Acoustical Assessment
Arroyo Village

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ACOUSTICAL ASSESSMENT

for the

Arroyo Village

San Gabriel, California

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DEFINITIONS OF COMMONLY USED TERMS IN NOISE CONTROL

The definitions that follow are in general agreement with those contained in publications of various professional organizations, including the American National Standards Institute (ANSI); the American Society for Testing and Materials (ASTM); the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE); the International Organization for Standardization (ISO); and the International Electrotechnical Commission (IEC).

TERMINOLOGY

acoustic; acoustical: *Acoustic* is usually used when the term being qualified designates something that has the properties, dimensions, or physical characteristics associated with sound waves (e.g., acoustic power); *acoustical* is usually used when the term which it modifies does not explicitly designate something that has the properties, dimensions, or physical characteristics of sound (e.g., acoustical material).

ambient noise: The all-encompassing noise associated with a given environment at a specified time, usually being a composite of sound from many sources arriving from many directions, near and far; no particular sound is dominant.

attenuation: The decrease in level of sound, usually from absorption, divergence, scattering, or the cancellation of the sound waves.

average sound level (L_{eq}): The level of a steady sound which, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound.
Unit: decibel.

A-weighted sound level (L_A): The sound level measured with a sound-level meter using A-weighting. *Unit*: decibel (dBA).

background noise: The total noise from all sources other than a particular sound that is of interest (e.g., other than the noise being measured or other than the speech or music being listened to).

decibel (dB): A unit of level which denotes the ratio between two quantities that are proportional to power; the number of decibels correspond to the logarithm (to the base 10) of this ratio. [In many sound fields, the sound pressure ratios are not proportional to the corresponding power ratios, but it is common practice to extend the use of the decibel to such cases. One decibel equals one-tenth of a *bel*.]

equivalent continuous sound level (average sound level) (L_{eq}): The level of a steady sound which, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound. *Unit*: decibel (dBA).

frequency (*f*): Of a periodic function, the number of times that a quantity repeats itself in one second, i.e., the number of cycles per second. *Unit*: hertz (Hz).

noise: Any disagreeable or undesired sound, i.e., unwanted sound.

noise level: Same as sound level. Usually used to describe the sound level of an unwanted sound.

noise reduction (NR): The difference in sound pressure level between any two points along a path of sound propagation.

sound: (1) A change in air pressure that is capable of being detected by the human ear.
(2) The hearing sensation excited by a change in air pressure.

sound level: Ten times the logarithm to the base 10 of the square of the ratio of the frequency-weighted (and time-averaged) sound pressure to the reference sound pressure of 20 micropascals. The frequency-weightings and time-weighting employed should be specified; if they are not specified, it is understood that A-frequency-weighting is used and that an averaging time of 0.125 is used. *Unit*: decibel (dBA).

SYMBOLS, ABBREVIATIONS, AND ACRONYMS

ADT	Average Daily Traffic
ANSI	American National Standards Institute
AM	Ante Meridiem
APN	Assessor's Parcel Number
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibel
EPA	United States Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
INCE	Institute of Noise Control Engineering
HVAC	heating, ventilation, and air conditioning
in/sec	inches per second
Ldn	average day/night sound level
Leq	equivalent sound level
Lmax	maximum noise level
Lmin	minimum noise level
Ln	exceedance level
MPH	miles per hour
PM	Post Meridiem
PPV	peak particle velocity
STC	sound transmission class
VdB	velocity decibels

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EXECUTIVE SUMMARY

The purpose of this Acoustical Assessment is to evaluate potential short- and long-term noise impacts resulting from implementation of the proposed Arroyo Village project ("project" or "proposed project"). The proposed project is located at 235 South Arroyo Drive in the City of San Gabriel. Overall, the project site is located within residential area of the City of San Gabriel and is within the City's Mission District Specific Plan area.

The project proposes to demolish the existing on-site single-family residential building and construct a new four-story residential building encompassing 46 one- to three-bedroom condominium units (totaling approximately 57,332 square feet for four floors) with a basement level for parking (totaling approximately 36,734 square feet for parking garage). The lot is approximately 1.16 acres (50,343 square feet) in size and has an irregular shape. As stated above, Alhambra wash traverses the project site in a northeast-southwest direction. The project site topography varies and slopes to the southeast and southwest toward the wash.

The proposed residential building would be approximately 481.5 feet tall. The condominium units would include 4 one-bedroom units, 26 two-bedroom units, and 16 three-bedroom units. A courtyard area would be located at the center of the first floor surrounded by the residential units. Additionally, two more courtyards would be located to the west of the wash within the first floor. Vehicular access to the site would be provided from Arroyo Drive via a bridge over the existing Alhambra wash which would make the west leg of the intersection of Arroyo Drive and Mays Alley. The access bridge over the wash would include two-lane for vehicular ingress and egress directly to the basement parking spaces. A total of 111 vehicular parking spots (101 spots within the basement garage and 10 spaces within the open area of the project entrance) would be provided and would be utilized by on-site residents and guests. There would be a pedestrian walkway along north side of the bridge over the wash with stairs leading to the subterranean parking garage and lobby. Additionally, two elevators, one at the lobby and one at the central courtyard, would provide residential access to the garage and other floors. Trash enclosure would be located at the basement garage. Additionally, mechanical room and electrical room are located within the basement garage.

<u>Temporary Impacts</u>. Based upon the results of the analysis, noise from construction activities would not exceed the noise standards of the City of San Gabriel's *Municipal Code* at nearby residential uses with compliance with the recommended mitigation measures. Additionally, short-term vibration impacts from construction would be less than significant.

<u>Long-Term Impacts</u>. The analysis has concluded that implementation of the proposed project would result in less than significant impacts with regard to mobile noise sources from project operations. Additionally, less than significant impacts have been identified in regard to stationary sources.

1.0 INTRODUCTION

The purpose of this Acoustical Assessment is to evaluate potential short- and long-term noise impacts resulting from implementation of the proposed Arroyo Village project ("project" or "proposed project") in the City of San Gabriel (City).

1.1 PROJECT LOCATION

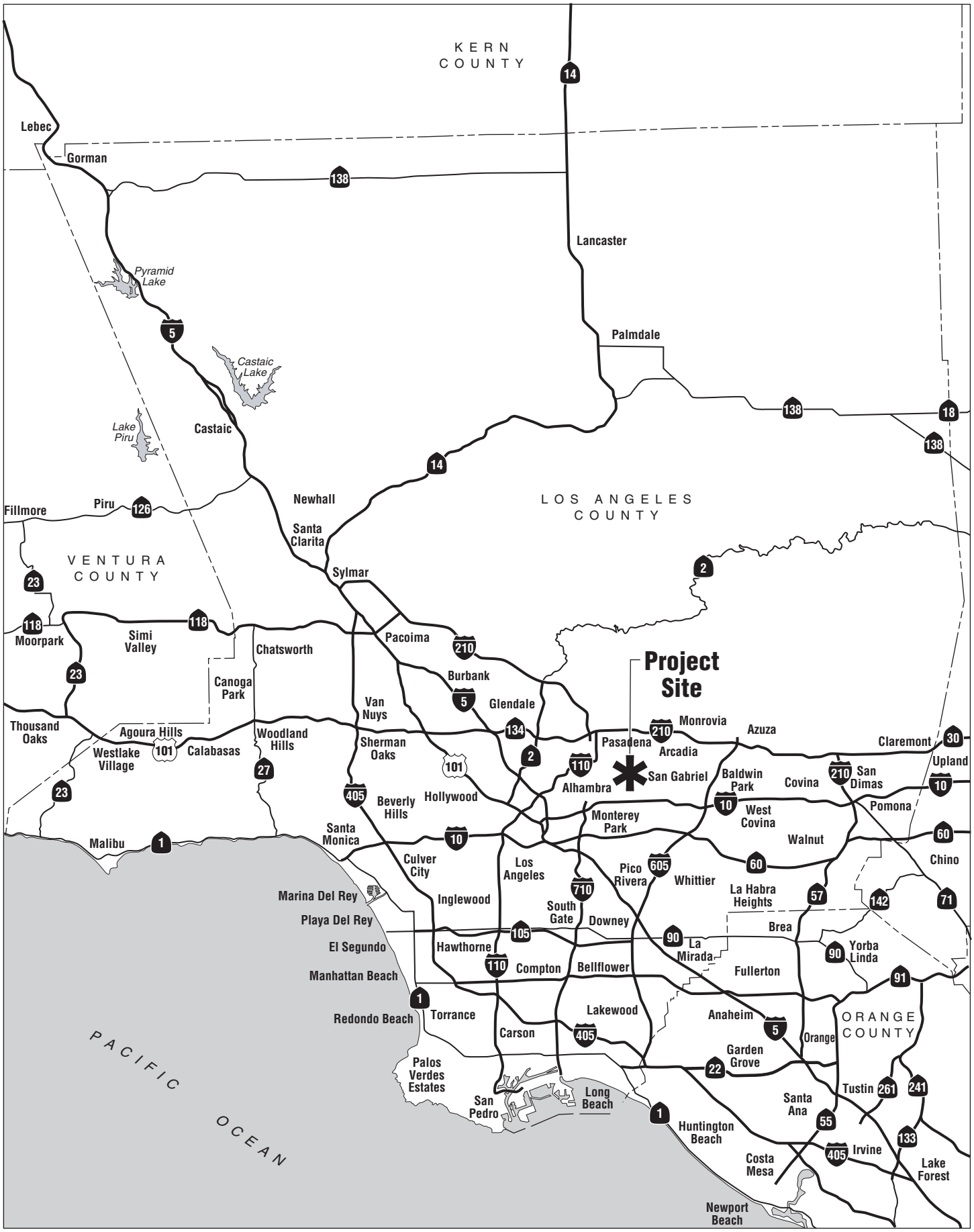
The proposed project is located at 235 South Arroyo Drive, in the City of San Gabriel, California. The project site (Assessor's Parcel Numbers [APNs] 5346-011-001, 5346-011-004, 5346-011-006, 5346-009-010, and 5346-008-031) is located along Arroyo Drive and to the west of the three-way intersection of Arroyo Drive and Carillo Drive and three-way intersection of Arroyo Drive and Mays Alley, approximately 1.9 miles north of Interstate 10 (I-10) and approximately 3.6 miles south of Interstate 210 (I-210); refer to Exhibit 1, *Regional Vicinity*. Overall, the project site is located within residential area of the City of San Gabriel and is within the City's Mission District Specific Plan area. Alhambra Wash traverses the project site in a northeast-southwest direction. A two-story residential building is located to the north side of the project site and to the west of the wash. Other parts of the site are currently vacant lands covered partially with vegetation. The project site is bounded by residential uses on all sides with the exception of a commercial use to the northwest and a vacant land to the southwest of the site; refer to Exhibit 2, *Site Vicinity*.

1.2 PROJECT DESCRIPTION

The project proposes to demolish the existing on-site single-family residential building and construct a new four-story residential building encompassing 46 one- to three-bedroom condominium units (totaling approximately 57,332 square feet for four floors) with a basement level for parking (totaling approximately 36,734 square feet for parking garage); refer to Exhibit 3, *Conceptual Site Plan*. The lot is approximately 1.16 acres (50,343 square feet) in size and has an irregular shape. The building has a footprint of 18,245 square feet. The project site topography varies and slopes to the southeast and southwest toward the wash.

The proposed residential building would be approximately 481.5 feet tall. The condominium units would include 4 one-bedroom units, 26 two-bedroom units, and 16 three-bedroom units. A courtyard area would be located at the center of the first floor surrounded by the residential units. Additionally, two more courtyards would be located to the west of the wash on the first floor.

Vehicular access to the site would be provided from Arroyo Drive via a bridge over the existing Alhambra wash which would make the west leg of the intersection of Arroyo Drive and Mays Alley. The access bridge over the wash would include two-lanes for vehicular ingress and egress directly to the basement parking spaces. A total of 111 vehicular parking spots (101 spots



Michael Baker INTERNATIONAL

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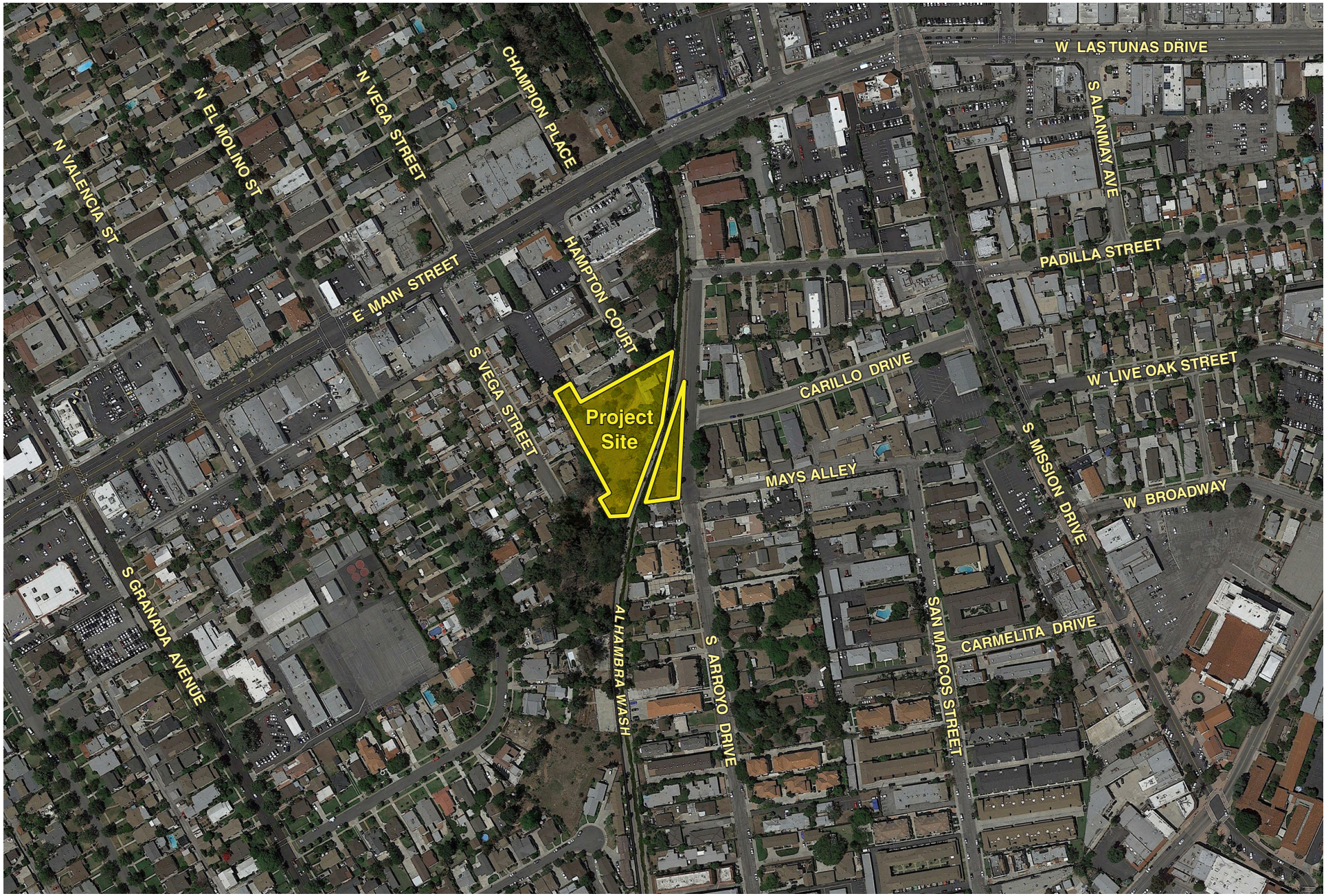
ARROYO VILLAGE • ACOUSTICAL ASSESSMENT

Regional Vicinity

Exhibit 1



SOURCE: Google Earth Aerial, 2015

not to scale

ARROYO VILLAGE • ACOUSTICAL ASSESSMENT

Site Vicinity

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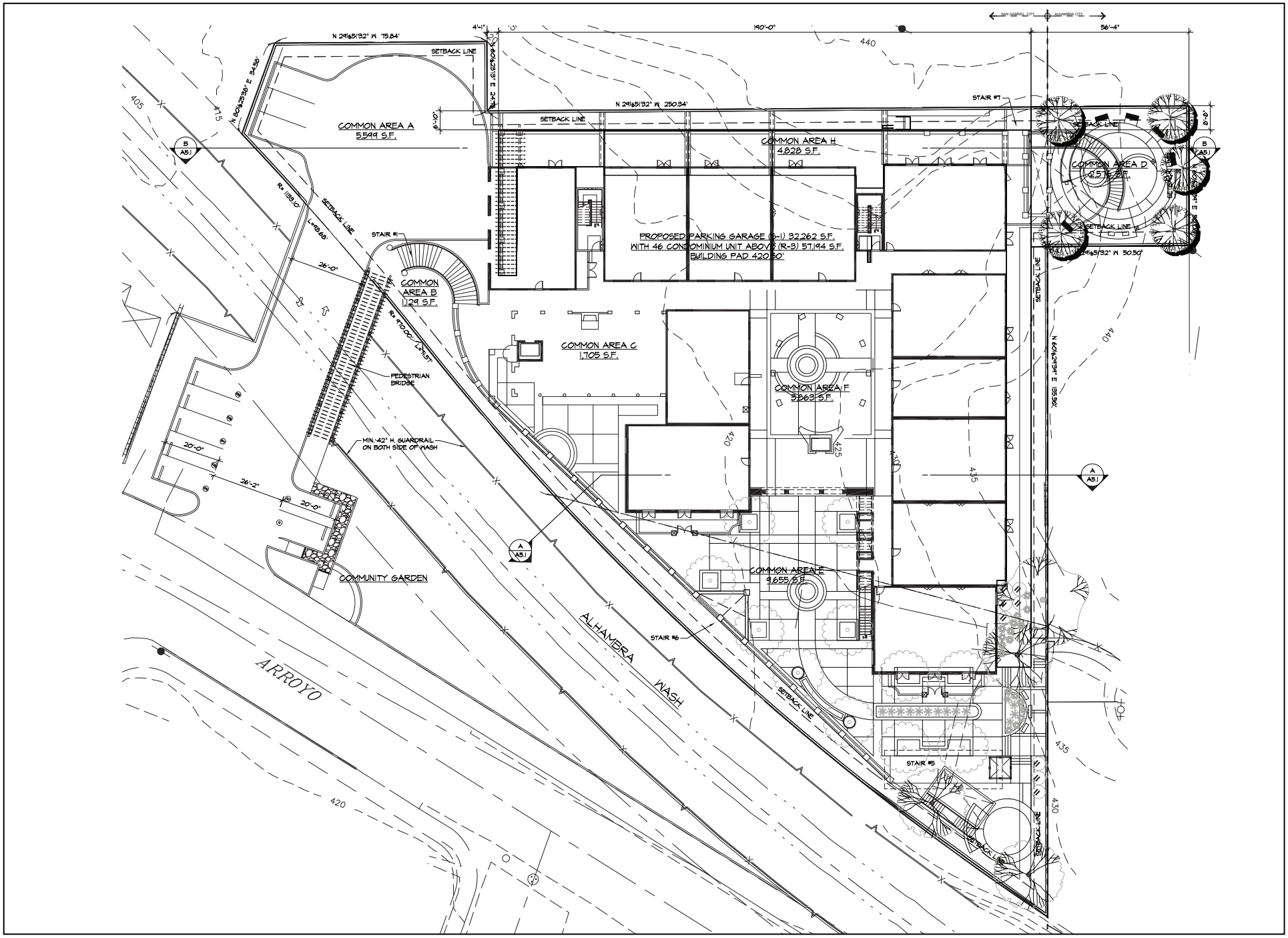
Exhibit 2



SOURCE: Design Inspiration Group, Inc.

not to scale

ARROYO VILLAGE • ACOUSTICAL ASSESSMENT

Conceptual Site Plan

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Exhibit 3

within the basement garage and 10 spaces within the open area of the project entrance) would be provided and would be utilized by on-site residents and guests. There would be a pedestrian walkway along north side of the bridge over the wash with stairs leading to the subterranean parking garage and lobby. Two elevators, one at the lobby and one at the central courtyard, would provide residential access to the garage and other floors. A trash enclosure would be located at the basement garage. Additionally, mechanical room and electrical room are located within the basement garage.

MISSION DISTRICT SPECIFIC PLAN

The proposed project is within the *Mission District Specific Plan* (August 2004) area. The Environmental Impact Report (EIR), dated July 2004, for the *Mission District Specific Plan* determined that impacts related to long-term vehicular traffic noise would be significant and unavoidable. The following three roadway segments would have exterior noise levels that would exceed adopted noise standards:

- Santa Anita Street: north of Las Tunas Drive;
- Broadway: east of Junipero Serra Drive; and
- Junipero Serra Drive: San Marino Avenue to Broadway.

All other noise impacts were less than significant with the implementation of mitigation measures.

2.0 DESCRIPTION OF NOISE METRICS

2.1 STANDARD UNIT OF MEASUREMENT

Sound is described in terms of the loudness (amplitude) of the sound and frequency (pitch) of the sound. The standard unit of measurement of the loudness of sound is the decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by differentiating among frequencies in a manner approximating the sensitivity of the human ear.

Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner similar to the Richter scale used to measure earthquakes. In terms of human response to noise, a sound 10 dBA higher than another is perceived to be twice as loud and 20 dBA higher is perceived to be four times as loud, and so forth. Everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). Examples of various sound levels in different environments are illustrated on Exhibit 4, *Common Environmental Noise Levels*.

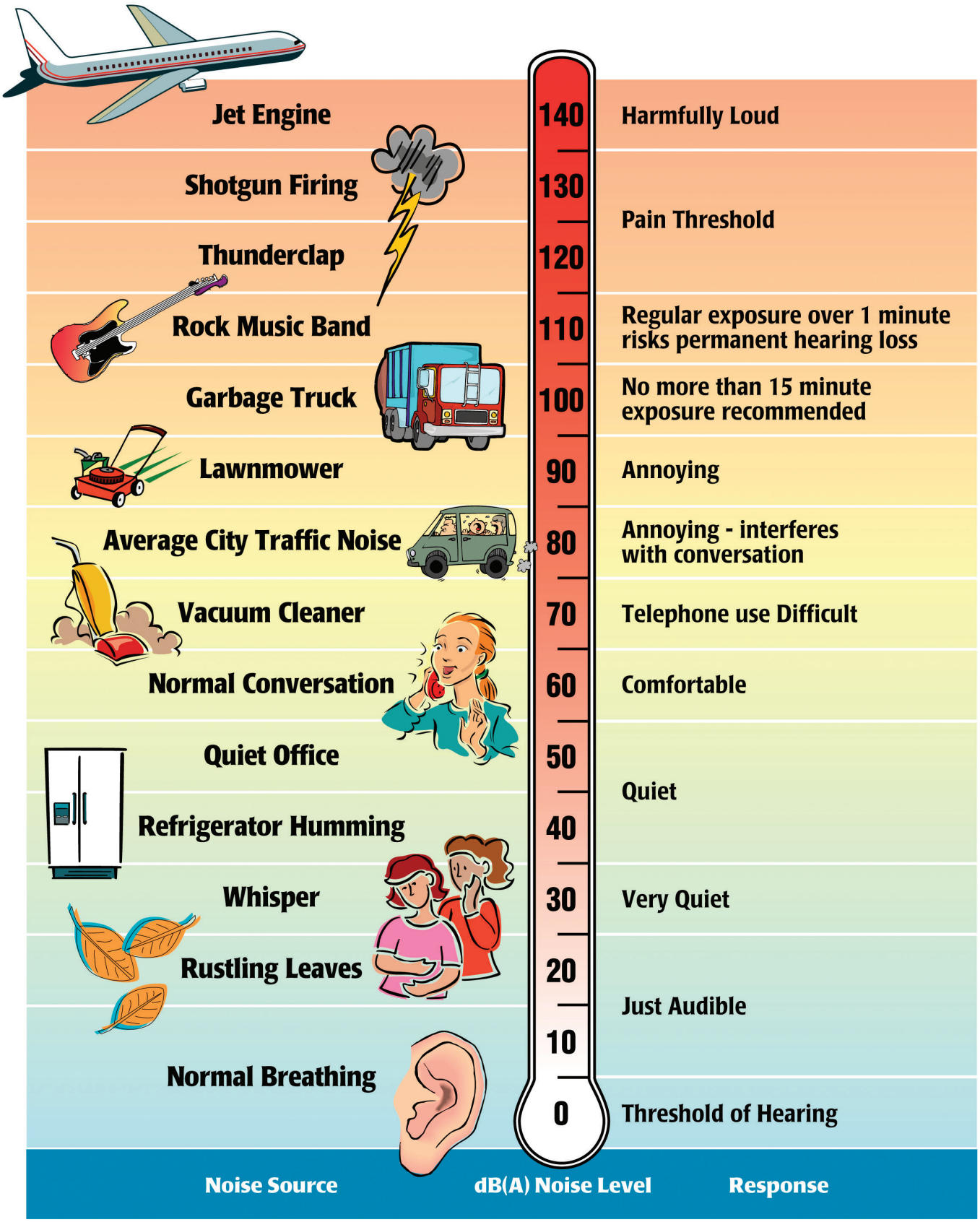
Many methods have been developed for evaluating community noise to account for, among other things:

- The variation of noise levels over time;
- The influence of periodic individual loud events; and
- The community response to changes in the community noise environment.

Table 1, *Noise Descriptors*, provides a listing of methods to measure sound over a period of time.

2.2 HEALTH EFFECTS OF NOISE

Human response to sound is highly individualized. Annoyance is the most common issue regarding community noise. The percentage of people claiming to be annoyed by noise generally increases with the environmental sound level. However, many factors also influence people's response to noise. The factors can include the character of the noise, the variability of the sound level, the presence of tones or impulses, and the time of day of the occurrence. Additionally, non-acoustical factors, such as the person's opinion of the noise source, the ability to adapt to the noise, the attitude towards the source and those associated with it, and the predictability of the noise, all influence people's response. As such, response to noise varies widely from one person to another and with any particular noise, individual responses would range from "not annoyed" to "highly annoyed."



Source:

Melville C. Branch and R. Dale Beland, *Outdoor Noise in the Metropolitan Environment*, 1970.

Environmental Protection Agency, *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.

ARROYO VILLAGE • ACOUSTICAL ASSESSMENT

Common Environmental Noise Levels

Table 1
Noise Descriptors

Term	Definition
Decibel (dB)	The unit for measuring the volume of sound equal to 10 times the logarithm (base 10) of the ratio of the pressure of a measured sound to a reference pressure (20 micropascals).
A-Weighted Decibel (dBA)	A sound measurement scale that adjusts the pressure of individual frequencies according to human sensitivities. The scale accounts for the fact that the region of highest sensitivity for the human ear is between 2,000 and 4,000 cycles per second (hertz).
Equivalent Sound Level (L_{eq})	The sound level containing the same total energy as a time varying signal over a given time period. The L_{eq} is the value that expresses the time averaged total energy of a fluctuating sound level.
Maximum Sound Level (L_{max})	The highest individual sound level (dBA) occurring over a given time period.
Minimum Sound Level (L_{min})	The lowest individual sound level (dBA) occurring over a given time period.
Community Noise Equivalent Level (CNEL)	A rating of community noise exposure to all sources of sound that differentiates between daytime, evening, and nighttime noise exposure. These adjustments are +5 dBA for the evening, 7:00 PM to 10:00 PM, and +10 dBA for the night, 10:00 PM to 7:00 AM.
Day/Night Average (L_{dn})	The L_{dn} is a measure of the 24-hour average noise level at a given location. It was adopted by the U.S. Environmental Protection Agency for developing criteria for the evaluation of community noise exposure. It is based on a measure of the average noise level over a given time period called the L_{eq}. The L_{dn} is calculated by averaging the L_{eq}'s for each hour of the day at a given location after penalizing the "sleeping hours" (defined as 10:00 PM to 7:00 AM) by 10 dBA to account for the increased sensitivity of people to noises that occur at night.
Exceedance Level (L_n)	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% (L_{01}, L_{10}, L_{50}, L_{90}, respectively) of the time during the measurement period.

Source: Cyril M. Harris, *Handbook of Noise Control*, 1979.

When the noise level of an activity rises above 70 dBA, the chance of receiving a complaint is possible, and as the noise level rises, dissatisfaction among the public steadily increases. However, an individual's reaction to a particular noise depends on many factors, such as the source of the sound, its loudness relative to the background noise, and the time of day. The reaction to noise can also be highly subjective; the perceived effect of a particular noise can vary widely among individuals in a community.

The effects of noise are often only transitory, but adverse effects can be cumulative with prolonged or repeated exposure. The effects of noise on the community can be organized into six broad categories:

- Noise-Induced Hearing Loss;
- Interference with Communication;
- Effects of Noise on Sleep;
- Effects on Performance and Behavior;

- Extra-Auditory Health Effects; and
- Annoyance.

Although it often causes discomfort and sometimes pain, noise-induced hearing loss usually takes years to develop. Noise-induced hearing loss can impair the quality of life through a reduction in the ability to hear important sounds and to communicate with family and friends. Hearing loss is one of the most obvious and easily quantified effects of excessive exposure to noise. While the loss may be temporary at first, it could become permanent after continued exposure. When combined with hearing loss associated with aging, the amount of hearing loss directly caused by the environment is difficult to quantify. Although the major cause of noise-induced hearing loss is occupational, substantial damage can be caused by non-occupational sources.

According to the United States Public Health Service, nearly ten million of the estimated 21 million Americans with hearing impairments owe their losses to noise exposure. Noise can mask important sounds and disrupt communication between individuals in a variety of settings. This process can cause anything from a slight irritation to a serious safety hazard, depending on the circumstance. Noise can disrupt face-to-face communication and telephone communication, and the enjoyment of music and television in the home. It can also disrupt effective communication between teachers and pupils in schools, and can cause fatigue and vocal strain in those who need to communicate in spite of the noise.

Interference with communication has proven to be one of the most important components of noise-related annoyance. Noise-induced sleep interference is one of the critical components of community annoyance. Sound level, frequency distribution, duration, repetition, and variability can make it difficult to fall asleep and may cause momentary shifts in the natural sleep pattern, or level of sleep. It can produce short-term adverse effects on mood changes and job performance, with the possibility of more serious effects on health if it continues over long periods. Noise can cause adverse effects on task performance and behavior at work, and non-occupational and social settings. These effects are the subject of some controversy, since the presence and degree of effects depends on a variety of intervening variables. Most research in this area has focused mainly on occupational settings, where noise levels must be sufficiently high and the task sufficiently complex for effects on performance to occur.

Recent research indicates that more moderate noise levels can produce disruptive after-effects, commonly manifested as a reduced tolerance for frustration, increased anxiety, decreased incidence of “helping” behavior, and increased incidence of “hostile” behavior. Noise has been implicated in the development or exacerbation of a variety of health problems, ranging from hypertension to psychosis. As with other categories, quantifying these effects is difficult due to the amount of variables that need to be considered in each situation. As a biological stressor, noise can influence the entire physiological system. Most effects seem to be transitory, but with continued exposure some effects have been shown to be chronic in laboratory animals.

Annoyance can be viewed as the expression of negative feelings resulting from interference with activities, as well as the disruption of one's peace of mind and the enjoyment of one's environment. Field evaluations of community annoyance are useful for predicting the consequences of planned actions involving highways, airports, road traffic, railroads, or other noise sources. The consequences of noise-induced annoyance are privately held dissatisfaction, publicly expressed complaints to authorities, and potential adverse health effects, as discussed above. In a study conducted by the United States Department of Transportation, the relationship between the effects of annoyance and the community were quantified. In areas where exterior noise levels were consistently above 60 dBA CNEL, approximately nine percent of the community is highly annoyed. When levels exceed 65 dBA Community Noise Equivalent Level (CNEL), that percentage rises to 15 percent. Although evidence for the various effects of noise have differing levels of certainty, it is clear that noise can affect human health. Most of the effects are, to a varying degree, stress related.

3.0 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Land uses deemed sensitive by the State of California (State) within the vicinity of the project site include schools. Many jurisdictions also consider single- and multi-family residential uses particularly noise-sensitive because families and individuals expect to use time in the home for rest and relaxation, and noise can interfere with those activities. Some jurisdictions may also identify other noise-sensitive uses such as churches. Land uses that are relatively insensitive to noise include office, commercial, and retail developments. There is a range of insensitive noise receptors that include uses that generate significant noise levels and that typically have a low level of human occupancy.

This noise analysis was conducted in accordance with Federal, State, and local criteria described in the following sections.

3.1 U.S. ENVIRONMENTAL PROTECTION AGENCY

The U.S. Environmental Protection Agency (EPA) offers guidelines for community noise exposure in the publication *Noise Effects Handbook – A Desk Reference to Health and Welfare Effects of Noise*. These guidelines consider occupational noise exposure as well as noise exposure in homes. The EPA recognizes an exterior noise level of 55 decibels day-night level (dB L_{dn}) as a general goal to protect the public from hearing loss, activity interference, sleep disturbance, and annoyance. The EPA and other Federal agencies have adopted suggested land use compatibility guidelines that indicate that residential noise exposures of 55 to 65 dB L_{dn} are acceptable. However, the EPA notes that these levels are not regulatory goals, but are levels defined by a negotiated scientific consensus, without concern for economic and technological feasibility or the needs and desires of any particular community.

3.2 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The State Office of Planning and Research Noise Element Guidelines include recommended exterior and interior noise level standards for local jurisdictions to identify and prevent the creation of incompatible land uses due to noise. The Noise Element Guidelines contain a land use compatibility table that describes the compatibility of various land uses with a range of environmental noise levels in terms of the CNEL. Table 2, *Land Use Compatibility for Community Noise Environments*, presents guidelines for determining acceptable and unacceptable community noise exposure limits for various land use categories. The guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

Table 2
Land Use Compatibility for Community Noise Environments

Land Use Category	Community Noise Exposure (Ldn or CNEL, dBA)			
	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 – 75	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

NA: Not Applicable; Ldn: average day/night sound level; CNEL: Community Noise Equivalent Level

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

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

3.3 LOCAL JURISDICTION

CITY OF SAN GABRIEL GENERAL PLAN

The *General Plan* Noise Element identifies noise-sensitive land uses and noise sources, defines areas of noise impact, and establishes goals, policies, and programs to ensure that City residents are protected from excessive noise. The following lists applicable noise goals and targets obtained from the *General Plan:*

Goal 9.2: Minimize the impact of traffic noise for those who live and work on our major roadways.

Target 9.2.1: Commit to using innovative noise reducing asphalt products when resurfacing or repaving major arterial streets.

Goal 9.4: Protect residents from the harmful effects of noise from mechanical equipment and trucks.

Target 9.4.1: Adopt a comprehensive noise ordinance by 2006, including allowable decibel levels in commercial/industrial areas and residential areas adjacent to them.

Table 3, *Exterior Noise Standards*, provides noise standards for designated land uses within the City and Table 4, *Interior Noise Standards*, provides the City's interior noise standards.

Table 3
Exterior Noise Standards

Noise Zone	Designated Noise Zone Land Use (Receptor Property)	Time Interval	Exterior Noise Level (dB)	Standard 1 (dB) [1]	Standard 2 (dB) [2]	Standard 3 (dB) [3]	Standard 4 (dB) [4]	Standard 5 (dB) [5]
I	Noise-sensitive area	Anytime	45	45	50	55	60	65
II	Residential properties	10:00 PM – 7:00 AM (Nighttime)	45	45	50	55	60	65
		7:00 AM – 10:00 PM (Daytime)	50	50	55	60	65	70
III	Commercial properties	10:00 PM – 7:00 AM (Nighttime)	55	55	60	65	70	75
		7:00 AM – 10:00 PM (Daytime)	60	60	65	70	75	80
IV	Industrial properties	Anytime	70	70	75	80	85	90

Notes:
1. Standard No. 1 is the exterior noise level that may not be exceeded for more than a total of 30 minutes in any hour.
2. Standard No. 2 is the exterior noise level that may not be exceeded for more than a total of 15 minutes in any hour.
3. Standard No. 3 is the exterior noise level that may not be exceeded for more than a total of 5 minutes in any hour.
4. Standard No. 4 is the exterior noise level that may not be exceeded for more than a total of 1 minute in any hour.
5. Standard No. 5 is the exterior noise level that may not be exceeded for any period of time.

Source: City of San Gabriel, *Comprehensive General Plan of the City of San Gabriel*, May 18, 2004.

Table 4
Interior Noise Standards

Noise Zone	Designated Noise Zone Land Use (Receptor Property)	Time Interval	Allowable Interior Noise level (dB)	Standard 1 (dB) [1]	Standard 2 (dB) [2]	Standard 3 (dB) [3]
All	Residential	10:00 PM – 7:00 AM	40	45	50	55
		7:00 AM – 10:00 PM	45	45	50	55

Notes:
1. Standard No. 1 is the interior noise level that may not be exceeded for more than a total of 5 minutes in any hour.
2. Standard No. 2 is the interior noise level that may not be exceeded for more than a total of 1 minute in any hour.
3. Standard No. 3 is the interior noise level that may not be exceeded for any period of time.

Source: City of San Gabriel, *Comprehensive General Plan of the City of San Gabriel*, May 18, 2004.

CITY OF SAN GABRIEL MUNICIPAL CODE

Although the City's noise standards are contained within the *General Plan*, the *Municipal Code* includes several references to noise control. The following sections of the *Municipal Code* are applicable to the proposed project.

§ 98.02 MAINTENANCE OF PREMISES; NUISANCES.

It shall be unlawful and hereby declared a public nuisance for any person or persons either owning, leasing, occupying or having charge or possession of any real property within the city to cause, permit or allow any of the following conditions to exist thereon:

To maintain or operate, between the hours of 10:00 PM and 7:00 AM, any device, instrument, vehicle or machinery in such a manner as to create noise or cause vibrations which cause discomfort or annoyance to reasonable persons of normal sensitivity, or which endangers the comfort, repose, health or peace of the public or of any person using or occupying other property in the vicinity;

Title XIII: General Offenses

§ 130.09 NOISE CAUSED BY MACHINERY.

It shall be unlawful for any person to run or operate, or permit to be run or operated, any mechanical, electrical, electronic, hydraulic, or wind-driven equipment, fan, pump, compressor, blower, motor, engine, machine, or other similar apparatus, whether as owner, agent, employee, lessee, or other person having the charge thereof, which causes, or is likely to cause, any loud, excessive, unnecessary, or unusual continued or intermittent noise, or any noise which annoys, disturbs, injures, or endangers the comfort, repose, health, peace, or safety of others within the city unless such noise is muffled effectually and the apparatus is either equipped with a muffler device in constant operation and properly maintained to deaden such noise, or the apparatus is enclosed in a room, building, or other enclosure sufficiently insulated to deaden such noise.

Title XV: Land Usage

§ 150.003 Construction; Hours of Construction

No construction shall take place within the city except between the hours of 7:00 AM and 7:00 PM, Monday through Friday and between the hours of 8:00 AM and 4:00 PM on Saturday. Construction shall be prohibited on Sundays and such holidays as may be designated by Council resolution. The Community Development Director may extend the hours of operation for special circumstances by providing written notice to surrounding residents in advance. The restriction on construction hours shall not apply

to emergency repairs required to protect the public health, safety, ad welfare, whether performed by a public agency, utility, company, or private owner. Said restrictions also shall not apply to a residential property owner and or members of his immediate family, performing work on his personal property.

4.0 EXISTING CONDITIONS

4.1 NOISE MEASUREMENTS

In order to quantify existing ambient noise levels in the project area, RBF Consulting, a Michael Baker International company (RBF Baker) conducted two noise measurements on March 19, 2015; refer to Table 5, *Noise Measurements*. The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the project site. Ten-minute measurements were taken, between 11:00 AM and 2:00 PM, at each site during the day. Short-term (L_{eq}) measurements are considered representative of the noise levels in the project vicinity.

Table 5
Noise Measurements

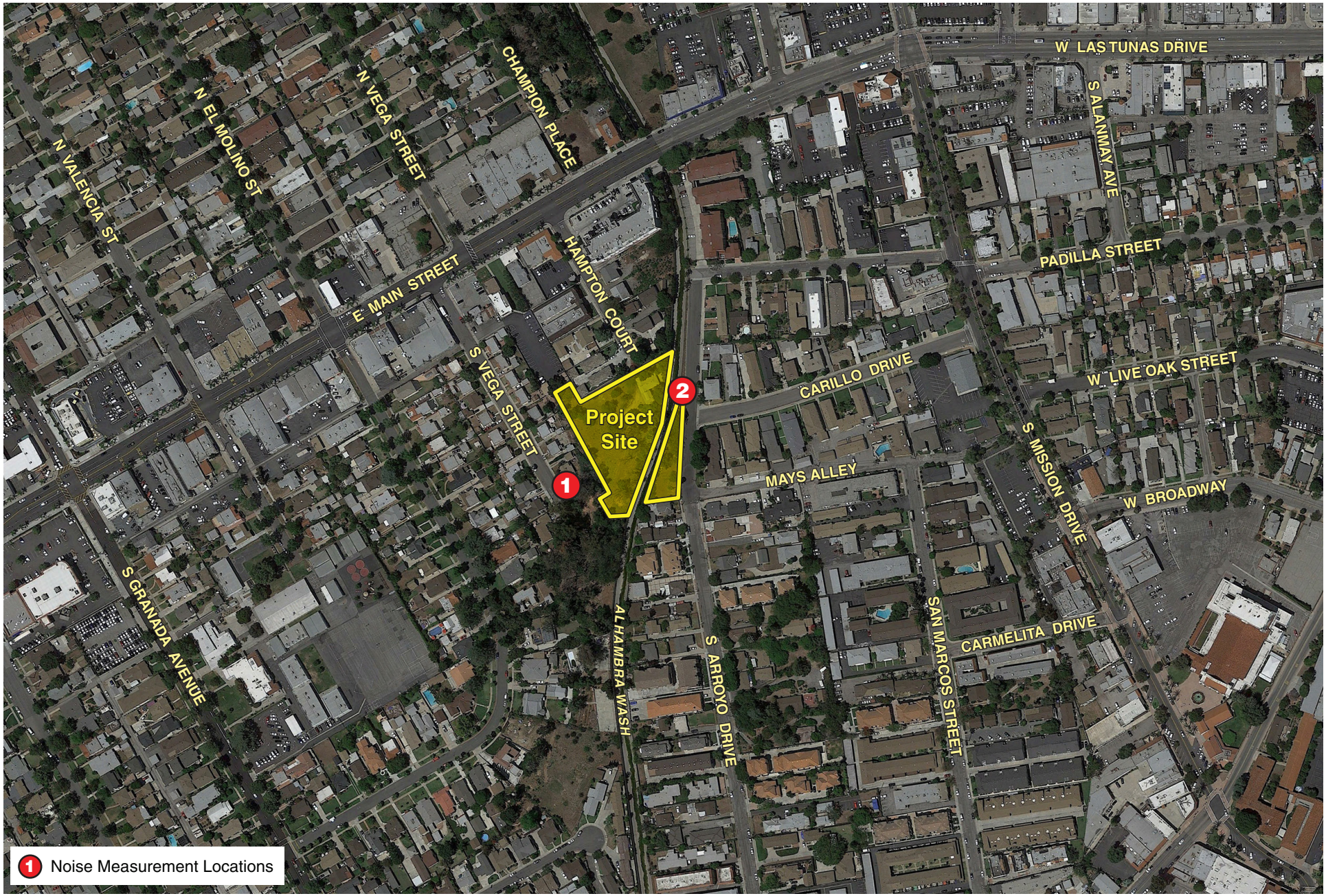
Site No.	Location	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	Peak (dBA)	Time
1	Along Vega Street, approximately 90 feet west of the site boundary.	42.7	36.1	60.7	79.7	1:12 PM
2	Along Arroyo Drive and the eastern boundary of the project site beside the wash.	53.4	36.3	73.7	90.9	11:43 AM

Source: RBF Consulting, March 19, 2015.

Meteorological conditions were clear skies, warm temperatures, with light wind speeds (0 to 5 miles per hour), and low humidity. Measured noise levels during the daytime measurements ranged from 42.7 to 53.4 dBA L_{eq}. Noise monitoring equipment used for the ambient noise survey consisted of a Brüel & Kjær Hand-held Analyzer Type 2250 equipped with a Type 4189 pre-polarized microphone. The monitoring equipment complies with applicable requirements of the American National Standards Institute (ANSI) for Type I (precision) sound level meters. The results of the field measurements are included in Appendix A, *Noise Measurement Data*. Refer to Exhibit 5, *Noise Measurement Locations*, for the noise measurement sites.

4.2 SENSITIVE RECEPTORS

Certain land uses are particularly sensitive to noise, including schools, hospitals, rest homes, long-term medical and mental care facilities, and parks and recreation areas. Residential areas are also considered noise sensitive, especially during the nighttime hours. Existing sensitive receptors located in the project vicinity include residential uses, recreational uses, schools, places of worship, and libraries. Sensitive receptors are listed in Table 6, *Sensitive Receptors*.



SOURCE: Google Earth Aerial, 2015

not to scale

ARROYO VILLAGE • ACOUSTICAL ASSESSMENT

Noise Measurement Locations

JN 145708-20968 MAS 04/01/15

Exhibit 5

Table 6
Sensitive Receptors

Type	Name	Distance from Project Site (feet)	Direction from Project Site	Location
Residential	Residential Uses	Adjoining	North	Along Arroyo Drive and Hampton Court
		Adjoining	East	Along Arroyo Drive and Carillo Drive
		Adjoining	South	Along Arroyo Drive
		Adjoining	West	Along Vega Street
Schools	Paramount Academy	680	Northwest	1027 East Main Street, Alhambra, CA 91801
	Growing Time Montessori School	934	East	248 South Mission Drive, San Gabriel, CA 91776
	Granada Elementary School	770	Southwest	100 South Granada Avenue, Alhambra, CA 91801
	San Gabriel Mission High School	1,664	East	254 South Santa Anita Street, San Gabriel, CA 91776
	San Gabriel High School	1,945	South	801 South Ramona Street, San Gabriel, CA 91776
	Children's Montessori Center	1,985	Southwest	19 North Hidalgo Avenue, Alhambra, CA 91801
	St. Therese School Alhambra	2,417	Northwest	1106 East Alhambra Road, Alhambra, CA 91801
	Washington Elementary School	3,490	Northeast	300 North San Marino Avenue, San Gabriel, CA 91775
	Emmaus Lutheran School	4,506	South	840 South Almansor Street, Alhambra, CA 91801
	Martha Baldwin Elementary School	4,905	South	900 South Almansor Street, Alhambra, CA 91801
	Alhambra High School	5,033	Southwest	101 South 2nd Street, Alhambra, CA 91801
Library	Jack Miller Memorial Library	4,313	Southwest	20 West Commonwealth Avenue, Alhambra, CA 91801
	Alhambra Civic Center Library	4,641	Southwest	101 South 1st Street, Alhambra, CA 91801
Places of Worship	Church in San Gabriel	1,318	Southeast	615 West Santa Anita Street, San Gabriel, CA 91776
	San Gabriel Mission	1,579	Southeast	428 South Mission Drive, San Gabriel, CA 91776
	Alhambra First United Methodist	2,306	West	9 North Almansor Street, Alhambra, CA 91801
	Sacred Heart Retreat	2,400	Northwest	507 North Granada Avenue, Alhambra, CA 91801
	St. Therese Church	2,533	Northwest	1100 East Alhambra Road, Alhambra, CA 91801
	Alhambra Seventh Day Adventist	2,771	Southwest	220 South Chapel Avenue, Alhambra, CA 91801
	San Gabriel Presbyterian Church	3,308	East	200 West Las Tunas Drive, San Gabriel, CA 91776
	Church of Our Saviour	3,721	Northeast	535 West Roses Road, San Gabriel, Ca 91775
	Carmel of St Teresa	4,100	Northwest	215 East Alhambra Road, Alhambra, CA 91801
Parks	Plaza Park	1,802	Southeast	Along Mission Road
	Lindaraka Park	1,953	Northwest	North Cordova Street, Alhambra, CA
	Alhambra Golf Course	2,113	South	630 South Almansor Street, Alhambra, CA 91801
	Smith Park	2,635	East	232 West Broadway, San Gabriel, CA 91776
	Story Park	3,058	West	210 North Chapel Avenue, Alhambra, CA 91801
	Almansor Park	3,687	Southwest	800 South Almansor Street, Alhambra, CA 91801
	San Gabriel Country Club	5,100	Northeast	350 East Hermosa Drive, San Gabriel, CA 91775

Note:
1 – Distances are measured from the exterior project boundary only and not from individual construction areas within the interior of the project site.
Source: Google Earth, 2015.

4.3 EXISTING NOISE LEVELS

MOBILE SOURCES

In order to assess the potential for mobile source noise impacts, it is necessary to determine the noise currently generated by vehicles traveling through the project area. The majority of the existing noise in the project area is generated from vehicle sources along Arroyo Drive and

Carillo Drive. As shown in Table 7, *Existing Traffic Noise Levels*, mobile noise sources in the vicinity of the project site range from 43.2 to 48.2 dBA.

Table 7
Existing Traffic Noise Levels

Roadway Segment	Existing Conditions				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Arroyo Drive					
Carillo Drive to Santa Anita Avenue	880	48.2	8	2	1
Carillo Drive					
Mission Drive to Arroyo Drive	280	43.2	2	1	0

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level

Source: Noise modeling is based on traffic data within *Traffic Impact Study - Arroyo Village Condo Project*, prepared by Transtech Engineers, Inc. (May 20, 2014).

Mobile source noise was modeled using the Federal Highway Administration's Highway Noise Prediction Model (FHWA RD-77-108), which incorporates several roadway and site parameters. The model does not account for ambient noise levels. Noise projections are based on modeled vehicular traffic as derived from the *Traffic Impact Study - Arroyo Village Condo Project* (*Traffic Impact Study*) prepared by Transtech Engineers, Inc. (May 20, 2014). A 25-mile per hour vehicle speed was assumed for existing conditions based on empirical observations and posted maximum speeds along the adjacent roadways. Existing modeled traffic noise levels are shown in Table 7.

STATIONARY SOURCES

The primary sources of stationary noise in the project vicinity are those associated with the operations of adjacent residential uses on all sides and commercial uses to the north.

5.0 POTENTIAL ACOUSTICAL IMPACTS

CEQA THRESHOLDS

Appendix G of the *CEQA Guidelines* contains analysis guidelines related to the assessment of noise impacts. These guidelines and the City of San Gabriel's *Procedures for Implementation of the California Environmental Quality Act* (dated September 6, 2011) have been used by the City to develop thresholds of significance for this analysis. As stated in Appendix G, a project would create a significant environmental impact if it would:

- Expose persons to, or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies (refer to Impact Statement NOI-1);

- Expose persons to or generate excessive ground borne vibration or ground borne noise levels (refer to Impact Statement NOI-2);

- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project (refer to Impact Statement NOI-1);

- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project (refer to Impact Statement NOI-1);

- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels (refer to Impact Statement NOI-3); and

- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels (refer to Impact Statement NOI-3).

Based on these standards and thresholds, the effects of the proposed project have been categorized as either a "less than significant impact" or a "potentially significant impact." Mitigation measures are provided for all potentially significant impacts.

SIGNIFICANCE OF CHANGES IN TRAFFIC NOISE LEVELS

An off-site traffic noise impact typically occurs when there is a discernable increase in traffic and the resulting noise level exceeds an established noise standard. In community noise considerations, changes in noise levels greater than 3 dB are often identified as substantial, while changes less than 1 dB will not be discernible to local residents. In the range of 1 to 3 dB, residents who are very sensitive to noise may perceive a slight change. In laboratory testing

situations, humans are able to detect noise level changes of slightly less than 1 dB. However, this is based on a direct, immediate comparison of two sound levels. Community noise exposures occur over a long period of time and changes in noise levels occur over years (rather than the immediate comparison made in a laboratory situation). Therefore, the level at which changes in community noise levels become discernible is likely to be some value greater than 1 dB, and 3 dB is the most commonly accepted discernable difference. A 5 dB change is generally recognized as a clearly discernable difference.

As traffic noise levels at sensitive uses likely approach or exceed the applicable land use compatibility standard (refer to Table 2), a 3 dB increase as a result of the project is used as the increase threshold for the project. Thus, a project would result in a significant noise impact when a permanent increase in ambient noise levels of 3 dB occur upon project implementation and the resulting noise level exceeds the applicable exterior standard at a noise sensitive use.

As stated above, the proposed project is within the *Mission District Specific Plan* (August 2004) area. The EIR, dated July 2004, for the *Mission District Specific Plan* determined that impacts related to long-term vehicular traffic noise would be significant and unavoidable. The following three roadway segments would have exterior noise levels that would exceed adopted noise standards:

- Santa Anita Street: north of Las Tunas Drive;
- Broadway: east of Junipero Serra Drive; and
- Junipero Serra Drive: San Marino Avenue to Broadway.

All other noise impacts were less than significant with the implementation of mitigation measures.

NOI-1

- ***EXPOSE PERSONS TO, OR GENERATE NOISE LEVELS IN EXCESS OF STANDARDS ESTABLISHED IN THE LOCAL GENERAL PLAN OR NOISE ORDINANCE, OR APPLICABLE STANDARDS OF OTHER AGENCIES?***

- ***A SUBSTANTIAL PERMANENT INCREASE IN AMBIENT NOISE LEVELS IN THE PROJECT VICINITY ABOVE LEVELS EXISTING WITHOUT THE PROJECT?***

- ***A SUBSTANTIAL TEMPORARY OR PERIODIC INCREASE IN AMBIENT NOISE LEVELS IN THE PROJECT VICINITY ABOVE LEVELS EXISTING WITHOUT THE PROJECT?***

Level of Significance Before Mitigation: *Potentially Significant Impact.*

SHORT-TERM CONSTRUCTION

Construction of the proposed project would occur over approximately 18 months and would include demolition, site preparation, grading, paving, building construction, and architectural coating. Ground-borne noise and other types of construction-related noise impacts would typically occur during excavation activities of the grading phase. This phase of construction has the potential to create the highest levels of noise. Typical noise levels generated by construction equipment are shown in Table 8, *Maximum Noise Levels Generated by Construction Equipment*. It should be noted that the noise levels identified in Table 8 are maximum sound levels (L_{max}), which are the highest individual sound occurring at an individual time period. Operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be due to random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts).

Table 8
Maximum Noise Levels Generated by Construction Equipment

Type of Equipment	Acoustical Use Factor[1]	L_{max} at 50 Feet (dBA)
Concrete Saw	20	90
Crane	16	81
Concrete Mixer Truck	40	79
Backhoe	40	78
Dozer	40	82
Excavator	40	81
Forklift	40	78
Paver	50	77
Roller	20	80
Tractor	40	84
Water Truck	40	80
Grader	40	85
General Industrial Equipment	50	85

Note:
1 – Acoustical Use Factor (percent): Estimates the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.

Source: Federal Highway Administration, *Roadway Construction Noise Model (FHWA-HEP-05-054)*, January 2006.

Pursuant to *Municipal Code* Section 150.003, construction activities may occur between the hours of 7:00 AM and 7:00 PM on weekdays, 8:00 AM and 4:00 PM Saturdays, and is prohibited on Sundays. These permitted hours of construction are included in the code in recognition that construction activities undertaken during daytime hours are a typical part of living in an urban

environment and do not cause a significant disruption. The potential for construction-related noise to affect nearby residential receptors would depend on the location and proximity of construction activities to these receptors. Construction would occur throughout the project site and would not be concentrated or confined in the area directly adjacent to sensitive receptors. Therefore, construction noise would be acoustically dispersed throughout the project site and not concentrated in one area near adjacent sensitive uses. It should be noted that the noise levels depicted in Table 8 are maximum noise levels, which would occur sporadically when construction equipment is operated in proximity to sensitive receptors. Given the sporadic and variable nature of proposed project construction and the implementation of time limits specified in the *Municipal Code*, noise impacts would be reduced to a less than significant level. Additionally, to further reduce the potential for noise impacts, Mitigation Measure NOI-1 would be implemented to incorporate best management practices during construction. Implementation of Mitigation Measure NOI-1 would further minimize impacts from construction noise as it requires construction equipment to be equipped with properly operating and maintained mufflers and other state required noise attenuation devices. Thus, with mitigation, a less than significant noise impact would result from construction activities.

Construction Truck Trips

Construction activities would also cause increased noise along access routes to and from the site due to movement of equipment and workers. Demolition requires the removal of an approximately 5,436 square foot structure, which results in approximately 25 hauling trips round trip. Grading of the project site would require the export of 4,417 cubic yards of soil, which would result in approximately 552 soil hauling trips round trip. It is anticipated that construction worker trips would be a maximum of 49 trips per day. Approximately 11 vendor trips per day are anticipated during the building phase. Mobile source noise would increase along access routes to and from the project site during construction. However, this source of noise would be temporary and would cease upon project completion. It is anticipated that hauling would occur along Arroyo Drive, which is a residential corridor. Although there would be a relatively high single-event noise exposure resulting in intermittent noise nuisance, the effect on longer term (hourly or daily) ambient noise levels would be minimal. Additionally, Mitigation Measure NOI-1 would require construction activities only take place within the allowable hours specified by the City's *Municipal Code* Section 150.003. Therefore, short-term construction-related impacts associated with worker commute and equipment transport to the project site would be less than significant.

LONG-TERM OPERATIONAL IMPACTS

Off-Site Mobile Noise

Future development generated by the proposed project would result in additional traffic on adjacent roadways, thereby increasing vehicular noise in the vicinity of existing and proposed land uses. Based on the *Traffic Impact Study*, the proposed project is projected to generate a total

of approximately 267 daily trips, including 20 trips during the AM peak hour and 24 trips during the PM peak hour. The "Future Without Project" and "Future With Project" scenarios are compared in Table 9, *Future Traffic Noise Levels*. As depicted in Table 9, under the "Future Without Project" scenario, noise levels would range from approximately 43.2 dBA to 48.2 dBA, with the highest noise levels occurring along Arroyo Drive (Carillo Drive to Santa Anita Avenue). The "Future With Project" scenario noise levels would range from approximately 44.5 dBA to 48.8 dBA, with the highest noise levels also occurring along Arroyo Drive (Carillo Drive to Santa Anita Avenue).

Table 9 also compares the "Future Without Project" scenario to the "Future With Project" scenario. The noise levels would result in a maximum increase of 1.3 dBA as a result of the proposed project. This increase in noise would occur along Carillo Drive (Mission Drive to Arroyo Drive). Since the proposed project would not significantly increase noise levels along the roadway segments analyzed (i.e., noise increase would be less than 3.0 dBA), a less than significant impact would occur.

Table 9
Future Traffic Noise Levels

Roadway Segment	Future Without Project					Future With Project					Difference In dBA @ 100 Feet from Roadway
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour	
Arroyo Drive											
Carillo Drive to Santa Anita Avenue	895	48.2	8	2	1	1,015	48.8	9	3	1	0.6
Carillo Drive											
Mission Drive to Arroyo Drive	280	43.2	2	1	0	380	44.5	3	1	0	1.3

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level

Source: Noise modeling is based on traffic data within *Traffic Impact Study - Arroyo Village Condo Project, prepared by Transtech Engineers, Inc., May 20, 2014.*

Cumulative Mobile Source Impacts

A project's contribution to a cumulative traffic noise increase would be considered significant when the combined effect exceeds perception level (i.e., auditory level increase) threshold. The combined effect compares the "cumulative with project" condition to "existing" conditions. This comparison accounts for the traffic noise increase generated by a project combined with the traffic noise increase generated by projects in the cumulative project list. The following criteria have been utilized to evaluate the combined effect of the cumulative noise increase.

Combined Effect. The cumulative with project noise level ("Future With Project") would cause a significant cumulative impact if a 3.0 dBA increase over existing conditions occurs and the resulting noise level exceeds the applicable exterior standard at a sensitive use.

Although there may be a significant noise increase due to the proposed project in combination with other related projects (combined effects), it must also be demonstrated that the project has an incremental effect. In other words, a significant portion of the noise increase must be due to the proposed project. The following criteria have been utilized to evaluate the incremental effect of the cumulative noise increase.

Incremental Effects. The "Future With Project" causes a 1.0 dBA increase in noise over the "Future Without Project" noise level.

A significant impact would result only if both the combined and incremental effects criteria have been exceeded. Noise by definition is a localized phenomenon, and reduces as distance from the source increases. Consequently, only the proposed project and growth due to occur in the project site's general vicinity would contribute to cumulative noise impacts. Table 10, *Cumulative Noise Scenario*, lists the traffic noise effects along roadway segments in the project vicinity for "Existing," "Future Without Project," and "Future With Project," conditions, including incremental and net cumulative impacts.

Table 10
Cumulative Noise Scenario

Roadway Segment	Existing	Future Without Project	Future With Project	Combined Effects	Incremental Effects	Cumulatively Significant Impact?
	dBA @ 100 Feet from Roadway Centerline	dBA @ 100 Feet from Roadway Centerline	dBA @ 100 Feet from Roadway Centerline	Difference In dBA Between Existing and Future With Project	Difference In dBA Between Future Without Project and Future With Project	
Arroyo Drive						
Carillo Drive to Santa Anita Avenue	48.2	48.2	48.8	0.6	0.6	No
Carillo Drive						
Mission Drive to Arroyo Drive	43.2	43.2	44.5	1.3	1.3	No

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level

Source: Noise modeling is based on traffic data within *Traffic Impact Study - Arroyo Village Condo Project, prepared by Transtech Engineers, Inc. (May 20, 2014).*

As indicated in Table 10, the *Incremental Effects* criterion of 1.0 dBA is exceeded along Carillo Drive (Mission Drive to Arroyo Drive). However, the 3.0 dBA *Combined Effects* criterion is not exceeded along any of the segments. Thus, none of the roadway segments would have a significant cumulative noise increase. Therefore, the proposed project, in combination with cumulative background traffic noise levels, would result in less than significant impacts.

On-Site Mobile Noise

The proposed project includes 46 condominium units (totaling approximately 57,332 square feet). Based on the modeled noise levels in Table 9, exterior noise levels would be approximately 48.8 at 100 feet from the centerline of Arroyo Drive. The closest residential dwelling units would be located approximately 30 feet from the roadway centerline. At this distance traffic noise would be 53.0 dBA CNEL.[1] Therefore, the projected exterior noise levels at the residential portions of the project site would not exceed the land use compatibility multi-family residential exterior normally acceptable noise standards of 50 to 65 dBA at the closest residences. Utilizing a standard 24 dBA exterior-to-interior attenuation rate with windows closed[2], interior noise levels would be approximately 29 dBA, and would be below the City's 45 dBA interior noise standard. Therefore, traffic noise impacts to on-site residences would be less than significant.

STATIONARY NOISE IMPACTS

Mechanical Equipment

Typically, mechanical equipment noise is 55 dBA at 50 feet from the source. HVAC units would be included on the roof of the proposed building. The HVAC units would be shielded by a mechanical screen wall and the roof would include a parapet, which would further attenuate noise. As the project would not place mechanical equipment associated with project near adjacent to residential uses, noise from the HVAC units would not be perceptible at the nearest residents (adjacent to the project site on all sides).

Parking Areas

Traffic associated with parking lots is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale such as the CNEL scale. However, the instantaneous maximum sound levels generated by a car door slamming, engine starting up and car passbys may be an annoyance to adjacent noise-sensitive receptors. Estimates of the maximum noise levels associated with some parking lot activities are presented in Table 11, *Typical Noise Levels Generated by Parking Lots*. Conversations in parking areas may also be an annoyance to adjacent sensitive receptors. Sound levels of speech typically range from 33 dBA at 48 feet for normal speech to 50 dBA at 50 feet for very loud speech.

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[1] Refer to Noise Modeling Data in Appendix B, *Modeling Data*.

[2] U.S. Environmental Protection Agency, *Protective Noise Levels (EPA 550/9-79-100)*, November 1979.

Table 11
Typical Noise Levels Generated by Parking Lots

Noise Source	Maximum Noise Levels at 50 Feet from Source
Car door slamming	63 dBA Leq
Car starting	60 dBA Leq
Car idling	61 dBA Leq

Impacts associated with parking would be considered minimal since the majority of parking spaces would be within the subterranean level. 111 parking spaces would be located within the basement garage. Only 10 parking spots would be located within the open area of the project entrance. It should be noted that parking lot noise are instantaneous noise levels compared to noise standards in the CNEL scale, which are averaged over time. As a result, actual noise levels over time resulting from parking lot activities would be far lower. Parking lot noise would also be partially masked by background noise from traffic along Arroyo Drive. Therefore, the proposed parking would not result in substantially greater noise levels than currently exist at the project site. Noise associated with parking lot activities is not anticipated to exceed the City's Noise Standards or the California Land Use Compatibility Standards during operation. Therefore, noise impacts from parking lots would be less than significant.

Mitigation Measures:

NOI-1 Prior to Grading Permit issuance, the Project Applicant shall demonstrate, to the satisfaction of the San Gabriel Planning Department that the project complies with the following:

- Construction contracts specify that all construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers and other state required noise attenuation devices.

- Property owners and occupants located within 200 feet of the project boundary shall be sent a notice, at least 15 days prior to commencement of construction of each phase, regarding the construction schedule of the proposed project. A sign, legible at a distance of 50 feet shall also be posted at the project construction site. All notices and signs shall be reviewed and approved by the City of San Gabriel Community Development Director (or designee), prior to mailing or posting and shall indicate the dates and duration of construction activities, as well as provide a contact name and a telephone number where residents can inquire about the construction process and register complaints.

- The Contractor shall provide evidence that a construction staff member will be designated as a Noise Disturbance Coordinator and will be present on-site during construction activities. The Noise Disturbance Coordinator shall be responsible for responding to any local complaints about construction noise. When a complaint is received, the Noise Disturbance Coordinator shall notify the City within 24-hours of the complaint and determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and shall implement reasonable measures to resolve the complaint, as deemed acceptable by the Community Development Director (or designee). All notices that are sent to residential units immediately surrounding the construction site and all signs posted at the construction site shall include the contact name and the telephone number for the Noise Disturbance Coordinator.

- Prior to issuance of any Grading or Building Permit, the Project Applicant shall demonstrate to the satisfaction of the Community Development Director (or designee) that construction noise reduction methods shall be used where feasible. These reduction methods include shutting off idling equipment, installing temporary acoustic barriers around stationary construction noise sources, maximizing the distance between construction equipment staging areas and occupied residential areas, and electric air compressors and similar power tools.

- Construction haul routes shall be designed to avoid noise sensitive uses (e.g., residences, convalescent homes, etc.), to the extent feasible.

- During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receivers.

- Construction activities shall not take place outside of the allowable hours specified by the City's *Municipal Code* Section 150.003 (7:00 AM and 7:00 PM on weekdays and 8:00 AM and 4:00 PM on Saturdays; construction activities are not permitted on Sundays or legal holidays).

(Mitigation Measure NOI-1 correlates with Mitigation Measures N1, N2, and N3 in the Mission District Specific Plan Program EIR. This mitigation measure includes updates to reflect the latest practices and recommendations).

Level of Significance After Mitigation: *Less Than Significant Impact.*

NOI-2 EXPOSURE OF PERSONS TO OR GENERATION OF EXCESSIVE GROUNDBORNE VIBRATION OR GROUNDBORNE NOISE LEVELS?

Level of Significance Before Mitigation: *Less Than Significant Impact.*

SHORT-TERM CONSTRUCTION

Project construction can generate varying degrees of groundborne vibration, depending on the construction procedure and the construction equipment used. Operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels. Groundborne vibrations from construction activities rarely reach levels that damage structures.

The Federal Transit Administration (FTA) has published standard vibration velocities for construction equipment operations. In general, the FTA architectural damage criterion for continuous vibrations (i.e., 0.2 inch/second) appears to be conservative. The types of construction vibration impacts include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. The vibration produced by construction equipment, is illustrated in Table 12, *Typical Vibration Levels for Construction Equipment*.

Table 12
Typical Vibration Levels for Construction Equipment

Equipment	Approximate peak particle velocity at 15 feet (inches/second) [1]	Approximate peak particle velocity at 25 feet (inches/second) [2]	Approximate peak particle velocity at 50 feet (inches/second) [2]	Approximate peak particle velocity at 100 feet (inches/second) [2]
Large bulldozer	0.192	0.089	0.031	0.011
Loaded trucks	0.164	0.076	0.027	0.010
Small bulldozer	0.007	0.003	0.001	0.000
Jackhammer	0.075	0.035	0.012	0.004

Notes:
1 – Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Guidelines*, May 2006. Table 12-2.
2 – Calculated using the following formula:

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

where: PPV (equip) = the peak particle velocity in in/sec of the equipment adjusted for the distance
PPV (ref) = the reference vibration level in in/sec from Table 12-2 of the FTA *Transit Noise and Vibration Impact Assessment Guidelines*
D = the distance from the equipment to the receiver

Groundborne vibration decreases rapidly with distance. As indicated in Table 12, based on the FTA data, vibration velocities from typical heavy construction equipment operation that would be used during project construction range from 0.007 to 0.192 in/sec peak particle velocity (PPV) at 15 feet from the source of activity. With regard to the proposed project, groundborne vibration would be generated primarily during site clearing and grading activities on-site and by off-site haul-truck travel. The majority of construction activities would not involve equipment that would generate excessive vibration impacts to the nearby sensitive receptors located approximately 15 to 100 feet from an active construction zone.

With regard to the proposed project, ground-borne vibration would be generated primarily during demolition and grading activities on-site and by off-site haul-truck travel. Pile driving activities would not be required for construction activities. The PPV from bulldozer and heavy truck operations is shown to be 0.192 inch-per-second PPV and 0.164 inch-per-second PPV, respectively, at a distance of 15 feet. As each of these values is below the 0.2 inch-per-second PPV significance threshold, vibration impacts associated with construction would be less than significant and no mitigation measures are required.

LONG-TERM OPERATIONAL IMPACTS

The project proposes residential uses that would not generate ground-borne vibration that could be felt at surrounding uses. The proposed project would not involve railroads or substantial heavy truck operations, and therefore would not result in vibration impacts at surrounding uses. No impact would occur in this regard.

Mitigation Measures: No mitigation measures are required.

Level of Significance After Mitigation: *Less Than Significant Impact.*

NOI-3

- ***FOR A PROJECT LOCATED WITHIN AN AIRPORT LAND USE PLAN OR, WHERE SUCH A PLAN HAS NOT BEEN ADOPTED, WITHIN TWO MILES OF A PUBLIC AIRPORT OR PUBLIC USE AIRPORT, EXPOSE PEOPLE RESIDING OR WORKING IN THE PROJECT AREA TO EXCESSIVE NOISE LEVELS?***

- ***FOR A PROJECT WITHIN THE VICINITY OF A PRIVATE AIRSTRIP, EXPOSE PEOPLE RESIDING OR WORKING IN THE PROJECT AREA TO EXCESSIVE NOISE LEVELS?***

Level of Significance Before Mitigation: *No Impact.*

SHORT-TERM CONSTRUCTION

The proposed project is not located within an airport land use plan. There is no public airport, public use airport, or private airstrip located within two miles of the project site. The proposed project would not expose people residing or working in the area to excessive noise levels. Therefore, impacts in this regard would be less than significant.

LONG-TERM OPERATIONAL IMPACTS

Refer to the discussion above. The proposed project is not located within an airport land use plan and there is no public airport, public use airport, or private airstrip located within two miles of the project site.

***Mitigation Measures*:** No mitigation measures are required.

Level of Significance After Mitigation: *No Impact.*

6.0 REFERENCES

6.1 LIST OF PREPARERS

RBF CONSULTING
14725 Alton Parkway
Irvine, California 95618
949/472-3505

Eddie Torres, INCE, Environmental Sciences Manager
Achilles Malisos, Manager of Air and Noise Studies
Leili Namazi, Environmental Associate
Faye Stroud, Graphics

6.2 DOCUMENTS

1. City of San Gabriel, *Comprehensive General Plan of the City of San Gabriel, May 18, 2004*.

2. City of San Gabriel, *Mission District Specific Plan*, August 2004.

3. City of San Gabriel, *Mission District Specific Plan Environmental Impact Report*, July 2004.

4. Design Inspection Group, Inc., *Arroyo Village*, revised April 2015.

5. Federal Highway Administration, *Roadway Construction Noise Model (FHWA-HEP-05-054)*, January 2006.

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

7. Harris, Cyril, *Handbook of Noise Control*, 1979.

8. State of California, Governor's Office of Planning and Research, *General Plan Guidelines*, October 2003.

9. Transtech Engineers, Inc., *Traffic Impact Study - Arroyo Village Condo Project*, May 20, 2014.

10. U.S. Environmental Protection Agency, *Noise Effects Handbook – A Desk Reference to Health and Welfare Effects of Noise*, October 1979 (revised July 1981).

11. U.S. Environmental Protection Agency, *Protective Noise Levels (EPA 550/9-79-100)*, November 1979.

6.3 SOFTWARE/WEBSITES

Google Earth, 2015.

APPENDIX

APPENDIX A: NOISE MEASUREMENT DATA

Site Number: SG-1			
Recorded By: Leili Namazi			
Job Number: 145708			
Date: 03/19/15			
Time: 01:12 PM			
Location: Along Vega Street approximately 90 feet west of the site boundary.			
Source of Peak Noise: Birds, Dogs, and Traffic along Vega Street.			
Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
42.7	36.1	60.7	79.7

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Brüel & Kjær**	**2250**	**2548189**	**11/18/2014**	
	Microphone	**Brüel & Kjær**	**4189**	**2543364**	**11/18/2014**	
	Preamp	**Brüel & Kjær**	**ZC 0032**	**4265**	**11/18/2014**	
	Calibrator	**Brüel & Kjær**	**4231**	**2545667**	**11/18/2014**	

Weather Data			
Est.	**Duration:** 10 minutes	**Sky:** ☼ Sunny	
	Note: dBA Offset = - 0.01	**Sensor Height (ft):** 5 ft	
	Wind Ave Speed (mph / m/s)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (in)**
	1.1	76.8	30.05

Photo of Measurement Location

2250

Instrument:		2250
Application:		BZ7225 Version 4.3.2
Start Time:		03/19/2015 13:12:01
End Time:		03/19/2015 13:22:01
Elapsed Time:		00:10:00
Bandwidth:		Broadband
Max Input Level:		138.47

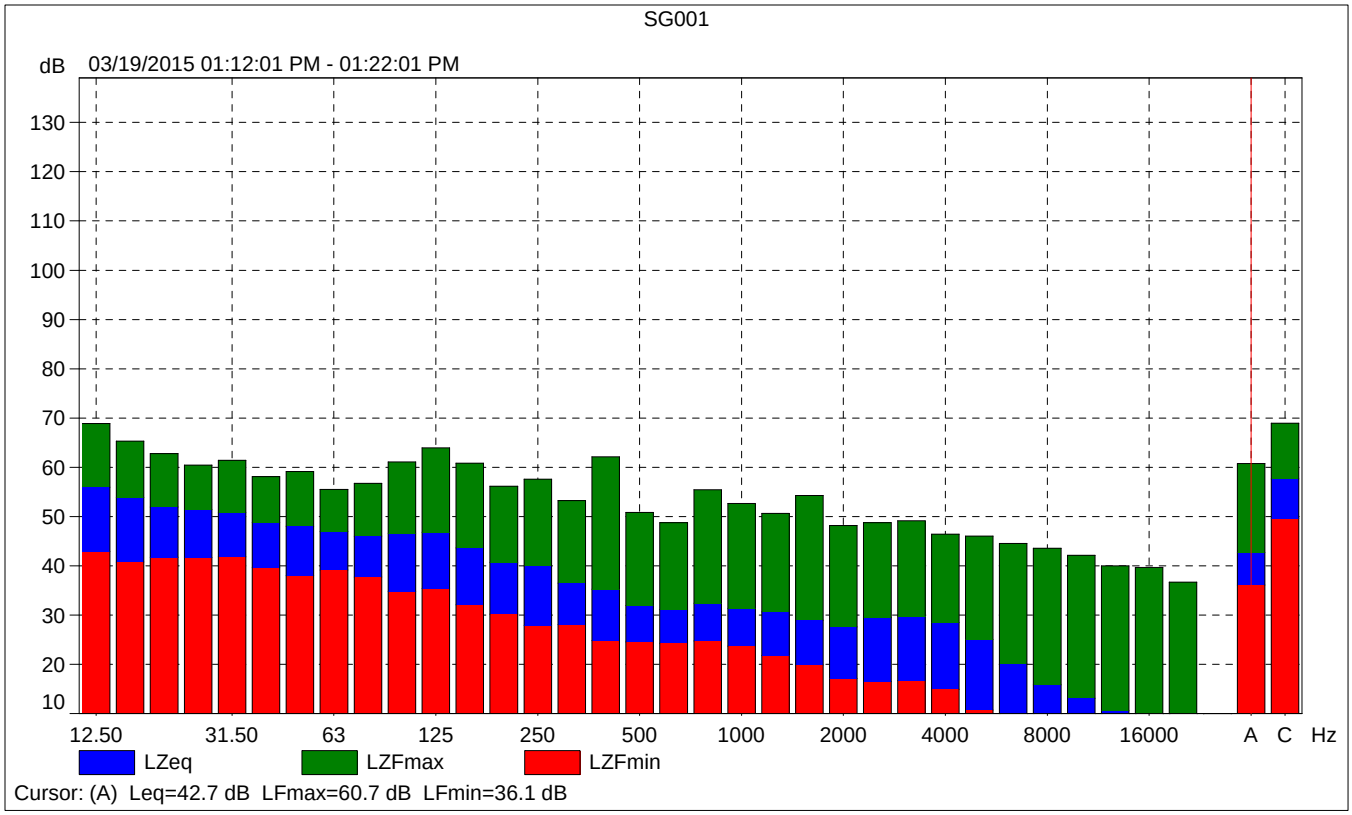
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	Z

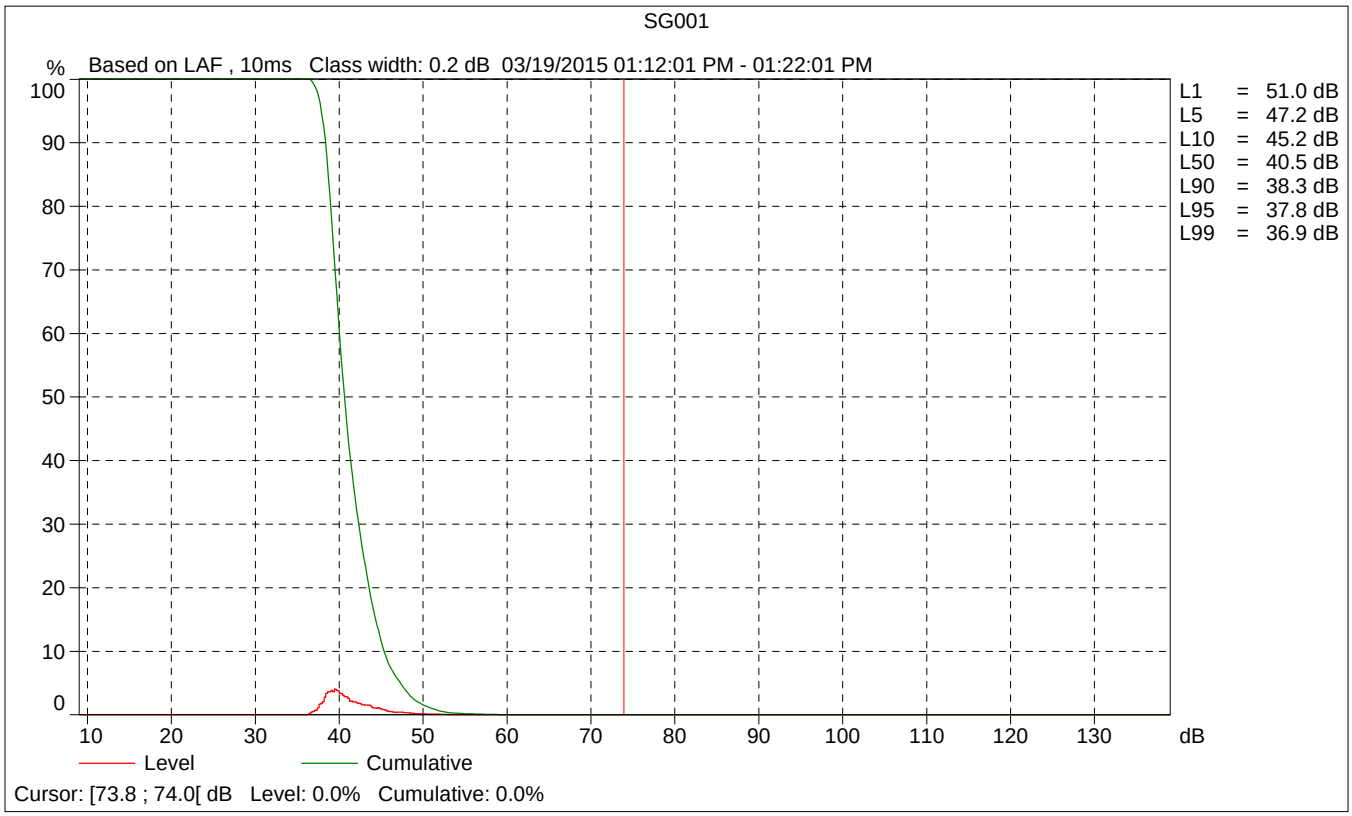
Instrument Serial Number:		2548189
Microphone Serial Number:		2543364
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

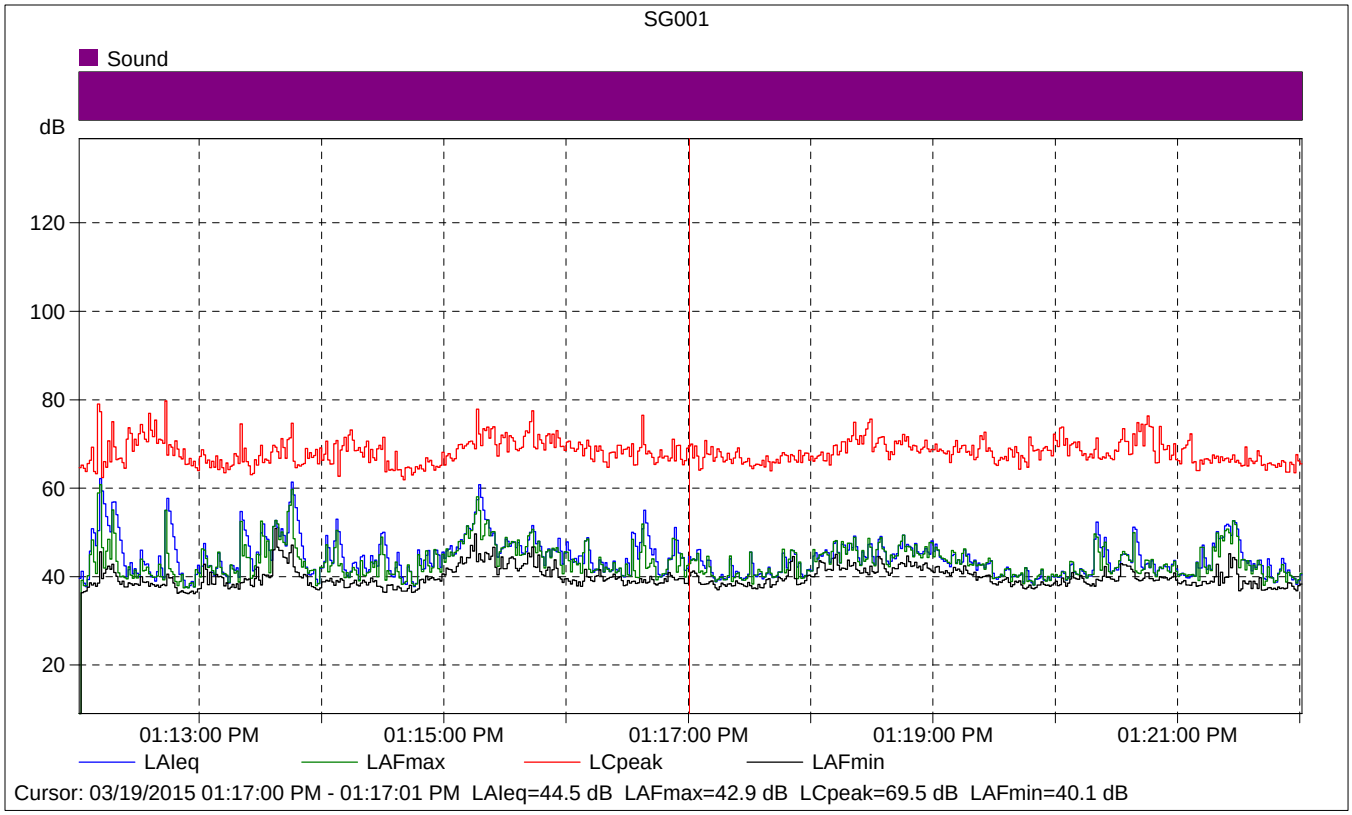
Calibration Time:		03/19/2015 07:36:43
Calibration Type:		External reference
Sensitivity:		66.5178745985031 mV/Pa

SG001

	Start time	End time	Elapsed time	Overload [%]	LAeq [dB]	LAFmax [dB]	LAFmin [dB]
Value				0.00	42.7	60.7	36.1
Time	01:12:01 PM	01:22:01 PM	0:10:00				
Date	03/19/2015	03/19/2015					

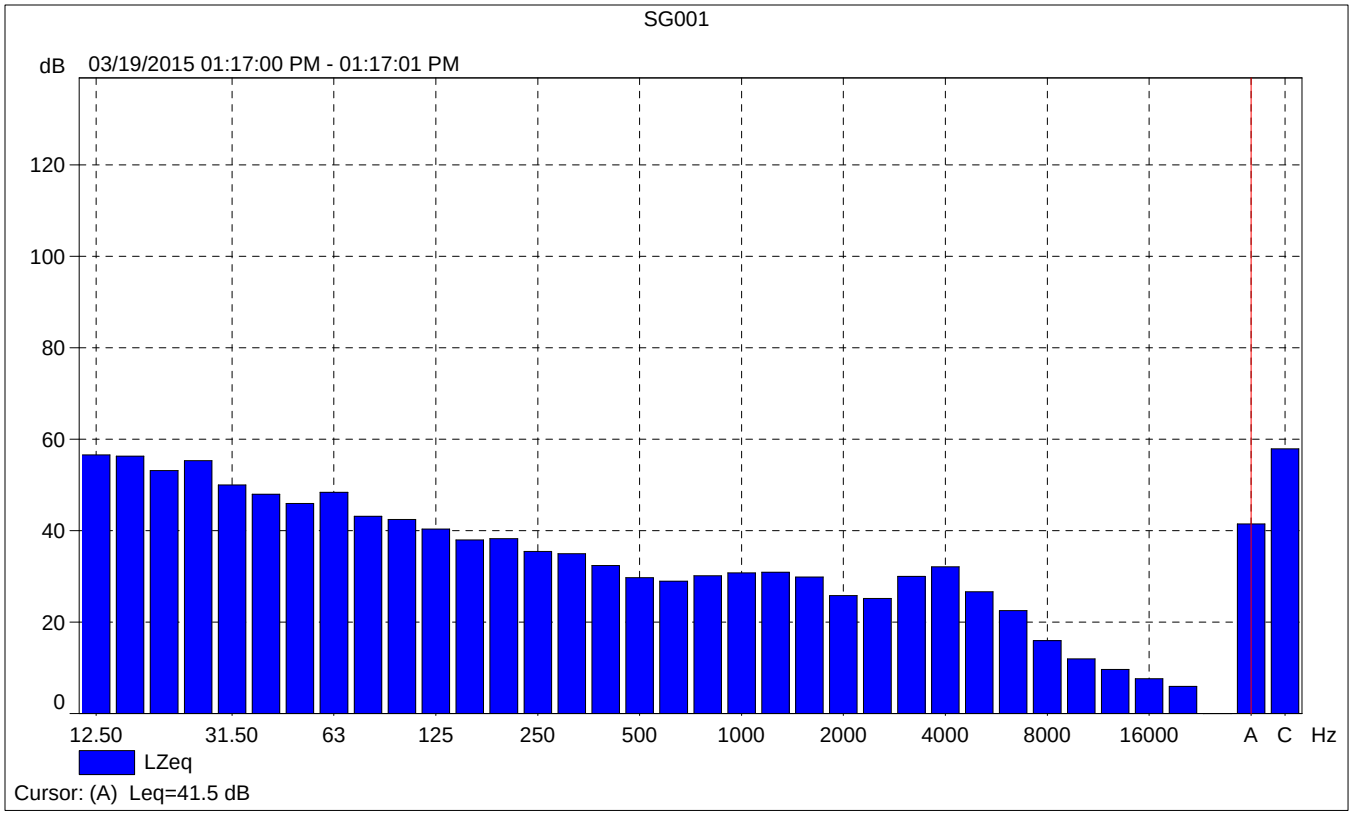

SG001
dB
03/19/2015 01:12:01 PM - 01:22:01 PM
130
120
110
100
90
80
70
60
50
40
30
20
10
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
C
Hz
LZeq
LZFmax
LZFmin
Cursor: (A) Leq=42.7 dB LFmax=60.7 dB LFmin=36.1 dB

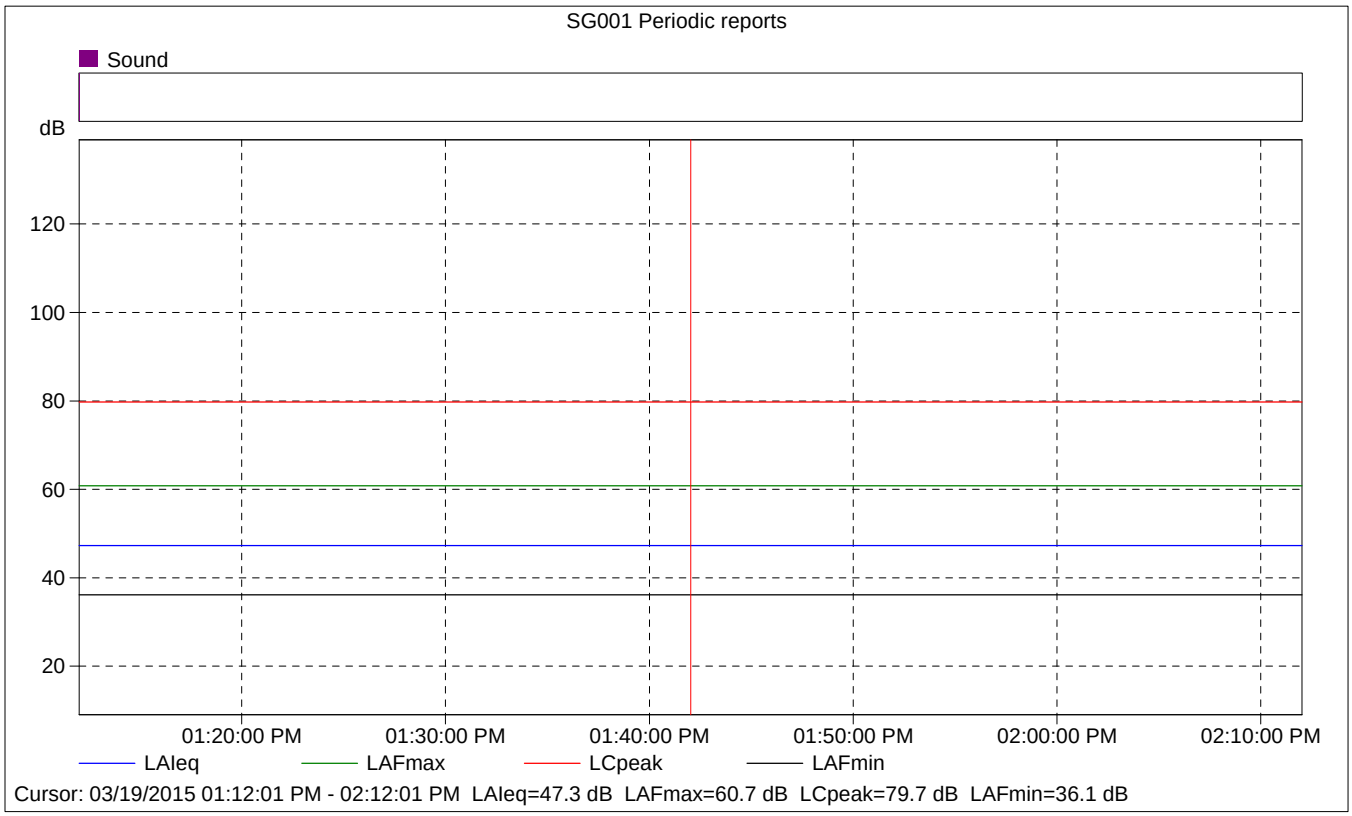

SG001
%
Based on LAF , 10ms Class width: 0.2 dB 03/19/2015 01:12:01 PM - 01:22:01 PM
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
dB
L1 = 51.0 dB
L5 = 47.2 dB
L10 = 45.2 dB
L50 = 40.5 dB
L90 = 38.3 dB
L95 = 37.8 dB
L99 = 36.9 dB
Level
Cumulative
Cursor: [73.8 ; 74.0[dB Level: 0.0% Cumulative: 0.0%



SG001

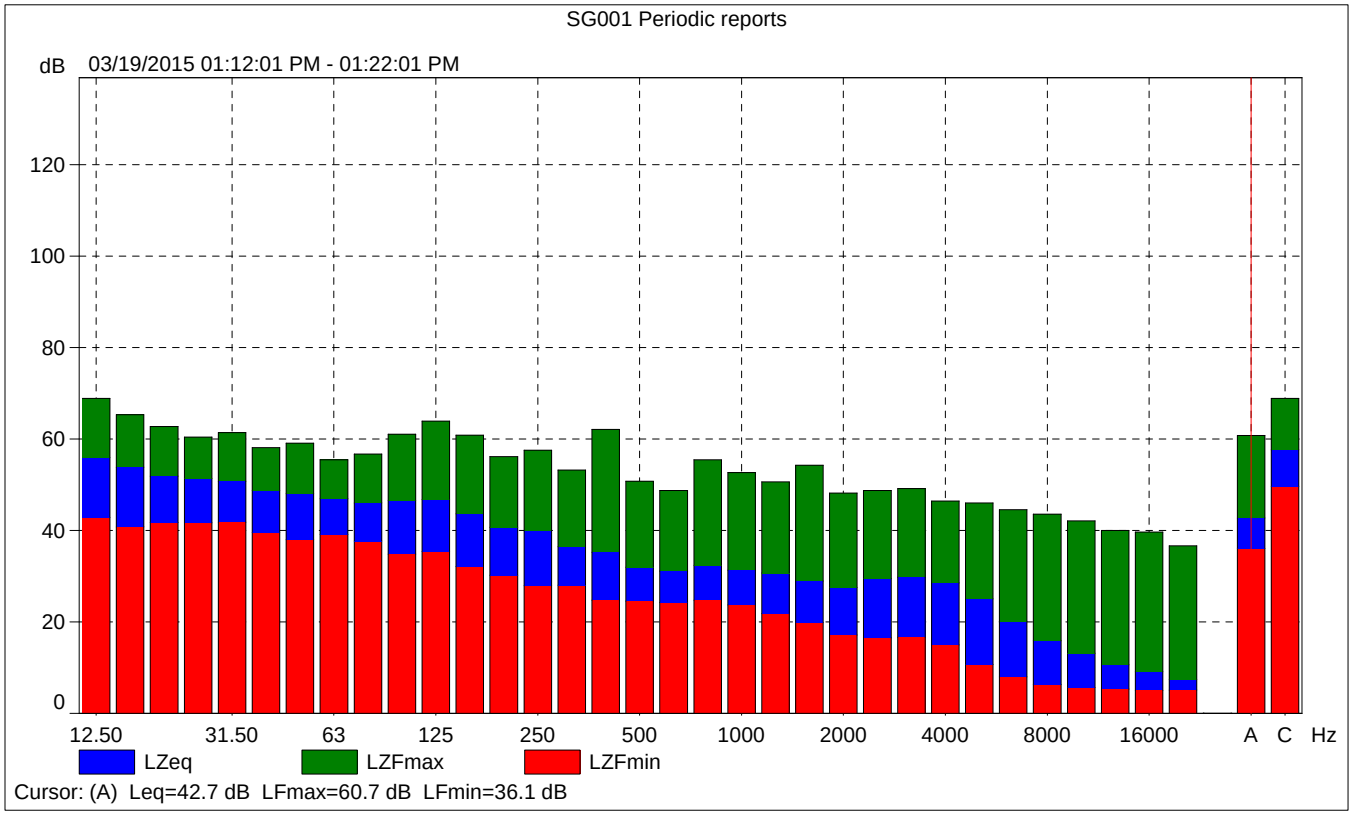
	Start time	Elapsed time	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			44.5	42.9	40.1
Time	01:17:00 PM	0:00:01			
Date	03/19/2015				

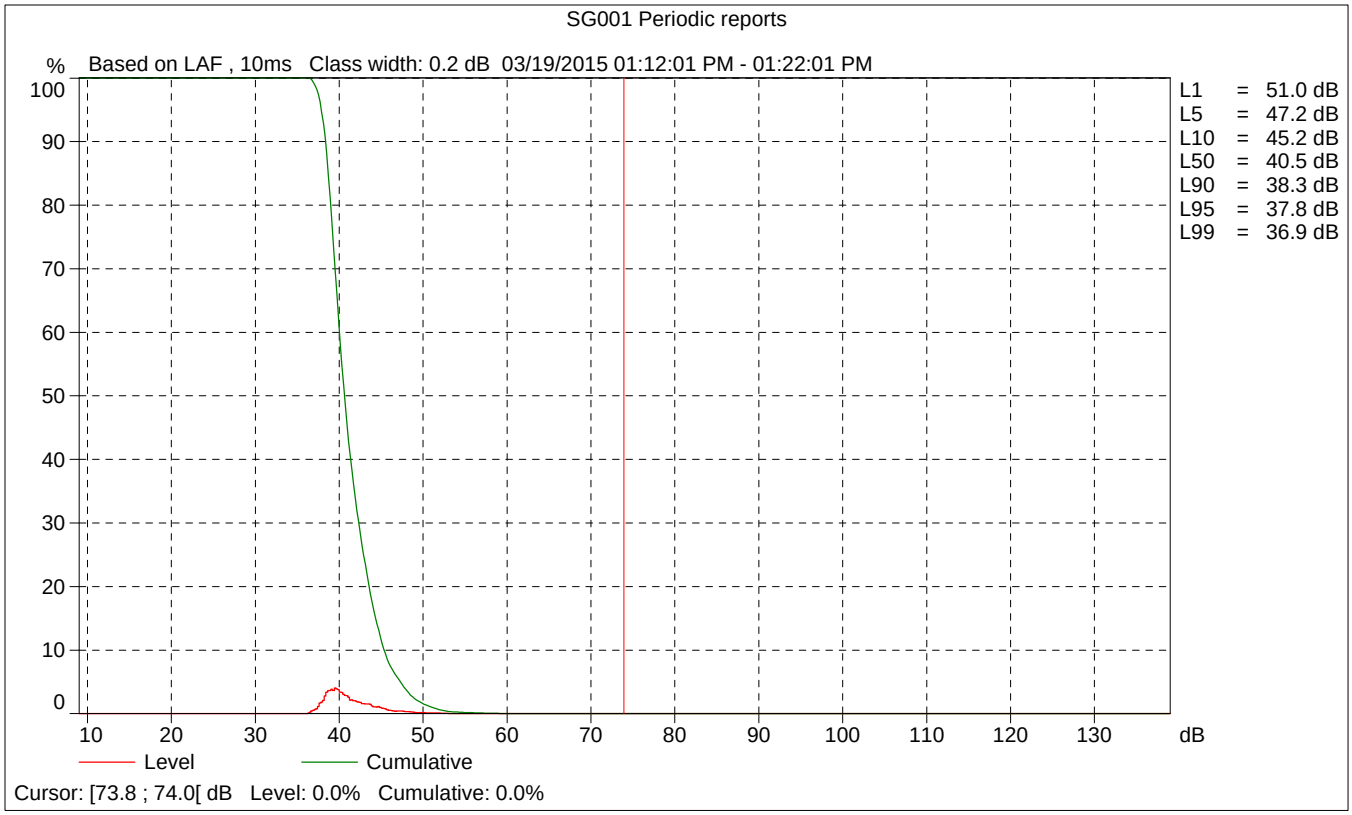

SG001
dB
03/19/2015 01:17:00 PM - 01:17:01 PM
120
100
80
60
40
20
0
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
C
Hz
LZeq
Cursor: (A) Leq=41.5 dB


SG001 Periodic reports
Sound
dB
120
100
80
60
40
20
01:20:00 PM
01:30:00 PM
01:40:00 PM
01:50:00 PM
02:00:00 PM
02:10:00 PM
LAIeq
LAFmax
LCpeak
LAFmin
Cursor: 03/19/2015 01:12:01 PM - 02:12:01 PM LAIeq=47.3 dB LAFmax=60.7 dB LCpeak=79.7 dB LAFmin=36.1 dB

SG001 Periodic reports

	Start time	Elapsed time	Overload [%]	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			0.00	47.3	60.7	36.1
Time	01:12:01 PM	0:10:00				
Date	03/19/2015					




SG001 Periodic reports
% Based on LAF , 10ms Class width: 0.2 dB 03/19/2015 01:12:01 PM - 01:22:01 PM
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
dB
L1 = 51.0 dB
L5 = 47.2 dB
L10 = 45.2 dB
L50 = 40.5 dB
L90 = 38.3 dB
L95 = 37.8 dB
L99 = 36.9 dB
Level
Cumulative
Cursor: [73.8 ; 74.0[dB Level: 0.0% Cumulative: 0.0%

Site Number: SG-2			
Recorded By: Leili Namazi			
Job Number: 145708			
Date: 03/19/15			
Time: 11:43 AM			
Location: Along Arroyo Drive and eastern boundary of the project site beside the wash.			
Source of Peak Noise: Birds, Traffic along Arroyo Drive and Carillo Drive, an Airplane, and one School Bus.			
Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
53.4	36.3	73.7	90.9

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Brüel & Kjær**	**2250**	**2548189**	**11/18/2014**	
	Microphone	**Brüel & Kjær**	**4189**	**2543364**	**11/18/2014**	
	Preamp	**Brüel & Kjær**	**ZC 0032**	**4265**	**11/18/2014**	
	Calibrator	**Brüel & Kjær**	**4231**	**2545667**	**11/18/2014**	

Weather Data			
Est.	**Duration:** 10 minutes	**Sky:** ☼ Sunny	
	Note: dBA Offset = - 0.01	**Sensor Height (ft):** 5 ft	
	Wind Ave Speed (mph / m/s)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (in)**
	1.8	71.5	30.05

Photo of Measurement Location

2250

Instrument:		2250
Application:		BZ7225 Version 4.3.2
Start Time:		03/19/2015 11:43:43
End Time:		03/19/2015 11:53:43
Elapsed Time:		00:10:00
Bandwidth:		Broadband
Max Input Level:		138.47

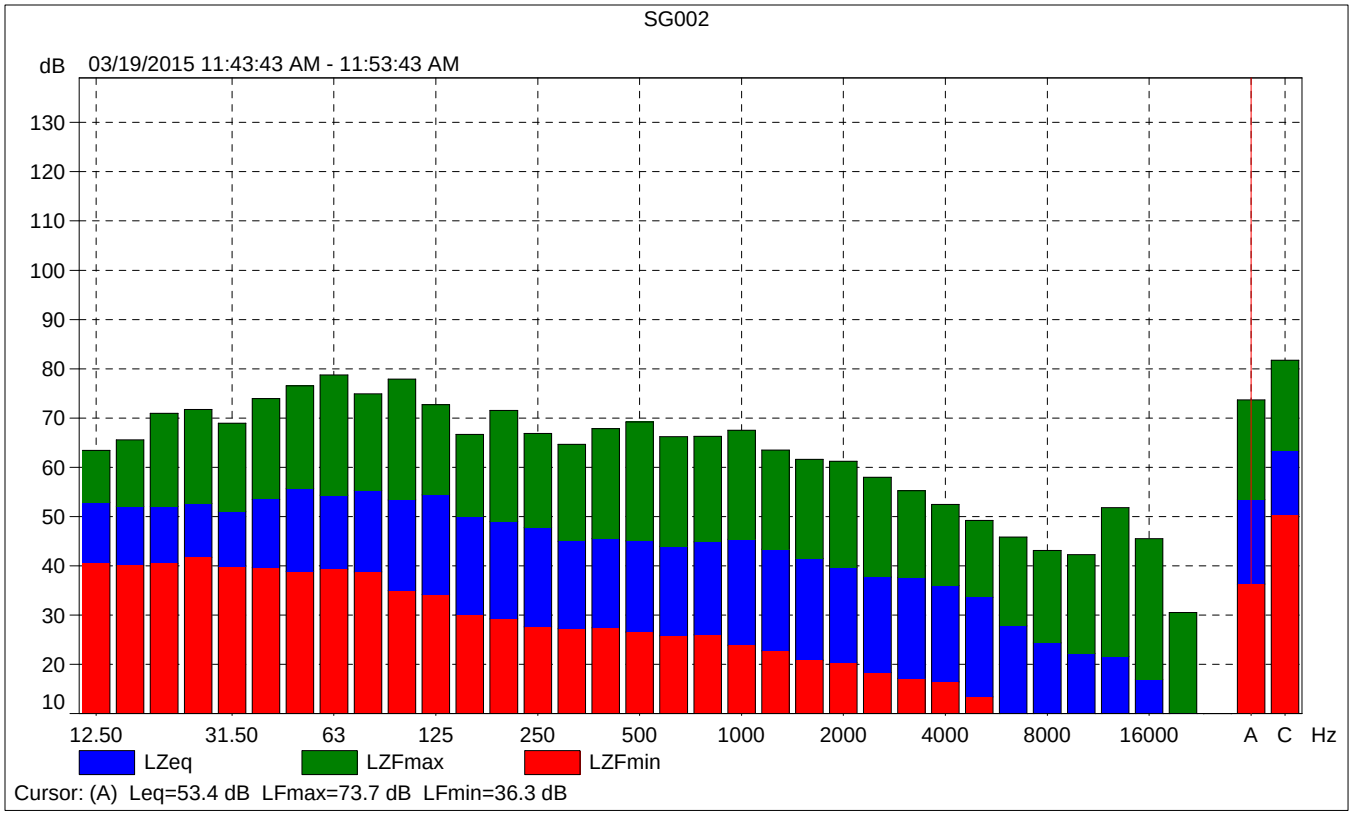
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	Z

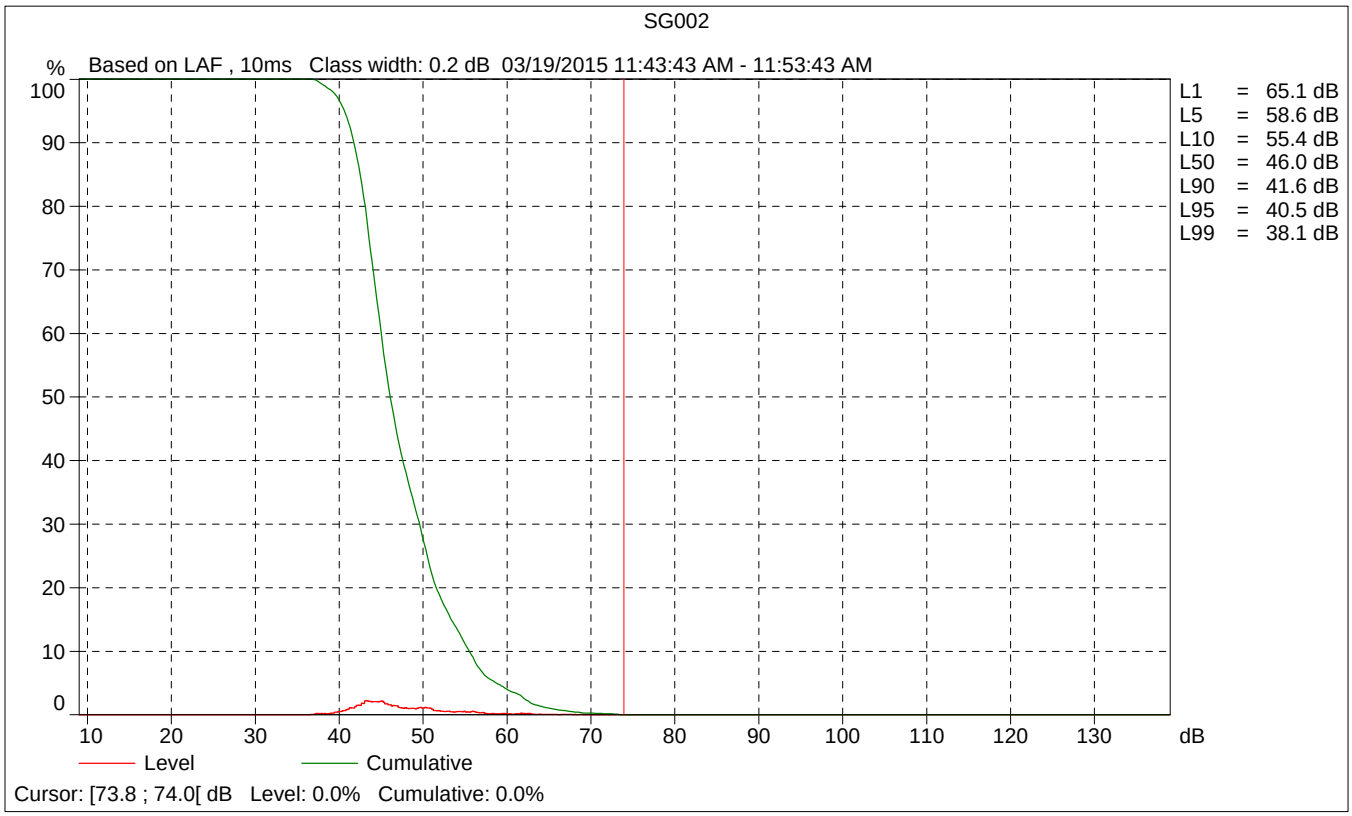
Instrument Serial Number:		2548189
Microphone Serial Number:		2543364
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

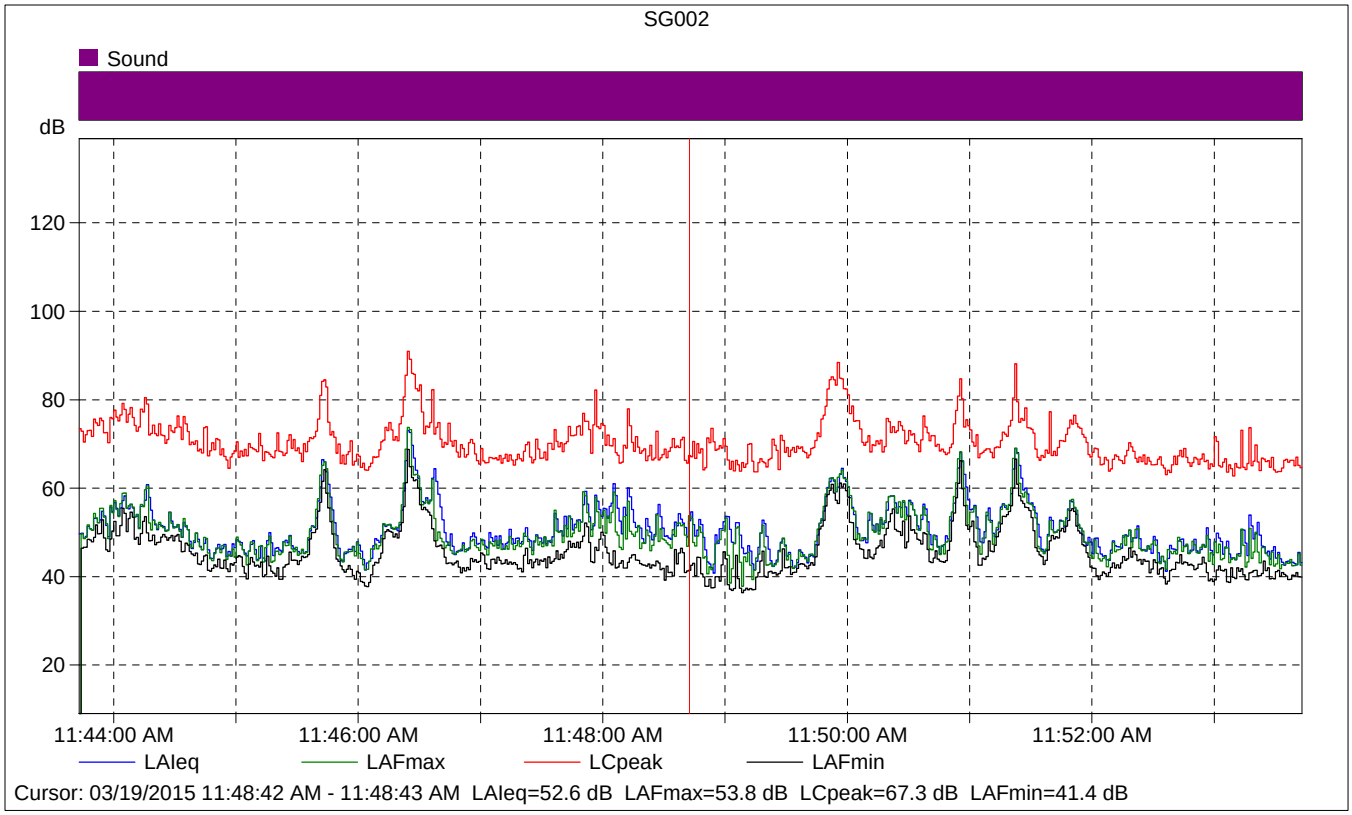
Calibration Time:		03/19/2015 07:36:43
Calibration Type:		External reference
Sensitivity:		66.5178745985031 mV/Pa

SG002

	Start time	End time	Elapsed time	Overload [%]	LAeq [dB]	LAFmax [dB]	LAFmin [dB]
Value				0.00	53.4	73.7	36.3
Time	11:43:43 AM	11:53:43 AM	0:10:00				
Date	03/19/2015	03/19/2015					

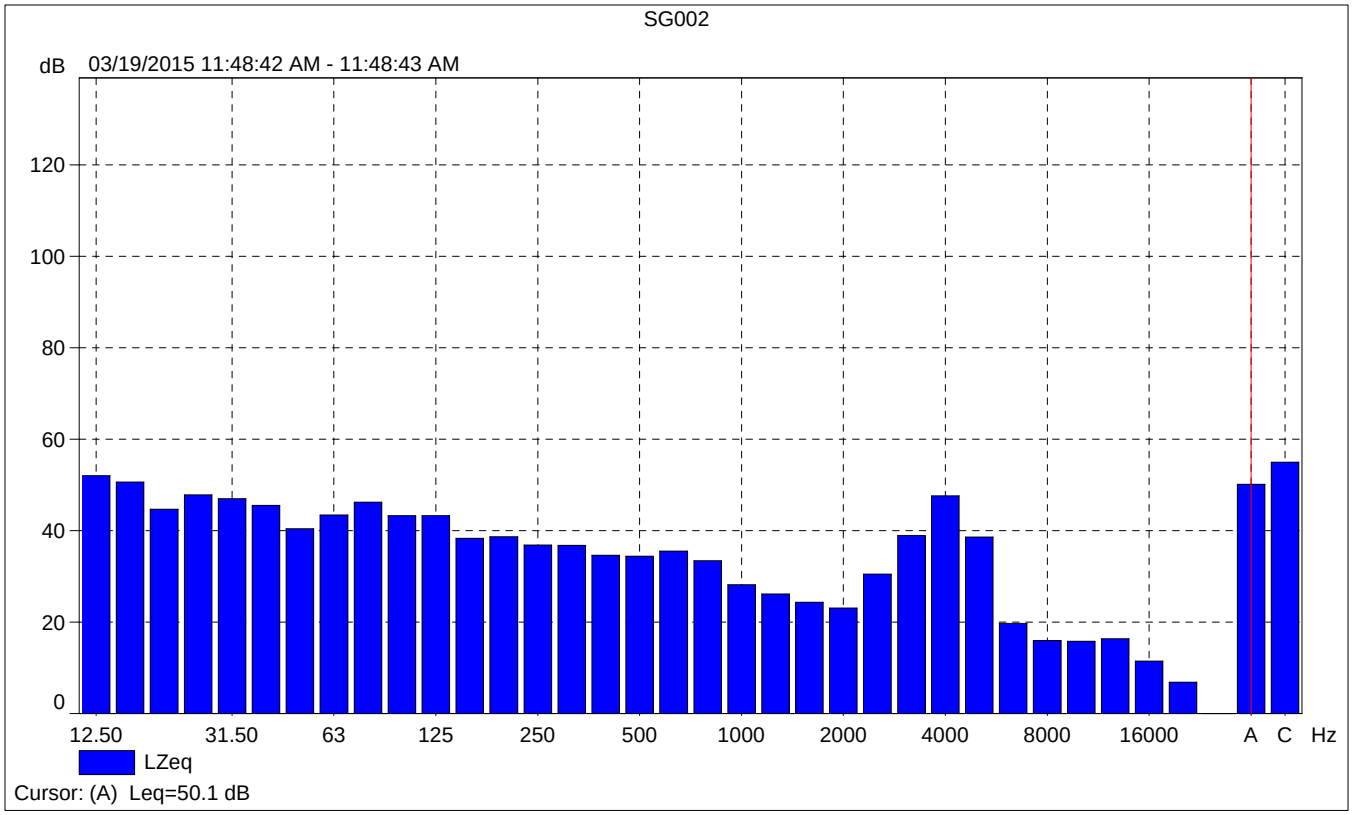

SG002
dB
03/19/2015 11:43:43 AM - 11:53:43 AM
130
120
110
100
90
80
70
60
50
40
30
20
10
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
C
Hz
LZeq
LZFmax
LZFmin
Cursor: (A) Leq=53.4 dB LFmax=73.7 dB LFmin=36.3 dB

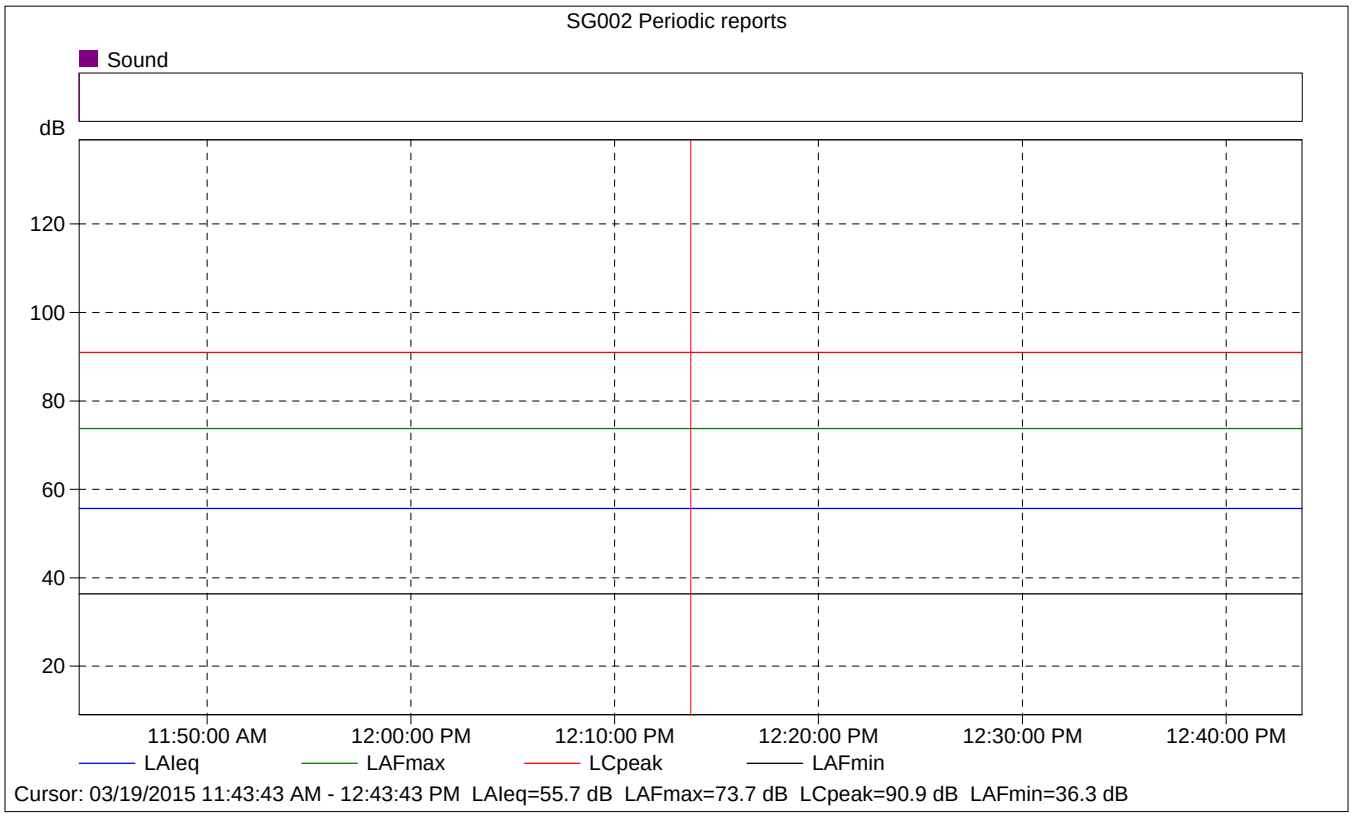

SG002
%
Based on LAF , 10ms Class width: 0.2 dB 03/19/2015 11:43:43 AM - 11:53:43 AM
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
dB
L1 = 65.1 dB
L5 = 58.6 dB
L10 = 55.4 dB
L50 = 46.0 dB
L90 = 41.6 dB
L95 = 40.5 dB
L99 = 38.1 dB
Level
Cumulative
Cursor: [73.8 ; 74.0[dB Level: 0.0% Cumulative: 0.0%



SG002

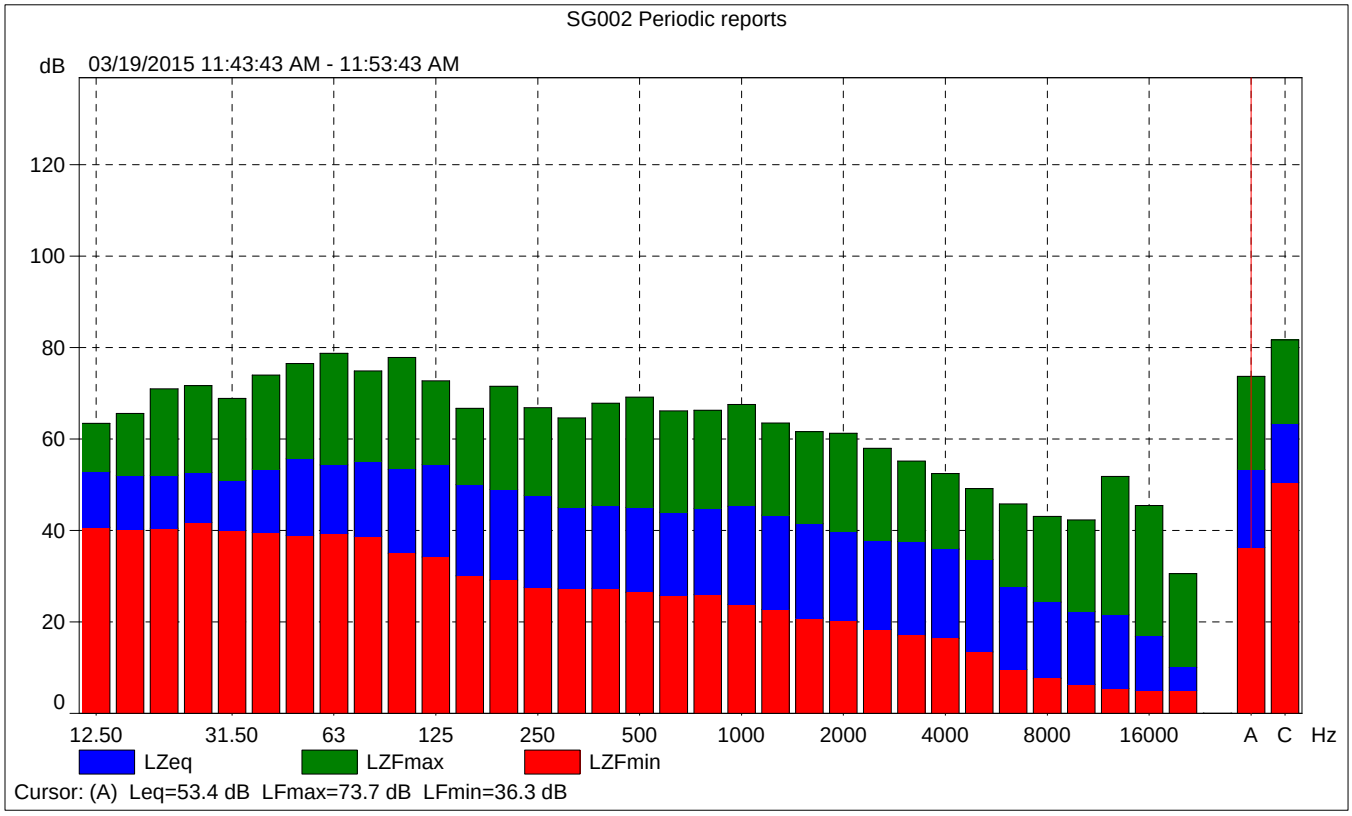
	Start time	Elapsed time	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			52.6	53.8	41.4
Time	11:48:42 AM	0:00:01			
Date	03/19/2015				

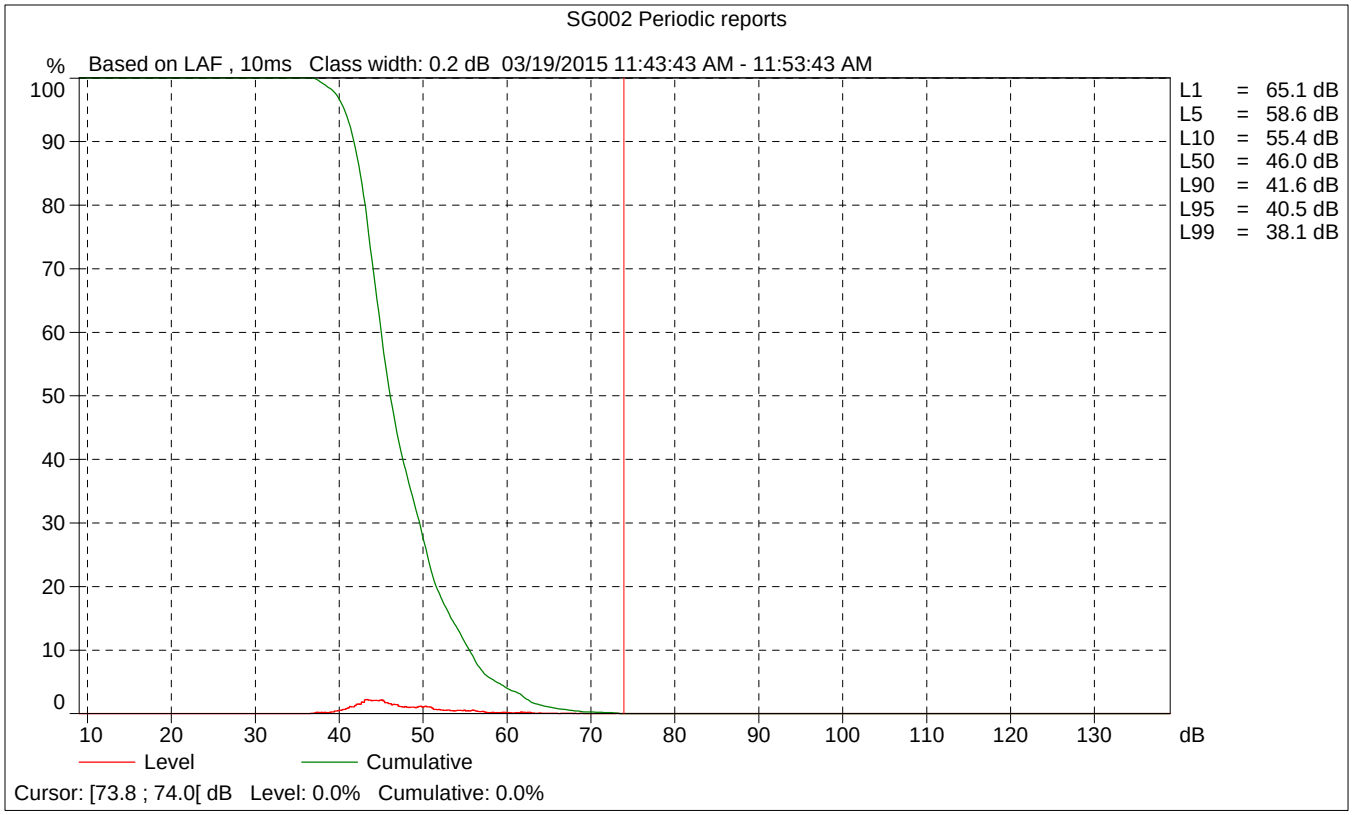

SG002
dB
03/19/2015 11:48:42 AM - 11:48:43 AM
120
100
80
60
40
20
0
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
C
Hz
LZeq
Cursor: (A) Leq=50.1 dB


SG002 Periodic reports
Sound
dB
120
100
80
60
40
20
11:50:00 AM
12:00:00 PM
12:10:00 PM
12:20:00 PM
12:30:00 PM
12:40:00 PM
LAIeq
LAFmax
LCpeak
LAFmin
Cursor: 03/19/2015 11:43:43 AM - 12:43:43 PM LAIeq=55.7 dB LAFmax=73.7 dB LCpeak=90.9 dB LAFmin=36.3 dB

SG002 Periodic reports

	Start time	Elapsed time	Overload [%]	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			0.00	55.7	73.7	36.3
Time	11:43:43 AM	0:10:00				
Date	03/19/2015					




SG002 Periodic reports
% Based on LAF , 10ms Class width: 0.2 dB 03/19/2015 11:43:43 AM - 11:53:43 AM
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
dB
L1 = 65.1 dB
L5 = 58.6 dB
L10 = 55.4 dB
L50 = 46.0 dB
L90 = 41.6 dB
L95 = 40.5 dB
L99 = 38.1 dB
Level
Cumulative
Cursor: [73.8 ; 74.0[dB Level: 0.0% Cumulative: 0.0%

APPENDIX B: MODELING DATA

Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Arroyo Village Project	Scenario:	Existing
Analyst:	Leili Namazi	Job #:	145708
Roadway:	Arroyo Drive		
Road Segment:	Carillo Drive and Santa Anita Avenue		

PROJECT DATA		SITE DATA	
Centerline Dist to Barrier	**0**	Road Grade:	0
Barrier (0=wall, 1= berm):	**0**	Average Daily Traffic:	880
Receiver Barrier Dist:	**0**	Peak Hour Traffic:	**88**
Centerline Dist. To Observer:	**100**	Vehicle Speed:	25
Barrier Near Lane CL Dist:	**0**	Centerline Separation:	34
Barrier Far lane CL Dist:	**0**	**NOISE INPUTS**	
Pad Elevation:	**0.5**	Site conditions **HARD SITE**	
Road Elevation:	**0**	**FLEET MIX**	
Observer Height (above grade):	**0**		
Barrier Height:	**0**		
Rt View: **90**	Lft View: **-90**		
NOISE SOURCE ELEVATIONS (Feet)			
Autos:	**0**		
Medium Trucks:	**2.3**		
Heavy Trucks:	**8**		

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

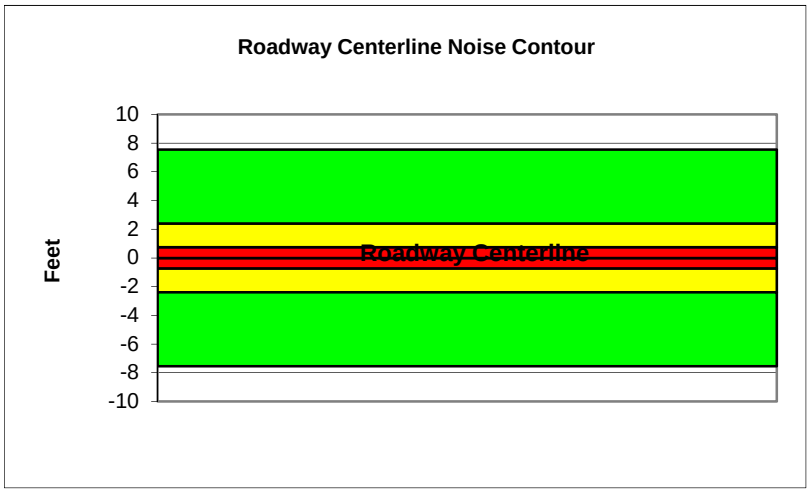
UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	35.1	43.9	42.1	36.0	44.6	45.3
Medium Trucks:	46.7	38.7	32.3	30.7	39.2	39.4
Heavy Trucks:	52.9	40.9	31.9	33.1	43.5	43.6
Vehicle Noise:	**55.5**	**47.1**	**43.1**	**39.2**	**47.8**	**48.2**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR	
Unmitigated	
60 dBA	8
65 dBA	2
70 dBA	1
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Arroyo Village Project	Scenario:	Existing
Analyst:	Leili Namazi	Job #:	145708
Roadway:	Carillo Drive		
Road Segment:	Mission Drive and Arroyo Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	280
Peak Hour Traffic:	**28**
Vehicle Speed:	25
Centerline Separation:	32

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

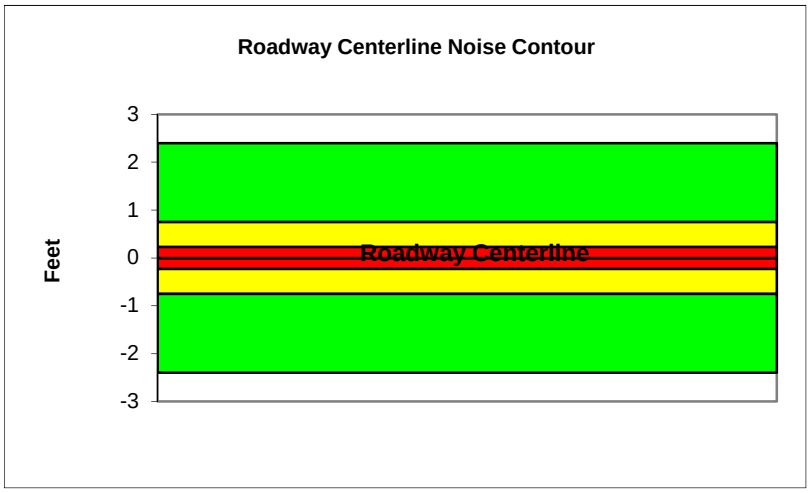
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	30.1	38.9	37.1	31.1	39.7	40.3
Medium Trucks:	41.8	33.7	27.3	25.8	34.3	34.5
Heavy Trucks:	47.9	36.0	27.0	28.2	38.6	38.7
Vehicle Noise:	**50.6**	**42.2**	**38.1**	**34.3**	**42.8**	**43.2**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	2
65 dBA	1
70 dBA	0
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Arroyo Village Project	Scenario:	Future
Analyst:	Leili Namazi	Job #:	145708
Roadway:	Arroyo Drive		
Road Segment:	Carillo Drive and Santa Anita Avenue		

PROJECT DATA

Centerline Dist to Barrier	**0**		
Barrier (0=wall, 1= berm):	**0**		
Receiver Barrier Dist:	**0**		
Centerline Dist. To Observer:	**100**		
Barrier Near Lane CL Dist:	**0**		
Barrier Far lane CL Dist:	**0**		
Pad Elevation:	**0.5**		
Road Elevation:	**0**		
Observer Height (above grade):	**0**		
Barrier Height:	**0**		
Rt View:	**90**	Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	895
Peak Hour Traffic:	**89.5**
Vehicle Speed:	25
Centerline Separation:	34

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

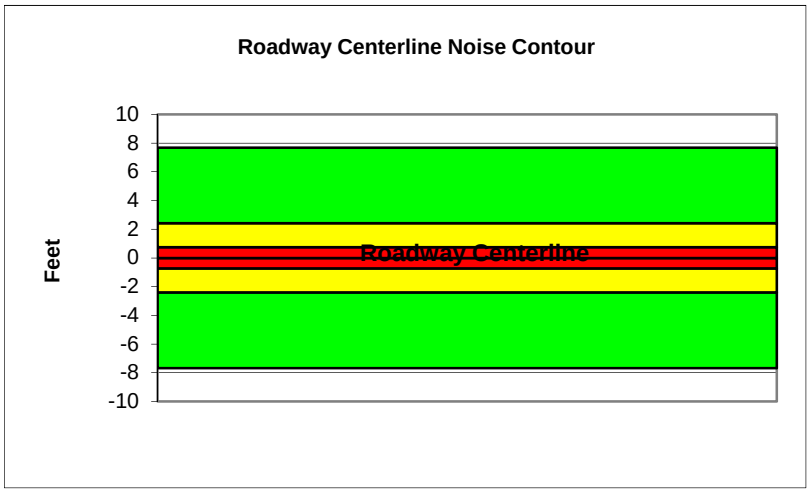
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	35.2	43.9	42.2	36.1	44.7	45.3
Medium Trucks:	46.8	38.7	32.4	30.8	39.3	39.5
Heavy Trucks:	53.0	41.0	32.0	33.2	43.6	43.7
Vehicle Noise:	**55.6**	**47.2**	**43.1**	**39.3**	**47.8**	**48.2**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	8
65 dBA	2
70 dBA	1
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Arroyo Village Project	Scenario:	Future
Analyst:	Leili Namazi	Job #:	145708
Roadway:	Carillo Drive		
Road Segment:	Mission Drive and Arroyo Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**		
Barrier (0=wall, 1= berm):	**0**		
Receiver Barrier Dist:	**0**		
Centerline Dist. To Observer:	**100**		
Barrier Near Lane CL Dist:	**0**		
Barrier Far lane CL Dist:	**0**		
Pad Elevation:	**0.5**		
Road Elevation:	**0**		
Observer Height (above grade):	**0**		
Barrier Height:	**0**		
Rt View: **90**		Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	280
Peak Hour Traffic:	**28**
Vehicle Speed:	25
Centerline Separation:	32

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

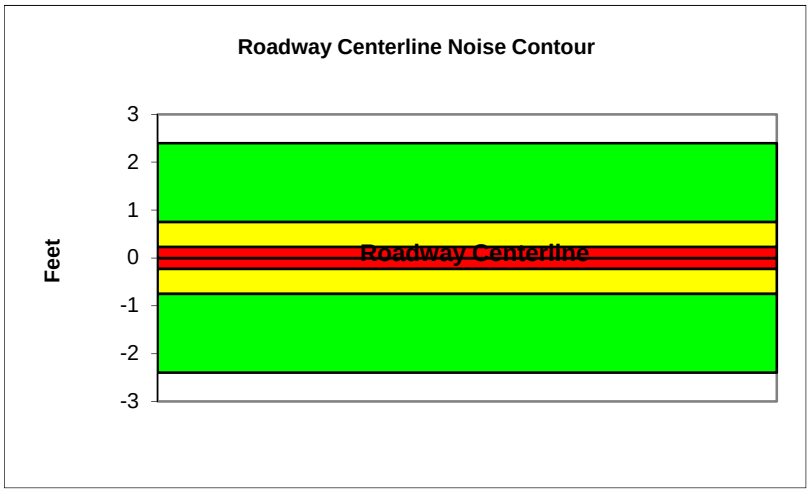
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	30.1	38.9	37.1	31.1	39.7	40.3
Medium Trucks:	41.8	33.7	27.3	25.8	34.3	34.5
Heavy Trucks:	47.9	36.0	27.0	28.2	38.6	38.7
Vehicle Noise:	**50.6**	**42.2**	**38.1**	**34.3**	**42.8**	**43.2**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	2
65 dBA	1
70 dBA	0
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Arroyo Village Project	Scenario:	Future Plus Project
Analyst:	Leili Namazi	Job #:	145708
Roadway:	Arroyo Drive		
Road Segment:	Carillo Drive and Santa Anita Avenue		

PROJECT DATA

Centerline Dist to Barrier	**0**		
Barrier (0=wall, 1= berm):	**0**		
Receiver Barrier Dist:	**0**		
Centerline Dist. To Observer:	**100**		
Barrier Near Lane CL Dist:	**0**		
Barrier Far lane CL Dist:	**0**		
Pad Elevation:	**0.5**		
Road Elevation:	**0**		
Observer Height (above grade):	**0**		
Barrier Height:	**0**		
Rt View: **90**		Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	1015
Peak Hour Traffic:	**101.5**
Vehicle Speed:	25
Centerline Separation:	34

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

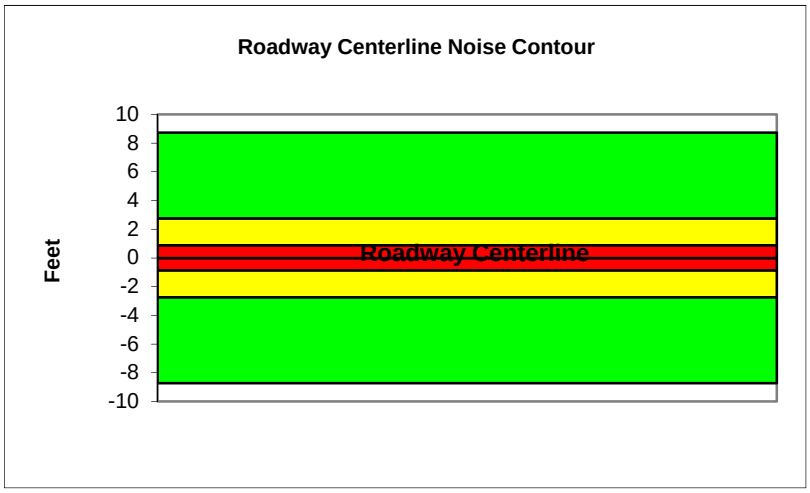
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	35.7	44.5	42.7	36.6	45.3	45.9
Medium Trucks:	47.4	39.3	32.9	31.3	39.8	40.0
Heavy Trucks:	53.5	41.6	32.5	33.7	44.1	44.2
Vehicle Noise:	**56.2**	**47.7**	**43.7**	**39.9**	**48.4**	**48.8**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	9
65 dBA	3
70 dBA	1
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Arroyo Village Project	Scenario:	Future Plus Project
Analyst:	Leili Namazi	Job #:	145708
Roadway:	Carillo Drive		
Road Segment:	Mission Drive and Arroyo Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	380
Peak Hour Traffic:	**38**
Vehicle Speed:	25
Centerline Separation:	32

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

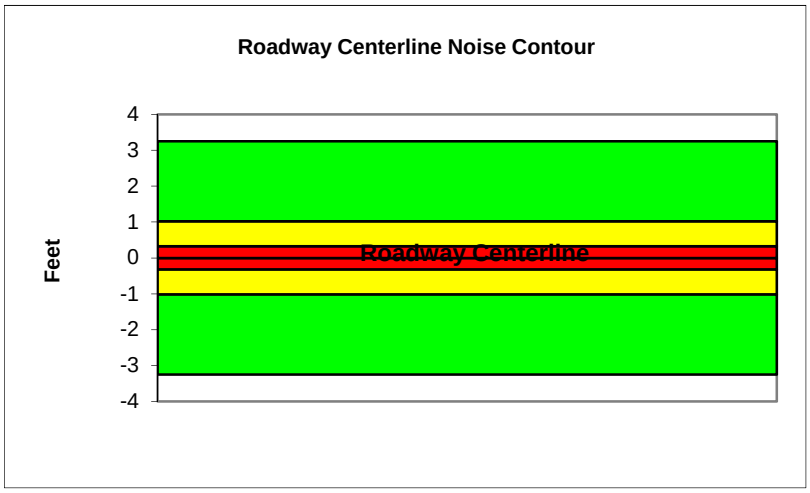
Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	31.5	40.3	38.5	32.4	41.0	41.6
Medium Trucks:	43.1	35.1	28.7	27.1	35.6	35.8
Heavy Trucks:	49.3	37.3	28.3	29.5	39.9	40.0
Vehicle Noise:	**51.9**	**43.5**	**39.5**	**35.6**	**44.2**	**44.5**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	3
65 dBA	1
70 dBA	0
Mitigated	
60 dBA	
65 dBA	
70 dBA