. | E of S. Alameda | 0.9 | 0.4 |
| E. 4th St. | W of S. Central | 0.1 | 0.0 |
| | S. Central - S. Alameda | 0.1 | 0.0 |
| | E of S. Alameda | 0.2 | 0.1 |
| | W of Merrick | 0.3 | 0.1 |
| | E of Merrick | 0.2 | 0.1 |
| E. 6th St. | W of S. Central | 0.0 | 0.0 |
| | S. Central - S. Alameda | 0.0 | 0.0 |
| | S. Alameda - Mateo | 0.0 | 0.0 |
| | E of Mateo | 0.0 | 0.1 |
| E. 7th St. | W of S. Central | 0.0 | 0.0 |
| | S. Central - S. Alameda | 0.0 | 0.0 |
| | S. Alameda - Mateo | 0.0 | 0.0 |
| | Mateo - S. Santa Fe | 0.0 | 0.0 |
| | E of S. Santa Fe | -0.1 | 0.0 |
| E. 2nd St. | W of S. Alameda | 0.0 | 0.0 |
| | E of S. Alameda | 0.0 | 0.0 |
| S. Central Ave. | N of E. 3rd | 0.0 | 0.0 |
| | E. 3rd- E. 4th | 0.0 | 0.0 |
| | E. 4th- E. 6th | 0.0 | 0.0 |
| | E. 6th- E. 7th | 0.0 | 0.0 |

| Roadway Segment | | Existing Impact (Difference Between Existing and Existing + Project) | Future Impact (Difference Between Future and Future + Project) |
|---|---|---|---|
| | S of E. 7th | 0.0 | 0.0 |
| S. Alameda St. | N of E. 2nd | 0.2 | 0.1 |
| | E. 2nd- E. 3rd | 0.2 | 0.1 |
| | E. 3rd- E. 4th | 0.2 | 0.2 |
| | E. 4th- E. 6th | 0.2 | 0.1 |
| | E. 6th- E. 7th | 0.2 | 0.1 |
| | S of E. 7th | 0.2 | 0.1 |
| Merrick | N of E. 4th | 0.0 | 0.0 |
| Molino | S of E. 4th | 0.0 | 0.0 |
| Mateo | N of E. 6th | 0.1 | 0.0 |
| | E 6th- E. 7th | 0.1 | 0.1 |
| S. Santa Fe Ave. | N of E. 7th | -0.1 | 0.0 |
| | E 7th-E. 8th | -0.1 | 0.0 |
| | S of E. 8th | 0.0 | 0.0 |
| E. Olympic | W of S. Alameda | 0.0 | 0.0 |
| | E of S. Alameda | 0.0 | 0.0 |
| S. Alameda St. | N of E. Olympic | 0.1 | 0.1 |
| | S of E. Olympic | 0.1 | 0.1 |
| Boyle Ave. | N of E. 4th Street | 0.1 | 0.0 |
| | E. 4th - Whittier | 0.0 | 0.0 |
| | S of Whittier | 0.0 | 0.0 |
| Soto St. | N of E. 4th | 0.0 | 0.0 |
| | S of E. 4th | 0.0 | 0.0 |
| E. 4th St. | W of U.S.-101 NB Off-Ramp | 0.2 | 0.1 |
| | U.S.-101 NB Off-Ramp - Boyle | 0.1 | 0.1 |
| | Boyle - I-5 SB Ramps | 0.1 | 0.0 |
| | I-5 SB Ramps - I-5 NB Ramps | 0.0 | 0.1 |
| | I-5 NB Ramps - Soto | 0.0 | 0.1 |
| | E of Soto | 0.0 | 0.0 |
| Whittier Blvd | W of Boyle | 0.1 | 0.0 |
| | E of Boyle | 0.0 | 0.1 |

Source: Giroux & Associates and Envicom Corporation. April 2022 Revised).

Note: Results may vary by a factor of +/- 0.1 due to rounding.

## Parking Structure Noise

Parking for the Project would be located on three subterranean levels and on the 2nd through 5th floors of the Office Building. There would be a combined total of 660 parking spaces on all levels. The aboveground levels of the parking structure would be enclosed on three sides, and partially enclosed but open to air on the elevation facing Colyton Street (opaquely-screened from view). Vehicular access to the on-site parking garage would be provided via two driveways on 4th Street. North of the Project Site and across 4th Street are auto repair-related businesses, Miyako Sushi, and Washoku School. Live/work lofts are located northwest of the Project Site at 825 E. 4th Street, which would be the closest noise-sensitive use to the main parking structure entrance. The general parking (for employees and visitors to the office and commercial spaces) entrance to the aboveground parking levels for the Project is 300 feet southeast of the 825 E. 4th Street building. The general parking entrance to the underground parking levels is immediately adjacent to the east of the aboveground parking entrance; therefore, it has a greater setback. For this analysis, it is assumed that all general Project traffic would utilize the closest entrance point. Loading and deliveries would access the Office Building from S. Hewitt Street, and impacts associated with this use are addressed under "Loading Dock/Trash Collection Areas," below.

As indicated, vehicle parking areas would be provided on three subterranean levels and on the 2nd through 5th floors of the Office Building. After entering the garage roughly half of the vehicular traffic would proceed to the below ground parking and half to above ground parking. From there, about half the cars would look for spots to the west and half to the east. Therefore, even during peak hour only about one fourth of Project traffic would be in any above ground quadrant of the structure. It is unlikely that parking in the subterranean lot would be audible at the exterior of the structure.

Although the entirety of the garage is not enclosed by solid barriers, at a minimum all above ground parking perimeters have industrial steel frame metal windows and board form concrete floors and ramps that would limit noise exposure outside of the structure. To the west, the building that was formerly occupied by the A+D Museum would partially shield the aboveground parking structure. To the east, closed windows and steel frames would enclose the parking structure. The southern elevation is completely enclosed with board form concrete. Most of the vehicular noise is attributed to the entry points, where all the general traffic would be concentrated and would be located outside the parking structure. Because it would be a predominantly enclosed structure that would acoustically block the noise sources inside of it from traveling to off-site noise-sensitive receptors, the parking structure itself would eliminate or greatly reduce the main sources of auto-related parking garage noises: tire squeal, accelerating vehicles, noise from driving over bumps and expansion joints, cars starting, and vibration-induced car alarm noises. Also, given the many possible directions traffic disperses once inside the structure, only a few cars would be traveling in the same vicinity. Noise sources such as tire squeal persist for only one to two seconds, and when averaged over any length of time, as used for a Leq (time averaged) calculation, would be minimized because of the length of time for which there is no tire noise.

Noise levels at the parking facility 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, during peak traffic hours when the largest number of automobiles would enter and exit the parking structure. The peak hour trip rate from the Project traffic study showed 388 a.m. trips and 384 p.m. trips. According to FTA equations, the noise level associated with 388 trips is approximately 52 dBA Leq at 50 feet.[25] However, 825 E. 4th Street has at least 300 feet of setback from the closest parking entrance. Parking structure noise calculation worksheets are shown in **Appendix E, Operational Noise Levels**.

[25] FTA. 2018. Transit Noise and Vibration Impact Assessment Manual. September.

Based on this distance attenuation, the noise level at the 825 E. 4th Street building would be approximately 41 dBA Leq. The daytime ambient noise level is 74 dBA Leq. The addition of 41 dBA (parking structure) to 74 dBA (background traffic) is negligible (<0.1 dBA). All other noise sensitive land uses would experience lower parking structure noise impacts, because they are located farther away and do not have a view of the parking lot entrance. Since the noise level would not increase the daytime average ambient noise level at the closest noise sensitive use by 5 dBA, parking structure noise impacts of the Project would be less than significant.

**Heating, Ventilation, and Air Conditioning (HVAC) Equipment**

Section 112.02 of the LAMC limits increases in noise levels from air conditioning, refrigeration, heating, pumping, and filtering equipment. Such equipment may not be operated in such a manner as to create any noise that would cause the noise level on the premises of any other occupied property to exceed the ambient noise level by more than 5 dBA. The Project would comply with the requirement to install mechanical equipment that would generate noise levels below this threshold, consistent with applicable regulatory requirements. The following project design feature is provided to ensure that noise and vibration impacts associated with rooftop mechanical equipment used during operations are further minimized:

**NOI-PDF-6:** Rooftop mechanical equipment, including heating, ventilation, and air conditioning (HVAC) systems, will be acoustically screened from off-site locations and will include vibration-attenuation mounts.

The nighttime ambient noise level in the center of the Project Site is 57.2 dBA; therefore, equipment cannot exceed a 62.2 dBA Leq threshold at the nearest property. Noise generated by rooftop-mounted mechanical equipment varies significantly depending upon the equipment type and size. However, based on measurements at other similar commercial centers and literature from Trane Industries, noise levels of 54 dBA at 50 feet from external mechanical systems is typical.

The closest off-site noise-sensitive use to the Project Site is the rooftop trailer at 428 S. Hewitt Street. Minimally, there is a separation distance of 80 feet from the closest Project rooftop HVAC equipment to 428 S. Hewitt Street. Mechanical screens are included in the design of the Project's rooftop mechanical equipment, and a minimal 5 dBA reduction is taken for the attenuation from the screens (NOI-PDF-6). As the distance between the Project HVAC equipment and 428 S. Hewitt Street is 80 ft and with the 5 dBA screening reduction, HVAC equipment noise would be reduced to 49 dBA at 50 ft and 45 dBA at 80 ft (based on the information provided above from Trane industries that noise levels of 54 dBA at 50 ft from external mechanical systems is typical). Additionally, though not quantified, the Project would mount mechanical equipment on the rooftop of the 18-story building, while the 428 S. Hewitt Street trailer is atop a two-story structure, which would increase the separation distance between the HVAC equipment noise source and receptor further (and reducing noise further). As the minimum ambient nighttime noise level at the center of the Project Site is 65 dBA Leq, the HVAC mechanical equipment would not result in an increase by 5 dBA or more over ambient levels (65 dBA with a 5 dBA increase would be 70 dBA as compared to 45 dBA). Project HVAC noise calculations are shown in Appendix E, Operational Noise Levels.

Given the requirements of Section 112.02 of the LAMC, distances to noise-sensitive receptors (that are conservatively underestimated above), the relatively quiet operation of modern HVAC systems, and the height at which the Project's HVAC equipment would be placed, mechanical equipment would not be capable of causing the ambient noise levels of nearby sensitive uses to increase by 5 dBA. Therefore, operation of mechanical equipment would not exceed the City's thresholds of significance and impacts would be less than significant.

**Loading Dock/Trash Collection Areas**

Loading dock activities such as truck movements/idling and loading/unloading operations generate noise levels that have the potential to adversely impact adjacent land uses during long-term Project operations. However, the loading dock and trash storage for the Project are located internally to the building and it is unlikely that truck noise would be noticeable outside the structure. The main noise source would be truck movement. The Project would not allow any delivery truck idling for more than 5 consecutive minutes in the loading area pursuant to state regulation [Title 13 California Code of Regulations (CCR), Section 2485]. Although the ambient noise levels would be elevated for a short period of time, they would not have much of an impact on the 24-hour CNELs.

The loading and trash collection area for the Project would be located on the southern portion of the Project Site along S. Hewitt Street. Trucks would enter and exit via S. Hewitt Street at the ground level. The door to the area would be capable of closing such that loading, and collection activities, occur in the enclosed space. Based on noise surveys conducted at similar loading docks by Giroux & Associates, loading dock activity would generate noise levels of approximately 67 dBA Leq at a reference distance of 50 feet for semi-trucks and 65 dBA for box trucks, as shown in **Table 22**, **Typical Noise Levels Associated with Loading and Trash Collection Activities**. This includes truck idling and backup alarms. Most deliveries to the Project Site would be made with the quieter, medium-sized trucks, such as Federal Express or United Parcel Service.

**Table 22**
**Typical Noise Levels Associated with Loading and Trash Collection Activities**

| Noise Generating Activity | Reference Level @ 50 feet |
|---|---|
| Semi-Truck Unloading | 67 dBA Leq (10 minutes) |
| Medium Box Truck Unloading[1] | 65 dBA Leq (10 minutes) |

Source: Giroux & Associates. 2007. Wal-Mart Super Center, Ontario. March.

Note: Box truck merged with dock, forklift operating inside receiving area.

The only noise sensitive uses in proximity to the loading and trash collection area is the rooftop-mounted trailer located at 428 S. Hewitt Street. The trailer itself is located approximately 80 feet from the driveway entrance for the loading and trash collection area.

Based on this distance, there would be 4 dBA of attenuation relative to the 50-foot reference distance. In addition, the semi-enclosed space would provide an additional 5 dBA of attenuation. The residual noise level at 428 S. Hewitt Street is compared to the threshold (ambient + 5 dBA) and is shown in **Table 23, Loading and Trash Collection Noise Levels at the Closest Sensitive Receptor**. Because it is possible for deliveries to occur at night, nighttime thresholds were also evaluated. Loading and trash collection noise calculations are shown in Appendix E, Operational Noise Levels.

**Table 23**
**Loading and Trash Collection Noise Levels at the Closest Sensitive Receptor**

| Receptor | Distance to Dock | Reference Noise (dBA) at 50 ft [a] | Attenuated Noise at Receiver | Threshold Daytime/Nighttime | Exceeds Threshold? |
|---|---|---|---|---|---|
| 428 S. Hewitt Street | 80 | 65-67 | 56-58 dBA | 70.0/70.0 dBA | No/No |

Source: Giroux & Associates and Envicom Corporation. April 2022 (Revised).

Note: Sounds levels presented are conservative. The dock is approximately 80 feet west of the Project property line, such that the separation distance may be up to 160 feet, depending on the size and orientation of the truck when parked at the dock.

[a] Giroux & Associates. 2007. Wal-Mart Super Center, Ontario. March.

Noise levels associated with occasional trash/recycling and loading dock activities would be substantially attenuated from off-site locations and would have a nominal effect on surrounding average ambient noise levels.

**Garage Ventilation**

Enclosed or underground parking garages require ventilation to remove harmful vehicle emissions and other pollutants, while providing fresh air. All enclosed parking garages in North America are subject to ventilation standards established by the International Mechanical Code (IMC) and the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE).

An analysis was performed to ensure that ventilation systems do not increase ambient noise levels at sensitive properties by more than 5 dBA. Based on data made available by Jetvent Fans, a company that manufactures fans for parking garages,[26] their largest unit generates 65 dBA for the pre-set maximum speed at a reference distance of 8 meters (approximately 25 feet). As a worst-case scenario, it was assumed that all such fans for the Project (a possible total of four) use the preset maximum speed with a noise level of 65 dBA at 8 meters, as shown in **Table 24, Project Fans Operating at Optional Maximum Speed**. Project fan noise calculations are shown in Appendix E, Operational Noise Levels.

There may be up to four exhaust fans spaced out between the various parking levels. The aboveground fans would be oriented as follows; one on the western side of the parking structure at Level 1, one fan facing the east on Level 2, and two fans facing north on Levels 4 and 5. The Level 1 fan would directly face the building that was formerly occupied by the A+D Museum. Noise from this fan would be partially blocked by the building that was formerly occupied by the A+D Museum, but to be conservative no noise reduction credit was taken. The Level 2 fan may impact the rooftop-mounted trailer at 428 S. Hewitt Street (80 feet away), and the three fans at the

[26] Jetvent Fans (Zoo Fans). Product Technical Data. Available at: https://jetventfans.com/products/. Accessed April 7, 2021.

west and north façades may impact the lofts at 825 E. 4th Street (approximately 270 feet from the fan location). Since the fans could operate during the night, the fan operations were compared to nocturnal noise standards. As shown, even if all the fans ran at full power at night, the noise levels generated at the noise-sensitive land uses would be less than significant.

**Table 24**
**Project Fans Operating at Optional Maximum Speed**

| Receptor | Distance to Fan(s) | Noise (dBA) at 8 Meters [a] | Attenuated Noise at Receiver | Threshold Daytime/Nighttime | Exceeds Threshold? |
|---|---|---|---|---|---|
| 428 S. Hewitt Street | 80 | 65 | 55 dBA | 70.0/70.0 dBA | No/No |
| 825 E. 4th Street | 275 | 70[b] | 50 dBA | 73.7/70.0 dBA | No/No |

Source: Giroux & Associates and Envicom Corporation. April 2022 (Revised).

[a] Jetvent Fans (Zoo Fans). Product Technical Data. Available at: https://jetventfans.com/products/. Accessed April 7, 2021.
[b] Assumes all three fans on the west and north side of the structure at Levels 1, 4 and 5 operate at full power at the same time.

### Composite Operational Noise Levels

The various operational noise sources from the Project may operate at the same time. The noise levels at the nearest noise sensitive receptors are shown on **Table 25, Composite Operational Noise Levels**. To calculate composite operational noise levels, the existing year Project-related traffic noise increase from Table 21 was arithmetically added to the existing daytime and nighttime ambient noise levels and the results were logarithmically added to noise levels from the Project's parking, HVAC, loading and trash collection, and garage ventilation fans. Additionally, at 825 E. 4th Street the proposed Office Building would reduce loading and trash collection noise by approximately 15 dB.[27] As shown on Table 25, the resulting composite operational noise levels would not exceed the threshold (ambient +5 dBA) and composite operational noise impacts would be less than significant. Composite operational noise calculation worksheets are shown in Appendix E, Operational Noise Levels.

**Table 25**
**Composite Operational Noise Levels**

| Receptor | Existing Ambient Noise Level (dBA) | Existing Year Project-Related Traffic Noise Increase (dBA) | Parking (dBA) | HVAC (dBA) | Loading and Trash Collection (dBA) | Garage Ventilation Fans (dBA) | Total Daytime/Nighttime (dBA) | Threshold Daytime/ Nighttime (dBA) | Exceeds Threshold? |
|---|---|---|---|---|---|---|---|---|---|
| 428 S. Hewitt Street | 65.0/65.0 | 0.3 | 34 | 45 | 56-58 | 55 | 66.2-66.4/ 66.2-66.4 | 70.0/70.0 | No |
| 825 E. 4th Street | 68.7/65.0 | 0.2 | 41 | 34 | 31-33[a] | 50 | 69.0/65.3-65.4 | 73.7/70.0 | No |

Source: Giroux & Associates and Envicom Corporation. April 2022 (Revised).
[a] 15 dB reduction was taken due to shielding from the structure of the proposed Office Building itself.

[27] FHWA. 2006. FHWA Roadway Construction Noise Model User's Guide: Final Report. January.

### Operational Vibration Impacts

The primary sources of transient operational vibration would be vehicle circulation within the proposed parking areas of the Project. Typical road traffic-induced vibration levels are unlikely to be perceptible by people, and it is also unusual for vibration, even from sources such as buses and trucks, to be perceptible, even in locations close to major roads.[28] Only ground vibration associated with heavy trucks traveling on road surfaces with speed bumps or potholes could typically reach perceptibility thresholds; however, the Project would not generate a substantial amount of heavy truck trips during operations. Therefore, Project vehicular vibration is unlikely to be perceptible. The Project would also include roof mounted HVAC equipment. However, such mechanical equipment would be mounted on the 18th story of the Project and the closest sensitive receptor is a rooftop trailer atop a two-story structure; therefore, vibration would not amplify through all levels of the Project structure to the rooftop of the second story structure across S. Hewitt Street. As such, operation of the Project would not increase vibration levels in the Project vicinity, and vibration impacts during operations would be less than significant.

## CUMULATIVE NOISE AND VIBRATION IMPACTS

A cumulative impact analysis considers the impact of on-site development in combination with ambient growth and other development projects. There are 137 pending Related Projects in the Project area with several geographical clusters immediately adjacent to surrounding sensitive uses identified earlier in this study. However, only projects and ambient growth in the nearby area could combine with the Project's on-site development to result in cumulative noise impacts. Further, the potential for cumulative noise impacts to occur is specific to the distance between each Related Project and their noise sources. Therefore, pending projects closest to the Project Site were identified as part of this analysis.

### CUMULATIVE OFF-ROAD CONSTRUCTION NOISE IMPACTS

A previously discussed, the roof-mounted trailer at 428 S. Hewitt Street, the live/work land use at 442 Colyton Street, and the live/work use at 449 S. Hewitt Street may experience construction noise levels in excess of ambient noise +5 dB. The implementation of NOI-MM-1 and NOI-PDF-1 through NOI-PDF-5 would reduce the Project level composite construction noise impact. However, even with mitigation, the Project would have a significant and unavoidable impact related to off-road construction noise. The Project would have less than significant off-road construction noise impacts at 825 E. 4th Street and Art Share LA at 801 E. 4th Place based on the greater distance from the Project Site. Construction noise can contribute to a cumulative noise impact for sensitive receptors located midway between two construction sites. Noise from the construction of Related Projects is localized and has the potential to affect noise-sensitive uses within proximity from the Project construction site based on the L.A. City Thresholds Guide screening criteria. In order to achieve a substantial cumulative increase in construction noise, more than one source emitting high levels of construction noise would need to be in close proximity to the on-site Project development. Pursuant to the Thresholds Guide, noise from construction

[28] FTA. 2006. Noise and Vibration Assessment, Page 7-1. May.

activities would normally affect sensitive receptors that are located immediately adjacent to the construction sites, especially those that are located less than 500 feet from the construction sites. Based on the 500-foot distance, the cumulative construction noise impacts analysis is limited to Related Projects that are located within 1,000 feet of the Project Site, assuming that the sensitive receptor is located halfway between the Project Site and a Related Project. Although there are 137 cumulative projects identified as being Related Projects, not all are located within the screening distance of 1,000 feet of the Project Site. The Related Projects located in closest proximity to the Project Site are listed in **Table 26, Cumulative Projects within Proximity of the Project Site**. Four existing sensitive uses that could potentially be impacted by Related Project construction, in addition to Project construction, are identified within 300 feet of the Project Site, as shown in **Figure 3, Related Projects Relative to Adjacent Noise-Sensitive Uses**.

**Table 26**
**Cumulative Projects within Proximity of the Project Site**

| Related Project Identification Number | Related Project Address | Distance to the Project Site |
|---|---|---|
| 94 | 940 E. 4th Street | 60 feet |
| 37 | 963 E. 4th Street | 135 feet |
| 137 | 431 Colyton Street | 170 feet |
| 44 | 360 S. Alameda Street | 375 feet |
| 52 | 400 S. Alameda Street | 445 feet |
| 85 | 1129 E. 5th Street | 470 feet |
| 78 | 330 S. Alameda Street | 500 feet |
| 120 | 1100 E. 5th Street | 595 feet |
| 96 | 333 S. Alameda Street | 660 feet |
| 129 | 810 E. 3rd St | 740 feet |
| 20 | 950 E. 3rd St | 875 feet |
| 79 | 527 Colyton Street | 900 feet |

The nearest noise sensitive use to Related Projects 37 and 94 is the rooftop-mounted trailer at 428 S. Hewitt Street, located 80 feet southeast of the Project Site and directly south of Related Project 94. The Related Projects are closer to this sensitive use than the Project and would impact this receptor to a greater extent than the Project. Cumulative construction impacts could create a significant impact for the sensitive use at 428 S. Hewitt Street and would occur regardless of Project construction. Nevertheless, as Project construction would result in a significant and unavoidable Project-level impact during construction for 428 S. Hewitt Street, the Project's contribution to the cumulative impact would also be significant. As with the Project-level impact, there is no feasible mitigation measure for this impact due to the rooftop location of the trailer at 428 S. Hewitt Street requiring off-site property owner consent) and the fact that the noise level at 428 S. Hewitt Street would still exceed 75 dB and a 5 dB increase if both the off-site and on-site barriers are erected as part of NOI-MM-1. Therefore, a cumulative impact related to construction noise would occur at 428 S. Hewitt Street.

The nearest noise-sensitive use to Related Projects 96, 78, 44 and 52 is 825 E. 4th Street, the 6-story multi-unit residential structure on the northeast corner of Seaton Street and 4th Street, which is 200 feet northwest of the Project Site. If all four of the adjoining Related Projects were to be


Aerial Source: Google Earth Pro, June 8, 2018.

4TH AND HEWITT PROJECT – NOISE AND VIBRATION IMPACT ANALYSIS

envicom

# Related Projects Relative to Adjacent Noise-Sensitive Uses

FEET 0 200 400

FIGURE 3

constructed concurrently, the existing residential building would be exposed to significant construction noise impacts. These impacts would occur regardless of Project construction. Due to the 200-foot distance between the Project Site and the 825 E. 4th Street six-story multi-unit residential structure, as analyzed above, the Project would result in less than significant construction noise impacts at this receptor location. Therefore, Project impacts during construction at this location would not be cumulatively considerable and cumulative impacts would be less than significant.

The residential uses south of the Project Site at 442 Colyton Street and 449 S. Hewitt Street are separated from the Project by multiple structures. The three Related Projects (Related Project 85, 137, and 94) to these two receptors could result in a cumulatively significant construction noise level, which would occur regardless of Project construction. However, as previously described, the Project's construction noise impact at these two receptors would be significant and unavoidable. Therefore, the Project's contribution to construction noise at these locations (442 Colyton Street and 449 S. Hewitt Street) would be cumulatively considerable and cumulative impacts would be significant.

Noise associated with cumulative construction activities would be reduced to the degree feasible through proposed mitigation measures for each individual Related Project and compliance with the LAMC-dictated construction hours and days, as well as the Project's implementation of NOI-MM-1. However, if nearby Related Projects were to be constructed concurrently, significant cumulative construction noise impacts would occur at 428 S. Hewitt Street, 442 Colyton Street, and 449 S. Hewitt. There is no feasible way to eliminate the Project's cumulative construction noise impact at 428 S. Hewitt Street; therefore, it is considered significant and unavoidable. The Project would not contribute to potential cumulative construction noise impacts at any other sensitive use and cumulative impacts at other sensitive receptors (including 825 E. 4th Street) would therefore be less than significant.

## CUMULATIVE ON-ROAD CONSTRUCTION NOISE IMPACTS

Conservatively assuming that concurrent construction of Related Projects in the Project vicinity would occur, it could potentially result in more haul or vendor trucks utilizing the same haul route as the Project. However, because traffic levels are already high, a Leq of 70 dBA or 110 hourly heavy diesel truck trips traveling the same route as Project traffic would be required to exceed significance thresholds (i.e., noise levels at sensitive receptors). Since the Project is expected to generate a maximum of 18 truck trips per hour during peak construction (excavation and grading), it is unlikely that construction truck traffic associated with the nearby Related Projects would add 92 additional truck trips along the same travel route at the same time as the Project.[29] Even in this unlikely scenario, the Project's 18 truck trips per hour would not substantially contribute to the overall cumulative impact (it would account for approximately 16 percent of the truck trips); therefore, the Project's contribution to on-road construction noise would not be cumulatively considerable, and cumulative impacts would be less than significant.

[29] Ninety-two truck trips represents the difference between 110 hourly trips, which would exceed the threshold, and the actual number of hourly Project trips (18 trips). To trigger more than 110 hourly trips, the Related Projects would have to add 92 hourly trips along each roadway segment.

## CUMULATIVE COMPOSITE CONSTRUCTION NOISE IMPACTS

The Project level composite construction noise impact due to the combined effect of on- and off-road construction noise sources at three sensitive receptors (428 S. Hewitt Street, 442 Colyton Street, and 449 S. Hewitt Street) would be significant. Although the implementation of NOI-MM-1 would reduce the Project level composite construction noise impact, noise levels would remain above 75 dB and would exceed the +5.0 dBA increase threshold. Therefore, composite construction noise impacts would be significant and unavoidable. Sensitive receptors would potentially be simultaneously affected by composite construction noise from the Project and Related Projects. As such, the Project's contribution to the combination of construction and haul truck noise at the identified sensitive uses is cumulatively considerable and would also remain a significant and unavoidable cumulative impact following implementation of NOI-MM-1. Both the Project-level and cumulative composite noise impact during construction would be less than significant at the remaining identified sensitive receptors (825 E. 4$^{th}$ Street and 801 E. 4$^{th}$ Place).

## CUMULATIVE OFF-ROAD CONSTRUCTION VIBRATION IMPACTS

Since groundborne vibration decreases quickly with distance as discussed previously, the potential for adverse vibration effects generated by construction activities would typically be limited to fragile structures or vibration-sensitive land uses that are located nearest to a construction site. As previously discussed, the Project's structural vibration impacts on the fragile structures located at 418 Colyton Street, 424 Colyton Street, and 427 S. Hewitt Street would be significant and unavoidable. These impacts would be cumulatively considerable if a structure was exposed to potential vibration damage from a Related Project at the same time.

The Project would result in a building damage-related vibration impact at 427 S. Hewitt Street, with or without the cumulative contribution of Related Project 94. Vibration mitigation measures NOI-MM-2, NOI-MM-3, and NOI-MM-4 would reduce this impact to a less than significant level, but because they require the consent of other property owners, this analysis considers it to be infeasible and thus significant and unavoidable, as previously discussed. The nearest Related Project to the Project Site is Related Project 94, which is 60 feet to the east of the Project Site, across S. Hewitt Street and at the intersection of E. 4$^{th}$ Street. The closest off-site building to the Project Site and also the Related Project 94 site is located at 427 S. Hewitt Street, which is immediately south of the Project Site but 60 feet from the southern extent of the Related Project 94 address. At 60 feet, vibration levels would be 0.024 in/sec PPV or 76 VdB, below even the most stringent damage threshold. The nearest Related Project would not worsen or contribute to the Project's significant impact related to potential vibration damage from the Project. Therefore, potential vibration damage from at the 427 S. Hewitt Street structure due to cumulative effects of the Project and the nearest Related Project would be less than significant. In addition, the retail and office uses within the building are not considered to be sensitive to vibration annoyance.

Construction vibration associated with Related Project 94 would impact the vibration-sensitive use at the closest sensitive receptor to the Project Site, the residence at 428 S. Hewitt Street (80 feet from Project construction). The 428 S. Hewitt Street use has a shared property line with Related Project 94. Therefore, vibration from Related Project 94 could have a significant impact at the 428

S. Hewitt Street structure. Similar vibration mitigation for Related Project 94 as proposed for the Project (NOI-MM-2, NOI-MM-3, and NOI-MM-4) would reduce the construction vibration at Related Project 94 through implementation of a pre-construction survey, shoring plan, and comprehensive structure monitoring program. However, this impact would occur even without the Project because the Project would have a less than significant impact to this structure, as previously evaluated. Therefore, the Project's impact would not be cumulatively considerable, and the cumulative impact to 428 S. Hewitt Street use would be less than significant.

With regard to vibration effects related to human annoyance, the closest vibration-sensitive receptor to the Project Site is the rooftop-mounted trailer used as a residence at 428 S. Hewitt Street, located 80 feet east of the Project Site but immediately south of the Related Project 94 site. As discussed previously, this use is of sufficient distance from the Project Site such that Project construction would fall under the "barely perceptible" human annoyance level for vibration. Therefore, the Project's impact would not be cumulative considerable, and the cumulative impact would be less than significant. Depending on the design of the structure for Related Project 94 and the types of construction equipment to be utilized at that site, it may result in a human annoyance vibration impact during construction to the rooftop trailer residence. However, this impact would occur regardless of Project construction and the cumulative impact related to human annoyance from vibration would be less than significant.

### CUMULATIVE ON-ROAD CONSTRUCTION VIBRATION IMPACTS

As discussed above for Project construction impacts, delivery trucks, haul trucks, and other construction vehicles would travel to and from the Project Site throughout the construction period. Structures along the haul route may experience groundborne vibration levels of approximately 0.034 in/sec PPV, below the fragile building damage threshold criterion of 0.12 in/sec PPV. Potential building damage impacts would not be cumulatively considerable, because the haul trucks or construction vehicles from the Related Project sites would not increase the levels of peak vibration beyond the levels from vehicles from the Project itself due to the distance from the roadways to the building. Therefore, building damage impacts from construction traffic would be cumulatively less than significant.

Delivery trucks, haul trucks, and other construction vehicles may potentially generate human annoyance vibration impacts to sensitive uses along their haul routes that exceed the adopted 72 VdB and 75 VdB human annoyance thresholds, because they would potentially travel within 25 feet of a structure with uses that are sensitive to experiencing human annoyance from vibration. The vibration human annoyance impacts would be cumulatively considerable, because sensitive receptors could be affected by multiple projects if a roadway is used for truck hauling by multiple projects simultaneously, as may be the case with Related Projects 94 and 37. These trucks and construction vehicles from the Related Project sites would increase the number of vibration events that exceed the human annoyance threshold per day above those that would occur with the Project alone. Therefore, human annoyance vibration impacts from construction traffic would be a significant and unavoidable cumulative impact.

## CUMULATIVE OPERATIONAL TRAFFIC NOISE IMPACTS

Cumulative traffic noise impacts compare the "future with Project" noise levels, which include Related Projects and Project traffic volumes with the "existing no Project" scenario. If the total noise along the affected segment exceeds 70 dB CNEL (within the City's "normally unacceptable" noise compatibility category for noise-sensitive land uses), an increase of +3 dB CNEL in traffic noise (to which the Project would contribute) would also be required for a significant impact, because an increase of less than 3 dB is not perceptible to the human ear in an outdoor environment. Therefore, as discussed previously, a significant impact would occur if a) the Project would contribute to a +5 dB CNEL or greater (readily perceptible) cumulative increase or b) the total noise along the affected segment exceeds 70 dB CNEL (within the City's "normally unacceptable" noise compatibility category for noise-sensitive land uses) as a result of a +3 dB CNEL noise increase which would not otherwise occur without the Project's noise contribution. **Table 27, Cumulative Traffic-Related Noise Impacts**, shows the cumulative traffic noise impacts.

**Table 27**
**Cumulative Traffic-Related Noise Impacts**

| Roadway Segment | Existing Noise Level (dB CNEL) | Existing with Project Noise Level (dB CNEL) | Future with Project Noise Level (dB CNEL) | Cumulative Increase (dB CNEL) | Maximal Project Impact (dB CNEL) | Would Increase Result without Project? | Within "Normally Unacceptable" Noise Compatibility Category? | Significant Impact? |
|---|---|---|---|---|---|---|---|---|
| 1st St. W of Vignes | 66.3 | 66.3 | 66.7 | 0.4 | 0.0 | No | No | No |
| 1st St. E of Vignes | 66.8 | 66.8 | 67.3 | 0.5 | 0.0 | No | No | No |
| Vignes N of 1st | 57.2 | 57.2 | 57.5 | 0.3 | 0.0 | No | No | No |
| Vignes S of 1st | 56.7 | 56.7 | 57.2 | 0.5 | 0.0 | No | No | No |
| 3rd St. Central to Alameda | 66.2 | 66.3 | 68.4 | 2.2 | 0.1 | No | No | No |
| 4th Place, E of Alameda | 64.5 | 65.4 | 68.1 | 3.6 | 0.9 | Yes | No | No |
| 4th St. W of Central | 64.8 | 64.9 | 66.1 | 1.3 | 0.1 | No | No | No |
| 4th St. Central – Alameda | 65.2 | 65.3 | 66.4 | 1.2 | 0.1 | No | No | No |
| 4th St. E of Alameda | 67.2 | 67.4 | 68.6 | 1.4 | 0.2 | No | No | No |
| 4th St. W of Merrick | 66.5 | 66.8 | 68.3 | 1.8 | 0.3 | No | No | No |
| 4th St. E of Merrick | 69.6 | 69.8 | 71.7 | 2.1 | 0.2 | No | Yes | No |
| 6th St. W of Central | 65.5 | 65.5 | 67.6 | 2.1 | 0.0 | No | No | No |
| 6th St. Central -Alameda | 66.9 | 66.9 | 68.8 | 1.9 | 0.0 | No | No | No |

| Roadway Segment | Existing Noise Level (dB CNEL) | Existing with Project Noise Level (dB CNEL) | Future with Project Noise Level (dB CNEL) | Cumulative Increase (dB CNEL) | Maximal Project Impact (dB CNEL) | Would Increase Result without Project? | Within "Normally Unacceptable" Noise Compatibility Category? | Significant Impact? |
|---|---|---|---|---|---|---|---|---|
| 6th St. Alameda – Mateo | 66.8 | 66.8 | 69.9 | 3.1 | 0.0 | Yes | No | No |
| 6th St. E of Mateo | 66.0 | 66.0 | 67.2 | 1.2 | 0.0 | No | No | No |
| 7th St. W of Central | 64.6 | 64.6 | 66.6 | 2.0 | 0.0 | No | No | No |
| 7th St. Central - Alameda | 64.6 | 64.6 | 66.9 | 2.3 | 0.0 | No | No | No |
| 7th St. Alameda – Mateo | 64.5 | 64.5 | 67.2 | 2.7 | 0.0 | No | No | No |
| 7th Street, Mateo – Santa Fe | 64.0 | 64.0 | 67.2 | 3.2 | 0.0 | Yes | No | No |
| 7th St. E of Santa Fe | 64.9 | 64.8 | 67.8 | 2.9 | -0.1 | No | No | No |
| 2nd St. W of Alameda | 61.5 | 61.5 | 62.0 | 0.5 | 0.0 | No | No | No |
| 2nd St. E of Alameda | 59.6 | 59.6 | 60.5 | 0.9 | 0.0 | No | No | No |
| Central Ave. N of 3rd | 67.1 | 67.1 | 67.5 | 0.4 | 0.0 | No | No | No |
| Central Ave. 3rd-4th | 68.2 | 68.2 | 69.0 | 0.8 | 0.0 | No | No | No |
| Central Ave. 4th-6th | 67.6 | 67.6 | 68.3 | 0.7 | 0.0 | No | No | No |
| Central Ave. 6th-7th | 68.0 | 68.0 | 69.3 | 1.3 | 0.0 | No | No | No |
| Central Ave. S of 7th | 68.3 | 68.3 | 69.1 | 0.8 | 0.0 | No | No | No |
| Alameda St. N of 2nd | 69.0 | 69.2 | 70.6 | 1.6 | 0.2 | No | Yes | No |
| Alameda St. 2nd-3rd | 69.1 | 69.3 | 70.7 | 1.6 | 0.2 | No | Yes | No |
| Alameda St. 3rd-4th | 69.2 | 69.4 | 71.2 | 2.0 | 0.2 | No | Yes | No |
| Alameda St. 4th-6th | 68.7 | 68.9 | 70.9 | 2.2 | 0.2 | No | Yes | No |
| Alameda St. 6th-7th | 68.8 | 69.0 | 70.4 | 1.6 | 0.2 | No | Yes | No |
| Alameda St. S of 7th | 68.7 | 68.9 | 70.3 | 1.6 | 0.2 | No | Yes | No |
| Merrick N of 4th | 55.1 | 55.1 | 55.5 | 0.4 | 0.0 | No | No | No |

| Roadway Segment | Existing Noise Level (dB CNEL) | Existing with Project Noise Level (dB CNEL) | Future with Project Noise Level (dB CNEL) | Cumulative Increase (dB CNEL) | Maximal Project Impact (dB CNEL) | Would Increase Result without Project? | Within "Normally Unacceptable" Noise Compatibility Category? | Significant Impact? |
|---|---|---|---|---|---|---|---|---|
| Molino Street, S of E 4th St. | 52.5 | 52.5 | 59.1 | 6.6 | 0.0 | Yes | No | No |
| Mateo N of 6th | 58.3 | 58.4 | 60.7 | 2.4 | 0.1 | No | No | No |
| Mateo 6th-7th | 58.6 | 58.7 | 60.4 | 1.8 | 0.1 | No | No | No |
| Santa Fe Ave. N of 7th | 62.9 | 62.8 | 65.2 | 2.3 | -0.1 | No | No | No |
| Santa Fe Ave. 7th-8th | 65.4 | 65.3 | 66.5 | 1.1 | -0.1 | No | No | No |
| Santa Fe Ave. S of 8th | 66.4 | 66.4 | 67.4 | 1.0 | 0.0 | No | No | No |
| Olympic W of Alameda | 68.1 | 68.1 | 69.2 | 1.1 | 0.0 | No | No | No |
| Olympic E of Alameda | 69.5 | 69.5 | 70.7 | 1.2 | 0.0 | No | Yes | No |
| Alameda St. N of Olympic | 69.0 | 69.1 | 70.5 | 1.5 | 0.1 | No | Yes | No |
| Alameda St. S of Olympic | 69.1 | 69.2 | 70.4 | 1.3 | 0.1 | No | Yes | No |
| Boyle Ave. N of 4th | 63.2 | 63.3 | 63.6 | 0.4 | 0.1 | No | No | No |
| Boyle Ave., 4th – Whittier | 64.3 | 64.3 | 64.6 | 0.3 | 0.0 | No | No | No |
| Boyle Ave. S of Whittier | 65.7 | 65.7 | 66.0 | 0.3 | 0.0 | No | No | No |
| Soto St. N of 4th | 67.8 | 67.8 | 68.1 | 0.3 | 0.0 | No | No | No |
| Soto St. S of 4th | 68.2 | 68.2 | 68.6 | 0.4 | 0.0 | No | No | No |
| 4th St. W of US 101 NB Off-Ramp | 69.0 | 69.2 | 70.9 | 1.9 | 0.2 | No | Yes | No |
| 4th St. US 101 NB Off-Ramp – Boyle | 68.9 | 69.0 | 70.5 | 1.6 | 0.1 | No | Yes | No |
| 4th St. Boyle – I-5 SB Ramps | 69.7 | 69.8 | 70.8 | 1.1 | 0.1 | No | Yes | No |
| 4th St. I-5 SB Ramps – I-5 NB Ramps | 69.8 | 69.8 | 70.6 | 0.8 | 0.0 | No | Yes | No |
| 4th St. I-5 NB Ramps – Soto | 68.7 | 68.7 | 69.3 | 0.6 | 0.0 | No | No | No |

| Roadway Segment | Existing Noise Level (dB CNEL) | Existing with Project Noise Level (dB CNEL) | Future with Project Noise Level (dB CNEL) | Cumulative Increase (dB CNEL) | Maximal Project Impact (dB CNEL) | Would Increase Result without Project? | Within "Normally Unacceptable" Noise Compatibility Category? | Significant Impact? |
|---|---|---|---|---|---|---|---|---|
| 4th St. E of Soto | 68.7 | 68.7 | 69.1 | 0.4 | 0.0 | No | No | No |
| Whittier W of Boyle | 67.7 | 67.8 | 68.4 | 0.7 | 0.1 | No | No | No |
| Whittier E of Boyle | 67.5 | 67.5 | 68.2 | 0.7 | 0.0 | No | No | No |
| Source: Giroux & Associates and Envicom Corporation. April 2022 (Revised). | | | | | | | | |

As shown in Table 27, Cumulative Traffic Related Noise Impacts, there are four roadway segments that would experience a cumulative traffic noise increase of +3.0 dBA: E. 4th Place east of Alameda Street, 6th Street from Alameda Street to Mateo Street, 7th Street from Mateo Street to Santa Fe Avenue, and Molino Street south of E. 4th Street. The cumulative traffic noise increases of 3 dB or more at the 6th Street, 7th Street, and Molino Street segments would occur regardless of Project implementation. As the Project would not substantially contribute to these increases, and the overall roadway noise would be less than the noise levels of the sensitive use "normally unacceptable" noise compatibility category, they are not considered to be significant. With regard to the 4th Place east of Alameda Street roadway segment, land uses along this segment are dominated by commercial, industrial, and manufacturing land uses, which are not noise-sensitive land uses. However, Art Share LA, located at the intersection of S. Hewitt Street and 4th Place, includes live/work residential units for artists, which is a noise-sensitive land use. Nevertheless, the future with Project traffic noise level along this segment is less than 70 dB CNEL, which is within the residential use "normally unacceptable" noise compatibility category. As the analysis shows, none of the roadway segments would experience a cumulative noise increase of 5 dB or more, nor would any experience *both* a cumulative noise increase of 3 dB or more (a perceptible noise increase) *and* a noise level of above 70 dB CNEL. Therefore, adjacent uses would not be exposed to a significant noise level. The remainder of the cumulative impacts are less than +3.0 dBA and would be less than significant.

(It should be noted that noise levels calculated from traffic volumes are less than measured noise levels, as the measured noise level would pick up other urban background noise sources (e.g., industrial activities, heavy trucks, etc.) that are not accounted for when basing noise on traffic volumes only. Regardless, the calculated noise level is intended to demonstrate the Project contribution, and if ambient noise was higher, it would not adversely affect the net Project-related impact.)

## CUMULATIVE STATIONARY SOURCE NOISE IMPACTS

As previously addressed, the LAMC limits stationary noise from select items such as HVAC and other rooftop-mounted equipment. Therefore, noise levels from such sources at the Project Site and at the Related Project locations at the property line would be less than significant based on required regulatory compliance. Furthermore, the rooftop-mounted equipment for the Project would be acoustically screened from nearby sensitive uses. Based on the Project's operational noise levels, the Project design, and requirements of the LAMC, the stationary source noise impacts of the Project would not be cumulatively considerable and cumulative impacts would be less than significant.

### CUMULATIVE OPERATIONAL VIBRATION IMPACTS

Operational vibration impacts are localized and rarely impact off-site uses. Therefore, they would not have the potential to worsen the impact of another project or be and would therefore not be cumulatively considerable. There are no Related Projects that are close enough to the Project Site and that propose land uses with substantial vibration sources for vibration impacts to be a concern (the Related Projects are generally residential or commercial in nature). Cumulative vibration impacts during operations would be less than significant.

## SUMMARY

### CONSTRUCTION PERIOD NOISE AND VIBRATION

Construction activities are limited to the hours of 7:00 a.m. and 9:00 p.m. on weekdays and 8:00 a.m. to 6:00 p.m. on Saturdays. Construction is not permitted on any national holiday or on Sundays. The Project would implement Project Design Features NOI-PDF-1 through NOI-PDF-5, below. Although they would result in some reduction at various times during construction, they were not included in the calculations of the Project construction noise levels, because when applied, the numerical reduction cannot be accurately determined. Therefore, the noise levels reported for off-road construction are conservative, as they would be reduced with the application of Project Design Features NOI-PDF-1 through NOI-PDF-5.

**NOI-PDF-1:** All capable diesel-powered construction vehicles will be equipped with exhaust mufflers, aftermarket dampening systems, or other suitable noise reduction devices.

**NOI-PDF-2:** Power construction equipment (including combustion engines), fixed or mobile, will be equipped with state-of-the-art noise shielding and muffling devices (consistent with manufacturers' standards). All equipment will be properly maintained to ensure that no additional noise, due to worn or improperly maintained parts, would be generated.

**NOI-PDF-3:** Grading and construction contractors will use rubber-tired equipment rather than metal-tracked equipment.

**NOI-PDF-4:** An on-site construction manager will be responsible for responding to local complaints about construction noise. Notices will be sent to residential units within 500 feet of the construction site and signs will be posted at the construction site that list the telephone number for the on-site construction manager.

**NOI-PDF-5:** Construction supervisors will be informed of Project-specific noise requirements, noise issues for sensitive land uses adjacent to the Project construction Site, and/or equipment operations to ensure compliance with the required regulations and best practices.

Construction of the Project may result in a potentially significant noise impact on nearby sensitive receptors. A mitigation measure is identified to reduce the construction noise level at the closest noise-sensitive receptor, 428 S. Hewitt Street. However, construction noise levels would still be above the 75 dB threshold and the +5.0 dBA increase threshold)for part of the project construction and a portion of NOI-MM-1 would require the consent of another property owner who may not agree to implement all components of the recommended mitigation measures as stated herein; therefore, the temporary impact at the closest noise-sensitive receptors would be significant and unavoidable. In addition, off-road construction equipment noise impacts would also occur at 442 Colyton Street and 449 S. Hewitt Street and there would be no feasible mitigation. The temporary noise impact at these locations would also be significant and unavoidable. However, the following mitigation measure would reduce the impact at 428 S. Hewitt Street if implemented:

**NOI-MM-1:** Subject to off-site property owner agreement, a temporary construction barrier on the rooftop of 428 S. Hewitt Street, near the edge of the rooftop facing the Project Site shall be erected during the Project demolition and grading phases and when equipment is used on the ground floor during building construction and paving. The barrier shall be least four feet in height and constructed of a material with a Sound Transmission Class (STC) rating of at least STC-30 (such as acoustic panels or sound barrier products) or a transmission loss of at least 20 decibels (dB) at 500 hertz (such as 1/2-inch plywood). In addition to the rooftop barrier, a temporary construction barrier of approximately 300 feet in length and 24 feet in height, located at the eastern edge and southeastern corner of the Project Site, and constructed of a material with a rating of STC-35 or greater (such as acoustic panels or sound barrier products) or providing a transmission loss of at least 25 dB at 500 hertz (such as 3/4-inch plywood), shall be erected during the Project demolition and grading phases and when equipment is used on the ground floor during building construction and paving.

With respect to construction period vibration, implementation of Mitigation Measures NOI-MM-2, NOI-MM-3, and NOI-MM-4 would reduce potential vibration building damage to adjacent fragile structures to less than significant. However, because these mitigation measures require the consent of other property owners, who may not agree to implement all components of the recommended mitigation measures as stated herein, implementation of the provided mitigation measures cannot be guaranteed. Thus, it is conservatively concluded that building damage impacts on the structures due to vibration would be significant and unavoidable.

**NOI-MM-2:** Prior to demolition, the Applicant shall retain the services of a structural engineer or other qualified professional to conduct pre-construction surveys to document the current physical conditions of the following identified vibration-sensitive receptors: 418 Colyton Street, 424 Colyton Street, and 427 S. Hewitt Street.

**NOI-MM-3:** Prior to the issuance of grading permits, the Applicant shall retain the services of a structural engineer or other qualified professional to prepare a demolition and shoring plan to ensure the proper protection and treatment of the properties at 418 Colyton Street, 424 Colyton Street, and 427 S. Hewitt Street during construction. The plan shall include appropriate measures to protect these properties from damage due to demolition of existing structures, excavation or other ground-disturbing activities, vibration, soil settlement, and general construction activities. The plan shall be submitted to the Los Angeles Department of City Planning's Office of Historic Resources for review and approval.

**NOI-MM-4:** Prior to the issuance of grading permits, the Applicant shall retain the services of an acoustical engineer or other qualified professional to develop and implement a structural monitoring program during construction. The performance standards of the structural monitoring program shall include the following:

- Documentation, consisting of video and/or photographic documentation of accessible and visible areas on the exterior of the receptor buildings (refer to NOI-MM-2).
- A registered civil engineer, certified engineering geologist, or vibration control engineer shall review the appropriate vibration criteria for the identified vibration receptors, taking into consideration their age, construction, condition, and other factors related to vibration sensitivity in order to develop additional recommendations for the structural monitoring program.
- Vibration sensors shall be installed on and/or around the identified vibration receptors to monitor for horizontal and vertical movement. These sensors shall remain in place for the duration of excavation, shoring, and grading phases.
- The vibration sensors shall be equipped with real-time warning system capabilities that can immediately alert construction supervisors when monitored vibration levels approach or exceed threshold limits. The registered civil engineer, certified engineering geologist, or vibration control engineer shall determine the appropriate limits.
- Should an exceedance of vibration thresholds occur, work in the vicinity of the affected area shall be halted and the respective vibration receptor shall be inspected for any damage. Results of the inspection shall be logged. In the event that damage occurs, the damage shall be repaired in consultation with a qualified preservation consultant. In the event of an exceedance, feasible steps to reduce vibratory levels shall be undertaken, such as halting/staggering concurrent activities and utilizing lower-vibratory techniques.

Vibration levels may be above the threshold for human annoyance at the adjacent industrial/manufacturing uses but these are not considered vibration-sensitive uses. Vibration during construction at the closest off-site sensitive uses would be less than the human annoyance thresholds. Construction noise at all other sensitive uses would be less than significant and no mitigation is necessary.

Noise from construction related vehicles traveling along the Projects' identified haul route would be less than 5 dBA above the ambient noise levels and would not cause the analyzed roadway segments to experience an exceedance of the significance threshold. No mitigation measures would be required.

Project construction vehicles would not cause a vibration exceedance for building damage at the closest sensitive uses and building damage impacts would be less than significant without mitigation. However, the vibration human annoyance thresholds related to construction traffic would be significant and unavoidable for sensitive receptors located along the haul route.

## OPERATIONAL PERIOD NOISE AND VIBRATION

The Project noise impact study indicates a less than significant noise impact from Project-related traffic on noise-sensitive receptors in the Project vicinity. No mitigation measures would be required.

Noise from the parking structure would be less than ambient noise levels at the adjacent sensitive uses, as would noise from HVAC equipment on the roof level of the Project structure and from garage ventilation units located at the ground floor and aboveground parking levels. Loading and trash collection would be less than daytime ambient noise levels and would not substantially increase nighttime noise levels. Combined operational noise levels would not substantially increase ambient noise levels. No mitigation measures would be required. The following project design feature will be incorporated in the Project:

**NOI-PDF-6:** Rooftop mechanical equipment, including heating, ventilation, and air conditioning (HVAC) systems, will be acoustically screened from off-site locations and will include vibration-attenuation mounts.

The only sources of operational vibration would derive from the parking structure and HVAC equipment. However, neither source would create a perceptible impact at any off-site use. No mitigation measures would be required.

## CUMULATIVE IMPACTS

### Cumulative Off-Road Construction Noise Impacts

Project construction would result in a significant and unavoidable Project-level impact during construction for 428 S. Hewitt Street, 442 Colyton Street, and 449 S. Hewitt Street and the Project's contribution to the cumulative impact would also be significant. As with the Project-level impact, there is no feasible mitigation measure for this impact due to the anticipated 18-story height of the Project. Noise associated with cumulative construction activities would be reduced to the degree feasible through proposed mitigation measures for each individual Related Project and compliance with the LAMC-dictated construction hours and days as well as the Project's compliance with NOI-MM-1 and NOI-PDF-1 through NOI- PDF-5. However, if nearby Related Projects were to be constructed concurrently, significant cumulative construction noise impacts could occur regardless of Project development. There is no feasible way to eliminate the Project's cumulative construction noise impact at the 428 S. Hewitt Street 442 Colyton Street, and 449 S. Hewitt Street residences; therefore, it is considered significant and unavoidable.

Due to the 200-foot distance between the Project Site and 825 E. 4th Street, the six-story multi-unit residential structure, Project impacts during construction at this location would not be cumulatively considerable and cumulative impacts would be less than significant. The residential uses south of the Project Site at 442 Colyton Street and 449 S. Hewitt Street are separated from the Project by multiple structures, and therefore, Project construction noise would not be cumulatively considerable and cumulative impacts would be less than significant.

**Cumulative On-Road Construction Noise Impacts**

The Project's 18 truck trips per hour would not substantially contribute to the overall cumulative impact; therefore, the Project's cumulative impact would be less than significant.

**Cumulative Off-Road Construction Vibration Impacts**

The Project would result in a building damage impact at 427 S. Hewitt Street, with or without the cumulative contribution of Related Project 94. Vibration Mitigation Measures NOI-MM-2, NOI-MM-3, and NOI-MM-4 would reduce this impact to a less than significant level, but because they require the consent of other property owners, implementation of the provided mitigation measures cannot be guaranteed. Thus, this analysis conservatively considers it a significant unavoidable impact, as previously discussed. The nearest Related Project would not worsen or contribute to the Project's significant impact related to potential vibration damage from the Project. Therefore, potential vibration damage due to cumulative effects of the Project and the nearest Related Project at the 427 S. Hewitt Street Structure would be less than significant. In addition, the retail and office uses within the building are not considered to be sensitive to vibration annoyance.

The residence at 428 S. Hewitt Street (80 feet from Project construction) would be impacted by construction vibration associated with Related Project 94, with which the residence has a shared property line, but would not be impacted by the Project due to the distance. Vibration from Related Project 94 could have a significant impact at the 428 S. Hewitt Street structure, which would occur even without the Project. The Project's impact would not be cumulatively considerable, and the cumulative impact to the 428 S. Hewitt Street structure would be less than significant.

With regard to vibration effects related to human annoyance, the closest vibration-sensitive receptor to the Project Site is the rooftop-mounted trailer used as a residence at 428 S. Hewitt Street. Project construction would result in a "barely perceptible" human annoyance level for vibration and would not be cumulatively considerable. Related Project 94 may result in a human annoyance vibration impact during construction to the rooftop trailer residence. This impact would occur regardless of Project construction and the cumulative impact related to human annoyance from vibration would be less than significant.

**Cumulative Composite Construction Noise Impacts**

The Project's contribution to the composite construction noise impact (due to the combination of construction and haul truck noise at three of the identified sensitive uses) is cumulatively significant and would remain a significant and unavoidable cumulative impact following implementation of NOI-MM-1. The cumulative composite noise impact during construction would be less than significant at the remaining identified sensitive receptors.

**Cumulative On-Road Construction Vibration Impacts**

Vibration levels from Project construction traffic in addition to cumulative construction traffic may negatively impact the vibration levels in the Project vicinity and contribute to vibration levels above the human annoyance threshold. This is considered a significant and unavoidable cumulative impact. However, the vibration building damage threshold is unlikely to be exceeded and would be cumulatively less than significant.

**Cumulative Operational Traffic Noise Impacts**

As discussed previously, if the total noise along the affected segment exceeds 70 dB CNEL (within the City's "normally unacceptable" noise compatibility category for noise-sensitive land uses), an increase of +3 dB CNEL in traffic noise would also be required for a significant impact because an increase of less than 3 dB is not perceptible to the human ear in an outdoor environment. An impact would also occur if an increase of +5 dB CNEL in traffic noise would occur, regardless of total noise level. The roadway segments of 4$^{th}$ Place east of Alameda, 7$^{th}$ Street from Mateo street to Santa Fe Avenue, 7$^{th}$ Street east of Santa Fe Avenue, and Molino Street south of E. 4$^{th}$ Street would experience a cumulative increase of 3.0 dBA or more. However, at the 7$^{th}$ Street and Molino Street segments, these increases of 3 dB or more would occur regardless of Project implementation and the Project would not substantially contribute to the increases. In addition, because the noise level on the 4$^{th}$ Place east of Alameda roadway segment is less than 70 dB CNEL, which is within the residential use "normally unacceptable" noise compatibility category, the sensitive land use (Art Share LA) along this segment would not be exposed to a significant noise level. In addition, none of the roadway segments would have an increase of 5 dBA or more. Therefore, the cumulative impacts would also be less than significant.

**Cumulative Stationary Source Noise Impacts**

As previously addressed, the LAMC limits stationary noise from select items such as HVAC and other rooftop-mounted equipment. Therefore, noise levels from such sources at the Project Site and at the Related Project locations at the property line would be less than significant based on required regulatory compliance. Furthermore, the rooftop-mounted equipment for the Project would be acoustically screened from nearby sensitive uses (NOI-PDF-6). Based on the Project's operational noise levels, the Project design, and requirements of the LAMC, cumulative stationary source noise impacts of the Project would be less than significant.

**Cumulative Operational Vibration Impacts**

There are no Related Projects that are close enough to the Project Site and that propose land uses with substantial vibration sources for vibration impacts to be a concern. Cumulative vibration impacts during operations would be less than significant.

## APPENDICES

## 4th and Hewitt Project Noise and Vibration Impact Analysis
## Appendix A: Construction Noise Levels
## Federal Highway Administration Roadway Construction Noise Model (FHWA RCNM)

| Receptor | Phase Name | Equipment | RCNM Equipment | Usage Factor* | Measured Noise at 50 feet (dBA Lmax)** | Average Noise Level at 50 feet (dBA Leq) | Quantity | Distance | Insertion Loss (dBA) | Individual Equipment Leq (dBA) | Full Quantity of Equipment Leq (dBA) | Project Construction Noise Level (dBA Leq) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 ft | Demolition | Dozer | Dozer | 40 | 82 | 78.0 | 1 | 50 | 0 | 78.0 | 78.0 | 85 |
| | | Concrete Saw | Concrete Saw | 20 | 90 | 83.0 | 1 | 50 | 0 | 83.0 | 83.0 | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 3 | 50 | 0 | 73.7 | 78.5 | |
| | Grading | Grader | Grader | 40 | 85 | 81.0 | 1 | 50 | 0 | 81.0 | 81.0 | 85 |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 3 | 50 | 0 | 73.7 | 78.5 | |
| | | Dozer | Dozer | 40 | 82 | 78.0 | 1 | 50 | 0 | 78.0 | 78.0 | |
| | | Excavator | Excavator | 40 | 81 | 77.0 | 1 | 50 | 0 | 77.0 | 77.0 | |
| | Building Construction | Forklift | Man Lift | 20 | 75 | 68.0 | 1 | 50 | 0 | 68.0 | 68.0 | 82 |
| | | Generator Set | Generator | 50 | 81 | 78.0 | 1 | 50 | 0 | 78.0 | 78.0 | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 50 | 0 | 73.7 | 73.7 | |
| | | Crane | Crane | 16 | 81 | 73.0 | 1 | 50 | 0 | 73.0 | 73.0 | |
| | | Welder | Welder/Torch | 46 | 74 | 70.6 | 3 | 50 | 0 | 70.6 | 75.4 | |
| | Paving | Paver | Paver | 50 | 77 | 74.0 | 1 | 50 | 0 | 74.0 | 74.0 | 81 |
| | | Cement Mixer | Vibratory Concrete Mixer | 20 | 80 | 73.0 | 1 | 50 | 0 | 73.0 | 73.0 | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 50 | 0 | 73.7 | 73.7 | |
| | | Paving Equipment | Paver | 40 | 76 | 72.0 | 1 | 50 | 0 | 72.0 | 72.0 | |
| | | Roller | Roller | 38 | 80 | 75.8 | 1 | 50 | 0 | 75.8 | 75.8 | |

Sources: Giroux & Associates and Envicom Corporation. January 2022.
FHWA. 2006. FHWA Roadway Construction Noise Model User's Guide: Final Report. January.

* Usage factor is the percentage of time the equipment operates at full power.
** Federal Highway Administration. 2006. Roadway Construction Noise Model User's Guide, January.

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## Appendix A: Construction Noise Levels
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| Receptor | Phase Name | Equipment | RCNM Equipment | Usage Factor* | Measured Noise at 50 feet (dBA Lmax)** | Average Noise Level at 50 feet (dBA Leq) | Quantity | Distance | Insertion Loss (dBA) | Individual Equipment Leq (dBA) | Full Quantity of Equipment Leq (dBA) | Project Construction Noise Level (dBA Leq) | Existing Ambient Noise Levels (dBA Leq) | Project Construction Equipment Plus Ambient (dBA Leq) | Project Increment (dBA Leq) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 428 S. Hewitt Street | Demolition | Dozer | Dozer | 40 | 82 | 78.0 | 1 | 80 | 0 | 73.9 | 73.9 | 81 | 65 | 81.1 | 16.1 |
| | | Concrete Saw | Concrete Saw | 20 | 90 | 83.0 | 1 | 80 | 0 | 78.9 | 78.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 3 | 80 | 0 | 69.6 | 74.4 | | | | |
| | Grading | Grader | Grader | 40 | 85 | 81.0 | 1 | 80 | 0 | 76.9 | 76.9 | 81 | 65 | 81.1 | 16.1 |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 3 | 80 | 0 | 69.6 | 74.4 | | | | |
| | | Dozer | Dozer | 40 | 82 | 78.0 | 1 | 80 | 0 | 73.9 | 73.9 | | | | |
| | | Excavator | Excavator | 40 | 81 | 77.0 | 1 | 80 | 0 | 72.9 | 72.9 | | | | |
| | Building Construction | Forklift | Man Lift | 20 | 75 | 68.0 | 1 | 80 | 0 | 63.9 | 63.9 | 78 | 65 | 78.2 | 13.2 |
| | | Generator Set | Generator | 50 | 81 | 78.0 | 1 | 80 | 0 | 73.9 | 73.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 80 | 0 | 69.6 | 69.6 | | | | |
| | | Crane | Crane | 16 | 81 | 73.0 | 1 | 80 | 0 | 69.0 | 69.0 | | | | |
| | | Welder | Welder/Torch | 46 | 74 | 70.6 | 3 | 80 | 0 | 66.5 | 71.3 | | | | |
| | Paving | Paver | Paver | 50 | 77 | 74.0 | 1 | 80 | 0 | 69.9 | 69.9 | 77 | 65 | 77.3 | 12.3 |
| | | Cement Mixer | Vibratory Concrete Mixer | 20 | 80 | 73.0 | 1 | 80 | 0 | 68.9 | 68.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 80 | 0 | 69.6 | 69.6 | | | | |
| | | Paving Equipment | Paver | 40 | 76 | 72.0 | 1 | 80 | 0 | 67.9 | 67.9 | | | | |
| | | Roller | Roller | 38 | 80 | 75.8 | 1 | 80 | 0 | 71.7 | 71.7 | | | | |

Source: Giroux & Associates and Envicom Corporation. January 2022.
FHWA. 2006. FHWA Roadway Construction Noise Model User's Guide: Final Report. January.

* Usage factor is the percentage of time the equipment operates at full power.
** Federal Highway Administration. 2006. Roadway Construction Noise Model User's Guide, January.

# 4th and Hewitt Project Noise and Vibration Impact Analysis
## Appendix A: Construction Noise Levels
## Federal Highway Administration Roadway Construction Noise Model (FHWA RCNM)

| Receptor | Phase Name | Equipment | RCNM Equipment | Usage Factor* | Measured Noise at 50 feet (dBA Lmax)** | Average Noise Level at 50 feet (dBA Leq) | Quantity | Distance | Insertion Loss (dBA) *** | Individual Equipment Leq (dBA) | Full Quantity of Equipment Leq (dBA) | Project Construction Noise Level (dBA Leq) | Existing Ambient Noise Levels (dBA Leq) | Project Construction Equipment Plus Ambient (dBA Leq) | Project Increment (dBA Leq) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 825 E. 4th Street | Demolition | Dozer | Dozer | 40 | 82 | 78.0 | 1 | 200 | 10 | 56.0 | 56.0 | 63 | 74 | 74.3 | 0.3 |
| | | Concrete Saw | Concrete Saw | 20 | 90 | 83.0 | 1 | 200 | 10 | 61.0 | 61.0 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 3 | 200 | 10 | 51.6 | 56.4 | | | | |
| | Grading | Grader | Grader | 40 | 85 | 81.0 | 1 | 200 | 10 | 59.0 | 59.0 | 63 | 74 | 74.3 | 0.3 |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 3 | 200 | 10 | 51.6 | 56.4 | | | | |
| | | Dozer | Dozer | 40 | 82 | 78.0 | 1 | 200 | 10 | 56.0 | 56.0 | | | | |
| | | Excavator | Excavator | 40 | 81 | 77.0 | 1 | 200 | 10 | 55.0 | 55.0 | | | | |
| | Building Construction | Forklift | Man Lift | 20 | 75 | 68.0 | 1 | 200 | 0 | 56.0 | 56.0 | 70 | 74 | 75.5 | 1.5 |
| | | Generator Set | Generator | 50 | 81 | 78.0 | 1 | 200 | 0 | 65.9 | 65.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 200 | 0 | 61.6 | 61.6 | | | | |
| | | Crane | Crane | 16 | 81 | 73.0 | 1 | 200 | 0 | 61.0 | 61.0 | | | | |
| | | Welder | Welder/Torch | 46 | 74 | 70.6 | 3 | 200 | 0 | 58.6 | 63.4 | | | | |
| | Paving | Paver | Paver | 50 | 77 | 74.0 | 1 | 200 | 0 | 61.9 | 61.9 | 69 | 74 | 75.2 | 1.2 |
| | | Cement Mixer | Vibratory Concrete Mixer | 20 | 80 | 73.0 | 1 | 200 | 0 | 61.0 | 61.0 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 200 | 0 | 61.6 | 61.6 | | | | |
| | | Paving Equipment | Paver | 40 | 76 | 72.0 | 1 | 200 | 0 | 60.0 | 60.0 | | | | |
| | | Roller | Roller | 38 | 80 | 75.8 | 1 | 200 | 0 | 63.8 | 63.8 | | | | |

Source: Giroux & Associates and Envicom Corporation. January 2022.
FHWA. 2006. FHWA Roadway Construction Noise Model User's Guide: Final Report. January.

* Usage factor is the percentage of time the equipment operates at full power.
** Federal Highway Administration. 2006. Roadway Construction Noise Model User's Guide, January.
***Receptors are partially shielded from the Project construction Site by multiple existing buildings. A 10 dBA reduction by shielding was taken but only during grading and demolition while equipment operates at ground level, based on guidance from the FHWA Manual for Highway Noise and Land Use (Federal Highway Administration. The Audible Landscape: A Manual for Highway Noise and Land Use. https://www.fhwa.dot.gov/ENVIRonment/noise/noise_compatible_planning/federal_approach/audible_landscape/al04.cfm. Accessed April 7, 2021). No reduction during construction phase was taken where the work height can be 18-stories high.

## 4th and Hewitt Project Noise and Vibration Impact Analysis
## Appendix A: Construction Noise Levels
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| Receptor | Phase Name | Equipment | RCNM Equipment | Usage Factor* | Measured Noise at 50 feet (dBA Lmax)** | Average Noise Level at 50 feet (dBA Leq) | Quantity | Distance | Insertion Loss (dBA) *** | Individual Equipment Leq (dBA) | Full Quantity of Equipment Leq (dBA) | Project Construction Noise Level (dBA Leq) | Existing Ambient Noise Levels (dBA Leq) | Project Construction Equipment Plus Ambient (dBA Leq) | Project Increment (dBA Leq) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 442 Colyton Street | Demolition | Dozer | Dozer | 40 | 82 | 78.0 | 1 | 200 | 10 | 56.0 | 56.0 | 63 | 65 | 67.1 | 2.1 |
| | | Concrete Saw | Concrete Saw | 20 | 90 | 83.0 | 1 | 200 | 10 | 61.0 | 61.0 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 3 | 200 | 10 | 51.6 | 56.4 | | | | |
| | Grading | Grader | Grader | 40 | 85 | 81.0 | 1 | 200 | 10 | 59.0 | 59.0 | 63 | 65 | 67.1 | 2.1 |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 3 | 200 | 10 | 51.6 | 56.4 | | | | |
| | | Dozer | Dozer | 40 | 82 | 78.0 | 1 | 200 | 10 | 56.0 | 56.0 | | | | |
| | | Excavator | Excavator | 40 | 81 | 77.0 | 1 | 200 | 10 | 55.0 | 55.0 | | | | |
| | Building Construction | Forklift | Man Lift | 20 | 75 | 68.0 | 1 | 200 | 0 | 56.0 | 56.0 | 70 | 65 | 71.2 | 6.2 |
| | | Generator Set | Generator | 50 | 81 | 78.0 | 1 | 200 | 0 | 65.9 | 65.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 200 | 0 | 61.6 | 61.6 | | | | |
| | | Crane | Crane | 16 | 81 | 73.0 | 1 | 200 | 0 | 61.0 | 61.0 | | | | |
| | | Welder | Welder/Torch | 46 | 74 | 70.6 | 3 | 200 | 0 | 58.6 | 63.4 | | | | |
| | Paving | Paver | Paver | 50 | 77 | 74.0 | 1 | 200 | 0 | 61.9 | 61.9 | 69 | 65 | 70.5 | 5.5 |
| | | Cement Mixer | Vibratory Concrete Mixer | 20 | 80 | 73.0 | 1 | 200 | 0 | 61.0 | 61.0 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 200 | 0 | 61.6 | 61.6 | | | | |
| | | Paving Equipment | Paver | 40 | 76 | 72.0 | 1 | 200 | 0 | 60.0 | 60.0 | | | | |
| | | Roller | Roller | 38 | 80 | 75.8 | 1 | 200 | 0 | 63.8 | 63.8 | | | | |

Source: Giroux & Associates and Envicom Corporation. January 2022.
FHWA. 2006. FHWA Roadway Construction Noise Model User's Guide: Final Report. January.

* Usage factor is the percentage of time the equipment operates at full power.
** Federal Highway Administration. 2006. Roadway Construction Noise Model User's Guide, January.
***Receptors are partially shielded from the Project construction Site by multiple existing buildings. A 10 dBA reduction by shielding was taken but only during grading and demolition while equipment operates at ground level, based on guidance from the FHWA Manual for Highway Noise and Land Use (Federal Highway Administration. The Audible Landscape: A Manual for Highway Noise and Land Use. https://www.fhwa.dot.gov/ENVIRonment/noise/noise_compatible_planning/federal_approach/audible_landscape/al04.cfm. Accessed April 7, 2021). No reduction during construction phase was taken where the work height can be 18-stories high.

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## Appendix A: Construction Noise Levels
## Federal Highway Administration Roadway Construction Noise Model (FHWA RCNM)

| Receptor | Phase Name | Equipment | RCNM Equipment | Usage Factor* | Measured Noise at 50 feet (dBA Lmax)** | Average Noise Level at 50 feet (dBA Leq) | Quantity | Distance | Insertion Loss (dBA) *** | Individual Equipment Leq (dBA) | Full Quantity of Equipment Leq (dBA) | Project Construction Noise Level (dBA Leq) | Existing Ambient Noise Levels (dBA Leq) | Project Construction Equipment Plus Ambient (dBA Leq) | Project Increment (dBA Leq) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 449. S. Hewitt Street Colyton Street | Demolition | Dozer | Dozer | 40 | 82 | 78.0 | 1 | 200 | 10 | 56.0 | 56.0 | 63 | 65 | 67.1 | 2.1 |
| | | Concrete Saw | Concrete Saw | 20 | 90 | 83.0 | 1 | 200 | 10 | 61.0 | 61.0 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 3 | 200 | 10 | 51.6 | 56.4 | | | | |
| | Grading | Grader | Grader | 40 | 85 | 81.0 | 1 | 200 | 10 | 59.0 | 59.0 | 63 | 65 | 67.1 | 2.1 |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 3 | 200 | 10 | 51.6 | 56.4 | | | | |
| | | Dozer | Dozer | 40 | 82 | 78.0 | 1 | 200 | 10 | 56.0 | 56.0 | | | | |
| | | Excavator | Excavator | 40 | 81 | 77.0 | 1 | 200 | 10 | 55.0 | 55.0 | | | | |
| | Building Construction | Forklift | Man Lift | 20 | 75 | 68.0 | 1 | 200 | 0 | 56.0 | 56.0 | 70 | 65 | 71.2 | 6.2 |
| | | Generator Set | Generator | 50 | 81 | 78.0 | 1 | 200 | 0 | 65.9 | 65.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 200 | 0 | 61.6 | 61.6 | | | | |
| | | Crane | Crane | 16 | 81 | 73.0 | 1 | 200 | 0 | 61.0 | 61.0 | | | | |
| | | Welder | Welder/Torch | 46 | 74 | 70.6 | 3 | 200 | 0 | 58.6 | 63.4 | | | | |
| | Paving | Paver | Paver | 50 | 77 | 74.0 | 1 | 200 | 0 | 61.9 | 61.9 | 69 | 65 | 70.5 | 5.5 |
| | | Cement Mixer | Vibratory Concrete Mixer | 20 | 80 | 73.0 | 1 | 200 | 0 | 61.0 | 61.0 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 200 | 0 | 61.6 | 61.6 | | | | |
| | | Paving Equipment | Paver | 40 | 76 | 72.0 | 1 | 200 | 0 | 60.0 | 60.0 | | | | |
| | | Roller | Roller | 38 | 80 | 75.8 | 1 | 200 | 0 | 63.8 | 63.8 | | | | |

Source: Giroux & Associates and Envicom Corporation. January 2022.
FHWA. 2006. FHWA Roadway Construction Noise Model User's Guide: Final Report. January.

* Usage factor is the percentage of time the equipment operates at full power.
** Federal Highway Administration. 2006. Roadway Construction Noise Model User's Guide, January.
***Receptors are partially shielded from the Project construction Site by multiple existing buildings. A 10 dBA reduction by shielding was taken but only during grading and demolition while equipment operates at ground level, based on guidance from the FHWA Manual for Highway Noise and Land Use (Federal Highway Administration. The Audible Landscape: A Manual for Highway Noise and Land Use. https://www.fhwa.dot.gov/ENVIRonment/noise/noise_compatible_planning/federal_approach/audible_landscape/al04.cfm. Accessed April 7, 2021). No reduction during construction phase was taken where the work height can be 18-stories high.

# 4th and Hewitt Project Noise and Vibration Impact Analysis
## Appendix A: Construction Noise Levels
## Federal Highway Administration Roadway Construction Noise Model (FHWA RCNM)

| Receptor | Phase Name | Equipment | RCNM Equipment | Usage Factor* | Measured Noise at 50 feet (dBA Lmax)** | Average Noise Level at 50 feet (dBA Leq) | Quantity | Distance | Insertion Loss (dBA) *** | Individual Equipment Leq (dBA) | Full Quantity of Equipment Leq (dBA) | Project Construction Noise Level (dBA Leq) | Existing Ambient Noise Levels (dBA Leq) | Project Construction Equipment Plus Ambient (dBA Leq) | Project Increment (dBA Leq) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Art Share LA at 801 E 4th Place | Demolition | Dozer | Dozer | 40 | 82 | 78.0 | 1 | 350 | 10 | 51.1 | 51.1 | 58 | 74 | 74.1 | 0.1 |
| | | Concrete Saw | Concrete Saw | 20 | 90 | 83.0 | 1 | 350 | 10 | 56.1 | 56.1 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 3 | 350 | 10 | 46.8 | 51.6 | | | | |
| | Grading | Grader | Grader | 40 | 85 | 81.0 | 1 | 350 | 10 | 54.1 | 54.1 | 58 | 74 | 74.1 | 0.1 |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 3 | 350 | 10 | 46.8 | 51.6 | | | | |
| | | Dozer | Dozer | 40 | 82 | 78.0 | 1 | 350 | 10 | 51.1 | 51.1 | | | | |
| | | Excavator | Excavator | 40 | 81 | 77.0 | 1 | 350 | 10 | 50.1 | 50.1 | | | | |
| | Building Construction | Forklift | Man Lift | 20 | 75 | 68.0 | 1 | 350 | 0 | 51.1 | 51.1 | 65 | 74 | 74.5 | 0.5 |
| | | Generator Set | Generator | 50 | 81 | 78.0 | 1 | 350 | 0 | 61.1 | 61.1 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 350 | 0 | 56.8 | 56.8 | | | | |
| | | Crane | Crane | 16 | 81 | 73.0 | 1 | 350 | 0 | 56.1 | 56.1 | | | | |
| | | Welder | Welder/Torch | 46 | 74 | 70.6 | 3 | 350 | 0 | 53.7 | 58.5 | | | | |
| | Paving | Paver | Paver | 50 | 77 | 74.0 | 1 | 350 | 0 | 57.1 | 57.1 | 64 | 74 | 74.4 | 0.4 |
| | | Cement Mixer | Vibratory Concrete Mixer | 20 | 80 | 73.0 | 1 | 350 | 0 | 56.1 | 56.1 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 350 | 0 | 56.8 | 56.8 | | | | |
| | | Paving Equipment | Paver | 40 | 76 | 72.0 | 1 | 350 | 0 | 55.1 | 55.1 | | | | |
| | | Roller | Roller | 38 | 80 | 75.8 | 1 | 350 | 0 | 58.9 | 58.9 | | | | |

Source: Giroux & Associates and Envicom Corporation. January 2022.
FHWA. 2006. FHWA Roadway Construction Noise Model User's Guide: Final Report. January.

* Usage factor is the percentage of time the equipment operates at full power.
** Federal Highway Administration. 2006. Roadway Construction Noise Model User's Guide, January.
***Receptors are partially shielded from the Project construction Site by multiple existing buildings. A 10 dBA reduction by shielding was taken but only during grading and demolition while equipment operates at ground level, based on guidance from the FHWA Manual for Highway Noise and Land Use (Federal Highway Administration. The Audible Landscape: A Manual for Highway Noise and Land Use. https://www.fhwa.dot.gov/ENVIRonment/noise/noise_compatible_planning/federal_approach/audible_landscape/al04.cfm. Accessed April 7, 2021). No reduction during construction phase was taken where the work height can be 18-stories high.

# Federal Highway Administration Roadway Construction Noise Model (FHWA RCNM)

| Composite Construction Noise Levels | | | | | | |
|---|---|---|---|---|---|---|
| **Receptor** | **Ambient (dBA Leq)** | **Construction Noise (dBA Leq)** | **Maximum Construction Vehicle (Haul Truck) Noise (dBA Leq)** | **New Ambient (dBA Leq)** | **Increase (dBA Leq)** | **Exceeds 5 dBA Threshold?** |
| 428 S. Hewitt Street | 65 | 81 | 63 | 81.2 | 16.2 | Yes |
| 825 E. 4th Street | 74 | 70 | 63 | 75.7 | 1.7 | No |
| 442 Colyton Street | 65 | 70 | 63 | 71.8 | 6.8 | Yes |
| 449 S. Hewitt Street | 65 | 70 | 63 | 71.8 | 6.8 | Yes |
| Art Share LA at 801 E. 4th | 74 | 65 | 63 | 74.8 | 0.8 | No |

Source: Giroux & Associates and Envicom Corporation. February 2022.

| Composite Construction Noise Levels st 428 S/ Hewitt Street | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Receptor** | **Phase** | **Ambient (dBA Leq)** | **Construction Noise (dBA Leq)** | **Maximum Construction Vehicle (Haul Truck) Noise (dBA Leq)** | **New Ambient (dBA Leq)** | **Increase (dBA Leq)** | **Exceeds 5 dBA Threshold?** |
| 428 S. Hewitt Street | Demolition | 65 | 81 | 63 | 81 | 16.3 | Yes |
| | Grading | 65 | 81 | 63 | 81 | 16.0 | Yes |
| | Building Construction | 65 | 78 | 63 | 78 | 13.0 | Yes |
| | Paving | 65 | 77 | 63 | 77 | 12.2 | Yes |

Source: Giroux & Associates and Envicom Corporation. February 2022.

# 4th and Hewitt Project Noise and Vibration Impact Analysis
## Appendix B-1: Mitigated Off-Road Construction Equipment Noise Levels
## Federal Highway Administration Roadway Construction Noise Model (FHWA RCNM)

| Receptor | Phase Name | Equipment | RCNM Equipment | Usage Factor* | Measured Noise at 50 feet (dBA Lmax)** | Average Noise Level at 50 feet (dBA Leq) | Quantity | Distance | Insertion Loss (dBA) *** | Individual Equipment Leq (dBA) | Full Quantity of Equipment Leq (dBA) | Project Construction Noise Level (dBA Leq) | Existing Ambient Noise Levels (dBA Leq) | Project Construction Plus Ambient (dBA Leq) | Project Increment (dBA Leq) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 428 S. Hewitt Street with On-site Ground Floor Barrier | Demolition | Dozer | Dozer | 40 | 82 | 78.0 | 1 | 80 | 15 | 58.9 | 58.9 | 66 | 65 | 68.5 | 3.5 |
| | | Concrete Saw | Concrete Saw | 20 | 90 | 83.0 | 1 | 80 | 15 | 63.9 | 63.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 3 | 80 | 15 | 54.6 | 59.4 | | | | |
| | Grading | Grader | Grader | 40 | 85 | 81.0 | 1 | 80 | 15 | 61.9 | 61.9 | 66 | 65 | 68.5 | 3.5 |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 3 | 80 | 15 | 54.6 | 59.4 | | | | |
| | | Dozer | Dozer | 40 | 82 | 78.0 | 1 | 80 | 15 | 58.9 | 58.9 | | | | |
| | | Excavator | Excavator | 40 | 81 | 77.0 | 1 | 80 | 15 | 57.9 | 57.9 | | | | |
| | Building Construction (1st Floor) | Forklift | Man Lift | 20 | 75 | 68.0 | 1 | 80 | 15 | 48.9 | 48.9 | 63 | 65 | 67.1 | 2.1 |
| | | Generator Set | Generator | 50 | 81 | 78.0 | 1 | 80 | 15 | 58.9 | 58.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 80 | 15 | 54.6 | 54.6 | | | | |
| | | Crane | Crane | 16 | 81 | 73.0 | 1 | 80 | 15 | 54.0 | 54.0 | | | | |
| | | Welder | Welder/Torch | 46 | 74 | 70.6 | 3 | 80 | 15 | 51.5 | 56.3 | | | | |
| | Building Construction (2nd-18th Floors) [1] | Forklift | Man Lift | 20 | 75 | 68.0 | 1 | 80 | 15 | 48.9 | 48.9 | 74 | 65 | 74.5 | 9.5 |
| | | Generator Set | Generator | 50 | 81 | 78.0 | 1 | 80 | 15 | 58.9 | 58.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 80 | 15 | 54.6 | 54.6 | | | | |
| | | Crane | Crane | 16 | 81 | 73.0 | 1 | 80 | 0 | 69.0 | 69.0 | | | | |
| | | Welder | Welder/Torch | 46 | 74 | 70.6 | 3 | 80 | 0 | 66.5 | 71.3 | | | | |
| | Paving (1st Floor) | Paver | Paver | 50 | 77 | 74.0 | 1 | 80 | 15 | 54.9 | 54.9 | 62 | 65 | 66.8 | 1.8 |
| | | Cement Mixer | Vibratory Concrete Mixer | 20 | 80 | 73.0 | 1 | 80 | 15 | 53.9 | 53.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 80 | 15 | 54.6 | 54.6 | | | | |
| | | Paving Equipment | Paver | 40 | 76 | 72.0 | 1 | 80 | 15 | 52.9 | 52.9 | | | | |
| | | Roller | Roller | 38 | 80 | 75.8 | 1 | 80 | 15 | 56.7 | 56.7 | | | | |
| | Paving (2nd-5th Floors) [2] | Paver | Paver | 50 | 77 | 74.0 | 1 | 80 | 0 | 69.9 | 69.9 | 76 | 65 | 76.3 | 11.3 |
| | | Cement Mixer | Vibratory Concrete Mixer | 20 | 80 | 73.0 | 1 | 80 | 0 | 68.9 | 68.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 80 | 15 | 54.6 | 54.6 | | | | |
| | | Paving Equipment | Paver | 40 | 76 | 72.0 | 1 | 80 | 0 | 67.9 | 67.9 | | | | |
| | | Roller | Roller | 38 | 80 | 75.8 | 1 | 80 | 0 | 71.7 | 71.7 | | | | |

Source: Giroux & Associates and Envicom Corporation. January 2022.
FHWA. 2006. FHWA Roadway Construction Noise Model User's Guide: Final Report. January.

* Usage factor is the percentage of time the equipment operates at full power.
** Federal Highway Administration. 2006. Roadway Construction Noise Model User's Guide, January.
***Barrier insertion loss was subtracted where applicable, based on equations for barrier insertion loss from Federal Transit Administration. 2018. Transit Noise and Vibration Impact Assessment Manual.
[1] When building construction occurs at upper floors, it was assumed that forklifts, generator sets, and loader/backhoes would remain at the ground floor and be shielded, while the work-tool interaction of the crane and the welders would occur above ground level and be unshielded.
[2] When paving occurs at upper floors, it was assumed loader/backhoes would remain at the ground floor and be shielded, while the remaining equipment would operate above ground level and be unshielded.

# 4th and Hewitt Project Noise and Vibration Impact Analysis
## Appendix B-1: Mitigated Off-Road Construction Equipment Noise Levels
## Federal Highway Administration Roadway Construction Noise Model (FHWA RCNM)

| Receptor | Phase Name | Equipment | RCNM Equipment | Usage Factor* | Measured Noise at 50 feet (dBA Lmax)** | Average Noise Level at 50 feet (dBA Leq) | Quantity | Distance | Insertion Loss (dBA) *** | Individual Equipment Leq (dBA) | Full Quantity of Equipment Leq (dBA) | Project Construction Noise Level (dBA Leq) | Existing Ambient Noise Levels (dBA Leq) | Project Construction Plus Ambient (dBA Leq) | Project Increment (dBA Leq) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 428 S. Hewitt Street with Off-Site Rooftop Barrier | Demolition | Dozer | Dozer | 40 | 82 | 78.0 | 1 | 80 | 10 | 63.9 | 63.9 | 71 | 65 | 72.0 | 7.0 |
| | | Concrete Saw | Concrete Saw | 20 | 90 | 83.0 | 1 | 80 | 10 | 68.9 | 68.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 3 | 80 | 10 | 59.6 | 64.4 | | | | |
| | Grading | Grader | Grader | 40 | 85 | 81.0 | 1 | 80 | 10 | 66.9 | 66.9 | 71 | 65 | 72.0 | 7.0 |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 3 | 80 | 10 | 59.6 | 64.4 | | | | |
| | | Dozer | Dozer | 40 | 82 | 78.0 | 1 | 80 | 10 | 63.9 | 63.9 | | | | |
| | | Excavator | Excavator | 40 | 81 | 77.0 | 1 | 80 | 10 | 62.9 | 62.9 | | | | |
| | Building Construction (1st Floor) | Forklift | Man Lift | 20 | 75 | 68.0 | 1 | 80 | 10 | 53.9 | 53.9 | 68 | 65 | 69.8 | 4.8 |
| | | Generator Set | Generator | 50 | 81 | 78.0 | 1 | 80 | 10 | 63.9 | 63.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 80 | 10 | 59.6 | 59.6 | | | | |
| | | Crane | Crane | 16 | 81 | 73.0 | 1 | 80 | 10 | 59.0 | 59.0 | | | | |
| | | Welder | Welder/Torch | 46 | 74 | 70.6 | 3 | 80 | 10 | 56.5 | 61.3 | | | | |
| | Building Construction (2nd-18th Floors) [1] | Forklift | Man Lift | 20 | 75 | 68.0 | 1 | 80 | 10 | 53.9 | 53.9 | 74 | 65 | 74.5 | 9.5 |
| | | Generator Set | Generator | 50 | 81 | 78.0 | 1 | 80 | 10 | 63.9 | 63.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 80 | 10 | 59.6 | 59.6 | | | | |
| | | Crane | Crane | 16 | 81 | 73.0 | 1 | 80 | 0 | 69.0 | 69.0 | | | | |
| | | Welder | Welder/Torch | 46 | 74 | 70.6 | 3 | 80 | 0 | 66.5 | 71.3 | | | | |
| | Paving (1st Floor) | Paver | Paver | 50 | 77 | 74.0 | 1 | 80 | 10 | 59.9 | 59.9 | 67 | 65 | 69.1 | 4.1 |
| | | Cement Mixer | Vibratory Concrete Mixer | 20 | 80 | 73.0 | 1 | 80 | 10 | 58.9 | 58.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 80 | 10 | 59.6 | 59.6 | | | | |
| | | Paving Equipment | Paver | 40 | 76 | 72.0 | 1 | 80 | 10 | 57.9 | 57.9 | | | | |
| | | Roller | Roller | 38 | 80 | 75.8 | 1 | 80 | 10 | 61.7 | 61.7 | | | | |
| | Paving (2nd-5th Floors) [2] | Paver | Paver | 50 | 77 | 74.0 | 1 | 80 | 0 | 69.9 | 69.9 | 76 | 65 | 76.3 | 11.3 |
| | | Cement Mixer | Vibratory Concrete Mixer | 20 | 80 | 73.0 | 1 | 80 | 0 | 68.9 | 68.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 80 | 10 | 59.6 | 59.6 | | | | |
| | | Paving Equipment | Paver | 40 | 76 | 72.0 | 1 | 80 | 0 | 67.9 | 67.9 | | | | |
| | | Roller | Roller | 38 | 80 | 75.8 | 1 | 80 | 0 | 71.7 | 71.7 | | | | |

Source: Giroux & Associates and Envicom Corporation. January 2022.
FHWA. 2006. FHWA Roadway Construction Noise Model User's Guide: Final Report. January.

* Usage factor is the percentage of time the equipment operates at full power.
** Federal Highway Administration. 2006. Roadway Construction Noise Model User's Guide, January.
***Barrier insertion loss was subtracted where applicable, based on equations for barrier insertion loss from Federal Transit Administration. 2018. Transit Noise and Vibration Impact Assessment Manual.
[1] When building construction occurs at upper floors, it was assumed that forklifts, generator sets, and loader/backhoes would remain at the ground floor and be shielded, while the work-tool interaction of the crane and the welders would occur above ground level and be unshielded.
[2] When paving occurs at upper floors, it was assumed loader/backhoes would remain at the ground floor and be shielded, while the remaining equipment would operate above ground level and be unshielded.

# 4th and Hewitt Project Noise and Vibration Impact Analysis
## Appendix B-1: Mitigated Off-Road Construction Equipment Noise Levels
## Federal Highway Administration Roadway Construction Noise Model (FHWA RCNM)

| Receptor | Phase Name | Equipment | RCNM Equipment | Usage Factor* | Measured Noise at 50 feet (dBA Lmax)** | Average Noise Level at 50 feet (dBA Leq) | Quantity | Distance | Insertion Loss (dBA) *** | Individual Equipment Leq (dBA) | Full Quantity of Equipment Leq (dBA) | Project Construction Noise Level (dBA Leq) | Existing Ambient Noise Levels (dBA Leq) | Project Construction Plus Ambient (dBA Leq) | Project Increment (dBA Leq) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 428 S. Hewitt Street with On-Site Ground Floor Barrier and Off-Site Rooftop Barrier | Demolition | Dozer | Dozer | 40 | 82 | 78.0 | 1 | 80 | 25 | 48.9 | 48.9 | 56 | 65 | 65.5 | 0.5 |
| | | Concrete Saw | Concrete Saw | 20 | 90 | 83.0 | 1 | 80 | 25 | 53.9 | 53.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 3 | 80 | 25 | 44.6 | 49.4 | | | | |
| | Grading | Grader | Grader | 40 | 85 | 81.0 | 1 | 80 | 25 | 51.9 | 51.9 | 56 | 65 | 65.5 | 0.5 |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 3 | 80 | 25 | 44.6 | 49.4 | | | | |
| | | Dozer | Dozer | 40 | 82 | 78.0 | 1 | 80 | 25 | 48.9 | 48.9 | | | | |
| | | Excavator | Excavator | 40 | 81 | 77.0 | 1 | 80 | 25 | 47.9 | 47.9 | | | | |
| | Building Construction (1st Floor) | Forklift | Man Lift | 20 | 75 | 68.0 | 1 | 80 | 25 | 38.9 | 38.9 | 53 | 65 | 65.3 | 0.3 |
| | | Generator Set | Generator | 50 | 81 | 78.0 | 1 | 80 | 25 | 48.9 | 48.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 80 | 25 | 44.6 | 44.6 | | | | |
| | | Crane | Crane | 16 | 81 | 73.0 | 1 | 80 | 25 | 44.0 | 44.0 | | | | |
| | | Welder | Welder/Torch | 46 | 74 | 70.6 | 3 | 80 | 25 | 41.5 | 46.3 | | | | |
| | Building Construction (2nd-18th Floors) [1] | Forklift | Man Lift | 20 | 75 | 68.0 | 1 | 80 | 25 | 38.9 | 38.9 | 73 | 65 | 73.6 | 8.6 |
| | | Generator Set | Generator | 50 | 81 | 78.0 | 1 | 80 | 25 | 48.9 | 48.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 80 | 25 | 44.6 | 44.6 | | | | |
| | | Crane | Crane | 16 | 81 | 73.0 | 1 | 80 | 0 | 69.0 | 69.0 | | | | |
| | | Welder | Welder/Torch | 46 | 74 | 70.6 | 3 | 80 | 0 | 66.5 | 71.3 | | | | |
| | Paving (1st Floor) | Paver | Paver | 50 | 77 | 74.0 | 1 | 80 | 25 | 44.9 | 44.9 | 52 | 65 | 65.2 | 0.2 |
| | | Cement Mixer | Vibratory Concrete Mixer | 20 | 80 | 73.0 | 1 | 80 | 25 | 43.9 | 43.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 80 | 25 | 44.6 | 44.6 | | | | |
| | | Paving Equipment | Paver | 40 | 76 | 72.0 | 1 | 80 | 25 | 42.9 | 42.9 | | | | |
| | | Roller | Roller | 38 | 80 | 75.8 | 1 | 80 | 25 | 46.7 | 46.7 | | | | |
| | Paving (2nd-5th Floors) [2] | Paver | Paver | 50 | 77 | 74.0 | 1 | 80 | 0 | 69.9 | 69.9 | 76 | 65 | 76.3 | 11.3 |
| | | Cement Mixer | Vibratory Concrete Mixer | 20 | 80 | 73.0 | 1 | 80 | 0 | 68.9 | 68.9 | | | | |
| | | Loader/Backhoe | Backhoe | 37 | 78 | 73.7 | 1 | 80 | 25 | 44.6 | 44.6 | | | | |
| | | Paving Equipment | Paver | 40 | 76 | 72.0 | 1 | 80 | 0 | 67.9 | 67.9 | | | | |
| | | Roller | Roller | 38 | 80 | 75.8 | 1 | 80 | 0 | 71.7 | 71.7 | | | | |

Source: Giroux & Associates and Envicom Corporation. January 2022.
FHWA. 2006. FHWA Roadway Construction Noise Model User's Guide: Final Report. January.

* Usage factor is the percentage of time the equipment operates at full power.
** Federal Highway Administration. 2006. Roadway Construction Noise Model User's Guide, January.
***Barrier insertion loss was subtracted where applicable, based on equations for barrier insertion loss from Federal Transit Administration. 2018. Transit Noise and Vibration Impact Assessment Manual.
[1] When building construction occurs at upper floors, it was assumed that forklifts, generator sets, and loader/backhoes would remain at the ground floor and be shielded, while the work-tool interaction of the crane and the welders would occur above ground level and be unshielded.
[2] When paving occurs at upper floors, it was assumed loader/backhoes would remain at the ground floor and be shielded, while the remaining equipment would operate above ground level and be unshielded.

# 4th and Hewitt Project Noise and Vibration Impact Analysis
## Appendix B-2: Noise Barrier Calculations

| Receptor | 428 S. Hewitt Street (Rooftop Trailer) | | |
|---|---|---|---|
| **Barrier Location** | **On-Site Ground Floor** | | **Off-Site Rooftop Barrier** |
| Barrier Height (ft) | 24 | | 4 |
| Barrier Elevation (ft) | 0 | | 24 |
| Source Height (ft) | 6.8 | | 6.8 |
| Source Elevation (ft) | 0 | | 0 |
| Receptor Height (ft) | 5 | | 5 |
| Receptor Elevation (ft) | 24 | | 24 |
| Receptor to Barrier Distance (Horizontal) (ft) | 80 | | 16 |
| Source to Barrier Distance (Horizontal) (ft) | 20 | | 60 |
| Source to Receptor Distance (Horizontal) (ft) | 100 | | 76 |
| | | | |
| A (direct source to barrier path) (ft) | 26.4 | | 63.6 |
| B (direct barrier to receiver path) (ft) | 80.2 | | 16.0 |
| C (source to receiver path) (ft) | 102.4 | | 79.2 |
| P (Barrier Parameter) | 4.1 | | 0.5 |
| Heff, No Barrier | 5.9 | | 17.9 |
| G, No Barrier | 0.0 | | 0.0 |
| Heff, Barrier | 29.9 | | 21.9 |
| G, Barrier | 0.0 | | 0.0 |
| | | | |
| $A_{barrier}$ (dBA) | 15 | | 10 |
| **Barrier Insertion Loss (dBA)** | **15** | | **10** |

Source: Envicom Corporation, January 2022.
Calculations based on: Federal Transit Administration. 2018. Transit Noise and Vibration Impact Assessment Manual. September.

# 4th and Hewitt Project Noise and Vibration Impact Analysis
# Appendix B-3: Mitigated Composite Construction Noise Levels

| Receptor | Phase Name | Existing Ambient Noise Levels (dBA Leq) | Mitigated Off-Road Construction Equipment Noise Level (dBA Leq) | Maximum On-Road Construction Vehicle Noise (dBA Leq) | Mitigated Composite Construction Noise Level (dBA Leq) | Ambient with Project Construction (dBA Leq) | Project Increment (dBA Leq) |
|---|---|---|---|---|---|---|---|
| 428 S. Hewitt Street with On-site Ground Floor Barrier | Demolition | 65 | 66 | 63 | 68 | 69.7 | 4.7 |
| | Grading | 65 | 66 | 63 | 68 | 69.5 | 4.5 |
| | Building Construction (1st Floor) | 65 | 63 | 63 | 66 | 68.4 | 3.4 |
| | Building Construction (2nd-18th Floors) [1] | 65 | 74 | 63 | 74 | 74.4 | **9.4** * |
| | Paving (1st Floor) | 65 | 62 | 63 | 65 | 68.2 | 3.2 |
| | Paving (2nd-5th Floors) [2] | 65 | 76 | 63 | **76** | 76.4 | **11.4** |

Source: Giroux & Associates and Envicom Corporation. January 2022.
Note: Barrier insertion loss was subtracted where applicable, based on equations for barrier insertion loss from the Federal Transit Administration. 2018. Transit Noise and Vibration Impact Assessment Manual.
[1] When building construction occurs at upper floors, it was assumed that forklifts, generator sets, and loader/backhoes would remain at the ground floor and be shielded, while the work-tool interaction of the crane and the welders would occur above ground level and be unshielded.
[2] When paving occurs at upper floors, it was assumed loader/backhoes would remain at the ground floor and be shielded, while the remaining equipment would operate above ground level and be unshielded.
* Numbers in bold indicate an exceedance of the construction noise threshold due to the generation of noise levels above 75 dBA at a sensitive receptor or due to a 5 dBA or more exceedance of existing ambient exterior noise levels at a sensitive receptor during operations lasting more than 10 days.

| Receptor | Phase Name | Existing Ambient Noise Levels (dBA Leq) | Mitigated Off-Road Construction Equipment Noise Level (dBA Leq) | Maximum On-Road Construction Vehicle Noise (dBA Leq) | Mitigated Composite Construction Noise Level (dBA Leq) | Ambient with Project Construction (dBA Leq) | Project Increment (dBA Leq) |
|---|---|---|---|---|---|---|---|
| 428 S. Hewitt Street with Off-Site Rooftop Barrier | Demolition | 65 | 71 | 63 | 72 | 72.6 | **7.6** * |
| | Grading | 65 | 71 | 63 | 71 | 72.4 | **7.4** |
| | Building Construction (1st Floor) | 65 | 68 | 63 | 69 | 70.4 | **5.4** |
| | Building Construction (2nd-18th Floors) [1] | 65 | 74 | 63 | 74 | 74.8 | **9.8** |
| | Paving (1st Floor) | 65 | 67 | 63 | 68 | 70.0 | **5.0** |
| | Paving (2nd-5th Floors) [2] | 65 | 76 | 63 | **76** | 76.5 | **11.5** |

Source: Giroux & Associates and Envicom Corporation. January 2022.
Note: Barrier insertion loss was subtracted where applicable, based on equations for barrier insertion loss from the Federal Transit Administration. 2018. Transit Noise and Vibration Impact Assessment Manual.
[1] When building construction occurs at upper floors, it was assumed that forklifts, generator sets, and loader/backhoes would remain at the ground floor and be shielded, while the work-tool interaction of the crane and the welders would occur above ground level and be unshielded.
[2] When paving occurs at upper floors, it was assumed loader/backhoes would remain at the ground floor and be shielded, while the remaining equipment would operate above ground level and be unshielded.
* Numbers in bold indicate an exceedance of the construction noise threshold due to the generation of noise levels above 75 dBA at a sensitive receptor or due to a 5 dBA or more exceedance of existing ambient exterior noise levels at a sensitive receptor during operations lasting more than 10 days.

| Receptor | Phase Name | Existing Ambient Noise Levels (dBA Leq) | Mitigated Off-Road Construction Equipment Noise Level (dBA Leq) | Maximum On-Road Construction Vehicle Noise (dBA Leq) | Mitigated Composite Construction Noise Level (dBA Leq) | Ambient with Project Construction (dBA Leq) | Project Increment (dBA Leq) |
|---|---|---|---|---|---|---|---|
| 428 S. Hewitt Street with On-Site Ground Floor Barrier and Off-Site Rooftop Barrier | Demolition | 65 | 56 | 63 | 64 | 67.5 | 2.5 |
| | Grading | 65 | 56 | 63 | 64 | 67.4 | 2.4 |
| | Building Construction (1st Floor) | 65 | 53 | 63 | 63 | 67.3 | 2.3 |
| | Building Construction (2nd-18th Floors) [1] | 65 | 73 | 63 | 74 | 74.3 | **9.3** * |
| | Paving (1st Floor) | 65 | 52 | 63 | 63 | 67.2 | 2.2 |
| | Paving (2nd-5th Floors) [2] | 65 | 76 | 63 | **76** | 76.4 | **11.4** |

Source: Giroux & Associates and Envicom Corporation. January 2022.
Note: Barrier insertion loss was subtracted where applicable, based on equations for barrier insertion loss from the Federal Transit Administration. 2018. Transit Noise and Vibration Impact Assessment Manual.
[1] When building construction occurs at upper floors, it was assumed that forklifts, generator sets, and loader/backhoes would remain at the ground floor and be shielded, while the work-tool interaction of the crane and the welders would occur above ground level and be unshielded.
[2] When paving occurs at upper floors, it was assumed loader/backhoes would remain at the ground floor and be shielded, while the remaining equipment would operate above ground level and be unshielded.
[3] Numbers in bold indicate an exceedance of the construction noise threshold due to the generation of noise levels above 75 dBA at a sensitive receptor or due to a 5 dBA or more exceedance of existing ambient exterior noise levels at a sensitive receptor during operations lasting more than 10 days.

# 4th and Hewitt Project Noise and Vibration Impact Analysis
## Appendix C: Construction Vibration Levels

| Estimated Vibration Levels During Construction | | | | |
|---|---|---|---|---|
| **Equipment** | **PPV at 5 ft (in/sec)** | **PPV at 10 ft (in/sec)** | **PPV at 25 ft (in/sec) *** | **PPV at 50 ft (in/sec)** |
| Large Bulldozer | 0.995 | 0.352 | 0.089 | 0.031 |
| Loaded trucks | 0.850 | 0.300 | 0.076 | 0.027 |
| Jackhammer | 0.391 | 0.138 | 0.035 | 0.012 |
| Small Bulldozer | 0.034 | 0.012 | 0.003 | 0.001 |

Source: Giroux & Associates and Envicom Corporation. January 2022.
* FTA. 2006. Transit Noise and Vibration Impact Assessment. May.
Note: Only data for the above equipment list is available.

| Minimum Distances for Vibration Building Damage | | |
|---|---|---|
| **Equipment** | **Distance to Impact (Threshold of 0.2 in/sec PPV) (ft)** | **Distance to Impact (Threshold of 0.12 in/sec PPV) (ft)** |
| Large Bulldozer | 15 | 20 |
| Loaded trucks | 13 | 18 |
| Jackhammer | 8 | 11 |
| Small Bulldozer | 2 | 2 |

Source: Giroux & Associates and Envicom Corporation. January 2022.

| Vibration Annoyance for Construction Equipment at Multiple Distances | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **VdB at 25 feet *** | **VdB at 50 feet** | **VdB at 60 feet** | **VdB at 80 feet** | **VdB at 200 feet** |
| Large Bulldozer | 87 | 78 | 76 | 72 | 60 |
| Loaded trucks | 86 | 77 | 75 | 71 | 59 |
| Jackhammer | 79 | 70 | 68 | 64 | 52 |
| Small Bulldozer | 58 | 49 | 47 | 43 | 31 |

Source: Giroux & Associates and Envicom Corporation. January 2022.
* FTA. 2006. Transit Noise and Vibration Impact Assessment. May.
Note: Only data for the above equipment list is available.

# 4th and Hewitt Project Noise and Vibration Impact Analysis
## Appendix D-1: Existing Conditions (2017)
## FHWA RD-77-108 Traffic Noise Model

| Roadway | ADT | Speed (mph) | Roadway Width (ft) | Distance CL (ft) | CNEL (dB) | | Distance (ft) from CL to CNEL (dB) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 70 | 65 | 60 |
| E. 1st St., W of S. Vignes | 12670 | 30 | 72 | 50 | 66.3 | | <50 | 61 | 132 |
| E. 1st St., E of S. Vignes | 14230 | 30 | 72 | 50 | 66.8 | | <50 | 66 | 143 |
| S. Vignes St., N of E. 1st | 3150 | 25 | 24 | 50 | 57.2 | | <50 | <50 | <50 |
| S. Vignes St., S of E. 1st | 2790 | 25 | 24 | 50 | 56.7 | | <50 | <50 | <50 |
| E. 3rd St., S. Central to S. Alameda | 11530 | 35 | 48 | 50 | 66.2 | | <50 | 60 | 129 |
| E. 4th Pl., E of S. Alameda | 7870 | 35 | 48 | 50 | 64.5 | | <50 | <50 | 100 |
| E. 4th St., W of S. Central | 16680 | 25 | 48 | 50 | 64.8 | | <50 | <50 | 105 |
| E. 4th St., S. Central - S. Alameda | 18285 | 25 | 48 | 50 | 65.2 | | <50 | 52 | 112 |
| E. 4th St., E of S. Alameda | 15980 | 35 | 24 | 50 | 67.2 | | <50 | 70 | 150 |
| E. 4th St., W of Merrick | 22500 | 25 | 60 | 50 | 66.5 | | <50 | 63 | 137 |
| E. 4th St., E of Merrick | 23130 | 35 | 60 | 50 | 69.6 | | <50 | 101 | 218 |
| E. 6th St., W of S. Central | 9890 | 35 | 48 | 50 | 65.5 | | <50 | 54 | 116 |
| E. 6th St., S. Central - S. Alameda | 13765 | 35 | 48 | 50 | 66.9 | | <50 | 67 | 145 |
| E. 6th St., S. Alameda - Mateo | 13355 | 35 | 48 | 50 | 66.8 | | <50 | 66 | 142 |
| E. 6th St., E. of Mateo | 11010 | 35 | 48 | 50 | 66.0 | | <50 | 58 | 125 |
| E. 7th St., W of S. Central | 15580 | 25 | 48 | 50 | 64.6 | | <50 | <50 | 101 |
| E. 7th St., S. Central - S. Alameda | 15755 | 25 | 48 | 50 | 64.6 | | <50 | <50 | 101 |
| E. 7th St., S. Alameda - Mateo | 15370 | 25 | 48 | 50 | 64.5 | | <50 | <50 | 100 |
| E. 7th St., Mateo - S. Santa Fe | 13790 | 25 | 48 | 50 | 64.0 | | <50 | <50 | 93 |
| E. 7th St., E of S. Santa Fe | 15270 | 25 | 60 | 50 | 64.9 | | <50 | <50 | 106 |
| E. 2nd St., W of S. Alameda | 8410 | 25 | 24 | 50 | 61.5 | | <50 | <50 | 63 |
| E. 2nd St, E of S. Alameda | 5480 | 25 | 24 | 50 | 59.6 | | <50 | <50 | <50 |
| S. Central Ave., N of E. 3rd | 12930 | 35 | 60 | 50 | 67.1 | | <50 | 69 | 148 |
| S. Central Ave., E. 3rd-E. 4th | 16655 | 35 | 60 | 50 | 68.2 | | <50 | 81 | 175 |
| S. Central Ave., E. 4th- 6th | 14605 | 35 | 60 | 50 | 67.6 | | <50 | 74 | 160 |
| S. Central Ave., E. 6th-E. 7th | 15975 | 35 | 60 | 50 | 68.0 | | <50 | 79 | 170 |
| S. Central Ave., S of E. 7th | 17170 | 35 | 60 | 50 | 68.3 | | <50 | 83 | 179 |
| S. Alameda St., N of E. 2nd | 20330 | 35 | 60 | 50 | 69.0 | | <50 | 93 | 200 |
| S. Alameda St., E. 2nd-E. 3rd | 20775 | 35 | 60 | 50 | 69.1 | | <50 | 94 | 203 |
| S. Alameda St., E. 3rd-E .4th | 21050 | 35 | 60 | 50 | 69.2 | | <50 | 95 | 205 |
| S. Alameda St., E. 4th-E. 6th | 18690 | 35 | 60 | 50 | 68.7 | | <50 | 88 | 189 |
| S. Alameda St., E. 6th-E. 7th | 19450 | 35 | 60 | 50 | 68.8 | | <50 | 90 | 194 |
| S. Alameda St., S of E. 7th | 18900 | 35 | 60 | 50 | 68.7 | | <50 | 88 | 190 |
| Merrick, N of E. 4th | 1960 | 25 | 24 | 50 | 55.1 | | <50 | <50 | <50 |
| Molino, S of E. 4th | 1070 | 25 | 24 | 50 | 52.5 | | <50 | <50 | <50 |
| Mateo, N of E. 6th | 4060 | 25 | 24 | 50 | 58.3 | | <50 | <50 | <50 |
| Mateo, E 6th-E. 7th | 4335 | 25 | 24 | 50 | 58.6 | | <50 | <50 | <50 |
| S. Santa Fe Ave., N of E. 7th | 7860 | 30 | 24 | 50 | 62.9 | | <50 | <50 | 78 |
| S. Santa Fe Ave., E 7th- E. 8th | 12770 | 30 | 48 | 50 | 65.4 | | <50 | 53 | 114 |
| S. Santa Fe Ave., S of E. 8th | 16320 | 30 | 48 | 50 | 66.4 | | <50 | 62 | 134 |
| E. Olympic, W of S. Alameda | 21890 | 30 | 60 | 50 | 68.1 | | <50 | 81 | 174 |
| E. Olympic, E of S. Alameda | 22710 | 35 | 60 | 50 | 69.5 | | <50 | 100 | 215 |
| S. Alameda St., N of E. Olympic | 20000 | 35 | 60 | 50 | 69.0 | | <50 | 92 | 198 |
| S. Alameda St., S of E. Olympic | 20600 | 35 | 60 | 50 | 69.1 | | <50 | 94 | 202 |
| Boyle Avenue, N of E. 4th Street | 12230 | 25 | 36 | 50 | 63.2 | | <50 | <50 | 82 |
| Boyle Avenue, E. 4th - Whittier | 15545 | 25 | 36 | 50 | 64.3 | | <50 | <50 | 97 |
| Boyle Avenue, S of Whittier | 18330 | 25 | 60 | 50 | 65.7 | | <50 | 55 | 119 |
| Soto Street, N of E. 4th | 16770 | 35 | 48 | 50 | 67.8 | | <50 | 77 | 165 |
| Soto Street, S of E. 4th | 18580 | 35 | 48 | 50 | 68.2 | | <50 | 82 | 177 |
| E. 4th St., W of US 101 NB Off-Ramp | 20340 | 35 | 60 | 50 | 69.0 | | <50 | 93 | 200 |
| E. 4th St., US 101 NB Off-Ramp - Boyle | 19940 | 35 | 60 | 50 | 68.9 | | <50 | 92 | 197 |
| E. 4th St., Boyle - I-5 SB Ramps | 23665 | 35 | 60 | 50 | 69.7 | | <50 | 103 | 221 |
| E. 4th St., I-5 SB Ramps - I-5 NB Ramps | 24045 | 35 | 60 | 50 | 69.8 | | <50 | 104 | 224 |
| E. 4th St., I-5 NB Ramps - Soto | 18835 | 35 | 60 | 50 | 68.7 | | <50 | 88 | 190 |
| E. 4th St., E of Soto | 18660 | 35 | 60 | 50 | 68.7 | | <50 | 88 | 189 |
| Whittier Boulevard, W of Boyle | 15150 | 35 | 60 | 50 | 67.7 | | <50 | 76 | 164 |
| Whittier Boulevard, E of Boyle | 15580 | 35 | 48 | 50 | 67.5 | | <50 | 73 | 157 |

Sources: Giroux & Associates and Envicom Corporation. February 2022.
FHWA. FHWA Highway Traffic Noise Prediction Model, FHWA RD 77-108. December 1978.
Traffic Data: Gibson Transportation Consulting. 2020 and 2021.

| Vehicle Class and Time % | | | | |
|---|---|---|---|---|
| | Day | Evening | Night | % Daily |
| A | 77.5% | 12.9% | 9.6% | 97.42% |
| MT | 84.8% | 4.9% | 10.3% | 1.84% |
| HT | 86.5% | 2.7% | 10.8% | 0.74% |

# 4th and Hewitt Project Noise and Vibration Impact Analysis
## Appendix D-2: Existing With Project Conditions (2017)
## FHWA RD-77-108 Traffic Noise Model

| Roadway | ADT | Speed (mph) | Roadway Width (ft) | Distance CL (ft) | CNEL (dB) | Distance (ft) from CL to CNEL (dB) | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 70 | 65 | 60 |
| E. 1st St., W of S. Vignes | 12670 | 30 | 72 | 50 | 66.3 | <50 | 61 | 132 |
| E. 1st St., E of S. Vignes | 14230 | 30 | 72 | 50 | 66.8 | <50 | 66 | 143 |
| S. Vignes St., N of E. 1st | 3150 | 25 | 24 | 50 | 57.2 | <50 | <50 | <50 |
| S. Vignes St., S of E. 1st | 2790 | 25 | 24 | 50 | 56.7 | <50 | <50 | <50 |
| E. 3rd St., S. Central to S. Alameda | 11790 | 35 | 48 | 50 | 66.3 | <50 | 61 | 131 |
| E. 4th Pl., E of S. Alameda | 9610 | 35 | 48 | 50 | 65.4 | <50 | 53 | 114 |
| E. 4th St., W of S. Central | 16750 | 25 | 48 | 50 | 64.9 | <50 | <50 | 106 |
| E. 4th St., S. Central - S. Alameda | 18355 | 25 | 48 | 50 | 65.3 | <50 | 52 | 112 |
| E. 4th St., E of S. Alameda | 16680 | 35 | 24 | 50 | 67.4 | <50 | 72 | 155 |
| E. 4th St., W of Merrick | 23730 | 25 | 60 | 50 | 66.8 | <50 | 66 | 142 |
| E. 4th St., E of Merrick | 24360 | 35 | 60 | 50 | 69.8 | <50 | 105 | 225 |
| E. 6th St., W of S. Central | 9930 | 35 | 48 | 50 | 65.5 | <50 | 54 | 117 |
| E. 6th St., S. Central - S. Alameda | 13805 | 35 | 48 | 50 | 66.9 | <50 | 67 | 145 |
| E. 6th St., S. Alameda - Mateo | 13460 | 35 | 48 | 50 | 66.8 | <50 | 66 | 143 |
| E. 6th St., E. of Mateo | 11180 | 35 | 48 | 50 | 66.0 | <50 | 59 | 126 |
| E. 7th St., W of S. Central | 15710 | 25 | 48 | 50 | 64.6 | <50 | <50 | 101 |
| E. 7th St., S. Central - S. Alameda | 15885 | 25 | 48 | 50 | 64.6 | <50 | <50 | 102 |
| E. 7th St., S. Alameda - Mateo | 15410 | 25 | 48 | 50 | 64.5 | <50 | <50 | 100 |
| E. 7th St., Mateo - S. Santa Fe | 13695 | 25 | 48 | 50 | 64.0 | <50 | <50 | 92 |
| E. 7th St., E of S. Santa Fe | 15020 | 25 | 60 | 50 | 64.8 | <50 | <50 | 104 |
| E. 2nd St., W of S. Alameda | 8410 | 25 | 24 | 50 | 61.5 | <50 | <50 | 63 |
| E. 2nd St, E of S. Alameda | 5480 | 25 | 24 | 50 | 59.6 | <50 | <50 | <50 |
| S. Central Ave., N of E. 3rd | 12930 | 35 | 60 | 50 | 67.1 | <50 | 69 | 148 |
| S. Central Ave., E. 3rd-E. 4th | 16690 | 35 | 60 | 50 | 68.2 | <50 | 81 | 175 |
| S. Central Ave., E. 4th- 6th | 14605 | 35 | 60 | 50 | 67.6 | <50 | 74 | 160 |
| S. Central Ave., E. 6th-E. 7th | 15975 | 35 | 60 | 50 | 68.0 | <50 | 79 | 170 |
| S. Central Ave., S of E. 7th | 17170 | 35 | 60 | 50 | 68.3 | <50 | 83 | 179 |
| S. Alameda St., N of E. 2nd | 20980 | 35 | 60 | 50 | 69.2 | <50 | 95 | 204 |
| S. Alameda St., E. 2nd-E. 3rd | 21425 | 35 | 60 | 50 | 69.3 | <50 | 96 | 207 |
| S. Alameda St., E. 3rd-E .4th | 22165 | 35 | 60 | 50 | 69.4 | <50 | 98 | 212 |
| S. Alameda St., E. 4th-E. 6th | 19745 | 35 | 60 | 50 | 68.9 | <50 | 91 | 196 |
| S. Alameda St., E. 6th-E. 7th | 20140 | 35 | 60 | 50 | 69.0 | <50 | 92 | 199 |
| S. Alameda St., S of E. 7th | 19590 | 35 | 60 | 50 | 68.9 | <50 | 90 | 195 |
| Merrick, N of E. 4th | 1960 | 25 | 24 | 50 | 55.1 | <50 | <50 | <50 |
| Molino, S of E. 4th | 1070 | 25 | 24 | 50 | 52.5 | <50 | <50 | <50 |
| Mateo, N of E. 6th | 4190 | 25 | 24 | 50 | 58.4 | <50 | <50 | <50 |
| Mateo, E 6th-E. 7th | 4465 | 25 | 24 | 50 | 58.7 | <50 | <50 | <50 |
| S. Santa Fe Ave., N of E. 7th | 7710 | 30 | 24 | 50 | 62.8 | <50 | <50 | 77 |
| S. Santa Fe Ave., E 7th- E. 8th | 12645 | 30 | 48 | 50 | 65.3 | <50 | 53 | 113 |
| S. Santa Fe Ave., S of E. 8th | 16320 | 30 | 48 | 50 | 66.4 | <50 | 62 | 134 |
| E. Olympic, W of S. Alameda | 21890 | 30 | 60 | 50 | 68.1 | <50 | 81 | 174 |
| E. Olympic,, E of S. Alameda | 22750 | 35 | 60 | 50 | 69.5 | <50 | 100 | 215 |
| S. Alameda St., N of E. Olympic | 20690 | 35 | 60 | 50 | 69.1 | <50 | 94 | 202 |
| S. Alameda St., S of E. Olympic | 21250 | 35 | 60 | 50 | 69.2 | <50 | 96 | 206 |
| Boyle Avenue, N of E. 4th Street | 12280 | 25 | 36 | 50 | 63.3 | <50 | <50 | 82 |
| Boyle Avenue, E. 4th - Whittier | 15545 | 25 | 36 | 50 | 64.3 | <50 | <50 | 97 |
| Boyle Avenue, S of Whittier | 18330 | 25 | 60 | 50 | 65.7 | <50 | 55 | 119 |
| Soto Street, N of E. 4th | 16770 | 35 | 48 | 50 | 67.8 | <50 | 77 | 165 |
| Soto Street, S of E. 4th | 18580 | 35 | 48 | 50 | 68.2 | <50 | 82 | 177 |
| E. 4th St., W of US 101 NB Off-Ramp | 20940 | 35 | 60 | 50 | 69.2 | <50 | 95 | 204 |
| E. 4th St., US 101 NB Off-Ramp - Boyle | 20430 | 35 | 60 | 50 | 69.0 | <50 | 93 | 201 |
| E. 4th St., Boyle - I-5 SB Ramps | 24105 | 35 | 60 | 50 | 69.8 | <50 | 104 | 224 |
| E. 4th St., I-5 SB Ramps - I-5 NB Ramps | 24415 | 35 | 60 | 50 | 69.8 | <50 | 105 | 226 |
| E. 4th St., I-5 NB Ramps - Soto | 19005 | 35 | 60 | 50 | 68.7 | <50 | 89 | 191 |
| E. 4th St., E of Soto | 18830 | 35 | 60 | 50 | 68.7 | <50 | 88 | 190 |
| Whittier Boulevard, W of Boyle | 15320 | 35 | 60 | 50 | 67.8 | <50 | 77 | 165 |
| Whittier Boulevard,, E of Boyle | 15750 | 35 | 48 | 50 | 67.5 | <50 | 74 | 159 |

Sources: Giroux & Associates and Envicom Corporation. February 2022.
FHWA. FHWA Highway Traffic Noise Prediction Model, FHWA RD 77-108. December 1978.
Traffic Data: Gibson Transportation Consulting. 2020 and 2021.

| Vehicle Class and Time % | | | | |
|---|---|---|---|---|
| | Day | Evening | Night | % Daily |
| A | 77.5% | 12.9% | 9.6% | 97.42% |
| MT | 84.8% | 4.9% | 10.3% | 1.84% |
| HT | 86.5% | 2.7% | 10.8% | 0.74% |

# 4th and Hewitt Project Noise and Vibration Impact Analysis
## Appendix D-3: Future Without Project Conditions (2025)
## FHWA RD-77-108 Traffic Noise Model

| Roadway | ADT | Speed (mph) | Roadway Width (ft) | Distance CL (ft) | CNEL (dB) | | Distance (ft) from CL to CNEL (dB) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 70 | 65 | 60 |
| E. 1st St., W of S. Vignes | 13820 | 30 | 72 | 50 | 66.7 | | <50 | 65 | 140 |
| E. 1st St., E of S. Vignes | 15660 | 30 | 72 | 50 | 67.3 | | <50 | 71 | 152 |
| S. Vignes St., N of E. 1st | 3410 | 25 | 24 | 50 | 57.5 | | <50 | <50 | <50 |
| S. Vignes St., S of E. 1st | 3170 | 25 | 24 | 50 | 57.2 | | <50 | <50 | <50 |
| E. 3rd St., S. Central to S. Alameda | 18880 | 35 | 48 | 50 | 68.3 | | <50 | 83 | 179 |
| E. 4th Pl., E of S. Alameda | 16310 | 35 | 48 | 50 | 67.7 | | <50 | 75 | 162 |
| E. 4th St., W of S. Central | 22110 | 25 | 48 | 50 | 66.1 | | <50 | 59 | 127 |
| E. 4th St., S. Central - S. Alameda | 23810 | 25 | 48 | 50 | 66.4 | | <50 | 62 | 133 |
| E. 4th St., E of S. Alameda | 21590 | 35 | 24 | 50 | 68.5 | | <50 | 85 | 184 |
| E. 4th St., W of Merrick | 32530 | 25 | 60 | 50 | 68.2 | | <50 | 81 | 175 |
| E. 4th St., E of Merrick | 36820 | 35 | 60 | 50 | 71.6 | | 64 | 138 | 297 |
| E. 6th St., W of S. Central | 15900 | 35 | 48 | 50 | 67.6 | | <50 | 74 | 160 |
| E. 6th St., S. Central - S. Alameda | 21160 | 35 | 48 | 50 | 68.8 | | <50 | 90 | 193 |
| E. 6th St., S. Alameda - Mateo | 27280 | 35 | 48 | 50 | 69.9 | | <50 | 106 | 229 |
| E. 6th St., E. of Mateo | 14370 | 35 | 48 | 50 | 67.1 | | <50 | 69 | 149 |
| E. 7th St., W of S. Central | 24680 | 25 | 48 | 50 | 66.6 | | <50 | 63 | 137 |
| E. 7th St., S. Central - S. Alameda | 26815 | 25 | 48 | 50 | 66.9 | | <50 | 67 | 144 |
| E. 7th St., S. Alameda - Mateo | 28525 | 25 | 48 | 50 | 67.2 | | <50 | 70 | 151 |
| E. 7th St., Mateo - S. Santa Fe | 28765 | 25 | 48 | 50 | 67.2 | | <50 | 70 | 151 |
| E. 7th St., E of S. Santa Fe | 30140 | 25 | 60 | 50 | 67.8 | | <50 | 77 | 166 |
| E. 2nd St., W of S. Alameda | 9450 | 25 | 24 | 50 | 62.0 | | <50 | <50 | 68 |
| E. 2nd St, E of S. Alameda | 6790 | 25 | 24 | 50 | 60.5 | | <50 | <50 | 54 |
| S. Central Ave., N of E. 3rd | 14190 | 35 | 60 | 50 | 67.5 | | <50 | 73 | 157 |
| S. Central Ave., E. 3rd-E. 4th | 20245 | 35 | 60 | 50 | 69.0 | | <50 | 93 | 199 |
| S. Central Ave., E. 4th- 6th | 17285 | 35 | 60 | 50 | 68.3 | | <50 | 83 | 179 |
| S. Central Ave., E. 6th-E. 7th | 21515 | 35 | 60 | 50 | 69.3 | | <50 | 96 | 208 |
| S. Central Ave., S of E. 7th | 20890 | 35 | 60 | 50 | 69.1 | | <50 | 94 | 204 |
| S. Alameda St., N of E. 2nd | 28690 | 35 | 60 | 50 | 70.5 | | 54 | 117 | 251 |
| S. Alameda St., E. 2nd-E. 3rd | 29525 | 35 | 60 | 50 | 70.6 | | 55 | 119 | 256 |
| S. Alameda St., E. 3rd-E .4th | 32055 | 35 | 60 | 50 | 71.0 | | 58 | 126 | 271 |
| S. Alameda St., E. 4th-E. 6th | 30435 | 35 | 60 | 50 | 70.8 | | 56 | 121 | 262 |
| S. Alameda St., E. 6th-E. 7th | 27440 | 35 | 60 | 50 | 70.3 | | 53 | 113 | 244 |
| S. Alameda St., S of E. 7th | 26850 | 35 | 60 | 50 | 70.2 | | 52 | 112 | 241 |
| Merrick, N of E. 4th | 2120 | 25 | 24 | 50 | 55.5 | | <50 | <50 | <50 |
| Molino, S of E. 4th | 4830 | 25 | 24 | 50 | 59.1 | | <50 | <50 | <50 |
| Mateo, N of E. 6th | 6980 | 25 | 24 | 50 | 60.7 | | <50 | <50 | 55 |
| Mateo, E 6th-E. 7th | 6370 | 25 | 24 | 50 | 60.3 | | <50 | <50 | 52 |
| S. Santa Fe Ave., N of E. 7th | 13420 | 30 | 24 | 50 | 65.2 | | <50 | 51 | 111 |
| S. Santa Fe Ave., E 7th- E. 8th | 16465 | 30 | 48 | 50 | 66.5 | | <50 | 63 | 135 |
| S. Santa Fe Ave., S of E. 8th | 20230 | 30 | 48 | 50 | 67.4 | | <50 | 72 | 155 |
| E. Olympic, W of S. Alameda | 28170 | 30 | 60 | 50 | 69.2 | | <50 | 95 | 206 |
| E. Olympic,, E of S. Alameda | 30170 | 35 | 60 | 50 | 70.7 | | 56 | 121 | 260 |
| S. Alameda St., N of E. Olympic | 28030 | 35 | 60 | 50 | 70.4 | | 53 | 115 | 248 |
| S. Alameda St., S of E. Olympic | 27330 | 35 | 60 | 50 | 70.3 | | 52 | 113 | 243 |
| Boyle Avenue, N of E. 4th Street | 13250 | 25 | 36 | 50 | 63.6 | | <50 | <50 | 87 |
| Boyle Avenue, E. 4th - Whittier | 16830 | 25 | 36 | 50 | 64.6 | | <50 | <50 | 102 |
| Boyle Avenue, S of Whittier | 19840 | 25 | 60 | 50 | 66.0 | | <50 | 58 | 126 |
| Soto Street, N of E. 4th | 18150 | 35 | 48 | 50 | 68.1 | | <50 | 81 | 174 |
| Soto Street, S of E. 4th | 20120 | 35 | 48 | 50 | 68.6 | | <50 | 87 | 187 |
| E. 4th St., W of US 101 NB Off-Ramp | 30880 | 35 | 60 | 50 | 70.8 | | 57 | 123 | 264 |
| E. 4th St., US 101 NB Off-Ramp - Boyle | 28135 | 35 | 60 | 50 | 70.4 | | 53 | 115 | 248 |
| E. 4th St., Boyle - I-5 SB Ramps | 30455 | 35 | 60 | 50 | 70.8 | | 56 | 121 | 262 |
| E. 4th St., I-5 SB Ramps - I-5 NB Ramps | 28590 | 35 | 60 | 50 | 70.5 | | 54 | 116 | 251 |
| E. 4th St., I-5 NB Ramps - Soto | 21290 | 35 | 60 | 50 | 69.2 | | <50 | 96 | 206 |
| E. 4th St., E of Soto | 20610 | 35 | 60 | 50 | 69.1 | | <50 | 94 | 202 |
| Whittier Boulevard, W of Boyle | 17630 | 35 | 60 | 50 | 68.4 | | <50 | 84 | 182 |
| Whittier Boulevard, E of Boyle | 18090 | 35 | 48 | 50 | 68.1 | | <50 | 81 | 174 |

Sources: Giroux & Associates and Envicom Corporation. February 2022.
FHWA. FHWA Highway Traffic Noise Prediction Model, FHWA RD 77-108. December 1978.
Traffic Data: Gibson Transportation Consulting. 2020 and 2021.

| Vehicle Class and Time % | | | | |
|---|---|---|---|---|
| | Day | Evening | Night | % Daily |
| A | 77.5% | 12.9% | 9.6% | 97.42% |
| MT | 84.8% | 4.9% | 10.3% | 1.84% |
| HT | 86.5% | 2.7% | 10.8% | 0.74% |

# 4th and Hewitt Project Noise and Vibration Impact Analysis
# Appendix D-4: Traffic Noise - Future With Project Conditions (2025)
# FHWA RD-77-108 Traffic Noise Model

| Roadway | ADT | Speed (mph) | Roadway Width (ft) | Distance CL (ft) | CNEL (dB) | | Distance (ft) from CL to CNEL (dB) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 70 | 65 | 60 |
| E. 1st St., W of S. Vignes | 13820 | 30 | 72 | 50 | 66.7 | | <50 | 65 | 140 |
| E. 1st St., E of S. Vignes | 15660 | 30 | 72 | 50 | 67.3 | | <50 | 71 | 152 |
| S. Vignes St., N of E. 1st | 3410 | 25 | 24 | 50 | 57.5 | | <50 | <50 | <50 |
| S. Vignes St., S of E. 1st | 3170 | 25 | 24 | 50 | 57.2 | | <50 | <50 | <50 |
| E. 3rd St., S. Central to S. Alameda | 19140 | 35 | 48 | 50 | 68.4 | | <50 | 84 | 181 |
| E. 4th Pl., E of S. Alameda | 18050 | 35 | 48 | 50 | 68.1 | | <50 | 81 | 174 |
| E. 4th St., W of S. Central | 22180 | 25 | 48 | 50 | 66.1 | | <50 | 59 | 127 |
| E. 4th St., S. Central - S. Alameda | 23880 | 25 | 48 | 50 | 66.4 | | <50 | 62 | 134 |
| E. 4th St., E of S. Alameda | 22290 | 35 | 24 | 50 | 68.6 | | <50 | 87 | 188 |
| E. 4th St., W of Merrick | 33760 | 25 | 60 | 50 | 68.3 | | <50 | 83 | 179 |
| E. 4th St., E of Merrick | 38050 | 35 | 60 | 50 | 71.7 | | 65 | 141 | 304 |
| E. 6th St., W of S. Central | 15940 | 35 | 48 | 50 | 67.6 | | <50 | 74 | 160 |
| E. 6th St., S. Central - S. Alameda | 21200 | 35 | 48 | 50 | 68.8 | | <50 | 90 | 193 |
| E. 6th St., S. Alameda - Mateo | 27385 | 35 | 48 | 50 | 69.9 | | <50 | 106 | 229 |
| E. 6th St., E. of Mateo | 14540 | 35 | 48 | 50 | 67.2 | | <50 | 70 | 150 |
| E. 7th St., W of S. Central | 24810 | 25 | 48 | 50 | 66.6 | | <50 | 64 | 137 |
| E. 7th St., S. Central - S. Alameda | 26945 | 25 | 48 | 50 | 66.9 | | <50 | 67 | 145 |
| E. 7th St., S. Alameda - Mateo | 28565 | 25 | 48 | 50 | 67.2 | | <50 | 70 | 151 |
| E. 7th St., Mateo - S. Santa Fe | 28805 | 25 | 48 | 50 | 67.2 | | <50 | 70 | 152 |
| E. 7th St., E of S. Santa Fe | 30180 | 25 | 60 | 50 | 67.8 | | <50 | 77 | 166 |
| E. 2nd St., W of S. Alameda | 9450 | 25 | 24 | 50 | 62.0 | | <50 | <50 | 68 |
| E. 2nd St, E of S. Alameda | 6790 | 25 | 24 | 50 | 60.5 | | <50 | <50 | 54 |
| S. Central Ave., N of E. 3rd | 14190 | 35 | 60 | 50 | 67.5 | | <50 | 73 | 157 |
| S. Central Ave., E. 3rd-E. 4th | 20280 | 35 | 60 | 50 | 69.0 | | <50 | 93 | 200 |
| S. Central Ave., E. 4th- 6th | 17285 | 35 | 60 | 50 | 68.3 | | <50 | 83 | 179 |
| S. Central Ave., E. 6th-E. 7th | 21515 | 35 | 60 | 50 | 69.3 | | <50 | 96 | 208 |
| S. Central Ave., S of E. 7th | 20890 | 35 | 60 | 50 | 69.1 | | <50 | 94 | 204 |
| S. Alameda St., N of E. 2nd | 29340 | 35 | 60 | 50 | 70.6 | | 55 | 118 | 255 |
| S. Alameda St., E. 2nd-E. 3rd | 30175 | 35 | 60 | 50 | 70.7 | | 56 | 121 | 260 |
| S. Alameda St., E. 3rd-E .4th | 33170 | 35 | 60 | 50 | 71.2 | | 60 | 129 | 277 |
| S. Alameda St., E. 4th-E. 6th | 31490 | 35 | 60 | 50 | 70.9 | | 58 | 124 | 268 |
| S. Alameda St., E. 6th-E. 7th | 28130 | 35 | 60 | 50 | 70.4 | | 53 | 115 | 248 |
| S. Alameda St., S of E. 7th | 27540 | 35 | 60 | 50 | 70.3 | | 53 | 114 | 245 |
| Merrick, N of E. 4th | 2120 | 25 | 24 | 50 | 55.5 | | <50 | <50 | <50 |
| Molino, S of E. 4th | 4830 | 25 | 24 | 50 | 59.1 | | <50 | <50 | <50 |
| Mateo, N of E. 6th | 7110 | 25 | 24 | 50 | 60.7 | | <50 | <50 | 56 |
| Mateo, E 6th-E. 7th | 6500 | 25 | 24 | 50 | 60.4 | | <50 | <50 | 53 |
| S. Santa Fe Ave., N of E. 7th | 13420 | 30 | 24 | 50 | 65.2 | | <50 | 51 | 111 |
| S. Santa Fe Ave., E 7th- E. 8th | 16465 | 30 | 48 | 50 | 66.5 | | <50 | 63 | 135 |
| S. Santa Fe Ave., S of E. 8th | 20230 | 30 | 48 | 50 | 67.4 | | <50 | 72 | 155 |
| E. Olympic, W of S. Alameda | 28170 | 30 | 60 | 50 | 69.2 | | <50 | 95 | 206 |
| E. Olympic,, E of S. Alameda | 30210 | 35 | 60 | 50 | 70.7 | | 56 | 121 | 260 |
| S. Alameda St., N of E. Olympic | 28720 | 35 | 60 | 50 | 70.5 | | 54 | 117 | 252 |
| S. Alameda St., S of E. Olympic | 27980 | 35 | 60 | 50 | 70.4 | | 53 | 115 | 247 |
| Boyle Avenue, N of E. 4th Street | 13300 | 25 | 36 | 50 | 63.6 | | <50 | <50 | 87 |
| Boyle Avenue, E. 4th - Whittier | 16830 | 25 | 36 | 50 | 64.6 | | <50 | <50 | 102 |
| Boyle Avenue, S of Whittier | 19840 | 25 | 60 | 50 | 66.0 | | <50 | 58 | 126 |
| Soto Street, N of E. 4th | 18150 | 35 | 48 | 50 | 68.1 | | <50 | 81 | 174 |
| Soto Street, S of E. 4th | 20120 | 35 | 48 | 50 | 68.6 | | <50 | 87 | 187 |
| E. 4th St., W of US 101 NB Off-Ramp | 31480 | 35 | 60 | 50 | 70.9 | | 58 | 124 | 267 |
| E. 4th St., US 101 NB Off-Ramp - Boyle | 28625 | 35 | 60 | 50 | 70.5 | | 54 | 117 | 251 |
| E. 4th St., Boyle - I-5 SB Ramps | 30895 | 35 | 60 | 50 | 70.8 | | 57 | 123 | 264 |
| E. 4th St., I-5 SB Ramps - I-5 NB Ramps | 28960 | 35 | 60 | 50 | 70.6 | | 55 | 117 | 253 |
| E. 4th St., I-5 NB Ramps - Soto | 21460 | 35 | 60 | 50 | 69.3 | | <50 | 96 | 207 |
| E. 4th St., E of Soto | 20780 | 35 | 60 | 50 | 69.1 | | <50 | 94 | 203 |
| Whittier Boulevard, W of Boyle | 17800 | 35 | 60 | 50 | 68.4 | | <50 | 85 | 183 |
| Whittier Boulevard,, E of Boyle | 18260 | 35 | 48 | 50 | 68.2 | | <50 | 81 | 175 |

Sources: Giroux & Associates and Envicom Corporation. February 2022.
FHWA. FHWA Highway Traffic Noise Prediction Model, FHWA RD 77-108. December 1978.
Traffic Data: Gibson Transportation Consulting. 2020 and 2021.

| Vehicle Class and Time % | | | | |
|---|---|---|---|---|
| | Day | Evening | Night | % Daily |
| A | 77.5% | 12.9% | 9.6% | 97.42% |
| MT | 84.8% | 4.9% | 10.3% | 1.84% |
| HT | 86.5% | 2.7% | 10.8% | 0.74% |

# 4th and Hewitt Project Noise and Vibration Impact Analysis
## Appendix D-5: Traffic Noise - Impacts

| Roadway | Existing dB CNEL | Existing + Project dB CNEL | Future dB CNEL | Future + Project dB CNEL | Existing Impact dB CNEL | Future Impact dB CNEL | Cumulative Increase dB CNEL |
|---|---|---|---|---|---|---|---|
| E. 1st St., W of S. Vignes | 66.3 | 66.3 | 66.7 | 66.7 | 0.0 | 0.0 | 0.4 |
| E. 1st St., E of S. Vignes | 66.8 | 66.8 | 67.3 | 67.3 | 0.0 | 0.0 | 0.5 |
| S. Vignes St., N of E. 1st | 57.2 | 57.2 | 57.5 | 57.5 | 0.0 | 0.0 | 0.3 |
| S. Vignes St., S of E. 1st | 56.7 | 56.7 | 57.2 | 57.2 | 0.0 | 0.0 | 0.5 |
| E. 3rd St., S. Central to S. Alameda | 66.2 | 66.3 | 68.3 | 68.4 | 0.1 | 0.1 | 2.2 |
| E. 4th Pl., E of S. Alameda | 64.5 | 65.4 | 67.7 | 68.1 | 0.9 | 0.4 | 3.6 |
| E. 4th St., W of S. Central | 64.8 | 64.9 | 66.1 | 66.1 | 0.1 | 0.0 | 1.3 |
| E. 4th St., S. Central - S. Alameda | 65.2 | 65.3 | 66.4 | 66.4 | 0.1 | 0.0 | 1.2 |
| E. 4th St., E of S. Alameda | 67.2 | 67.4 | 68.5 | 68.6 | 0.2 | 0.1 | 1.4 |
| E. 4th St., W of Merrick | 66.5 | 66.8 | 68.2 | 68.3 | 0.3 | 0.1 | 1.8 |
| E. 4th St., E of Merrick | 69.6 | 69.8 | 71.6 | 71.7 | 0.2 | 0.1 | 2.1 |
| E. 6th St., W of S. Central | 65.5 | 65.5 | 67.6 | 67.6 | 0.0 | 0.0 | 2.1 |
| E. 6th St., S. Central - S. Alameda | 66.9 | 66.9 | 68.8 | 68.8 | 0.0 | 0.0 | 1.9 |
| E. 6th St., S. Alameda - Mateo | 66.8 | 66.8 | 69.9 | 69.9 | 0.0 | 0.0 | 3.1 |
| E. 6th St., E. of Mateo | 66.0 | 66.0 | 67.1 | 67.2 | 0.0 | 0.1 | 1.2 |
| E. 7th St., W of S. Central | 64.6 | 64.6 | 66.6 | 66.6 | 0.0 | 0.0 | 2.0 |
| E. 7th St., S. Central - S. Alameda | 64.6 | 64.6 | 66.9 | 66.9 | 0.0 | 0.0 | 2.3 |
| E. 7th St., S. Alameda - Mateo | 64.5 | 64.5 | 67.2 | 67.2 | 0.0 | 0.0 | 2.7 |
| E. 7th St., Mateo - S. Santa Fe | 64.0 | 64.0 | 67.2 | 67.2 | 0.0 | 0.0 | 3.2 |
| E. 7th St., E of S. Santa Fe | 64.9 | 64.8 | 67.8 | 67.8 | -0.1 | 0.0 | 2.9 |
| E. 2nd St., W of S. Alameda | 61.5 | 61.5 | 62.0 | 62.0 | 0.0 | 0.0 | 0.5 |
| E. 2nd St, E of S. Alameda | 59.6 | 59.6 | 60.5 | 60.5 | 0.0 | 0.0 | 0.9 |
| S. Central Ave., N of E. 3rd | 67.1 | 67.1 | 67.5 | 67.5 | 0.0 | 0.0 | 0.4 |
| S. Central Ave., E. 3rd-E. 4th | 68.2 | 68.2 | 69.0 | 69.0 | 0.0 | 0.0 | 0.8 |
| S. Central Ave., E. 4th- 6th | 67.6 | 67.6 | 68.3 | 68.3 | 0.0 | 0.0 | 0.7 |
| S. Central Ave., E. 6th-E. 7th | 68.0 | 68.0 | 69.3 | 69.3 | 0.0 | 0.0 | 1.3 |
| S. Central Ave., S of E. 7th | 68.3 | 68.3 | 69.1 | 69.1 | 0.0 | 0.0 | 0.8 |
| S. Alameda St., N of E. 2nd | 69.0 | 69.2 | 70.5 | 70.6 | 0.2 | 0.1 | 1.6 |
| S. Alameda St., E. 2nd-E. 3rd | 69.1 | 69.3 | 70.6 | 70.7 | 0.2 | 0.1 | 1.6 |
| S. Alameda St., E. 3rd-E .4th | 69.2 | 69.4 | 71.0 | 71.2 | 0.2 | 0.2 | 2.0 |
| S. Alameda St., E. 4th-E. 6th | 68.7 | 68.9 | 70.8 | 70.9 | 0.2 | 0.1 | 2.2 |
| S. Alameda St., E. 6th-E. 7th | 68.8 | 69.0 | 70.3 | 70.4 | 0.2 | 0.1 | 1.6 |
| S. Alameda St., S of E. 7th | 68.7 | 68.9 | 70.2 | 70.3 | 0.2 | 0.1 | 1.6 |
| Merrick, N of E. 4th | 55.1 | 55.1 | 55.5 | 55.5 | 0.0 | 0.0 | 0.4 |
| Molino, S of E. 4th | 52.5 | 52.5 | 59.1 | 59.1 | 0.0 | 0.0 | 6.6 |
| Mateo, N of E. 6th | 58.3 | 58.4 | 60.7 | 60.7 | 0.1 | 0.0 | 2.4 |
| Mateo, E 6th-E. 7th | 58.6 | 58.7 | 60.3 | 60.4 | 0.1 | 0.1 | 1.8 |
| S. Santa Fe Ave., N of E. 7th | 62.9 | 62.8 | 65.2 | 65.2 | -0.1 | 0.0 | 2.3 |
| S. Santa Fe Ave., E 7th- E. 8th | 65.4 | 65.3 | 66.5 | 66.5 | -0.1 | 0.0 | 1.1 |
| S. Santa Fe Ave., S of E. 8th | 66.4 | 66.4 | 67.4 | 67.4 | 0.0 | 0.0 | 1.0 |
| E. Olympic, W of S. Alameda | 68.1 | 68.1 | 69.2 | 69.2 | 0.0 | 0.0 | 1.1 |
| E. Olympic, E of S. Alameda | 69.5 | 69.5 | 70.7 | 70.7 | 0.0 | 0.0 | 1.2 |
| S. Alameda St., N of E. Olympic | 69.0 | 69.1 | 70.4 | 70.5 | 0.1 | 0.1 | 1.5 |
| S. Alameda St., S of E. Olympic | 69.1 | 69.2 | 70.3 | 70.4 | 0.1 | 0.1 | 1.3 |
| Boyle Avenue, N of E. 4th Street | 63.2 | 63.3 | 63.6 | 63.6 | 0.1 | 0.0 | 0.4 |
| Boyle Avenue, E. 4th - Whittier | 64.3 | 64.3 | 64.6 | 64.6 | 0.0 | 0.0 | 0.3 |
| Boyle Avenue, S of Whittier | 65.7 | 65.7 | 66.0 | 66.0 | 0.0 | 0.0 | 0.3 |
| Soto Street, N of E. 4th | 67.8 | 67.8 | 68.1 | 68.1 | 0.0 | 0.0 | 0.3 |
| Soto Street, S of E. 4th | 68.2 | 68.2 | 68.6 | 68.6 | 0.0 | 0.0 | 0.4 |
| E. 4th St., W of US 101 NB Off-Ramp | 69.0 | 69.2 | 70.8 | 70.9 | 0.2 | 0.1 | 1.9 |
| E. 4th St., US 101 NB Off-Ramp - Boyle | 68.9 | 69.0 | 70.4 | 70.5 | 0.1 | 0.1 | 1.6 |
| E. 4th St., Boyle - I-5 SB Ramps | 69.7 | 69.8 | 70.8 | 70.8 | 0.1 | 0.0 | 1.1 |
| E. 4th St., I-5 SB Ramps - I-5 NB Ramps | 69.8 | 69.8 | 70.5 | 70.6 | 0.0 | 0.1 | 0.8 |
| E. 4th St., I-5 NB Ramps - Soto | 68.7 | 68.7 | 69.2 | 69.3 | 0.0 | 0.1 | 0.6 |
| E. 4th St., E of Soto | 68.7 | 68.7 | 69.1 | 69.1 | 0.0 | 0.0 | 0.4 |
| Whittier Boulevard, W of Boyle | 67.7 | 67.8 | 68.4 | 68.4 | 0.1 | 0.0 | 0.7 |
| Whittier Boulevard, E of Boyle | 67.5 | 67.5 | 68.1 | 68.2 | 0.0 | 0.1 | 0.7 |

Sources: Giroux & Associates and Envicom Corporation. February 2022.

FHWA. FHWA Highway Traffic Noise Prediction Model, FHWA RD 77-108. December 1978.

Traffic Data: Gibson Transportation Consulting. 2020 and 2021.

**Parking Structure Noise Levels**

| Receptor | Distance to Parking Structure | Reference Noise Level (dBA SEL) at 50 ft * | Hourly Vehicle Trips | Noise Level at 50 feet (dBA Leq) | Attenuated Noise Level at Receiver (dBA Leq) | Parking Stucture Noise Reduction (dBA) | Noise at Receiver (dBA Leq) | Threshold Daytime/ Nighttime | Exceeds Threshold? |
|---|---|---|---|---|---|---|---|---|---|
| 428 S. Hewitt Street | 80 | 92 | 388 | 52 | 49 | 15 | 34 | 70.0/70.0 dBA | No/No |
| 825 E. 4th Street | 300 | 92 | 388 | 52 | 41 | 0 | 41 | 73.7/70.0 dBA | No/No |

Source: Giroux & Associates and Envicom Corporation. January 2022.
* Federal Transit Administration. 2018. Transit Noise and Vibration Impact Assessment Manual. September.

**HVAC Noise Levels**

| Receptor | Distance to HVAC | Reference Noise Level (dBA) at 50 ft * | Insertion Loss (dBA) | Attenuated Noise at Receiver (dBA Leq) | Threshold Daytime/ Nighttime | Exceeds Threshold? |
|---|---|---|---|---|---|---|
| 428 S. Hewitt Street | 80 | 54 | 5 | 45 | 70.0/70.0 dBA | No/No |
| 825 E. 4th Street | 275 | 54 | 5 | 34 | 73.7/70.0 dBA | No/No |

Source: Giroux & Associates and Envicom Corporation. January 2022.
* Trane Industries

**Loading and Trash Collection Noise Levels**

| Receptor | Distance to Dock | Medium Truck Reference Noise (dBA) at 50 ft * | Semi-Truck Reference Noise (dBA) at 50 ft * | Insertion Loss (dBA) | Attenuated Medium Truck Noise at Receiver (dBA Leq) | Attenuated Semi-Truck Noise at Receiver (dBA Leq) | Attenuated Noise at Receiver (dBA Leq) | Threshold Daytime/ Nighttime | Exceeds Threshold? |
|---|---|---|---|---|---|---|---|---|---|
| 428 S. Hewitt Street | 80 | 65 | 67 | 5 | 56 | 58 | 56 - 58 | 70.0/70.0 dBA | No/No |
| 825 E. 4th Street | 450 | 65 | 67 | 15 | 31 | 33 | 31 - 33 | 73.7/70.0 dBA | No/No |

Source: Giroux & Associates and Envicom Corporation. January 2022.

Note: Sounds levels presented are conservative. The dock is approximately 80 feet west of the Project property line, such that the separation distance from 428 S. Hewitt Street may be up to 160 feet, depending on the size and orientation of the truck when parked at the dock.

* Giroux & Associates. 2007. Wal-Mart Super Center, Ontario. March.

**Project Fans Operating at Optional Maximum Speed**

| Receptor | Distance (ft) | Noise (dBA) at 8 Meters [1, 2] | Attenuated Noise at Receiver (dBA Leq) | Threshold Daytime/ Nighttime | Exceeds Threshold? |
|---|---|---|---|---|---|
| 428 S. Hewitt Street | 80 | 65 | 55 | 70.0/70.0 dBA | No/No |
| 825 E. 4th Street | 275 | 70 | 50 | 73.7/70.0 dBA | No/No |

Source: Giroux & Associates and Envicom Corporation. January 2022.

[1] Jetvent Fans (Zoo Fans). Product Technical Data. Available at: https://jetventfans.com/products/. Accessed April 7, 2021.
[2] Assumes all three fans on the west and north side of the structure at Levels 1, 4 and 5 operate at full power at the same time.
Note: Sounds levels presented are conservative. The dock is approximately 80 feet west of the Project property line, such that the separation distance may be up to 160 feet, depending on the size and orientation of the truck when parked at the dock.

**Composite Operational Noise Levels**

| Receptor | Existing Ambient Noise Level (dBA) | | Existing Year Project-Related Traffic Noise Increase (dBA) | Parking (dBA) | HVAC (dBA) | Loading and Trash Collection (dBA) | Garage Ventilation Fans (dBA) | Total Daytime/Nighttime (dBA) | Threshold Daytime/ Nighttime (dBA) | Exceeds Threshold? |
|---|---|---|---|---|---|---|---|---|---|---|
| 428 S. Hewitt Street | Day | 65.0 | 0.3 | 34 | 45 | 56 - 58 | 55 | 66.2-66.4/ 66.2-66.4 | 70.0/ 70.0 | No |
| | Night | 65.0 | | | | | | | | |
| 825 E. 4th Street | Day | 68.7 | 0.2 | 41 | 34 | 31 - 33* | 50 | 69.0/ 65.3-65.4 | 73.7/ 70.0 | No |
| | Night | 65.0 | | | | | | | | |

Source: Giroux & Associates and Envicom Corporation. January 2022.
* A 15 dB reduction for loading and trash collection was taken due to shielding from the structure of the proposed Office Building itself.