KUNZMAN ASSOCIATES, INC.

ISLAMIC COMMUNITY CENTER OF REDLANDS

NOISE IMPACT ANALYSIS

November 1, 2016

Traffic Engineering | Transportation Planning | Parking | Noise/Vibration | Expert Witness
Air Quality | Global Climate Change | Health Risk Assessment

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Prepared by:

Roma Stromberg, INCE/M.S. ■ Catherine Howe, M.S.
Carl Ballard, LEED GA ■ William Kunzman, P.E.

KUNZMAN ASSOCIATES, INC.
1111 Town & Country Road, Suite 34 ■ Orange, California 92868
5005 La Mart Drive, Suite 201 ■ Riverside, California 92507
(714) 973-8383 ■ www.traffic-engineer.com

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I. INTRODUCTION AND SETTING

A. Purpose and Objectives

The purpose of this report is to provide an assessment of the noise impacts resulting from development of the proposed Islamic Community Center of Redlands project and to identify mitigation measures that may be necessary to reduce those impacts. The noise issues related to the proposed land use and development have been evaluated in the context of the California Environmental Quality Act.

Although this is a technical report, every effort has been made to write the report clearly and concisely. To assist the reader with those terms unique to noise analysis, a list of acronyms and a glossary of terms have been provided in Appendix A and Appendix B of this report, respectively.

B. Project Location

The project site is located north of Beaumont Avenue and west of Nevada Street in the Redlands area of the County of San Bernardino. A vicinity map showing the project location is provided on Figure 1.

C. Project Description

The approximately 5.5 acre project site is proposed to be developed with an Islamic community center. The community center would include 28,670 square feet of buildings including a Masjid, a Social Pod, and an Educational Pod. The project also proposes outdoor recreational areas such as a soccer/football field and basketball court and fountain court. Figure 2 illustrates the project site plan.

Figure 1
Project Location Map

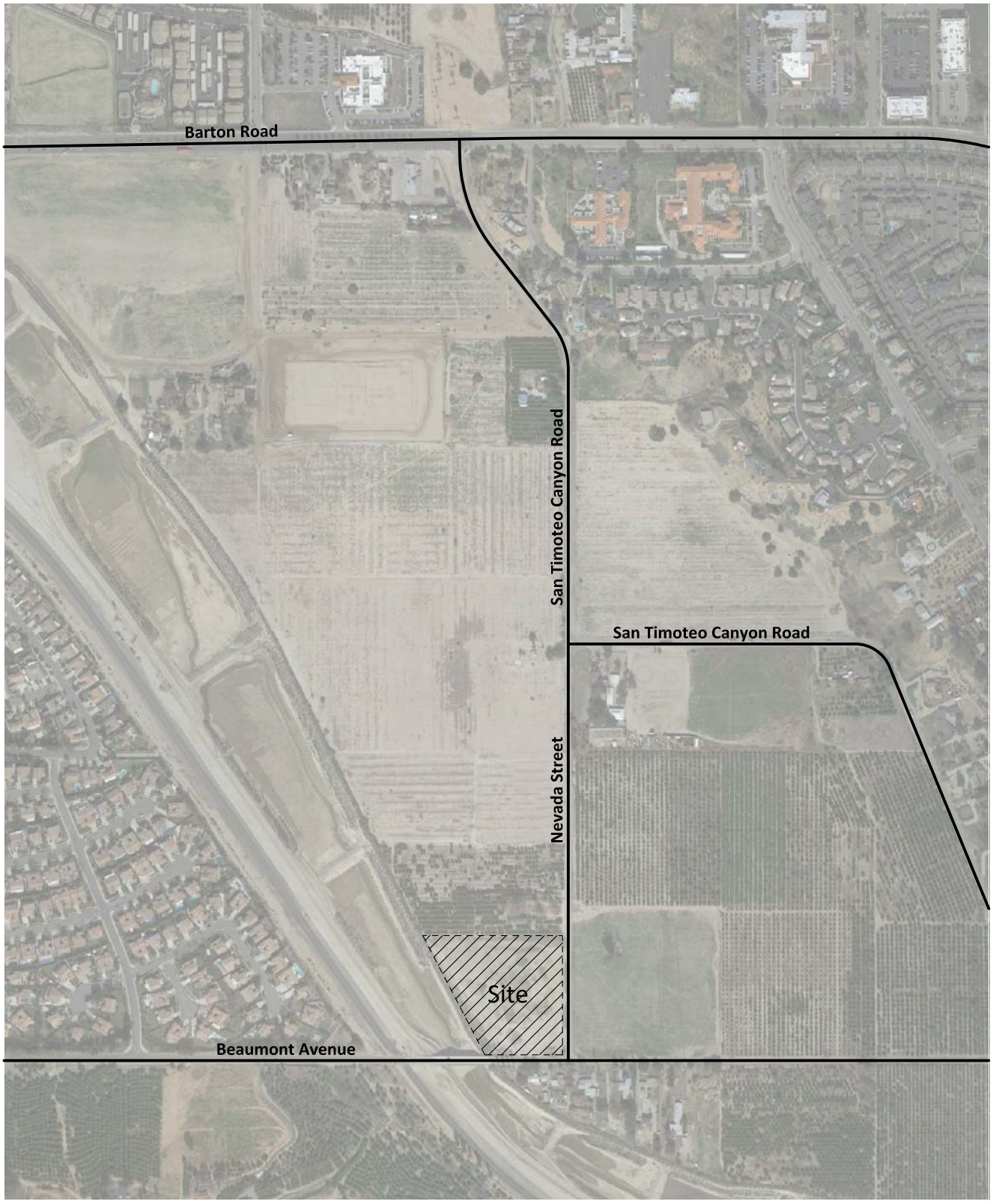

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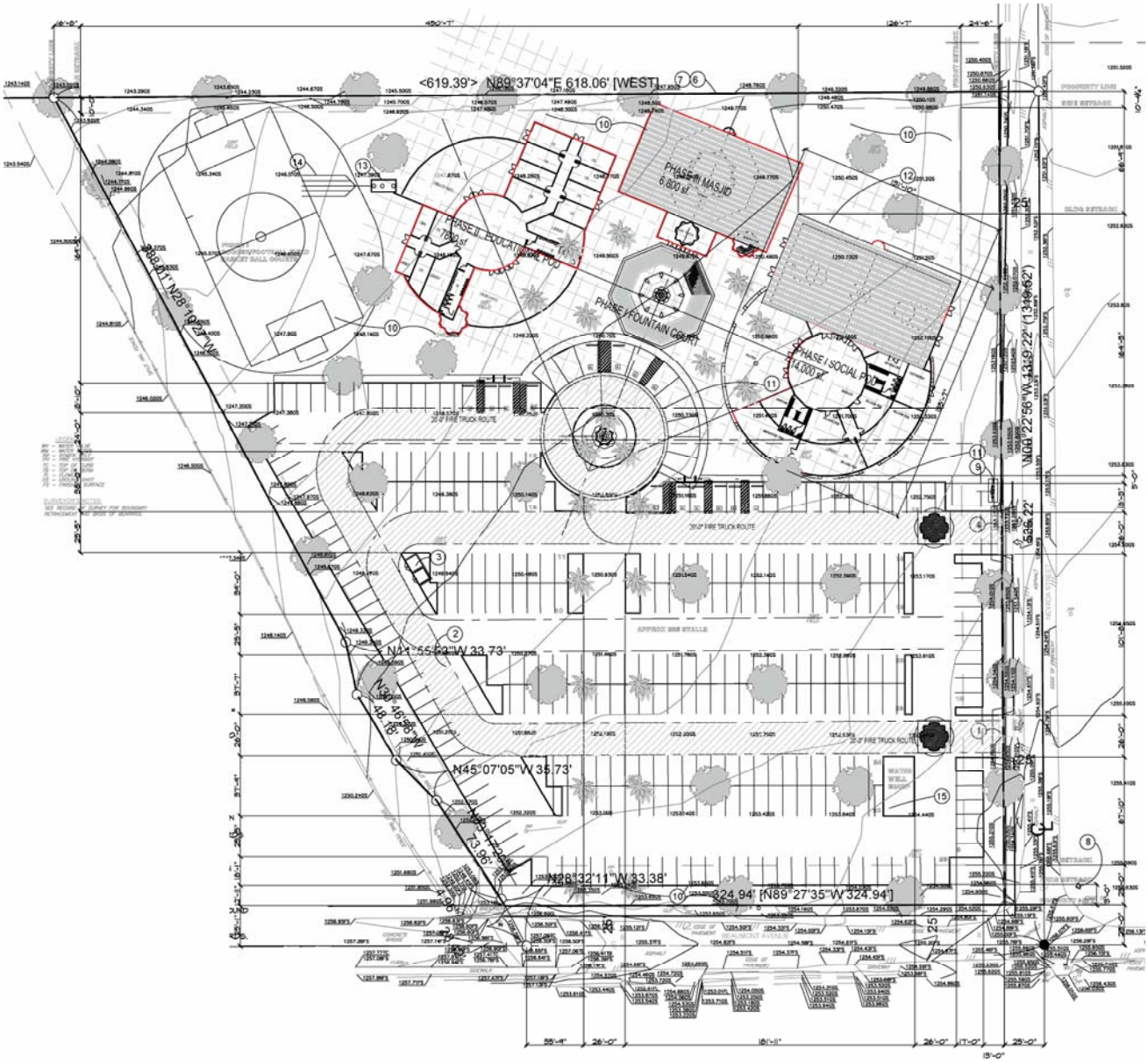
Figure 2
Site Plan



II. NOISE AND VIBRATION FUNDAMENTALS

A. Noise Fundamentals

Sound is a pressure wave created by a moving or vibrating source that travels through an elastic medium such as air. Noise is defined as unwanted or objectionable sound. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and in extreme circumstances, hearing impairment.

Commonly used noise terms are presented in Appendix B. The unit of measurement used to describe a noise level is the decibel (dB). The human ear is not equally sensitive to all frequencies within the sound spectrum. Therefore, the "A-weighted" noise scale, which weights the frequencies to which humans are sensitive, is used for measurements. Noise levels using A-weighted measurements are written dB(A) or dBA.

From the noise source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source as well as ground absorption, atmospheric effects and refraction, and shielding by natural and manmade features. Sound from point sources, such as air conditioning condensers, radiates uniformly outward as it travels away from the source in a spherical pattern. The noise drop-off rate associated with this geometric spreading is 6 dBA per each doubling of the distance (dBA/DD). Transportation noise sources such as roadways are typically analyzed as line sources, since at any given moment the receiver may be impacted by noise from multiple vehicles at various locations along the roadway. Because of the geometry of a line source, the noise drop-off rate associated with the geometric spreading of a line source is 3 dBA/DD.

Decibels are measured on a logarithmic scale, which quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, a doubling of the energy of a noise source, such as a doubled traffic volume, would increase the noise levels by 3 dBA; halving of the energy would result in a 3 dBA decrease.

Figure 3 shows the relationship of various noise levels to commonly experienced noise events.

Average noise levels over a period of minutes or hours are usually expressed as dBA_{Leq}, or the equivalent noise level for that period of time. For example, $L_{eq(3)}$ would represent a 3-hour average. When no period is specified, a one-hour average is assumed.

Noise standards for land use compatibility are stated in terms of the Community Noise Equivalent Level (CNEL) and the Day-Night Average Noise Level (L_{dn}). CNEL is a 24-hour weighted average measure of community noise. CNEL is obtained by adding five decibels to sound levels in the evening (7:00 PM to 10:00 PM), and by adding ten decibels to sound levels at night (10:00 PM to 7:00 AM). This weighting accounts for the increased human sensitivity to noise during the evening and nighttime hours. L_{dn} is a very similar 24-hour average measure that weights only the nighttime hours.

It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA; that a change of 5 dBA is readily perceptible, and that an increase (decrease) of 10 dBA sounds twice (half) as loud. This definition is recommended by the California Department of Transportation's Traffic Noise Analysis Protocol for New Highway and Reconstruction Projects (2009).

B. Vibration Fundamentals

The way in which vibration is transmitted through the earth is called propagation. Propagation of earthborn vibrations is complicated and difficult to predict because of the endless variations in the soil through which waves travel. There are three main types of vibration propagation: surface, compression and shear waves. Surface waves, or Raleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water. Compression waves, or P-waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. Shear waves, or S-waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse or "side-to-side and perpendicular to the direction of propagation".

As vibration waves propagate from a source, the energy is spread over an ever-increasing area such that the energy level striking a given point is reduced with the distance from the energy source. This geometric spreading loss is inversely proportional to the square of the distance. Wave energy is also reduced with distance as a result of material damping in the form of internal friction, soil layering, and void spaces. The amount of attenuation provided by material damping varies with soil type and condition as well as the frequency of the wave.

Construction operations generally include a wide range of activities that can generate groundborne vibration. Vibratory compactors or rollers, pile drivers, and pavement breakers can generate perceptible amounts of vibration at up to 200 feet. Heavy trucks can also generate groundborne vibrations, which can vary depending on vehicle type, weight, and pavement conditions. Potholes, pavement joints, discontinuities, or the differential settlement of pavement all increase the vibration levels from vehicles passing over a road surface. Construction vibration is normally of greater concern than vibration from normal traffic flows on streets and freeways with smooth pavement conditions.

Typically, particle velocity or acceleration (measured in gravities) is used to describe vibration. Table 1 shows the peak particle velocities (PPV) of some common construction equipment and Table 2 shows typical human reactions to various levels of PPV as well as the effect of PPV on buildings.

Table 1

Construction Equipment Vibration Source Levels[1]

Equipment	Peak Partical Velocity in inches per second[2]		
	at 25 feet	at 50 feet	at 100 feet
Clam Shovel Drop (slurry wall)	**0.202**	0.071	0.025
Vibratory Roller	**0.210**	0.074	0.026
Hoe Ram	**0.089**	0.031	0.011
Large Bulldozer	**0.089**	0.031	0.011
Caisson Drilling	**0.089**	0.031	0.011
Loaded Trucks	0.076	0.027	0.010
Jackhammer	0.035	0.012	0.004
Small Bulldozer	0.003	0.001	0.0004

[1] Source: Federal Transit Administration: Transit Noise and Vibration Impact Assessment, 2006.

[2] Bold values are considered annoying to people.

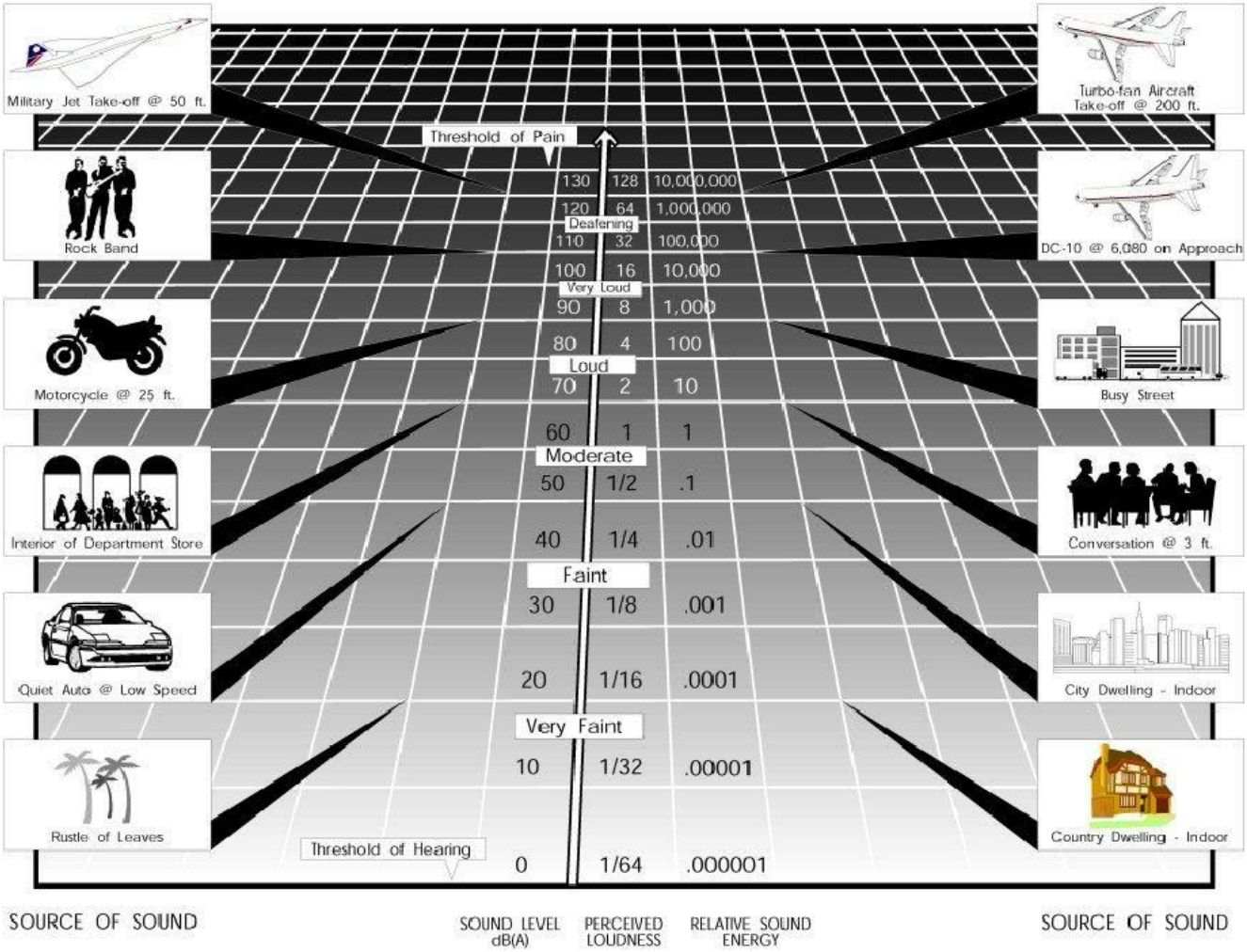
Table 2

Typical Human Reaction and Effect on Buildings Due to Groundborne Vibration [1]

Vibration Level Peak Particle Velocity (PPV)	Human Reaction	Effect on Buildings
0.006–0.019 in/sec	Threshold of perception, possibility of intrusion	Vibrations unlikely to cause damage of any type
0.08 in/sec	Vibrations readily perceptible	Recommended upper level of vibration to which ruins and ancient monuments should be subjected
0.10 in/sec	Level at which continuous vibration begins to annoy people	Virtually no risk of "architectural" (i.e., not structural) damage to normal buildings
0.20 in/sec	Vibrations annoying to people in buildings	Threshold at which there is a risk to "architectural" damage to normal dwelling – houses with plastered walls and ceilings
0.4–0.6 in/sec	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage

[1] Source: California Department of Transportation, 2002.

Figure 3
Common Noise Sources and Noise Levels



III. EXISTING NOISE ENVIRONMENT

A. Sensitive Noise Receptors

The project site is bordered by citrus groves to the north, the San Timoteo Wash to the west, Beaumont Avenue to the south, and Nevada Street to the east.

The State of California defines sensitive receptors as those land uses that require serenity or are otherwise adversely affected by noise events or conditions. Schools, libraries, churches, hospitals, single and multiple-family residential, including transient lodging, motels and hotel uses make up the majority of these areas. Sensitive receptors that may be affected by project generated noise include the single-family detached residential dwelling units located approximately 65 feet south of the project site (along Beaumont Avenue) and approximately 605 feet west of the project site. Single-family detached residential dwelling units are also located approximately 1,095 feet northeast, 1,161 feet southwest, 1,869 feet southeast, and 2,082 feet east of the project site.

B. Ambient Noise Measurements

An American National Standards Institute (ANSI Section SI4 1979, Type 1) Larson Davis model LxT sound level meter was used to document existing ambient noise levels. In order to document existing ambient noise levels in the project area, three (3) 10-minute daytime noise measurements were taken between 12:46 PM and 2:13 PM on November 1, 2016. Field worksheets and measurement output data is included in Appendix C.

As shown on Figure 4, the noise measurements were taken near existing sensitive receptors to the south along Beaumont Avenue, to the west along Columbia Court, and to the northeast along San Timoteo Canyon Road and Nevada Street. Table 3 provides a summary of the short-term ambient noise data. Ambient noise levels ranged between 41.7 and 66.7 dBA_{Leq}. The dominant noise source was from vehicles traveling along Beaumont Avenue, San Timoteo Canyon Road, and Columbia Court. Overhead aircrafts, residential noise, car backup beepers, and bird song were also audible, but not dominant.

Table 3

Short-Term Noise Measurement Summary (dBA)[1, 2]

Daytime								
Site Location	Time Started	Leq	Lmax	Lmin	L(2)	L(8)	L(25)	L(50)
NM1	12:46 PM	41.7	52.5	34.9	47.8	45.6	42.7	39.6
NM2	1:26 PM	58.8	74.6	43.1	69.5	61.9	55.3	52.7
NM3	2:03 PM	66.7	80.3	44.7	75.9	70.1	65.8	63.1

[1] See Figure 4 for noise measurement locations. Each noise measurement was performed over a 10-minute duration.

[2] Noise measurements were performed on November 1, 2016.

Figure 4
Noise Measurement Location Map

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IV. REGULATORY SETTING

A. Federal Regulations

1. Federal Noise Control Act of 1972

The U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control was originally established to coordinate federal noise control activities. After its inception, EPA's Office of Noise Abatement and Control issued the Federal Noise Control Act of 1972, establishing programs and guidelines to identify and address the effects of noise on public health, welfare, and the environment. In response, the EPA published Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (Levels of Environmental Noise). The Levels of Environmental Noise recommended that the Ldn should not exceed 55 dBA outdoors or 45 dBA indoors to prevent significant activity interference and annoyance in noise-sensitive areas.

In addition, the Levels of Environmental Noise identified five (5) dBA as an "adequate margin of safety" for a noise level increase relative to a baseline noise exposure level of 55 dBA Ldn (i.e., there would not be a noticeable increase in adverse community reaction with an increase of five dBA or less from this baseline level). The EPA did not promote these findings as universal standards or regulatory goals with mandatory applicability to all communities, but rather as advisory exposure levels below which there would be no risk to a community from any health or welfare effect of noise.

In 1981, EPA administrators determined that subjective issues such as noise would be better addressed at lower levels of government. Consequently, in 1982 responsibilities for regulating noise control policies were transferred to State and local governments. However, noise control guidelines and regulations contained in EPA rulings in prior years remain in place by designated Federal agencies, allowing more individualized control for specific issues by designated Federal, State, and local government agencies.

B. State Regulations

1. State of California General Plan Guidelines 2003

Though not adopted by law, the State of California General Plan Guidelines 2003, published by the California Governor's Office of Planning and Research (OPR) (OPR Guidelines), provide guidance for the compatibility of projects within areas of specific noise exposure. The OPR Guidelines identify the suitability of various types of construction relative to a range of outdoor noise levels and provide each local community some flexibility in setting local noise standards that allow for the variability in community preferences. Findings presented in the Levels of Environmental Noise Document (EPA 1974) influenced the recommendations of the OPR Guidelines, most importantly in the choice of noise exposure metrics (i.e., Ldn or CNEL) and in the upper limits for the Normally Acceptable outdoor exposure of noise-sensitive uses. The OPR Guidelines include a Noise and Land Use Compatibility Matrix identifies acceptable and

unacceptable community noise exposure limits for various land use categories. The County of San Bernardino has developed its own noise standards.

2. California Environmental Quality Act

The California Environmental Quality Act Guidelines (Appendix G) establishes thresholds for noise impact analysis. Two of these standards apply to what is referred to as a "substantial increase" in ambient noise levels. The County does not have a definition of a substantial increase, nor does CEQA establish a numerical value for this threshold. Noise generated by transportation sources propagates differently than noise generated by point sources. Therefore, for purposes of this analysis, the following two thresholds were utilized to evaluate the project's potential to result in substantial increases in ambient noise levels.

Traffic Noise

Roadway noise impacts would be considered significant if the project increases noise levels at a noise sensitive land use by 3 dBA CNEL and if: (1) the existing noise levels already exceed the residential land use compatibility standard for "normally acceptable" (65 dBA CNEL), or (2) the project increases noise levels from below the 65 dBA CNEL standard to above 65 dBA CNEL.

Stationary Noise

Project operations, including noise from car wash equipment and trucks, may produce an increase in noise levels which disturbs the peace and quiet of adjacent residential areas or cause discomfort/annoyance to area residents. A 5 dBA increase is considered to be "readily audible", which seems to correlate most closely to "substantial increase." For the purposes of this report, a substantial permanent increase in ambient noise levels due to stationary noise sources shall be considered 5 dBA L_{eq}.

3. California Department of Transportation (Caltrans)

The California Department of Transportation (Caltrans) has published one of the seminal works for the analysis of groundborne noise and vibration relating to transportation- and construction-induced vibrations and although the project is not subject to these regulations, it serves as useful tools to evaluate vibration impacts. These guidelines recommend that a standard of 0.2 inches per section (in/sec) PPV not be exceeded for the protection of normal residential buildings (Caltrans 2002). Caltrans guidance will be used for this analysis considering that the County of San Bernardino has not established significance criteria for the evaluation of groundborne vibration.

C. Local Regulations

1. County of San Bernardino General Plan

The County of San Bernardino General Plan Noise Element provides goals, policies and implementation measures that are intended to achieve and maintain land use compatibility with environmental noise levels and to ensure that County residents will be protected from excessive noise intrusion, both now and in the future. Goals and Policies applicable to the proposed project are presented below.

Goal N 1. The County will abate and avoid excessive noise exposures through noise mitigation measures incorporated into the design of new noise generating and new noise sensitive land uses, while protecting areas within the County where the present noise environment is within acceptable limits.

> **Policy N 1.2.** Ensure that new development of residential or other noise-sensitive land uses is not permitted in noise-impacted areas unless effective mitigation measures are incorporated into the project design to reduce noise levels to the standards of Noise-sensitive land uses include residential uses, schools, hospitals, nursing homes, places of worship and libraries.
> **Policy N 1.4.** Enforce the state noise insulation standards (California Administrative Code, Title 24) and Chapter 35 of the California Building Code (CBC) 6.
> **Policy N 1.5.** Limit truck traffic in residential and commercial areas to designated truck routes; limit construction, delivery, and through-truck traffic to designated routes; and distribute maps of approved truck routes to County traffic officers.
> **Policy N 1.6.** Enforce the hourly noise-level performance standards for stationary and other locally regulated sources, such as industrial, recreational, and construction activities as well as mechanical and electrical equipment.
> **Policy N 1.7.** Prevent incompatible land uses, by reason of excessive noise levels, from occurring in the future.

Goal N 2. The County will strive to preserve and maintain the quiet environment of mountain, desert and other rural areas.

> **Policy N 2.1.** The County will require appropriate and feasible on-site noise attenuating measures that may include noise walls, enclosure of noise generating equipment, site planning to locate noise sources away from sensitive receptors, and other comparable features.

2. County of San Bernardino Development Code

Section 83.01.080 of the County of San Bernardino Development Code establishes standards concerning acceptable noise levels for both noise sensitive land uses and for noise generating land uses. Sections of the code applicable to the proposed project are presented below.

Noise Standards for Stationary Noise Sources

Noise level limits for Stationary Sources, as they affect adjacent properties (Section 83.01.080(c)(1) of San Bernardino County Code) are presented in **Error! Reference source not found.**. However, because the land uses that may be affected by the proposed project are not included in **Error! Reference source not found.**, the interior noise level limit presented in **Error! Reference source not found.** (a 12-Hour Equivalent level of 45 dBA L_{dn}) for educational, institutions, libraries and meeting facilities applies to the proposed project.

Section 83.01.080 of the ordinance also sets forth a maximum interior noise level of 65 dBA as an average of the loudest of intrusive sounds occurring during a 24-hour period.

Noise Standards from Adjacent Mobile Noise Sources

The County of San Bernardino Development Code also sets forth interior noise level standards for the structures specified in Table 6.

Construction Noise

Temporary construction, maintenance, repair, and demolition activities between 7:00 AM and 7:00 PM, except Sundays and Federal holidays are exempt from Section 83.01.080(g)(3) the San Bernardino Development Code.

Ground Vibration

Section 83.01.090(a) of the County of San Bernardino Development Code prohibits the creation of ground vibration that can be felt without the aid of instruments at or beyond the lot-line, nor shall any vibration be allowed which produces a particle velocity greater than or equal to two-tenths (0.2) inches per second measured at or beyond the lot-line.

(c) Exempt vibrations. The following sources of vibration shall be exempt from the regulations of this Section.

(2) Temporary construction, maintenance, repair, or demolition activities between 7:00 AM and 7:00 PM, except Sundays and Federal holidays.

Table 4

Noise Standards for Stationary Noise Sources (Development Code Table 83-2)[1]

Affected Land Uses (Receiving Noise)	7:00 AM to 10:00 PM dBA L_{eq}	10:00 PM to 7:00 AM dBA L_{eq}
Residential	55	45
Professional Services	55	55
Other Commercial	60	60
Industrial	70	70

Noise limit categories. No person shall operate or cause to be operated a source of sound at a location or allow the creation of noise on property owned, leased, occupied, or otherwise controlled by the person, which causes the noise level, when measured on another property, either incorporated or unincorporated, to exceed any one of the following:

(A) The noise standard for the receiving land use as specified in Subsection B (Noise-impacted areas), above, for a cumulative period of more than 30 minutes in any hour.

(B) The noise standard plus 5 dB(A) for a cumulative period of more than 15 minutes in any hour.

(C) The noise standard plus 10 dB(A) for a cumulative period of more than five minutes in any hour.

(D) The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour.

(E) The noise standard plus 20 dB(A) for any period of time.

If the measured ambient level exceeds any of the first four noise limit categories, the allowable noise exposure standard shall be increased to reflect the ambient noise level. If the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under this category shall be increased to reflect the maximum ambient noise level.

[1] Source: County of San Bernardino Development Code.

Table 5

Noise Standards for Other Structures
(Development Code Table 83-3)[1]

Noise Standards for Other Structures	
Typical Uses	12-Hour Equivalent Sound Level (Interior) in dBA Ldn
Educational, institutions, libraries, meeting facilities, etc.	45
General office, reception, etc.	50
Retail stores, restaurants, etc.	55
Other areas for manufacturing, assembly, testing, warehousing, etc.	65

[1] Source: County of San Bernardino Development Code.

Table 6

Noise Standards for Mobile Noise Sources (Development Code Table 83-3)[1]

Land Use		L_{dn} (or CNEL) dB(A)	
Categories	Uses	Interior[2]	Exterior[3]
Residential	Single and multi-family, duplex, mobile homes	45	60[4]
Commercial	Hotel, motel, transient housing	45	60[4]
	Commercial retail, bank, restaurant	50	n/a
	Office building, research and development, professional offices	45	65
	Amphitheater, concert hall, auditorium, movie theater	45	n/a
Institutional/Public	Hospital, nursing home, school classroom, religious institution, library	45	65
Open Space	Park	n/a	65

[1] Source: County of San Bernardino Development Code.

[2] The indoor environment shall exclude bathrooms, kitchens, toilets, closets and corridors.

[3] The outdoor environment shall be limited to:

Hospital/office building patios
Hotel and motel recreation areas
Mobile home parks
Multi-family private patios or balconies
Park picnic areas
Private yard of single-family dwellings
School playgrounds

[4] An exterior noise level of up to 65 dB(A) (or CNEL) shall be allowed provided exterior noise levels have been substantially mitigated through a reasonable application of the best available noise reduction technology, and interior noise exposure does not exceed 45 dB(A) (or CNEL) with windows and doors closed. Requiring that windows and doors remain closed to achieve an acceptable interior noise level shall necessitate the use of air conditioning or mechanical ventilation.

V. ANALYTICAL METHODOLOGY AND MODEL PARAMETERS

A. Noise Modeling and Input

1. Road Construction Noise Model (RCNM)

A worst-case construction noise scenario was modeled using a version of the Federal Highway Administration's Roadway Construction Noise Model (RCNM). RCNM utilizes standard noise emission levels for many different types of equipment and includes utilization percentage, impact, and shielding parameters. Modeling input parameters and output are provided in Appendix D.

2. Federal Highway Administration (FHWA) Traffic Noise Prediction Model

Existing, Existing Plus Project, and Future noise levels along acoustically significant area roadways were modeled utilizing the FHWA Traffic Noise Prediction Model - FHWA-RD-77-108. This model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). Adjustments are then made to the REMEL to account for: total average daily trips (ADT), roadway classification, width, speed and truck mix, roadway grade and site conditions (hard or soft ground surface). Surfaces adjacent to all modeled roadways were assumed to have a "hard site" to predict worst-case, conservative noise levels. A hard site, such as pavement, is highly reflective and does not attenuate noise as quickly as grass or other soft sites. Possible reductions in noise levels due to intervening topography and vegetation were not accounted for in the analysis.

Project traffic volumes and vehicle mix were obtained from the project's traffic study (Kunzman Associates, Inc., 2016). Existing Plus Project mixes were calculated by adding the proposed project trips to existing conditions. The County of San Bernardino does not have a Day/Evening/Night (D/E/N) split published for use in acoustical studies. For existing conditions, road segments were assigned D/E/N splits recommended by the Riverside County Department of Industrial Hygiene for noise modeling. Vehicle speeds were based on roadway classification, per County protocol. FHWA worksheets are included in Appendix E.

3. SoundPLAN

The SoundPLAN noise modeling software was utilized to model noise associated with the operation of the proposed project. This model represents a worst-case operational noise scenario. Noise sources associated with the proposed parking areas and outdoor recreational activities were included in the model. Noise associated with parking lots include, but are not limited to idling cars/trucks, trucks diesel engines, exhaust systems, trailer coupling, air brakes, warning signal, doors closing, and starting engine noise. The parking lot was modeled with approximately 307 parking spaces during peak hour. The outdoor recreational activities were modeled using reference sound level data for the various stationary sources. Noise sources were modeled at the proposed soccer/football field and basketball court area, the fountain court, and the outdoor

patios of both the Educational Pod and the Social Pod. Figure 5 shows the results of the operational noise model are provided in Section VI.

VI. IMPACT ANALYSIS

A. Noise Impacts

This impact discussion analyzes the potential for noise impacts to cause an exposure of person to or generation of noise levels in excess of established County of San Bernardino noise standards related to construction noise, transportation and railroad related noise impacts to or from the proposed project.

1. Construction Noise

Existing single-family detached residential dwelling units located south and west of the project site may be affected by short-term noise impacts associated with the transport of workers, the movement of construction materials to and from the project site, ground clearing, excavation, grading, and building activities. Construction noise is considered a short-term impact and would be considered significant if construction activities are undertaken outside the allowable times as described by Section 83.01.080(g)(3) of the San Bernardino Development Code. The noise analysis reviews the construction noise levels during the various phases of the project.

Construction noise varies depending on the construction process, type of equipment involved, location of the construction site with respect to sensitive receptors, the schedule proposed to carry out each task (e.g., hours and days of the week) and the duration of the construction work. Site grading is expected to produce the highest sustained construction noise levels. Typical noise sources and noise levels associated with the site grading phase of construction are shown in Table 7. Typical 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. A likely worst-case construction noise scenario during grading assumes the use of a grader, a dozer, an excavator, a backhoe and a water truck (modeled as a dump truck) operating between 85 and 250 feet from the nearest sensitive receptor.

Assuming a usage factor of 40 percent for each piece of equipment, unmitigated noise levels have the potential to reach 77.3 dBA L_{eq} and 80.4 dBA_{Lmax} at the nearest sensitive receptor during grading.

Consistency with Applicable Standards

County of San Bernardino General Plan

Policy N 1.6. *Enforce the hourly noise-level performance standards for stationary and other locally regulated sources, such as industrial, recreational, and construction activities as well as mechanical and electrical equipment.*

San Bernardino Development Code

Temporary construction, maintenance, repair, and demolition activities between 7:00 AM and 7:00 PM, except Sundays and Federal holidays are exempt from Section 83.01.080(g)(3) of the San Bernardino Development Code.

Summary of Construction Related Noise Impacts. Limiting project construction to the hours in which construction activities are exempt from the County of San Bernardino's noise ordinance as well as implementing all construction mitigation will minimize construction noise impacts at nearby sensitive receptors. Mitigation Measures are presented in Section VII of this report.

2. Noise Impacts to Off-Site Receptors Due to Project Generated Traffic

Existing and Existing Plus Project noise levels were modeled for each roadway segment included in the traffic study (Kunzman Associates, Inc., 2016) in order to calculate project generated increases in ambient noise levels, as well as noise levels overall with operation of the project. The noise level was found at the nearest sensitive receptor for each roadway segment. Noise levels were modeled using the FHWA Traffic Noise Prediction Model - FHWA-RD-77-108, Modeling output is included in this report as Appendix C.

The Existing traffic noise model resulted in noise levels of 55.98-75.13 dBA CNEL at nearby sensitive receptors along area roadways. The Existing Plus Project traffic noise model resulted in noise levels of 58.19-75.15 dBA CNEL at nearby sensitive receptors and increases in ambient noise levels of 0.02 to 2.21 dBA CNEL. The results of the Existing and Existing Plus Project traffic noise models are shown in Error! Reference source not found..

It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA; that a change of 5 dBA is readily perceptible, and that an increase or decrease of 10 dBA sounds twice or half as loud. For example, doubling the traffic on a highway would result in an increase of 3 dB. Conversely, reducing traffic by one half would reduce the noise level by 3 dB (Caltrans 2009). For purposes of this study, roadway noise impacts would be considered significant if the project increases noise levels for a noise sensitive land use by 3 dBA CNEL and if: (1) the existing noise levels already exceed the standard appropriate for the receiving land use (60 dBA CNEL for residential and 65 dBA CNEL for churches and schools), or (2) the project increases noise levels from below the standard appropriate for the receiving land use to above that standard.

Consistency with Applicable Standards

San Bernardino Development Code

The County of San Bernardino Development Code Table 83-3 (**Error! Reference source not found.**) prescribes mobile noise level limits for different land uses. Although noise levels along many area road segments already exceed standards, the project will not increase noise levels on area road segments by more than 2.21 dBA CNEL.

Summary of Off-Site Traffic Noise Impacts. Unmitigated noise levels along project area roadways are projected to increase from 0.02 to 2.21 dBA with the completion of the proposed project. The largest increase (2.21 dBA) will occur along Nevada Street adjacent to the proposed project, which as mentioned previously, would not be audible. Because there are no road segments which will exceed 65 dBA CNEL *and* experience an increase of 3 dBA CNEL or greater, project generated traffic noise will not result in a significant impact.

3. Future Traffic Noise Impacts to the Proposed Project

As stated previously, the County of San Bernardino Development Code Table 83-3 (**Error! Reference source not found.**) prescribes mobile noise level limits for different land uses.

In order to determine if future traffic noise levels would exceed County mobile noise level standards (presented in Table 6), Year 2040 with project traffic noise volumes were modeled at the nearest proposed structures for both Beaumont Avenue and Nevada Street. Traffic volumes utilized for noise modeling were taken from the traffic study prepared for the proposed project (Kunzman 2016). Published vehicle mix and day/evening/night distribution provided by the County of Riverside was also utilized in the model. The County of San Bernardino does not have published vehicle mixes or day/evening/night mixes.

As shown in Table 9, future noise levels along Beaumont Avenue are expected to reach up to 59.29 dBA CNEL at the nearest portion of the Social Pod, approximately 291 feet north of the roadway; 58.45 dBA CNEL at the nearest portion of the soccer/football field and basketball court, approximately 353 feet north of the roadway; 58.21 dBA CNEL at the nearest portion of the fountain court, approximately 373 feet north of the roadway; and 58.13 dBA CNEL at the nearest portion of the Educational Pod, approximately 380 feet north of the roadway. Future noise levels along Nevada Street are expected to reach up to 61.25 dBA CNEL at the closest point of the Social Pod, approximately 50 feet west of the roadway, and 56.56 dBA CNEL at the nearest point of the Masjid, approximately 147 feet west of the roadway.

The County allows institutional/public uses and park uses in areas where exterior noise levels reach up to 65 dBA CNEL. Further, interior noise levels of the proposed community center are not expected to exceed 45 dBA CNEL.

Consistency with Applicable Standards

San Bernardino Development Code

The County of San Bernardino Development Code Table 83-3 (**Error! Reference source not found.**) prescribes mobile noise level limits for different land uses.

Summary of On-Site Traffic Noise Impacts. The proposed community center use would not exceed the County of San Bernardino Development Code mobile noise level

limits for institutional/public uses. Therefore, noise levels at the proposed community center would comply with the County of San Bernardino Development Code and no mitigation is required.

4. Operational Noise Impacts

Land uses surrounding the site consist of single-family detached residential dwelling units to the south, citrus groves and vacant land to the north, vacant land and citrus groves to the east, and the San Timoteo Creek and single-family detached residential dwelling units to the west. The nearest sensitive receptors are single-family detached residential dwelling units located approximately 65 feet south and 605 feet west of the project site. Single-family detached residential dwelling units are also located approximately 1,095 feet northeast, 1,161 feet southwest, 1,869 feet southeast, and 2,082 feet east of the project site.

The County of San Bernardino Development Code Table 83-2 (Table 4) prescribes stationary noise level limits for different land uses. The County allows residential uses in areas where exterior noise levels reach up to 65 dBA Leq during the daytime and 45 dBA Leq during the nighttime.

The worst-case stationary noise was modeled utilizing the SoundPLAN model. Noise sources associated with the proposed parking areas and outdoor recreational activities were included in the model. Noise associated with parking lots include, but are not limited to idling cars/trucks, trucks diesel engines, exhaust systems, trailer coupling, air brakes, warning signal, doors closing, and starting engine noise. The parking lot was modeled with approximately 307 parking spaces during peak hour. The parking lot was modeled with approximately 307 parking spaces.

The outdoor recreational activities were modeled using reference sound level data for the various stationary sources. Outdoor noise sources were modeled at the proposed soccer/football field and basketball court area, the fountain court, and the outdoor patios of both the Educational Pod and the Social Pod.

As shown on Figure 5, the proposed project is not expected to exceed 55 dBA CNEL at the nearest sensitive receptors.

Consistency with Applicable Standards

County of San Bernardino General Plan Noise Element

Goal N 1. *The County will abate and avoid excessive noise exposures through noise mitigation measures incorporated into the design of new noise generating and new noise sensitive land uses, while protecting areas within the County where the present noise environment is within acceptable limits.*

Policy N 1.6. *Enforce the hourly noise-level performance standards for stationary and other locally regulated sources, such as industrial, recreational, and construction activities as well as mechanical and electrical equipment.*

County of San Bernardino Development Code

Section 83.01.080 of the County of San Bernardino Development Code establishes standards concerning acceptable noise levels for both noise sensitive land uses and for noise generating land uses. Sections of the code applicable to the proposed project are presented below.

Summary of Operational Noise Impacts. As mentioned previously, exterior noise level limits for Stationary Sources, as they affect adjacent properties, (Section 83.01.080(c)(1) of San Bernardino County Code) are allowed to reach up to 65 dBA L_{eq} during the daytime and 45 dBA L_{eq} during the nighttime. Project stationary noise sources at the nearest sensitive receptor may result in noise levels of up to 52.7 dBA L_{eq} during the day. As shown on Figure 5, the proposed project is not expected to exceed the daytime or nighttime noise standard at nearby sensitive receptors. Further, project operational noise will not cause interior noise levels to exceed 45 dBA L_{eq} at any sensitive receptors. The project is consistent with applicable General Plan and development code standards, impacts are considered less than significant. No additional mitigation measures are required. Operational noise levels are shown on Figure 5.

B. Vibration Impacts

This impact discussion analyzes the potential for the proposed project to cause an exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels. Vibration levels in the project area may be influenced by construction. A vibration impact would generally be considered significant if it involves any construction-related or operations-related impacts in excess of 0.2 +inches per second (in/sec) PPV.

1. Project Generated Vibration

Construction activity can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage at the highest levels. Table 2 gives approximate vibration levels for particular construction activities. This data provides a reasonable estimate for a wide range of soil conditions.

The nearest existing structure to the project site is located approximately 65 feet to the south of the project site. As shown in Table 2, the threshold at which there may be a risk of architectural damage to normal houses with plastered walls and ceilings is 0.20 PPV in/second. Primary sources of vibration during construction would be bulldozers. As shown in Table 2, a large bulldozer could produce up to 0.089 PPV at 25 feet.

At a distance of 65 feet, a bulldozer would yield a worst-case 0.021 PPV (in/sec) which is well below the threshold of perception and below any risk or architectural damage.

Adherence to County of San Bernardino's allowed hours for construction will minimize ground vibration noise impacts related to construction at adjacent sensitive receptors.

Consistency with Applicable Standards

County of San Bernardino

Section 83.01.090(a) of the County of San Bernardino Development Code prohibits the creation of ground vibration that can be felt without the aid of instruments at or beyond the lot-line, nor shall any vibration be allowed which produces a particle velocity greater than or equal to two-tenths (0.2) inches per second measured at or beyond the lot-line.

However, construction of the proposed project is exempt from this standard if it takes place between 7:00 AM and 7:00 PM, and not on Sundays or Federal holidays.

Summary of Vibration Impacts. Construction equipment may result in vibration levels that are considered annoying at nearby sensitive receptors when vibration causing equipment is within 100 feet of a receptor. Limiting construction to the hours in which the County's noise ordinance states it as exempt will greatly reduce this impact.

Table 7

Typical Construction Equipment Noise Levels[1]

Type of Equipment	Range of Maximum Sound Levels Measured (dBA at 50 feet)	Suggested Maximum Sound Levels for Analysis (dBA at 50 feet)
Rock Drills	83-99	96
Jack Hammers	75-85	82
Pneumatic Tools	78-88	85
Pumps	74-84	80
Dozers	77-90	85
Scrapers	83-91	87
Haul Trucks	83-94	88
Cranes	79-86	82
Portable Generators	71-87	80
Rollers	75-82	80
Tractors	77-82	80
Front-End Loaders	77-90	86
Hydraulic Backhoe	81-90	86
Hydraulic Excavators	81-90	86
Graders	79-89	86
Air Compressors	76-89	86
Trucks	81-87	86

[1] Source: Bolt, Beranek & Newman; Noise Control for Buildings and Manufacturing Plants, 1987.

Table 8

Existing and Existing Plus Project Traffic Noise Levels

Roadway	Segment	Distance from centerline of roadway to nearest sensitive receptor (feet)	Modeled Noise Levels (dBA CNEL)						
			Existing	Existing Plus Project	Increase	Applicable Standard	Substantial Increase	Exceeds Standard	Significant Impact
Barton Road	West of San Timoteo Canyon Road	75	75.13	75.15	0.02	65	No	Yes	No
	East of San Timoteo Canyon Road	75	74.76	74.79	0.03	65	No	Yes	No
Beaumont Avenue	West of Nevada Street	50	65.69	65.75	0.06	65	No	Yes	No
	East of Nevada Street	60	63.81	63.88	0.07	65	No	No	No
San Timoteo Canyon Road	Barton Road to Nevada Street	50	67.97	68.31	0.34	65	No	Yes	No
Nevada Street	South of San Timoteo Canyon Road	95	55.98	58.19	2.21	65	No	No	No

Table 9

Future On-Site Noise Levels

Roadway	Land Use	Modeled Noise Levels (CNEL) Year 2040 With Project
Beaumont Avenue	Social Pod	59.29
	Soccer/Football Field & Basketball Court	58.45
	Fountain Court	58.21
	Educational Pod	58.13
Nevada Street	Social Pod	61.25
	Masjid	56.56

Figure 5
Operational Noise Levels (bBA Leq)

VII. MITIGATION MEASURES

A. Construction Mitigation Measures

In addition to adherence to the County of San Bernardino policies found in the Noise Element and Development Code limiting the construction hours of operation, the following measures are recommended to reduce construction noise and vibrations, emanating from the proposed project:

1. During all project site excavation and grading on-site, construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturer standards.

2. The contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the project site.

3. Equipment shall be shut off and not left to idle when not in use.

4. The contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise/vibration sources and sensitive receptors nearest the project site during all project construction.

5. The project proponent shall mandate that the construction contractor prohibit the use of music or sound amplification on the project site during construction.

6. The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment.

B. Operational Mitigation Measures

No operational mitigation is required.

VIII. REFERENCES

Bolt, Baranek, and Newman
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2009 Technical Noise Supplement. Division of Environmental Analysis, November.

Federal Transit Administration
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Harris, Cyril M.
1991 Handbook of Acoustical Measurement and Noise Control

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2009 Requirements for determining and mitigating traffic noise impacts to residential structures. Department of Health – Office of Industrial Hygiene

San Bernardino, County of
2007 Development Code
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Kunzman Associates, Inc.
2016 Islamic Community Center of Redlands Traffic Impact Analysis. June 30.

APPENDICES

Appendix A – List of Acronyms

Appendix B – Definitions of Acoustical Terms

Appendix C – Noise Monitoring Field Worksheets

Appendix D – RCNM Noise Modeling Output

Appendix E – Project Generated Traffic FHWA Worksheets

APPENDIX A

List of Acronyms

Term	Definition
ADT	Average Daily Traffic
ANSI	American National Standard Institute
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
D/E/N	Day / Evening / Night
dB	Decibel
dBA or dB(A)	Decibel "A-Weighted"
dBA/DD	Decibel per Double Distance
dBA L_{eq}	Average Noise Level over a Period of Time
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
L_{02},L_{08},L_{50},L_{90}	A-weighted Noise Levels at 2 percent, 8 percent, 50 percent, and 90 percent, respectively, of the time period
L_{dn}	Day-Night Average Noise Level
$L_{eq(x)}$	Equivalent Noise Level for '"x" period of time
L_{eq}	Equivalent Noise Level
L_{max}	Maximum Level of Noise (measured using a sound level meter)
L_{min}	Minimum Level of Noise (measured using a sound level meter)
LOS C	Level of Service C
OPR	California Governor's Office of Planning and Research
PPV	Peak Particle Velocities
RCNM	Road Construction Noise Model
REMEL	Reference Energy Mean Emission Level
RMS	Root Mean Square

APPENDIX B

Definitions of Acoustical Terms

Term	Definition
Decibel, dB	A logarithmic unit of noise level measurement that relates the energy of a noise source to that of a constant reference level; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hertz	In a function periodic in time, the number of times that the quantity repeats itself in one second (i.e., the number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear.
Root Mean Square (RMS)	A measure of the magnitude of a varying noise source quantity. The name derives from the calculation of the square root of the mean of the squares of the values. It can be calculated from either a series of lone values or a continuous varying function.
Fast/Slow Meter Response	The fast and slow meter responses are different settings on a sound level meter. The fast response setting takes a measurement every 100 milliseconds, while a slow setting takes one every second.
L_{02}, L_{08}, L_{50}, L_{90}	The A-weighted noise levels that are equaled or exceeded by a fluctuating sound level, 2 percent, 8 percent, 50 percent, and 90 percent of a stated time period, respectively.
Equivalent Continuous Noise Level, L_{eq}	A level of steady state sound that in a stated time period, and a stated location, has the same A-weighted sound energy as the time-varying sound.
L_{max}, L_{min}	L_{max} is the RMS (root mean squared) maximum level of a noise source or environment measured on a sound level meter, during a designated time interval, using fast meter response. L_{min} is the minimum level.
Ambient Noise Level	The all-encompassing noise environment associated with a given environment, at a specified time, usually a composite of sound from many sources, at many directions, near and far, in which usually no particular sound is dominant.
Offensive/ Offending/ Intrusive Noise	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of sound depends on its amplitude, duration, frequency, and time of occurrence, and tonal information content as well as the prevailing ambient noise level.

APPENDIX C

Noise Monitoring Field Worksheets

Noise Measurement
Field Data

Project Name: Islamic Community Center of Redlands Date: 1-Nov-16

Project #: 6416a

Noise Measurement #: NM1 **3099 LxT_Data.092 .xlsx** Technician: **Ian Edward Gallagher**

Nearest Address or Cross Street: **Amherst Ct & Columbia Ct**

Site Description (Type of Existing Land Use and any other notable features) **Farmland with residential development, area contains two track railroad and one flood control channel**

Weather: Mostly cloudy skies **Settings:** **SLOW** **FAST** (Circle one)

Temperature: 62 deg F **Wind: Calm to 2mph** **Humidity:59%** **Terrain:** **FLAT**

Start Time: **12:46 PM** **End Time:** **12:56 PM** **Run Time:** **10 MIN**

Leq:	41.7 **dB**	**Primary Noise Source:**	**The occasional residential car driving by.**
Lmax	52.5 **dB**		
L2	47.8 **dB**	**Secondary Noise Sources:**	Birdsong, reverse alarm on some large vehicle being operated at some
L8	45.6 **dB**		**distance, overhead aircraft, both jet and propellor. Pretty peaceful.**
L25	42.7 **dB**		
L50	39.6 **dB**		

NOISE METER:	SoundTrack LxT Class 1	**CALIBRATOR:**	Larson Davis CAL250 Acoustic Calibrator
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LxT1	**MODEL:**	Cal250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2723
FACTORY CALIBRATION DATE:	11/4/2014	**FACTORY CALIBRATION DATE:**	11/3/2014
FIELD CALIBRATION DATE:	11/1/2016		

Noise Measurement
Field Data

Additional Notes/Sketch

JN6416a NM1

Summary					
File Name	LxT_Data.092				
Serial Number	0003099				
Model	SoundTrack LxT®				
Firmware Version	2.301				
User	Ian Edward Gallagher				
Location	NM1 JN6416a				
Job Description	10 min noise sample				
Measurement Description					
Start	2016-11-01 12:46:30				
Stop	2016-11-01 12:56:30				
Duration	0:10:00.0				
Run Time	0:10:00.0				
Pause	0:00:00.0				
Pre Calibration	2016-11-01 12:45:35				
Post Calibration	None				
Calibration Deviation	---				
Overall Settings					
RMS Weight	A Weighting				
Peak Weight	Z Weighting				
Detector	Slow				
Preamp	PRMLxT1L				
Microphone Correction	Off				
Integration Method	Linear				
OBA Range	Low				
OBA Bandwidth	1/1 and 1/3				
OBA Freq. Weighting	Z Weighting				
OBA Max Spectrum	Bin Max				
Overload	121.3	dB			
Results					
LAeq	41.7	dB			
LAE	69.5	dB			
EA	0.991	µPa²h			
EA8	47.591	µPa²h			
EA40	237.955	µPa²h			
LZpeak (max)	2016-11-01 12:52:27		85.7	dB	
LASmax	2016-11-01 12:51:54		52.5	dB	
LASmin	2016-11-01 12:53:47		34.9	dB	
SEA	-99.9	dB			
			Statistics		
LCeq	55.3	dB	**LAS2.00**	47.8	dB
LAeq	41.7	dB	**LAS8.00**	45.6	dB
LCeq - LAeq	13.5	dB	**LAS25.00**	42.7	dB
LAIeq	45.5	dB	**LAS50.00**	39.6	dB
LAeq	41.7	dB	**LAS66.60**	37.9	dB
LAIeq - LAeq	3.7	dB	**LAS90.00**	36.1	dB

Noise Measurement
Field Data

Project Name:	Islamic Community Center of Redlands	Date:	1-Nov-16
Project #:	6416a		
Noise Measurement #:	NM2 **3099 LxT_Data.094 .xlsx**	Technician:	**Ian Edward Gallagher**
Nearest Address or Cross Street:	**Nevada Street & Beaumont Ave**		
Site Description (Type of Existing Land Use and any other notable features)	**Farmland with residential development, area contains two track railroad and one flood control channel**		
Weather:	Mostly cloudy skies	**Settings:**	**SLOW** **FAST** (Circle one)
Temperature: 64 deg F	**Wind: 4 to 6mph** **Humidity:54%**	**Terrain:**	**FLAT**
Start Time:	**1:26 PM** **End Time:** **1:36 PM**	**Run Time:**	**10 MIN**

Leq:	58.8 **dB**	**Primary Noise Source:**	**Traffic along Beaumont Avenue (Nevada Street closed)**
Lmax	74.6 **dB**		
L2	69.5 **dB**	**Secondary Noise Sources:**	Some kind of maintenance going on parallel to rail road track. Large
L8	61.9 **dB**		**vehicle in operation going back and forth wirh reverse alarm.**
L25	55.3 **dB**		**Bird song, wind in trees, leaves rustling, overhead aircraft.**
L50	52.7 **dB**		

NOISE METER:	SoundTrack LxT Class 1	**CALIBRATOR:**	Larson Davis CAL250 Acoustic Calibrator
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LxT1	**MODEL:**	Cal250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2723
FACTORY CALIBRATION DATE:	11/4/2014	**FACTORY CALIBRATION DATE:**	11/3/2014
FIELD CALIBRATION DATE:	11/1/2016		

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Noise Measurement
Field Data

Additional Notes/Sketch

JN6416a NM2

Summary						
File Name	LxT_Data.094					
Serial Number	0003099					
Model	SoundTrack LxT®					
Firmware Version	2.301					
User	Ian Edward Gallagher					
Location	NM2 JN6416a					
Job Description	10 min noise sample					
Measurement Description						
Start	2016-11-01 13:26:39					
Stop	2016-11-01 13:36:39					
Duration	0:10:00.0					
Run Time	0:10:00.0					
Pause	0:00:00.0					
Pre Calibration	2016-11-01 13:09:35					
Post Calibration	None					
Calibration Deviation	---					
Overall Settings						
RMS Weight	A Weighting					
Peak Weight	Z Weighting					
Detector	Slow					
Preamp	PRMLxT1L					
Microphone Correction	Off					
Integration Method	Linear					
OBA Range	Low					
OBA Bandwidth	1/1 and 1/3					
OBA Freq. Weighting	Z Weighting					
OBA Max Spectrum	Bin Max					
Overload	121.3 dB					
Results						
LAeq	58.8 dB					
LAE	86.6 dB					
EA	50.948 µPa²h					
EA8	2.446 mPa²h					
EA40	12.228 mPa²h					
LZpeak (max)	2016-11-01 13:26:50		101.1 dB			
LASmax	2016-11-01 13:30:50		74.6 dB			
LASmin	2016-11-01 13:28:55		43.1 dB			
SEA	-99.9 dB					
				Statistics		
LCeq	66.3 dB			**LAS2.00**	69.5 dB	
LAeq	58.8 dB			**LAS8.00**	61.9 dB	
LCeq - LAeq	7.5 dB			**LAS25.00**	55.3 dB	
LAIeq	62.0 dB			**LAS50.00**	52.7 dB	
LAeq	58.8 dB			**LAS66.60**	50.8 dB	
LAIeq - LAeq	3.1 dB			**LAS90.00**	47.2 dB	

Noise Measurement
Field Data

Project Name: Islamic Community Center of Redlands Date: 1-Nov-16

Project #: 6416a

Noise Measurement #: NM3 **3099 LxT_Data.095 .xlsx** Technician: **Ian Edward Gallagher**

Nearest Address or Cross Street: **Nevada Street & San Timoteo Canyon Road**

Site Description (Type of Existing Land Use and any other notable features) **Farmland with residential development, area contains two track railroad and one flood control channel**

Weather: Mostly cloudy skies **Settings:** **SLOW** **FAST** (Circle one)

Temperature: 66 deg F **Wind: 2 to 4mph** **Humidity:54%** **Terrain:** **FLAT**

Start Time: **2:03 PM** **End Time:** **2:13 PM** **Run Time:** **10 MIN**

Leq:	66.7 **dB**	**Primary Noise Source:**	**Traffic along San Timoteo Canyon Road (Nevada Street closed)**
Lmax	80.3 **dB**		Busy road.
L2	75.9 **dB**	**Secondary Noise Sources:**	Bird song, wind in trees, horse noises, overhead aircraft
L8	70.1 **dB**		
L25	65.8 **dB**		
L50	63.1 **dB**		

NOISE METER:	SoundTrack LxT Class 1	**CALIBRATOR:**	Larson Davis CAL250 Acoustic Calibrator
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LxT1	**MODEL:**	Cal250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2723
FACTORY CALIBRATION DATE:	11/4/2014	**FACTORY CALIBRATION DATE:**	11/3/2014
FIELD CALIBRATION DATE:	11/1/2016		

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Noise Measurement
Field Data

Additional Notes/Sketch

JN6416a NM3

Summary					
File Name	LxT_Data.095				
Serial Number	0003099				
Model	SoundTrack LxT®				
Firmware Version	2.301				
User	Ian Edward Gallagher				
Location	NM3 JN6416a				
Job Description	10 min noise sample				
Measurement Description					
Start	2016-11-01 14:03:30				
Stop	2016-11-01 14:13:30				
Duration	0:10:00.0				
Run Time	0:10:00.0				
Pause	0:00:00.0				
Pre Calibration	2016-11-01 14:03:01				
Post Calibration	None				
Calibration Deviation	---				
Overall Settings					
RMS Weight	A Weighting				
Peak Weight	Z Weighting				
Detector	Slow				
Preamp	PRMLxT1L				
Microphone Correction	Off				
Integration Method	Linear				
OBA Range	Low				
OBA Bandwidth	1/1 and 1/3				
OBA Freq. Weighting	Z Weighting				
OBA Max Spectrum	Bin Max				
Overload	121.3	dB			
Results					
LAeq	66.7	dB			
LAE	94.5	dB			
EA	310.339	µPa²h			
EA8	14.896	mPa²h			
EA40	74.481	mPa²h			
LZpeak (max)	2016-11-01 14:12:40		104.6	dB	
LASmax	2016-11-01 14:12:38		80.3	dB	
LASmin	2016-11-01 14:13:29		44.7	dB	
SEA	-99.9	dB			
			Statistics		
LCeq	77.5	dB	**LAS2.00**	75.9	dB
LAeq	66.7	dB	**LAS8.00**	70.1	dB
LCeq - LAeq	10.8	dB	**LAS25.00**	65.8	dB
LAIeq	67.9	dB	**LAS50.00**	63.1	dB
LAeq	66.7	dB	**LAS66.60**	60.5	dB
LAIeq - LAeq	1.2	dB	**LAS90.00**	53.1	dB

APPENDIX D

RCNM Noise Modeling Output

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/25/2016
Case Description: 6416a Islamic Community Center of Redlands

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential	Residential	65	65	45

Equipment Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		85	0
Backhoe	No	40		77.6	125	0
Dump Truck	No	40		76.5	175	0
Dozer	No	40		81.7	225	0
Excavator	No	40		80.7	250	0

		Calculated (dBA)		Results
Equipment		*Lmax	Leq	Day Lmax
Grader		80.4	76.4	N/A
Backhoe		69.6	65.6	N/A
Dump Truck		65.6	61.6	N/A
Dozer		68.6	64.6	N/A
Excavator		66.7	62.8	N/A
	Total	80.4	77.3	N/A

*Calculated Lmax is the Loudest value.

APPENDIX E

Project Generated Traffic
FHWA Worksheets

FHWA Sound32 Spreadsheet

Existing Traffic Noise

Project: **6416a Islamic Community Center of Redlands**

Road: **Barton Road**

Segment: **West of San Timoteo Canyon Road**

	DAYTIME			EVENING			NIGHTTIME			ADT	25000.00
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	SPEED	45.00
										DISTANCE	75.00
INPUT PARAMETERS											
Vehicles per hour	1447.92	30.00	50.00	1075.00	5.00	8.33	266.67	41.67	69.44	% A	92
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	3
NOISE CALCULATIONS											
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14	% HT	5
ADJUSTMENTS											
Flow	24.77	7.93	10.15	23.48	0.15	2.37	17.42	9.36	11.58		
Distance	-1.83	-1.83	-1.83	-1.83	-1.83	-1.83	-1.83	-1.83	-1.83	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	75.13
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	69.83
LEQ	67.28	58.72	65.46	65.99	50.94	57.68	59.94	60.15	66.89	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	69.83		EVENING LEQ	66.70		NIGHT LEQ	68.39		Use hour?	no
										GRADE dB	0.00
		CNEL	**75.13**								

FHWA Sound32 Spreadsheet

Existing Plus Project Traffic Noise

Project: **6416a Islamic Community Center of Redlands**
Road: **Barton Road**
Segment: **West of San Timoteo Canyon Road**

	DAYTIME			EVENING			NIGHTTIME			ADT	25299.94
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	SPEED	45.00
										DISTANCE	75.00
INPUT PARAMETERS											
Vehicles per hour	1466.31	30.22	50.09	1088.66	5.04	8.35	270.05	41.97	69.57	% A	92.06
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	2.99
NOISE CALCULATIONS											
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14	% HT	4.95
ADJUSTMENTS											
Flow	24.82	7.97	10.16	23.53	0.18	2.38	17.48	9.39	11.59		
Distance	-1.83	-1.83	-1.83	-1.83	-1.83	-1.83	-1.83	-1.83	-1.83	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	75.15
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	69.86
LEQ	67.34	58.76	65.47	66.04	50.97	57.69	59.99	60.18	66.90	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	69.86		EVENING LEQ	66.75		NIGHT LEQ	68.41		Use hour?	no
										GRADE dB	0.00
		CNEL	**75.15**								

FHWA Sound32 Spreadsheet

Existing Traffic Noise

Project: **6416a Islamic Community Center of Redlands**

Road: **Barton Road**

Segment: **East of San Timoteo Canyon Road**

	DAYTIME			EVENING			NIGHTTIME			ADT	23000.00
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	SPEED	45.00
										DISTANCE	75.00
INPUT PARAMETERS											
Vehicles per hour	1332.08	27.60	46.00	989.00	4.60	7.67	245.33	38.33	63.89	% A	92
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	3
NOISE CALCULATIONS											
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14	% HT	5
ADJUSTMENTS											
Flow	24.41	7.57	9.79	23.11	-0.21	2.01	17.06	9.00	11.22		
Distance	-1.83	-1.83	-1.83	-1.83	-1.83	-1.83	-1.83	-1.83	-1.83	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	74.76
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	69.47
LEQ	66.92	58.36	65.10	65.63	50.58	57.32	59.57	59.79	66.53	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	69.47		EVENING LEQ	66.34		NIGHT LEQ	68.03		Use hour?	no
										GRADE dB	0.00
		CNEL	**74.76**								

FHWA Sound32 Spreadsheet

Existing Plus Project Traffic Noise

Project: **6416a Islamic Community Center of Redlands**
Road: **Barton Road**
Segment: **East of San Timoteo Canyon Road**

	DAYTIME			EVENING			NIGHTTIME			ADT	23299.94
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	SPEED	45.00
										DISTANCE	75.00
INPUT PARAMETERS											
Vehicles per hour	1350.48	27.82	46.09	1002.66	4.64	7.68	248.72	38.64	64.01	% A	92.07
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	2.99
NOISE CALCULATIONS											
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14	% HT	4.95
ADJUSTMENTS											
Flow	24.47	7.61	9.80	23.17	-0.18	2.02	17.12	9.03	11.22		
Distance	-1.83	-1.83	-1.83	-1.83	-1.83	-1.83	-1.83	-1.83	-1.83	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	74.79
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	69.51
LEQ	66.98	58.40	65.11	65.69	50.62	57.33	59.63	59.82	66.54	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	69.51		EVENING LEQ	66.39		NIGHT LEQ	68.05		Use hour?	no
										GRADE dB	0.00
		CNEL	**74.79**								

FHWA Sound32 Spreadsheet

Existing Traffic Noise

Project: **6416a Islamic Community Center of Redlands**

Road: **Beaumont Avenue**

Segment: **West of Nevada Street**

	DAYTIME			EVENING			NIGHTTIME			ADT	2700.00
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	SPEED	35.00
										DISTANCE	50.00
INPUT PARAMETERS											
Vehicles per hour	156.38	3.24	5.40	116.10	0.54	0.90	28.80	4.50	7.50	% A	92
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	3
NOISE CALCULATIONS											
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05	% HT	5
ADJUSTMENTS											
Flow	16.20	-0.64	1.58	14.90	-8.42	-6.20	8.85	0.79	3.00		
Distance	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	65.69
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	59.80
LEQ	56.23	49.12	56.55	54.94	41.34	48.77	48.89	50.54	57.98	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	59.80		EVENING LEQ	56.03		NIGHT LEQ	59.13		Use hour?	no
										GRADE dB	0.00
		CNEL	**65.69**								

FHWA Sound32 Spreadsheet

Existing Plus Project Traffic Noise

Project: **6416a Islamic Community Center of Redlands**
Road: **Beaumont Avenue**
Segment: **West of Nevada Street**

	DAYTIME			EVENING			NIGHTTIME			ADT	2799.98
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	SPEED	35.00
										DISTANCE	50.00
INPUT PARAMETERS											
Vehicles per hour	162.51	3.31	5.43	120.65	0.55	0.90	29.93	4.60	7.54	% A	92.19
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	2.96
NOISE CALCULATIONS											
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05	% HT	4.85
ADJUSTMENTS											
Flow	16.36	-0.54	1.60	15.07	-8.33	-6.18	9.01	0.88	3.03		
Distance	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	65.75
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	59.89
LEQ	56.40	49.21	56.58	55.11	41.43	48.80	49.05	50.64	58.00	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	59.89		EVENING LEQ	56.17		NIGHT LEQ	59.18		Use hour?	no
										GRADE dB	0.00
		CNEL	**65.75**								

FHWA Sound32 Spreadsheet

Existing Traffic Noise

Project: **6416a Islamic Community Center of Redlands**

Road: **Beaumont Avenue**

Segment: **East of Nevada Street**

	DAYTIME			EVENING			NIGHTTIME			ADT	2100.00
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	SPEED	35.00
										DISTANCE	60.00
INPUT PARAMETERS											
Vehicles per hour	121.63	2.52	4.20	90.30	0.42	0.70	22.40	3.50	5.83	% A	92
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	3
NOISE CALCULATIONS											
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05	% HT	5
ADJUSTMENTS											
Flow	15.10	-1.73	0.49	13.81	-9.51	-7.30	7.76	-0.31	1.91		
Distance	-0.86	-0.86	-0.86	-0.86	-0.86	-0.86	-0.86	-0.86	-0.86	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	63.81
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	57.91
LEQ	54.35	47.23	54.67	53.06	39.45	46.89	47.00	48.66	56.10	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	57.91		EVENING LEQ	54.15		NIGHT LEQ	57.25		Use hour?	no
										GRADE dB	0.00
		CNEL	**63.81**								

FHWA Sound32 Spreadsheet

Existing Plus Project Traffic Noise

Project: **6416a Islamic Community Center of Redlands**
Road: **Beaumont Avenue**
Segment: **East of Nevada Street**

	DAYTIME			EVENING			NIGHTTIME			ADT	2199.98
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	SPEED	35.00
										DISTANCE	60.00
INPUT PARAMETERS											
Vehicles per hour	127.76	2.59	4.23	94.85	0.43	0.70	23.53	3.60	5.87	% A	92.25
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	2.95
NOISE CALCULATIONS											
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05	% HT	4.81
ADJUSTMENTS											
Flow	15.32	-1.61	0.52	14.02	-9.39	-7.27	7.97	-0.18	1.94		
Distance	-0.86	-0.86	-0.86	-0.86	-0.86	-0.86	-0.86	-0.86	-0.86	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	63.88
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	58.03
LEQ	54.57	47.36	54.70	53.27	39.58	46.92	47.22	48.79	56.13	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	58.03		EVENING LEQ	54.32		NIGHT LEQ	57.31		Use hour?	no
										GRADE dB	0.00
		CNEL	**63.88**								

FHWA Sound32 Spreadsheet

Existing Traffic Noise

Project: **6416a Islamic Community Center of Redlands**

Road: **San Timoteo Canyon Road**

Segment: **Between Barton Road and Nevada Street**

	DAYTIME			EVENING			NIGHTTIME			ADT	7500.00
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	SPEED	45.00
										DISTANCE	50.00
INPUT PARAMETERS											
Vehicles per hour	459.97	5.62	2.19	339.93	1.00	1.00	85.14	7.50	2.92	% A	97.4
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	1.84
NOISE CALCULATIONS											
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14	% HT	0.74
ADJUSTMENTS											
Flow	19.79	0.66	-3.44	18.48	-6.85	-6.83	12.46	1.91	-2.19		
Distance	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	67.97
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	64.76
LEQ	64.06	53.22	53.63	62.75	45.71	50.24	56.74	54.46	54.88	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	64.76		EVENING LEQ	63.07		NIGHT LEQ	60.25		Use hour?	no
										GRADE dB	0.00
		CNEL	**67.97**								

FHWA Sound32 Spreadsheet

Existing Plus Project Traffic Noise

Project: **6416a Islamic Community Center of Redlands**
Road: **San Timoteo Canyon Road**
Segment: **Between Barton Road and Nevada Street**

	DAYTIME			EVENING			NIGHTTIME			ADT	8099.88
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	SPEED	45.00
										DISTANCE	50.00
INPUT PARAMETERS											
Vehicles per hour	496.77	6.07	2.36	367.12	1.08	1.08	91.96	8.10	3.15	% A	97.40
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	1.84
NOISE CALCULATIONS											
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14	% HT	0.74
ADJUSTMENTS											
Flow	20.12	1.00	-3.10	18.81	-6.51	-6.50	12.80	2.25	-1.85		
Distance	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	68.31
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	65.09
LEQ	64.40	53.55	53.97	63.08	46.04	50.57	57.07	54.80	55.22	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	65.09		EVENING LEQ	63.40		NIGHT LEQ	60.58		Use hour?	no
										GRADE dB	0.00
		CNEL	**68.31**								

FHWA Sound32 Spreadsheet

Existing Traffic Noise

Project: **6416a Islamic Community Center of Redlands**

Road: **Nevada Street**

Segment: **South of San Timoteo Canyon Road**

	DAYTIME			EVENING			NIGHTTIME			ADT	900.00
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	SPEED	45.00
										DISTANCE	95.00
INPUT PARAMETERS											
Vehicles per hour	55.20	0.67	0.26	40.79	0.12	0.12	10.22	0.90	0.35	% A	97.4
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	1.84
NOISE CALCULATIONS											
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14	% HT	0.74
ADJUSTMENTS											
Flow	10.58	-8.55	-12.65	9.27	-16.05	-16.04	3.26	-7.30	-11.40		
Distance	-2.86	-2.86	-2.86	-2.86	-2.86	-2.86	-2.86	-2.86	-2.86	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	55.98
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	52.76
LEQ	52.07	41.22	41.64	50.75	33.71	38.24	44.74	42.47	42.89	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	52.76		EVENING LEQ	51.07		NIGHT LEQ	48.25		Use hour?	no
										GRADE dB	0.00
		CNEL	**55.98**								

FHWA Sound32 Spreadsheet

Existing Plus Project Traffic Noise

Project: **6416a Islamic Community Center of Redlands**
Road: **Nevada Street**
Segment: **South of San Timoteo Canyon Road**

	DAYTIME			EVENING			NIGHTTIME			ADT	1499.88
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	SPEED	45.00
										DISTANCE	95.00
INPUT PARAMETERS											
Vehicles per hour	91.99	1.12	0.44	67.99	0.20	0.20	17.03	1.50	0.58	% A	97.41
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	1.84
NOISE CALCULATIONS											
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14	% HT	0.74
ADJUSTMENTS											
Flow	12.80	-6.33	-10.43	11.49	-13.84	-13.82	5.47	-5.08	-9.18		
Distance	-2.86	-2.86	-2.86	-2.86	-2.86	-2.86	-2.86	-2.86	-2.86	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	58.19
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	54.98
LEQ	54.29	43.44	43.86	52.97	35.93	40.46	46.96	44.69	45.11	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	54.98		EVENING LEQ	53.29		NIGHT LEQ	50.47		Use hour?	no
										GRADE dB	0.00
		CNEL	**58.19**								

FHWA Sound32 Spreadsheet
Riverside County Published Mix
For Secondary and Smaller

Nevada Street (Social Pod)
Future Traffic Noise

	DAYTIME			EVENING			NIGHTTIME				
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	ADT	1600.00
										SPEED	45.00
										DISTANCE	50.00
INPUT PARAMETERS											
Vehicles per hour	98.13	1.19	0.47	72.52	0.21	0.21	18.16	1.57	0.62	% A	97.40
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	% MT	1.84
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	% HT	0.74
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	LEFT	-90.00
										RIGHT	90.00
NOISE CALCULATIONS											
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14	CNEL	61.25
ADJUSTMENTS										DAY LEQ	58.04
Flow	13.08	-6.08	-10.15	11.77	-13.56	-13.54	5.75	-4.88	-8.90		
Distance	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	Day hour	89.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Absorbtive?	no
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	Use hour?	no
LEQ	57.35	46.47	46.92	56.04	39.00	43.53	50.03	47.67	48.17	GRADE dB	0.00

DAY LEQ	58.04	EVENING LEQ	56.36	NIGHT LEQ	53.52	
CNEL	**61.25**					

FHWA Sound32 Spreadsheet
Riverside County Published Mix
For Secondary and Smaller

Nevada Street (Masjid)
Future Traffic Noise

	DAYTIME			EVENING			NIGHTTIME				
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	ADT	1600.00
										SPEED	45.00
										DISTANCE	147.00
INPUT PARAMETERS											
Vehicles per hour	98.13	1.19	0.47	72.52	0.21	0.21	18.16	1.57	0.62	% A	97.40
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	% MT	1.84
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	% HT	0.74
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	LEFT	-90.00
										RIGHT	90.00
NOISE CALCULATIONS											
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14	CNEL	56.56
ADJUSTMENTS										DAY LEQ	53.36
Flow	13.08	-6.08	-10.15	11.77	-13.56	-13.54	5.75	-4.88	-8.90		
Distance	-4.75	-4.75	-4.75	-4.75	-4.75	-4.75	-4.75	-4.75	-4.75	Day hour	89.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Absorbtive?	no
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	Use hour?	no
LEQ	52.67	41.78	42.24	51.36	34.31	38.84	45.35	42.99	43.49	GRADE dB	0.00

DAY LEQ 53.36 EVENING LEQ 51.67 NIGHT LEQ 48.84

CNEL **56.56**

FHWA Sound32 Spreadsheet
Riverside County Published Mix
Larger than Secondary

Beaumont Avenue (Social Pod)
Future Traffic Noise

	DAYTIME			EVENING			NIGHTTIME				
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	ADT	3600.00
										SPEED	35.00
										DISTANCE	291.00
INPUT PARAMETERS											
Vehicles per hour	208.49	4.32	7.20	154.78	0.72	1.20	38.38	6.00	10.00	% A	92.00
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	% MT	3.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	% HT	5.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	LEFT	-90.00
										RIGHT	90.00
NOISE CALCULATIONS											
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05	CNEL	59.29
ADJUSTMENTS										DAY LEQ	53.40
Flow	17.44	0.61	2.83	16.15	-7.17	-4.95	10.09	2.03	4.25		
Distance	-7.72	-7.72	-7.72	-7.72	-7.72	-7.72	-7.72	-7.72	-7.72	Day hour	89.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Absorbtive?	no
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	Use hour?	no
LEQ	49.83	42.72	50.15	48.54	34.94	42.37	42.49	44.14	51.58	GRADE dB	0.00

DAY LEQ	53.40	EVENING LEQ	49.63	NIGHT LEQ	52.73	
CNEL	**59.29**					

FHWA Sound32 Spreadsheet
Riverside County Published Mix
Larger than Secondary

Beaumont Avenue (Soccer/Football Field & Basketball Courts)
Future Traffic Noise

	DAYTIME			EVENING			NIGHTTIME				
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	ADT	3600.00
										SPEED	35.00
										DISTANCE	353.00
INPUT PARAMETERS											
Vehicles per hour	208.49	4.32	7.20	154.78	0.72	1.20	38.38	6.00	10.00	% A	92.00
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	% MT	3.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	% HT	5.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	LEFT	-90.00
										RIGHT	90.00
NOISE CALCULATIONS											
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05	CNEL	58.45
ADJUSTMENTS										DAY LEQ	52.56
Flow	17.44	0.61	2.83	16.15	-7.17	-4.95	10.09	2.03	4.25		
Distance	-8.56	-8.56	-8.56	-8.56	-8.56	-8.56	-8.56	-8.56	-8.56	Day hour	89.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Absorbtive?	no
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	Use hour?	no
LEQ	49.00	41.88	49.31	47.70	34.10	41.53	41.65	43.31	50.74	GRADE dB	0.00

DAY LEQ 52.56 EVENING LEQ 48.79 NIGHT LEQ 51.89

CNEL **58.45**

FHWA Sound32 Spreadsheet
Riverside County Published Mix
Larger than Secondary

Beaumont Avenue (Fountain Court)
Future Traffic Noise

	DAYTIME			EVENING			NIGHTTIME				
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	ADT	3600.00
										SPEED	35.00
										DISTANCE	373.00
INPUT PARAMETERS											
Vehicles per hour	208.49	4.32	7.20	154.78	0.72	1.20	38.38	6.00	10.00	% A	92.00
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	% MT	3.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	% HT	5.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	LEFT	-90.00
										RIGHT	90.00
NOISE CALCULATIONS											
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05	CNEL	58.21
ADJUSTMENTS										DAY LEQ	52.32
Flow	17.44	0.61	2.83	16.15	-7.17	-4.95	10.09	2.03	4.25		
Distance	-8.80	-8.80	-8.80	-8.80	-8.80	-8.80	-8.80	-8.80	-8.80	Day hour	89.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Absorbtive?	no
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	Use hour?	no
LEQ	48.76	41.64	49.08	47.46	33.86	41.29	41.41	43.07	50.50	GRADE dB	0.00

DAY LEQ 52.32 EVENING LEQ 48.55 NIGHT LEQ 51.65

CNEL **58.21**

FHWA Sound32 Spreadsheet
Riverside County Published Mix
Larger than Secondary

Beaumont Avenue (Educational Pod)
Future Traffic Noise

	DAYTIME			EVENING			NIGHTTIME				
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	ADT	3600.00
										SPEED	35.00
										DISTANCE	380.00
INPUT PARAMETERS											
Vehicles per hour	208.49	4.32	7.20	154.78	0.72	1.20	38.38	6.00	10.00	% A	92.00
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	% MT	3.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	% HT	5.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	LEFT	-90.00
										RIGHT	90.00
NOISE CALCULATIONS											
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05	CNEL	58.13
ADJUSTMENTS										DAY LEQ	52.24
Flow	17.44	0.61	2.83	16.15	-7.17	-4.95	10.09	2.03	4.25		
Distance	-8.88	-8.88	-8.88	-8.88	-8.88	-8.88	-8.88	-8.88	-8.88	Day hour	89.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Absorbtive?	no
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	Use hour?	no
LEQ	48.68	41.56	48.99	47.38	33.78	41.21	41.33	42.98	50.42	GRADE dB	0.00

DAY LEQ 52.24 EVENING LEQ 48.47 NIGHT LEQ 51.57

CNEL **58.13**

Kunzman Associates, Inc.

OVER 40 YEARS OF EXCELLENT SERVICE

1111 Town & Country Road, Suite 34
Orange, California 92868
(714) 973-8383

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