Appendix F: Noise Impact Analysis

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Noise Impact Analysis Report
Casa Blanca Elementary School Project
City of Riverside, Riverside County California

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Date: November 9, 2018

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ACRONYMS AND ABBREVIATIONS

ADT	average daily traffic
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibel
FCS	FirstCarbon Solutions
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
L_{dn}	day-night average sound level
L_{eq}	equivalent sound level
OSHA	Occupational Safety and Health Administration
PPV	peak particle velocity
RMS	root mean square
RUSD	Riverside Unified School District
VdB	Velocity in Decibels

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SECTION 1: INTRODUCTION

1.1 - Purpose of Analysis and Study Objectives

This Noise Impact Analysis has been prepared by FirstCarbon Solutions (FCS) to determine the off-site and on-site noise impacts associated with the proposed Casa Blanca Elementary School project. The following is provided in this report:

- A description of the study area, project site, and proposed project.
- Information regarding the fundamentals of noise and vibration.
- A description of the local noise guidelines and standards.
- A description of the existing noise environment.
- An analysis of the potential short-term, construction-related noise, and vibration impacts from the proposed project.
- An analysis of long-term, operations-related noise, and vibration impacts from the proposed project.

1.2 - Project Summary

1.2.1 - Site Location

The proposed project is located in the City of Riverside, Riverside County, California (Exhibit 1). The project site has regional access via State Route 91 (SR-91)(also known as the Riverside Freeway) through the Madison Street exit, which is located approximately 0.7 miles northwest from the project site. The site is also accessible from SR-60, which is approximately 4.6 miles northeast of the project site, and Interstate 215 located approximately 6.3 miles east of the project site.

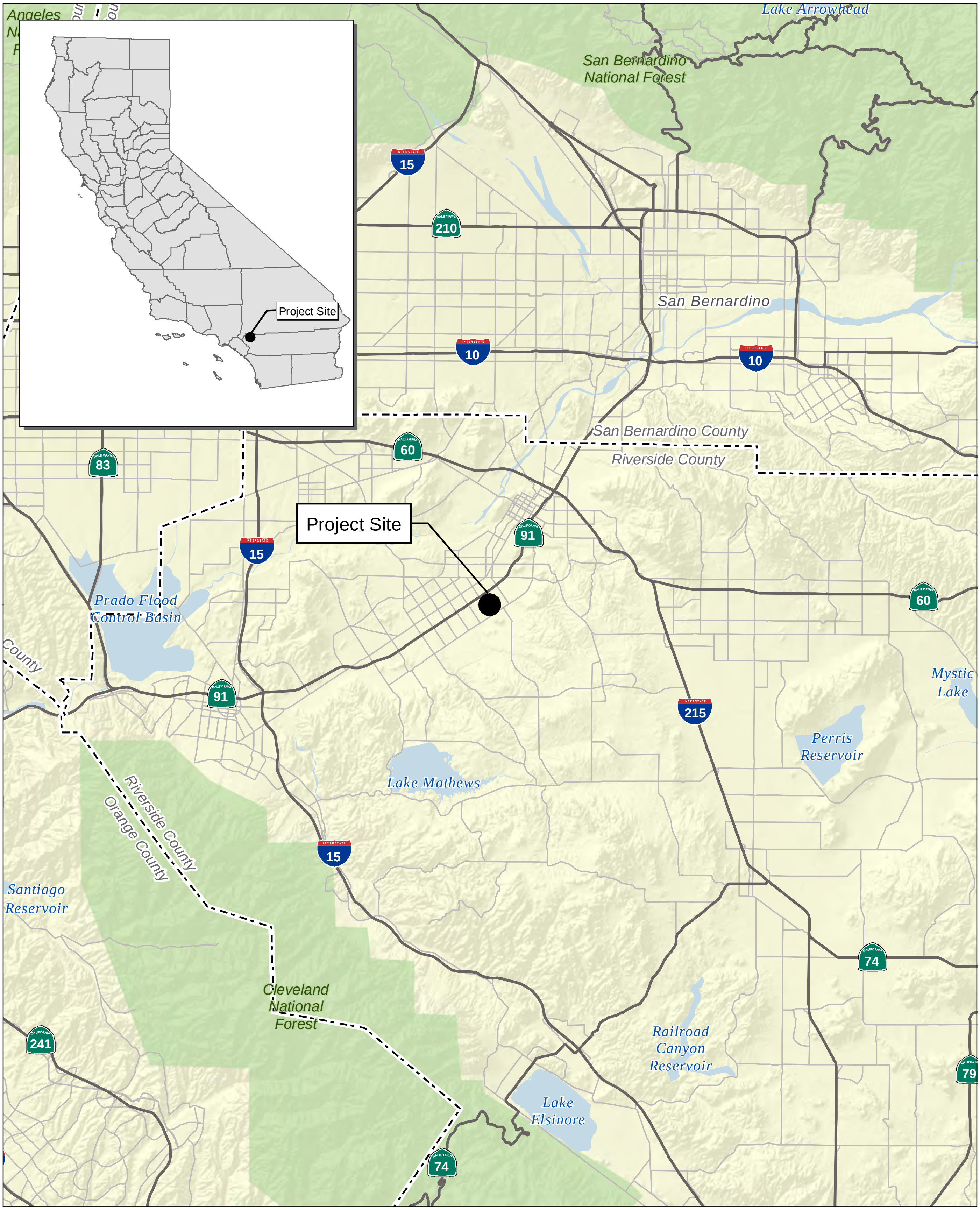
The proposed project is located on the 9.8-acre lot at the northern side of Lincoln Avenue and Sonora Place (Exhibit 2). The 9.8-acre project site was formerly occupied by a KPRO 1570 AM transmitter building and antenna system. The four antenna structures and building have since been removed from the site.

1.2.2 - Project Description

The Riverside Unified School District (RUSD) is proposing the construction of a new kindergarten through sixth grade (K-6) campus known as the Casa Blanca Elementary School (project) on a 9.8-acre site at 7351 Lincoln Avenue in the City of Riverside (Assessor's Parcel Number: 230-360-001) (Exhibit 3). The proposed project consists of a 1-story 11,000-square-foot multi-purpose/food service building, a 1-story 6,500 square foot administration building, a 2-story 83,000 square foot classroom, and a library and kindergarten building with a capacity to serve up to 800 students. In addition to the main buildings, the site proposes to include outdoor recreation space that consists of a 13,500 square foot kindergarten playground, 29,500 square foot quad and courtyard with lunch shelter, 36,800 square foot hardcourt area, 143,500 square foot playfields (baseball, basketball, and soccer fields), a 4,000 square foot outdoor Science Grow Lab, and associated soft edge landscaping totaling 240,870 square feet.

A total of four driveways would provide ingress/egress to the project. All driveways front Lincoln Avenue and are restricted to right-in and right-out turning. There are three proposed parking lots: (1) a staff parking lot with a total of 84 stalls and a bus drop-off area for up to three buses to cue; (2) a dedicated kindergarten parking lot with a total of 24 spaces and a drop-off area; and (3) a visitor parking lot with a total of 48 spaces and a drop-off area. In total, the three proposed parking lots would provide a total of 156 spaces.

The new campus would serve students living in the Casa Blanca Neighborhood school boundary. The school calendar and specific operation dates are established by the RUSD every two years. School instruction would begin in early August and ensue until the end of May, operating a total of 181 days out of the year for students with additional work days for teachers, as specified by RUSD. The facilities would be unoccupied for some holidays and for longer periods in November, December, January, and March. Daily hours of operation for instruction would be consistent with surrounding elementary schools: Monday, Tuesday, Thursday, and Friday from 8:05 a.m. to 2:30 p.m., and Wednesday from 8:05 a.m. to 1:15 p.m. An afterschool program has not been established at this time. However, in the event an afterschool program is established, students will be on campus from close of school until 6:00 p.m. each school day.



Source: Census 2000 Data, The CaSIL

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Exhibit 1
Regional Location Map

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RIVERSIDE UNIFIED SCHOOL DISTRICT
CASA BLANCA ELEMENTARY SCHOOL PROJECT
NOISE IMPACT ANALYSIS REPORT

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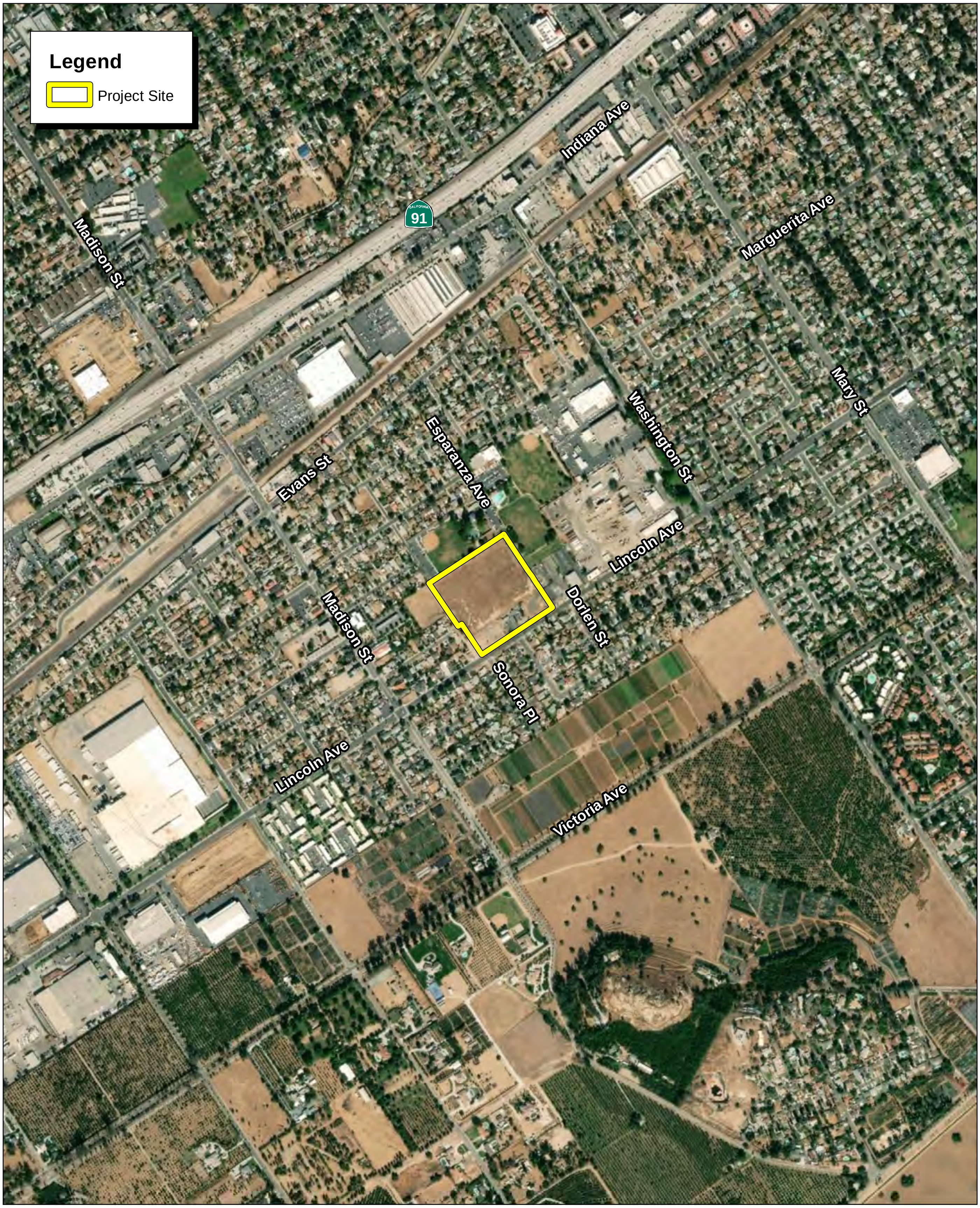

Source: ESRI Aerial Imagery.

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1,000 500 0 1,000 Feet

Exhibit 2
Local Vicinity Map
Aerial Base

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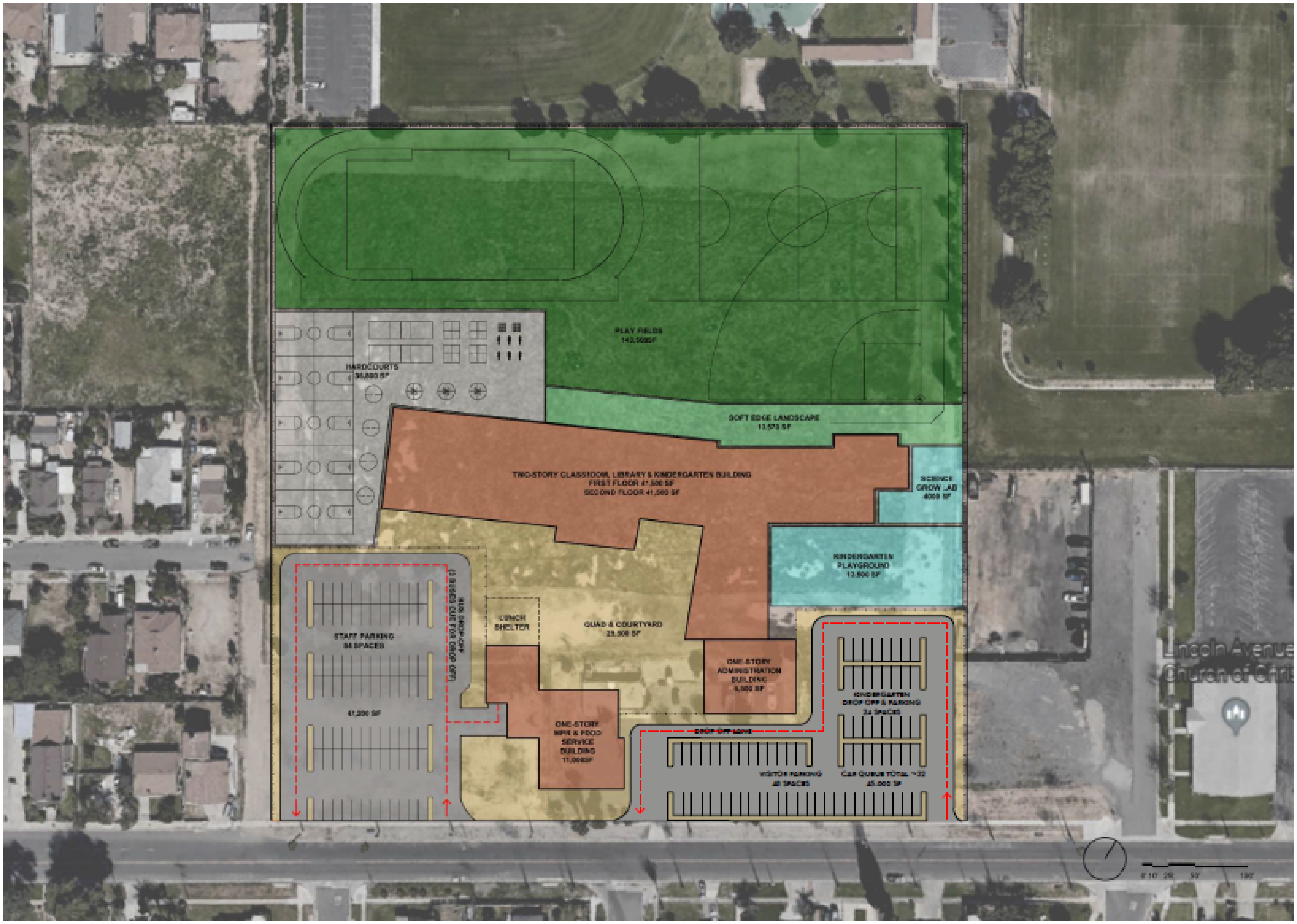

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Exhibit 3
Site Plan

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RIVERSIDE UNIFIED SCHOOL DISTRICT
CASA BLANCA ELEMENTARY SCHOOL PROJECT
NOISE IMPACT ANALYSIS REPORT

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SECTION 2: NOISE AND VIBRATION FUNDAMENTALS

2.1 - Characteristics of Noise

Noise is generally defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep.

Several noise measurement scales exist, which are used to describe noise in a particular location. A decibel (dB) is a unit of measurement that indicates the relative intensity of a sound. The 0 point on the dB scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Changes of 3.0 dB or less are only perceptible in laboratory environments. Audible increases in noise levels generally refer to a change of 3.0 dB or more, as this level has been found to be barely perceptible to the human ear in outdoor environments. Sound levels in dB are calculated on a logarithmic basis. An increase of 10 dB represents a 10-fold increase in acoustic energy, while 20 dB is 100 times more intense, and 30 dB is 1,000 times more intense. Each 10-dB increase in sound level is perceived as approximately a doubling of loudness. Sound intensity is normally measured through the A-weighted sound level (dBA). This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive.

Noise impacts can be described in three categories; audible impacts, potentially audible, and inaudible changes. (1) Audible impacts refers to increases in noise levels noticeable to humans. An audible increase in noise levels generally refers to a change of 3.0 dB or greater, since this level has been found to be barely perceptible in exterior environments; (2) potentially audible refers to a change in noise levels between 1.0 and 3.0 dB. This range of noise level has been found to be noticeable only in laboratory environments; and (3) changes in noise level of less than 1.0 dB are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

As noise spreads from a source, it loses energy so that the farther away the noise receiver is from the noise source, the lower the perceived noise level would be. Geometric spreading causes the sound level to attenuate or be reduced, resulting in a 6-dB reduction in the noise level for each doubling of distance from a single point source of noise to the noise-sensitive receptor of concern. A long, closely spaced continuous line of vehicles along a roadway becomes a line source and produces a 3 dBA decrease in sound level for each doubling of distance. However, experimental evidence has shown that where sound from a highway propagates close to “soft” ground (e.g., plowed farmland, grass, crops, etc.), the most suitable dropoff rate to use is not 3 dBA but rather 4.5 dBA per distance doubling. There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. The predominant rating scales for human communities in the State of California are the L_{eq} and community noise equivalent level (CNEL) or the day-night average level (L_{dn}) based on A-weighted decibels (dBA). Equivalent continuous sound level (L_{eq}) is the total sound energy of time-varying noise over a sample period. CNEL is the time-varying noise over a 24-hour period, with a 5-dBA weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10-dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale but without the adjustment for events occurring during the evening hours. CNEL and L_{dn} are within one dBA of each other and are normally exchangeable. The noise adjustments are added to the noise events occurring during the more sensitive hours.

Other noise rating scales of importance when assessing the annoyance factor include the maximum noise level (L_{max}), which is the highest exponential time-averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis are specified in terms of maximum levels denoted by L_{max} for short-term noise impacts. L_{max} reflects peak operating conditions and addresses the annoying aspects of intermittent noise.

Common sources of noise in urban environments include mobile sources, such as traffic, and stationary sources, such as mechanical equipment or construction operations.

Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on each construction site and, therefore, would change the noise levels as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table 1 shows typical noise levels of construction equipment as measured at a distance of 50 feet from the operating equipment. Construction-period noise levels are higher than background ambient noise levels, but eventually cease once construction is complete.

Table 1: Typical Construction Equipment Maximum Noise Levels, L_{max}

Category	Specification Maximum Sound Levels for Analysis (dBA at 50 feet)
Pickup Truck	55
Pumps	77
Air Compressors	80
Backhoe	80
Front-End Loaders	80
Portable Generators	82
Dump Truck	84
Tractors	84
Auger Drill Rig	85
Concrete Mixer Truck	85
Cranes	85

Table 1 (cont.): Typical Construction Equipment Maximum Noise Levels, L_{max}

Category	Specification Maximum Sound Levels for Analysis (dBA at 50 feet)
Dozers	85
Excavators	85
Graders	85
Jackhammers	85
Man Lift	85
Paver	85
Pneumatic Tools	85
Rollers	85
Scrapers	85
Concrete/Industrial Saws	90
Impact Pile Driver	95
Vibratory Pile Driver	95
Source: FHWA, 2006.	

2.2 - Characteristics of Groundborne Vibration

Groundborne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. Vibrating objects in contact with the ground radiate vibration waves through various soil and rock strata to the foundations of nearby buildings.

Although groundborne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. When assessing annoyance from groundborne vibration, vibration is typically expressed as root mean square (rms) velocity in units of decibels of 1 micro-inch per second. To distinguish these vibration levels referenced in decibels from noise levels referenced in decibels, the unit descriptor is written as "VdB."

In extreme cases, excessive groundborne vibration has the potential to cause structural damage to buildings. Common sources of groundborne vibration include construction activities such as blasting, pile driving and operating heavy earthmoving equipment. However, construction vibration impacts to building structures are generally assessed in terms of peak particle velocity (PPV). For purposes of this analysis, project related impacts are expressed in terms of PPV. Typical vibration source levels from construction equipment are shown in Table 2.

Table 2: Vibration Levels of Construction Equipment

Construction Equipment	PPV at 25 Feet (inches/second)	RMS Velocity in Decibels (VdB) at 25 Feet
Water Trucks	0.001	57
Scraper	0.002	58
Bulldozer—small	0.003	58
Jackhammer	0.035	79
Concrete Mixer	0.046	81
Concrete Pump	0.046	81
Paver	0.046	81
Pickup Truck	0.046	81
Auger Drill Rig	0.051	82
Backhoe	0.051	82
Crane (Mobile)	0.051	82
Excavator	0.051	82
Grader	0.051	82
Loader	0.051	82
Loaded Trucks	0.076	86
Bulldozer—Large	0.089	87
Caisson drilling	0.089	87
Vibratory Roller (small)	0.101	88
Compactor	0.138	90
Clam shovel drop	0.202	94
Vibratory Roller (large)	0.210	94
Pile Driver (impact-typical)	0.644	104
Pile Driver (impact-upper range)	1.518	112
Source: Compilation of scientific and academic literature, generated by FTA and FHWA.		

Propagation of vibration through soil can be calculated using the vibration reference equation:

PPV= PPV ref * (25/D)^n (in/sec)

Where:

PPV=reference measurement at 25 feet from vibration source
D=distance from equipment to property line
n=vibration attenuation rate through ground

According to Chapter 12 of the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment manual (FTA 2006), an “n” value of 1.5 is recommended to calculate vibration propagation through typical soil conditions.

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SECTION 3: REGULATORY SETTING

3.1 - Federal Regulations

3.1.1 - United States Environmental Protection Agency

In 1972, Congress enacted the Noise Control Act. This act authorized the EPA to publish descriptive data on the effects of noise and establish levels of sound "requisite to protect the public welfare with an adequate margin of safety." These levels are separated into health (hearing loss levels) and welfare (annoyance levels) categories, as shown in Table 3. The EPA cautions that these identified levels are not standards because they do not take into account the cost or feasibility of the levels.

For protection against hearing loss, 96 percent of the population would be protected if sound levels are less than or equal to an $L_{eq(24)}$ of 70 dBA. The EPA activity and interference guidelines are designed to ensure reliable speech communication at about 5 feet in the outdoor environment. For outdoor and indoor environments, interference with activity and annoyance should not occur if levels are below 55 dBA and 45 dBA, respectively.

Table 3: Summary of EPA Recommended Noise Levels to Protect Public Welfare

Effect	Level	Area
Hearing loss	$L_{eq}(24) \leq 70$ dB	All areas
Outdoor activity interference and annoyance	$L_{dn} \leq 55$ dB	Outdoors in residential areas, farms, and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use
	$L_{eq}(24) \leq 55$ dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	$L_{eq} \leq 45$ dB	Indoor residential areas
	$L_{eq}(24) \leq 45$ dB	Other indoor areas with human activities such as schools, etc.

Note:
(24) = L_{eq} duration of 24 hours
Source: EPA, 1974.

3.1.2 - Federal Transit Administration

The FTA has established industry accepted standards for vibration impact criteria and impact assessment. These guidelines are published in its Transit Noise and Vibration Impact Assessment document (FTA 2006). The FTA guidelines include thresholds for construction vibration impacts for various structural categories as shown in Table 4.

Table 4: Federal Transit Administration Construction Vibration Impact Criteria

Building Category	PPV (in/sec)	Approximate VdB
I. Reinforced—Concrete, Steel or Timber (no plaster)	0.5	102
II. Engineered Concrete and Masonry (no plaster)	0.3	98
III. Non Engineered Timber and Masonry Buildings	0.2	94
IV. Buildings Extremely Susceptible to Vibration Damage	0.12	90

Note:
VdB = velocity in decibels
Source: FTA, 2006.

3.2 - State Regulations

The State of California has established regulations that help prevent adverse impacts to occupants of buildings located near noise sources. Referred to as the "State Noise Insulation Standard," it requires buildings to meet performance standards through design and/or building materials that would offset any noise source in the vicinity of the receptor. State regulations include requirements for the construction of new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings that are intended to limit the extent of noise transmitted into habitable spaces. These requirements are found in the California Code of Regulations, Title 24 (known as the Building Standards Administrative Code), Part 2 (known as the California Building Code), Appendix Chapters 12 and 12A. The proposed project is a school development project, and does not include the development of any of these multi-family type land use developments, so these regulations do not apply.

The State has also established land use compatibility guidelines for determining acceptable noise levels for specified land uses.

3.3 - Local Regulations

The project site is located within the City of Riverside, in Riverside County. The City of Riverside addresses noise in the Noise Element of its General Plan (General Plan 2025) and in its Municipal Code (City of Riverside, 2018).

3.3.1 - City of Riverside General Plan 2025

The City of Riverside adopted its General Plan 2025 in November, 2007. The objective of the General Plan's Noise Element is to minimize the exposure of new residential development, schools, hospitals, and similar noise-sensitive uses to excessive or unhealthy noise levels to the greatest extent possible. To assist with meeting its objective, the City's General Plan 2025 establishes Noise/Land Use Noise Compatibility Criteria guidelines for noise in Figure N-10 (shown in Exhibit 4) of its Noise Element. These guidelines are summarized below:

The land use category listed in the City's Noise/Land Use Noise Compatibility Criteria guidelines table that most closely applies to the proposed project is schools, libraries, churches, hospitals, and nursing homes. Under this designation, noise environments up to 60 dBA CNEL are considered "normally acceptable" for this type of new land use development. While environments with ambient noise levels ranging from 60 dBA to 70 dBA CNEL are considered "conditionally acceptable" for this type of land use development; as such, new construction or development should be undertaken only after a detailed analysis of noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.

3.3.2 - City of Riverside Municipal Code

The City of Riverside establishes noise performance standards in its noise ordinance. Ordinances applicable to the proposed project are summarized below.

Exterior sound level limits (Section 7.25.010)

The City's performance standard for exterior sound levels limits noise at residential properties to 55 dBA L_{eq} from 7:00 a.m. to 10:00 p.m. and 45 dBA L_{eq} from 10:00 p.m. to 7:00 a.m. Furthermore, it is unlawful for any person to create noise, when measured at an affected residential property line, which causes the sound level to exceed:

1. The exterior noise standard, up to 5 dBA, for a cumulative period of more than 30 minutes in any hour; or
2. The exterior noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour; or
3. The exterior noise standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour; or
4. The exterior noise standard plus 15 dBA for a cumulative period of more than 1 minute in any hour; or
5. The exterior noise standard plus 20 dBA for any period of time.

According to the City's exterior noise standard, if a measured ambient noise level exceeds that permissible within any of the first four noise limit categories above, the allowable noise exposure standard shall be increased in five decibel increments in each category as appropriate to encompass the ambient noise level.

Interior sound level limits (Section 7.30.015)

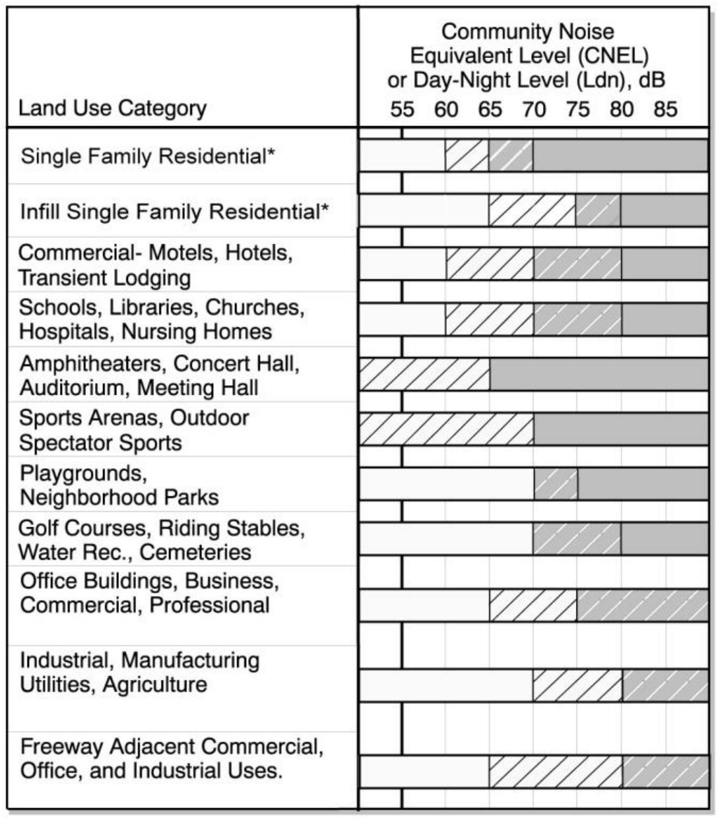
Interior noise levels in residential dwellings are limited to 45 dBA L_{eq} from 7:00 a.m. to 10:00 p.m. and to 35 dBA L_{eq} from 10:00 p.m. to 7:00 a.m. Furthermore, it is unlawful for any person to create noise, when measured on any residential property, which causes the sound level to exceed:

1. The noise standard, up to 5 dBA, for a cumulative period of more than 5 minutes in any hour; or
2. The noise standard plus 5 dBA for a cumulative period of more than 1 minute in any hour; or
3. The noise standard plus 10 dBA for any period of time.

In the event the ambient noise level exceeds the noise limit categories above, the cumulative period applicable to said category shall be increased to reflect the ambient noise level.

General noise regulations (Section 7.35.010)

Other applicable standards pertain to noise levels generated by project-related construction, loading, and unloading activities. According to the City's noise ordinances, operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration, grading or demolition work between the hours of 7:00 p.m. and 7:00 a.m. on weekdays and between 5:00 p.m. and 8:00 a.m. on Saturdays or at any time on Sunday or federal holidays is prohibited.



Nature of the noise environment where the CNEL or Ldn level is:

Below 55 dB
Relatively quiet suburban or urban areas, no arterial streets within 1 block, no freeways within 1/4 mile.

55-65 dB
Most somewhat noisy urban areas, near but not directly adjacent to high volumes of traffic.

65-75 dB
Very noisy urban areas near arterials, freeways or airports.

75+ dB
Extremely noisy urban areas adjacent to freeways or under airport traffic patterns. Hearing damage with constant exposure outdoors.

Normally Acceptable

Specific land use is satifactory, based on the assumption that any building is of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable

New construction or development should be undertaken only after a detailed analysis of noise reduction requirements is made and needed noise insulation features included in design. Conventional construction, but with closed windows and fresh air supply systems or air condition-ing, will normally suffice.

Normally Unacceptable

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 design.

Conditionally Unacceptable

New construction or develop-ment should generally not be undertaken, unless it can be demonstrated that noise reduction requirements can be employed to reduce noise impacts to an acceptable level. 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.

The Community Noise Equivalent Level (CNEL) and Day-Night Noise Level (Ldn) are measures of the 24-hour noise environment. They represent the constant A-weighted noise level that would be measured if all the sound energy received over the day were averaged. In order to account for the greater sensitivity of people to noise at night, the CNEL weighting includes a 5-decibel penalty on noise between 7:00 p.m. and 10:00 p.m. and a 10-decibel penalty on noise between 10:00 p.m. and 7:00 a.m. of the next day. The Ldn includes only the 10-decibel weighting for late-night noise events. For practical purposes, the two measures are equivalent for typical urban noise environments.

* For properties located within airport influence areas, acceptable noise limits for single family residential uses are established by the Riverside County Airport Land Use Compatibility Plan.

SOURCE: STATE DEPARTMENT OF HEALTH,
AS MODIFIED BY THE CITY OF RIVERSIDE

Exhibit 4
Noise/Land Use
Noise Compatibility Criteria

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SECTION 4: EXISTING NOISE CONDITIONS

The following section describes the existing ambient noise environment of the project vicinity.

4.1 - Existing Ambient Noise Levels

The existing noise levels on the project site were documented through a noise monitoring effort performed at the project site. A total of three short-term noise measurements (15 minutes each) were taken on August 14, 2018, starting at 10:30 a.m. and ending at 11:55 p.m., during the midday peak noise hour.

The first short-term measurement, ST-1, was taken at the southern corner of the project site, on Bunker Street and Lincoln Avenue, which is located between a proposed parking lot and residential homes. The resulting measurement showed that ambient noise levels at this location averaged 63.1 dBA L_{eq}. As was observed by the technician at the time of the noise measurement, the dominant noise source in the project vicinity was from vehicular traffic along Lincoln Avenue.

The second short-term measurement, ST-2, was taken at the southwestern boundary of the project site, on Bunker Street, which is located between proposed hardcourts and residential homes. The resulting measurement showed that ambient noise levels at this location averaged 49.1 dBA L_{eq}. As was observed by the technician at the time of the noise measurement, the dominant noise source in the vehicle noise on local roadways.

The third short-term measurement, ST-3, was taken near the eastern corner of the project site, approximately 130 feet northwest of Lincoln Avenue and 180 feet southwest of Dorlen Street. The resulting measurement showed that ambient noise levels at this location averaged 51.1 dBA L_{eq}. As was observed by the technician at the time of the noise measurement, the dominant noise sources in the project vicinity were vehicular traffic along Lincoln Avenue, birds, dogs, and a garbage truck.

The ambient noise measurement locations are shown in Exhibit 5. The noise monitoring survey data sheets are provided in Appendix A.

4.2 - Existing Traffic Noise Levels

Existing traffic noise levels along the roadway segments adjacent to the project site were modeled using the Federal Highway Administration (FHWA) Traffic Noise Prediction Model (FHWA-RD-77-108). Site-specific information is entered, such as roadway traffic volumes, roadway active width, source-to-receiver distances, travel speed, noise source and receiver heights, and the percentages of automobiles, medium trucks, and heavy trucks that the traffic is made up of throughout the day, amongst other variables. The daily traffic volumes were obtained from the traffic analysis prepared for the project by Linscott, Law & Greenspan, Engineers (2018). The traffic volumes described here correspond to the existing without project conditions traffic scenario as described in the transportation analysis. The model inputs and outputs—including the 60 dBA, 65 dBA, and 70 dBA

CNEL noise contour distances—are provided in the Appendix of this document. A summary of the modeling results is shown in Table 5.

Table 5: Existing Traffic Noise Levels

Roadway Segment	Approximate Average Daily Traffic (ADT)	Center-line to 70 L_{dn} (feet)	Center-line to 65 L_{dn} (feet)	Center-line to 60 L_{dn} (feet)	L_{dn} (dBA) 50 feet from Centerline of Outermost Lane
Lincoln Avenue—Sonora Place to Collingwood Street	5,600	< 50	< 50	57	60.1
Lincoln Avenue—Collingwood Street to Dorlen Street	5,400	< 50	< 50	55	59.9

Notes:
[1] Modeling results do not take into account mitigating features such as topography, vegetative screening, fencing, building design, or structure screening. Rather it assumes a worst case of having a direct line of site on flat terrain.
Source: FirstCarbon Solutions, 2018.

The modeling results show that traffic noise levels on roadway segments adjacent to the project site range up to 60.1 dBA CNEL as measured at 50 feet from the centerline of the outermost travel lane.

4.3 - Existing Stationary Source Noise Levels

Some of the surrounding land uses generate noise associated with mechanical ventilation systems, parking lot activities, and recreational activities at the adjacent park land use. Noise levels from typical rooftop mechanical ventilation equipment are anticipated to range up to approximately 60 dBA L_{eq} at a distance of 25 feet. Typical parking lot activities, such as people conversing or closing doors, generate approximately 60 dBA to 70 dBA L_{max} at 50 feet. These activities are potential point sources of noise that contribute to the existing ambient noise environment in the project vicinity.

Source: ESRI Aerial Imagery.

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300 150 0 300 Feet

Exhibit 5
Noise Monitoring Locations Map

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SECTION 5: THRESHOLDS OF SIGNIFICANCE AND IMPACT ANALYSIS

5.1 - Thresholds of Significance

This report analyzes potential project impacts according to the following criteria of significance. The proposed project would result in a significant impact if the project would result in:

a) Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

b) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;

c) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project; or

d) Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels.

e) Exposure of people residing or working in the project area to excessive noise levels if the project is located within an area covered by an airport land use plan, or where such plan has not been adopted within 2 miles of a public airport or public use airport?

f) Exposure of people residing or working in the project area to excessive noise levels if the project is located in the vicinity of a private airstrip?

5.2 - Exceedance of Noise Standards Impacts

A significant impact would occur if implementation of the project would expose persons working or residing at the project site or in the project vicinity to noise levels in excess of established standards.

The City's General Plan 2025 indicates that for schools, libraries, churches, hospitals, and nursing home land use developments, environments with ambient noise levels ranging up to 60 dBA CNEL are considered "normally acceptable." While environments with ambient noise levels ranging from 60 dBA to 70 dBA CNEL are considered "conditionally acceptable."

The City's noise ordinance establishes exterior and interior noise performance standards for receiving residential land uses:

- Exterior noise levels at receiving residential property lines shall not exceed 55 dBA L_{eq} from 7:00 a.m. to 10:00 p.m. and 45 dBA L_{eq} from 10:00 p.m. to 7:00 a.m.
- Interior noise levels in residential dwellings shall not exceed 45 dBA L_{eq} from 7:00 a.m. to 10:00 p.m. and 35 dBA L_{eq} from 10:00 p.m. to 7:00 a.m.

5.2.1 - Stationary Source Operational Noise Impacts

A significant impact would occur if operational noise levels generated by stationary noise sources at the project site would exceed the following levels at the property line of any receiving residential land use in the project vicinity:

- 55 dBA L_{eq} between the hours of 7:00 a.m. and 10:00 p.m.; or
- 45 dBA L_{eq} between the hours of 10:00 p.m. and 7:00 a.m.

The proposed project would include new stationary noise sources, such as typical parking lot activities, outdoor recreational activities, and mechanical ventilation equipment.

Typical parking lot activities include people conversing, doors shutting, and vehicles idling which generate noise levels ranging from approximately 60 dBA to 70 dBA L_{max} at 50 feet. These activities are expected to occur sporadically throughout the day, as visitors and staff arrive and leave parking lot areas at the project site.

Mechanical Equipment Operations

Implementation of the project would include operation of a new stationary noise source of mechanical equipment to support the new classrooms. At the time of preparation of this analysis, specific details of mechanical ventilation systems were not available; therefore, a reference noise level for typical rooftop mechanical ventilation systems was used. Noise levels from typical commercial-grade mechanical ventilation equipment systems range up to approximately 60 dBA L_{eq} at a distance of 25 feet. The closest off-site sensitive receptors to the nearest possible location where this equipment could be located are the residences located to the southeast of the project site. These residences are located approximately 180 feet from the closest possible location for project mechanical ventilation equipment. At this distance these nearest residential receptors would be exposed to mechanical ventilation system operational noise levels of approximately 43 dBA L_{eq}. Therefore, noise generated by project mechanical ventilation equipment would be well be below the City's residential daytime and nighttime noise standards of 55 dBA L_{eq} and 45 dBA L_{eq}, respectively, for stationary noise sources. Therefore, noise impacts from project mechanical ventilation equipment would be less than significant.

Parking Lot Activities

Typical parking lot activities such as people conversing, doors slamming or vehicles idling generate noise levels of approximately 60 dBA to 70 dBA L_{max} at 50 feet. The closest noise-sensitive land use to the proposed parking areas is the residential land uses southeast of the project site across Bunker Street, located approximately 70 feet from the nearest acoustic center of parking lot activity. At this distance, maximum noise levels from parking lot activities could range up to approximately 57 dBA to 67 dBA L_{max} at this receptor. These activities would be expected to occur sporadically throughout the day, as visitors and staff arrive and leave the parking lot areas. As a result, although there would be occasional high single-event noise exposure of up to 67 dBA L_{max} from parking lot activities, such activities when averaged over an hour or longer period would result in average noise levels of less than 50 dBA L_{eq}. Use of the parking lot would only occur during the school's operational hours and would not occur during nighttime hours. Thus, noise generated by parking lot activities would be well be below the City's residential daytime and nighttime noise standards of 55 dBA L_{eq} and 45 dBA L_{eq}, respectively, for stationary noise sources. Therefore, noise impacts from project parking lot activities would be less than significant.

5.2.2 - Mobile Source Operational Noise Impacts

A significant impact would occur if persons working or residing at the proposed project site would be exposed to traffic noise levels exceeding the City's "normally acceptable" land use compatibility threshold of 60 dBA CNEL for new schools, libraries, churches, hospitals, and nursing home land use developments.

The FHWA highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate existing and future traffic noise conditions along roadway segments adjacent to the project site. The projected future traffic noise levels adjacent to the project site were analyzed to determine compliance with the City's noise and land use compatibility standards. The daily traffic volumes were obtained from the traffic analysis prepared for the project by Linscott, Law & Greenspan, Engineers (2018). The resultant noise levels were weighed and summed over a 24-hour period in order to determine the CNEL values. The traffic noise modeling input and output files are included in Appendix A of this document. Table 6 shows a summary of the traffic noise levels for existing and year 2040 buildout conditions without and with the project as measured at 50 feet from the centerline of the outermost travel lane.

Table 6: Traffic Noise Model Results Summary

Roadway Segment	Existing + No Project (dBA) CNEL	Existing + Plus Project (dBA) CNEL	Increase over Existing + No Project (dBA)	Year 2040 No Project (dBA) CNEL	Year 2040 + Project (dBA) CNEL	Increase over Year 2040 No Project (dBA)
Lincoln Avenue—Sonora Place to Collingwood Street	60.1	60.6	0.5	61.1	61.5	0.4
Lincoln Avenue—Collingwood Street to Dorlen Street	59.9	60.4	0.5	61.1	61.3	0.2
Source: FirstCarbon Solutions, 2018.						

The traffic noise model results show that projected traffic noise levels along Lincoln Avenue adjacent to the project site would range up to 60.6 dBA CNEL as measured at 50 feet from the centerline of the nearest travel lane under existing plus project conditions; and up to 61.5 dBA CNEL under year 2040 plus project conditions. The closest façade of the proposed school buildings would be located approximately 80 feet from the centerline of the roadway. At this distance the highest projected traffic noise levels would attenuate to below 58.5 dBA CNEL. These noise levels are within the City's normally acceptable range for new school land use developments. Therefore, implementation of the project would not expose persons to traffic noise levels in excess of established standards and traffic noise impacts to the project would be less than significant.

5.3 - Excessive Groundborne Vibration Impacts

This section analyzes both construction and operational groundborne vibration impacts. Groundborne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. Vibrating objects in contact with the ground radiate vibration waves through various soil and rock strata to the foundations of nearby buildings.

In extreme cases, excessive groundborne vibration has the potential to cause structural damage to buildings. Common sources of groundborne vibration include construction activities such as blasting, pile driving, and operating heavy earthmoving equipment.

The City of Riverside has not adopted a provision addressing the impacts of groundborne vibration levels. Therefore, for purposes of this analysis, the FTA Construction Vibration Impact Criteria are utilized. The FTA has established industry accepted standards for vibration impact assessment in its Transit Noise and Vibration Impact Assessment document (FTA 2006). These guidelines are summarized in Table 4.

5.3.1 - Short-term Construction Vibration Impacts

A significant impact would occur if existing structures at the project site or in the project vicinity would be exposed to groundborne vibration levels in excess of levels established by the FTA's Construction Vibration Impact Criteria for the listed type of structure, as shown in Table 4.

Of the variety of equipment used during construction, the small vibratory rollers that are anticipated to be used in the site preparation phase of construction would produce the greatest groundborne vibration levels. Small vibratory rollers produce groundborne vibration levels ranging up to 0.101 inch per second (in/sec) PPV at 25 feet from the operating equipment.

The nearest off-site receptors to the project site are the single-family residential homes located near the southwest boundary of the project site on Bunker Street. The closest of these homes would be located approximately 40 feet from the nearest construction footprint where the heaviest construction equipment would potentially operate. At this distance, groundborne vibration levels would range up to 0.05 PPV from operation of the types of equipment that would produce the highest vibration levels. This is below the FTA's Construction Vibration Impact Criteria of 0.2 PPV for buildings of non-engineered timber and masonry. Therefore, the impact of groundborne vibration levels on off-site receptors would be less than significant.

5.3.2 - Operational Vibration Impacts

Implementation of the project would not include any permanent sources that would expose persons in the project vicinity to groundborne vibration levels that could be perceptible without instruments at any existing sensitive land use in the project vicinity. In addition, there are no existing significant permanent sources of groundborne vibration in the project vicinity to which the proposed project would be exposed. Therefore, project operational groundborne vibration level impacts would be considered less than significant.

5.4 - Substantial Permanent Increase Impacts

Significant noise impacts to off-site receptors would occur if the proposed project would result in a substantial increase in ambient noise levels compared with those that would exist without the project. As noted in the characteristics of noise discussion, audible increases in noise levels generally refer to a change of 3 dBA or more, as this level has been found to be barely perceptible to the human ear in outdoor environments. A change of 5 dBA is considered the minimum readily perceptible change to the human ear in outdoor environments. Therefore, for purposes of this analysis, an increase of 5 dBA or greater would be considered a substantial permanent increase in ambient noise levels.

5.4.1 - Traffic Noise Increase

As shown in Table 6, the greatest increase in traffic noise levels that would result from implementation of the project would be an increase of 0.5 dBA compared to noise levels that would exist without the project. This increase would not be perceptible and would be well below the threshold of a 5 dBA increase that would be considered a substantial permanent increase. Therefore, project-related traffic levels would not result in a substantial permanent increase in ambient noise levels.

5.4.2 - Stationary Source Noise Increase

Based on the analysis shown in Section 5.2.1, parking lot activities could result in noise levels ranging up to approximately 37 dB L_{eq}, at the nearest residences. Mechanical ventilation system operational noise levels could range up to approximately 43 dBA L_{eq} as measured at the nearest residential receptor. These levels are below the existing noise levels in the project vicinity as documented by the ambient noise monitoring and the traffic noise modeling results. Therefore, project-related parking lot activities and mechanical equipment operation would not result in a substantial permanent increase in ambient noise levels.

Implementation of the project would also include recreational activities by school children on the proposed hardcourt and play field areas. Noise levels from these activities would be similar to existing noise levels from activities at the adjacent public park, located immediately north of the project site. However, school activities would only occur during school hours and not during evening or nighttime hours, when major use of the public park would occur. Since the school recreational activities would not occur during the same time period of when major use of the public park would occur, they would not result in a doubling of this noise source. Therefore, noise generated by recreational activities would not result in even a 3 dBA increase in ambient noise levels compared to existing noise levels experienced in the project vicinity from current recreational activity at the adjacent public park. Therefore, noise impacts from project recreational activities would be less than significant.

Therefore, project-related stationary sources would not result in a substantial permanent increase of (3 dBA or greater) compared with noise levels existing without the project, and noise impacts to off-site sensitive receptors would be less than significant.

5.5 - Substantial Temporary or Periodic Increase Impacts

5.5.1 - Construction Noise Impacts

A significant impact would occur if project construction would result in temporary or periodic increases in ambient noise levels that would result in an adverse health impact of annoyance or sleep disturbance at nearby sensitive receptors.

Two types of short-term noise impacts could occur during the construction of the proposed project. First, construction crew commutes and the transport of construction equipment and materials to the project site would incrementally increase noise levels on access roads leading to the project site. Although there would be a relatively high single-event noise exposure potential causing intermittent noise nuisance, the effect on longer-term (hourly or daily) ambient noise levels would be small. Therefore, short-term construction-related impacts associated with worker commute and equipment transport to the project site would be less than significant.

The second type of short-term noise impact is related to noise generated during construction on the project site. Construction is completed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on the site and, therefore, the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction related noise ranges to be categorized by work phase. Table 1 lists typical construction equipment noise levels, based on a distance of 50 feet between the equipment and a noise receptor. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full-power operation followed by 3 or 4 minutes at lower power settings. Impact equipment such as pile drivers are not expected to be used during construction of this project.

The site preparation phase, which includes excavation and grading of the site, tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery and compacting equipment, such as bulldozers, draglines, backhoes, front loaders, roller compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three or four minutes at lower power settings.

The construction that would take place during this project would likely require the use of scrapers, bulldozers, water trucks, haul trucks, and pickup trucks. The maximum noise level generated by each scraper is assumed to be 85 dBA L_{max} at 50 feet from this equipment. Each bulldozer would also generate 85 dBA L_{max} at 50 feet. The maximum noise level generated by graders is approximately 85 dBA L_{max} at 50 feet. Each doubling of sound sources with equal strength increases the noise level by 3 dBA. Assuming that multiple pieces of the loudest pieces of construction equipment all operate simultaneously at full power within 50 feet of a single point (the acoustic center of these various noise sources) would produce a reasonable worst-case combined noise level during the loudest phase of construction of up to 90 dBA L_{max}. Assuming that these multiple pieces of equipment would all operate simultaneously in those same locations for a full hour would result in a reasonable worst-case hourly average of 86 dBA L_{eq}. The acoustical center reference is used because construction equipment must operate at some distance from one another on a project site (they cannot all operate simultaneously at a single point), and the combined noise level as measured at a point equidistant from the sources (acoustic center) would be the worst-case maximum noise level.

The closest noise-sensitive receptors to the project site are the single-family residential homes located near the southwest boundary of the project site on Bunker Street. The façade of the closest home would be located approximately 90 feet from the acoustic center of construction activity where multiple pieces of heavy construction equipment would operate simultaneously during construction of the proposed sports fields. At this distance, construction noise levels could range up to approximately 84.9 dBA L_{max}, with a relative worst-case hourly average of 80.9 dBA L_{eq} at this receptor.

Although there could be a relatively high single event noise exposure potential causing an intermittent noise nuisance, the effect on longer-term (hourly or daily) ambient noise levels would be small but could result in an adverse health impact of annoyance or sleep disturbances at nearby sensitive receptors. However, compliance with the permissible construction hours established by the City's Municipal Code would reduce the effects of noise produced by construction activities on longer-term (hourly or daily) ambient noise levels, and it would reduce potential impacts that could result in annoyance or sleep disturbances at nearby sensitive receptors. Therefore, implementation of Mitigation Measure (MM) NOI-1, restricting the permissible hours of construction and implementing best management noise reduction techniques and practices, would reduce impacts from temporary increases in ambient noise levels due to construction activity to less than significant. Therefore, the potential short-term construction noise impacts on sensitive receptors in the project vicinity would be reduced to a less than significant level.

Mitigation Measures

MM NOI-1 Implementation of the following multi-part mitigation measure is required to reduce potential construction period noise impacts:

- The construction contractor shall ensure that all equipment driven by internal combustion engines shall be equipped with mufflers, which are in good condition and appropriate for the equipment.
- The construction contractor shall ensure that unnecessary idling of internal combustion engines (i.e., idling in excess of 5 minutes) is prohibited.
- The construction contractor shall utilize "quiet" models of air compressors and other stationary noise sources where technology exists.
- At all times during project grading and construction, the construction contractor shall ensure that stationary noise-generating equipment shall be located as far as practicable from sensitive receptors and placed so that emitted noise is directed away from adjacent residences.

- The construction contractor shall ensure that the construction staging areas shall be located to create the greatest feasible distance between the staging area and noise-sensitive receptors nearest the project site.
- The construction contractor shall ensure that all on-site construction activities, including the operation of any tools or equipment used in construction, drilling, repair, alteration, grading or demolition work, do not commence between the hours of 7:00 p.m. and 7:00 a.m. on week days and between 5:00 p.m. and 8:00 a.m. on Saturdays or at any time on Sunday or federal holidays.

5.6 - Airport Noise Impact

5.6.1 - Public Airport Noise Impacts

The nearest airport to the project site is the Riverside Municipal Airport that is located 2.7 miles northwest of the project site. Because of its distance from the airports runways, the project site is located well outside of the airport's 55 dBA CNEL noise contours. Therefore, implementation of the project would not expose persons residing, working or visiting the project site to excessive noise levels associated with public airport noise. No impacts associated with public airport noise would occur.

5.6.2 - Private Airstrips Noise Impacts

No private airstrips are located within 2 miles of the project site. Because of its distance from any private airstrips, the proposed project would not expose persons residing, working, or visiting the project site to excessive noise levels associated with private airstrip noise. No impacts associated with private airstrip noise would occur.

SECTION 6: REFERENCES

City of Riverside. 2007. General Plan 2025. Noise Element. November.

City of Riverside. 2018. Municipal Code. Website: https://riversideca.gov/municode/

Federal Highway Administration (FHWA). 2006. Highway Construction Noise Handbook. August.

Federal Transit Administration (FTA). 2006. Transit Noise and Vibration Impact Assessment. May.

Linscott, Law & Greenspan, Engineers. 2018. Traffic Impact Analysis Report Casa Blanca Elementary School Project. November 2.

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Appendix A:
Noise Monitoring and Traffic Data

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Project Number: 3459.0005
Project Name: Casa Blanca Elementary
Test Personnel: Victoria C.

Sheet 1 of 3

Noise Measurement Survey

Site Number: ST-1 Date: 8/14/18 Time: From 11:02 am To 11:18 am

Site Location:
Edge of property on Bunker St & Lincoln Ave.

Primary Noise Sources: Vehicular traffic

Measurement Results

	dBA
Leq	63.1
Lmax	
Lmin	
L5	
L10	
L50	
L90	
Ldn	
CNEL	

Observed Noise Sources/Events

Time	Noise Source/Event	dBA
11:13am	dog barking	

Comments:

Equipment: Larson LXT2
Settings: A-Weighted☒ Other☐

Measured Difference: -.06 dBA
Slow☒ Fast☐ Windscreen☒

Atmospheric Conditions:

Maximum Wind Velocity (mph)	Average Wind Velocity (mph)	Temperature (F)	Relative Humidity (%)	
3.1	0.6	89.9°		
Comments:	slightly windy			

Project Number: 3459.0005
Project Name: Casa Blanca Elementary
Test Personnel: Victoria C.

Noise Measurement Survey

Site Number: ST-2 Date: 8/14/18 Time: From 11:40 am To 11:55 am

Site Location:
Center - edge of property, next to residential

Primary Noise Sources: Vehicle noise on roadways

Measurement Results

	dBA
Leq	49.1
Lmax	
Lmin	
L5	
L10	
L50	
L90	
Ldn	
CNEL	

Observed Noise Sources/Events

Time	Noise Source/Event	dBA
11:53	Car engine	

Comments:

Equipment: Larson LXT2 Measured Difference: ∅ dBA
Settings: A-Weighted☒ Other☐ Slow☒ Fast☐ Windscreen☒

Atmospheric Conditions:

Maximum Wind Velocity (mph)	Average Wind Velocity (mph)	Temperature (F)	Relative Humidity (%)	
3.1	0.6	90°		
Comments:				

Project Number: 3459.0005
Project Name: Casa Blanca Elementary
Test Personnel: Victoria C.

Noise Measurement Survey

Site Number: ST-3 Date: 8/14/18 Time: From 10:30 am To 10:45 am

Site Location:
Corner at former KPRO & former lot for government use.

Primary Noise Sources: Vehicular traffic, birds, dogs, garbage truck noise.

Measurement Results

	dBA
Leq	51.1
Lmax	
Lmin	
L5	
L10	
L50	
L90	
Ldn	
CNEL	

Observed Noise Sources/Events

Time	Noise Source/Event	dBA
10:30 am	garbage truck	
10:40 am	airplane	
10:42 am	helicopter	

Comments:

Equipment: Larson LXT2 Measured Difference: -0.72 dBA
Settings: A-Weighted☒ Other☐ Slow☒ Fast☐ Windscreen☒

Atmospheric Conditions:

Maximum Wind Velocity (mph)	Average Wind Velocity (mph)	Temperature (F)	Relative Humidity (%)	
1.7	1.2	82.9°		
Comments:	slightly windy			

TABLE Existing -01

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 11/05/2018
ROADWAY SEGMENT: Lincoln Avenue - Sonora Place to Collingwood Street
NOTES: Casa Blanca Elementary - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5600   SPEED (MPH): 30   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6   SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.07

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	56.5	121.3

TABLE Existing -02

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 11/05/2018
ROADWAY SEGMENT: Lincoln Avenue - Collingwood Street to Dorlen Street
NOTES: Casa Blanca Elementary - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5400   SPEED (MPH): 30   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.91

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	55.2	118.4

TABLE Existing + Project-01

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 11/05/2018
ROADWAY SEGMENT: Lincoln Avenue - Sonora Place to Collingwood Street
NOTES: Casa Blanca Elementary - Existing + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6300   SPEED (MPH): 30   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS			
	75.51	12.57	9.34
M-TRUCKS			
	1.56	0.09	0.19
H-TRUCKS			
	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.58

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	61.1	131.1

TABLE Existing + Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 11/05/2018
ROADWAY SEGMENT: Lincoln Avenue - Collingwood Street to Dorlen Street
NOTES: Casa Blanca Elementary - Existing + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6000   SPEED (MPH): 30   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.37

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	59.2	127.0

TABLE Year 2040 Buildout No Project-01

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 11/05/2018
ROADWAY SEGMENT: Lincoln Avenue - Sonora Place to Collingwood Street
NOTES: Casa Blanca Elementary - Year 2040 Buildout No Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7100   SPEED (MPH): 30   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.10

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	66.1	142.0

TABLE Year 2040 Buildout No Project-02

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 11/05/2018
ROADWAY SEGMENT: Lincoln Avenue - Collingwood Street to Dorlen Street
NOTES: Casa Blanca Elementary - Year 2040 Buildout No Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7100   SPEED (MPH): 30   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.10

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	66.1	142.0

TABLE Year 2040 + Project-01

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 11/05/2018
ROADWAY SEGMENT: Lincoln Avenue - Sonora Place to Collingwood Street
NOTES: Casa Blanca Elementary - Year 2040 + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7800 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.50

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	70.4	151.2

TABLE Year 2040 + Project-02

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 11/05/2018
ROADWAY SEGMENT: Lincoln Avenue - Collingwood Street to Dorlen Street
NOTES: Casa Blanca Elementary - Year 2040 + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7500   SPEED (MPH): 30   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.33

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	68.6	147.3

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