APPENDIX M

NOISE AND VIBRATION TECHNICAL REPORT

NOISE AND VIBRATION TECHNICAL REPORT
FOR THE
LOS ANGELES AERIAL RAPID TRANSIT PROJECT
LOS ANGELES, CA

Prepared for:

The Los Angeles Aerial Rapid Transit Draft Environmental Impact Report

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1. Introduction

This introductory section includes background information on sound and vibration. Subsequent sections include a detailed project description, regulatory background, noise and vibration prediction methodology, predicted sound levels and vibration and potential impacts for project construction and operation, and proposed mitigation measures.

1.1 Basics of Sound

Noise is typically defined as unwanted sound. The following is a brief discussion of fundamental environmental noise concepts.

1.1.1 Sound, Noise, and Acoustics

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a hearing organ, such as a human ear. Noise is defined as loud, unexpected, or annoying sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receptor, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receptor determine the sound level and characteristics of the noise perceived by the receptor. The field of acoustics deals primarily with the propagation and control of sound.

1.1.2 Frequency

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or Hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz (kHz), or thousands of Hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

1.1.3 Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (µPa). One µPa is approximately one hundred billionth (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 µPa. Because of this huge range of values, sound is rarely expressed in terms of µPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB). The threshold of hearing for young people is about 0 dB, which corresponds to 20 µPa.

1.1.4 Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3 dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB—rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dB louder than one source.

1.1.5 A-Weighted Decibels

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, people are most sensitive to the frequency range of 1,000–4,000 Hz and perceive sounds within that range better than sounds of the same amplitude at higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies. Then, an "A-weighted" sound level (expressed in units of dBA) can be computed based on this information.

The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds at moderate levels. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special conditions (e.g., B-, C-, and D-scales), but these scales are rarely used in conjunction with noise affecting humans. Noise levels for this report are reported in terms of A-weighted decibels or dBA. **Table 1-1** describes typical A-weighted noise levels for various noise sources.

Table 1-1 Typical A-Weighted Sound Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1000 feet		
	— 100 —	
Gas lawn mower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	— 70 —	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	— 60 —	
		Large business office
Quiet urban daytime	— 50 —	Dishwasher next room
Quiet urban nighttime	— 40 —	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing

Source: Caltrans 2013.

1.1.6 Human Response to Changes in Noise Levels

As discussed above, doubling sound energy results in a 3 dB increase in sound level. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different than what is measured.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1 dB changes in sound levels, when exposed to steady, single-frequency ("pure-tone") signals in the midfrequency (1,000 Hz–4,000 Hz) range. In typical noisy environments, changes in noise levels of 1 to 2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5 dB increase is generally perceived as a distinctly noticeable increase, and a 10 dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3 dB increase in sound level, would generally be perceived as barely detectable.

1.1.7 Noise Descriptors

Noise in our daily environment fluctuates over time. Some fluctuations are minor, but some are substantial. Some noise levels occur in regular patterns, but others are random. Some noise levels fluctuate rapidly, but others slowly. Some noise levels vary widely, but others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors used in this noise analysis.

- **Equivalent Sound Level (L_{eq})**: L_{eq} represents an average of the sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1-hour A-weighted equivalent sound level ($L_{Aeq(h)}$) is the energy average of A-weighted sound levels occurring during a one-hour period and is the basis for noise abatement criteria for many agencies.
- **Daytime Equivalent Sound Level ($L_{eq(day)}$)**: $L_{eq(day)}$ is the L_{eq} average of the A-weighted sound levels occurring during daytime hours from 7:00 AM to 10:00 PM.
- **Nighttime Equivalent Sound Level ($L_{eq(night)}$)**: $L_{eq(night)}$ is the L_{eq} average of the A-weighted sound levels occurring during nighttime hours from 10:00 PM to 7:00 AM.
- **Day-Night Level (L_{dn})**: L_{dn} is the energy-average of A-weighted sound levels occurring over a 24-hour period, with a 10 dB penalty applied to A-weighted sound levels occurring during nighttime hours between 10:00 PM and 7:00 AM to address the added sensitivity of people to noise during normal sleeping hours. This metric is often used to assess human annoyance to community noise.
- **Community Noise Equivalent Level (CNEL)**: CNEL is the energy-average of A-weighted sound levels occurring over a 24-hour period, with a 5 dB penalty applied to A-weighted sound levels occurring during evening hours between 7:00 PM and 10:00 PM, and a 10 dB penalty applied to A-weighted sound levels occurring during nighttime hours between 10:00 PM and 7:00 AM.
- **Sound Power Level (L_w):** Sound power level is a quantity that describes the quantity of acoustical energy that is emitted by a sound source independent of the receptor's distance from the object (similar to the wattage of a light bulb). Sound power level is not usually referenced in regulations describing maximum allowable noise levels, but rather, is used in some calculations and design standards to achieve a desired or allowable noise level.

- **Maximum Sound Level (L_{max}):** The maximum instantaneous sound level reached during a given period of time. This metric is commonly used in vehicle and construction equipment noise specifications.

1.1.8 Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors.

Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 decibels for each doubling of distance from a point source. A line source, such as a highway or train, consists of several localized noise sources on a defined path. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 decibels for each doubling of distance from a line source. This report evaluates noise sources from the proposed Project as point sources except for vehicular traffic associated with the Project, which is treated as a line source.

Ground Absorption

When a noise source is close to the ground, noise attenuation from ground absorption and reflective wave-canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 feet. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receptor, such as a parking lot or still body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receptor, such as soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 decibels per doubling of distance is normally assumed. When added to the spherical spreading for point sources, the excess ground attenuation results in an overall drop-off rate of 7.5 decibels per doubling of distance. As mentioned above, ground absorption/attenuation is only relevant to noise sources that are close to the ground and is not relevant to the noise sources associated with the proposed Project that are located well above ground level, for which ground absorption effects would be minimal. Accordingly, for noise sources located more than 10 feet above ground level, this report does not apply any noise reduction for ground absorption.

Atmospheric Effects

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

Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and solid walls) can substantially reduce noise levels. Walls are often constructed between a source and a receptor specifically to reduce noise. A barrier that breaks the line-of-sight between a source and a receptor will typically result in at least 5 dBA of noise reduction. Taller barriers provide increased noise reduction, up to a practical limit of 10 to 15 dBA.

1.2 Basics of Vibration

1.2.1 Characteristics of Vibration

Vibration is an oscillatory motion through a solid medium, such as soil or concrete, in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Vibration is also acoustic energy transmitted as waves through the solid medium. The rate at which pressure changes occur is called the frequency of the vibration, measured by the number of oscillations per second or Hertz (Hz). Vibration may be in the form of a single pulse of acoustical energy, a series of pulses, or a continuous oscillating motion.

The way that vibration is transmitted through the ground depends on the soil type, the presence of rock formations or man-made features, and the topography between the vibration source and the receptor location. As a general rule, vibration waves tend to dissipate and reduce in magnitude with distance from the source. Also, the high frequency vibrations are generally attenuated rapidly as they travel through the ground, so that the vibration received at locations distant from the source tends to be dominated by low-frequency vibration. The frequencies of ground-borne vibration most perceptible to humans are in the range from less than 1 Hz to 100 Hz.

Vibration can be a serious concern, causing buildings to shake and rumbling sounds to be heard. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of vibration are trains, buses on rough roads, and construction activities, such as blasting, pile driving, and heavy earth-moving equipment.

Ground-borne vibration levels rarely affect human health. Instead, most people consider ground-borne vibration to be an annoyance that can affect concentration or disturb sleep. In addition, high levels of ground-borne vibration can damage fragile buildings or interfere with equipment that is highly sensitive to ground-borne vibration (e.g., electron microscopes).

1.2.2 Vibration Descriptors

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings and is usually measured in inches per second. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body. The RMS amplitude is defined as the square root of the average of the squared amplitude of the velocity signal. Decibel notation for vibration level (VdB) is commonly used to measure RMS. The VdB acts to compress the range of numbers required to describe vibration. Vibration level (L_v) is expressed in velocity level decibels (L_v, VdB).

1.2.3 Effects of Vibration

When ground-borne vibration arrives at a building, a portion of the energy will be reflected or refracted away from the building, and a portion of the energy will typically continue to penetrate through the ground-building interface. However, once the vibration energy is in the building structure, it can be amplified by the resonance of the walls and floors. Occupants can perceive vibration as motion of the building elements (particularly floors) and also rattling of lightweight components, such as windows, shutters, or items on shelves. At very high amplitudes (energy levels), low-frequency vibration can cause damage to buildings.

Unlike noise, ground-borne vibration is not a phenomenon that most people experience every day. Most perceptible indoor vibration is caused by sources within buildings, such as operation of mechanical equipment, movement of people or slamming of doors. Typical outdoor sources of perceptible ground-borne vibration are construction equipment and traffic on rough roads. If the roadway is smooth, the vibration from traffic is rarely perceptible.

2. Project Description

2.1 Project Overview

The proposed Los Angeles Aerial Rapid Transit Project (proposed Project) would connect Los Angeles Union Station (LAUS) to the Dodger Stadium property via an aerial gondola system. The proposed Project would include an intermediate station at the southernmost entrance of the Los Angeles State Historic Park. The proposed Project would provide an aerial rapid transit (ART) option for visitors to Dodger Stadium, while also providing access between the Dodger Stadium property, the surrounding communities, including Chinatown, Mission Junction, the Los Angeles State Historic Park, Elysian Park, and Solano Canyon, to the regional transit system accessible at LAUS. The aerial gondola system would be approximately 1.2 miles and consist of cables, three passenger stations, a non-passenger junction, towers, and gondola cabins. When complete, the proposed Project would have a maximum capacity of approximately 5,000 people per hour per direction, and the travel time from LAUS to Dodger Stadium would be approximately 7 minutes. The proposed Project would provide amenities at the Los Angeles State Historic Park and would provide pedestrian improvements, including hardscape and landscape improvements. The ART system has the ability to overcome grade and elevation issues between LAUS and Dodger Stadium and provide safe, zero emission, environmentally friendly, and high-capacity transit connectivity in the Project area that would reduce greenhouse gas (GHG) emissions as a result of reduced vehicular congestion in and around Dodger Stadium and on neighborhood streets, arterial roadways, and freeways. The proposed Project would operate daily to serve existing residents, workers, park users, and visitors to Los Angeles.

Established aerial gondola transit systems worldwide, such as in La Paz, Bolivia, and Mexico City, Mexico, are being used as rapid transit for the urban population that they serve. The proposed Project would employ a Tricable Detachable Gondola system (also known as “3S”).[1] 3S Gondola system cabins carry approximately 30 to 40 passengers. Similar systems are used in Koblenz, Germany, Phu Quoc, Vietnam, and Toulouse, France.

2.2 Project Location

The proposed Project is located in the City of Los Angeles, situated northeast of downtown Los Angeles, within the Downtown, Chinatown, Mission Junction, and Elysian Park communities. **Figure 2-1** shows the regional location of the proposed Project.

The proposed Project would commence adjacent to LAUS and El Pueblo de Los Angeles (El Pueblo) and terminate at Dodger Stadium. The proposed Project would include three stations, a non-passenger junction, and cable-supporting towers at various locations along the alignment. As shown in **Figure 2-2**, the proposed Project alignment would generally be located within public right of way (ROW), following Alameda Street and then continuing along Spring Street in a northeast direction through the community of Chinatown to the southernmost corner of the Los Angeles State Historic Park. The alignment would then continue northeast over the western edge of the Los Angeles State Historic Park and the Los Angeles County Metropolitan Transportation Authority (Metro) L Line (Gold) to the intersection of North Broadway and Bishops Road. At this intersection, the proposed Project alignment would turn and continue northwest following Bishops Road toward its terminus at Dodger Stadium, located in the Elysian Park community.

[1] *The naming convention for this system is derived from the German word “seil”, which translates in English to “rope”. Hence, Tricable Detachable Gondola systems are known as a “3S” systems due to the use of three ropes, or cables.*

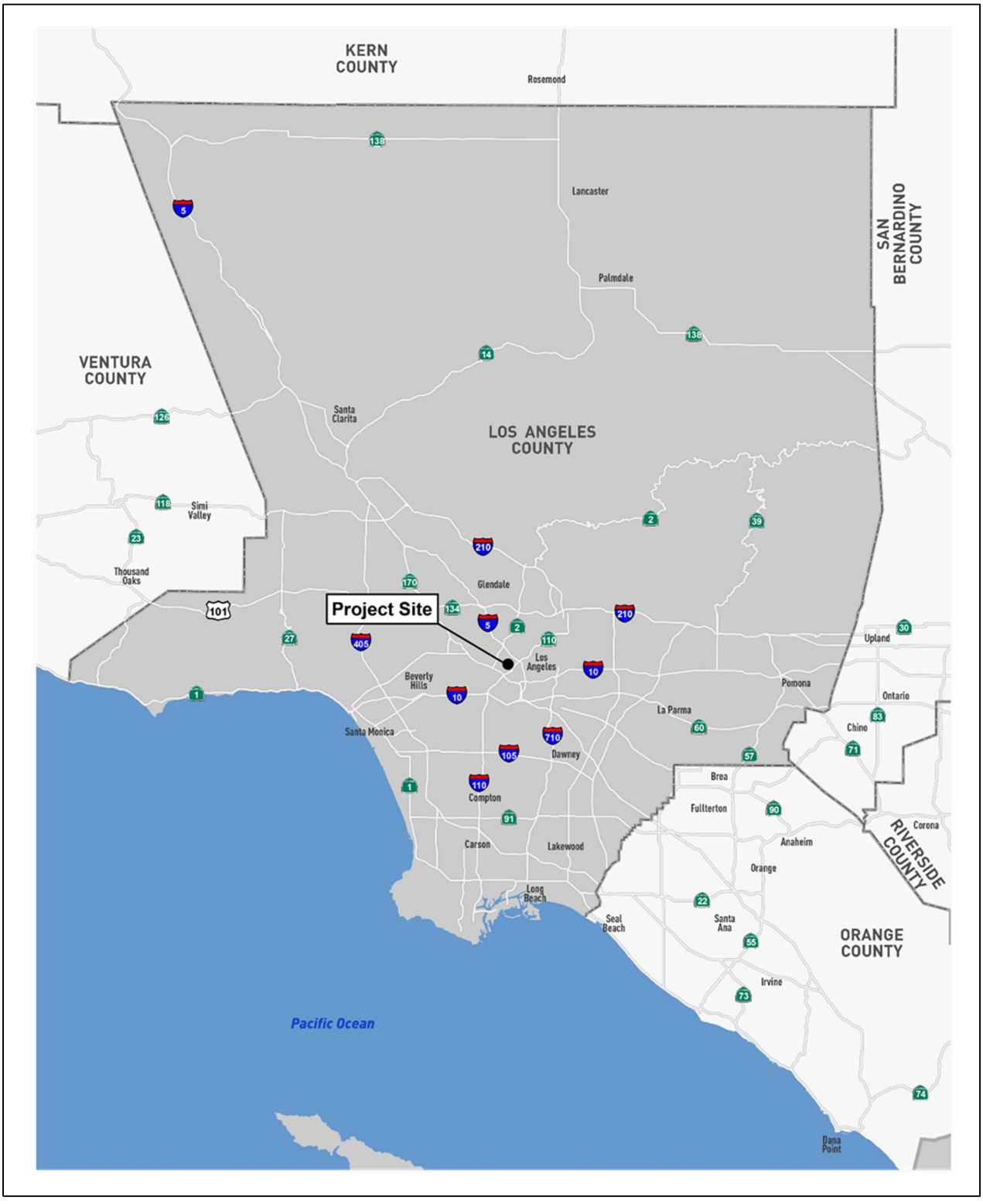


Figure 2-1 Regional Location Map

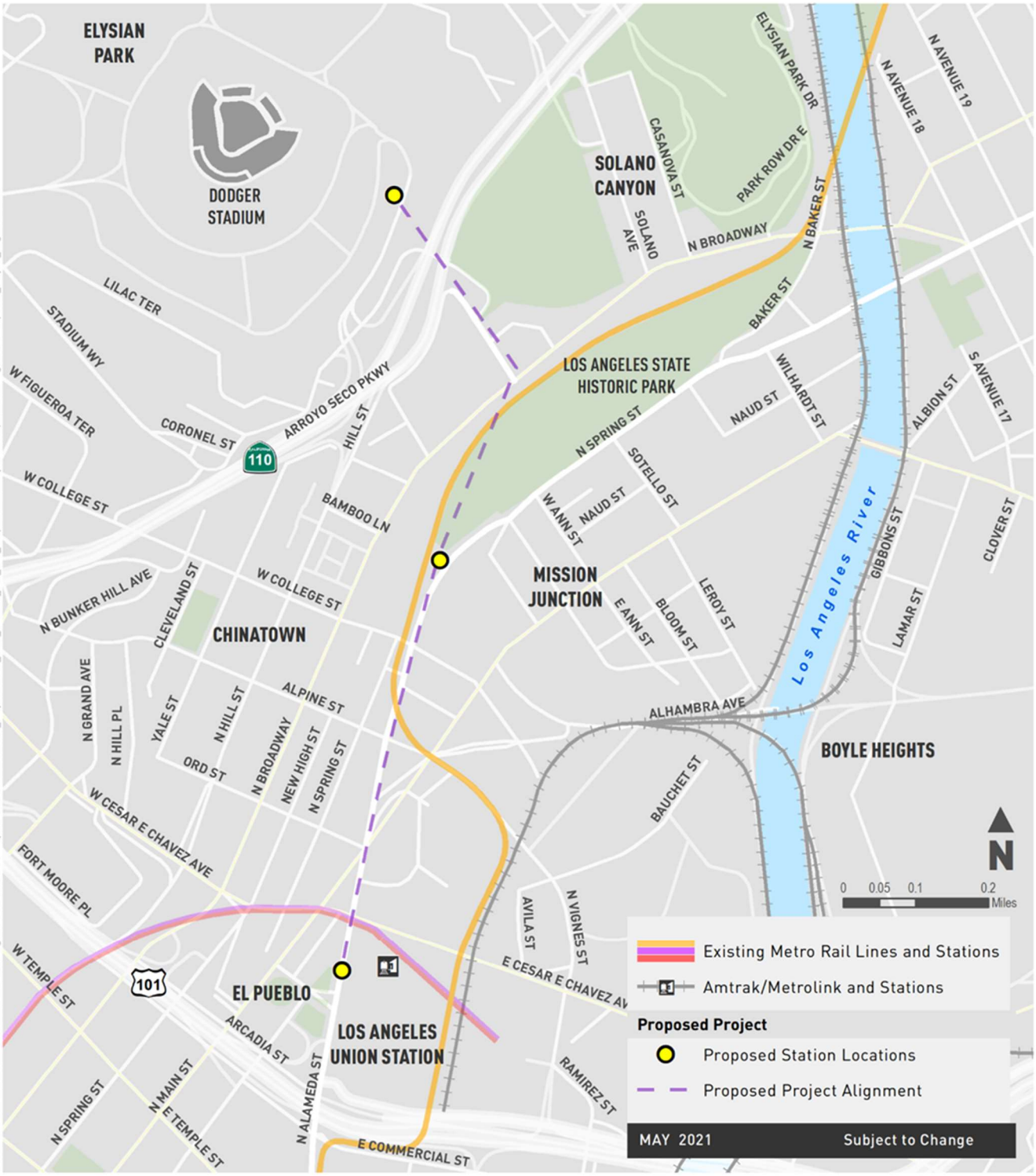


Figure 2-2 Proposed Project Location

2.3 Proposed Project Alignment and Components

The proposed Project “alignment” is defined as the length and width of suspended above-grade cables and cabins following the position of the Project components along the ART route from Alameda Station to Dodger Stadium Station.

2.3.1 Proposed Project Alignment

The proposed Project alignment would extend approximately 1.2 miles beginning near El Pueblo and LAUS on Alameda Street. The proposed Alameda Station would be constructed over Alameda Street between Los Angeles Street and Cesar Chavez Avenue, adjacent to the Placita de Dolores and planned LAUS Forecourt. From the Alameda Station, the proposed Project alignment would remain primarily above the public ROW and travel north along Alameda Street to the proposed Alameda Tower, which would be constructed on the Alameda Triangle, a portion of City ROW between Alameda Street, North Main Street, and Alhambra Street.

From the Alameda Tower, the proposed Project alignment would continue north along Alameda Street and cross Alpine Street. The proposed Alpine Tower would be constructed at the corner of Alameda Street and Alpine Street on City property. From the Alpine Tower, the proposed Project alignment would follow the public ROW and continue over the elevated Metro L Line (Gold). North of College Street, Alameda Street becomes Spring Street, and the proposed alignment would generally follow Spring Street in a northeast trajectory until it reaches the southernmost point of Los Angeles State Historic Park, where the proposed Chinatown/State Park Station would be constructed partially on City ROW and partially within the boundaries of the Los Angeles State Historic Park.

From the Chinatown/State Park Station, the proposed Project alignment would continue traveling north towards the intersection of North Broadway and Bishops Road, crossing over the western edge of the Los Angeles State Historic Park and the Metro L Line (Gold) tracks. The Broadway Junction would be located at the northern corner of the intersection of North Broadway and Bishops Road (1201 North Broadway). From the Broadway Junction, the proposed Project alignment would travel northwest primarily along Bishops Road, with portions above private property, crossing over State Route 110 (SR-110) towards Dodger Stadium. The proposed Stadium Tower would be located on hillside private property north of Stadium Way between the Downtown Gate entrance road to Dodger Stadium and SR-110. The northern terminus of the system would be located in a parking lot at the Dodger Stadium property, where the proposed Dodger Stadium Station would be constructed.

Figure 2-3 depicts the proposed Project alignment, including station locations, junction location, and tower locations. The proposed Project components are detailed below.

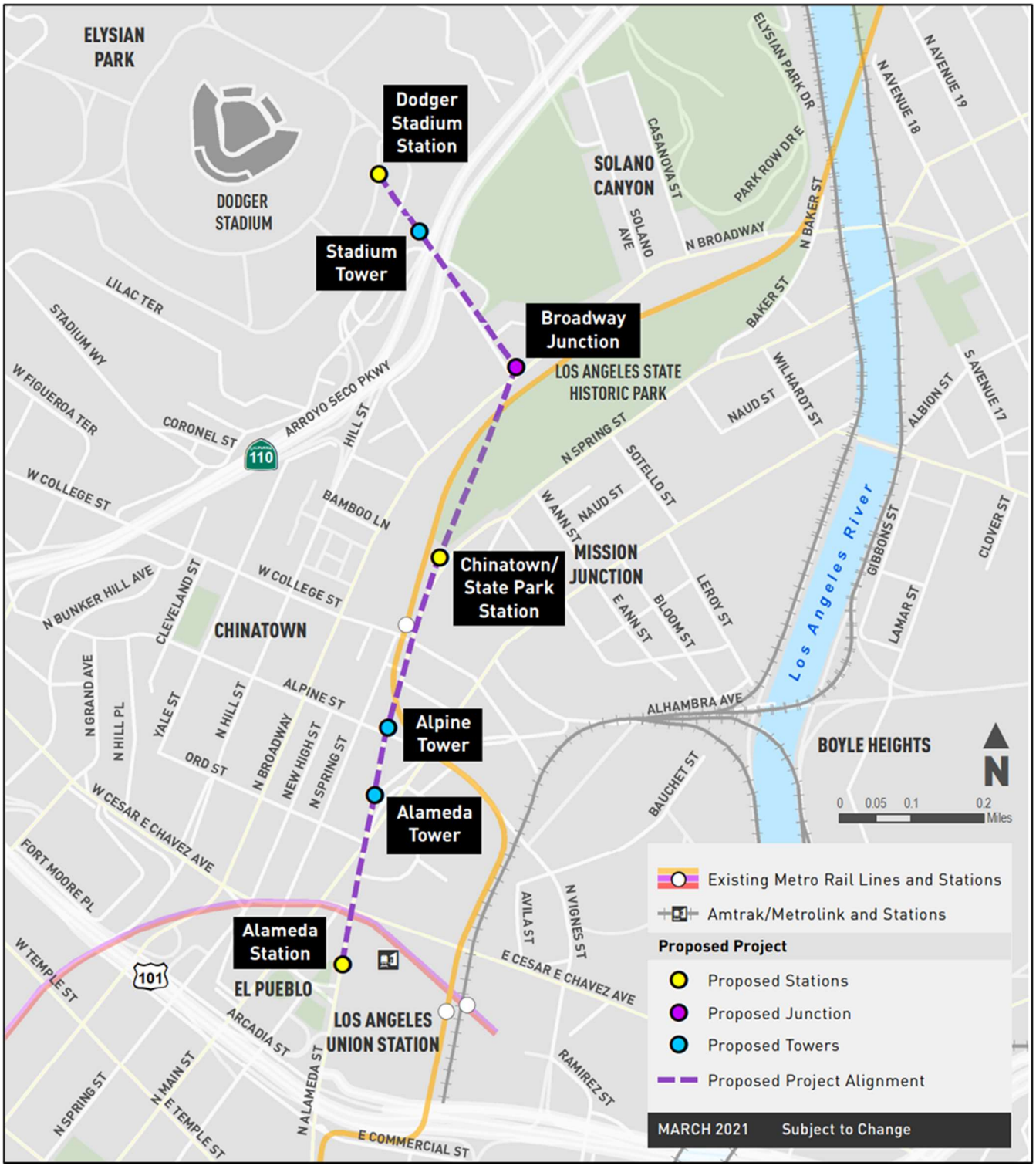


Figure 2-3 Proposed Project Alignment

Alameda Station: The Alameda Station would be located on Alameda Street adjacent to the planned LAUS Forecourt and Placita de Dolores between Los Angeles Street and Cesar Chavez Avenue. The station would be approximately 173 feet long, 109 feet wide, and 78 feet high at its tallest point, with the passenger loading platform approximately 31 feet above Alameda Street. Vertical circulation elements (e.g., elevators, escalators, stairs) for pedestrian access, which would also serve as queuing areas to the station, would be introduced at-grade north of the Placita de Dolores in a proposed new pedestrian plaza at El Pueblo on the west in an area currently containing a parking and loading area for El Pueblo. On the east, vertical circulation elements would be introduced at-grade from the planned LAUS Forecourt. Installation of the vertical circulation elements may include removal and replacement of trees, removal of parking and loading for El Pueblo, and installation of landscaping and hardscape.

Alameda Tower: The Alameda Tower would be located on the Alameda Triangle, a City ROW between Alameda Street, North Main Street, and Alhambra Avenue and would be 195 feet tall with the cable suspended 175 feet above-ground. Implementation of the Alameda Tower would include reuse and integration of the existing pavers located at the Alameda Triangle, as well as additional landscape and hardscape updates to the Alameda Triangle.

Alpine Tower: The Alpine Tower would be located on a City-owned parcel that is currently a surface parking lot, at the northeast corner of Alameda Street and Alpine Street, adjacent to the Metro L Line (Gold). The Alpine Tower would be 195 feet tall at its tallest point, with the cable suspended 175 feet above ground. The Alpine Tower would also include the installation of landscaping and hardscaping near the base of the tower.

Chinatown/State Park Station: The Chinatown/State Park Station would be located adjacent to Spring Street in the southernmost portion of the Los Angeles State Historic Park. The southern portion of the station would be located on City ROW, while the northern portion of the station would be integrated into the southern boundary of the Los Angeles State Historic Park. The station would be approximately 200 feet long, 80 feet wide, and 98 feet tall at its tallest point, with the passenger boarding platform approximately 50 feet above-grade. Access to the boarding platform would be from the mezzanine via elevators and stairs. Comprised of three levels, elevators and stairs from the ground level would lead up to a mezzanine, 27 feet above-grade, and ramps for the queuing area would lead up to the boarding platform, which is 50 feet above-ground. Elevators would be centrally located within the station. The Chinatown/State Park Station would also include Park amenities, including approximately 740 square feet of concessions, 770 square feet of restrooms, and a 220 square foot covered breezeway connecting the concessions and restrooms. Additionally, the Chinatown/State Park Station would include a mobility hub where passengers would be able to access a suite of first and last mile multi-modal options, such as a bike share program. Pedestrian access enhancements could include pedestrian improvements between Metro's L Line (Gold) Station and the Chinatown/State Park Station, including hardscape and landscape improvements, shade structures, and potential seating, as well as support for the future Los Angeles State Historic Park bike and pedestrian bridge. The Chinatown/State Park Station would require the removal of trees and vegetation; however, it will include the installation of landscaping and hardscaping. The Chinatown/State Park Station would provide passenger access to Chinatown, the Los Angeles State Historic Park, and to nearby neighborhoods and land uses, including the Mission Junction neighborhood, which includes the William Mead Homes public housing complex.

Broadway Junction: The Broadway Junction is a non-passenger junction that would be located at the intersection of North Broadway and Bishops Road. The junction would primarily be located on privately-owned property with a portion of the junction and overhead cable infrastructure cantilevered and elevated above the public ROW. The existing building located at 1201 N. Broadway would be demolished. The Broadway Junction would be approximately 227 feet long, 60 feet wide, and 98 feet high at its tallest point, with the platform approximately 50 feet above

the ground. Vertical circulation elements (i.e., elevators and stairs) would be installed on the northwest side of the junction for staff and maintenance access to the platform.

Stadium Tower: The Stadium Tower would be located on hillside private property north of Stadium Way between Downtown Gate and SR-110 and would stand 179 feet tall with the cable suspended 159 feet above-ground. The Stadium Tower would also include a 70-foot fire buffer area around the construction site and the installation of landscaping near the base of the tower.

Dodger Stadium Station: The Dodger Stadium Station would be located in the southeast portion of the Dodger Stadium property near the Downtown Gate. This station would be approximately 194 feet long, 80 feet wide, and 74 feet high at its tallest point. Cabins at this station would arrive and depart from an at-grade boarding platform, with the passenger queuing area also at-grade. The Dodger Stadium Station would include a subterranean area below the platform for storage and maintenance of cabins, as well as staff break rooms, lockers, and parts storage areas. The cabins will be transferred between the Station platform and the subterranean area by way of a cabin elevator. Automated parking and controls will manage the process of storing cabins or returning them to service. Cabins would be returned to and stored at the Dodger Stadium Station when the system is not in use.

Additionally, the Project Sponsor will request a program with the Los Angeles Dodgers on the potential for the Dodger Stadium Station to include a mobility hub where passengers would be able to access first and last mile multi-modal options to access Elysian Park and other nearby neighborhoods, including Solano Canyon. Consideration as to the mobility hub include securing Dodger Stadium and the surrounding surface parking, which are operated as an MLB stadium. Dodger Stadium Station would also include a pedestrian connection to Dodger Stadium, including hardscape and landscape improvements and potential seating. Restrooms for passenger use would be located at the station. Implementation of the Dodger Stadium Station would require the removal of parking spaces, as well as removal and replacement of landscaping.

2.4 System Operations

2.4.1 Typical Operating Logistics

During operations, the cabins would travel on a continuous loop between the Alameda Station and the Dodger Stadium Station. Cabins would pass through passenger stations at roughly one foot per second to allow for unloading and loading. If needed, a cabin could be stopped to accommodate passenger boarding. After the cabins pass through the unload/load zones, the doors would close and the cabins would accelerate to match the line speed of the haul rope before reattaching to the haul rope.

Gondola cabins would enter, traverse, and depart stations under fully automated control. Operation of the proposed Project would require approximately 20 personnel. Station attendants would be located within each station to assure safe boarding or to execute stops, if necessary. Attendants would also provide customer interaction and observation; if a passenger needs special assistance, an attendant may either further slow or stop a cabin. A separate operator would sit in a booth adjacent to the boarding area and monitor screens, which would show activities in each cabin and station, as well as all of the system controls.

2.4.2 Queueing and Ticketing/Fare Checking

Queueing areas would be built into and as necessary, adjacent to, each of the stations to provide a gathering place for passengers waiting to enter the stations, thereby preventing crowding of sidewalks and walkways by passengers around stations. Queueing for the Alameda Station

would occur in the planned LAUS Forecourt area on the east side of Alameda Street, and north of the Placita de Dolores in a proposed new pedestrian plaza at El Pueblo on the west side of Alameda Street. At the Chinatown/State Park Station, queueing would occur on the mezzanine and boarding platform levels. At the Dodger Stadium Station, the queueing area would be located on the north side of the station in a designated queueing area adjacent to the station.

Ticketing for the proposed Project would use either a chip-based card system or electronic ticketing that could be purchased and saved on a personal mobile device. Using these types of technologies would allow for contactless fare checking at the stations. Riders would pre-purchase their ticket prior to entering the boarding platform and fares would be checked using a card reader/scanner.

2.4.3 Signage

Similar to other transit projects that incorporate signage, the proposed Project would include signage to support wayfinding for transit patrons including information about transit connections and other important information to facilitate transit usage. Private funding for the proposed Project is anticipated to be supported by naming rights and sponsorship revenues, and such sponsors would be recognized in Project signage, which would be designed consistent with applicable Metro and City approval requirements. Such signage may include identification and other static signs, electronic digital displays and/or changeable message light-emitting diode (LED) boards that include both transit information and other content, which may include off-site advertising that generates proceeds to support transit system costs and operations. Signage would be architecturally integrated into the design of the ART system including its stations, the junction, towers, and cabins. In addition, directional and pedestrian signage would be placed adjacent to and throughout the proposed Project as necessary to facilitate access and safety, including along the pedestrian improvements between Metro's L Line (Gold) Station and the pedestrian connection between the Dodger Stadium Station and Dodger Stadium. Project signage would be illuminated by means of low-level external lighting, internal lighting, or ambient light. Exterior lights would be directed onto signs to minimize off-site glare. Signage would be in conformance with all applicable requirements of the Los Angeles Municipal Code (LAMC), and in accordance with LAMC, lighting intensity will be minimized in order to avoid negative impacts to adjacent residential properties.

2.4.4 Lighting

Project lighting would include low-level lighting for security and wayfinding purposes adjacent to and within the stations, junction, and towers, within cabins, at the vertical circulation, and areas for ticketing, fare checking, and queueing. In addition, low-level lighting to accent signage, architectural features, landscaping, adjacent pedestrian plazas, and potential mobility hubs would be installed at the stations, junction, and towers. Lighting would also be provided underneath the elevated stations and junction. Lighting for the pedestrian access enhancements, including the pedestrian improvements between Metro's L Line (Gold) Station and the pedestrian connection between the Dodger Stadium Station and Dodger Stadium would include new pole lights for security and wayfinding purposes, as well as low-level lighting to accent signage and landscaping.

Lighting would be low-level and primarily integrated within the architectural features. Exterior lighting would be shielded or directed toward the areas to be lit to limit spillover onto adjacent properties and off-site uses, and would meet all applicable LAMC lighting standards.

2.4.5 Maintenance

The proposed Project would require routine maintenance that would be performed by the system operator. The overall system would be observed on a daily basis as part of the startup routine.

Routine maintenance activities would generally take place during overnight periods or other scheduled down time. Cabins and their associated grips and hangers would be maintained in the shop at the Dodger Stadium Station. A work carrier cabin would be provided to facilitate work at tower equipment. Annual maintenance activities may require crane access at tower locations, including the potential to require the temporary closing of traffic lanes.

Rope maintenance schedules would be determined through a combination of system design and periodic monitoring; however, it is expected that the haul rope would need replacement every 5 to 10 years. This would require pulling a new haul rope, which would take up to two weeks to complete.

On a periodic basis, the system would undergo formal testing as prescribed by the California Division of Occupational Safety and Health (Cal/OSHA) and appropriate ropeway standards. This formal testing is required by standards to occur at least every 7 years. It is anticipated that the system would be closed to riders for up to two days during the formal testing events.

Backup power would be provided by battery storage located at each station and tower and the non-passenger junction. The battery storage system would be tested on a regular basis.

2.4.6 Power Requirements

Operational power requirements can be separated into two categories: normal operations and emergency operations. Power requirements of normal operations would be provided by the City of Los Angeles Department of Water and Power through a connection to their power grid, and would include the power to operate the gondola system and the non-gondola system components (i.e. lights, ventilation, escalators, elevators). When operating at capacity, normal operations are estimated to require a total of approximately 2.5 megawatts of power.

Power requirements for emergency operations consist of the energy needed for operations in the event of a power grid failure. The proposed Project would include the installation of backup battery storage at each station, tower, and junction to provide backup power to allow unloading of the system in the event of a power grid failure. The total backup power required is 1,400 kilowatts.

2.4.7 Sustainability Features

The proposed Project would provide a sustainable, high-capacity zero emission ART option for visitors to Dodger Stadium, while also providing access between Dodger Stadium, the surrounding communities, and the regional transit system accessible at LAUS. ART technology is quiet, and the proposed Project would reduce VMT and congestion, leading to reduced GHG emissions and improved air quality.

The proposed Project's stations, junction, towers, and gondola cabins would incorporate energy efficient, sustainable, water and waste efficient, and resilient features, as feasible. The proposed stations and junction are designed to be open-air buildings, allowing for passive ventilation strategies and providing direct access to outdoor air and natural daylight, while also providing adequate shade protection from heat. The cabins would be ventilated to enhance air quality for passengers.

The design intent and structural strategy for the stations and towers also provides an efficiency of materials. The steel plate tower forms have been designed as “Monocoque” structures, where structure, form, and finish are unified. Materials for the stations, junction, and towers would be locally sourced where possible, and would include recycled content where possible. Light-toned finish materials will also serve to minimize heat island concerns.

The proposed Project would be designed to comply with all applicable state and local codes, including the City of Los Angeles Green Building and Low-Impact Development (LID) Ordinances.

2.5 Construction

Construction of the proposed Project is anticipated to begin as early as 2024 and take approximately 25 months, including construction, cable installation, and system testing. A summary of the construction activities is provided below. Construction of the Project components may partially overlap in schedule, especially since construction would occur at several physically separated sites.

Utility relocations would occur prior to construction of the proposed Project components and would be coordinated directly with the utility providers. Following utility relocations, construction would commence.

During construction, some parking spaces at Dodger Stadium would be temporarily closed for construction of the Dodger Stadium Station and for overall Project construction, construction trailers, laydown and staging areas, and construction worker parking.

Construction of more than one Project component would occur at the same time, with consideration of available materials, work crew availability, and coordination of roadway closures. **Table 2-1** below includes the estimated duration to complete construction of each of the proposed Project components, the maximum depths of drilled piles, the maximum depth of excavation, the amount of excavation, and the amount of materials (soils and demolition debris) to be exported for each component of the proposed Project.

Table 2-1 Proposed Project Construction Details

Component	Construction Duration	Maximum Depth of Drilled Piles	Maximum Depth of Excavation	Amount of Excavation	Amount of Materials Exported
Alameda Station	17 months	125 feet	10 feet	2,728 cubic yards	2,295 cubic yards
Alameda Tower	12 months	120 feet	10 feet	2,850 cubic yards	2,292 cubic yards
Alpine Tower	11 months	120 feet	10 feet	3,606 cubic yards	2,887 cubic yards
Chinatown/State Park Station	19 months	80 feet	10 feet	6,267 cubic yards	4,567 cubic yards
Broadway Junction	19 months	90 feet	7 feet	6,407 cubic yards	5,379 cubic yards
Stadium Tower	12 months	120 feet	7 feet	1,286 cubic yards	1,202 cubic yards
Dodger Stadium Station	20 months	55 feet	42 feet	44,313 cubic yards	44,001 cubic yards

Following completion of construction, the gondola cables would be installed, followed by system testing and inspections.

Working hours would vary to meet special circumstances and restrictions, but are anticipated to be consistent with the City's allowable construction hours of Monday through Friday between 7:00 a.m. to 9:00 p.m. and Saturdays and National Holidays between 8:00 a.m. to 6:00 p.m. While not anticipated, approval would be required from the City of Los Angeles Board of Police Commissioners for any extended construction hours and possible construction on Sundays.

Anticipated closures would include lane closures in which lanes would be closed 24-hours a day during certain phases of construction, or alternating closures during certain phases of construction, in which closures would occur during construction hours for approximately 10 hours a day, and roads would reopen during non-construction hours for approximately 14 hours a day. For alternating closures, during non-construction hours, steel plates would be placed over construction sites to the extent feasible in order to allow for vehicular and pedestrian circulation. The closures and hours would vary between location and phase of construction. The proposed Project would implement a Construction Traffic Management Plan that would include detours and ensure that emergency access is maintained throughout all construction activities.

3. Regulatory Framework

3.1 Noise

3.1.1 Federal

The Federal Transit Administration (FTA) methodologies for assessing noise impacts are defined in the FTA's Transit Noise and Vibration Impact Assessment Manual (FTA Manual). The values presented in **Table 3-1** represent the detailed construction noise impact assessment criteria for daytime construction from the FTA Manual.

Table 3-1 FTA Detailed Noise Analysis Construction Assessment Criteria

Land Use	Daytime Noise $L_{eq(8\text{-}hr)}$
Residential	80
Commercial	85
Industrial	90

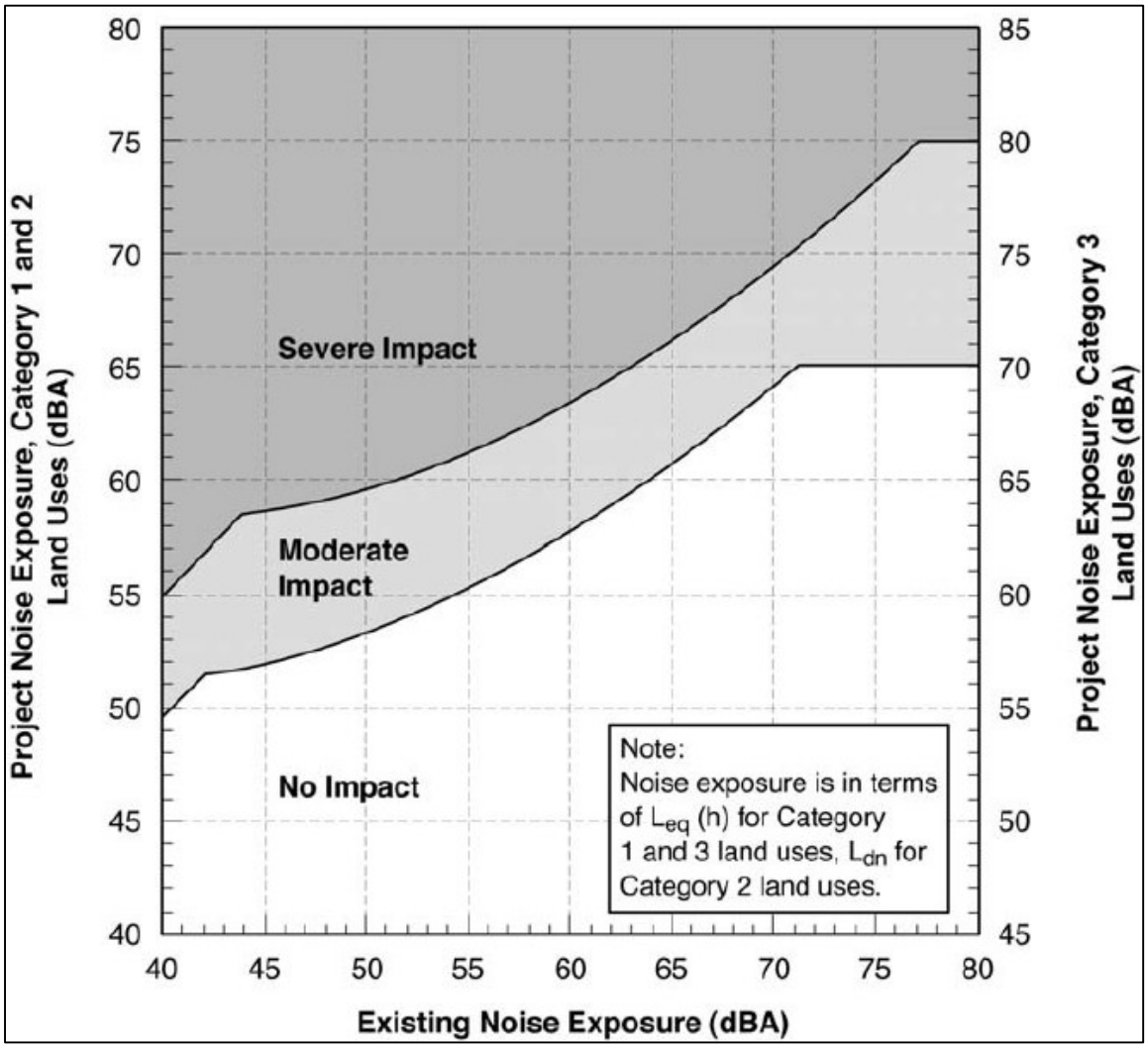
Source: FTA, 2018

The FTA operational noise impact criteria for transit projects are shown graphically on **Figure 3-1**. The Land Use Categories (1, 2, and 3) shown on **Figure 3-1** are defined in **Table 3-2**.

Table 3-2 FTA Land Use Categories and Metrics for Transit Noise Impact Criteria

Land Use Category	Land Use Type	Noise Metric (dBA)	Description of Land Use Category
1	High Sensitivity	Outdoor $L_{eq(h)}$[1]	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use.
2	Residential	Outdoor L_{dn}	Residences and buildings where people normally sleep. This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Institutional	Outdoor $L_{eq(h)}$[1]	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Buildings with interior spaces where quiet is important, such as medical offices, conference rooms, recording studios, and concert halls fall into this category. Places for meditation or study associated with cemeteries, monuments, and museums. Certain historical sites, parks, and recreational facilities are also included.

[1] L_{eq} for the noisiest hour of system-related activity during hours of noise sensitivity.
Source: FTA, 2018.



Source: FTA, 2018

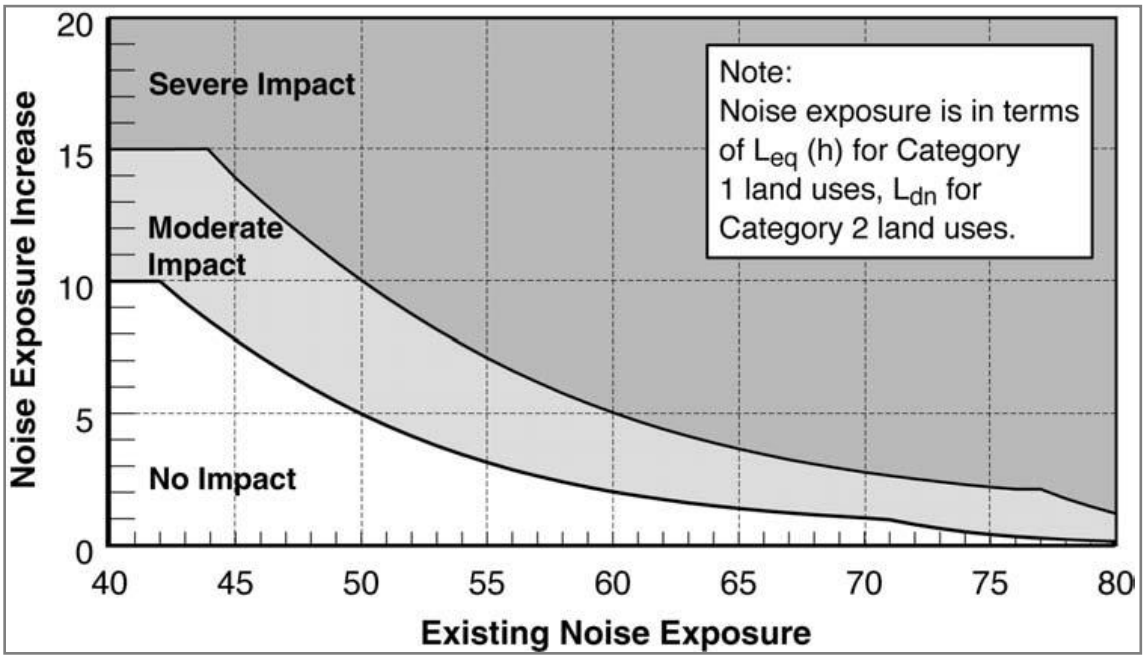
Figure 3-1 Operational Noise Impact Criteria for Transit Projects

With a noise exposure below the lower of the two curves on **Figure 3-1**, a proposed project is considered to have no noise impact because, on average, its introduction would result in a minimal increase in the number of people highly annoyed by the new noise. The curve defining the onset of noise impact stops increasing at 65 dBA for Land Use Categories 1 and 2 (the left-hand axis), a standard limit for an acceptable living environment defined by a number of federal, state, and local agencies. Project noise above the upper curve is considered to cause a severe impact because a significant percentage of people would be highly annoyed by the new noise. The upper curve flattens at 75 dBA for Land Use Categories 1 and 2, indicating a level associated with an unacceptable living environment. As indicated by the Land Use Category 3 scale on **Figure 3-1** (right-hand axis), the noise criteria are 5 dB higher for Land Use Category 3 because these types of land uses are considered to be less sensitive to noise than Land Use Categories 1 and 2.

Between the two curves, a proposed project is judged to have a moderate impact. The change in the combined noise level—when project-generated noise is added to existing noise levels—is noticeable to most people, but could not be sufficient to cause strong, adverse reactions from the community. In this transitional area, other project-specific factors must be considered to determine the impact's magnitude and the need for mitigation, such as the existing noise level,

predicted level of increase over existing noise levels, and the types and numbers of noise-sensitive land uses affected.

Although the **Figure 3-1** curves are defined in terms of existing and project component noise exposures, it is important to emphasize that it is the increase in the combined noise that is the basis for the criteria. To illustrate this point, **Figure 3-2** shows the noise impact criteria for Land Use Categories 1 and 2 in terms of the allowable increase in the combined noise exposure. Because L_{dn} and L_{eq} are measures of total acoustic energy, any new noise source in a community would cause an increase, even if the new source level is less than the existing level. Referring to Figure 3-2, it can be seen that the criterion for moderate impact allows a noise exposure increase of 10 dB if the existing noise exposure is 42 dBA or less, but only a 1 dB increase when the existing noise exposure is 70 dBA.



Source: FTA, 2018

Figure 3-2 FTA Allowable Increase in Operational Cumulative Noise Levels

As the existing ambient noise level increases, the allowable transit noise level increases, but the total amount of allowable increase in community noise exposure is reduced. This accounts for the unexpected result that a project noise exposure that is less than the existing noise exposure can still cause an impact. This is clearer from the examples given in **Table 3-3**, which indicate the allowed transit noise level for different existing levels of exposure.

Table 3-3 FTA Operational Noise Impact Criteria: Effect on Cumulative Noise Exposure

L_{dn} or L_{eq} in dBA (rounded to the nearest whole decibel)			
Existing Noise Exposure	Allowable Project Noise Exposure Before Moderate Impact	Allowable Combined Total Noise Exposure	Allowable Noise Exposure Increase
45	51	52	7
50	53	55	5
55	55	58	3
60	57	62	2
65	60	66	1
70	64	71	1
75	65	75	0

Source: FTA, 2018

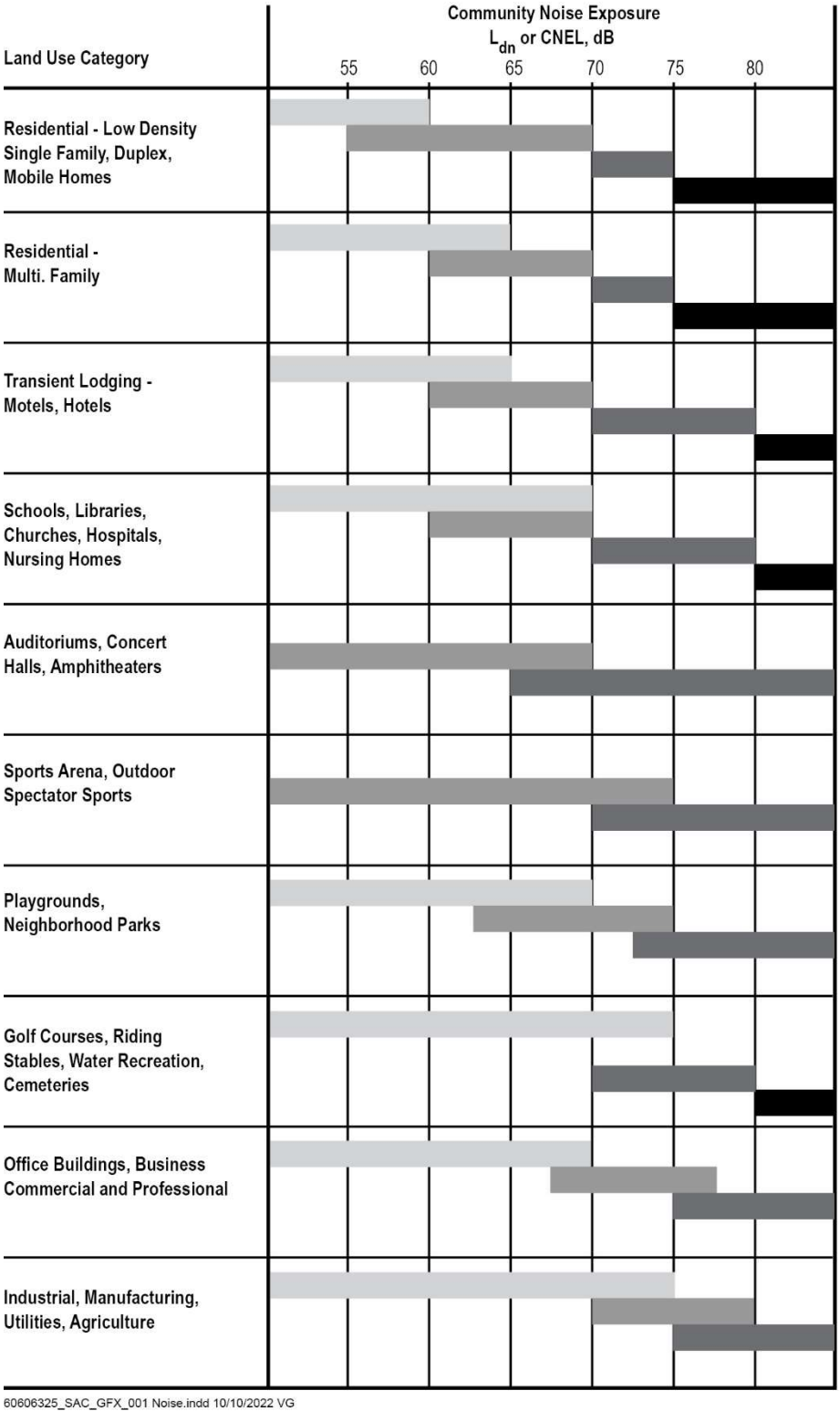
3.1.2 State

The State of California has not adopted statewide standards for environmental noise, but the California Department of Health Services (DHS) has established guidelines for evaluating the compatibility of various land uses as a function of community noise exposure, as presented in **Figure 3-3**. The purpose of these guidelines is to maintain acceptable noise levels in a community setting for different land use types. Noise levels are divided into four general categories, which vary in range according to land use type:

- “normally acceptable,”
- “conditionally acceptable,”
- “normally unacceptable,” and
- “clearly unacceptable.”

For instance, a noise environment ranging from 50 dBA CNEL to 65 dBA CNEL is considered to be “normally acceptable” for multi-family residential uses, while a noise environment of 75 dBA CNEL or above for multi-family residential uses is considered to be “clearly unacceptable.”

In addition, California Government Code Section 65302 requires each county and city in the State to prepare and adopt a comprehensive long-range general plan for its physical development, with Section 65302(f) requiring a noise element to be included in the general plan.



Source: California Office of Noise Control

Figure 3-3 Guidelines for Noise Compatible Land Use

3.1.3 Local

3.1.3.1 Los Angeles Municipal Code

The City's Noise Regulations are provided in Chapter XI of the Los Angeles Municipal Code (LAMC). Section 111.02 of the LAMC provides procedures and criteria for the measurement of the sound level of certain noise sources. In accordance with the LAMC, a noise source that causes a noise level increase of 5 dBA over the existing average ambient noise level as measured at an adjacent property line is considered to create a violation of the LAMC.

To account for people's increased tolerance for short-duration noise events, the LAMC provides a 5 dBA allowance for a noise source that causes noise lasting more than 5 but less than 15 minutes in any 1-hour period and an additional 5 dBA allowance (total of 10 dBA) for a noise source that causes noise lasting 5 minutes or less in any 1-hour period.

Section 112.05 of the LAMC sets a maximum noise level for construction equipment of 75 dBA at a distance of 50 feet between 7 AM and 10 PM when operated within 500 feet of a residential zone. Compliance with this standard shall not apply where "technically infeasible."

Section 41.40 of the LAMC prohibits construction between the hours of 9:00 PM and 7:00 AM Monday through Friday, 6:00 PM and 8:00 AM on Saturday, and at any time on Sunday (i.e., construction is allowed Monday through Friday between 7:00 AM and 9:00 PM; and Saturdays and National Holidays between 8:00 AM and 6:00 PM). Approval would be required from the City of Los Angeles Board of Police Commissioners for extended construction hours and construction on Sundays.

3.1.3.2 City of Los Angeles Noise Element

The Noise Element of the City of Los Angeles General Plan establishes CNEL guidelines for land use compatibility and includes a number of goals, objectives, and polices for land use planning purposes.

The overall purpose of the Noise Element is to guide policy makers in making land use determinations and in preparing noise ordinances that would limit exposure of citizens to excessive noise levels. The following policies and objectives from the Noise Element are applicable to the Project.

- Objective 2 (non-airport): Reduce or eliminate non-airport related intrusive noise, especially relative to noise-sensitive land uses.
- Policy 2.1: Enforce and/or implement applicable City, State, and federal regulations intended to mitigate proposed noise producing activities, reduce intrusive noise and alleviate noise that is deemed a public nuisance.
- Objective 3 (Land Use Development): Reduce or eliminate noise impacts associated with the proposed development of land and changes in land use.
- Policy 3.1: Develop land use policies and programs that will reduce or eliminate potential and existing noise impacts.

The City's Noise Element includes the CNEL guidelines for land use compatibility, which are provided in **Table 3-4**. As explained in Section 3.1.2, these CNEL guidelines for specific land uses are classified into four categories:

- "normally acceptable,"
- "conditionally acceptable,"

- "normally unacceptable," and
- "clearly unacceptable."

New development should generally be discouraged within the "normally unacceptable" or "clearly unacceptable" categories. However, if new development does proceed, a detailed analysis of the noise reductions required must be made in order to determine the noise insulation features that must be included in the design.

Table 3-4 City of Los Angeles Guidelines for Noise Compatible Land Use

Land Use Category	Day-Night Average Exterior Sound Level (CNEL dBA)						
	50	55	60	65	70	75	80
Residential Single Family, Duplex, Mobile Home	A	C	C	C	N	U	U
Residential Multi-Family	A	A	C	C	N	U	U
Transient Lodging, Motel, Hotel	A	A	C	C	N	U	U
School, Library, Church, Hospital, Nursing Home	A	A	C	C	N	N	U
Auditorium, Concert Hall, Amphitheater	C	C	C	C/N	U	U	U
Sport Arena, Outdoor Spectator Sports	C	C	C	C	C/U	U	U
Playground, Neighborhood Park	A	A	A	A/N	N	N/U	U
Golf Course, Riding Stable, Water Recreation, Cemetery	A	A	A	A	N	A/N	U
Office Building, Business Commercial Professional	A	A	A	A/C	C	C/N	N
Agricultural, Industrial, Manufacturing, Utilities	A	A	A	A	A/C	C/N	N

A = Normally acceptable. Specified land use is satisfactory, based upon assumption buildings involved are conventional construction, without any special noise insulation.
C = Conditionally acceptable. New construction or development only after a detailed analysis of noise mitigation is made and needed noise insulation features are included in project design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will suffice.
N = Normally unacceptable. New construction or development generally should be discouraged. A detailed analysis of noise reduction requirements must be made and noise insulation features included in the design of the project.
U = Clearly unacceptable. New construction or development generally should not be undertaken.
Source: Noise Element of the City of Los Angeles General Plan, 1999

3.2 Vibration

3.2.1 Federal

The evaluation of vibration impacts can be divided into two categories, human annoyance and building damage. The FTA guidelines provide ground-borne noise and vibration criteria for human annoyance. Ground-borne noise is typically only assessed at locations with subway or tunnel operations where there is no airborne noise path. Since there are no subway or tunnel operations associated with the proposed Project, ground-borne noise impacts were not assessed. The FTA guidelines vibration criteria for human annoyance are listed in **Table 3-5**. These levels represent the maximum RMS level of an event. In addition, the guidelines provide human annoyance criteria for special buildings that are very sensitive to ground-borne vibration that could disrupt or disturb their intended use. The human annoyance vibration impact criteria for these special buildings, defined as concert halls, television studios, recording studios, auditoriums, and theaters, are shown in **Table 3-6**.

Both **Table 3-5** and **Table 3-6** differentiate human annoyance vibration impact thresholds depending on the frequency of daily vibration events, with fewer than 30 vibration events per day considered "infrequent," between 30 and 70 events considered "occasional," and more than 70 events considered "frequent." These dividing lines were originally selected to differentiate

between the operational impacts of freight rail, commuter rail and light rail transit systems. The FTA criteria for "frequent events" are used for the proposed Project to apply the most conservative threshold.

Table 3-5 FTA Ground-Borne-Vibration Human Annoyance Impact Criteria

Land Use Category	Ground-Borne Vibration Impact Levels (VdB re 1 micro inch/second)		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations	65 VdB[4]	65 VdB[4]	65 VdB[4]
Category 2: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use	75 VdB	78 VdB	83 VdB

Notes:

[1] "Frequent events" are defined as more than 70 vibration events of the same kind per day.
[2] "Occasional events" are defined as between 30 and 70 vibration events of the same kind per day.
[3] "Infrequent events" are defined as fewer than 30 vibration events of the same kind per day.
[4] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research would require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the heating, ventilation, and air conditioning systems and stiffened floors.
VdB = root mean square vibration velocity level, decibels
Source: FTA, 2018

Table 3-6 FTA Ground-Borne-Vibration Human Annoyance Impact Criteria for Special Buildings

Type of Building or Room	Ground-Borne Vibration Impact Levels (VdB re 1 micro inch/second)	
	Frequent Events[1]	Occasional or Infrequent Events[2]
Concert halls	65 VdB	65 VdB
Television studios	65 VdB	65 VdB
Recording studios	65 VdB	65 VdB
Auditoriums	72 VdB	80 VdB
Theaters	72 VdB	80 VdB

Notes
[1] "Frequent events" are defined as more than 70 vibration events of the same kind per day.
[2] "Occasional or infrequent events" are defined as fewer than 70 vibration events of the same kind per day.
VdB = root mean square vibration velocity level, decibels
Source: FTA, 2018

In addition to human annoyance impact criteria, the FTA guidelines provide vibration criteria for building damage. Construction activities can result in varying degrees of ground vibration, depending on the equipment and method employed. The vibration associated with typical transit construction is not likely to cause major structural damage to building structures, but it could cause slight architectural damage at the highest level (FTA Manual 2018). Construction vibration impact on a building is generally assessed in terms of PPV (in inches per second). **Table 3-7**

summarizes the FTA guidelines' construction vibration criteria for the analysis of potential building damage.

Table 3-7 FTA Construction Vibration Building Potential Damage Criteria

Building Category	PPV (inches per second)	Approximate L_v[1]
I. Reinforced-concrete, steel or timber (no plaster)	0.50	102 VdB
II. Engineered concrete and masonry (no plaster)	0.30	98 VdB
III. Non-engineered timber and masonry buildings	0.20	94 VdB
IV. Buildings extremely susceptible to vibration damage	0.12	90 VdB

Notes:
[1] VdB re 1 micro-inch per second
L_v = velocity level, decibels
PPV = peak particle velocity
VdB = root mean square vibration
Source: FTA, 2018

3.2.2 State

The California Department of Transportation (Caltrans) has published a Transportation and Vibration Guidance Manual, 2020 that include guidelines for building damage and human response to vibration. The Caltrans guidance regarding vibration damage thresholds is largely consistent with the standards and techniques presented in the FTA Noise and Vibration Impact Assessment manual, as discussed above.

3.2.3 Local

The City of Los Angeles currently does not have any adopted standards, guidance or thresholds relative to ground-borne vibration. Therefore, available guidance from the FTA is utilized to assess impacts due to ground borne vibration for project construction and operation.

4. Existing Conditions

A noise survey was conducted to establish existing noise conditions in a variety of locations throughout the Project area, focusing on areas of existing or future noise-sensitive receptors, including single-family residential (SFR) areas, multi-family residential (MFR) areas, parks, schools, and other outdoor areas of frequent human use.

4.1 Noise Survey Program

The existing condition noise survey included a combination of short-term (approximately 15 minutes) and long-term (24-hour) measurements at a total of 22 locations. Most measurements were conducted between June 15 and June 18, 2020; measurements for an additional location were conducted on May 11, 2022. The noise measurements were generally conducted at the sites representative of noise-sensitive receptors along the proposed Project alignment, from LAUS to Dodger Stadium. These included identified locations of existing and future residential developments, schools, parks, and other areas with frequent outdoor human use. See Appendix A for noise measurement procedures, measurement detail, photos, and instrument calibration certificates.

4.1.1 Measurement Locations

The 22 measurement locations are shown in **Figure 4-1**. **Table 4-1** provides descriptions for each of the 22 measurement locations, including addresses, cross-streets, and/or the names of the measurement location; site ID, which corresponds to the measurement location shown in **Figure 4-1**; and land use description.

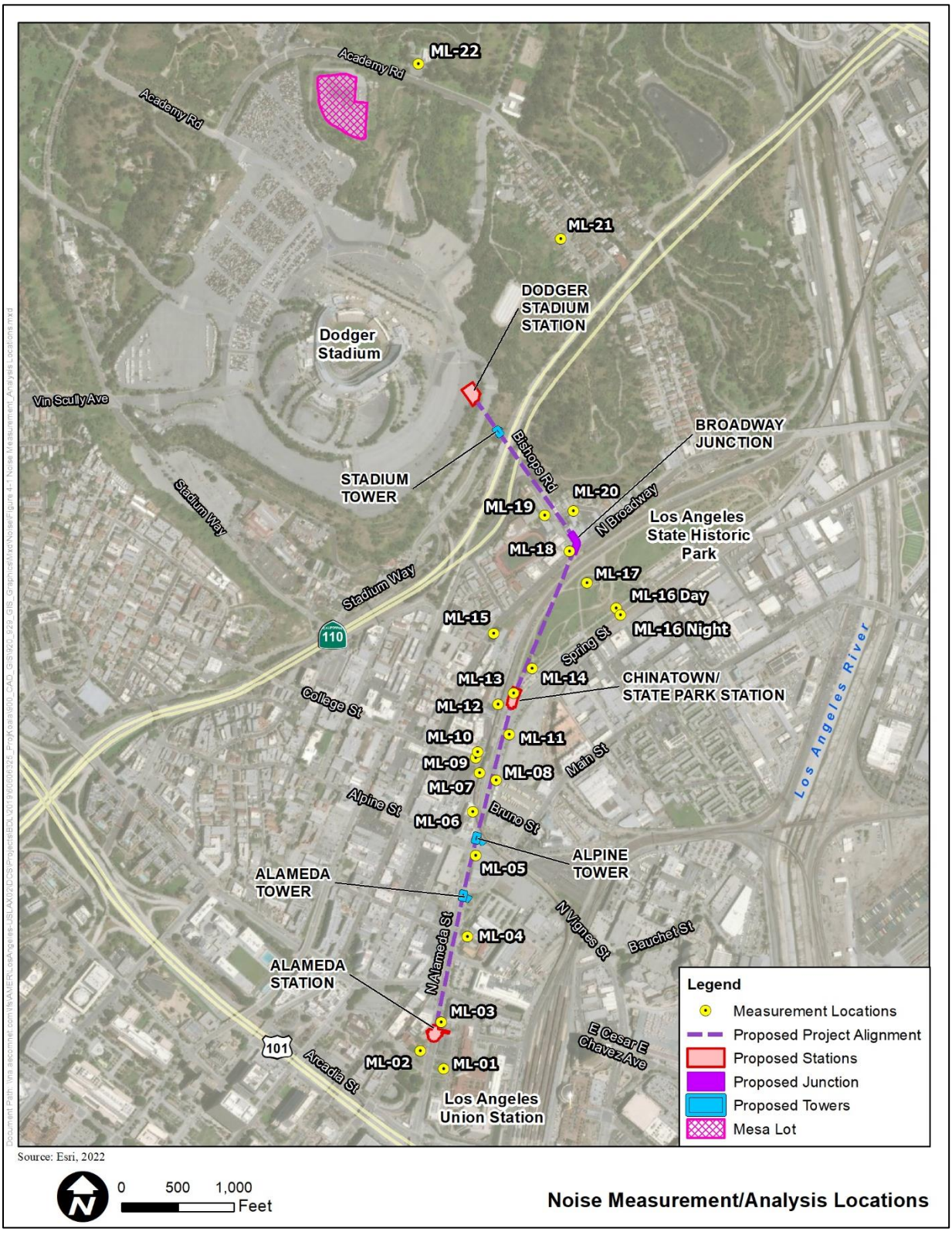


Figure 4-1 Measurement Locations

Table 4-1 Measurement Location Descriptions

Site ID	Location Description	Current Land Use	FTA Land Use Category
ML-01	LAUS Entrance Plaza	Public Plaza (Daytime Use)	Category 3 - Institutional
ML-02	Father Serra Park	Public Plaza (Daytime Use)	Category 3 - Institutional
ML-03	Mozaic Apartments	Multi-Family Residence (24-hour)	Category 2 - Residential
ML-04	The California Endowment	Business (Daytime Use)	Category 3 - Institutional
ML-05	Alameda Street and Alpine Street	Parking Lot (Daytime Use); Possible Future Residential	Category 2 - Residential
ML-06	Chinatown Senior Lofts	Multi-Family Residence (24-hour)	Category 2 - Residential
ML-07	Under Chinatown Station	Public Plaza (Daytime Use)	Category 3 - Institutional
ML-08	College Street and Alameda Street	School Bus Parking Lot (Daytime Use); Possible Future Residential	Category 2 - Residential
ML-09	Blossom Apartments Sidewalk	Multi-Family Residence (24-hour)	Category 2 - Residential
ML-10	Blossom Apartments Upper Plaza	Multi-Family Residence (24-hour)	Category 2 - Residential
ML-11	College Station Development	Parking Lot (Daytime Use); Future Residential Development	Category 2 - Residential
ML-12	Parking under L Line (Gold) tracks	Parking Lot (Daytime Use)	Category 3 - Institutional
ML-13	Los Angeles State Historic Park	Public Park (Daytime Use)	Category 3 - Institutional
ML-14	Los Angeles State Historic Park	Public Park (Daytime Use)	Category 3 - Institutional
ML-15	Broadway and Bernard Street	Retail (Daytime Use)	Category 3 - Institutional
ML-16	Los Angeles State Historic Park	Public Park (Daytime Use)	Category 3 - Institutional
ML-17	Los Angeles State Historic Park	Public Park (Daytime Use)	Category 3 - Institutional
ML-18	Bishops Road and Broadway	School (Daytime Use)	Category 3 - Institutional
ML-19	Cathedral High School	School (Daytime Use)	Category 3 - Institutional
ML-20	430 Savoy Street	Single Residence (24-hour)	Category 2 - Residential
ML-21	Solano Canyon	Residential (24-hour)	Category 2 - Residential
ML-22	Elysian Park Recreation Center	Public Park (Daytime use)	Category 3 - Institutional

Note: Not all the measurement locations identified in this table were eventually used to represent noise-sensitive receptors, as identified in Section 6.1. Some of these were used as alternative measurement locations, but not representative of additional noise-sensitive land uses.

4.1.2 Existing Noise Conditions

Table 4-2 provides a summary of the existing conditions in the Project area, reporting for each measurement: site ID, location, time period, $L_{eq(day)}$, $L_{eq(night)}$, L_{dn}, and CNEL. Short-term data for multi-hour noise descriptors were derived from the difference in L_{eq} between the short-term measurement in question and the closest long-term measurement at the same time. For more details, see Appendix A.2.

Table 4-2 Existing Ambient Noise Level Summary (dBA)

Site ID	Location Description	$L_{eq(day)}$	$L_{eq(night)}$	L_{dn}	CNEL
ML-01	LAUS Entrance Plaza	61.1	57.7	64.8	65.1
ML-02	Father Serra Park	69.0	65.5	72.6	72.9
ML-03	Mozaic Apartments	68.4	65.5	72.5	72.7
ML-04	The California Endowment	63.6	60.7	67.7	68
ML-05	Alameda Street and Alpine Street	65.6	64.9	71.5	71.6
ML-06	Chinatown Senior Lofts	69.0	64.1	71.6	72.0
ML-07*	Under Chinatown Station	66.7	63.2	70.3	70.6
ML-08	College Street and Alameda Street	69.8	65.1	72.6	72.9
ML-09	Blossom Apartments Sidewalk	65.0	54.9	64.9	65.6
ML-10	Blossom Apartments Upper Plaza	61.1	56.5	63.9	64.3
ML-11	College Station Development	64.7	64.4	70.8	71.0
ML-12	Parking under L Line (Gold) tracks	63.0	59.5	66.6	66.9
ML-13	Los Angeles State Historic Park	64.1	59.1	66.7	67.1
ML-14	Los Angeles State Historic Park	58.7	55.2	62.3	62.6
ML-15	Broadway and Bernard Street	67.7	63.6	70.9	71.2
ML-16	Los Angeles State Historic Park	55.4	50.5	58.0	58.5
ML-17	Los Angeles State Historic Park	53.6	48.7	56.3	56.7
ML-18	Bishops Road and Broadway	65.8	60.9	68.5	69.0
ML-19	Cathedral High School	58.7	53.8	61.3	61.8
ML-20*	430 Savoy Street	56.1	51.2	58.7	59.3
ML-21	Solano Canyon	56.5	51.6	59.1	59.6
ML-22**	Elysian Park Recreation Center (day use only)	57.2	--	--	--

Notes, Measurement results are based on representative short-term noise measurements, typically 15-30 minutes and extrapolated using long-term measurement references to represent indicated time periods.

* Measurement locations ML-07 and ML-20 were long-term 24-hour noise measurements.

**Measurement location ML-22, was at a remote daytime use only location (public park) so only representative daytime noise measurements were collected at that location.

Continuous 24-hour noise levels were measured at two locations – ML-07 (representative of areas adjacent to busy roadways (such as Alameda Street) and ML-20 (representative of locations further from busy streets); at the remainder of locations, short-term noise levels were taken. Longer-duration noise metrics for short-term locations (L_{day}, L_{night}, L_{dn} and CNEL) were calculated by comparing the short-term noise measurement and the appropriate representative long-term noise measurement location. More specifically, the difference in monitored sound levels at the same times-of-day between a short-term measurement and the appropriate long-term measurement were used to develop long-term values for the locations where short-term noise levels were taken. These values were then used to determine the L_{day}, L_{night}, L_{dn} and CNEL values at the short-term monitoring locations. This is an acoustical standard method for determining L_{day}, L_{night}, L_{dn} and CNEL values.

Note that, during the time when the noise measurements were conducted for this analysis (June of 2020 for all measurements except ML-22, which was conducted on May 11, 2022), local traffic

volumes were anticipated to be somewhat lower than normal due to COVID-19 Pandemic restrictions. While no comparative traffic data was available to confirm this observation, an informal comparison of measured noise levels to previously measured noise levels for other technical studies in similar locations during pre-COVID conditions show that the previously measured noise levels were up to 3 dBA higher. While no correction was applied to the measured data in this report, the report results in a conservative noise impact assessment because the measured noise levels were at least somewhat lower than typical conditions.

4.2 Existing Vibration Conditions

Unlike existing ambient noise conditions, existing vibration levels are not typically considered in the assessment of project vibration impacts, so existing vibration levels were not measured for this project. However, for the identified Project area it is assumed that existing ambient vibration levels would typically be below human perceptibility, except for some heavy loaded trucks operating on local streets, which could be perceptible within about 25 feet. Vibration levels for “Rubber Tired Vehicles” would be less than ~70 VdB at 25 feet, which is generally not perceptible per FTA.

5. Noise and Vibration Prediction Methodology

The general procedure for assessing noise and vibration impacts for a project is to predict the future noise and vibration levels associated with a project, and then compare those predicted levels to the appropriate identified significant impact thresholds in accordance with applicable local, state, and federal policies. The noise and vibration impact analysis for this Project includes two primary phases - noise and vibration for construction of Project components, and ongoing operational noise (for both the system and people noise). The methodologies and assumptions used for predicting future noise and vibration values for these phases are described below. Associated impacts are assessed in Section 6.

5.1 Construction Noise

5.1.1 On-Site Construction Activities

Potential construction noise impacts were determined by calculating the Project-related construction noise levels at representative sensitive receptors and comparing these values to existing ambient noise levels (i.e., noise levels without construction noise from the proposed Project). Construction noise associated with the proposed Project was analyzed based on the worst-case (loudest) construction equipment and processes expected to be in use during the Project's construction phases. The construction noise model for the proposed Project is based on the FWHA Roadway Construction Noise Model (RCNM). Additionally, the FTA "detailed" construction noise analysis was used due to the complexity of the construction noise resulting from the wide variety of equipment being used and the multiple construction phases.

The methodology used to analyze on-site construction activities starts with the reference noise level and usage factor for each type of construction equipment to be used under conservative worse-case conditions for each identified construction phase. These reference noise levels are then adjusted for the distance from source to the noise-sensitive receptor, the fractional portion of time (Acoustic Use Factor or AUF) that the equipment is operating at full power (L_{max}), and any acoustical shielding that may be present (such as buildings or terrain), and then summing together the contributed noise from all pieces of equipment.

Construction equipment rosters and usage data represent typical noise conditions over the course of a workday for worst-case noise conditions. The acoustical contribution (or the equivalent sound level) for each piece of equipment at each construction area is calculated using the following standard equation.

$$L_{eq} = L_{max(ref)} - 20\log\left(\frac{D}{D_{ref}}\right) + 10\log\left(\frac{AUF\%}{100}\right) + 10\log(N) - S \quad (eq.\ 1)$$

Where:

L_{eq} = the equivalent sound level energy-averaged over the period of time over which the equipment is operating, in dBA
$L_{max(ref)}$ = the maximum operating equipment sound level operating at full power as measured at the reference distance
D = the distance between the operating equipment and the noise-sensitive receptor location (distances conservatively assumed to be the shortest practice distance from source to receptor at any given site for worst case conditions)
D_{ref} = the reference distance for the $L_{max(ref)}$, typically 50 feet
AUF = the Acoustic Use factor (typical fractional value of time that equipment is operating at full power)
N = number of similar pieces of equipment operating in the same area

S = the estimated noise reduction shielding value between that source and noise-sensitive receptor, in dBA

The acoustic contribution for all equipment assumed to be operating during the defined construction phase is summed together on an energy basis as the estimated combined noise level for each specific noise-sensitive receptor and then adjusted for distance and acoustical shielding from intervening structures such as buildings or terrain in accordance with FTA methodology for estimating barrier insertion loss (as detailed in FTA Table 4-28).

The list of construction equipment available to be used for the various construction phases of the proposed Project are selected from the full RCNM equipment list, including maximum noise level (L_{max}) and Acoustic Use Factor (AUF) as shown in **Table 5-1** below. The list of equipment used for the analysis of construction noise levels for various construction phases are provided in **Table 6-2**.

In addition, to evaluate compliance with LAMC Section 112.05, which sets a maximum noise level for construction equipment of 75 dBA at 50 feet, the analysis included an evaluation of the Project's proposed construction equipment at 50 feet.

5.1.2 Off-Site Construction Noise

In addition to the construction equipment identified above, there would be some additional traffic on the local roadway network to and from the construction sites associated with construction equipment movements, worker trips, and material delivery and removal. An off-site noise analysis was conducted using the FHWA Traffic Noise Model (TNM) version 2.5 to predict and evaluate additional noise contributed by construction related traffic noise at typical receptor distances. The TNM is the current standard computer noise model used nationally for traffic noise studies. The model allows for the input of roadways, noise receptors, and sound barriers, if applicable. The existing traffic volumes for haul route roadways were obtained from Fehr and Peers, the Project's traffic consultant. The additional construction-related off-site heavy truck volumes were obtained from the Project contractor in coordination with Fehr and Peers.

The TNM was used to calculate existing traffic noise levels at typical receptor distances of 50 and 100 feet from the roadway centerline for the area streets used for haul routes, which were then compared to calculated noise levels for the existing traffic plus project traffic to assess increases in traffic noise levels as a result of the project construction traffic. Noise impacts associated with off-site construction traffic are reported in Section 6.1.2.

5.2 Construction Vibration

Ground-borne vibration impacts due to the proposed Project's construction activities were evaluated for both on-site and off-site construction activities by identifying potential vibration sources (i.e., construction equipment), estimating the vibration levels at the potentially affected receptor, and comparing the proposed Project's activities to the applicable vibration significance thresholds. The methodology for calculating the construction vibration levels is described below.

Construction-related vibration is assessed using two different metrics: 1) to assess potential structural damage from vibration and; 2) to assess human annoyance from vibration. Peak particle velocity (PPV) in inches per second (in/sec) is used to assess potential structural damage. Vibration velocity level (L_v) in VdB is used to assess human annoyance. These are calculated using the following equations from the FTA Manual.

Table 5-1 Acoustical Properties of Construction Equipment

Equivalent Type	$L_{max\text{-}Ref}$ dBA (50 feet)	AUF%
Auger Drill	84	20
Backhoe	78	40
Boring Jack Power Unit	83	50
Chain Saw	84	20
Compactor (ground)	83	20
Compressor (air)	78	40
Concrete Mixer Truck	79	40
Concrete Pump Truck	81	20
Concrete Saw	90	20
Crane	81	16
Dozer	82	40
Drill Rig Truck	79	20
Drum Mixer	80	50
Dump Truck	76	40
Excavator	81	40
Flat Bed Truck	74	40
Front End Loader	79	40
Generator (>25KVA)	81	50
Generator (<25KVA)	73	50
Gradall	83	40
Grader	85	40
Horizontal Boring Jack	82	25
Hoe Ram	90	20
Jackhammer	89	20
Man Lift	75	20
Pavement Scarifier	90	20
Paver	77	50
Pickup Truck	75	40
Pneumatic Tools	85	50
Pumps	81	50
Roller	80	20
Scraper	84	40
Shears (on backhoe)	96	40
Tractor	84	40
Vacuum Excavator	85	40
Vacuum Street Sweeper	82	10
Ventilating Fan	79	100
Vibrating Hopper	87	50
Vibratory Concrete Mixer	80	20
Warning Horn	83	5
Welder/Torch	74	40

Source: RCNM User Guide, 2006, Table 1 (actual measured L_{max})

Structural Damage Equation (PPV):

$$\mathrm{PPV} = \mathrm{PPV_{ref}} * \left(\frac{25}{\mathrm{D}}\right)^{1.5} \quad (\mathrm{eq.}\ 2)$$

Where: PPV = Peak Particle Velocity at the nearest structure
PPV_{ref} = the reference PPV value for a piece of equipment at reference distance of 25 feet
D = the distance from the construction equipment to the structure

Human Annoyance Equation (L_v)

$$L_v = L_{v(ref)} - 30 \log\left(\frac{D}{25}\right) \quad (eq. 3)$$

Where: L_v = the Vibration Velocity Level at the nearest structure
$L_{v\text{-}(ref)}$ = the reference L_v value for a piece of equipment at a reference distance of 25 feet
D = the distance from the construction equipment to the structure

Not all construction equipment produces significant ground-borne vibration. Of the equipment for the proposed Project as shown in **Table 5-1**, the equipment with the highest reference vibration level would be "Vibratory Roller" which has reference values of PPV_{ref} equal to 0.21 in/sec at 25 feet, and $L_{v\text{-}(ref)}$ equal to 94 VdB at 25 feet. Other construction equipment types expected to be used for the Project that cause ground-borne vibration are listed in **Table 5-2** (from FTA 2018, Table 7-4).

Potential vibration impacts for both damage and human annoyance are typically assessed using the closest distance to the potentially impacted structure.

Table 5-2 Reference Vibration Properties of Construction Equipment

Equipment Type	PPV at 25 ft, in/sec	L_v, VdB at 25 ft.
Vibratory Roller	0.21	94
Hoe-Ram	0.089	87
Large Bulldozer	0.089	87
Caisson/Auger Drilling	0.089	87
Loaded Trucks	0.076	86
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Source FTA 2018, Table 7-4

5.3 Operational Noise

Operational noise impacts were evaluated by identifying the noise levels that would be generated by Project operation noise sources, including stations, junction, towers, cabins, and passengers at stations waiting to board the system. The noise level from each noise source at each surrounding sensitive receptor property line location was then calculated and compared to the existing ambient noise levels. Details and results of the operational noise impacts are presented in Section 6.1.3.

Operational System Noise

There is no universally recognized standard methodology for predicting noise levels for gondola transportation systems, such as those proposed for use on this Project. However, a targeted literature review identified a relevant journal article, *Noise prediction models for gondola ropeway components* (Rossi 2011), which was used as a basis for predicting the noise from the Project's operations. This article includes equations for predicting noise levels for both station noise and tower noise based on empirical data collected from several modern aerial gondola systems. The article includes equations for two types of gondola systems – powered and tensioning. As provided in the article, the noise levels for the powered system are louder than the tensioning system. Accordingly, to provide a conservative analysis this report utilized the equations for the powered systems to provide a worst-case evaluation. The noise levels calculated using the equations from the article represent predicted sound level values. The use of the Rossi article equations was validated by comparing predicted noise levels generated by the equations to

in-situ measured (real-world data from an operating system, see Appendix A) noise levels for a 3S gondola system similar to that proposed for this Project. This comparison was conducted to determine whether the predicted sound levels using the Rossi article equations are similar enough to actual system sound measurements such that the equations could be used to model the sound values for the proposed Project. This comparison of predicted and measured values is shown in **Table 5-3** and **Table 5-4** below, resulting in differences of up to 3.9 dBA for the stations and up to 1.2 dBA for the towers, which is within the normally-accepted tolerance of noise prediction models.

Station and Junction Noise

Noise from stations and the junction at receptor locations is generated by the equipment that powers and directs the movement of the gondolas. Predicting the noise levels generated from the stations and junction takes into consideration the sound power generated by the equipment, the distance from the station/junction to the receptors, and the offset angle of the receptors relative to the gondola's direction of travel. These values were calculated using Equations 4 and 5 below from the Rossi article. Equation 4 predicts the sound pressure level for the station/junction at distance (r), and Equation 5 adjusts the predicted sound pressure level as a function of angle from the direction of travel.

$$\mathrm{L_p} = \mathrm{L_{w_{s\phi}}} - 15\log(\mathrm{r}) \quad (eq.4)$$

$$\mathrm{L_{p_i}} = 10\log\left[\frac{1}{45}\left(10^{\frac{\mathrm{L_{p_{dir1}}}}{10}} * \theta + 10^{\frac{\mathrm{L_{p_{dir2}}}}{10}} * (45+\theta)\right)\right] \quad (eq.5)$$

Where:

> L_p is the equivalent sound pressure level (L_{Aeq}) produced by the station at the noise-sensitive receptor, and
>
> $L_{Ws\phi}$ is a parameter which takes into account the A-weighted sound power level of the source, the typology of the various noise sources and components which constitute the station, the typology of the carriers and the noise propagation conditions, and noise directivity.

Equation 4 relies on reference values at discrete angles from the station/junction in 45-degree increments. Equation 5 interpolates the values to provide a prediction at any angle. Sound power reference values for various line speeds, and offset angles are presented in **Table 5-5** as recommended in the Rossi article.

Table 5-3 below, presents a comparison of predicted sound level values generated using the equations from the Rossi article and measured (real-world, see Appendix A) sound level values conducted for a 3S gondola system similar to that proposed for this Project. As previously discussed, this comparison was conducted to determine whether the predicted sound levels are similar enough to actual system sound measurements such that the predicted sound levels could be used to model the sound values for the proposed Project. As shown in **Table 5-3**, this comparison led to a conservative average over-prediction of 2.6 dBA across all locations. This is considered an acceptable difference that validates use of the equations from the Rossi article to predict noise levels for the proposed Project. Accordingly, use of the Rossi article's equations to evaluate the Project's operational noise has been validated and results in a conservative assessment of the noise generated by the Project's gondola system.

Table 5-3 Station Noise Prediction Validation

Measurement/Prediction Location Description[1]	Predicted[2] L_{eq}, dBA	Measured[3] L_{eq}, dBA	Difference
Station 0 degrees at 50 meters/164 feet	54.8	51.0	3.8
Station 30 degrees at 35 meters/115 feet	56.0	52.6	3.4
Station 45 degrees at 35 meters/115 feet	55.3	53.7	1.6
Station 0 degrees at 50 meters/164 feet	54.8	50.9	3.9
Station 30 degrees at 35 meters/115 feet	55.4	52.6	2.8
Station 45 degrees at 35 meters/115 feet	55.3	55.6	-0.3
Station 0 degrees at 20 meters/66 feet	60.8	58.9	1.9
Station 90 degrees at 20 meters/66 feet	58.0	54.5	3.5
		Average:	2.6

Notes:
1. Angle in degrees is relative to tow rope direction.
2. Predicted levels for Rossi Journal Article equations
3. Measured L_{eq} values data for a similar 3S gondola system provided in Appendix A.

The following assumptions regarding the Project's stations/junction were utilized for the Project's analysis:

- The stations generate noise in a similar way as the systems in the Rossi article (which are considered to be conservative as a result of model validation in **Table 5-3**).
- The proposed Project includes three stations. While some stations may have power equipment (electrical motors to move the gondolas) and some may not, it was conservatively assumed that all stations would have power units, presenting a worst-case noise analysis.
- The proposed Project includes one junction. The junction is a non-passenger junction used to execute a turn in the ropeway (while the junction includes vertical circulation elements, which are for maintenance). Acoustically, it was assumed that the junction would have the same power unit as the stations and was modeled using the same equations and parameters as the stations.
- Distance from stations/junction to receptor was measured from the outline of the station/junction footprint to the receptor to provide the worst-case scenario.
- All angles were measured from the line direction provided in the preliminary construction phasing diagrams that were provided by the Project team.

Tower Noise

Tower noise was calculated based on equations in the Rossi article, using equations 6, 7, and 8, below, including noise generated by the rope passing over the sheaves (mechanism at top of tower which supports and/or holds down the cables) ($\mathrm{Lp}_1, Equation\ 6$); and noise generated by the gondola cabin passing over the sheaves (L_{p2}, *Equation 7*). The calculated levels for both sources are combined using a time-weighted average ($\mathrm{Lp}_{\mathrm{tot}}, Equation\ 8$).

$$\mathrm{L}_{\mathrm{p}_1} = \mathrm{L}_{\mathrm{w}_{1\phi}} - 15\log(\mathrm{r}^2 + \mathrm{h}^2)^{0.5} \quad (\mathrm{eq.}\ 6)$$

$$\mathrm{L}_{\mathrm{p}_2} = \mathrm{L}_{\mathrm{w}_{2\phi}} - 15\log(\mathrm{r}^2 + \mathrm{h}^2)^{0.5} \quad (\mathrm{eq.}\ 7)$$

$$\mathrm{L}_{\mathrm{p}_{\mathrm{tot}}} = 10\log\left[\frac{1}{\mathrm{D1}+\mathrm{D2}}\left(10^{\frac{\mathrm{L}_{\mathrm{p}_1}}{10}} * \mathrm{D1} + 10^{\frac{\mathrm{L}_{\mathrm{p}_2}}{10}} * \mathrm{D2}\right)\right] \quad (\mathrm{eq.}\ 8)$$

Where: L_{p1} is L_{Aeq} produced by the rope running on the sheave at the noise sensitive receptor location.
L_{p2} is L_{Aeq} produced by the gondola cabin running over the sheave at the noise sensitive receptor in dBA.
$L_{W1\phi}$ is a parameter which takes into account the A-weighted sound power of the noise source.
D1 is the time length of the noise produced when there is only rope running, in seconds
D2 is the time length of the noise produced by the gondola cabin transit, in seconds
h is the tower height in meters

Table 5-4 below presents a comparison of predicted sound level values using the equations in the Rossi article and measured (real-world) sound level values for a 3S gondola system similar to that proposed for this Project (see Appendix A). As previously discussed, this comparison was conducted to determine whether the predicted sound levels are similar enough to actual system sound measurements such that the predicted sound levels could be used to model the sound values for the proposed Project. **Table 5-4** provides the predicted sound values for a gondola tower derived from the Rossi article for different speeds and distances and measured (real-world) sound level values for a 3S gondola tower similar to that proposed for this Project (see Appendix A). As shown in **Table 5-4**, this comparison led to close correlation between measured (real-world) and predicted noise levels of less than +/- 1.2 dBA. This is considered an acceptable difference that validates use of the equations from the Rossi article to predict noise levels for the proposed Project's towers.

Table 5-4 Gondola Tower Noise Prediction Validation

Measurement/Prediction Location Description	Line Speed (meters per second/feet per second)	Predicted L_{eq}, dBA[1]	Measured L_{eq}, dBA[2]	Difference
Tower 90 degrees at 20 meters/66 feet	7/23	59.7	60.1	-0.4
Tower 90 degrees at 20 meters/66 feet	6/20	55.7	55.3	0.4
Tower 90 degrees at 20 meters/66 feet	5/16	52.8	52.6	0.2
Tower 90 degrees at 20 meters/66 feet	4/13	47.4	47.4	0.0
Tower 30 degrees at 30 meters/98 feet	7/23	55.8	57.0	-1.2
			Average:	-0.2

Notes:.
1. Predicted levels from Rossi Journal Article equations.
2. Measured L_{eq} values from data for a similar 3S gondola system provided in Appendix A.

The following assumptions regarding the Project's towers were utilized for the Project's analysis:

- Tower to noise-sensitive receptor distances are based on the plan distance with no extra distance added to account for tower height to provide worst-case propagation distance and a conservative analysis.
- The duration of time that the gondola cabin is crossing over the support sheaves (support system on top of towers through which the rope passes under or over) was calculated by dividing the assumed length of sheaves by the line speed.
- Sheave length was assumed to be 80 feet for all sheaves consistent with the Project design.
- The duration of time the cable is passing over the sheaves between cabins was found by subtracting the duration of time that the gondola is crossing over the support sheaves from the headway between gondolas.

Operational System Sound Power Levels for Prediction Models

The reference sound power level values used for the prediction of operational system noise, for stations, junction, and towers, as provided in the Rossi article, are presented in **Table 5-5**, below, including:

- Noise from stations and the junction
- Noise at the towers generated by the rope traveling through (i.e., between gondola cabins)
- Noise at the towers generated by a gondola cabin traveling through

The "Offset angle" is the angle from the noise source to the noise-sensitive receptor; noise levels vary depending on this angle.

Table 5-5 Gondola System Sound Power Reference Levels ($L_{ws\phi}$, dBA)

Offset angle To cable (degrees)	Stations and Junction		Towers* (Rope)		Towers* (Gondola Cabin)	
	11.5 ft/s (3.5 m/s)	16.4 ft/s (5.0 m/s)	11.5 ft/s (3.5 m/s)	16.4 ft/s (5.0 m/s)	11.5 ft/s (3.5 m/s)	16.4 ft/s (5.0 m/s)
0	71	76	70.5	75	80	84.5
45	71	75.5	--	--	80	84.5
90	71	74	71.5	76	80	84.5
135	71	75.5	--	--	80	84.5
180	72	77	70.5	75	80	84.5
225	72	75.5	--	--	80	84.5
270	72.5	75.5	71.5	76	80	84.5
315	72	76	--	--	80	84.5

Source: Rossi and Nicolini, 2011
*Tower sound power levels assume hold down sheaves, which are the tower components over which the rope travels, as they are slightly more conservative than other referenced sheave types.
*Station sound power levels assumed the louder "powered" stations.

5.3.1 Passenger Noise

Passenger noise was calculated using reference values as shown in **Table 5-6**, and standard noise propagation equations (Olsen 1998) with model inputs being overall passenger queuing number estimates accompanied by percentage breakdowns by gender/age and vocal effort (explained more in the operational assumptions section).

Table 5-6 Passenger Noise Reference Values in L_{eq}, dBA at 3.3 feet (1 meter)

Gender/age	Casual	Normal	Raised	Loud	Shouted
Females	50	55	63	71	82
Males	52	58	65	76	89
Children	53	58	65	74	82

Source: Olsen 1998

Conservatively, the passenger noise modeling assumptions utilized in the analysis for all operational scenarios are those that are applicable to the Dodger Game Day scenario as part of the 2042 horizon year, which would generate the highest ridership and therefore the highest

passenger noise levels. The Dodger Game Day scenario utilized the following assumptions, which are discussed further in Section 6.1.3:

- Passenger breakdown - 50% males, 30% females, 20% children.
- Vocal Effort - 50% not talking; of the 50% talking, 60% normal, 35% raised, 5% loud.

5.3.2 Gondola Cabin Noise

In addition to the primary operational noise levels from the stations, junction, towers and passengers at stations as discussed above, an analysis was also conducted to assess the noise from the gondola cabins themselves as they travel between and within the stations, towers and junction in proximity to receptor locations. While the cabins themselves would be mostly silent, some noise might be expected from the people traveling inside the cabin and any heating, ventilation, and air conditioning (HVAC) equipment associated with the cabin.

For this analysis, the closest distance from the cabin path to the receptor was calculated, the number and mix of people inside the cabin was considered (assuming up to 40 people per cabin with acoustical assumptions similar to those presented above), the typical noise reduction for standard automotive safety glass (approximately 25 dBA), as well as a maximum allowable sound power level allowed for the HVAC units in order for the resulting noise level at the nearest receptor to be at least 10 dBA below the expected nighttime ambient noise level. These requirements are listed as Project Design Feature (PDF) NOI-PDF-A in Section 7 below.

5.3.3 Combined Operational Noise

The combined operational noise at any analysis location is the energy-sum of the system noise (stations, junction, and/or towers), passenger noise sources (stations), and cabins within 500 feet of the analysis location, as calculated in hourly L_{eq}, and CNEL, in dBA.

5.4 Operational Vibration

Ground-borne vibration impacts due to the Project's operation activities were evaluated by identifying potential vibration sources and evaluating potential vibration outside of the Project footprint.

5.5 Thresholds of Significance

Appendix G of the State CEQA Guidelines provides a set of screening questions that are intended to assist lead agencies when assessing a project's potential impacts with regard to noise and vibration. These questions are as follows:

Would the Project result in:

a. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

b. Generation of excessive ground-borne vibration or ground-borne noise levels?

c. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

For purposes of this proposed Project, for which Metro is the Lead Agency and the City is a responsible agency, but which is proposed by the private Project Sponsor, both Metro's thresholds and the City's thresholds are included as part of the analysis. Metro applies the FTA impact criteria for both noise and vibration. The City utilizes thresholds from the City's 2006 L.A. CEQA Thresholds Guide and the LAMC for noise, which are generally not utilized by Metro, but are included for purposes of this Draft EIR. For vibration, the City of Los Angeles also uses the FTA impact criteria.

5.5.1 Construction Impact Thresholds

5.5.1.1 Noise Thresholds

Metro uses the following noise threshold:

From the FTA Manual, a significant noise impact would exist if:

The Project construction noise level would exceed a daytime L_{eq} of 80 dBA at a residential, school, church property, or park use or 85 dBA at a commercial property.

The City of Los Angeles uses the following noise thresholds:

The L.A. CEQA Thresholds Guide identifies the following criteria to evaluate construction noise:

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

LAMC Section 112.05 identifies the following criteria to evaluate construction noise:

- Between the hours of 7:00 AM and 10:00 PM, in any residential zone of the City or within 500 feet thereof, the maximum allowable noise level for construction equipment is 75 dBA when measured at 50 feet from the noise source. Said noise limitations shall not apply where compliance therewith is technically infeasible despite the use of mufflers, shields, sound barriers and/or other noise reduction device or techniques during the operation of the equipment.

For purposes of analyzing construction impacts in this EIR, this L.A. Municipal Code standard will be expanded to include sensitive uses in addition to a "residential zone" and will not include the waiver for the limitation where reducing noise below 75 dBA is technically infeasible.

5.5.1.2 Vibration Thresholds

Metro and the City of Los Angeles both use the following vibration thresholds:

From FTA Guidance, a significant vibration impact would exist if:

- For human annoyance, ground vibration levels exceed 72 VdB at residential structures, or 75 VdB at institution land uses.
- For potential structural damage, ground vibration levels exceeding:

- 0.5 PPV, inches per second, for category 1 buildings (reinforced-concrete, steel or timber (no plaster))
- 0.3 PPV, inches per second, for category 2 buildings (engineered concrete and masonry (no plaster))
- 0.2 PPV, inches per second, for category 3 buildings (non-engineered timber and masonry buildings)
- 0.12 PPV, inches per second, for category 4 buildings (buildings extremely susceptible to vibration damage)

Based on the guidance provided above, and as construction activities for the Project would last more than 10 days in a three-month period, the applicable construction-related noise and vibration thresholds for the Project are:

- **Noise-1:** A project would normally have a significant impact on noise levels from construction if construction activities lasting more than 10 days in a three-month period would exceed existing ambient exterior noise levels by 5 dBA $L_{eq(day)}$ or more at a noise-sensitive use (City: L.A. CEQA Thresholds Guide).
- **Noise-2**: A significant noise impact would exist if noise from construction equipment generates noise levels greater than 75 dBA at a distance of 50 feet from the source between 7:00 AM and 10:00 PM (City: LAMC).
- **Noise-3:** A significant noise impact would exist if the Project construction noise level would exceed 80 dBA $L_{eq(day)}$ at residential properties, churches, schools, and parks, or 85 dBA $L_{eq(day)}$ at commercial properties (Metro: FTA).
- **Vibration-1:** A significant vibration impact would exist for human annoyance if ground vibration levels exceed 72 VdB at residential structures, or 75 VdB at institutional structures. For potential structural damage, a significant vibration impact would exist if ground vibration levels exceed:
  - 0.5 PPV, inches per second, for category 1 buildings (reinforced-concrete, steel or timber (no plaster)) – (FTA)
  - 0.3 PPV, inches per second, for category 2 buildings (engineered concrete and masonry (no plaster)) – (FTA)
  - 0.2 PPV, inches per second, for category 3 buildings (non-engineered timber and masonry buildings) – (FTA)
  - 0.12 PPV, inches per second, for category 4 buildings (buildings extremely susceptible to vibration damage) – (FTA)

5.5.2 Operational Impact Thresholds

Metro uses the following operational noise threshold:

From the FTA Manual, a significant noise impact would exist if:

- The project noise level would result in a “severe impact” at levels ranging from 55 to 80 dBA depending on existing noise exposure, in accordance with Figure 3-1 in Section 3.1.1 above.

The City of Los Angeles uses the following operational noise thresholds:

The L.A. CEQA Thresholds Guide states that a project would normally have a significant impact during operation if:

- The project causes the ambient noise level measured at the property line of affected uses to increase by 3 dBA in CNEL, to or within the “normally unacceptable” or “clearly unacceptable” category, or any 5 dBA CNEL or greater noise increase (see Table 3-4 City of Los Angeles Guidelines for Noise Compatible Land UseTable 3-4).

From the LAMC, a significant noise impact would exist if:

- The project Noise level would result in a significant noise impact with an increase in $L_{eq(day)}$ or $L_{eq(night)}$ levels over 5 dBA over existing ambient noise levels.

Based on the guidance provided above, the applicable operation-related noise thresholds for the Project are:

- **Noise-4:** A project would normally have a significant impact during operation if the project causes the ambient noise level measured at the property line of affected uses to increase by 3 dBA in CNEL, to or within the “normally unacceptable” or “clearly unacceptable” category, or any 5 dBA CNEL or greater noise increase (City: L.A. CEQA Thresholds Guide).
- **Noise-5:** A significant noise impact would exist if the project Noise level would result in an increase in $L_{eq(day)}$ or $L_{eq(night)}$ levels of 5 dBA over existing ambient noise levels (City: LAMC).
- **Noise-6**: A significant noise impact would exist if the project noise level would result in a “severe impact” at levels ranging from 55 to 80 dBA depending on existing noise, in accordance with Figure 3-1 in Section 3.1.1 above (Metro: FTA).

6. Noise and Vibration Impacts

6.1 Noise

This section discusses predicted noise levels and resulting noise impacts for both construction and operation of the Project.

6.1.1 Noise-Sensitive Receptors

The noise-sensitive receptors (NSRs) evaluated in the construction and operational noise analysis are listed in **Table 6-1** (including existing noise level information) and are shown in **Figure 6-1** for the proposed Project. As mentioned previously, the NSRs represent existing noise conditions in a variety of locations throughout the Project area, focusing on areas of existing or future noise-sensitive receptors, including single-family residential (SFR) areas, multi-family residential (MFR) areas, parks, schools, and other outdoor areas of frequent human use. For this Project, to ensure that the analysis is conservative, exterior facades with operable windows were also considered for noise impacts at residential units and school buildings. The noise measurements were conducted at the sites of impact-sensitive receptors along the proposed Project alignment, from LAUS to Dodger Stadium.

Table 6-1 Noise Receptors and Existing Noise Levels Summary (dBA)

NSR	Name	Land Use[1]	ML[2]	$L_{eq(day)}$	$L_{eq(night)}$	L_{dn}	CNEL
				7:00-22:00	22:00-7:00	24-hr	24-hr
NSR 1 A	Los Angeles Union Station	Transit Terminal	ML-01	61.1	57.7	64.8	65.1
NSR 1 B	First 5 LA	Daycare Center	ML-01	61.1	57.7	64.8	65.1
NSR 2	El Pueblo	Public Park	ML-02	69.0	65.5	72.6	72.9
NSR 3	Mozaic Apartments	MFR	ML-03	68.4	65.5	72.5	72.7
NSR 4	The California Endowment	Office Building	ML-04	63.6	60.7	67.7	68.0
NSR 5	Future Residential Development	Future MFR[3]	ML-05	65.6	64.9	71.5	71.6
NSR 6	Chinatown Senior Lofts	MFR	ML-06	69.0	64.1	71.6	72.0
NSR 7	Homeboy Industries	Office Building	ML-08	69.8	65.1	72.6	72.9
NSR 8	Future Residential Development	Future MFR[3]	ML-11	64.7	64.4	70.8	71.0
NSR 9	Blossom Plaza	MFR	ML-10	61.1	56.5	63.9	64.3
NSR 10	Future Residential Development	Future MFR[3]	ML-10	61.1	56.5	63.9	64.3
NSR 11	Capitol Milling	Commercial	ML-12	63.0	59.5	66.6	66.9
NSR 12	Residential Development	MFR	ML-11	64.7	64.4	70.8	71.0
NSR 13 N	Future Residential Development - North	Future MFR[3]	ML-18	65.8	60.9	68.5	69.0
NSR 13 S	Future Residential Development - South	Future MFR[3]	ML-15	67.7	63.6	70.9	71.2
NSR 14 N	Los Angeles State Historic Park – North	Public Park	ML-17	53.6	48.7	56.3	56.7
NSR 14 S	Los Angeles State Historic Park – South	Public Park	ML-14	58.7	55.2	62.3	62.6
NSR 15	St Peter's Church	Church	ML-18	65.8	60.9	68.5	69.0
NSR 16	Cathedral High School	School	ML-19	58.7	53.8	61.3	61.8

NSR	Name	Land Use[1]	ML[2]	$L_{eq(day)}$ 7:00-22:00	$L_{eq(night)}$ 22:00-7:00	L_{dn} 24-hr	CNEL 24-hr
NSR 17 N	Low-Rise Residential - North (on Savoy Street)	SFR	ML-20	56.1	51.2	58.9	59.3
NSR 17 S	Low-Rise Residential - South (on Savoy Street)	SFR	ML-20	56.1	51.2	58.9	59.3
NSR 18	Solano Canyon Neighborhood	SFR	ML-21	56.5	51.6	59.1	59.6
NSR 19[4]	Elysian Park Recreation Center	Public Park	ML-22	57.2	--	--	--

Notes:
[1] SFR = Single Family Residential, MFR = Multi-Family Residential, ML= Measurement Location.
[2] Not all noise measurement locations represented NSRs, some of these were alternate locations for potential future NSRs.
[3] NSR 5 is currently an undeveloped City-owned parking lot and is proposed for future multi-family residential uses. NSR 8 is a vacant lot at N. Spring St. and W. College St. that's proposed for College Station, a mixed-use transit-oriented development that would include up to 770 residential units. NSR 10 is a proposed mixed-use project at 924 N. Broadway that would include 178 residential units. NSR 13N and 13S are two phases of the proposed Buena Vista mixed-use development at 1251 North Spring Street and 1030-1080 N. Broadway that would include up to 986 residential units.
[4] NSR 19/ML-22, is a daytime use only location (public park picnic area) that is not near Project operations but will have a laydown yard nearby during the Project construction phases, so only representative daytime noise measurements were collected at that location. Only construction impacts were modeled for this location.

6.1.2 Construction Noise Impacts

This section of the report discusses predicted noise levels and potential impacts associated with the construction of the Project.

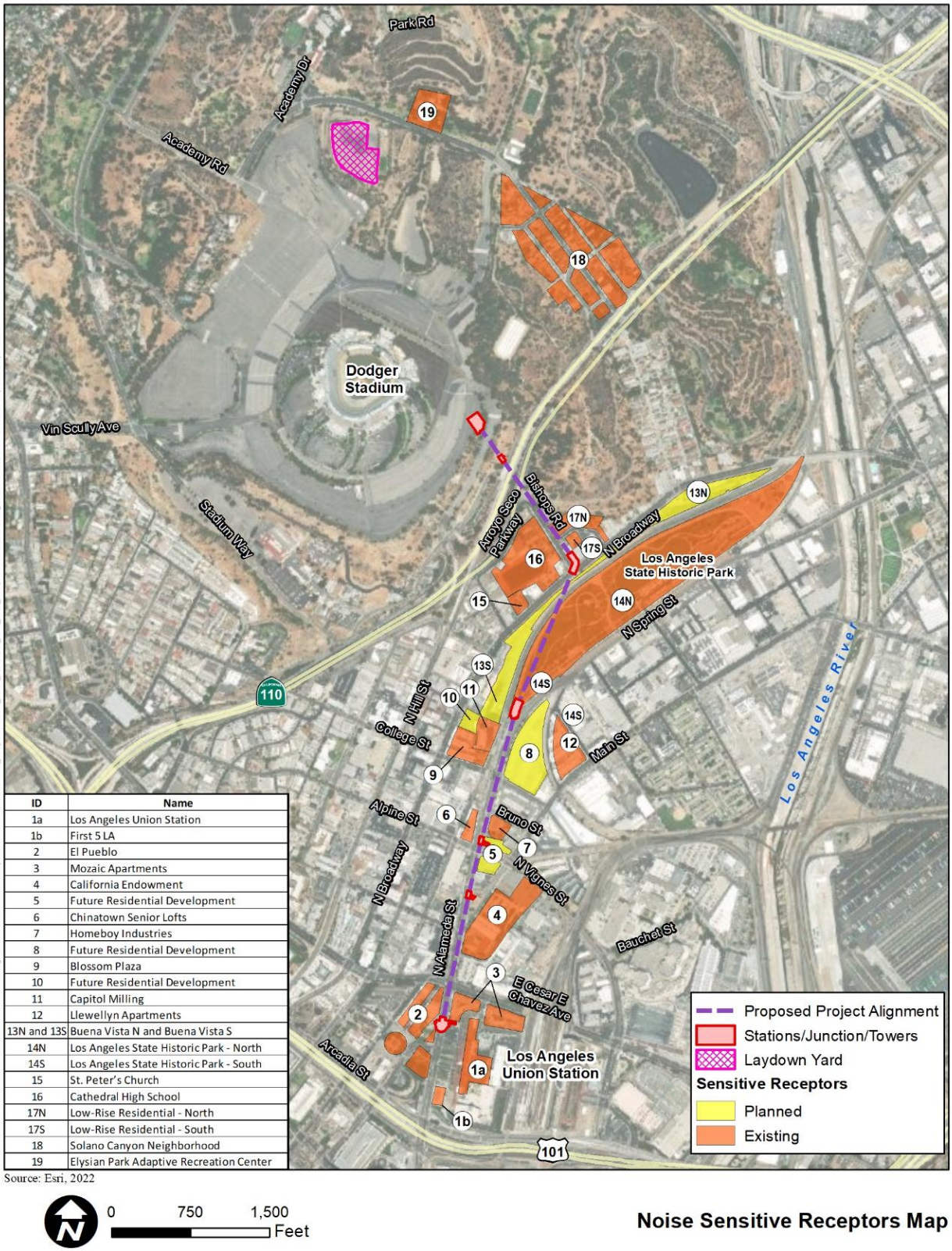
On-Site Construction Noise

Significant and Unavoidable. Noise impacts from Project construction activities would be a function of the noise generated by construction equipment, the location of the equipment, the timing and duration of the noise-generating construction activities, and the relative distance to noise-sensitive receptors. Each phase of construction would involve the use of various types of construction equipment and would, therefore, have its own distinct noise characteristics. Construction noise levels would fluctuate throughout a given workday as construction equipment moves within the various Project component construction sites.

Construction Noise Sources and Receptors

A construction noise impact analysis was conducted for each Project component during selected worst-case construction phases, evaluating all NSRs within approximately 500 feet of each Project component site. A distance of 500 feet was selected because noise attenuates with distance and it is estimated that, beyond this distance, construction noise levels would generally be expected to be less than the high daytime ambient noise levels in the Project's urban environment. Therefore, the proposed Project would not impact NSRs beyond 500 feet. An exception was made to the 500-foot distance for the Elysian Park Recreation Center (NSR 19) which is the nearest sensitive land use to the Mesa Lot, and has a lower ambient noise level than most of the Project NSRs. The Elysian Park Recreation Center (NSR 19) is located approximately 615 feet from the Project's construction laydown area.
The construction noise impact analysis analyzed the following phases of construction at each location as follows:

1) Building Demolition at the Broadway Junction
2) Foundations and Columns at all Project components



ID	Name
1a	Los Angeles Union Station
1b	First 5 LA
2	El Pueblo
3	Mozaic Apartments
4	California Endowment
5	Future Residential Development
6	Chinatown Senior Lofts
7	Homeboy Industries
8	Future Residential Development
9	Blossom Plaza
10	Future Residential Development
11	Capitol Milling
12	Llewellyn Apartments
13N and 13S	Buena Vista N and Buena Vista S
14N	Los Angeles State Historic Park - North
14S	Los Angeles State Historic Park - South
15	St. Peter's Church
16	Cathedral High School
17N	Low-Rise Residential - North
17S	Low-Rise Residential - South
18	Solano Canyon Neighborhood
19	Elysian Park Adaptive Recreation Center

Figure 6-1 Noise-Sensitive Receptors Map

3) Structural Steel and Gondola Equipment Erection at all Project components
4) Vertical Circulation, Hardscaping, Landscaping, and Interior Work at all Project components
5) Material Laydown at the Mesa Lot

For each construction phase, the worst-case simultaneous equipment was analyzed as provided in **Table 6-2**. For the Structural Steel and Gondola Equipment Erection construction phase, the available sound barrier mitigation varies over the course of the Structural Steel phase. Therefore, as part of this analysis, three different sound barrier mitigation scenarios were analyzed: 1) sound barriers during deck cribbing and shoring; 2) sound barriers once deck cribbing and shoring is complete; and 3) sound barriers during deck removal.

Table 6-2 Equipment Rosters for Analyzed Construction Phases

Equipment	L_{eq} at 50 ft	Number of Each Equipment Type for Worst Case per Phase[1]					
		Demo	Foundations and Columns	Structural Steel and Gondola Equipment Erection	Vertical Circulation, Hardscaping, Landscaping, and Interior Work[2]		Mesa Laydown Area
					Stations	Towers	
Backhoe	73.6	1	-	-	1	2	-
Chain Saw	76.7	1	-	-	-	-	-
Compactor (ground)	76.2	-	-	-	1	1	-
Compressor (air)	73.7	-	-	1	-	-	-
Concrete Mixer Truck	74.8	-	2	2	1	1	-
Concrete Pump Truck	74.4	-	1	-	-	-	-
Concrete Saw	82.6	1	-	-	-	-	-
Crane	72.6	-	1	1	1	-	1
Dozer	77.7	1	-	-	-	-	-
Dump Truck	72.5	5	-	-	1	1	-
Excavator	76.7	2	-	-	-	-	-
Flat Bed Truck	70.3	-	1	1	1	1	1
Gradall	79.4	-	1	1	-	1	2
Hydra Break Ram	80.0	1	-	-	-	-	-
Jackhammer	81.9	1	-	-	-	-	-
Pickup Truck	71.0	2	1	1	1	1	-
Pneumatic Tools	82.2	-	-	2	-	-	-
Vacuum Excavator (Vac-truck)	81.3	-	1	-	-	-	-
Vacuum Street Sweeper	71.6	1	1	1	1	1	-
Ventilation Fan	78.9	-	-	1	-	-	-

Equipment	L_{eq} at 50 ft	Number of Each Equipment Type for Worst Case per Phase[1]					
		Demo	Foundations and Columns	Structural Steel and Gondola Equipment Erection	Vertical Circulation, Hardscaping, Landscaping, and Interior Work[2]		Mesa Laydown Area
					Stations	Towers	
Vibrating Hopper	84.0	-	2	-	-	-	-
Warning Horn	70.2	1	3	4	2	2	-
Welder / Torch	70.0	1	1	4	1	-	-
Total:		18	15	19	11	11	4

[1] The worst-case equipment for the noise analysis was developed by determining for each construction phase the simultaneous equipment mix that would produce the highest noise levels.
[2] Vertical Circulation, Hardscaping, Landscaping, and Interior Work phase had separate equipment lists for station and tower Project locations.

The equipment rosters for all analyzed phases, including RCNM reference values for L_{eq} at 50 feet, are shown in **Table 6-2**.

Construction Noise Predicted Levels and Impacts

To determine construction noise impacts, sound-generating equipment was modeled at representative locations within the construction area for each construction phase at each Project component, and the RCNM reference levels were propagated to nearby NSRs to determine their respective sound levels due to construction activity.

Table 6-3 shows a summary of the construction analysis, including predicted levels and total impacts, without and with mitigation. The existing noise level (L_{eq}) is provided for each Project component location at the associated NSRs (e.g., NSRs 1 through 3 are associated with the Alameda Station). The predicted noise levels during each phase of construction activities are shown, as well as the increase (difference) in noise level from the existing conditions to the construction conditions, and whether that increase is considered an exceedance of a threshold and therefore an impact.

Ranges of levels for mitigation results in **Table 6-3** represent best and worst-case scenarios of mitigation measures (e.g., sound barriers). Specifically, during the Structural Steel and Gondola Equipment Erection phase, a temporary platform will be installed on which a sound barrier would be placed. However, it is only feasible to have the sound barrier installed during a portion of the Structural Steel and Gondola Equipment Erection phase. Accordingly, **Tables 6-3** and **6-4** identify the best-case mitigation in this location (e.g., when the sound walls will be installed) as well as the worst-case (i.e., when the sound walls will not be installed).

For multistory residential NSRs, impacts were modeled at 2 different elevations as applicable - ground level (appended “B” in **Table 6-3**) and at the lowest floor at which a sound barrier would be ineffective because it would not block the line-of-sight between the source and receptor (appended “T” in **Table 6-3**).

An NSR was considered to have an impact as defined by the L.A. CEQA Thresholds Guide if the sound level due to construction activity exceeded the existing condition by at least 5 dBA L_{eq}, and an NSR was considered to have an impact as defined by FTA if the construction noise exceeds the thresholds outlined in **Table 3-1**. An analysis of the thresholds is provided after the tables below. **Table 6-2** includes information used to assess construction noise impacts associated with the LAMC Section 112.05 noise limit of 75 dBA at 50 feet, discussed in Noise-2.

Table 6-3: Proposed Project Construction Noise (L.A. CEQA Threshold Analysis)

Project Component Site	Construction Phase	NSR	Land Use	Existing L_{eq} (dBA)	Without Mitigation			With Mitigation			
					Predicted Construction Noise Levels L_{eq} (dBA)		Impacts?	Predicted Construction Noise Levels L_{eq} (dBA)			Impacts?
					Level	Increase		Level	Increase	Reduction in Noise Level from Sound Barrier	
Alameda Station	Foundations and Columns	NSR 1A	Transit Terminal	61.1	81.0	19.9	**Yes**	79.5	18.4	1.5	**Yes**
		NSR 1B	Daycare Center	61.1	67.7	6.6	**Yes**	65.1	4.0	2.6	No
		NSR 2	Public Park	69.0	90.1	21.1	**Yes**	81.4	12.4	8.7	**Yes**
		NSR 3	MFR	68.4	88.9	20.5	**Yes**	78.9	10.5	10.0	**Yes**
		NSR 3T	MFR	68.4	87.4	19.0	**Yes**	87.3	18.9	0.1	**Yes**
	Structural Steel and Gondola Equipment Erection	NSR 1A	Transit Terminal	61.1	79.8	18.7	**Yes**	77.2 - 79.8	16.1 - 18.7	0.0 - 2.6	**Yes**
		NSR 1B	Daycare Center	61.1	64.9	3.8	No	63.8	2.7	1.1	No
		NSR 2*	Public Park	69.0	90.0	21.0	**Yes**	90.0	21.0	0.0	**Yes**
		NSR 3	MFR	68.4	92.3	23.9	**Yes**	84.8 - 87.9	16.4 - 19.5	4.4 - 7.5	**Yes**
		NSR 3T**	MFR	68.4	91.8	23.4	**Yes**	91.8	23.4	0.0	**Yes**
	Vertical Circulation, Hardscape, Landscape, Interior Work	NSR 1A	Transit Terminal	61.1	73.0	11.9	**Yes**	71.0	9.9	2.0	**Yes**
		NSR 1B	Daycare Center	61.1	59.0	0.0	No	58.4	0.0	0.0	No
		NSR 2*	Public Park	69.0	91.8	22.8	**Yes**	91.8	22.8	0.0	**Yes**
		NSR 3	MFR	68.4	90.6	22.2	**Yes**	80.6	12.2	10.0	**Yes**
		NSR 3T**	MFR	68.4	85.5	17.1	**Yes**	85.5	17.1	0.0	**Yes**
Alameda Tower	Foundations and Columns	NSR 4	Office Building	63.6	84.1	20.5	**Yes**	80.9	17.3	3.2	**Yes**
	Structural Steel and Gondola Equipment Erection	NSR 4	Office Building	63.6	79.5	15.9	**Yes**	78.7	15.1	0.8	**Yes**
	Vertical Circulation, Hardscape,	NSR 4	Office Building	63.6	78.7	15.1	**Yes**	72.9	9.3	5.8	**Yes**

Project Component Site	Construction Phase	NSR	Land Use	Existing L_{eq} (dBA)	Without Mitigation			With Mitigation			
					Predicted Construction Noise Levels L_{eq} (dBA)		Impacts?	Predicted Construction Noise Levels L_{eq} (dBA)			Impacts?
					Level	Increase		Level	Increase	Reduction in Noise Level from Sound Barrier	
	Landscape, Interior Work										
Alpine Tower	Foundations and Columns	NSR 5	Future MFR	65.6	82.0	16.4	**Yes**	77.6	12.0	4.4	**Yes**
		NSR 5T	Future MFR	65.6	81.6	16.0	**Yes**	81.3	15.7	0.3	**Yes**
		NSR 6	MFR	69.0	81.2	12.2	**Yes**	77.5	8.5	3.7	**Yes**
		NSR 6 T**	MFR	69.0	78.9	9.9	**Yes**	78.9	9.9	0.0	**Yes**
		NSR 7	Office Building	69.8	84.1	14.3	**Yes**	80.3	10.5	3.8	**Yes**
	Structural Steel and Gondola Equipment Erection	NSR 5	Future MFR	65.6	82.0	16.4	**Yes**	73.8	8.2	8.2	**Yes**
		NSR 5T	Future MFR	65.6	81.0	15.4	**Yes**	79.3	13.7	1.7	**Yes**
		NSR 6	MFR	69.0	80.3	11.3	**Yes**	78.4	9.4	1.9	**Yes**
		NSR 6T	MFR	69.0	78.3	9.3	**Yes**	75.1	6.1	3.2	**Yes**
		NSR 7	Office Building	69.8	80.0	10.2	**Yes**	77.6	7.8	2.4	**Yes**
	Vertical Circulation, Hardscape, Landscape, Interior Work	NSR 5	Future MFR	65.6	76.8	11.2	**Yes**	69.5	3.9	7.3	No
		NSR 5 T**	Future MFR	65.6	76.4	10.8	**Yes**	76.4	10.8	0.0	**Yes**
		NSR 6	MFR	69.0	75.9	6.9	**Yes**	68.3	0.0	6.9	No
		NSR 6T	MFR	69.0	74.7	5.7	**Yes**	72.9	3.9	1.8	No
		NSR 7	Office Building	69.8	78.5	8.7	**Yes**	71.3	1.5	7.2	No
Chinatown/State Park Station	Foundations and Columns	NSR 8T	Future MFR	64.7	82.9	18.2	**Yes**	78.5	13.8	4.4	**Yes**
		NSR 8B	Future MFR	64.7	84.9	20.2	**Yes**	80.5	15.8	4.4	**Yes**
		NSR 9	MFR	61.1	72.6	11.5	**Yes**	68.1	7.0	4.5	**Yes**
		NSR 9T**	MFR	61.1	72.4	11.3	**Yes**	72.4	11.3	0.0	**Yes**
		NSR 10	MFR	61.1	68.9	7.8	**Yes**	65.4	4.3	3.5	No
		NSR 10T**	MFR	61.1	66.5	5.4	**Yes**	66.5	5.4	0.0	**Yes**
		NSR 11	Restored Mill	63.0	83.2	20.2	**Yes**	77.2	14.2	6.0	**Yes**

Project Component Site	Construction Phase	NSR	Land Use	Existing L_{eq} (dBA)	Without Mitigation			With Mitigation			
					Predicted Construction Noise Levels L_{eq} (dBA)		Impacts?	Predicted Construction Noise Levels L_{eq} (dBA)			Impacts?
					Level	Increase		Level	Increase	Reduction in Noise Level from Sound Barrier	
		NSR 12	MFR	64.7	74.9	10.2	**Yes**	71.2	6.5	3.7	**Yes**
		NSR 12T**	MFR	64.7	74.8	10.1	**Yes**	74.8	10.1	0.0	**Yes**
		NSR 13S*	Future MFR	67.7	69.2	1.5	No	69.2	1.5	0.0	No
		NSR 14S	Public Park	58.7	85.8	27.1	**Yes**	77.7	19.0	8.1	**Yes**
	Structural Steel and Gondola Equipment Erection	NSR 8T	Future MFR	64.7	80.4	15.7	**Yes**	79.8	15.1	0.6	**Yes**
		NSR 8B	Future MFR	64.7	83.2	18.5	**Yes**	82.7	18.0	0.5	**Yes**
		NSR 9	MFR	61.1	66.7	5.6	**Yes**	65.7	4.6	1.0	No
		NSR 9T**	MFR	61.1	66.6	5.5	**Yes**	66.6	5.5	0.0	**Yes**
		NSR 10	MFR	61.1	67.0	5.9	**Yes**	66.6	5.5	0.4	**Yes**
		NSR 10T**	MFR	61.1	65.7	4.6	No	65.7	4.6	0.0	No
		NSR 11	Restored Mill	63.0	75.2	12.2	**Yes**	73.8	10.8	1.4	**Yes**
		NSR 12	MFR	64.7	73.3	8.6	**Yes**	72.4	7.7	0.9	**Yes**
		NSR 12T**	MFR	64.7	73.3	8.6	**Yes**	72.6	7.9	0.7	**Yes**
		NSR 13S*	Future MFR	67.7	64.0	0.0	No	63.5	0.0	0.0	No
		NSR 14S	Public Park	58.7	77.5	18.8	**Yes**	76.0	17.3	1.5	**Yes**
	Vertical Circulation, Hardscape, Landscape, Interior Work	NSR 8T	Future MFR	64.7	74.4	9.7	**Yes**	68.2	3.5	6.2	No
		NSR 8B	Future MFR	64.7	75.5	10.8	**Yes**	69.5	4.8	6.0	No
		NSR 9	MFR	61.1	62.6	1.5	No	54.3	0.0	1.5	No
		NSR 9T**	MFR	61.1	62.4	1.3	No	62.4	1.3	0.0	No
		NSR 10	MFR	61.1	63.8	2.7	No	57.5	0.0	2.7	No
		NSR 10T**	MFR	61.1	61.1	0.0	No	61.1	0.0	0.0	No
		NSR 11	Restored Mill	63.0	73.6	10.6	**Yes**	64.7	1.7	8.9	No
		NSR 12	MFR	64.7	67.1	2.4	No	57.1	0.0	2.4	No
		NSR 12T**	MFR	64.7	67.0	2.3	No	67.0	2.3	0.0	No

Project Component Site	Construction Phase	NSR	Land Use	Existing L_{eq} (dBA)	Without Mitigation			With Mitigation			
					Predicted Construction Noise Levels L_{eq} (dBA)		Impacts?	Predicted Construction Noise Levels L_{eq} (dBA)			Impacts?
					Level	Increase		Level	Increase	Reduction in Noise Level from Sound Barrier	
		NSR 13S*	Future MFR	67.7	60.3	0.0	No	55.3	0.0	0.0	No
		NSR 14S	Public Park	58.7	78.8	20.1	**Yes**	68.8	10.1	10.0	**Yes**
Broadway Junction	Demo	NSR 13S*	Future MFR	67.7	66.1	0.0	No	66.1	0.0	0.0	No
		NSR 13N*	Future MFR	65.8	67.0	1.2	No	67.0	1.2	0.0	No
		NSR 14N	Public Park	53.6	72.6	19.0	**Yes**	62.6	9.0	10.0	**Yes**
		NSR 15	Church	65.8	67.7	1.9	No	58.1	0.0	1.9	No
		NSR 16	School	58.7	79.7	21.0	**Yes**	69.7	11.0	10.0	**Yes**
		NSR 17N	SFR	56.1	77.3	21.2	**Yes**	67.3	11.2	10.0	**Yes**
		NSR 17S	SFR	56.1	90.0	33.9	**Yes**	80.0	23.9	10.0	**Yes**
	Foundations and Columns	NSR 13S*	Future MFR	67.7	66.1	0.0	No	66.1	0.0	0.0	No
		NSR 13N*	Future MFR	65.8	67.3	1.5	No	67.3	1.5	0.0	No
		NSR 14N	Public Park	53.6	72.8	19.2	**Yes**	62.8	9.2	10.0	**Yes**
		NSR 15	Church	65.8	67.6	1.8	No	61.7	0.0	1.8	No
		NSR 16	School	58.7	78.9	20.2	**Yes**	68.9	10.2	10.0	**Yes**
		NSR 17N	SFR	56.1	76.9	20.8	**Yes**	67.0	10.9	9.9	**Yes**
		NSR 17S	SFR	56.1	89.2	33.1	**Yes**	79.2	23.1	10.0	**Yes**
	Structural Steel and Gondola Equipment Erection	NSR 13S*	Future MFR	67.7	66.0	0.0	No	65.2 - 66	0.0	0.0	No
		NSR 13N*	Future MFR	65.8	65.5	0.0	No	64.9 - 65.5	0.0	0.0	No
		NSR 14N	Public Park	53.6	72.6	19.0	**Yes**	70.1 - 71.4	16.5 - 17.8	1.2 - 2.5	**Yes**
		NSR 15	Church	65.8	68.3	2.5	No	67.2 - 67.7	1.4 - 1.9	0.6 - 1.1	No
		NSR 16	School	58.7	72.8	14.1	**Yes**	70.2 - 72.2	11.5 - 13.5	0.6 - 2.6	**Yes**
		NSR 17N	SFR	56.1	73.1	17.0	**Yes**	69.3 - 71.5	13.2 - 15.4	1.6 - 3.8	**Yes**
		NSR 17S	SFR	56.1	80.7	24.6	**Yes**	75.1 - 75.1	19.0	5.6	**Yes**

Project Component Site	Construction Phase	NSR	Land Use	Existing L_{eq} (dBA)	Without Mitigation			With Mitigation			
					Predicted Construction Noise Levels L_{eq} (dBA)		Impacts?	Predicted Construction Noise Levels L_{eq} (dBA)			Impacts?
					Level	Increase		Level	Increase	Reduction in Noise Level from Sound Barrier	
	Vertical Circulation, Hardscape, Landscape, Interior Work	NSR 13S*	Future MFR	67.7	59.8	0.0	No	59.8	0.0	0.0	No
		NSR 13N*	Future MFR	65.8	60.9	0.0	No	60.9	0.0	0.0	No
		NSR 14N	Public Park	53.6	66.3	12.7	**Yes**	56.3	2.7	10.0	No
		NSR 15	Church	65.8	61.3	0.0	No	56.6	0.0	0.0	No
		NSR 16	School	58.7	72.4	13.7	**Yes**	63.1	4.4	9.3	No
		NSR 17N	SFR	56.1	71.9	15.8	**Yes**	61.9	5.8	10.0	**Yes**
		NSR 17S	SFR	56.1	82.6	26.5	**Yes**	72.6	16.5	10.0	**Yes**
Stadium Tower	Foundations and Columns	NSR 16*	School	58.7	63.7	5.0	Yes	61.0	2.3	2.7	No
		NSR 17N*	SFR	56.1	59.9	3.8	No	57.1	1.0	2.8	No
		NSR 18*	SFR	56.5	53.1	0.0	No	53.1	0.0	0.0	No
	Structural Steel and Gondola Equipment Erection	NSR 16	School	58.7	65.6	6.9	**Yes**	59.7	1.0	5.9	No
		NSR 17N	SFR	56.1	62.2	6.1	**Yes**	56.1	0.0	6.1	No
		NSR 18	SFR	56.5	55.7	0.0	No	49.6	0.0	0.0	No
	Vertical Circulation, Hardscape, Landscape, Interior Work	NSR 16	School	58.7	58.5	0.0	No	58.2	0.0	0.0	No
		NSR 17N	SFR	56.1	54.8	0.0	No	54.6	0.0	0.0	No
		NSR 18	SFR	56.5	48.2	0.0	No	48.2	0.0	0.0	No

Project Component Site	Construction Phase	NSR	Land Use	Existing L_{eq} (dBA)	Without Mitigation			With Mitigation			
					Predicted Construction Noise Levels L_{eq} (dBA)		Impacts?	Predicted Construction Noise Levels L_{eq} (dBA)			Impacts?
					Level	Increase		Level	Increase	Reduction in Noise Level from Sound Barrier	
Stadium Station	Foundations and Columns	NSR 16*	School	58.7	61.0	2.3	No	61.0	2.3	0.0	No
		NSR 18*	SFR	56.5	54.8	0.0	No	54.8	0.0	0.0	No
	Structural Steel and Gondola Equipment Erection	NSR 16*	School	58.7	61.7	3.0	No	61.7	3.0	0.0	No
		NSR 18*	SFR	56.5	56.8	0.3	No	56.8	0.3	0.0	No
	Vertical Circulation, Hardscape, Landscape, Interior Work	NSR 16*	School	58.7	54.4	0.0	No	54.4	0.0	0.0	No
		NSR 18*	SFR	56.5	49.2	0.0	No	49.2	0.0	0.0	No
Mesa Lot	Laydown Yard	NSR 19*	Public Park	57.2	53.8	0.0	No	-	-	-	No

1: Mitigation applied only when a barrier could feasibly be constructed between construction and impacted receptors. Receptors where barriers were found to not be feasible marked with an asterisk (*). Receptors where barriers were found to only be feasible at the bottom floor and not feasible at the top floor marked with a double asterisk (**).
2: Ranges of levels for mitigation results represent best and worst-case scenarios of mitigation measures at the receptor, such as when a barrier will need to be moved partway through a phase.

Table 6-4 Proposed Project Construction Noise (FTA Analysis)

Project Component Site	Construction Phase	NSR	Land Use	FTA Impact Threshold	Existing L_{eq} (dBA)	Without Mitigation		With Mitigation	
						Predicted Construction Noise Levels L_{eq} (dBA)		Predicted Construction Noise Levels L_{eq} (dBA)	
						Level	Impacts?	Level	Impacts?
Alameda Station	Foundations and Columns	NSR 1A	Transit Terminal	85	61.1	81.0	No	79.5	No
		NSR 1B	Daycare Center	80	61.1	67.7	No	65.1	No
		NSR 2	Public Park	80	69.0	90.1	**Yes**	81.4	Yes
		NSR 3	MFR	80	68.4	88.9	**Yes**	78.9	No
		NSR 3T	MFR	80	68.4	87.4	**Yes**	87.3	**Yes**
	Structural Steel and Gondola Equipment Erection	NSR 1A	Transit Terminal	85	61.1	79.8	No	77.2 - 79.8	No
		NSR 1B	Daycare Center	80	61.1	64.9	No	63.8	No
		NSR 2*	Public Park	80	69.0	90.0	**Yes**	90.0	**Yes**
		NSR 3	MFR	80	68.4	92.3	**Yes**	84.8 - 87.9	**Yes**
		NSR 3T**	MFR	80	68.4	91.8	**Yes**	91.8	**Yes**
	Vertical Circulation, Hardscape, Landscape, Interior Work	NSR 1A	Transit Terminal	85	61.1	73.0	No	71.0	No
		NSR 1B	Daycare Center	80	61.1	59.0	No	58.4	No
		NSR 2*	Public Park	80	69.0	91.8	**Yes**	91.8	**Yes**
		NSR 3	MFR	80	68.4	90.6	**Yes**	80.6	**Yes**
		NSR 3T**	MFR	80	68.4	85.5	**Yes**	85.5	**Yes**
Alameda Tower	Foundations and Columns	NSR 4	Office Building	85	63.6	84.1	No	80.9	No
	Structural Steel and Gondola Equipment Erection	NSR 4	Office Building	85	63.6	79.5	No	78.7	No
	Vertical Circulation, Hardscape, Landscape, Interior Work	NSR 4	Office Building	85	63.6	78.7	No	72.9	No

Project Component Site	Construction Phase	NSR	Land Use	FTA Impact Threshold	Existing L_{eq} (dBA)	Without Mitigation		With Mitigation	
						Predicted Construction Noise Levels L_{eq} (dBA)		Predicted Construction Noise Levels L_{eq} (dBA)	
						Level	Impacts?	Level	Impacts?
Alpine Tower	Foundations and Columns	NSR 5	Future MFR	80	65.6	82.0	**Yes**	77.6	No
		NSR 5T	Future MFR	80	65.6	81.6	**Yes**	81.3	**Yes**
		NSR 6	MFR	80	69.0	81.2	**Yes**	77.5	No
		NSR 6T**	MFR	80	69.0	78.9	No	78.9	No
		NSR 7	Office Building	85	69.8	84.1	No	80.3	No
	Structural Steel and Gondola Equipment Erection	NSR 5	Future MFR	80	65.6	82.0	**Yes**	73.8	No
		NSR 5T	Future MFR	80	65.6	81.0	**Yes**	79.3	No
		NSR 6	MFR	80	69.0	80.3	**Yes**	78.4	No
		NSR 6T	MFR	80	69.0	78.3	No	75.1	No
		NSR 7	Office Building	85	69.8	80.0	No	77.6	No
	Vertical Circulation, Hardscape, Landscape, Interior Work	NSR 5	Future MFR	80	65.6	76.8	No	69.5	No
		NSR 5T**	Future MFR	80	65.6	76.4	No	76.4	No
		NSR 6	MFR	80	69.0	75.9	No	68.3	No
		NSR 6T	MFR	80	69.0	74.7	No	72.9	No
		NSR 7	Office Building	85	69.8	78.5	No	71.3	No
Chinatown/State Park Station	Foundations and Columns	NSR 8T	Future MFR	80	64.7	82.9	**Yes**	78.5	No
		NSR 8B	Future MFR	80	64.7	84.9	**Yes**	80.5	**Yes**
		NSR 9	MFR	80	61.1	72.6	No	68.1	No
		NSR 9T**	MFR	80	61.1	72.4	No	72.4	No
		NSR 10	MFR	80	61.1	68.9	No	65.4	No
		NSR 10T**	MFR	80	61.1	66.5	No	66.5	No
		NSR 11	Restored Mill	85	63.0	83.2	No	77.2	No
		NSR 12	MFR	80	64.7	74.9	No	71.2	No
		NSR 12T**	MFR	80	64.7	74.8	No	74.8	No

Project Component Site	Construction Phase	NSR	Land Use	FTA Impact Threshold	Existing L_{eq} (dBA)	Without Mitigation		With Mitigation	
						Predicted Construction Noise Levels L_{eq} (dBA)		Predicted Construction Noise Levels L_{eq} (dBA)	
						Level	Impacts?	Level	Impacts?
		NSR 13S*	Future MFR	80	67.7	69.2	No	69.2	No
		NSR 14S	Public Park	85	58.7	85.8	**Yes**	77.7	No
	Structural Steel and Gondola Equipment Erection	NSR 8T	Future MFR	80	64.7	80.4	**Yes**	79.8	No
		NSR 8B	Future MFR	80	64.7	83.2	**Yes**	82.7	**Yes**
		NSR 9	MFR	80	61.1	66.7	No	65.7	No
		NSR 9T**	MFR	80	61.1	66.6	No	66.6	No
		NSR 10	MFR	80	61.1	67.0	No	66.6	No
		NSR 10T**	MFR	80	61.1	65.7	No	65.7	No
		NSR 11	Restored Mill	85	63.0	75.2	No	73.8	No
		NSR 12	MFR	80	64.7	73.3	No	72.4	No
		NSR 12T**	MFR	80	64.7	73.3	No	72.6	No
		NSR 13S*	Future MFR	80	67.7	64.0	No	63.5	No
		NSR 14S	Public Park	80	58.7	77.5	No	76.0	No
	Vertical Circulation, Hardscape, Landscape, Interior Work	NSR 8T	Future MFR	80	64.7	74.4	No	68.2	No
		NSR 8B	Future MFR	80	64.7	75.5	No	69.5	No
		NSR 9	MFR	80	61.1	62.6	No	54.3	No
		NSR 9T**	MFR	80	61.1	62.4	No	62.4	No
		NSR 10	MFR	80	61.1	63.8	No	57.5	No
		NSR 10T**	MFR	80	61.1	61.1	No	61.1	No
		NSR 11	Restored Mill	85	63.0	73.6	No	64.7	No
		NSR 12	MFR	80	64.7	67.1	No	57.1	No
		NSR 12T**	MFR	80	64.7	67.0	No	67.0	No
		NSR 13S*	Future MFR	80	67.7	60.3	No	55.3	No
		NSR 14S	Public Park	80	58.7	78.8	No	68.8	No

Project Component Site	Construction Phase	NSR	Land Use	FTA Impact Threshold	Existing L_{eq} (dBA)	Without Mitigation		With Mitigation	
						Predicted Construction Noise Levels L_{eq} (dBA)		Predicted Construction Noise Levels L_{eq} (dBA)	
						Level	Impacts?	Level	Impacts?
Broadway Junction	Demo	NSR 13S*	Future MFR	80	67.7	66.1	No	66.1	No
		NSR 13N*	Future MFR	80	65.8	67.0	No	67.0	No
		NSR 14N	Public Park	80	53.6	72.6	No	62.6	No
		NSR 15	Church	80	65.8	67.7	No	58.1	No
		NSR 16	School	80	58.7	79.7	No	69.7	No
		NSR 17N	SFR	80	56.1	77.3	No	67.3	No
		NSR 17S	SFR	80	56.1	90.0	**Yes**	80.0	No
	Foundations and Columns	NSR 13S*	Future MFR	80	67.7	66.1	No	66.1	No
		NSR 13N*	Future MFR	80	65.8	67.3	No	67.3	No
		NSR 14N	Public Park	80	53.6	72.8	No	62.8	No
		NSR 15	Church	80	65.8	67.6	No	61.7	No
		NSR 16	School	80	58.7	78.9	No	68.9	No
		NSR 17N	SFR	80	56.1	76.9	No	67.0	No
		NSR 17S	SFR	80	56.1	89.2	**Yes**	79.2	No
	Structural Steel and Gondola Equipment Erection	NSR 13S*	Future MFR	80	67.7	66.0	No	65.2 - 66	No
		NSR 13N*	Future MFR	80	65.8	65.5	No	64.9 - 65.5	No
		NSR 14N	Public Park	80	53.6	72.6	No	70.1 - 71.4	No
		NSR 15	Church	80	65.8	68.3	No	67.2 - 67.7	No
		NSR 16	School	80	58.7	72.8	No	70.2 - 72.2	No
		NSR 17N	SFR	80	56.1	73.1	No	69.3 - 71.5	No
		NSR 17S	SFR	80	56.1	80.7	**Yes**	75.1 - 75.1	No
	Vertical Circulation, Hardscape, Landscape, Interior Work	NSR 13S*	Future MFR	80	67.7	59.8	No	59.8	No
		NSR 13N*	Future MFR	80	65.8	60.9	No	60.9	No

Project Component Site	Construction Phase	NSR	Land Use	FTA Impact Threshold	Existing L_{eq} (dBA)	Without Mitigation		With Mitigation	
						Predicted Construction Noise Levels L_{eq} (dBA)		Predicted Construction Noise Levels L_{eq} (dBA)	
						Level	Impacts?	Level	Impacts?
		NSR 14N	Public Park	80	53.6	66.3	No	56.3	No
		NSR 15	Church	80	65.8	61.3	No	56.6	No
		NSR 16	School	80	58.7	72.4	No	63.1	No
		NSR 17N	SFR	80	56.1	71.9	No	61.9	No
		NSR 17S	SFR	80	56.1	82.6	**Yes**	72.6	No
Stadium Tower	Foundations and Columns	NSR 16*	School	80	58.7	63.7	No	61.0	No
		NSR 17N*	SFR	80	56.1	59.9	No	57.1	No
		NSR 18*	SFR	80	56.5	53.1	No	53.1	No
	Structural Steel and Gondola Equipment Erection	NSR 16	School	80	58.7	65.6	No	59.7	No
		NSR 17N	SFR	80	56.1	62.2	No	56.1	No
		NSR 18	SFR	80	56.5	55.7	No	49.6	No
	Vertical Circulation, Hardscape, Landscape, Interior Work	NSR 16	School	80	58.7	58.5	No	58.2	No
		NSR 17N	SFR	80	56.1	54.8	No	54.6	No
		NSR 18	SFR	80	56.5	48.2	No	48.2	No

Project Component Site	Construction Phase	NSR	Land Use	FTA Impact Threshold	Existing L_{eq} (dBA)	Without Mitigation		With Mitigation	
						Predicted Construction Noise Levels L_{eq} (dBA)		Predicted Construction Noise Levels L_{eq} (dBA)	
						Level	Impacts?	Level	Impacts?
Stadium Station	Foundations and Columns	NSR 16*	School	80	58.7	61.0	No	61.0	No
		NSR 18*	SFR	80	56.5	54.8	No	54.8	No
	Structural Steel and Gondola Equipment Erection	NSR 16*	School	80	58.7	61.7	No	61.7	No
		NSR 18*	SFR	80	56.5	56.8	No	56.8	No
	Vertical Circulation, Hardscape, Landscape, Interior Work	NSR 16*	School	80	58.7	54.4	No	54.4	No
		NSR 18*	SFR	80	56.5	49.2	No	49.2	No
Mesa Lot	Laydown Yard	NSR 19*	Public Park	80	57.2	53.8	No	-	-

1: Mitigation applied only when a barrier could feasibly be constructed between construction and impacted receptors. Receptors where barriers were found to not be feasible marked with an asterisk (*). Receptors where barriers were found to only be feasible at the bottom floor and not feasible at the top floor marked with a double asterisk (**).

2: Ranges of levels for mitigation results represent best and worst-case scenarios of mitigation measures at the receptor, such as when a barrier will need to be moved partway through a phase.

As previously discussed, analyses were performed for worst-case scenarios for each construction phase. As such, **Table 6-3** and **Table 6-4** include L.A. CEQA Thresholds Guide and FTA analyses (respectively) of each construction phase. Refer to Appendix B for the construction noise calculation details.

Construction Noise Thresholds – Impact Analysis

On-Site Construction Noise Impact Analysis

Noise-1: *A project would normally have a significant impact on noise levels from construction if construction activities lasting more than 10 days in a three-month period would exceed existing ambient exterior noise levels by 5 dBA $L_{eq(day)}$ or more at a noise-sensitive use (L.A. CEQA Thresholds Guide).*

As shown in **Table 6-3**, construction activities would exceed ambient existing exterior noise levels by 5 dBA L_{eq} or more at several noise-sensitive uses, as described below for each Project component.

Alameda Station

NSR 1A (Los Angeles Union Station), NSR 1B (First Five LA), NSR 2 (El Pueblo), and NSR 3 (Mozaic Apartments) would experience a significant noise impact during construction activities of the Alameda Station. Construction activities would result in the greatest increase over existing noise levels for this Project location at NSR 3 during the Structural Steel and Gondola Equipment Erection phase (23.9 dBA over existing). Construction noise levels at NSR 1A and NSR 1B would be greatest during the Foundations and Columns phase (19.9 dBA over existing and 6.6 dBA over existing, respectively), while construction noise levels at NSR 2 would be greatest during the Vertical Circulation, Hardscaping, Landscaping, and Interior Work phase (22.8 dBA over existing).

Alameda Tower

NSR 4 (The California Endowment) would experience a significant noise impact during construction activities of the Alameda Tower. Construction activities would result in the greatest increase over existing noise levels for NSR 4 during the Foundations and Columns phase (20.5 dBA over existing).

Alpine Tower

NSR 5 (Future Residential Development), NSR 6 (Chinatown Senior Lofts), and NSR 7 (Homeboy Industries) would experience a significant noise impact during construction activities of the Alpine Tower. Construction activities would result in the greatest increase over existing noise levels for this Project location at NSR 5 during both the Foundations and Columns phase and the Structural Steel and Gondola Equipment Erection phase (16.4 dBA over existing). Construction noise levels at NSR 6 and NSR 7 would be greatest during the Foundations and Columns phase (12.2 dBA over existing and 14.3 dBA over existing, respectively).

Chinatown/State Park Station

NSR 8 (Future Residential Development), NSR 9 (Blossom Plaza), NSR 10 (Future Residential Development), NSR 11 (Capitol Milling), NSR 12 (Llewellyn Apartments), and NSR 14 S (Los Angeles State Historic Park – South) would experience a significant noise impact during construction activities of the Chinatown/State Park Station. Construction activities would result in the greatest increase over existing noise levels for this Project location at NSR 14 S during the Foundations and Columns phase (27.1 dBA over existing). Construction noise levels at NSR 8, NSR 9, NSR 10, NSR 11, and NSR 12 would be greatest during the Foundations and

Columns phase (20.2 dBA over existing, 11.5 dBA over existing, 7.8 dBA over existing, 20.2 dBA over existing, and 10.2 dBA over existing, respectively).

The construction activities of the Chinatown/State Park Station would not result in impacts at NSR 13 S (Buena Vista S).

Broadway Junction

NSR 14N (Los Angeles State Historic Park – North), NSR 16 (Cathedral High School), NSR 17N (Low-Rise Residential on Savoy Street – North), and NSR 17S (Low-Rise Residential on Savoy Street – South) would experience a significant noise impact during construction activities of the Broadway Junction. Construction activities would result in the greatest increase over existing noise levels for this Project location at NSR 17S during the Demolition phase (33.9 dBA over existing). Construction noise levels at NSR 14N would be greatest during the Foundations and Columns phase (19.2 dBA over existing), while construction noise levels at NSR 16 and 17 N would be greatest during the Demolition phase (21 and 21.2 dBA over existing, respectively).

The construction activities of the Broadway Junction would not result in impacts at NSR 13S (Buena Vista S), NSR 13N (Buena Vista N), and NSR 15 (St. Peter's Church).

Stadium Tower

NSR 16 (Cathedral High School) and NSR 17N (Low-Rise Residential on Savoy Street – North) would experience a significant noise impact during construction activities of the Stadium Tower. Construction activities would result in the greatest increase over existing noise levels for this Project location at NSR 16 during the Structural Steel and Gondola Equipment Erection phase (6.9 dBA over existing). Construction noise levels at NSR 17N would be greatest during the Structural Steel and Gondola Equipment Erection phase (6.1 dBA over existing).

The construction activities of the Stadium Tower would not result in impacts at NSR 18.

Dodger Stadium Station

The construction activities of the Dodger Stadium Station would not result in impacts at any NSRs, including NSR 16 (Cathedral High School) and NSR 18 (Solano Canyon Neighborhood).

Mesa Laydown Lot

The construction activities of the Mesa Laydown Lot would not result in impacts at any NSRs, including NSR 19 (Elysian Park Recreation Center).

Noise-2: *A significant noise impact would exist if noise from construction equipment generates noise levels greater than 75 dBA at a distance of 50 feet from the source between 7:00 AM and 10:00 PM (LAMC Section 112.05).*

LAMC Section 112.05 establishes that the maximum allowable noise level for construction equipment within 500 feet of any residential zone is 75 dBA when measured at 50 feet from the noise source. For purposes of analyzing construction impacts in this EIR, this LAMC standard is expanded to include sensitive uses in addition to a "residential zone." Typical noise levels at 50 feet from the equipment that would be used during Project construction are listed in **Table 6-2**, Equipment Rosters for Analyzed Construction Phases. As provided in Table 6-2 the majority of equipment that would be used for the Project exceeds 75 dBA at 50 feet. In addition, during construction multiple pieces of equipment may operate simultaneously, generating overall noise levels at 50 feet that are higher than the noise levels shown in Table 6-2. Therefore, construction equipment would generate noise greater than 75 dBA at a distance of 50 feet resulting in a

significant and unavoidable impact for all construction phases. The noise levels generated at specific sensitive receptors by construction phase are provided in **Table 6-3**.

Noise-3: *A significant noise impact would exist if the Project construction noise level would exceed 80 dBA $L_{eq(day)}$ at residential properties, churches, parks, and schools, or 85 dBA $L_{eq(day)}$ at commercial properties (FTA thresholds).*

As shown in **Table 6-4**, construction activities would exceed the appropriate FTA Impact threshold at several noise-sensitive uses, as described below for each Project component.

Alameda Station

NSR 2 (El Pueblo) and NSR 3 (Mozaic Apartments) would experience noise levels that exceed the appropriate FTA impact threshold during construction activities of the Alameda Station. This impact would be significant.

The construction activities of the Alameda Station would not result in FTA impacts at NSR 1A (Los Angeles Union Station) and NSR 1B (First Five LA).

Alameda Tower

The construction activities of the Alameda Tower would not result in FTA impacts at any NSRs.

Alpine Tower

NSR 5 (Future Residential Development) and NSR 6 (Chinatown Senior Lofts) would experience noise levels that exceed the appropriate FTA impact threshold during construction activities of the Alpine Tower. This impact would be significant.

The construction activities of the Alpine Tower would not result in FTA impacts at NSR 7 (Homeboy Industries).

Chinatown/State Park Station

NSR 8 (Future Residential Development), and NSR 14S (Los Angeles State Historic Park – South) would experience noise levels that exceed the appropriate FTA impact threshold during construction activities of the Chinatown/State Park Station. This impact would be significant.

The construction activities of the Chinatown/State Park Station would not result in FTA impacts at NSR 9 (Blossom Plaza), NSR 10 (Future Residential Development), NSR 11 (Capitol Milling), NSR 12 (Llewellyn Apartments), and NSR 13S (Buena Vista S).

Broadway Junction

NSR 17S (Low-Rise Residential on Savoy Street – South) would experience noise levels that exceed the appropriate FTA impact threshold during construction activities of the Broadway Junction. This impact would be significant.

The construction activities of the Broadway Junction would not result in FTA impacts at NSR 13S (Buena Vista S), NSR 13N (Buena Vista N), NSR 14N (Low-Rise Residential on Savoy Street – North, NSR 15 (St. Peter's Church), NSR 16 (Cathedral High School), and NSR 17N (Low-Rise Residential on Savoy Street – North).

Stadium Tower

The construction activities of the Stadium Tower would not result in FTA impacts at any NSRs, including NSR 16 (Cathedral High School), NSR 17N (Low-Rise Residential on Savoy Street – North), and NSR 18 (Solano Canyon Neighborhood).

Dodger Stadium Station

The construction activities of the Dodger Stadium Station would not result in FTA impacts at any NSRs, including NSR 16 (Cathedral High School) and NSR 18 (Solano Canyon Neighborhood).

Mesa Laydown Lot

The construction activities of the Mesa Laydown Lot would not result in FTA impacts at any NSRs, including NSR 19 (Elysian Park Recreation Center).

Off-Site Construction Noise Impact Analysis

In addition to on-site construction activities, noise would be generated off-site by construction-related traffic traveling via off-site construction traffic routes. The noise impacts of construction trucks traveling on these construction traffic routes were analyzed using the Traffic Noise Model (TNM) to create a conceptual scenario representative of the Project area. Off-site construction noise impacts can be assessed by determining the relative increase of traffic noise levels as a result of additional project related traffic, especially the addition of heavy trucks using public roadways.

The haul routes for heavy trucks servicing the project areas were determined by the traffic consultant. These roadways and segments are listed in Table 6-5 and in a figure included in Appendix B. Existing traffic noise levels in $L_{eq(1\text{-hour})}$ were estimated using existing traffic volume data for area roadways as provided by the Project's traffic consultant and calculated at typical receptor distances of 50 and 100 feet from the roadway centerline. Existing plus project traffic noise was calculated with TNM using the same estimated existing traffic volumes plus an additional 16 heavy truck trips (8 round trips) per hour along the haul routes based upon input included in Appendix B of the Project EIR. The additional 16 trucks per hour would account for a variety of heavy truck types during different phases of the Project such as dump trucks removing excavated material during excavation activity, concrete mixer trucks delivering concrete mix during concrete pours, and flatbed trucks delivering other construction materials and supplies during other phases. A lesser number of additional smaller pickup trucks and automobiles would also be assumed for worker trips, but these would contribute an insignificant amount of additional traffic noise compared to the larger dump trucks and concrete mixer trucks. The estimated increase in noise levels due to the additional 16 heavy truck trips during construction by roadway segment are shown in **Table 6-5**. The greatest increase is 0.6 dBA (below a barely perceptible increase). Therefore, the noise generated by off-site construction activities would not represent a significant increase in noise that would exceed the threshold of a 5 dBA increase over existing ambient noise levels as per LAMC and the L.A. CEQA Thresholds Guide and off-site construction traffic noise impacts would be less than significant.

Table 6-5 Off-Site Construction Traffic Noise Impact

Roadway	Segment	50 ft from Roadway center line ($L_{eq(h)}$, dBA)			100 ft from Roadway center line ($L_{eq(h)}$, dBA)		
		Existing	Ext + Proj	Increase	Existing	Ext + Proj	Increase
Alameda Street	Los Angeles Street to Cesar E. Chavez Avenue	71.1	71.4	0.3	67.3	67.6	0.3
Alameda Street	Cesar E. Chavez Avenue to Bauchet Street/Main Street	71.2	71.5	0.3	67.4	67.7	0.3
Alameda Street	Bauchet Street/Main Street to Alpine Street	72.7	72.9	0.2	69.1	69.3	0.2
Alameda Street	Alpine Street to College Street	71.5	71.8	0.3	68.0	68.2	0.2
Spring Street	College Street to Ann Street	71.1	71.3	0.2	67.9	68.1	0.2
Spring Street	Ann Street to Avenue 18	71.8	72.0	0.2	68.5	68.7	0.2
Broadway	Avenue 18 to Bishops Road	72.3	72.4	0.1	68.8	69.0	0.2
Bishops Road	N. Broadway to SR-110	62.3	62.9	0.6	59.0	59.6	0.6

6.1.3 Operational Noise Impacts

This section presents predicted operational noise levels using the methodology developed in Section 5.3 (including noise from the equipment and mechanical operations of the stations, junction, and towers, as well as noise from gondola cabins and passengers waiting to board in stations), and potential impacts assessed according to significance thresholds established in Section 5.5 of this technical report.

Operational Noise Scenarios

The proposed Project would operate under a variety of different operating scenarios to respond to varying demand. The different operating scenarios would have different line speed, cabins per hour, and queueing numbers that affect system and passenger noise levels.

For purposes of the operational noise analysis, the worst-case scenario was selected, which represents a Dodger Game Day. The Dodger Game Day scenario is the worst-case scenario because it would include the highest line speed, cabins per hour, and queueing numbers, and would include nighttime operations, all of which contribute to this scenario resulting in the worst-case condition. The assumptions for the Dodger Game Day scenario using the 2042 horizon year are:

- Maximum Line Speed: 6.0 meters per second/19.7 feet per second
- Maximum Cabins: 156/hour
- Includes nighttime operations
- Maximum Queueing: 603 people

Operational Noise Predicted Levels and Impacts

As discussed in Section 3, several impact thresholds were used to analyze the potential for operational noise impacts, including FTA impact criteria, the L.A. CEQA Thresholds Guide, and LAMC noise standards, each applied to the worst-case scenario.

Noise-4: *A project would normally have a significant impact during operation if the project causes the ambient noise level measured at the property line of affected uses to increase by 3 dBA in CNEL, to or within the "normally unacceptable" or "clearly unacceptable" category, or any 5 dBA or greater noise increase (L.A. CEQA Thresholds Guide).*

Table 6-6 summarizes the predicted future CNEL levels and impacts for the Dodger Game Day scenario for the proposed Project. This analysis accounts for noise from the stations/junction, towers, and passenger queuing. More detailed information is provided in Appendix B.3

Table 6-6 L.A. CEQA Thresholds Guide Operational Noise Impact Analysis, 2042 Dodger Game Day (dBA)

NSR ID	Land Use	Existing CNEL	Project CNEL	Existing +Project	Allowable Increase	Increase	Impact?
NSR 1A	Transit Terminal	65.1	53.1	65.3	5	0.3	No
NSR 1B	Daycare Center	65.1	53.1	65.3	5	0.3	No
NSR 2	Public Park	72.9	57.9	73.0	3	0.1	No
NSR 3	MFR	72.7	63.1	73.2	3	0.5	No
NSR 4	Office Building	68.0	46.3	68.0	5	0.0	No
NSR 5	Future MFR	71.6	54.4	71.7	3	0.1	No
NSR 6	MFR	72.0	49.4	72.0	3	0.0	No
NSR 7	Office Building	72.9	48.5	72.9	3	0.0	No
NSR 8	Future MFR	71.0	61.8	71.5	3	0.5	No
NSR 9	MFR	64.3	53.0	64.6	5	0.3	No
NSR 10	Future MFR	64.3	53.0	64.6	5	0.3	No
NSR 11	Commercial	66.9	51.1	67.0	5	0.1	No
NSR 12	Future MFR	71.0	61.8	71.5	3	0.5	No
NSR 13N	Future MFR	69.0	49.4	69.0	5	0.0	No
NSR 13S	Future MFR	71.2	49.8	71.3	3	0.0	No
NSR 14N	Public Park	56.7	58.6	60.8	5	4.0	No
NSR 14S	Public Park	62.6	58.5	64.0	5	1.4	No
NSR 15	Church	69.0	49.4	69.0	5	0.0	No
NSR 16	School	61.8	60.5	64.2	5	2.4	No
NSR 17N	SFR	59.3	58.9	62.1	5	2.8	No
NSR 17S	MFR	59.3	58.9	62.1	5	2.8	No
NSR 18	SFR	59.6	41.6	59.6	5	0.1	No
Increase values were rounded to the closest 0.1 dBA							

As shown in **Table 6-6**, the highest increase in noise levels for operation would be 4.0 dBA at NSR 14N (Los Angeles State Historic Park) under the worst-case scenario. The increases in noise levels resulting from operation of the proposed Project would be below the applicable L.A. CEQA Thresholds Guide threshold at all NSRs based on the NSRs' land use category per Table 3-4, and no operational impact would occur under the worst-case scenario. Since no operational impacts would occur under the worst-case scenario, the remaining operational scenarios, which result in less noise as a result of changes to the line speed, cabins per hour, or queueing numbers, would also not result in significant noise impacts.

Noise-5: *A significant noise impact would exist if the project noise level would result in an increase in $L_{eq(day)}$ or $L_{eq(night)}$ levels of 5 dBA over existing ambient noise levels (LAMC).*

The LAMC defines an impact as an increase in $L_{eq(day)}$ or $L_{eq(night)}$ levels over 5 dBA. Existing and predicted $L_{eq(day)}$ and $L_{eq(night)}$ levels for the 2042 - Weekday, High – Dodger Event scenario are

reported in **Table 6-7**. The increase over existing is also reported along with impacts. This analysis accounts for noise from the stations/junction, towers, and passenger queuing.

Table 6-7 LAMC Operational Noise Impact Analysis, 2042 Dodger Game Day (dBA)

NSR ID	Land Use	Existing		Project		Existing + Project		Increase over Existing		Impact?	
		$L_{eq(day)}$	$L_{eq(night)}$	$L_{eq(day)}$	$L_{eq(night)}$	$L_{eq(day)}$	$L_{eq(night)}$	$L_{eq(day)}$	$L_{eq(night)}$	$L_{eq(day)}$	$L_{eq(night)}$
NSR 1A	Transit Terminal	61.1	57.7	49.3	45.2	61.4	57.9	0.3	0.2	No	No
NSR 1B	Daycare Center	61.1	57.7	49.3	45.2	61.4	57.9	0.3	0.2	No	No
NSR 2	Public Park	69.0	65.5	54.0	50.1	69.1	65.6	0.1	0.1	No	No
NSR 3	MFR	68.4	65.5	59.3	55.3	68.9	65.9	0.5	0.4	No	No
NSR 4	Office Building	63.6	60.7	42.2	38.3	63.6	60.7	0.0	0.0	No	No
NSR 5	Future MFR	65.6	64.9	50.2	46.4	65.7	65.0	0.1	0.1	No	No
NSR 6	MFR	69.0	64.1	45.2	41.4	69.0	64.1	0.0	0.0	No	No
NSR 7	Office Building	69.8	65.1	44.3	40.5	69.8	65.1	0.0	0.0	No	No
NSR 8	Future MFR	64.7	64.4	57.8	53.8	65.5	64.8	0.8	0.4	No	No
NSR 9	MFR	61.1	56.5	49.1	45.0	61.4	56.8	0.3	0.3	No	No
NSR 10	Future MFR	61.1	56.5	49.1	45.0	61.4	56.8	0.3	0.3	No	No
NSR 11	Commercial	63.0	59.5	47.3	43.1	63.1	59.6	0.1	0.1	No	No
NSR 12	MFR	64.7	64.4	57.8	53.8	65.5	64.8	0.8	0.4	No	No
NSR 13N	Future MFR	65.8	60.9	45.5	41.3	65.8	60.9	0.0	0.0	No	No
NSR 13S	Future MFR	67.7	63.6	45.9	41.7	67.7	63.6	0.0	0.0	No	No
NSR 14N	Public Park	53.6	48.7	54.6	50.6	57.1	52.8	3.5	4.1	No	No
NSR 14S	Public Park	58.7	55.2	54.5	50.5	60.1	56.5	1.4	1.3	No	No
NSR 15	Church	65.8	60.9	45.5	41.3	65.8	60.9	0.0	0.0	No	No
NSR 16	School	58.7	53.8	56.5	52.4	60.7	56.2	2.0	2.4	No	No
NSR 17N	SFR	56.1	51.2	55.1	50.8	58.6	54.0	2.5	2.8	No	No
NSR 17S	MFR	56.1	51.2	55.1	50.8	58.6	54.0	2.5	2.8	No	No
NSR 18	SFR	56.5	51.6	37.1	33.9	56.5	51.7	0.0	0.1	No	No
Increase values were rounded to the closest 0.1 dBA											

As shown in **Table 6-7**, the highest increase in noise levels for operation of the proposed Project would be 4.1 dBA $L_{eq(night)}$ at NSR 14 N (Los Angeles State Historic Park) under the worst-case scenario. The increases in noise levels resulting from operation of the proposed Project would be below the 5 dBA L_{eq} LAMC threshold at all NSRs, and no operational impact would occur under the worst-case scenario. Since no operational impacts would occur under the worst-case scenario, the remaining operational scenarios, which result in less noise as a result of changes to line speed, cabins per hour, or queuing numbers, would also not result in significant noise impacts. Therefore, Project operation would not result in noise levels above the applicable LAMC thresholds, and impacts would be less than significant.

Noise-6: *A significant noise impact would exist if the project noise level would result in a "severe impact" at levels ranging from 55 to 80 dBA depending on existing noise, in accordance with Figure 3-1 in Section 3.1.1 above (FTA).*

FTA impact criteria have different impact threshold metrics and levels based on the type of land use at the receptor location and the existing noise exposure. These levels are explained in more

detail in Section 3. Impact thresholds range from 55 to 80 dBA depending on existing noise exposure and the analysis compares these thresholds to either the worst-hour L_{eq} from the Project or the Project L_{dn}, depending on the FTA land use category of the NSR. **Table 6-8** summarizes the existing noise levels, the applicable impact thresholds, the noise levels from the Project, and whether the Project would result in a significant impact. Project noise levels account for noise from the stations/junction, towers, and passenger queuing, as well as the distance from these sources to the analyzed NSR. More detailed information is provided in Appendix B.3

Table 6-8 FTA Operational Noise Impact Analysis, 2042 Dodger Game Day (dBA)

NSR ID	Land Use	FTA Land Use Category	Impact Metric[1]	Existing Level (L_{eq}-WH or L_{dn})	Impact Threshold	Predicted Project Level	Severe Impact?
NSR 1A	Transit Terminal	Category 3	L_{eq}-WH[2]	61.1	64	53.1	No
NSR 1B	Daycare Center	Category 3	L_{eq}-WH	61.1	64	53.1	No
NSR 2	Public Park	Category 3	L_{eq}-WH	69.0	69	59.6	No
NSR 3	MFR	Category 2	L_{dn}	72.5	71	62.5	No
NSR 4	Office Building	Category 3	L_{eq}-WH	63.6	65	44.1	No
NSR 5	Future MFR	Category 2	L_{dn}	65.6	66	52.3	No
NSR 6	MFR	Category 2	L_{dn}	71.6	70	48.6	No
NSR 7	Office Building	Category 3	L_{eq}-WH	69.8	69	46.3	No
NSR 8	Future MFR	Category 2	L_{dn}	70.8	70	61	No
NSR 9	MFR	Category 2	L_{dn}	63.9	65	52.3	No
NSR 10	Future MFR	Category 2	L_{dn}	63.9	65	52.3	No
NSR 11	Commercial	Category 3	L_{eq}-WH	63.0	71	48.4	No
NSR 12	MFR	Category 2	L_{dn}	70.8	70	61	No
NSR 13N	Future MFR	Category 2	L_{dn}	68.5	68	48.6	No
NSR 13S	Future MFR	Category 2	L_{dn}	70.9	66	49.1	No
NSR 14N	Public Park	Category 3	L_{eq}-WH	53.6	60	56.3	No
NSR 14S	Public Park	Category 3	L_{eq}-WH	58.7	62	56.2	No
NSR 15	Church	Category 3	L_{eq}-WH	65.8	66	46.8	No
NSR 16	School	Category 3	L_{eq}-WH	58.7	63	58.1	No
NSR 17N	SFR	Category 2	L_{dn}	58.9	63	58.2	No
NSR 17S	MFR	Category 2	L_{dn}	58.9	63	58.2	No
NSR 18	SFR	Category 2	L_{dn}	59.1	63	40.9	No

[1] The impact metric being used depends on the FTA Land Use Category of the analyzed NSR. Category 1 and 3 land uses are analyzed with respect to Project worst-hour noise levels. Category 2 land uses are analyzed with respect to Project L_{dn} levels.
[2] WH = worst hour (Predicted L_{eq} for hour with anticipated highest level of Project activity)

As shown in **Table 6-8**, operation of the proposed Project would not increase noise levels in exceedance of the FTA impact threshold (ranging from 55 to 80 dBA depending on existing noise exposure) under the worst-case scenario. As such, no operational impact would occur under the worst-case scenario. Since no operational impacts would occur under the worst-case scenario, the remaining operational scenarios, which result in less noise as a result of changes to line speed, cabins per hour, or queuing numbers, would also not result in significant noise

impacts. Therefore, Project operation would not result in noise levels above the applicable FTA thresholds, and impacts would be less than significant.

Gondola Cabin Noise

In addition to the primary operational noise levels from the stations, junction, towers and passengers at stations as discussed above, which also included gondola noise (as is explained below), an analysis was conducted to evaluate the noise from the gondola cabins as they travel between the stations, towers and junction in proximity to receptor locations.

Cabin noise might be expected from the people traveling inside the cabin and any heating, ventilation and air conditioning (HVAC) equipment associated with the cabin. The Project would implement Project Design Feature NOI-PDF-A in Section 7 that provides specifications regarding the interior to exterior noise reduction of the gondola cabins as well as the sound power level of the HVAC system. For purpose of the analysis, the assumed nighttime noise level is the measured noise level at the receptor location minus an additional 5 dBA where the gondola cabin would be at an elevation of 35 feet or greater above street level. As shown in **Table 6-9**, with implementation of Project Design Feature NOI-PDF-A, noise from the gondola cabins would be at least 10 dBA less than the existing nighttime noise level at noise-sensitive uses. In fact, in many cases, the noise levels from the gondola cabins would be over 20 dBA less than the existing nighttime noise level at noise-sensitive uses. Due to decibel mathematics, combining two sound levels that differ by 10 dB or more results in a sound level identical to the higher value of the two. Because the gondola noise would be at least 10 dBA less than the existing nighttime noise level, cabin noise will not contribute to the overall operational noise levels at any NSRs and impacts from gondola cabin noise would be less than significant.

A summary of this analysis is presented in **Table 6-9,** with more details about this information in Appendix B.5.

Table 6-9 Gondola Cabin Noise

Rec. ID[a]	Cabin to NSR Dist. (ft)	Nighttime Existing Level (L_{eq}, dBA)	Cabin Noise with NOI-PDF-A	Cabin Noise Level Below Nighttime Existing Level (L_{eq}, dBA)
NSR 3	44	65.5	41.2	24.3
NSR 5	104	64.9	33.9	31.0
NSR 6	76	64.1	36.6	27.5
NSR 7	114	65.1	33.1	32.0
NSR 8	35	64.4	43.4	21.0
NSR 9	183	56.5	29.0	27.5
NSR 13 S	150	63.6	30.7	32.9
NSR 14 S	115	55.2	33.1	22.1
NSR 17 N	45	51.2	41.2	10

[a] The NSRs included in this evaluation were conservatively selected as those most likely to be impacted by the cabins either because of the distance from the NSR to the cabin or the existing nighttime noise levels. Impacts at all other NSRs would be less than those analyzed here.

Operational Noise Impacts Summary

Table 6-10 shows a summary of impacts assessed above for the worst-case 2042 Dodger Game Day scenario:

Table 6-10 Operational Noise Impact Summary

Noise Standard	Operational Noise Impact from Stations, Towers, and Queuing	Operational Noise Impacts from Cabins	Cumulative Operational Noise Impacts
L.A. CEQA Thresholds Guide	none	none	none
L.A. Municipal Code	none	none	none
FTA	none	none	none

Table 6-10 above summarizes operational noise impacts for the worst-case operational scenario, including potential impacts from cabin noise. The cabin noise would not result in a contribution to cumulative noise levels because Project Design Feature NOI-PDF-A ensures that the cabins would be designed such that they will generate noise levels of at least 10 dBA below the current background levels. Operational impacts would be less than significant and no mitigation measures are required.

6.2 Vibration

6.2.1 Construction Vibration

Construction Vibration Receptors

A construction vibration impact analysis was conducted for those vibration-sensitive receptors (VSRs) that were located within approximately 200 feet of each Project component site. This distance was chosen because vibration attenuates with distance and, at 200 feet, vibration levels for the highest vibration producing equipment for construction of the proposed Project (vibratory rollers) would be less than the most restrictive vibration level (0.12 in/sec PPV) and, therefore, the Project would not impact VSRs beyond 200 feet.

A list of the VSRs including their building type and potential damage and annoyance thresholds is presented in **Table 6-11** and **Figure 6-2**. Annoyance and damage thresholds are referenced from the FTA Manual (see Tables 3-5, 3-6 and 3-7).

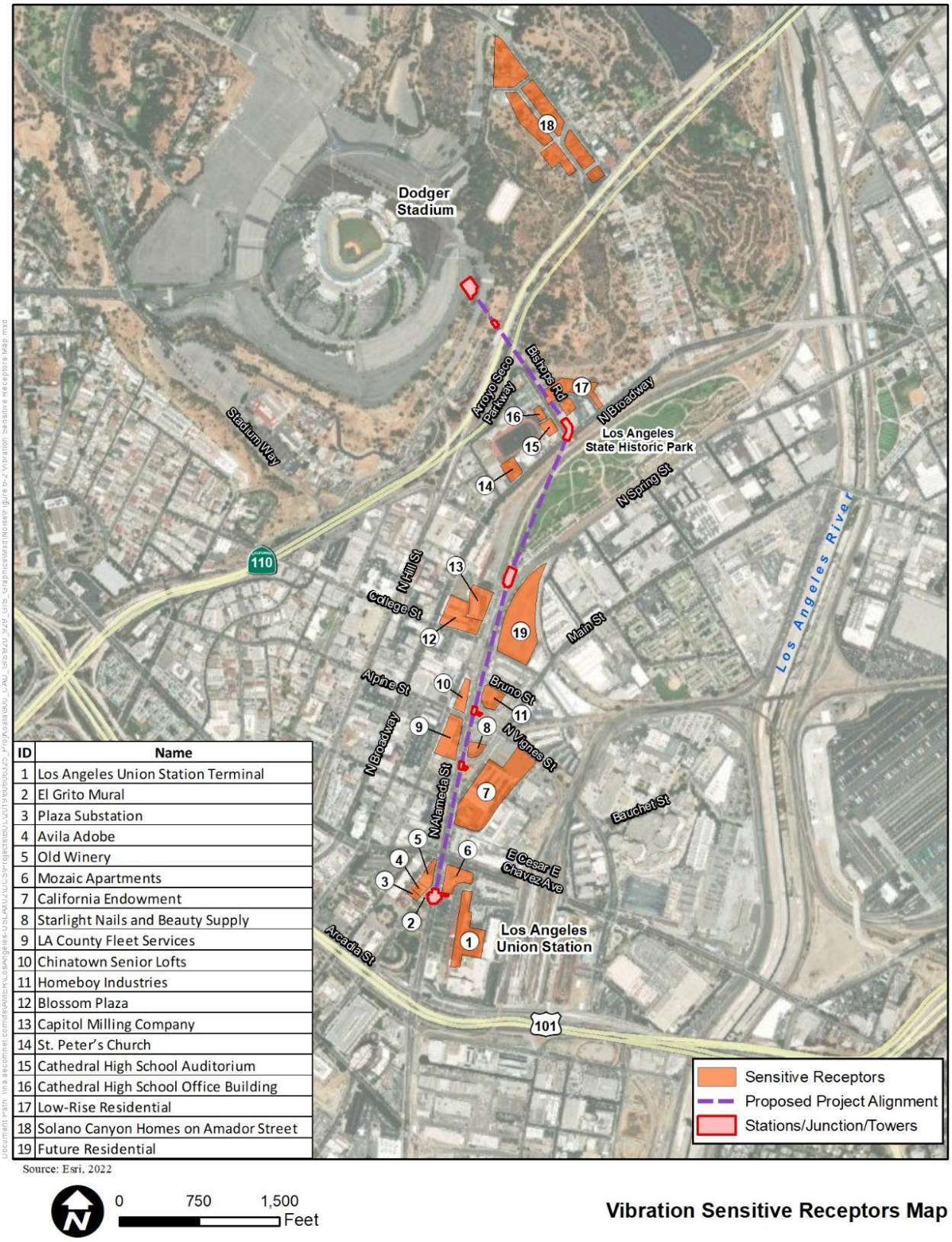
Construction Vibration Predicted Level and Impacts

On-Site Construction Activity. Construction vibration levels were calculated as per the methodology presented in Section 5.2. While a variety of vibration-producing equipment was considered, the worst-case scenario was generally associated with the use of vibratory rollers, with a reference vibration level of 0.21 PPV in/sec (94 VdB) at a distance of 25 feet, which was considered for the closest construction activities. The summary results for predicted vibration levels are presented in **Table 6-12**. Detailed prediction spreadsheets are provided in Appendix B.2.

Table 6-11 Vibration-Sensitive Receptors

ID	Name	Building Type	Impact threshold*	
			Damage (PPV in in/sec)	Annoyance (VdB)
VSR-1	Los Angeles Union Station Terminal	II Engineered	0.3	75
VSR-2	Plaza Substation	III Non-Engineered	0.2	75
VSR-3	El Grito Mural	III Non-Engineered	0.2	NA
VSR-4	a. Avila Adobe (original 1818 structure)	“Extremely Fragile”	0.12	75
	b. Avila Adobe (1970s addition)	III Non-Engineered	0.2	75
VSR-5	Old Winery	III Non-Engineered	0.2	75
VSR-6	Mozaic Apartments	I Reinforced	0.5	72
VSR-7	The California Endowment	I Reinforced	0.5	75
VSR-8	Starlight Nail and Beauty Supply	III Non-Engineered	0.2	75
VSR-9	LA County Fleet Services	I Reinforced	0.5	75
VSR-10	Chinatown Senior Lofts	II Engineered	0.3	72
VSR-11	Homeboy Industries	I Reinforced	0.5	75
VSR-12	Blossom Plaza	I Reinforced	0.5	72
VSR-13	Capitol Milling Company	III Non-Engineered	0.2	75
VSR-14	St. Peter's Church	III Non-Engineered	0.2	75
VSR-15	Cathedral High School Auditorium	I Reinforced	0.5	72
VSR-16	Cathedral High School Office Building	II Engineered	0.3	75
VSR-17	Low-Rise Residential (on Savoy Street)	III Non-Engineered	0.2	72
VSR-18	Solano Canyon Homes on Amador Street	III Non-Engineered	0.2	72
VSR-19	Future Residential	I Reinforced	0.5	72

* Damage and annoyance thresholds from FTA, 2018, See Table 3-7, except for “Extremely Fragile historic buildings, ruins, ancient monuments” from Caltrans, 2020, Table 19 for Avila Adobe (original 1818 structure), which was selected to ensure that the most conservative threshold is applied to the original structure.



ID	Name
1	Los Angeles Union Station Terminal
2	El Grito Mural
3	Plaza Substation
4	Avila Adobe
5	Old Winery
6	Mozaic Apartments
7	California Endowment
8	Starlight Nails and Beauty Supply
9	LA County Fleet Services
10	Chinatown Senior Lofts
11	Homeboy Industries
12	Blossom Plaza
13	Capitol Milling Company
14	St. Peter's Church
15	Cathedral High School Auditorium
16	Cathedral High School Office Building
17	Low-Rise Residential
18	Solano Canyon Homes on Amador Street
19	Future Residential

Source: Esri, 2022

0 750 1,500 Feet

Vibration Sensitive Receptors Map

Figure 6-2 Vibration-Sensitive Receptors

Table 6-12 FTA Construction Vibration Impact Analysis

Structures			Impact Threshold		Without Mitigation				With Mitigation	
					Vibration Velocity & Level		Potential Impact		Potential Impact	
Project Component Site	ID	Vibration-Sensitive Receptor	Damage, PPV, in/sec	Annoyance, VdB	PPV, in/sec	VdB	Damage	Annoyance	Damage	Annoyance
Alameda Station	VSR-5	Old Winery	0.2	75	0.13	90	No	**Yes**	No	**Yes**
	VSR-4	Avila Adobe (original 1818 structure)	0.12	75	0.06	83	No	**Yes**	No	**Yes**
	VSR-4	Avila Adobe (1970s addition)	0.2	75	0.08	87	No	**Yes**	No	**Yes**
	VSR-3	Plaza Substation	0.2	75	0.09	87	No	**Yes**	No	**Yes**
	VSR-2	El Grito Mural	0.2	N/A	0.13	90	No	N/A[a]	No	N/A[b]
	VSR-6	Mozaic Apartments – Alameda Façade	0.5	72	0.10	88	No	**Yes**	No	**Yes**
	VSR-6	Mozaic Apartments – LAUS Façade	0.5	72	0.09	87	No	**Yes**	No	**Yes**
	VSR-1	Los Angeles Union Station Terminal	0.3	75	0.04	81	No	**Yes**	No	**Yes**
Alameda Station (Vertical Circulation/ Hardscape/ Landscape/Interior work - East)	VSR-6	Mozaic Apartments	0.5	72	0.40	100	No	**Yes**	No	**Yes**
	VSR-1	Los Angeles Union Station Terminal	0.3	75	0.04	81	No	**Yes**	No	**Yes**
Alameda Station (Forecourt Hardscape)	VSR-1	Los Angeles Union Station Terminal	0.3	75	0.04	81	No	**Yes**	No	**Yes**
Alameda Station (Vertical Circulation Hardscape/Landscape/Interior work - West)	VSR-5	Old Winery	0.2[b]	75	7.24	125	**Yes**	**Yes**	No	**Yes**
	VSR-4	Avila Adobe (original 1818 structure)	0.12[b]	75	0.06	83	No	**Yes**	No	**Yes**
	VSR-4	Avila Adobe (1970s addition)	0.2	75	7.24	125	**Yes**	**Yes**	No	**Yes**
	VSR-3	Plaza Substation	0.2	75	0.09	87	No	**Yes**	No	**Yes**
	VSR-2	El Grito Mural	0.2	N/A	1.58	112	**Yes**	N/A[b]	No	N/A[b]

Structures			Impact Threshold		Without Mitigation				With Mitigation	
					Vibration Velocity & Level		Potential Impact		Potential Impact	
Alameda Tower (Excavation work)	VSR-7	The California Endowment	0.5	75	0.06	83	No	**Yes**	No	**Yes**
	VSR-8	Starlight Nail and Beauty Supply	0.2	75	0.16	92	No	**Yes**	No	**Yes**
	VSR-9	LA County Fleet Services	0.5	75	0.07	85	No	**Yes**	No	**Yes**
Alameda Tower (Street work)	VSR-7	The California Endowment	0.5	75	0.06	83	No	**Yes**	No	**Yes**
	VSR-8	Starlight Nail and Beauty Supply	0.2	75	0.16	92	No	**Yes**	No	**Yes**
	VSR-9	LA County Fleet Services	0.5	75	0.07	85	No	**Yes**	No	**Yes**
Alpine Tower	VSR-10	Chinatown Senior Lofts	0.3	72	0.09	87	No	**Yes**	No	**Yes**
	VSR-11	Homeboy Industries	0.5	75	0.16	92	No	**Yes**	No	**Yes**
Chinatown/ State Park Station	VSR-19	Future Residential	0.5	72	0.17	97	No	**Yes**	No	**Yes**
	VSR-12	Blossom Plaza	0.3	72	0.01	68	No	No	No	No
	VSR-13	Capitol Milling Company	0.2	75	0.09	87	No	**Yes**	No	**Yes**
Broadway Junction	VSR-15	Cathedral High School Auditorium	0.5	72	0.27	97	No	**Yes**	No	**Yes**
	VSR-16	Cathedral High School Office Building	0.3	75	0.13	90	No	**Yes**	No	**Yes**
	VSR-17	451 Savoy Street	0.2	72	0.14	91	No	**Yes**	No	**Yes**
	VSR-17	437 Savoy Street	0.2	72	0.09	87	No	**Yes**	No	**Yes**
	VSR-17	438 Savoy Street.	0.2	72	0.17	93	No	**Yes**	No	**Yes**
	VSR-14	St. Peter's Church	0.2	75	0.01	68	No	No	No	No
Stadium Tower	VSR-16	Cathedral High School Office Building	0.3	75	0.01	66	No	No	No	No
Dodger Stadium Station	VSR-18	Solano Canyon Homes on Amador Street	0.2	72	0.00	57	No	No	No	No

a. An annoyance impact is not applicable to this resource as it is an artwork and does not have human occupants such as the other receptors.

b. Note that for the Vertical Circulation/Hardscape/Landscape/Interior work-West Phase for VSRs-4 and -5 (Avila Adobe and Old Winery), a one-foot distance from the structures was conservatively assumed for the vibration analysis. It should be noted that Mitigation Measure VIB-B requires use of non-vibrating equipment or hand tools for ground compaction or excavation/drilling operations within 26 feet of these structures.

Construction Vibration – Impact Analysis

Vibration-1: *A significant vibration impact would exist for human annoyance if ground-borne vibration levels exceed 72 VdB at residential structures, or 75 VdB at institutional structures. For potential structural damage, a significant vibration impact would exist if ground-borne vibration levels exceed:*

- *0.5 PPV, inches per second, for Category 1 buildings (reinforced-concrete, steel or timber (no plaster)) – (FTA)*
- *0.3 PPV, inches per second, for Category 2 buildings (engineered concrete and masonry (no plaster)) – (FTA)*
- *0.2 PPV, inches per second, for Category 3 buildings (non-engineered timber and masonry buildings) – (FTA)*
- *0.12 PPV, inches per second, for Category 4 buildings (buildings extremely susceptible to vibration damage) – (FTA)*

Potential construction vibration impacts were evaluated for vibration-generating construction equipment that would be used for the Project including vibratory rollers, loaded trucks, plate compactors, excavators, and drill rigs. All vibration-generating equipment was evaluated as detailed in Appendix B.2, which determined that the worst-case vibration generating equipment are vibratory rollers and loaded trucks depending upon the type of construction activity occurring in proximity to the sensitive use. **Table 6-12** presents the worst-case vibration levels for each sensitive receptor.

As shown in **Table 6-12**, construction activities would result in potential vibration impacts for several vibration-sensitive uses, as described below for each Project component.

For human annoyance, the analysis determined that a vibratory roller would generate an impact when it is located within 135 feet of a residential use and 107 feet of an institutional use. Because construction sites (stations and towers) are generally in or near rights-of-way that are fronted by residential and institutional uses that are within these distances, they would be subject to this impact. For example, the proposed Alameda Station would be constructed above Alameda Street south of E. Cesar Chavez Avenue and approximately 50 feet from the corner of Mozaic Apartments (VSR-6), a residential use. In addition, for human annoyance, the analysis determined that a loaded truck would generate an impact when it is located within 73 feet of a residential use and 58 feet of an institutional use. Project haul routes are fronted by residential and institutional uses and therefore would be subject to this impact. For example, one of the Project's haul route segments is Alameda Street from Los Angeles Street to E. Cesar Chavez Avenue. Two of the southbound lanes of this segment are within 50 feet of institutional uses—Villa Adobe (VSR-4) and Old Winery (VSR-5), and the northbound lanes are within 60 feet of the edge of the Mozaic Apartments (VSR-6).

Alameda Station

Human Annoyance

Construction of the Alameda Station would exceed the vibration annoyance thresholds (72 VdB at residential structures or 75 VdB at other land uses) for all of the vibration-sensitive receptors near this component location, including the LAUS Terminal (VSR-1), El Plaza Substation (VSR-3), Avila Adobe (VSR-4), Old Winery (VSR-5), and Mozaic Apartments (VSR-6). The human annoyance threshold is so low that many typical activities, such as trucks passing within

73 feet of residential buildings or within 58 feet of institutional buildings, can generate vibrations that are perceptible to occupants and exceed this limit. As noted above, for example, the Mozaic Apartments (VSR-6) are located within 60 feet of the northbound lanes of Alameda Street, a Project haul route. It should be noted that activities such as trucks passing by would be relatively brief and intermittent in nature. Nevertheless, this impact would be significant.

Building Damage

The use of vibration-generating equipment in close proximity to structures at El Pueblo associated with installation of the vertical circulation elements for the Alameda Station would exceed the vibration damage threshold of 0.2 PPV inches per second at the Old Winery (VSR-5), El Grito Mural (VSR-2), and Avila Adobe -1970s addition (VSR-4b). This impact would be significant.

Construction activities for the Alameda Station would not exceed the vibration damage thresholds at LAUS Terminal (VSR-1), El Plaza Substation (VSR-3), the original 1818 Avila Adobe structure (VSR-4), and Mozaic Apartments (VSR-6). Therefore, this impact would be less than significant.

Alameda Tower

Human Annoyance

Construction of the Alameda Tower would exceed the annoyance threshold (75 VdB) for all of the vibration-sensitive receptors near this component location, including The California Endowment (VSR-7), Starlight Nail and Beauty Supply (VSR-8), and LA County Fleet Services (VSR-9). This impact would be significant.

Building Damage

Construction activities for the Alameda Tower would not exceed the vibration damage thresholds at any vibration-sensitive receptors. Therefore, this impact would be less than significant.

Alpine Tower

Human Annoyance

Construction of the Alpine Tower would exceed the annoyance thresholds (72 VdB at residential structures or 75 VdB at other land uses) for all of the vibration-sensitive receptors near this component location, including Homeboy Industries (VSR-11) and Chinatown Senior Lofts (VSR-10). This impact would be significant.

Building Damage

Construction activities for the Alpine Tower would not exceed the vibration damage thresholds at any vibration-sensitive receptors. Therefore, this impact would be less than significant.

Chinatown/State Park Station

Human Annoyance

Construction of the Chinatown/State Park Station would exceed the annoyance threshold of 75 VdB at the Capitol Milling Company (VSR-13), and 72 VdB at the College Station future residential development (VSR-19). This impact would be significant.

Construction activities for the Chinatown/State Park Station would not exceed the annoyance threshold at Blossom Plaza (VSR-12); therefore, human annoyance impacts at VSR-12 would be less than significant.

Building Damage

Construction activities for the Chinatown/State Park Station would not exceed the vibration damage thresholds at any vibration-sensitive receptors. Therefore, this impact would be less than significant.

Broadway Junction

Human Annoyance

Construction of the Broadway Junction would exceed the annoyance threshold (72 VdB) at the Cathedral High School Auditorium (VSR-15), Cathedral High School Office Building (VSR-16) 451 Savoy Street, 437 Savoy Street, and the Other Homes on Savoy Street (VSR-17). This impact would be significant.

Building Damage

Construction activities for the Broadway Junction would not exceed the vibration damage thresholds at any vibration-sensitive receptors. Therefore, this impact would be less than significant.

Stadium Tower

Human Annoyance

Construction activities for the Stadium Tower would not exceed the vibration annoyance thresholds at any vibration-sensitive receptors. Therefore, this impact would be less than significant.

Building Damage

Construction activities for the Stadium Tower would not exceed the vibration damage thresholds at any vibration-sensitive receptors. Therefore, this impact would be less than significant.

Dodger Stadium Station

Human Annoyance

Construction activities for the Dodger Stadium Station would not exceed the vibration annoyance thresholds at any vibration-sensitive receptors. Therefore, this impact would be less than significant.

Building Damage

Construction activities for the Dodger Stadium Station would not exceed the vibration damage thresholds at any vibration-sensitive receptors. Note that Dodger Stadium is located approximately 640 feet west of the Dodger Stadium Station site. At this distance, Dodger Stadium would not be susceptible to vibration impacts during construction activities. Therefore, this impact would be less than significant, and no mitigation measures would be required.

Conclusion Summary

As indicated by **Table 6-12**, the Project would result in human annoyance vibration impacts. Therefore, these impacts would be significant.

Potential damage thresholds could be exceeded at three locations, including the Avila Adobe - 1970s addition (VSR-4b), the Old Winery (VSR-5), and El Grito Mural (VSR-3) due to construction activity associated with the installation of vertical circulation elements for the Alameda Station. These impacts would be significant.

Off-site Construction Vibration Impact

In addition to vibration-sensitive receptors near the Project component sites, potential vibration from loaded trucks operating on local haul routes (primarily sections of Alameda Street, Spring Street, North Broadway, and Bishops Road) was also reviewed. With a reference level of 0.076 in/sec PPV and 86 VdB at 25 feet for loaded trucks, this would translate to levels of 0.03 in/sec and 77 VdB at 50 feet and 0.01 in/sec and 68 VdB at 100 feet (compared to the impact threshold of 72 VdB for residential and 75 VdB for institutional lands uses). These values would be well below potential damage thresholds of 0.12 in/sec PPV even for Type IV extremely fragile buildings but could result in some annoyance impacts for people in occupied structures within 73 feet of the roadway for residential buildings or within 58 feet of the roadway for institutional buildings. However, it should be noted that all of these roadways currently carry a significant number of heavy trucks and any such annoyance threshold is already being exceeded many times each day. Nevertheless, Project-related off-site construction vibration would exceed the annoyance threshold, resulting in a significant impact.

6.2.2 Operation Vibration

None of the proposed Project operations are anticipated to produce perceptible vibration beyond the Project footprint. Some of the equipment within the towers, stations or junction, such as motors or cable guidance systems, may produce a small amount of vibration during normal operations that may be perceptible within the station or junction structure, but these components would be isolated and balanced as part of their basic design and maintenance for proper operation such that they would not produce perceptible vibration levels outside of the station or junction footprint. In addition, vertical circulation devices such as escalators and elevators would, similarly, not generate perceptible vibration levels beyond the Project footprint. In addition, ground-borne vibration attenuates rapidly as a function of distance from a vibration source. Therefore, operation of the proposed Project would not increase the existing vibration levels in the immediate vicinity of the Project component sites, and as such, vibration impacts associated with the operation of the proposed Project would be less than significant.

7. Project Design Features

NOI-PDF-A: Gondola Cabin Noise Control Features

The Project's gondola cabins shall include the following features:

1) Gondola cabins shall be designed with an interior to exterior noise reduction rating of no less than Sound Transmission Class (STC) 35.
2) If heating, ventilation, and air conditioning (HVAC) units are included in the gondola cabin design, they shall be designed with a sound power level of no more than 71 dBA.

In addition, the following project design features CUL-PDF-A through CUL-PDF-E related to cultural resources (Section 3.5 of the Project EIR), provide a robust protection plan for VSR-2 (El Grito Mural) and VSR-5 (Old Winery).

CUL-PDF-A Pre-Construction Documentation of The Winery.

CUL-PDF-B Post-Construction Documentation of The Winery.

CUL-PDF-C Pre-Construction Documentation of El Grito (The Cry) Mural.

CUL-PDF-D Protection During Adjacent Construction of El Grito (The Cry) Mural.

CUL-PDF-E Construction Monitoring Plan (Built Resources)

These project design features, which are included in the Project, require pre-construction surveys to document existing conditions at El Grito Mural and Old Winery, post-construction inspections to document any construction-related damage, and retention of an experienced professional or professionals qualified to carry out the repairs within 12 months of completion of the Project. Any required repairs would conform to the Secretary of Interior's Standards for the Treatment of Historic Properties (36 CFR Part 68).

8. Mitigation Measures

8.1 Noise Mitigation Measures

Potential noise impacts resulting from the proposed Project are associated only with construction of the Project. No noise impacts were identified for operation of the proposed Project. The following mitigation measures are recommended to be implemented during construction of the proposed Project.

NOI-A: Prior to the issuance of grading permits for the proposed Project, the Project Sponsor shall design a Construction Noise Management Plan to minimize the construction-related noise impacts to off-site noise-sensitive receptors. The Construction Noise Management Plan shall include the following measures to reduce noise levels:

- **Noise Barriers**: Temporary construction noise barriers between the Project construction area and affected receptors shall be installed as identified below. The noise barriers shall be designed to have a sound transmission class (STC) rating of at least 25 and should have the ability to provide a range of noise reduction between 5 dBA and 15 dBA when the construction equipment is located below the elevation level of the noise barrier and there is no line-of-sight between the construction equipment and the noise-sensitive receptors. Specific locations and heights for the temporary noise barriers shall include the following by Project components:
    - Alameda Station
        - For the entire duration of construction, the Project shall provide a 24-foot-tall temporary noise barrier between the Project construction site and NSR 3 [Mozaic Apartments].
        - For the entire duration of construction, the Project shall provide an 8-foot temporary noise barrier between the Project construction site and NSR 1A [Union Station] and NSR 1B [First Five LA].
        - During the Foundations and Columns phase, the Project shall provide a 10-foot temporary noise barrier between the Project construction activities occurring within Alameda Street and NSR 1A [Union Station], NSR 1B [First Five LA], NSR 2 [El Pueblo], and NSR 3 [Mozaic Apartments].
        - During a portion of the Structural Steel and Gondola Equipment Erection phase and during a portion of the Vertical Circulation, Hardscaping, Landscaping, and Interior Work phase temporary platforms will be installed to facilitate construction activities. While the temporary platforms are installed, the Project shall provide a 10-foot temporary noise barrier on the temporary platforms between the Project construction site and NSR 3.

- Alameda Tower
    - For the entire duration of construction, the Project shall provide an 8-foot temporary noise barrier between the Project construction site and NSR 4 [The California Endowment].
    - During a portion of the Structural Steel and Gondola Equipment Erection phase temporary platforms will be installed to facilitate construction activities. While the temporary platforms are installed, the Project shall provide a 10-foot temporary noise barrier on the temporary platforms between the Project construction site and NSR 4.
- Alpine Tower
    - For the entire duration of construction, the Project shall provide an 8-foot temporary noise barrier between the Project construction site and NSR 6 [Chinatown Senior Lofts] and NSR 7 [Homeboy Industries].
    - During a portion of the Structural Steel and Gondola Equipment Erection phase temporary platforms will be installed to facilitate construction activities. While the temporary platforms are installed, the Project shall provide a 10-foot temporary noise barrier on the temporary platforms between the Project construction site and NSR 6 and NSR 7.
    - NSR 5 [Future Residential] is currently an undeveloped City-owned parking lot and is proposed for future multi-family residential uses. If NSR 5 is occupied by residential units at the time of Project construction the following noise barriers shall be provided:
        - For the entire duration of construction, the Project shall provide an 8-foot temporary noise barrier between the Project construction site and NSR 5.
        - During the Foundations and Columns and Structural Steel and Gondola Equipment Erection phases, the Project shall provide a 24-foot temporary noise barrier between the Project construction site and occupied residential units at NSR 5 [Future Residential].
        - During a portion of the Structural Steel and Gondola Equipment Erection phase temporary platforms will be installed to facilitate construction activities. While the temporary platforms are installed, the Project shall provide a 10-foot temporary noise barrier on the temporary platforms between the Project construction site and NSR 5.
- Chinatown/State Park Station
    - For the entire duration of construction, the Project shall provide an 8-foot temporary noise barrier between the Project construction site and NSR 9 [Blossom Plaza], NSR 10 [Future Residential Development], NSR 11 [Capitol Milling], and NSR 14S [Los Angeles

State Park]. The noise barrier will include a gate that may be temporarily opened for access during construction hours along Spring Street for construction access.

  - For the entire duration of construction, the Project shall provide a 10-foot temporary noise barrier between the Chinatown / State Park Station and NSR 8 [College Station] and NSR 12 [Future Residential Development].

  - During a portion of the Structural Steel and Gondola Equipment Erection phase temporary platforms will be installed to facilitate construction activities. While the temporary platforms are installed, the Project shall provide a 10-foot temporary noise barrier on the temporary platforms between the Project construction site and NSR 8, NSR 12, and NSR 14S.

- Broadway Junction

  - For the entire duration of construction, the Project shall provide a 24-foot temporary noise barrier between the Project construction site and NSR 13 [Future Development], NSR 14N [Los Angeles State Historic Park], and NSR 17 [Low Rise Residential].

  - During the Demolition phase and the Foundations and Columns phase, the Project shall provide a 24-foot temporary noise barrier between the Project construction site and NSR 16 [Cathedral High School].

  - During the Structural Streel and Gondola Equipment Erection phase and the Vertical Circulation, Hardscaping, Landscaping, and Interior Work phase, the Project shall provide an 8-foot temporary noise barrier between the Project construction site and NSR 16 [Cathedral High School]

  - During a portion of the Structural Steel and Gondola Equipment Erection phase and during a portion of the Vertical Circulation, Hardscaping, Landscaping, and Interior Work phase temporary platforms will be installed to facilitate construction activities. While the temporary platforms are installed, the Project shall provide a 10-foot temporary noise barrier on the temporary platforms between the Project construction site and NSR 13, NSR 14N, NSR 16, and NSR 17.

- Stadium Tower

  - During the Foundations and Columns phase, the Project shall provide an 8-foot temporary noise barrier between the Project construction site and NSR 16 [Cathedral High School] and NSR 17 [Low Rise Residential].

  - During a portion of the Structural Steel and Gondola Equipment Erection phase temporary platforms will be installed to facilitate construction activities. While the temporary platforms are installed, the

Project shall provide a 10-foot temporary noise barrier on the temporary platforms between the Project construction site and NSR 16 and NSR 17.

- **Equipment Maintenance**: Construction equipment shall be properly maintained per manufacturers' specifications to prevent noise due to worn or improperly maintained parts and shall be fitted with the best available noise suppression devices (i.e., mufflers, lagging, and/or motor enclosures). All impact tools shall be shrouded or shielded, and all intake and exhaust ports on power equipment shall be muffled or shielded.

- **Electrical Sources:** When possible, on-site electrical sources shall be used to power equipment rather than diesel generators.

- **Sensitive Uses:** Fixed and/or stationary equipment (e.g., generators, compressors, concrete mixers) shall be located away from noise-sensitive receptors.

- **Community Outreach:** The following shall be implemented to reduce impacts to the local community related to disturbances from construction noise:

  - Noise Disturbance Coordinator: A noise and vibration disturbance coordinator shall be established. The noise disturbance coordinator shall be responsible for responding to any local complaints about construction noise. The noise and vibration disturbance coordinator shall determine the cause of the complaint (e.g., starting too early, bad muffler, etc.) and shall be required to implement reasonable measures to address the complaint. Construction hours, allowable workdays, and the phone number of the job superintendent shall be clearly posted at all construction entrances to allow surrounding property owners to contact the job superintendent if necessary. In the event a complaint is received, appropriate corrective actions shall be implemented and a report of the action provided to the reporting party.
  - Construction Notice: The construction contractor shall provide a construction notice to residents within 500 feet of the construction site for each Project component prior to initiation of construction activities. The construction site notice shall include job site address, anticipated equipment to be used and duration of construction activities, permit number, name and phone number of the job superintendent, construction hours, and the City telephone number where violations can be reported. The notice will also include the phone number of the noise disturbance coordinator.

- **Limit Idling Equipment**: Construction equipment shall not idle for longer than 5 minutes, as required by Section 2485 of the California Code of Regulations.

8.2 Vibration Mitigation Measures

Potential vibration impacts resulting from the proposed Project are associated only with construction of the project. No vibration impacts were identified for operation of the proposed

Project. The following mitigation measures are recommended for the construction phase of the proposed Project to address potential building damage resulting from vibration. Since the human annoyance threshold is exceeded by common occurrences such as vehicle pass-bys during construction, there is no feasible method for mitigating human annoyance impacts. It should be noted that because the human annoyance threshold is so low, it is already exceeded on roadways by existing truck trips. Accordingly, the following mitigation measure is designed to addresses potential building damage. As discussed above, protective measures are also included in Section 3.5 of the Project EIR, Cultural Resources, with CUL-PDF-A through CUL-PDF-E, which require pre-construction surveys to document existing conditions at El Grito Mural (VSR-2) and Old Winery (VSR-5), post-construction inspections to document any construction-related damage, and retention of an experienced professional or professionals qualified to carry out the repairs within 12 months of completion of the Project. Any required repairs would conform to the Secretary of Interior's Standards for the Treatment of Historic Properties (36 CFR Part 68).

VIB-A: **Vibration Monitoring:** Prior to the issuance of grading permits for the proposed Project, the Project Sponsor shall design a Vibration Monitoring Plan. The Plan shall provide for:

- Vibration Monitoring Equipment: The placement of vibration monitoring equipment at least 26 feet away from the Avila Adobe (1970s addition), El Grito mural wall, and The Old Winery by a qualified professional for real-time vibration monitoring for construction work at the Alameda Station requiring heavy equipment or ground compaction devices.

- Modification of Vibration Equipment: The monitoring devices shall notify the construction crew if vibration levels are within 0.1 PPV, in/sec, of the vibration damage threshold. The construction crew shall modify the construction equipment to ensure that the vibration damage threshold is not exceeded.

VIB-B: **Force Adjustable Ground Compaction Devices:** For construction work occurring at the Alameda Station in proximity to the Avila Adobe (1970s addition), El Grito Mural, and The Old Winery:

- At a distance of 26 feet or more of the Avila Adobe (1970s addition), El Grito Mural and The Old Winery, any ground compacting equipment including vibratory rollers and plate compactors shall be calibrated onsite prior to use to ensure vibration levels remain below the assumed reference level of 0.21 PPV, in/sec, at 25 feet. If the ground compacting equipment cannot achieve the assumed reference level, equipment with less vibration (less than 0.21 PPV, in/sec, at 25 feet), non-vibrating equipment, or hand tools shall be required for ground compaction activities.

- Any ground compaction or excavation/drilling operations within 26 feet of the Avila Adobe (1970s addition), El Grito Mural or The Old Winery structures must be completed with non-vibrating equipment or hand tools.

8.3 Level of Significance with Mitigation

Impacts regarding noise and vibration during construction were determined to be potentially significant.

8.3.1 Noise

Mitigation Measure NOI-A would reduce construction noise impacts through the use of noise barriers, maintenance of equipment, avoidance of unnecessary equipment idling, the use of electrical equipment where practicable, and locating equipment as far from noise-sensitive receptors to the extent feasible. Noise barriers were designed and placed in collaboration with the construction contractor based on the location of noise-producing equipment in relation to the sensitive receptors, as well as the physical constraints of the Project site and the Project phase. These barriers would reduce noise levels to the extent that construction activities are shielded (i.e., below the height of sound barriers) or not within the line-of-sight of noise-sensitive receptors (e.g., upper stories of residential buildings). However, because construction of stations and towers at different phases will occur at elevations above the tops of sound barriers or in some cases within the line-of-sight of noise-sensitive receptors, even with implementation of these measures, significant impacts from noise levels due to construction activities would remain. For the LAMC analysis with the implementation of Mitigation Measure NOI-A, construction equipment would generate noise greater than 75 dBA at a distance of 50 feet, resulting in a significant and unavoidable impact for all construction phases. The noise levels generated at specific sensitive receptors by construction phase with mitigation are provided in Table 6-3. In addition, for the L.A. CEQA Thresholds Guide analysis and the FTA Manual analysis, the significant impacts would remain at the following locations:

Alameda Station

L.A. CEQA Thresholds Guide

With the implementation of Mitigation Measure NOI-A, the construction noise impact at NSR 1B (First 5 LA) would be reduced to less than significant. Implementation of Mitigation Measure NOI-A would be required to minimize the impact at NSR 1A (Los Angeles Union Station), NSR 2 (El Pueblo) and NSR 3 (Mozaic Apartments); however, the construction impact at these receptors would remain significant and unavoidable during all construction phases.

FTA Manual

With the implementation of Mitigation Measure NOI-A, the construction noise impact during the Foundations and Columns phase at NSR 3 (Mozaic Apartments) would be reduced to less than significant. Implementation of Mitigation Measure NOI-A would be required to minimize the impact at NSR 2 (El Pueblo) and NSR 3 (Mozaic Apartments) during the Structural Steel and Gondola Equipment Erection and the Vertical Circulation, Hardscape, Landscape, and Interior Work phases, as well as the Foundations and Columns phase for NSR 2; however, the construction impact at NSR 2 and NSR 3 would remain significant and unavoidable during these construction phases.

Alameda Tower

L.A. CEQA Thresholds Guide

Implementation of Mitigation Measure NOI-A would be required to minimize the impact at NSR 4 (The California Endowment); however, the construction impact at NSR 4 would remain significant and unavoidable during all construction phases.

Alpine Tower

L.A. CEQA Thresholds Guide

With the implementation of Mitigation Measure NOI-A, the construction noise impact during the Vertical Circulation, Hardscape, Landscape, and Interior Work phase at NSR 6 (Chinatown Senior Lofts) and NSR 7 (Homeboy Industries) would be reduced to less than significant. Implementation of Mitigation Measure NOI-A would be required to minimize impacts at NSR 5 (Future Residential Development), NSR 6 (Chinatown Senior Lofts), and NSR 7 (Homeboy Industries) during the Foundations and Columns and Structural Steel and Gondola Equipment Erection phases, and the Vertical Circulation, Hardscape, Landscape, and Interior Work phase at NSR 5; however, construction impacts at NSR 5, NSR 6, and NSR 7 would remain significant and unavoidable during these construction phases.

FTA Manual

With the implementation of Mitigation Measure NOI-A, the construction noise impact at NSR 6 (Chinatown Senior Lofts) would be reduced to less than significant for all construction phases.

Implementation of Mitigation Measure NOI-A would be required to minimize the impact at NSR 5 (Future Residential Development) during the Foundations and Columns and Structural Steel and Gondola Equipment Erection phases; however, the construction impact would remain significant and unavoidable at NSR 5 during the Foundations and Columns phase.

Chinatown/State Park Station

L.A. CEQA Thresholds Guide

With the implementation of Mitigation Measure NOI-A, the construction noise impact at NSR 8 (Future Residential Development), NSR 9 (Blossom Plaza), NSR 10 (Future Residential Development), NSR 11 (Capitol Milling), NSR 12 (Residential Development) and NSR 14S (Los Angeles State Historic Park – South) would be reduced to less than significant during the Vertical Circulation, Hardscape, Landscape, and Interior Work phase.

Implementation of Mitigation Measure NOI-A would be required to minimize impacts during the Foundations and Columns and Structural Steel and Gondola Equipment Erection phases; however, construction impacts at NSR 8 (Future Residential Development), NSR 9 (Blossom Plaza), NSR 10 (Future Residential Development), NSR 11 (Capitol Milling), NSR 12 (Residential Development), and NSR 14S (Los Angeles State Historic Park – South) would remain significant and unavoidable during these construction phases.

FTA Manual

With the implementation of Mitigation Measure NOI-A, the construction noise impact at NSR 14S (Los Angeles State Historic Park – South) would be reduced to less than significant during all construction phases, as well as at NSR 8 (Future Residential Development) during the Vertical Circulation, Hardscape, Landscape, and Interior Work phase.

Implementation of Mitigation Measure NOI-A would be required to minimize the impact during the Foundations and Columns and the Structural Steel and Gondola Equipment Erection phases at NSR 8 (Future Residential Development); however, the construction impact would remain significant and unavoidable at NSR 8 during these phases.

Broadway Junction

L.A. CEQA Thresholds Guide

With the implementation of Mitigation Measure NOI-A, the construction noise impact at NSR 14N (Los Angeles State Historic Park – North) would be reduced to less than significant during the Vertical Circulation, Hardscape, Landscape, and Interior Work phase; however, construction impacts would remain significant and unavoidable at this receptor during the Demolition, Foundations and Columns, and Structural Steel and Gondola Equipment Erection construction phases.

Implementation of Mitigation Measure NOI-A would be required to minimize impacts during all construction phases at NSR 16 (Cathedral High School), NSR 17N (Low-Rise Residential – North), and NSR 17S (Low-Rise Residential – South); however, construction impacts at NSR 16, NSR 17N, and NSR 17S would remain significant and unavoidable during all construction phases.

FTA Manual

With the implementation of Mitigation Measure NOI-A, the construction noise impact at NSR 17S (Low-Rise Residential – South) would be reduced to less than significant during all construction phases.

Stadium Tower

L.A. CEQA Thresholds Guide

With the implementation of Mitigation Measure NOI-A, the construction noise impact at NSR 16 (Cathedral High School) during the Foundations and Columns phase and NSR 17N (Low-Rise Residential – North) during the Foundations and Columns and Structural Steel and Gondola Equipment Erection phases would be reduced to less than significant.

8.3.2 Operations

Noise and vibration impacts from operations would be less than significant without mitigation. Therefore, no mitigation measures for operations would be required, and impacts would remain less than significant.

8.3.3 Vibration

Building Damage

Potential damage thresholds could be exceeded at three locations, including the Avila Adobe - 1970s addition (VSR-4b), the Old Winery (VSR-5), and El Grito Mural (VSR-3), due to construction activity associated with the installation of vertical circulation elements for the Alameda Station. With implementation of Mitigation Measures VIB-A and VIB-B, vibration damage impacts at these structures would be less than significant.

Human Annoyance

Significant human annoyance impacts would occur at Alameda Station (VSR-1, -2, -3 -4, -5, and -6), Alameda Tower (VSR-7, -8 and -9), Alpine Tower (VSR-10 and -11), Chinatown/State Park Station (VSR-13 and VSR-19), and Broadway Junction (VSR-14, -15, -16, and -17) and along the Project's haul route. However, no feasible mitigation measures are available to reduce the

vibration annoyance impacts identified for vibration-sensitive receptors from on-site construction activities, as well as along the Project alignment for off-site construction activities. This is because the human annoyance threshold is exceeded by common occurrences such as vehicle pass-bys during construction. Such equipment is needed to build the Project and there is no alignment or haul route option that would create sufficient separation from adjacent uses to eliminate the human impact. As a result, vibration annoyance impacts would remain significant and unavoidable.

9. References

Caltrans Technical Noise Supplement to Traffic Noise Analysis Protocol, 2013. https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tens-sep2013-a11y.pdf

Federal Highway Administration, Roadway Construction Noise Model, User's Guide, 2006 https://www.fhwa.dot.gov/ENVIRonment/noise/construction_noise/rcnm/rcnm.pdf

Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, 2018. https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf

L.A. CEQA Thresholds Guide, City of Los Angeles, 2006 https://planning.lacity.org/eir/CrossroadsHwd/deir/files/references/A07.pdf

Noise Element of the City of Los Angeles General Plan, 1999 https://planning.lacity.org/odocument/b49a8631-19b2-4477-8c7f-08b48093cddd/Noise_Element.pdf

Olsen, W.O. Average Speech Levels and Spectra in Various Speaking/Listening Conditions. *American Journal of Audiology*, 7(2), pp. 21-25, October 1998.

Rossi, F. and Nicolini, A. Noise Prediction Models for Gondola Ropeway Components. *Noise Control Engineering Journal*, 59 (5), pp. 415-431,September-October 2011.

APPENDIX A

NOISE MEASUREMENT DETAIL

Appendix A Noise Measurement Detail

Description of noise measurement procedures

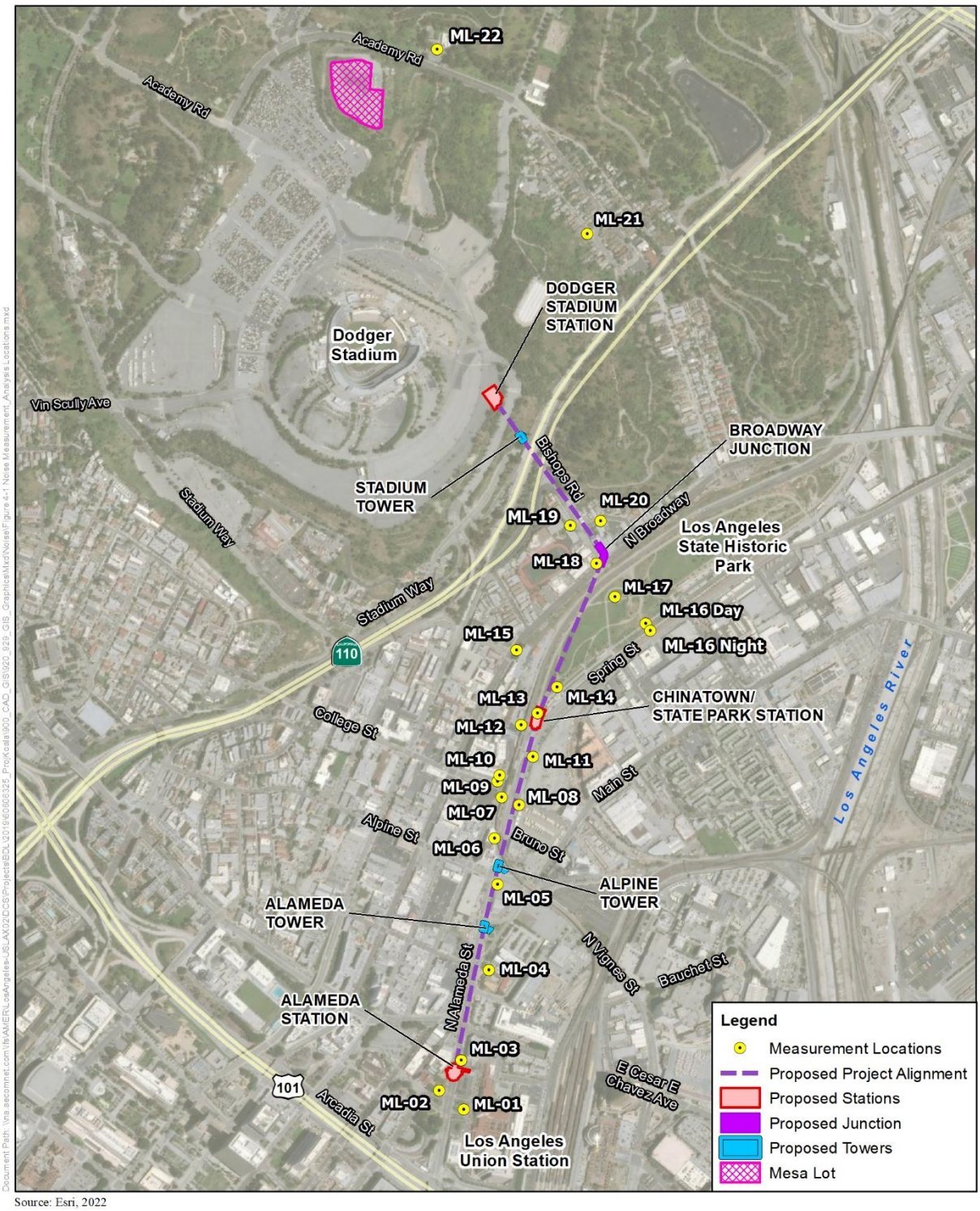
Short-term measurements were taken with two Class 1 Larson Davis LxT Sound Level Meters. Each meter was calibrated before and after taking a measurement. The meters were fitted with windscreens, and they recorded A-weighted equivalent sound level (L_{Aeq}) at 1-minute intervals for approximately 15 minutes. Weather conditions were monitored to ensure they were within acceptable limits. Events that could represent non-ambient conditions were noted, with a timestamp, on the field sheet corresponding to the measurement.

Long-term measurements were taken with two Type 1 Larson Davis 820 Sound Level Meters. Each meter was calibrated before and after taking a measurement. The meters were fitted with windscreens and they recorded A-weighted equivalent sound level (L_{Aeq}) at 10-minute intervals for at least 24 hours. Weather conditions were noted before and after each measurement to ensure they were within acceptable limits.

Noise Short Term Measurement Detail

This Appendix includes a summary of short-term data. A map showing the measurement locations is included after the table.

Measurement ID	Start Time (hh:mm)	Duration (min.)	1-minute L_{eq} (dBA)		
			Min	Max	Average
ML-01	12:23	18	55.1	67.0	61.2
ML-02	13:18	12	60.1	73.1	68.7
ML-03	16:22	14	62.5	74.0	67.4
	23:54	14	50.3	71.9	62.4
ML-04	13:13	15	58.8	67.6	63.3
	23:28	16	48.3	63.4	56.4
ML-05	17:01	14	63.7	70.5	66.9
	22:59	15	54.7	66.6	61.6
ML-06	13:36	13	64.6	78.1	70.1
	22:44	14	49.3	68.7	61.4
ML-08	11:47	13	64.6	74.7	70.6
	23:25	17	47.6	68.4	60.8
ML-09	14:01	14	61.9	70.4	65.9
	21:59	17	54.0	68.3	61.7
ML-10	9:36	22	55.7	69.8	61.8
	22:19	15	50.1	64.5	54.7
ML-11	13:43	13	61.6	69.6	66.2
	23:03	14	43.9	67.5	60.8
ML-12	10:15	14	56.1	68.2	60.8
ML-13	14:26	14	58.7	67.4	63.7
	23:26	16	42.9	61.6	54.8
ML-14	14:46	14	54.1	61.1	58.4
ML-15	14:16	13	63.3	72.3	67.8
	22:36	13	49.3	68.3	62.5
ML-16	15:10	14	51.9	59.5	55.7
	23:02	14	45.3	63.0	58.8
ML-17	11:07	14	50.3	58.6	54.8
ML-18	12:01	14	56.6	71.8	64.9
	22:22	13	51.2	66.9	61.8
ML-19	15:10	14	52.7	63.4	59.0
	22:04	14	49.9	58.8	56.4
ML-21	14:43	13	53.6	60.0	57.9
	22:11	13	49.5	55.5	54.4
ML-22	13:35	15	50.4	59.6	57.2



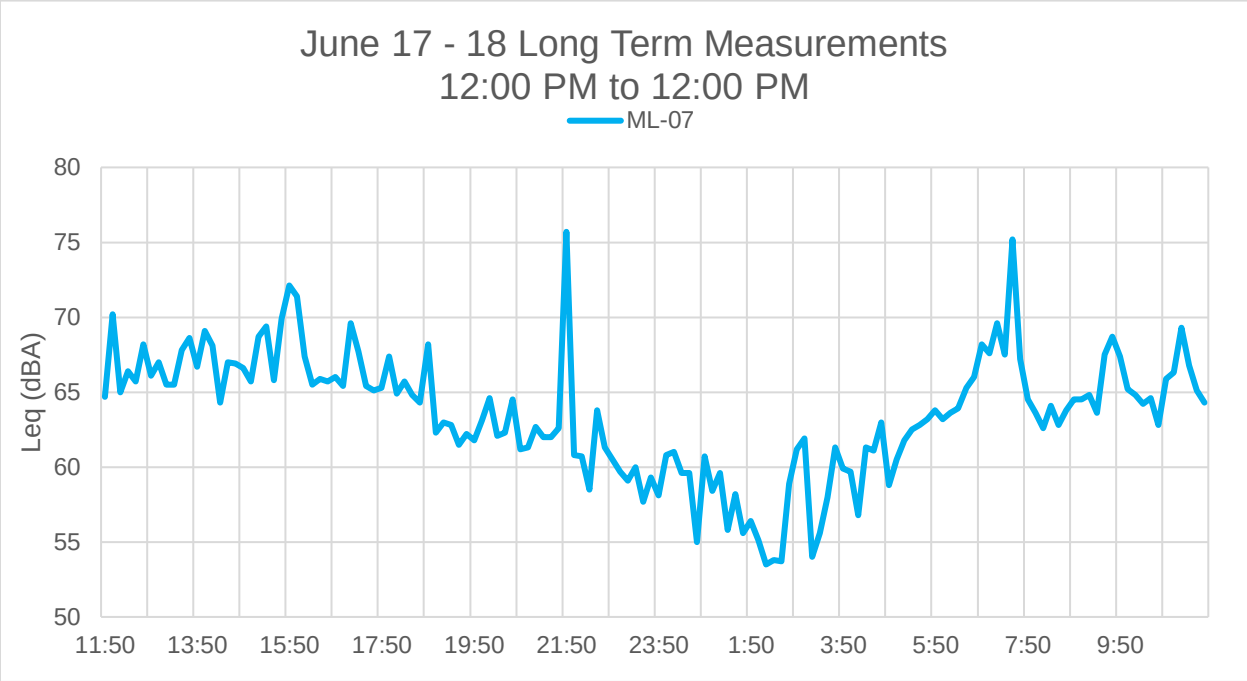
Source: Esri, 2022

0 500 1,000 Feet

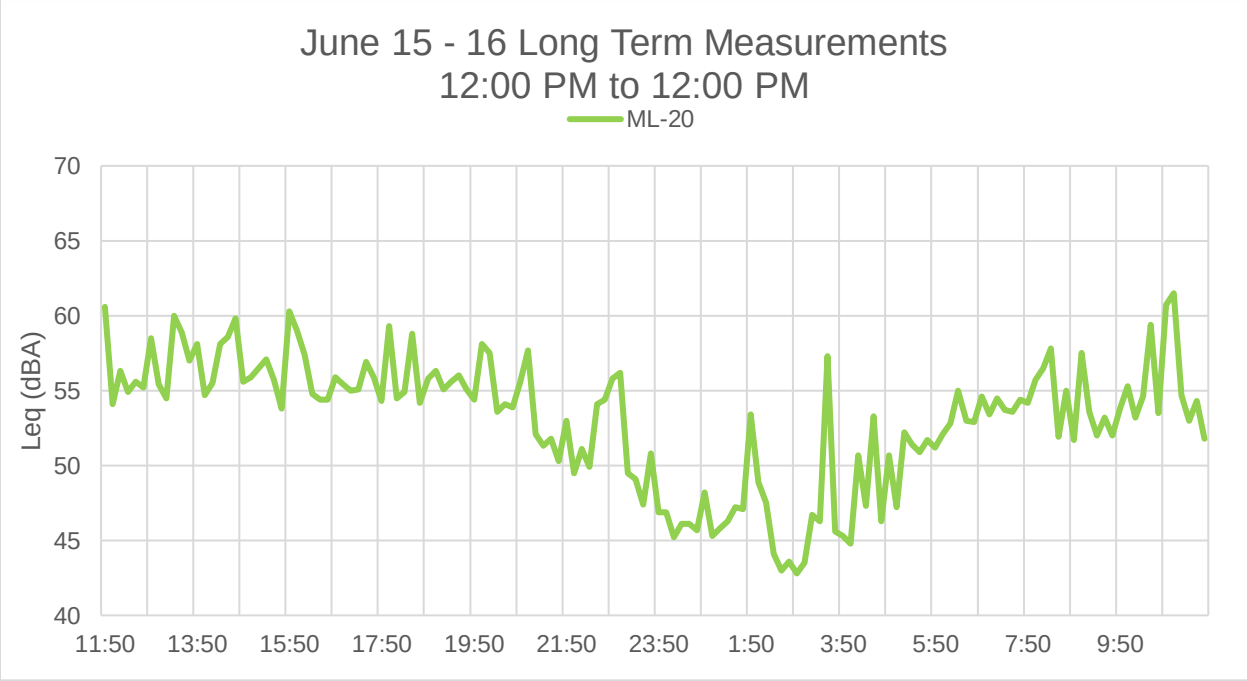
Noise Measurement/Analysis Locations

Long-Term Measurement Charts

This appendix includes a summary of long-term data measurements. All measurement locations are identified in the map below.



Long-term Noise Measurement Location ML-07 (see map above)



Long-term Noise Measurement Location ML-20 (see map above)

Noise Measurement Field Data Sheets

Field data sheets for approximately 25 field noise measurement events have been scanned and saved to a secure project directory and are available upon request.

Each data sheet includes the following:

- Location, date and time of measurement
- Individual conducting the measurement
- Model and serial number of SLM and Field Calibrator
- Field calibration data
- Meteorological observation
- Short term measurement results (1-minute Leq data)
- Site diagram and description of measurement site.
- Description of existing acoustical sources

Noise Measurement Photo Log

This Appendix includes a photo log of measurement collection. Two photos with descriptions are included for each measurement location.

ML-01, Union Station

	
ML-01, facing Union Station Entrance (looking E)	ML-01, facing Alameda St. (looking W)

ML-02 Father Serra Park

	
ML-02, facing Museum of Social Justice (looking NW)	ML-02, facing Alameda St. (looking W)

ML-03 Mozaic Apartments

	
ML-03, facing Alameda St. (looking SW)	ML-03, facing Mozaic Apartments (looking NE)

ML-04 The California Endowment

	
ML-04, facing N Main Street (looking NW)	ML-04, facing The California Endowment (looking SE)

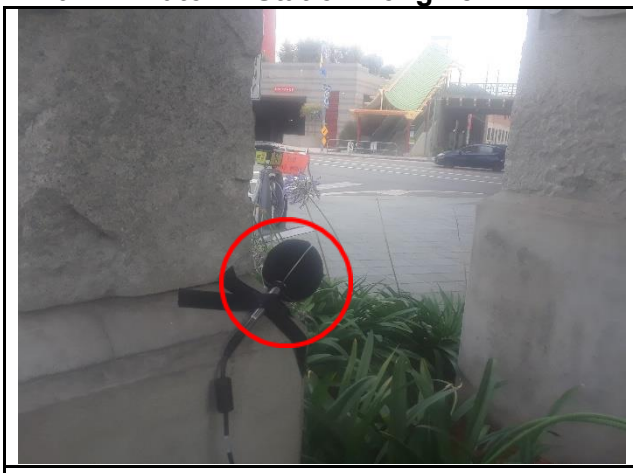
ML-05 Alameda and Alpine

	
ML-05, facing Alameda St and Alpine St. intersection (Looking N)	ML-05, facing Alameda St. (looking SW)

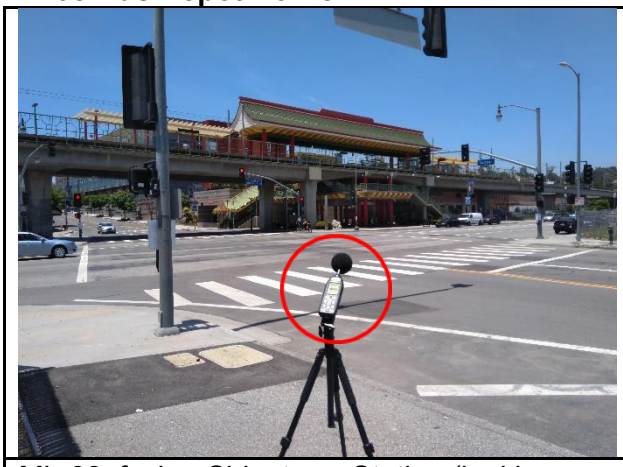
ML-06 Chinatown Senior Lofts

	
ML-06, facing Alameda St. (looking SE)	ML-06, facing Chinatown shops (looking NW)

ML-07 Chinatown Station Long-Term

	
ML-07, facing Blossom Plaza (looking NW)	ML-07 facing Alameda St./Chinatown Station (looking SE)

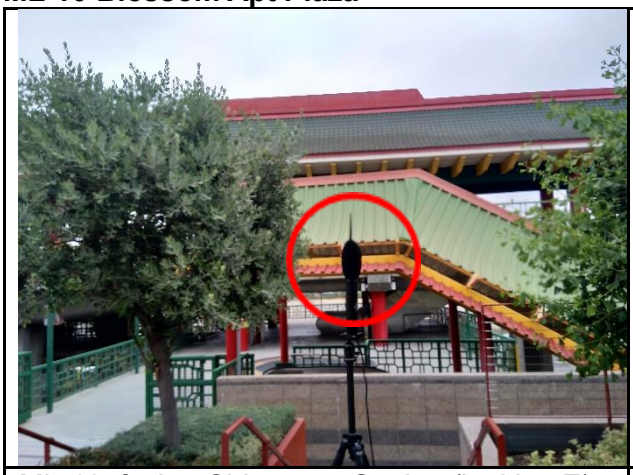
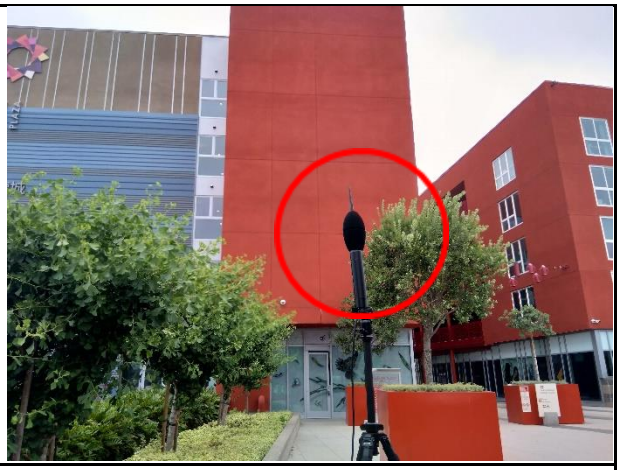
ML-08 Bus Depot Corner

	
ML-08, facing Chinatown Station (looking NW)	ML-08, facing College Station Development (looking NE)

ML-09 Blossom Apt Sidewalk

	
ML-09, facing College St. (facing S)	ML-09, facing Blossom staircase (facing NW)

ML-10 Blossom Apt Plaza

	
ML-10, facing Chinatown Station (looking E)	ML-10, facing Blossom Apartments (looking W)

ML-11 College Station Development

	
ML-11, facing Chinatown Station (looking SW)	ML-11, facing College Station Development (looking E)

ML-12 Parking Lot under L Line (Gold)

	
ML-12, facing parking under L Line (Gold) (looking S)	ML-12, facing N Spring St. (looking SE)

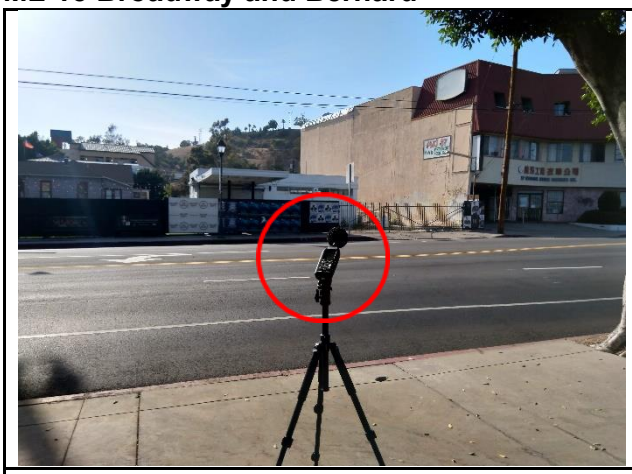
ML-13 Park Plaza

	
ML-13, facing L Line (Gold) (looking SW)	ML-13, facing College Station Development (looking E)

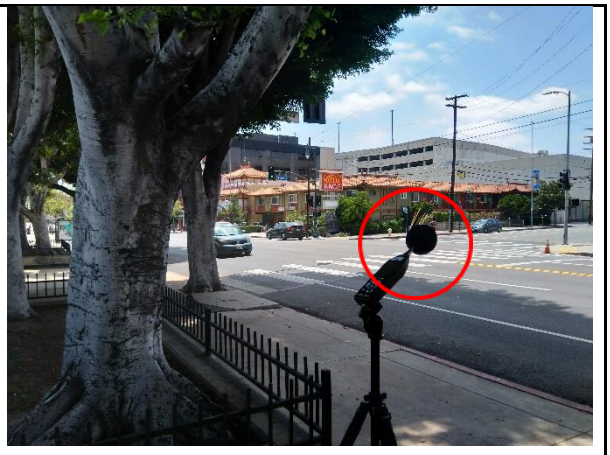
ML-14 Park Corner

	
ML-14, facing Los Angeles State Historic Park (looking NW)	ML-14, facing N Spring St. (looking SE)

ML-15 Broadway and Bernard



ML-15, facing North Broadway (looking NW)



ML-15, facing North Broadway and Bernard St. intersection (looking SW)

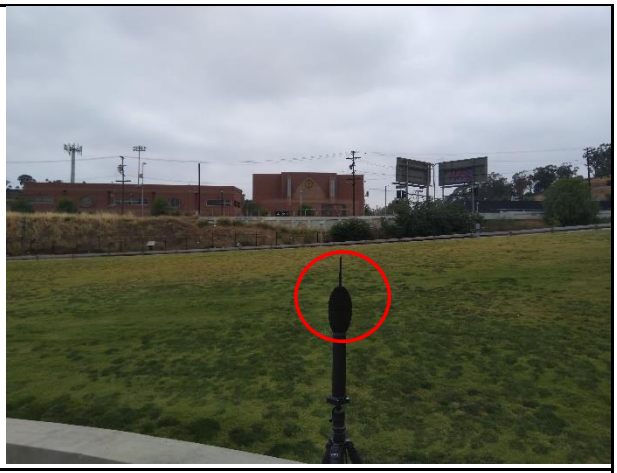
ML-16 Park Center

ML-16, facing park interior (looking NW)

ML-16, facing park entrance (looking S)

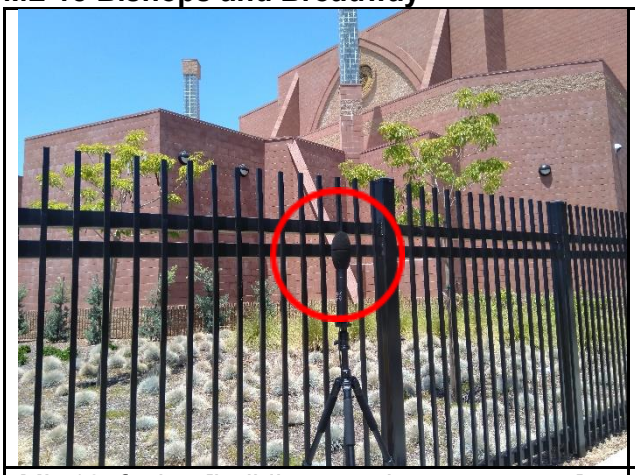
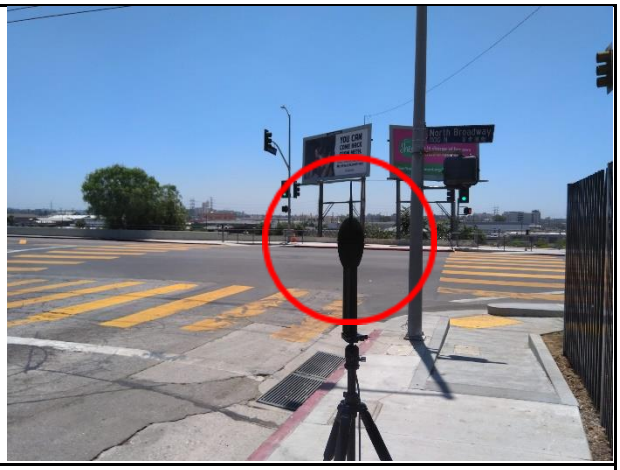
ML-17, Park Circle

ML-17, facing park entrance (looking SE)



ML-17, facing Cathedral HS (looking NW)

ML-18 Bishops and Broadway

	
ML-18, facing [building not shown on maps] (looking NW)	ML-18 facing Bishops Rd and North Broadway intersection (looking SE)

ML-19 Cathedral High School

	
ML-19, facing school (looking NW)	ML-19, facing Bishops Rd (looking NE)

ML-20 Savoy Long-Term

	
ML-20, facing Savoy St. (looking NW)	ML-20, facing house (looking SE)

ML-21 Solano Canyon

	
ML-21, facing Amador St. and Jarvis St. intersection (looking NE)	ML-21, facing homes (looking S)

ML-22 Elysian Park Recreation Center

	
ML-22, Picnic Area facing Recreation Center (looking North)	ML-22, Picnic Area facing Academy Rd/parking lot (looking West)

SLM Calibration Certificates

CERTIFICATE OF CALIBRATION
25061-1
FOR LARSON DAVIS PRECISION INTEGRATING SOUND LEVEL METER

Model **LxT1** Serial No. **0002527**
ID No. **N/A**
With Microphone **377B02** Serial No. **116833**
With Preamplifier **PRMLxT1L** Serial No. **0126**

Customer: **AECOM**
San Diego, CA 92101 P.O. No. **Credit Card**

was tested and met Larson Davis specifications at the points tested and as outlined in ANSI S1.4-1983 Type 1; IEC 61672-2002 Class1; 60651-2001 Type 1

on **21 AUG 2019** **BY HAROLD LYNCH**
Service Manager

As received and as left condition: Within Specification.
Re-calibration due on: **21 AUG 2020**

Certified References*

Mfg.	Type	Serial No.	Cal Date	Due Date
B&K	1051	1777523	01 OCT 2018	01 OCT 2019
B&K	2636	1423390	02 JAN 2019	02 JAN 2020
B&K	4226	2141942	30 NOV 2018	30 NOV 2019
B&K	4231	1770857	13 SEP 2018	13 SEP 2019
HP	34401A	MY45023668	31 JAN 2019	31 JAN 2020
HP	3458A	2823A07179	24 JUL 2019	24 JUL 2020

Performed in Compliance with ANSI, NCSL Z-540-1, 1994
and ISO 17025, ISO 9001:2015 Certification NQA No. 11252
*References are traceable to NIST (National Institute of Standards and Technology).

Note: For calibration data see enclosed pages.
The data represent both "as found" and "as left" conditions.

Reference Test Procedure: **ACCT Procedure LxT-831 Version 0.5.1.**

Temperature	Relative Humidity	Barometric Pressure
23°C	**36 %**	**984.96** hPa

Signed:

ODIN METROLOGY, INC.
CALIBRATION OF SOUND & VIBRATION INSTRUMENTATION
3533 OLD CONEJO ROAD, SUITE 125 THOUSAND OAKS CA 91320
PHONE: (805) 375-0830 FAX: (805) 375-0405

Odin Metrology, Inc.
Calibration of Sound & Vibration Instruments

Certificate Number: **25061-2**

Certificate of Calibration for PCB 1/2" Free-field Microphone

This calibration is performed by comparison with measurement reference standard microphone:

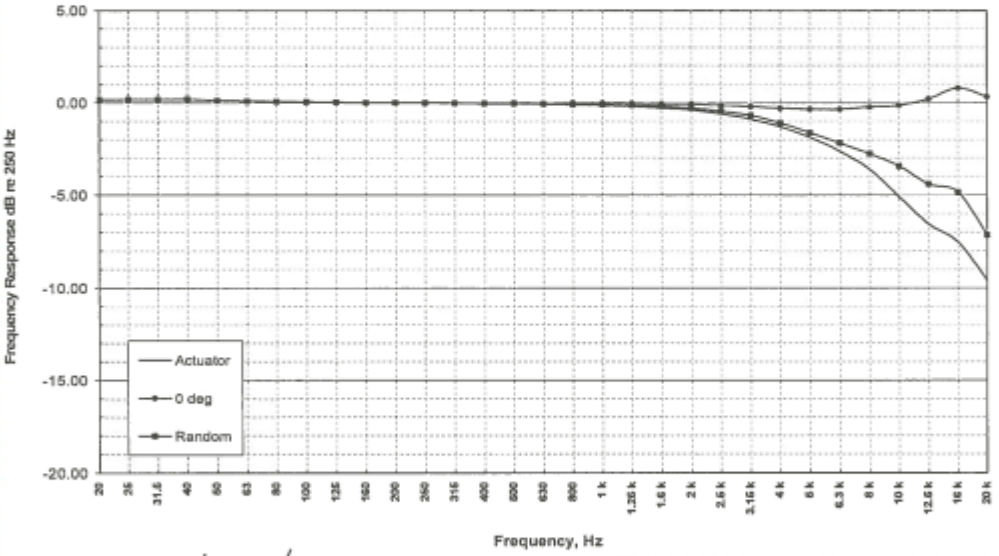
Reference Standards	
Type No.	4134/UA0825
Serial No.	1866523
Calibrated by	DANAK
Cal Date	24 SEP 2018
Due Date	24 SEP 2020

a) Estimated uncertainty of comparison: ± 0.06 dB
b) Estimated uncertainty of reference microphone: ± 0.04 dB
c) Total uncertainty: $\sqrt{a^2+b^2}$ = ± 0.07 dB
d) Expanded uncertainty (coverage factor k = 2 for 95% confidence level): = ± 0.14 dB

Type no.	377B02
Serial no.	116833
With preamplifier type no.	N/A
Preamplifier Serial no.	N/A
Submitted by	AECOM San Diego, CA 92101
Purchase order no.	Credit Card
Asset no.	N/A

Performance Data		
Open circuit sensitivity at 1,013 hPa, 23°C, 50% RH, 251.2 Hz	-25.64	dB re 1 V/Pa
	52.25	mV/Pa
System sensitivity (with preamplifier) at 251.2 Hz	N/A	dB re 1 V/Pa
	N/A	mV/Pa

Microphone Frequency Response Type 377B02
S/N 116833 : Measured 20 Aug 2019



Calibration performed by

Harold Lynch, Service Manager

Condition of Test		
Ambient Pressure	987.82	hPa
Temperature	23	°C
Relative Humidity	37	%
Polarization Voltage	0	V
Frequency	251.2	Hz
Date of Calibration	20 AUG 2019	
Re-calibration due on	20 AUG 2020	

Odin Metrology, Inc.
3533 Old Conejo Road, Suite 125
Thousand Oaks, CA 91320
Phone: (805) 375-0830; Fax: (805) 375-0405

The calibration data is both "as found" and "as final." At the time of calibration this microphone was found to be within the manufacturer's specifications.
Calibration Procedure: **OM-P-1008-Microphone Rev. 1.2 20130618.**

This calibration is traceable to DANAK/DPLA No. **M2.10-1254-3.1** and through inter-laboratory comparisons to NIST Test Number: **TN-683/286992-15** for transfer standard **4160# 512338 24 JUN 2015**. *See page 2 Traceability.

CERTIFICATE OF CALIBRATION
25597-5
FOR LARSON DAVIS PRECISION INTEGRATING SOUND LEVEL METER

Model **LxT1** Serial No. **0004485**
ID No. **N/A**
With Microphone **377B20** Serial No. **150269**
With Preamplifier **PRMLxT1L** Serial No. **029357**

Customer: **AECOM**
San Diego, CA 92101 P.O. No. **Credit Card**

was tested and met Larson Davis specifications at the points tested and as outlined in ANSI S1.4-1983 Type 1; IEC 61672-2002 Class1; 60651-2001 Type 1

on **20 MAY 2020** **BY HAROLD LYNCH**
Service Manager

As received and as left condition: Within Specification.
Re-calibration due on: **20 MAY 2021**

Certified References*

Mfg.	Type	Serial No.	Cal Date	Due Date
B&K	1051	1777523	30 SEP 2019	30 SEP 2020
B&K	2636	1423390	02 JAN 2020	02 JAN 2021
B&K	4226	1774068	17 MAR 2020	17 MAR 2021
B&K	4231	1770857	11 SEP 2019	11 SEP 2020
HP	34401A	MY45023668	05 FEB 2020	05 FEB 2021
HP	3458A	2823A07179	24 JUL 2019	24 JUL 2020

Performed in Compliance with ANSI, NCSL Z-540-1, 1994
and ISO 17025, ISO 9001:2015 Certification NQA No. 11252
*References are traceable to NIST (National Institute of Standards and Technology).

Note: For calibration data see enclosed pages.
The data represent both "as found" and "as left" conditions.

Reference Test Procedure: **ACCT Procedure LxT-831 Version 0.5.1.**

Temperature	Relative Humidity	Barometric Pressure
23°C	**39** %	**991.48** hPa

Signed:

ODIN METROLOGY, INC.
CALIBRATION OF SOUND & VIBRATION INSTRUMENTATION
3533 OLD CONEJO ROAD, SUITE 125 THOUSAND OAKS CA 91320
PHONE: (805) 375-0830 FAX: (805) 375-0405

Odin Metrology, Inc.
Calibration of Sound & Vibration Instruments

Certificate Number: **25597-6**

Certificate of Calibration for PCB 1/2" Random Incidence Microphone

This calibration is performed by comparison with measurement reference standard microphone:

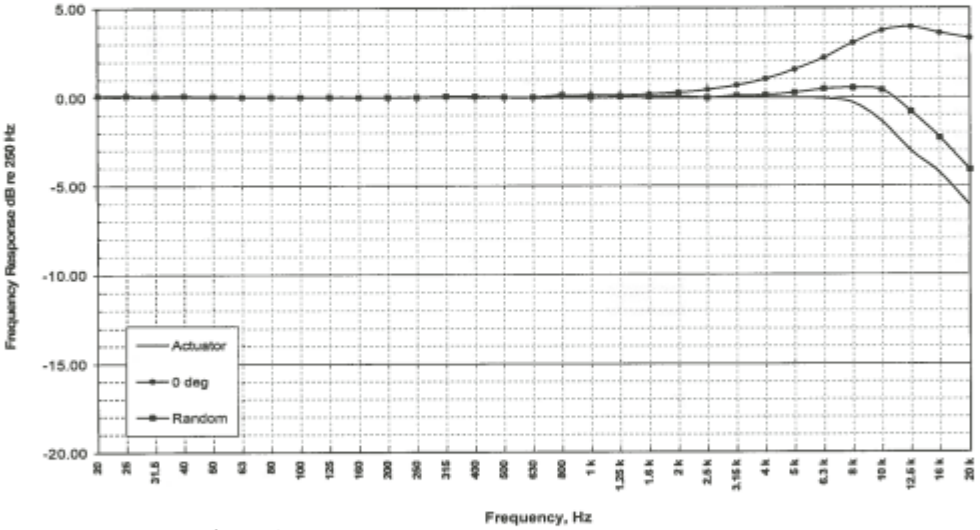
Reference Standards	
Type No.	4134/UA0825
Serial No.	1866524
Calibrated by	DANAK
Cal Date	07 OCT 2019
Due Date	07 OCT 2021

Type no.	**377B20**
Serial no.	**150269**
With preamplifier type no.	**N/A**
Preamplifier Serial no.	**N/A**
Submitted by	**AECOM**
	San Diego, CA 92101
Purchase order no.	**Credit Card**
Asset no.	**4485**

a) Estimated uncertainty of comparison: ± **0.05** dB
b) Estimated uncertainty of reference microphone: ± **0.04** dB
c) Total uncertainty: $\sqrt{a^2 + b^2}$ = ± **0.064** dB
d) Expanded uncertainty (coverage factor k = 2 for 95% confidence level): = ± **0.13** dB

Performance Data		
Open circuit sensitivity at 1,013 hPa, 23°C, 50% RH, 251.2 Hz	**-26.13**	dB re 1 V/Pa
	49.40	mV/Pa
System sensitivity (with preamplifier) at 251.2 Hz	**N/A**	dB re 1 V/Pa
	N/A	mV/Pa

Microphone Frequency Response Type 377B20
S/N 150269 : Measured 19 May 2020



Calibration performed by

Harold Lynch, Service Manager

Condition of Test		
Ambient Pressure	**988.43**	hPa
Temperature	**23**	°C
Relative Humidity	**39**	%
Polarization Voltage	**0**	V
Frequency	**251.2**	Hz
Date of Calibration	**19 MAY 2020**	
Re-calibration due on	**19 MAY 2021**	

ODIN METROLOGY, INC.
3533 Old Conejo Road, Suite 125
Thousand Oaks, CA 91320
Phone: (805) 375-0830; Fax: (805) 375-0405

The calibration data is both "as found" and "as final." At the time of calibration this microphone was found to be within the manufacturer's specifications.
Calibration Procedure: **OM-P-1008-Microphone Rev. 1.2 20130618.**

This calibration is traceable to DANAK/DPLA No. **M2.10-1350-3.1** and through inter-laboratory comparisons to NIST Test Number: **TN-683/286992-15** for transfer standard **4160# 512338 24 JUN 2015.** *See page 2 Traceability.

CERTIFICATE OF CALIBRATION
25597-10
FOR LARSON DAVIS
PRECISION INTEGRATING AND LOGGING SOUND LEVEL METER

Model **820** — Serial No. **1573**
ID No. **N/A**
With Microphone Model **2560** — Serial No. **3493**
With Preamplifier Model **PRM828** — Serial No. **1964**

Customer: **AECOM**
San Diego, CA 92101 — P.O. No. **Credit Card**

was tested and met Larson Davis specifications at the points tested and as outlined in ANSI S1.4-1983 Type 1; IEC 651-1979 Type 1

on **20 MAY 2020** **BY HAROLD LYNCH**
Service Manager

As received and as left condition: Within Specification.
Re-calibration due on: **20 MAY 2021**

Certified References*

Mfg.	Type	Serial No.	Cal Date	Due Date
B&K	1051	1777523	30 SEP 2019	30 SEP 2020
B&K	2636	1423390	02 JAN 2020	02 JAN 2021
B&K	4226	1774068	17 MAR 2020	17 MAR 2021
B&K	4231	1770857	11 SEP 2019	11 SEP 2020
HP	34401A	MY45023668	05 FEB 2020	05 FEB 2021
HP	3458A	2823A07179	24 JUL 2019	24 JUL 2020

Performed in Compliance with ANSI, NCSL Z-540-1, 1994
and ISO 17025, ISO 9001:2015 Certification NQA No. 11252
*References are traceable to NIST (National Institute of Standards and Technology).

Note: For calibration data see enclosed pages.
The data represent both "as found" and "as left" condition.

Reference Test Procedure: **ACCT Procedure 812-820 Version 3.5.1.**

Temperature	Relative Humidity	Barometric Pressure
23°C	**39 %**	**991.48** hPa

Signed:

ODIN METROLOGY, INC.
CALIBRATION OF SOUND & VIBRATION INSTRUMENTATION
3533 OLD CONEJO ROAD, SUITE 125 THOUSAND OAKS CA 91320
PHONE: (805) 375-0830 FAX: (805) 375-0405

Odin Metrology, Inc.
Calibration of Sound & Vibration Instruments

Certificate Number: **25597-11**

Certificate of Calibration for Larson Davis 1/2" Random Incidence Microphone

This calibration is performed by comparison with measurement reference standard microphone:

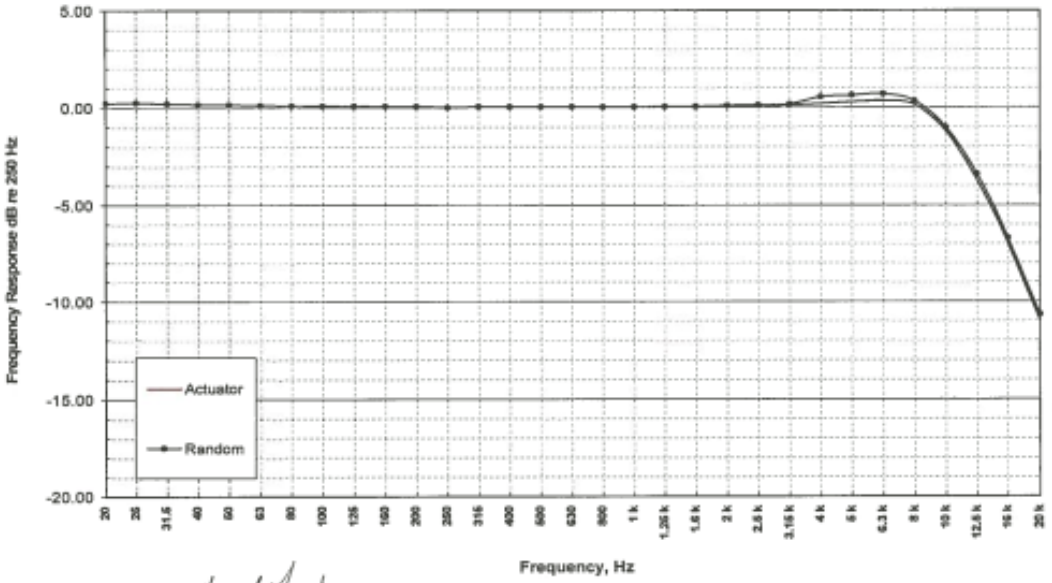
Reference Standards	
Type No.	4134/UA0825
Serial No.	1866524
Calibrated by	DANAK
Cal Date	07 OCT 2019
Due Date	07 OCT 2021

Type no.	**2560**
Serial no.	**3493**
With preamplifier type no.	**N/A**
Preamplifier Serial no.	**N/A**
Submitted by	**AECOM**
	San Diego, CA 92101
Purchase order no.	**Credit Card**
Asset no.	**1573**

a) Estimated uncertainty of comparison: ± **0.05** dB
b) Estimated uncertainty of reference microphone: ± **0.04** dB
c) Total uncertainty: $\sqrt{a^2+b^2}$ = ± **0.064** dB
d) Expanded uncertainty (coverage factor k = 2 for 95% confidence level): = ± **0.13** dB

Performance Data		
Open circuit sensitivity at 1,013 hPa, 23°C, 50% RH, 251.2 Hz	**-26.12**	dB re 1 V/Pa
	49.43	mV/Pa
System sensitivity (with preamplifier) at 251.2 Hz	**N/A**	dB re 1 V/Pa
	N/A	mV/Pa

Microphone Frequency Response Type 2560
S/N 3493 : Measured 19 May 2020



Calibration performed by

Harold Lynch, Service Manager

Condition of Test		
Ambient Pressure	**988.43**	hPa
Temperature	**23**	°C
Relative Humidity	**39**	%
Polarization Voltage	**200**	V
Frequency	**251.2**	Hz
Date of Calibration	**19 MAY 2020**	
Re-calibration due on	**19 MAY 2021**	

ODIN METROLOGY, INC.
3533 OLD CONEJO ROAD, SUITE 125
THOUSAND OAKS, CA 91320
PHONE: (805) 375-0830; FAX: (805) 375-0405

The calibration data is both "as found" and "as final." At the time of calibration this microphone was found to be within the manufacturer's specifications.
Calibration Procedure: **OM-P-1008-Microphone Rev. 1.2 20130618.**

This calibration is traceable to DANAK/DPLA No. **M2.10-1350-3.1** and through inter-laboratory comparisons to NIST Test Number: **TN-683/286992-15** for transfer standard **4160# 512338 24 JUN 2015**, *See page 2 Traceability.

CERTIFICATE OF CALIBRATION
25597-7
FOR LARSON DAVIS
PRECISION INTEGRATING AND LOGGING SOUND LEVEL METER

Model **820** — Serial No. **1597**
ID No. **N/A**
With Microphone Model **377B02** — Serial No. **101267**
With Preamplifier Model **PRM828** — Serial No. **2491**

Customer: **AECOM**
San Diego, CA 92101 — P.O. No. **Credit Card**

was tested and met Larson Davis specifications at the points tested and as outlined in ANSI S1.4-1983 Type 1; IEC 651-1979 Type 1

on **20 MAY 2020** **BY** **HAROLD LYNCH**
Service Manager

As received and as left condition: Within Specification.
Re-calibration due on: **20 MAY 2021**

Certified References*

Mfg.	Type	Serial No.	Cal Date	Due Date
B&K	1051	1777523	30 SEP 2019	30 SEP 2020
B&K	2636	1423390	02 JAN 2020	02 JAN 2021
B&K	4226	1774068	17 MAR 2020	17 MAR 2021
B&K	4231	1770857	11 SEP 2019	11 SEP 2020
HP	34401A	MY45023668	05 FEB 2020	05 FEB 2021
HP	3458A	2823A07179	24 JUL 2019	24 JUL 2020

Performed in Compliance with ANSI, NCSL Z-540-1, 1994
and ISO 17025, ISO 9001:2015 Certification NQA No. 11252
*References are traceable to NIST (National Institute of Standards and Technology).

Note: For calibration data see enclosed pages.
The data represent both "as found" and "as left" condition.

Reference Test Procedure: **ACCT Procedure 812-820 Version 3.5.1.**

Temperature	Relative Humidity	Barometric Pressure
23°C	**39 %**	**991.48** hPa

Signed: Harold Lynch

ODIN METROLOGY, INC.
CALIBRATION OF SOUND & VIBRATION INSTRUMENTATION
3533 OLD CONEJO ROAD, SUITE 125 THOUSAND OAKS CA 91320
PHONE: (805) 375-0830 FAX: (805) 375-0405

Odin Metrology, Inc.
Calibration of Sound & Vibration Instruments

Certificate Number: **25597-8**

Certificate of Calibration for PCB 1/2" Free-field Microphone

This calibration is performed by comparison with measurement reference standard microphone:

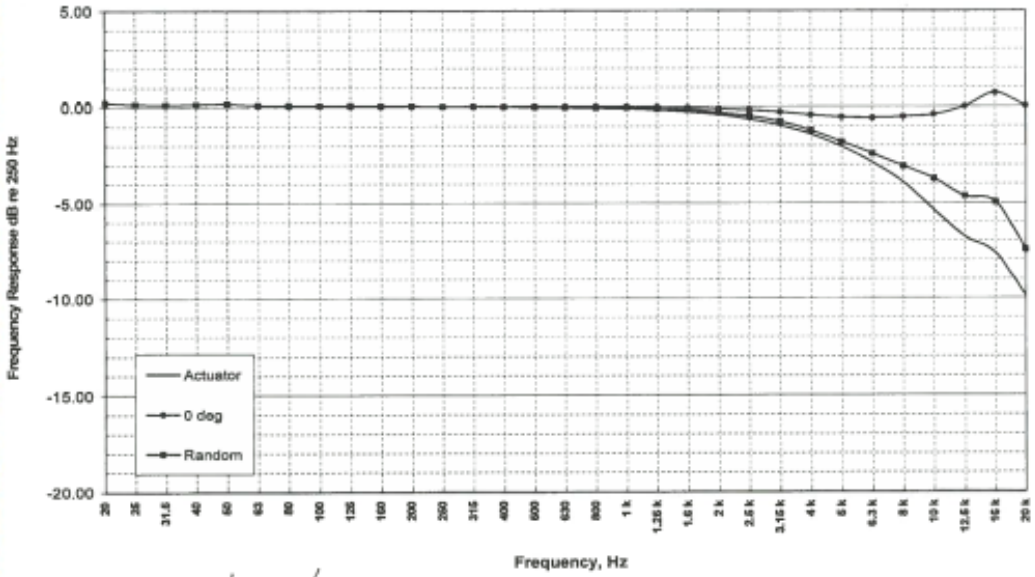
Reference Standards	
Type No.	4134/UA0825
Serial No.	1866524
Calibrated by	DANAK
Cal Date	07 OCT 2019
Due Date	07 OCT 2021

a) Estimated uncertainty of comparison: ± **0.06** dB
b) Estimated uncertainty of reference microphone: ± **0.04** dB
c) Total uncertainty: $\sqrt{a^2+b^2}$ = ± **0.07** dB
d) Expanded uncertainty (coverage factor k = 2 for 95% confidence level): = ± **0.14** dB

Type no.	**377B02**
Serial no.	**101267**
With preamplifier type no.	**N/A**
Preamplifier Serial no.	**N/A**
Submitted by	**AECOM**
	San Diego, CA 92101
Purchase order no.	**Credit Card**
Asset no.	**1597**

Performance Data		
Open circuit sensitivity at 1,013 hPa, 23°C, 50% RH, 251.2 Hz	**-27.41**	dB re 1 V/Pa
	42.62	mV/Pa
System sensitivity (with preamplifier) at 251.2 Hz	**N/A**	dB re 1 V/Pa
	N/A	mV/Pa

Microphone Frequency Response Type 377B02
S/N 101267 : Measured 19 May 2020



Calibration performed by

Harold Lynch, Service Manager

Condition of Test		
Ambient Pressure	**988.43**	hPa
Temperature	**23**	°C
Relative Humidity	**39**	%
Polarization Voltage	**0**	V
Frequency	**251.2**	Hz
Date of Calibration	**19 MAY 2020**	
Re-calibration due on	**19 MAY 2021**	

ODIN METROLOGY, INC.
3533 Old Conejo Road, Suite 125
Thousand Oaks, CA 91320
Phone: (805) 375-0830; Fax: (805) 375-0405

The calibration data is both "as found" and "as final." At the time of calibration this microphone was found to be **within** the manufacturer's specifications. Calibration Procedure: **OM-P-1008-Microphone Rev. 1.2 20130618.**

This calibration is traceable to DANAK/DPLA No. **M2.10-1350-3.1** and through inter-laboratory comparisons to NIST Test Number: **TN-683/286992-15** for transfer standard **4160# 512338 24 JUN 2015**. *See page 2 Traceability.

Odin Metrology, Inc.
Calibration of Sound & Vibration Instruments

Certificate Number: **25597-14**

Certificate of Calibration for Larson Davis Calibrator

This calibration is performed by comparison with measurement reference standard microphone:

Type No.	4134
Serial No.	1315901
Calibrated by	HL
Cal Date	25 MAR 2020
Due Date	25 MAR 2021

a) Estimated uncertainty of comparison: ± **0.05** dB
b) Estimated uncertainty of calibration service for standard pistonphone: ± **0.06** dB
c) Total uncertainty: $\sqrt{a^2 + b^2}$ = ± **0.08** dB
d) Expanded uncertainty (coverage factor k = 2 for 95% confidence level): = ± **0.16** dB

This acoustic calibrator has been calibrated using standards with values traceable to the National Institute of Standards and Technology. This calibration is traceable to NIST Test Number **TN-683/286992-15.**

CONDITION OF TEST		
Ambient Pressure	**991.48**	hPa
Temperature	**23**	°C
Relative Humidity	**39**	%
Date of Calibration	**20 MAY 2020**	
Re-calibration due on	**20 MAY 2021**	

The calibration of this acoustic calibrator was performed using a test system conforming to the requirements of ANSI/NCSLZ540-1, 1994, ISO 17025, and ISO 9001:2015, Certification NQA No. 11252.

Calibration procedure: **OM-P-1001-Acoustic_Calibrator, Rev. 1.0 20130522.**

Calibration performed by

Harold Lynch, Service Manager

Calibrator type	**CAL200**
Serial no.	**4637**
Submitted by	**AECOM**
	San Diego, CA 92101
Purchase order no.	**Credit Card**
Asset no.	**N/A**

This calibrator has been found to perform **within** the specifications listed below at the normalized conditions stated.

SPL produced in coupler terminated by a loading volume of a ½" microphone	94.0 ± 0.2 dB 114 ± 0.2 dB
Frequency	1,000 Hz ± 1%
Distortion	< 2%
At 1,013 hPa, 20°C, and 65% relative humidity	

PERFORMANCE AS RECEIVED		
Frequency	**1000.0**	Hz
SPL (94 dB)	**93.96**	dB
SPL (114 dB)	**113.97**	dB
Distortion (at 94 dB)	**0.3**	%
Battery Voltage	**8.6**	V

Was adjustment performed? **No**
Were batteries replaced? **Yes**

FINAL PERFORMANCE		
Frequency	**1000.0**	Hz
SPL (94 dB)	**93.96**	dB
SPL (114 dB)	**113.97**	dB
Distortion (at 94 dB)	**0.3**	%

Note: This calibrator was **within** manufacturer's specifications as received.

ODIN METROLOGY, INC.
3533 OLD CONEJO ROAD, SUITE 125
THOUSAND OAKS, CA 91320
PHONE: (805) 375-0830; FAX: (805) 375-0405

Odin Metrology, Inc.
Calibration of Sound & Vibration Instruments

Certificate Number: **25002-2**

Certificate of Calibration for Larson Davis Calibrator

This calibration is performed by comparison with measurement reference standard microphone:

Type No.	4134
Serial No.	1315901
Calibrated by	HL
Cal Date	23 APR 2018
Due Date	23 APR 2020

a) Estimated uncertainty of comparison: ± 0.05 dB
b) Estimated uncertainty of calibration service for standard pistonphone: ± 0.06 dB
c) Total uncertainty: $\sqrt{a^2 + b^2}$ = ± 0.08 dB
d) Expanded uncertainty (coverage factor k = 2 for 95% confidence level): = ± 0.16 dB

This acoustic calibrator has been calibrated using standards with values traceable to the National Institute of Standards and Technology. This calibration is traceable to NIST Test Number **TN-683/286992-15.**

Condition of Test		
Ambient Pressure	**986.53**	hPa
Temperature	**23**	°C
Relative Humidity	**37**	%
Date of Calibration	**29 JUL 2019**	
Re-calibration due on	**29 JUL 2020**	

The calibration of this acoustic calibrator was performed using a test system conforming to the requirements of ANSI/NCSLZ540-1, 1994, ISO 17025, and ISO 9001:2015, Certification NQA No. 11252.

Calibration procedure: Larson Davis CAL200, **25.3, 20190606.**

Calibration performed by

Harold Lynch, Service Manager

Calibrator type **CAL200**
Serial no. **1238**
Submitted by **AECOM**
San Diego, CA 92101
Purchase order no. **Credit Card**
Asset no. **N/A**

This calibrator has been found to perform **within** the specifications listed below at the normalized conditions stated.

SPL produced in coupler terminated by a loading volume of a ½" microphone	94.0 ± 0.2 dB 114 ± 0.2 dB
Frequency	1,000 Hz ± 1%
Distortion	< 2%
At 1,013 hPa, 20°C, and 65% relative humidity	

Performance as Received		
Frequency	**999.9**	Hz
SPL (94 dB)	**93.96**	dB
SPL (114 dB)	**114.04**	dB
Distortion (at 94 dB)	**0.5**	%
Battery Voltage	**9.3**	V

Was adjustment performed? **No**
Were batteries replaced? **No**

Final Performance		
Frequency	**999.9**	Hz
SPL (94 dB)	**93.96**	dB
SPL (114 dB)	**114.04**	dB
Distortion (at 94 dB)	**0.5**	%

Note: This calibrator was **within** manufacturer's specifications as received.

Odin Metrology, Inc.
3533 Old Conejo Road, Suite 125
Thousand Oaks, CA 91320
Phone: (805) 375-0830; Fax: (805) 375-0405

3S Gondola System Sound Measurements

The following memo was provided by Leitner Poma of America to document operational sound measurements for a similar 3S type gondola system. These measurement values were used to develop and validate the operational gondola sound prediction model as discussed in Section 5 of the technical report.

To: Mike Deiparine, SCJ Alliance

From: Fred Demoulin, Leitner Poma of America

Date: May 15, 2020

Subject: 3S Sound Measurements

Following your inquiries on operational sounds from 3S ropeway systems, we have some relevant measurements we can share with you. The measurements were taken outside the station and near towers of a 3S system in Austria. The towers are all support towers and the system utilizes slack carriers. You may find these characteristics similar to how you have described your proposed system. System operations were coordinated with the measurement activities.[1]

The following table lists the location of measurements taken near the station (0 degrees is along the lift line) and the sound pressure levels measured. For this table, all measurements were taken at an operating speed of 6 m/s.

Station Sound Measurements

Measurement Location Description	*Measured L_{eq}, dBA*
Outside of Station 0 degrees at 50 meters	51
Outside of Station 30 degrees at 35 meters	52.6
Outside of Station 45 degrees at 35 meters	53.7
Outside of Station 0 degrees at 50 meters	50.9
Outside of Station 30 degrees at 35 meters	52.6
Outside of Station 45 degrees at 35 meters	55.6
Outside of Station 0 degrees at 20 meters	58.9
Outside of Station 90 degrees at 20 meters	54.5

The following table lists the location of measurements taken near one of the towers at varying operating speeds and two distances *from the tower head*.

Tower Sound Measurements

Measurement Location Description	*Line Speed (meters per second)*	*Measured L_{eq}, dBA*
Tower 90 degrees at 20 meters	7	60.1
Tower 90 degrees at 20 meters	6	55.3
Tower 90 degrees at 20 meters	5	52.6
Tower 90 degrees at 20 meters	4	47.4
Tower 30 degrees at 30 meters	7	57.0

[1] While system operations were coordinated with the measurement activities other noise sources may also be reflected in these noise measurements. These noise measurements do not apply any reduction for other noise sources and therefore may overstate the noise associated with the 3S ropeway system.

APPENDIX B

CALCULATION DETAIL

Appendix B Calculation Detail

B.1 Construction Noise Calculation Sheets

B.2 Construction Vibration Calculation Sheets

B.3 Operational Noise Calculation Sheets

B.4 Construction Haul Route MapB.5 Detailed Gondola Cabin Noise Calculation Results

B.1 Construction Noise Calculation Sheets

Construction Noise Calculations, Alameda Station (Foundations & Columns)

Construction Area Alameda Station (Without Mitigation)

		NSR 1A Union Station				NSR 1B First Five				NSR 2A El Pueblo Plaza (Mural)				NSR 2B El Pueblo Plaza (Grass)				NSR 2C El Pueblo Plaza (Fountain)				NSR 3 Mozaic Apartments				NSR 3 Mozaic Apartments Top Floor			
		Elevation: 5				Elevation: 5				Elevation: 14				Elevation: 11				Elevation: 14				Elevation: 5				Elevation: 35			
		2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance		
Equipment	Source Ele	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq
Concrete Mixer Truck	5.0	85.3	85.3	0.0	70.2	313.9	313.9	5.0	53.9	133	133.3	0.0	66.3	82.4	82.6	0.0	70.5	45.6	46.5	0.0	75.5	68.2	68.2	0.0	72.1	68.2	74.5	0.0	71.4
Concrete Mixer Truck	5.0	85.3	85.3	0.0	70.2	313.9	313.9	5.0	53.9	133	133.3	0.0	66.3	82.4	82.6	0.0	70.5	45.6	46.5	0.0	75.5	68.2	68.2	0.0	72.1	68.2	74.5	0.0	71.4
Concrete Pump Truck	5.0	85.3	85.3	0.0	69.8	313.9	313.9	5.0	53.5	133	133.3	0.0	65.9	82.4	82.6	0.0	70.0	45.6	46.5	0.0	75.0	68.2	68.2	0.0	71.7	68.2	74.5	0.0	70.9
Crane	5.0	283.4	283.4	0.0	57.6	490.7	490.7	5.0	47.8	51.9	52.7	0.0	72.2	77.6	77.8	0.0	68.8	115.1	115.5	0.0	65.4	129.0	129.0	0.0	64.4	129.0	132.4	0.0	64.2
Flat Bed Truck	5.0	85.3	85.3	0.0	65.7	313.9	313.9	5.0	49.4	133	133.3	0.0	61.8	82.4	82.6	0.0	66.0	45.6	46.5	0.0	71.0	68.2	68.2	0.0	67.6	68.2	74.5	0.0	66.9
Gradall	5.0	245.7	245.7	0.0	65.6	366.0	366.0	5.0	57.1	38.6	39.6	0.0	81.4	38.6	39.1	0.0	81.6	38.6	39.6	0.0	81.4	53.6	53.6	0.0	78.8	53.6	61.4	0.0	77.6
Pickup Truck	5.0	85.3	85.3	0.0	66.4	362.2	362.2	5.0	48.8	118	118.3	0.0	63.5	118	118.2	0.0	63.6	118	118.3	0.0	63.5	18.6	18.6	0.0	79.6	18.6	35.3	0.0	74.0
Vacuum Excavator (Vac-truck)	5.0	85.3	85.3	0.0	76.7	313.9	313.9	5.0	60.4	133	133.3	0.0	72.8	82.4	82.6	0.0	77.0	45.6	46.5	0.0	82.0	68.2	68.2	0.0	78.6	68.2	74.5	0.0	77.9
Vacuum Street Sweeper	5.0	85.3	85.3	0.0	67.0	313.9	313.9	5.0	50.6	133	133.3	0.0	63.1	82.4	82.6	0.0	67.2	45.6	46.5	0.0	72.2	68.2	68.2	0.0	68.9	68.2	74.5	0.0	68.1
Vibrating Hopper	5.0	245.7	245.7	0.0	70.2	366.0	366.0	5.0	61.7	38.6	39.6	0.0	86.0	38.6	39.1	0.0	86.1	38.6	39.6	0.0	86.0	53.6	53.6	0.0	83.4	53.6	61.4	0.0	82.2
Vibrating Hopper	5.0	245.7	245.7	0.0	70.2	366.0	366.0	5.0	61.7	38.6	39.6	0.0	86.0	38.6	39.1	0.0	86.1	38.6	39.6	0.0	86.0	53.6	53.6	0.0	83.4	53.6	61.4	0.0	82.2
Warning Horn	5.0	85.3	85.3	0.0	65.6	366.0	366.0	5.0	47.9	38.6	39.6	0.0	72.2	38.6	39.1	0.0	72.3	38.6	39.6	0.0	72.2	53.6	53.6	0.0	69.6	53.6	61.4	0.0	68.4
Warning Horn	5.0	85.3	85.3	0.0	65.6	362.2	362.2	5.0	48.0	118	118.3	0.0	62.7	118	118.2	0.0	62.7	118	118.3	0.0	62.7	68.2	68.2	0.0	67.5	68.2	74.5	0.0	66.7
Warning Horn	5.0	85.3	85.3	0.0	65.6	362.2	362.2	5.0	48.0	118	118.3	0.0	62.7	118	118.2	0.0	62.7	118	118.3	0.0	62.7	68.2	68.2	0.0	67.5	68.2	74.5	0.0	66.7
Welder / Torch	5.0	245.7	245.7	0.0	56.2	366.0	366.0	5.0	47.7	38.6	39.6	0.0	72.0	38.6	39.1	0.0	72.2	38.6	39.6	0.0	72.0	53.6	53.6	0.0	69.4	53.6	61.4	0.0	68.2
Total					81.0				67.7				90.1				90.4				91.0				88.9				87.4
Existing-day					61.1				61.1				69.0				69.0				69.0				68.4				68.4
Existing-night					57.7				57.7				65.5				65.5				65.5				65.5				65.5
Day Impact					Impact				Impact				Impact				Impact				Impact				Impact				Impact
Night Impact					Impact				Impact				Impact				Impact				Impact				Impact				Impact

Construction Area Alameda Station (With Mitigation)

		NSR 1A Union Station				NSR 1B First Five				NSR 2A El Pueblo Plaza (Mural)				NSR 2B El Pueblo Plaza (Grass)				NSR 2C El Pueblo Plaza (Fountain)				NSR 3 Mozaic Apartments				NSR 3 Mozaic Apartments Top Floor			
		Elevation: 5				Elevation: 5				Elevation: 14				Elevation: 11				Elevation: 14				Elevation: 5				Elevation: 35			
		2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance		
Equipment	Source Ele	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq
Concrete Mixer Truck	5.0	85.3	85.3	0.0	70.2	313.9	313.9	5.0	53.9	133	133.3	0.0	66.3	82.4	82.6	0.0	70.5	45.6	46.5	0.0	75.5	68.2	68.2	10.0	62.1	68.2	74.5	0.8	70.6
Concrete Mixer Truck	5.0	85.3	85.3	0.0	70.2	313.9	313.9	5.0	53.9	133	133.3	0.0	66.3	82.4	82.6	0.0	70.5	45.6	46.5	0.0	75.5	68.2	68.2	10.0	62.1	68.2	74.5	0.8	70.6
Concrete Pump Truck	5.0	85.3	85.3	0.0	69.8	313.9	313.9	5.0	53.5	133	133.3	0.0	65.9	82.4	82.6	0.0	70.0	45.6	46.5	0.0	75.0	68.2	68.2	10.0	61.7	68.2	74.5	0.8	70.1
Crane	5.0	283.4	283.4	10.0	47.6	490.7	490.7	5.0	47.9	51.9	52.7	10.0	62.2	77.6	77.8	9.3	59.5	115.1	115.5	2.3	63.1	129.0	129.0	10.0	54.4	129.0	132.4	0.0	64.2
Flat Bed Truck	5.0	85.3	85.3	0.0	65.7	313.9	313.9	5.0	49.4	133	133.3	0.0	61.8	82.4	82.6	0.0	66.0	45.6	46.5	0.0	71.0	68.2	68.2	10.0	57.6	68.2	74.5	0.8	66.1
Gradall	5.0	245.7	245.7	10.0	55.6	366.0	366.0	10.0	52.1	38.6	39.6	10.0	71.4	38.6	39.1	10.0	71.6	38.6	39.6	10.0	71.4	53.6	53.6	10.0	68.8	53.6	61.4	0.0	77.6
Pickup Truck	5.0	85.3	85.3	10.0	56.4	362.2	362.2	10.0	43.8	118	118.3	2.3	61.2	118	118.2	4.7	58.8	118	118.3	1.9	61.6	18.6	18.6	10.0	69.6	18.6	35.3	0.0	74.0
Vacuum Excavator (Vac-truck)	5.0	85.3	85.3	0.0	76.7	313.9	313.9	5.0	60.4	133	133.3	0.0	72.8	82.4	82.6	0.0	77.0	45.6	46.5	0.0	82.0	68.2	68.2	10.0	68.6	68.2	74.5	0.8	77.1
Vacuum Street Sweeper	5.0	85.3	85.3	0.0	67.0	313.9	313.9	5.0	50.6	133	133.3	0.0	63.1	82.4	82.6	0.0	67.2	45.6	46.5	0.0	72.2	68.2	68.2	10.0	58.9	68.2	74.5	0.8	67.3
Vibrating Hopper	5.0	245.7	245.7	10.0	60.2	366.0	366.0	10.0	56.7	38.6	39.6	10.0	76.0	38.6	39.1	10.0	76.1	38.6	39.6	10.0	76.0	53.6	53.6	10.0	73.4	53.6	61.4	0.0	82.2
Vibrating Hopper	5.0	245.7	245.7	10.0	60.2	366.0	366.0	10.0	56.7	38.6	39.6	10.0	76.0	38.6	39.1	10.0	76.1	38.6	39.6	10.0	76.0	53.6	53.6	10.0	73.4	53.6	61.4	0.0	82.2
Warning Horn	5.0	85.3	85.3	10.0	55.6	366.0	366.0	10.0	42.9	38.6	39.6	10.0	62.2	38.6	39.1	10.0	62.3	38.6	39.6	10.0	62.2	53.6	53.6	10.0	59.6	53.6	61.4	0.0	68.4
Warning Horn	5.0	85.3	85.3	10.0	55.6	362.2	362.2	10.0	43.0	118	118.3	0.0	62.7	118	118.2	0.0	62.7	118	118.3	0.0	62.7	68.2	68.2	10.0	57.5	68.2	74.5	0.0	66.7
Warning Horn	5.0	85.3	85.3	10.0	55.6	362.2	362.2	10.0	43.0	118	118.3	0.0	62.7	118	118.2	0.0	62.7	118	118.3	0.0	62.7	68.2	68.2	10.0	57.5	68.2	74.5	0.0	66.7
Welder / Torch	5.0	245.7	245.7	10.0	46.2	366.0	366.0	10.0	42.7	38.6	39.6	10.0	62.0	38.6	39.1	10.0	62.2	38.6	39.6	10.0	62.0	53.6	53.6	10.0	59.4	53.6	61.4	0.0	68.2
Total					79.5				65.1				81.4				82.9				85.9				78.9				87.3
Existing-day					61.1				61.1				69.0				69.0				69.0				68.4				68.4
Existing-night					57.7				57.7				65.5				65.5				65.5				65.5				65.5
Day Impact					Impact				No impact				Impact				Impact				Impact				Impact				Impact
Night Impact					Impact				Impact				Impact				Impact				Impact				Impact				Impact

Construction Noise Calculations, Alpine Tower and Alameda Tower (Foundations & Columns)

Construction Area Alameda Tower (Without Mitigation)

Equipment	Source Ele	NSR 4 CA Endowment Elevation: 7 2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Concrete Mixer Truck	5.0	79.9	79.9	0.0	70.7
Concrete Mixer Truck	5.0	79.9	79.9	0.0	70.7
Concrete Pump Truck	5.0	79.9	79.9	0.0	70.3
Crane	5.0	366.5	366.5	0.0	55.3
Flat Bed Truck	5.0	79.9	79.9	0.0	66.2
Gradall	5.0	100.9	100.9	0.0	73.3
Pickup Truck	5.0	93.7	93.7	0.0	65.6
Vacuum Excavator (Vac truck)	5.0	79.9	79.9	0.0	77.2
Vacuum Street Sweeper	5.0	79.9	79.9	0.0	67.5
Vibrating Hopper	5.0	100.9	100.9	0.0	77.9
Vibrating Hopper	5.0	100.9	100.9	0.0	77.9
Warning Horn	5.0	100.9	100.9	0.0	64.1
Warning Horn	5.0	93.7	93.7	0.0	64.7
Warning Horn	5.0	93.7	93.7	0.0	64.7
Welder / Torch	5.0	100.9	100.9	0.0	63.9
Total					84.1
Existing-day					63.6
Existing-night					60.7
Day Impact					Impact
Night Impact					Impact

Construction Area Alpine Tower (Without Mitigation)

Equipment	Source Ele	NSR 5 Future Homeboy Industries Residential Elevation: 5 2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	NSR 5 Future Homeboy Industries Residential Top Floor Elevation: 45 2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	NSR 6 Chinatown Senior Lofts Elevation: 15 2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	NSR 6 Chinatown Senior Lofts Top Floor Elevation: 115 2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	NSR 7 Homeboy Industries Elevation: 5 2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Concrete Mixer Truck	5.0	115.5	115.5	0.0	67.5	115.5	122.2	0.0	67.1	122.2	122.6	0.0	67.0	122.2	164.4	0.0	64.5	86.5	86.5	0.0	70.1
Concrete Mixer Truck	5.0	115.5	115.5	0.0	67.5	115.5	122.2	0.0	67.1	122.2	122.6	0.0	67.0	122.2	164.4	0.0	64.5	86.5	86.5	0.0	70.1
Concrete Pump Truck	5.0	115.5	115.5	0.0	67.1	115.5	122.2	0.0	66.6	122.2	122.6	0.0	66.6	122.2	164.4	0.0	64.1	86.5	86.5	0.0	69.6
Crane	5.0	123.3	123.3	0.0	64.8	123.3	129.6	0.0	64.4	136.2	136.6	0.0	63.9	136.2	175.1	0.0	61.8	96.5	96.5	0.0	66.9
Flat Bed Truck	5.0	115.5	115.5	0.0	63.0	115.5	122.2	0.0	62.6	122.2	122.6	0.0	62.5	122.2	164.4	0.0	60.0	86.5	86.5	0.0	65.6
Gradall	5.0	123.3	123.3	0.0	71.6	123.3	129.6	0.0	71.1	136.2	136.6	0.0	70.7	136.2	175.1	0.0	68.5	96.5	96.5	0.0	73.7
Pickup Truck	5.0	94.9	94.9	0.0	65.5	94.9	103.0	0.0	64.7	110.6	111.1	0.0	64.1	110.6	156.0	0.0	61.1	113.7	113.7	0.0	63.9
Vacuum Excavator (Vac-truck)	5.0	115.5	115.5	0.0	74.0	115.5	122.2	0.0	73.6	122.2	122.6	0.0	73.5	122.2	164.4	0.0	71.0	86.5	86.5	0.0	76.6
Vacuum Street Sweeper	5.0	115.5	115.5	0.0	64.3	115.5	122.2	0.0	63.8	122.2	122.6	0.0	63.8	122.2	164.4	0.0	61.3	86.5	86.5	0.0	66.8
Vibrating Hopper	5.0	123.3	123.3	0.0	76.1	123.3	129.6	0.0	75.7	136.2	136.6	0.0	75.3	136.2	175.1	0.0	73.1	96.5	96.5	0.0	78.3
Vibrating Hopper	5.0	123.3	123.3	0.0	76.1	123.3	129.6	0.0	75.7	136.2	136.6	0.0	75.3	136.2	175.1	0.0	73.1	96.5	96.5	0.0	78.3
Warning Horn	5.0	123.3	123.3	0.0	62.3	123.3	129.6	0.0	61.9	136.2	136.6	0.0	61.5	136.2	175.1	0.0	59.3	96.5	96.5	0.0	64.5
Warning Horn	5.0	94.9	94.9	0.0	64.6	94.9	103.0	0.0	63.9	110.6	111.1	0.0	63.3	110.6	156.0	0.0	60.3	113.7	113.7	0.0	63.1
Warning Horn	5.0	94.9	94.9	0.0	64.6	94.9	103.0	0.0	63.9	110.6	111.1	0.0	63.3	110.6	156.0	0.0	60.3	113.7	113.7	0.0	63.1
Welder / Torch	5.0	123.3	123.3	0.0	62.2	123.3	129.6	0.0	61.7	136.2	136.6	0.0	61.3	136.2	175.1	0.0	59.1	96.5	96.5	0.0	64.3
Total					82.0				81.6				81.2				78.9				84.1
Existing-day					65.6				65.6				69.0				69.0				69.8
Existing-night					64.9				64.9				64.1				64.1				65.1
Day Impact					Impact				Impact				Impact				Impact				Impact
Night Impact					Impact				Impact				Impact				Impact				Impact

Construction Area Alameda Tower (With Mitigation)

Equipment	Source Ele	NSR 4 CA Endowment Elevation: 7 2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Concrete Mixer Truck	5.0	79.9	79.9	0.0	70.7
Concrete Mixer Truck	5.0	79.9	79.9	0.0	70.7
Concrete Pump Truck	5.0	79.9	79.9	0.0	70.3
Crane	5.0	366.5	366.5	1.5	53.9
Flat Bed Truck	5.0	79.9	79.9	0.0	66.2
Gradall	5.0	100.9	100.9	10.0	63.3
Pickup Truck	5.0	93.7	93.7	0.0	65.6
Vacuum Excavator (Vac truck)	5.0	79.9	79.9	0.0	77.2
Vacuum Street Sweeper	5.0	79.9	79.9	0.0	67.5
Vibrating Hopper	5.0	100.9	100.9	10.0	67.9
Vibrating Hopper	5.0	100.9	100.9	10.0	67.9
Warning Horn	5.0	100.9	100.9	10.0	54.1
Warning Horn	5.0	93.7	93.7	0.0	64.7
Warning Horn	5.0	93.7	93.7	0.0	64.7
Welder / Torch	5.0	100.9	100.9	10.0	53.9
Total					80.9
Existing-day					63.6
Existing-night					60.7
Day Impact					Impact
Night Impact					Impact

Construction Area Alpine Tower (With Mitigation)

Equipment	Source Ele	NSR 5 Future Homeboy Industries Residential Elevation: 5 2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	NSR 5 Future Homeboy Industries Residential Top Floor Elevation: 45 2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	NSR 6 Chinatown Senior Lofts Elevation: 15 2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	NSR 6 Chinatown Senior Lofts Top Floor Elevation: 115 2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	NSR 7 Homeboy Industries Elevation: 5 2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Concrete Mixer Truck	5.0	115.5	115.5	0.0	67.5	115.5	122.2	0.0	67.1	122.2	122.6	0.0	67.0	122.2	164.4	0.0	64.5	86.5	86.5	0.0	70.1
Concrete Mixer Truck	5.0	115.5	115.5	0.0	67.5	115.5	122.2	0.0	67.1	122.2	122.6	0.0	67.0	122.2	164.4	0.0	64.5	86.5	86.5	0.0	70.1
Concrete Pump Truck	5.0	115.5	115.5	0.0	67.1	115.5	122.2	0.0	66.6	122.2	122.6	0.0	66.6	122.2	164.4	0.0	64.1	86.5	86.5	0.0	69.6
Crane	5.0	123.3	123.3	10.0	54.8	123.3	129.6	0.0	64.4	136.2	136.6	10.0	53.9	136.2	175.1	0.0	61.8	96.5	96.5	10.0	56.9
Flat Bed Truck	5.0	115.5	115.5	0.0	63.0	115.5	122.2	0.0	62.6	122.2	122.6	0.0	62.5	122.2	164.4	0.0	60.0	86.5	86.5	0.0	65.6
Gradall	5.0	123.3	123.3	10.0	61.6	123.3	129.6	0.0	71.1	136.2	136.6	10.0	60.7	136.2	175.1	0.0	68.5	96.5	96.5	10.0	63.7
Pickup Truck	5.0	94.9	94.9	10.0	55.5	94.9	103.0	10.0	54.7	110.6	111.1	0.0	64.1	110.6	156.0	0.0	61.1	113.7	113.7	0.0	63.9
Vacuum Excavator (Vac-truck)	5.0	115.5	115.5	0.0	74.0	115.5	122.2	0.0	73.6	122.2	122.6	0.0	73.5	122.2	164.4	0.0	71.0	86.5	86.5	0.0	76.6
Vacuum Street Sweeper	5.0	115.5	115.5	0.0	64.3	115.5	122.2	0.0	63.8	122.2	122.6	0.0	63.8	122.2	164.4	0.0	61.3	86.5	86.5	0.0	66.8
Vibrating Hopper	5.0	123.3	123.3	10.0	66.1	123.3	129.6	0.0	75.7	136.2	136.6	10.0	65.3	136.2	175.1	0.0	73.1	96.5	96.5	10.0	68.3
Vibrating Hopper	5.0	123.3	123.3	10.0	66.1	123.3	129.6	0.0	75.7	136.2	136.6	10.0	65.3	136.2	175.1	0.0	73.1	96.5	96.5	10.0	68.3
Warning Horn	5.0	123.3	123.3	10.0	52.3	123.3	129.6	0.0	61.9	136.2	136.6	10.0	51.5	136.2	175.1	0.0	59.3	96.5	96.5	10.0	54.5
Warning Horn	5.0	94.9	94.9	10.0	54.6	94.9	103.0	10.0	53.9	110.6	111.1	0.0	63.3	110.6	156.0	0.0	60.3	113.7	113.7	0.0	63.1
Warning Horn	5.0	94.9	94.9	10.0	54.6	94.9	103.0	10.0	53.9	110.6	111.1	0.0	63.3	110.6	156.0	0.0	60.3	113.7	113.7	0.0	63.1
Welder / Torch	5.0	123.3	123.3	10.0	52.2	123.3	129.6	0.0	61.7	136.2	136.6	10.0	51.3	136.2	175.1	0.0	59.1	96.5	96.5	10.0	54.3
Total					77.6				81.3				77.5				78.9				80.3
Existing-day					65.6				65.6				69.0				69.0				69.8
Existing-night					64.9				64.9				64.1				64.1				65.1
Day Impact					Impact				Impact				Impact				Impact				Impact
Night Impact					Impact				Impact				Impact				Impact				Impact

Construction Noise Calculations, Chinatown/State Park Station (Foundations & Columns)

Construction Area Chinatown / State Park Station (Without Mitigation)

		NSR 8 T College Station Residential Development Top Floor				NSR 8 B College Station Residential Development Bottom Floor				NSR 9 Blossom Plaza				NSR 9 Blossom Plaza Top Floor				NSR 10 Harmony Residential Development				NSR 10 Harmony Residential Development Top Floor				NSR 11 Capitol Milling				NSR 12 High Street Residential Development				NSR 12 High Street Residential Development Top Floor				NSR 13 S Ribdi Residential Development				NSR 14 S Los Angeles State Historical Park			
		Elevation: 70.7				Elevation: 5				Elevation: 26				Elevation: 70				Elevation: 25				Elevation: 265				Elevation: 9				Elevation: 5				Elevation: 35				Elevation: 35				Elevation: 5			
		2D	3D			2D	3D			2D	3D			2D	3D			2D	3D			2D	3D			2D	3D			2D	3D			2D	3D										
		Distance	Distance			Distance	Distance			Distance	Distance			Distance	Distance			Distance	Distance			Distance	Distance			Distance	Distance			Distance	Distance			Distance	Distance										
Equipment	Source El	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	Distance (	Distance (	Shielding	Leq	Distance (	Distance (	Shielding	Leq
Concrete Mixer Truck	5.0	91.2	112.4	0.0	67.8	91.2	91.2	0.0	69.6	348.2	348.8	0.0	57.9	348.2	354.2	0.0	57.8	366.4	366.9	5.0	52.5	366.4	449.3	5.0	50.7	133.9	134.0	0.0	66.3	255.3	255.3	0.0	60.7	255.3	257.0	0.0	60.6	512.9	513.8	5.0	49.6	183.5	183.5	0.0	63.5
Concrete Mixer Truck	5.0	91.2	112.4	0.0	67.8	91.2	91.2	0.0	69.6	348.2	348.8	0.0	57.9	348.2	354.2	0.0	57.8	366.4	366.9	5.0	52.5	366.4	449.3	5.0	50.7	133.9	134.0	0.0	66.3	255.3	255.3	0.0	60.7	255.3	257.0	0.0	60.6	512.9	513.8	5.0	49.6	183.5	183.5	0.0	63.5
Concrete Pump Truck	5.0	91.2	112.4	0.0	67.4	91.2	91.2	0.0	69.2	348.2	348.8	0.0	57.5	348.2	354.2	0.0	57.4	366.4	366.9	5.0	52.1	366.4	449.3	5.0	50.3	133.9	134.0	0.0	65.9	255.3	255.3	0.0	60.3	255.3	257.0	0.0	60.2	512.9	513.8	5.0	49.2	183.5	183.5	0.0	63.1
Crane	5.0	85.2	107.6	0.0	66.0	85.2	85.2	0.0	68.0	348.9	349.5	0.0	55.8	348.9	354.9	0.0	55.6	279.7	280.4	5.0	52.7	279.7	381.9	5.0	50.0	95.2	95.3	0.0	67.0	281.6	281.6	0.0	57.6	281.6	283.2	0.0	57.6	256.2	258.0	5.0	53.4	66.7	66.7	0.0	70.1
Flat Bed Truck	5.0	91.2	112.4	0.0	63.3	91.2	91.2	0.0	65.1	348.2	348.8	0.0	53.4	348.2	354.2	0.0	53.3	366.4	366.9	5.0	48.0	366.4	449.3	5.0	46.2	133.9	134.0	0.0	61.8	255.3	255.3	0.0	56.2	255.3	257.0	0.0	56.1	512.9	513.8	5.0	45.1	183.5	183.5	0.0	59.0
Gradall	5.0	85.2	107.6	0.0	72.8	85.2	85.2	0.0	74.8	348.9	349.5	0.0	62.5	348.9	354.9	0.0	62.4	279.7	280.4	5.0	59.4	279.7	381.9	5.0	56.8	95.2	95.3	0.0	73.8	281.6	281.6	0.0	64.4	281.6	283.2	0.0	64.4	256.2	258.0	5.0	60.2	66.7	66.7	0.0	76.9
Pickup Truck	5.0	73.8	98.8	0.0	65.1	73.8	73.8	0.0	67.6	793.1	793.4	0.0	47.0	793.1	795.8	0.0	47.0	591.4	591.7	5.0	44.6	591.4	646.0	5.0	43.8	489.4	489.4	0.0	51.2	235.2	235.2	0.0	57.6	235.2	237.1	0.0	57.5	478.3	479.2	5.0	46.4	126.6	126.6	0.0	63.0
Vacuum Excavator (Vac-truck)	5.0	91.2	112.4	0.0	74.3	91.2	91.2	0.0	76.1	348.2	348.8	0.0	64.4	348.2	354.2	0.0	64.3	366.4	366.9	5.0	59.0	366.4	449.3	5.0	57.2	133.9	134.0	0.0	72.8	255.3	255.3	0.0	67.2	255.3	257.0	0.0	67.1	512.9	513.8	5.0	56.1	183.5	183.5	0.0	70.0
Vacuum Street Sweeper	5.0	91.2	112.4	0.0	64.6	91.2	91.2	0.0	66.4	348.2	348.8	0.0	54.7	348.2	354.2	0.0	54.6	366.4	366.9	5.0	49.3	366.4	449.3	5.0	47.5	133.9	134.0	0.0	63.0	255.3	255.3	0.0	57.4	255.3	257.0	0.0	57.4	512.9	513.8	5.0	46.4	183.5	183.5	0.0	60.3
Vibrating Hopper	5.0	85.2	107.6	0.0	77.3	85.2	85.2	0.0	79.4	348.9	349.5	0.0	67.1	348.9	354.9	0.0	67.0	279.7	280.4	5.0	64.0	279.7	381.9	5.0	61.3	95.2	95.3	0.0	78.4	281.6	281.6	0.0	69.0	281.6	283.2	0.0	68.9	256.2	258.0	5.0	64.7	66.7	66.7	0.0	81.5
Vibrating Hopper	5.0	85.2	107.6	0.0	77.3	85.2	85.2	0.0	79.4	348.9	349.5	0.0	67.1	348.9	354.9	0.0	67.0	279.7	280.4	5.0	64.0	279.7	381.9	5.0	61.3	95.2	95.3	0.0	78.4	281.6	281.6	0.0	69.0	281.6	283.2	0.0	68.9	256.2	258.0	5.0	64.7	66.7	66.7	0.0	81.5
Warning Horn	5.0	85.2	107.6	0.0	63.5	85.2	85.2	0.0	65.6	348.9	349.5	0.0	53.3	348.9	354.9	0.0	53.2	279.7	280.4	5.0	50.2	279.7	381.9	5.0	47.5	95.2	95.3	0.0	64.6	281.6	281.6	0.0	55.2	281.6	283.2	0.0	55.1	256.2	258.0	5.0	50.9	66.7	66.7	0.0	67.7
Warning Horn	5.0	73.8	98.8	0.0	64.3	73.8	73.8	0.0	66.8	793.1	793.4	0.0	46.2	793.1	795.8	0.0	46.2	591.4	591.7	5.0	43.7	591.4	646.0	5.0	43.0	489.4	489.4	0.0	50.4	235.2	235.2	0.0	56.7	235.2	237.1	0.0	56.7	478.3	479.2	5.0	45.6	126.6	126.6	0.0	62.1
Warning Horn	5.0	73.8	98.8	0.0	64.3	73.8	73.8	0.0	66.8	793.1	793.4	0.0	46.2	793.1	795.8	0.0	46.2	591.4	591.7	5.0	43.7	591.4	646.0	5.0	43.0	489.4	489.4	0.0	50.4	235.2	235.2	0.0	56.7	235.2	237.1	0.0	56.7	478.3	479.2	5.0	45.6	126.6	126.6	0.0	62.1
Welder / Torch	5.0	85.2	107.6	0.0	63.4	85.2	85.2	0.0	65.4	348.9	349.5	0.0	53.1	348.9	354.9	0.0	53.0	279.7	280.4	5.0	50.0	279.7	381.9	5.0	47.4	95.2	95.3	0.0	64.4	281.6	281.6	0.0	55.0	281.6	283.2	0.0	55.0	256.2	258.0	5.0	50.8	66.7	66.7	0.0	67.5
Total					82.9				84.9				72.6				72.4				68.9				66.5				83.2				74.9				74.8				69.2				85.8
Existing-day					64.7				64.7				61.1				61.1				61.1				61.1				63.0				64.7				64.7				67.7				58.7
Existing-night					64.4				64.4				56.5				56.5				56.5				56.5				59.5				64.4				64.4				63.6				55.2
Day Impact					Impact				Impact				Impact				Impact				Impact				Impact				Impact				Impact				Impact				No impact				Impact
Night Impact					Impact				Impact				Impact				Impact				Impact				Impact				Impact				Impact				Impact				Impact				Impact

Construction Area Chinatown / State Park Station (With Mitigation)

		NSR 8 T College Station Residential Development Top Floor				NSR 8 B College Station Residential Development Bottom Floor				NSR 9 Blossom Plaza				NSR 9 Blossom Plaza Top Floor				NSR 10 Harmony Residential Development				NSR 10 Harmony Residential Development Top Floor				NSR 11 Capitol Milling				NSR 12 High Street Residential Development				NSR 12 High Street Residential Development Top Floor				NSR 13 S Ribdi Residential Development				NSR 14 S Los Angeles State Historical Park			
		Elevation: 70.7				Elevation: 5				Elevation: 26				Elevation: 70				Elevation: 25				Elevation: 265				Elevation: 9				Elevation: 5				Elevation: 35				Elevation: 35				Elevation: 5			
		2D	3D			2D	3D			2D	3D			2D	3D			2D	3D			2D	3D			2D	3D			2D	3D			2D	3D										
		Distance	Distance			Distance	Distance			Distance	Distance			Distance	Distance			Distance	Distance			Distance	Distance			Distance	Distance			Distance	Distance			Distance	Distance										
Equipment	Source El	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	Distance (	Distance (	Shielding	Leq	Distance (	Distance (	Shielding	Leq
Concrete Mixer Truck	5.0	91.2	112.4	0.0	67.8	91.2	91.2	0.0	69.6	348.2	348.8	0.0	57.9	348.2	354.2	0.0	57.8	366.4	366.9	5.0	52.5	366.4	449.3	5.0	50.7	133.9	134.0	0.0	66.3	255.3	255.3	0.0	60.7	255.3	257.0	0.0	60.6	512.9	513.8	5.0	49.6	183.5	183.5	0.0	63.5
Concrete Mixer Truck	5.0	91.2	112.4	0.0	67.8	91.2	91.2	0.0	69.6	348.2	348.8	0.0	57.9	348.2	354.2	0.0	57.8	366.4	366.9	5.0	52.5	366.4	449.3	5.0	50.7	133.9	134.0	0.0	66.3	255.3	255.3	0.0	60.7	255.3	257.0	0.0	60.6	512.9	513.8	5.0	49.6	183.5	183.5	0.0	63.5
Concrete Pump Truck	5.0	91.2	112.4	0.0	67.4	91.2	91.2	0.0	69.2	348.2	348.8	0.0	57.5	348.2	354.2	0.0	57.4	366.4	366.9	5.0	52.1	366.4	449.3	5.0	50.3	133.9	134.0	0.0	65.9	255.3	255.3	0.0	60.3	255.3	257.0	0.0	60.2	512.9	513.8	5.0	49.2	183.5	183.5	0.0	63.1
Crane	5.0	85.2	107.6	10.0	56.0	85.2	85.2	10.0	58.0	348.9	349.5	10.0	45.8	348.9	354.9	0.0	55.6	279.7	280.4	10.0	47.7	279.7	381.9	5.0	50.0	95.2	95.3	10.0	57.0	281.6	281.6	10.0	47.6	281.6	283.2	0.0	57.6	256.2	258.0	5.0	53.4	66.7	66.7	10.0	60.1
Flat Bed Truck	5.0	91.2	112.4	0.0	63.3	91.2	91.2	0.0	65.1	348.2	348.8	0.0	53.4	348.2	354.2	0.0	53.3	366.4	366.9	5.0	48.0	366.4	449.3	5.0	46.2	133.9	134.0	0.0	61.8	255.3	255.3	0.0	56.2	255.3	257.0	0.0	56.1	512.9	513.8	5.0	45.1	183.5	183.5	0.0	59.0
Gradall	5.0	85.2	107.6	10.0	62.8	85.2	85.2	10.0	64.8	348.9	349.5	10.0	52.5	348.9	354.9	0.0	62.4	279.7	280.4	10.0	54.4	279.7	381.9	5.0	56.8	95.2	95.3	10.0	63.8	281.6	281.6	10.0	54.4	281.6	283.2	0.0	64.4	256.2	258.0	5.0	60.2	66.7	66.7	10.0	66.9
Pickup Truck	5.0	73.8	98.8	0.0	65.1	73.8	73.8	0.0	67.6	793.1	793.4	10.0	37.0	793.1	795.8	0.0	47.0	591.4	591.7	10.0	39.6	591.4	646.0	5.0	43.8	489.4	489.4	10.0	41.2	235.2	235.2	0.0	57.6	235.2	237.1	0.0	57.5	478.3	479.2	5.0	46.4	126.6	126.6	0.0	63.0
Vacuum Excavator (Vac-truck)	5.0	91.2	112.4	0.0	74.3	91.2	91.2	0.0	76.1	348.2	348.8	0.0	64.4	348.2	354.2	0.0	64.3	366.4	366.9	5.0	59.0	366.4	449.3	5.0	57.2	133.9	134.0	0.0	72.8	255.3	255.3	0.0	67.2	255.3	257.0	0.0	67.1	512.9	513.8	5.0	56.1	183.5	183.5	0.0	70.0
Vacuum Street Sweeper	5.0	91.2	112.4	0.0	64.6	91.2	91.2	0.0	66.4	348.2	348.8	0.0	54.7	348.2	354.2	0.0	54.6	366.4	366.9	5.0	49.3	366.4	449.3	5.0	47.5	133.9	134.0	0.0	63.0	255.3	255.3	0.0	57.4	255.3	257.0	0.0	57.4	512.9	513.8	5.0	46.4	183.5	183.5	0.0	60.3
Vibrating Hopper	5.0	85.2	107.6	10.0	67.3	85.2	85.2	10.0	69.4	348.9	349.5	10.0	57.1	348.9	354.9	0.0	67.0	279.7	280.4	10.0	59.0	279.7	381.9	5.0	61.3	95.2	95.3	10.0	68.4	281.6	281.6	10.0	59.0	281.6	283.2	0.0	68.9	256.2	258.0	5.0	64.7	66.7	66.7	10.0	71.5
Vibrating Hopper	5.0	85.2	107.6	10.0	67.3	85.2	85.2	10.0	69.4	348.9	349.5	10.0	57.1	348.9	354.9	0.0	67.0	279.7	280.4	10.0	59.0	279.7	381.9	5.0	61.3	95.2	95.3	10.0	68.4	281.6	281.6	10.0	59.0	281.6	283.2	0.0	68.9	256.2	258.0	5.0	64.7	66.7	66.7	10.0	71.5
Warning Horn	5.0	85.2	107.6	10.0	53.5	85.2	85.2	10.0	55.6	348.9	349.5	10.0	43.3	348.9	354.9	0.0	53.2	279.7	280.4	10.0	45.2	279.7	381.9	5.0	47.5	95.2	95.3	10.0	54.6	281.6	281.6	10.0	45.2	281.6	283.2	0.0	55.1	256.2	258.0	5.0	50.9	66.7	66.7	10.0	57.7
Warning Horn	5.0	73.8	98.8	0.0	64.3	73.8	73.8	0.0	66.8	793.1	793.4	10.0	36.2	793.1	795.8	0.0	46.2	591.4	591.7	10.0	38.7	591.4	646.0	5.0	43.0	489.4	489.4	10.0	40.4	235.2	235.2	0.0	56.7	235.2	237.1	0.0	56.7	478.3	479.2	5.0	45.6	126.6	126.6	0.0	62.1
Warning Horn	5.0	73.8	98.8	0.0	64.3	73.8	73.8	0.0	66.8	793.1	793.4	10.0	36.2	793.1	795.8	0.0	46.2	591.4	591.7	10.0	38.7	591.4	646.0	5.0	43.0	489.4	489.4	10.0	40.4	235.2	235.2	0.0	56.7	235.2	237.1	0.0	56.7	478.3	479.2	5.0	45.6	126.6	126.6	0.0	62.1
Welder / Torch	5.0	85.2	107.6	10.0	53.4	85.2	85.2	10.0	55.4	348.9	349.5	10.0	43.1	348.9	354.9	0.0	53.0	279.7	280.4	10.0	45.0	279.7	381.9	5.0	47.4	95.2	95.3	10.0	54.4	281.6	281.6	10.0	45.0	281.6	283.2	0.0	55.0	256.2	258.0	5.0	50.8	66.7	66.7	10.0	57.5
Total					78.5				80.5				68.1				72.4				65.4				66.5				77.2				71.2				74.8				69.2				77.7
Existing-day					64.7				64.7				61.1				61.1				61.1				61.1				63.0				64.7				64.7				67.7				58.7
Existing-night					64.4				64.4				56.5				56.5				56.5				56.5				59.5				64.4				64.4				63.6				55.2
Day Impact					Impact				Impact				Impact				Impact				No impact				Impact				Impact				Impact				Impact				No impact				Impact
Night Impact					Impact				Impact				Impact				Impact				Impact				Impact				Impact				Impact				Impact				Impact				Impact

Construction Noise Calculations, Broadway Junction (Foundations & Columns)

Construction Area Broadway Junction (With Mitigation)

		NSR 13 S Riboli Residential Development				NSR 13 N Riboli Residential Development				NSR 14 N Los Angeles State Historical Par				NSR 15 St Peter's Church				NSR 16 Cathedral HS				NSR 17 N Low Rise Residential				NSR 17 S Low Rise Residential			
		Elevation: -10				Elevation: 5				Elevation: -30				Elevation: 5				Elevation: 15				Elevation: 25				Elevation: 15			
		2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance		
Equipment	Source Ele	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq
Concrete Mixer Truck	5.0	893.5	893.6	0.0	49.8	671.7	671.7	0.0	52.3	389.3	390.9	10.0	47.0	790.4	790.4	0.0	50.8	433.0	433.3	10.0	46.1	305.5	306.5	10.0	49.1	163.2	163.9	10.0	54.5
Concrete Mixer Truck	5.0	893.5	893.6	0.0	49.8	671.7	671.7	0.0	52.3	389.3	390.9	10.0	47.0	790.4	790.4	0.0	50.8	433.0	433.3	10.0	46.1	305.5	306.5	10.0	49.1	163.2	163.9	10.0	54.5
Concrete Pump Truck	5.0	893.5	893.6	0.0	49.4	671.7	671.7	0.0	51.8	389.3	390.9	10.0	46.5	790.4	790.4	0.0	50.4	433.0	433.3	10.0	45.7	305.5	306.5	10.0	48.7	163.2	163.9	10.0	54.1
Crane	5.0	790.0	790.1	0.0	48.7	777.4	777.4	0.0	48.8	375.1	376.8	10.0	45.1	675.6	675.6	10.0	40.0	196.0	196.3	10.0	50.8	228.0	228.9	10.0	49.4	85.9	86.5	10.0	57.9
Flat Bed Truck	5.0	893.5	893.6	0.0	45.3	671.7	671.7	0.0	47.8	389.3	390.9	10.0	42.5	790.4	790.4	0.0	46.3	433.0	433.3	10.0	41.6	305.5	306.5	10.0	44.6	163.2	163.9	10.0	50.0
Gradall	5.0	700.3	700.5	0.0	56.5	636.6	636.6	0.0	57.3	328.0	329.9	10.0	53.0	581.6	581.6	10.0	48.1	144.2	144.5	10.0	60.2	192.0	193.0	10.0	57.7	42.7	43.9	10.0	70.6
Pickup Truck	5.0	855.0	855.1	0.0	46.4	636.6	636.6	0.0	48.9	369.4	371.1	10.0	43.6	753.6	753.6	10.0	37.5	355.0	355.3	10.0	44.0	243.0	243.8	10.0	47.3	84.7	85.3	10.0	56.4
Vacuum Excavator (Vac-tru	5.0	893.5	893.6	0.0	56.3	671.7	671.7	0.0	58.8	389.3	390.9	10.0	53.5	790.4	790.4	0.0	57.3	433.0	433.3	10.0	52.6	305.5	306.5	10.0	55.6	163.2	163.9	10.0	61.0
Vacuum Street Sweeper	5.0	893.5	893.6	0.0	46.6	671.7	671.7	0.0	49.0	389.3	390.9	10.0	43.7	790.4	790.4	0.0	47.6	433.0	433.3	10.0	42.8	305.5	306.5	10.0	45.9	163.2	163.9	10.0	51.3
Vibrating Hopper	5.0	700.3	700.5	0.0	61.1	636.6	636.6	0.0	61.9	328.0	329.9	10.0	57.6	581.6	581.6	10.0	52.7	144.2	144.5	10.0	64.8	192.0	193.0	10.0	62.3	42.7	43.9	10.0	75.1
Vibrating Hopper	5.0	700.3	700.5	0.0	61.1	636.6	636.6	0.0	61.9	328.0	329.9	10.0	57.6	581.6	581.6	10.0	52.7	144.2	144.5	10.0	64.8	192.0	193.0	10.0	62.3	42.7	43.9	10.0	75.1
Warning Horn	5.0	700.3	700.5	0.0	47.3	636.6	636.6	0.0	48.1	328.0	329.9	10.0	43.8	581.6	581.6	10.0	38.9	144.2	144.5	10.0	51.0	192.0	193.0	10.0	48.5	42.7	43.9	10.0	61.3
Warning Horn	5.0	855.0	855.1	0.0	45.5	636.6	636.6	0.0	48.1	369.4	371.1	10.0	42.8	753.6	753.6	10.0	36.6	355.0	355.4	10.0	43.2	243.0	244.3	10.0	46.4	84.7	86.0	10.0	55.5
Warning Horn	5.0	855.0	855.1	0.0	45.5	636.6	636.6	0.0	48.1	369.4	371.1	10.0	42.8	753.6	753.6	10.0	36.6	355.0	355.4	10.0	43.2	243.0	244.3	10.0	46.4	84.7	86.0	10.0	55.5
Welder / Torch	5.0	700.3	700.5	0.0	47.1	636.6	636.6	0.0	47.9	328.0	329.9	10.0	43.6	581.6	581.6	10.0	38.7	144.2	144.5	10.0	50.8	192.0	193.0	10.0	48.3	42.7	43.9	10.0	61.2
Total					66.1				67.3				62.8				61.7				68.9				67.0				79.2
Existing-day					67.7				65.8				53.6				65.8				58.7				56.1				56.1
Existing-night					63.6				60.9				48.7				60.9				53.8				51.2				51.2
Day Impact					No impact				No impact				Impact				No impact				Impact				Impact				Impact
Night Impact					No impact				Impact				Impact				No impact				Impact				Impact				Impact

Construction Area Broadway Junction (Without Mitigation)

		NSR 13 S Riboli Residential Development				NSR 13 N Riboli Residential Development				NSR 14 N Los Angeles State Historical Par				NSR 15 St Peter's Church				NSR 16 Cathedral HS				NSR 17 N Low Rise Residential				NSR 17 S Low Rise Residential			
		Elevation: -10				Elevation: 5				Elevation: -30				Elevation: 5				Elevation: 15				Elevation: 25				Elevation: 15			
		2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance		
Equipment	Source Ele	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq
Concrete Mixer Truck	5.0	893.5	893.6	0.0	49.8	671.7	671.7	0.0	52.3	389.3	390.9	0.0	57.0	790.4	790.4	0.0	50.8	433.0	433.3	0.0	56.1	305.5	306.5	0.0	59.1	163.2	163.9	0.0	64.5
Concrete Mixer Truck	5.0	893.5	893.6	0.0	49.8	671.7	671.7	0.0	52.3	389.3	390.9	0.0	57.0	790.4	790.4	0.0	50.8	433.0	433.3	0.0	56.1	305.5	306.5	0.0	59.1	163.2	163.9	0.0	64.5
Concrete Pump Truck	5.0	893.5	893.6	0.0	49.4	671.7	671.7	0.0	51.8	389.3	390.9	0.0	56.5	790.4	790.4	0.0	50.4	433.0	433.3	0.0	55.7	305.5	306.5	0.0	58.7	163.2	163.9	0.0	64.1
Crane	5.0	790.0	790.1	0.0	48.7	777.4	777.4	0.0	48.8	375.1	376.8	0.0	55.1	675.6	675.6	0.0	50.0	196.0	196.3	0.0	60.8	228.0	228.9	5.0	54.4	85.9	86.5	0.0	67.9
Flat Bed Truck	5.0	893.5	893.6	0.0	45.3	671.7	671.7	0.0	47.8	389.3	390.9	0.0	52.5	790.4	790.4	0.0	46.3	433.0	433.3	0.0	51.6	305.5	306.5	0.0	54.6	163.2	163.9	0.0	60.0
Gradall	5.0	700.3	700.5	0.0	56.5	636.6	636.6	0.0	57.3	328.0	329.9	0.0	63.0	581.6	581.6	0.0	58.1	144.2	144.5	0.0	70.2	192.0	193.0	0.0	67.7	42.7	43.9	0.0	80.6
Pickup Truck	5.0	855.0	855.1	0.0	46.4	636.6	636.6	0.0	48.9	369.4	371.1	0.0	53.6	753.6	753.6	0.0	47.5	355.0	355.3	0.0	54.0	243.0	243.8	0.0	57.3	84.7	85.3	0.0	66.4
Vacuum Excavator (Vac-tru	5.0	893.5	893.6	0.0	56.3	671.7	671.7	0.0	58.8	389.3	390.9	0.0	63.5	790.4	790.4	0.0	57.3	433.0	433.3	0.0	62.6	305.5	306.5	0.0	65.6	163.2	163.9	0.0	71.0
Vacuum Street Sweeper	5.0	893.5	893.6	0.0	46.6	671.7	671.7	0.0	49.0	389.3	390.9	0.0	53.7	790.4	790.4	0.0	47.6	433.0	433.3	0.0	52.8	305.5	306.5	0.0	55.9	163.2	163.9	0.0	61.3
Vibrating Hopper	5.0	700.3	700.5	0.0	61.1	636.6	636.6	0.0	61.9	328.0	329.9	0.0	67.6	581.6	581.6	0.0	62.7	144.2	144.5	0.0	74.8	192.0	193.0	0.0	72.3	42.7	43.9	0.0	85.1
Vibrating Hopper	5.0	700.3	700.5	0.0	61.1	636.6	636.6	0.0	61.9	328.0	329.9	0.0	67.6	581.6	581.6	0.0	62.7	144.2	144.5	0.0	74.8	192.0	193.0	0.0	72.3	42.7	43.9	0.0	85.1
Warning Horn	5.0	700.3	700.5	0.0	47.3	636.6	636.6	0.0	48.1	328.0	329.9	0.0	53.8	581.6	581.6	0.0	48.9	144.2	144.5	0.0	61.0	192.0	193.0	0.0	58.5	42.7	43.9	0.0	71.3
Warning Horn	5.0	855.0	855.1	0.0	45.5	636.6	636.6	0.0	48.1	369.4	371.1	0.0	52.8	753.6	753.6	0.0	46.6	355.0	355.4	0.0	53.2	243.0	244.3	0.0	56.4	84.7	86.0	0.0	65.5
Warning Horn	5.0	855.0	855.1	0.0	45.5	636.6	636.6	0.0	48.1	369.4	371.1	0.0	52.8	753.6	753.6	0.0	46.6	355.0	355.4	0.0	53.2	243.0	244.3	0.0	56.4	84.7	86.0	0.0	65.5
Welder / Torch	5.0	700.3	700.5	0.0	47.1	636.6	636.6	0.0	47.9	328.0	329.9	0.0	53.6	581.6	581.6	0.0	48.7	144.2	144.5	0.0	60.8	192.0	193.0	0.0	58.3	42.7	43.9	0.0	71.2
Total					66.1				67.3				72.8				67.6				78.9				76.9				89.2
Existing-day					67.7				65.8				53.6				65.8				58.7				56.1				56.1
Existing-night					63.6				60.9				48.7				60.9				53.8				51.2				51.2
Day Impact					No impact				No impact				Impact				No impact				Impact				Impact				Impact
Night Impact					No impact				Impact				Impact				Impact				Impact				Impact				Impact

Construction Noise Calculations, Stadium Tower and Dodger Stadium Station (Foundations & Columns)

Construction Area Dodger Stadium Station (Without Mitigation)

		NSR 16	Cathedral HS			NSR 18	Solano Canyon Neighborhood		
		Elevation:	-140			Elevation:	-75		
		2D Distance	3D Distance			2D Distance	3D Distance		
Equipment	Source Ele	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq
Concrete Mixer Truck	5.0	770.9	784.4	5.0	45.9	1623.1	1625.1	5.0	39.6
Concrete Mixer Truck	5.0	770.9	784.4	5.0	45.9	1623.1	1625.1	5.0	39.6
Concrete Pump Truck	5.0	770.9	784.4	5.0	45.5	1623.1	1625.1	5.0	39.2
Crane	5.0	744.0	758.0	5.0	44.0	1550.1	1552.2	5.0	37.8
Flat Bed Truck	5.0	770.9	784.4	5.0	41.4	1623.1	1625.1	5.0	35.1
Gradall	5.0	720.0	734.5	5.0	51.1	1529.9	1532.0	5.0	44.7
Pickup Truck	5.0	1064.4	1074.2	5.0	39.4	1397.3	1399.6	5.0	37.1
Vacuum Excavator (Vac-truck)	5.0	770.9	784.4	5.0	52.4	1623.1	1625.1	5.0	46.1
Vacuum Street Sweeper	5.0	770.9	784.4	5.0	42.7	1623.1	1625.1	5.0	36.4
Vibrating Hopper	5.0	720.0	734.5	5.0	55.6	1529.9	1532.0	5.0	49.3
Vibrating Hopper	5.0	720.0	734.5	5.0	55.6	1529.9	1532.0	5.0	49.3
Warning Horn	5.0	720.0	734.5	5.0	41.8	1529.9	1532.0	5.0	35.5
Warning Horn	5.0	1064.4	1074.2	5.0	38.5	1397.3	1399.6	5.0	36.2
Warning Horn	5.0	1064.4	1074.2	5.0	38.5	1397.3	1399.6	5.0	36.2
Welder / Torch	5.0	720.0	734.5	5.0	41.7	1529.9	1532.0	5.0	35.3
Total					61.0				54.8
Existing-day					58.7				56.5
Existing-night					53.8				51.6
Day Impact					No impact				No impact
Night Impact					Impact				No impact

Construction Area Dodger Stadium Station (With Mitigation)

		NSR 16	Cathedral HS			NSR 18	Solano Canyon Neighborhood		
		Elevation:	-140			Elevation:	-75		
		2D Distance	3D Distance			2D Distance	3D Distance		
Equipment	Source Ele	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq
Concrete Mixer Truck	5.0	770.9	784.4	5.0	45.9	1623.1	1625.1	5.0	39.6
Concrete Mixer Truck	5.0	770.9	784.4	5.0	45.9	1623.1	1625.1	5.0	39.6
Concrete Pump Truck	5.0	770.9	784.4	5.0	45.5	1623.1	1625.1	5.0	39.2
Crane	5.0	744.0	758.0	5.0	44.0	1550.1	1552.2	5.0	37.8
Flat Bed Truck	5.0	770.9	784.4	5.0	41.4	1623.1	1625.1	5.0	35.1
Gradall	5.0	720.0	734.5	5.0	51.1	1529.9	1532.0	5.0	44.7
Pickup Truck	5.0	1064.4	1074.2	5.0	39.4	1397.3	1399.6	5.0	37.1
Vacuum Excavator (Vac-truck)	5.0	770.9	784.4	5.0	52.4	1623.1	1625.1	5.0	46.1
Vacuum Street Sweeper	5.0	770.9	784.4	5.0	42.7	1623.1	1625.1	5.0	36.4
Vibrating Hopper	5.0	720.0	734.5	5.0	55.6	1529.9	1532.0	5.0	49.3
Vibrating Hopper	5.0	720.0	734.5	5.0	55.6	1529.9	1532.0	5.0	49.3
Warning Horn	5.0	720.0	734.5	5.0	41.8	1529.9	1532.0	5.0	35.5
Warning Horn	5.0	1064.4	1074.2	5.0	38.5	1397.3	1399.6	5.0	36.2
Warning Horn	5.0	1064.4	1074.2	5.0	38.5	1397.3	1399.6	5.0	36.2
Welder / Torch	5.0	720.0	734.5	5.0	41.7	1529.9	1532.0	5.0	35.3
Total					61.0				54.8
Existing-day					58.7				56.5
Existing-night					53.8				51.6
Day Impact					No impact				No impact
Night Impact					Impact				No impact

Construction Area Stadium Tower (Without Mitigation)

		NSR 16	Cathedral HS			NSR 17 N	Low Rise Residential			NSR 18	Solano Canyon Neighborhood		
		Elevation:	-40			Elevation:	-40			Elevation:	25		
		2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance		
Equipment	Source Ele	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq
Concrete Mixer Truck	5.0	530.4	532.3	5.0	49.3	834.5	835.7	5.0	45.4	2023.0	2023.1	5.0	37.7
Concrete Mixer Truck	5.0	530.4	532.3	5.0	49.3	834.5	835.7	5.0	45.4	2023.0	2023.1	5.0	37.7
Concrete Pump Truck	5.0	530.4	532.3	5.0	48.9	834.5	835.7	5.0	44.9	2023.0	2023.1	5.0	37.3
Crane	5.0	584.0	585.7	5.0	46.3	885.2	886.3	5.0	42.7	2024.6	2024.7	5.0	35.5
Flat Bed Truck	5.0	530.4	532.3	5.0	44.8	834.5	835.7	5.0	40.9	2023.0	2023.1	5.0	33.2
Gradall	5.0	561.1	562.9	5.0	53.4	862.1	863.3	5.0	49.7	1819.6	1819.7	5.0	43.2
Pickup Truck	5.0	629.7	631.3	5.0	44.0	936.2	937.3	5.0	40.6	1813.2	1813.3	5.0	34.8
Vacuum Excavator (Vac-truck)	5.0	530.4	532.3	5.0	55.8	834.5	835.7	5.0	51.9	2023.0	2023.1	5.0	44.2
Vacuum Street Sweeper	5.0	530.4	532.3	5.0	46.1	834.5	835.7	5.0	42.1	2023.0	2023.1	5.0	34.5
Vibrating Hopper	5.0	561.1	562.9	5.0	58.0	862.1	863.3	5.0	54.2	1819.6	1819.7	5.0	47.8
Vibrating Hopper	5.0	561.1	562.9	5.0	58.0	862.1	863.3	5.0	54.2	1819.6	1819.7	5.0	47.8
Warning Horn	5.0	561.1	562.9	5.0	44.2	862.1	863.3	5.0	40.4	1819.6	1819.7	5.0	34.0
Warning Horn	5.0	530.4	532.3	5.0	44.6	936.2	937.3	5.0	39.7	1813.2	1813.3	5.0	34.0
Warning Horn	5.0	530.4	532.3	5.0	44.6	936.2	937.3	5.0	39.7	1813.2	1813.3	5.0	34.0
Welder / Torch	5.0	561.1	562.9	5.0	44.0	862.1	863.3	5.0	40.3	1819.6	1819.7	5.0	33.8
Total					63.7				59.9				53.1
Existing-day					58.7				56.1				56.5
Existing-night					53.8				51.2				51.6
Day Impact					No impact				No impact				No impact
Night Impact					Impact				Impact				No impact

Construction Area Stadium Tower (With Mitigation)

		NSR 16	Cathedral HS			NSR 17 N	Low Rise Residential			NSR 18	Solano Canyon Neighborhood		
		Elevation:	-40			Elevation:	-40			Elevation:	25		
		2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance		
Equipment	Source Ele	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq
Concrete Mixer Truck	5.0	530.4	532.3	5.0	49.3	834.5	835.7	5.0	45.4	2023.0	2023.1	5.0	37.7
Concrete Mixer Truck	5.0	530.4	532.3	5.0	49.3	834.5	835.7	5.0	45.4	2023.0	2023.1	5.0	37.7
Concrete Pump Truck	5.0	530.4	532.3	5.0	48.9	834.5	835.7	5.0	44.9	2023.0	2023.1	5.0	37.3
Crane	5.0	584.0	585.7	5.0	46.3	885.2	886.3	5.0	42.7	2024.6	2024.7	5.0	35.5
Flat Bed Truck	5.0	530.4	532.3	5.0	44.8	834.5	835.7	5.0	40.9	2023.0	2023.1	5.0	33.2
Gradall	5.0	561.1	562.9	5.0	53.4	862.1	863.3	5.0	49.7	1819.6	1819.7	5.0	43.2
Pickup Truck	5.0	629.7	631.3	5.0	44.0	936.2	937.3	5.0	40.6	1813.2	1813.3	5.0	34.8
Vacuum Excavator (Vac-truck)	5.0	530.4	532.3	5.0	55.8	834.5	835.7	5.0	51.9	2023.0	2023.1	5.0	44.2
Vacuum Street Sweeper	5.0	530.4	532.3	5.0	46.1	834.5	835.7	5.0	42.1	2023.0	2023.1	5.0	34.5
Vibrating Hopper	5.0	561.1	562.9	5.0	58.0	862.1	863.3	5.0	54.2	1819.6	1819.7	5.0	47.8
Vibrating Hopper	5.0	561.1	562.9	5.0	58.0	862.1	863.3	5.0	54.2	1819.6	1819.7	5.0	47.8
Warning Horn	5.0	561.1	562.9	5.0	44.2	862.1	863.3	5.0	40.4	1819.6	1819.7	5.0	34.0
Warning Horn	5.0	530.4	532.3	5.0	44.6	936.2	937.3	5.0	39.7	1813.2	1813.3	5.0	34.0
Warning Horn	5.0	530.4	532.3	5.0	44.6	936.2	937.3	5.0	39.7	1813.2	1813.3	5.0	34.0
Welder / Torch	5.0	561.1	562.9	5.0	44.0	862.1	863.3	5.0	40.3	1819.6	1819.7	5.0	33.8
Total					63.7				59.9				53.1
Existing-day					58.7				56.1				56.5
Existing-night					53.8				51.2				51.6
Day Impact					No impact				No impact				No impact
Night Impact					Impact				Impact				No impact

Construction Noise Calculations, Broadway Junction (Demolition)

Construction Area Broadway Junction (Without Mitigation)

Equipment	Source Elevation	NSR 13 S	Riboli Residential Development			NSR 13 N	Riboli Residential Development			NSR 14 N	Los Angeles State Historical Park			NSR 15	St Peter's Church			NSR 16	Cathedral HS			NSR 17 N	Low Rise Residential			NSR 17 S	Low Rise Residential		
		Elevation:	-10			Elevation:	5			Elevation:	-30			Elevation:	5			Elevation:	15			Elevation:	25			Elevation:	15		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Backhoe	5.0	700.3	700.5	0.0	50.7	636.6	636.6	0.0	51.5	328.0	329.9	0.0	57.2	581.6	581.6	0.0	52.3	144.2	144.5	0.0	64.4	192.0	193.0	0.0	61.9	42.7	43.9	0.0	74.8
Hydra Break Ram	5.0	700.3	700.5	0.0	57.1	636.6	636.6	0.0	57.9	328.0	329.9	0.0	63.6	581.6	581.6	0.0	58.7	144.2	144.5	0.0	70.8	192.0	193.0	0.0	68.3	42.7	43.9	0.0	81.1
Chain Saw	5.0	700.3	700.5	0.0	53.8	636.6	636.6	0.0	54.6	328.0	329.9	0.0	60.3	581.6	581.6	0.0	55.4	144.2	144.5	0.0	67.5	192.0	193.0	0.0	65.0	42.7	43.9	0.0	77.8
Concrete Saw	5.0	700.3	700.5	0.0	59.7	636.6	636.6	0.0	60.5	328.0	329.9	0.0	66.2	581.6	581.6	0.0	61.3	144.2	144.5	0.0	73.4	192.0	193.0	0.0	70.9	42.7	43.9	0.0	83.7
Dozer	5.0	700.3	700.5	0.0	54.8	636.6	636.6	0.0	55.6	328.0	329.9	0.0	61.3	581.6	581.6	0.0	56.4	144.2	144.5	0.0	68.5	192.0	193.0	0.0	66.0	42.7	43.9	0.0	78.9
Dump Truck	5.0	700.3	700.5	0.0	49.6	636.6	636.6	0.0	50.4	328.0	329.9	0.0	56.1	581.6	581.6	0.0	51.2	144.2	144.5	0.0	63.3	192.0	193.0	0.0	60.8	42.7	43.9	0.0	73.7
Dump Truck	5.0	700.3	700.5	0.0	49.6	636.6	636.6	0.0	50.4	328.0	329.9	0.0	56.1	581.6	581.6	0.0	51.2	144.2	144.5	0.0	63.3	192.0	193.0	0.0	60.8	42.7	43.9	0.0	73.7
Dump Truck	5.0	700.3	700.5	0.0	49.6	636.6	636.6	0.0	50.4	328.0	329.9	0.0	56.1	581.6	581.6	0.0	51.2	144.2	144.5	0.0	63.3	192.0	193.0	0.0	60.8	42.7	43.9	0.0	73.7
Dump Truck	5.0	700.3	700.5	0.0	49.6	636.6	636.6	0.0	50.4	328.0	329.9	0.0	56.1	581.6	581.6	0.0	51.2	144.2	144.5	0.0	63.3	192.0	193.0	0.0	60.8	42.7	43.9	0.0	73.7
Dump Truck	5.0	700.3	700.5	0.0	49.6	636.6	636.6	0.0	50.4	328.0	329.9	0.0	56.1	581.6	581.6	0.0	51.2	144.2	144.5	0.0	63.3	192.0	193.0	0.0	60.8	42.7	43.9	0.0	73.7
Excavator	5.0	700.3	700.5	0.0	53.8	636.6	636.6	0.0	54.6	328.0	329.9	0.0	60.3	581.6	581.6	0.0	55.4	144.2	144.5	0.0	67.5	192.0	193.0	0.0	65.0	42.7	43.9	0.0	77.9
Excavator	5.0	700.3	700.5	0.0	53.8	636.6	636.6	0.0	54.6	328.0	329.9	0.0	60.3	581.6	581.6	0.0	55.4	144.2	144.5	0.0	67.5	192.0	193.0	0.0	65.0	42.7	43.9	0.0	77.9
Jackhammer	5.0	700.3	700.5	0.0	59.0	636.6	636.6	0.0	59.8	328.0	329.9	0.0	65.5	581.6	581.6	0.0	60.6	144.2	144.5	0.0	72.7	192.0	193.0	0.0	70.2	42.7	43.9	0.0	83.0
Pickup Truck	5.0	855.0	855.1	0.0	46.4	636.6	636.6	0.0	48.9	369.4	371.1	0.0	53.6	753.6	753.6	0.0	47.5	355.0	355.3	0.0	54.0	243.0	244.3	0.0	57.2	84.7	86.0	0.0	66.3
Pickup Truck	5.0	855.0	855.1	0.0	46.4	636.6	636.6	0.0	48.9	369.4	371.1	0.0	53.6	753.6	753.6	0.0	47.5	355.0	355.3	0.0	54.0	243.0	244.3	0.0	57.2	84.7	86.0	0.0	66.3
Vacuum Street Sweeper	5.0	893.5	893.6	0.0	46.6	671.7	671.7	0.0	49.0	389.3	390.9	0.0	53.7	790.4	790.4	0.0	47.6	433.0	433.3	0.0	52.8	305.5	306.5	0.0	55.9	163.2	163.9	0.0	61.3
Warning Horn	5.0	700.3	700.5	0.0	47.3	636.6	636.6	0.0	48.1	328.0	329.9	0.0	53.8	581.6	581.6	0.0	48.9	144.2	144.5	0.0	61.0	192.0	193.0	0.0	58.5	42.7	43.9	0.0	71.3
Welder / Torch	5.0	700.3	700.5	0.0	47.1	636.6	636.6	0.0	47.9	328.0	329.9	0.0	53.6	581.6	581.6	0.0	48.7	144.2	144.5	0.0	60.8	192.0	193.0	0.0	58.3	42.7	43.9	0.0	71.2
Total					66.1				67.0				72.6				67.7				79.7				77.3				90.0
Existing-day					67.7				65.8				53.6				65.8				58.7				56.1				56.1
Existing-night					63.6				60.9				48.7				60.9				53.8				51.2				51.2
Day Impact					No impact				No impact				Impact				No impact				Impact				Impact				Impact
Night Impact					No impact				Impact				Impact				Impact				Impact				Impact				Impact

Construction Area Broadway Junction (With Mitigation)

Equipment	Source Elevation	NSR 13 S	Riboli Residential Development			NSR 13 N	Riboli Residential Development			NSR 14 N	Los Angeles State Historical Park			NSR 15	St Peter's Church			NSR 16	Cathedral HS			NSR 17 N	Low Rise Residential			NSR 17 S	Low Rise Residential		
		Elevation:	-10			Elevation:	5			Elevation:	-30			Elevation:	5			Elevation:	15			Elevation:	25			Elevation:	15		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Backhoe	5.0	50.0	700.5	0.0	50.7	50.0	636.6	0.0	51.5	50.0	329.9	10.0	47.2	50.0	581.6	10.0	42.3	50.0	144.5	10.0	54.4	50.0	193.0	10.0	51.9	50.0	43.9	10.0	64.8
Hydra Break Ram	5.0	50.0	700.5	0.0	57.1	50.0	636.6	0.0	57.9	50.0	329.9	10.0	53.6	50.0	581.6	10.0	48.7	50.0	144.5	10.0	60.8	50.0	193.0	10.0	58.3	50.0	43.9	10.0	71.1
Chain Saw	5.0	50.0	700.5	0.0	53.8	50.0	636.6	0.0	54.6	50.0	329.9	10.0	50.3	50.0	581.6	10.0	45.4	50.0	144.5	10.0	57.5	50.0	193.0	10.0	55.0	50.0	43.9	10.0	67.8
Concrete Saw	5.0	50.0	700.5	0.0	59.7	50.0	636.6	0.0	60.5	50.0	329.9	10.0	56.2	50.0	581.6	10.0	51.3	50.0	144.5	10.0	63.4	50.0	193.0	10.0	60.9	50.0	43.9	10.0	73.7
Dozer	5.0	50.0	700.5	0.0	54.8	50.0	636.6	0.0	55.6	50.0	329.9	10.0	51.3	50.0	581.6	10.0	46.4	50.0	144.5	10.0	58.5	50.0	193.0	10.0	56.0	50.0	43.9	10.0	68.9
Dump Truck	5.0	50.0	700.5	0.0	49.6	50.0	636.6	0.0	50.4	50.0	329.9	10.0	46.1	50.0	581.6	10.0	41.2	50.0	144.5	10.0	53.3	50.0	193.0	10.0	50.8	50.0	43.9	10.0	63.7
Dump Truck	5.0	50.0	700.5	0.0	49.6	50.0	636.6	0.0	50.4	50.0	329.9	10.0	46.1	50.0	581.6	10.0	41.2	50.0	144.5	10.0	53.3	50.0	193.0	10.0	50.8	50.0	43.9	10.0	63.7
Dump Truck	5.0	50.0	700.5	0.0	49.6	50.0	636.6	0.0	50.4	50.0	329.9	10.0	46.1	50.0	581.6	10.0	41.2	50.0	144.5	10.0	53.3	50.0	193.0	10.0	50.8	50.0	43.9	10.0	63.7
Dump Truck	5.0	50.0	700.5	0.0	49.6	50.0	636.6	0.0	50.4	50.0	329.9	10.0	46.1	50.0	581.6	10.0	41.2	50.0	144.5	10.0	53.3	50.0	193.0	10.0	50.8	50.0	43.9	10.0	63.7
Dump Truck	5.0	50.0	700.5	0.0	49.6	50.0	636.6	0.0	50.4	50.0	329.9	10.0	46.1	50.0	581.6	10.0	41.2	50.0	144.5	10.0	53.3	50.0	193.0	10.0	50.8	50.0	43.9	10.0	63.7
Excavator	5.0	50.0	700.5	0.0	53.8	50.0	636.6	0.0	54.6	50.0	329.9	10.0	50.3	50.0	581.6	10.0	45.4	50.0	144.5	10.0	57.5	50.0	193.0	10.0	55.0	50.0	43.9	10.0	67.9
Excavator	5.0	50.0	700.5	0.0	53.8	50.0	636.6	0.0	54.6	50.0	329.9	10.0	50.3	50.0	581.6	10.0	45.4	50.0	144.5	10.0	57.5	50.0	193.0	10.0	55.0	50.0	43.9	10.0	67.9
Jackhammer	5.0	50.0	700.5	0.0	59.0	51.0	636.6	0.0	59.8	51.0	329.9	10.0	55.5	51.0	581.6	10.0	50.6	51.0	144.5	10.0	62.7	51.0	193.0	10.0	60.2	51.0	43.9	10.0	73.0
Pickup Truck	5.0	50.0	855.1	0.0	46.4	52.0	636.6	0.0	48.9	52.0	371.1	10.0	43.6	52.0	753.6	10.0	37.5	52.0	355.3	10.0	44.0	52.0	244.3	10.0	47.2	52.0	86.0	10.0	56.3
Pickup Truck	5.0	50.0	855.1	0.0	46.4	53.0	636.6	0.0	48.9	53.0	371.1	10.0	43.6	53.0	753.6	10.0	37.5	53.0	355.3	10.0	44.0	53.0	244.3	10.0	47.2	53.0	86.0	10.0	56.3
Vacuum Street Sweeper	5.0	50.0	893.6	0.0	46.6	50.0	671.7	0.0	49.0	50.0	390.9	10.0	43.7	50.0	790.4	0.0	47.6	50.0	433.3	10.0	42.8	50.0	306.5	10.0	45.9	50.0	163.9	10.0	51.3
Warning Horn	5.0	50.0	700.5	0.0	47.3	50.0	636.6	0.0	48.1	50.0	329.9	10.0	43.8	50.0	581.6	10.0	38.9	50.0	144.5	10.0	51.0	50.0	193.0	10.0	48.5	50.0	43.9	10.0	61.3
Welder / Torch	5.0	50.0	700.5	0.0	47.1	50.0	636.6	0.0	47.9	50.0	329.9	10.0	43.6	50.0	581.6	10.0	38.7	50.0	144.5	10.0	50.8	50.0	193.0	10.0	48.3	50.0	43.9	10.0	61.2
Total					66.1				67.0				62.6				58.1				69.7				67.3				80.0
Existing-day					67.7				65.8				53.6				65.8				58.7				56.1				56.1
Existing-night					63.6				60.9				48.7				60.9				53.8				51.2				51.2
Day Impact					No impact				No impact				Impact				No impact				Impact				Impact				Impact
Night Impact					No impact				Impact				Impact				No impact				Impact				Impact				Impact

Construction Noise Calculations, Alameda Station (Structural Steel)

Construction Area Alameda Station (Without Mitigation)

		NSR 1A	Union Station			NSR 1B	First Five		
		Elevation:	5			Elevation:	5		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	5.0	180.7	180.7	0.0	62.6	361.1	361.1	5.0	51.5
Concrete Mixer Truck	5.0	85.3	85.3	0.0	70.2	386.3	386.3	5.0	52.1
Concrete Mixer Truck	5.0	85.3	85.3	0.0	70.2	386.3	386.3	5.0	52.1
Crane	5.0	209.1	209.1	0.0	60.2	515.8	515.8	5.0	47.4
Flat Bed Truck	5.0	85.3	85.3	0.0	65.7	386.3	386.3	5.0	47.6
Gradall	5.0	85.1	85.1	0.0	74.8	361.1	361.1	5.0	57.2
Pickup Truck	5.0	85.1	85.1	0.0	66.4	361.1	361.1	5.0	48.8
Pneumatic Tools	78.0	245.5	256.1	0.0	68.0	467.8	473.5	5.0	57.7
Pneumatic Tools	78.0	245.5	256.1	0.0	68.0	467.8	473.5	5.0	57.7
Vacuum Street Sweeper	5.0	85.3	85.3	0.0	67.0	386.3	386.3	5.0	48.8
Ventilation Fan	27.6	245.5	246.5	0.0	65.0	467.8	468.4	5.0	54.5
Warning Horn	5.0	85.1	85.1	0.0	65.6	361.1	361.1	5.0	48.0
Warning Horn	5.0	209.1	209.1	0.0	57.8	515.8	515.8	5.0	44.9
Warning Horn	5.0	85.1	85.1	0.0	65.6	361.1	361.1	5.0	48.0
Warning Horn	5.0	85.1	85.1	0.0	65.6	361.1	361.1	5.0	48.0
Welder / Torch	27.6	245.5	246.5	0.0	56.2	467.8	468.4	5.0	45.6
Welder / Torch	27.6	245.5	246.5	0.0	56.2	467.8	468.4	5.0	45.6
Welder / Torch	27.6	245.5	246.5	0.0	56.2	467.8	468.4	5.0	45.6
Welder / Torch	27.6	245.5	246.5	0.0	56.2	467.8	468.4	5.0	45.6
Total					79.8				64.9
Existing-day					61.1				61.1
Existing-night					57.7				57.7
Day Impact					Impact				No impact
Night Impact					Impact				Impact

	NSR 2A	El Pueblo Plaza (Mural)			NSR 2B	El Pueblo Plaza (Grass)		
	Elevation:	14			Elevation:	11		
Equipment	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	17.1	19.3	0.0	82.0	17.1	18.1	0.0	82.5
Concrete Mixer Truck	175.3	175.5	0.0	63.9	175.3	175.4	0.0	63.9
Concrete Mixer Truck	175.3	175.5	0.0	63.9	175.3	175.4	0.0	63.9
Crane	173.1	173.3	0.0	61.8	191.0	191.1	0.0	61.0
Flat Bed Truck	175.3	175.5	0.0	59.4	175.3	175.4	0.0	59.4
Gradall	117.6	117.9	0.0	72.0	117.6	117.8	0.0	72.0
Pickup Truck	117.6	117.9	0.0	63.6	117.6	117.8	0.0	63.6
Pneumatic Tools	17.1	66.2	0.0	79.7	47.5	82.1	0.0	77.9
Pneumatic Tools	17.1	66.2	0.0	79.7	47.5	82.1	0.0	77.9
Vacuum Street Sweeper	175.3	175.5	0.0	60.7	175.3	175.4	0.0	60.7
Ventilation Fan	17.1	21.8	0.0	86.1	47.5	50.3	0.0	78.8
Warning Horn	117.6	117.9	0.0	62.7	117.6	117.8	0.0	62.7
Warning Horn	173.1	173.3	0.0	59.4	191.0	191.1	0.0	58.5
Warning Horn	117.6	117.9	0.0	62.7	117.6	117.8	0.0	62.7
Warning Horn	117.6	117.9	0.0	62.7	117.6	117.8	0.0	62.7
Welder / Torch	17.1	21.8	0.0	77.2	47.5	50.3	0.0	70.0
Welder / Torch	17.1	21.8	0.0	77.2	47.5	50.3	0.0	70.0
Welder / Torch	17.1	21.8	0.0	77.2	47.5	50.3	0.0	70.0
Welder / Torch	17.1	21.8	0.0	77.2	47.5	50.3	0.0	70.0
Total				90.0				86.5
Existing-day				69.0				69.0
Existing-night				65.5				65.5
Day Impact				Impact				Impact
Night Impact				Impact				Impact

	NSR 2C	El Pueblo Plaza (Fountain)			NSR 3	Mozaic Apartments			NSR 3	Mozaic Apartments Top Floor		
	Elevation:	14			Elevation:	5			Elevation:	35		
Equipment	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	17.1	19.3	0.0	82.0	18.1	18.1	0.0	82.5	18.1	35.0	0.0	76.8
Concrete Mixer Truck	175.3	175.5	0.0	63.9	92.0	92.0	0.0	69.5	92.0	96.8	0.0	69.1
Concrete Mixer Truck	175.3	175.5	0.0	63.9	92.0	92.0	0.0	69.5	92.0	96.8	0.0	69.1
Crane	213.7	213.9	0.0	60.0	87.2	87.2	0.0	67.8	87.2	92.2	0.0	67.3
Flat Bed Truck	175.3	175.5	0.0	59.4	92.0	92.0	0.0	65.0	92.0	96.8	0.0	64.6
Gradall	117.6	117.9	0.0	72.0	18.1	18.1	0.0	88.2	18.1	35.0	0.0	82.5
Pickup Truck	117.6	117.9	0.0	63.6	18.1	18.1	0.0	79.8	18.1	35.0	0.0	74.1
Pneumatic Tools	86.6	107.7	0.0	75.5	18.1	75.2	0.0	78.6	18.1	46.7	0.0	82.8
Pneumatic Tools	86.6	107.7	0.0	75.5	18.1	75.2	0.0	78.6	18.1	46.7	0.0	82.8
Vacuum Street Sweeper	175.3	175.5	0.0	60.7	92.0	92.0	0.0	66.3	92.0	96.8	0.0	65.9
Ventilation Fan	86.6	87.7	0.0	74.0	18.1	29.0	0.0	83.6	18.1	19.6	0.0	87.1
Warning Horn	117.6	117.9	0.0	62.7	18.1	18.1	0.0	79.0	18.1	35.0	0.0	73.3
Warning Horn	213.7	213.9	0.0	57.6	87.2	87.2	0.0	65.4	87.2	92.2	0.0	64.9
Warning Horn	117.6	117.9	0.0	62.7	18.1	18.1	0.0	79.0	18.1	35.0	0.0	73.3
Warning Horn	117.6	117.9	0.0	62.7	18.1	18.1	0.0	79.0	18.1	35.0	0.0	73.3
Welder / Torch	86.6	87.7	0.0	65.1	18.1	29.0	0.0	74.8	18.1	19.6	0.0	78.2
Welder / Torch	86.6	87.7	0.0	65.1	18.1	29.0	0.0	74.8	18.1	19.6	0.0	78.2
Welder / Torch	86.6	87.7	0.0	65.1	18.1	29.0	0.0	74.8	18.1	19.6	0.0	78.2
Welder / Torch	86.6	87.7	0.0	65.1	18.1	29.0	0.0	74.8	18.1	19.6	0.0	78.2
Total				84.8				92.3				91.8
Existing-day				69.0				68.4				68.4
Existing-night				65.5				65.5				65.5
Day Impact				Impact				Impact				Impact
Night Impact				Impact				Impact				Impact

Construction Area Alameda Station (With Mitigation)

		NSR 1A	Union Station			NSR 1B	First Five		
		Elevation:	5			Elevation:	5		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	5.0	180.7	180.7	4.0	58.5	361.1	361.1	5.0	51.5
Concrete Mixer Truck	5.0	85.3	85.3	0.0	70.2	386.3	386.3	6.5	50.6
Concrete Mixer Truck	5.0	85.3	85.3	0.0	70.2	386.3	386.3	6.5	50.6
Crane	5.0	209.1	209.1	3.7	56.5	515.8	515.8	5.0	47.4
Flat Bed Truck	5.0	85.3	85.3	0.0	65.7	386.3	386.3	6.5	46.1
Gradall	5.0	85.1	85.1	10.0	64.8	361.1	361.1	10.0	52.2
Pickup Truck	5.0	85.1	85.1	10.0	56.4	361.1	361.1	10.0	43.8
Pneumatic Tools	78.0	245.5	256.1	0.0	68.0	467.8	473.5	5.0	57.7
Pneumatic Tools	78.0	245.5	256.1	0.0	68.0	467.8	473.5	5.0	57.7
Vacuum Street Sweeper	5.0	85.3	85.3	0.0	67.0	386.3	386.3	6.5	47.4
Ventilation Fan	27.6	245.5	246.5	0.0	65.0	467.8	468.4	5.0	54.5
Warning Horn	5.0	85.1	85.1	10.0	55.6	361.1	361.1	10.0	43.0
Warning Horn	5.0	209.1	209.1	3.7	54.1	515.8	515.8	5.0	44.9
Warning Horn	5.0	85.1	85.1	10.0	55.6	361.1	361.1	10.0	43.0
Warning Horn	5.0	85.1	85.1	10.0	55.6	361.1	361.1	10.0	43.0
Welder / Torch	27.6	245.5	246.5	0.0	56.2	467.8	468.4	5.0	45.6
Welder / Torch	27.6	245.5	246.5	0.0	56.2	467.8	468.4	5.0	45.6
Welder / Torch	27.6	245.5	246.5	0.0	56.2	467.8	468.4	5.0	45.6
Welder / Torch	27.6	245.5	246.5	0.0	56.2	467.8	468.4	5.0	45.6
Total					77.2				63.8
Existing-day					61.1				61.1
Existing-night					57.7				57.7
Day Impact					Impact				No impact
Night Impact					Impact				Impact

	NSR 2A	El Pueblo Plaza (Mural)			NSR 2B	El Pueblo Plaza (Grass)		
	Elevation:	14			Elevation:	11		
Equipment	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	17.1	19.3	0.0	82.0	17.1	18.1	0.0	82.5
Concrete Mixer Truck	175.3	175.5	0.0	63.9	175.3	175.4	0.0	63.9
Concrete Mixer Truck	175.3	175.5	0.0	63.9	175.3	175.4	0.0	63.9
Crane	173.1	173.3	0.0	61.8	191.0	191.1	0.0	61.0
Flat Bed Truck	175.3	175.5	0.0	59.4	175.3	175.4	0.0	59.4
Gradall	117.6	117.9	0.0	72.0	117.6	117.8	0.0	72.0
Pickup Truck	117.6	117.9	0.0	63.6	117.6	117.8	0.0	63.6
Pneumatic Tools	17.1	66.2	0.0	79.7	47.5	82.1	0.0	77.9
Pneumatic Tools	17.1	66.2	0.0	79.7	47.5	82.1	0.0	77.9
Vacuum Street Sweeper	175.3	175.5	0.0	60.7	175.3	175.4	0.0	60.7
Ventilation Fan	17.1	21.8	0.0	86.1	47.5	50.3	0.0	78.8
Warning Horn	117.6	117.9	0.0	62.7	117.6	117.8	0.0	62.7
Warning Horn	173.1	173.3	0.0	59.4	191.0	191.1	0.0	58.5
Warning Horn	117.6	117.9	0.0	62.7	117.6	117.8	0.0	62.7
Warning Horn	117.6	117.9	0.0	62.7	117.6	117.8	0.0	62.7
Welder / Torch	17.1	21.8	0.0	77.2	47.5	50.3	0.0	70.0
Welder / Torch	17.1	21.8	0.0	77.2	47.5	50.3	0.0	70.0
Welder / Torch	17.1	21.8	0.0	77.2	47.5	50.3	0.0	70.0
Welder / Torch	17.1	21.8	0.0	77.2	47.5	50.3	0.0	70.0
Total				90.0				86.5
Existing-day				69.0				69.0
Existing-night				65.5				65.5
Day Impact				Impact				Impact
Night Impact				Impact				Impact

	NSR 2C	El Pueblo Plaza (Fountain)			NSR 3	Mozaic Apartments			NSR 3	Mozaic Apartments Top Floor		
	Elevation:	14			Elevation:	5			Elevation:	35		
Equipment	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	17.1	19.3	0.0	82.0	18.1	18.1	10.0	72.5	18.1	35.0	0.0	76.8
Concrete Mixer Truck	175.3	175.5	0.0	63.9	92.0	92.0	10.0	59.5	92.0	96.8	0.0	69.1
Concrete Mixer Truck	175.3	175.5	0.0	63.9	92.0	92.0	10.0	59.5	92.0	96.8	0.0	69.1
Crane	213.7	213.9	0.0	60.0	87.2	87.2	10.0	57.8	87.2	92.2	0.0	67.3
Flat Bed Truck	175.3	175.5	0.0	59.4	92.0	92.0	10.0	55.0	92.0	96.8	0.0	64.6
Gradall	117.6	117.9	0.0	72.0	18.1	18.1	10.0	78.2	18.1	35.0	0.0	82.5
Pickup Truck	117.6	117.9	0.0	63.6	18.1	18.1	10.0	69.8	18.1	35.0	0.0	74.1
Pneumatic Tools	86.6	107.7	0.0	75.5	18.1	75.2	0.0	78.6	18.1	46.7	0.0	82.8
Pneumatic Tools	86.6	107.7	0.0	75.5	18.1	75.2	0.0	78.6	18.1	46.7	0.0	82.8
Vacuum Street Sweeper	175.3	175.5	0.0	60.7	92.0	92.0	10.0	56.3	92.0	96.8	0.0	65.9
Ventilation Fan	86.6	87.7	0.0	74.0	18.1	29.0	10.0	73.6	18.1	19.6	0.0	87.1
Warning Horn	117.6	117.9	0.0	62.7	18.1	18.1	10.0	69.0	18.1	35.0	0.0	73.3
Warning Horn	213.7	213.9	0.0	57.6	87.2	87.2	10.0	55.4	87.2	92.2	0.0	64.9
Warning Horn	117.6	117.9	0.0	62.7	18.1	18.1	10.0	69.0	18.1	35.0	0.0	73.3
Warning Horn	117.6	117.9	0.0	62.7	18.1	18.1	10.0	69.0	18.1	35.0	0.0	73.3
Welder / Torch	86.6	87.7	0.0	65.1	18.1	29.0	10.0	64.8	18.1	19.6	0.0	78.2
Welder / Torch	86.6	87.7	0.0	65.1	18.1	29.0	10.0	64.8	18.1	19.6	0.0	78.2
Welder / Torch	86.6	87.7	0.0	65.1	18.1	29.0	10.0	64.8	18.1	19.6	0.0	78.2
Welder / Torch	86.6	87.7	0.0	65.1	18.1	29.0	10.0	64.8	18.1	19.6	0.0	78.2
Total				84.8				84.8				91.8
Existing-day				69.0				68.4				68.4
Existing-night				65.5				65.5				65.5
Day Impact				Impact				Impact				Impact
Night Impact				Impact				Impact				Impact

Construction Noise Calculations, Alameda Station (Decking and Shoring Mitigation)

Construction Area Alameda Station (With Mitigation)

		NSR 1A	Union Station			NSR 1B	First Five			NSR 2A	El Pueblo Plaza (Mural)		
		Elevation:	5			Elevation:	5			Elevation:	14		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	5.0	180.7	180.7	0.0	62.6	361.1	361.1	5.0	51.5	17.1	19.3	0.0	82.0
Concrete Mixer Truck	5.0	85.3	85.3	0.0	70.2	386.3	386.3	6.5	50.6	175.3	175.5	0.0	63.9
Concrete Mixer Truck	5.0	85.3	85.3	0.0	70.2	386.3	386.3	6.5	50.6	175.3	175.5	0.0	63.9
Crane	5.0	209.1	209.1	0.0	60.2	515.8	515.8	5.0	47.4	173.1	173.3	0.0	61.8
Flat Bed Truck	5.0	85.3	85.3	0.0	65.7	386.3	386.3	6.5	46.1	175.3	175.5	0.0	59.4
Gradall	5.0	85.1	85.1	0.0	74.8	361.1	361.1	10.0	52.2	117.6	117.9	0.0	72.0
Pickup Truck	5.0	85.1	85.1	0.0	66.4	361.1	361.1	10.0	43.8	117.6	117.9	0.0	63.6
Pneumatic Tools	78.0	245.5	256.1	0.0	68.0	467.8	473.5	5.0	57.7	17.1	66.2	0.0	79.7
Pneumatic Tools	78.0	245.5	256.1	0.0	68.0	467.8	473.5	5.0	57.7	17.1	66.2	0.0	79.7
Vacuum Street Sweeper	5.0	85.3	85.3	0.0	67.0	386.3	386.3	6.5	47.4	175.3	175.5	0.0	60.7
Ventilation Fan	27.6	245.5	246.5	0.0	65.0	467.8	468.4	5.0	54.5	17.1	21.8	0.0	86.1
Warning Horn	5.0	85.1	85.1	0.0	65.6	361.1	361.1	10.0	43.0	117.6	117.9	0.0	62.7
Warning Horn	5.0	209.1	209.1	0.0	57.8	515.8	515.8	5.0	44.9	173.1	173.3	0.0	59.4
Warning Horn	5.0	85.1	85.1	0.0	65.6	361.1	361.1	10.0	43.0	117.6	117.9	0.0	62.7
Warning Horn	5.0	85.1	85.1	0.0	65.6	361.1	361.1	10.0	43.0	117.6	117.9	0.0	62.7
Welder / Torch	27.6	245.5	246.5	0.0	56.2	467.8	468.4	5.0	45.6	17.1	21.8	0.0	77.2
Welder / Torch	27.6	245.5	246.5	0.0	56.2	467.8	468.4	5.0	45.6	17.1	21.8	0.0	77.2
Welder / Torch	27.6	245.5	246.5	0.0	56.2	467.8	468.4	5.0	45.6	17.1	21.8	0.0	77.2
Welder / Torch	27.6	245.5	246.5	0.0	56.2	467.8	468.4	5.0	45.6	17.1	21.8	0.0	77.2
Total					79.8				63.8				90.0
Existing-day					61.1				61.1				69.0
Existing-night					57.7				57.7				65.5
Day Impact					Impact				No impact				Impact
Night Impact					Impact				Impact				Impact

	NSR 2B	El Pueblo Plaza (Grass)			NSR 2C	El Pueblo Plaza (Fountain)			NSR 3	Mozaic Apartments			NSR 3	Mozaic Apartments Top Floor		
	Elevation:	11			Elevation:	14			Elevation:	5			Elevation:	35		
Equipment	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	17.1	18.1	0.0	82.5	17.1	19.3	0.0	82.0	18.1	18.1	10.0	72.5	18.1	35.0	0.0	76.8
Concrete Mixer Truck	175.3	175.4	0.0	63.9	175.3	175.5	0.0	63.9	92.0	92.0	10.0	59.5	92.0	96.8	0.0	69.1
Concrete Mixer Truck	175.3	175.4	0.0	63.9	175.3	175.5	0.0	63.9	92.0	92.0	10.0	59.5	92.0	96.8	0.0	69.1
Crane	191.0	191.1	0.0	61.0	213.7	213.9	0.0	60.0	87.2	87.2	10.0	57.8	87.2	92.2	0.0	67.3
Flat Bed Truck	175.3	175.4	0.0	59.4	175.3	175.5	0.0	59.4	92.0	92.0	10.0	55.0	92.0	96.8	0.0	64.6
Gradall	117.6	117.8	0.0	72.0	117.6	117.9	0.0	72.0	18.1	18.1	10.0	78.2	18.1	35.0	0.0	82.5
Pickup Truck	117.6	117.8	0.0	63.6	117.6	117.9	0.0	63.6	18.1	18.1	10.0	69.8	18.1	35.0	0.0	74.1
Pneumatic Tools	47.5	82.1	0.0	77.9	86.6	107.7	0.0	75.5	18.1	75.2	0.0	78.6	18.1	46.7	0.0	82.8
Pneumatic Tools	47.5	82.1	0.0	77.9	86.6	107.7	0.0	75.5	18.1	75.2	0.0	78.6	18.1	46.7	0.0	82.8
Vacuum Street Sweeper	175.3	175.4	0.0	60.7	175.3	175.5	0.0	60.7	92.0	92.0	10.0	56.3	92.0	96.8	0.0	65.9
Ventilation Fan	47.5	50.3	0.0	78.8	86.6	87.7	0.0	74.0	18.1	29.0	0.0	83.6	18.1	19.6	0.0	87.1
Warning Horn	117.6	117.8	0.0	62.7	117.6	117.9	0.0	62.7	18.1	18.1	10.0	69.0	18.1	35.0	0.0	73.3
Warning Horn	191.0	191.1	0.0	58.5	213.7	213.9	0.0	57.6	87.2	87.2	10.0	55.4	87.2	92.2	0.0	64.9
Warning Horn	117.6	117.8	0.0	62.7	117.6	117.9	0.0	62.7	18.1	18.1	10.0	69.0	18.1	35.0	0.0	73.3
Warning Horn	117.6	117.8	0.0	62.7	117.6	117.9	0.0	62.7	18.1	18.1	10.0	69.0	18.1	35.0	0.0	73.3
Welder / Torch	47.5	50.3	0.0	70.0	86.6	87.7	0.0	65.1	18.1	29.0	0.0	74.8	18.1	19.6	0.0	78.2
Welder / Torch	47.5	50.3	0.0	70.0	86.6	87.7	0.0	65.1	18.1	29.0	0.0	74.8	18.1	19.6	0.0	78.2
Welder / Torch	47.5	50.3	0.0	70.0	86.6	87.7	0.0	65.1	18.1	29.0	0.0	74.8	18.1	19.6	0.0	78.2
Welder / Torch	47.5	50.3	0.0	70.0	86.6	87.7	0.0	65.1	18.1	29.0	0.0	74.8	18.1	19.6	0.0	78.2
Total				86.5				84.8				87.9				91.8
Existing-day				69.0				69.0				68.4				68.4
Existing-night				65.5				65.5				65.5				65.5
Day Impact				Impact				Impact				Impact				Impact
Night Impact				Impact				Impact				Impact				Impact

Construction Noise Calculations, Alameda Station (Deck Removal Mitigation)

Construction Area Alameda Station (With Mitigation)

		NSR 1A	Union Station			NSR 1B	First Five			NSR 2A	El Pueblo Plaza (Mural)		
		Elevation:	5			Elevation:	5			Elevation:	14		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	5.0	180.7	180.7	0.0	62.6	361.1	361.1	5.0	51.5	17.1	19.3	0.0	82.0
Concrete Mixer Truck	5.0	85.3	85.3	0.0	70.2	386.3	386.3	6.5	50.6	175.3	175.5	0.0	63.9
Concrete Mixer Truck	5.0	85.3	85.3	0.0	70.2	386.3	386.3	6.5	50.6	175.3	175.5	0.0	63.9
Crane	5.0	209.1	209.1	0.0	60.2	515.8	515.8	5.0	47.4	173.1	173.3	0.0	61.8
Flat Bed Truck	5.0	85.3	85.3	0.0	65.7	386.3	386.3	6.5	46.1	175.3	175.5	0.0	59.4
Gradall	5.0	85.1	85.1	0.0	74.8	361.1	361.1	10.0	52.2	117.6	117.9	0.0	72.0
Pickup Truck	5.0	85.1	85.1	0.0	66.4	361.1	361.1	10.0	43.8	117.6	117.9	0.0	63.6
Pneumatic Tools	78.0	245.5	256.1	0.0	68.0	467.8	473.5	5.0	57.7	17.1	66.2	0.0	79.7
Pneumatic Tools	78.0	245.5	256.1	0.0	68.0	467.8	473.5	5.0	57.7	17.1	66.2	0.0	79.7
Vacuum Street Sweeper	5.0	85.3	85.3	0.0	67.0	386.3	386.3	6.5	47.4	175.3	175.5	0.0	60.7
Ventilation Fan	27.6	245.5	246.5	0.0	65.0	467.8	468.4	5.0	54.5	17.1	21.8	0.0	86.1
Warning Horn	5.0	85.1	85.1	0.0	65.6	361.1	361.1	10.0	43.0	117.6	117.9	0.0	62.7
Warning Horn	5.0	209.1	209.1	0.0	57.8	515.8	515.8	5.0	44.9	173.1	173.3	0.0	59.4
Warning Horn	5.0	85.1	85.1	0.0	65.6	361.1	361.1	10.0	43.0	117.6	117.9	0.0	62.7
Warning Horn	5.0	85.1	85.1	0.0	65.6	361.1	361.1	10.0	43.0	117.6	117.9	0.0	62.7
Welder / Torch	27.6	245.5	246.5	0.0	56.2	467.8	468.4	5.0	45.6	17.1	21.8	0.0	77.2
Welder / Torch	27.6	245.5	246.5	0.0	56.2	467.8	468.4	5.0	45.6	17.1	21.8	0.0	77.2
Welder / Torch	27.6	245.5	246.5	0.0	56.2	467.8	468.4	5.0	45.6	17.1	21.8	0.0	77.2
Welder / Torch	27.6	245.5	246.5	0.0	56.2	467.8	468.4	5.0	45.6	17.1	21.8	0.0	77.2
Total					79.8				63.8				90.0
Existing-day					61.1				61.1				69.0
Existing-night					57.7				57.7				65.5
Day Impact					Impact				No impact				Impact
Night Impact					Impact				Impact				Impact

	NSR 2B	El Pueblo Plaza (Grass)			NSR 2C	El Pueblo Plaza (Fountain)			NSR 3	Mozaic Apartments			NSR 3	Mozaic Apartments Top Floor		
	Elevation:	11			Elevation:	14			Elevation:	5			Elevation:	35		
Equipment	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	17.1	18.1	0.0	82.5	17.1	19.3	0.0	82.0	18.1	18.1	10.0	72.5	18.1	35.0	0.0	76.8
Concrete Mixer Truck	175.3	175.4	0.0	63.9	175.3	175.5	0.0	63.9	92.0	92.0	10.0	59.5	92.0	96.8	0.0	69.1
Concrete Mixer Truck	175.3	175.4	0.0	63.9	175.3	175.5	0.0	63.9	92.0	92.0	10.0	59.5	92.0	96.8	0.0	69.1
Crane	191.0	191.1	0.0	61.0	213.7	213.9	0.0	60.0	87.2	87.2	10.0	57.8	87.2	92.2	0.0	67.3
Flat Bed Truck	175.3	175.4	0.0	59.4	175.3	175.5	0.0	59.4	92.0	92.0	10.0	55.0	92.0	96.8	0.0	64.6
Gradall	117.6	117.8	0.0	72.0	117.6	117.9	0.0	72.0	18.1	18.1	10.0	78.2	18.1	35.0	0.0	82.5
Pickup Truck	117.6	117.8	0.0	63.6	117.6	117.9	0.0	63.6	18.1	18.1	10.0	69.8	18.1	35.0	0.0	74.1
Pneumatic Tools	47.5	82.1	0.0	77.9	86.6	107.7	0.0	75.5	18.1	75.2	0.0	78.6	18.1	46.7	0.0	82.8
Pneumatic Tools	47.5	82.1	0.0	77.9	86.6	107.7	0.0	75.5	18.1	75.2	0.0	78.6	18.1	46.7	0.0	82.8
Vacuum Street Sweeper	175.3	175.4	0.0	60.7	175.3	175.5	0.0	60.7	92.0	92.0	10.0	56.3	92.0	96.8	0.0	65.9
Ventilation Fan	47.5	50.3	0.0	78.8	86.6	87.7	0.0	74.0	18.1	29.0	10.0	73.6	18.1	19.6	0.0	87.1
Warning Horn	117.6	117.8	0.0	62.7	117.6	117.9	0.0	62.7	18.1	18.1	10.0	69.0	18.1	35.0	0.0	73.3
Warning Horn	191.0	191.1	0.0	58.5	213.7	213.9	0.0	57.6	87.2	87.2	10.0	55.4	87.2	92.2	0.0	64.9
Warning Horn	117.6	117.8	0.0	62.7	117.6	117.9	0.0	62.7	18.1	18.1	10.0	69.0	18.1	35.0	0.0	73.3
Warning Horn	117.6	117.8	0.0	62.7	117.6	117.9	0.0	62.7	18.1	18.1	10.0	69.0	18.1	35.0	0.0	73.3
Welder / Torch	47.5	50.3	0.0	70.0	86.6	87.7	0.0	65.1	18.1	29.0	10.0	64.8	18.1	19.6	0.0	78.2
Welder / Torch	47.5	50.3	0.0	70.0	86.6	87.7	0.0	65.1	18.1	29.0	10.0	64.8	18.1	19.6	0.0	78.2
Welder / Torch	47.5	50.3	0.0	70.0	86.6	87.7	0.0	65.1	18.1	29.0	10.0	64.8	18.1	19.6	0.0	78.2
Welder / Torch	47.5	50.3	0.0	70.0	86.6	87.7	0.0	65.1	18.1	29.0	10.0	64.8	18.1	19.6	0.0	78.2
Total				86.5				84.8				84.8				91.8
Existing-day				69.0				69.0				68.4				68.4
Existing-night				65.5				65.5				65.5				65.5
Day Impact				Impact				Impact				Impact				Impact
Night Impact				Impact				Impact				Impact				Impact

Construction Noise Calculations, Alpine Tower and Alameda Tower (Structural Steel)

Construction Area Alpine Tower (Without Mitigation)

		NSR 5	Future Homeboy Industries Residential			NSR 5	Future Homeboy Industries Residential Top Floor			NSR 6	Chinatown Senior Lofts			NSR 6	Chinatown Senior Lofts Top Floor			NSR 7	Homeboy Industries		
		Elevation:	5			Elevation:	45			Elevation:	15			Elevation:	115			Elevation:	5		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	5.0	122.2	122.2	0.0	66.0	122.2	128.6	0.0	65.5	132.7	133.1	0.0	65.2	132.7	172.4	0.0	63.0	100.2	100.2	0.0	67.7
Concrete Mixer Truck	5.0	152.0	152.0	0.0	65.2	152.0	157.2	0.0	64.9	122.5	122.9	0.0	67.0	122.5	164.6	0.0	64.5	88.1	88.1	0.0	69.9
Concrete Mixer Truck	5.0	152.0	152.0	0.0	65.2	152.0	157.2	0.0	64.9	122.5	122.9	0.0	67.0	122.5	164.6	0.0	64.5	88.1	88.1	0.0	69.9
Crane	5.0	85.8	85.8	0.0	68.0	85.8	94.7	0.0	67.1	276.8	277.0	0.0	57.8	276.8	297.9	0.0	57.1	256.0	256.0	0.0	58.5
Flat Bed Truck	5.0	152.0	152.0	0.0	60.7	152.0	157.2	0.0	60.4	122.5	122.9	0.0	62.5	122.5	164.6	0.0	60.0	88.1	88.1	0.0	65.4
Gradall	5.0	57.2	57.2	0.0	78.3	57.2	69.8	0.0	76.5	81.3	81.9	0.0	75.1	81.3	136.8	0.0	70.7	116.0	116.0	0.0	72.1
Pickup Truck	5.0	57.2	57.2	0.0	69.9	57.2	69.8	0.0	68.1	81.3	81.9	0.0	66.7	81.3	136.8	0.0	62.3	116.0	116.0	0.0	63.7
Pneumatic Tools	64.8	170.5	180.7	0.0	71.0	170.5	171.6	0.0	71.5	160.2	167.8	0.0	71.7	160.2	167.9	0.0	71.7	155.4	166.5	0.0	71.7
Pneumatic Tools	64.8	170.5	180.7	0.0	71.0	170.5	171.6	0.0	71.5	160.2	167.8	0.0	71.7	160.2	167.9	0.0	71.7	155.4	166.5	0.0	71.7
Vacuum Street Sweeper	5.0	152.0	152.0	0.0	61.9	152.0	157.2	0.0	61.7	122.5	122.9	0.0	63.8	122.5	164.6	0.0	61.2	88.1	88.1	0.0	66.7
Ventilation Fan	64.8	170.5	180.7	0.0	67.7	170.5	171.6	0.0	68.2	160.2	167.8	0.0	68.4	160.2	167.9	0.0	68.4	155.4	166.5	0.0	68.5
Warning Horn	5.0	57.2	57.2	0.0	69.0	57.2	69.8	0.0	67.3	81.3	81.9	0.0	65.9	81.3	136.8	0.0	61.4	116.0	116.0	0.0	62.9
Warning Horn	5.0	85.8	85.8	0.0	65.5	85.8	94.7	0.0	64.6	276.8	277.0	0.0	55.3	276.8	297.9	0.0	54.7	256.0	256.0	0.0	56.0
Warning Horn	5.0	57.2	57.2	0.0	69.0	57.2	69.8	0.0	67.3	81.3	81.9	0.0	65.9	81.3	136.8	0.0	61.4	116.0	116.0	0.0	62.9
Warning Horn	5.0	57.2	57.2	0.0	69.0	57.2	69.8	0.0	67.3	81.3	81.9	0.0	65.9	81.3	136.8	0.0	61.4	116.0	116.0	0.0	62.9
Welder / Torch	64.8	170.5	180.7	0.0	58.9	170.5	171.6	0.0	59.3	160.2	167.8	0.0	59.5	160.2	167.9	0.0	59.5	155.4	166.5	0.0	59.6
Welder / Torch	64.8	170.5	180.7	0.0	58.9	170.5	171.6	0.0	59.3	160.2	167.8	0.0	59.5	160.2	167.9	0.0	59.5	155.4	166.5	0.0	59.6
Welder / Torch	64.8	170.5	180.7	0.0	58.9	170.5	171.6	0.0	59.3	160.2	167.8	0.0	59.5	160.2	167.9	0.0	59.5	155.4	166.5	0.0	59.6
Welder / Torch	64.8	170.5	180.7	0.0	58.9	170.5	171.6	0.0	59.3	160.2	167.8	0.0	59.5	160.2	167.9	0.0	59.5	155.4	166.5	0.0	59.6
Total					82.0				81.0				80.3				78.3				80.0
Existing day					65.6				65.6				69.0				69.0				69.8
Existing night					64.9				64.9				64.1				64.1				65.1
Day Impact					Impact				Impact				Impact				Impact				Impact
Night Impact					Impact				Impact				Impact				Impact				Impact

Construction Area Alameda Tower (Without Mitigation)

		NSR 4	CA Endowment		
		Elevation:	7		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	5.0	100.9	100.9	0.0	67.6
Concrete Mixer Truck	5.0	79.9	79.9	0.0	70.7
Concrete Mixer Truck	5.0	79.9	79.9	0.0	70.7
Crane	5.0	218.8	218.8	0.0	59.8
Flat Bed Truck	5.0	79.9	79.9	0.0	66.2
Gradall	5.0	93.7	93.7	0.0	74.0
Pickup Truck	5.0	93.7	93.7	0.0	65.6
Pneumatic Tools	74.6	304.2	311.6	0.0	66.3
Pneumatic Tools	74.6	304.2	311.6	0.0	66.3
Vacuum Street Sweeper	5.0	79.9	79.9	0.0	67.5
Ventilation Fan	74.6	304.2	311.6	0.0	63.0
Warning Horn	5.0	93.7	93.7	0.0	64.7
Warning Horn	5.0	218.8	218.8	0.0	57.4
Warning Horn	5.0	93.7	93.7	0.0	64.7
Warning Horn	5.0	93.7	93.7	0.0	64.7
Welder / Torch	74.6	304.2	311.6	0.0	54.1
Welder / Torch	74.6	304.2	311.6	0.0	54.1
Welder / Torch	74.6	304.2	311.6	0.0	54.1
Welder / Torch	74.6	304.2	311.6	0.0	54.1
Total					79.5
Existing-day					63.6
Existing-night					60.7
Day Impact					Impact
Night Impact					Impact

Construction Area Alpine Tower (With Mitigation)

		NSR 5	Future Homeboy Industries Residential			NSR 5	Future Homeboy Industries Residential Top Floor			NSR 6	Chinatown Senior Lofts			NSR 6	Chinatown Senior Lofts Top Floor			NSR 7	Homeboy Industries		
		Elevation:	5			Elevation:	45			Elevation:	15			Elevation:	115			Elevation:	5		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	5.0	122.2	122.2	10.0	56.0	122.2	128.6	0.0	65.5	132.7	133.1	10.0	55.2	132.7	172.4	0.0	63.0	100.2	100.2	10.0	57.7
Concrete Mixer Truck	5.0	152.0	152.0	0.0	65.2	152.0	157.2	0.0	64.9	122.5	122.9	0.0	67.0	122.5	164.6	0.0	64.5	88.1	88.1	0.0	69.9
Concrete Mixer Truck	5.0	152.0	152.0	0.0	65.2	152.0	157.2	0.0	64.9	122.5	122.9	0.0	67.0	122.5	164.6	0.0	64.5	88.1	88.1	0.0	69.9
Crane	5.0	85.8	85.8	10.0	58.0	85.8	94.7	10.0	57.1	276.8	277.0	0.0	57.8	276.8	297.9	0.0	57.1	256.0	256.0	7.0	51.4
Flat Bed Truck	5.0	152.0	152.0	0.0	60.7	152.0	157.2	0.0	60.4	122.5	122.9	0.0	62.5	122.5	164.6	0.0	60.0	88.1	88.1	0.0	65.4
Gradall	5.0	57.2	57.2	10.0	68.3	57.2	69.8	0.0	76.5	81.3	81.9	0.0	75.1	81.3	136.8	0.0	70.7	116.0	116.0	0.0	72.1
Pickup Truck	5.0	57.2	57.2	10.0	59.9	57.2	69.8	0.0	68.1	81.3	81.9	0.0	66.7	81.3	136.8	0.0	62.3	116.0	116.0	0.0	63.7
Pneumatic Tools	64.8	170.5	180.7	10.0	61.0	170.5	171.6	10.0	61.5	160.2	167.8	10.0	61.7	160.2	167.9	10.0	61.7	155.4	166.5	10.0	61.7
Pneumatic Tools	64.8	170.5	180.7	10.0	61.0	170.5	171.6	10.0	61.5	160.2	167.8	10.0	61.7	160.2	167.9	10.0	61.7	155.4	166.5	10.0	61.7
Vacuum Street Sweeper	5.0	152.0	152.0	0.0	61.9	152.0	157.2	0.0	61.7	122.5	122.9	0.0	63.8	122.5	164.6	0.0	61.2	88.1	88.1	0.0	66.7
Ventilation Fan	64.8	170.5	180.7	10.0	57.7	170.5	171.6	10.0	58.2	160.2	167.8	10.0	58.4	160.2	167.9	10.0	58.4	155.4	166.5	10.0	58.5
Warning Horn	5.0	57.2	57.2	10.0	59.0	57.2	69.8	0.0	67.3	81.3	81.9	0.0	65.9	81.3	136.8	0.0	61.4	116.0	116.0	0.0	62.9
Warning Horn	5.0	85.8	85.8	10.0	55.5	85.8	94.7	10.0	54.6	276.8	277.0	0.0	55.3	276.8	297.9	0.0	54.7	256.0	256.0	7.0	49.0
Warning Horn	5.0	57.2	57.2	10.0	59.0	57.2	69.8	0.0	67.3	81.3	81.9	0.0	65.9	81.3	136.8	0.0	61.4	116.0	116.0	0.0	62.9
Warning Horn	5.0	57.2	57.2	10.0	59.0	57.2	69.8	0.0	67.3	81.3	81.9	0.0	65.9	81.3	136.8	0.0	61.4	116.0	116.0	0.0	62.9
Welder / Torch	64.8	170.5	180.7	10.0	48.9	170.5	171.6	10.0	49.3	160.2	167.8	10.0	49.5	160.2	167.9	10.0	49.5	155.4	166.5	10.0	49.6
Welder / Torch	64.8	170.5	180.7	10.0	48.9	170.5	171.6	10.0	49.3	160.2	167.8	10.0	49.5	160.2	167.9	10.0	49.5	155.4	166.5	10.0	49.6
Welder / Torch	64.8	170.5	180.7	10.0	48.9	170.5	171.6	10.0	49.3	160.2	167.8	10.0	49.5	160.2	167.9	10.0	49.5	155.4	166.5	10.0	49.6
Welder / Torch	64.8	170.5	180.7	10.0	48.9	170.5	171.6	10.0	49.3	160.2	167.8	10.0	49.5	160.2	167.9	10.0	49.5	155.4	166.5	10.0	49.6
Total					73.8				79.3				78.4				75.1				77.6
Existing day					65.6				65.6				69.0				69.0				69.8
Existing night					64.9				64.9				64.1				64.1				65.1
Day Impact					Impact				Impact				Impact				Impact				Impact
Night Impact					Impact				Impact				Impact				Impact				Impact

Construction Area Alameda Tower (With Mitigation)

		NSR 4	CA Endowment		
		Elevation:	7		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	5.0	100.9	100.9	10.0	57.6
Concrete Mixer Truck	5.0	79.9	79.9	0.0	70.7
Concrete Mixer Truck	5.0	79.9	79.9	0.0	70.7
Crane	5.0	218.8	218.8	2.1	57.8
Flat Bed Truck	5.0	79.9	79.9	0.0	66.2
Gradall	5.0	93.7	93.7	0.0	74.0
Pickup Truck	5.0	93.7	93.7	0.0	65.6
Pneumatic Tools	74.6	304.2	311.6	10.0	56.3
Pneumatic Tools	74.6	304.2	311.6	10.0	56.3
Vacuum Street Sweeper	5.0	79.9	79.9	0.0	67.5
Ventilation Fan	74.6	304.2	311.6	10.0	53.0
Warning Horn	5.0	93.7	93.7	0.0	64.7
Warning Horn	5.0	218.8	218.8	2.1	55.3
Warning Horn	5.0	93.7	93.7	0.0	64.7
Warning Horn	5.0	93.7	93.7	0.0	64.7
Welder / Torch	74.6	304.2	311.6	10.0	44.1
Welder / Torch	74.6	304.2	311.6	10.0	44.1
Welder / Torch	74.6	304.2	311.6	10.0	44.1
Welder / Torch	74.6	304.2	311.6	10.0	44.1
Total					78.7
Existing-day					63.6
Existing-night					60.7
Day Impact					Impact
Night Impact					Impact

Construction Noise Calculations, Chinatown/State Park Station (Structural Steel)

Construction Area Chinatown / State Park Station (Without Mitigation)

Equipment	Source Elevation	NSR 8 T College Station Residential				NSR 8 B College Station Residential				NSR 9 Blossom Plaza				NSR 9 Blossom Plaza Top Floor			
		Elevation:	70.7			Elevation:	5			Elevation:	26			Elevation:	70		
		2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	5.0	64.3	91.9	0.0	68.4	64.3	64.3	0.0	71.5	348.9	349.5	0.0	56.8	348.9	354.9	0.0	56.7
Concrete Mixer Truck	5.0	73.0	98.2	0.0	69.0	73.0	73.0	0.0	71.5	348.2	348.8	0.0	57.9	348.2	354.2	0.0	57.8
Concrete Mixer Truck	5.0	73.0	98.2	0.0	69.0	73.0	73.0	0.0	71.5	348.2	348.8	0.0	57.9	348.2	354.2	0.0	57.8
Crane	5.0	162.9	175.6	0.0	61.7	162.9	162.9	0.0	62.4	416.0	416.5	0.0	54.2	416.0	421.0	0.0	54.1
Flat Bed Truck	5.0	73.0	98.2	0.0	64.5	73.0	73.0	0.0	67.0	348.2	348.8	0.0	53.4	348.2	354.2	0.0	53.3
Gradall	5.0	50.9	83.1	0.0	75.0	50.9	50.9	0.0	79.3	793.1	793.4	0.0	55.4	793.1	795.8	0.0	55.4
Pickup Truck	5.0	50.9	83.1	0.0	66.6	50.9	50.9	0.0	70.9	793.1	793.4	0.0	47.0	793.1	795.8	0.0	47.0
Pneumatic Tools	98.0	192.1	194.0	0.0	70.4	192.1	213.4	0.0	69.6	482.9	488.2	5.0	57.4	482.9	483.7	5.0	57.5
Pneumatic Tools	98.0	192.1	194.0	0.0	70.4	192.1	213.4	0.0	69.6	482.9	488.2	5.0	57.4	482.9	483.7	5.0	57.5
Vacuum Street Sweeper	5.0	73.0	98.2	0.0	65.7	73.0	73.0	0.0	68.3	348.2	348.8	0.0	54.7	348.2	354.2	0.0	54.6
Ventilation Fan	55.0	192.1	192.7	0.0	67.2	192.1	198.5	0.0	66.9	482.9	483.8	5.0	54.2	482.9	483.1	5.0	54.2
Warning Horn	5.0	50.9	83.1	0.0	65.8	50.9	50.9	0.0	70.0	793.1	793.4	0.0	46.2	793.1	795.8	0.0	46.2
Warning Horn	5.0	162.9	175.6	0.0	59.3	162.9	162.9	0.0	59.9	416.0	416.5	0.0	51.8	416.0	421.0	0.0	51.7
Warning Horn	5.0	50.9	83.1	0.0	65.8	50.9	50.9	0.0	70.0	793.1	793.4	0.0	46.2	793.1	795.8	0.0	46.2
Warning Horn	5.0	50.9	83.1	0.0	65.8	50.9	50.9	0.0	70.0	793.1	793.4	0.0	46.2	793.1	795.8	0.0	46.2
Welder / Torch	55.0	192.1	192.7	0.0	58.3	192.1	198.5	0.0	58.0	482.9	483.8	5.0	45.3	482.9	483.1	5.0	45.3
Welder / Torch	55.0	192.1	192.7	0.0	58.3	192.1	198.5	0.0	58.0	482.9	483.8	5.0	45.3	482.9	483.1	5.0	45.3
Welder / Torch	55.0	192.1	192.7	0.0	58.3	192.1	198.5	0.0	58.0	482.9	483.8	5.0	45.3	482.9	483.1	5.0	45.3
Welder / Torch	55.0	192.1	192.7	0.0	58.3	192.1	198.5	0.0	58.0	482.9	483.8	5.0	45.3	482.9	483.1	5.0	45.3
Total					80.4				83.2				66.7				66.6
Existing-day					64.7				64.7				61.1				61.1
Existing-night					64.4				64.4				56.5				56.5
Day Impact					Impact				Impact				Impact				Impact
Night Impact					Impact				Impact				Impact				Impact

Equipment	NSR 10 Harmony Residential				NSR 10 Harmony Residential				NSR 11 Capitol Milling				NSR 12 High Street Residential			
	Elevation:	25			Elevation:	265			Elevation:	9			Elevation:	5		
	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	249.9	250.7	5.0	54.7	249.9	360.6	5.0	51.6	95.2	95.3	0.0	68.1	258.2	258.2	0.0	59.5
Concrete Mixer Truck	366.4	366.9	5.0	52.5	366.4	449.3	5.0	50.7	133.9	134.0	0.0	66.3	244.4	244.4	0.0	61.0
Concrete Mixer Truck	366.4	366.9	5.0	52.5	366.4	449.3	5.0	50.7	133.9	134.0	0.0	66.3	244.4	244.4	0.0	61.0
Crane	314.7	315.3	5.0	51.6	314.7	408.2	5.0	49.4	137.3	137.4	0.0	63.9	275.5	275.5	0.0	57.8
Flat Bed Truck	366.4	366.9	5.0	48.0	366.4	449.3	5.0	46.2	133.9	134.0	0.0	61.8	244.4	244.4	0.0	56.5
Gradall	591.4	591.7	5.0	53.0	591.4	646.0	5.0	52.2	489.4	489.4	0.0	59.6	218.1	218.1	0.0	66.6
Pickup Truck	591.4	591.7	5.0	44.6	591.4	646.0	5.0	43.8	489.4	489.4	0.0	51.2	218.1	218.1	0.0	58.2
Pneumatic Tools	303.2	311.9	5.0	61.3	303.2	346.1	5.0	60.4	176.2	197.4	5.0	65.3	342.4	354.8	0.0	65.2
Pneumatic Tools	303.2	311.9	5.0	61.3	303.2	346.1	5.0	60.4	176.2	197.4	5.0	65.3	342.4	354.8	0.0	65.2
Vacuum Street Sweeper	366.4	366.9	5.0	49.3	366.4	449.3	5.0	47.5	133.9	134.0	0.0	63.0	244.4	244.4	0.0	57.8
Ventilation Fan	303.2	304.7	5.0	58.2	303.2	368.8	5.0	56.5	176.2	182.1	5.0	62.7	342.4	346.0	0.0	62.1
Warning Horn	591.4	591.7	5.0	43.7	591.4	646.0	5.0	43.0	489.4	489.4	0.0	50.4	218.1	218.1	0.0	57.4
Warning Horn	314.7	315.3	5.0	49.2	314.7	408.2	5.0	47.0	137.3	137.4	0.0	61.4	275.5	275.5	0.0	55.4
Warning Horn	591.4	591.7	5.0	43.7	591.4	646.0	5.0	43.0	489.4	489.4	0.0	50.4	218.1	218.1	0.0	57.4
Warning Horn	591.4	591.7	5.0	43.7	591.4	646.0	5.0	43.0	489.4	489.4	0.0	50.4	218.1	218.1	0.0	57.4
Welder / Torch	303.2	304.7	5.0	49.3	303.2	368.8	5.0	47.7	176.2	182.1	5.0	53.8	342.4	346.0	0.0	53.2
Welder / Torch	303.2	304.7	5.0	49.3	303.2	368.8	5.0	47.7	176.2	182.1	5.0	53.8	342.4	346.0	0.0	53.2
Welder / Torch	303.2	304.7	5.0	49.3	303.2	368.8	5.0	47.7	176.2	182.1	5.0	53.8	342.4	346.0	0.0	53.2
Welder / Torch	303.2	304.7	5.0	49.3	303.2	368.8	5.0	47.7	176.2	182.1	5.0	53.8	342.4	346.0	0.0	53.2
Total				67.0				65.7				75.2				73.3
Existing-day				61.1				61.1				63.0				64.7
Existing-night				56.5				56.5				59.5				64.4
Day Impact				Impact				No impact				Impact				Impact
Night Impact				Impact				Impact				Impact				Impact

Equipment	NSR 12 High Street Residential				NSR 13 S Riboli Residential				NSR 14 S Los Angeles State Historical			
	Elevation:	35			Elevation:	35			Elevation:	5		
	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	258.2	259.9	0.0	59.4	256.2	258.0	5.0	54.5	66.7	66.7	0.0	71.2
Concrete Mixer Truck	244.4	246.2	0.0	61.0	512.9	513.8	5.0	49.6	183.5	183.5	0.0	63.5
Concrete Mixer Truck	244.4	246.2	0.0	61.0	512.9	513.8	5.0	49.6	183.5	183.5	0.0	63.5
Crane	275.5	277.1	0.0	57.8	612.9	613.6	5.0	45.9	327.8	327.8	0.0	56.3
Flat Bed Truck	244.4	246.2	0.0	56.5	512.9	513.8	5.0	45.1	183.5	183.5	0.0	59.0
Gradall	218.1	220.1	0.0	66.5	478.3	479.2	5.0	54.8	126.6	126.6	0.0	71.4
Pickup Truck	218.1	220.1	0.0	58.1	478.3	479.2	5.0	46.4	126.6	126.6	0.0	63.0
Pneumatic Tools	342.4	348.1	0.0	65.3	492.4	496.4	5.0	57.3	260.2	276.3	0.0	67.3
Pneumatic Tools	342.4	348.1	0.0	65.3	492.4	496.4	5.0	57.3	260.2	276.3	0.0	67.3
Vacuum Street Sweeper	244.4	246.2	0.0	57.8	512.9	513.8	5.0	46.4	183.5	183.5	0.0	60.3
Ventilation Fan	342.4	343.0	0.0	62.2	492.4	492.8	5.0	54.0	260.2	265.0	0.0	64.4
Warning Horn	218.1	220.1	0.0	57.3	478.3	479.2	5.0	45.6	126.6	126.6	0.0	62.1
Warning Horn	275.5	277.1	0.0	55.3	612.9	613.6	5.0	43.4	327.8	327.8	0.0	53.9
Warning Horn	218.1	220.1	0.0	57.3	478.3	479.2	5.0	45.6	126.6	126.6	0.0	62.1
Warning Horn	218.1	220.1	0.0	57.3	478.3	479.2	5.0	45.6	126.6	126.6	0.0	62.1
Welder / Torch	342.4	343.0	0.0	53.3	492.4	492.8	5.0	45.1	260.2	265.0	0.0	55.5
Welder / Torch	342.4	343.0	0.0	53.3	492.4	492.8	5.0	45.1	260.2	265.0	0.0	55.5
Welder / Torch	342.4	343.0	0.0	53.3	492.4	492.8	5.0	45.1	260.2	265.0	0.0	55.5
Welder / Torch	342.4	343.0	0.0	53.3	492.4	492.8	5.0	45.1	260.2	265.0	0.0	55.5
Total				73.3				64.0				77.5
Existing-day				64.7				67.7				58.7
Existing-night				64.4				63.6				55.2
Day Impact				Impact				No impact				Impact
Night Impact				Impact				No impact				Impact

Construction Area Chinatown / State Park Station (With Mitigation)

Equipment	Source Elevation	NSR 8 T College Station Residential				NSR 8 B College Station Residential				NSR 9 Blossom Plaza				NSR 9 Blossom Plaza Top Floor			
		Elevation:	70.7			Elevation:	5			Elevation:	26			Elevation:	70		
		2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	5.0	64.3	91.9	10.0	58.4	64.3	64.3	10.0	61.5	348.9	349.5	10.0	46.8	348.9	354.9	0.0	56.7
Concrete Mixer Truck	5.0	73.0	98.2	0.0	69.0	73.0	73.0	0.0	71.5	348.2	348.8	0.0	57.9	348.2	354.2	0.0	57.8
Concrete Mixer Truck	5.0	73.0	98.2	0.0	69.0	73.0	73.0	0.0	71.5	348.2	348.8	0.0	57.9	348.2	354.2	0.0	57.8
Crane	5.0	162.9	175.6	0.0	61.7	162.9	162.9	10.0	52.4	416.0	416.5	0.7	53.5	416.0	421.0	0.0	54.1
Flat Bed Truck	5.0	73.0	98.2	0.0	64.5	73.0	73.0	0.0	67.0	348.2	348.8	0.0	53.4	348.2	354.2	0.0	53.3
Gradall	5.0	50.9	83.1	0.0	75.0	50.9	50.9	0.0	79.3	793.1	793.4	10.0	45.4	793.1	795.8	0.0	55.4
Pickup Truck	5.0	50.9	83.1	0.0	66.6	50.9	50.9	0.0	70.9	793.1	793.4	10.0	37.0	793.1	795.8	0.0	47.0
Pneumatic Tools	98.0	192.1	194.0	0.0	70.4	192.1	213.4	0.0	69.6	482.9	488.2	5.0	57.4	482.9	483.7	5.0	57.5
Pneumatic Tools	98.0	192.1	194.0	0.0	70.4	192.1	213.4	0.0	69.6	482.9	488.2	5.0	57.4	482.9	483.7	5.0	57.5
Vacuum Street Sweeper	5.0	73.0	98.2	0.0	65.7	73.0	73.0	0.0	68.3	348.2	348.8	0.0	54.7	348.2	354.2	0.0	54.6
Ventilation Fan	55.0	192.1	192.7	10.0	57.2	192.1	198.5	10.0	56.9	482.9	483.8	5.0	54.2	482.9	483.1	5.0	54.2
Warning Horn	5.0	50.9	83.1	0.0	65.8	50.9	50.9	0.0	70.0	793.1	793.4	10.0	36.2	793.1	795.8	0.0	46.2
Warning Horn	5.0	162.9	175.6	0.0	59.3	162.9	162.9	10.0	49.9	416.0	416.5	0.7	51.0	416.0	421.0	0.0	51.7
Warning Horn	5.0	50.9	83.1	0.0	65.8	50.9	50.9	0.0	70.0	793.1	793.4	10.0	36.2	793.1	795.8	0.0	46.2
Warning Horn	5.0	50.9	83.1	0.0	65.8	50.9	50.9	0.0	70.0	793.1	793.4	10.0	36.2	793.1	795.8	0.0	46.2
Welder / Torch	55.0	192.1	192.7	10.0	48.3	192.1	198.5	10.0	48.0	482.9	483.8	5.0	45.3	482.9	483.1	5.0	45.3
Welder / Torch	55.0	192.1	192.7	10.0	48.3	192.1	198.5	10.0	48.0	482.9	483.8	5.0	45.3	482.9	483.1	5.0	45.3
Welder / Torch	55.0	192.1	192.7	10.0	48.3	192.1	198.5	10.0	48.0	482.9	483.8	5.0	45.3	482.9	483.1	5.0	45.3
Welder / Torch	55.0	192.1	192.7	10.0	48.3	192.1	198.5	10.0	48.0	482.9	483.8	5.0	45.3	482.9	483.1	5.0	45.3
Total					79.8				82.7				65.7				66.6
Existing-day					64.7				64.7				61.1				61.1
Existing-night					64.4				64.4				56.5				56.5
Day Impact					Impact				Impact				No impact				Impact
Night Impact					Impact				Impact				Impact				Impact

Equipment	NSR 10 Harmony Residential				NSR 10 Harmony Residential				NSR 11 Capitol Milling				NSR 12 High Street Residential			
	Elevation:	25			Elevation:	265			Elevation:	9			Elevation:	5		
	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	249.9	250.7	10.0	49.7	249.9	360.6	5.0	51.6	95.2	95.3	10.0	58.1	258.2	258.2	10.0	49.5
Concrete Mixer Truck	366.4	366.9	5.0	52.5	366.4	449.3	5.0	50.7	133.9	134.0	0.0	66.3	244.4	244.4	0.0	61.0
Concrete Mixer Truck	366.4	366.9	5.0	52.5	366.4	449.3	5.0	50.7	133.9	134.0	0.0	66.3	244.4	244.4	0.0	61.0
Crane	314.7	315.3	5.0	51.6	314.7	408.2	5.0	49.4	137.3	137.4	3.9	59.9	275.5	275.5	10.0	47.8
Flat Bed Truck	366.4	366.9	5.0	48.0	366.4	449.3	5.0	46.2	133.9	134.0	0.0	61.8	244.4	244.4	0.0	56.5
Gradall	591.4	591.7	10.0	48.0	591.4	646.0	5.0	52.2	489.4	489.4	10.0	49.6	218.1	218.1	0.0	66.6
Pickup Truck	591.4	591.7	10.0	39.6	591.4	646.0	5.0	43.8	489.4	489.4	10.0	41.2	218.1	218.1	0.0	58.2
Pneumatic Tools	303.2	311.9	5.0	61.3	303.2	346.1	5.0	60.4	176.2	197.4	5.0	65.3	342.4	354.8	0.0	65.2
Pneumatic Tools	303.2	311.9	5.0	61.3	303.2	346.1	5.0	60.4	176.2	197.4	5.0	65.3	342.4	354.8	0.0	65.2
Vacuum Street Sweeper	366.4	366.9	5.0	49.3	366.4	449.3	5.0	47.5	133.9	134.0	0.0	63.0	244.4	244.4	0.0	57.8
Ventilation Fan	303.2	304.7	5.0	58.2	303.2	368.8	5.0	56.5	176.2	182.1	5.0	62.7	342.4	346.0	10.0	52.1
Warning Horn	591.4	591.7	10.0	38.7	591.4	646.0	5.0	43.0	489.4	489.4	10.0	40.4	218.1	218.1	0.0	57.4
Warning Horn	314.7	315.3	5.0	49.2	314.7	408.2	5.0	47.0	137.3	137.4	3.9	57.5	275.5	275.5	10.0	45.4
Warning Horn	591.4	591.7	10.0	38.7	591.4	646.0	5.0	43.0	489.4	489.4	10.0	40.4	218.1	218.1	0.0	57.4
Warning Horn	591.4	591.7	10.0	38.7	591.4	646.0	5.0	43.0	489.4	489.4	10.0	40.4	218.1	218.1	0.0	57.4
Welder / Torch	303.2	304.7	5.0	49.3	303.2	368.8	5.0	47.7	176.2	182.1	5.0	53.8	342.4	346.0	10.0	43.2
Welder / Torch	303.2	304.7	5.0	49.3	303.2	368.8	5.0	47.7	176.2	182.1	5.0	53.8	342.4	346.0	10.0	43.2
Welder / Torch	303.2	304.7	5.0	49.3	303.2	368.8	5.0	47.7	176.2	182.1	5.0	53.8	342.4	346.0	10.0	43.2
Welder / Torch	303.2	304.7	5.0	49.3	303.2	368.8	5.0	47.7	176.2	182.1	5.0	53.8	342.4	346.0	10.0	43.2
Total				66.6				65.7				73.8				72.4
Existing-day				61.1				61.1				63.0				64.7
Existing-night				56.5				56.5				59.5				64.4
Day Impact				Impact				No impact				Impact				Impact
Night Impact				Impact				Impact				Impact				Impact

Equipment	NSR 12 High Street Residential				NSR 13 S Riboli Residential				NSR 14 S Los Angeles State Historical			
	Elevation:	35			Elevation:	35			Elevation:	5		
	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	258.2	259.9	0.0	59.4	256.2	258.0	5.0	54.5	66.7	66.7	10.0	61.2
Concrete Mixer Truck	244.4	246.2	0.0	61.0	512.9	513.8	5.0	49.6	183.5	183.5	0.0	63.5
Concrete Mixer Truck	244.4	246.2	0.0	61.0	512.9	513.8	5.0	49.6	183.5	183.5	0.0	63.5
Crane	275.5	277.1	10.0	47.8	612.9	613.6	5.0	45.9	327.8	327.8	2.7	53.6
Flat Bed Truck	244.4	246.2	0.0	56.5	512.9	513.8	5.0	45.1	183.5	183.5	0.0	59.0
Gradall	218.1	220.1	0.0	66.5	478.3	479.2	5.0	54.8	126.6	126.6	0.0	71.4
Pickup Truck	218.1	220.1	0.0	58.1	478.3	479.2	5.0	46.4	126.6	126.6	0.0	63.0
Pneumatic Tools	342.4	348.1	0.0	65.3	492.4	496.4	5.0	57.3	260.2	276.3	0.0	67.3
Pneumatic Tools	342.4	348.1	0.0	65.3	492.4	496.4	5.0	57.3	260.2	276.3	0.0	67.3
Vacuum Street Sweeper	244.4	246.2	0.0	57.8	512.9	513.8	5.0	46.4	183.5	183.5	0.0	60.3
Ventilation Fan	342.4	343.0	10.0	52.2	492.4	492.8	10.0	49.0	260.2	265.0	10.0	54.4
Warning Horn	218.1	220.1	0.0	57.3	478.3	479.2	5.0	45.6	126.6	126.6	0.0	62.1
Warning Horn	275.5	277.1	10.0	45.3	612.9	613.6	5.0	43.4	327.8	327.8	2.7	51.2
Warning Horn	218.1	220.1	0.0	57.3	478.3	479.2	5.0	45.6	126.6	126.6	0.0	62.1
Warning Horn	218.1	220.1	0.0	57.3	478.3	479.2	5.0	45.6	126.6	126.6	0.0	62.1
Welder / Torch	342.4	343.0	10.0	43.3	492.4	492.8	10.0	40.1	260.2	265.0	10.0	45.5
Welder / Torch	342.4	343.0	10.0	43.3	492.4	492.8	10.0	40.1	260.2	265.0	10.0	45.5
Welder / Torch	342.4	343.0	10.0	43.3	492.4	492.8	10.0	40.1	260.2	265.0	10.0	45.5
Welder / Torch	342.4	343.0	10.0	43.3	492.4	492.8	10.0	40.1	260.2	265.0	10.0	45.5
Total				72.6				63.5				76.0
Existing-day				64.7				67.7				58.7
Existing-night				64.4				63.6				55.2
Day Impact				Impact				No impact				Impact
Night Impact				Impact				No impact				Impact

Construction Noise Calculations, Broadway Junction (Structural Steel)

Construction Area Broadway Junction (Without Mitigation)

		NSR 13 S	Riboli Residential Development			NSR 13 N	Riboli Residential Development			NSR 14 N	Los Angeles State Historical Park		
		Elevation:	-10			Elevation:	5			Elevation:	-30		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	5.0	620.0	620.2	0.0	51.8	715.3	715.3	0.0	50.6	268.0	270.3	0.0	59.1
Concrete Mixer Truck	5.0	706.8	707.0	0.0	51.8	597.0	597.0	0.0	53.3	318.2	320.1	0.0	58.7
Concrete Mixer Truck	5.0	706.8	707.0	0.0	51.8	597.0	597.0	0.0	53.3	318.2	320.1	0.0	58.7
Crane	5.0	848.0	848.1	0.0	48.1	728.3	728.3	0.0	49.4	451.2	452.6	0.0	53.5
Flat Bed Truck	5.0	706.8	707.0	0.0	47.3	597.0	597.0	0.0	48.8	318.2	320.1	0.0	54.2
Gradall	5.0	859.2	859.3	0.0	54.7	637.8	637.8	0.0	57.3	453.9	455.2	0.0	60.2
Pickup Truck	5.0	859.2	859.3	0.0	46.3	637.8	637.8	0.0	48.9	453.9	455.2	0.0	51.8
Pneumatic Tools	98.0	620.0	629.3	0.0	60.2	766.0	771.6	0.0	58.4	268.0	297.0	0.0	66.7
Pneumatic Tools	98.0	620.0	629.3	0.0	60.2	766.0	771.6	0.0	58.4	268.0	297.0	0.0	66.7
Vacuum Street Sweeper	5.0	706.8	707.0	0.0	48.6	597.0	597.0	0.0	50.1	318.2	320.1	0.0	55.5
Ventilation Fan	27.6	620.0	621.1	0.0	57.0	766.0	766.3	0.0	55.2	268.0	274.1	0.0	64.1
Warning Horn	5.0	859.2	859.3	0.0	45.5	637.8	637.8	0.0	48.1	453.9	455.2	0.0	51.0
Warning Horn	5.0	848.0	848.1	0.0	45.6	728.3	728.3	0.0	46.9	451.2	452.6	0.0	51.1
Warning Horn	5.0	859.2	859.3	0.0	45.5	637.8	637.8	0.0	48.1	453.9	455.2	0.0	51.0
Warning Horn	5.0	859.2	859.3	0.0	45.5	637.8	637.8	0.0	48.1	453.9	455.2	0.0	51.0
Welder / Torch	27.6	620.0	621.1	0.0	48.1	766.0	766.3	0.0	46.3	268.0	274.1	0.0	55.2
Welder / Torch	27.6	620.0	621.1	0.0	48.1	766.0	766.3	0.0	46.3	268.0	274.1	0.0	55.2
Welder / Torch	27.6	620.0	621.1	0.0	48.1	766.0	766.3	0.0	46.3	268.0	274.1	0.0	55.2
Welder / Torch	27.6	620.0	621.1	0.0	48.1	766.0	766.3	0.0	46.3	268.0	274.1	0.0	55.2
Total					66.0				65.5				72.6
Existing-day					67.7				65.8				53.6
Existing-night					63.6				60.9				48.7
Day Impact					No impact				No impact				Impact
Night Impact					No impact				No impact				Impact

	NSR 15	St Peter's Church			NSR 16	Cathedral HS			NSR 17 N	Low Rise Residential			NSR 17 S	Low Rise Residential		
	Elevation:	5			Elevation:	15			Elevation:	25			Elevation:	15		
Equipment	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	459.1	459.1	0.0	54.5	151.7	152.0	0.0	64.1	161.2	162.4	0.0	63.5	43.3	44.4	0.0	74.7
Concrete Mixer Truck	602.5	602.5	0.0	53.2	433.3	433.7	0.0	56.1	305.1	306.4	0.0	59.1	162.8	163.8	0.0	64.5
Concrete Mixer Truck	602.5	602.5	0.0	53.2	433.3	433.7	0.0	56.1	305.1	306.4	0.0	59.1	162.8	163.8	0.0	64.5
Crane	731.0	731.0	0.0	49.3	390.5	390.9	0.0	54.8	302.2	303.5	0.0	57.0	136.1	137.3	0.0	63.9
Flat Bed Truck	602.5	602.5	0.0	48.7	433.3	433.7	0.0	51.6	305.1	306.4	0.0	54.6	162.8	163.8	0.0	60.0
Gradall	751.2	751.2	0.0	55.9	355.8	356.1	0.0	62.4	230.6	232.0	0.0	66.1	85.4	86.7	0.0	74.6
Pickup Truck	751.2	751.2	0.0	47.5	355.8	356.1	0.0	54.0	230.6	232.0	0.0	57.7	85.4	86.7	0.0	66.2
Pneumatic Tools	459.1	468.4	0.0	62.8	296.3	307.7	0.0	66.4	347.1	354.7	0.0	65.2	173.9	192.7	0.0	70.5
Pneumatic Tools	459.1	468.4	0.0	62.8	296.3	307.7	0.0	66.4	347.1	354.7	0.0	65.2	173.9	192.7	0.0	70.5
Vacuum Street Sweeper	602.5	602.5	0.0	50.0	433.3	433.7	0.0	52.8	305.1	306.4	0.0	55.9	162.8	163.8	0.0	61.3
Ventilation Fan	459.1	459.7	0.0	59.6	296.3	296.6	0.0	63.4	347.1	347.1	0.0	62.1	173.9	174.4	0.0	68.1
Warning Horn	751.2	751.2	0.0	46.7	355.8	356.1	0.0	53.1	230.6	232.0	0.0	56.9	85.4	86.7	0.0	65.4
Warning Horn	731.0	731.0	0.0	46.9	390.5	390.9	0.0	52.3	302.2	303.5	0.0	54.5	136.1	137.3	0.0	61.4
Warning Horn	751.2	751.2	0.0	46.7	355.8	356.3	0.0	53.1	230.6	232.3	0.0	56.8	85.4	87.3	0.0	65.4
Warning Horn	751.2	751.2	0.0	46.7	355.8	356.3	0.0	53.1	230.6	232.3	0.0	56.8	85.4	87.3	0.0	65.4
Welder / Torch	459.1	459.7	0.0	50.8	296.3	296.6	0.0	54.6	347.1	347.1	0.0	53.2	173.9	174.4	0.0	59.2
Welder / Torch	459.1	459.7	0.0	50.8	296.3	296.6	0.0	54.6	347.1	347.1	0.0	53.2	173.9	174.4	0.0	59.2
Welder / Torch	459.1	459.7	0.0	50.8	296.3	296.6	0.0	54.6	347.1	347.1	0.0	53.2	173.9	174.4	0.0	59.2
Welder / Torch	459.1	459.7	0.0	50.8	296.3	296.6	0.0	54.6	347.1	347.1	0.0	53.2	173.9	174.4	0.0	59.2
Total				68.3				72.8				73.1				80.7
Existing-day				65.8				58.7				56.1				56.1
Existing-night				60.9				53.8				51.2				51.2
Day Impact				No impact				Impact				Impact				Impact
Night Impact				Impact				Impact				Impact				Impact

Construction Area Broadway Junction (With Mitigation)

		NSR 13 S	Riboli Residential Development			NSR 13 N	Riboli Residential Development			NSR 14 N	Los Angeles State Historical Park		
		Elevation:	-10			Elevation:	5			Elevation:	-30		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	5.0	620.0	620.2	0.0	51.8	715.3	715.3	0.0	50.6	268.0	270.3	10.0	49.1
Concrete Mixer Truck	5.0	706.8	707.0	0.0	51.8	597.0	597.0	0.0	53.3	318.2	320.1	10.0	48.7
Concrete Mixer Truck	5.0	706.8	707.0	0.0	51.8	597.0	597.0	0.0	53.3	318.2	320.1	10.0	48.7
Crane	5.0	848.0	848.1	0.0	48.1	728.3	728.3	0.0	49.4	451.2	452.6	10.0	43.5
Flat Bed Truck	5.0	706.8	707.0	0.0	47.3	597.0	597.0	0.0	48.8	318.2	320.1	10.0	44.2
Gradall	5.0	859.2	859.3	0.0	54.7	637.8	637.8	0.0	57.3	453.9	455.2	10.0	50.2
Pickup Truck	5.0	859.2	859.3	0.0	46.3	637.8	637.8	0.0	48.9	453.9	455.2	10.0	41.8
Pneumatic Tools	98.0	620.0	629.3	0.0	60.2	766.0	771.6	0.0	58.4	268.0	297.0	0.0	66.7
Pneumatic Tools	98.0	620.0	629.3	0.0	60.2	766.0	771.6	0.0	58.4	268.0	297.0	0.0	66.7
Vacuum Street Sweeper	5.0	706.8	707.0	0.0	48.6	597.0	597.0	0.0	50.1	318.2	320.1	10.0	45.5
Ventilation Fan	27.6	620.0	621.1	10.0	47.0	766.0	766.3	10.0	45.2	268.0	274.1	10.0	54.1
Warning Horn	5.0	859.2	859.3	0.0	45.5	637.8	637.8	0.0	48.1	453.9	455.2	10.0	41.0
Warning Horn	5.0	848.0	848.1	0.0	45.6	728.3	728.3	0.0	46.9	451.2	452.6	10.0	41.1
Warning Horn	5.0	859.2	859.3	0.0	45.5	637.8	637.8	0.0	48.1	453.9	455.2	10.0	41.0
Warning Horn	5.0	859.2	859.3	0.0	45.5	637.8	637.8	0.0	48.1	453.9	455.2	10.0	41.0
Welder / Torch	27.6	620.0	621.1	10.0	38.1	766.0	766.3	10.0	36.3	268.0	274.1	10.0	45.2
Welder / Torch	27.6	620.0	621.1	10.0	38.1	766.0	766.3	10.0	36.3	268.0	274.1	10.0	45.2
Welder / Torch	27.6	620.0	621.1	10.0	38.1	766.0	766.3	10.0	36.3	268.0	274.1	10.0	45.2
Welder / Torch	27.6	620.0	621.1	10.0	38.1	766.0	766.3	10.0	36.3	268.0	274.1	10.0	45.2
Total					65.2				64.9				70.1
Existing-day					67.7				65.8				53.6
Existing-night					63.6				60.9				48.7
Day Impact					No impact				No impact				Impact
Night Impact					No impact				No impact				Impact

	NSR 15	St Peter's Church			NSR 16	Cathedral HS			NSR 17 N	Low Rise Residential			NSR 17 S	Low Rise Residential		
	Elevation:	5			Elevation:	15			Elevation:	25			Elevation:	15		
Equipment	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	459.1	459.1	0.0	54.5	151.7	152.0	10.0	54.1	161.2	162.4	10.0	53.5	43.3	44.4	10.0	64.7
Concrete Mixer Truck	602.5	602.5	0.0	53.2	433.3	433.7	5.8	50.3	305.1	306.4	10.0	49.1	162.8	163.8	10.0	54.5
Concrete Mixer Truck	602.5	602.5	0.0	53.2	433.3	433.7	5.8	50.3	305.1	306.4	10.0	49.1	162.8	163.8	10.0	54.5
Crane	731.0	731.0	1.9	47.4	390.5	390.9	0.0	54.8	302.2	303.5	10.0	47.0	136.1	137.3	10.0	53.9
Flat Bed Truck	602.5	602.5	0.0	48.7	433.3	433.7	5.8	45.8	305.1	306.4	10.0	44.6	162.8	163.8	10.0	50.0
Gradall	751.2	751.2	1.8	54.1	355.8	356.1	9.7	52.7	230.6	232.0	10.0	56.1	85.4	86.7	10.0	64.6
Pickup Truck	751.2	751.2	1.8	45.7	355.8	356.1	9.7	44.3	230.6	232.0	10.0	47.7	85.4	86.7	10.0	56.2
Pneumatic Tools	459.1	468.4	0.0	62.8	296.3	307.7	0.0	66.4	347.1	354.7	0.0	65.2	173.9	192.7	0.0	70.5
Pneumatic Tools	459.1	468.4	0.0	62.8	296.3	307.7	0.0	66.4	347.1	354.7	0.0	65.2	173.9	192.7	0.0	70.5
Vacuum Street Sweeper	602.5	602.5	0.0	50.0	433.3	433.7	5.8	47.0	305.1	306.4	10.0	45.9	162.8	163.8	10.0	51.3
Ventilation Fan	459.1	459.7	10.0	49.6	296.3	296.6	10.0	53.4	347.1	347.1	4.5	57.5	173.9	174.4	7.8	60.3
Warning Horn	751.2	751.2	1.8	44.9	355.8	356.1	9.7	43.4	230.6	232.0	10.0	46.9	85.4	86.7	10.0	55.4
Warning Horn	731.0	731.0	1.9	45.0	390.5	390.9	0.0	52.3	302.2	303.5	10.0	44.5	136.1	137.3	10.0	51.4
Warning Horn	751.2	751.2	1.8	44.9	355.8	356.3	10.0	43.1	230.6	232.3	10.0	46.8	85.4	87.3	10.0	55.4
Warning Horn	751.2	751.2	1.8	44.9	355.8	356.3	10.0	43.1	230.6	232.3	10.0	46.8	85.4	87.3	10.0	55.4
Welder / Torch	459.1	459.7	10.0	40.8	296.3	296.6	10.0	44.6	347.1	347.1	4.5	48.7	173.9	174.4	7.8	51.4
Welder / Torch	459.1	459.7	10.0	40.8	296.3	296.6	10.0	44.6	347.1	347.1	4.5	48.7	173.9	174.4	7.8	51.4
Welder / Torch	459.1	459.7	10.0	40.8	296.3	296.6	10.0	44.6	347.1	347.1	4.5	48.7	173.9	174.4	7.8	51.4
Welder / Torch	459.1	459.7	10.0	40.8	296.3	296.6	10.0	44.6	347.1	347.1	4.5	48.7	173.9	174.4	7.8	51.4
Total				67.2				70.2				69.3				75.1
Existing-day				65.8				58.7				56.1				56.1
Existing-night				60.9				53.8				51.2				51.2
Day Impact				No impact				Impact				Impact				Impact
Night Impact				Impact				Impact				Impact				Impact

Construction Noise Calculations, Broadway Junction (Decking and Shoring Mitigation)

Construction Area Broadway Junction (With Mitigation)

		NSR 13 S	Riboli Residential Development			NSR 13 N	Riboli Residential Development			NSR 14 N	Los Angeles State Historical Park		
		Elevation:	-10			Elevation:	5			Elevation:	-30		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	5.0	620.0	620.2	0.0	51.8	715.3	715.3	0.0	50.6	268.0	270.3	10.0	49.1
Concrete Mixer Truck	5.0	706.8	707.0	0.0	51.8	597.0	597.0	0.0	53.3	318.2	320.1	10.0	48.7
Concrete Mixer Truck	5.0	706.8	707.0	0.0	51.8	597.0	597.0	0.0	53.3	318.2	320.1	10.0	48.7
Crane	5.0	848.0	848.1	0.0	48.1	728.3	728.3	0.0	49.4	451.2	452.6	10.0	43.5
Flat Bed Truck	5.0	706.8	707.0	0.0	47.3	597.0	597.0	0.0	48.8	318.2	320.1	10.0	44.2
Gradall	5.0	859.2	859.3	0.0	54.7	637.8	637.8	0.0	57.3	453.9	455.2	10.0	50.2
Pickup Truck	5.0	859.2	859.3	0.0	46.3	637.8	637.8	0.0	48.9	453.9	455.2	10.0	41.8
Pneumatic Tools	98.0	620.0	629.3	0.0	60.2	766.0	771.6	0.0	58.4	268.0	297.0	0.0	66.7
Pneumatic Tools	98.0	620.0	629.3	0.0	60.2	766.0	771.6	0.0	58.4	268.0	297.0	0.0	66.7
Vacuum Street Sweeper	5.0	706.8	707.0	0.0	48.6	597.0	597.0	0.0	50.1	318.2	320.1	10.0	45.5
Ventilation Fan	27.6	620.0	621.1	0.0	57.0	766.0	766.3	0.0	55.2	268.0	274.1	0.0	64.1
Warning Horn	5.0	859.2	859.3	0.0	45.5	637.8	637.8	0.0	48.1	453.9	455.2	10.0	41.0
Warning Horn	5.0	848.0	848.1	0.0	45.6	728.3	728.3	0.0	46.9	451.2	452.6	10.0	41.1
Warning Horn	5.0	859.2	859.3	0.0	45.5	637.8	637.8	0.0	48.1	453.9	455.2	10.0	41.0
Warning Horn	5.0	859.2	859.3	0.0	45.5	637.8	637.8	0.0	48.1	453.9	455.2	10.0	41.0
Welder / Torch	27.6	620.0	621.1	0.0	48.1	766.0	766.3	0.0	46.3	268.0	274.1	0.0	55.2
Welder / Torch	27.6	620.0	621.1	0.0	48.1	766.0	766.3	0.0	46.3	268.0	274.1	0.0	55.2
Welder / Torch	27.6	620.0	621.1	0.0	48.1	766.0	766.3	0.0	46.3	268.0	274.1	0.0	55.2
Welder / Torch	27.6	620.0	621.1	0.0	48.1	766.0	766.3	0.0	46.3	268.0	274.1	0.0	55.2
Total					66.0				65.5				71.4
Existing-day					67.7				65.8				53.6
Existing-night					63.6				60.9				48.7
Day Impact					No impact				No impact				Impact
Night Impact					No impact				No impact				Impact

	NSR 15	St Peter's Church			NSR 16	Cathedral HS			NSR 17 N	Low Rise Residential			NSR 17 S	Low Rise Residential		
	Elevation:	5			Elevation:	15			Elevation:	25			Elevation:	15		
Equipment	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	459.1	459.1	0.0	54.5	151.7	152.0	10.0	54.1	161.2	162.4	10.0	53.5	43.3	44.4	10.0	64.7
Concrete Mixer Truck	602.5	602.5	0.0	53.2	433.3	433.7	0.0	56.0	305.1	306.4	10.0	49.1	162.8	163.8	10.0	54.5
Concrete Mixer Truck	602.5	602.5	0.0	53.2	433.3	433.7	0.0	56.0	305.1	306.4	10.0	49.1	162.8	163.8	10.0	54.5
Crane	731.0	731.0	1.9	47.4	390.5	390.9	0.0	54.8	302.2	303.5	10.0	47.0	136.1	137.3	10.0	53.9
Flat Bed Truck	602.5	602.5	0.0	48.7	433.3	433.7	0.0	51.5	305.1	306.4	10.0	44.6	162.8	163.8	10.0	50.0
Gradall	751.2	751.2	0.0	55.9	355.8	356.1	0.0	62.4	230.6	232.0	0.0	66.1	85.4	86.7	10.0	64.6
Pickup Truck	751.2	751.2	0.0	47.5	355.8	356.1	0.0	54.0	230.6	232.0	0.0	57.7	85.4	86.7	10.0	56.2
Pneumatic Tools	459.1	468.4	0.0	62.8	296.3	307.7	0.0	66.4	347.1	354.7	0.0	65.2	173.9	192.7	0.0	70.5
Pneumatic Tools	459.1	468.4	0.0	62.8	296.3	307.7	0.0	66.4	347.1	354.7	0.0	65.2	173.9	192.7	0.0	70.5
Vacuum Street Sweeper	602.5	602.5	0.0	50.0	433.3	433.7	0.0	52.8	305.1	306.4	10.0	45.9	162.8	163.8	10.0	51.3
Ventilation Fan	459.1	459.7	10.0	49.6	296.3	296.6	0.0	63.4	347.1	347.1	4.5	57.5	173.9	174.4	7.8	60.3
Warning Horn	751.2	751.2	0.0	46.7	355.8	356.1	0.0	53.1	230.6	232.0	0.0	56.9	85.4	86.7	10.0	55.4
Warning Horn	731.0	731.0	1.9	45.0	390.5	390.9	0.0	52.3	302.2	303.5	10.0	44.5	136.1	137.3	10.0	51.4
Warning Horn	751.2	751.2	0.0	46.7	355.8	356.3	0.0	53.1	230.6	232.3	0.0	56.8	85.4	87.3	10.0	55.4
Warning Horn	751.2	751.2	0.0	46.7	355.8	356.3	0.0	53.1	230.6	232.3	0.0	56.8	85.4	87.3	10.0	55.4
Welder / Torch	459.1	459.7	0.0	50.8	296.3	296.6	0.0	54.6	347.1	347.1	4.5	48.7	173.9	174.4	7.8	51.4
Welder / Torch	459.1	459.7	0.0	50.8	296.3	296.6	0.0	54.6	347.1	347.1	4.5	48.7	173.9	174.4	7.8	51.4
Welder / Torch	459.1	459.7	0.0	50.8	296.3	296.6	0.0	54.6	347.1	347.1	4.5	48.7	173.9	174.4	7.8	51.4
Welder / Torch	459.1	459.7	0.0	50.8	296.3	296.6	0.0	54.6	347.1	347.1	4.5	48.7	173.9	174.4	7.8	51.4
Total				67.7				72.2				71.5				75.1
Existing-day				65.8				58.7				56.1				56.1
Existing-night				60.9				53.8				51.2				51.2
Day Impact				No impact				Impact				Impact				Impact
Night Impact				Impact				Impact				Impact				Impact

Construction Noise Calculations, Broadway Junction (Deck Removal Mitigation)

Construction Area Broadway Junction (With Mitigation)

		NSR 13 S	Riboli Residential Development			NSR 13 N	Riboli Residential Development			NSR 14 N	Los Angeles State Historical Park		
		Elevation:	-10			Elevation:	5			Elevation:	-30		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	5.0	620.0	620.2	0.0	51.8	715.3	715.3	0.0	50.6	268.0	270.3	10.0	49.1
Concrete Mixer Truck	5.0	706.8	707.0	0.0	51.8	597.0	597.0	0.0	53.3	318.2	320.1	10.0	48.7
Concrete Mixer Truck	5.0	706.8	707.0	0.0	51.8	597.0	597.0	0.0	53.3	318.2	320.1	10.0	48.7
Crane	5.0	848.0	848.1	0.0	48.1	728.3	728.3	0.0	49.4	451.2	452.6	10.0	43.5
Flat Bed Truck	5.0	706.8	707.0	0.0	47.3	597.0	597.0	0.0	48.8	318.2	320.1	10.0	44.2
Gradall	5.0	859.2	859.3	0.0	54.7	637.8	637.8	0.0	57.3	453.9	455.2	0.0	60.2
Pickup Truck	5.0	859.2	859.3	0.0	46.3	637.8	637.8	0.0	48.9	453.9	455.2	0.0	51.8
Pneumatic Tools	98.0	620.0	629.3	0.0	60.2	766.0	771.6	0.0	58.4	268.0	297.0	0.0	66.7
Pneumatic Tools	98.0	620.0	629.3	0.0	60.2	766.0	771.6	0.0	58.4	268.0	297.0	0.0	66.7
Vacuum Street Sweeper	5.0	706.8	707.0	0.0	48.6	597.0	597.0	0.0	50.1	318.2	320.1	10.0	45.5
Ventilation Fan	27.6	620.0	621.1	10.0	47.0	766.0	766.3	10.0	45.2	268.0	274.1	10.0	54.1
Warning Horn	5.0	859.2	859.3	0.0	45.5	637.8	637.8	0.0	48.1	453.9	455.2	0.0	51.0
Warning Horn	5.0	848.0	848.1	0.0	45.6	728.3	728.3	0.0	46.9	451.2	452.6	10.0	41.1
Warning Horn	5.0	859.2	859.3	0.0	45.5	637.8	637.8	0.0	48.1	453.9	455.2	0.0	51.0
Warning Horn	5.0	859.2	859.3	0.0	45.5	637.8	637.8	0.0	48.1	453.9	455.2	0.0	51.0
Welder / Torch	27.6	620.0	621.1	10.0	38.1	766.0	766.3	10.0	36.3	268.0	274.1	10.0	45.2
Welder / Torch	27.6	620.0	621.1	10.0	38.1	766.0	766.3	10.0	36.3	268.0	274.1	10.0	45.2
Welder / Torch	27.6	620.0	621.1	10.0	38.1	766.0	766.3	10.0	36.3	268.0	274.1	10.0	45.2
Welder / Torch	27.6	620.0	621.1	10.0	38.1	766.0	766.3	10.0	36.3	268.0	274.1	10.0	45.2
Total					65.2				64.9				70.7
Existing-day					67.7				65.8				53.6
Existing-night					63.6				60.9				48.7
Day Impact					No impact				No impact				Impact
Night Impact					No impact				No impact				Impact

	NSR 15	St Peter's Church			NSR 16	Cathedral HS			NSR 17 N	Low Rise Residential			NSR 17 S	Low Rise Residential		
	Elevation:	5			Elevation:	15			Elevation:	25			Elevation:	15		
Equipment	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	459.1	459.1	0.0	54.5	151.7	152.0	10.0	54.1	161.2	162.4	10.0	53.5	43.3	44.4	10.0	64.7
Concrete Mixer Truck	602.5	602.5	0.0	53.2	433.3	433.7	0.0	56.0	305.1	306.4	10.0	49.1	162.8	163.8	10.0	54.5
Concrete Mixer Truck	602.5	602.5	0.0	53.2	433.3	433.7	0.0	56.0	305.1	306.4	10.0	49.1	162.8	163.8	10.0	54.5
Crane	731.0	731.0	1.9	47.4	390.5	390.9	0.0	54.8	302.2	303.5	10.0	47.0	136.1	137.3	10.0	53.9
Flat Bed Truck	602.5	602.5	0.0	48.7	433.3	433.7	0.0	51.5	305.1	306.4	10.0	44.6	162.8	163.8	10.0	50.0
Gradall	751.2	751.2	0.0	55.9	355.8	356.1	0.0	62.4	230.6	232.0	0.0	66.1	85.4	86.7	10.0	64.6
Pickup Truck	751.2	751.2	0.0	47.5	355.8	356.1	0.0	54.0	230.6	232.0	0.0	57.7	85.4	86.7	10.0	56.2
Pneumatic Tools	459.1	468.4	0.0	62.8	296.3	307.7	0.0	66.4	347.1	354.7	0.0	65.2	173.9	192.7	0.0	70.5
Pneumatic Tools	459.1	468.4	0.0	62.8	296.3	307.7	0.0	66.4	347.1	354.7	0.0	65.2	173.9	192.7	0.0	70.5
Vacuum Street Sweeper	602.5	602.5	0.0	50.0	433.3	433.7	0.0	52.8	305.1	306.4	10.0	45.9	162.8	163.8	10.0	51.3
Ventilation Fan	459.1	459.7	10.0	49.6	296.3	296.6	10.0	53.4	347.1	347.1	4.5	57.5	173.9	174.4	7.8	60.3
Warning Horn	751.2	751.2	0.0	46.7	355.8	356.1	0.0	53.1	230.6	232.0	0.0	56.9	85.4	86.7	10.0	55.4
Warning Horn	731.0	731.0	1.9	45.0	390.5	390.9	0.0	52.3	302.2	303.5	10.0	44.5	136.1	137.3	10.0	51.4
Warning Horn	751.2	751.2	0.0	46.7	355.8	356.3	0.0	53.1	230.6	232.3	0.0	56.8	85.4	87.3	10.0	55.4
Warning Horn	751.2	751.2	0.0	46.7	355.8	356.3	0.0	53.1	230.6	232.3	0.0	56.8	85.4	87.3	10.0	55.4
Welder / Torch	459.1	459.7	10.0	40.8	296.3	296.6	10.0	44.6	347.1	347.1	4.5	48.7	173.9	174.4	7.8	51.4
Welder / Torch	459.1	459.7	10.0	40.8	296.3	296.6	10.0	44.6	347.1	347.1	4.5	48.7	173.9	174.4	7.8	51.4
Welder / Torch	459.1	459.7	10.0	40.8	296.3	296.6	10.0	44.6	347.1	347.1	4.5	48.7	173.9	174.4	7.8	51.4
Welder / Torch	459.1	459.7	10.0	40.8	296.3	296.6	10.0	44.6	347.1	347.1	4.5	48.7	173.9	174.4	7.8	51.4
Total				67.4				71.3				71.5				75.1
Existing-day				65.8				58.7				56.1				56.1
Existing-night				60.9				53.8				51.2				51.2
Day Impact				No impact				Impact				Impact				Impact
Night Impact				Impact				Impact				Impact				Impact

Construction Noise Calculations, Stadium Tower and Dodger Stadium Station (Structural Steel)

Construction Area Dodger Stadium Station (Without Mitigation)

		NSR 16	Cathedral HS			NSR 18	Solano Canyon Neighborhood		
		Elevation:	-140			Elevation:	-75		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	5.0	720.0	734.5	5.0	45.4	1529.9	1532.0	5.0	39.0
Concrete Mixer Truck	5.0	770.9	784.4	5.0	45.9	1623.1	1625.1	5.0	39.6
Concrete Mixer Truck	5.0	770.9	784.4	5.0	45.9	1623.1	1625.1	5.0	39.6
Crane	5.0	744.0	758.0	5.0	44.0	1550.1	1552.2	5.0	37.8
Flat Bed Truck	5.0	770.9	784.4	5.0	41.4	1623.1	1625.1	5.0	35.1
Gradall	5.0	1064.4	1074.2	5.0	47.8	1397.3	1399.6	5.0	45.5
Pickup Truck	5.0	1064.4	1074.2	5.0	39.4	1397.3	1399.6	5.0	37.1
Pneumatic Tools	74.0	845.8	872.5	0.0	57.4	1547.5	1554.7	0.0	52.3
Pneumatic Tools	74.0	845.8	872.5	0.0	57.4	1547.5	1554.7	0.0	52.3
Vacuum Street Sweeper	5.0	770.9	784.4	5.0	42.7	1623.1	1625.1	5.0	36.4
Ventilation Fan	5.0	845.8	858.1	5.0	49.2	1547.5	1549.6	5.0	44.1
Warning Horn	5.0	1064.4	1074.2	5.0	38.5	1397.3	1399.6	5.0	36.2
Warning Horn	5.0	744.0	758.0	5.0	41.6	1550.1	1552.2	5.0	35.4
Warning Horn	5.0	1064.4	1074.2	5.0	38.5	1397.3	1399.6	5.0	36.2
Warning Horn	5.0	1064.4	1074.2	5.0	38.5	1397.3	1399.6	5.0	36.2
Welder / Torch	5.0	845.8	858.1	5.0	40.3	1547.5	1549.6	5.0	35.2
Welder / Torch	5.0	845.8	858.1	5.0	40.3	1547.5	1549.6	5.0	35.2
Welder / Torch	5.0	845.8	858.1	5.0	40.3	1547.5	1549.6	5.0	35.2
Welder / Torch	5.0	845.8	858.1	5.0	40.3	1547.5	1549.6	5.0	35.2
Total					61.7				56.8
Existing-day					58.7				56.5
Existing-night					53.8				51.6
Day Impact					No impact				No impact
Night Impact					Impact				Impact

Construction Area Stadium Tower (Without Mitigation)

		NSR 16	Cathedral HS			NSR 17 N	Low Rise Residential			NSR 18	Solano Canyon Neighborhood		
		Elevation:	-40			Elevation:	-40			Elevation:	25		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	5.0	561.1	562.9	5.0	47.7	862.1	863.3	5.0	44.0	1819.6	1819.7	5.0	37.5
Concrete Mixer Truck	5.0	530.4	532.3	5.0	49.3	834.5	835.7	5.0	45.4	2023.0	2023.1	5.0	37.7
Concrete Mixer Truck	5.0	530.4	532.3	5.0	49.3	834.5	835.7	5.0	45.4	2023.0	2023.1	5.0	37.7
Crane	5.0	584.0	585.7	5.0	46.3	885.2	886.3	5.0	42.7	2024.6	2024.7	5.0	35.5
Flat Bed Truck	5.0	530.4	532.3	5.0	44.8	834.5	835.7	5.0	40.9	2023.0	2023.1	5.0	33.2
Gradall	5.0	629.7	631.3	5.0	52.4	936.2	937.3	5.0	49.0	1813.5	1813.6	5.0	43.2
Pickup Truck	5.0	629.7	631.3	5.0	44.0	936.2	937.3	5.0	40.6	1813.5	1813.6	5.0	34.8
Pneumatic Tools	88.7	600.7	614.3	0.0	60.4	887.3	896.6	0.0	57.1	1899.7	1900.8	0.0	50.6
Pneumatic Tools	88.7	600.7	614.3	0.0	60.4	887.3	896.6	0.0	57.1	1899.7	1900.8	0.0	50.6
Vacuum Street Sweeper	5.0	530.4	532.3	5.0	46.1	834.5	835.7	5.0	42.1	2023.0	2023.1	5.0	34.5
Ventilation Fan	88.7	600.7	614.3	0.0	57.1	887.3	896.6	0.0	53.8	1899.7	1900.8	0.0	47.3
Warning Horn	5.0	629.7	631.3	5.0	43.2	936.2	937.3	5.0	39.7	1813.5	1813.6	5.0	34.0
Warning Horn	5.0	584.0	585.7	5.0	43.8	885.2	886.3	5.0	40.2	2024.6	2024.7	5.0	33.0
Warning Horn	5.0	629.7	631.3	5.0	43.2	936.2	937.3	5.0	39.7	1813.5	1813.6	5.0	34.0
Warning Horn	5.0	629.7	631.3	5.0	43.2	936.2	937.3	5.0	39.7	1813.5	1813.6	5.0	34.0
Welder / Torch	88.7	600.7	614.3	0.0	48.2	887.3	896.6	0.0	44.9	1899.7	1900.8	0.0	38.4
Welder / Torch	88.7	600.7	614.3	0.0	48.2	887.3	896.6	0.0	44.9	1899.7	1900.8	0.0	38.4
Welder / Torch	88.7	600.7	614.3	0.0	48.2	887.3	896.6	0.0	44.9	1899.7	1900.8	0.0	38.4
Welder / Torch	88.7	600.7	614.3	0.0	48.2	887.3	896.6	0.0	44.9	1899.7	1900.8	0.0	38.4
Total					65.6				62.2				55.7
Existing-day					58.7				56.1				56.5
Existing-night					53.8				51.2				51.6
Day Impact					Impact				Impact				No impact
Night Impact					Impact				Impact				No impact

Construction Area Dodger Stadium Station (With Mitigation)

		NSR 16	Cathedral HS			NSR 18	Solano Canyon Neighborhood		
		Elevation:	-140			Elevation:	-75		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	5.0	720.0	734.5	5.0	45.4	1529.9	1532.0	5.0	39.0
Concrete Mixer Truck	5.0	770.9	784.4	5.0	45.9	1623.1	1625.1	5.0	39.6
Concrete Mixer Truck	5.0	770.9	784.4	5.0	45.9	1623.1	1625.1	5.0	39.6
Crane	5.0	744.0	758.0	5.0	44.0	1550.1	1552.2	5.0	37.8
Flat Bed Truck	5.0	770.9	784.4	5.0	41.4	1623.1	1625.1	5.0	35.1
Gradall	5.0	1064.4	1074.2	5.0	47.8	1397.3	1399.6	5.0	45.5
Pickup Truck	5.0	1064.4	1074.2	5.0	39.4	1397.3	1399.6	5.0	37.1
Pneumatic Tools	74.0	845.8	872.5	0.0	57.4	1547.5	1554.7	0.0	52.3
Pneumatic Tools	74.0	845.8	872.5	0.0	57.4	1547.5	1554.7	0.0	52.3
Vacuum Street Sweeper	5.0	770.9	784.4	5.0	42.7	1623.1	1625.1	5.0	36.4
Ventilation Fan	5.0	845.8	858.1	5.0	49.2	1547.5	1549.6	5.0	44.1
Warning Horn	5.0	1064.4	1074.2	5.0	38.5	1397.3	1399.6	5.0	36.2
Warning Horn	5.0	744.0	758.0	5.0	41.6	1550.1	1552.2	5.0	35.4
Warning Horn	5.0	1064.4	1074.2	5.0	38.5	1397.3	1399.6	5.0	36.2
Warning Horn	5.0	1064.4	1074.2	5.0	38.5	1397.3	1399.6	5.0	36.2
Welder / Torch	5.0	845.8	858.1	5.0	40.3	1547.5	1549.6	5.0	35.2
Welder / Torch	5.0	845.8	858.1	5.0	40.3	1547.5	1549.6	5.0	35.2
Welder / Torch	5.0	845.8	858.1	5.0	40.3	1547.5	1549.6	5.0	35.2
Welder / Torch	5.0	845.8	858.1	5.0	40.3	1547.5	1549.6	5.0	35.2
Total					61.7				56.8
Existing-day					58.7				56.5
Existing-night					53.8				51.6
Day Impact					No impact				No impact
Night Impact					Impact				Impact

Construction Area Stadium Tower (With Mitigation)

		NSR 16	Cathedral HS			NSR 17 N	Low Rise Residential			NSR 18	Solano Canyon Neighborhood		
		Elevation:	-40			Elevation:	-40			Elevation:	25		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Compressor (air)	5.0	561.1	562.9	5.0	47.7	862.1	863.3	5.0	44.0	1819.6	1819.7	5.0	37.5
Concrete Mixer Truck	5.0	530.4	532.3	5.0	49.3	834.5	835.7	5.0	45.4	2023.0	2023.1	5.0	37.7
Concrete Mixer Truck	5.0	530.4	532.3	5.0	49.3	834.5	835.7	5.0	45.4	2023.0	2023.1	5.0	37.7
Crane	5.0	584.0	585.7	5.0	46.3	885.2	886.3	5.0	42.7	2024.6	2024.7	5.0	35.5
Flat Bed Truck	5.0	530.4	532.3	5.0	44.8	834.5	835.7	5.0	40.9	2023.0	2023.1	5.0	33.2
Gradall	5.0	629.7	631.3	5.0	52.4	936.2	937.3	5.0	49.0	1813.5	1813.6	5.0	43.2
Pickup Truck	5.0	629.7	631.3	5.0	44.0	936.2	937.3	5.0	40.6	1813.5	1813.6	5.0	34.8
Pneumatic Tools	88.7	600.7	614.3	10.0	50.4	887.3	896.6	10.0	47.1	1899.7	1900.8	10.0	40.6
Pneumatic Tools	88.7	600.7	614.3	10.0	50.4	887.3	896.6	10.0	47.1	1899.7	1900.8	10.0	40.6
Vacuum Street Sweeper	5.0	530.4	532.3	5.0	46.1	834.5	835.7	5.0	42.1	2023.0	2023.1	5.0	34.5
Ventilation Fan	88.7	600.7	614.3	10.0	47.1	887.3	896.6	10.0	43.8	1899.7	1900.8	10.0	37.3
Warning Horn	5.0	629.7	631.3	5.0	43.2	936.2	937.3	5.0	39.7	1813.5	1813.6	5.0	34.0
Warning Horn	5.0	584.0	585.7	5.0	43.8	885.2	886.3	5.0	40.2	2024.6	2024.7	5.0	33.0
Warning Horn	5.0	629.7	631.3	5.0	43.2	936.2	937.3	5.0	39.7	1813.5	1813.6	5.0	34.0
Warning Horn	5.0	629.7	631.3	5.0	43.2	936.2	937.3	5.0	39.7	1813.5	1813.6	5.0	34.0
Welder / Torch	88.7	600.7	614.3	10.0	38.2	887.3	896.6	10.0	34.9	1899.7	1900.8	10.0	28.4
Welder / Torch	88.7	600.7	614.3	10.0	38.2	887.3	896.6	10.0	34.9	1899.7	1900.8	10.0	28.4
Welder / Torch	88.7	600.7	614.3	10.0	38.2	887.3	896.6	10.0	34.9	1899.7	1900.8	10.0	28.4
Welder / Torch	88.7	600.7	614.3	10.0	38.2	887.3	896.6	10.0	34.9	1899.7	1900.8	10.0	28.4
Total					59.7				56.1				49.6
Existing-day					58.7				56.1				56.5
Existing-night					53.8				51.2				51.6
Day Impact					No impact				No impact				No impact
Night Impact					Impact				No impact				No impact

Construction Noise Calculations, Alameda Station (Vertical Circulation, Hardscaping, Landscaping, and Interior Work)

Construction Area Alameda Station (Without Mitigation)

		NSR 1A Union Station				NSR 1B First Five				NSR 2A El Pueblo Plaza (Mural)				NSR 2B El Pueblo Plaza (Grass)				NSR 2C El Pueblo Plaza (Fountain)				NSR 3 Mozaic Apartments				NSR 3 Mozaic Apartments			
		Elevation: 5				Elevation: 5				Elevation: 14				Elevation: 11				Elevation: 14				Elevation: 5				Elevation: 35			
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Backhoe	5.0	245.5	245.5	0.0	59.8	464.9	464.9	5.0	49.3	12.4	15.3	0.0	83.9	47.5	47.9	0.0	74.0	88.0	88.5	0.0	68.7	18.1	18.1	0.0	82.4	18.1	35.0	0.0	76.7
Compactor (ground)	5.0	245.5	245.5	0.0	62.4	464.9	464.9	5.0	51.8	12.4	15.3	0.0	86.5	47.5	47.9	0.0	76.6	88.0	88.5	0.0	71.3	18.1	18.1	0.0	85.0	18.1	35.0	0.0	79.3
Concrete Mixer Truck	5.0	245.5	245.5	0.0	61.0	464.9	464.9	5.0	50.5	12.4	15.3	0.0	85.1	47.5	47.9	0.0	75.2	88.0	88.5	0.0	69.9	18.1	18.1	0.0	83.6	18.1	35.0	0.0	77.9
Crane	5.0	209.1	209.1	0.0	60.2	515.8	515.8	5.0	47.4	173.1	173.3	0.0	61.8	191.0	191.1	0.0	61.0	213.7	213.9	0.0	60.0	87.2	87.2	0.0	67.8	87.2	92.2	0.0	67.3
Dump Truck	5.0	245.5	245.5	0.0	58.7	464.9	464.9	5.0	48.2	12.4	15.3	0.0	82.8	47.5	47.9	0.0	72.9	88.0	88.5	0.0	67.6	18.1	18.1	0.0	81.3	18.1	35.0	0.0	75.6
Flat Bed Truck	5.0	85.3	85.3	0.0	65.7	386.3	386.3	5.0	47.6	175.3	175.5	0.0	59.4	175.3	175.4	0.0	59.4	175.3	175.5	0.0	59.4	92.0	92.0	0.0	65.0	92.0	96.8	0.0	64.6
Pickup Truck	5.0	85.1	85.1	0.0	66.4	361.1	361.1	5.0	48.8	117.6	117.9	0.0	63.6	117.6	117.8	0.0	63.6	117.6	117.9	0.0	63.6	18.1	18.1	0.0	79.8	18.1	35.0	0.0	74.1
Welder / Torch	27.6	245.5	246.5	0.0	56.2	464.9	465.5	5.0	45.6	12.4	18.4	0.0	78.7	47.5	50.3	0.0	70.0	88.0	89.0	0.0	65.0	23.6	32.7	0.0	73.7	23.6	24.7	0.0	76.1
Warning Horn	5.0	245.5	245.5	0.0	56.4	464.9	464.9	5.0	45.8	12.4	15.3	0.0	80.5	47.5	47.9	0.0	70.6	88.0	88.5	0.0	65.2	18.1	18.1	0.0	79.0	18.1	35.0	0.0	73.3
Warning Horn	5.0	245.5	245.5	0.0	56.4	464.9	464.9	5.0	45.8	12.4	15.3	0.0	80.5	47.5	47.9	0.0	70.6	88.0	88.5	0.0	65.2	18.1	18.1		79.0	18.1	35.0	0.0	73.3
Vacuum Street Sweeper	5.0	85.3	85.3	0.0	67.0	386.3	386.3	5.0	48.8	175.3	175.5	0.0	60.7	175.3	175.4	0.0	60.7	175.3	175.5	0.0	60.7	92.0	92.0	0.0	66.3	92.0	96.8	0.0	65.9
Total					73.0				59.0				91.8				82.1				77.1				90.6				85.5
Existing-day					61.1				61.1				69.0				69.0				69.0				68.4				68.4
Existing-night					57.7				57.7				65.5				65.5				65.5				65.5				65.5
Day Impact					Impact				No impact				Impact				Impact				Impact				Impact				Impact
Night Impact					Impact				No impact				Impact				Impact				Impact				Impact				Impact

Construction Area Alameda Station (With Mitigation)

		NSR 1A Union Station				NSR 1B First Five				NSR 2A El Pueblo Plaza (Mural)				NSR 2B El Pueblo Plaza (Grass)				NSR 2C El Pueblo Plaza (Fountain)				NSR 3 Mozaic Apartments				NSR 3 Mozaic Apartments			
		Elevation: 5				Elevation: 5				Elevation: 14				Elevation: 11				Elevation: 14				Elevation: 5				Elevation: 35			
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Backhoe	5.0	245.5	245.5	3.3	56.5	464.9	464.9	5.0	49.3	12.4	15.3	0.0	83.9	47.5	47.9	0.0	74.0	88.0	88.5	0.0	68.7	18.1	18.1	10.0	72.4	18.1	35.0	0.0	76.7
Compactor (ground)	5.0	245.5	245.5	3.3	59.1	464.9	464.9	5.0	51.8	12.4	15.3	0.0	86.5	47.5	47.9	0.0	76.6	88.0	88.5	0.0	71.3	18.1	18.1	10.0	75.0	18.1	35.0	0.0	79.3
Concrete Mixer Truck	5.0	245.5	245.5	3.3	57.7	464.9	464.9	5.0	50.5	12.4	15.3	0.0	85.1	47.5	47.9	0.0	75.2	88.0	88.5	0.0	69.9	18.1	18.1	10.0	73.6	18.1	35.0	0.0	77.9
Crane	5.0	209.1	209.1	3.7	56.5	515.8	515.8	5.0	47.4	173.1	173.3	0.0	61.8	191.0	191.1	0.0	61.0	213.7	213.9	0.0	60.0	87.2	87.2	10.0	57.8	87.2	92.2	0.0	67.3
Dump Truck	5.0	245.5	245.5	3.3	55.4	464.9	464.9	5.0	48.2	12.4	15.3	0.0	82.8	47.5	47.9	0.0	72.9	88.0	88.5	0.0	67.6	18.1	18.1	10.0	71.3	18.1	35.0	0.0	75.6
Flat Bed Truck	5.0	85.3	85.3	0.0	65.7	386.3	386.3	6.9	45.7	175.3	175.5	0.0	59.4	175.3	175.4	0.0	59.4	175.3	175.5	0.0	59.4	92.0	92.0	10.0	55.0	92.0	96.8	0.0	64.6
Pickup Truck	5.0	85.1	85.1	10.0	56.4	361.1	361.1	10.0	43.8	117.6	117.9	0.0	63.6	117.6	117.8	0.0	63.6	117.6	117.9	0.0	63.6	18.1	18.1	10.0	69.8	18.1	35.0	0.0	74.1
Welder / Torch	27.6	245.5	246.5	0.0	56.2	464.9	465.5	5.0	45.6	12.4	18.4	0.0	78.7	47.5	50.3	0.0	70.0	88.0	89.0	0.0	65.0	23.6	32.7	10.0	63.7	23.6	24.7	0.0	76.1
Warning Horn	5.0	245.5	245.5	3.3	53.1	464.9	464.9	5.0	45.8	12.4	15.3	0.0	80.5	47.5	47.9	0.0	70.6	88.0	88.5	0.0	65.2	18.1	18.1	10.0	69.0	18.1	35.0	0.0	73.3
Warning Horn	5.0	245.5	245.5	3.3	53.1	464.9	464.9	5.0	45.8	12.4	15.3	0.0	80.5	47.5	47.9	0.0	70.6	88.0	88.5	0.0	65.2	18.1	18.1	10.0	69.0	18.1	35.0	0.0	73.3
Vacuum Street Sweeper	5.0	85.3	85.3	0.0	67.0	386.3	386.3	6.9	47.0	175.3	175.5	0.0	60.7	175.3	175.4	0.0	60.7	175.3	175.5	0.0	60.7	92.0	92.0	10.0	56.3	92.0	96.8	0.0	65.9
Total					71.0				58.4				91.8				82.1				77.1				80.6				85.5
Existing-day					61.1				61.1				69.0				69.0				69.0				68.4				68.4
Existing-night					57.7				57.7				65.5				65.5				65.5				65.5				65.5
Day Impact					Impact				No impact				Impact				Impact				Impact				Impact				Impact
Night Impact					Impact				No impact				Impact				Impact				Impact				Impact				Impact

Construction Noise Calculations, Alameda Tower and Alpine Tower (Vertical Circulation, Hardscaping, Landscaping, and Interior Work)

Construction Area Alpine Tower (Without Mitigation)

		NSR 5 Future Homeboy Industries Residential				NSR 5 Future Homeboy Industries Residential Top Floor				NSR 6 Chinatown Senior Lofts				NSR 6 Chinatown Senior Lofts Top Floor				NSR 7 Homeboy Industries			
		Elevation: 5				Elevation: 45				Elevation: 15				Elevation: 115				Elevation: 5			
		2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance		
Equipment	Source Elevation	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq
Backhoe	5.0	122.2	122.2	0.0	65.9	122.2	128.6	0.0	65.4	132.8	133.2	0.0	65.1	132.8	172.4	0.0	62.9	100.2	100.2	0.0	67.6
Backhoe	5.0	122.2	122.2	0.0	65.9	122.2	128.6	0.0	65.4	132.8	133.2	0.0	65.1	132.8	172.4	0.0	62.9	100.2	100.2	0.0	67.6
Compactor (ground)	5.0	122.2	122.2	0.0	68.4	122.2	128.6	0.0	68.0	132.8	133.2	0.0	67.7	132.8	172.4	0.0	65.5	100.2	100.2	0.0	70.2
Concrete Mixer Truck	5.0	122.2	122.2	0.0	67.1	122.2	128.6	0.0	66.6	132.8	133.2	0.0	66.3	132.8	172.4	0.0	64.1	100.2	100.2	0.0	68.8
Dump Truck	5.0	122.2	122.2	0.0	64.8	122.2	128.6	0.0	64.3	132.8	133.2	0.0	64.0	132.8	172.4	0.0	61.8	100.2	100.2	0.0	66.5
Pickup Truck	5.0	122.2	122.2	0.0	63.3	122.2	128.6	0.0	62.8	243.3	243.5	0.0	57.3	243.3	267.0	0.0	56.5	112.8	112.8	0.0	64.0
Gradall	5.0	122.2	122.2	0.0	71.7	122.2	128.6	0.0	71.2	132.8	133.2	0.0	70.9	132.8	172.4	0.0	68.7	100.2	100.2	0.0	73.4
Flat Bed Truck	5.0	112.5	112.5	0.0	63.3	112.5	119.4	0.0	62.8	122.5	122.9	0.0	62.5	122.5	164.6	0.0	60.0	88.1	88.1	0.0	65.4
Warning Horn	5.0	122.2	122.2	0.0	62.4	122.2	128.6	0.0	62.0	132.8	133.2	0.0	61.7	132.8	172.4	0.0	59.4	100.2	100.2	0.0	64.2
Warning Horn	5.0	122.2	122.2	0.0	62.4	122.2	128.6	0.0	62.0	132.8	133.2	0.0	61.7	132.8	172.4	0.0	59.4	100.2	100.2	0.0	64.2
Vacuum Street Sweeper	5.0	112.5	112.5	0.0	64.6	112.5	119.4	0.0	64.0	122.5	122.9	0.0	63.8	122.5	164.6	0.0	61.2	88.1	88.1	0.0	66.7
Total					76.8				76.4				75.9				73.7				78.5
Existing-day					65.6				65.6				69.0				69.0				69.8
Existing-night					64.9				64.9				64.1				64.1				65.1
Day Impact					Impact				Impact				Impact				No Impact				Impact
Night Impact					Impact				Impact				Impact				Impact				Impact

Construction Area Alameda Tower (Without Mitigation)

		NSR 4 CA Endowment			
		Elevation: 7			
		2D Distance	3D Distance		
Equipment	Source Elevation	(ft)	(ft.)	Shielding	Leq
Backhoe	5.0	100.9	100.9	0.0	67.5
Backhoe	5.0	100.9	100.9	0.0	67.5
Compactor (ground)	5.0	100.9	100.9	0.0	70.1
Concrete Mixer Truck	5.0	100.9	100.9	0.0	68.7
Dump Truck	5.0	100.9	100.9	0.0	66.4
Pickup Truck	5.0	93.7	93.7	0.0	65.6
Gradall	5.0	100.9	100.9	0.0	73.3
Flat Bed Truck	5.0	79.9	79.9	0.0	66.2
Warning Horn	5.0	100.9	100.9	0.0	64.1
Warning Horn	5.0	100.9	100.9	0.0	64.1
Vacuum Street Sweeper	5.0	79.9	79.9	0.0	67.5
Total					78.7
Existing-day					63.6
Existing-night					60.7
Day Impact					Impact
Night Impact					Impact

Construction Area Alpine Tower (With Mitigation)

		NSR 5 Future Homeboy Industries Residential				NSR 5 Future Homeboy Industries Residential Top Floor				NSR 6 Chinatown Senior Lofts				NSR 6 Chinatown Senior Lofts Top Floor				NSR 7 Homeboy Industries			
		Elevation: 5				Elevation: 45				Elevation: 15				Elevation: 115				Elevation: 5			
		2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance		
Equipment	Source Elevation	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq
Backhoe	5.0	122.2	122.2	10.0	55.9	122.2	128.6	0.0	65.4	132.8	133.2	10.0	55.1	132.8	172.4	0.0	62.9	100.2	100.2	10.0	57.6
Backhoe	5.0	122.2	122.2	10.0	55.9	122.2	128.6	0.0	65.4	132.8	133.2	10.0	55.1	132.8	172.4	0.0	62.9	100.2	100.2	10.0	57.6
Compactor (ground)	5.0	122.2	122.2	10.0	58.4	122.2	128.6	0.0	68.0	132.8	133.2	10.0	57.7	132.8	172.4	0.0	65.5	100.2	100.2	10.0	60.2
Concrete Mixer Truck	5.0	122.2	122.2	10.0	57.1	122.2	128.6	0.0	66.6	132.8	133.2	10.0	56.3	132.8	172.4	0.0	64.1	100.2	100.2	10.0	58.8
Dump Truck	5.0	122.2	122.2	10.0	54.8	122.2	128.6	0.0	64.3	132.8	133.2	10.0	54.0	132.8	172.4	0.0	61.8	100.2	100.2	10.0	56.5
Pickup Truck	5.0	122.2	112.5	10.0	54.0	122.2	119.4	0.0	63.5	243.3	122.9	10.0	53.2	243.3	164.6	0.0	60.7	112.8	88.1	10.0	56.1
Gradall	5.0	122.2	122.2	10.0	61.7	122.2	128.6	0.0	71.2	132.8	243.5	10.0	55.7	132.8	267.0	0.0	64.9	100.2	112.8	10.0	62.4
Flat Bed Truck	5.0	112.5	122.2	0.0	62.6	112.5	128.6	0.0	62.1	122.5	133.2	0.0	61.8	122.5	172.4	0.0	59.6	88.1	100.2	0.0	64.3
Warning Horn	5.0	122.2	122.2	10.0	52.4	122.2	128.6	0.0	62.0	132.8	133.2	10.0	51.7	132.8	172.4	0.0	59.4	100.2	100.2	10.0	54.2
Warning Horn	5.0	122.2	122.2	10.0	52.4	122.2	128.6	0.0	62.0	132.8	133.2	10.0	51.7	132.8	172.4	0.0	59.4	100.2	100.2	10.0	54.2
Vacuum Street Sweeper	5.0	112.5	112.5	0.0	64.6	112.5	119.4	0.0	64.0	122.5	122.9	0.0	63.8	122.5	164.6	0.0	61.2	88.1	88.1	0.0	66.7
Total					69.5				76.4				68.3				72.9				71.3
Existing-day					65.6				65.6				69.0				69.0				69.8
Existing-night					64.9				64.9				64.1				64.1				65.1
Day Impact					No Impact				Impact				No Impact				No Impact				No Impact
Night Impact					No Impact				Impact				No Impact				Impact				Impact

Construction Area Alameda Tower (With Mitigation)

		NSR 4 CA Endowment			
		Elevation: 7			
		2D Distance	3D Distance		
Equipment	Source Elevation	(ft)	(ft.)	Shielding	Leq
Backhoe	5.0	100.9	100.9	10.0	57.5
Backhoe	5.0	100.9	100.9	10.0	57.5
Compactor (ground)	5.0	100.9	100.9	10.0	60.1
Concrete Mixer Truck	5.0	100.9	100.9	10.0	58.7
Dump Truck	5.0	100.9	100.9	10.0	56.4
Pickup Truck	5.0	93.7	79.9	0.0	66.9
Gradall	5.0	100.9	93.7	10.0	64.0
Flat Bed Truck	5.0	79.9	100.9	0.0	64.2
Warning Horn	5.0	100.9	100.9	10.0	54.1
Warning Horn	5.0	100.9	100.9	10.0	54.1
Vacuum Street Sweeper	5.0	79.9	79.9	0.0	67.5
Total					72.9
Existing-day					63.6
Existing-night					60.7
Day Impact					Impact
Night Impact					Impact

Construction Noise Calculations, Chinatown / State Park Station (Vertical Circulation, Hardscaping, Landscaping, and Interior Work)

Construction Area Chinatown / State Park Station (Without Mitigation)

		NSR 8 T College Station Residential				NSR 8 B College Station Residential				NSR 9 Blossom Plaza				NSR 9 Blossom Plaza				NSR 10 Harmony Residential				NSR 10 Harmony Residential			
		Elevation: 70.7				Elevation: 5				Elevation: 26				Elevation: 70				Elevation: 25				Elevation: 265			
		2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance		
Equipment	Source Ele	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq
Backhoe	5.0	119.6	136.5	0.0	64.9	119.6	119.6	0.0	66.0	281.1	281.9	0.0	58.6	281.1	288.5	0.0	58.4	257.5	258.3	0.0	59.4	257.5	365.9	0.0	56.3
Compactor (ground)	5.0	119.6	136.5	0.0	67.5	119.6	119.6	0.0	68.6	481.1	481.6	5.0	51.5	481.1	485.5	5.0	51.5	271.6	272.3	5.0	56.5	271.6	376.0	5.0	53.7
Concrete Mixer Truck	5.0	119.6	136.5	0.0	66.1	119.6	119.6	0.0	67.2	481.1	481.6	5.0	50.1	481.1	485.5	5.0	50.1	271.6	272.3	5.0	55.1	271.6	376.0	5.0	52.3
Crane	5.0	133.3	148.6	0.0	63.2	133.3	133.3	0.0	64.1	741.4	741.7	0.0	49.2	741.4	744.2	0.0	49.2	538.6	539.0	5.0	47.0	538.6	598.1	5.0	46.1
Dump Truck	5.0	119.6	136.5	0.0	63.8	119.6	119.6	0.0	64.9	481.1	481.6	5.0	47.8	481.1	485.5	5.0	47.8	271.6	272.3	5.0	52.8	271.6	376.0	5.0	50.0
Flat Bed Truck	5.0	103.5	122.6	0.0	62.5	103.5	103.5	0.0	64.0	348.7	349.3	0.0	53.4	348.7	354.7	0.0	53.3	382.6	383.1	5.0	47.6	382.6	462.6	5.0	46.0
Pickup Truck	5.0	119.6	136.5	0.0	62.3	119.6	119.6	0.0	63.4	711.4	711.7	0.0	48.0	711.4	714.4	0.0	47.9	511.2	511.6	5.0	45.8	511.2	573.5	5.0	44.8
Welder / Torch	55.0	119.6	120.6	0.0	62.4	119.6	129.6	0.0	61.7	481.1	482.0	5.0	45.3	481.1	481.3	5.0	45.4	271.6	273.3	5.0	50.3	271.6	343.3	5.0	48.3
Warning Horn	5.0	119.6	136.5	0.0	61.5	119.6	119.6	0.0	62.6	481.1	481.6	5.0	45.5	481.1	485.5	5.0	45.4	271.6	272.3	5.0	50.5	271.6	376.0	5.0	47.7
Warning Horn	5.0	119.6	136.5	0.0	61.5	119.6	119.6	0.0	62.6	481.1	481.6	5.0	45.5	481.1	485.5	5.0	45.4	271.6	272.3	5.0	50.5	271.6	376.0	5.0	47.7
Vacuum Street Sweeper	5.0	103.5	122.6	0.0	63.8	103.5	103.5	0.0	65.3	348.7	349.3	0.0	54.7	348.7	354.7	0.0	54.6	382.6	383.1	5.0	48.9	382.6	462.6	5.0	47.3
Total					74.6				75.5				62.6				62.4				63.8				61.1
Existing-day					64.7				64.7				61.1				61.1				61.1				61.1
Existing-night					64.4				64.4				56.5				56.5				56.5				56.5
Day Impact					Impact				Impact				No impact				No impact				No impact				No impact
Night Impact					Impact				Impact				Impact				Impact				Impact				No impact

		NSR 11 Capitol Milling				NSR 12 High Street Residential				NSR 12 High Street Residential				NSR 13 S Riboli Residential Development				NSR 14 S Los Angeles State Historical			
		Elevation: 9				Elevation: 5				Elevation: 35				Elevation: 35				Elevation: 5			
		2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance		
Equipment	Source Ele	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq
Backhoe	5.0	60.5	60.6	0.0	71.9	312.5	312.5	0.0	57.7	312.5	313.9	0.0	57.7	336.5	337.8	5.0	52.0	68.0	68.0	0.0	70.9
Compactor (ground)	5.0	170.0	170.0	5.0	60.6	312.5	312.5	0.0	60.3	312.5	313.9	0.0	60.3	336.5	337.8	5.0	54.6	68.0	68.0	0.0	73.5
Concrete Mixer Truck	5.0	170.0	170.0	5.0	59.2	312.5	312.5	0.0	58.9	312.5	313.9	0.0	58.9	336.5	337.8	5.0	53.2	68.0	68.0	0.0	72.1
Crane	5.0	440.3	440.3	0.0	53.7	332.0	332.0	0.0	56.2	332.0	333.4	0.0	56.2	576.9	577.7	5.0	46.4	216.9	216.9	0.0	59.9
Dump Truck	5.0	170.0	170.0	5.0	56.9	312.5	312.5	0.0	56.6	312.5	313.9	0.0	56.6	336.5	337.8	5.0	50.9	68.0	68.0	0.0	69.8
Flat Bed Truck	5.0	136.6	136.7	0.0	61.6	300.3	300.3	0.0	54.7	300.3	301.8	0.0	54.7	631.0	631.7	5.0	43.3	184.1	184.1	0.0	59.0
Pickup Truck	5.0	411.0	411.0	0.0	52.7	316.5	316.5	0.0	55.0	316.5	317.9	0.0	55.0	564.0	564.8	5.0	45.0	198.2	198.2	0.0	59.1
Welder / Torch	55.0	170.0	176.1	5.0	54.1	338.0	341.7	0.0	53.3	338.0	338.6	0.0	53.4	506.2	506.6	5.0	44.9	218.2	223.9	0.0	57.0
Warning Horn	5.0	170.0	170.0	5.0	54.6	312.5	312.5	0.0	54.3	312.5	313.9	0.0	54.2	336.5	337.8	5.0	48.6	68.0	68.0	0.0	67.5
Warning Horn	5.0	170.0	170.0	5.0	54.6	312.5	312.5	0.0	54.3	312.5	313.9	0.0	54.2	336.5	337.8	5.0	48.6	68.0	68.0	0.0	67.5
Vacuum Street Sweeper	5.0	136.6	136.7	0.0	62.9	300.3	300.3	0.0	56.0	300.3	301.8	0.0	56.0	631.0	631.7	5.0	44.6	184.1	184.1	0.0	60.3
Total					73.6				67.1				67.0				60.3				78.8
Existing-day					63.0				64.7				64.7				67.7				58.7
Existing-night					59.5				64.4				64.4				63.6				55.2
Day Impact					Impact				No impact				No impact				No impact				Impact
Night Impact					Impact				No impact				No impact				No impact				Impact

Construction Area Chinatown / State Park Station (With Mitigation)

		NSR 8 T College Station Residential				NSR 8 B College Station Residential				NSR 9 Blossom Plaza				NSR 9 Blossom Plaza				NSR 10 Harmony Residential				NSR 10 Harmony Residential			
		Elevation: 70.7				Elevation: 5				Elevation: 26				Elevation: 70				Elevation: 25				Elevation: 265			
		2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance		
Equipment	Source Ele	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq
Backhoe	5.0	119.6	136.5	10.0	54.9	119.6	119.6	10.0	56.0	281.1	281.9	10.0	48.6	281.1	288.5	0.0	58.4	257.5	258.3	10.0	49.4	257.5	365.9	0.0	56.3
Compactor (ground)	5.0	119.6	136.5	10.0	57.5	119.6	119.6	10.0	58.6	481.1	481.6	10.0	46.5	481.1	485.5	5.0	51.5	271.6	272.3	10.0	51.5	271.6	376.0	5.0	53.7
Concrete Mixer Truck	5.0	119.6	136.5	10.0	56.1	119.6	119.6	10.0	57.2	481.1	481.6	10.0	45.1	481.1	485.5	5.0	50.1	271.6	272.3	10.0	50.1	271.6	376.0	5.0	52.3
Crane	5.0	133.3	148.6	10.0	53.2	133.3	133.3	10.0	54.1	741.4	741.7	10.0	39.2	741.4	744.2	0.0	49.2	538.6	539.0	10.0	42.0	538.6	598.1	5.0	46.1
Dump Truck	5.0	119.6	136.5	10.0	53.8	119.6	119.6	10.0	54.9	481.1	481.6	10.0	42.8	481.1	485.5	5.0	47.8	271.6	272.3	10.0	47.8	271.6	376.0	5.0	50.0
Flat Bed Truck	5.0	103.5	122.6	0.0	62.5	103.5	103.5	0.0	64.0	348.7	349.3	10.0	43.4	348.7	354.7	0.0	53.3	382.6	383.1	10.0	42.6	382.6	462.6	5.0	46.0
Pickup Truck	5.0	119.6	136.5	10.0	52.3	119.6	119.6	10.0	53.4	711.4	711.7	10.0	38.0	711.4	714.4	0.0	47.9	511.2	511.6	10.0	40.8	511.2	573.5	5.0	44.8
Welder / Torch	55.0	119.6	120.6	10.0	52.4	119.6	129.6	10.0	51.7	481.1	482.0	10.0	40.3	481.1	481.3	5.0	45.4	271.6	273.3	10.0	45.3	271.6	343.3	5.0	48.3
Warning Horn	5.0	119.6	136.5	10.0	51.5	119.6	119.6	10.0	52.6	481.1	481.6	10.0	40.5	481.1	485.5	5.0	45.4	271.6	272.3	10.0	45.5	271.6	376.0	5.0	47.7
Warning Horn	5.0	119.6	136.5	10.0	51.5	119.6	119.6	10.0	52.6	481.1	481.6	10.0	40.5	481.1	485.5	5.0	45.4	271.6	272.3	10.0	45.5	271.6	376.0	5.0	47.7
Vacuum Street Sweeper	5.0	103.5	122.6	0.0	63.8	103.5	103.5	0.0	65.3	348.7	349.3	10.0	44.7	348.7	354.7	0.0	54.6	382.6	383.1	10.0	43.9	382.6	462.6	5.0	47.3
Total					68.2				69.5				54.3				62.4				57.5				61.1
Existing-day					64.7				64.7				61.1				61.1				61.1				61.1
Existing-night					64.4				64.4				56.5				56.5				56.5				56.5
Day Impact					No impact				No impact				No impact				No impact				No impact				No impact
Night Impact					No impact				Impact				No impact				Impact				No impact				No impact

		NSR 11 Capitol Milling				NSR 12 High Street Residential				NSR 12 High Street Residential				NSR 13 S Riboli Residential Development				NSR 14 S Los Angeles State Historical			
		Elevation: 9				Elevation: 5				Elevation: 35				Elevation: 35				Elevation: 5			
		2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance		
Equipment	Source Ele	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq
Backhoe	5.0	60.5	60.6	10.0	61.9	312.5	312.5	10.0	47.7	312.5	313.9	0.0	57.7	336.5	337.8	10.0	47.0	68.0	68.0	10.0	60.9
Compactor (ground)	5.0	170.0	170.0	10.0	55.6	312.5	312.5	10.0	50.3	312.5	313.9	0.0	60.3	336.5	337.8	10.0	49.6	68.0	68.0	10.0	63.5
Concrete Mixer Truck	5.0	170.0	170.0	10.0	54.2	312.5	312.5	10.0	48.9	312.5	313.9	0.0	58.9	336.5	337.8	10.0	48.2	68.0	68.0	10.0	62.1
Crane	5.0	440.3	440.3	10.0	43.7	332.0	332.0	10.0	46.2	332.0	333.4	0.0	56.2	576.9	577.7	10.0	41.4	216.9	216.9	10.0	49.9
Dump Truck	5.0	170.0	170.0	10.0	51.9	312.5	312.5	10.0	46.6	312.5	313.9	0.0	56.6	336.5	337.8	10.0	45.9	68.0	68.0	10.0	59.8
Flat Bed Truck	5.0	136.6	136.7	10.0	51.6	300.3	300.3	10.0	44.7	300.3	301.8	0.0	54.7	631.0	631.7	10.0	38.3	184.1	184.1	10.0	49.0
Pickup Truck	5.0	411.0	411.0	10.0	42.7	316.5	316.5	10.0	45.0	316.5	317.9	0.0	55.0	564.0	564.8	10.0	40.0	198.2	198.2	10.0	49.1
Welder / Torch	55.0	170.0	176.1	10.0	49.1	338.0	341.7	10.0	43.3	338.0	338.6	0.0	53.4	506.2	506.6	10.0	39.9	218.2	223.9	10.0	47.0
Warning Horn	5.0	170.0	170.0	10.0	49.6	312.5	312.5	10.0	44.3	312.5	313.9	0.0	54.2	336.5	337.8	10.0	43.6	68.0	68.0	10.0	57.5
Warning Horn	5.0	170.0	170.0	10.0	49.6	312.5	312.5	10.0	44.3	312.5	313.9	0.0	54.2	336.5	337.8	10.0	43.6	68.0	68.0	10.0	57.5
Vacuum Street Sweeper	5.0	136.6	136.7	10.0	52.9	300.3	300.3	10.0	46.0	300.3	301.8	0.0	56.0	631.0	631.7	10.0	39.6	184.1	184.1	10.0	50.3
Total					64.7				57.1				67.0				55.3				68.8
Existing-day					63.0				64.7				64.7				67.7				58.7
Existing-night					59.5				64.4				64.4				63.6				55.2
Day Impact					No impact				No impact				No impact				No impact				Impact
Night Impact					Impact				No impact				No impact				No impact				Impact

Construction Noise Calculations, Broadway Junction (Vertical Circulation, Hardscaping, Landscaping, and Interior Work)

Construction Area Broadway Junction (Without Mitigation)

		NSR 13 S Riboli Residential Development				NSR 13 N Riboli Residential Development				NSR 14 N Los Angeles State Historical Park				NSR 15 St Peter's Church				NSR 16 Cathedral HS				NSR 17 N Low Rise Residential				NSR 17 S Low Rise Residential			
		Elevation: -10				Elevation: 5				Elevation: -30				Elevation: 5				Elevation: 15				Elevation: 25				Elevation: 15			
		2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance		
Equipment	Source Elevation	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq
Backhoe	5.0	702.2	702.4	0.0	50.7	635.7	635.7	0.0	51.5	329.5	331.4	0.0	57.2	585.5	585.5	0.0	52.2	147.9	148.2	0.0	64.2	160.7	161.9	0.0	63.4	44.4	45.5	0.0	74.4
Compactor (ground)	5.0	702.2	702.4	0.0	53.3	635.7	635.7	0.0	54.1	329.5	331.4	0.0	59.8	585.5	585.5	0.0	54.8	147.9	148.2	0.0	66.8	160.7	161.9	0.0	66.0	44.4	45.5	0.0	77.0
Concrete Mixer Truck	5.0	702.2	702.4	0.0	51.9	635.7	635.7	0.0	52.7	329.5	331.4	0.0	58.4	585.5	585.5	0.0	53.4	147.9	148.2	0.0	65.4	160.7	161.9	0.0	64.6	44.4	45.5	0.0	75.6
Crane	5.0	847.1	847.2	0.0	48.1	728.0	728.0	0.0	49.4	451.0	452.5	0.0	53.5	730.9	730.9	0.0	49.3	390.7	391.1	0.0	54.8	302.6	303.9	0.0	57.0	137.1	138.3	0.0	63.8
Dump Truck	5.0	702.2	702.4	0.0	49.6	635.7	635.7	0.0	50.4	329.5	331.4	0.0	56.1	585.5	585.5	0.0	51.1	147.9	148.2	0.0	63.1	160.7	161.9	0.0	62.3	44.4	45.5	0.0	73.3
Flat Bed Truck	5.0	707.7	707.9	0.0	47.3	597.0	597.0	0.0	48.8	318.5	320.4	0.0	54.2	605.3	605.3	0.0	48.7	434.9	435.3	0.0	51.5	305.4	306.7	0.0	54.6	165.0	166.0	0.0	59.9
Pickup Truck	5.0	856.5	856.6	0.0	46.3	635.7	635.7	0.0	48.9	453.3	454.6	0.0	51.8	751.3	751.3	0.0	47.5	355.1	355.4	0.0	54.0	228.8	230.2	0.0	57.8	84.5	85.8	0.0	66.3
Welder / Torch	27.6	702.2	703.2	0.0	47.1	635.7	636.1	0.0	47.9	329.5	334.5	0.0	53.5	585.5	585.9	0.0	48.6	147.9	148.4	0.0	60.6	160.7	160.7	0.0	59.9	44.4	46.2	0.0	70.7
Warning Horn	5.0	702.2	702.4	0.0	47.2	635.7	635.7	0.0	48.1	329.5	331.4	0.0	53.8	585.5	585.5	0.0	48.8	147.9	148.2	0.0	60.7	160.7	161.9	0.0	60.0	44.4	45.5	0.0	71.0
Warning Horn	5.0	702.2	702.4	0.0	47.2	635.7	635.7	0.0	48.1	329.5	331.4	0.0	53.8	585.5	585.5	0.0	48.8	147.9	148.2	0.0	60.7	160.7	161.9	0.0	60.0	44.4	45.5	0.0	71.0
Vacuum Street Sweeper	5.0	707.7	707.9	0.0	48.6	597.0	597.0	0.0	50.1	318.5	320.4	0.0	55.5	605.3	605.3	0.0	49.9	434.9	435.3	0.0	52.8	305.4	306.7	0.0	55.8	165.0	166.0	0.0	61.2
Total					59.8				60.9				66.3				61.3				72.4				71.9				82.6
Existing-day					67.7				65.8				53.6				65.8				58.7				56.1				56.1
Existing-night					63.6				60.9				48.7				60.9				53.8				51.2				51.2
Day Impact					No impact				No impact				Impact				No impact				Impact				Impact				Impact
Night Impact					No impact				No impact				Impact				No impact				Impact				Impact				Impact

Construction Area Broadway Junction (With Mitigation)

		NSR 13 S Riboli Residential Development				NSR 13 N Riboli Residential Development				NSR 14 N Los Angeles State Historical Park				NSR 15 St Peter's Church				NSR 16 Cathedral HS				NSR 17 N Low Rise Residential				NSR 17 S Low Rise Residential			
		Elevation: -10				Elevation: 5				Elevation: -30				Elevation: 5				Elevation: 15				Elevation: 25				Elevation: 15			
		2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance		
Equipment	Source Elevation	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq
Backhoe	5.0	702.2	702.4	0.0	50.7	635.7	635.7	0.0	51.5	329.5	331.4	10.0	47.2	585.5	585.5	10.0	42.2	147.9	148.2	10.0	54.2	160.7	161.9	10.0	53.4	44.4	45.5	10.0	64.4
Compactor (ground)	5.0	702.2	702.4	0.0	53.3	635.7	635.7	0.0	54.1	329.5	331.4	10.0	49.8	585.5	585.5	10.0	44.8	147.9	148.2	10.0	56.8	160.7	161.9	10.0	56.0	44.4	45.5	10.0	67.0
Concrete Mixer Truck	5.0	702.2	702.4	0.0	51.9	635.7	635.7	0.0	52.7	329.5	331.4	10.0	48.4	585.5	585.5	10.0	43.4	147.9	148.2	10.0	55.4	160.7	161.9	10.0	54.6	44.4	45.5	10.0	65.6
Crane	5.0	847.1	847.2	0.0	48.1	728.0	728.0	0.0	49.4	451.0	452.5	10.0	43.5	730.9	730.9	0.5	48.9	390.7	391.1	10.0	44.8	302.6	303.9	10.0	47.0	137.1	138.3	10.0	53.8
Dump Truck	5.0	702.2	702.4	0.0	49.6	635.7	635.7	0.0	50.4	329.5	331.4	10.0	46.1	585.5	585.5	10.0	41.1	147.9	148.2	10.0	53.1	160.7	161.9	10.0	52.3	44.4	45.5	10.0	63.3
Flat Bed Truck	5.0	707.7	707.9	0.0	47.3	597.0	597.0	0.0	48.8	318.5	320.4	10.0	44.2	605.3	605.3	0.0	48.7	434.9	435.3	0.0	51.5	305.4	306.7	10.0	44.6	165.0	166.0	10.0	49.9
Pickup Truck	5.0	856.5	856.6	0.0	46.3	635.7	635.7	0.0	48.9	453.3	454.6	10.0	41.8	751.3	751.3	1.7	45.7	355.1	355.4	10.0	44.0	228.8	230.2	10.0	47.8	84.5	85.8	10.0	56.3
Welder / Torch	27.6	702.2	703.2	0.0	47.1	635.7	636.1	0.0	47.9	329.5	334.5	10.0	43.5	585.5	585.9	0.0	48.6	147.9	148.4	10.0	50.6	160.7	160.7	10.0	49.9	44.4	46.2	10.0	60.7
Warning Horn	5.0	702.2	702.4	0.0	47.2	635.7	635.7	0.0	48.1	329.5	331.4	10.0	43.8	585.5	585.5	10.0	38.8	147.9	148.2	10.0	50.7	160.7	161.9	10.0	50.0	44.4	45.5	10.0	61.0
Warning Horn	5.0	702.2	702.4	0.0	47.2	635.7	635.7	0.0	48.1	329.5	331.4	10.0	43.8	585.5	585.5	10.0	38.8	147.9	148.2	10.0	50.7	160.7	161.9	10.0	50.0	44.4	45.5	10.0	61.0
Vacuum Street Sweeper	5.0	707.7	707.9	0.0	48.6	597.0	597.0	0.0	50.1	318.5	320.4	10.0	45.5	605.3	605.3	0.0	49.9	434.9	435.3	0.0	52.8	305.4	306.7	10.0	45.8	165.0	166.0	10.0	51.2
Total					59.8				60.9				56.3				56.6				63.1				61.9				72.6
Existing-day					67.7				65.8				53.6				65.8				58.7				56.1				56.1
Existing-night					63.6				60.9				48.7				60.9				53.8				51.2				51.2
Day Impact					No impact				No impact				No impact				No impact				No impact				Impact				Impact
Night Impact					No impact				No impact				Impact				No impact				Impact				Impact				Impact

Construction Noise Calculations, Stadium Tower and Stadium Station (Vertical Circulation, Hardscaping, Landscaping, and Interior Work)

Construction Area Dodger Stadium Station (Without Mitigation)

		NSR 16	Cathedral HS			NSR 18	Solano Canyon Neighborhood		
		Elevation:	-140			Elevation:	-75		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Backhoe	5.0	720.0	734.5	5.0	45.3	1290.0	1292.5	5.0	40.4
Compactor (ground)	5.0	720.0	734.5	5.0	47.9	1290.0	1292.5	5.0	43.0
Concrete Mixer Truck	5.0	720.0	734.5	5.0	46.5	1290.0	1292.5	5.0	41.6
Crane	5.0	908.0	919.5	5.0	42.3	1703.3	1705.2	5.0	37.0
Dump Truck	5.0	720.0	734.5	5.0	44.2	1290.0	1292.5	5.0	39.3
Flat Bed Truck	5.0	720.0	734.5	5.0	42.0	1725.3	1727.2	5.0	34.6
Pickup Truck	5.0	1094.9	1104.5	5.0	39.1	1567.3	1569.3	5.0	36.1
Welder / Torch	74.0	720.0	751.1	5.0	41.5	1290.0	1298.6	5.0	36.7
Warning Horn	5.0	720.0	734.5	5.0	41.8	1290.0	1292.5	5.0	36.9
Warning Horn	5.0	720.0	734.5	5.0	41.8	1290.0	1292.5	5.0	36.9
Vacuum Street Sweeper	5.0	720.0	734.5	5.0	43.3	1725.3	1727.2	5.0	35.8
Total					54.4				49.2
Existing-day					58.7				56.5
Existing-night					53.8				51.6
Day Impact					No impact				No impact
Night Impact					No impact				No impact

Construction Area Dodger Stadium Station (With Mitigation)

		NSR 16	Cathedral HS			NSR 18	Solano Canyon Neighborhood		
		Elevation:	-140			Elevation:	-75		
Equipment	Source Elevation	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq	2D Distance (ft)	3D Distance (ft.)	Shielding	Leq
Backhoe	5.0	720.0	734.5	5.0	45.3	1290.0	1292.5	5.0	40.4
Compactor (ground)	5.0	720.0	734.5	5.0	47.9	1290.0	1292.5	5.0	43.0
Concrete Mixer Truck	5.0	720.0	734.5	5.0	46.5	1290.0	1292.5	5.0	41.6
Crane	5.0	908.0	919.5	5.0	42.3	1703.3	1705.2	5.0	37.0
Dump Truck	5.0	720.0	734.5	5.0	44.2	1290.0	1292.5	5.0	39.3
Flat Bed Truck	5.0	720.0	734.5	5.0	42.0	1725.3	1727.2	5.0	34.6
Pickup Truck	5.0	1094.9	1104.5	5.0	39.1	1567.3	1569.3	5.0	36.1
Welder / Torch	74.0	720.0	751.1	5.0	41.5	1290.0	1298.6	5.0	36.7
Warning Horn	5.0	720.0	734.5	5.0	41.8	1290.0	1292.5	5.0	36.9
Warning Horn	5.0	720.0	734.5	5.0	41.8	1290.0	1292.5	5.0	36.9
Vacuum Street Sweeper	5.0	720.0	734.5	5.0	43.3	1725.3	1727.2	5.0	35.8
Total					54.4				49.2
Existing-day					58.7				56.5
Existing-night					53.8				51.6
Day Impact					No impact				No impact
Night Impact					No impact				No impact

Construction Area Stadium Tower (Without Mitigation)

		NSR 16	Cathedral HS			NSR 17 N	Low Rise Residential			NSR 18	Solano Canyon Neighborhood		
		Elevation:	-40			Elevation:	-40			Elevation:	25		
		2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance		
Equipment	Source Elevation	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq
Backhoe	5.0	561.1	562.9	5.0	47.6	862.1	863.3	5.0	43.9	1819.6	1819.7	5.0	37.4
Backhoe	5.0	561.1	562.9	5.0	47.6	862.1	863.3	5.0	43.9	1819.6	1819.7	5.0	37.4
Compactor (ground)	5.0	561.1	562.9	5.0	50.2	862.1	863.3	5.0	46.5	1819.6	1819.7	5.0	40.0
Concrete Mixer Truck	5.0	561.1	562.9	5.0	48.8	862.1	863.3	5.0	45.1	1819.6	1819.7	5.0	38.6
Dump Truck	5.0	561.1	562.9	5.0	46.5	862.1	863.3	5.0	42.8	1819.6	1819.7	5.0	36.3
Pickup Truck	5.0	629.7	631.3	5.0	44.0	936.2	937.3	5.0	40.6	1813.5	1813.6	5.0	34.8
Gradall	5.0	561.1	562.9	5.0	53.4	862.1	863.3	5.0	49.7	1819.6	1819.7	5.0	43.2
Flat Bed Truck	5.0	530.4	532.3	5.0	44.8	834.5	835.7	5.0	40.9	2023.0	2023.1	5.0	33.2
Warning Horn	5.0	561.1	562.9	5.0	44.2	862.1	863.3	5.0	40.4	1819.6	1819.7	5.0	34.0
Warning Horn	5.0	561.1	562.9	5.0	44.2	862.1	863.3	5.0	40.4	1819.6	1819.7	5.0	34.0
Vacuum Street Sweeper	5.0	530.4	532.3	5.0	46.1	834.5	835.7	5.0	42.1	2023.0	2023.1	5.0	34.5
Total					58.5				54.8				48.2
Existing-day					58.7				56.1				56.5
Existing-night					53.8				51.2				51.6
Day Impact					No impact				No impact				No impact
Night Impact					No impact				No impact				No impact

Construction Area Stadium Tower (With Mitigation)

		NSR 16	Cathedral HS			NSR 17 N	Low Rise Residential			NSR 18	Solano Canyon Neighborhood		
		Elevation:	-40			Elevation:	-40			Elevation:	25		
		2D Distance	3D Distance			2D Distance	3D Distance			2D Distance	3D Distance		
Equipment	Source Elevation	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq	(ft)	(ft.)	Shielding	Leq
Backhoe	5.0	561.1	562.9	5.0	47.6	862.1	863.3	5.0	43.9	1819.6	1819.7	5.0	37.4
Backhoe	5.0	561.1	562.9	5.0	47.6	862.1	863.3	5.0	43.9	1819.6	1819.7	5.0	37.4
Compactor (ground)	5.0	561.1	562.9	5.0	50.2	862.1	863.3	5.0	46.5	1819.6	1819.7	5.0	40.0
Concrete Mixer Truck	5.0	561.1	562.9	5.0	48.8	862.1	863.3	5.0	45.1	1819.6	1819.7	5.0	38.6
Dump Truck	5.0	561.1	562.9	5.0	46.5	862.1	863.3	5.0	42.8	1819.6	1819.7	5.0	36.3
Pickup Truck	5.0	629.7	532.3	5.0	45.5	936.2	835.7	5.0	41.6	1813.5	2023.1	5.0	33.9
Gradall	5.0	561.1	631.3	5.0	52.4	862.1	937.3	5.0	49.0	1819.6	1813.6	5.0	43.2
Flat Bed Truck	5.0	530.4	562.9	5.0	44.3	834.5	863.3	5.0	40.6	2023.0	1819.7	5.0	34.1
Warning Horn	5.0	561.1	562.9	5.0	44.2	862.1	863.3	5.0	40.4	1819.6	1819.7	5.0	34.0
Warning Horn	5.0	561.1	562.9	5.0	44.2	862.1	863.3	5.0	40.4	1819.6	1819.7	5.0	34.0
Vacuum Street Sweeper	5.0	530.4	532.3	5.0	46.1	834.5	835.7	5.0	42.1	2023.0	2023.1	5.0	34.5
Total					58.2				54.6				48.2
Existing-day					58.7				56.1				56.5
Existing-night					53.8				51.2				51.6
Day Impact					No impact				No impact				No impact
Night Impact					No impact				No impact				No impact

Construction Noise Calculations, Mesa Laydown Area (Mesa Lot)

Mesa Lot Laydown Area (Without Mitigation)													
		Mesa NSR 1	Park			Mesa NSR 2	Basketball Court			Mesa NSR 3	Picnic Tables		
		Elevation:	583			Elevation:	560			Elevation:	564		
Equipment	**Source Elevation**	**X Distance (ft)**	**Distance (ft.)**	**Shielding**	**Leq**	**X Distance (ft)**	**Distance (ft.)**	**Shielding**	**Leq**	**X Distance (ft)**	**Distance (ft.**	**Shielding**	**Leq**
Crane	620.0	620.9	622.0	5.0	45.7	852.9	855.0	5.0	43.0	928.1	929.8	5.0	42.3
Gradall	617.0	482.5	483.7	5.0	54.7	698.5	700.8	5.0	51.5	742.7	744.6	5.0	51.0
Gradall	617.0	720.7	721.5	5.0	51.2	915.7	917.5	5.0	49.1	922.3	923.8	5.0	49.1
Flat Bed Truck	615.0	386.0	387.3	5.0	47.5	628.5	630.9	5.0	43.3	755.2	756.9	5.0	41.7
Total					57.2				54.2				53.8
Existing-day					58.7				53.6				58.7
Existing-night					55.2				48.7				55.2
Day Impact					No impact				No impact				No impact
Night Impact					No impact				Impact				No impact

B.2 Construction Vibration Calculation Sheets

Alameda Station

Construction Vibration Screening Analysis				Note: 1 foot used for "Zero Feet" Calc.						Ref Levels (PPV ips @ 25 ft.) 0.089	0.210	0.060	0.076				
Project Component	Construction Location	Nearby Structures (<200 feet or closest)	Building Category	Impact Threshold		Distance (feet)				Predicted Vib. Velocity				Potential Impact			
				Damage (PPV,ips)	Annoyance (VdB)	direction	Drill/ Excav.	Vib. Roller	Loaded Trucks	Drill/ Excav.	Vib. Roller	Plate Compt.	Loaded Trucks	Max Vib (IPS)	Max Vib (VdB)	Damage	Annoyance
Alameda Station	Alameda Station Foundations and Columns	Old Winery	III Non-Eng.	0.2	75	W	40	40	17	0.05	0.13	0.04	0.12	0.13	90	No	Yes
		Avila Adobe- older portion	IV Fragile	0.08	75	W	140	80	134	0.01	0.06	0.02	0.01	0.06	83	No	Yes
		Avila Adobe- newer portion	II Engineered	0.2	75	W	57	57	55	0.04	0.08	0.02	0.03	0.08	87	No	Yes
		Plaza Substation	III Non-Eng.	0.2	75	W	125	53	115	0.02	0.09	0.03	0.01	0.09	87	No	Yes
		El Grito Mural	III Non-Eng.	0.2	75	W	42	42	60	0.05	0.12	0.03	0.03	0.12	89	No	Yes
		Mozaic Apartments- Alameda Façade	I Reinfored	0.5	72	E	51	51	53	0.04	0.10	0.03	0.03	0.10	88	No	Yes
		Mozaic Apartments-LAUS Façade	I Reinforced	0.5	72	E	NA	NA	22	NA	NA	NA	0.09	0.09	87	No	Yes
		LAUS Terminal	II Engineered	0.3	75	SE	236	241	42	0.01	0.02	0.00	0.04	0.04	81	No	Yes
Alameda Station	LAUS Forecourt (Vertical Circulation on east side of station)	Mozaic Apartments- Alameda Façade	I Reinforced	0.5	72	N	15	14	53	0.16	0.40	0.11	0.03	0.40	100	No	Yes
		Mozaic Apartments-LAUS Façade	I Reinforced	0.5	72	N	NA	NA	22	NA	NA	NA	0.09	0.09	87	No	Yes
		LAUS Terminal	II Engineered	0.3	75	E	137	155	42	0.01	0.03	0.01	0.04	0.04	81	No	Yes
	Forecourt Hardscape	LAUS Terminal	II Engineered	0.3	75	SE		102	42		0.04	0.01	0.04	0.04	81	No	Yes
	Placita De Dolores (Vertical Circulation on west side of station)	Old Winery	III Non-Eng.	0.2	75	W	28	1	17	0.08	7.24	2.07	0.12	7.24	125	Yes	Yes
		Avila Adobe- older portion	IV Fragile	0.12	75	W	105	80	134	0.02	0.06	0.02	0.01	0.06	83	No	Yes
		Avila Adobe- newer portion	II Engineered	0.2	75	W	23	1	55	0.10	7.24	2.07	0.03	7.24	125	Yes	Yes
		El Grito Mural	III Non-Eng.	0.2	75	S	12	4	30	0.20	1.58	0.45	0.06	1.58	112	Yes	Yes
		Plaza Substation	III Non-Eng.	0.2	75	W	78	53	115	0.03	0.09	0.03	0.01	0.09	87	No	Yes

Alameda Tower, Alpine Tower, Chinatown/State Park Station, Broadway Junction, Stadium Tower, and Dodger Stadium Station

Construction Vibration Screening Analysis				Note: 1 foot used for "Zero Feet" Calc.						Ref Levels (PPV ips @ 25 ft.)							
										0.089	0.210	0.060	0.076				
Project Component	Construction Location	Nearby Structures (<200 feet or closest)	Building Category	Impact Threshold			Distance (feet)			Predicted Vib. Velocity						Potential Impact	
				Damage (PPV,ips)	Annoyance (VdB)	direction	Drill/ Excav.	Vib. Roller	Loaded Trucks	Drill/ Excav.	Vib. Roller	Plate Compt.	Loaded Trucks	Max Vib (IPS)	Max Vib (VdB)	Damage	Annoyance
Alameda Tower	Foundation	California Endowment	I Reinforced	0.5	75	SE	75	80	44	0.03	0.06	0.02	0.04	0.06	83	No	Yes
		Starlight Nails and Beauty Supply	III Non-Eng.	0.2	75	N	47	46	13	0.04	0.11	0.03	0.16	0.16	92	No	Yes
		LA County Fleet Services	I Reinforced	0.5	75	NW	60	65	42	0.03	0.07	0.02	0.04	0.07	85	No	Yes
	Roadway	California Endowment	I Reinforced	0.5	75	SE	NA	80	44	NA	0.06	0.03	0.04	0.06	83	No	Yes
		Starlight Nails and Beauty Supply	III Non-Eng.	0.2	75	N	NA	46	13	NA	0.11	0.12	0.16	0.16	92	No	Yes
		LA County Fleet Services	I Reinforced	0.5	75	NW	NA	65	42	NA	0.07	0.03	0.04	0.07	85	No	Yes
Alpine Tower		Homeboy Industries	I Reinforced	0.5	75	N	46	51	13	0.05	0.10	0.03	0.16	0.16	92	No	Yes
		Chinatown Senior Lofts	II Engineered	0.3	72	NW	48	53	36	0.04	0.09	0.03	0.05	0.09	87	No	Yes
Chinatown/State Park Station		College Station Residential Development (future)	I Reinforced	0.5	72	SE	40	40	12	0.05	0.13	0.04	0.17	0.17	93	No	Yes
		Blossom Plaza	II Engineered	0.3	72	SW	395	395	250	0.00	0.01	0.00	0.01	0.01	68	No	No
		Capitol Milling Company	III Non-Eng.	0.2	75	SW	93	56	54	0.02	0.09	0.02	0.03	0.09	87	No	Yes
Broadway Junction		Cathedral HS auditorium	I Reinforced	0.5	72	W	31	20	16	0.07	0.27	0.08	0.12	0.27	97	No	Yes
		Cathrdral HS Classrooms	II Engineered	0.3	72	NW	79	38	33	0.03	0.13	0.04	0.06	0.13	90	No	Yes
		451 Savoy	III Non-Eng.	0.2	72	N	110	36	22	0.02	0.14	0.04	0.09	0.14	91	No	Yes
		437 Savoy	III Non-Eng.	0.2	72	NE	126	57	21	0.02	0.08	0.02	0.09	0.09	87	No	Yes
		Other homes on Savoy	III Non-Eng.	0.2	72	NE	127	64	12	0.01	0.07	0.02	0.17	0.17	93	No	Yes
		Cathedral HS Office Building	III Non-Eng.	0.2	75	NW	79	38	33	0.03	0.13	0.04	0.06	0.13	90	No	Yes
		St. Peter's Church	III Non-Eng.	0.2	75	SW	380	380	360	0.00	0.01	0.00	0.00	0.01	68	No	No
Stadium Tower		Cathedral HS Office Building	II Engineered	0.3	75	SE	495	495	300	0.00	0.01	0.00	0.00	0.01	66	No	No
Dodger Stadium Station		Solano Canyon Homes on Amador Street	III Non-Eng.	0.2	72	NE	1258	1258	1050	0.00	0.00	0.00	0.00	0.00	57	No	No

B.3 Operational Noise Calculation Sheets

Operational Noise Calculations, System Noise

System Noise		Leq By Hour																							
	Scenario I	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
	Mode ID:	6	6	6	6	6	6	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1
ML-01	Union Station Forecourt	0.0	0.0	0.0	0.0	0.0	0.0	46.5	46.5	46.5	46.5	46.5	46.5	46.5	46.5	46.5	46.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5
ML-02		0.0	0.0	0.0	0.0	0.0	0.0	49.4	49.4	49.4	49.4	49.4	49.4	49.4	49.4	49.4	49.4	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6
ML-03		0.0	0.0	0.0	0.0	0.0	0.0	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8
ML-04		0.0	0.0	0.0	0.0	0.0	0.0	39.8	39.8	39.8	39.8	39.8	39.8	39.8	39.8	39.8	39.8	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1
ML-05		0.0	0.0	0.0	0.0	0.0	0.0	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3
ML-06		0.0	0.0	0.0	0.0	0.0	0.0	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	47.2	47.2	47.2	47.2	47.2	47.2	47.2	47.2
ML-07		0.0	0.0	0.0	0.0	0.0	0.0	46.3	46.3	46.3	46.3	46.3	46.3	46.3	46.3	46.3	46.3	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5
ML-08		0.0	0.0	0.0	0.0	0.0	0.0	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8	46.3	46.3	46.3	46.3	46.3	46.3	46.3	46.3
ML-09		0.0	0.0	0.0	0.0	0.0	0.0	48.1	48.1	48.1	48.1	48.1	48.1	48.1	48.1	48.1	48.1	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7
ML-10		0.0	0.0	0.0	0.0	0.0	0.0	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6
ML-11		0.0	0.0	0.0	0.0	0.0	0.0	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4
ML-12		0.0	0.0	0.0	0.0	0.0	0.0	46.2	46.2	46.2	46.2	46.2	46.2	46.2	46.2	46.2	46.2	48.4	48.4	48.4	48.4	48.4	48.4	48.4	48.4
ML-13		0.0	0.0	0.0	0.0	0.0	0.0	63.2	63.2	63.2	63.2	63.2	63.2	63.2	63.2	63.2	63.2	66.9	66.9	66.9	66.9	66.9	66.9	66.9	66.9
ML-14		0.0	0.0	0.0	0.0	0.0	0.0	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	56.2	56.2	56.2	56.2	56.2	56.2	56.2	56.2
ML-15		0.0	0.0	0.0	0.0	0.0	0.0	44.5	44.5	44.5	44.5	44.5	44.5	44.5	44.5	44.5	44.5	47.2	47.2	47.2	47.2	47.2	47.2	47.2	47.2
ML-16		0.0	0.0	0.0	0.0	0.0	0.0	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0
ML-17		0.0	0.0	0.0	0.0	0.0	0.0	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	56.2	56.2	56.2	56.2	56.2	56.2	56.2	56.2
ML-18		0.0	0.0	0.0	0.0	0.0	0.0	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8
ML-19		0.0	0.0	0.0	0.0	0.0	0.0	54.4	54.4	54.4	54.4	54.4	54.4	54.4	54.4	54.4	54.4	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0
ML-20		0.0	0.0	0.0	0.0	0.0	0.0	53.2	53.2	53.2	53.2	53.2	53.2	53.2	53.2	53.2	53.2	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0
ML-21		0.0	0.0	0.0	0.0	0.0	0.0	35.2	35.2	35.2	35.2	35.2	35.2	35.2	35.2	35.2	35.2	37.9	37.9	37.9	37.9	37.9	37.9	37.9	37.9

Operational Noise Calculations, Queueing Noise, High Gameday 2026 and 2042

Queueing Noise			Leq By Hour																							
		Distance (m)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
	High Gameday (Weekday) 2026																									
	Nearest Station																									
ML-01	LAUS	82.6	0.0	0.0	0.0	0.0	0.0	0.0	40.6	40.6	40.6	40.6	40.6	40.6	40.6	40.6	40.6	40.7	40.6	40.6	40.6	40.6	40.6	40.6	45.0	0.0
ML-02	LAUS	33.1	0.0	0.0	0.0	0.0	0.0	0.0	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.6	53.0	0.0
ML-03	LAUS	21.2	0.0	0.0	0.0	0.0	0.0	0.0	52.4	52.4	52.4	52.4	52.4	52.4	52.4	52.4	52.4	52.5	52.4	52.4	52.4	52.4	52.4	52.4	56.8	0.0
ML-04	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-05	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-06	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-07	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-08	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-09	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-10	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-11	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-12	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-13	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-14	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-15	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-16	Park (S)	39	0.0	0.0	0.0	0.0	0.0	0.0	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1
ML-17 (B)	Park (B)	105.4	0.0	0.0	0.0	0.0	0.0	0.0	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5
ML-17 (S)	Park (S)	125.7	0.0	0.0	0.0	0.0	0.0	0.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
ML-18	Park (B)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-19	Park (B)	80.5	0.0	0.0	0.0	0.0	0.0	0.0	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9
ML-20	Park (B)	52.3	0.0	0.0	0.0	0.0	0.0	0.0	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6
ML-21	Stadium	452.3	0.0	0.0	0.0	0.0	0.0	0.0	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	29.0	25.9	25.9	25.9	25.9	26.1	25.9
	High Gameday (Weekday) 2042																									
	Nearest Station																									
ML-01	LAUS	82.6	0.0	0.0	0.0	0.0	0.0	0.0	40.6	40.6	40.6	40.6	40.6	40.6	40.6	40.6	40.6	40.7	40.6	41.9	50.7	40.6	40.6	40.6	45.0	45.0
ML-02	LAUS	33.1	0.0	0.0	0.0	0.0	0.0	0.0	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.6	49.9	58.6	48.6	48.6	48.6	53.0	53.0
ML-03	LAUS	21.2	0.0	0.0	0.0	0.0	0.0	0.0	52.4	52.4	52.4	52.4	52.4	52.4	52.4	52.4	52.4	52.5	52.4	53.7	62.5	52.4	52.4	52.4	56.8	56.8
ML-04	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-05	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-06	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-07	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-08	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-09	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-10	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-11	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-12	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-13	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-14	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-15	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-16	Park (S)	39	0.0	0.0	0.0	0.0	0.0	0.0	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1
ML-17 (B)	Park (B)	105.4	0.0	0.0	0.0	0.0	0.0	0.0	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5
ML-17 (S)	Park (S)	125.7	0.0	0.0	0.0	0.0	0.0	0.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
ML-18	Park (B)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ML-19	Park (B)	80.5	0.0	0.0	0.0	0.0	0.0	0.0	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9
ML-20	Park (B)	52.3	0.0	0.0	0.0	0.0	0.0	0.0	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6
ML-21	Stadium	452.3	0.0	0.0	0.0	0.0	0.0	0.0	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	29.0	29.0	25.9	25.9	25.9	34.8	34.7

Operational Noise Calculations, Combined System and Queueing Noise, High Gameday 2026 and 2042

Combined Operational System Noise (System + Queuing)

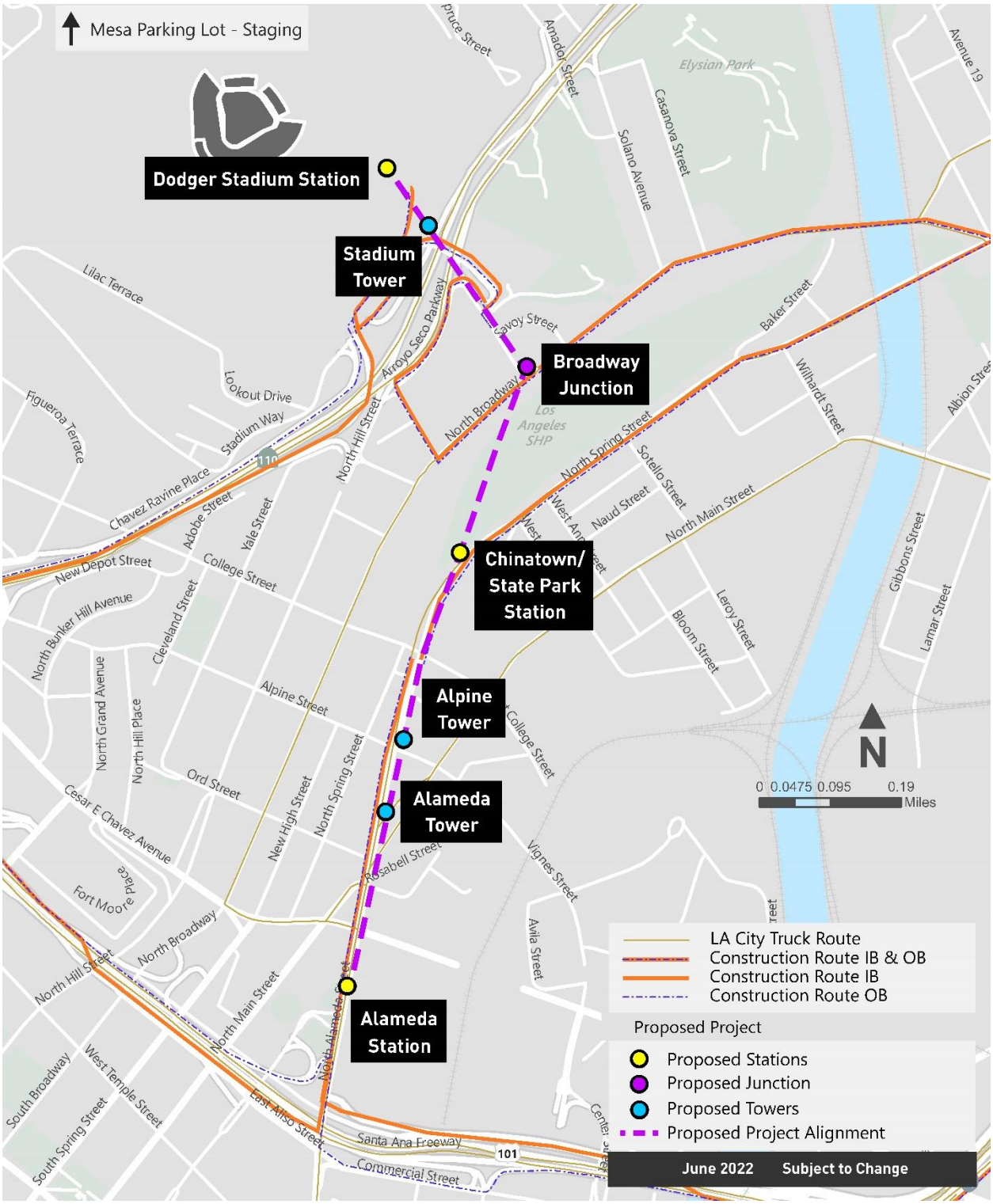
Weekday Gameday 2026 New Alignment

			NSRID	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	Lday	Lnight	Ldn	Lday	Leve	Lnight	CNEL	Worst Hour
M L-01	Union Station	Transit Terminal	1.1	3.0	3.0	3.0	3.0	3.0	3.0	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	50.1	50.1	50.1	50.1	50.1	50.1	50.8	49.5	48.9	44.7	52.0	48.5	50.3	44.7	52.8	50.8
M L-01			1.2	3.0	3.0	3.0	3.0	3.0	3.0	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	50.1	50.1	50.1	50.1	50.1	50.1	50.8	49.5	48.9	44.7	52.0	48.5	50.3	44.7	52.8	50.8
M L-02	El Pueblo	Public Park	2	3.0	3.0	3.0	3.0	3.0	3.0	52	52	52	52	52	52	52	52	52	52	52	54	54	54	54	54	54	55.8	52.6	53.2	49.0	56.3	52.7	54.5	49.0	57.0	51.8
ML-03	Mozaic Apts	MFR	3	3.0	3.0	3.0	3.0	3.0	3.0	57.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5	59.7	59.7	59.7	59.7	59.7	59.7	60.9	58.8	58.7	54.5	61.8	58.3	60.0	54.5	62.5	60.9
ML-04	Cal Endowment	Office Building	4	3.0	3.0	3.0	3.0	3.0	3.0	39.8	39.8	39.8	39.8	39.8	39.8	39.8	39.8	39.8	39.8	39.8	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	42.2	38.3	45.6	41.6	44.1	38.3	46.3	44.1
M L-05		Future MFR	5	3.0	3.0	3.0	3.0	3.0	3.0	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3	50.2	46.4	53.6	49.6	52.3	46.4	54.4	52.3
ML-06	Senior Apts	MFR	6	3.0	3.0	3.0	3.0	3.0	3.0	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	47.2	47.2	47.2	47.2	47.2	47.2	47.2	47.2	45.2	41.4	48.6	44.6	47.2	41.4	49.4	47.2
M L-08		Future M FR	7	3.0	3.0	3.0	3.0	3.0	3.0	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8	46.3	46.3	46.3	46.3	46.3	46.3	46.3	46.3	44.3	40.5	47.7	43.7	46.3	40.5	48.5	46.3
M L-11	College Station	Future MFR	8	3.0	3.0	3.0	3.0	3.0	3.0	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	57.8	53.8	61.0	57.3	59.4	53.8	61.8	59.4
ML-10	Blossom Apts	MFR	9	3.0	3.0	3.0	3.0	3.0	3.0	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6	49.2	45.0	52.3	48.7	50.6	45.0	53.0	50.6
ML-10			10	3.0	3.0	3.0	3.0	3.0	3.0	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6	49.2	45.0	52.3	48.7	50.6	45.0	53.0	50.6
M L-12			11	3.0	3.0	3.0	3.0	3.0	3.0	46.2	46.2	46.2	46.2	46.2	46.2	46.2	46.2	46.2	46.2	46.2	48.4	48.4	48.4	48.4	48.4	48.4	48.4	48.4	47.3	43.1	50.4	47.0	48.4	43.2	51.1	48.4
M L-11		Future MFR	12	3.0	3.0	3.0	3.0	3.0	3.0	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	57.8	53.8	61.0	57.3	59.4	53.8	61.8	59.4
M L-18	LA Historical Park	Public Park N	13.1	3.0	3.0	3.0	3.0	3.0	3.0	44.9	44.9	44.9	44.9	44.9	44.9	44.9	44.9	44.9	44.9	47.3	47.3	47.3	47.3	47.3	47.3	47.3	47.3	46.2	41.8	49.2	45.8	47.3	41.8	49.9	47.3
ML-I5		Future MFR S	13.2	3.0	3.0	3.0	3.0	3.0	3.0	44.5	44.5	44.5	44.5	44.5	44.5	44.5	44.5	44.5	44.5	47.2	47.2	47.2	47.2	47.2	47.2	47.2	47.2	45.9	41.7	49.1	45.5	47.2	41.7	49.8	47.2
M L-17	LA Historical Park	Public Park	14.1	3.0	3.0	3.0	3.0	3.0	3.0	52.7	52.7	52.7	52.7	52.7	52.7	52.7	52.7	52.7	52.7	56.3	56.3	56.3	56.3	56.3	56.3	56.3	56.3	54.6	50.6	57.9	54.1	56.3	50.6	58.6	56.3
ML-14			14.2	3.0	3.0	3.0	3.0	3.0	3.0	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	56.2	56.2	56.2	56.2	56.2	56.2	56.2	56.2	54.5	50.5	57.7	54.0	56.2	50.5	58.5	56.2
M L-18	Cathedral HS	School	15	3.0	3.0	3.0	3.0	3.0	3.0	44.9	44.9	44.9	44.9	44.9	44.9	44.9	44.9	44.9	44.9	47.3	47.3	47.3	47.3	47.3	47.3	47.3	47.3	46.2	41.8	49.2	45.8	47.3	41.8	49.9	47.3
M L-19	Cathedral HS	School	16	3.0	3.0	3.0	3.0	3.0	3.0	54.4	54.4	54.4	54.4	54.4	54.4	54.4	54.4	54.4	54.4	58	58	58	58	58	58	58	58	56.4	52.3	59.6	55.9	58.0	52.3	60.4	58.0
ML-20			17.1	3.0	3.0	3.0	3.0	3.0	3.0	53.4	53.4	53.4	53.4	53.4	53.4	53.4	53.4	53.4	53.4	56.1	56.1	56.1	56.1	56.1	56.1	56.1	56.1	54.8	50.6	57.9	54.5	56.1	50.6	58.7	56.2
ML-20	Savoy St Homes	SFR	17.2	3.0	3.0	3.0	3.0	3.0	3.0	53.4	53.4	53.4	53.4	53.4	53.4	53.4	53.4	53.4	53.4	56.1	56.1	56.1	56.1	56.1	56.1	56.1	56.1	54.8	50.6	57.9	54.5	56.1	50.6	58.7	56.2
M L-21	Solano Canyon	SFR	18	3.0	3.0	3.0	3.0	3.0	3.0	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.2	40.5	48.0	45.2	45.4	40.5	48.6	45.4

Weekday Gameday 2042 New Alignment

																						600 Queuing at LAUS												
																													Lday	Lnight	Ldn	Lday	Leve	Lnight	CNEL	
M L-01			1.1	3	3	3	3	3	3	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	50.1	50.2	53.1	50.1	50.1	50.1	50.8	50.8	49.3	45.2	52.5	49.0	50.3	45.2	53.1	53.1
M L-01			1.2	3	3	3	3	3	3	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	50.1	50.2	53.1	50.1	50.1	50.1	50.8	50.8	49.3	45.2	52.5	49.0	50.3	45.2	53.1	53.1
M L-02			2	3	3	3	3	3	3	52	52	52	52	52	52	52	52	52	52	54	54.4	59.6	54	54	54	55.8	55.8	54.0	50.1	57.3	53.8	54.5	50.2	57.9	59.6
ML-03			3	3	3	3	3	3	3	57.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5	59.7	59.9	64	59.7	59.7	59.7	60.9	60.9	59.3	55.3	62.5	59.0	60.0	55.3	63.1	64.0
ML-04			4	3	3	3	3	3	3	39.8	39.8	39.8	39.8	39.8	39.8	39.8	39.8	39.8	39.8	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	42.2	38.3	45.6	41.6	44.1	38.3	46.3	44.1
M L-05			5	3	3	3	3	3	3	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3	50.2	46.4	53.6	49.6	52.3	46.4	54.4	52.3
ML-06			6	3	3	3	3	3	3	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	47.2	47.2	47.2	47.2	47.2	47.2	47.2	47.2	45.2	41.4	48.6	44.6	47.2	41.4	49.4	47.2
M L-08			7	3	3	3	3	3	3	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8	46.3	46.3	46.3	46.3	46.3	46.3	46.3	46.3	44.3	40.5	47.7	43.7	46.3	40.5	48.5	46.3
M L-11			8	3	3	3	3	3	3	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	57.8	53.8	61.0	57.3	59.4	53.8	61.8	59.4
ML-10			9	3	3	3	3	3	3	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6	49.2	45.0	52.3	48.7	50.6	45.0	53.0	50.6
ML-10			10	3	3	3	3	3	3	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6	49.2	45.0	52.3	48.7	50.6	45.0	53.0	50.6
M L-12			11	3	3	3	3	3	3	46.2	46.2	46.2	46.2	46.2	46.2	46.2	46.2	46.2	46.2	48.4	48.4	48.4	48.4	48.4	48.4	48.4	48.4	47.3	43.1	50.4	47.0	48.4	43.2	51.1	48.4
M L-11			12	3	3	3	3	3	3	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	57.8	53.8	61.0	57.3	59.4	53.8	61.8	59,4
M L-18			13.1	3	3	3	3	3	3	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	45.5	41.3	48.6	45.1	46.8	41.3	49.4	46.8
ML-I5			13.2	3	3	3	3	3	3	44.5	44.5	44.5	44.5	44.5	44.5	44.5	44.5	44.5	44.5	47.2	47.2	47.2	47.2	47.2	47.2	47.2	47.2	45.9	41.7	49.1	45.5	47.2	41.7	49.8	47.2
M L-17			14.1	3	3	3	3	3	3	52.7	52.7	52.7	52.7	52.7	52.7	52.7	52.7	52.7	52.7	56.3	56.3	56.3	56.3	56.3	56.3	56.3	56.3	54.6	50.6	57.9	54.1	56.3	50.6	58.6	56.3
ML-14			14.2	3	3	3	3	3	3	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	56.2	56.2	56.2	56.2	56.2	56.2	56.2	56.2	54.5	50.5	57.7	54.0	56.2	50.5	58.5	56.2
M L-18			15	3	3	3	3	3	3	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	46.8	46.8	46.8	46.8	46.8	46.8	46.8	46.8	45.5	41.3	48.6	45.1	46.8	41.3	49.4	46.8
M L-19			16	3	3	3	3	3	3	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	58.1	58.1	58.1	58.1	58.1	58.1	58.1	58.1	56.5	52.4	59.7	56.0	58.1	52,4	60.5	58.2
ML-20			17.1	3	3	3	3	3	3	53.7	53.7	53.7	53.7	53.7	53.7	53.7	53.7	53.7	53.7	56.3	56.3	56.3	56.3	56.3	56.3	56.3	56.3	55.2	50.8	58.2	54.7	56.3	50.8	58.9	56.3
ML-20			17.2	3	3	3	3	3	3	53.7	53.7	53.7	53.7	53.7	53.7	53.7	53.7	53.7	53.7	56.3	56.3	56.3	56.3	56.3	56.3	56.3	56.3	55.2	50.8	58.2	54.7	56.3	50.8	58.9	56.3
M L-21			18	3	3	3	3	3	3	35.7	35.7	35.7	35.7	35.7	35.7	35.7	35.7	35.7	35.7	38.2	38.4	38.4	38.2	38.2	38.2	39.6	39.6	37.2	33.9	40.9	36.7	38.6	33.9	41.6	39.6

B.4 Construction Haul Route Map



B.5 Detailed Gondola Cabin Noise Calculation Results

Rec. ID	Receiver Height (ft)	Plan Distance NSR to Cabin (ft)	Elevation difference NSR to Cabin (ft)	Total Cabin to NSR Dist. (ft)	Nighttime Existing Level (L_{eq}, dBA)	Nighttime Goal Level[1] (L_{eq}, dBA)	People Noise with Typ. Glass[2] (L_{eq}, dBA)	Nighttime Goal minus People Noise (L_{eq}, dBA)	HVAC Max Sound Power[3] (L_w, dBA)
NSR 3	35	44	1	44	65.5	50.5	26.4	24.1	81
NSR 5	45	25	101	104	64.9	49.9	18.9	31.0	87
NSR 6	95	70	29	76	64.1	49.1	21.7	27.4	84
NSR 7	15	35	109	114	65.1	55.1	18.1	37.0	93
NSR 8	55	32	13	35	64.4	49.4	28.5	20.9	77
NSR 9	20	150	104	183	56.5	46.5	14.0	32.5	89
NSR 13 S	125	150	0	150	63.6	48.6	15.7	32.9	89
NSR 14 S	5	0	115	115	55.2	45.2	18.1	27.1	84
NSR 17 N	15	0	45	45	51.2	41.2	26.2	15.0	71

Notes:
1) Nighttime goal level is 10 dBA under assumed existing L_{eq} minus an additional 5 dBA for receptor elevation greater than three stories (35 feet)
2) It is assumed that cabins will be fitted with non-operable windows similar to standard automotive safety glass with a noise reduction of at least 25 dBA.
3) Specified HVAC maximum sound power rating of 71 dBA (as calculated for NSR 17N) will result in sound levels at receptors no higher than nighttime goal.