Appendix G

Noise Assessment

Kimley»Horn

MEMORANDUM

To: Kari Cano, Project Manager

From: Alex Pohlman
Kimley-Horn and Associates, Inc.

Date: August 23, 2022

Subject: Fontana Square Project – Noise Consistency Analysis

1.0 PURPOSE

The purpose of this memorandum is to outline the impacts related to air quality, greenhouse gas (GHG), noise, and energy emissions associated with construction and operation of the revised Fontana Square Project ("revised Project") located in the City of Fontana, California. This consistency analysis has been undertaken to analyze whether the revised Project would result in any new or substantially more severe significant environmental impacts as compared to the conclusions discussed in *The Fontana Square Project Initial Study and Mitigated Negative Declaration* ("Original IS/MND" and "original Project"). Updated CEQA analysis is required only if Project revisions would lead to significantly different impacts to what was previously analyzed.

2.0 PROPOSED PROJECT

Project Location

The Project site is located in northern Fontana, in San Bernardino County (County). The proposed Project site is located at 16014 S. Highland Avenue, south of State Route (SR) 210 (SR 210), north of south Highland Avenue, east of Catawba Avenue, and west of Citrus Avenue, in the City of Fontana. The Project site is bounded by SR 210 to the north, S. Highland Avenue and single-family residential to the south, Citrus Avenue and vacant land to the east, and Catawba Avenue and vacant land to the west.

2.1 Original Project

The original Project proposed a commercial development composed of a banquet hall, a Holiday Inn Express Hotel & Suite, a Staybridge Suites, a convenience Store / restaurant, and an In-N-Out Burger. Due to the variety of services provided on-site, it is anticipated that the Holiday Inn Express Hotel and Staybridge Suites, will operate 24/7, 7 day per weeks, 365 days a year. However, the other businesses would operate during the regular business hours for that type of development.

2.2 Revised Project

The revised Project proposes similar uses but will expand the banquet hall and combined the Staybridge Suites and Holiday Inn Express into a single building. The convenience store / restaurant and In-N-Out Burger developments will remain unchanged. Similar to the original Project, it is anticipated that the hotels in the revised Project will operate 24/7, 7 day per weeks, 365 days a year and the other businesses would operate during the regular business hours for that type of development.

2.3 Changes to Project

The Table 1: Differences Between Original and Revised Project

Project Components	Original Project	Revised Project	Change
Banquet Hall (Total Building Area)	Two Floors (33,934 SF)	Two Floors (38,907 SF)	(Increase of 4,973 SF)
Holiday Inn Express (Total Building Area) [Outdoor Pool and Deck]	Five Floors (61,184 SF) [2,119 SF]	Combined Hotel Five Floors (121,094 SF) [2,990 SF]	(Decrease of 27,969 SF) [Decrease of 534 SF]
Staybridge Suites (Total Building Area) [Outdoor Pool and Deck]	Five Floors (87,879 SF) [1,405 SF]		
Restaurant / Convenience Store (Total Building Area)	(5,000 SF)	(5,000 SF)	No Change
In-N-Out Burger (Total Building Area) [Outdoor Seating]	(3,885 SF) [500 SF]	(3,885 SF) [500 SF]	No Change
Total Development Area	195,906 SF	172,376 SF	Decrease of 23,530 SF
Total Building Footprint	64,164 SF	24,916 SF	Decrease of 39,248 SF
Parking Spaces	450	455	Increase of 5 spaces
Daily Vehicle Trips	4,573 ADT	4,393 ADT	Decrease of 180 ADT
SF= square feet, ADT = average daily trips			

As shown in Table 1: Differences Between Original and Revised Project, the original Project would include the same uses as the original Project but would expand the banquet hall and combine the two hotels. Overall, the revised Project would decrease the total development area by 23,530 SF and decrease the number of daily vehicle trips by 180.

3.0 PROJECT SPECIFIC ANALYSIS

3.3 Noise

Construction

Construction of the revised Project would be similar to the original project, except for the expansion of the banquet hall and the combination of the two hotel properties. The revised Project would reduce the overall building footprint area by 39,248 SF when compared with the original Project and would not require more intense construction activities or equipment. Therefore, noise impacts are not anticipated to noticeably increase or result in additional impacts than those already analyzed in the Original IS/MND. Therefore, the revised Project would not result in impacts beyond those identified in the Original IS/MND and no further analysis is required.

Operations

The original project's operational noise impacts were determined to be less than significant. The revised Project will reduce the overall development and does not include any new uses when compared to the original project. In addition, the hours of operation of the revised Project would be similar to the original Project. Therefore, the revised Project would not result in impacts beyond those identified in the Original IS/MND, and no further analysis is required.

Vibration

Project construction can generate varying degrees of groundborne vibration, depending on the construction procedure and the construction equipment used. Since the revised Project decreases the development area and would not require more intense construction activities or equipment, construction vibration is not anticipated to noticeably increase or result in additional impacts that those already analyzed in the Original IS/MND. In addition, the revised Project would not be a substantial source of vibration during operations. Therefore, the revised Project's vibration impacts would be less than significant, and no further analysis is required.

Acoustical Assessment
Fontana Square Project
City of Fontana, California

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LIST OF ABBREVIATED TERMS

APN	Assessor's Parcel Number
ADT	average daily traffic
dBA	A-weighted sound level
CEQA	California Environmental Quality Act
CLSP	California Landings Specific Plan
CSMA	California Subdivision Map Act
CNEL	community equivalent noise level
L_{dn}	day-night noise level
dB	decibel
du/ac	dwelling units per acre
L_{eq}	equivalent noise level
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HVAC	heating ventilation and air conditioning
Hz	hertz
HOA	homeowner's association
in/sec	inches per second
L_{max}	maximum noise level
µPa	micropascals
L_{min}	minimum noise level
PPV	peak particle velocity
RMS	root mean square
VdB	vibration velocity level

1 INTRODUCTION

This report documents the results of an Acoustical Assessment completed for the Fontana Square Project ("Project" or "Proposed Project"). The purpose of this Acoustical Assessment is to evaluate the potential construction and operational noise and vibration levels associated with the Project and determine the level of impact the Project would have on the environment.

1.1 Project Location and Setting

The Project site is located in northern Fontana, in San Bernardino County (County); refer to Exhibit 1: Regional Vicinity. The proposed Project site is located at 16014 S. Highland Avenue, south of State Route (SR) 210 (SR 210), north of south Highland Avenue, east of Catawba Avenue, and west of Citrus Avenue, in the City of Fontana. The Project site is bounded by SR 210 to the north, S. Highland Avenue and single-family residential to the south, Citrus Avenue and vacant land to the east, and Catawba Avenue and vacant land to the west; Exhibit 2: Site Vicinity.

The Project site is a vacant rectangular-shaped site on 8.876-acres. Historical images show that the Project site was previously developed on the southern half of the site with residential dwelling units. The Project site is currently vacant and shows signs of ruderal grasses, but no native habitat remains on-site. The Project site has a General Plan land use designation of General Commercial (C-G) and is within the General Commercial (C-2) Zoning District.

1.2 Project Description

The proposed Project is a commercial development composed of a banquet hall (Development A), a Holiday Inn Express Hotel & Suite (Development B), a Staybridge Suites (Development C), a C-Store/Restaurant (Development D), and an In-N-Out Burger (Development E); refer to Exhibit 3: Conceptual Site Plan. Due to the variety of services provided on-site, it is anticipated that developments like the Developments B and C will operate 24/7, 7 day per weeks, 365 days a year. However, the balance of the proposed developments would operate during regular business hours for that type of development.

Development Area (A): Banquet Hall

The proposed Project consists of the construction of a new one-story (approximately 29'-6") banquet hall (27,880-square-feet) with an 960-seating capacity. The banquet hall would be located on the northwest corner of the site on 1.65-acres of the overall Project site. Main entrance for guest would be provided on the east side of the building via two lobbies located on the northeast and southeast corners of the building. The building would provide a full kitchen, break room, dish washer, two dry storage rooms, walk in cooler, walk in freezer, men & women restrooms, and two bride rooms.

Development Area (B): Holiday Inn Express Hotel & Suites

Development B would be a 4-story building at approximately 57'-6" in height. The hotel would be generally located on the western half of the site on 2.28-acres of the overall Project site. The main entrance for guests would be provided on the east side of the building via one lobby located on the southeast corner of the building. Development B would provide 124 hotel rooms and associated amenities such as pool, hot tub, and patio.

Development Area (C): Staybridge Suites

Development C would be a 4-story building at approximately 49'-9" in height. The hotel would be generally located on the eastern half of the site on 2.6-acres of the overall Project site. The main entrance for guest would be located on the south side of the building via one lobby generally located on the southeast portion of the building. Development C would provide 127 hotel rooms and associated amenities such as pool, hot tub, and patio.

Development Area (D): C-Store Area/Restaurant

Development D would be a one-story building at approximately 22'-9" in height. The proposed use would be generally located on the eastern portion of the site and would have an approximate 4,328-square-feet of seating area. The main entrance would be located on the southeast corner of the building. Development D would provide sit-down dining opportunities, but tenants are to be determined.

Development Area (E): In-N-Out Burger

Development E would be a one-story building at approximately 22'-9" in height. The fast-food restaurant would be located on the northeast portion of the site and would have an approximate 3,168-square-feet of seating area. Development E would include a drive-thru and provide sit-down dining opportunities.

Landscaping

Landscaping would be provided on approximately 20 percent (65,155 square feet) of the Project site.

Project Circulation

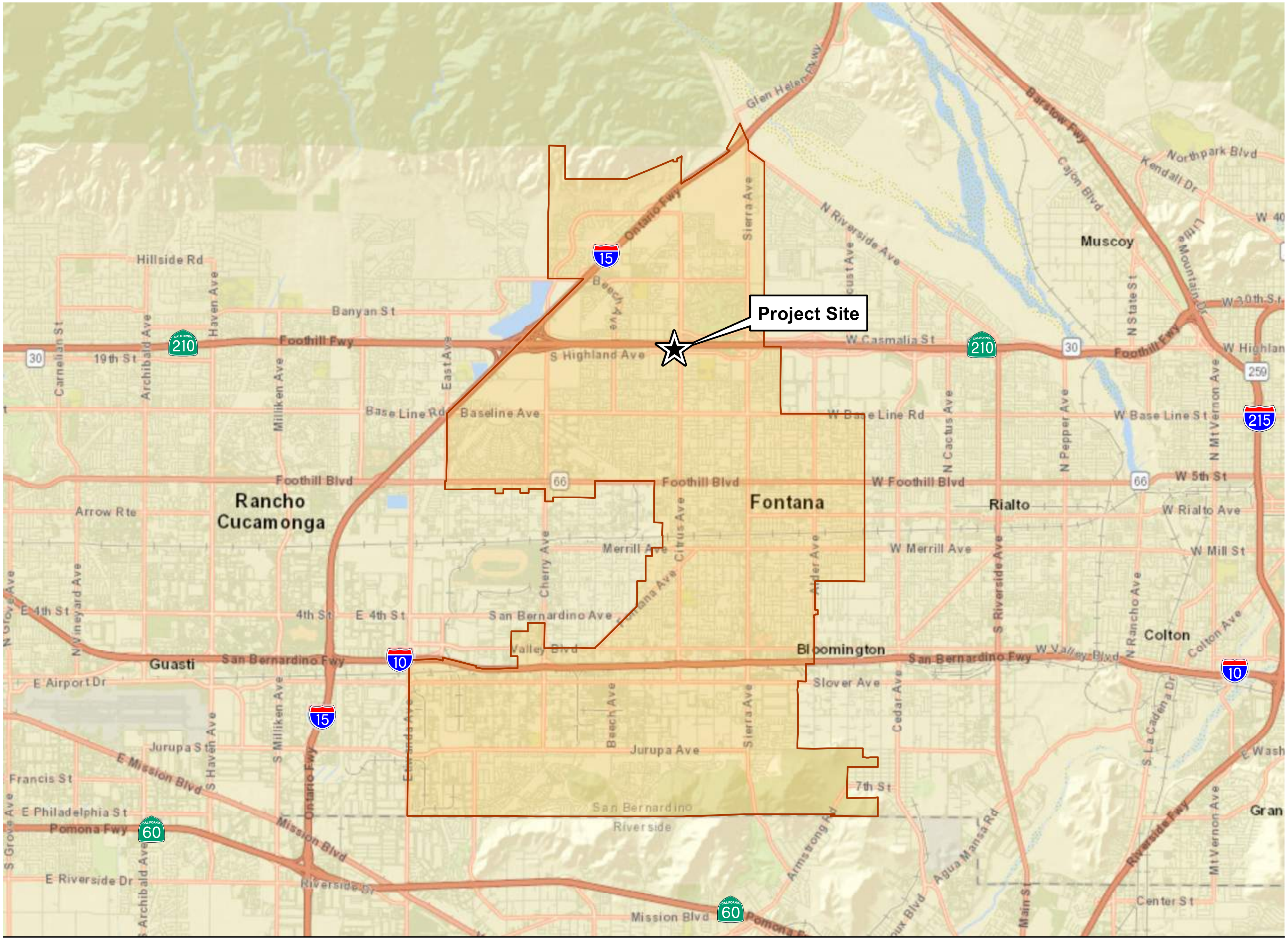
Main ingress and egress to the site would be via a 56'-foot-wide driveway (Driveway No.1) located directly across from Tokay Avenue. Driveway No.1 would allow for full ingress movements on all directions but would only allow eastbound and westbound egress onto S. Highland Avenue. Driveway No. 2 is a 35'-foot-wide driveway located on the southwest corner of the site, directly across from Jacaranda Avenue. Driveway No.3 is an approximately 23'-foot-wide driveway located on the northwest corner of the site with direct access to Catawba Avenue. Driveway No. 4 is a 35'-foot-wide driveway located southeast portion of the site, directly across Cherimoya Avenue.

Parking

The Project would provide 452 parking stalls, with most of the vehicle parking located on south end of the site, along S. Highland Avenue and Citrus Avenue. Parking is also provided throughout the site and between the various establishments.

Project Phasing and Construction

The Project is anticipated to be developed in one phase. Should the Project be approved, construction is anticipated to occur over a duration of approximately 18 months, beginning in March 2022 and completed by the end of August 2023.



Source: ESRI World Street Map

EXHIBIT 1: Regional Vicinity

Fontana Square Project

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Source: ESRI World Imagery

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EXHIBIT 2: Site Vicinity
Fontana Square Project

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Feet

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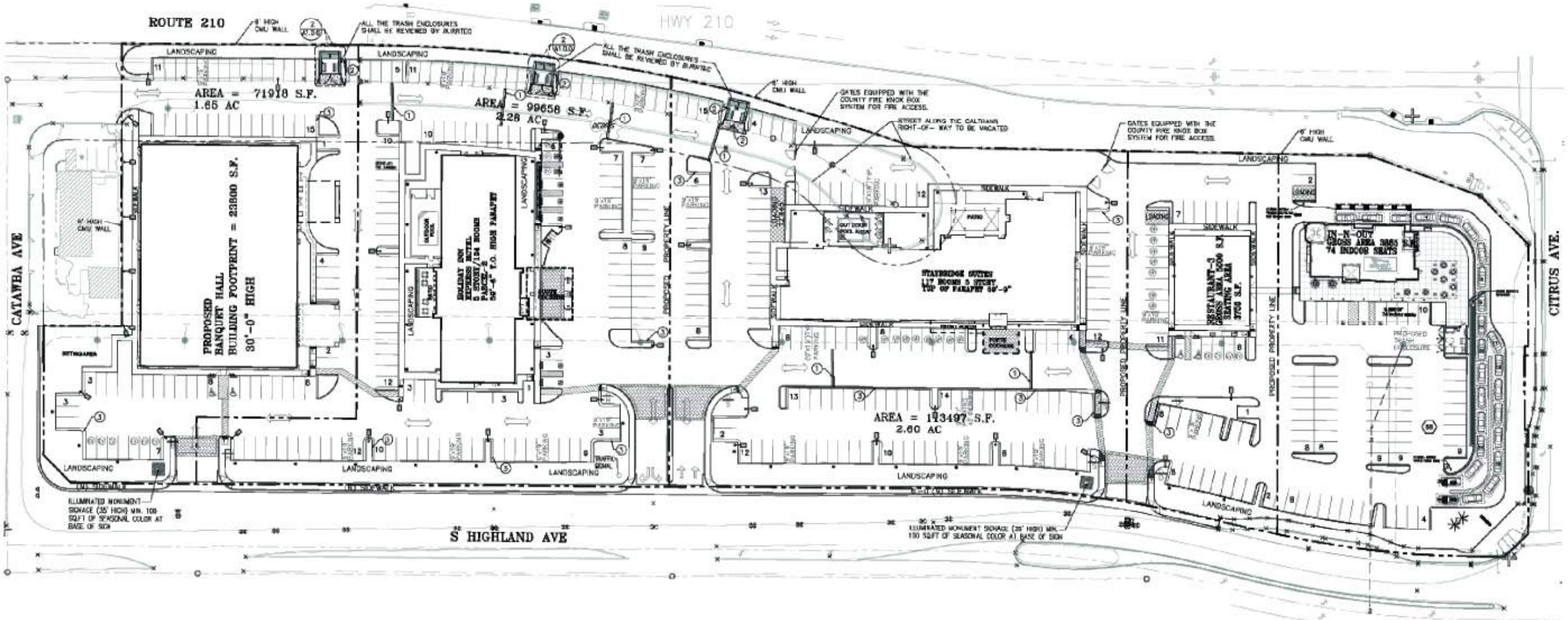

Source: ACE Design, Site Plan 5/3/2021

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EXHIBIT 3: Conceptual Site Plan
Fontana Square Project

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2 ACOUSTIC FUNDAMENTALS

2.1 Sound and Environmental Noise

Acoustics is the science of sound. Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a medium (e.g. air) to human (or animal) ear. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, or hertz (Hz).

Noise is defined as loud, unexpected, or annoying sound. In acoustics, the fundamental model consists of a noise source, a receptor, and the propagation path between the two. The loudness of the noise source, obstructions, or atmospheric factors affecting the propagation path, determine the perceived sound level and noise characteristics at the receptor. Acoustics deal primarily with the propagation and control of sound. A typical noise environment consists of a base of steady background noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These sources can vary from an occasional aircraft or train passing by to continuous noise from traffic on a major highway. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a large range of numbers. To avoid this, the decibel (dB) scale was devised. The dB scale uses the hearing threshold of 20 micropascals (µPa) as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The dB scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels correspond closely to human perception of relative loudness. Table 1: Typical Noise Levels provides typical noise levels.

Table 1: Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	– 110 –	Rock Band
Jet fly-over at 1,000 feet		
	– 100 –	
Gas lawnmower at 3 feet		
	– 90 –	
Diesel truck at 50 feet at 50 miles per hour		Food blender at 3 feet
	– 80 –	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 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 in 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: California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.

Noise Descriptors

The dB 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. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The equivalent noise level (L_{eq}) represents the continuous sound pressure level over the measurement period, while the day-night noise level (L_{dn}) and Community Equivalent Noise Level (CNEL) are measures of energy average during a 24-hour period, with dB weighted sound levels from 7:00 p.m. to 7:00 a.m. Most commonly, environmental sounds are described in terms of L_{eq} that has the same acoustical energy as the summation of all the time-varying events. Each is applicable to this analysis and defined in Table 2: Definitions of Acoustical Terms.

Table 2: Definitions of Acoustical Terms

Term	Definitions
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in µPa (or 20 micronewtons per square meter), where 1 pascals is the pressure resulting from a force of 1 newton exerted over an area of 1 square meter. The sound pressure level is expressed in dB as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g. 20 µPa). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level (dBA)	The sound pressure level in dB as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level (L_{eq})	The average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
Maximum Noise Level (L_{max}) Minimum Noise Level (L_{min})	The maximum and minimum dBA during the measurement period.
Exceeded Noise Levels (L_{01}, L_{10}, L_{50}, L_{90})	The dBA values that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day-Night Noise Level (L_{dn})	A 24-hour average L_{eq} with a 10 dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity at nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
Community Noise Equivalent Level (CNEL)	A 24-hour average L_{eq} with a 5 dBA weighting during the hours of 7:00 a.m. to 10:00 a.m. and a 10 dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

The A-weighted decibel (dBA) sound level scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends on the distance between the receptor and the noise source.

A-Weighted Decibels

The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by dBA values. There is a strong correlation between dBA and the way the human ear perceives sound. For this reason, the dBA has become the standard tool of environmental noise assessment. All noise levels reported in this document are in terms of dBA, but are expressed as dB, unless otherwise noted.

Addition of Decibels

The dB scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic dB is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound and twice as loud as a 60-dBA sound. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dBA higher than one source under the same conditions. Under the dB scale, three sources of equal loudness together would produce an increase of 5 dBA.

Sound Propagation and Attenuation

Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern. Sound levels attenuate at a rate of approximately 3 dB for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics. No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. For line sources, an overall attenuation rate of 3 dB per doubling of distance is assumed.

Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The way older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in dBA, the following relationships should be noted:

- Except in carefully controlled laboratory experiments, a 1-dBA change cannot be perceived by humans.
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference.
- A minimum 5-dBA change is required before any noticeable change in community response would be expected. A 5-dBA increase is typically considered substantial.
- A 10-dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Effects of Noise on People

Hearing Loss. While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise. The Occupational Safety and Health Administration has a noise exposure standard that is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over 8 hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

Annoyance. Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. A noise level of about 55 dBA L_{dn} is the threshold at which a substantial percentage of people begin to report annoyance.[1]

2.2 Groundborne Vibration

Sources of groundborne vibrations include natural phenomena (earthquakes, volcanic eruptions, sea waves, landslides, etc.) or man-made causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g. factory machinery) or transient (e.g. explosions). Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One is the peak particle velocity (PPV); another is the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. The RMS velocity is defined as the average of the squared amplitude of the signal. The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

Table 3: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations, displays the reactions of people and the effects on buildings produced by continuous vibration levels. The annoyance levels shown in the table should be interpreted with care since vibration may be found to be annoying at much lower levels than those listed, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where groundborne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

Table 3: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations

Maximum PPV (in/sec)	Vibration Annoyance Potential Criteria	Vibration Damage Potential Threshold Criteria	FTA Vibration Damage Criteria
0.008	--	Extremely fragile historic buildings, ruins, ancient monuments	--
0.01	Barely Perceptible	--	--
0.04	Distinctly Perceptible	--	--
0.1	Strongly Perceptible	Fragile buildings	--
0.12	--	--	Buildings extremely susceptible to vibration damage
0.2	--	--	Non-engineered timber and masonry buildings
0.25	--	Historic and some old buildings	--
0.3	--	Older residential structures	Engineered concrete and masonry (no plaster)
0.4	Severe	--	--
0.5	--	New residential structures, Modern industrial/commercial buildings	Reinforced-concrete, steel or timber (no plaster)

PPV = peak particle velocity; in/sec = inches per second; FTA = Federal Transit Administration

Source: California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, 2020 and Federal Transit administration, Transit Noise and Vibration Assessment Manual, 2018.

Ground vibration can be a concern in instances where buildings shake, and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be

[1] Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, August 1992.

perceptible. Common sources for groundborne vibration are planes, trains, and construction activities such as earth-moving which requires the use of heavy-duty earth moving equipment. For the purposes of this analysis, a PPV descriptor with units of inches per second (in/sec) is used to evaluate construction-generated vibration for building damage and human complaints.

3 REGULATORY SETTING

To limit population exposure to physically or psychologically damaging as well as intrusive noise levels, the Federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise.

3.1 State of California

California Government Code

California Government Code Section 65302(f) mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of "normally acceptable", "conditionally acceptable", "normally unacceptable", and "clearly unacceptable" noise levels for various land use types. Single-family homes are "normally acceptable" in exterior noise environments up to 60 CNEL and "conditionally acceptable" up to 70 CNEL. Multiple-family residential uses are "normally acceptable" up to 65 CNEL and "conditionally acceptable" up to 70 CNEL. Schools, libraries, and churches are "normally acceptable" up to 70 CNEL, as are office buildings and business, commercial, and professional uses.

Title 24 – Building Code

The State's noise insulation standards are codified in the California Code of Regulations, Title 24: Part 1, Building Standards Administrative Code, and Part 2, California Building Code. These noise standards are applied to new construction in California for interior noise compatibility from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are located near major transportation noise sources, and where such noise sources create an exterior noise level of 65 dBA CNEL or higher. Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new multi-family residential buildings, the acceptable interior noise limit for new construction is 45 dBA CNEL.

3.2 Local

City of Fontana General Plan

Adopted on November 13, 2018, the Fontana Forward General Plan Update 2015-2035 (Fontana General Plan) identifies noise standards that are used as guidelines to evaluate transportation noise level impacts. These standards are also used to assess the long-term traffic noise impacts on specific land uses. According to the Fontana General Plan, land uses such as residences have acceptable exterior noise levels of up to 65 dBA CNEL. Based on the guidelines in the Fontana General Plan, an exterior noise level of 65 dBA CNEL is generally considered the maximum exterior noise level for sensitive receptors.

Land uses near these significant noise-producers can incorporate buffers and noise control techniques including setbacks, landscaping, building transitions, site design, and building construction techniques to reduce the impact of excessive noise. Selection of the appropriate noise control technique would vary depending on the level of noise that needs to be reduced as well as the location and intended land use.

The City has adopted the Noise and Safety Element as a part of the updated Fontana General Plan. The Noise and Safety Element specifies the maximum allowable unmitigated exterior noise levels for new developments impacted by transportation noise sources. Additionally, the Noise and Safety Element identifies transportation noise policies designed to protect, create, and maintain an environment free of harmful noise that could impact the health and welfare of sensitive receptors. The following Fontana General Plan goals, policies, and actions for addressing noise are applicable to the Project:

Goal 8: The City of Fontana protects sensitive land uses from excessive noise by diligent planning through 2035.

Policy 8.2: Noise-tolerant land uses shall be guided into areas irrevocably committed to land uses that are noise-producing, such as transportation corridors.

Policy 8.4: Noise spillover or encroachment from commercial, industrial and educational land uses shall be minimized into adjoining residential neighborhoods or noise-sensitive uses.

Action C: The State of California Office of Planning and Research General Plan Guidelines shall be followed with respect to acoustical study requirements.

Goal 9: The City of Fontana provides a diverse and efficiently operated ground transportation system that generates the minimum feasible noise on its residents through 2035.

Policy 9.1: All noise sections of the State Motor Vehicle Code shall be enforced.

Policy 9.2: Roads shall be maintained such that the paving is in good condition and free of cracks, bumps, and potholes.

Action A: On-road trucking activities shall continue to be regulated in the City to ensure noise impacts are minimized, including the implementation of truck-routes based on traffic studies.

Action B: Development that generates increased traffic and subsequent increases in the ambient noise level adjacent to noise-sensitive land uses shall provide appropriate mitigation measures.

Action D: Explore the use of "quiet pavement" materials for street improvements.

Goal 10: Fontana's residents are protected from the negative effects of "spillover" noise.

Policy 10.1: Residential land uses and areas identified as noise-sensitive shall be protected from excessive noise from non-transportation sources including industrial, commercial, and residential activities and equipment.

Action A: Projects located in commercial areas shall not exceed stationary-source noise standards at the property line of proximate residential or commercial uses.

Action B: Industrial uses shall not exceed commercial or residential stationary source noise standards at the most proximate land uses.

Action C: Non-transportation noise shall be considered in land use planning decisions.

Action D: Construction shall be performed as quietly as feasible when performed in proximity to residential or other noise sensitive land uses.

City of Fontana Municipal Code

Standards established under the City of Fontana Municipal Code (Municipal Code) are used to analyze noise impacts originating from the Project. Operational noise impacts are typically governed by Fontana Municipal Code Sections 18-61 through 18-67. However, the City currently relies on delineated general industrial areas. According to the General Plan Noise and Safety section, these areas are buffered from residential uses through land use zoning that places either light industrial or commercial uses between the major manufacturers involved in heavy industrial uses and local residents. This separation of land uses meaning noise intrusion on conforming land uses is not a problem at this time.

Guidelines for non-transportation and stationary noise source impacts from operations at private properties are found in the Zoning and Development Code in Chapter 30 of the Fontana Municipal Code. Applicable guidelines indicate that no person shall create or cause any sound exceeding the City's stated noise performance standards measured at the property line of any residentially zoned property. Per Fontana Municipal Code Section 30-543(A), the performance standards for exterior noise emanating from any property are 70 dBA between the hours of 7:00 a.m. and 10:00 p.m. and 65 dBA during the noise-sensitive hours of 10:00 p.m. to 7:00 a.m. at residential uses. For this analysis, a 65-dBA nighttime noise level standard is conservatively used to analyze potential noise impacts at off-site residential receptors within the City of Fontana.

The City has also set restrictions to control noise impacts from construction activities. Section 18-63(b)(7) states that the erection (including excavation), demolition, alteration, or repair of any structure shall only occur between the hours of 7:00 a.m. and 6:00 p.m. on weekdays and between the hours of 8:00 a.m. and 5:00 p.m. on Saturdays, except in the case of urgent necessity or otherwise approved by the City of Fontana. Although the Fontana Municipal Code limits the hours of construction, it does not provide specific noise level performance standards for construction.

4 EXISTING CONDITIONS

4.1 Existing Noise Sources

The City is impacted by various noise sources. Mobile sources of noise, especially cars, trucks, and trains are the most common and significant sources of noise. Other noise sources are the various land uses (i.e. residential, commercial, institutional, and recreational and parks activities) throughout the City that generate stationary-source noise.

Mobile Sources

Existing roadway noise levels were calculated for the roadway segments in the Project vicinity. This task was accomplished using the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) and existing traffic volumes from the *Traffic Impact Study for the Fontana Square Project*, prepared by Kimley-Horn (October 2021) (Traffic Impact Study). The noise prediction model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (also referred to as energy rates) used in the FHWA model have been modified to reflect average vehicle noise rates identified for California by the California Department of Transportation (Caltrans). The Caltrans data indicates that California automobile noise is 0.8 to 1.0 dBA higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels. The average daily noise levels along roadway segments in proximity to the Project site are included in Table 4: Existing Traffic Noise Levels. As shown in Table 4, existing traffic noise levels in the Project vicinity range between 62.7 dBA CNEL and 70.0 dBA CNEL.

Table 4: Existing Traffic Noise Levels

Roadway Segment	ADT	dBA CNEL[1]
Highland Avenue		
Beech Avenue to Citrus Avenue	7,014	62.7
Citrus Avenue to Oleander Avenue	11,327	64.9
Citrus Avenue		
SR-210 to Highland Avenue	36,783	70.0
Highland Avenue to Walnut Avenue	28,628	68.9

ADT = average daily trips; dBA = A-weighted decibels; CNEL= Community Equivalent Noise Level
1. Traffic noise levels are at 100 feet from the roadway centerline.
Source: Based on traffic data provided by Kimley-Horn and Associates, Inc., October 2021. Refer to Appendix B for traffic noise modeling results.

Stationary Sources

The primary sources of stationary noise in the Project vicinity are those associated with liquor store to the west and residential properties to the south of the Project. The noise associated with these sources may represent a single-event noise occurrence or short-term noise. Other noises include mechanical equipment (e.g., heating ventilation and air conditioning [HVAC] equipment), dogs barking, idling vehicles, and residents talking.

4.2 Noise Measurements

The Project site is currently vacant with a liquor store located adjacent to the west and single-family residential to the south. To quantify existing ambient noise levels in the Project area, Kimley-Horn conducted four short-term noise measurements on October 13, 2021; see Appendix A: Existing Ambient Noise Measurements. The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the Project site. The 10-minute measurements were taken between 11:15 a.m. and 11:54 a.m. Measurements of L_{eq} are considered representative of the noise levels throughout the day. The average noise levels and sources of noise measured at each location are listed in Table 5: Existing Noise Measurements and shown on Exhibit 4: Noise Measurement Locations.

Table 5: Existing Noise Measurements

Site	Location	Measurement Period	Duration	Daytime Average L_{eq} (dBA)
ST-1	Off Catawba Ave, 160 feet north of South Highland Avenue	11:15 – 11:25 a.m.	10 Minutes	58.6
ST-2	Off South Highland Avenue, 100 feet west of Citrus Avenue	11:58 – 12:08 a.m.	10 Minutes	65.6
ST-3	At the eastern intersection of Jacaranda Avenue and South Highland Avenue	11:44 – 11:54 a.m.	10 Minutes	64.5
ST-4	ff Knox Avenue, 100 feet South of South Highland Avenue	11:29 – 11:39 a.m.	10 Minutes	67.3

Source: Noise measurements taken by Kimley-Horn, October 13, 2021. See Appendix A for noise measurement results.

Source: ESRI World Imagery

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EXHIBIT 4: Noise Measurement Locations
Fontana Square Project

0 150 300
Feet

Kimley»Horn

4.3 Sensitive Receptors

Sensitive populations are more susceptible to the effects of air pollution than is the general population. Sensitive receptors that are in proximity to localized sources of toxics are of particular concern. Land uses considered sensitive receptors include residences, schools, playgrounds, childcare centers, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. Sensitive land uses near the Project include single-family residential homes, approximately 105 feet to the south on the opposite side of S. Highland Avenue, single-family residential homes approximately 270 feet to the west on Highland Avenue, and a school, A.B. Miller High School, located approximately 1,600 feet to the southeast of the Project.

5 SIGNIFICANCE CRITERIA AND METHODOLOGY

5.1 CEQA Thresholds

Appendix G of the California Environmental Quality Act (CEQA) Guidelines contains analysis guidelines related to noise impacts. These guidelines have been used by the City to develop thresholds of significance for this analysis. A project would create a significant environmental impact if it would:

- Generate 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;
- Generate excessive groundborne vibration or groundborne noise levels; and
- 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, expose people residing or working in the Project area to excessive noise levels.

5.2 Methodology

Construction

Construction noise levels were based on typical noise levels generated by construction equipment published by the Federal Transit Administration (FTA) and FHWA. Construction noise is assessed in dBA Leq. This unit is appropriate because Leq can be used to describe noise level from operation of each piece of equipment separately, and levels can be combined to represent the noise level from all equipment operating during a given period.

FHWA's Roadway Construction Noise Model (RCNM) was used to estimate construction noise at nearby sensitive receptors. For modeling purposes, construction equipment has been distributed evenly between the center of the construction site and the nearest receptor. To be conservative, the loudest and most used equipment was placed nearest the sensitive receptor. Noise level estimates do not account for the presence of intervening structures or topography, which may reduce noise levels at receptor locations. Therefore, the noise levels presented herein represent a conservative, reasonable worst-case estimate of actual temporary construction noise.

Operations

The analysis of the Without Project and With Project noise environments is based on noise prediction modeling and empirical observations. Reference noise level data are used to estimate the Project operational noise impacts from stationary sources. Noise levels are collected from field noise measurements and other published sources from similar types of activities are used to estimate noise levels expected with the Project's stationary sources. The reference noise levels are used to represent a worst-case noise environment as noise level from stationary sources can vary throughout the day. Operational noise is evaluated based on the standards within the City's Noise Ordinance and General Plan. The Without Project and With Project traffic noise levels in the Project vicinity were calculated using the FHWA Highway Noise Prediction Model (FHWA-RD-77-108).

Vibration

Ground-borne vibration levels associated with construction-related activities for the Project were evaluated utilizing typical ground-borne vibration levels associated with construction equipment, obtained from FTA published data for construction equipment. Potential ground-borne vibration impacts related to building/structure damage and interference with sensitive existing operations were evaluated, considering the distance from construction activities to nearby land uses and typically applied criteria for structural damage and human annoyance.

6 POTENTIAL IMPACTS AND MITIGATION

6.1 Acoustical Impacts

Threshold 6.1 Would the Project generate 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?

Construction

Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g. land clearing, grading, excavation, paving). Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. During construction, exterior noise levels could affect the residential neighborhoods surrounding the construction site. single-family residential homes, approximately 105 feet to the south on the opposite side of S. Highland Avenue, However, it is acknowledged that construction activities would occur throughout the Project site and would not be concentrated at a single point near sensitive receptors.

Construction activities would include demolition, site preparation, grading, building construction, paving, and architectural coating. Such activities would require industrial saws, excavators, and dozers for demolition; dozers and tractors during site preparation; excavators, graders, dozers, and tractors during grading; cranes, forklifts, generators, tractors, and welders during building construction; pavers, rollers, mixers, and paving equipment during paving; and air compressors during architectural coating. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 to 4 minutes at lower power settings. Other primary sources of acoustical disturbance would be random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts). Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. Typical noise levels associated with individual construction equipment are listed in Table 6: Typical Construction Noise Levels. Noise levels at 105 feet, the distance to the nearest sensitive receptor from the construction area, are included in Table 6.

Table 6: Typical Construction Noise Levels		
Equipment	**Typical Noise Level (dBA) at 50 feet from Source**	**Typical Noise Level (dBA) at 105 feet from Source[1]**
Air Compressor	81	75
Backhoe	80	74
Compactor	82	76
Concrete Mixer	85	79
Concrete Pump	82	76
Concrete Vibrator	76	70
Crane, Derrick	88	82
Crane, Mobile	83	77
Dozer	85	79
Generator	81	76
Grader	85	79
Impact Wrench	85	79
Jack Hammer	88	82
Loader	85	74
Paver	89	79
Pneumatic Tool	85	95
Pump	76	89
Roller	74	79
Saw	76	70
Scraper	89	79
Shovel	82	76
Truck	88	78
Note: 1. Calculated using the inverse square law formula for sound attenuation: $dBA_2 = dBA_1 + 20Log(d_1/d_2)$ Where: dBA_2 = estimated noise level at receptor; dBA_1 = reference noise level; d_1 = reference distance; d_2 = receptor location distance		
Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.		

The noise levels calculated in Table 7: Project Construction Noise Levels, show estimated exterior construction noise without accounting for attenuation from physical barriers or topography. Table 7 depicts a worst-case scenario for each phase of construction. Construction equipment has been distributed evenly between the center of the construction site and the nearest receptor. To be conservative, the loudest equipment was placed nearest the sensitive receptor. However, during construction, equipment would operate throughout the Project site and the associated noise levels would not occur at a fixed location for extended periods of time.

The City's Municipal Code does not establish quantitative construction noise standards. Instead, the Municipal Code establishes limited hours of construction activities. Municipal Code Section 18-63 states that construction activities may only take place between the hours of 7:00 a.m. and 6:00 p.m. on weekdays and between the hours of 8:00 a.m. and 5:00 p.m. on Saturdays, except in the case of urgent necessity or otherwise approved by the City of Fontana. However, this analysis conservatively uses the FTA's threshold of 80 dBA (8-hour L_{eq}) for residential uses and 85 dBA (8-hour L_{eq}) for non-residential uses to evaluate construction noise impacts.[2]

[2] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, Table 7-2, Page 179, September 2018.

Table 7: Project Construction Noise Levels at Nearest Receptor			
Construction Phase	**Modeled Exterior Construction Noise Level (dBA L_{eq})**	**Noise Threshold (dBA L_{eq})**	**Exceed Threshold?**
Demolition	76.8	80	No
Site Preparation	74.7	80	No
Grading	75.1	80	No
Building Construction/ Paving/Architectural Coating	73.3	80	No
Note: Equipment distributed evenly between the center of the construction site and the nearest sensitive receptor.			
Source: Federal Highway Administration, *Roadway Construction Noise Model,* 2006. Refer to Appendix B for noise modeling results.			

Compliance with the Municipal Code would minimize impacts from construction noise, as construction would be limited to daytime hours on weekdays and Saturdays. By following Municipal Code standards, Project construction activities would result in a less than significant noise impact.

Operations

Implementation of the proposed Project would create new sources of noise in the project vicinity. The major noise sources associated with the Project that would potentially impact existing nearby residences include stationary noise equipment (i.e. trash compactors, air conditioners, etc.); parking areas (i.e. car door slamming, car radios, engine start-up, and car pass-by); and off-site traffic noise.

Mechanical Equipment. The nearest sensitive receptors to the Project site are the residences 105 feet south of the Project site. Potential stationary noise sources related to long-term operation of the Project would include mechanical equipment. Mechanical equipment (e.g. heating ventilation and air conditioning [HVAC] equipment) typically generates noise levels of approximately 52 dBA at 50 feet.[3] Based on Project site plans, the nearest potential location for a HVAC unit would be located approximately 175 feet from the nearest residential property and HVAC noise levels would attenuate by the distance to approximately 41.1 dBA, which is well below he City's 65 dBA noise standard for residential uses. Operation of mechanical equipment would not increase ambient noise levels beyond the acceptable compatible land use noise levels. Further, it is noted that noise from stationary sources at the Project site would primarily occur during the daytime activity hours of 7:00 a.m. to 10:00 p.m. Therefore, the proposed project would result in a less than significant impact related to stationary noise levels.

Parking Noise. The Project would provide 452 parking stalls, with most of the vehicle parking located on south end of the site, along S. Highland Avenue and Citrus Avenue. Parking is also provided throughout the site and between the various establishments. Traffic associated with parking lots is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale such as the CNEL scale. The instantaneous maximum sound levels generated by a car door slamming, engine starting up, and car pass-bys range from 53 to 61 dBA.[4] Conversations in parking areas may also be an annoyance to adjacent sensitive receptors. Sound levels of speech typically range from 33 dBA at 50 feet for normal speech to 50 dBA at 50 feet for very loud speech.[5] It should be noted that parking lot noises

[3] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, 2015.

[4] Kariel, H. G., *Noise in Rural Recreational Environments*, Canadian Acoustics 19(5), 3-10, 1991.

[5] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden. Noise Navigator Sound Level Database with Over 1700 Measurement Values, July 6, 2010.

are instantaneous noise levels compared to noise standards in the hourly L_{eq} metric, which are averaged over the entire duration of a time period. As a result, actual noise levels over time resulting from parking lot activities would be far lower than the reference levels identified above.

For the purpose of providing a conservative, quantitative estimate of the noise levels that would be generated from the vehicles entering and exiting the parking lot, the methodology recommended by FTA for the general assessment of stationary transit noise sources is used. Using the methodology, the Project's peak hourly noise level that would be generated by the on-site parking levels was estimated using the following FTA equation for a parking lot:

$$L_{eq(h)} = SEL_{ref} + 10 \log (NA/1{,}000) - 35.6$$

Where:

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

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

NA = number of automobiles per hour

35.6 is a constant in the formula, calculated as 10 times the logarithm of the number of seconds in an hour

Based on the peak hour trip generation rates in the Traffic Study, approximately 364 trips during peak hours would be made to the Project site each day. Using the FTA's reference noise level of 92 dBA SEL[6] at 50 feet from the noise source, the Project's highest peak hour vehicle trips would generate noise levels of approximately 52.0 dBA L_{eq} at 50 feet from the parking lot. The nearest sensitive receptor is 125 feet from a parking area. Based strictly on distance attenuation, parking lot noise at the nearest receptor would be 44 dBA which is below the City's residential noise standard. Therefore, noise impacts from parking lots would be less than significant.

Off-Site Traffic Noise. Implementation of the Project would generate increased traffic volumes along nearby roadway segments. According to the Traffic Impact Study, the proposed Project would generate 4,573 daily trips which would result in noise increases on Project area roadways. In general, a traffic noise increase of less than 3 dBA is barely perceptible to people, while a 5-dBA increase is readily noticeable.[7] Generally, traffic volumes on Project area roadways would have to approximately double for the resulting traffic noise levels to increase by 3 dBA. Therefore, permanent increases in ambient noise levels of less than 3 dBA are considered to be less than significant.

Traffic noise levels for roadways primarily affected by the Project were calculated using the FHWA's Highway Noise Prediction Model (FHWA-RD-77-108). Traffic noise modeling was conducted for conditions with and without the Project, based on traffic volumes from the Traffic Impact Analysis. As indicated in Table 8: Opening Year and Opening Year Plus Project Traffic Noise Levels, Opening Year Plus Project traffic-generated noise levels on Project area roadways would range between 65.0 dBA CNEL and 70.8 dBA CNEL at 100 feet from the centerline, and the Project would result in a maximum increase of 1.4 dBA CNEL along Highland Avenue. Noise impacts from off-site traffic would be less than significant.

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6 Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.

7 Federal Highway Administration, *Highway Traffic Noise Analysis and Abatement Policy and Guidance, Noise Fundamentals*, https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm, accessed March 11, 2020.

Table 8: Opening Year and Opening Year Plus Project Traffic Noise Levels						
Roadway Segment	**Opening Year**		**Opening Year Plus Project**		**Project Change from No Build Conditions**	**Significant Impact?**
	ADT	**dBA CNEL[1]**	**ADT**	**dBA CNEL[1]**		
Highland Avenue						
Citrus Avenue to Cypress Avenue	8,495	63.6	11,926	65.0	1.4	No
Cypress Avenue to Sierra Avenue	14,280	65.9	14,738	66.0	0.1	No
Citrus Avenue						
SR-210 to Highland Avenue	42,254	70.6	44,541	70.8	0.2	No
Highland Avenue to Walnut Avenue	32,473	69.4	33,159	69.5	0.1	No

ADT = average daily trips; dBA = A-weighted decibels; CNEL= Community Equivalent Noise Level
1. Traffic noise levels are at 100 feet from the roadway centerline.
Source: Based on traffic data provided by Kimley-Horn and Associates, Inc., October 2021. Refer to Appendix B for traffic noise modeling results.

The Horizon Year "2040 Without Project" and "2040 Plus Project" scenarios were also compared. As shown in Table 9: Horizon Year and Horizon Year Plus Project Traffic Noise Levels, roadway noise levels would range between 67.2 dBA CNEL and 70.8 dBA CNEL at 100 feet from the centerline, and the Project would result in a maximum increase of 0.8 dBA CNEL. As such, the Project would result in an increase of less than 3.0 dBA CNEL for the roadway segments analyzed and traffic noise. Noise impacts from off-site traffic would be less than significant in this regard.

Table 9: Horizon Year and Horizon Year Plus Project Traffic Noise Levels						
Roadway Segment	**Horizon Year (2040)**		**Horizon Year (2040) Plus Project**		**Project Change from No Build Conditions**	**Significant Impact?**
	ADT	**dBA CNEL[1]**	**ADT**	**dBA CNEL[1]**		
Slover Avenue						
Citrus Avenue to Cypress Avenue	16,200	66.4	19,631	67.2	0.8	No
Cypress Avenue to Sierra Avenue	21,700	67.7	22,158	67.8	0.1	No
Citrus Avenue						
SR-210 to Highland Avenue	42,254	70.6	44,541	70.8	0.2	No
Highland Avenue to Walnut Avenue	32,473	69.4	33,159	69.5	0.1	No

ADT = average daily trips; dBA = A-weighted decibels; CNEL= Community Equivalent Noise Level
1. Traffic noise levels are at 100 feet from the roadway centerline.
Source: Based on traffic data provided by Kimley-Horn and Associates, Inc., October 2021. Refer to Appendix A for traffic noise modeling results.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 6.2 Would the Project generate excessive groundborne vibration or groundborne noise levels?

Increases in groundborne vibration levels attributable to the proposed Project would be primarily associated with short-term construction-related activities. The Federal Transit Administration (FTA) has published standard vibration velocities for construction equipment operations in their 2018 *Transit Noise and Vibration Impact Assessment Manual*. The types of construction vibration impacts include human annoyance and building damage.

The Federal Transit Administration (FTA) has published standard vibration velocities for construction equipment operations. In general, the FTA architectural damage criterion for continuous vibrations (i.e., 0.2 in/sec) appears to be conservative. The types of construction vibration impacts include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. For example, for a building that is constructed with reinforced concrete with no plaster, the FTA guidelines show that a vibration level of up to 0.20 in/sec is considered safe and would not result in any construction vibration damage.

Table 10: Typical Construction Equipment Vibration Levels, lists vibration levels at 25 feet for typical construction equipment. Ground-borne vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. As indicated in Table 10, based on FTA data, vibration velocities from typical heavy construction equipment operations that would be used during Project construction range from 0.003 to 0.089 in/sec PPV at 25 feet from the source of activity.

Table 10: Typical Construction Equipment Vibration Levels

Equipment	Peak Particle Velocity at 25 Feet (in/sec)	Peak Particle Velocity at 15 Feet (in/sec)[1]	Peak Particle Velocity at 35 Feet (in/sec)[1]
Large Bulldozer	0.089	0.1915	0.0537
Caisson Drilling	0.089	0.1915	0.0537
Loaded Trucks	0.076	0.1635	0.0459
Jackhammer	0.035	0.0753	0.0211
Small Bulldozer/Tractors	0.003	0.0065	0.0018

[1] Calculated using the following formula: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$, where: PPV_{equip} = the peak particle velocity in in/sec of the equipment adjusted for the distance; PPV_{ref} = the reference vibration level in in/sec from Table 7-4 of the Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018; D = the distance from the equipment to the receiver.

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018.

The nearest structure is a small storage building associated with the liquor store located approximately 15 feet to the west of the active construction zone. Using the calculation shown in Table 10, at 15 feet the vibration velocities from construction equipment would not exceed 0.1915 in/sec PPV, which is below the FTA's 0.20 in/sec PPV threshold for building damage. The nearest occupied building is the liquor store located approximately 35 feetfrom the active construction zone. At 35 feet, the vibration velocities from construction equipment would not exceed 0.0537 in/sec PPV, which is below the FTA's 0.10 in/sec PPV annoyance threshold. It is also acknowledged that construction activities would occur throughout the Project site and would not be concentrated at the point closest to the nearest structure. Therefore, vibration impacts associated with the proposed Project would be less than significant.

Once operational, the Project would not be a significant source of groundborne vibration. Groundborne vibration surrounding the Project currently result from heavy-duty vehicular travel (e.g. refuse trucks, heavy duty trucks, delivery trucks, and transit buses) on the nearby local roadways. Due to the rapid drop-off rate of ground-borne vibration and the short duration of the associated events, vehicular traffic-induced ground-borne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that cause damage to buildings in the vicinity. Impacts would be less than significant in this regard.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 6.3 For a Project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?

The nearest airport to the Project site is the Ontario International Airport located approximately 10 miles to the southwest. The Project is not within 2.0 miles of a public airport or within an airport land use plan. Additionally, there are no private airstrips located within the Project vicinity. Therefore, the Project would not expose people residing or working in the Project area to excessive airport- or airstrip-related noise levels and no mitigation is required.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

6.2 Cumulative Noise Impacts

Cumulative Construction Noise

The Project's construction activities would not result in a substantial temporary increase in ambient noise levels. Construction noise would be periodic and temporary noise impacts that would cease upon completion of construction activities. The Project would contribute to other proximate construction project noise impacts if construction activities were conducted concurrently. However, based on the noise analysis above, the Project's construction-related noise impacts would be less than significant following the City of Fontana Municipal Code.

Construction activities at other planned and approved projects near the Project site would be required to comply with applicable City rules related to noise and would take place during daytime hours on the days permitted by the applicable Municipal Code, and projects requiring discretionary City approvals would be required to evaluate construction noise impacts, comply with the City's standard conditions of approval, and implement mitigation, if necessary, to minimize noise impacts. Construction noise impacts are by nature localized. Based on the fact that noise dissipates as it travels away from its source, noise impacts would be limited to the Project site and vicinity. Therefore, Project construction would not result in a cumulatively considerable contribution to significant cumulative impacts, assuming such a cumulative impact existed, and impacts in this regard are not cumulatively considerable.

Cumulative Operational Noise

Cumulative Off-Site Traffic Noise

Cumulative noise impacts describe how much noise levels are projected to increase over existing conditions with the development of the proposed Project and other foreseeable projects. Cumulative noise impacts would occur primarily as a result of increased traffic on local roadways due to buildout of the proposed Project and other projects in the vicinity. Cumulative increases in traffic noise levels were estimated by comparing the Existing and Opening Year Without Project scenarios to the Opening Year Plus Project scenario. The traffic analysis considers cumulative traffic from future growth assumed in the transportation model, as well as cumulative projects.

A project's contribution to a cumulative traffic noise increase would be considered significant when the combined effect exceeds perception level (i.e., auditory level increase) threshold. The following criteria is used to evaluate the combined and incremental effects of the cumulative noise increase.

- *Combined Effect.* The cumulative with Project noise level ("Opening Year With Project") would cause a significant cumulative impact if a 3.0 dB increase over "Existing" conditions occurs and the resulting noise level exceeds the applicable exterior standard at a sensitive use. Although there may be a significant noise increase due to the proposed Project in combination with other related projects (combined effects), it must also be demonstrated that the Project has an incremental effect. In other words, a significant portion of the noise increase must be due to the proposed Project.
- *Incremental Effects*. The "Opening Year With Project" causes a 1.0 dBA increase in noise over the "Opening Year Without Project" noise level.

A significant impact would result only if both the combined and incremental effects criteria have been exceeded. Noise by definition is a localized phenomenon and reduces as distance from the source increases. Consequently, only the proposed Project and growth due to occur in the general area would contribute to cumulative noise impacts.

Table 11: Cumulative Traffic Noise Levels identifies the traffic noise effects along roadway segments in the Project vicinity for "Existing," "Opening Year Without Project," and "Opening Year With Project," conditions, including incremental and net cumulative impacts. Table 11 shows the increase for combined effects and incremental effects and none of the segments meet the criteria for cumulative noise increase. The proposed Project would not result in long-term mobile noise impacts based on project-generated traffic as well as cumulative and incremental noise levels. Therefore, the proposed Project, in combination with cumulative background traffic noise levels, would result in a less than significant cumulative impact. The proposed Project's contribution would not be cumulatively considerable.

Table 11: Cumulative Traffic Noise Levels

Roadway Segment	Existing (dBA CNEL)	Opening Year Without Project (dBA CNEL)	Opening Year With Project (dBA CNEL)	Combined Effects	Incremental Effects	Cumulatively Significant Impact?
				Difference In dBA Between Existing and Opening Year With Project	Difference In dBA Between Opening Year Without Project and Opening Year With Project	
Slover Avenue						
Citrus Avenue to Cypress Avenue	62.7	63.6	65.0	2.3	1.4	No
Cypress Avenue to Sierra Avenue	64.9	65.9	66.0	1.1	0.1	No
Citrus Avenue						
SR-210 to Highland Avenue	70.0	70.6	70.8	0.8	0.2	No
Highland Avenue to Walnut Avenue	68.9	69.4	69.5	0.6	0.1	No

ADT = average daily trips; dBA = A-weighted decibels; CNEL= Community Equivalent Noise Level
Source: Based on traffic data provided by Kimley-Horn and Associates, Inc., October 2021. Refer to Appendix B for traffic noise modeling results.

Cumulative Stationary Noise

Stationary noise sources of the proposed Project would result in an incremental increase in non-transportation noise sources in the Project vicinity. However, as discussed above, operational noise caused by the proposed Project would be less than significant. Similar to the proposed Project, other planned and approved projects would be required to mitigate for stationary noise impacts at nearby sensitive receptors, if necessary. As stationary noise sources are generally localized, there is a limited potential for other projects to contribute to cumulative noise impacts.

No known past, present, or reasonably foreseeable projects would combine with the operational noise levels generated by the Project to increase noise levels above acceptable standards because each project must comply with applicable City regulations that limit operational noise. Therefore, the Project, together with other projects, would not create a significant cumulative impact, and even if there was such a significant cumulative impact, the Project would not make a cumulatively considerable contribution to significant cumulative operational noises.

Given that noise dissipates as it travels away from its source, operational noise impacts from on-site activities and other stationary sources would be limited to the Project site and vicinity. Thus, cumulative operational noise impacts from related projects, in conjunction with Project specific noise impacts, would not be cumulatively significant.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

7 REFERENCES

1. Ace Design LLC, Fontana Square Site Plan, May 2021.
2. California Department of Transportation, *California Vehicle Noise Emission Levels*, 1987.
3. California Department of Transportation, *Traffic Noise Analysis Protocol*, 2011.
4. California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, 2013.
5. California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, 2020.
6. City of Fontana, *General Plan Update 2015-2035*, November 2018.
7. City of Fontana, *Municipal Code*, 2020.
8. Federal Highway Administration, *Roadway Construction Noise Model*, 2006.
9. Federal Highway Administration, *Roadway Construction Noise Model User's Guide Final Report*, 2006.
10. Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, 1992.
11. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018.
12. Kimley-Horn, *Traffic Impact Analysis for the Proposed Fontana Square Project*, October 2021.
13. United States Environmental Protection Agency, *Protective Noise Levels (EPA 550/9-79-100)*, 1979.

Appendix A

NOISE MEASUREMENTS

Noise Measurement Field Data

Project:	Fontana Square	**Job Number:**	195270002
Site No.:	1	**Date:**	10/13/2021
Analyst:	Alex Howard and Melissa Thayer	**Time:**	11:15 - 11:25 AM
Location:	Off Catawba Ave, 160 feet north of South Highland Avenue		
Noise Sources:	Traffic on the 210 Freeway/Foothill Fwy and Highland Ave		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	58.6	50.3	68.1	86.1

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	67°
Wind (mph):	< 5
Sky:	Clear
Bar. Pressure:	29.92"
Humidity:	15%

Photo:

Kimley»Horn

Summary		
File Name on Meter	ST.005	
File Name on PC	SLM_0005586_ST_005.00.ldbin	
Serial Number	0005586	
Model	SoundExpert® LxT	
Firmware Version	2.404	
User	Alex Howard	
Location	Fontana	
Job Description	Fontana Square	
Note		

Measurement		
Description	Fontana Square and Gateway 8 sites	
Start	2021-10-13 11:15:21	
Stop	2021-10-13 11:25:21	
Duration	00:10:00.0	
Run Time	00:10:00.0	
Pause	00:00:00.0	
Pre Calibration	2021-10-13 07:33:57	
Post Calibration	None	
Calibration Deviation	---	

Overall Settings		
RMS Weight	A Weighting	
Peak Weight	A Weighting	
Detector	Slow	
Preamp	PRMLxT1L	
Microphone Correction	Off	
Integration Method	Linear	
OBA Range	Normal	
OBA Bandwidth	1/1 and 1/3	
OBA Freq. Weighting	A Weighting	
OBA Max Spectrum	At LMax	
Overload	122.6 dB	
	A	**C**
Under Range Peak	**79.1**	76.1
Under Range Limit	**25.3**	26.0
Noise Floor	16.1	16.8

Results		
LAeq	58.6	
LAE	86.4	
EA	48.215 µPa²h	
LApeak (max)	2021-10-13 11:20:54	86.1
LASmax	2021-10-13 11:22:22	68.1
LASmin	2021-10-13 11:19:16	50.3
SEA	-99.9 dB	

Measurement Report

Report Summary

Meter's File Name	ST.005	Computer's File Name	SLM_0005586_ST_005.00.ldbin
Meter	LxT SE		
Firmware	2.404		
User	Alex Howard	Location	
Description	Fontana Square		
Note			

Start Time	2021-10-13 11:15:21	Duration	0:10:00.0		
End Time	2021-10-13 11:25:21	Run Time	0:10:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	58.6 dB		
LAE	86.4 dB	SEA	--- dB
EA	48.2 µPa²h		
LA_{peak}	86.1 dB	2021-10-13 11:20:54	
LAS_{max}	68.1 dB	2021-10-13 11:22:22	
LAS_{min}	50.3 dB	2021-10-13 11:19:16	
LA_{eq}	58.6 dB		
LC_{eq}	69.6 dB	LC_{eq} - LA_{eq}	11.0 dB
LAI_{eq}	59.9 dB	LAI_{eq} - LA_{eq}	1.3 dB

Exceedances

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
58.6 dB	58.6 dB	0.0 dB	
LDEN	**LDay**	**LEve**	**LNight**
58.6 dB	58.6 dB	--- dB	--- dB

Any Data

	A Level	A Time Stamp	C Level	C Time Stamp	Z Level	Z Time Stamp
L_{eq}	58.6 dB		69.6 dB		--- dB	
$Ls_{(max)}$	68.1 dB	2021-10-13 11:22:22	--- dB		--- dB	
$LS_{(min)}$	50.3 dB	2021-10-13 11:19:16	--- dB		--- dB	
$L_{Peak(max)}$	86.1 dB	2021-10-13 11:20:54	--- dB		--- dB	

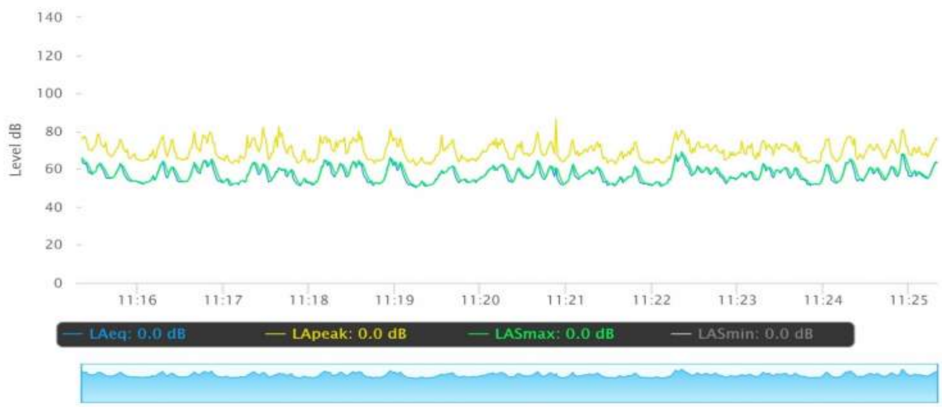
Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	63.2 dB
LAS 10.0	62.0 dB
LAS 33.3	58.7 dB
LAS 50.0	57.0 dB
LAS 66.6	55.0 dB
LAS 90.0	52.3 dB

Time History



Noise Measurement Field Data

Project:	Fontana Square	**Job Number:**	195270002
Site No.:	2	**Date:**	10/13/2021
Analyst:	Alex Howard and Melissa Thayer	**Time:**	11:58 AM - 12:08 PM
Location:	Off South Highland Avenue, 100 feet west of Citrus Avenye		
Noise Sources:	Traffic frm the Citrus Ave and S Highland Ave intersection		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	65.6	53.1	85.1	99.5

Equipment		Weather	
Sound Level Meter:	LD SoundExpert LxT	**Temp. (degrees F):**	67°
Calibrator:	CAL200	**Wind (mph):**	< 5
Response Time:	Slow	**Sky:**	Clear
Weighting:	A	**Bar. Pressure:**	29.92"
Microphone Height:	5 feet	**Humidity:**	15%

Photo:

Kimley»Horn

Summary		
File Name on Meter	ST.008	
File Name on PC	SLM_0005586_ST_008.00.ldbin	
Serial Number	0005586	
Model	SoundExpert® LxT	
Firmware Version	2.404	
User	Alex Howard	
Location	Fontana	
Job Description	Fontana Square	
Note		

Measurement		
Description	Fontana Square and Gateway 8 sites	
Start	2021-10-13 11:58:53	
Stop	2021-10-13 12:08:53	
Duration	00:10:00.0	
Run Time	00:10:00.0	
Pause	00:00:00.0	
Pre Calibration	2021-10-13 07:33:57	
Post Calibration	None	
Calibration Deviation	---	

Overall Settings		
RMS Weight	A Weighting	
Peak Weight	A Weighting	
Detector	Slow	
Preamp	PRMLxT1L	
Microphone Correction	Off	
Integration Method	Linear	
OBA Range	Normal	
OBA Bandwidth	1/1 and 1/3	
OBA Freq. Weighting	A Weighting	
OBA Max Spectrum	At LMax	
Overload	122.6 dB	
	A	**C**
Under Range Peak	**79.1**	76.1
Under Range Limit	**25.3**	26.0
Noise Floor	16.1	16.8

Results		
LAeq	65.6	
LAE	93.3	
EA	239.704 µPa²h	
LApeak (max)	2021-10-13 12:02:41	99.5
LASmax	2021-10-13 12:02:41	85.1
LASmin	2021-10-13 12:01:57	53.1

Measurement Report

Report Summary

Meter's File Name	ST.008	Computer's File Name	SLM_0005586_ST_008.00.ldbin
Meter	LxT SE		
Firmware	2.404		
User	Alex Howard	Location	
Description	Fontana Square		
Note			

Start Time	2021-10-13 11:58:53	Duration	0:10:00.0		
End Time	2021-10-13 12:08:53	Run Time	0:10:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	65.6 dB		
LAE	93.3 dB	SEA	--- dB
EA	239.7 µPa²h		
LA_{peak}	99.5 dB	2021-10-13 12:02:41	
LAS_{max}	85.1 dB	2021-10-13 12:02:41	
LAS_{min}	53.1 dB	2021-10-13 12:01:57	
LA_{eq}	65.6 dB		
LC_{eq}	77.0 dB	$LC_{eq} - LA_{eq}$	11.4 dB
LAI_{eq}	68.0 dB	$LAI_{eq} - LA_{eq}$	2.5 dB

Exceedances

Exceedances	Count	Duration
LAS > 85.0 dB	1	0:00:00.8
LAS > 115.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
65.6 dB	65.6 dB	0.0 dB	
LDEN	LDay	LEve	LNight
65.6 dB	65.6 dB	--- dB	--- dB

Any Data

	A Level	A Time Stamp	C Level	C Time Stamp	Z Level	Z Time Stamp
L_{eq}	65.6 dB		77.0 dB		--- dB	
$Ls_{(max)}$	85.1 dB	2021-10-13 12:02:41	--- dB		--- dB	
$LS_{(min)}$	53.1 dB	2021-10-13 12:01:57	--- dB		--- dB	
$L_{Peak(max)}$	99.5 dB	2021-10-13 12:02:41	--- dB		--- dB	

Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	69.5 dB
LAS 10.0	67.7 dB
LAS 33.3	63.3 dB
LAS 50.0	61.9 dB
LAS 66.6	60.0 dB
LAS 90.0	56.8 dB

Time History

Noise Measurement Field Data

Project:	Fontana Square	**Job Number:**	195270002
Site No.:	3	**Date:**	10/13/2021
Analyst:	Alex Howard and Melissa Thayer	**Time:**	11:44 - 11:54 AM
Location:	At the eastern intersection of Jacaranda Avenue and South Highland Avenue		
Noise Sources:	Traffic on the 210 Freeway/Foothill Fwy and S Highland Ave		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	64.5	48.5	79.7	96.4

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	67°
Wind (mph):	< 5
Sky:	Clear
Bar. Pressure:	29.94"
Humidity:	15%

Photo:

Kimley»Horn

Summary		
File Name on Meter	ST.007	
File Name on PC	SLM_0005586_ST_007.00.ldbin	
Serial Number	0005586	
Model	SoundExpert® LxT	
Firmware Version	2.404	
User	Alex Howard	
Location	Fontana	
Job Description	Fontana Square	
Note		

Measurement		
Description	Fontana Square and Gateway 8 sites	
Start	2021-10-13 11:44:32	
Stop	2021-10-13 11:54:32	
Duration	00:10:00.0	
Run Time	00:10:00.0	
Pause	00:00:00.0	
Pre Calibration	2021-10-13 07:33:57	
Post Calibration	None	
Calibration Deviation	---	

Overall Settings		
RMS Weight	A Weighting	
Peak Weight	A Weighting	
Detector	Slow	
Preamp	PRMLxT1L	
Microphone Correction	Off	
Integration Method	Linear	
OBA Range	Normal	
OBA Bandwidth	1/1 and 1/3	
OBA Freq. Weighting	A Weighting	
OBA Max Spectrum	At LMax	
Overload	122.6 dB	
	A	**C**
Under Range Peak	**79.1**	76.1
Under Range Limit	**25.3**	26.0
Noise Floor	16.1	16.8

Results		
LAeq	64.5	
LAE	92.3	
EA	189.870 µPa²h	
LApeak (max)	2021-10-13 11:50:17	96.4
LASmax	2021-10-13 11:45:24	79.7
LASmin	2021-10-13 11:50:03	48.5

Measurement Report

Report Summary

Meter's File Name	ST.007	Computer's File Name	SLM_0005586_ST_007.00.ldbin
Meter	LxT SE		
Firmware	2.404		
User	Alex Howard	Location	
Description	Fontana Square		
Note			

Start Time	2021-10-13 11:44:32	Duration	0:10:00.0		
End Time	2021-10-13 11:54:32	Run Time	0:10:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	64.5 dB		
LAE	92.3 dB	SEA	--- dB
EA	189.9 µPa²h		
LA_{peak}	96.4 dB	2021-10-13 11:50:17	
LAS_{max}	79.7 dB	2021-10-13 11:45:24	
LAS_{min}	48.5 dB	2021-10-13 11:50:03	
LA_{eq}	64.5 dB		
LC_{eq}	70.9 dB	LC_{eq} - LA_{eq}	6.4 dB
LAI_{eq}	66.5 dB	LAI_{eq} - LA_{eq}	2.0 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
64.5 dB	64.5 dB	0.0 dB	
LDEN	**LDay**	**LEve**	**LNight**
64.5 dB	64.5 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	64.5 dB		70.9 dB		--- dB	
$Ls_{(max)}$	79.7 dB	2021-10-13 11:45:24	--- dB		--- dB	
$LS_{(min)}$	48.5 dB	2021-10-13 11:50:03	--- dB		--- dB	
$L_{Peak(max)}$	96.4 dB	2021-10-13 11:50:17	--- dB		--- dB	

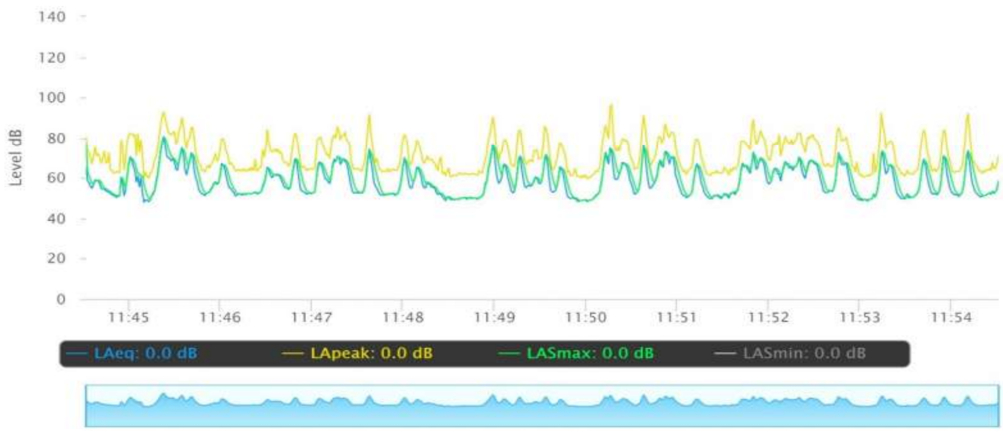
Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	70.4 dB
LAS 10.0	68.8 dB
LAS 33.3	62.9 dB
LAS 50.0	58.0 dB
LAS 66.6	53.7 dB
LAS 90.0	50.5 dB

Time History



Noise Measurement Field Data

Project:	Fontana Square	**Job Number:**	195270002
Site No.:	4	**Date:**	10/13/2021
Analyst:	Alex Howard and Melissa Thayer	**Time:**	11:29 - 11:39 AM
Location:	Off Knox Avenue, 100ft South of South Highland Avenue		
Noise Sources:	Traffic on the 210 Freeway/Foothill Fwy and S Highland Ave		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	67.3	50.1	83.3	99.0

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	67°
Wind (mph):	< 5
Sky:	Clear
Bar. Pressure:	29.94"
Humidity:	15%

Photo:

Kimley»Horn

Summary		
File Name on Meter	ST.006	
File Name on PC	SLM_0005586_ST_006.00.ldbin	
Serial Number	0005586	
Model	SoundExpert® LxT	
Firmware Version	2.4	
User	Alex Howard	
Location	Fontana	
Job Description	Fontana Square	
Note		

Measurement		
Description	Fontana Square and	
Start	2021-10-13 11:29:57	
Stop	2021-10-13 11:39:57	
Duration	00:10:00.0	
Run Time	00:10:00.0	
Pause	00:00:00.0	
Pre Calibration	2021-10-13 07:33:57	
Post Calibration	None	
Calibration Deviation	---	

Overall Settings		
RMS Weight	A Weighting	
Peak Weight	A Weighting	
Detector	Slow	
Preamp	PRMLxT1L	
Microphone Correction	Off	
Integration Method	Linear	
OBA Range	Normal	
OBA Bandwidth	1/1 and 1/3	
OBA Freq. Weighting	A Weighting	
OBA Max Spectrum	At LMax	
Overload	122.6 dB	
	A	**C**
Under Range Peak	**79.1**	76.1
Under Range Limit	**25.3**	26.0
Noise Floor	16.1	16.8

Results		
LAeq	67.3	
LAE	95.1	
EA	360.027 µPa²h	
LApeak (max)	2021-10-13 11:35:04	99.0
LASmax	2021-10-13 11:35:05	83.3
LASmin	2021-10-13 11:36:54	50.1

Measurement Report

Report Summary

Meter's File Name	ST.006	Computer's File Name	SLM_0005586_ST_006.00.ldbin
Meter	LxT SE		
Firmware	2.404		
User	Alex Howard	Location	
Description	Fontana Square		
Note			

Start Time	2021-10-13 11:29:57	Duration	0:10:00.0		
End Time	2021-10-13 11:39:57	Run Time	0:10:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	67.3 dB		
LAE	95.1 dB	SEA	--- dB
EA	360.0 µPa²h		
LA_{peak}	99.0 dB	2021-10-13 11:35:04	
LAS_{max}	83.3 dB	2021-10-13 11:35:05	
LAS_{min}	50.1 dB	2021-10-13 11:36:54	
LA_{eq}	67.3 dB		
LC_{eq}	73.8 dB	LC_{eq} - LA_{eq}	6.5 dB
LAI_{eq}	70.4 dB	LAI_{eq} - LA_{eq}	3.1 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
67.3 dB	67.3 dB	0.0 dB	
LDEN	**LDay**	**LEve**	**LNight**
67.3 dB	67.3 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	67.3 dB		73.8 dB		--- dB	
$Ls_{(max)}$	83.3 dB	2021-10-13 11:35:05	--- dB		--- dB	
$LS_{(min)}$	50.1 dB	2021-10-13 11:36:54	--- dB		--- dB	
$L_{Peak(max)}$	99.0 dB	2021-10-13 11:35:04	--- dB		--- dB	

Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	74.1 dB
LAS 10.0	71.7 dB
LAS 33.3	64.2 dB
LAS 50.0	60.5 dB
LAS 66.6	57.7 dB
LAS 90.0	54.7 dB


Time History
140
120
100
80
60
40
20
0
Level dB
11:30
11:32
11:34
11:36
11:38
LAeq
LApeak
LASmax
LASmin

Appendix B

NOISE DATA

Roadway Construction Noise Model (RCNM),Version 1.

Report date: 10/26/2021
Case Description: Fontana Square - Demo

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Residence	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Concrete Saw	No	20		89.6	105	0
Excavator	No	40		80.7	175	0
Dozer	No	40		81.7	250	0

				Results			
		Calculated (dBA)			Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw		83.1	76.1	N/A	N/A	N/A	N/A
Excavator		69.8	65.8	N/A	N/A	N/A	N/A
Dozer		67.7	63.7	N/A	N/A	N/A	N/A
	Total	83.1	76.8	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.

Report date: 10/26/2021
Case Description: Fontana Square - Site Prep

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Residence	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Tractor	No	40	84		125	0
Dozer	No	40		81.7	105	0

				Results			
		Calculated (dBA)			Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor		76	72.1	N/A	N/A	N/A	N/A
Dozer		75.2	71.2	N/A	N/A	N/A	N/A
	Total	76	74.7	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.

Report date: 10/26/2021
Case Description: Fontana Square - Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Residence	Residential	1	1	1

				Equipment			
				Spec	Actual	Receptor	Estimated
		Impact		Lmax	Lmax	Distance	Shielding
Description		Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Excavator		No	40		80.7	105	0
Grader		No	40	85		150	0
Dozer		No	40		81.7	200	0
Tractor		No	40	84		250	0

				Results			
		Calculated (dBA)			Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		74.3	70.3	N/A	N/A	N/A	N/A
Grader		75.5	71.5	N/A	N/A	N/A	N/A
Dozer		69.6	65.6	N/A	N/A	N/A	N/A
Tractor		70	66	N/A	N/A	N/A	N/A
	Total	75.5	75.1	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.

Report date: 10/26/2021
Case Description: Fontana Square - Building/Paving/Painting

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Residence	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Crane	No	16		80.6	150	0
Generator	No	50		80.6	250	0
Tractor	No	40	84		200	0
Welder / Torch	No	40		74	275	0
Paver	No	50		77.2	105	0
Roller	No	20		80	125	0
Compressor (air)	No	40		77.7	225	0

				Results			
		Calculated (dBA)			Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		71	63	N/A	N/A	N/A	N/A
Generator		66.7	63.6	N/A	N/A	N/A	N/A
Tractor		72	68	N/A	N/A	N/A	N/A
Welder / Torch		59.2	55.2	N/A	N/A	N/A	N/A
Paver		70.8	67.8	N/A	N/A	N/A	N/A
Roller		72	65.1	N/A	N/A	N/A	N/A
Compressor (air)		64.6	60.6	N/A	N/A	N/A	N/A
	Total	72	73.3	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Fontana Square
Project Number: 195270002
Scenario: Existing
Ldn/CNEL: CNEL

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

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	**Roadway**	**Segment**	**Lanes**	**Width**	**Volume**	**(mph)**	**Factor**	**Trucks**	**Trucks**	**100 Feet**	**70 CNEL**	**65 CNEL**	**60 CNEL**	**55 CNEL**
1	Highland Avenue	Beech Avenue to Citrus Avenue	3	15	7,014	45	0	3.0%	2.0%	62.7	-	59	187	592
2	Highland Avenue	Citrus Avenue to Oleander Avenue	4	15	11,327	45	0	3.0%	2.0%	64.9	-	97	307	970
3	Citrus Avenue	SR-210 to Highland Avenue	4	15	36,783	45	0	3.0%	2.0%	70.0	100	315	996	3,151
4	Citrus Avenue	Highland Avenue to Walnut Avenue	4	15	28,628	45	0	3.0%	2.0%	68.9	78	245	776	2,452

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Fontana Square
Project Number: 195270002
Scenario: Opening Year
Ldn/CNEL: CNEL

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

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	**Roadway**	**Segment**	**Lanes**	**Width**	**Volume**	**(mph)**	**Factor**	**Trucks**	**Trucks**	**100 Feet**	**70 CNEL**	**65 CNEL**	**60 CNEL**	**55 CNEL**
1	Highland Avenue	Beech Avenue to Citrus Avenue	3	15	8,495	45	0	3.0%	2.0%	63.6	-	72	227	717
2	Highland Avenue	Citrus Avenue to Oleander Avenue	4	15	14,280	45	0	3.0%	2.0%	65.9	-	122	387	1,223
3	Citrus Avenue	SR-210 to Highland Avenue	4	15	42,254	45	0	3.0%	2.0%	70.6	114	362	1,145	3,620
4	Citrus Avenue	Highland Avenue to Walnut Avenue	4	15	32,473	45	0	3.0%	2.0%	69.4	88	278	880	2,782

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Fontana Square
Project Number: 195270002
Scenario: Opening Year Plus Project
Ldn/CNEL: CNEL

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

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Highland Avenue	Beech Avenue to Citrus Avenue	3	15	11,926	45	0	3.0%	2.0%	65.0	-	101	318	1,007
2	Highland Avenue	Citrus Avenue to Oleander Avenue	4	15	14,738	45	0	3.0%	2.0%	66.0	-	126	399	1,262
3	Citrus Avenue	SR-210 to Highland Avenue	4	15	44,541	45	0	3.0%	2.0%	70.8	121	382	1,207	3,815
4	Citrus Avenue	Highland Avenue to Walnut Avenue	4	15	33,159	45	0	3.0%	2.0%	69.5	90	284	898	2,840

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Fontana Square
Project Number: 195270002
Scenario: Horizon Year
Ldn/CNEL: CNEL

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

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	**Roadway**	**Segment**	**Lanes**	**Width**	**Volume**	**(mph)**	**Factor**	**Trucks**	**Trucks**	**100 Feet**	**70 CNEL**	**65 CNEL**	**60 CNEL**	**55 CNEL**
1	Highland Avenue	Beech Avenue to Citrus Avenue	3	15	16,200	45	0	3.0%	2.0%	66.4	-	137	433	1,368
2	Highland Avenue	Citrus Avenue to Oleander Avenue	4	15	21,700	45	0	3.0%	2.0%	67.7	59	186	588	1,859
3	Citrus Avenue	SR-210 to Highland Avenue	4	15	42,254	45	0	3.0%	2.0%	70.6	114	362	1,145	3,620
4	Citrus Avenue	Highland Avenue to Walnut Avenue	4	15	32,473	45	0	3.0%	2.0%	69.4	88	278	880	2,782

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Fontana Square
Project Number: 195270002
Scenario: Horizon Year
Ldn/CNEL: CNEL

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

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Highland Avenue	Beech Avenue to Citrus Avenue	3	15	19,631	45	0	3.0%	2.0%	67.2	52	166	524	1,658
2	Highland Avenue	Citrus Avenue to Oleander Avenue	4	15	22,158	45	0	3.0%	2.0%	67.8	60	190	600	1,898
3	Citrus Avenue	SR-210 to Highland Avenue	4	15	44,541	45	0	3.0%	2.0%	70.8	121	382	1,207	3,815
4	Citrus Avenue	Highland Avenue to Walnut Avenue	4	15	33,159	45	0	3.0%	2.0%	69.5	90	284	898	2,840