APPENDIX 8

Tentative Parcel Map No. 30394

NOISE IMPACT ANALYSIS

CITY OF MURRIETA

PREPARED BY:

Bill Lawson, PE, INCE
blawson@urbanxroads.com
(949) 336-5979

OCTOBER 14, 2019

TABLE OF CONTENTS

APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

LIST OF ABBREVIATED TERMS

(1)	Reference
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
I-215	Interstate 215
IEC	International Electrotechnical Commission
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
L_{max}	Maximum level measured over the time interval
L_{min}	Minimum level measured over the time interval
mph	Miles per hour
PPV	Peak Particle Velocity
Project	Tentative Parcel Map No. 30394
REMEL	Reference Energy Mean Emission Level
RMS	Root-mean-square
VdB	Vibration Decibels

EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and the necessary noise mitigation measures for the proposed Tentative Parcel Map No. 30394 development ("Project"). The Project site is located on the northeast corner of Washington Avenue and Nutmeg Street in the City of Murrieta. The Project is proposed to consist of the development of 210 market rate apartments This noise study has been prepared to satisfy applicable City of Murrieta noise standards and significance criteria based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

ON-SITE TRAFFIC NOISE ANALYSIS

The results of this analysis indicate that future vehicle noise from Washington Avenue and Nutmeg Street represents the principal source of community noise that will impact the Project site. The Project will also experience some background traffic noise impacts from the Project's internal local streets, however due to the distance, topography and low traffic volume/speeds, traffic noise from these roads will not make a significant contribution to the noise environment. With the following recommended noise mitigation measures shown on Exhibit ES-A, the on-site noise impacts will be *less than significant*.

EXTERIOR NOISE ANALYSIS

No exterior noise mitigation is required to satisfy the City of Murrieta General Plan Noise Element exterior land use/noise level compatibility criteria for residential uses. Adjacent to Washington Avenue and Nutmeg Street, residential uses are shown to experience *conditionally acceptable* exterior noise levels of 65.1 to 66.9 dBA CNEL. Therefore, because of the future unmitigated exterior traffic noise levels at the Project site, additional interior noise analysis is required to satisfy the General Plan Noise Element *conditionally acceptable* residential use requirements within the Project site. (2)

INTERIOR NOISE ANALYSIS

This noise study evaluates the interior noise levels at the Project buildings based on the City of Murrieta 45 dBA CNEL residential interior noise level standard. The Project buildings are shown to require a Noise Reduction (NR) of up to 21.9 dBA and a windows-closed condition requiring a means of mechanical ventilation (e.g. air conditioning). To meet the City of Murrieta 45 dBA CNEL interior noise standards the following on-site mitigation measures are required:

- Windows: All buildings require standards windows and sliding glass doors with a minimum STC rating of 27 (all windows/glass doors, all floors), and a means of mechanical ventilation (e.g., air conditioning).
- Exterior Doors (Non-Glass): All residential building exterior doors shall be well weather-stripped and have minimum STC ratings of 27. Well-sealed perimeter gaps around the doors are essential to achieve the optimal STC rating. (3)

- Walls: At any penetrations of exterior walls by pipes, ducts, or conduits, the space between the wall and pipes, ducts, or conduits shall be caulked or filled with mortar to form an airtight seal.
- Residential Roofs: Roof sheathing of wood construction shall be per manufacturer's specification or caulked plywood of at least one-half inch thick. Ceilings shall be per manufacturer's specification or well-sealed gypsum board of at least one-half inch thick. Insulation with at least a rating of R-19 shall be used in the attic space.
- Ventilation: Arrangements for any habitable room shall be such that any exterior door or window can be kept closed when the room is in use and still receive circulated air. A forced air circulation system (e.g. air conditioning) or active ventilation system (e.g. fresh air supply) shall be provided which satisfies the requirements of the Uniform Building Code.

STATIONARY-SOURCE NOISE LEVELS

The Tentative Parcel Map No. 30394 residential development is not expected to include any specific type of operational noise levels beyond the typical noise sources associated with residential land use in the Project study area, such as people and children, car doors slamming, garage doors, trash collection, and small community parks, and is considered a noise-sensitive receiving land use. Therefore, no potential operational noise impacts for the residential land use are analyzed in the noise study.

CONSTRUCTION NOISE ANALYSIS

Construction noise levels are expected to create temporary and intermittent high-level noise conditions at receivers surrounding the Project site when certain activities occur at the closest point to the nearby receiver locations from the edge of primary Project construction activity. Using sample reference noise levels to represent the construction activities at the Tentative Parcel Map No. 30394 site, this analysis estimates the Project-related construction noise levels at nearby sensitive receiver locations. The results of the analysis show the highest construction noise levels at the potentially impacted receiver locations are expected to approach 74.1 dBA L_{max} from mobile equipment, and 66.0 dBA L_{max} for stationary equipment.

While the Project related construction equipment noise levels satisfy the City of Murrieta Municipal Code construction noise level standards of 75 dBA L_{max} for mobile equipment, the noise Project noise levels will exceed the 60 dBA L_{max} standards for stationary equipment during temporary Project construction activities at receiver locations R1, R2 and R3.

The noise impacts due to unmitigated Project construction noise levels is, therefore, considered a *potentially significant* impact at nearby sensitive receiver locations and mitigation measures are required to reduce the noise levels generated during temporary Project construction activities. However, with the following construction noise mitigation measures, the short-term Project construction impacts are considered a *less than significant*

CONSTRUCTION NOISE MITIGATION MEASURES

- The construction contractor shall provide a 100-foot buffer zone between adjacent occupied, sensitive residential receiver locations and stationary construction equipment.
- Prior to approval of grading plans and/or issuance of building permits, plans shall include a note indicating that noise-generating Project construction activities shall only occur between the hours of 7:00 a.m. to 8:00 p.m. daily, with no activity allowed on Sundays or holidays (City of Murrieta Municipal Code, Section 16.30.130(A)(2)(a)(1)). The Project construction supervisor shall ensure compliance with the note and the City shall conduct periodic inspection at its discretion.
- During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the Project site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site during all Project construction activities (i.e., to the center).
- The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment (between the hours of 7:00 a.m. to 8:00 p.m. daily, with no activity allowed on Sundays or holidays). The contractor shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.

CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. Project construction vibration velocity levels are expected to approach 0.018 in/sec RMS at the nearby receiver locations, and will therefore, exceed the City of Murrieta vibration threshold of 0.01 in/sec RMS. As such, the unmitigated Project-related vibration impact is considered *potentially significant* during the construction activities at the Project site. Therefore, a 100-foot buffer for large construction equipment (greater than or equal to 81,500 pounds) (4) shall be required to reduce vibration levels at nearby receiver locations as well. The mitigated Project construction vibration levels will be reduced to 0.004 in/sec RMS and remain below the City of Murrieta 0.01 in/sec RMS threshold, thereby resulting in *less than significant* vibration impacts with mitigation.

CONSTRUCTION VIBRATION MITIGATION MEASURES

- Large loaded trucks and dozers (greater than or equal to 81,500 pounds) shall not be used within 100 feet of receiver locations R1, R2 and R3 if occupied at the time of Project construction, as shown on Exhibit ES-B. Instead, smaller, rubber-tired bulldozers (less than 81,500 pounds) shall be used within this area during Project construction to reduce vibration effects. If all mobile equipment used during Project construction are less than 81,500 pounds, then the 100-foot buffer mitigation is not required.

SUMMARY OF SIGNIFICANCE FINDINGS

The results of this Tentative Parcel Map No. 30394 Noise Impact Analysis are summarized below based on the significance criteria in Section 4 of this report. Table ES-1 shows the findings of significance for each potential noise and/or vibration impact before and after incorporation of Project design features.

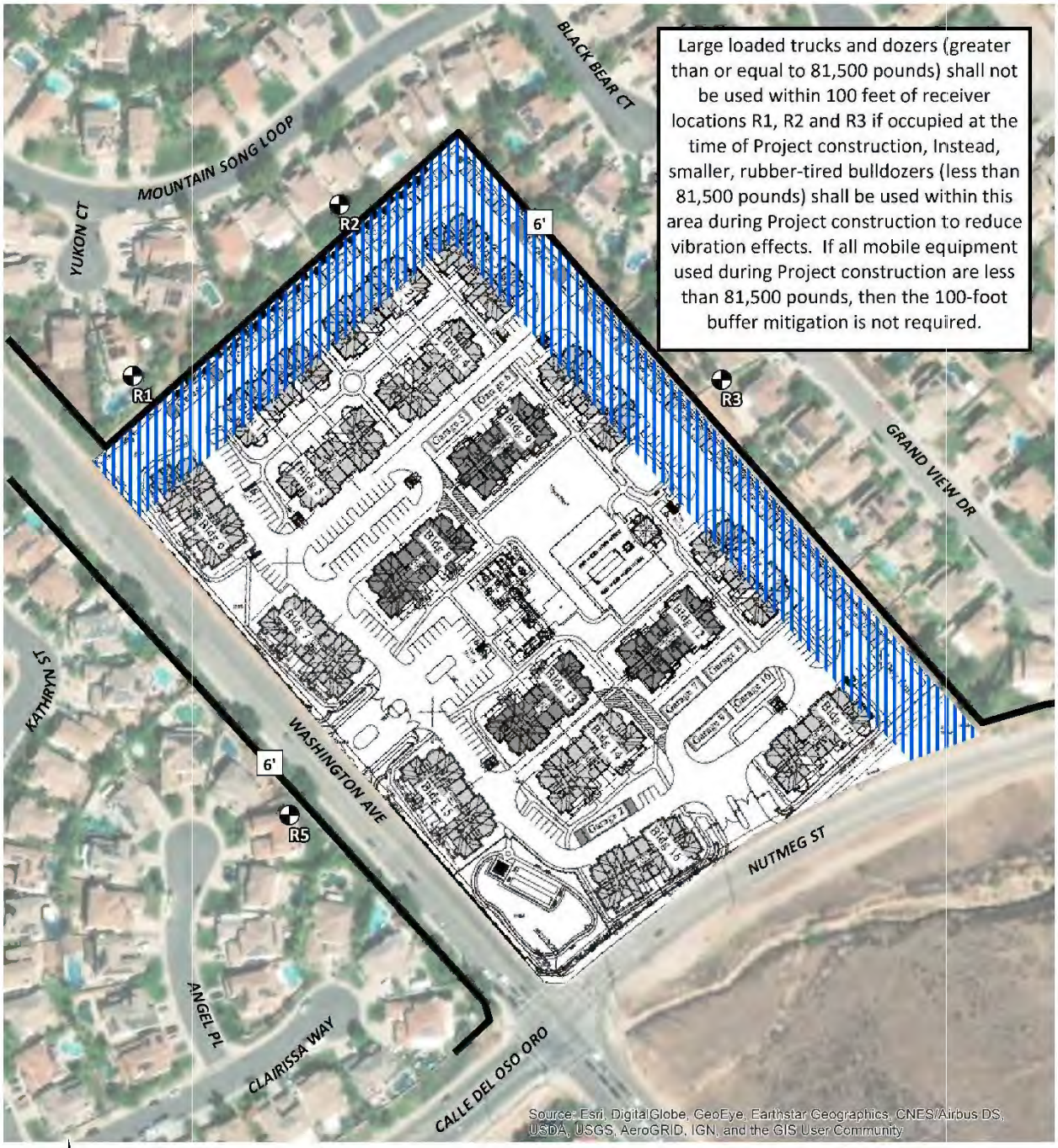
TABLE ES-1: SUMMARY OF SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
On-Site Exterior Traffic Noise Levels	7	*Less Than Significant*	*n/a*
On-Site Interior Traffic Noise Levels		*Potentially Significant*	*Less Than Significant*
Construction Noise Levels	9	*Potentially Significant*	*Less Than Significant*
Construction Vibration Levels		*Potentially Significant*	*Less Than Significant*

"n/a" = No mitigation is required since the unmitigated impact will be less than significant.

EXHIBIT ES-A: SUMMARY OF ON-SITE RECOMMENDATIONS

EXHIBIT ES-B: CONSTRUCTION MITIGATION SUMMARY



1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development of the proposed Tentative Parcel Map No. 30394 ("Project"). This noise study describes the proposed Project, provides information regarding noise fundamentals, outlines the local regulatory setting, provides the study methods and procedures for traffic and construction noise analysis, and evaluates the future exterior noise environment.

1.1 SITE LOCATION

The proposed Tentative Parcel Map No. 30394 Project is located on the northeast corner of Washington Avenue and Nutmeg Street in the City of Murrieta, as shown on Exhibit 1-A.

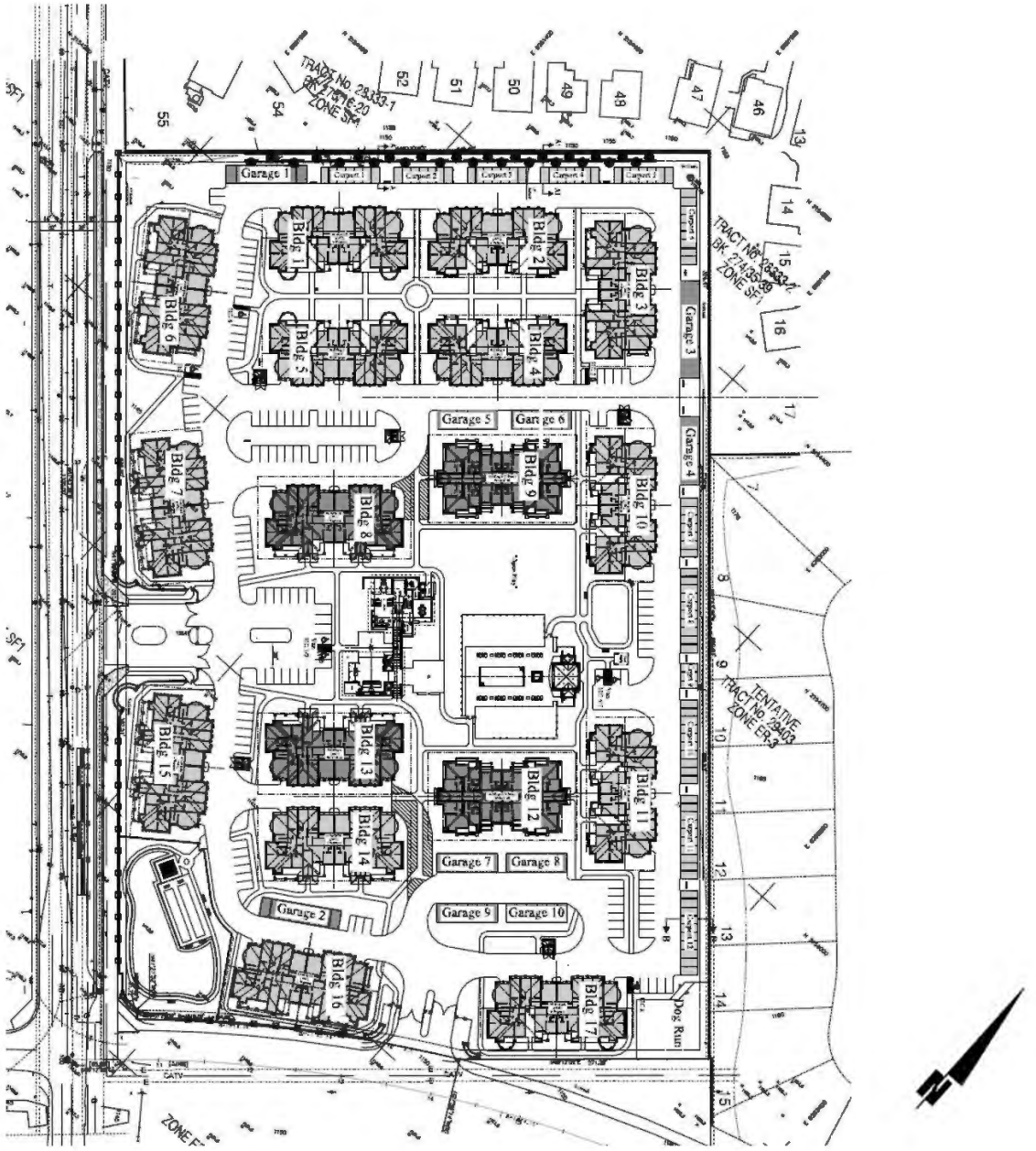
Existing land uses near the site include residential homes east and west of the Project site; a commercial use located south of the Project site; and a vacant land designated for single-family residential use to the south of the Project site. Interstate 15 (I-15) is located approximately 0.50 miles northeast of the Project site. The Project site is currently vacant and is designated for Multiple-Family Residential (MFR) land uses. The MFR designation provides for attached and detached apartments and condominiums. Typical development consists of townhomes, condominiums, apartments, senior housing, and stacked flats. MFR encourages the development of integrated projects that provide complementary open spaces and amenities on-site (5).

1.2 PROJECT DESCRIPTION

The site plan for the proposed Project is shown on Exhibit 1-B. The Project is to consist of 210 market rate apartments. It is anticipated that the Project would be developed in a single phase with an anticipated Opening Year of 2022.

EXHIBIT 1-A: LOCATION MAP

EXHIBIT 1-B: SITE PLAN



This page intentionally left blank

2 FUNDAMENTALS

Noise has been simply defined as "unwanted sound." Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). A-weighted decibels (dBA) approximate the subjective response of the human ear to broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear. Exhibit 2-A presents a summary of the typical noise levels and their subjective loudness and effects that are described in more detail below.

EXHIBIT 2-A: TYPICAL NOISE LEVELS

COMMON OUTDOOR ACTIVITIES	COMMON INDOOR ACTIVITIES	A - WEIGHTED SOUND LEVEL dBA	SUBJECTIVE LOUDNESS	EFFECTS OF NOISE
THRESHOLD OF PAIN		140	INTOLERABLE OR DEAFENING	HEARING LOSS
NEAR JET ENGINE		130		
		120		
JET FLY-OVER AT 300m (1000 ft)	ROCK BAND	110		
LOUD AUTO HORN		100	VERY NOISY	
GAS LAWN MOWER AT 1m (3 ft)		90		
DIESEL TRUCK AT 15m (50 ft), at 80 km/hr (50 mph)	FOOD BLENDER AT 1m (3 ft)	80		SPEECH INTERFERENCE
NOISY URBAN AREA, DAYTIME	VACUUM CLEANER AT 3m (10 ft)	70	LOUD	
HEAVY TRAFFIC AT 90m (300 ft)	NORMAL SPEECH AT 1m (3 ft)	60		
QUIET URBAN DAYTIME	LARGE BUSINESS OFFICE	50	MODERATE	SLEEP DISTURBANCE
QUIET URBAN NIGHTTIME	THEATER, LARGE CONFERENCE ROOM (BACKGROUND)	40		
QUIET SUBURBAN NIGHTTIME	LIBRARY	30	FAINT	NO EFFECT
QUIET RURAL NIGHTTIME	BEDROOM AT NIGHT, CONCERT HALL (BACKGROUND)	20		
	BROADCAST/RECORDING STUDIO	10	VERY FAINT	
LOWEST THRESHOLD OF HUMAN HEARING	LOWEST THRESHOLD OF HUMAN HEARING	0		

Source: Environmental Protection Agency Office of Noise Abatement and Control, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA/ONAC 550/9-74-004) March 1974.

2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (6) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA

at approximately 100 feet, which can cause serious discomfort. (7) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

Environmental noise descriptors are generally based on averages, rather than instantaneous, noise levels. The most commonly used figure is the equivalent level (L_{eq}). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period and is commonly used to describe the "average" noise levels within the environment.

To describe the time-varying character of environmental noise, the statistical or percentile noise descriptors L_{50}, L_{25}, L_8 and L_2, are commonly used. The percentile noise descriptors are the noise levels equaled or exceeded during 50 percent, 25 percent, 8 percent, and 2 percent of a stated time. Sound levels associated with the L_2 and L_8 typically describe transient or short-term events, while levels associated with the L_{50} describe the steady state (or median) noise conditions. While the L_{50} describes the median noise levels occurring 50 percent of the time, the L_{eq} accounts for the total energy (average) observed for the entire hour. Therefore, the L_{eq} noise descriptor is generally 1-2 dBA higher than the L_{50} noise level.

Peak hour or average noise levels, while useful, do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur during times when quiet is most desirable, namely evening and nighttime (sleeping) hours. To account for this, the Community Noise Equivalent Level (CNEL), representing a composite 24-hour noise level is utilized. The CNEL is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of 5 decibels to dBA L_{eq} sound levels in the evening from 7:00 p.m. to 10:00 p.m., and the addition of 10 decibels to dBA L_{eq} sound levels at night between 10:00 p.m. and 7:00 a.m. These additions are made to account for the noise sensitive time periods during the evening and night hours when sound appears louder. CNEL does not represent the actual sound level heard at any time, but rather represents the total sound exposure. The City of Murrieta relies on the 24-hour CNEL level to assess land use compatibility with transportation related noise sources.

2.3 SOUND PROPAGATION

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

2.3.1 GEOMETRIC SPREADING

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source. (6)

2.3.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receptor is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 ft. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receptor, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receptor such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source. (8)

2.3.3 ATMOSPHERIC EFFECTS

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects. (6)

2.3.4 SHIELDING

A large object or barrier in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Shielding by trees and other such vegetation typically only has an “out of sight, out of mind” effect. That is, the perception of noise impact tends to decrease when vegetation blocks the line-of-sight to nearby resident. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide and dense enough to completely obstruct the line-of sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The FHWA does not consider the planting of vegetation to be a noise abatement measure. (8)

2.4 NOISE CONTROL

Noise control is the process of obtaining an acceptable noise environment for an observation point or receptor by controlling the noise source, transmission path, receptor, or all three. This concept is known as the source-path-receptor concept. In general, noise control measures can be applied to these three elements.

2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receptor. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (8)

2.6 LAND USE COMPATIBILITY WITH NOISE

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic health and growth potential of a community by reducing the area's desirability as a place to live, shop and work. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design process. The FHWA encourages State and Local government to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized. (9)

2.7 VIBRATION

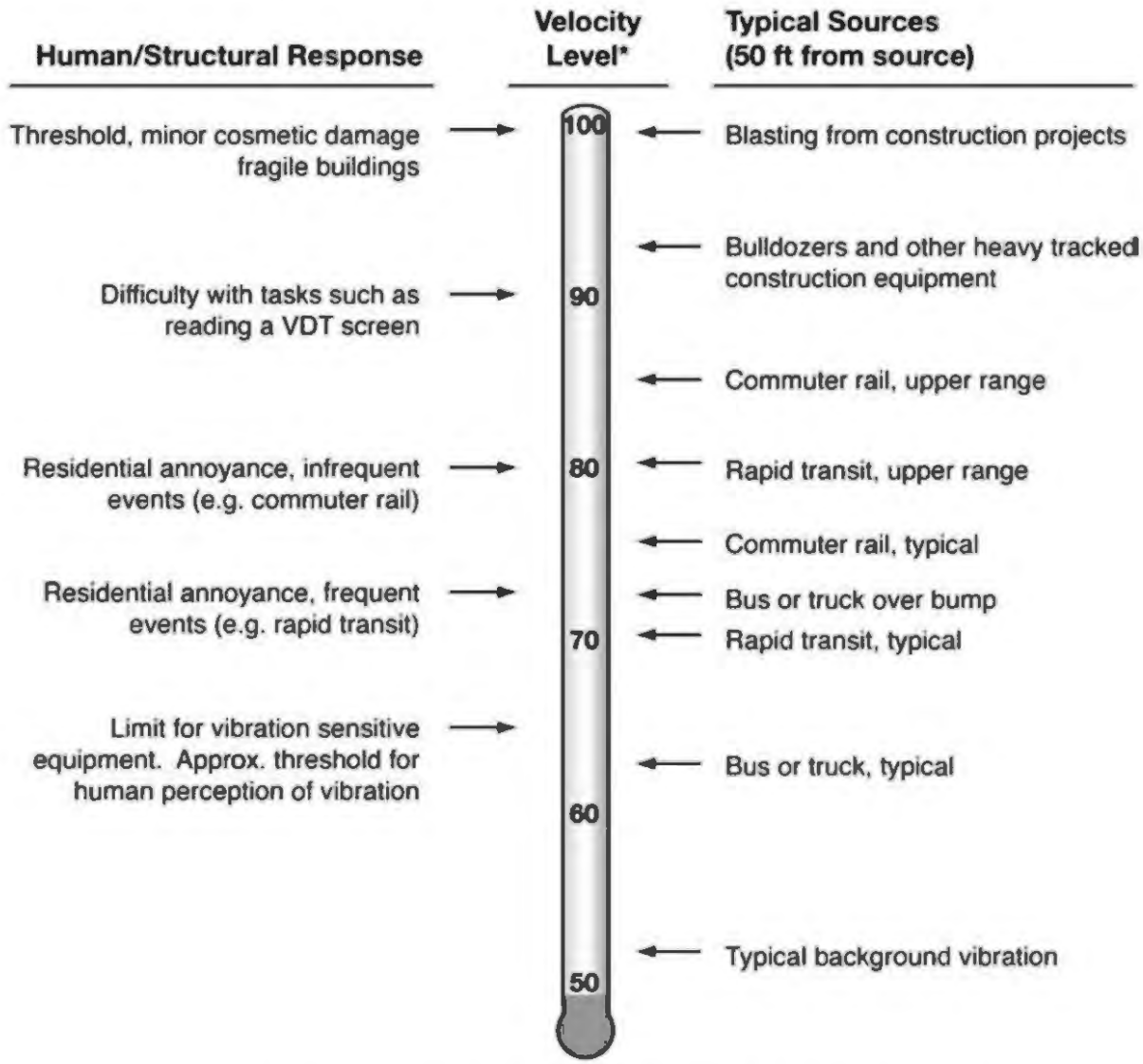
Per the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment* (10), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions. As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency.

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings, but is not always suitable for evaluating human response (annoyance) because it takes some time for the human body to respond to vibration signals. Instead, the human body responds to average vibration amplitude often described as the root mean square (RMS). The RMS amplitude is defined as the average of the squared amplitude of the signal, and is most frequently used to describe the effect of

vibration on the human body. Decibel notation (VdB) is commonly used to measure RMS. Decibel notation (VdB) serves to reduce the range of numbers used to describe human response to vibration. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receivers for vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick), and vibration-sensitive equipment.

The background vibration-velocity level in residential areas is generally 50 VdB. Ground-borne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Exhibit 2-B illustrates common vibration sources and the human and structural response to ground-borne vibration.

EXHIBIT 2-B: TYPICAL LEVELS OF GROUND-BORNE VIBRATION



** RMS Vibration Velocity Level in VdB relative to 10^{-6} inches/second*

Source: Federal Transit Administration (FTA) Transit Noise Impact and Vibration Assessment.

3 REGULATORY SETTING

To limit population exposure to physically and/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. In most areas, automobile and truck traffic is the major source of environmental noise. Traffic activity generally produces an average sound level that remains constant with time. Air and rail traffic, and commercial and industrial activities are also major sources of noise in some areas. Federal, state, and local agencies regulate different aspects of environmental noise. Federal and state agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies.

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared according to guidelines adopted by the Governor's Office of Planning and Research. (11) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts.

3.2 STATE OF CALIFORNIA BUILDING CODE

The State of California's noise insulation standards are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 2, and the California Building Code. These noise standards are applied to new construction in California for controlling interior noise levels resulting 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 developed near major transportation noise sources, and where such noise sources create an exterior noise level of 60 dBA CNEL or higher. Acoustical studies that accompany building plans for noise-sensitive land uses must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new residential buildings, schools, and hospitals, the acceptable interior noise limit for new construction is 45 dBA CNEL.

3.3 CITY OF MURRIETA GENERAL PLAN NOISE ELEMENT

The City of Murrieta has adopted a Noise Element of the General Plan to control and abate environmental noise, and to protect the citizens of the City of Murrieta from excessive exposure to noise. (2) The Noise Element specifies the exterior noise levels allowable for new developments impacted by transportation noise sources such as arterial roads, freeways, airports and railroads. In addition, the Noise Element identifies noise polices designed to protect, create, and maintain an environment free from noise that may jeopardize the health or welfare of

sensitive receivers, or degrade quality of life. To protect City of Murrieta residents from excessive noise, the Noise Element contains the following three goals related to the Project:

N-1 Noise sensitive land uses are properly and effectively protected from excessive noise generators.

N-2 A comprehensive and effective land use planning and development review process that ensures noise impacts are adequately addressed.

N-3 Noise from mobile noise sources is minimized.

The noise policies specified in the City of Murrieta Noise Element provide the guidelines necessary to satisfy these three goals. To protect noise sensitive land uses from excessive noise generators (N-1), Table 11-2 of the City of Murrieta General Plan Noise Element, shown on Exhibit 3-A, identifies a maximum allowable exterior *normally acceptable* noise level of 60 dBA CNEL and an interior noise level limit of 45 dBA CNEL for residential homes impacted by transportation noise sources such as arterial roads, freeways, airports and railroads. The Noise Element also provides several policies to reduce noise impacts to new developments (N-2) that include integrating noise considerations into planning decisions, noise mitigation measures as development requirements, and compliance with the standards of the Noise Element and Noise Ordinance. To ensure noise from mobile sources is minimized (N-3), noise mitigation measures must be considered in the design of all future streets and highways such as the construction and maintenance of noise barriers located along the I-15 and I-215 Freeways.

The policies included in the General Plan Noise Element consider land use compatibility and identify exterior noise level compatibility standards for transportation related noise. The *Land Use Compatibility for Community Noise Environments* matrix shown on Exhibit 3-A provides the City with a planning tool to gauge the compatibility of land uses relative to existing and future exterior noise levels.

According to the City's *Land Use Compatibility for Community Noise Environments* (Table 11-2), multi-family residential land uses such as the Tentative Parcel Map No. 30394 Project are considered *normally acceptable* with exterior noise levels below 65 dBA CNEL and *conditionally acceptable* with noise levels below 70 dBA CNEL. For land uses within the *normally unacceptable* category, where exterior noise levels range from 70 to 75 dBA CNEL, *new construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise-insulation features must be included in the design*.

EXHIBIT 3-A: LAND USE COMPATIBILITY FOR COMMUNITY NOISE ENVIRONMENTS

Land Use Category	Community Noise Exposure (CNEL)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential-Low Density, Single-Family, Duplex, Mobile Homes	50 - 60	55 – 70	70 – 75	75 – 85
Residential – Multiple Family	50 – 65	60 – 70	70 – 75	70 – 85
Transient Lodging – Motel, Hotels	50 – 65	60 – 70	70 – 80	80 – 85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 – 70	60 – 70	70 – 80	80 – 85
Auditoriums, Concert Halls, Amphitheaters	NA	50 – 70	NA	65 – 85
Sports Arenas, Outdoor Spectator Sports	NA	50 – 75	NA	70 – 85
Playgrounds, Neighborhood Parks	50 – 70	NA	67.5 – 77.5	72.5 – 85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 – 70	NA	70 – 80	80 – 85
Office Buildings, Business Commercial and Professional	50 – 70	67.5 – 77.5	75 – 85	NA
Industrial, Manufacturing, Utilities, Agriculture	50 – 75	70 – 80	75 – 85	NA

CNEL = community noise equivalent level; NA = not applicable

NORMALLY ACCEPTABLE: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
CONDITIONALLY ACCEPTABLE: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features have been included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.
NORMALLY UNACCEPTABLE: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise-insulation features must be included in the design.
CLEARLY UNACCEPTABLE: New construction or development should generally not be undertaken.

Source: Office of Planning and Research, California, *General Plan Guidelines*, October 2003.

3.4 CONSTRUCTION NOISE STANDARDS

To analyze noise impacts originating from the construction of the Tentative Parcel Map No. 30394 Project, noise from construction activities are typically limited to the hours of operation established under the Municipal Code. The Municipal Code noise standards for construction are described below for the City of Murrieta to determine the potential noise impacts at the nearby sensitive receiver locations. The construction-related noise standards are summarized in Tables 3-1 and 3-2.

The City of Murrieta has established maximum noise levels for mobile and stationary construction equipment. Section 16.30.130 of the Municipal Code identifies limits on noise levels from construction activities those shown on Table 3-1 and 3-2 for mobile and stationary equipment, respectively. The nearest noise-sensitive receivers to the Project site consist of existing single-family residential homes. For single-family residential development, mobile equipment noise levels may not exceed 75 dBA L_{max} and stationary equipment noise levels may not exceed 60 dBA L_{max} during the daytime hours. (12) In addition, the Municipal Code identifies hours during which mobile and stationary equipment may operate, between 7:00 a.m. to 8:00 p.m. daily, with no activity allowed on Sundays or holidays (City of Murrieta Municipal Code, Section 16.30.130(A)(2)(a)(1)). The City of Murrieta Municipal Code is included in Appendix 3.1.

TABLE 3-1: MOBILE EQUIPMENT NOISE LEVEL LIMITS

Receiving Land Use Category	Time Period	Maximum Noise Levels (dBA L_{max})[1]
Single-Family Residential	Daytime (7:00 a.m. - 8:00 p.m.)	75
	Nighttime (8:00 p.m. - 7:00 a.m.)	60
Multi-Family Residential	Daytime (7:00 a.m. - 8:00 p.m.)	80
	Nighttime (8:00 p.m. - 7:00 a.m.)	64
Commercial	Daytime (7:00 a.m. - 8:00 p.m.)	85
	Nighttime (8:00 p.m. - 7:00 a.m.)	70

[1] Maximum noise levels for mobile equipment, City of Murrieta Municipal Code, 16.30.130 (A) (Appendix 3.1).

TABLE 3-2: STATIONARY EQUIPMENT NOISE LEVEL LIMITS

Receiving Land Use Category	Time Period	Maximum Noise Levels (dBA L_{max})[1]
Single-Family Residential	Daytime (7:00 a.m. - 8:00 p.m.)	60
	Nighttime (8:00 p.m. - 7:00 a.m.)	50
Multi-Family Residential	Daytime (7:00 a.m. - 8:00 p.m.)	65
	Nighttime (8:00 p.m. - 7:00 a.m.)	55
Commercial	Daytime (7:00 a.m. - 8:00 p.m.)	70
	Nighttime (8:00 p.m. - 7:00 a.m.)	60

[1] Maximum noise levels for stationary equipment, City of Murrieta Municipal Code, 16.30.130 (A) (Appendix 3.1).

3.5 CONSTRUCTION VIBRATION STANDARDS

The City of Murrieta Municipal Code, Section 16.30.130 (K), states that *operating or permitting the operation of any device that creates a vibration that is above the vibration perception threshold of an individual at or beyond the property boundary of the source if on private property or at one hundred fifty feet from the source if on public space or public right-of-way* is prohibited. The Municipal Code defines the vibration perception threshold to be a motion velocity of 0.01 in/sec over the range of one to 100 Hz. (12) Table 3-3 shows the City of Murrieta Municipal Code vibration level standards.

Typically, the human response at the perception threshold for vibration includes annoyance in residential areas as previously shown on Exhibit 2-B, when vibration levels expressed in vibration decibels (VdB) approach 75 VdB. The City of Murrieta, however, identifies a vibration perception threshold of 0.01 in/sec. For vibration levels expressed in velocity, the human body responds to the average vibration amplitude often described as the root-mean-square (RMS). The RMS of a signal is the average of the squared amplitude of the signal, typically calculated over a one-second period. As with airborne sound, the RMS velocity is often expressed in decibel notation as vibration decibels (VdB), which serves to reduce the range of numbers used to describe human response to vibration. Therefore, the City of Murrieta vibration standard of 0.01 in/sec in RMS velocity levels is used in this analysis to assess the human perception of vibration levels due to Project-related construction activities.

TABLE 3-3: CONSTRUCTION VIBRATION STANDARDS

Jurisdiction	Root-Mean-Square Velocity Standard (in/sec)
City of Murrieta[1]	0.01

[1] Source: City of Murrieta Municipal Code, Section 16.30.130 (K) (Appendix 3.1).

This page intentionally left blank

4 SIGNIFICANCE CRITERIA

The following significance criteria are based on currently adopted guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (13) For the purposes of this report, impacts would be potentially significant if the Project results in or causes:

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

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

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

While the City of Murrieta General Plan Guidelines provide direction on noise compatibility and establish noise standards by land use type that are sufficient to assess the significance of noise impacts, they do not define the levels at which increases are considered substantial for use under Guideline A. CEQA Appendix G Guideline C applies to nearby public and private airports, if any, and the Project's land use compatibility. Table 4-2 shows the significance criteria summary matrix.

ON-SITE TRAFFIC NOISE

- If the on-site noise levels:
    1. exceed the exterior land use compatibility criteria of the City of Murrieta General Plan Noise Element, Table 11-2, for Project land uses; and
    2. exceed an interior noise level of 45 dBA CNEL for residential uses within the Project site (California Code of Regulations, Title 24, Building Standards Administrative Code, Part 2 as discussed in Section 3.2).

CONSTRUCTION NOISE AND VIBRATION

- If Project-related construction activities:
    1. occur anytime other than between the permitted hours of 7:00 a.m. to 8:00 p.m. daily, with no activity allowed on Sundays or holidays (City of Murrieta Municipal Code, Section 16.30.130(A)(2)(a)(1)); or
    2. create noise levels which exceed the mobile 75 dBA L_{max} or stationary 60 dBA L_{max} equipment noise level limits at the nearby sensitive residential land uses (City of Murrieta Municipal Code, Section 16.30.130 (A)).
- If short-term Project generated construction vibration levels could exceed the City of Murrieta maximum acceptable vibration standard of 0.01 in/sec RMS at sensitive receiver locations (City of Murrieta Municipal Code, Section 16.30.130 (K)).

TABLE 4-2: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
On-Site Traffic Noise	Noise-Sensitive	Exterior Noise Level Criteria[1]	See Exhibit 3-A	
		Interior Noise Level Standard[2]	45 dBA CNEL	
Construction Noise & Vibration		Mobile Equipment Noise Level Threshold[3]	75 dBA L_{max}	
		Stationary Equipment Noise Level Threshold[3]	60 dBA L_{max}	
		Vibration Level Threshold[4]	0.01 in/sec RMS	

[1] Source: City of Murrieta General Plan Noise Element, Table 11-2.
[2] Source: California Code of Regulations, Title 24, Building Standards Administrative Code, Part 2.
[3] Source: City of Murrieta Municipal Code, Section 16.30.130 (A) (Appendix 3.1).
[4] Source: City of Murrieta Municipal Code, Section 16.30.130 (K) (Appendix 3.1).
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, five 24-hour noise level measurements were taken at sensitive receiver locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Wednesday, September 18th, 2019. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (14)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent any part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (6) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (10)

Based on recommendations of Caltrans and the FTA, it is not necessary to collect measurements at each individual building or residence, because each receiver measurement represents a group of buildings that share acoustical equivalence. (10) In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting reference ambient noise level measurements at the nearby

sensitive receiver locations allows for a comparison of the before and after Project noise levels and is necessary to assess potential noise impacts due to the Project's contribution to the ambient noise levels.

5.3 NOISE MEASUREMENT RESULTS

The noise measurements presented below focus on the average or equivalent sound levels (L_{eq}). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 5-1 identifies the hourly daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels at each noise level measurement location. Appendix 5.2 provides a summary of the existing hourly ambient noise levels described below:

- Location L1 represents the noise levels on Washington Avenue South of 42001 Yukon Court near the northern Project site boundary. The noise level measurements collected show an overall 24-hour exterior noise level of 72.0 dBA CNEL. The hourly noise levels measured at location L1 ranged from 67.7 to 72.2 dBA L_{eq} during the daytime hours and from 53.7 to 70.3 dBA L_{eq} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 69.3 dBA L_{eq} with an average nighttime noise level of 64.0 dBA L_{eq}.
- Location L2 represents the noise levels in the nearby single-family residential community at 23372 Mountain Song Loop. The noise level measurements collected show an overall 24-hour exterior noise level of 66.4 dBA CNEL. The hourly noise levels measured at location L2 ranged from 46.5 to 66.4 dBA L_{eq} during the daytime hours and from 38.5 to 49.1 dBA L_{eq} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 56.9 dBA L_{eq} with an average nighttime noise level of 45.0 dBA L_{eq}.
- Location L3 represents the noise levels east of the Project site near the single-family home at 41751 Grand View Drive. The 24-hour CNEL indicates that the overall exterior noise level is 50.8 dBA CNEL. At location L3 the background ambient noise levels ranged from 43.1 to 53.8 dBA L_{eq} during the daytime hours to levels of 37.0 to 47.2 dBA L_{eq} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 48.4 dBA L_{eq} with an average nighttime noise level of 42.6 dBA L_{eq}.
- Location L4 represents the noise levels south the Project site across Nutmeg Street on Washington Avenue in the northwest parking lot of the Church of Jesus Christ of Latter-Day Saints. The noise level measurements collected show an overall 24-hour exterior noise level of 67.1 dBA CNEL. The hourly noise levels measured at location L4 ranged from 62.2 to 67.9 dBA L_{eq} during the daytime hours and from 49.0 to 58.9 dBA L_{eq} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 64.1 dBA L_{eq} with an average nighttime noise level of 58.9 dBA L_{eq}.
- Location L5 describes the noise levels on Washington Avenue north of the single-family home at 23610 Kathryn Street. The noise level measurements collected show an overall 24-hour exterior noise level of 79.4 dBA CNEL. The hourly noise levels measured at location L1 ranged from 73.5 to 79.1 dBA L_{eq} during the daytime hours and from 61.9 to 76.4 dBA L_{eq} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 76.9 dBA L_{eq} with an average nighttime noise level of 71.0 dBA L_{eq}.

Table 5-1 provides the (energy average) noise levels used to describe the daytime and nighttime ambient conditions. These daytime and nighttime energy average noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number. Appendix 5.2 provides summary worksheets of the noise levels for each hour as well as the minimum, maximum, L_1, L_2, L_5, L_8, L_{25}, L_{50}, L_{90}, L_{95}, and L_{99} percentile noise levels observed during the daytime and nighttime periods.

The background ambient noise levels in the Project study area are dominated by the transportation-related noise associated with the arterial roadway network. The 24-hour existing noise level measurements shown on Table 5-1 present the existing ambient noise conditions.

TABLE 5-1: 24-HOUR AMBIENT NOISE LEVEL MEASUREMENTS

Location[1]	Distance to Site (Feet)	Description	Energy Average Hourly Noise Level (dBA L_{eq})[2]		Average Median Noise Level (dBA L_{50})[2]		CNEL
			Daytime	Nighttime	Daytime	Nighttime	
L1	100'	Located on Washington Ave. South of 42001 Yukon Ct.	69.3	64.0	62.5	60.3	79.4
L2	270'	Located east of single-family home at 23372 Mountain Song Loop	56.9	45.0	45.3	41.3	56.4
L3	200'	Located in front of single-family home at 41751 Grand View Dr.	48.4	42.6	41.9	38.3	50.8
L4	700'	Located along Washington Ave. in the northwest parking lot of the Church of Jesus Christ of Latter-Day Saints	64.1	58.9	59.8	48.4	67.1
L5	75'	Located along Washington Ave. north of single-family home at 23610 Kathryn St.	76.9	71.0	70.5	60.3	79.4

[1] See Exhibit 5-A for the noise level measurement locations.
[2] The long-term 24-hour measurement printouts are included in Appendix 5.2.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

LEGEND:

▲ Noise Measurement Locations

6 METHODS AND PROCEDURES

The following section outlines the methods and procedures used to model and analyze the future on-site noise environment, and potential Project-related construction noise and vibration impacts.

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The estimated roadway noise impacts from vehicular traffic were calculated using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (15) The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. (16) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period.

6.2 ON-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

The on-site roadway parameters including the ADT volumes used for this analysis are presented on Table 6-1. Based on the City of Murrieta General Plan Circulation Element, Exhibit 5-10, Washington Avenue and Nutmeg Street are classified as 4-lane Secondary Roadways. (17) To predict the future on-site noise environment at the Project site, the City of Murrieta General Plan Circulation Element Table 5-2 *Daily Roadway Capacity Values* were used. The traffic volumes shown on Table 6-1 reflect future long-range traffic conditions needed to assess the future on-site traffic noise environment and to identify potential mitigation measures (if any) that address the worst-case future conditions. For the purposes of this analysis, soft site conditions were used to analyze the on-site traffic noise impacts for the Project study area. Soft site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. Research conducted by Caltrans has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (18)

TABLE 6-1: ON-SITE ROADWAY PARAMETERS

Roadway	Lanes	Classification[1]	Daily Roadway Capacity Volume[2]	Posted Speed Limit (mph)[3]	Site Conditions
Washington Ave.	4	Secondary	20,700	40	Soft
Nutmeg St.	4	Secondary	20,700	40	Soft

[1] Source: City of Murrieta General Plan Circulation Element, Exhibit 5-10.
[2] Roadway traffic volumes were obtained from the City of Murrieta General Plan Circulation Element, Table 5-2.
[3] Posted speed limit on Washington Avenue and Nutmeg Street.

Table 6-2 presents the time of day vehicle splits by vehicle type, and Table 6-3 presents the total traffic flow distributions (vehicle mixes) used for this analysis. The vehicle mix provides the hourly distribution percentages of automobile, medium trucks and heavy trucks for input into the FHWA Model based on roadway types.

TABLE 6-2: TIME OF DAY VEHICLE SPLITS

Time Period	Vehicle Type		
	Autos	Medium Trucks	Heavy Trucks
Daytime (7:00 a.m. - 7:00 p.m.)	77.5%	84.8%	86.5%
Evening (7:00 p.m. - 10:00 p.m.)	12.9%	4.9%	2.7%
Nighttime (10:00 p.m. - 7:00 a.m.)	9.6%	10.3%	10.8%
Total:	100.0%	100.0%	100.0%

Source: Typical Southern California vehicle mix.

TABLE 6-3: DISTRIBUTION OF TRAFFIC FLOW BY VEHICLE TYPE (VEHICLE MIX)

Roadway	Total % Traffic Flow			Total
	Autos	Medium Trucks	Heavy Trucks	
All Roadways	97.42%	1.84%	0.74%	100.00%

Source: Typical Southern California vehicle mix.

To predict the future noise environment at multi-family residential buildings within the Project site, coordinate information was collected to identify the noise transmission path between the noise source and receiver. The coordinate information is based on the Project site plan showing the plotting of the residential building in relationship to Washington Avenue and Nutmeg Street is shown in Appendix 6.1.

The exterior noise level impacts at the first-floor building facade were placed five feet above the pad elevation. All second-floor receivers were located 14 feet above the proposed finished floor elevation.

6.3 CONSTRUCTION ACTIVITY

Noise generated by the Project construction equipment will include a combination of trucks, power tools, concrete mixers, and portable generators that when combined can reach high levels. The number and mix of construction equipment are expected to occur in the following stages:

- Site Preparation (Mobile Equipment)
- Grading (Mobile Equipment)
- Building Construction (Stationary Equipment)
- Paving (Mobile Equipment)
- Architectural Coating (Stationary Equipment)

This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of Project construction. The construction reference noise level measurements represent a list of typical construction activity noise levels. Noise levels generated by heavy construction equipment can range from approximately 68 dBA to in excess of 80 dBA when measured at 50 feet. Hard site conditions are used in the construction noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source (i.e. construction equipment). For example, a noise level of 80 dBA measured at 50 feet from the noise source to the receiver would be reduced to 74 dBA at 100 feet from the source to the receiver, and would be further reduced to 68 dBA at 200 feet from the source to the receiver. The construction stages used in this analysis are consistent with the data used to support the construction emissions in the *Tentative Parcel Map No. 30394 Air Quality Impact Analysis* prepared by Urban Crossroads, Inc. (19)

6.4 CONSTRUCTION REFERENCE NOISE LEVELS

To describe the Project construction noise levels, measurements were collected for similar activities at several construction sites. Table 6-4 provides a summary of the construction reference noise level measurements. Since the reference noise levels were collected at varying distances, all construction noise level measurements presented on Table 6-4 have been adjusted to describe a common reference distance of 50 feet.

TABLE 6-4: CONSTRUCTION REFERENCE NOISE LEVELS

ID	Noise Source	Reference Distance From Source (Feet)	Reference Noise Levels @ Reference Distance (dBA L_{max})	Reference Noise Levels @ 50 Feet (dBA L_{max})[6]
1	Dozer Activity[1]	30'	76.4	72.0
2	Construction Vehicle Maintenance Activities[2]	30'	74.8	70.4
3	Foundation Trenching[2]	30'	74.9	70.5
4	Rough Grading Activities[2]	30'	84.8	80.4
5	Framing[3]	30'	76.7	72.3
6	Two Scrapers Pass-By[4]	30'	86.9	82.5
7	Concrete Mixer Truck Movements[5]	50'	73.1	73.1
8	Concrete Paver Activities[5]	30'	75.7	71.3
9	Concrete Mixer Pour & Paving Activities[5]	30'	76.3	71.9
10	Concrete Mixer Backup Alarms & Air Brakes[5]	50'	78.8	78.8
11	Concrete Mixer Pour Activities[5]	50'	79.2	79.2

[1] As measured by Urban Crossroads, Inc. on 10/14/15 at a business park construction site located at the northwest corner of Barranca Parkway and Alton Parkway in the City of Irvine.
[2] As measured by Urban Crossroads, Inc. on 10/20/15 at a construction site located in Rancho Mission Viejo.
[3] As measured by Urban Crossroads, Inc. on 10/20/15 at a residential construction site located in Rancho Mission Viejo.
[4] As measured by Urban Crossroads, Inc. on 10/30/15 during grading operations within an industrial construction site located in the City of Ontario.
[5] Reference noise level measurements were collected from a nighttime concrete pour at an industrial construction site, located at 27334 San Bernardino Avenue in the City of Redlands, between 1:00 a.m. to 2:00 a.m. on 7/1/15.
[6] Reference noise levels are calculated at 50 feet using a drop off rate of 6 dBA per doubling of distance (point source).

6.5 CONSTRUCTION VIBRATION ASSESSMENT METHODOLOGY

This analysis focuses on the potential ground-borne vibration associated with construction activities. Construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 6-5. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the human response (annoyance) using the following vibration assessment methods defined by the FTA. To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation:

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

TABLE 6-5: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment	PPV (in/sec) at 25 feet
Small bulldozer	0.003
Loaded Trucks	0.076
Large bulldozer	0.089

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

This page intentionally left blank

7 ON-SITE TRAFFIC NOISE IMPACTS

A noise impact analysis has been completed to determine the noise exposure levels that would result from off-site traffic noise sources, and to identify potential noise mitigation measures that would achieve acceptable Project exterior and interior noise levels. The primary source of traffic noise affecting the Project site is anticipated to be from Washington Avenue and Nutmeg Street. The Project would also be exposed to nominal traffic noise from the Project's internal local streets. However, due to the distance, topography and low traffic volume/speed, traffic noise from these roads will not make a substantive contribution to ambient noise conditions. This section analyzes on-site exterior and interior noise levels at the Project buildings.

7.1 EXTERIOR NOISE ANALYSIS

Using the FHWA traffic noise prediction model, and the parameters outlined in Section 6, the expected future exterior noise levels at the first-floor building façades were calculated. Table 7-1 presents a summary of future exterior noise level impacts at the first-floor receiver locations. The on-site transportation noise level impacts indicate that the unmitigated exterior noise levels will range from 65.1 to 66.9 dBA CNEL. The on-site traffic noise analysis calculations are provided in Appendix 7.1.

No exterior noise mitigation is required to satisfy the City of Murrieta General Plan Noise Element exterior land use/noise level compatibility criteria for residential uses. Adjacent to Washington Avenue and Nutmeg Street, residential uses are shown to experience *conditionally acceptable* exterior noise levels of 65.1 to 66.9 dBA CNEL. Therefore, because of the future unmitigated exterior traffic noise levels at the Project site, additional interior noise analysis is required to satisfy the General Plan Noise Element *conditionally acceptable* residential use requirements within the Project site. (2)

TABLE 7-1: UNMITIGATED EXTERIOR TRAFFIC NOISE LEVELS

Receiver Location	Roadway	First-Floor Unmitigated Noise Level (dBA CNEL)	Noise Element Land Use Compatibility[1]	Resulting Requirements[1]
Bldg 6	Washington Ave.	65.1	*Conditionally Acceptable*	Interior Analysis
Bldg 7	Washington Ave.	65.7	*Conditionally Acceptable*	Interior Analysis
Bldg 15	Washington Ave.	65.1	*Conditionally Acceptable*	Interior Analysis
Bldg 16	Nutmeg St.	66.9	*Conditionally Acceptable*	Interior Analysis
Bldg 17	Nutmeg St.	65.6	*Conditionally Acceptable*	Interior Analysis

[1] Based on the Table 11-2 compatibility criteria of the City of Murrieta General Plan Noise Element (Exhibit 3-A)

7.2 INTERIOR NOISE ANALYSIS

To ensure that the interior noise levels comply with the City of Murrieta interior noise level standards, future noise levels were calculated at the first and second-floor building façades.

7.2.1 NOISE REDUCTION METHODOLOGY

The interior noise level is the difference between the predicted exterior noise level at the building facade and the noise reduction of the structure. Typical building construction will provide a Noise Reduction (NR) of approximately 12 dBA with "windows open" and a minimum 25 dBA noise reduction with "windows closed." (8; 20) However, sound leaks, cracks and openings within the window assembly can greatly diminish its effectiveness in reducing noise. Several methods are used to improve interior noise reduction, including: (1) weather-stripped solid core exterior doors; (2) upgraded dual glazed windows; (3) mechanical ventilation/air conditioning; and (4) exterior wall/roof assembles free of cut outs or openings.

7.2.2 INTERIOR NOISE LEVEL ASSESSMENT

Tables 7-2 and 7-3 show that the buildings within the Project will require a windows-closed condition and a means of mechanical ventilation (e.g. air conditioning). Table 7-2 shows that the future exterior noise levels at the first-floor building façades are expected to range from 65.1 to 66.9 dBA CNEL. The first-floor interior noise level analysis shows that the City of Murrieta 45 dBA CNEL residential interior noise level standard can be satisfied using standard building construction providing windows and sliding glass doors with minimum STC ratings of 27 as shown on Exhibit ES-A.

Table 7-3 shows the future unmitigated noise levels at the second-floor building façades are expected to range from 65.1 to 66.8 dBA CNEL. The second-floor interior noise level analysis shows that the City of Murrieta 45 dBA CNEL residential interior noise level standard can be satisfied using standard building construction providing windows and sliding glass doors with minimum STC ratings of 27 as shown on Exhibit ES-A.

TABLE 7-2: FIRST-FLOOR INTERIOR NOISE IMPACTS (CNEL)

Receiver Location	Noise Level at Façade[1]	Required Interior Noise Reduction[2]	Estimated Interior Noise Reduction[3]	Upgraded Windows[4]	Interior Noise Level[5]
Bldg 6	65.1	20.1	25.0	No	40.1
Bldg 7	65.7	20.7	25.0	No	40.7
Bldg 15	65.1	20.1	25.0	No	40.1
Bldg 16	66.9	21.9	25.0	No	41.9
Bldg 17	65.6	20.6	25.0	No	40.6

[1] Exterior noise level at the facade with a windows closed condition requiring a means of mechanical ventilation (e.g. air conditioning).
[2] Noise reduction required to satisfy the 45 dBA CNEL interior noise standards.
[3] A minimum of 25 dBA noise reduction is assumed with standard building construction.
[4] Does the required interior noise reduction trigger upgraded windows with a minimum STC rating of greater than 27?
[5] Estimated interior noise level with minimum STC rating for all windows.

TABLE 7-3: SECOND-FLOOR INTERIOR NOISE IMPACTS (CNEL)

Receiver Location	Noise Level at Façade[1]	Required Interior Noise Reduction[2]	Estimated Interior Noise Reduction[3]	Upgraded Windows[4]	Interior Noise Level[5]
Bldg 6	65.1	20.1	25.0	No	40.1
Bldg 7	65.6	20.6	25.0	No	40.6
Bldg 15	65.1	20.1	25.0	No	40.1
Bldg 16	66.8	21.8	25.0	No	41.8
Bldg 17	65.6	20.6	25.0	No	40.6

[1] Exterior noise level at the facade with a windows closed condition requiring a means of mechanical ventilation (e.g. air conditioning).
[2] Noise reduction required to satisfy the 45 dBA CNEL interior noise standards.
[3] A minimum of 25 dBA noise reduction is assumed with standard building construction.
[4] Does the required interior noise reduction trigger upgraded windows with a minimum STC rating of greater than 27?
[5] Estimated interior noise level with minimum STC rating for all windows.

This page intentionally left blank

8 RECEIVER LOCATIONS

To assess the potential for the project related operational noise sources and short-term construction noise source impacts, the following five receiver locations as shown on Exhibit 8-A were identified as representative locations for focused analysis. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Moderately noise-sensitive land uses typically include multi-family dwellings, hotels, motels, dormitories, out-patient clinics, cemeteries, golf courses, country clubs, athletic/tennis clubs, and equestrian clubs. Land uses that are considered relatively insensitive to noise include business, commercial, and professional developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

Sensitive receivers near the Project site include existing single-family residential homes adjacent to Project site to the north and east with additional single-family residential homes located west of the site across Washington Avenue. The Church of Jesus Christ of Latter-day Saints is located south of the Project site across Nutmeg Street. Other sensitive land uses in the Project study area that are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures.

R1: Located approximately 69 feet north of the Project site and an existing 6-foot high noise barrier, R1 represents the existing residential outdoor living areas (backyards) adjacent to the northern Project site boundaries. A 24-hour noise level measurement was taken near this location, L2, to describe the existing ambient noise environment.

R2: Located approximately 58 feet north of the Project site and an existing 6-foot high noise barrier, R2 represents the existing residential outdoor living areas (backyards) adjacent to the northern Project site boundaries. A 24-hour noise level measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Located approximately 71 feet east of the Project site and an existing 6-foot high noise barrier, R3 represents the existing residential outdoor living areas (backyards) adjacent to the eastern Project site boundaries. A 24-hour noise level measurement was taken near this location, L3, to describe the existing ambient noise environment.

R4: Located approximately 825 feet south of the Project site across Nutmeg Street and behind an existing 6-foot high noise barrier, R4 represents the existing Church of Jesus Christ of Latter-day Saints. A 24-hour noise level measurement was taken near this location, L4, to describe the existing ambient noise environment.

R5: Located approximately 132 feet west of the Project site across Washington Avenue and behind an existing 6-foot high noise barrier, R5 represents the existing residential outdoor living areas (backyards). A 24-hour noise level measurement was taken near this location, L5, to describe the existing ambient noise environment.

EXHIBIT 8-A: RECEIVER LOCATIONS

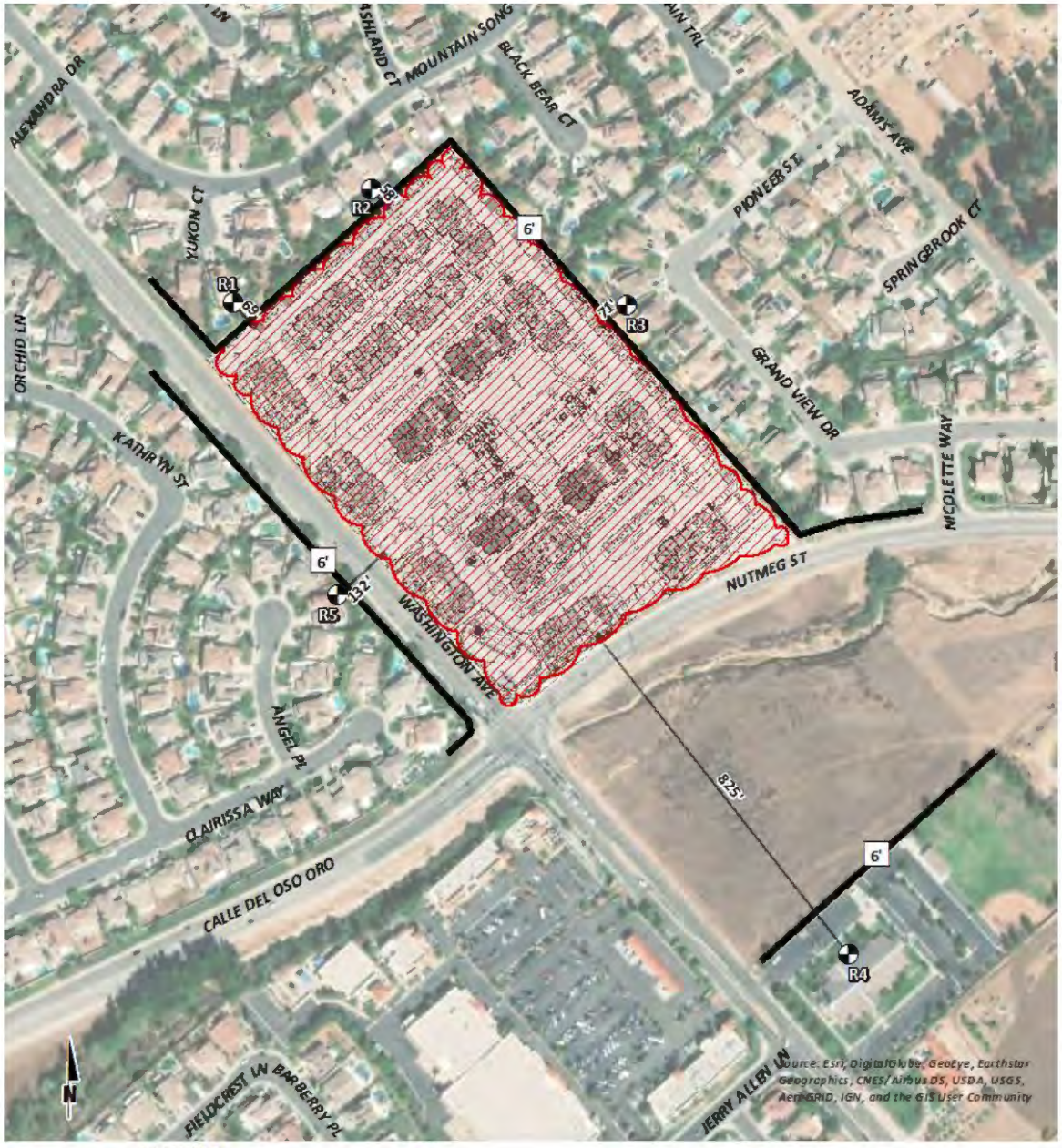
LEGEND:

- Receiver Locations
- Distance from receiver to Project site boundary (in feet)
- 6' Existing Barrier Height (in feet)
- Existing Barrier

9 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 9-A shows the construction activity boundaries in relation to the nearby sensitive receiver locations.

EXHIBIT 9-A: CONSTRUCTION ACTIVITY AND RECEIVER LOCATIONS



LEGEND:

- Receiver Locations
- Construction Activity
- 6' Existing Barrier Height (in feet)
- Distance from receiver to construction activity (in feet)
- Existing Barrier

9.1 CONSTRUCTION NOISE ANALYSIS

Using the reference construction equipment noise levels, previously shown on Table 6-2, calculations of the Project construction noise level impacts at the nearby sensitive receiver locations were completed. Tables 9-1 to 9-5 present the short-term construction noise levels for each stage of construction. Table 9-6 provides a summary of the construction noise levels by stage at the nearby noise-sensitive receiver locations. Based on the stages of construction, the noise impacts associated with the proposed Project are expected to create temporarily high noise levels at the nearby receiver locations. To assess the worst-case construction noise levels, this analysis shows the highest noise impacts when the equipment with the highest reference noise level is operating at the closest point from the edge of primary construction activity to each receiver location.

TABLE 9-1: SITE PREPARATION (MOBILE EQUIPMENT) NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{max})
Dozer Activity	72.0
Highest Reference Noise Level at 50 Feet:	72.0

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA)[3]	Estimated Noise Barrier Attenuation (dBA)[4]	Construction Noise Level (dBA L_{max})
R1	69'	-2.8	-5.0	64.2
R2	58'	-1.3	-5.0	65.7
R3	71'	-3.0	-5.0	64.0
R4	825'	-24.3	-5.0	42.7
R5	132'	-8.4	-5.0	58.6

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

TABLE 9-2: GRADING (MOBILE EQUIPMENT) NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{max})
Dozer Activity	72.0
Rough Grading Activities	80.4
Highest Reference Noise Level at 50 Feet:	80.4

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA)[3]	Estimated Noise Barrier Attenuation (dBA)[4]	Construction Noise Level (dBA L_{max})
R1	69'	-2.8	-5.0	72.6
R2	58'	-1.3	-5.0	74.1
R3	71'	-3.0	-5.0	72.4
R4	825'	-24.3	-5.0	51.1
R5	132'	-8.4	-5.0	67.0

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

TABLE 9-3: BUILDING CONSTRUCTION (STATIONARY EQUIPMENT) NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{max})
Construction Vehicle Maintenance Activities	70.4
Foundation Trenching	70.5
Framing	72.3
Highest Reference Noise Level at 50 Feet:	72.3

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA)[3]	Estimated Noise Barrier Attenuation (dBA)[4]	Construction Noise Level (dBA L_{max})
R1	69'	-2.8	-5.0	64.5
R2	58'	-1.3	-5.0	66.0
R3	71'	-3.0	-5.0	64.3
R4	825'	-24.3	-5.0	43.0
R5	132'	-8.4	-5.0	58.9

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

TABLE 9-4: PAVING (MOBILE EQUIPMENT) NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{max})
Concrete Mixer Truck Movements	73.1
Concrete Paver Activities	71.3
Concrete Mixer Pour & Paving Activities	71.9
Concrete Mixer Backup Alarms & Air Brakes	78.8
Concrete Mixer Pour Activities	79.2
Highest Reference Noise Level at 50 Feet:	79.2

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA)[3]	Estimated Noise Barrier Attenuation (dBA)[4]	Construction Noise Level (dBA L_{max})
R1	69'	-2.8	-5.0	71.4
R2	58'	-1.3	-5.0	72.9
R3	71'	-3.0	-5.0	71.2
R4	825'	-24.3	-5.0	49.9
R5	132'	-8.4	-5.0	65.8

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

TABLE 9-5: ARCHITECTURAL COATING (STATIONARY EQUIPMENT) NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{max})
Construction Vehicle Maintenance Activities	70.4
Framing	72.3
Highest Reference Noise Level at 50 Feet:	72.3

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA)[3]	Estimated Noise Barrier Attenuation (dBA)[4]	Construction Noise Level (dBA L_{max})
R1	69'	-2.8	-5.0	64.5
R2	58'	-1.3	-5.0	66.0
R3	71'	-3.0	-5.0	64.3
R4	825'	-24.3	-5.0	43.0
R5	132'	-8.4	-5.0	58.9

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area.

9.2 CONSTRUCTION NOISE LEVEL COMPLIANCE

The construction noise analysis shows that the highest construction noise levels will occur when equipment is operating at the closest point to each receiver location. As shown on Table 9-6, the unmitigated construction noise levels experienced at the nearby sensitive receiver locations are expected to range from 42.7 to 74.1 dBA L_{max} for mobile equipment, and between 43.0 to 66.0 dBA L_{max} for stationary equipment at the sensitive receiver locations.

Table 9-7 shows the highest construction noise levels at the potentially impacted receiver locations are expected to approach 74.1 dBA L_{max} from mobile equipment, and 66.0 dBA L_{max} for stationary equipment. While the Project related construction equipment noise levels satisfy the City of Murrieta Municipal Code construction noise level standards of 75 dBA L_{max} for mobile equipment, the noise Project noise levels will exceed the 60 dBA L_{max} standards for stationary equipment during temporary Project construction activities at receiver locations R1, R2 and R3.

The noise impacts due to unmitigated Project construction noise levels is, therefore, considered a *potentially significant* impact at receiver locations R1, R2 and R3 and mitigation measures are required to reduce the stationary equipment noise levels generated during temporary Project construction activities. Since receivers R4 and R5 satisfy the City of Murrieta Municipal Code construction noise level standards no mitigation is needed for these locations. Temporary

construction noise mitigation measures are only required to reduce the stationary equipment Project construction noise levels at receiver locations R1, R2 and R3.

TABLE 9-6: UNMITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Unmitigated Construction Stage Noise Level (dBA L_{max})					
	Mobile Equipment			Stationary Equipment		Highest Noise Levels[2]
	Site Preparation	Grading	Paving	Building Construction	Architectural Coating	
R1	64.2	72.6	71.4	64.5	64.5	72.6
R2	65.7	74.1	72.9	66.0	66.0	74.1
R3	64.0	72.4	71.2	64.3	64.3	72.4
R4	42.7	51.1	49.9	43.0	43.0	51.1
R5	58.6	67.0	65.8	58.9	58.9	67.0

[1] Noise receiver locations are shown on Exhibit 9-A.
[2] Highest construction noise levels across all stages of Project construction.

TABLE 9-7: UNMITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL COMPLIANCE

Receiver Location[1]	Land Use Category	Highest Construction Activity Noise Levels[2]		Noise Level Threshold[3]		Threshold Exceeded?[4]	
		Mobile Equipment	Stationary Equipment	Mobile Equipment	Stationary Equipment	Mobile Equipment	Stationary Equipment
R1	Single-Family Residential	72.6	64.5	75	60	No	Yes
R2	Single-Family Residential	74.1	66.0	75	60	No	Yes
R3	Single-Family Residential	72.4	64.3	75	60	No	Yes
R4	Church	51.1	43.0	75	60	No	No
R5	Single-Family Residential	67.0	58.9	75	60	No	No

[1] Noise receiver locations are shown on Exhibit 9-A.
[2] Highest construction noise levels of mobile and stationary equipment, as shown on Table 9-6.
[3] Construction noise standards as shown on Table 3-1 and 3-2.
[4] Do the estimated Project construction noise levels exceed the construction noise level thresholds?

The construction noise analysis presents a conservative approach with the highest noise-level-producing equipment for each stage of Project construction operating at the closest point from primary construction activity to the nearby sensitive receiver locations. This scenario is unlikely to occur during typical construction activities and likely overstates the construction noise levels which will be experienced at each receiver location. With the construction noise mitigation

measures identified in this noise study, shown on Exhibit 9-A, the worst-case construction noise level increases at the nearby residential receivers would be reduced.

Table 9-8 shows the mitigated construction noise levels with the required 100-foot buffer area separating the stationary construction equipment from nearby noise sensitive receivers. With the 100-foot buffer mitigation for stationary equipment construction noise, the noise level at nearby noise sensitive receiver locations will be reduced to 56.6 to 57.3 dBA L_{max}.

TABLE 9-8: MITIGATED PROJECT CONSTRUCTION NOISE LEVELS (100-FOOT BUFFER)

Receiver Location[1]	Land Use Category	Highest Construction Activity Noise Levels[2]	Distance to Construction Activity (Feet)[3]	Distance Attenuation (dBA)[3]	Estimated Noise Barrier Attenuation (dBA)[4]	Mitigated Construction Noise Level (dBA L_{max})
R1	Single-Family Residential	72.3	169'	-10.6	-5.0	56.7
R2	Single-Family Residential	72.3	158'	-10.0	-5.0	57.3
R3	Single-Family Residential	72.3	171'	-10.7	-5.0	56.6

[1] Noise receiver locations are shown on Exhibit 9-A.
[2] Highest construction noise levels of stationary equipment, as shown on Table 9-7.
[3] Includes the 100' buffer mitigation setback for stationary equipment.
[4] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[5] Estimated barrier attenuation from existing barriers in the Project study area.

The 100-foot buffer noise mitigation measure for stationary equipment construction satisfies the City of Murrieta 60 dBA L_{max} noise level standards, as shown on Table 9-9. As such, the noise impact due to Project construction is considered a *less than significant* impact with mitigation.

TABLE 9-9: MITIGATED CONSTRUCTION ACTIVITY NOISE LEVEL COMPLIANCE

Receiver Location[1]	Land Use Category	Mitigated Construction Activity Noise Levels[2]	Stationary Equipment Noise Level Threshold[3]	Threshold Exceeded?[4]
R1	Single-Family Residential	56.7	60	No
R2	Single-Family Residential	57.3	60	No
R3	Single-Family Residential	56.6	60	No

[1] Noise receiver locations are shown on Exhibit 9-A.
[2] Mitigated stationary equipment construction noise levels stationary equipment, as shown on Table 9-9.
[3] Construction noise standards as shown on Table 3-1 and 3-2.
[4] Do the mitigated Project construction noise levels exceed the construction noise level thresholds?

9.3 CONSTRUCTION NOISE MITIGATION MEASURES

Though construction is temporary, intermittent and of short duration, and will not present any long-term impacts, the following mitigation measures would reduce the noise level impacts due to Project construction activities at the nearby noise-sensitive residential land uses:

- The construction contractor shall provide a 100-foot buffer zone between adjacent occupied, sensitive residential receiver locations and stationary construction equipment.
- Prior to approval of grading plans and/or issuance of building permits, plans shall include a note indicating that noise-generating Project construction activities shall only occur between the hours of 7:00 a.m. to 8:00 p.m. daily, with no activity allowed on Sundays or holidays (City of Murrieta Municipal Code, Section 16.30.130(A)(2)(a)(1)). The Project construction supervisor shall ensure compliance with the note and the City shall conduct periodic inspection at its discretion.
- During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the Project site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site during all Project construction activities (i.e., to the center).
- The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment (between the hours of 7:00 a.m. to 8:00 p.m. daily, with no activity allowed on Sundays or holidays). The contractor shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.

9.4 CONSTRUCTION VIBRATION IMPACTS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. The proposed Project's construction activities most likely to cause vibration impacts are:

- Heavy Construction Equipment: Although all heavy mobile construction equipment has the potential of causing at least some perceptible vibration while operating close to building, the vibration is usually short-term and is not of sufficient magnitude to cause building damage. It is not expected that heavy equipment such as large bulldozers would operate close enough to any residences to cause a vibration impact.
- Trucks: Trucks hauling building materials to construction sites can be sources of vibration intrusion if the haul routes pass through residential neighborhoods on streets with bumps or potholes. Repairing the bumps and potholes generally eliminates the problem.

Ground-borne vibration levels resulting from construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration (FTA). Construction activities that would have the potential to generate low levels of ground-borne vibration within

the Project site include grading. Using the vibration source level of construction equipment provided on Table 6-5 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts. Table 9-10 presents the unmitigated Project construction-related vibration levels at the nearby receiver locations.

Based on the reference vibration levels provided by the FTA, a large bulldozer represents the peak source of vibration with a reference velocity of 0.089 in/sec PPV at 25 feet. At distances of 58 feet from the Project construction activities, construction vibration velocity levels are expected to approach 0.025 in/sec PPV, as shown on Table 9-10. To assess the human perception of vibration levels in PPV, as previously discussed in Section 3, the velocities are converted to RMS vibration levels based on the Caltrans *Transportation and Construction Vibration Guidance Manual* conversion factor of 0.71. Table 9-11 shows the construction vibration levels are expected to approach 0.018 in/sec RMS. Therefore, the Project-related vibration impacts will exceed the City of Murrieta 0.01 in/sec RMS threshold, and impacts are considered *potentially significant* during the construction activities at the Project site.

TABLE 9-10: UNMITIGATED CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Receiver Location[1]	Distance To Const. Activity (Feet)	Unmitigated Receiver PPV Levels (in/sec)[2]				RMS Velocity Levels (in/sec)[3]	Threshold Exceeded?[4]
		Small Bulldozer	Loaded Trucks	Large Bulldozer	Peak Vibration (PPV)		
R1	69'	0.001	0.017	0.019	0.019	0.014	Yes
R2	58'	0.001	0.022	0.025	0.025	0.018	Yes
R3	71'	0.001	0.016	0.019	0.019	0.013	Yes
R4	825'	0.000	0.000	0.000	0.000	0.000	No
R5	132'	0.000	0.006	0.007	0.007	0.005	No

[1] Receiver locations are shown on Exhibit 9-A.
[2] Based on the Vibration Source Levels of Construction Equipment included on Table 6-5.
[3] Vibration levels in PPV are converted to RMS velocity using a 0.71 conversion factor identified in the Caltrans Transportation and Construction Vibration Guidance Manual, September 2013.
[4] Do the unmitigated vibration levels exceed the vibration level threshold shown on Table 3-3?

Therefore, a 100-foot buffer for large construction equipment greater than or equal to 81,500 pounds based on information provided in the Caterpillar Performance Handbook, (4) shall be required to reduce vibration levels at nearby receiver locations. Instead, smaller, rubber-tired bulldozers (less than 81,500 pounds) shall be used within this area during Project construction to reduce vibration effects. Table 9-11 shows the mitigated Project construction vibration levels will be reduced to 0.004 in/sec RMS and remain below the City of Murrieta 0.01 in/sec RMS threshold, thereby resulting in *less than significant* vibration impacts with mitigation.

TABLE 9-11: MITIGATED CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Receiver Location[1]	Distance To Const. Activity (Feet)	Mitigated Receiver PPV Levels (in/sec)[2]				RMS Velocity Levels (in/sec)[3]	Threshold Exceeded?[4]
		Small Bulldozer	Loaded Trucks	Large Bulldozer	Peak Vibration (PPV)		
R1	169'	0.000	0.004	0.005	0.005	0.004	No
R2	158'	0.000	0.005	0.006	0.006	0.004	No
R3	171'	0.000	0.004	0.005	0.005	0.004	No

[1] Receiver locations are shown on Exhibit 9-A.
[2] Based on the Vibration Source Levels of Construction Equipment included on Table 6-5.
[3] Vibration levels in PPV are converted to RMS velocity using a 0.71 conversion factor identified in the Caltrans Transportation and Construction Vibration Guidance Manual, September 2013.
[4] Do the mitigated vibration levels exceed the vibration level threshold shown on Table 3-3?

9.5 CONSTRUCTION VIBRATION MITIGATION MEASURES

- Large loaded trucks and dozers (greater than or equal to 81,500 pounds) (4) shall not be used within 100 feet of the project boundary near receiver locations R1, R2 and R3 if occupied at the time of Project construction, as shown on Exhibit ES-B. Instead, smaller, rubber-tired bulldozers (less than 81,500 pounds) shall be used within this area during Project construction to reduce vibration effects. If all mobile equipment used during Project construction are less than 81,500

This page intentionally left blank

10 REFERENCES

1. **State of California.** *California Environmental Quality Act, Appendix G.* 2016.
2. **City of Murrieta.** *General Plan Noise Element.* July 2011.
3. **Harris, Cyril M.** *Noise Control in Buildings.* s.l. : McGraw-Hill, Inc., 1994.
4. **Caterpillar.** *Caterpillar Perfomance Handbook.* January 2017.
5. **City of Murrieta.** *Murrieta General Plan 2035.* 2011.
6. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
7. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* March 1974. EPA/ONAC 550/9/74-004.
8. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* June, 1995.
9. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response.* April 2000. p. 3.
10. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment.* May 2006. FTA-VA-90-1003-06.
11. **Office of Planning and Research.** *State of California General Plan Guidlines 2003.* October 2003.
12. **City of Murrieta.** *Municipal Code, Chapter 16.30 Noise.*
13. **State of California.** *California Environmental Quality Act, Appendix G.* 2018.
14. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
15. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.
16. **California Department of Transportation Environmental Program, Office of Environmental Engineering.** *Use of California Vehicle Noise Reference Energy Mean Emission Levels (Calveno REMELs) in FHWA Highway Traffic Noise Prediction.* September 1995. TAN 95-03.
17. **City of Murrieta.** *General Plan Circulation Element.* July 2011.
18. **California Department of Transportation.** *Traffic Noise Attenuation as a Function of Ground and Vegetation Final Report.* June 1995. FHWA/CA/TL-95/23.
19. **Urban Crossroads, Inc.** *Tentative Parcel Map No. 303394 Air Quality Impact Analysis.* October 2019.
20. **California Department of Transportation.** *Traffic Noise Analysis Protocol.* May 2011.

This page intentionally left blank

11 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Tentative Parcel Map No. 30394 Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5979.

Bill Lawson, P.E., INCE
Principal
URBAN CROSSROADS, INC.
260 E. Baker Street, Suite 200
Costa Mesa, CA 92626
(949) 336-5979
blawson@urbanxroads.com

EDUCATION

Master of Science in Civil and Environmental Engineering
California Polytechnic State University, San Luis Obispo • December, 1993

Bachelor of Science in City and Regional Planning
California Polytechnic State University, San Luis Obispo • June, 1992

PROFESSIONAL REGISTRATIONS

PE – Registered Professional Traffic Engineer – TR 2537 • January, 2009
AICP – American Institute of Certified Planners – 013011 • June, 1997–January 1, 2012
PTP – Professional Transportation Planner • May, 2007 – May, 2013
INCE – Institute of Noise Control Engineering • March, 2004

PROFESSIONAL AFFILIATIONS

ASA – Acoustical Society of America
ITE – Institute of Transportation Engineers

PROFESSIONAL CERTIFICATIONS

Certified Acoustical Consultant – County of Orange • February, 2011
FHWA-NHI-142051 Highway Traffic Noise Certificate of Training • February, 2013

This page intentionally left blank

APPENDIX 3.1:

CITY OF MURRIETA MUNICIPAL CODE

This page intentionally left blank

16.30 Noise

Sections:

16.30.010 Purpose.

The purpose of this chapter is to establish standards to protect the health, safety, and welfare of those living and working in the city and to implement policies of the general plan noise element.

(Ord. 182 § 2 (part), 1997)

16.30.020 Declaration of Policy .

Excessive noise levels are detrimental to the health and safety of individuals. Noise is considered a public nuisance and the city discourages unnecessary, excessive or annoying noises from all sources. Creating, maintaining, causing or allowing to be created. caused or maintained any noise or vibration in a manner prohibited by the provisions of this chapter is a public nuisance and shall be punishable as a misdemeanor.

(Ord. 182 § 2 (part), 1997)

16.30.030 Definitions.

The following words. terms and phrases. when used in this chapter, shall have the meanings ascribed to them in this chapter, except where the context clearly indicates a different meaning:

A-Weighted Sound Level. The sound level in decibels as measured on a sound level meter using the A-weighting network. The level so read is designated dB(A) or dBA.

Ambient Noise Histogram. The composite of all noise from sources near and far, excluding the alleged intrusive noise source. In this context, the ambient noise histogram shall constitute the normal or existing level of environmental noise at a given location.

Cumulative Period. An additive period of time composed of individual time segments which may be continuous or interrupted.

Decibel. A unit for measuring the amplitude of a sound, equal to twenty (20) times the logarithm to the base of ten of the ratio of the pressure of the sound measured to the reference pressure, which is twenty (20) micropascals.

Emergency Machinery , Vehicle or Alarm. Any machinery, vehicle or alarm used, employed, performed or operated in an effort to protect, provide or restore safe conditions in the community, or work by private or public utilities when restoring utility service.

Emergency W ork. Work performed for the purpose of preventing or alleviating the physical trauma or property damage threatened or caused by an emergency.

Fixed Noise Sour ce. A stationary device which creates sounds while fixed or motionless, including, but not limited to, residential, agricultural, industrial and commercial machinery and equipment, pumps, fans, compressors, air conditioners and refrigeration equipment.

Impulsive Noise. A sound of short duration, usually less than one second and of high intensity, with an abrupt onset and rapid decay.

Intrusive Noise. The alleged offensive noise that intrudes over and above the existing ambient noise at the receptor property.

Mobile Noise Sour ce. A noise source other than a fixed noise source.

Noise Disturbance. An alleged intrusive noise that violates an applicable noise standard of this chapter. Noise Histogram. A graphical representation of the distribution of frequency of occurrence of all noise levels near and far measured over a given period of time.

Noise Level (L_N). The noise level expressed in decibels that exceeds the specified (L,) value a percentage of total time measured. For example, an L25 noise level means that noise level that is exceeded twenty-five (25) percent of the time measured.

Noise-Sensitive Ar ea. An area designated for the purpose of ensuring exceptional quiet (e.g.. around hospitals, nursing homes, libraries, and similar uses).

NoiseZone. A defined area of a generally consistent land use.

Pur e Tone Noise. A sound that can be judged as audible as a single pitch or a set of single pitches by the code enforcement officer. For the purposes of this chapter, a pure tone shall exist if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the sound-pressure levels of the two contiguous one-third octave bands by five dB for center frequencies of five hundred (500) Hertz and above, and by eight dB for center frequencies between one hundred sixty (160) and four hundred (400) Hertz, and by fifteen (15) dB for center frequencies less than or equal to one hundred twenty-five (125) Hertz.

Sound Level Meter . An instrument, including a microphone, an amplifier, an output meter and frequency weighting network, for the measurement of sound levels, that satisfies the requirements pertinent for Type S2A meters in American National Standards Institute specifications for sound level meters.

Vibration. The minimum ground or structure-borne vibrational motion necessary to cause a normal person to be aware of the vibration including, but not limited to, sensation by touch or visual observations of moving objects. The perception threshold shall be presumed to be a motion velocity of 0.01 in/sec over the range of one to one hundred (100) Hertz.

Weekday . Any day. Monday through Friday, that is not a legal holiday.

(Ord. 182 § 2 (part), 1997)

16.30.040 Enfor cement of Regulations.

The code enforcement officer shall have primary responsibility for the enforcement of the noise regulations contained in this chapter. The code enforcement officer shall make all noise-level measurements required for the enforcement of this chapter.

(Ord. 182 § 2 (part), 1997)

16.30.050 Initial V iolations.

In the event of an initial violation of the provisions of this chapter, a written notice of violation shall be given the alleged violator. specifying the time by which the condition shall be corrected or an application for a permit or variance shall be filed. No further action shall be taken if the cause of the violation has been removed, the condition abated, or fully corrected within the time period specified in the written notice.

(Ord. 182 § 2 (part), 1997)

16.30.060 Activities Exempt fr om Regulations.

The following activities shall be exempt from the provisions of this chapter:

A. Emergency Exemption. The emission of sound for the purpose of alerting persons to the existence of an emergency, or the emission of sound in the performance of emergency work.

B. Warning Device. Warning devices necessary for the protection of public safety, (e.g., police, tire and ambulance sirens, and train horns).

C. Outdoor Activities. Activities conducted on public playgrounds and public or private school grounds. including, but not limited to, school athletic and school entertainment events.

D. Motion Pictur e Pr oduction and Related Activities. Activities in connection to production of motion pictures.

E. Railr oad Activities. All locomotives and rail cars operated by any railroad which is regulated by the state Public Utilities Commission.

F. Federal or State Pr e-Exempted Activities. Any activity, to the extent regulation thereof has been pre-empted by state or federal law,

G. Public Health and Safety Activities. All transportation, flood control, and utility company maintenance and construction operations at any time on public right-of-way, and those situations that may occur on private real property deemed necessary to serve the best interest of the public and to protect the public's health and well being, including, but not limited to, street sweeping, debris and limb removal, removal of downed wires, restoring electrical service, repairing traffic signals, unplugging sewers, house moving, vacuuming catchbasins, removal of damaged poles and vehicles, repair of water hydrants and mains, gas lines, oil lines, sewers, etc.

H. Motor , Vehicles on Public Right-of-W ay and Private Pr operty . Except as provided in this chapter, all vehicles operating in a legal manner in compliance with local, state, and federal vehicle noise regulations within the public right-of-way or on private property.

1. Minor Maintenance to Residential Real Pr operty . Noise sources associated with the minor maintenance of residential real property, provided the activities take place between the hours of seven a.m. and eight p.m. on any day except Sunday, or between the hours of nine a.m. and eight p.m. on Sunday.

(Ord. 182 § 2 (part), 1997)

16.30.070 Decibel Measur ement.

Decibel measurements made in compliance with the provisions of this chapter shall be based on a reference sound-pressure of twenty (20) micropascals, as measured with a sound level meter using the A-weighted network (scale) at slow response, or at the fast response when measuring impulsive sound levels and vibrations.

(Ord. 182 § 2 (part). 1997)

16.30.080 Noise Zones Designated.

Receptor properties described in this chapter are hereby assigned to the following noise zones:

A. Noise zone I, noise-sensitive area:

B. Noise zone II, residential properties;

C. Noise zone Ill, commercial properties: and

D. Noise zone IV, industrial properties.

(Ord. 182 § 2 (part), 1997)

16.30.090 Exterior Noise Standards.

A. Standards for Noise Zones. Unless otherwise provided in this chapter, the following exterior noise levels shall apply to all receptor properties within a designated noise zone:

TABLE 3-6
EXTERIOR NOISE ST ANDARDS

Noise Zone	Designated Noise Zone Land Use (Receptor Pr operty)	Time Interval	Allowed Exterior Noise Level (dB)
I	Noise-sensitive area	Anytime	45
II	Residential properties Residential properties within five hundred (500) feet of a kennel(s)	10:00 p.m. to 7:00 a.m. (nighttime) 7:00 a.m. to 10:00 p.m. (daytime) 7:00 a.m. to 10:00 p.m.	45 50 70
III	Commercial properties	10:00 p.m. to 7:00 a.m. (nighttime) 7:00 a.m. to 10:00 p.m. (daytime)	55 60
IV	Industrial properties	Anytime	70

B. Noise Standards. No person shall operate or cause to be operated. any source of sound at any location within the city or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by a person that causes the noise level, when measured on any other property to exceed the following exterior noise standards:

1. Standard No. 1. Standard No. 1 shall be the exterior noise level which shall not be exceeded for a cumulative period of more than thirty (30) minutes in any hour. Standard No. 1 may be the applicable noise level from Table 3-6 above.

2. Standard No. 2. Standard No. 2 shall be the exterior noise level which shall not be exceeded for a cumulative period of more than fifteen (15) minutes in any hour. Standard No. 2 shall be the applicable noise level from Table 3-6 above, plus five dB.

3. Standard No. 3. Standard No. 3 shall be the exterior noise level which shall not be exceeded for a cumulative period of more than five minutes in any hour. Standard No. 3 shall be the applicable noise level from Table 3-6 above plus ten dB.

4. Standard No. 4. Standard No. 4 shall be the exterior noise level which shall not be exceeded for a cumulative period of more than one minute in any hour. Standard No. 4 shall be the applicable noise level from Table 3-6 above plus fifteen (15) dB.

5. Standard No. 5. Standard No. 5 shall be the exterior noise level which shall not be exceeded for any period of time. Standard No. 5 shall be the applicable noise level from Table 3-6 above plus twenty (20) dB.

C. Noise at Zone Boundaries. If the measurement location is on a boundary property between two different zoning districts, the exterior noise level utilized in subsection B of this chapter to determine the exterior standard shall be the arithmetic mean of the exterior noise levels. as specified in Table 3-6, of the subject zones.

D. Measur ement of Ambient Noise Histogram. The ambient noise histogram shall be measured at the same location along the property line utilized in subsection B. above, with the alleged intruding noise source inoperative. If the alleged intruding noise source cannot be turned off, the ambient noise histogram shall be estimated by performing a measurement in the same general area of the alleged intruding noise source but at a sufficient distance so that the noise from the alleged intruding noise source is at least ten dB below the ambient noise histogram.

E. Abatement Notice in Lieu of Citation. If the intrusive noise exceeds the exterior noise standards provided in subsections A and B above, at a specific receptor property and the code enforcement officer has reason to believe that this violation was unanticipated and due to abnormal conditions, the code enforcement officer shall issue an abatement notice in lieu of a citation. lithe specific violation is abated, no citation shall be is-sued. If the specific violation is not abated, the code enforcement officer shall issue a citation.

(Ord. 182 § 2 (part), 1997)

16.30.100 Interior Noise Standards for Multi-Family Residential.

A. Noise Standards for Residential Units. No person shall operate or cause to be operated within a residential unit. any source of sound, or allow the creation of any noise, that causes the noise level when measured inside a neighboring receiving residential unit to exceed the following standards:

1. Standard No. 1. The applicable interior noise level for cumulative period of more than five minutes in any hour;

2. Standard No. 2. The applicable interior noise level plus five dB for a cumulative period of more than one minute in any hour; or

3. Standard No. 3. The applicable interior noise level plus ten dB for any period of time.

B. Interior Noise Levels for Multi-Family Residential. The following interior noise levels shall apply within multi-family dwellings with windows in their normal seasonal configuration.

Noise Zone	Designated Land Use	Time Interval	Allowable Interior Noise Level(dBl
All	Multi-family Residential	10:00 p.m.—7:00 a.m. 7:00 a.m.—10:00 p.m.	40 45

If the measured ambient noise level reflected by the L_{50} exceeds that permissible within the interior noise standards in subsection A above. the allowable interior noise level shall be increased in five dB increments to reflect the ambient noise level (L5,,).

(Ord. 182 § 2 (part), 1997)

16.30.110 Corr ection for Certain T ypes of Sounds.

For any source of sound that emits a pure tone or impulsive noise, the allowed noise levels provided in Sections 1 6.30.090 (Exterior Noise Standards) and 16.30.100 (Interior Noise Standards for Multi-family Residential) shall be reduced by five decibels.

(Ord. 182 § 2 (part). 1997)

16.30.120 Measur ement Methods.

A. A-weighting Scale. The noise level shall be measured at a position(s) at any point on the receiver's property utilizing the A-weighting scale of the sound-level meter and the slow meter response (use fast response for impulsive type sounds). Calibration of the measurement equipment, utilizing an acoustic calibrator, shall be performed immediately prior to recording any noise data.

B. Micr ophone Location. The microphone shall be located four to five feet above the ground and ten feet or more from the nearest reflective surface except in those cases where another elevation is deemed appropriate.

C. Interior Noise. Interior noise measurements shall be made within the affected residential unit. The measurements shall be made at a point at least four feet from the wall, ceiling or floor nearest the noise source, with windows in the normal seasonal configuration.

(Ord. 182 § 2 (part), 1997)

16.30.130 Acts Deemed V iolations of Chapter .

The following acts are a violation of this chapter.

A. Construction Noise.

1. Operating or causing the operation of tools or equipment used in construction, drilling, repair, alteration, or demolition work between weekday hours of seven p.m. and seven a.m., or at any time on Sundays or holidays. so that the sound creates a noise disturbance across a residential or commercial property line, except for emergency work of public service utilities.

2. Construction activities shall be conducted in a manner that the maximum noise levels at the affected structures will not exceed those listed in the following schedule:

a. Residential Structur es:

1) Mobile Equipment. Maximum noise levels for nonscheduled, intermittent, short-term operation (less than ten days) of mobile equipment:

	Single-family Residential	Multi-family Residential	Commer cial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	75 dBA	80 dBA	85 dBA
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	60 dBA	64 dBA	70 dBA

2) Stationary Equipment. Maximum noise level for repetitively scheduled and relatively long-term operation periods (three days or more) of stationary equipment:

	Single-family Residential	Multi-family Residential	Commer cial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	60 dBA	65 dBA	70 dBA
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	50 dBA	55 dBA	60 dBA

b. Business Structur es. Maximum noise levels for nonscheduled, intermittent, short-term operation of mobile equipment: daily. including Sundays and legal holidays, all hours: maximum of eighty-five (85) dBA.

3. All mobile or stationary internal combustion engine powered equipment or machinery shall be equipped with suitable exhaust and air-intake silencers in proper working order.

B. Loading and Unloading Operations. Loading, unloading, opening, closing or other handling of boxes. crates, containers, building materials, garbage cans or similar objects between the hours of ten p.m. and six am. in a manner to cause a noise disturbance is prohibited.

C. Noise Disturbances in Noise-Sensitive Zones. Creating or causing the creation of a noise disturbance within a noise-sensitive zone is prohibited, provided that conspicuous signs are displayed indicating the presence of the zone. Noise-sensitive zones shall be indicated by the display of conspicuous signs in at least three separate locations within five hundred (500) feet of the institution or facility (e.g., health care facility)

D. Places of Public Entertainment. Operating, playing, or permitting the operation or playing of a radio, television. phonograph, drum, musical instrument, sound amplifier or similar device that produces, reproduces, or amplifies sound in a place of public entertainment at a sound level greater than ninety-five (95) dBA, (read by the slow response on a sound level meter) at any point that is normally occupied by a customer is prohibited, unless conspicuous signs are located near each public entrance stating, "Warning: Sound Levels Within May Cause Hearing Impairment."

E. Emergency Signaling Devices.

1. The intentional sounding or permitting the sounding outdoors of an emergency signaling device, including fire, burglar or civil defense alarm, siren, whistle, or similar stationary emergency signaling device, except for emergency purposes or for testing is prohibited.

2. Testing of a stationary emergency signaling device shall not occur before seven a.m. or after seven p.m. Testing shall use only the minimum cycle test time. Test time shall not exceed sixty (60) seconds. Testing of the complete emergency signaling system, including the functioning of the signaling device, and the personnel response to the signaling device, shall not occur more than once in each calendar month. Testing shall not occur before seven a.m. or after ten p.m.

3. Sounding or permitting the sounding of an exterior burglar or fire alarm, or motor vehicle burglar alarm

is prohibited, unless the alarm is terminated within fifteen (15) minutes of activation.

F. Stationary Nonemergency Signaling Devices. Sounding or permitting the sounding of an electronically amplified signal from a stationary bell, chime, siren. whistle, or similar device intended primarily for nonemergency purposes, from any place, for more than ten consecutive seconds in any hourly period is prohibited.

G. Refuse Collection V ehicles.

1. Operating or permitting the operation of the compacting mechanism of any motor vehicle that compacts refuse and that creates, during the compacting cycle, a sound level in excess of eighty-six (86) dBA when measured at fifty (50) feet from any point of the vehicle is prohibited.

2. Collecting refuse, or operating or permitting the operation of the compacting mechanism of any motor vehicle that compacts refuse between the hours often p.m. and six a.m. the following day in a residential area or noise-sensitive zone is prohibited.

H. Sweepers and Associated Equipment. Operating or permitting the operation of sweepers or associated sweeping equipment (i.e., blowers) between the hours often p.m. and six a.m. the following day in, or adjacent to, a residential area or noise-sensitive area is prohibited.

I. Residential Air Conditioning ·or Refrigeration Equipment. Operating or permitting the operation of air conditioning or refrigeration equipment in a manner that exceeds the following sound levels is prohibited:

Measur ement Location	Maximum Noise level
Any point on neighboring property line, five feet above grade level, no closer than three feet from any wall.	55
Center of neighboring patio, five feet above grade level, no closer than three feet from any wall.	50
Outside the neighboring living area window nearest the equipment location, not more than three feet from the window opening, but at least three feet from any other surface.	50

J. Vehicle or Motorboat Repairs and T esting. Repairing, rebuilding, modifying or testing any motor vehicle, motorcycle or motorboat in a manner as to cause a noise disturbance across property lines or within a noise-sensitive zone is prohibited.

K. Vibration. Operating or permitting the operation of any device that creates vibration that is above the vibration perception threshold of an individual at or beyond the property boundary of the source if on private property, or at one hundred fifty (150) feet from the source if on a public space or public right-of-way is prohibited. The perception threshold shall be a motion velocity of 0.01 in/sec over the range of 1 to 100 Hertz.

(Ord. 182 § 2 (part), 1997)

16.30.140 Modification of Standards.

Modifications to the requirements of this chapter may be granted by the director for a period of up to two years, subject to any terms, conditions, or requirements to minimize adverse effects on the surrounding neighborhood reasonable. Modifications may be granted only if one of the following findings can be made:

A. Additional time is necessary for the applicant to alter or modify the activity, operation, or noise source to comply with this chapter: or

B. The activity, operation, or noise source cannot feasibly be done in a manner that would comply with the provisions of this chapter. and no other reasonable alternative is available to the applicant.

This page intentionally left blank

APPENDIX 5.1:

STUDY AREA PHOTOS

This page intentionally left blank

JN: 12743 Study Area Photos

L1_E
33, 34' 29.400000", 117, 14' 12.950000"

L1_N
33, 34' 7.710000", 117, 12' 49.180000"

L1_S
33, 34' 29.340000", 117, 14' 12.950000"

L1_W
33, 34' 29.440000", 117, 14' 12.980000"

L2_E
33, 34' 34.890000", 117, 14' 8.640000"

L2_N
33, 34' 13.470000", 117, 13' 9.920000"

L2_S
33, 34' 36.090000", 117, 14' 8.640000"

L2_W
33, 34' 34.890000", 117, 14' 8.610000"

L3_E
33, 34' 30.030000", 117, 14' 0.070000"

L3_N
33, 34' 7.580000", 117, 12' 48.660000"

L3_S
33, 34' 7.580000", 117, 12' 48.660000"

L3_W
33, 34' 29.910000", 117, 13' 59.880000"

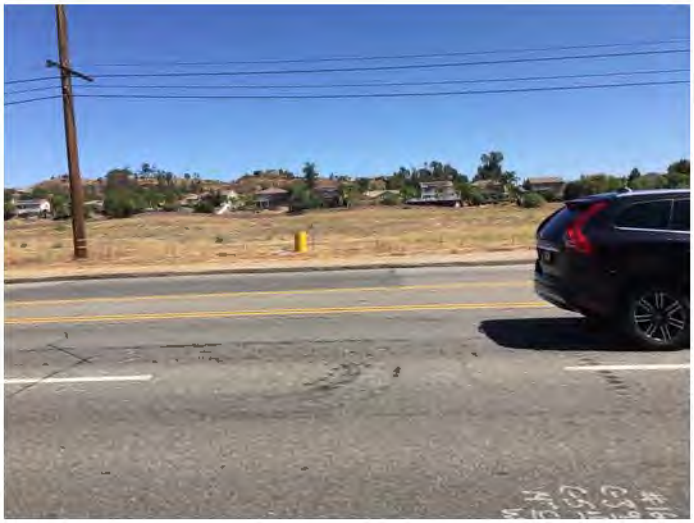
JN: 12743 Study Area Photos

L4_E
33, 34' 16.790000", 117, 13' 58.640000"

L4_N
33, 34' 7.580000", 117, 12' 48.660000"

L4_S
33, 34' 16.900000", 117, 13' 58.700000"

L4_W
33, 34' 16.720000", 117, 13' 58.780000"



L5_E
33, 34' 22.960000", 117, 14' 7.460000"

L5_N
33, 34' 32.210000", 117, 14' 41.320000"

JN: 12743 Study Area Photos

L5_S
33, 34' 22.930000", 117, 14' 7.490000"

L5_W
33, 34' 22.970000", 117, 14' 7.490000"

APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

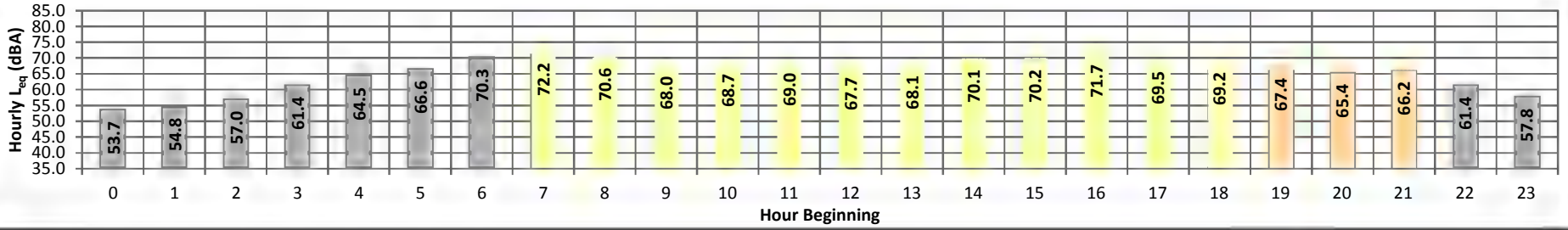
This page intentionally left blank

24-Hour Noise Level Measurement Summary

Date: Wednesday, September 18, 2019 *Location:* L1 _Located on Washington Ave. South of 42001 Yukon Ct. *Meter:* Piccolo I *JN:* 12743

Project: TENTATIVE PARCEL MAP 30394 *Analyst:* P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	53.7	76.4	38.2	68.0	64.0	52.0	46.0	40.0	39.0	38.0	38.0	38.0	53.7	10.0	63.7
	1	54.8	81.5	38.2	69.0	64.0	51.0	45.0	40.0	39.0	38.0	38.0	38.0	54.8	10.0	64.8
	2	57.0	82.6	38.3	70.0	65.0	55.0	50.0	42.0	41.0	40.0	38.0	38.0	57.0	10.0	67.0
	3	61.4	79.9	40.3	74.0	72.0	69.0	65.0	51.0	47.0	43.0	42.0	41.0	61.4	10.0	71.4
	4	64.5	85.8	43.9	75.0	74.0	72.0	69.0	59.0	50.0	46.0	45.0	44.0	64.5	10.0	74.5
	5	66.6	81.7	47.1	77.0	75.0	73.0	72.0	66.0	56.0	49.0	49.0	48.0	66.6	10.0	76.6
	6	70.3	85.2	48.7	78.0	77.0	76.0	75.0	71.0	66.0	52.0	51.0	49.0	70.3	10.0	80.3
Day	7	72.2	96.2	47.3	80.0	78.0	76.0	75.0	72.0	67.0	53.0	50.0	48.0	72.2	0.0	72.2
	8	70.6	97.7	41.3	78.0	77.0	75.0	74.0	70.0	64.0	49.0	46.0	43.0	70.6	0.0	70.6
	9	68.0	87.1	40.1	77.0	75.0	74.0	73.0	68.0	61.0	47.0	44.0	41.0	68.0	0.0	68.0
	10	68.7	85.7	40.7	79.0	76.0	74.0	73.0	69.0	62.0	46.0	44.0	42.0	68.7	0.0	68.7
	11	69.0	93.4	40.9	77.0	76.0	73.0	72.0	69.0	63.0	46.0	43.0	41.0	69.0	0.0	69.0
	12	67.7	90.7	42.3	76.0	74.0	73.0	72.0	68.0	62.0	48.0	46.0	43.0	67.7	0.0	67.7
	13	68.1	89.9	43.1	76.0	75.0	73.0	72.0	68.0	63.0	50.0	48.0	44.0	68.1	0.0	68.1
	14	70.1	85.6	44.9	78.0	76.0	74.0	74.0	71.0	67.0	55.0	51.0	48.0	70.1	0.0	70.1
	15	70.2	86.2	44.7	78.0	76.0	75.0	74.0	71.0	67.0	53.0	49.0	46.0	70.2	0.0	70.2
	16	71.7	95.1	44.3	80.0	78.0	75.0	74.0	71.0	67.0	52.0	49.0	46.0	71.7	0.0	71.7
	17	69.5	88.0	43.0	78.0	76.0	74.0	73.0	70.0	65.0	51.0	48.0	45.0	69.5	0.0	69.5
	18	69.2	91.8	42.9	78.0	76.0	74.0	73.0	69.0	64.0	49.0	46.0	44.0	69.2	0.0	69.2
Evening	19	67.4	86.4	43.7	77.0	75.0	73.0	72.0	67.0	59.0	46.0	45.0	44.0	67.4	5.0	72.4
	20	65.4	80.8	40.1	75.0	73.0	72.0	71.0	65.0	56.0	44.0	43.0	41.0	65.4	5.0	70.4
	21	66.2	95.7	38.3	74.0	73.0	70.0	69.0	59.0	50.0	40.0	40.0	38.0	66.2	5.0	71.2
Night	22	61.4	83.4	37.5	73.0	71.0	68.0	66.0	53.0	43.0	38.0	38.0	38.0	61.4	10.0	71.4
	23	57.8	83.2	35.3	70.0	68.0	64.0	59.0	44.0	40.0	38.0	38.0	35.0	57.8	10.0	67.8

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	67.7	85.6	40.1	76.0	74.0	73.0	72.0	68.0	61.0	46.0	43.0	41.0
	Max	72.2	97.7	47.3	80.0	78.0	76.0	75.0	72.0	67.0	55.0	51.0	48.0
Energy Average		69.8	Average:		77.9	76.1	74.2	73.3	69.7	64.3	49.9	47.0	44.3
Evening	Min	65.4	80.8	38.3	74.0	73.0	70.0	69.0	59.0	50.0	40.0	40.0	38.0
	Max	67.4	95.7	43.7	77.0	75.0	73.0	72.0	67.0	59.0	46.0	45.0	44.0
Energy Average		66.4	Average:		75.3	73.7	71.7	70.7	63.7	55.0	43.3	42.7	41.0
Night	Min	53.7	76.4	35.3	68.0	64.0	51.0	45.0	40.0	39.0	38.0	38.0	35.0
	Max	70.3	85.8	48.7	78.0	77.0	76.0	75.0	71.0	66.0	52.0	51.0	49.0
Energy Average		64.0	Average:		72.7	70.0	64.4	60.8	51.8	46.8	42.4	41.9	41.0

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
68.0	69.3	64.0

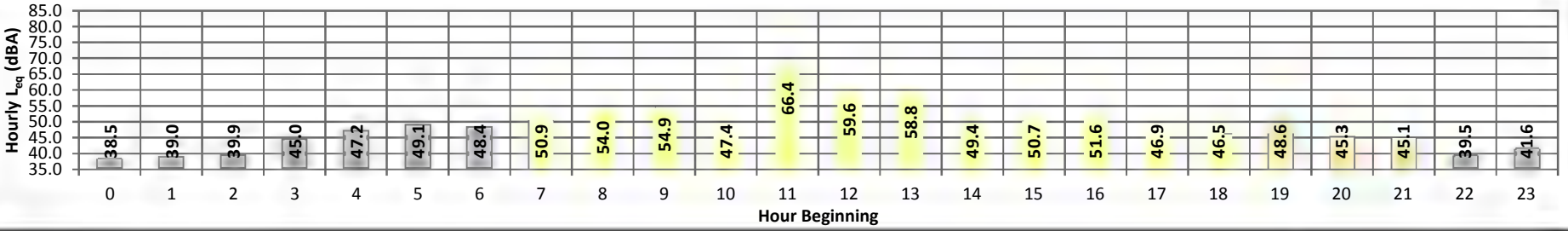
24-Hour CNEL (dBA)
72.0

24-Hour Noise Level Measurement Summary

Date: Wednesday, September 18, 2019 *Location:* L2 - Located east of single family home at 23372 Mountain Song Loop *Meter:* Piccolo I *JN:* 12743

Project: TENTATIVE PARCEL MAP 30394 *Analyst:* P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	38.5	57.3	35.2	43.0	41.0	39.0	38.0	38.0	38.0	35.0	35.0	35.0	38.5	10.0	48.5
	1	39.0	47.8	35.2	43.0	42.0	41.0	40.0	39.0	38.0	38.0	38.0	35.0	39.0	10.0	49.0
	2	39.9	50.2	38.0	43.0	43.0	42.0	41.0	40.0	39.0	38.0	38.0	38.0	39.9	10.0	49.9
	3	45.0	55.5	38.2	51.0	50.0	49.0	48.0	45.0	43.0	40.0	39.0	38.0	45.0	10.0	55.0
	4	47.2	64.6	41.3	52.0	51.0	50.0	49.0	47.0	45.0	43.0	43.0	42.0	47.2	10.0	57.2
	5	49.1	74.4	43.8	55.0	53.0	50.0	50.0	48.0	47.0	45.0	45.0	44.0	49.1	10.0	59.1
	6	48.4	68.0	44.0	56.0	54.0	51.0	49.0	47.0	46.0	45.0	45.0	44.0	48.4	10.0	58.4
Day	7	50.9	74.5	38.2	61.0	59.0	55.0	53.0	48.0	44.0	41.0	40.0	38.0	50.9	0.0	50.9
	8	54.0	77.8	38.2	65.0	63.0	60.0	57.0	52.0	48.0	40.0	39.0	38.0	54.0	0.0	54.0
	9	54.9	67.8	38.0	65.0	64.0	62.0	60.0	53.0	48.0	39.0	38.0	38.0	54.9	0.0	54.9
	10	47.4	65.9	38.1	59.0	57.0	52.0	49.0	44.0	42.0	40.0	39.0	38.0	47.4	0.0	47.4
	11	66.4	82.0	35.2	78.0	75.0	71.0	71.0	66.0	53.0	37.0	35.0	35.0	66.4	0.0	66.4
	12	59.6	85.5	39.3	72.0	72.0	60.0	55.0	48.0	46.0	42.0	42.0	40.0	59.6	0.0	59.6
	13	58.8	81.2	39.9	72.0	72.0	59.0	54.0	49.0	46.0	43.0	42.0	41.0	58.8	0.0	58.8
	14	49.4	64.0	42.1	58.0	56.0	53.0	52.0	49.0	47.0	44.0	43.0	43.0	49.4	0.0	49.4
	15	50.7	71.6	41.8	60.0	57.0	54.0	53.0	49.0	47.0	45.0	44.0	42.0	50.7	0.0	50.7
	16	51.6	75.2	41.2	61.0	59.0	55.0	54.0	49.0	47.0	44.0	43.0	42.0	51.6	0.0	51.6
	17	46.9	65.4	40.5	55.0	54.0	51.0	49.0	46.0	44.0	42.0	42.0	41.0	46.9	0.0	46.9
	18	46.5	67.9	39.8	57.0	53.0	49.0	47.0	44.0	42.0	41.0	40.0	40.0	46.5	0.0	46.5
Evening	19	48.6	72.7	39.8	60.0	58.0	51.0	49.0	44.0	43.0	41.0	41.0	40.0	48.6	5.0	53.6
	20	45.3	67.3	39.9	53.0	50.0	47.0	46.0	44.0	43.0	41.0	41.0	40.0	45.3	5.0	50.3
	21	45.1	69.9	38.0	55.0	52.0	48.0	46.0	42.0	40.0	38.0	38.0	38.0	45.1	5.0	50.1
Night	22	39.5	60.2	35.2	46.0	41.0	40.0	39.0	38.0	38.0	35.0	35.0	35.0	39.5	10.0	49.5
	23	41.6	66.7	35.2	47.0	42.0	39.0	39.0	38.0	38.0	35.0	35.0	35.0	41.6	10.0	51.6

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	46.5	64.0	35.2	55.0	53.0	49.0	47.0	44.0	42.0	37.0	35.0	35.0
	Max	66.4	85.5	42.1	78.0	75.0	71.0	71.0	66.0	53.0	45.0	44.0	43.0
Energy Average		57.8	Average:		63.6	61.8	56.8	54.5	49.8	46.2	41.5	40.6	39.7
Evening	Min	45.1	67.3	38.0	53.0	50.0	47.0	46.0	42.0	40.0	38.0	38.0	38.0
	Max	48.6	72.7	39.9	60.0	58.0	51.0	49.0	44.0	43.0	41.0	41.0	40.0
Energy Average		46.6	Average:		56.0	53.3	48.7	47.0	43.3	42.0	40.0	40.0	39.3
Night	Min	38.5	47.8	35.2	43.0	41.0	39.0	38.0	38.0	38.0	35.0	35.0	35.0
	Max	49.1	74.4	44.0	56.0	54.0	51.0	50.0	48.0	47.0	45.0	45.0	44.0
Energy Average		45.0	Average:		48.4	46.3	44.6	43.7	42.2	41.3	39.3	39.2	38.4

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
55.0	56.9	45.0

24-Hour CNEL (dBA)

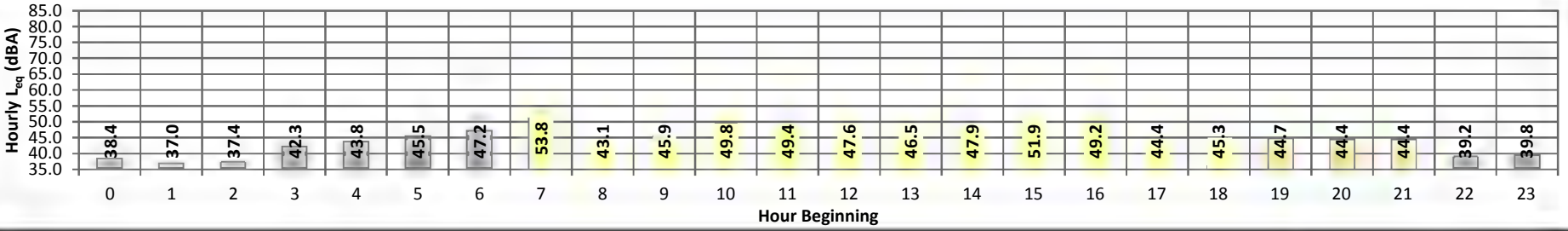
56.4

24-Hour Noise Level Measurement Summary

Date: Wednesday, September 18, 2019 *Location:* L3 - Located in front of single family home at 41751 Grand View Dr. *Meter:* Piccolo I *JN:* 12743

Project: TENTATIVE PARCEL MAP 30394 *Analyst:* P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	38.4	48.2	35.7	42.0	42.0	42.0	42.0	36.0	35.0	35.0	35.0	35.0	38.4	10.0	48.4
	1	37.0	49.6	35.7	42.0	40.0	38.0	38.0	35.0	35.0	35.0	35.0	35.0	37.0	10.0	47.0
	2	37.4	48.7	35.7	40.0	39.0	38.0	38.0	38.0	35.0	35.0	35.0	35.0	37.4	10.0	47.4
	3	42.3	65.4	35.7	49.0	45.0	42.0	42.0	40.0	40.0	38.0	38.0	37.0	42.3	10.0	52.3
	4	43.8	62.0	40.0	47.0	46.0	45.0	45.0	44.0	42.0	40.0	40.0	40.0	43.8	10.0	53.8
	5	45.5	65.6	40.5	54.0	49.0	46.0	45.0	44.0	43.0	42.0	41.0	41.0	45.5	10.0	55.5
	6	47.2	65.5	42.3	57.0	52.0	49.0	47.0	45.0	44.0	43.0	43.0	42.0	47.2	10.0	57.2
Day	7	53.8	82.2	38.7	63.0	59.0	51.0	49.0	46.0	43.0	41.0	40.0	38.0	53.8	0.0	53.8
	8	43.1	63.9	37.7	52.0	50.0	47.0	45.0	41.0	40.0	38.0	38.0	38.0	43.1	0.0	43.1
	9	45.9	66.6	35.7	56.0	52.0	49.0	48.0	43.0	40.0	38.0	38.0	37.0	45.9	0.0	45.9
	10	49.8	67.2	38.0	60.0	60.0	57.0	52.0	46.0	42.0	38.0	38.0	38.0	49.8	0.0	49.8
	11	49.4	76.4	36.8	62.0	57.0	52.0	49.0	43.0	41.0	38.0	38.0	38.0	49.4	0.0	49.4
	12	47.6	71.6	38.5	56.0	53.0	50.0	48.0	45.0	43.0	41.0	40.0	39.0	47.6	0.0	47.6
	13	46.5	65.9	38.7	57.0	54.0	50.0	48.0	45.0	44.0	41.0	41.0	40.0	46.5	0.0	46.5
	14	47.9	65.6	40.5	58.0	55.0	52.0	50.0	46.0	45.0	42.0	42.0	41.0	47.9	0.0	47.9
	15	51.9	78.9	41.7	61.0	57.0	52.0	51.0	48.0	46.0	43.0	43.0	42.0	51.9	0.0	51.9
	16	49.2	67.5	40.2	61.0	57.0	52.0	51.0	47.0	45.0	42.0	42.0	41.0	49.2	0.0	49.2
	17	44.4	65.5	38.7	52.0	50.0	48.0	46.0	43.0	41.0	40.0	39.0	38.0	44.4	0.0	44.4
	18	45.3	65.1	38.7	55.0	51.0	47.0	46.0	42.0	40.0	39.0	38.0	38.0	45.3	0.0	45.3
Evening	19	44.7	67.8	36.8	55.0	51.0	48.0	46.0	42.0	41.0	38.0	38.0	38.0	44.7	5.0	49.7
	20	44.4	64.2	38.2	55.0	52.0	48.0	45.0	41.0	40.0	38.0	38.0	38.0	44.4	5.0	49.4
	21	44.4	65.2	35.7	58.0	51.0	46.0	43.0	39.0	38.0	35.0	35.0	35.0	44.4	5.0	49.4
Night	22	39.2	63.4	35.7	46.0	44.0	39.0	38.0	38.0	36.0	35.0	35.0	35.0	39.2	10.0	49.2
	23	39.8	67.4	35.7	42.0	39.0	38.0	38.0	36.0	35.0	35.0	35.0	35.0	39.8	10.0	49.8

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	43.1	63.9	35.7	52.0	50.0	47.0	45.0	41.0	40.0	38.0	38.0	37.0
	Max	53.8	82.2	41.7	63.0	60.0	57.0	52.0	48.0	46.0	43.0	43.0	42.0
Energy Average		49.0	Average:		57.8	54.6	50.6	48.6	44.6	42.5	40.1	39.8	39.0
Evening	Min	44.4	64.2	35.7	55.0	51.0	46.0	43.0	39.0	38.0	35.0	35.0	35.0
	Max	44.7	67.8	38.2	58.0	52.0	48.0	46.0	42.0	41.0	38.0	38.0	38.0
Energy Average		44.5	Average:		56.0	51.3	47.3	44.7	40.7	39.7	37.0	37.0	37.0
Night	Min	37.0	48.2	35.7	40.0	39.0	38.0	38.0	35.0	35.0	35.0	35.0	35.0
	Max	47.2	67.4	42.3	57.0	52.0	49.0	47.0	45.0	44.0	43.0	43.0	42.0
Energy Average		42.6	Average:		46.6	44.0	41.9	41.4	39.6	38.3	37.6	37.4	37.2

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
47.0	48.4	42.6

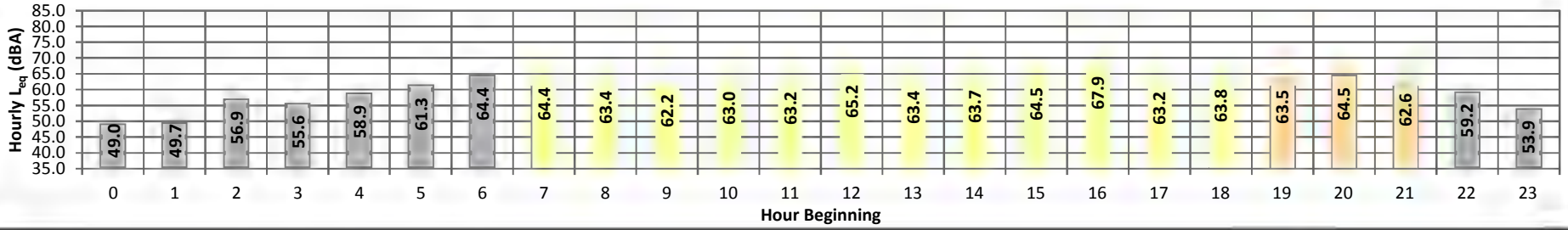
24-Hour CNEL (dBA)
50.8

24-Hour Noise Level Measurement Summary

Date: Wednesday, September 18, 2019 *Location:* L4 - Located along Washington Ave. in the nothwest parking lot of the Church of Jesus Christ of Latter-Day Saints *Meter:* Piccolo I *JN:* 12743

Project: TENTATIVE PARCEL MAP 30394 *Analyst:* P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	49.0	73.0	39.5	61.0	59.0	52.0	47.0	41.0	41.0	39.0	39.0	39.0	49.0	10.0	59.0
	1	49.7	75.3	39.1	61.0	57.0	50.0	47.0	43.0	41.0	39.0	39.0	39.0	49.7	10.0	59.7
	2	56.9	84.4	39.5	68.0	64.0	58.0	53.0	45.0	42.0	41.0	40.0	39.0	56.9	10.0	66.9
	3	55.6	78.7	42.3	67.0	65.0	61.0	59.0	50.0	46.0	43.0	42.0	42.0	55.6	10.0	65.6
	4	58.9	79.2	43.9	69.0	67.0	64.0	63.0	57.0	52.0	47.0	46.0	45.0	58.9	10.0	68.9
	5	61.3	77.8	48.6	70.0	68.0	66.0	65.0	61.0	58.0	52.0	51.0	49.0	61.3	10.0	71.3
	6	64.4	81.2	49.4	71.0	70.0	68.0	68.0	65.0	62.0	56.0	55.0	53.0	64.4	10.0	74.4
Day	7	64.4	81.8	48.4	72.0	70.0	68.0	67.0	65.0	62.0	56.0	54.0	51.0	64.4	0.0	64.4
	8	63.4	80.3	47.3	71.0	70.0	68.0	67.0	64.0	60.0	53.0	51.0	49.0	63.4	0.0	63.4
	9	62.2	81.6	44.8	71.0	69.0	67.0	66.0	62.0	58.0	52.0	51.0	48.0	62.2	0.0	62.2
	10	63.0	85.6	45.4	72.0	69.0	67.0	66.0	62.0	59.0	51.0	50.0	48.0	63.0	0.0	63.0
	11	63.2	81.1	47.4	72.0	70.0	67.0	66.0	63.0	60.0	53.0	51.0	49.0	63.2	0.0	63.2
	12	65.2	88.9	49.1	73.0	70.0	68.0	67.0	64.0	61.0	54.0	53.0	51.0	65.2	0.0	65.2
	13	63.4	82.1	47.3	72.0	70.0	67.0	66.0	64.0	60.0	54.0	52.0	50.0	63.4	0.0	63.4
	14	63.7	82.4	51.4	72.0	69.0	67.0	66.0	63.0	61.0	56.0	55.0	53.0	63.7	0.0	63.7
	15	64.5	87.4	51.8	73.0	70.0	67.0	67.0	64.0	61.0	56.0	55.0	54.0	64.5	0.0	64.5
	16	67.9	96.0	50.9	75.0	72.0	69.0	67.0	64.0	61.0	56.0	55.0	54.0	67.9	0.0	67.9
	17	63.2	80.1	48.3	71.0	69.0	67.0	66.0	64.0	61.0	54.0	53.0	51.0	63.2	0.0	63.2
	18	63.8	81.9	47.8	72.0	70.0	68.0	67.0	64.0	61.0	54.0	52.0	50.0	63.8	0.0	63.8
Evening	19	63.5	84.1	46.9	72.0	70.0	68.0	66.0	63.0	59.0	52.0	51.0	49.0	63.5	5.0	68.5
	20	64.5	92.3	43.4	73.0	70.0	68.0	66.0	63.0	58.0	49.0	47.0	45.0	64.5	5.0	69.5
	21	62.6	88.0	40.9	71.0	69.0	66.0	65.0	60.0	55.0	47.0	45.0	42.0	62.6	5.0	67.6
Night	22	59.2	85.0	39.5	69.0	67.0	64.0	62.0	55.0	51.0	45.0	42.0	39.0	59.2	10.0	69.2
	23	53.9	72.9	37.9	67.0	64.0	60.0	57.0	48.0	43.0	39.0	39.0	39.0	53.9	10.0	63.9

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	62.2	80.1	44.8	71.0	69.0	67.0	66.0	62.0	58.0	51.0	50.0	48.0
	Max	67.9	96.0	51.8	75.0	72.0	69.0	67.0	65.0	62.0	56.0	55.0	54.0
Energy Average		64.3	Average:		72.2	69.8	67.5	66.5	63.6	60.4	54.1	52.7	50.7
Evening	Min	62.6	84.1	40.9	71.0	69.0	66.0	65.0	60.0	55.0	47.0	45.0	42.0
	Max	64.5	92.3	46.9	73.0	70.0	68.0	66.0	63.0	59.0	52.0	51.0	49.0
Energy Average		63.6	Average:		72.0	69.7	67.3	65.7	62.0	57.3	49.3	47.7	45.3
Night	Min	49.0	72.9	37.9	61.0	57.0	50.0	47.0	41.0	41.0	39.0	39.0	39.0
	Max	64.4	85.0	49.4	71.0	70.0	68.0	68.0	65.0	62.0	56.0	55.0	53.0
Energy Average		58.9	Average:		67.0	64.6	60.3	57.9	51.7	48.4	44.6	43.7	42.7

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
62.8	64.1	58.9

24-Hour CNEL (dBA)

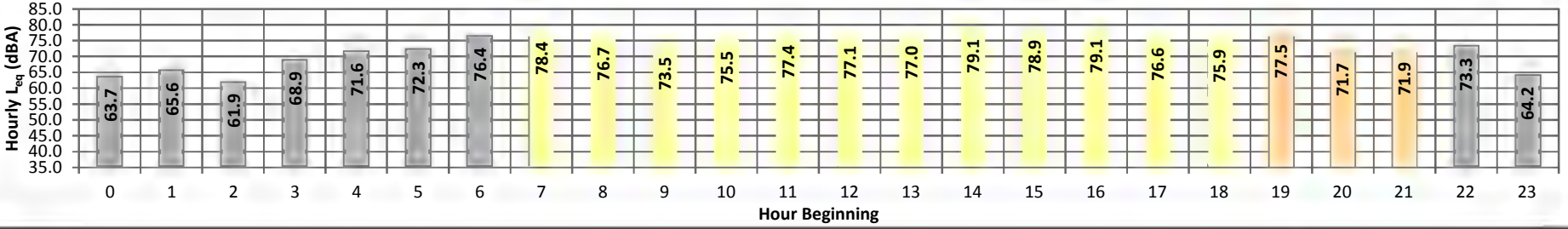
67.1

24-Hour Noise Level Measurement Summary

Date: Wednesday, September 18, 2019 *Location:* L5 - Located along Washington Ave. north of single family home at 23610 Kathryn St. *Meter:* Piccolo I *JN:* 12743

Project: TENTATIVE PARCEL MAP 30394 *Analyst:* P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	63.7	92.9	51.1	74.0	72.0	63.0	59.0	56.0	55.0	53.0	53.0	52.0	63.7	10.0	73.7
	1	65.6	95.6	51.3	75.0	70.0	65.0	60.0	57.0	56.0	54.0	53.0	52.0	65.6	10.0	75.6
	2	61.9	86.0	53.0	73.0	70.0	64.0	61.0	58.0	57.0	55.0	54.0	54.0	61.9	10.0	71.9
	3	68.9	96.3	52.6	78.0	76.0	72.0	70.0	62.0	60.0	56.0	55.0	54.0	68.9	10.0	78.9
	4	71.6	100.7	57.7	80.0	78.0	75.0	73.0	66.0	62.0	59.0	59.0	58.0	71.6	10.0	81.6
	5	72.3	92.5	60.5	83.0	80.0	77.0	76.0	70.0	66.0	62.0	62.0	61.0	72.3	10.0	82.3
	6	76.4	98.2	63.1	85.0	83.0	80.0	79.0	76.0	73.0	67.0	66.0	64.0	76.4	10.0	86.4
Day	7	78.4	101.0	62.8	88.0	86.0	82.0	80.0	77.0	73.0	67.0	66.0	64.0	78.4	0.0	78.4
	8	76.7	98.8	58.4	87.0	84.0	81.0	79.0	75.0	71.0	63.0	62.0	60.0	76.7	0.0	76.7
	9	73.5	89.9	58.6	82.0	81.0	79.0	77.0	73.0	69.0	62.0	62.0	60.0	73.5	0.0	73.5
	10	75.5	95.6	58.7	85.0	83.0	80.0	78.0	74.0	70.0	63.0	62.0	60.0	75.5	0.0	75.5
	11	77.4	101.2	58.2	88.0	85.0	81.0	79.0	75.0	71.0	63.0	62.0	60.0	77.4	0.0	77.4
	12	77.1	99.4	58.3	88.0	85.0	81.0	79.0	75.0	71.0	64.0	62.0	61.0	77.1	0.0	77.1
	13	77.0	96.0	58.1	88.0	85.0	81.0	80.0	76.0	72.0	65.0	63.0	61.0	77.0	0.0	77.0
	14	79.1	100.1	62.1	89.0	87.0	84.0	81.0	77.0	74.0	68.0	66.0	64.0	79.1	0.0	79.1
	15	78.9	99.6	61.1	90.0	87.0	83.0	81.0	77.0	74.0	67.0	65.0	63.0	78.9	0.0	78.9
	16	79.1	98.0	62.9	91.0	88.0	84.0	81.0	77.0	74.0	67.0	66.0	64.0	79.1	0.0	79.1
	17	76.6	96.4	60.7	87.0	84.0	80.0	79.0	76.0	72.0	65.0	64.0	62.0	76.6	0.0	76.6
	18	75.9	98.1	60.4	86.0	84.0	80.0	78.0	74.0	71.0	64.0	63.0	61.0	75.9	0.0	75.9
Evening	19	77.5	100.8	58.4	89.0	85.0	81.0	78.0	73.0	68.0	62.0	61.0	60.0	77.5	5.0	82.5
	20	71.7	93.9	56.6	81.0	79.0	77.0	75.0	71.0	65.0	60.0	59.0	58.0	71.7	5.0	76.7
	21	71.9	97.3	53.2	81.0	78.0	75.0	74.0	68.0	62.0	57.0	56.0	54.0	71.9	5.0	76.9
Night	22	73.3	100.5	51.7	82.0	79.0	74.0	72.0	64.0	58.0	54.0	53.0	52.0	73.3	10.0	83.3
	23	64.2	88.7	50.9	76.0	73.0	69.0	65.0	58.0	56.0	53.0	52.0	51.0	64.2	10.0	74.2

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	73.5	89.9	58.1	82.0	81.0	79.0	77.0	73.0	69.0	62.0	62.0	60.0
	Max	79.1	101.2	62.9	91.0	88.0	84.0	81.0	77.0	74.0	68.0	66.0	64.0
Energy Average		77.4	Average:		87.4	84.9	81.3	79.3	75.5	71.8	64.8	63.6	61.7
Evening	Min	71.7	93.9	53.2	81.0	78.0	75.0	74.0	68.0	62.0	57.0	56.0	54.0
	Max	77.5	100.8	58.4	89.0	85.0	81.0	78.0	73.0	68.0	62.0	61.0	60.0
Energy Average		74.6	Average:		83.7	80.7	77.7	75.7	70.7	65.0	59.7	58.7	57.3
Night	Min	61.9	86.0	50.9	73.0	70.0	63.0	59.0	56.0	55.0	53.0	52.0	51.0
	Max	76.4	100.7	63.1	85.0	83.0	80.0	79.0	76.0	73.0	67.0	66.0	64.0
Energy Average		71.0	Average:		78.4	75.7	71.0	68.3	63.0	60.3	57.0	56.3	55.3

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
75.5	76.9	71.0

24-Hour CNEL (dBA)

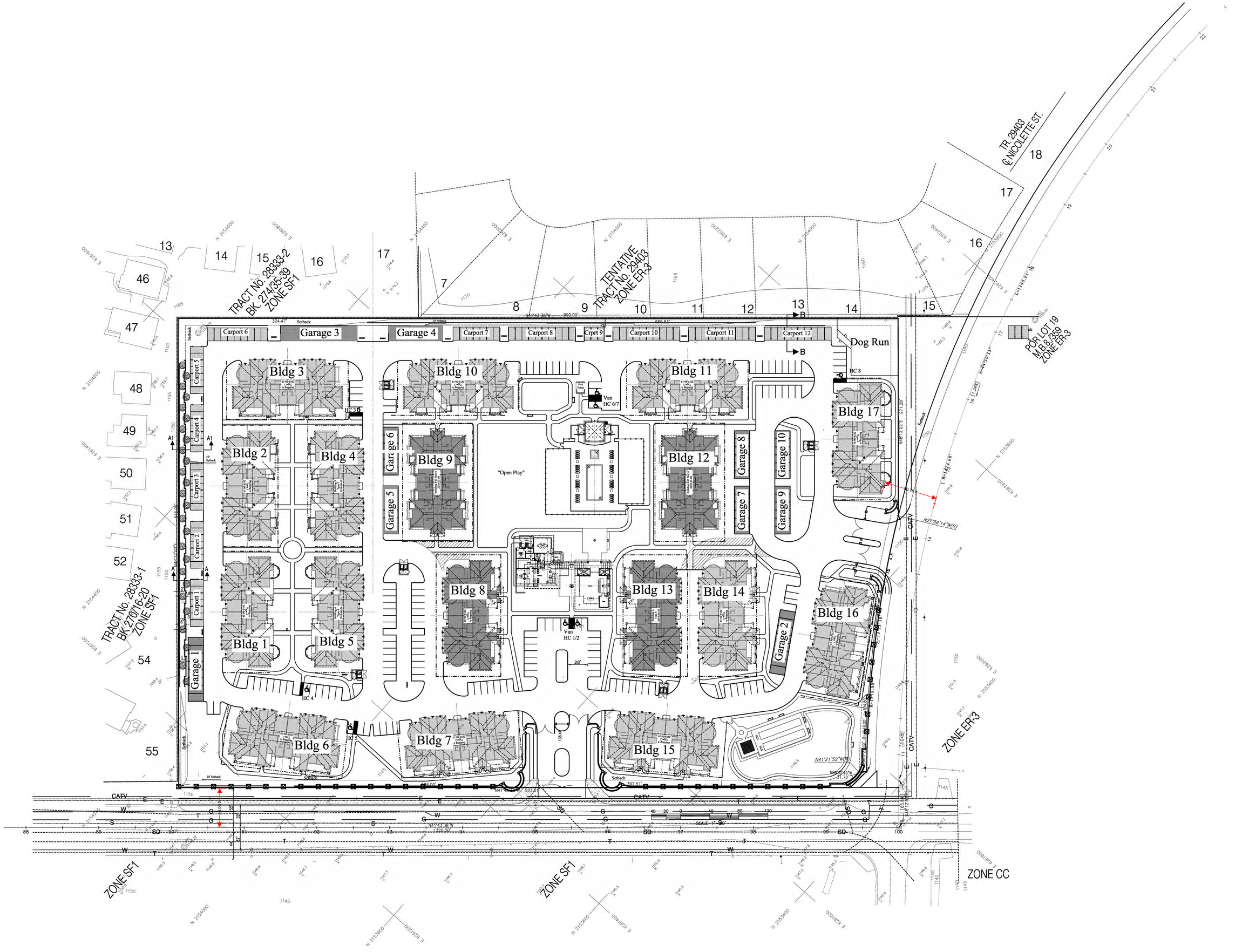
79.4

This page intentionally left blank

APPENDIX 6.1:

SITE PLAN

This page intentionally left blank


TRACT No. 28333-2
BK. 274/35-39
ZONE SF1
TENTATIVE
TRACT No. 29403
ZONE ER-3
TR 29403
℄ NICOLETTE ST.
POR LOT 19
M.B. 8/359
ZONE ER-3
TRACT No. 28333-1
BK 270/16-20
ZONE SF1
ZONE SF1
ZONE SF1
ZONE ER-3
ZONE CC
Garage 1
Garage 2
Garage 3
Garage 4
Garage 5
Garage 6
Garage 7
Garage 8
Garage 9
Garage 10
Carport 1
Carport 2
Carport 3
Carport 4
Carport 5
Carport 6
Carport 7
Carport 8
Crprt 9
Carport 10
Carport 11
Carport 12
Bldg 1
Bldg 2
Bldg 3
Bldg 4
Bldg 5
Bldg 6
Bldg 7
Bldg 8
Bldg 9
Bldg 10
Bldg 11
Bldg 12
Bldg 13
Bldg 14
Bldg 15
Bldg 16
Bldg 17
Dog Run
"Open Play"
Van
HC 6/7
Van
HC 1/2
HC 3
HC 4
HC 5
HC 8
10' Setback
Setback
N27°58'14"W(R)
N41°21'52"W(R)
N41°43'38"W
1320.00'
N48°12'02"E
271.28'
SCALE 1" = 80'

This page intentionally left blank

APPENDIX 7.1:

ON-SITE TRAFFIC NOISE LEVEL CALCULATIONS

This page intentionally left blank

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: First Floor With Wall
Road Name: Washington Ave.
Lot No: Bldg 6

Project Name: Tentative Parcel Map No. 30394
Job Number: 12743
Analyst: B. Lawson

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,070 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	43 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	86.0 feet
Centerline Dist. to Observer:	86.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	1,149.4 feet
Road Elevation:	1,149.4 feet
Barrier Elevation:	1,149.4 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	1,149.400		
Medium Trucks:	1,151.697		
Heavy Trucks:	1,157.406	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	83.419
Medium Trucks:	83.313
Heavy Trucks:	83.323

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	1.72	-3.44	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	76.31	-15.52	-3.43	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	81.16	-19.47	-3.43	-1.20	*-5.20*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.4	62.5	60.8	54.7	63.3	64.0
Medium Trucks:	56.2	54.7	48.3	46.8	55.2	55.4
Heavy Trucks:	57.1	55.6	46.6	47.8	56.2	56.3
Vehicle Noise:	65.7	63.9	61.2	56.1	64.6	65.1

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.4	62.5	60.8	54.7	63.3	64.0
Medium Trucks:	56.2	54.7	48.3	46.8	55.2	55.4
Heavy Trucks:	57.1	55.6	46.6	47.8	56.2	56.3
Vehicle Noise:	65.7	63.9	61.2	56.1	64.6	65.1

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: First Floor With Wall
Road Name: Washington Ave.
Lot No: Bldg 7

Project Name: Tentative Parcel Map No. 30394
Job Number: 12743
Analyst: B. Lawson

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,070 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	43 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	79.0 feet
Centerline Dist. to Observer:	79.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	1,148.6 feet
Road Elevation:	1,148.6 feet
Barrier Elevation:	1,148.6 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	1,148.600		
Medium Trucks:	1,150.897		
Heavy Trucks:	1,156.606	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	76.182
Medium Trucks:	76.066
Heavy Trucks:	76.077

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	1.72	-2.85	-1.20	*-4.74*	0.000	0.000
Medium Trucks:	76.31	-15.52	-2.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	81.16	-19.47	-2.84	-1.20	*-5.23*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.0	63.1	61.4	55.3	63.9	64.5
Medium Trucks:	56.8	55.3	48.9	47.3	55.8	56.0
Heavy Trucks:	57.6	56.2	47.2	48.4	56.8	56.9
Vehicle Noise:	66.3	64.5	61.8	56.7	65.2	65.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.0	63.1	61.4	55.3	63.9	64.5
Medium Trucks:	56.8	55.3	48.9	47.3	55.8	56.0
Heavy Trucks:	57.6	56.2	47.2	48.4	56.8	56.9
Vehicle Noise:	66.3	64.5	61.8	56.7	65.2	65.7

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: First Floor With Wall
Road Name: Washington Ave.
Lot No: Bldg 15

Project Name: Tentative Parcel Map No. 30394
Job Number: 12743
Analyst: B. Lawson

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,070 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	43 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	86.0 feet
Centerline Dist. to Observer:	86.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	1,148.8 feet
Road Elevation:	1,148.8 feet
Barrier Elevation:	1,148.8 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	1,148.800		
Medium Trucks:	1,151.097		
Heavy Trucks:	1,156.806	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	83.419
Medium Trucks:	83.313
Heavy Trucks:	83.323

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	1.72	-3.44	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	76.31	-15.52	-3.43	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	81.16	-19.47	-3.43	-1.20	*-5.20*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.4	62.5	60.8	54.7	63.3	64.0
Medium Trucks:	56.2	54.7	48.3	46.8	55.2	55.4
Heavy Trucks:	57.1	55.6	46.6	47.8	56.2	56.3
Vehicle Noise:	65.7	63.9	61.2	56.1	64.6	65.1

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.4	62.5	60.8	54.7	63.3	64.0
Medium Trucks:	56.2	54.7	48.3	46.8	55.2	55.4
Heavy Trucks:	57.1	55.6	46.6	47.8	56.2	56.3
Vehicle Noise:	65.7	63.9	61.2	56.1	64.6	65.1

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: First Floor With Wall
Road Name: Nutmeg St.
Lot No: Bldg 16

Project Name: Tentative Parcel Map No. 30394
Job Number: 12743
Analyst: B. Lawson

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,070	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	43	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	67.0	feet
Centerline Dist. to Observer:	67.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	1,149.6	feet
Road Elevation:	1,149.6	feet
Barrier Elevation:	1,149.6	feet
Road Grade:	0.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	1,149.600		
Medium Trucks:	1,151.897		
Heavy Trucks:	1,157.606	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	63.653
Medium Trucks:	63.514
Heavy Trucks:	63.528

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	1.72	-1.68	-1.20	*-4.71*	0.000	0.000
Medium Trucks:	76.31	-15.52	-1.66	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	81.16	-19.47	-1.66	-1.20	*-5.29*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.2	64.3	62.5	56.5	65.1	65.7
Medium Trucks:	57.9	56.4	50.1	48.5	57.0	57.2
Heavy Trucks:	58.8	57.4	48.4	49.6	58.0	58.1
Vehicle Noise:	67.4	65.7	62.9	57.8	66.4	66.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.2	64.3	62.5	56.5	65.1	65.7
Medium Trucks:	57.9	56.4	50.1	48.5	57.0	57.2
Heavy Trucks:	58.8	57.4	48.4	49.6	58.0	58.1
Vehicle Noise:	67.4	65.7	62.9	57.8	66.4	66.9

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: First Floor With Wall
Road Name: Nutmeg St.
Lot No: Bldg 17

Project Name: Tentative Parcel Map No. 30394
Job Number: 12743
Analyst: B. Lawson

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,070 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	43 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	80.0 feet
Centerline Dist. to Observer:	80.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	1,151.8 feet
Road Elevation:	1,151.8 feet
Barrier Elevation:	1,151.8 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	1,151.800		
Medium Trucks:	1,154.097		
Heavy Trucks:	1,159.806	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	77.219
Medium Trucks:	77.104
Heavy Trucks:	77.115

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	1.72	-2.93	-1.20	*-4.74*	0.000	0.000
Medium Trucks:	76.31	-15.52	-2.93	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	81.16	-19.47	-2.93	-1.20	*-5.23*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.3	55.2	63.8	64.5
Medium Trucks:	56.7	55.2	48.8	47.3	55.7	55.9
Heavy Trucks:	57.6	56.1	47.1	48.4	56.7	56.8
Vehicle Noise:	66.2	64.4	61.7	56.6	65.1	65.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.3	55.2	63.8	64.5
Medium Trucks:	56.7	55.2	48.8	47.3	55.7	55.9
Heavy Trucks:	57.6	56.1	47.1	48.4	56.7	56.8
Vehicle Noise:	66.2	64.4	61.7	56.6	65.1	65.6

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Second Floor With Wall
Road Name: Washington Ave.
Lot No: Bldg 6

Project Name: Tentative Parcel Map No. 30394
Job Number: 12743
Analyst: B. Lawson

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,070 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	43 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	86.0 feet
Centerline Dist. to Observer:	86.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	1,149.4 feet
Road Elevation:	1,149.4 feet
Barrier Elevation:	1,149.4 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	1,149.400		
Medium Trucks:	1,151.697		
Heavy Trucks:	1,157.406	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	84.438
Medium Trucks:	84.088
Heavy Trucks:	83.485

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	1.72	-3.52	-1.20	*-12.59*	0.000	0.000
Medium Trucks:	76.31	-15.52	-3.49	-1.20	*-12.95*	0.000	0.000
Heavy Trucks:	81.16	-19.47	-3.44	-1.20	*-13.86*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.4	62.5	60.7	54.6	63.3	63.9
Medium Trucks:	56.1	54.6	48.2	46.7	55.2	55.4
Heavy Trucks:	57.0	55.6	46.6	47.8	56.2	56.3
Vehicle Noise:	65.6	63.8	61.1	56.0	64.6	65.1

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.4	62.5	60.7	54.6	63.3	63.9
Medium Trucks:	56.1	54.6	48.2	46.7	55.2	55.4
Heavy Trucks:	57.0	55.6	46.6	47.8	56.2	56.3
Vehicle Noise:	65.6	63.8	61.1	56.0	64.6	65.1

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Second Floor With Wall
Road Name: Washington Ave.
Lot No: Bldg 7

Project Name: Tentative Parcel Map No. 30394
Job Number: 12743
Analyst: B. Lawson

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,070	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	43	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	79.0	feet
Centerline Dist. to Observer:	79.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	14.0	feet
Pad Elevation:	1,148.6	feet
Road Elevation:	1,148.6	feet
Barrier Elevation:	1,148.6	feet
Road Grade:	0.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	1,148.600		
Medium Trucks:	1,150.897		
Heavy Trucks:	1,156.606	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	77.297
Medium Trucks:	76.914
Heavy Trucks:	76.254

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	1.72	-2.94	-1.20	*-12.49*	0.000	0.000
Medium Trucks:	76.31	-15.52	-2.91	-1.20	*-12.89*	0.000	0.000
Heavy Trucks:	81.16	-19.47	-2.85	-1.20	*-13.87*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.3	55.2	63.8	64.4
Medium Trucks:	56.7	55.2	48.8	47.3	55.7	56.0
Heavy Trucks:	57.6	56.2	47.2	48.4	56.8	56.9
Vehicle Noise:	66.2	64.4	61.7	56.6	65.1	65.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.3	55.2	63.8	64.4
Medium Trucks:	56.7	55.2	48.8	47.3	55.7	56.0
Heavy Trucks:	57.6	56.2	47.2	48.4	56.8	56.9
Vehicle Noise:	66.2	64.4	61.7	56.6	65.1	65.6

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Second Floor With Wall
Road Name: Washington Ave.
Lot No: Bldg 15

Project Name: Tentative Parcel Map No. 30394
Job Number: 12743
Analyst: B. Lawson

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,070 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	43 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	86.0 feet
Centerline Dist. to Observer:	86.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	1,148.8 feet
Road Elevation:	1,148.8 feet
Barrier Elevation:	1,148.8 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	1,148.800		
Medium Trucks:	1,151.097		
Heavy Trucks:	1,156.806	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	84.438
Medium Trucks:	84.088
Heavy Trucks:	83.485

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	1.72	-3.52	-1.20	*-12.59*	0.000	0.000
Medium Trucks:	76.31	-15.52	-3.49	-1.20	*-12.95*	0.000	0.000
Heavy Trucks:	81.16	-19.47	-3.44	-1.20	*-13.86*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.4	62.5	60.7	54.6	63.3	63.9
Medium Trucks:	56.1	54.6	48.2	46.7	55.2	55.4
Heavy Trucks:	57.0	55.6	46.6	47.8	56.2	56.3
Vehicle Noise:	65.6	63.8	61.1	56.0	64.6	65.1

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.4	62.5	60.7	54.6	63.3	63.9
Medium Trucks:	56.1	54.6	48.2	46.7	55.2	55.4
Heavy Trucks:	57.0	55.6	46.6	47.8	56.2	56.3
Vehicle Noise:	65.6	63.8	61.1	56.0	64.6	65.1

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Second Floor With Wall
Road Name: Nutmeg St.
Lot No: Bldg 16

Project Name: Tentative Parcel Map No. 30394
Job Number: 12743
Analyst: B. Lawson

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,070	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	43	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	67.0	feet
Centerline Dist. to Observer:	67.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	14.0	feet
Pad Elevation:	1,149.6	feet
Road Elevation:	1,149.6	feet
Barrier Elevation:	1,149.6	feet
Road Grade:	0.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	1,149.600		
Medium Trucks:	1,151.897		
Heavy Trucks:	1,157.606	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	64.983
Medium Trucks:	64.527
Heavy Trucks:	63.739

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	1.72	-1.81	-1.20	*-12.28*	0.000	0.000
Medium Trucks:	76.31	-15.52	-1.76	-1.20	*-12.74*	0.000	0.000
Heavy Trucks:	81.16	-19.47	-1.68	-1.20	*-13.90*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.1	64.2	62.4	56.3	65.0	65.6
Medium Trucks:	57.8	56.3	50.0	48.4	56.9	57.1
Heavy Trucks:	58.8	57.4	48.3	49.6	57.9	58.1
Vehicle Noise:	67.3	65.5	62.8	57.7	66.3	66.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.1	64.2	62.4	56.3	65.0	65.6
Medium Trucks:	57.8	56.3	50.0	48.4	56.9	57.1
Heavy Trucks:	58.8	57.4	48.3	49.6	57.9	58.1
Vehicle Noise:	67.3	65.5	62.8	57.7	66.3	66.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Second Floor With Wall
Road Name: Nutmeg St.
Lot No: Bldg 17

Project Name: Tentative Parcel Map No. 30394
Job Number: 12743
Analyst: B. Lawson

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,070	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	43	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	80.0	feet
Centerline Dist. to Observer:	80.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	14.0	feet
Pad Elevation:	1,151.8	feet
Road Elevation:	1,151.8	feet
Barrier Elevation:	1,151.8	feet
Road Grade:	0.0%	

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	1,151.800		
Medium Trucks:	1,154.097		
Heavy Trucks:	1,159.806	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	78.318
Medium Trucks:	77.940
Heavy Trucks:	77.290

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	1.72	-3.03	-1.20	*-12.51*	0.000	0.000
Medium Trucks:	76.31	-15.52	-3.00	-1.20	*-12.90*	0.000	0.000
Heavy Trucks:	81.16	-19.47	-2.94	-1.20	*-13.87*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.2	55.1	63.8	64.4
Medium Trucks:	56.6	55.1	48.7	47.2	55.6	55.9
Heavy Trucks:	57.5	56.1	47.1	48.3	56.7	56.8
Vehicle Noise:	66.1	64.3	61.6	56.5	65.1	65.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.2	55.1	63.8	64.4
Medium Trucks:	56.6	55.1	48.7	47.2	55.6	55.9
Heavy Trucks:	57.5	56.1	47.1	48.3	56.7	56.8
Vehicle Noise:	66.1	64.3	61.6	56.5	65.1	65.6