KUNZMAN ASSOCIATES, INC.

REDLANDS DISTRIBUTION CENTER 13

NOISE IMPACT ANALYSIS

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Redlands Distribution Center 13

Noise Impact Analysis

This report was prepared for the Redlands Distribution Center 13 project located on Alabama Street between Palmetto Avenue and Riverbluff Avenue, approximately 1,500 feet west of the I-210 Freeway, in an unincorporated area of the County of San Bernardino. The project site is proposed to be developed with 389,327 square feet of high-cube warehouse distribution center land use.

This noise impact analysis contains documentation of existing noise levels as well as analysis of the impacts generated by project operation and traffic. Each of these topics is contained in a separate section of the report. In this way, information on any particular aspect of the study can be easily located by the reader.

Although this is a technical report, every effort has been made to write the report clearly and concisely. To assist the reader with terms unique to acoustics, a definition of terms has been provided in Section II.

I. Introduction and Setting

A. Purpose and Objectives

This study was performed to address the possibility of significant impacts due to noise. The objectives of the study include:

- documentation of existing noise conditions
- discussion of noise modeling methodology and procedures
- analysis of noise and vibration generated by the construction of the project
- analysis of noise generated by the typical operation of the project
- analysis of noise affecting nearby sensitive receptors due to increased traffic produced by the project
- recommendations for mitigation measures

B. Project Location

The proposed development is located on Alabama Avenue between Palmetto Avenue and Riverbluff Avenue, approximately 1,500 west of the I-210 Freeway, in an unincorporated area of the County of San Bernardino. A vicinity map showing the project location is provided on Figure 1.

C. Project Description

The project site is proposed to be developed with 389,327 square feet of high-cube warehouse distribution center land use. Figure 2 illustrates the project site plan. Project auto and truck traffic will have access to Palmetto Avenue and River Bluff Avenue.

Figure 1
Project Location Map

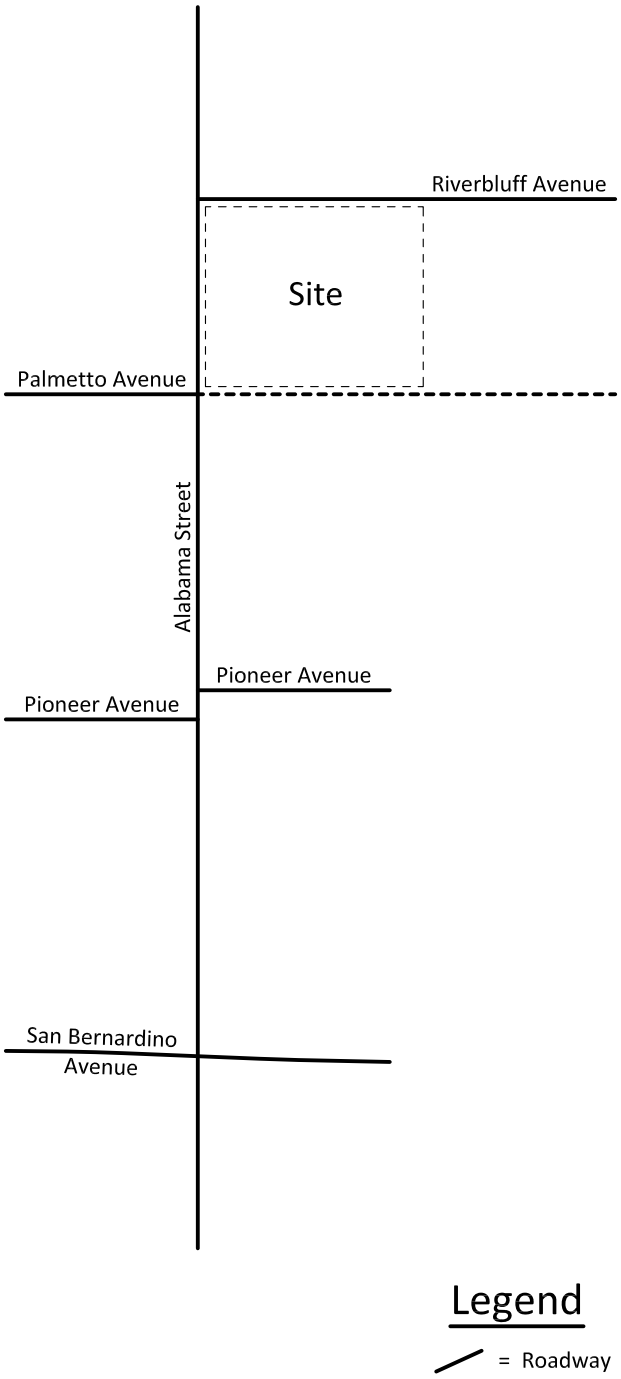

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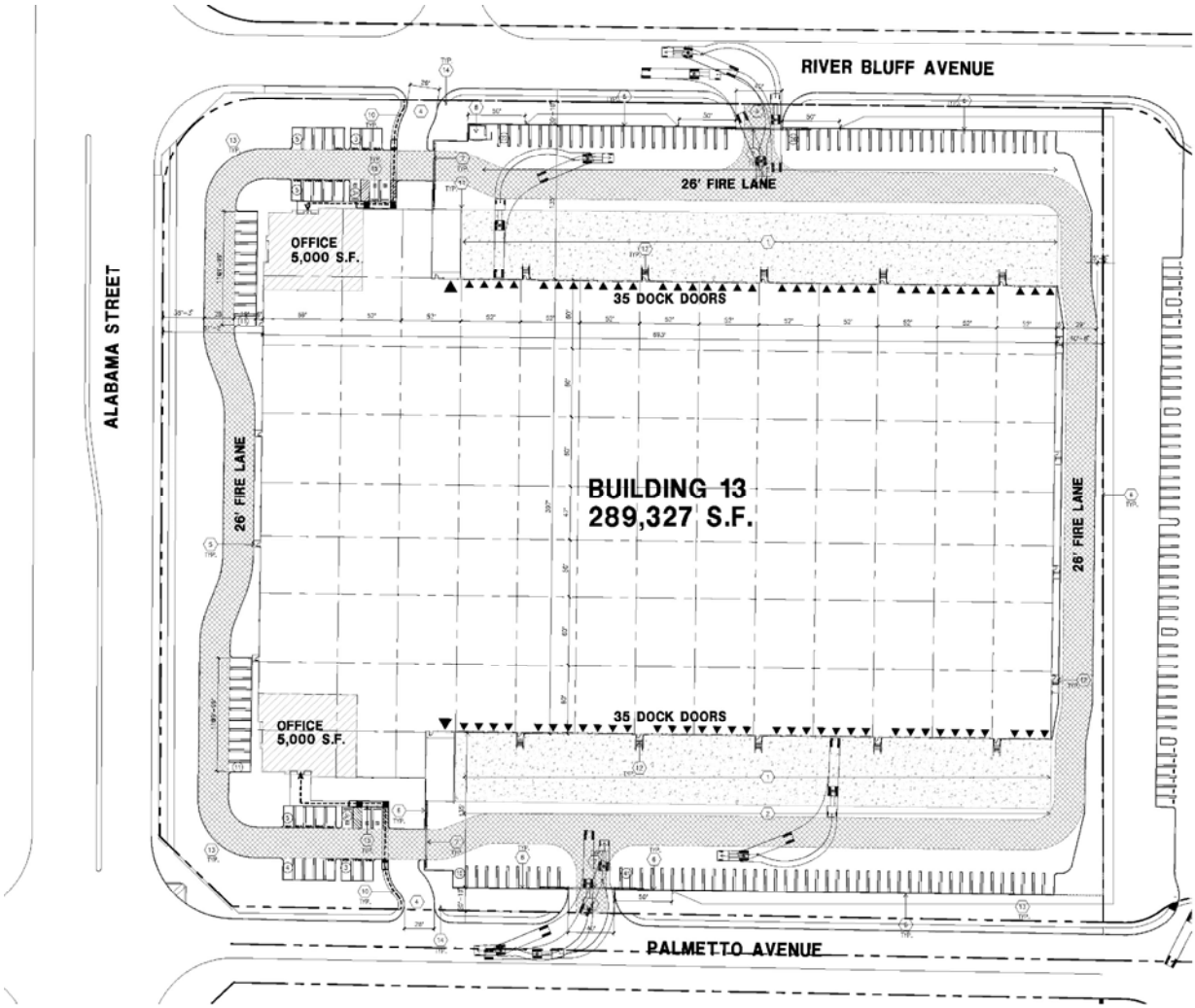
Figure 2
Site Plan



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II. Existing Noise Environment

A. Noise Sources

Primary noise sources in the project area consist of vehicular traffic on adjacent roadways and operational noise from an existing distribution center.

B. Sensitive Noise Receptors

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, and residential uses make up the majority of these areas. The nearest sensitive receptors are a single-family detached residential dwelling unit approximately 1,000 feet to the south and a high school nearly one half mile to the east.

C. Noise Measurement

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 on January 8, 2013. Three 15-minute noise measurements were taken between 12:00 and 1:30 PM at the project site and at an existing adjacent sensitive receptor, as shown on Figure 3. Ambient noise levels are presented in Table 1, and measurement output data is included within Appendix A.

Table 1

Ambient Noise Levels[1]

Name	Time	Measurement Period	Description	Existing Ambient Noise Levels (dBA)					
				L_{eq}	L_{max}	L_2	L_8	L_{25}	L_{50}
M1	12:15-12:30 PM	15 min	Along eastern side of proposed project site, halfway between River Bluff and Palmetto Avenues	51.6	66.1	60.6	52.9	50.9	49.6
M2	12:35-12:50 PM	15 min	At NW corner of project site, 100' E of Alabama Street and 100' S of River Bluff Avenue	55.5	68.7	62.2	59.0	56.0	53.9
M3	12:55-1:10PM	15 min	27358 E Pioneer Avenue, adjacent to existing single family home, S of project site.	54.6	71.9	63.6	58.3	52.1	49.0

[1] Source: Site Visit, Kunzman Associates, Inc. (January 8, 2012).

Figure 3
Noise Measurement Locations

Legend

⊗ = Measurement Location

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III. Definition of Terms

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 Table 2. 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 dBA or dBA.

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 4 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 $L_{eq,}$ or the equivalent continuous 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.

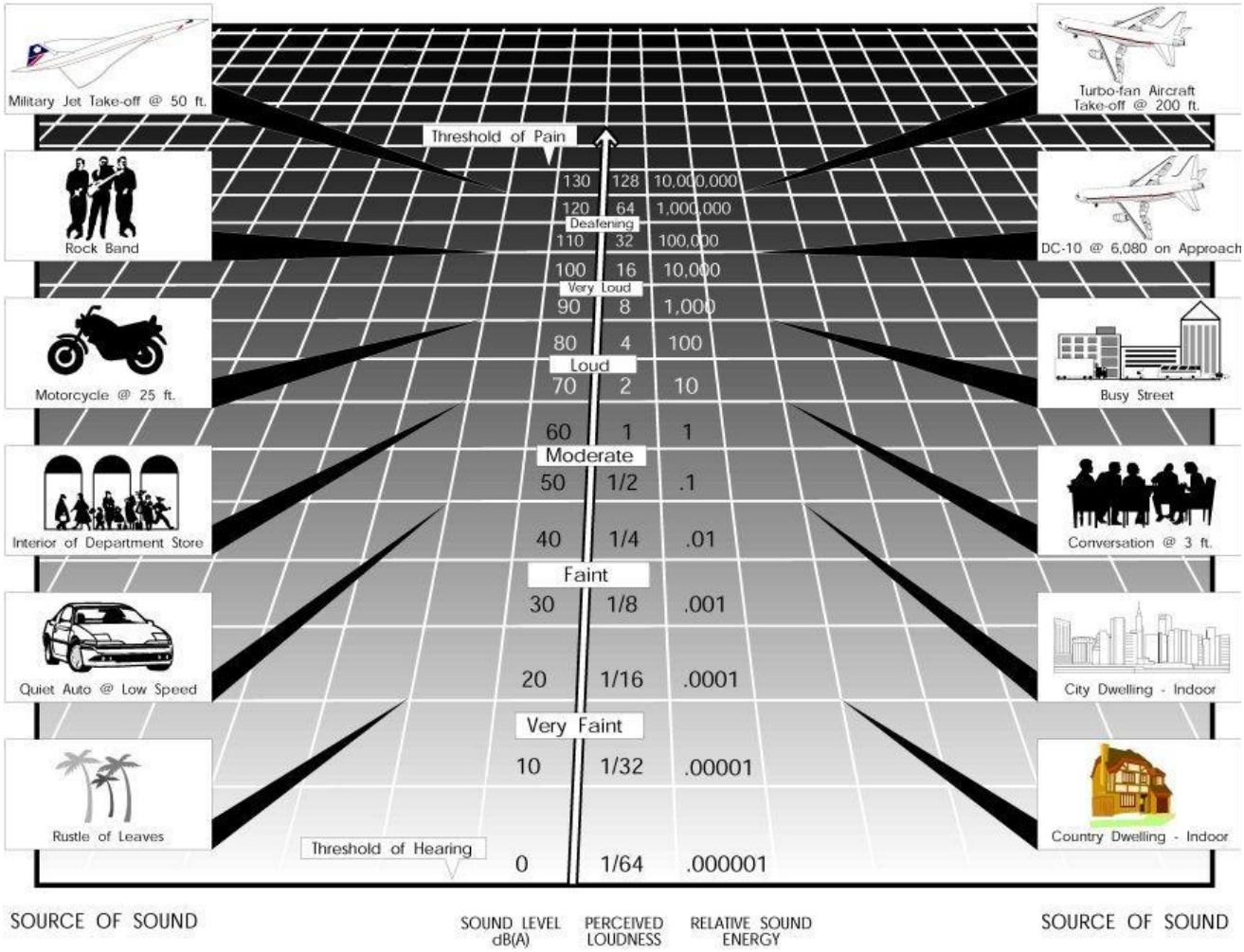
Table 2

Definitions of Acoustical Terms[1]

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.

[1] Adapted from: Cyril M. Harris; Handbook of Acoustical Measurement and Noise Control, 1991.

Figure 4
Common Noise Sources and Noise Levels



Source: County of Riverside General Plan Noise Element

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IV. Analytical Methodology and Model Parameters

A. Noise Modeling and Input

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

Existing and Existing Plus Project noise levels along 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. Existing traffic volumes were provided by Kunzman Associates, Inc. Roadway parameters including vehicle speed and mix that were utilized for this analysis are presented in Table 3.

The City of Redlands and the County of San Bernardino do not have truck mixes or Day/Evening/Night (D/E/N) splits published for use in acoustical studies. Vehicle mix was calculated for the road segments with traffic count data. Those segments without traffic count data were assigned one (of two) mixes as recommended by the Riverside County Department of Industrial Hygiene for noise modeling. Existing Plus Project mixes were calculated by adding the proposed project trips to existing conditions. Riverside County D/E/N splits were used for each roadway.

2. Road Construction Noise Model (RCNM)

A worst-case construction noise scenario was modeled using the Federal Highway Administration's Roadway Construction Noise Model (RCNM). Modeling parameters and output are provided in Appendix B. RCNM utilizes standard noise emission levels for many different types of equipment and includes utilization percentage, impact, and shielding parameters. RCNM was also utilized to model a worst-case operational noise scenario. Output worksheets for the operational analysis are also included in Appendix B.

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. The noise levels and frequency profiles for several sources typical to distribution centers were obtained from a previous noise survey completed by Kunzman Associates, Inc. and entered into the model. These sources included a truck backup alarm, truck/trailer disconnect, trailer being dropped, truck idling, truck accelerating,

and conveyor belts. The noise level resulting from the typical operation of all these sources was then calculated at two sensitive receptor locations. Figures showing the results of the operational noise model are provided in Section VI.

Table 3

Roadway Modeling Parameters[1]

Roadway	Segment	Vehicle Speed (mph)	Existing Truck Mix[2] (%)		
			Autos	Medium Trucks	Heavy Trucks
Alabama Street	South of San Bernardino Avenue	40	92.00	3.00	5.00
Palmetto Avenue	West of Alabama Street	35	89.30	7.10	3.60
Pioneer Avenue	East of Alabama Street	35	96.00	2.30	1.70
San Bernardino Avenue	West of Alabama Street	35	92.00	3.00	5.00
	East of Alabama Street	35	92.00	3.00	5.00

[1] Only roadways with a sensitive receptor within 1000' were considered.

[2] Traffic Mixes for Palmetto and Pioneer Avenues were calculated using traffic counts, all other road segments were assigned Riverside County's standard mix for roadways classified as secondary or larger.

V. Applicable Standards

The proposed project and the closest sensitive receptor are located within an unincorporated area of the County of San Bernardino. A second receptor east of the site lies within the City of Redlands. For the purposes of this study, the project will be evaluated in light of both County of San Bernardino and City of Redlands standards. All applicable standards are presented below by jurisdiction.

B. County of San Bernardino

1. General Plan Noise Element

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 N1: 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.

Policies:

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.

N 1.3) When industrial, commercial, or other land uses, including locally regulated noise sources, are proposed for areas containing noise sensitive land uses, noise levels generated by the proposed use will not exceed the performance standards of Development Code Table 83-2 (see Table 4) within outdoor activity areas.

Programs:

1. Require an acoustical analysis prior to approval of proposed development of new residential or other noise-sensitive land uses in a noise-impacted area or a new noise generating use in an area that could affect existing noise-sensitive land uses. The appropriate time for requiring an acoustical analysis is during the environmental review process so that noise mitigation may

be an integral part of the project design. The acoustical analysis shall:

a. Be the responsibility of the applicant.

b. Be prepared by a qualified person experienced in the fields of environmental noise assessment and architectural acoustics.

c. Include representative noise level measurements with sufficient sampling periods and locations to adequately describe local conditions.

d. Include estimated noise levels in terms of the descriptors shown in Figures II-8 and II-9 of the Noise Background Report for existing and projected future (20 years hence) conditions, with a comparison made to the adopted policies of the Noise Element.

e. Include recommendations for appropriate mitigation to achieve compliance with the adopted policies and standards of the Noise Element. Where the noise source in question consists of intermittent single events, the report must address the effects of maximum noise levels in sleeping rooms in terms of possible sleep disturbance.

f. Include estimates of noise exposure after the prescribed mitigation measures have been implemented. If compliance with the adopted standards and policies of the Noise Element will not be achieved, acoustical information to support a statement of overriding considerations for the project must be provided.

2. Develop and employ procedures to ensure that requirements imposed pursuant to the finding of an acoustical analysis are implemented as part of the project review and building permit processes.

N 1.4) Enforce the state noise insulation standards (California Administrative Code, Title 24) and Chapter 35 of the California Building Code (CBC)[1].

[1] Title 24 requires that an acoustical analysis be prepared for all new developments of multi-family dwellings, condominiums, hotels, and motels proposed for areas within the 60 dB CNEL contour of a major noise source to document that an acceptable interior noise level of 45 dB CNEL or below will be achieved with the windows and doors closed. UBC Chapter 35 requires that common wall and floor/ceiling assemblies within multi-family dwellings comply with minimum standards for the transmission of airborne sound and structure-borne impact noise.

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.

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.

N 1.7) Prevent incompatible land uses, by reason of excessive noise levels, from occurring in the future.

Goal N2: The County will strive to preserve and maintain the quiet environment of mountain, desert and other rural areas.

Policies:

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. 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 Measurement

Noise shall be measured:

(1) At the property line of the nearest site that is occupied by, and/or zoned or designated to allow the development of noise-sensitive land uses;

(2) With a sound level meter that meets the standards of the American National Standards Institute (ANSI Section SI4 1979, Type 1 or Type 2);

(3) Using the "A" weighted sound pressure level scale in decibels (ref. pressure = 20 micronewtons per meter squared). The unit of measure shall be designated as dB(A).

Noise Standards for Stationary Noise Sources

Noise level limits for Stationary Sources, as they affect adjacent properties (Section 83.01.080(c)(1) of County Development Code) are presented in Table 4. They specify a base limit of 55 dBA L_{eq} during the day (7:00 AM to 10:00 PM) and 45 dBA L_{eq} at night (10:00 PM to 7:00 AM).

Increases in Allowable Noise Levels

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.

Construction Noise

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

Noise Standards from Adjacent Mobile Noise Sources

The County of San Bernardino Development Code also sets forth standards for noise generated by mobile sources on adjacent properties. Mobile noise sources on adjacent properties are not to exceed the standards described in Table 5.

B. City of Redlands

1. General Plan Noise Element

The City of Redlands 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 Redlands residents will be protected from excessive noise intrusion, both now and in the future. The General Plan Noise Element sets forth noise/land use compatibility guidelines as shown in Table 6, Land Use/Noise Compatibility Matrix. These guidelines state that for the existing high school to the east of the proposed project, exterior noise levels up to 60 dBA CNEL would be “normally acceptable” and exterior noise levels up to 65 dBA CNEL would be “conditionally acceptable”. These criteria are the basis for the City’s specific noise standards that are presented in Table 7, Interior and Exterior Noise Standards.

2. Municipal Code

The City of Redlands Noise Code[2] is designed to protect sensitive receptors from stationary noise (non-transportation noise sources) that may cross property lines. The following Sections of the Code are applicable to the proposed project.

Section 8.06.030: General Noise Regulations

Municipal Code Section 8.06.030 prohibits any person from willfully or negligently making, or causing to be made, any loud, unnecessary or unusual noise which disturbs the peace and quiet of any neighborhood or which causes discomfort or annoyance to a reasonable person of normal sensitivity in the area.

Section 8.06.070: Exterior Noise Limits

Municipal Code Section 8.06.070 presents exterior noise standards intended to control noise impacts between two properties. As shown below, these standards are presented by land use and shall, unless otherwise specifically indicated, apply to all such property within a designated zone.

Maximum Permissible Exterior Sound Levels by Receiving Land Uses

Receiving Land Use	Time Period	Noise Level (dBA)
Single-family residential districts	10:00 PM - 7:00 AM	50
	7:00 AM - 10:00 PM	60
Multi-family residential districts; public space; institutional	10:00 PM - 7:00 AM	50
	7:00 AM - 10:00 PM	60
Commercial	10:00 PM - 7:00 AM	60
	7:00 AM - 10:00 PM	65
Industrial	Anytime	75

The above exterior noise standards are further defined with the following noise level limits that are not to be exceeded.

1. The noise standard for that land use specified in this section for a cumulative period of more than thirty (30) minutes in any hour (L_{50}); or

2. The noise standard specified in this section plus five (5) dB for a cumulative period of more than fifteen (15) minutes in any hour (L_{25}); or

[2] City of Redlands Municipal Code, as amended. September 16, 2008. http://www.sterlingcodifiers.com/codebook/index.php?book_id=550

3. The noise standard specified in this section plus ten (10) dB for a cumulative period of more than five (5) minutes in any hour (L_8); or

4. The noise standard specified in this section plus fifteen (15) dB for a cumulative period of more than one minute in any hour (L_2); or

5. The noise standard specified in this section plus twenty (20) dB or the maximum measured ambient level, for any period of time (L_{max}).

If the measured ambient level exceeds the allowable noise exposure standard within any of the first four (4) noise limit categories above, the allowable noise exposure standard shall be adjusted in five (5) dB increments in each category as appropriate to encompass or reflect said ambient noise level. In the event 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. As presented in Section II, ambient noise levels only exceed the above noise standards (for nearby residential properties) in the case of the L_{max}. Accordingly, the L_{max} standard will be modified to 75 dBA.

In the event the alleged offensive noise contains a steady, audible tone such as a whine, screech, hum, or is a repetitive noise such as hammering or riveting, or contains music or speech conveying informational content, the standard limits set forth in Table 2 of this section shall be reduced by five (5) dB.

Section 8.06.080: Interior Noise Standards

Municipal Code Section 8.06.080 prohibits any person from allowing an activity that causes the noise level when measured inside a neighboring receiving occupied building to exceed the following standards:

Maximum Permissible Interior Sound Levels by Receiving Land Uses

Receiving Land Use	Time Period	Noise Level (dBA)
Single-family residential districts	Any time	45
Multi-family residential districts; public space; institutional, hotels	Any time	45
Commercial	Any time	50
Industrial	Any time	60

1. The noise standard for that land use specified in Table 3 of this section for a cumulative period of more than five (5) minutes in any hour (L_8).

2. The noise standard for that land use specified in Table 3 of this section plus five (5) dB for a cumulative period of more than one minute in any hour (L_2).

3. The noise standard for that land use specified in Table 3 of this section plus ten (10) dB for the maximum measured ambient noise level for any period of time (L_{max}).

If the measured ambient level exceeds the allowable exterior noise exposure standard in Table 3, above the allowable interior noise exposure level shall be adjusted in five (5) dB increments as appropriate to reflect the ambient noise level. As stated above, the L_{max} noise level currently exceeds the exterior L_{max} standard for nearby residential properties. The interior noise L_{max} standard will be adjusted accordingly, to 60 dBA.

Section 8.06.090: Noise Disturbances Prohibited – Construction

Section 8.06.090(F) prohibits the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between weekday hours of six o'clock (6:00) PM and seven o'clock (7:00) AM, including Saturdays, or at any time on Sundays or holidays, such that the sound there from creates a noise disturbance across a residential or commercial real property line. This ordinance also requires that all mobile or stationary internal combustion engine powered equipment or machinery shall be equipped with exhaust and air intake silencers in proper working order, or suitable to meet the City of Redlands noise standards.

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.

Table 5

Noise Standards for Adjacent 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

Table 6

Noise/Land Use Compatibility Matrix[1]

Land Use Categories		Community Noise Equivalent Level (CNEL)						
Categories	Uses	< 60	65	70	75	80	85	>
RESIDENTIAL	Single Family, Duplex, Multiple Family	A	C	C	C	D	D	D
RESIDENTIAL	Mobile Homes	A	C	C	C	D	D	D
COMMERCIAL Regional, District	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D
COMMERCIAL Regional, Village District, Special	Commercial Retail, Bank, Restaurant, Movie Theater	A	A	A	A	B	B	C
COMMERCIAL INDUSTRIAL INSTITUTIONAL	Office Building, Research & Dev., Professional Offices, City Office Building	A	A	A	B	B	C	D
COMMERCIAL Recreation INSTITUTIONAL Civic Center	Amphitheater, Concert Hall, Auditorium, Meeting Hall	B	B	C	C	D	D	D
COMMERCIAL Recreation	Children's Amusement Park, Miniature Golf Course, Go-cart Track, Equestrian Center, Sports Club	A	A	A	A	B	B	B
COMMERCIAL General, Special INDUSTRIAL, INSTITUTIONAL	Automobile Service Station, Auto Dealership, Manufacturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B
INSTITUTIONAL General	Hospital, Church, Library, Schools, Classroom	A	B	C	C	D	D	D
OPEN SPACE	Parks	A	A	A	B	C	D	D
OPEN SPACE	Golf Course, Cemeteries, Nature Centers,	A	A	A	A	B	C	C
AGRICULTURE	Agriculture	A	A	A	A	A	A	A

ZONE A - CLEARLY COMPATIBLE Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

ZONE B - NORMALLY COMPATIBLE New construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.

ZONE C - NORMALLY INCOMPATIBLE New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in the design.

ZONE D - CLEARLY INCOMPATIBLE New construction or development should generally not be undertaken.

[1] Source: City of Redlands General Plan Noise Element.

Table 7

Interior and Exterior Noise Standards

Land Use Categories		Community Noise Equivalent Level (CNEL)	
Categories	Uses	Interior[1]	Exterior[2]
RESIDENTIAL	Single Family, Duplex, Multiple Family	45[3]	60
	Mobile Home	---	60[4]
COMMERCIAL INDUSTRIAL INSTITUTIONAL	Hotel, Motel, Transient	45	65[5]
	Lodging		
	Commercial Retail, Bank	55	---
	Restaurant		
	Office Building, Research	50	---
	& Development,		
	Professional Offices, City		
	Office Building		
	Amphitheater, Concert	45	---
	Hall, Auditorium, Meeting Hall		
	Gymnasium	50	---
	(Multipurpose)		
	Sports Club	55	---
	Manufacturing,	60	---
	Warehousing, Wholesale,		
	Utilities		
	Movie Theaters	45	---
INSTITUTIONAL	Hospital, Schools	45	60
	classrooms		
OPEN SPACE	Parks	---	60

[1] Indoor environment excluding bathrooms, toilets, closets, corridors.

[2] Outdoor environment limited to private yard of single family as measured at the property line; multifamily private patio or balcony which is served by a means of exit from inside; mobile-home park; hospital patio; park picnic area; school playground; hotel and recreational area.

[3] Noise level requirement with open windows, if they are used to meet natural ventilation requirement.

[4] Exterior noise level should be such that interior level will not exceed 45 CNEL.

[5] Except those areas affected by aircraft noise.

VI. Impact Analysis

A. Construction Noise Impacts

1. Construction Noise

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. Typical noise sources and noise levels associated with site grading are shown in Table 8.

The initial phase of construction would involve mass grading of the site, along with site development activities, including construction of internal roadways and parking which involves fine grading, trenching, and paving activities. Following site preparation activities, the project would include construction of the building. Construction of the building would require the following phases: site development (fine grading, trenching, and paving), building construction, architectural coatings application, and paving associated with buildings. Mass site grading is expected to produce the highest construction noise levels. Grading of the site usually requires graders, dozers, excavators, and scrapers.

Noise levels associated with a worst-case construction scenario were calculated at nearby sensitive receptors utilizing the Road Construction Noise Model (RCNM) provided by the FHWA. Unmitigated noise levels could reach 54.4 dBA L_{eq} at the single-family detached residential dwelling unit and 50.1 dBA L_{eq} at the high school. These noise levels are similar to the existing ambient noise levels at these locations, and will likely be indistinguishable.

2. Consistency with Applicable Standards

Project construction is not exempt from County of San Bernardino's Noise Standards for Stationary Noise Sources (Table 4) between the hours of 7:00 PM and 7:00 AM, on Sundays, or on Federal holidays. However, modeled construction noise levels do not exceed either the 30-minute (L_{50}) or maximum (L_{max}) County standard at the closest sensitive receptor, and are not likely to violate County standards for any period of time. Project construction will not result in a substantial increase in ambient noise levels.

The project will implement mitigation measures presented in Section VII of this report in order to comply with Section 8.06.090(F) of the City of Redlands Municipal Ordinance which requires that all mobile or stationary internal combustion engine powered equipment or machinery shall be equipped with exhaust and air intake silencers in proper working order, or suitable to meet the City of Redlands noise standards.

C. On-Site Operational Noise Impacts

1. On-Site Operational Noise

Noise representative of the proposed project was measured at an existing distribution facility in Rialto, and existing ambient noise conditions were measured onsite and at nearby sensitive receptors on January 8, 2013 from 12:00 to 1:30 PM. Noise Measurement data is presented in Table 1 and Appendix A. This data was input into SoundPLAN to predict on-site operational noise levels associated with the proposed project and to determine if it is likely to exceed the applicable County of San Bernardino or City of Redlands noise standards.

For the purposes of this report, the proposed facility was assumed to be operational seven days a week, 24-hours per day. Dominant sources of noise will include back-up alarms, trucks entering and leaving the property, loading and unloading activities, truck activity in the yard including the dropping and removing of trailers, and trailers being maneuvered by a switcher tractor (sometimes referred to as a "yard dog" or "yard horse").

The project will also include a substantial area for employee and visitor parking. Typical noises that may be generated by the proposed parking lot include landscaping maintenance, conversations and/or yelling in parking lots, vehicle doors closing, and car alarms. Activities that typically occur in parking lots can generate noise levels between 49 dBA (tire squeals) and 74 dBA (car alarms) at 50 feet. Because this is a private, almost entirely employee parking lot, these types of noises are not expected to occur as often as they would in a retail parking lot.

There are only two sensitive receptors within one half mile of the proposed project. One is a single-family detached residential dwelling unit located along Pioneer Avenue south of the project site, and the other is a high school on the other (east) side of the I-210 Freeway. Project operational noise levels are expected to reach 33.7 dBA L_{eq} / 47.2 dBA L_{max} at the single-family detached residential dwelling unit location, and 29.5 dBA L_{eq} / 40.7 dBA L_{max} at the high school.

The daytime, evening, and nighttime average noise level (L_{eq}) contour maps are shown on Figures 5, 6, and 7, respectively. The maximum noise level (L_{max}) contour map is shown on Figure 8. Figure 9 shows the operational noise level at specific sensitive receptors.

2. Consistency with Applicable Standards

The operation of the proposed project will not cause noise levels to violate any County or City standards, nor will it result in a substantial increase in ambient noise levels. Mitigation to further reduce the affect on the community has been recommended in Section VII.

D. Off-Site Operational Noise Impacts

1. Off-Site Operational Noise Impacts

Existing and Existing Plus Project noise levels were modeled for each roadway segment included in the traffic study (Kunzman Associates, Inc., 2013) 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 46.0-67.0 dBA CNEL at nearby sensitive receptors near roadways. The ambient noise levels at several sensitive receptors in the project vicinity are already above standards set by both the County of San Bernardino and the City of Redlands. The results of the Existing traffic noise model are shown in Table 9.

The Existing Plus Project traffic noise model resulted in noise levels of 48.2-67.3 dBA CNEL at nearby sensitive receptors. The results of the Existing Plus Project traffic noise model are also shown in Table 9.

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 65 dBA CNEL residential standard, or (2) the project increases noise levels from below the 65 dBA CNEL standard to above 65 dBA CNEL.

2. Consistency with Applicable Standards

Noise levels along project area roadways are projected to increase from 0.0 to 2.2 dBA with the completion and operation of the proposed project. No road segment will experience an increase of more than 3 dBA. Therefore, project traffic would not result in a substantial increase in ambient noise levels.

E. Traffic Noise Impacts to the Proposed Project

The City of Redlands General Plan Noise Element identifies noise levels that are below 75 dBA CNEL as “clearly compatible” for the development of warehousing land uses. The proposed project will be adjacent to Alabama Street, identified in the City's General Plan Circulation Element as a major arterial. Traffic noise levels along these roadways are not expected to exceed 75 dBA CNEL. The proposed project will not be affected by traffic noise generated on adjacent roadways. No mitigation measures are necessary.

F. Vibration Impacts

1. Project Generated Vibration

Ground-borne vibration is an oscillatory motion that is often described by the average amplitude of its velocity in inches per second or more specifically, peak particle velocity. Ground-borne vibration is much less common than airborne noise; the ambient peak particle velocity of a residential area is commonly .0003 inches per second or less, well below the threshold of human perception of .0059 inches per second. Nonetheless, human reactions to vibration are highly subjective, and even levels below the threshold can cause minor annoyances like rattling of dishes, doors, or fixtures. Typical human response to vibration is given in Table 10.

Table 11 shows the peak particle velocities of some common construction equipment and haul trucks (loaded trucks). Passing haul trucks may generate ground-borne vibration noise that may be perceptible at adjacent sensitive receptors. Based on Caltrans data, haul trucks would not be anticipated to exceed a 0.10 in/sec peak particle velocity (ppv) at 10 feet (Caltrans 2002). Predicted vibration levels at the nearest offsite structures, which are located 35 feet or more from the traveled roadway segments, would not be anticipated to exceed even the most conservative damage threshold of 0.2 inch/second ppv.

2. Consistency with Applicable Standards

Hauling and vibration intensive construction activities should be limited to daytime hours whenever feasible to minimize any ground vibration noise impacts related to construction at adjacent sensitive receptors.

Table 8

Typical Construction Equipment Noise Levels[1]

Type of Equipment	Range of Maximum Sound Levels Measured (dBA at 50 ft.)	Suggested Maximum Sound Levels for Analysis (dBA at 50 ft.)
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 9

FHWA-RD-77-108 Traffic Noise Model Results

Roadway	Segment	Distance from roadway centerline to receiver (ft)	Modeled Noise Levels (dBA CNEL)		
			Existing	Existing Plus Project	Increase
Alabama Street	South of San Bernardino Avenue	95	67.0	67.3	+ 0.2
Palmetto Avenue	West of Alabama Street	700	46.0	48.2	+ 2.2
Pioneer Avenue	East of Alabama Street	40	60.7	60.7	0.0
San Bernardino Avenue	West of Alabama Street	60	66.8	66.9	+ 0.1
	East of Alabama Street	90	65.8	66.2	+ 0.4

Table 10

Human Reaction to Typical Vibration Levels[1]

Vibration Level Peak Particle Velocity in inches/second	Human Reaction
0.0059-0.0188	Threshold of perception, possibly of intrusion
0.0787	Vibrations readily perceptible
0.0984	Continuous vibration begins to annoy people
0.1968	Vibrations annoying to people in buildings
0.3937-0.5905	Vibrations considered unpleasant when continuously subjected and unacceptable by some walking on bridges.

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

Table 11

Construction Equipment Vibration Emissions[1]

Equipment	Peak Partical Velocity in inches per second[2]		
	at 25 ft.	at 50 ft.	at 100 ft.
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

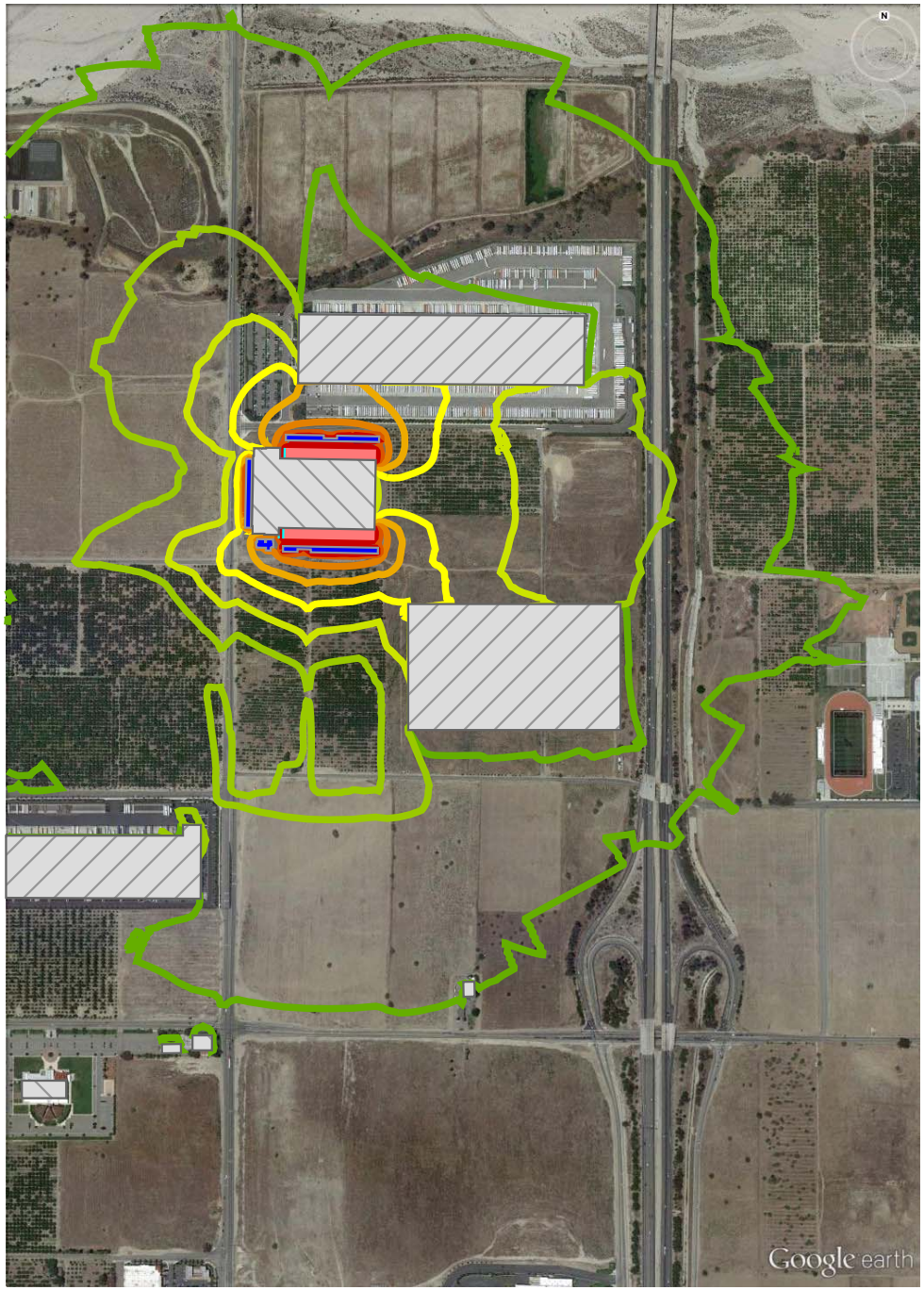
[1] Source: Federal Transit Administration: Transit Noise and Vibration Impact Assessment, 2006

[2] Bold values are considered annoying to people.

5206a / Figure 5

Redlands Distribution Center 13

Daytime Operational Noise Level Contours (Leq)



Signs and symbols

- Existing Wall
- Truck Loading
- Parking lot

Levels in dB(A)

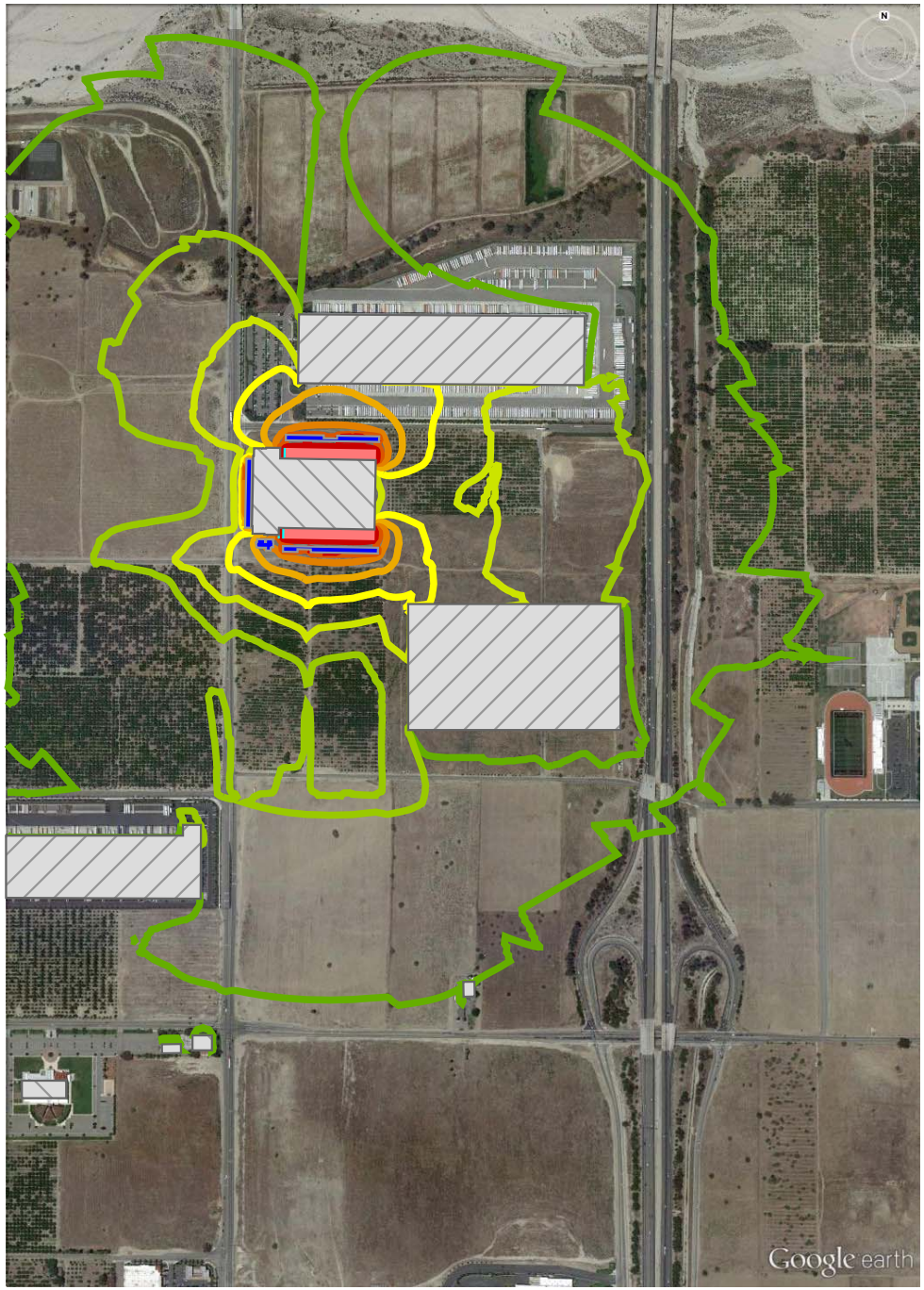
- = 30
- = 35
- = 40
- = 45
- = 50
- = 55
- = 60
- = 65
- = 70
- = 75
- = 80

0 50100 200 300 400 m

5206a / Figure 6

Redlands Distribution Center 13

Evening Operational Noise Level Contours (Leq)



Signs and symbols

- Existing Wall
- Truck Loading
- Parking lot

Levels in dB(A)

- = 30
- = 35
- = 40
- = 45
- = 50
- = 55
- = 60
- = 65
- = 70
- = 75
- = 80

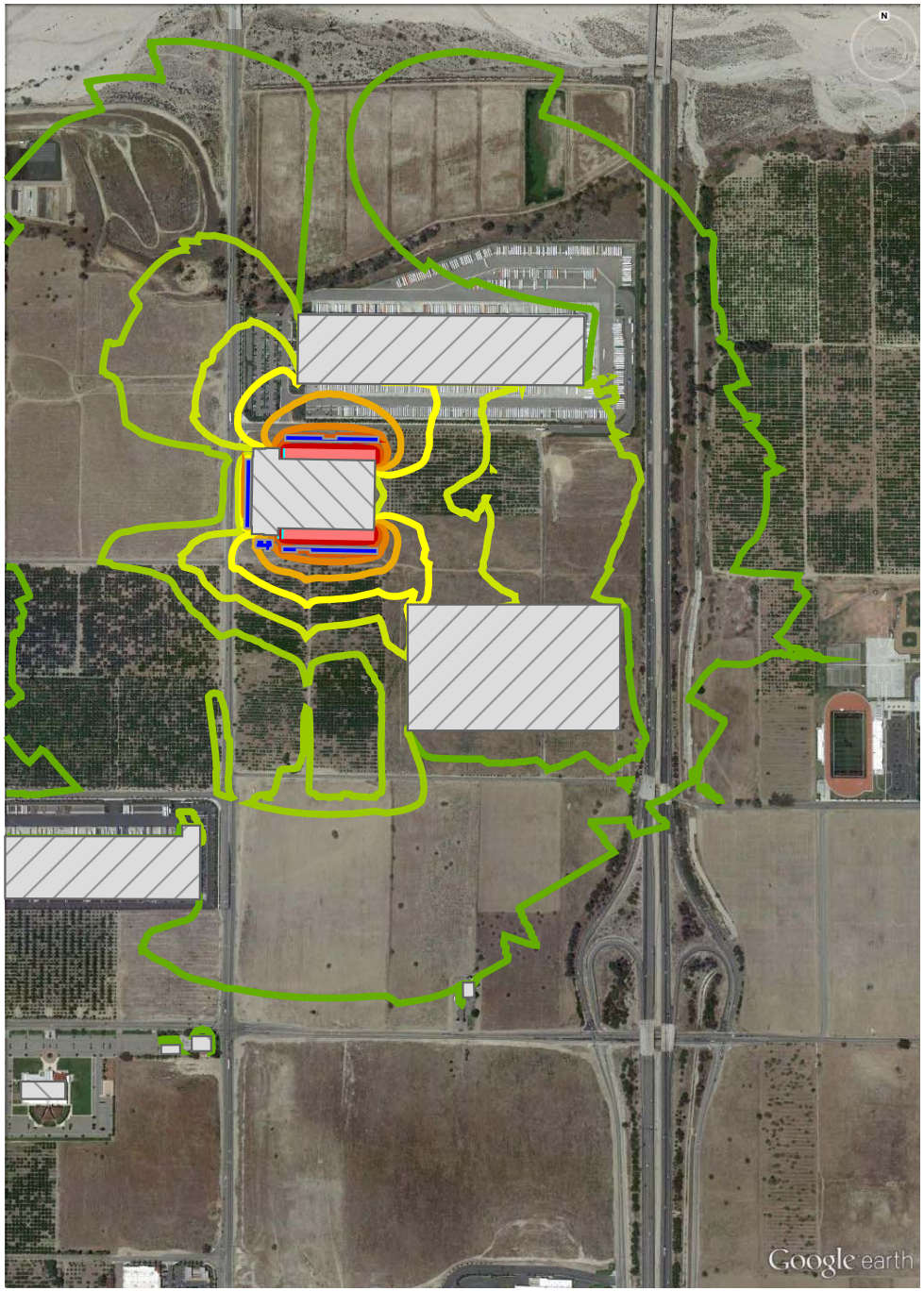
0 50100 200 300 400 m

N

5206a / Figure 7

Redlands Distribution Center 13

Nighttime Operational Noise Level Contours (Leq)



Signs and symbols

- Existing Wall
- Truck Loading
- Parking lot

Levels in dB(A)

- = 30
- = 35
- = 40
- = 45
- = 50
- = 55
- = 60
- = 65
- = 70
- = 75
- = 80

0 50100 200 300 400 m

N

5206a / Figure 8

Redlands Distribution Center 13

Maximum Operational Noise Level Contours (Lmax)

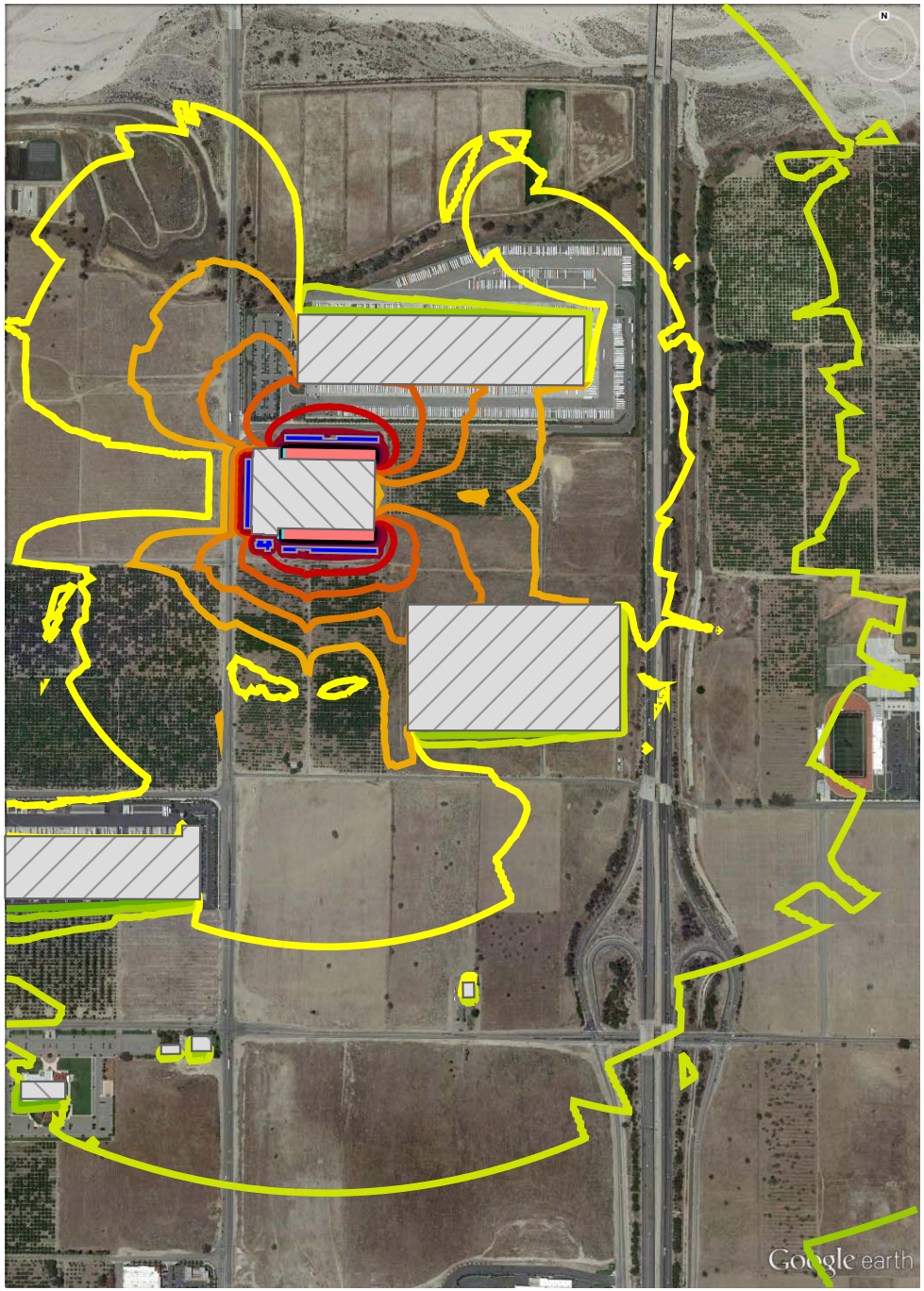
Signs and symbols

- Existing Wall
- Truck Loading
- Parking lot

Levels in dB(A)

- = 30
- = 35
- = 40
- = 45
- = 50
- = 55
- = 60
- = 65
- = 70
- = 75
- = 80

0 50100 200 300 400 m

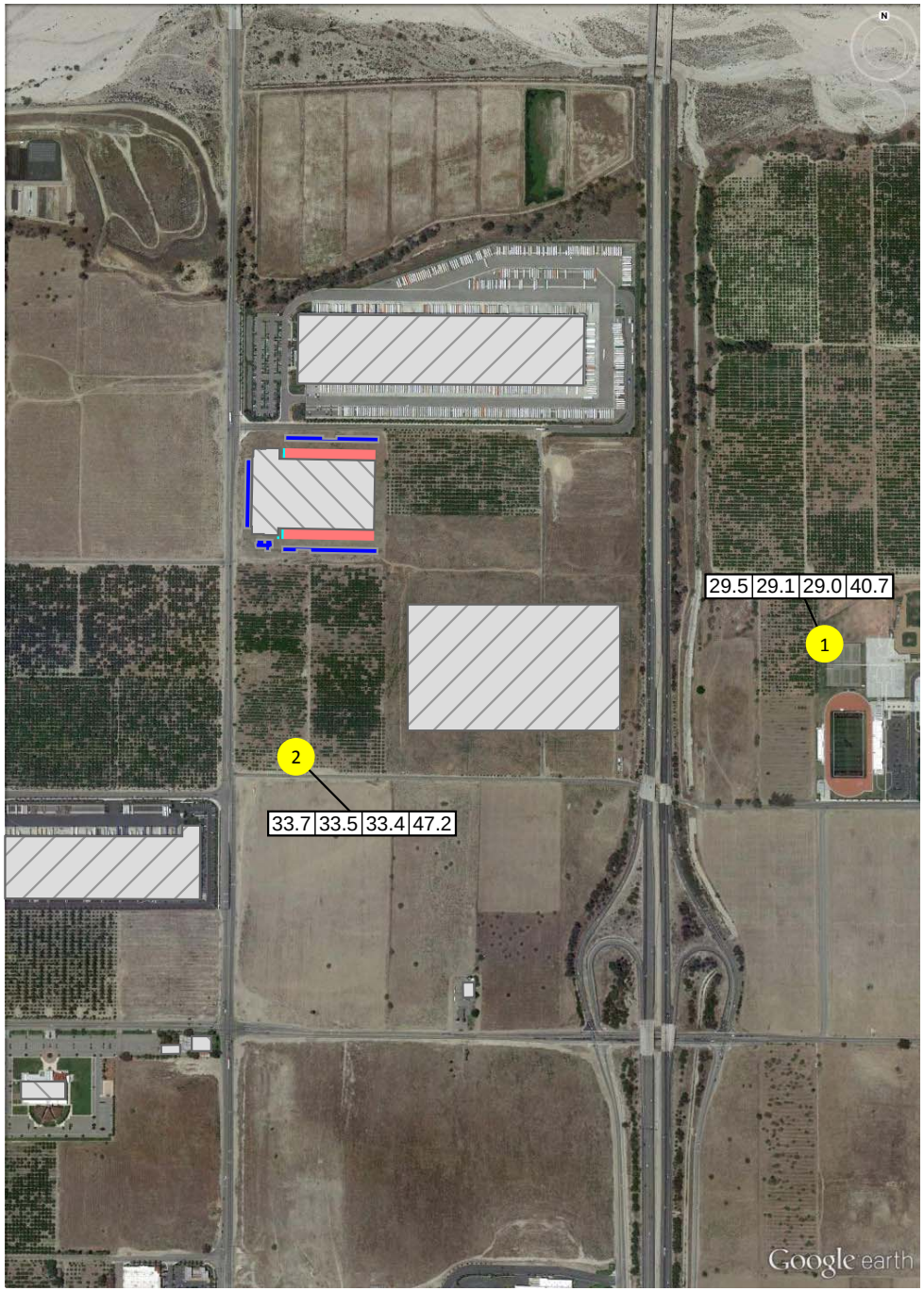


N

5206a / Figure 9

Redlands Distribution Center 13

Operational Noise Levels at Sensitive Receptors



Signs and symbols

- Existing Wall
- Receiver
- Truck Loading
- Parking lot
- Facade with conflict
- Noise Levels: Leq (Day/Evening/Night), Lmax

3	59.3	51.8
2	58.3	50.8
1	57.3	49.8

0 50100 200 300 400 m

VII. Mitigation Measures

A. Construction Measures

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

2. To the extent feasible, haul routes shall not pass sensitive land uses or residential dwellings, especially outside of the hours in which construction is exempt from the County of San Bernardino's noise ordinance.

B. Operational Measures

1. All operational equipment, fixed or mobile, shall be fitted with properly operating and maintained mufflers, consistent with manufacturers' standards. All available noise suppression devices and techniques should be utilized whenever possible to reduce exterior operational equipment noise to acceptable levels that are compatible with adjacent land uses. Prologis shall place all stationary noise generating equipment so that emitted noise is directed away from the noise sensitive receptors nearest the project site.

VIII. References

Bolt, Baranek, and Newman

1971 Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances

California Department of Transportation (Caltrans)

2009 Technical Noise Supplement. Division of Environmental Analysis, November.

Federal Transit Administration

2006 Transit Noise and Vibration Impact Assessment

Harris, Cyril M.

1991 Handbook of Acoustical Measurement and Noise Control

MAS Environmental

2006 Interactive Sound Level Calculator.

Rialto, City of

2010 General Plan Noise Element

2008 Municipal Code – Noise Ordinance

Riverside, County of

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

Fontana, City of

2003 General Plan Noise Element

2010 Municipal Code – Noise Ordinance

Kunzman Associates, Inc.

2012 Prologis Park Building 4 Traffic Impact Analysis

Appendices

Appendix A –Noise Measurement Data Worksheets

Appendix B – RCNM Noise Modeling Worksheets

Appendix D – FHWA Traffic Noise Prediction Model - FHWA-RD-77-108 Output

APPENDIX A

Noise Measurement Data Worksheets

Noise Measurement Field Data

KUNZMAN ASSOCIATES, INC.
Over 30 Years of Excellent Service

Project Name: Redlands Dist. Center 13
Project #: 5206a

Receiver Name: SFR
Technician: Chris Pylant
Date: 1/8/12

Address: 27358 E Pioneer Ave.
Site Description: (SFR along Pioneer) 75' S of ℄ represents →

Temperature: 73°
Wind: calm
Weather: sunny

Settings: (SLOW) FAST
Terrain: flat, grass to S, orange grove to N.

Primary Source: Traffic on Redlands Blvd. & Pioneer
Secondary Sources: faint construction to NE

1	Start: 12:55 PM	End: 1:10 PM	Leq: 54.6	Lmax: 71.9	Other:	$L_{1.67} = 63.6$, $L_{8.33} = 58.3$, $L_{25} = 52.1$, $L_{50} = 49.0$
2	Start:	End:	Leq:	Lmax:	Other:	
3	Start:	End:	Leq:	Lmax:	Other:	
4	Start:	End:	Leq:	Lmax:	Other:	

Additional Notes/Sketch

Noise Measurement
Field Data

KUNZMAN ASSOCIATES, INC.
Over 30 Years of Excellent Service

Project Name: Redlands Dist. Center 13
Project #: 5206a

Receiver Name: East
Technician: Chris Pylant
Date: 1/8/12

Address:
Site Description: midpoint of eastern property line

Temperature: 71°
Wind: NE 4
Weather: sunny

Settings: (SLOW) FAST
Terrain: flat, dirt to east, short grass & bushes west

Primary Source: Trucks passing on Riverbluff, trucks & loading at N distribution ctr.,
Secondary Sources: construction to south, traffic noise from I-210, aircraft

1	Start: 12:15 PM	End: 12:30 PM	Leq: 54.6	Lmax: 66.1	Other:	$L_{16.7}=60.6$, $L_{8.33}=52.9$, $L_{25}=50.9$, $L_{50}=49.6$
2	Start:	End:	Leq:	Lmax:	Other:	
3	Start:	End:	Leq:	Lmax:	Other:	
4	Start:	End:	Leq:	Lmax:	Other:	

Additional Notes/Sketch

dist ctr. noise
trucks accelerating
brakes
drops / disconnects
reverse alarms

Noise Measurement Field Data

KUNZMAN ASSOCIATES, INC.
OVER 20 YEARS OF EXCELLENT SERVICE

Project Name: Redlands Dist. Center 13
Project #: 5206a

Receiver Name: Northwest
Technician: Chris Pylant
Date: 1/8/12

Address:
Site Description: NW corner of site, approx 100' from N and W prop. lines

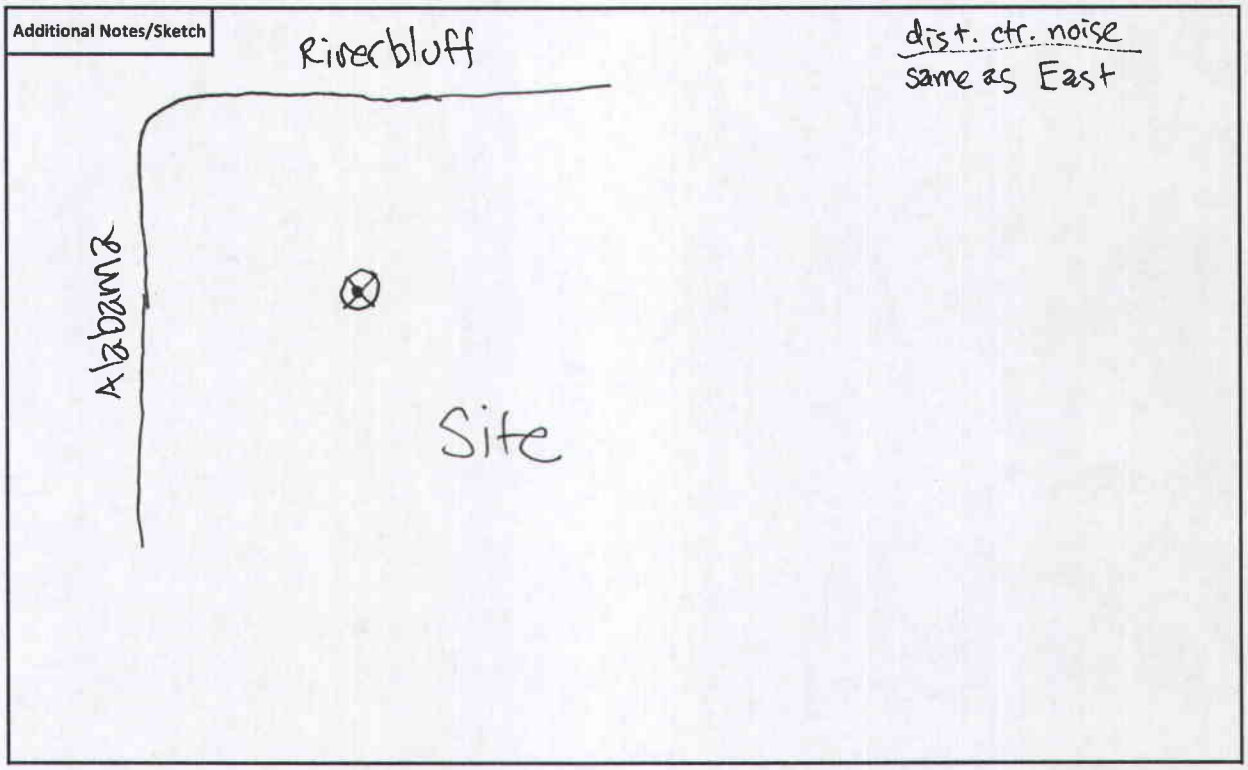
Temperature: 72°
Wind: calm
Weather: sunny

Settings: (SLOW) FAST
Terrain: Flat, grass & small bushes

Primary Source: Traffic on Alabama St., Trucks on Riverbluff, truck & dist. ctr. noise
Secondary Sources: Construction to South, Idling truck in driveway (N)

1	Start: 12:35 PM	End: 12:50 PM	Leq: 55.5	Lmax: 68.7	Other:	$L_{67}=62.2$, $L_{8.33}=59.0$, $L_{25}=56.0$, $L_{50}=53.9$
2	Start:	End:	Leq:	Lmax:	Other:	
3	Start:	End:	Leq:	Lmax:	Other:	
4	Start:	End:	Leq:	Lmax:	Other:	

Additional Notes/Sketch



APPENDIX B

RCNM Noise Modeling Worksheets

Output
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 01/25/2013
Case Description: Redlands Dist Center 13

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
SFR	Residential	54.6	54.6	54.6

Description	Impact Device	Usage (%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	1075.0	3.0
Grader	No	40	85.0		1075.0	3.0
Dozer	No	40		81.7	1075.0	3.0
Scraper	No	40		83.6	1075.0	3.0
Backhoe	No	40		77.6	1075.0	3.0

Results

Noise Limits (dBA)

Noise Limit Exceedance (dBA)

Night	Day	Calculated (dBA) Evening	Night	Day	Evening	Night

Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator			51.1	47.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader			55.4	51.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer			52.0	48.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper			53.9	50.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe			47.9	43.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total			55.4	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
High School	Residential	54.6	54.6	54.6

	Equipment Spec	Actual	Receptor	Estimated

Description	Impact Device	Usage (%)	Lmax (dBA)	Output Lmax (dBA)	Distance (feet)	Shielding (dBA)
Excavator	No	40		80.7	2500.0	0.0
Grader	No	40	85.0		2500.0	0.0
Dozer	No	40		81.7	2500.0	0.0
Scraper	No	40		83.6	2500.0	0.0
Backhoe	No	40		77.6	2500.0	0.0

Results

Noise Limit Exceedance (dBA)

Noise Limits (dBA)

Equipment	Calculated (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Excavator	46.7	42.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	51.0	47.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	47.7	43.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	49.6	45.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	43.6	39.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	51.0	51.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

APPENDIX C

FHWA Traffic Noise Prediction Model
– FHWA-RD-77-108 Output

FHWA Sound32 Spreadsheet

Noise Analysis for City of Rialto FedEx Groud Expansion

Existing Traffic Noise - Alabama St South of San Bernardino Ave

Closest Sensitive Receptor

	DAYTIME			EVENING			NIGHTTIME		
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS
INPUT PARAMETERS									
Vehicles per hour	443.04	9.18	15.30	82.23	0.38	0.64	61.17	9.56	15.94
Speed in MPH	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
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
NOISE CALCULATIONS									
Reference levels	67.36	76.31	81.16	67.36	76.31	81.16	67.36	76.31	81.16
ADJUSTMENTS									
Flow	20.14	3.30	5.52	12.82	-10.50	-8.28	11.54	3.48	5.70
Distance	-2.86	-2.86	-2.86	-2.86	-2.86	-2.86	-2.86	-2.86	-2.86
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
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
LEQ	59.64	51.76	58.82	52.33	37.96	45.02	51.04	51.93	59.00

DAY LEQ	62.63	EVENING LEQ	53.20	NIGHT LEQ	60.32	
CNEL	67.02					

ADT	15300.00	#VALUE!			
SPEED	40.00				
DISTANCE	95.00				
		0.32			
% A	92.00	% DAY	75.54	69.50	
		% EVENING	14.02	12.90	
		% NIGHT	10.43	9.60	
% MT	3.00	% DAY	48.00	1.44	
		% EVENING	2.00	0.06	
		% NIGHT	50.00	1.50	
% HT	5.00	% DAY	48.00	2.40	
		% EVENING	2.00	0.10	
		% NIGHT	50.00	2.50	
LEFT	-90.00				
RIGHT	90.00				
CNEL	67.02				
DAY LEQ	62.63				
Day hour	89.00				
Absorbtive?	no	TO TURN ON, COPY K2 TO J2			
Use hour?	no	TO TURN OFF, ENTER ADTS IN J2			
GRADE dB	0.00				

FHWA Sound32 Spreadsheet

Noise Analysis for City of Rialto FedEx Groud Expansion

Existing Plus Project Traffic Noise - Alabama St South of San Bernardino Ave

Closest Sensitive Receptor

	DAYTIME			EVENING			NIGHTTIME		
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS
INPUT PARAMETERS									
Vehicles per hour	444.80	9.32	16.46	82.55	0.39	0.69	61.42	9.71	17.15
Speed in MPH	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
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
NOISE CALCULATIONS									
Reference levels	67.36	76.31	81.16	67.36	76.31	81.16	67.36	76.31	81.16
ADJUSTMENTS									
Flow	20.16	3.37	5.84	12.84	-10.43	-7.96	11.56	3.55	6.02
Distance	-2.86	-2.86	-2.86	-2.86	-2.86	-2.86	-2.86	-2.86	-2.86
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
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
LEQ	59.66	51.82	59.14	52.34	38.02	45.34	51.06	52.00	59.32

	DAY LEQ	62.78		EVENING LEQ	53.26		NIGHT LEQ	60.57	
	CNEL		67.25						

ADT	15421.00	#VALUE!		
SPEED	40.00			
DISTANCE	95.00			
		0.32		
% A	91.64	% DAY	75.54	*69.23*
		% EVENING	14.02	*12.85*
		% NIGHT	10.43	*9.56*
% MT	3.02	% DAY	48.00	*1.45*
		% EVENING	2.00	*0.06*
		% NIGHT	50.00	*1.51*
% HT	5.34	% DAY	48.00	*2.56*
		% EVENING	2.00	*0.11*
		% NIGHT	50.00	*2.67*
LEFT	-90.00			
RIGHT	90.00			
CNEL	67.25			
DAY LEQ	62.78			
Day hour	89.00			
Absorbtive?	no	TO TURN ON, COPY K2 TO J2		
Use hour?	no	TO TURN OFF, ENTER ADTS IN J2		
GRADE dB	0.00			

FHWA Sound32 Spreadsheet

Noise Analysis for City of Rialto FedEx Groud Expansion
Existing Traffic Noise - Palmetto Ave West of Alabama St
Closest Sensitive Receptor

	DAYTIME			EVENING			NIGHTTIME		
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS
INPUT PARAMETERS									
Vehicles per hour	30.92	1.56	0.79	5.74	0.07	0.03	4.27	1.63	0.83
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
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	9.16	-3.81	-6.76	1.84	-17.61	-20.56	0.56	-3.63	-6.58
Distance	-11.53	-11.53	-11.53	-11.53	-11.53	-11.53	-11.53	-11.53	-11.53
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
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
LEQ	37.73	34.49	36.76	30.42	20.68	22.95	29.14	34.66	36.93

	DAY LEQ	41.30		EVENING LEQ	31.51		NIGHT LEQ	39.39	
	CNEL		46.00						

ADT	1100.00	#VALUE!	
SPEED	35.00		
DISTANCE	700.00		
		0.32	
% A	89.30	% DAY	75.54 *67.46*
		% EVENING	14.02 *12.52*
		% NIGHT	10.43 *9.31*
% MT	7.10	% DAY	48.00 *3.41*
		% EVENING	2.00 *0.14*
		% NIGHT	50.00 *3.55*
% HT	3.60	% DAY	48.00 *1.73*
		% EVENING	2.00 *0.07*
		% NIGHT	50.00 *1.80*
LEFT	-90.00		
RIGHT	90.00		
CNEL	46.00		
DAY LEQ	41.30		
Day hour	89.00		
Absorbtive?	no	TO TURN ON, COPY K2 TO J2	
Use hour?	no	TO TURN OFF, ENTER ADTS IN J2	
GRADE dB	0.00		

FHWA Sound32 Spreadsheet

Noise Analysis for City of Rialto FedEx Groud Expansion

Existing Plus Project Traffic Noise - Palmetto Ave West of Alabama St

Closest Sensitive Receptor

	DAYTIME			EVENING			NIGHTTIME		
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS
INPUT PARAMETERS									
Vehicles per hour	31.26	1.68	1.73	5.80	0.07	0.07	4.32	1.75	1.80
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
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	9.20	-3.49	-3.36	1.89	-17.29	-17.16	0.61	-3.31	-3.18
Distance	-11.53	-11.53	-11.53	-11.53	-11.53	-11.53	-11.53	-11.53	-11.53
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
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
LEQ	37.78	34.81	40.15	30.47	21.01	26.35	29.18	34.99	40.33

DAY LEQ	42.88		EVENING LEQ	32.23		NIGHT LEQ	41.69
CNEL		48.18					

ADT	1164.00	#VALUE!			
SPEED	35.00				
DISTANCE	700.00				
		0.32			
% A	85.34	% DAY	75.54	*64.46*	
		% EVENING	14.02	*11.96*	
		% NIGHT	10.43	*8.90*	
% MT	7.23	% DAY	48.00	*3.47*	
		% EVENING	2.00	*0.14*	
		% NIGHT	50.00	*3.61*	
% HT	7.44	% DAY	48.00	*3.57*	
		% EVENING	2.00	*0.15*	
		% NIGHT	50.00	*3.72*	
LEFT	-90.00				
RIGHT	90.00				
CNEL	48.18				
DAY LEQ	42.88				
Day hour	89.00				
Absorbtive?	no	TO TURN ON, COPY K2 TO J2			
Use hour?	no	TO TURN OFF, ENTER ADTS IN J2			
GRADE dB	0.00				

FHWA Sound32 Spreadsheet

Noise Analysis for City of Rialto FedEx Groud Expansion
Existing Traffic Noise - Pioneer Ave East of Alabama St
Closest Sensitive Receptor

	DAYTIME			EVENING			NIGHTTIME		
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS
INPUT PARAMETERS									
Vehicles per hour	105.76	1.61	1.19	19.63	0.07	0.05	14.60	1.68	1.24
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
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	14.50	-3.68	-4.99	7.18	-17.48	-18.79	5.90	-3.50	-4.81
Distance	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
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
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
LEQ	55.51	47.05	50.95	48.19	33.25	37.15	46.91	47.23	51.13

	DAY LEQ	57.25		EVENING LEQ	48.65		NIGHT LEQ	53.65	
	CNEL		60.65						

ADT	3500.00	#VALUE!	
SPEED	35.00		
DISTANCE	40.00		
		0.32	
% A	96.00	% DAY	75.54 *72.52*
		% EVENING	14.02 *13.46*
		% NIGHT	10.43 *10.01*
% MT	2.30	% DAY	48.00 *1.10*
		% EVENING	2.00 *0.05*
		% NIGHT	50.00 *1.15*
% HT	1.70	% DAY	48.00 *0.82*
		% EVENING	2.00 *0.03*
		% NIGHT	50.00 *0.85*
LEFT	-90.00		
RIGHT	90.00		
CNEL	60.65		
DAY LEQ	57.25		
Day hour	89.00		
Absorbtive?	no	TO TURN ON, COPY K2 TO J2	
Use hour?	no	TO TURN OFF, ENTER ADTS IN J2	
GRADE dB	0.00		

FHWA Sound32 Spreadsheet

Noise Analysis for City of Rialto FedEx Groud Expansion

Existing Plus Project Traffic Noise - Pioneer Ave East of Alabama St

Closest Sensitive Receptor

	DAYTIME			EVENING			NIGHTTIME		
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS
INPUT PARAMETERS									
Vehicles per hour	106.10	1.61	1.19	19.69	0.07	0.05	14.65	1.68	1.24
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
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	14.51	-3.68	-4.99	7.20	-17.48	-18.79	5.91	-3.50	-4.81
Distance	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
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
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
LEQ	55.52	47.05	50.95	48.21	33.25	37.15	46.92	47.23	51.13

DAY LEQ	57.26	EVENING LEQ	48.66	NIGHT LEQ	53.65	
CNEL	60.66					

ADT	3511.00	#VALUE!			
SPEED	35.00				
DISTANCE	40.00				
		0.32			
% A	96.01	% DAY	75.54		*72.53*
		% EVENING	14.02		*13.46*
		% NIGHT	10.43		*10.01*
% MT	2.29	% DAY	48.00		*1.10*
		% EVENING	2.00		*0.05*
		% NIGHT	50.00		*1.15*
% HT	1.69	% DAY	48.00		*0.81*
		% EVENING	2.00		*0.03*
		% NIGHT	50.00		*0.85*
LEFT	-90.00				
RIGHT	90.00				
CNEL	60.66				
DAY LEQ	57.26				
Day hour	89.00				
Absorbtive?	no	TO TURN ON, COPY K2 TO J2			
Use hour?	no	TO TURN OFF, ENTER ADTS IN J2			
GRADE dB	0.00				

FHWA Sound32 Spreadsheet

Noise Analysis for City of Rialto FedEx Groud Expansion

Existing Traffic Noise - San Bernardino Ave East of Alabama St

Closest Sensitive Receptor

	DAYTIME			EVENING			NIGHTTIME		
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS
INPUT PARAMETERS									
Vehicles per hour	379.34	7.86	13.10	70.40	0.33	0.55	52.38	8.19	13.65
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
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	20.04	3.21	5.43	12.73	-10.59	-8.38	11.44	3.38	5.60
Distance	-2.62	-2.62	-2.62	-2.62	-2.62	-2.62	-2.62	-2.62	-2.62
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
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
LEQ	57.53	50.41	57.85	50.22	36.61	44.05	48.93	50.59	58.03

DAY LEQ	61.09	EVENING LEQ	51.31	NIGHT LEQ	59.18	
CNEL	65.80					

ADT	13100.00	#VALUE!			
SPEED	35.00				
DISTANCE	90.00				
		0.32			
% A	92.00	% DAY	75.54	69.50	
		% EVENING	14.02	12.90	
		% NIGHT	10.43	9.60	
% MT	3.00	% DAY	48.00	1.44	
		% EVENING	2.00	0.06	
		% NIGHT	50.00	1.50	
% HT	5.00	% DAY	48.00	2.40	
		% EVENING	2.00	0.10	
		% NIGHT	50.00	2.50	
LEFT	-90.00				
RIGHT	90.00				
CNEL	65.80				
DAY LEQ	61.09				
Day hour	89.00				
Absorbtive?	no	TO TURN ON, COPY K2 TO J2			
Use hour?	no	TO TURN OFF, ENTER ADTS IN J2			
GRADE dB	0.00				

FHWA Sound32 Spreadsheet

Noise Analysis for City of Rialto FedEx Groud Expansion

Existing Plus Project Traffic Noise - San Bernardino Ave East of Alabama St

Closest Sensitive Receptor

	DAYTIME			EVENING			NIGHTTIME		
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS
INPUT PARAMETERS									
Vehicles per hour	380.41	8.08	14.74	70.60	0.34	0.61	52.52	8.42	15.35
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
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	20.06	3.33	5.94	12.74	-10.47	-7.86	11.46	3.50	6.12
Distance	-2.62	-2.62	-2.62	-2.62	-2.62	-2.62	-2.62	-2.62	-2.62
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
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
LEQ	57.54	50.53	58.36	50.23	36.73	44.56	48.94	50.71	58.54

	DAY LEQ	61.36		EVENING LEQ	51.42		NIGHT LEQ	59.59	
	CNEL		66.18						

ADT	13227.00	#VALUE!			
SPEED	35.00				
DISTANCE	90.00				
		0.32			
% A	91.37	% DAY	75.54	*69.02*	
		% EVENING	14.02	*12.81*	
		% NIGHT	10.43	*9.53*	
% MT	3.05	% DAY	48.00	*1.47*	
		% EVENING	2.00	*0.06*	
		% NIGHT	50.00	*1.53*	
% HT	5.57	% DAY	48.00	*2.67*	
		% EVENING	2.00	*0.11*	
		% NIGHT	50.00	*2.79*	
LEFT	-90.00				
RIGHT	90.00				
CNEL	66.18				
DAY LEQ	61.36				
Day hour	89.00				
Absorbtive?	no	TO TURN ON, COPY K2 TO J2			
Use hour?	no	TO TURN OFF, ENTER ADTS IN J2			
GRADE dB	0.00				

FHWA Sound32 Spreadsheet

Noise Analysis for City of Rialto FedEx Groud Expansion

Existing Traffic Noise - San Bernardino Ave West of Alabama St

Closest Sensitive Receptor

	DAYTIME			EVENING			NIGHTTIME		
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS
INPUT PARAMETERS									
Vehicles per hour	318.53	6.60	11.00	59.12	0.28	0.46	43.98	6.88	11.46
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
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	19.28	2.45	4.67	11.97	-11.35	-9.13	10.69	2.63	4.84
Distance	-0.86	-0.86	-0.86	-0.86	-0.86	-0.86	-0.86	-0.86	-0.86
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
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
LEQ	58.53	51.42	58.85	51.22	37.61	45.05	49.93	51.59	59.03

DAY LEQ	62.09	EVENING LEQ	52.31	NIGHT LEQ	60.18	
CNEL		66.80				

ADT	11000.00	#VALUE!				
SPEED	35.00					
DISTANCE	60.00					
					0.32	
% A	92.00	% DAY	75.54	*69.50*		
		% EVENING	14.02	*12.90*		
		% NIGHT	10.43	*9.60*		
% MT	3.00	% DAY	48.00	*1.44*		
		% EVENING	2.00	*0.06*		
		% NIGHT	50.00	*1.50*		
% HT	5.00	% DAY	48.00	*2.40*		
		% EVENING	2.00	*0.10*		
		% NIGHT	50.00	*2.50*		
LEFT	-90.00					
RIGHT	90.00					
CNEL	66.80					
DAY LEQ	62.09					
Day hour	89.00					
Absorbtive?	no	TO TURN ON, COPY K2 TO J2				
Use hour?	no	TO TURN OFF, ENTER ADTS IN J2				
GRADE dB	0.00					

FHWA Sound32 Spreadsheet

Noise Analysis for City of Rialto FedEx Groud Expansion

Existing Plus Project Traffic Noise - San Bernardino Ave West of Alabama St

Closest Sensitive Receptor

	DAYTIME			EVENING			NIGHTTIME		
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS
INPUT PARAMETERS									
Vehicles per hour	318.87	6.66	11.46	59.18	0.28	0.48	44.03	6.94	11.94
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
NOISE CALCULATIONS									
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05	65.11	74.83	80.05
ADJUSTMENTS									
Flow	19.29	2.49	4.85	11.98	-11.31	-8.96	10.69	2.67	5.02
Distance	-0.86	-0.86	-0.86	-0.86	-0.86	-0.86	-0.86	-0.86	-0.86
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
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
LEQ	58.54	51.45	59.03	51.22	37.65	45.23	49.94	51.63	59.21

DAY LEQ	62.18	EVENING LEQ	52.35	NIGHT LEQ	60.32	
CNEL	66.93					

ADT	11037.00	#VALUE!			
SPEED	35.00				
DISTANCE	60.00				
		0.32			
% A	91.79	% DAY	75.54	*69.34*	
		% EVENING	14.02	*12.87*	
		% NIGHT	10.43	*9.57*	
% MT	3.02	% DAY	48.00	*1.45*	
		% EVENING	2.00	*0.06*	
		% NIGHT	50.00	*1.51*	
% HT	5.19	% DAY	48.00	*2.49*	
		% EVENING	2.00	*0.10*	
		% NIGHT	50.00	*2.60*	
LEFT	-90.00				
RIGHT	90.00				
CNEL	66.93				
DAY LEQ	62.18				
Day hour	89.00				
Absorbtive?	no	TO TURN ON, COPY K2 TO J2			
Use hour?	no	TO TURN OFF, ENTER ADTS IN J2			
GRADE dB	0.00				