IV.L NOISE AND VIBRATION

INTRODUCTION

This section evaluates noise and vibration levels associated with the implementation of the proposed project. The noise and vibration analysis in this section assesses existing noise and vibration conditions within the Specific Plan area and its vicinity, as well as short-term construction and long-term operational noise and vibration impacts associated with the proposed project. Mitigation measures for potentially significant impacts are recommended when appropriate to reduce noise and vibration levels.

ENVIRONMENTAL SETTING

Noise

Characteristics of Sound

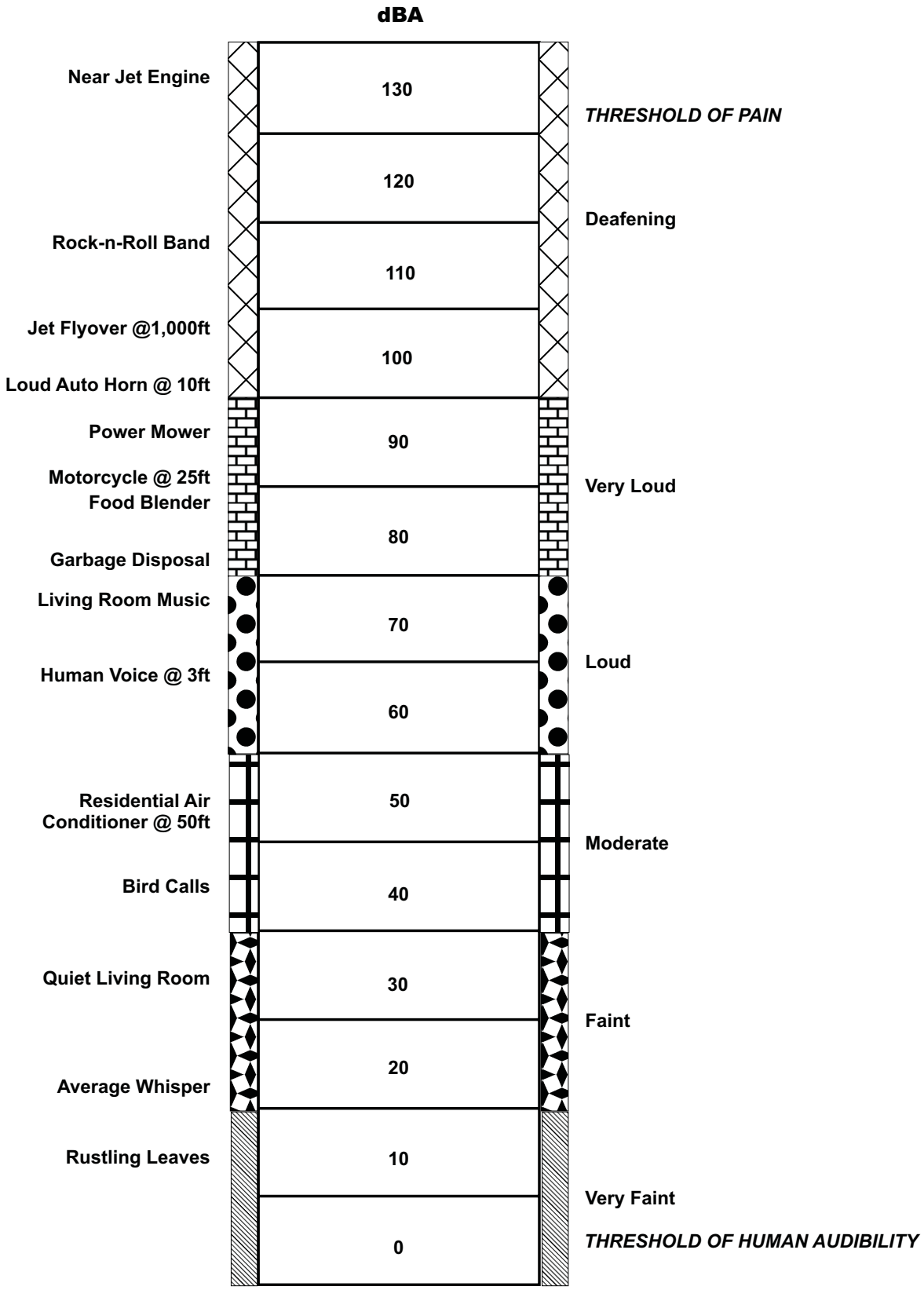
Sound is technically described in terms of the loudness (amplitude) and frequency (pitch) of the sound. The standard unit of measurement for sound is the decibel (dB). The human ear is not equally sensitive to sound at all frequencies. The "A-weighted scale," abbreviated dBA, reflects the normal hearing sensitivity range of the human ear. On this scale, the range of human hearing extends from approximately 3 to 140 dBA. **Figure IV.L-1** provides examples of A-weighted noise levels from common sounds.

Noise Definitions

This noise analysis discusses sound levels in terms of Community Noise Equivalent Level (CNEL) and Equivalent Noise Level (L_{eq}).

Community Noise Equivalent Level. CNEL is an average sound level during a 24-hour period. CNEL is a noise measurement scale, which accounts for noise source, distance, single event duration, single event occurrence, frequency, and time of day. Due to increased sensitivity during the evening hours, noise between 7:00 p.m. and 10:00 p.m. is weighted as if the sound were actually 5 dBA higher than if it occurred from 7:00 a.m. to 7:00 p.m. From 10:00 p.m. to 7:00 a.m., noise is weighted as if it were 10 dBA higher due to the lower background level and the likelihood for people to want to rest or sleep during those hours. Hence, the CNEL is obtained by adding an additional 5 dBA to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and 10 dBA to sound levels in the night before 7:00 a.m. and after 10:00 p.m. Because CNEL accounts for human sensitivity to sound, the CNEL 24-hour figure is always a higher number than the actual 24-hour average.

Equivalent Noise Level. L_{eq} is the average noise level on an energy basis for any specific time period. The L_{eq} for one hour is the energy average noise level during the hour. The average noise level is based on the energy content (acoustic energy) of the sound. L_{eq} can be thought of as the level of a continuous noise which has the same energy content as the fluctuating noise level. The equivalent noise level is expressed in units of dBA.



SOURCE: Cowan, James P., *Handbook of Environmental Acoustics*

FIGURE IV.L-1

A-WEIGHTED DECIBEL SCALE

Effects of Noise

Noise is generally defined as unwanted sound. The degree to which noise can impact the human environment ranges from levels that interfere with speech and sleep (annoyance and nuisance) to levels that cause adverse health effects (hearing loss and psychological effects). Human response to noise is subjective and can vary greatly from person to person. Factors that influence individual response include the intensity, frequency, and pattern of noise, the amount of background noise present before the intruding noise, and the nature of work or human activity that is exposed to the noise source.

Audible Noise Changes

Studies have shown that the smallest perceptible change in sound level for a person with normal hearing sensitivity is approximately 3 dBA. A change of at least 5 dBA would be noticeable and would likely evoke a community reaction. A 10-dBA increase is subjectively heard as a doubling in loudness and would cause a community response.

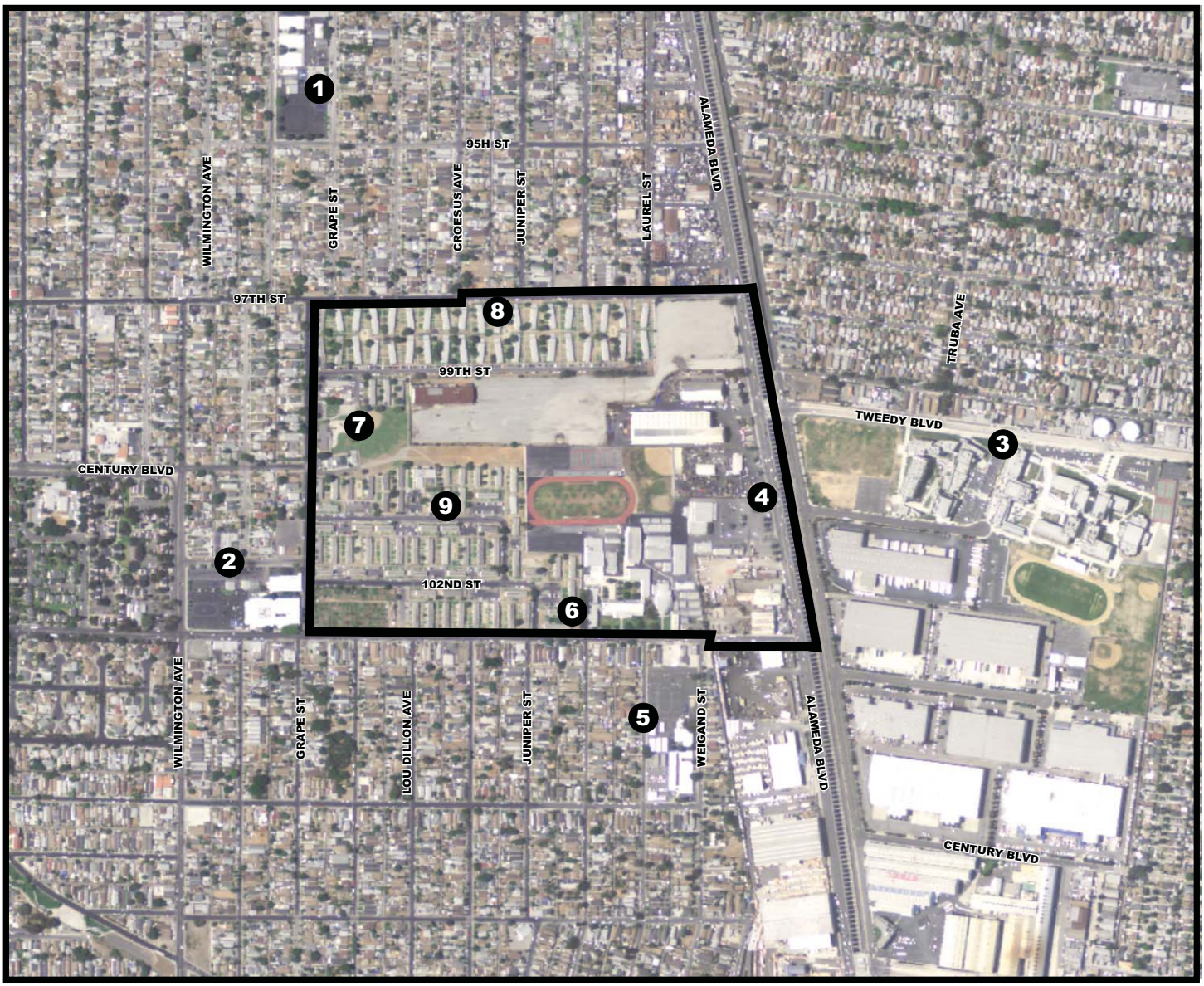
Noise levels decrease as the distance from the noise source to the receiver increases. Noise generated by a stationary noise source, or "point source," will decrease by approximately 6 dBA over hard surfaces and 7.5 dBA over soft surfaces for each doubling of the distance. For example, if a noise source produces a noise level of 89 dBA at a reference distance of 50 feet, then the noise level would be 83 dBA at a distance of 100 feet from the noise source, 77 dBA at a distance of 200 feet, and so on. Noise generated by a mobile source will decrease by approximately 3 dBA over hard surfaces and 4.5 dBA over soft surfaces for each doubling of the distance.

Generally, noise is most audible when traveling by direct line of sight. Barriers, such as walls, berms, or buildings that break the line-of-sight between the source and the receiver greatly reduce noise levels from the source since sound can only reach the receiver by bending over the top of the barrier (diffraction). Sound barriers can reduce sound levels by up to 20 dBA. However, if a barrier is not high or long enough to break the line of sight from the source to the receiver, its effectiveness is greatly reduced.

Existing Noise Levels

The urban area surrounding the Specific Plan area is characterized by residential, institutional, and industrial land uses. Existing source of noise include rail traffic within the Alameda Corridor and general industrial noise located on the eastern portion of the Specific Plan area. Typical urban noise sources include sirens, people (e.g., music, yelling/loud talking), and motorized vehicle traffic. In addition, the Specific Plan area is under the Los Angeles International Airport flight path and exposed to aircraft noise.

A series of 15-minute sound measurements were taken using a SoundPro DL Sound Level Meter on April 13, 2010 to determine existing ambient daytime noise levels at the Specific Plan area. Noise monitoring locations are shown in **Figure IV.L-2**. **Table IV.L-1** shows existing ambient noise levels along segments that are anticipated to experience the most residential growth along commercial corridors. The monitored noise levels ranged from 57.7 to 76.3 dBA L_{eq}. In addition to short term measurements, a 24-hour measurement was conducted at the Specific Plan area on April 13, 2010. The 24-hour noise level was 55.6 dBA CNEL.



LEGEND:

Specific Plan Area

(#) Noise Monitoring Locations

1. 92nd Street Elementary School
2. Florence Griffith-Joyner Elementary School
3. Southeast Middle School
4. East Side of Specific Plan Area
5. Weigand Elementary School
6. South Side of Specific Plan Area
7. West Side of Specific Plan Area
8. North Side of Specific Plan Area
9. 101st Street (interior of Specific Plan Area)

SOURCE: TAHA, 2010.

FIGURE IV.L-2

NOISE MONITORING LOCATIONS

TABLE IV.L-1: EXISTING NOISE LEVELS		
Key to Figure IV.L-2	**Noise Monitoring Location Land Use**	**Sound Level (dBA, L_{eq})**
1	92nd Street Elementary School	69.9
2	Florence Griffith Joyner Elementary School	73.2
3	Southeast Middle School and High School	72.7
4	East Side of Specific Plan Area	76.3
5	Weigand Elementary School	57.7
6	South Side of Specific Plan Area	75.6
7	West Side of Specific Plan Area	75.1
8	North Side of Specific Plan Area	75.1
9	101st Street (interior of Specific Plan Area)	71.3
SOURCE: TAHA, 2010.		

Noise-Sensitive Land Uses

Noise-sensitive land uses are locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Residences, schools, hospitals, guest lodging, libraries, and some passive recreation areas would each be considered noise-sensitive and may warrant unique measures for protection from intruding noise. As shown in **Figure IV.L-3**, noise-sensitive land uses within the project area include residences and schools. Residential areas include the following:

- Single-and multi-family residences located approximately 50 feet to the west, north, and south; and
- Single-and multi-family residences located approximately 200 feet to the east in South Gate.

Educational land uses include the following:

- Florence Griffith Joyner Elementary School located approximately 65 feet to the west;
- Simon Rodia Continuation School located approximately 65 feet to the south;
- Weigand Elementary School located approximately 210 feet to the south;
- Southeast Middle School located approximately 650 feet to the east;
- Youth Opportunity High School located approximately 900 feet to the west;
- 92nd Street Elementary School located approximately 915 feet to the north; and
- Southeast High School located approximately 1,275 feet to the east.

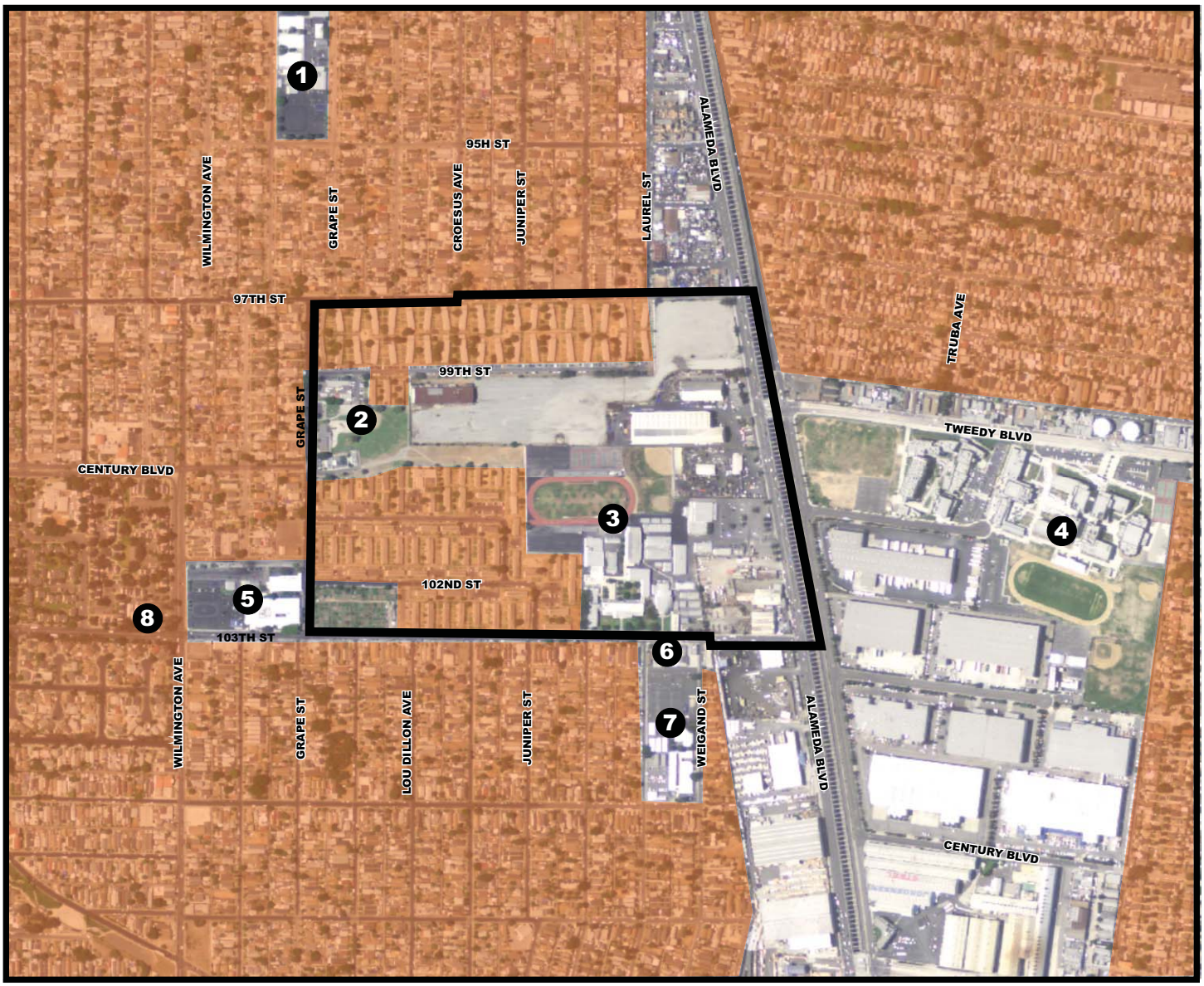
The following sensitive land uses are located within the Specific Plan area and were also considered in this analysis:

- Multi-family residences; and
- David Starr Jordan High School.

Vibration

Characteristics of Vibration

Vibration is an oscillatory motion through a solid medium, in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Vibration can be a serious concern, causing buildings to shake and rumbling sounds to be heard. In contrast to noise, vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of vibration are trains, buses on rough roads, and construction activities, such as blasting, pile driving, and heavy earth-moving equipment.



LEGEND:

Specific Plan Area

Single- and Multi-Family Residences

(#) Sensitive Receptor Locations

1. 92ND Street Elementary School
2. Jordan Downs Recreation Center Playground and Community Center Building
3. David Starr Jordan High School
4. Southeast Middle School
5. Florence Griffith Joyner Elementary School
6. Simon Rodia Continuation Schooll
7. Weigand Elementary School
8. Youth Opportunity High School

SOURCE: TAHA, 2010.

N

APPROX. SCALE

0 440 880 FEET

taha 2008-079

Jordan Downs Specific Plan
Environmental Impact Report

CITY OF LOS ANGELES DEPARTMENT OF CITY PLANNING

FIGURE IV.L-3

NOISE SENSITIVE RECEPTOR LOCATIONS

Vibration Definitions

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings and is usually measured in inches per second. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation (Vdb) is commonly used to measure RMS. The decibel notation acts to compress the range of numbers required to describe vibration.[1]

Effects of Vibration

High levels of vibration may cause physical personal injury or damage to buildings. However, ground-borne vibration levels rarely affect human health. Instead, most people consider ground-borne vibration to be an annoyance that may affect concentration or disturb sleep. In addition, high levels of ground-borne vibration may damage fragile buildings or interfere with equipment that is highly sensitive to ground-borne vibration (e.g., electron microscopes). To counter the effects of ground-borne vibration, the Federal Transit Administration (FTA) has published guidance relative to vibration impacts. According to the FTA, fragile buildings can be exposed to ground-borne vibration levels of 0.3 inches per second without experiencing structural damage.[2]

Perceptible Vibration Changes

In contrast to noise, ground-borne vibration is not a phenomenon that most people experience every day. The background vibration velocity level in residential areas is usually 50 VdB or lower, well below the threshold of perception for humans which is around 65 VdB.[3] Most perceptible indoor vibration is caused by sources within buildings, such as operation of mechanical equipment, movement of people, or slamming of doors. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If the roadway is smooth, the vibration from traffic is rarely perceptible.

Existing Vibration Levels

Similar to the environmental setting for noise, the vibration environment is dominated by traffic from nearby roadways. Heavy trucks can generate ground-borne vibrations that vary depending on vehicle type, weight, and pavement conditions. As heavy trucks typically operate on major streets, existing ground-borne vibration in the project vicinity is largely related to heavy truck traffic on the surrounding roadway network. Based on field visits to the site, vibration levels from adjacent roadways and the rail line are not perceptible at the Specific Plan area. This is due to the design of the Alameda Corridor and the distance between the project site and the Corridor.

Vibration-Sensitive Land Uses

Vibration-sensitive land uses include residences and buildings where people normally sleep, institutional land uses with primarily daytime use, and buildings where vibration would interfere with interior operations (e.g., recording studios, concert halls, theaters, etc.). Vibration-sensitive land uses within the project area generally include residences and schools.

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[1] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, May 2006.
[2] *Ibid.*
[3] *Ibid.*

Regulatory Framework

Noise Regulations - Noise Element of the General Plan

The City has developed a Noise Element of the General Plan to guide in the development of noise regulations.[4] It addresses noise mitigation regulations, strategies and programs and delineates federal, State and city jurisdiction relative to rail, automotive, aircraft and nuisance noise. Programs included in the Noise Element that are relevant to the proposed project include:

- For a proposed development project that is deemed to have a potentially significant noise impact on noise sensitive uses, as defined by this chapter, require mitigation measures, as appropriate, in accordance with California Environmental Quality Act and City procedures.

- When issuing discretionary permits for a proposed noise-sensitive use (as defined by this chapter) or a subdivision of four or more detached single-family units and which use is determined to be potentially significantly impacted by existing or proposed noise sources, require mitigation measures, as appropriate, in accordance with procedures set forth in the California Environmental Quality Act so as to achieve an interior noise level of a CNEL of 45 dB, or less, in any habitable room, as required by Los Angeles Municipal Code Section 91.

- Use, as appropriate, the "Guidelines for Noise Compatible Land Use" (**Table IV.L-2**), or other measures that are acceptable to the city, to guide land use and zoning reclassification, subdivision, conditional use and use variance determinations and environmental assessment considerations, especially relative to sensitive uses, as defined by this chapter, within a CNEL of 65 dB airport noise exposure areas and within a line of sight of freeways, major highways, railroads or truck haul routes.

Noise Regulations - Los Angeles Municipal Code

The City of Los Angeles has established policies and regulations concerning the generation and control of noise that could adversely affect its citizens and noise sensitive land uses. Regarding construction, Section 41.40 (Noise Due to Construction, Excavation Work – When Prohibited) of the Los Angeles Municipal Code (LAMC) indicates that no construction or repair work shall be performed between the hours of 9:00 p.m. and 7:00 a.m., since such activities would generate loud noises and disturb persons occupying sleeping quarters in any adjacent dwelling, hotel, apartment or other place of residence. No person, other than an individual home owner engaged in the repair or construction of his/her single-family dwelling, shall perform any construction or repair work of any kind or perform such work within 500 feet of land so occupied before 8:00 a.m. or after 6:00 p.m. on any Saturday or on a federal holiday, nor at any time on any Sunday. Under certain conditions, the City may grant a waiver to allow limited construction activities to occur outside of the limits described above.

Section 112.05 (Maximum Noise Level of Powered Equipment or Powered Hand Tools) of the LAMC also specifies the maximum noise level of powered equipment or powered hand tools. Any powered equipment or hand tool that produces a maximum noise level exceeding 75 dBA at a distance of 50 feet is prohibited. However, this noise limitation does not apply where compliance is technically infeasible. Technically infeasible means the above noise limitation cannot be met despite the use of mufflers, shields, sound barriers and/or any other noise reduction device or techniques during the operation of equipment.

[4]City of Los Angeles, *Noise Element of the Los Angeles City General Plan*, February 3, 1999.

TABLE IV.L-2: GUIDELINES FOR NOISE COMPATIBLE LAND USE

Land Use Category	Community Noise Exposure (dBA, CNEL) 55	60	65	70	75	80
Residential - Low Density Single-Family, Duplex, Mobile Homes						
Residential - Multi-Family						
Transient Lodging - Motels Hotels						
Schools, Libraries, Churches, Hospitals, Nursing Homes						
Auditoriums, Concert Halls, Amphitheaters						
Sports Arena, Outdoor Spectator Sports						
Playgrounds, Neighborhood Parks						
Golf Courses, Riding Stables, Water Recreation, Cemeteries						
Office Buildings, Business Commercial and Professional						
Industrial, Manufacturing, Utilities, Agriculture						

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

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

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

Clearly Unacceptable - New construction or development should generally not be undertaken.

SOURCE: California Office of Noise Control, Department of Health Services.

Vibration Regulations

There are no adopted City standards for ground-borne vibration. The County of Los Angeles vibration standard is stated in Title 12 (Environmental Protection), Chapter 12.08 (Noise Control), Section 12.08.560 (Vibration) of the Los Angeles County Code. The County Code states that, "Operating or permitting the operation of any device that creates vibration which is above the vibration perception threshold of any individual at or beyond the property boundary of the source if on private property, or at 150 feet (46 meters) from the source if on a public space or public right-of-way is prohibited. The perception threshold shall be a motion velocity of 0.01 in/sec over the range of 1 to 100 Hertz."

ENVIRONMENTAL IMPACTS

Significance Thresholds

The noise significance criteria are based on guidance contained in the *L.A. CEQA Thresholds Guide*. The City of Los Angeles has not adopted vibration standards.

Construction Noise Signifiance Criteria

Based on the *L.A. CEQA Threshold Guide*, the proposed project would result in significant noise impacts if the proposed project were to:

- Construction activities lasting more than one day would exceed existing ambient noise levels by 10 dBA or more at a noise sensitive use;
- Construction activities lasting more than ten days in a three-month period would exceed existing ambient noise levels by 5 dBA or more at a noise sensitive use; and/or
- Construction activities would exceed the ambient noise level by 5 dBA at a noise sensitive use between the hours of 9:00 p.m. and 7:00 a.m. Monday through Friday, before 8:00 a.m. or after 6:00 p.m. on Saturday, or anytime on Sunday.

Operational Noise Signifiance Criteria

Based on the *L.A. CEQA Threshold Guide*, the proposed project would result in significant noise impacts if the proposed project were to:

- The proposed project causes the ambient noise level measured at the property line of the affected uses to increase by 3 decibels CNEL to or within the "normally unacceptable" or "clearly unacceptable" categories, as shown in **Table IV.L-2**, or any 5-dBA or more increase in noise level; and/or
- New residential and school land uses would be located in incompatible noise environments (**Table IV.L-2**).

Vibration Signifiance Criteria

There are no adopted State or City of Los Angeles ground-borne vibration standards. Based on federal and County guidelines, the proposed project would result in a significant vibration impact if the proposed project were to:

- Construction activity would expose buildings to the FTA building damage threshold level of 0.3 inches per second; and/or
- Operational activity would generate vibration levels that exceed the County perception threshold of 0.01 inches per second at the property boundary.

Analysis of Proposed Project Impacts

Construction Phase Impacts

Construction of the proposed project would result in temporary increases in ambient noise levels in the project area on an intermittent basis. The increase in noise would occur during the approximate 84-month construction schedule. Noise levels would fluctuate depending on the construction phase, equipment type and duration of use, distance between the noise source and receptor, and presence or absence of noise attenuation barriers.

Construction activities typically require the use of numerous pieces of noise-generating equipment. Typical noise levels from various types of equipment that may be used during construction are listed in **Table IV.L-3**. The table shows noise levels at distances of 50 and 100 feet from the construction noise source.

TABLE IV.L-3: MAXIMUM NOISE LEVELS OF COMMON CONSTRUCTION MACHINES

	Noise Level (dBA)	
Noise Source	**50 Feet**	**100 Feet**
Front Loader	80	74
Trucks	89	83
Cranes (derrick)	88	82
Jackhammers	90	84
Generators	77	71
Back Hoe	84	78
Tractor	88	82
Scraper/Grader	87	81
Paver	87	81
Impact Pile Driving	101	95
Auger Drilling	77	71

SOURCE: City of Los Angeles, *L.A. CEQA Thresholds Guide*, 2006.

The noise levels shown in **Table IV.L-4** take into account the likelihood that more than one piece of construction equipment would be in operation at the same time and lists the typical overall noise levels that would be expected for each phase of construction. The highest noise levels are expected to occur during the grading/excavation and finishing phases of construction. A typical piece of noisy equipment is assumed to be active for 40 percent of the eight-hour workday (consistent with the USEPA studies of construction noise), generating a noise level of 89 dBA L_{eq} at a reference distance of 50 feet.

TABLE IV.L-4: OUTDOOR CONSTRUCTION NOISE LEVELS	
Construction Phase	**Noise Level At 50 Feet (dBA)**
Ground Clearing	84
Grading/Excavation	89
Foundations	78
Structural	85
Finishing	89
SOURCE: City of Los Angeles, *L.A. CEQA Thresholds Guide*, 2006.	

Construction Noise. The noise level during the construction period at each receptor location was calculated by (1) making a distance adjustment to the construction source sound level and (2) logarithmically adding the adjusted construction noise source level to the ambient noise level. **Table 4-12.5** presents the estimated noise levels at sensitive receptors during each phase of construction activity. Soil remediation and Phase 1 construction noise levels would exceed the 5-dBA significance threshold at on-site receptors. Phases 2, 3, and 4 construction noise levels would exceed the 5-dBA significance threshold at on-and off-site receptors. Construction noise would thus result in a potentially significant impact.

TABLE IV.L-5: CONSTRUCTION NOISE IMPACT – UNMITIGATED				
Sensitive Receptor	**Maximum Construction Noise Level (dBA) /a/**	**Existing Ambient (dBA, L_{eq}) /b/**	**New Ambient (dBA, L_{eq}) /c/**	**Increase /d/**
Soil Remediation				
On-Site Housing	89.0	71.3	89.1	**17.8**
Jordan High School	89.0	76.3	89.2	**12.9**
Residential - West	62.8	75.1	75.3	0.2
Residential - North	75.0	75.1	78.1	3.0
Residential - East	72.0	76.3	77.7	1.4
Residential - South	53.4	75.6	75.6	0.0
Joyner Elementary School	53.9	73.2	73.3	0.1
Weigand Elementary School	49.5	57.7	58.3	0.6
Southeast Middle School	64.9	72.7	73.4	0.7
92nd Street Elementary School	50.4	69.9	69.9	0.0
Southeast High School	55.4	72.7	72.8	0.1
Phase 1				
On-Site Housing	89.0	71.3	89.1	**17.8**
Jordan High School	89.0	76.3	89.2	**12.9**
Residential - West	67.8	75.1	75.8	0.7
Residential - North	75.0	75.1	78.1	3.0
Residential - East	72.0	76.3	77.7	1.4
Residential - South	53.4	75.6	75.6	0.0
Joyner Elementary School	54.9	73.2	73.3	0.1
Weigand Elementary School	49.5	57.7	58.3	0.6
Southeast Middle School	64.9	72.7	73.4	0.7
92nd Street Elementary School	49.5	69.9	69.9	0.0
Southeast High School	55.4	72.7	72.8	0.1

TABLE IV.L-5: CONSTRUCTION NOISE IMPACT – UNMITIGATED

Sensitive Receptor	Maximum Construction Noise Level (dBA) /a/	Existing Ambient (dBA, L_{eq}) /b/	New Ambient (dBA, L_{eq}) /c/	Increase /d/
Phase 2				
On-site Housing	89.0	71.3	89.1	**17.8**
Jordan High School	89.0	76.3	89.2	**12.9**
Residential - West	62.8	75.1	75.3	0.2
Residential - North	58.9	75.1	75.2	0.1
Residential - East	54.5	76.3	76.3	0.0
Residential - South	89.0	75.6	89.2	**13.6**
Joyner Elementary School	69.4	73.2	74.7	1.5
Weigand Elementary School	57.0	57.7	60.4	2.7
Southeast Middle School	47.9	72.7	72.7	0.0
92nd Street Elementary School	47.0	69.9	69.9	0.0
Southeast High School	44.7	72.7	72.7	0.0
Phase 3				
On-site Housing	89.0	71.3	89.1	**17.8**
Jordan High School	56.7	76.3	76.3	0.0
Residential - West	89.0	75.1	89.2	**14.1**
Residential - North	64.9	75.1	75.5	0.4
Residential - East	47.0	76.3	76.3	0.0
Residential - South	73.4	75.6	77.7	2.1
Joyner Elementary School	86.7	73.2	86.9	**13.7**
Weigand Elementary School	48.9	57.7	58.2	0.5
Southeast Middle School	44.4	72.7	72.7	0.0
92nd Street Elementary School	49.5	69.9	69.9	0.0
Southeast High School	42.6	72.7	72.7	0.0
Phase 4				
On-site Housing	89.0	71.3	89.1	**17.8**
Jordan High School	89.0	76.3	89.2	**12.9**
Residential - West	89.0	75.1	89.2	**14.1**
Residential - North	89.0	75.1	89.2	**14.1**
Residential - East	60.5	76.3	76.4	0.1
Residential - South	89.0	75.6	89.2	**13.6**
Joyner Elementary School	86.7	73.2	86.9	**13.7**
Weigand Elementary School	53.4	57.7	59.1	1.4
Southeast Middle School	65.5	72.7	73.5	0.8
92nd Street Elementary School	52.2	69.9	70.0	0.1
Southeast High School	55.7	72.7	72.8	0.1

/a/ Construction noise source's sound level at receptor location with distance and building adjustment.
/b/ Pre-construction activity ambient sound level at receptor location.
/c/ New sound level at receptor location during the construction period, including noise from construction activity.
/d/ An incremental noise level increase of 5 dBA or more would result in a significant impact.
SOURCE: TAHA, 2010.

Construction Vibration. Construction activity would use typical construction techniques and equipment. As shown in **Table IV.L-6**, use of heavy equipment (e.g., a large bulldozer) generates

vibration levels of 0.089 inches per second at a distance of 25 feet. Off-site sensitive receptors would be at least 50 feet from operating construction equipment. This would result in a vibration exposure level of 0.03 inches per second. This would be less than the 0.3 inches-per-second significance threshold, and off-site construction vibration exposure would result in a less-than-significant impact.

TABLE IV.L-6: VIBRATION VELOCITIES FOR CONSTRUCTION EQUIPMENT

Equipment	PPV at 25 feet (Inches /Second)
Hoe Ram	0.089
Large Bulldozer	0.089
Caisson Drilling	0.089
Loaded Trucks	0.076
Jackhammer	0.035
Small Bulldozer	0.003

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

Construction equipment may occasionally travel within 25 feet of on-site sensitive receptors (i.e., residences and David Starr Jordan High School). This would result in a vibration exposure level of 0.1 inches per second. This would be less than the 0.3 inches-per-second significance threshold, and on-site construction vibration exposure would result in a less-than-significant impact.

Operational Phase Noise Impacts

Mobile Sources. The proposed project would generate 14,150 daily vehicle trips.[5] To determine off-site roadway noise impacts, traffic was modeled under future-year "no project" and "with project" conditions utilizing FHWA RD-77-108 noise calculation formulas. Results of the analysis are summarized in **Table IV.L-7**. The greatest project-related mobile source noise increase would be 4.1 dBA CNEL and would occur along Century Boulevard between Compton and Wilmington Avenues. This noise level increase would be the direct result of increased roadway traffic generated by the proposed project. This would be less than the 5-dBA significance threshold, and mobile noise would result in a less-than-significant impact.

TABLE IV.L-7: ESTIMATED MOBILE SOURCE NOISE LEVELS – PROPOSED PROJECT

	Estimated dBA, CNEL		
Roadway Segment	No Project	Project	Project Impact
97th Street between Grape and Alameda Streets	62.6	63.0	0.4
97th Street between Grape Street and Wilmington Avenue	64.5	64.6	0.1
103rd Street between Grape and Alameda Streets	65.9	64.9	(1.0)
103rd Street between Grape Street and Wilmington Avenue	66.2	66.1	(0.1)
Century Boulevard between Compton and Wilmington Avenues	62.0	66.1	4.1
Tweedy Boulevard between Alameda Street and Long Beach Boulevard	65.6	66.5	0.9
Wilmington Avenue between 103rd Street and Santa Ana Boulevard	65.3	67.0	1.7
Wilmington Avenue between 108th and 111th Streets	65.6	66.4	0.8

SOURCE: TAHA, 2010.

[5]Iteris, *Draft Report - Jordan Downs Specific Plan Traffic Impact Study*, June 2010.

One segment along 103rd Street from Grape Street to Alameda Street would have traffic counts substantially reduced by the inclusion of the proposed project, resulting in a decrease in mobile noise levels by 1.0 dBA CNEL. This change in traffic flows is directly related to the extension of Century Boulevard through the Specific Plan area.

The proposed project would extend Century Boulevard from Grape Street to Tweedy Boulevard. AM peak hour traffic would increase from 35 trips to 699 trips. PM peak hour traffic would increase from 46 trips to 764 trips. The CNEL would be 63.0 dBA. This would be less than the 65-dBA CNEL normally acceptable level (**Table IV.L-2**) for multi-family residences. The Century Boulevard extension through the Specific Plan area would result in a less-than-significant impact.

Employment Uses (Commercial, Retail and Light Industrial). Commercial and retail uses include up to 210,000 gross square feet (gsf) of new commercial and retail space along Alameda Street, plus up to 20,000 gsf of community-serving retail and services in mixed-use buildings on HACLA-owned property. An additional 292,000 gsf of commercial and light industrial uses could also potentially be developed on the LAUSD- and privately-owned parcels along Alameda Street. The major sources of stationary noise associated with these land uses would be mechanical equipment (e.g., HVAC Systems), truck activity, and parking activity.

Mechanical Equipment. Mechanical equipment would be located on structure rooftops and would be screened from view to comply with the LAMC. Mechanical equipment typically generates noise levels of approximately 60 dBA L_{eq} at 50 feet. The nearest off-site sensitive land uses would be residences located to the north, east, and south of the Specific Plan area. Based on existing ambient noise levels, mechanical equipment would increase ambient noise levels by less than 0.1 dBA L_{eq} at these land uses. This would be less than the 5-dBA significance threshold, and mechanical equipment would result in a less-than-significant impact.

Truck Activity. The employment uses would generate activity and associated noise. These loading areas have not been identified at the time of this analysis, and it was assumed that truck activity would occur throughout the areas encompassing the employment uses. Trucks typically generate a noise level of 89 dBA L_{eq} at 50 feet and include backup alarms typically capable of generating noise levels up to 100 dBA at four feet. The nearest off-site sensitive land uses would be residences located to the north, east, and south of the Specific Plan area. Based on existing ambient noise levels and building attenuation factors, the highest truck activity incremental noise level increase would be 1.7 dBA L_{eq} at the residences north of the Specific Plan area. This would be less than the 5-dBA significance threshold, and truck activity would result in a less-than-significant impact.

Parking Activity. The employment uses would include a surface parking lot on the north side of the Specific Plan area. Automobile parking activity typically generates a noise level of approximately 58.1 dBA L_{eq} at 50 feet (e.g., tire noise, engine noise, and door slams).[6] The nearest off-site sensitive land uses would be residences located to the north, east, and south of the Specific Plan area. Based on existing ambient noise levels, parking activity would increase ambient noise levels by less than 0.1 dBA L_{eq} at these land uses. This would be less than the 5-dBA significance threshold, and parking activity would result in a less-than-significant impact.

Composite Noise Levels. The total noise increase was complied at off-site receptors for mechanical equipment, truck activity, and parking activity associated with the employment uses. Based on existing ambient noise levels and building attenuation factors, the highest composite noise level incremental noise level increase would be 1.8 dBA L_{eq} at the residences north of the Specific Plan area. This would be less

[6]The reference parking noise level is based on a series of noise measurements completed 50 feet from vehicles accessing a multi-level parking structure.

than the 5-dBA significance threshold, and employment use noise would result in a less-than-significant impact at off-site sensitive receptors.

Community Facilities. Community facilities include a Family Resource Center, a gymnasium and pool facility to be jointly used with Jordan High School. The new gymnasium, which would be 25 to 35 feet in height and oriented towards the new central park, would include locker rooms, and associated offices to serve the Jordan Downs community. The Family Resource Center would anchor the redeveloped Specific Plan area and would house family-oriented services and activities, provide learning opportunities, and serve as a central gathering place for the neighborhood. An enclosed open-to-the-air courtyard would serve as both a major entrance oriented to the central park, and a secured area for larger events and festivities. Community facilities would be located central to the Specific Plan area and away from off-site sensitive receptors. The facilities would be shielded from off-site receptors by proposed multi-story residential land uses and noise would not be audible at off-site sensitive receptors. Community facility noise would result in a less-than-significant impact at off-site sensitive receptors.

New Elementary School. A new elementary school site, which is planned for 550 to 650 students, would potentially be located on a three-acre parcel between 97th and 99th Streets, just east of Croesus Avenue. The site plans for the school have not been developed and a detailed noise analysis of off-site impacts would be speculative. The school would be located near the residential land uses along 99th Street and it is generally desirable to locate elementary schools in residential areas. Without detailed site plans, this analysis assumed that the play area (i.e., the loudest school noise source) would be located along 99th Street. This would be approximately 50 feet from off-site residential land uses. Outdoor activity would generate a noise level of approximately 74 dBA L_{eq} at 50 feet. The incremental noise level increase would be 2.5 dBA when outdoor activity noise is added to the existing ambient noise level of 75.1 dBA L_{eq}. This would be less than the 5-dBA significance threshold, and school noise would result in a less-than-significant impact at off-site sensitive receptors.

An alternative school site is located at 103rd Street and Juniper Street. This analysis assumed that the play area would be located approximately 100 feet from off-site residential land uses. Outdoor activity would generate a noise level of approximately 74 dBA L_{eq} at 50 feet. The incremental noise level increase would be 0.7 dBA when outdoor activity noise is added to the existing ambient noise level of 75.6 dBA L_{eq}. This would be less than the 5-dBA significance threshold, and school noise would result in a less-than-significant impact at off-site sensitive receptors.

Land Use Compatibility. The proposed project would locate new noise-sensitive receptors within the Specific Plan area. Residential land uses towards the eastern portion of the Specific Plan area would be in close proximity to the Alameda Corridor and would be located adjacent to employment uses. The Alameda Corridor is below-grade along the Specific Plan area. Typically, the loudest noise source associated with a train is the warning signal. There are no grade crossings near the Specific Plan area and trains do not use warning signals. Site visits confirmed that train noise is not audible at the Specific Plan area where residential land uses would be located. Noise sources associated with the employment uses would generally either generate low levels of noise (e.g., rooftop mechanical equipment) or occur during less sensitive daytime hours (e.g., parking noise). However, truck activity (e.g., loading) would potentially occur during sensitive early morning and late night hours. Loading areas have not been identified at the time of this analysis and it was assumed that truck activity would occur on the eastern portion of the employment uses, adjacent to new residential land uses and the David Starr Jordan High School. Trucks typically generate a noise level of 89 dBA L_{eq} at 50 feet and include backup alarms typically capable of generating noise levels up to 100 dBA at four feet. Single-event noise levels would incrementally increase daytime noise levels by more than 15 dBA and nighttime noise level by up to 30 dBA. This periodic incremental increase in noise levels would disturb new residences, and would result in a potentially significant impact.

The existing industrial land use located at the eastern and southeastern portion of the Specific Plan area would potentially expose new residential land uses to incompatible noise levels. The equipment associated with the recycling facility typically generates a noise level of approximately 89 dBA L_{eq} at 50 feet. Similar to the truck analysis described above, single-event noise levels would incrementally increase daytime noise levels by more than 15 dBA. This periodic incremental increase in noise levels would disturb new residences, and would result in a potentially significant impact.

The existing noise level near the southeastern industrial land uses is approximately 76.3 dBA L_{eq} at 50 feet. The nearest new residential land use would be approximately 600 feet from these sources. (How far are the Atlas cranes used in the recycling operation?) Industrial noise would be approximately 54.7 dBA L_{eq} at this distance. This would be consistent with the City's noise compatibility guidelines of 65 dBA for multi-family residences. The existing southeastern industrial use would not expose new residences to unacceptable noise levels, and this impact would be less than significant.

As previously stated, a new elementary school site would potentially be located on a three-acre parcel between 97th and 99th Streets, just east of Croesus Avenue. An alternative school site is located at 103rd Street and Juniper Street. **Table IV.L-2** indicates that schools should be located in areas with ambient noise levels less than 70 dBA CNEL. As shown in **Table IV.L-1**, the ambient noise levels along 97th Street and 103rd Street reach 75.1 and 75.6 dBA, respectively. The location of the new school in an area that exceeds 70 dBA would result in a potentially significant noise compatibility impact.

The land use compatibility of the residences was based on the estimated CNEL presented in **Table IV.L-7**. The maximum CNEL adjacent to proposed residences was estimated to be 64.9 dBA along 103rd Street. This noise level is within the 65 dBA "normally acceptable" range shown in **Table IV.L-2**. However, rounding the number would result in a 65-dBA noise level which is the lower range of "conditionally acceptable" for new residential land uses. "Conditionally acceptable" means that new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply system or air conditioning is normally sufficient. New residential land uses facing 103rd Street would potentially be exposed to noise levels that are considered conditionally compatible depending on noise reduction requirements. Therefore, construction of these residences would result in a potentially significant noise compatibility impact.

Ground-borne Vibration Impacts. The proposed project would not include significant stationary sources of ground-borne vibration, such as heavy equipment operations. Operational ground-borne vibration in the project vicinity would be generated by vehicular travel on the local roadways. Based on FTA guidance, typical truck and automobile travel does not generate perceptible vibration levels. Operational vibration would not exceed the County perception threshold of 0.01 inches per second, and would result in a less-than-significant impact.

CUMULATIVE IMPACTS

When calculating future traffic impacts, the traffic consultant took nine additional projects into consideration. Thus, the future traffic results without and with the proposed project already account for the cumulative impacts from these other projects. Since the noise impacts are generated directly from the traffic analysis results, the future without project and future with project noise impacts described in this report already reflect cumulative impacts.

Table IV.L-8 presents the cumulative increase in future traffic noise levels at intersections. The maximum cumulative roadway noise increase would be 4.3 dBA CNEL and would occur along Century Boulevard between Compton and Wilmington Avenues just west of the Specific Plan area. No other analyzed street segment would experience a cumulative increase greater than 3 dBA CNEL. The 4.3-

dBA CNEL noise level increase would be less than the 5-dBA significance threshold. The proposed project would not result in a cumulatively considerable noise impact.

TABLE IV.L-8: ESTIMATED MOBILE SOURCE NOISE LEVELS – CUMULATIVE

	Estimated dBA, CNEL		
Roadway Segment	**Existing**	**Project**	**Project Impact**
97th Street between Grape and Alameda Streets	62.4	63.0	0.6
97th Street between Grape Street and Wilmington Avenue	63.0	63.3	0.3
103rd Street between Grape and Alameda Streets	65.7	64.9	(0.8)
103rd Street between Grape Street and Wilmington Avenue	65.9	66.1	0.2
Century Boulevard between Compton and Wilmington Avenues	61.8	66.1	4.3
Tweedy Boulevard between Alameda Street and Long Beach Boulevard	65.5	66.5	1.0
Wilmington Avenue between 103rd Street and Santa Ana Boulevard	65.3	67.0	1.7
Wilmington Avenue between 108th and 111th Streets	65.4	66.4	1.0

SOURCE: TAHA, 2010.

The predominant vibration source near the Specific Plan area is heavy trucks traveling on the local roadways. Neither the proposed project nor related projects would substantially increase heavy-duty vehicle traffic near the Specific Plan area and would not cause a substantial increase in heavy-duty trucks on local roadways. The proposed project would not result in a cumulatively considerable vibration impact.

MITIGATION MEASURES

Construction Phase Noise Mitigation Measures

N1 All construction equipment shall be equipped with mufflers and other suitable noise attenuation devices.

N2 Grading and construction contractors shall use quieter equipment as opposed to noisier equipment (such as rubber-tired equipment rather than metal-tracked equipment).

N3 The construction contractor shall locate construction staging areas away from sensitive uses.

N4 Construction haul truck and materials delivery traffic shall avoided residential areas whenever feasible.

N5 The construction contractor shall schedule high noise-producing activities between the hours of 8:00 a.m. and 5:00 p.m. to minimize disruption to sensitive uses.

N6 The construction contractor shall use on-site electrical sources to power equipment rather than diesel generators where feasible.

N7 All residential units located within 500 feet of the construction site shall be sent a notice regarding the construction schedule of the proposed project. A sign, legible at a distance of 50 feet, shall also be posted at the construction site. All notices and signs shall indicate the dates and duration of construction activities, as well as provide a telephone number where residents can inquire about the construction process and register complaints.

N8 A "noise disturbance coordinator" shall be established. The disturbance coordinator shall be responsible for responding to any local complaints about construction noise. The disturbance coordinator shall determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and shall be required to implement reasonable measures such that the complaint is resolved. All notices that are sent to residential units within 500 feet of the construction site and all signs posted at the construction site shall list the telephone number for the disturbance coordinator.

N9 Prior to initiating construction for soil remediation and Phases 1, 2, and 4, the construction contractor shall coordinate with the site administrator for David Starr Jordan High School to discuss construction activities that generate high noise levels. Coordination between the site administrator and the construction contractor shall continue on an as-needed basis throughout the construction phase of the project to mitigate potential disruption of classroom activities.

N10 Prior to initiating construction for Phases 3 and 4, the construction contractor shall coordinate with the site administrator for Florence Griffith Joyner Elementary School to discuss construction activities that generate high noise levels. Coordination between the site administrator and the construction contractor shall continue on an as-needed basis throughout the construction phase of the project to mitigate potential disruption of classroom activities.

Operational Phase Noise Mitigation Measures

N11 Loading and unloading of trucks shall be prohibited between 10:00 p.m. and 7:00 a.m.

N12 A ten-foot solid wall shall be constructed between the employment uses, including the recycling facility, and the residences and David Starr Jordan High School.

N13 Residential units adjacent to the employment uses, including the recycling facility, shall be constructed with materials capable of reducing exterior-to-interior noise levels by at least 19 dBA.

N14 Prior to building approval, a site-specific noise study shall be completed for the elementary school based on the project design. The noise study shall ensure that noise levels at the school meet all relevant local and State guidelines.

N15 Residential land uses facing 103rd Street shall be constructed with single-glazed windows that are at least 5/16 inches thick. Alternatively, double-glazed windows may be used if the glass is at least 3/32 inches thick with four inches of airspace.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Construction Noise Impacts after Mitigation

Mitigation Measure **N1** would reduce noise levels by approximately 3 dBA. Mitigation Measures **N4** through **N10** would assist in attenuating construction noise levels. **Table IV.L-9** shows mitigated construction noise levels. Mitigated construction noise levels would still exceed the 5-dBA significance threshold at multiple sensitive receptors during all phases of construction activity. Construction activity would result in an unavoidable significant impact.

TABLE IV.L-9: CONSTRUCTION NOISE IMPACT – MITIGATED

Sensitive Receptor	Maximum Construction Noise Level (dBA) /a/	Existing Ambient (dBA, L_{eq}) /b/	New Ambient (dBA, L_{eq}) /c/	Increase /d/
Soil Remediation				
On-Site Housing	86.0	71.3	86.1	**14.8**
Jordan High School	86.0	76.3	86.4	**10.1**
Residential - West	59.8	75.1	75.2	0.1
Residential - North	72.0	75.1	76.8	1.7
Residential - East	69.0	76.3	77.0	0.7
Residential - South	50.4	75.6	75.6	0.0
Joyner Elementary School	50.9	73.2	73.2	0.0
Weigand Elementary School	46.5	57.7	58.0	0.3
Southeast Middle School	61.9	72.7	73.0	0.3
92nd Street Elementary School	47.4	69.9	69.9	0.0
Southeast High School	52.4	72.7	72.7	0.0
Phase 1				
On-Site Housing	86.0	71.3	86.1	**14.8**
Jordan High School	86.0	76.3	86.4	**10.1**
Residential - West	64.8	75.1	75.5	0.4
Residential - North	72.0	75.1	76.8	1.7
Residential - East	69.0	76.3	77.0	0.7
Residential - South	50.4	75.6	75.6	0.0
Joyner Elementary School	51.9	73.2	73.2	0.0
Weigand Elementary School	46.5	57.7	58.0	0.3
Southeast Middle School	61.9	72.7	73.0	0.3
92nd Street Elementary School	46.5	69.9	69.9	0.0
Southeast High School	52.4	72.7	72.7	0.0
Phase 2				
On-site Housing	86.0	71.3	86.1	**14.8**
Jordan High School	86.0	76.3	86.4	**10.1**
Residential - West	59.8	75.1	75.2	0.1
Residential - North	55.9	75.1	75.2	0.1
Residential - East	51.5	76.3	76.3	0.0
Residential - South	86.0	75.6	86.4	**10.8**
Joyner Elementary School	66.4	73.2	74.0	0.8
Weigand Elementary School	54.0	57.7	59.2	1.5
Southeast Middle School	44.9	72.7	72.7	0.0
92nd Street Elementary School	44.0	69.9	69.9	0.0
Southeast High School	41.7	72.7	72.7	0.0
Phase 3				
On-site Housing	86.0	71.3	86.1	**14.8**
Jordan High School	53.7	76.3	76.3	0.0
Residential - West	86.0	75.1	86.3	**11.2**
Residential - North	61.9	75.1	75.3	0.2
Residential - East	44.0	76.3	76.3	0.0
Residential - South	70.4	75.6	76.8	1.2

TABLE IV.L-9: CONSTRUCTION NOISE IMPACT – MITIGATED

Sensitive Receptor	Maximum Construction Noise Level (dBA) /a/	Existing Ambient (dBA, L_{eq}) /b/	New Ambient (dBA, L_{eq}) /c/	Increase /d/
Joyner Elementary School	83.7	73.2	84.1	**10.9**
Weigand Elementary School	45.9	57.7	58.0	0.3
Southeast Middle School	41.4	72.7	72.7	0.0
92nd Street Elementary School	46.5	69.9	69.9	0.0
Southeast High School	39.6	72.7	72.7	0.0
Phase 4				
On-site Housing	86.0	71.3	86.1	**14.8**
Jordan High School	86.0	76.3	86.4	**10.1**
Residential - West	86.0	75.1	86.3	**11.2**
Residential - North	86.0	75.1	86.3	**11.2**
Residential - East	57.5	76.3	76.4	0.1
Residential - South	86.0	75.6	86.4	**10.8**
Joyner Elementary School	83.7	73.2	84.1	**10.9**
Weigand Elementary School	50.4	57.7	58.4	0.7
Southeast Middle School	62.5	72.7	73.1	0.4
92nd Street Elementary School	49.2	69.9	69.9	0.0
Southeast High School	52.7	72.7	72.7	0.0

/a/ Construction noise source's sound level at receptor location with distance and building adjustment.
/b/ Pre-construction activity ambient sound level at receptor location.
/c/ New sound level at receptor location during the construction period, including noise from construction activity.
/d/ An incremental noise level increase of 5 dBA or more would result in a significant impact.
SOURCE: TAHA, 2010.

Operational Noise Impacts after Mitigation

Mitigation Measure **N11** would ensure that truck activity does not disturb new residential land uses during early morning or late evening time periods. Mitigation Measures **N12** and **N13** would reduce truck activity and recycling facility equipment daytime noise levels at new residences by at least 5 and 19 dBA, respectively. Exposure to single-event noise levels would be reduced by 24 dBA to 65 dBA L_{eq}. This would be consistent with the City's noise compatibility guidelines. Residences located adjacent to the employment uses would not be exposed to unacceptable noise levels, and this impact would be less than significant. Mitigation Measure **N14** would ensure that the elementary school would not be exposed to unacceptable noise levels, and this impact would be less than significant. The glass windows required in Mitigation Measure **N15** would reduce interior mobile source noise levels by at least 4 dBA when compared to standard single-glazed windows (e.g., glass with 1/8-inch thickness). This reduction would be similar to reducing the noise at the source and would result in a noise level of 60.9 dBA, which is well below the 65 dBA "conditionally acceptable" range. Mitigation Measure **N15** would ensure that residential land uses facing 103rd Street would not be exposed to unacceptable noise levels, and this impact would be less than significant.