TRAFFIC NOISE STUDY REPORT

I-710 Corridor Project

From Ocean Boulevard in Long Beach to Route 60 in East Los Angeles in

Los Angeles County, California

07-LA-710-PM 4.9/24.9

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EXECUTIVE SUMMARY

This traffic noise study report evaluates potential traffic noise impacts that may result from the proposed project to improve air quality and public health, improve traffic safety, provide modern design for the I-710 mainline, address projected traffic volumes, and address projected growth in population, employment, and economic activities related to goods movement on the Interstate 710 (I-710) freeway within the County of Los Angeles, California. The project consists of widening I-710 to ten general-purpose (GP) lanes and to construct four separated truck lanes to accommodate the heavy truck volumes and provide a safer facility for commuters. The limits of this project are from Ocean Boulevard, in the City of Long Beach, to State Route (SR) 60 in East Los Angeles. This traffic noise study report has been prepared to comply with Title 23 Part 772 of the Code of Federal Regulations (23CFR772), "Procedures for Abatement of Highway Traffic Noise and Construction Noise", as described in the May 2011 Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects (Protocol) and Section 216 of the California Street and Highways Code.

This noise study report evaluates the entire area within the project limits. Preliminary noise abatement measures necessary for the proposed project to comply with state and federal noise abatement regulations are also analyzed and presented in this document. This report will be used to provide information for the environmental document that will be prepared for the proposed project in compliance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA).

Three alternatives have been considered for the environmental analysis in the EIR/EIS as part of this project:

Alternative 1: No Build Alternative
The No Build Alternative does not include any improvements within the I-710 Corridor other than those projects that are already planned and committed to be constructed by or before the planning horizon year of 2035. The projects included in this alternative are based on SCAG's 2008 Regional Transportation Improvement Program (RTIP) project list, including freeway, arterial, and transit improvements within the SCAG region. This alternative also assumes that goods movement to and from the ports make maximum utilization of existing railroad capacity within the I-710 Corridor. Alternative 1 is the baseline against which the Build Alternatives proposed for the I-710 Corridor Project will be assessed. The existing I-710 mainline generally consists of eight GP lanes north of I-405 and six GP lanes south of I-405.

Alternative 5: I-710 Freeway Widening Up To 10 General Purpose Lanes
Alternative 5 proposes to widen the I-710 mainline up to 10 GP lanes (I-710 northbound [NB] and I-710 southbound [SB]). This alternative will:

- Provide an updated design at the I-405 and State Route 91 (SR-91) interchanges (no improvements to the I-710/Interstate 5 [I-5] interchange are proposed under Alternative 5).
- Reconfigure all local arterial interchanges within the project limits that may include realignment of on- and off-ramps, widening of on- and off-ramps, and reconfiguration of interchange geometry.
- Eliminate local ramp connections over I-710 (9th to 6th Street and 7th to 10th Street) in the City of Long Beach.
- Eliminate a local interchange at Wardlow Avenue in the City of Long Beach
- Add a local street connection under I-710 to Thunderbird Villas at Miller Way in the City of South Gate.
- Add a local connection (bridge) over I-710 at Southern Avenue in the City of South Gate.
- Add a local arterial interchange at NB and SB I-710/Slauson Avenue in the City of Maywood.
- Add one local arterial NB off-ramp from NB I-710 to 26th Street/Bandini Boulevard in the City of Bell.
- Shift the I-710 centerline at several locations to reduce right-of-way requirements.

Additionally, various structures such as freeway connectors, ramps, and local arterial overcrossings, structures over the Los Angeles River and structures over the two rail yards throughout the project limits will be replaced, widened, or added as part of Alternative 5.

Alternative 6A: 10 GP Lanes Plus A Freight Corridor (Truck Lanes)

Alternative 6A includes all the components of Alternatives 1 and 5 as described above. In addition, this alternative includes a separated four-lane freight corridor (FC) to be used by conventional trucks. It should be noted that trucks using this freight corridor are expected to be newer (post-2007) projected diesel/fossil-fueled trucks (new or retrofitted engines required per new regulations and standards) that will generate fewer emissions than the trucks using I-710 today. The freight corridor would be an at-grade and/or elevated structure, with two lanes in each direction, between Ocean Boulevard and the intermodal rail yards in the cities of Vernon and Commerce.

Alternative 6B: 10 GP Lanes Plus A Zero-Emissions Four Lane Freight Corridor

Alternative 6B includes all the components of Alternative 6A as described above, but would restrict the use of the FC to zero-emission trucks rather than conventional trucks. This proposed zero emission truck technology is assumed to consist of trucks powered by electric motors in lieu of internal combustion engines and producing zero tailpipe emissions while traveling on the freight corridor.

Alternative 6C: 10 GP Lanes Plus A Four Lane Freight Corridor With Tolls

Alternative 6C includes all the components of Alternative 6B as described above, but would toll trucks using the FC. Although tolling trucks in the FC could be done under either Alternative 6A or 6B; for analytical purposes, tolling has only been evaluated for Alternative 6B as this alternative provides for higher FC capacity than Alternative 6A due to the automated guidance feature of Alternative 6B.

Design Options

For alternatives 6A, 6B, and 6C, three design options for the portion of I-710 between the I-710/Slauson Ave interchange to just south of the I-710/I-5 interchange are under consideration. These configurations will be fully analyzed so that they can be considered in the future selection of a Preferred Alternative for the project. These options are as follows:

Design Option 1 (Option J)

Design Option 1 applies to Alternatives 6A, 6B and 6C and provides access to Washington Blvd on the west side of I-710.

Design Option 2 (Option M)

Design Option 2 applies to Alternatives 6A, 6B, and 6C and provides access from the NB FC to Washington Boulevard on the east side of I-710.

Design Option 3

Design Option 3 applies only to Alternative 6B and removes access to Washington Boulevard at its current location. The ramps at the I-710/Washington Boulevard interchange would be removed to accommodate the proposed FC ramps in and out of the rail yards.

Under 23CFR772.7, projects are categorized as Type I, Type II projects, or Type III projects. FHWA defines a Type I project as a proposed federal or federal-aid highway project for the construction of a highway on a new location, or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment, or increases the number of through-traffic lanes. Based on the above brief description of the alternatives, this project has been deemed to be a Type I project. As such, traffic noise analysis has been conducted for this project in accordance with the Protocol for Type I projects.

A field noise investigation was conducted to determine existing noise levels and gather information to develop and calibrate the traffic noise model that was used for predicting future noise levels. The entire area within the project limits was acoustically represented by 221 noise site locations. Existing noise levels were recorded at 149 locations and modeled at 72 locations. These locations are acoustically representative of the noise environment and land uses within the limits of the project. The existing ambient noise levels measured were between 46 and 75

decibels (dBA). Nineteen long-term (24-hour) noise level readings were conducted to determine the noisiest hour within the project limits.

Sound level readings, traffic counts and pertinent field data such as traffic flow speed and topography of the locations were used to develop the computer traffic noise model for each analysis site. The computer traffic noise model was then used to predict future noise levels to identify traffic noise impacts and recommend abatement for the impacted area. The computer program Traffic Noise Model (TNM 2.5), FHWA's Traffic Noise Prediction Model (FHWA-RD-77-108), was used in this analysis to develop the traffic noise model for both existing and design year conditions.

Since TNM is incapable of modeling zero-emissions vehicles, no noise analysis has been performed for Alternatives 6B and 6C. The future no-build and build worst-hour noise levels for both build alternatives (Alternative 5 and 6A) were based on the planning horizon year (2035) traffic data forecast provided by the URS Corporation, a consulting firm responsible for preparing the Environmental Document for this project. It must be noted that in some areas there is actually a drop in noise levels in the after-project scenario due to the mainline alignment shifting away from receptors. In contrast, there is a substantial noise increase in other areas due to the mainline alignment shifting closer to the noise sensitive receivers, the addition of truck lanes, and the existing sound barriers being removed (to accommodate the widening on mainline). The future noise levels have been predicted to be in the range of 53 – 83 dBA-Leq(h). Table 7-1-1 through Table 7-1-8 provide a summary of the traffic noise modeling results for all alternatives including the No Build.

The traffic noise analysis indicates that residential areas, schools, parks, cemeteries, golf courses, and a medical facility within the project limits will be impacted after project completion under Alternatives 5 and 6A [i.e. the noise level will approach or exceed FHWA Noise Abatement Criteria (NAC)]. NAC are given in Table 4-1. A traffic noise impact also occurs when there is a substantial noise increase (12 dBA or more from existing baseline conditions).

Additionally, nighttime (9 p.m. to 6 a.m.) noise levels have been analyzed under Alternative 6A for the Southern Terminus (i.e. from Ocean Boulevard to SR-91). The existing nighttime noise levels ranged from 55 – 65 dB along the southbound I-710. Future (2035) nighttime noise levels after noise abatement would rise to 55 – 68 dB, indicating an increase of up to 3 dB. Based on research, 3 dB is considered to be barely perceptible change by average healthy human ears. Therefore, the nighttime noise analysis concluded that there is no substantial noise increase (or impact) during the hours of 9 p.m. to 6 a.m.

Since traffic noise impacts have been identified, noise abatement has been considered for the impacted receivers. As stated in 23CFR772 and in Caltrans Protocol, noise abatement is considered where noise impacts are predicted and where frequent human use occurs and where a lowered noise level would be of benefit. For all impacted receptors, noise abatement has been

evaluated for preliminary acoustical feasibility (noise reduction of 5 dBA or more) with calculated reasonable allowances. The overall reasonableness is determined by these factors: noise reduction design goal, the cost of abatement, and viewpoints of benefited receptors (including property owners and residents of the benefited receptors). For a sound barrier to be considered reasonable, the 7 dB design goal must be achieved at one or more benefited receptors. The noise barrier is not required to reduce noise levels to below the NAC for any noise sensitive land uses.

Only acoustically feasible noise abatement measures are provided in the following charts as part of this project. Based on the studies so far conducted, Caltrans intends to incorporate noise abatement measures for the proposed project in the form of soundwalls to attenuate traffic noise in the impacted areas. Table 1-1 through Table 1-3 below summarize acoustically feasible soundwall locations, height range, approximate length, noise attenuation range, number of benefited receivers and reasonable allowance.

The design of noise barriers presented in this report is preliminary and has been conducted at a level appropriate for environmental review and not for final design of the project. Preliminary information on the physical location, length, and range of heights of noise barriers is provided in this report. If pertinent parameters change substantially during the final project design, preliminary noise barrier designs may be modified or eliminated from the final project. A final decision on the construction of the noise abatement will be made upon completion of the project design.

Table 1-1 Summary of Acoustically Feasible Soundwalls On I-710: Alternative 5							
Soundwall	**Direction**	**Location**	**Acoustically Feasible Height Range (Feet)**	**Approximate Length (Feet)**	**Noise Attenuation Range (dBA)**	**Number of Benefited Receivers**	**Reasonable Allowance**
SW-500	SB	Along Shoreline Drive (SB) Offramp @ Golden Shore St.	8 to 14	623	8 to 11	16 to 25	$880,000 to $1,375,000
SW-501	SB	Between Pacific Coast Highway and Willow Street	8 to 16	5370	8 to 13	45 to 185	$2,475,000 to $10,175,000
SW-502	SB	Between Willow Street and Wardlow Avenue	8 to 16	7109	10 to 15	55 to 219	$3,025,000 to $12,045,000
SW-503	SB	Along SB I-405 To SB I-710 Connector	10 to 16	1458	6 to 9	11 to 30	$605,000 to $1,650,000
SW-405A*	NB	Between Santa Fe Avenue and Alameda Street	-	2842	2 to 4	-	-
SW-405B*	SB	Between I-710 and Cedar Avenue	-	2222	2 to 4	-	-
SW-503A	SB	Between Long Beach Boulevard and Barclay Street	14 to 16	1365	5	10	$550,000
SW-503B	SB	Between Barclay Street and Adams Street	14 to 16	1176	5 to 6	10	$550,000
SW-504	SB	Along SB I-710 To EB SR-91 Connector	8 to 16	2301	8 to 12	14 to 45	$770,000 to $2,475,000
SW-505 + SW-506	SB	Between Atlantic Avenue and Alondra Boulevard Between Alondra Boulevard and SB I-710 On-ramp	8 to 16	1113 + 891	6 to 9	30 to 60	$1,650,000 to $3,300,000
SW-507	SB	Between Alondra Boulevard and Compton Blvd. Bridge	10 to 16	2702	5 to 10	24 to 64	$1,320,000 to $3,520,000
SW-509	SB	Between Imperial Highway and Firestone Boulevard	8 to 16	5194	7 to 14	55 to 272	$3,025,000 to $14,960,000
SW-510	NB	Between Firestone Boulevard and Clara Street	8 to 16	2005	7 to 14	13 to 39	$715,000 to $2,145,000
SW-511 + SW-512	NB	Between Washington Boulevard and I-5	8 to 16	507 + 1409	8 to 11	4 to 10	$220,000 to $550,000
SW-513 + SW-514	SB	Between Washington Boulevard and I-5	10 to 16	331 + 1396	5 to 8	4 to 25	$220,000 to $1,375,000
SW-515 + SW-516	NB	Between Olympic Boulevard and Whittier Boulevard	8 to 16	496 + 2655	6 to 10	47 to 57	$2,585,000 to $3,135,000
SW-517 + SW-518	SB	Between Olympic Boulevard and S Humphreys Avenue	8 to 16	514 + 600	6 to 9	9	$495,000
SW-519	SB	Between Olympic Boulevard and S Humphreys Avenue	8 to 16	1398	8 to 12	4 to 20	$220,000 to $1,100,000
SW-520	SB	Between 3RD Street and LA-60	12 to 16	537	5 to 7	2	$110,000

*Although acoustically not feasible and reasonable, SW-405A & SW-405B must be constructed to replace the existing soundwall due to widening on I-405.

Table 1-2 Summary of Acoustically Feasible Soundwalls On I-710: Alternative 6A							
Soundwall	**Direction**	**Location**	**Acoustically Feasible Height Range (Feet)**	**Approximate Length (Feet)**	**Noise Attenuation Range (dBA)**	**Number of Benefited Receivers**	**Reasonable Allowance**
SW-600	SB	Along Shoreline Drive (SB) Offramp @ Golden Shore St.	8 to 14	623	8 to 11	16 to 25	$880,000 to $1,375,000
SW-601	SB	Between Pacific Coast Highway and Willow Street	8 to 16	5370	6 to 7	25 to 47	$1,375,000 to $2,585,000
SW-601 + SW-601TL	SB	Between Pacific Coast Highway and Willow Street	8 to 16	5370 + 6205	8 to 12	45 to 195	$2,475,000 to $10,725,000
SW-602	SB	Between Willow Street and Wardlow Avenue	8 to 16	7106	10 to 14	55 to 180	$3,025,000 to $9,900,000
SW-602 + SW-602TL	SB	Between Willow Street and Wardlow Avenue	8 to 16	6998 + 3896	10 to 14	58 to 184	$3,190,000 to $11,605,000
SW-603	SB	SB I-405 To SB I-710 Connector	10 to 16	1447	6 to 9	11 to 30	$605,000 to $1,650,000
SW-405A*	NB	Between Santa Fe Avenue and Alameda Street	-	2842	2 to 4	-	-
SW-405B*	SB	Between I-710 and Cedar Avenue	-	2222	2 to 4	-	-
SW-603A	SB	Between Long Beach Boulevard and Barclay Street	14 to 16	1365	5	10	$550,000
SW-603B	SB	Between Barclay Street and Adams Street	14 to 16	1176	5 to 6	10	$550,000
SW-604	NB	Between Ginger Drive and Artesia Boulevard	8 to 16	2087	6 to 8	20	$1,100,000
SW-605	SB	Between Long Beach Blvd. and Adams Street	14 to 16	1683	6	4 to 6	$220,000 to $330,000
SW-606	EB	Between Atlantic Boulevard and Rose Avenue On ES (EB-91)	12 to 16	2423	5 to 6	20 to 28	$1,100,000 to $1,540,000
SW-607	WB	Between Atlantic Boulevard and Rose Avenue On ES (WB-91)	8 to 16	3665	6 to 9	40 to 54	$2,200,000 to $2,970,000
SW-608	SB	Between SB I-710 To EB SR-91 Connector and Atlantic Ave.	8 to 16	2301	6 to 10	14 to 45	$770,000 to $2,475,000
SW-609A + SW-609B	NB	Between SR-91 Freeway and Alondra Boulevard	8 to 16	489 + 1283	5 to 7	18	$990,000
SW-610 + SW-611	SB	Between Atlantic Avenue and Alondra Boulevard Along Alondra Blvd To SB I-710 On-ramp	12 to 16	1113 + 891	5 to 8	45 to 60	$2,475,000 to $3,300,000
SW-612	SB	Between Alondra Boulevard and Compton Blvd. Bridge	8 to 16	2702	5 to 8	12 to 30	660,000 to 1,650,000
SW-613	NB	Between Alondra Boulevard and Somerset Boulevard	14 to 16	1331	6 to 7	13	$715,000
SW-614	SB	Between Rosecrans Avenue and Olanda Street	14 to 16	2418	5	18	$990,000
SW-615	NB	Between Somerset Boulevard and Rosecrans Avenue	12 to 16	2979	5 to 7	22 to 60	$1,210,000 to $3,300,000
TL = Truck Lane							
*Although acoustically not feasible and reasonable, SW-405A & SW-405B must be constructed to replace the existing soundwall due to widening on I-405.							

Table 1-3 Summary of Acoustically Feasible Soundwalls On I-710: Alternative 6A

Soundwall	Direction	Location	Acoustically Feasible Height Range (Feet)	Approximate Length (Feet)	Noise Attenuation Range (dBA)	Number of Benefited Receivers	Reasonable Allowance
SW-616	SB	Between Imperial Highway and Firestone Boulevard	10 to 16	5194	6 to 9	19 to 71	$1,045,000 to $3,905,000
SW-616 + SW-616TL	SB	Between Imperial Highway and Firestone Boulevard	8 to 16 (ML) + 8 to 10 (TL)	5266 + 6100	7 to 12	67 to 255	$3,685,000 to $14,025,000
SW-617A	NB	Between Firestone Boulevard and Clara Street	10 to 16	1998	5 to 11	9	$495,000
SW-617B + SW-617TLN + SW-617TLS	NB	Between Firestone Boulevard and Clara Street	8 to 16 (ML) + 8 to 10 (TL)	2643 + 3668 + 2751	5 to 12	9 to 34	$495,000 to $1,870,000
SW-618 + SW-619 + SW-618TLN + SW618TLS	NB	Between Flourence Avenue and Slauson Avenue	8 to 16 (ML) + 10 (TL)	1029 + 1237 + 4202 + 2206	5 to 7	5 to 18	$275,000 to $990,000
SW-620 + SW-621A (Alt-6AJ)	NB	Between Washington Boulevard and Noakes Street	8 to 16	1015 + 1409	7 to 9	8 to 14	$440,000 to $770,000
SW-620 + SW-621B (Alt-6AM)	NB	Between Washington Boulevard and Noakes Street	8 to 16	1015 + 1409	7 to 11	9 to 16	$495,000 to $880,000
SW-620A + SW-620B (Alt-6AM)	SB	Between Washington Boulevard and Noakes Street	8 to 16	1520 + 1003	8 to 13	5 to 20	$275,000 to $1,100,000
SW-622 (Alt-6AJ)	NB	Between Noakes Street and I-5	8 to 16	1368	5 to 7	17	$935,000
SW-622 (Alt-6AM)	NB	Between Noakes Street and I-5	8 to 16	1368	5 to 8	17	$935,000
SW-622A + SW-622B (Alt-6AJ)*	SB	Between Noakes Street and I-5	12 to 16	1186 + 459	5	2	$110,000
SW-622A + SW-622B (Alt-6AM)*	SB	Between Noakes Street and I-5	-	1186 + 459	3 to 4	-	-
SW-623 + SW-624 + SW-625	SB	Between Olympic Boulevard and Whittier Boulevard	8 to 16	462 + 714 + 212	5 to 8	9 to 10	$495,000 to $550,000
SW-626	SB	Between Whittier Boulevard and S Humphreys Avenue	8 to 16	294	7 to 12	8	$440,000
SW-627	SB	Between 3RD Street and LA-60	14 to 18	537	5 to 7	2	$110,000

ML = Mainline, TL = Truck Lane, TLN = Truck Lane Northbound, TLS = Truck Lane Southbound

*Although acoustically not feasible and reasonable, SW-622A & SW-622B must be constructed to replace the existing soundwall due to widening on I-710.

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List of Abbreviated Terms

CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNEL	Community Noise Equivalent Level
dB	Decibels
dBA	A-weighted decibels
FHWA	Federal Highway Administration
HOV	High Occupancy Vehicle
Hz	Hertz
kHz	Kilohertz
KP	Kilometer post
L_{dn}	Day-Night Level
L_{eq}	Equivalent Sound Level
$L_{eq(h)}$	Equivalent Sound Level over one hour
L_{max}	Maximum Sound Level
LOS	Level of Service
L_{xx}	Percentile-Exceeded Sound Level
Loudness	Amplitude
mPa	Micro-Pascals
mph	Miles per Hour
NAC	Noise Abatement Criteria
NADR	Noise Abatement Decision Report
NEPA	National Environmental Policy Act
NSR	Noise Study Reports
PM	Post Mile
Protocol	Caltrans Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects
SPL	Sound Pressure Level
TeNS	Caltrans' Technical Noise Supplement
TNAP	Caltrans' Traffic Noise Analysis Protocol
TNM 2.5	FHWA Traffic Noise Model Version 2.5

Chapter 1. Introduction

1.1. Purpose of the Noise Study Report

The purpose of this Noise Study Report (NSR) is to evaluate traffic noise impacts and abatement under the requirements of Title 23, Part 772 of the Code of Federal Regulations (23CFR772) "Procedures for Abatement of Highway Traffic Noise". 23CFR772 provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. According to 23CFR772.3, all highway projects that are developed in conformance with this regulation are deemed to be in conformance with Federal Highway Administration (FHWA) noise standards.

The Caltrans Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects (Protocol) (Caltrans 2011) provides Caltrans policy for implementing 23CFR772 in California. The Protocol outlines the requirements for preparing noise study reports. The purpose of this NSR is to evaluate noise impacts consistent with the requirements of 23CFR772 and to determine whether the noise abatement satisfies Federal Highway Administration (FHWA) requirements.

Noise impacts associated with this project under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) are evaluated in the project's Environmental Impact Report/ Environmental Impact Statements (EIR/EIS).

1.2. Project Purpose and Need

The purpose of the proposed I-710 Corridor Project is to achieve the following within the I-710 corridor:

- Improve air quality and public health
- Improve traffic safety
- Provide modern design for the I-710 mainline
- Address projected traffic volumes
- Address projected growth in population, employment, and activities related to goods movement

The need for the proposed I-710 Corridor Project is as follows:

- I-710 experiences high heavy-duty truck volumes, resulting in high concentrations of diesel particulate emissions within the I-710 Corridor.
- I-710 experiences an accident rate that is well above the statewide average for freeways of this type.
- At many locations along I-710, the curves of on- and off-ramps do not meet current design standards and weaving sections between interchanges are of insufficient length.
- High volumes of both trucks and cars have led to traffic congestion throughout most of the day (6:00 a.m. to 7:00 p.m.) on I-710 as well as on the connecting freeways. This is projected to worsen over the next 25 years.
- Increases in population, employment, and goods movement between now and 2035 will lead to more traffic demand on I-710 and on the streets and roadways within the I-710 Corridor as a whole.

Chapter 2. Project Description

This section describes the alternatives that were developed by a multidisciplinary technical team to achieve the I-710 Corridor Project purpose. These alternatives were then reviewed and concurred upon by the various committees involved in the I-710 Corridor Project community participation framework. The alternatives are Alternative 1 (No Build Alternative), Alternative 5 (I-710 Widening up to 10 General Purpose [GP] Lanes), Alternative 6A (10 GP Lanes plus a Four-Lane Freight Corridor), Alternative 6B (10 GP Lanes plus a Zero Emissions Four-Lane Freight Corridor), and Alternative 6C (10 GP Lanes plus a Four-Lane Freight Corridor Tolled).

Alternative 1: No Build Alternative

The No Build Alternative does not include any improvements within the I-710 Corridor other than those projects that are already planned and committed to be constructed by or before the planning horizon year of 2035. The projects included in this alternative are based on SCAG's 2008 Regional Transportation Improvement Program (RTIP) project list, including freeway, arterial, and transit improvements within the SCAG region. This alternative also assumes that goods movement to and from the ports make maximum utilization of existing railroad capacity within the I-710 Corridor. Alternative 1 is the baseline against which the Build Alternatives proposed for the I-710 Corridor Project will be assessed. The existing I-710 mainline generally consists of eight GP lanes north of I-405 and six GP south of I-405.

Alternative 5: I-710 Freeway Widening Up To 10 General Purpose Lanes

Alternative 5 proposes to widen I-710 mainline up to 10 GP lanes (I-710 northbound [NB] and I-710 southbound [SB]). This alternative will:

- Provide an updated design at the I-405 and State Route 91 (SR-91) interchanges (no improvements to the I-710/Interstate 5 [I-5] interchange are proposed under Alternative 5).
- Reconfigure all local arterial interchanges within the project limits that may include realignment of on- and off-ramps, widening of on- and off-ramps, and reconfiguration of interchange geometry.
- Eliminate local ramp connections over I-710 (9th to 6th Street and 7th to 10th Street in the City of Long Beach.
- Eliminate a local interchange at Wardlow Avenue in the City of Long Beach.
- Add a local street connection under I-710 to Thunderbird Villas at Miller Way in the City of South Gate.
- Add a local connection (bridge) over I-710 at Southern Avenue in the City of South Gate.
- Add a local arterial interchange at NB and SB I-710/Slauson Avenue in the City of Maywood.

- Add one local arterial NB off-ramp from NB I-710 to 26th Street/Bandini Boulevard in the City of Bell.
- Shift the I-710 centerline at several locations to reduce right-of-way requirements.

Additionally, various structures such as freeway connectors, ramps, and local arterial overcrossings, structures over the Los Angeles River and structures over the two railyards throughout the project limits will be replaced, widened, or added as part of Alternative 5.

In addition to improvements to the I-710 mainline and the interchanges, Alternative 5 also includes Transportation Systems/Transportation Demand Management (TSM/TDM), Transit, and Intelligent Transportation Systems (ITS) improvements. TSM improvements include provision of or future provision of ramp metering at all locations and the addition of improved arterial signage for access to I-710. Parking restrictions during peak periods (7:00 a.m.–9:00 a.m.; 4:00 p.m.–7:00 p.m.) will be implemented on four arterial roadways: Atlantic Boulevard between Pacific Coast Highway and SR-60; Cherry Avenue Garfield Avenue between Pacific Coast Highway and SR-60; Eastern Avenue between Cherry Avenue and Atlantic Boulevard; and Long Beach Boulevard between San Antonio Drive and Firestone Boulevard. Transit improvements that will be provided as part of the I-710 Corridor Project include increased service on all Metro Rapid routes and local bus routes in the study area. ITS improvements include updated fiber-optic communications to interconnect traffic signals along major arterial streets to provide for continuous, real-time adjustment of signal timing to improve traffic flow as well as other technology improvements.

Alternative 5 also includes improvements to 35 local arterial intersections within the I-710 Corridor Project study area. These improvements generally consist of lane restriping or minimal widening to provide additional intersection turn lanes that will reduce traffic delay and improve intersection operations for those intersections with projected Level of Service (LOS) F.

In addition to the transportation system improvements described above, Alternative 5 also includes:

- Aesthetic Enhancements: Landscaping and irrigation systems would be provided within the corridor where feasible. Urban design and aesthetic treatment concepts for community enhancement will be integrated into the design of the I-710 Corridor Project. These concepts will highlight unique community identities within a unified overall corridor theme; strengthen physical connections and access/mobility within and between communities; and implement new technologies and best practices to ensure maximum respect for the environment and natural resources. They will continue to evolve and be refined through future phases of project development.

- Drainage/Water Quality Features: Alternative 5 includes modifications to the Los Angeles River levee; new, extended, replacement, and additional bents and pier walls in the Los Angeles River; additional and extended bents and pier walls in the Compton Channel; modifications to existing pump stations or provision of additional pump stations; and detention basins and bioswales that will provide for treatment of surface water runoff prior to discharge into the storm drain system.

Alternative 6A: 10 GP Lanes Plus A Four Lane Freight Corridor

Alternative 6A includes all the components of Alternatives 1 and 5 described above. (The alignment of the GP lanes in Alternative 6A will be somewhat different than Alternative 5 in a few locations.) In addition, this alternative includes a separated four-lane freight corridor (FC) from Ocean Blvd. northerly to its terminus near the Union Pacific and Burlington Northern Sante Fe rail yards in the City of Commerce. The FC would be built to Caltrans highway design standards and would be restricted to the exclusive use of heavy-duty trucks (5+ axles). In Alternative 6A these trucks are assumed to be "conventional" trucks (conventional trucks are defined to be newer [post-2007] diesel/fossil-fueled trucks [new or retrofitted engines required per new regulations and standards]).

The FC would be both at-grade and on elevated structures with two lanes in each direction. There are exclusive, truck only ingress and egress ramps to and/or from the FC at the following locations:

- Harbor Scenic Dr. (NB ingress only)
- Ocean Blvd. (NB ingress only)
- Pico Ave.
- Anaheim St. (NB ingress only)
- SB I-710 GP lanes just south of Pacific Coast Hwy (SB egress only)
- NB I-710 GP lanes north of I-405 at 208th St. (NB ingress only)
- SB I-710 GP lanes north of I-405 at 208th St. (SB egress only)
- Eastbound (EB) SR-91 (NB egress only)
- Westbound (WB) SR-91 (SB ingress only)
- SB I-710 GP lanes just south of Bandini Blvd. (SB ingress only)
- Washington Boulevard – hook ramp (NB egress only) (Design Option 1)
- Washington Boulevard – (NB egress only) (Design Option 2)
- I-710 SB GP lanes just north of Bandini Blvd (SB ingress only) (Design Options 1 and 2)

In addition to the FC feature, Alternative 6A includes:

- Modification to the I-5 interchange, notably the replacement of the NB I-710 to NB I-5 connector (right-side ramp replacement of left-side ramp) and a realigned SB I-5 to SB I-710 connector and 5 SB GP lanes from SR-60 to Washington Blvd.

- 3 NB GP lanes from I-5 to SR-60
- Modification to the I-710 SB on- and off-ramps at Eastern Avenue to slightly realign them.
- A local connection over I-710 at Patata Street in the cities of South Gate and Bell Gardens.

As with Alternative 5, Alternative 6A will include additional aesthetic enhancements, and drainage/water quality features as follow:

- Aesthetic Enhancements: In addition to the aesthetic enhancements described above for Alternative 5A, specific aesthetic treatments will be developed for the FC, including use of screen walls and masonry treatments on the FC structures.

- Drainage/water quality features: Alternative 6A includes features to capture and treat the additional surface water runoff from the FC, as well as some modifications to the Los Angeles River levees in order to accommodate electrical transmission line relocations.

Alternative 6B: 10 GP Lanes Plus A Zero-Emissions Four Lane Freight Corridor

Alternative 6B includes all the components of Alternative 6A as described above, but would restrict the use of the FC to zero-emission trucks rather than conventional trucks. This proposed zero emission truck technology is assumed to consist of trucks powered by electric motors in lieu of internal combustion engines and producing zero tailpipe emissions while traveling on the freight corridor. The specific type of electric motor is not defined, but feasible options include linear induction motors, linear synchronous motors or battery technology. The power system for these electric propulsion trucks could include, but is not limited to, hybrid with dual-mode operation (ZEV Mode), Range Extender EV (Fuel Cell or Turbine with ZEV mode), Full EV (with fast charging or infrastructure power), road-connected power (e.g., overhead catenary electric power distribution system), alternative fuel hybrids, zero NOx dedicated fuel engines (CNG, RNG, H2 ICE), and range extender EV (turbine). For purposes of the I-710 environmental studies, the zero-emission electric trucks are assumed to receive electric power while traveling along the FC via an overhead catenary electric power distribution system (road-connected power).

Alternative 6B also includes the assumption that all trucks using the FC will have an automated control system that will steer, brake, and accelerate the trucks under computer control while traveling on the FC. This will safely allow for trucks to travel in “platoons” (e.g., groups of 6–8 trucks) and increase the capacity of the FC from a nominal 2,350 passenger car equivalents per lane per hour (pces/ln/hr) (as defined in Alternative 6A) to 3,000 pces/ln/hr in Alternative 6B.
The design of the FC will also allow for possible future conversion, or be initially constructed, as feasible (which may require additional environmental analysis and approval), of a fixed-track

guide way family of alternative freight transport technologies (e.g., Maglev). However, this fixed-track family of technologies has been screened out of this analysis for now, as it has been determined to be inferior to electric trucks in terms of cost and ability to readily serve the multitude of freight origins and destinations served by trucks using the I-710 corridor.

Alternative 6C: 10 GP Lanes Plus A Four Lane Freight Corridor With Tolls

Alternative 6C includes all the components of Alternative 6B as described above, but would toll trucks using the FC. Although tolling trucks in the FC could be done under either Alternative 6A or 6B, for analytical purposes, tolling has only been evaluated for Alternative 6B as this alternative provides for higher FC capacity than Alternative 6A due to the automated guidance feature of Alternative 6B.

Tolls would be collected using electronic transponders which would require overhead sign bridges and transponder readers like the SR-91 toll lanes currently operating in Orange County, where no cash toll lanes are provided. The toll pricing structure would provide for collection of higher tolls during peak travel periods.

Design Options

For alternatives 6A, 6B, and 6C, three design options for the portion of I-710 between the I-710/Slauson Ave interchange to just south of the I-710/I-5 interchange are under consideration. These configurations will be fully analyzed so that they can be considered in the future selection of the Preferred Alternative for the project. These options are as follows:

Design Option 1 (Option J)

Design Option 1 applies to Alternatives 6A, 6B and 6C and provides access to Washington Blvd on the west side of I-710.

Design Option 2 (Option M)

Design Option 2 applies to Alternatives 6A, 6B, and 6C and provides access from the NB FC to Washington Boulevard on the east side of I-710.

Design Option 3

Design Option 3 applies only to Alternative 6B[1] and removes access to Washington Blvd. at its current location. The ramps at the I-710/Washington Blvd. interchange would be removed to accommodate the proposed FC ramps in and out of the rail yards. The SB off-ramp and NB-on-ramp access would be accommodated by Alternative 6B in the vicinity of the existing interchange by the proposed new SB off-ramp and NB on-ramp at Oak Street and Indiana Street. These two ramps are proposed as mixed-flow ramps (freight connector ramps that would also allow automobile traffic). However, the SB on-ramp and NB off-ramp traffic that previously

[1] Design Option 3 only applies to Alternative 6B because it was not included in the travel demand modeling for either Alternative 6A or 6C.

used the Washington Boulevard interchange would be required to access the Atlantic Boulevard/Bandini Boulevard interchange located south of the existing Washington Boulevard interchange to ultimately reach I-710.

Figure 2-1. Project Location

Chapter 3. Fundamentals of Traffic Noise

The following is a brief discussion of fundamental traffic noise concepts. For a detailed discussion, please refer to Caltrans' Technical Noise Supplement (TeNS) (Caltrans 2009), a technical supplement to the Protocol, which is available on Caltrans Web site (http://www.dot.ca.gov/hq/env/noise/pub/tens_complete.pdf) or the FHWA Highway Noise Barrier Design Handbook available on the FHWA website (http://www.fhwa.dot.gov/environment/noise/Manual.htm).

3.1. Sound, Noise, and Acoustics

Sound is a vibratory disturbance created by a moving or vibrating source in a gaseous or liquid medium or in the elastic strain of a solid that is capable of being detected by the hearing organs. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. The medium of main concern is air. In absence of any other qualifying statements, sound will be considered airborne sound, as opposed to, for example, structureborne or earthborne sound.

Noise is defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Sound (and noise) is actually a process that consists of three components: 1) the sound source, 2) the sound path, and 3) the sound receiver. All three components must be present for sound to exist. Without a source to produce sound, there obviously is no sound. Likewise, without a medium to transmit sound pressure waves there is also no sound. And finally, sound must be received, i.e. a hearing organ, sensor, or object must be present to perceive, register, or be affected by sound or noise. In most situations, there are many different sound sources, paths, and receivers, instead of just one of each.

Acoustics is the field of science that deals with the production, propagation, reception, effects, and control of sound. The field is very broad, and transportation related noise and its abatement covers just a small, specialized part of acoustics.

Traffic noise typically results from the interaction of the sources (moving vehicles) and the roadway. A considerable portion of traffic noise derives from the sound emitted by the combustion engines of these vehicles. From the source to the receiver, noise varies both in level and frequency.

3.2. Frequency

Sound can be described by its frequency (pitch) and amplitude (loudness). Frequency relates to the number of pressure oscillations per second. Low-frequency sounds are low in pitch, like the

low notes on a piano, whereas high-frequency sounds are high in pitch, like the high notes on a piano. Frequency is expressed in terms of oscillations, or cycles per second. Cycles per second are commonly referred to as Hertz (Hz). A frequency of 250 cycles per second is referred to as 250 Hz. High frequencies are sometimes more conveniently expressed in units of kilo-Hertz (kHz), or thousands of Hertz. The extreme ranges of frequencies that can be heard by the healthiest human ears spans from 16–20 Hz on the low end to about 20,000 Hz (or 20 kHz) on the high end.

3.3. Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this huge range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB). The threshold of hearing for young people is about 0 dB, which corresponds to 20 mPa.

3.4. Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB—rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dB louder than one source.

3.5. A-Weighted Decibels

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz, and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those

frequencies. Then, an "A-weighted" sound level (expressed in units of dBA) can be computed based on this information.

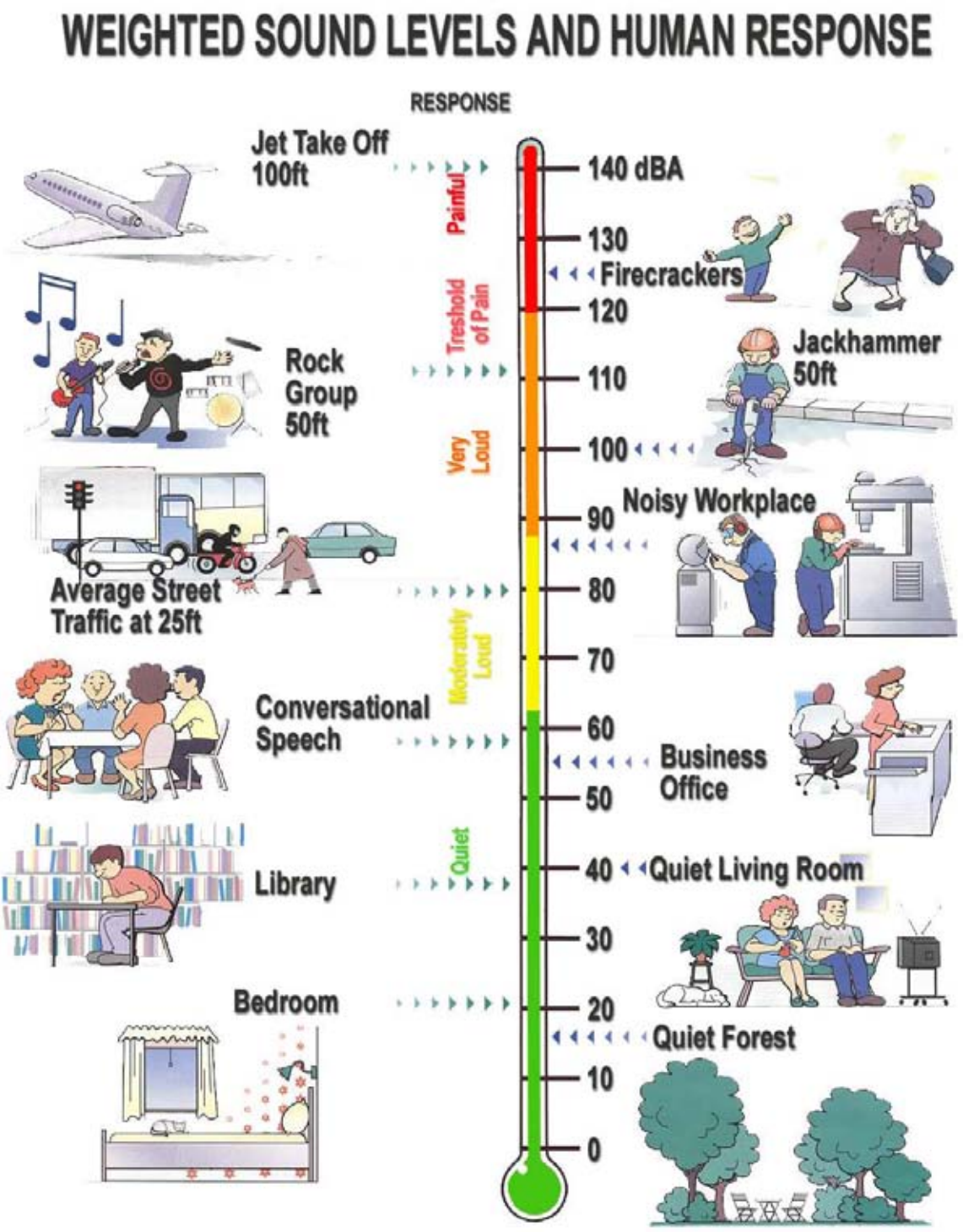
The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B-, C-, and D-scales), but these scales are rarely used in conjunction with highway-traffic noise. Noise levels for traffic noise reports are typically reported in terms of A-weighted decibels or dBA. Figure 3-1 describes typical A-weighted noise levels for various noise sources and shows levels of noise associated with common activities and human response.

3.6. Human Response to Changes in Noise Levels

As discussed above, doubling sound energy results in a 3-dB increase in sound. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different than what is measured.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1-dB changes in sound levels, when exposed to steady, single-frequency ("pure-tone") signals in the midfrequency (1,000 Hz–8,000 Hz) range. In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dB increase in sound, would generally be perceived as barely detectable.

Figure 3-1. Typical A-Weighted Noise Levels



Source: B&K

3.7. Noise Descriptors

Noise in our daily environment fluctuates over time. Some fluctuations are minor, but some are substantial. Some noise levels occur in regular patterns, but others are random. Some noise levels fluctuate rapidly, but others slowly. Some noise levels vary widely, but others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors most commonly used in traffic noise analysis.

- **Equivalent Sound Level (L_{eq}):** L_{eq} represents an average of the sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1-hour A-weighted equivalent sound level (L_{eq}[h]) is the energy average of A-weighted sound levels occurring during a one-hour period, and is the basis for noise abatement criteria (NAC) used by Caltrans and FHWA.

- **Percentile-Exceeded Sound Level (L_{xx}):** L_{xx} represents the sound level exceeded for a given percentage of a specified period (e.g., L_{10} is the sound level exceeded 10% of the time, and L_{90} is the sound level exceeded 90% of the time).

- **Maximum Sound Level (L_{max}):** L_{max} is the highest instantaneous sound level measured during a specified period.

- **Day-Night Level (L_{dn}):** L_{dn} is the energy average of A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound levels occurring during nighttime hours between 10 p.m. and 7 a.m.

- **Community Noise Equivalent Level (CNEL):** Similar to L_{dn}, CNEL is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound levels occurring during the nighttime hours between 10 p.m. and 7 a.m., and a 5-dB penalty applied to the A-weighted sound levels occurring during evening hours between 7 p.m. and 10 p.m.

3.8. Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors.

3.8.1. Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 decibels for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined

path, and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 decibels for each doubling of distance from a line source.

3.8.2. Ground Absorption

The propagation path of noise from a highway to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective-wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 feet. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water,), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver, such as soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 decibels per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 decibels per doubling of distance.

3.8.3. Atmospheric Effects

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) from the highway due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects.

3.8.4. Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. A barrier that breaks the line of sight between a source and a receiver will typically result in at least 5 dB of noise reduction. Taller barriers provide increased noise reduction. Vegetation between the highway and receiver is rarely effective in reducing noise because it does not create a solid barrier.

Chapter 4. Federal Regulations and State Policies

This report focuses on the requirements of 23CFR772, as discussed below.

4.1. Federal Regulations

4.1.1. 23CFR772

23CFR772 provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. Under 23CFR772.7, projects are categorized as Type I, Type II projects, or Type III projects. FHWA defines a Type I project as a proposed federal or federal-aid highway project for the construction of a highway on a new location, or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment, or increases the number of through-traffic lanes. A Type II project is a noise barrier retrofit project that involves no changes to highway capacity or alignment. A Type III project is a project that does not meet the classifications of a Type I or Type II project. Type III projects do not require a noise analysis.

Type I projects include those that create a completely new noise source, as well as those that increase the volume or speed of traffic or move the traffic closer to a receiver. Type I projects include the addition of an interchange, ramp, auxiliary lane, or truck-climbing lane to an existing highway, or the widening of an existing ramp by a full lane width for its entire length. Projects unrelated to increased noise levels, such as striping, lighting, signing, and landscaping projects, are not considered Type I projects.

Under 23CFR772.13, noise abatement must be considered and evaluated for feasibility and reasonableness for Type I projects if the project is predicted to result in a traffic noise impact. In such cases, 23CFR772 requires that the project sponsor "consider" noise abatement before adoption of the NEPA Categorical Exclusion (CE), Finding of No Significant Impact (FONSI), or Record of Decision (ROD). This process involves identification of noise abatement measures that are feasible, reasonable, and likely to be incorporated into the project, and noise impacts for which no noise abatement measures are feasible and reasonable.

Traffic noise impacts, as defined in 23CFR772.5, occur when the predicted noise level in the design year approaches or exceeds the NAC specified in 23CFR772, or a predicted noise level substantially exceeds the existing noise level (a "substantial" noise increase). Noise levels are expressed in terms the *A-weighted decibel (dBA)* and the *one-hour equivalent sound level* (*Leq[h]*).

In California a noise level is considered to approach the NAC for a given activity category if it is within 1 dBA of the NAC. In California a substantial noise increase is considered to occur when the project's predicted worst-hour design-year noise level exceeds the existing worst hour noise

level by 12 dBA or more. The use of 12 dB was established in California many years ago and is based on the concept that a 10 dB increase generally is perceived as a doubling of loudness. A collective decision by Caltrans staff, which was approved by FHWA, was made to use 12 dB. Table 4-1 summarizes NAC corresponding to various land use activity categories. Activity categories and related traffic noise impacts are determined based on the actual land use in a given area.

Table 4-1. Activity Categories and Noise Abatement Criteria

Activity Category	Activity $L_{eq}[h]$[1]	Evaluation Location	Description of Activities
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[2]	67	Exterior	Residential.
C[2]	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A–D or F.
F			Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G			Undeveloped lands that are not permitted.

[1] The Leq(h) and L10(h) Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures. All values are A-weighted decibels (dBA).

[2] Includes undeveloped lands permitted for this activity category.

In identifying noise impacts, primary consideration is given to exterior areas of frequent human use. In situations where no exterior activities are to be affected by traffic noise, or where the exterior activities are far from or physically shielded from the roadway in a manner that prevents an impact on exterior activities, the Activity Category D is used as the basis for determining a noise impact.

4.2. State Regulations and Policies

4.2.1. Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects

The Protocol specifies the policies, procedures, and practices to be used by agencies that sponsor new construction or reconstruction of federal or federal-aid highway projects. The NAC specified in the Protocol are the same as those specified in 23CFR772. The Protocol defines a noise increase as substantial when the predicted noise levels with project implementation exceed existing noise levels by 12 dBA. The Protocol also states that a sound level is considered to approach an NAC level when the sound level is within 1 dB of the NAC identified in 23CFR772 (e.g., 66 dBA is considered to approach the NAC of 67 dBA, but 65 dBA is not).

The TeNS to the Protocol provides detailed technical guidance for the evaluation of highway traffic noise. This includes field measurement methods, noise modeling methods, and report preparation guidance.

4.2.2. Section 216 of the California Streets and Highways Code

Section 216 of the California Streets and Highways Code relates to the noise effects of a proposed freeway project on public and private elementary and secondary schools. Under this code, a noise impact occurs if, as a result of a proposed freeway project, noise levels exceed 52 dBA-L_{eq}(h) in the interior of public or private elementary or secondary classrooms, libraries, multipurpose rooms, or spaces. This requirement does not replace the “approach or exceed” NAC criterion for FHWA Activity Category D for classroom interiors, but it is a requirement that must be addressed in addition to the requirements of 23CFR772.

If a project results in a noise impact under this code, noise abatement must be provided to reduce classroom noise to a level that is at or below 52 dBA-L_{eq}(h). If the noise levels generated from freeway and nonfreeway sources exceed 52 dBA-L_{eq}(h) prior to the construction of the proposed freeway project, then noise abatement must be provided to reduce the noise to the level that existed prior to construction of the project.

Chapter 5. Study Methods and Procedures

5.1. Methods for Identifying Land Uses and Selecting Noise Measurement and Modeling Receiver Locations

A field investigation was conducted to identify land uses that could be subject to traffic and construction noise impacts from the proposed project. Land uses in the project area were categorized by land use types, Activity Categories as defined in Table 4-1, and the extent of frequent human use. As stated in the Protocol, noise abatement is only considered for areas of frequent human use that would benefit from a lowered noise level. Although all developed land uses are evaluated in this analysis, the focus is on locations of frequent human use that would benefit from a lowered noise level. Accordingly, this noise impact analysis focuses on locations with defined frequent human use areas, such as residences, schools, libraries, churches and temples, hospitals, recreation and sport areas, playgrounds, cemeteries, golf courses, hotels, and motels.

Short-term measurement locations were selected to represent each major developed area within the project area. Long-term measurements were conducted in order to capture diurnal traffic noise level patterns in the project area. Short-term measurement locations were selected to serve as representative modeling locations. Several other non-measurement locations were selected as modeling locations. The field survey for all noise measurements included visiting the project sites in order to identify land uses within the project limits and to select the noise measurement sites. The entire area within the project limits was acoustically represented by 221 noise site locations. Traffic noise readings were taken at 149 locations and modeled at 72 sites.

The noise measurement sites were selected taking into consideration the following general site requirements:

1. Sites were acoustically representative of areas and conditions of interest. They were located at areas of human use.

2. Sites were clear of major obstructions between source and receiver. Microphone positions were more than 10 feet away from reflecting surfaces.

3. Sites were free of noise contamination by sources other than those of interest. Sites were not located near barking dogs, lawn mowers, pool pumps, air conditioners, etc.

4. Sites were not exposed to prevailing meteorological conditions that are beyond the constraints discussed in the Technical Noise Supplement (TeNs).

5.2. Field Measurement Procedures

A field noise study was conducted in accordance with recommended procedures in TeNS. Caltrans Division of Environmental Planning conducted noise measurements (short-term, long-term, and background) for the area between Ocean Boulevard and the Imperial Highway (SR-90). For the area between SR-90 and SR-60, noise measurements were used from a previous noise study report (dated 12/17/2007) for the LA-710 – EA 202100 Pavement Rehabilitation Project. However, some of the noise measurements were conducted by Caltrans Noise & Vibration staff for this project; they include areas between Rosecrans Avenue and I-105; and areas about 1 mile east and west of I-710 along both I-405 and SR-91 in Long Beach. Noise modeling result for the area south of Broadway east of the Los Angeles River (sites NB-A, NB-B, and NB-C) was taken from the noise study report for the Shoemaker Bridge Replacement Project prepared by LSA Associates, Inc., 2011.

The following is a summary of the procedures used to collect short-term and long-term sound level data. All noise monitoring locations and modeling locations are shown in Layouts L-1 through L-44 for both alternatives.

5.2.1. Short-Term Measurements

Short-term monitoring was conducted at 125 locations, using Metrosonics db-3080 sound level meters. Measurements were taken over a 10-minute period at most sites (a few sites included 15 minute noise monitoring). The short-term measurement locations are also listed on Tables 6-1-1 through Table 6-1-10.

During the short-term measurements, field staff attended each meter. 10-minute L_{eq} values collected during the measurement period were logged into the meter's internal memory, and dominant noise sources observed during each individual 10-minute period were also identified and logged. Using this approach, other non-traffic noise sources (such as aircraft and lawn equipment) can be identified and excluded from the noise readings. The calibration of the meter was checked before and after the measurement using the corresponding calibrators for each meter.

Temperature was recorded manually during the short-term monitoring session while the wind speed was recorded using Kestrel 1000. During the short-term noise measurements, temperatures typically ranged from approximately 65°F to 90°F, with clear weather conditions and the wind speed was mostly calm around 1 to 2 miles per hour (mph). Traffic on I-710 was classified and counted during short-term noise measurements. Vehicles were classified as automobiles, medium-duty trucks, or heavy-duty trucks. An automobile was defined as a vehicle with two axles and four tires that are designed primarily to carry passengers. Small vans and light trucks were included in this category. Medium-duty trucks included all cargo vehicles with two axles and six tires. Heavy-duty trucks included all vehicles with three or more axles. The posted speed limit on I-710 within the project limits was either 55 mph or 65 mph.

Additionally, 17 community background noise readings (duration of 10-minutes) were taken within the project limits. They ranged between 50 and 61 dBA-Leq(h). Background noise is the total of all noise generated within a community and is measured away from the freeway where freeway traffic noise does not contribute to the total noise level. Background noise levels are typically measured to determine the acoustical feasibility (noise reducibility of 5 dBA) of noise abatement and to ensure that noise reduction goals can be achieved. Noise abatement cannot reduce noise levels below background noise levels.

5.2.2. Long -Term Measurements

Long-term monitoring was conducted at 24 locations using Metrosonics Model db-3080 sound level meters. The purpose of these measurements was to identify variations in sound levels throughout the day. 24-hour readings were taken at locations representative of residential areas in order to determine the noisiest hour. A sound level meter was placed at the representative site and was left to run continuously monitoring and recording noise levels for a 24-hour period. The short-term noise levels were recorded within the 24-hour noise monitoring for that particular area. The noise level data collected was then analyzed and adjusted using the 24-hour noise readings to determine the noisiest hour. Please see Tables 6-3-1 through 6-3-4 for noise monitoring results at each long-term noise measurement sites.

5.3. Traffic Noise Levels Prediction Methods

Traffic noise levels were predicted using the FHWA Traffic Noise Model Version 2.5 (TNM 2.5). TNM 2.5 is a computer model based on two FHWA reports: FHWA-PD-96-009 and FHWA-PD-96-010 (FHWA 2004). Key inputs to the traffic noise model were the locations of roadways, shielding features (e.g., topography and buildings), noise barriers, ground type, and receivers. Three-dimensional representations of these inputs were developed using CAD drawings, aerials, and topographic contours provided by URS Consultants.

Traffic noise was evaluated under existing conditions, design year no-project conditions, and design year conditions with the project alternatives. Peak-hour traffic volumes, vehicle classification percentages, and traffic speeds in design-year (2035) conditions were provided by URS Corporation for input into the traffic noise model.

URS provided schematics of the traffic data for I-710 between each interchange including on/off ramps, connectors, and proposed truck lanes. These schematics contained 2035 traffic volumes and truck percentages for Alternatives 5 and 6A as well as for the No Build Alternative. Due to demand and growth in the area, the future 2035 truck percentages were significantly higher than the current truck percentages.

To validate the accuracy of the model, TNM 2.5 was used to compare measured traffic noise levels to modeled noise levels at field measurement locations. For each receiver, traffic volumes counted during the short-term measurement periods were normalized to 1-hour volumes. These

normalized volumes were assigned to the corresponding project area roadways to simulate the noise source intensity from the roadways during the actual measurement period. Modeled and measured sound levels were then compared to determine the accuracy of the model and if additional calibration of the model was necessary.

5.4. Methods for Identifying Traffic Noise Impacts and Consideration of Abatement

Traffic noise impacts are considered to occur at receiver locations where predicted design-year noise levels are at least 12 dBA greater than existing noise levels, or where predicted design year noise levels approach (within 1 dB) or exceed the NAC for the applicable activity category. Where traffic noise impacts are identified, noise abatement must be considered for feasibility and reasonableness as required by 23CFR772 and the Protocol.

According to the Protocol, abatement measures are considered acoustically feasible if a minimum noise reduction of 5 dBA at impacted receiver locations is predicted with implementation of the abatement measures. In addition, barriers should be designed to intercept the line-of-sight from the exhaust stack of a truck to the first tier of receivers, as recommended by the Highway Design Manual, Chapter 1100. Other factors that affect feasibility include topography, access requirements for driveways and ramps, presence of local cross streets, utility conflicts, other noise sources in the area, and safety considerations.

The overall reasonableness is determined by these factors: acoustical design goal, the cost of abatement, and viewpoints of benefited receptors (including property owners and residents of the benefited receptors). 23CFR722 requires that an acoustical design goal be applied to all noise abatement. Caltrans acoustical design goal is that a barrier must be predicted to provide at least 7 dB of noise reduction at one or more benefited receptors. In order for a sound barrier to be considered reasonable, the 7 dB design goal must be achieved at one or more benefited receptors. This design goal applies to any receptor and is not limited to impacted receptors. Cost considerations in the reasonableness determination of noise abatement are based on a 2011 allowance per *benefited receptor* of $55,000. A benefited receptor is a dwelling unit that is predicted to receive a noise reduction of at least 5 dBA from the proposed noise abatement measure. A receptor can be a benefited receptor even if it is not subject to a traffic noise impact. The noise barrier is not required to reduce noise levels to below the NAC for any noise sensitive land uses.

Chapter 6. Existing Noise Environment

6.1. Existing Land Uses

A field investigation was conducted to identify land uses that could be subject to traffic and construction noise impacts from the proposed project. Single-family residences and multi-family residences were identified as Activity Category B while schools, parks, recreation areas, playgrounds, golf courses, places of worship, medical facilities, and cemeteries were identified as Activity Category C land uses in the project area. Hotels/motels and restaurants were identified under Activity Category E.

As required by the Protocol, all developed land uses are evaluated in this analysis. However noise abatement is only considered for areas of frequent human use that would benefit from a lowered noise level. Accordingly, this impact analysis focuses on locations with defined outdoor activity areas, such as residential backyards and common use areas at multi-family residences.

6.1.1. Existing Traffic Noise

A field noise investigation was conducted to determine existing noise levels and gather information to develop and calibrate the traffic noise model that was used for predicting future noise levels. Existing noise levels were recorded at 149 locations and modeled at 72 locations, which were acoustically representative of the entire area within the limits of the project. The existing ambient noise levels measured were between 46 and 75 decibels (dBA). Twenty four long-term (24-hour) noise level readings were conducted to determine the noisiest hour within the project limits. Tables 7-1-1 through 7-1-8 summarize sound level measurements taken in the project area and the noise modeling results for existing conditions.

6.1.2. Existing Sound Barriers

The following is a list of existing sound barriers within the project limits.

1) 10 – 12 feet high soundwall along edge of shoulder on the southbound I-710 between Pacific Coast Highway and Willow Street.
2) 10 feet high soundwalls along the edge of shoulder on the southbound I-710 between Willow Street and just north of Wardlow Road (south of I-405 Interchange).
3) 8 – 12 feet high soundwalls along the state right of way on the southbound I-710 between Long Beach Boulevard and SR-91 Interchange.
4) 8 – 10 feet high soundwalls along the edge of shoulder on the southbound I-710 between SR-91 Interchange and Atlantic Avenue.
5) 12 feet high soundwalls along the state right of way on the southbound I-710 between Atlantic Avenue and Alondra Boulevard.
6) 12 feet high soundwall along the state right of way on the southbound I-710 between Linsley Street and Myrrh Street.

7) 10 – 12 feet high soundwall along the state right of way on the southbound I-710 between E. Compton Boulevard and Rosecrans Avenue.
8) 12 feet high soundwall along the state right of way/private property on the southbound I-710 between Olanda Street and Lavinia Avenue (south of I-105 interchange).
9) 12 feet high soundwall along the edge of shoulder on the southbound I-710 along Imperial Highway Off-ramp.
10) 12 feet high soundwall along the state right-of-way on the northbound I-710 between Cecilia Street and Clara Street.
11) 8 – 10 feet high soundwall along the state right-of-way on the northbound I-710 along Florence Avenue Off-ramp.
12) 8 – 14 feet high soundwall along the state right-of-way on the northbound I-710 between Florence Avenue and Gage Avenue.
13) 10 feet high soundwall along the state right of way on the northbound I-710 between Gage Avenue and Watcher Street.
14) 12 – 14 feet high soundwall along the edge of shoulder on the northbound I-710 along Washington Boulveard On-ramp.
15) 12 feet high soundwall along the edge of shoulder on the southbound I-710 along Washington Boulevard Off-ramp.
16) 12 ft. high soundwall along the edge of shoulder on the southbound I-710 between Noakes Street and Triggs Street (south of I-5 Interchange).
17) 12 feet high soundwall along the edge of shoulder on the northbound I-710 between Noakes Street and just north of Triggs Street (south of I-5 Interchange).
18) 12 feet high soundwall along the edge of shoulder on the northbound I-710 between Olympic Boulevard and S. Humphreys Avenue.
19) 12 ft high soundwall along the edge of shoulder on the southbound I-710 between Olympic Boulevard and S Humphreys Avenue.
20) 10 feet high soundwalls along the state right of way/edge of shoulder on the southbound I-710 between S. Humphreys Avenue and E. 3rd Street (south of SR-60 Interchange).
21) 6 – 14 feet high soundwall along the state right of way/edge of shoulder on the northbound I-710 between S. Humphreys Avenue and E. 3rd Street (south of SR-60 Interchange).
22) 10 – 14 feet high soundwall along the edge of shoulder on the northbound I-405 between Pacific Avenue and Pacific Place.
23) 10 feet high soundwall along the edge of shoulder on the southbound I-405 between Wardlow Road and Pacific Place.
24) 10 feet high soundwall along the edge of shoulder on the southbound I-405 between Pacific Place and the LA River.
25) 10 feet high soundwall along the edge of shoulder on the northbound I-405 between UPRR and Alameda Street.

26) 10 feet high soundwall along the edge of shoulder on the southbound I-405 between UPRR and just south of Alameda Street.
27) 8 feet high soundwall along the edge of shoulder from S Susana Road to Long Beach Blvd along eastbound SR-91.
28) 10 – 12 feet high soundwalls along the edge of shoulder from Long Beach Boulevard to the SR-91/I-710 interchange along westbound SR-91.
29) 8 feet high soundwall along the edge of shoulder from Long Beach Boulevard to the SR-91/I-710 interchange along eastbound SR-91.
30) 10 – 12 feet high soundwalls along the edge of shoulder between Atlantic Avenue and Cherry Avenue along westbound SR-91.
31) 10 – 12 feet high soundwalls along the edge of shoulder between Atlantic Avenue and Cherry Avenue along eastbound SR-91.

6.2. Noise Measurement Results

The existing noise levels in the project area are summarized in Table 6-1-1 through Table 6-1-10; Table 6-3-1 through Table 6-3-4; and Table 7-1-1 through Table 7-1-8; and they consist of short-term and long-term noise monitoring at representative noise sensitive locations within the project limits.

6.2.1. Short-Term Monitoring

Short-term monitoring was conducted at 125 locations, using Metrosonics db-3080 sound level meters. Measurements were taken over a 10-minute period at each site. Table 6-1-1 through Table 6-1-10 summarize the results of the short-term noise monitoring conducted in the project area. Table 6-2 summarizes the 17 community background noise levels within the project limits.

6.2.2. Long-Term Monitoring

Long-term monitoring was conducted at 24 locations using MetroSonics model db-3080 Type 2 sound level meters. The purpose of these measurements was to capture variations in traffic noise levels throughout the day, rather than absolute noise levels at a specific receptor of concern. The long-term sound level data was collected over 144 consecutive 10-minute intervals over a 24-hour period. Table 6-3-1 through Table 6-3-4 summarize the results of the long-term noise monitoring conducted in the project area. Figures 6-1 through 6-4 show graphically the results of the 24-hour noise testing.

Table 6-1-1 Summary of Short-Term Noise Measurements Between Ocean Boulevard and Pacific Coast Highway in Long Beach, CA 90810

Site	Address	Land Use	Date	Start Time	Duration (minutes)	Measured Leq-dBA	Freeway Direction	Number of MF Lanes	Autos	Medium Trucks	Heavy Trucks	Observed Speed (mph)
NB-C	701 W. Ocean Boulevard	Hotel	1/19/2011	3:32 PM	30	61.6	WB	2	314	1	2	40
							EB	2	565	1	1	40
NB-1	401 Golden Avenue	Park	10/21/2009	10:27 AM	10	59.1	NB	3	302	12	92	65
							SB	3	353	7	166	65
NB-1A	Cesar Chavez Elementary School - Interior	School	1/4/2010	12:15 PM	10	47.0	NB	3	351	9	69	65
							SB	3	356	10	130	65
NB-1B	Cesar Chavez Elementary School - Exterior	School	1/4/2010	12:28 PM	10	63.3	NB	3	351	9	69	65
							SB	3	356	10	130	65
NB-2	Cesar Chavez Community Center Playground	Recreation	10/21/2009	10:27 AM	10	57.7	NB	3	302	12	92	65
							SB	3	353	7	166	65
NB-3	Edison Elementary School - Exterior	School	10/21/2009	11:43 AM	10	62.3	NB	3	399	8	181	65
							SB	3	405	8	132	65
NB-3A	Edison Elementary School - Interior	School	10/21/2009	11:42 AM	10	41.0	NB	3	399	8	181	65
							SB	3	405	8	132	65

Table 6-1-2 Summary of Short-Term Noise Measurements Between Pacific Coast Highway and Willow Street in Long Beach, CA

Site	Address	Land Use	Date	Start Time	Duration (minutes)	Measured Leq-dBA	Freeway Direction	Number of MF Lanes	Autos	Medium Trucks	Heavy Trucks	Observed Speed (mph)
SB-1	1302 W. Parade Street	Residential	10/22/2009	10:13 AM	10	57.2	NB	3	439	28	119	65
							SB	3	404	29	158	65
SB-2	1901 Gale Avenue	Residential	10/22/2009	10:15 AM	10	62.4	NB	3	439	28	119	65
							SB	3	404	29	158	65
SB-4	2100 Gale Avenue	Residential	10/22/2009	10:47 AM	10	61.4	NB	3	475	17	181	65
							SB	3	453	25	168	65
SB-5	1247 21st Street	Residential	10/22/2009	10:49 AM	10	58.5	NB	3	475	17	181	65
							SB	3	453	25	168	65
SB-6	1228 23rd Street	Residential	10/22/2009	11:38 AM	10	63.5	NB	3	505	27	200	65
							SB	3	463	14	139	65
SB-8	1265 W. 25th Street	Residential	10/22/2009	11:38 AM	10	59.3	NB	3	505	27	200	65
							SB	3	463	14	139	65
SB-9	2556 Fashion Avenue	Residential	10/22/2009	1:51 PM	10	59.1	NB	3	469	32	181	65
							SB	3	461	14	135	65
NB-5	1871 San Francisco Avenue	Residential	10/22/2009	1:07 PM	10	55.8	NB	3	459	23	111	65
							SB	3	477	20	129	65
NB-6	2200 De Forest Avenue	Residential	10/22/2009	1:08 PM	10	48.3	NB	3	459	23	111	65
							SB	3	477	20	129	65
NB-7	2530 De Forest Avenue	Residential	10/22/2009	1:50 PM	10	52.2	NB	3	469	32	181	65
							SB	3	461	14	135	65

Table 6-1-3 Summary of Short-Term Noise Measurements Between Willow Street and I-405 in Long Beach, CA 90806 & 90810

Site	Address	Land Use	Date	Start Time	Duration (minutes)	Measured Leq-dBA	Freeway Direction	Number of MF Lanes	Autos	Medium Trucks	Heavy Trucks	Observed Speed (mph)
SB-10	2701 Gale Avenue	Residential	10/26/2009	10:27 AM	10	60.8	NB	4	533	28	124	65
							SB	4	541	28	187	65
SB-12	1222 Spring Street	Residential	10/26/2009	10:26 AM	10	65.3	NB	4	533	28	124	65
							SB	4	541	28	187	65
SB-13	2990 Gale Avenue	Residential	10/26/2009	11:01 AM	10	60.8	NB	4	539	33	179	65
							SB	4	515	25	205	65
SB-14	1223 33rd Street	Residential	10/26/2009	11:01 AM	10	66.0	NB	4	539	33	179	65
							SB	4	515	25	205	65
SB-15	3540 Gale Avenue	Residential	10/26/2009	11:36 AM	10	67.2	NB	4	566	27	185	65
							SB	4	536	23	156	65
SB-17	3635 Gale Avenue	Residential	10/27/2009	11:19 AM	10	61.6	NB	4	394	8	158	65
							SB	4	288	32	134	65
NB-8	2800 De Forest Avenue	Residential	10/26/2009	1:20 PM	10	49.0	NB	4	594	40	124	65
							SB	4	609	22	163	65
NB-9	3095 San Francisco Avenue	Residential	10/26/2009	1:21 PM	10	45.7	NB	4	594	40	124	65
							SB	4	609	22	163	65
NB-10	3384 De Forest Avenue	Residential	10/26/2009	1:46 PM	10	48.7	NB	4	635	21	175	65
							SB	4	648	26	155	65
NB-11	3872 Golden Avenue	Residential	10/27/2009	11:52 AM	10	59.7	NB	4	371	5	152	65
							SB	4	406	34	130	65

Table 6-1-4 Summary of Short-Term Noise Measurements Between Long Beach Boulevard and SR-91 in Long Beach, CA 90805

Site	Address	Land Use	Date	Start Time	Duration (minutes)	Measured Leq-dBA	Freeway Direction	Number of MF Lanes	Autos	Medium Trucks	Heavy Trucks	Observed Speed (mph)
NB-13	Virginia Country Club	Recreational	10/27/2009	2:35 PM	10	55.5	NB	4	824	38	118	65
							SB	4	1546	14	305	65
NB-15	5075 Daisy Avenue - Exterior	School	11/2/2009	9:18 AM	10	57.4	NB	4	602	29	150	65
							SB	4	651	23	147	65
NB-15A	5075 Daisy Avenue - Interior	School	11/2/2009	9:19 AM	10	42.2	NB	4	602	29	150	65
							SB	4	651	23	147	65
NB-17	156 W. Mountain Avenue	Residential	11/2/2009	1:09 PM	10	51.0	NB	4	590	41	111	65
							SB	4	619	43	156	65
NB-19	Shady Acres Mobile Park #15 Second Street	Residential	11/2/2009	1:10 PM	10	55.8	NB	4	590	41	111	65
							SB	4	619	43	156	65
NB-20	5798 Chestnut Avenue	Residential	11/3/2009	12:59 PM	10	55.6	NB	5	571	37	103	65
							SB	4	555	35	187	65
NB-21	101 E. 60th Street	Residential	11/3/2009	1:00 PM	10	58.2	NB	5	571	37	103	65
							SB	4	555	35	187	65
NB-22	De Forest Park (Play Ground) 6255 De Forest Avenue	Park	11/3/2009	2:01 PM	10	52.2	NB	4	521	38	115	65
							SB	3	404	21	117	65
NB-23	6475 Atlantic 937 Paradise Lane	Residential	11/3/2009	2:00 PM	10	52.6	NB	4	521	38	115	65
							SB	3	404	21	117	65
SB-19	Collin Powell Academy School 150 Victoria Street - Exterior	School	11/2/2009	11:27 AM	10	55.3	NB	4	547	36	148	65
							SB	4	552	24	155	65
SB-19A	Collin Powell Academy School 150 Victoria Street - Interior	School	11/2/2009	11:25 AM	10	41.5	NB	4	547	36	148	65
							SB	4	552	24	155	65
SB-20	Luxury Inn Motel - Exterior 5950 Long Beach Boulevard	Motel	11/3/2009	10:33 AM	10	61.3	NB	5	564	60	144	65
							SB	4	559	32	192	65
SB-20A	Luxury Inn Motel - Interior 5950 Long Beach Boulevard	Motel	11/3/2009	10:31 AM	10	44.5	NB	5	564	60	144	65
							SB	4	559	32	192	65
SB-20C	261 E. Barclay Street	Residential	11/3/2009	11:06 AM	10	61.9	NB	5	562	36	148	65
							SB	4	536	34	176	65
SB-23	333 Forhan Street	Residential	11/3/2009	11:20 AM	10	59.2	NB	4	537	35	139	65
							SB	3	562	29	127	65

Table 6-1-5 Summary of Short-Term Noise Measurements Between SR-91 and Compton Boulevard in Long Beach, CA 90805

Site	Address	Land Use	Date	Start Time	Duration (minutes)	Measured Leq-dBA	Freeway Direction	Number of MF Lanes	Autos	Medium Trucks	Heavy Trucks	Observed Speed (mph)
SB-25	6910 Coachella Avenue	Residential	11/4/2009	11:01 AM	10	63.2	NB	6	747	26	164	65
							SB	5	475	40	149	65
SB-26	6911 Coachella Avenue	Residential	11/4/2009	11:22 AM	10	55.9	NB	6	747	26	164	65
							SB	5	475	40	149	65
NB-25	6975 Atlantic Avenue	Residential	11/4/2009	2:16 PM	10	61.6	NB	5	892	64	129	65
							SB	5	798	55	133	65
NB-26	6312 Rancho Rio Road	Residential	11/4/2009	2:18 PM	10	56.4	NB	5	892	64	129	65
							SB	5	798	55	133	65
SB-28	1316 Atlantic Place	Residential	11/4/2009	1:34 PM	10	56.3	NB	5	812	70	122	65
							SB	5	588	52	110	65
SB-29	1311 Atlantic Place	Residential	11/4/2009	1:33 PM	10	56.7	NB	5	812	70	122	65
							SB	5	588	52	110	65
SB-30	16002 S. Atlantic Avenue	Residential	11/4/2009	1:03 PM	10	59.3	NB	5	764	62	99	65
							SB	5	458	53	137	65
SB-31	15539 S. Gibson Avenue	Residential	11/9/2009	11:55 AM	10	61.4	NB	5	698	52	137	65
							SB	5	681	58	172	65
SB-32	15519 S. Gibson Avenue	Residential	11/9/2009	11:55 AM	10	60.0	NB	5	698	52	137	65
							SB	5	681	58	172	65
SB-33	4827 Rose Street	Residential	11/9/2009	10:25 AM	10	58.9	NB	5	648	39	144	65
							SB	5	721	59	170	65
SB-34	4819 Rose Street	Residential	11/9/2009	11:13 AM	10	53.9	NB	5	709	44	134	65
							SB	5	678	55	184	65
SB-34A	15116 S. Gibson Avenue-Int.	School	11/9/2009	2:35 PM	10	40.9	NB	6	1188	57	131	65
							SB	6	991	35	146	65
SB-34B	15116 S. Gibson Avenue-Ext.	School	11/9/2009	2:36 PM	10	61.3	NB	6	1188	57	131	65
							SB	6	991	35	146	65
NB-27	6400 E. Compton Boulevard	Recreation	11/9/2009	11:54 AM	10	53.3	NB	5	698	52	137	65
							SB	5	681	58	172	65
NB-27A	6500 E. Compton Boulevard-Int.	School	11/9/2009	11:11 AM	10	43.5	NB	5	709	44	134	65
							SB	5	678	55	184	65
NB-27C	6500 E. Compton Boulevard-Ext.	School	11/9/2009	11:14 AM	10	62.7	NB	5	709	44	134	65
							SB	5	678	55	184	65
NB-27B	15301 San Jose Avenue - Ext.	School	11/9/2009	12:52 PM	10	57.0	NB	5	712	44	95	65
							SB	5	768	44	166	65
NB-27D	15301 San Jose Avenue - Int.	School	11/9/2009	12:53 PM	10	42.8	NB	5	712	44	95	65
							SB	5	768	44	166	65

Table 6-1-6 Summary of Short-Term Noise Measurements Between Compton Boulevard and I-105

Site	Address	Land Use	Date	Start Time	Duration (minutes)	Measured Leq-dBA	Freeway Direction	Number of MF Lanes	Autos	Medium Trucks	Heavy Trucks	Observed Speed (mph)
NB-28	6443 San Marcus Street	Residential	11/10/2009	1:35 PM	10	49.5	NB	6	1029	74	149	65
							SB	6	818	55	157	65
NB-29	14703 San Antonio Avenue	Residential	11/10/2009	1:35 PM	10	51.6	NB	6	1029	74	149	65
							SB	6	818	55	157	65
NB-30	6500 San Juan Street	Residential	11/10/2009	10:50 AM	10	48.0	NB	6	692	56	153	65
							SB	6	632	65	196	65
NB-30A	6556 Rosecrans Boulevard	Residential	11/10/2009	2:20 PM	10	53.1	NB	6	1060	82	168	65
							SB	6	975	51	150	65
SB-37	4955 San Juan Street	Residential	11/10/2009	10:15 AM	10	59.9	NB	6	690	54	152	65
							SB	6	744	88	205	65
SB-38	4951 San Juan Street	Residential	11/10/2009	10:14 AM	10	59.9	NB	6	690	54	152	65
							SB	6	744	88	205	65
SB-39	4964 San Rafael Street	Residential	11/10/2009	10:50 AM	10	57.0	NB	6	692	56	153	65
							SB	6	632	65	196	65
SB-41	12830 S. Manette Place	Residential	1/11/2010	10:25 AM	10	51.1	NB	4	482	40	101	65
							SB	4	497	28	140	65
SB-42	5450 McMillan Street	Residential	1/11/2010	10:28 AM	10	58.6	NB	4	482	40	101	65
							SB	4	497	28	140	65
SB-43	12501 Edgebrook Avenue	Residential	1/11/2010	10:51 AM	10	64.1	NB	4	471	47	115	65
							SB	4	398	36	110	65
SB-44	5520 Lavinia Avenue	Residential	1/11/2010	10:54 AM	10	56.6	NB	4	471	47	115	65
							SB	4	398	36	110	65
SB-45	12323 Edbrook Avenue	Residential	1/11/2010	11:15 AM	10	59.0	NB	4	496	35	116	65
							SB	4	460	24	115	65
SB-46	5542 Pelleur Street	Residential	1/11/2010	11:18 AM	10	56.0	NB	4	496	35	116	65
							SB	4	460	24	115	65

Table 6-1-7 Summary of Short-Term Noise Measurements Between I-105 and SR-90 (Imperial Highway)

Site	Address	Land Use	Date	Start Time	Duration (minutes)	Measured Leq-dBA	Freeway Direction	Number of MF Lanes	Autos	Medium Trucks	Heavy Trucks	Observed Speed (mph)
NB-31	13425 Rancho Camino	Residential	11/16/2009	1:56 PM	10	52.8	NB	4	631	40	129	65
							SB	4	860	37	124	65
NB-32	5511 Century Boulevard	School	12/22/2009	10:04 AM	10	63.1	NB	4	790	50	109	65
							SB	4	762	51	146	65
NB-33	5511 Century Boulevard	School	12/22/2009	10:21 AM	10	44.6	NB	4	790	50	109	65
							SB	4	762	51	146	65
NB-34	11599 Rio Hondo Drive	Residential	11/16/2009	2:00 PM	10	55.4	NB	4	631	40	129	65
							SB	4	860	37	124	65
NB-35	11319 Idaho Avenue	Residential	11/16/2009	1:56 PM	10	54.5	NB	4	631	40	129	65
							SB	4	860	37	124	65
SB-49	5246 Martin Luther King Jr.	School	11/17/2009	11:23 AM	10	43.5	NB	4	861	37	104	65
							SB	4	401	41	122	65
SB-50	5246 Martin Luther King Jr.	School	11/17/2009	11:22 AM	10	65.9	NB	4	861	37	104	65
							SB	4	401	41	122	65
SB-51	11323 Wright Road	Residential	11/17/2009	1:59 PM	10	59.9	NB	4	1114	103	152	65
							SB	4	1064	49	116	65
SB-52	11300 Wright Road	School	11/17/2009	12:31 PM	10	50.1	NB	4	1107	54	111	65
							SB	4	978	94	195	65
SB-53	11300 Wright Road	School	11/17/2009	12:31 PM	10	59.6	NB	4	1107	54	111	65
							SB	4	978	94	195	65
SB-54	5333 Beechwood Avenue	Residential	11/17/2009	2:32 PM	10	67.7	NB	4	1284	39	135	65
							SB	4	1321	121	151	65
SB-55	5327 Beechwood Avenue	Residential	11/17/2009	2:33 PM	10	56.8	NB	4	1284	39	135	65
							SB	4	1321	121	151	65
SB-56	11111 Wright Road	Residential	11/17/2009	1:58 PM	10	60.2	NB	4	1114	103	152	65
							SB	4	1064	49	116	65
SB-58	10914 Wright Road	Residential	11/17/2009	10:40 AM	10	64.8	NB	4	1108	50	110	65
							SB	4	680	68	163	65
SB-59	10920 Duncan Avenue	Residential	11/17/2009	10:40 AM	10	65.0	NB	4	1108	50	110	65
							SB	4	680	68	163	65

Table 6-1-8 Summary of Short-Term Noise Measurements Between SR-90 (Imperial Highway) & Washington Boulevard

Site	Address	Land Use	Date	Start Time	Duration (minutes)	Measured Leq-dBA	Freeway Direction	Number of MF Lanes	Autos	Medium Trucks	Heavy Trucks	Observed Speed (mph)
NB-37	7940 Bell Garden Avenue	Residential	6/5/2007	1:55 PM	10	66.4	NB	4	1388	78	153	65
							SB	4	1363	69	186	65
NB-38	7728 Bell Garden Avenue	Residential	6/5/2007	2:05 PM	10	63.9	NB	4	1388	78	153	65
							SB	4	1363	69	186	65
NB-39	6809 Marlow Avenue	Residential	6/6/2007	12:56 PM	10	66.1	NB	4	1232	59	156	60
							SB	4	1340	76	147	60
NB-40	6516 Selfland Avenue	Residential	6/6/2007	12:55 PM	10	67.8	NB	4	1232	59	156	60
							SB	4	1340	76	147	60
NB-42	5517 Watcher Street	Residential	6/7/2007	11:07 AM	10	63.4	NB	4	1235	54	129	65
							SB	4	1301	75	215	65
NB-43	4721 Noble Street	Residential	6/11/2007	10:47 AM	10	71.9	NB	5	1153	97	166	65
							SB	5	1376	41	160	65
NB-45	4643 Noakes Street	Residential	6/11/2007	11:33 AM	12	69.2	NB	5	1341	82	171	65
							SB	5	1339	46	151	65
NB-46	1448 Duncan Avenue	Residential	6/11/2007	11:42 AM	13	61.8	NB	5	1341	82	171	65
							SB	5	1339	46	151	65
NB-47	1354 Duncan Avenue	Residential	6/12/2007	10:45 AM	14	62.5	NB	3	562	45	99	65
							SB	3	683	36	103	65
NB-48	1278 Duncan Avenue	Residential	6/13/2007	10:37 AM	10	65.0	NB	4	967	56	188	65
							SB	3	894	49	114	65
NB-49	1269 Duncan Avenue	Residential	6/13/2007	10:35 AM	10	57.0	NB	4	967	56	188	65
							SB	3	894	49	114	65
NB-50	1118 Burger Avenue	Residential	6/13/2007	11:10 AM	10	66.5	NB	4	1221	91	261	65
							SB	4	1261	101	184	65
NB-51	716 Burger Avenue	Residential	6/13/2007	1:22 PM	10	63.8	NB	4	458	26	51	65
							SB	3	462	19	39	65
NB-52	604 Burger Avenue	Residential	6/13/2007	1:22 PM	10	67.9	NB	4	458	26	51	65
							SB	3	462	19	39	65
NB-53	438 Betty Avenue	Residential	6/14/2007	11:00 AM	10	60.7	NB	3	563	27	37	65
							SB	3	342	20	35	65
NB-54	426 Betty Avenue	Residential	6/14/2007	11:00 AM	10	63.0	NB	3	563	27	37	65
							SB	3	342	20	35	65
NB-55	4464 4th Street	Residential	6/14/2007	11:04 AM	10	60.0	NB	3	563	27	37	65
							SB	3	342	20	35	65

Table 6-1-9 Summary of Short-Term Noise Measurements Between Washington Boulevard & SR-60

Site	Address	Land Use	Date	Start Time	Duration (minutes)	Measured Leq-dBA	Freeway Direction	Number of MF Lanes	Autos	Medium Trucks	Heavy Trucks	Observed Speed (mph)
SB-61	10518 Blumont Road	Residential	6/5/2007	11:25 AM	10	66.4	NB	4	1202	64	127	65
							SB	4	1368	53	139	65
SB-63	10334 Blumont Road	Residential	6/5/2007	11:36 AM	10	65.8	NB	4	1202	64	127	65
							SB	4	1368	53	139	65
SB-64	#20 W. Frontage Road	Residential	6/5/2007	10:54 AM	10	74.2	NB	4	1159	87	205	65
							SB	4	1286	70	210	65
SB-65	#4 Frontage Road	Residential	6/5/2007	10:55 AM	10	74.7	NB	4	1159	87	205	65
							SB	4	1286	70	210	65
SB-66	#221 W. Frontage Road	Residential	6/5/2007	10:45 AM	10	78.7	NB	4	1182	63	169	65
							SB	4	1318	60	223	65
SB-67	4644 Leonis Street	Residential	6/11/2007	10:49 AM	10	65.8	NB	5	1153	97	166	65
							SB	5	1376	41	160	65
SB-68	4627 Leonis Street	Residential	6/11/2007	10:52 AM	10	60.1	NB	5	1153	97	166	65
							SB	5	1376	41	160	65
SB-69	1501 S. Sydney Street	Residential	6/11/2007	11:32 AM	10	64.6	NB	5	1341	82	171	65
							SB	5	1339	46	151	65
SB-70	1334 Eastern Avenue	Residential	6/12/2007	10:45 AM	10	64.9	NB	3	562	45	99	65
							SB	3	683	36	103	65
SB-72	4341 5th Street	Residential	6/13/2007	1:20 PM	10	64.1	NB	4	458	26	51	65
							SB	3	462	19	39	65

Table 6-1-10 Summary of Short-Term Noise Measurements Along SR-91 and Along I-405 east and west of I-710 in Long Beach

Site	Address	Land Use	Date	Start Time	Duration (minutes)	Measured Leq-dBA	Freeway Direction	Number of MF Lanes	Autos	Medium Trucks	Heavy Trucks	Observed Speed (mph)
EB-1	205 E. Neece Street	Residential	6/9/2010	10:46 AM	10	62.0	EB	6	901	60	109	65
							WB	6	828	59	89	65
EB-4	1230 E. 67th Street		6/8/2010	10:52 AM	10	63.7	EB	6	974	48	111	65
							WB	6	1006	61	89	65
EB-5	6679 Gaviota Avenue		6/8/2010	10:54 AM	10	66.6	EB	6	974	48	111	65
							WB	6	1006	61	89	65
WB-1	233 Artesia Boulevard		6/9/2010	11:07 AM	10	68.4	EB	6	901	60	109	65
							WB	6	828	59	89	65
WB-2	250 E. Artesia Boulevard		6/9/2010	10:19 AM	10	64.2	EB	6	903	57	108	65
							WB	6	928	65	92	65
WB-3	315 Artesia Lane		6/9/2010	10:15 AM	10	63.8	EB	6	903	57	108	65
							WB	6	928	65	92	65
WB-5	6757 Lime Avenue		6/8/2010	11:15 AM	10	62.9	EB	6	1120	49	118	65
							WB	6	959	50	97	65
WB-6	6755 Lewis Avenue		6/8/2010	11:17 AM	10	65.9	EB	6	1120	49	118	65
							WB	6	959	50	97	65
WB-7	1233 E. Eleanor Street		6/8/2010	11:36 AM	10	67.5	EB	6	1122	56	132	65
							WB	6	861	46	127	65
WB-8	6734 Gaviota Avenue		6/8/2010	11:35 AM	10	63.1	EB	6	1122	56	132	65
							WB	6	861	46	127	65
R1	Long Beach Golf Course	Golf Course	6/1/2011	10:04 AM	10	63.5	These sites are along northbound and southbound I-405, to the east and west of I-710. No traffic volumes were counted for these sites.					
R3	3840 Golden Avenue	Residential	6/1/2011	10:20 AM	10	62.4						
R4	22117 Carlerick Avenue		6/1/2011	10:52 AM	10	61.4						
R5	2850 221st Place		6/1/2011	11:12 AM	10	62.7						

Table 6-2. Summary of Background Noise Measurements							
Site	**Address**	**Freeway Direction**	**Land Uses**	**Start Time**	**Date**	**Duration (minutes)**	**Measured Leq dBA**
B1	527 9th Street	NB	Residential	11:54 AM	12/15/2009	10	53.0
B2	3319 Golden Avenue	NB	Residential	11:25 AM	12/15/2009	10	51.2
B3	160 Norton Street	NB	Residential	10:52 AM	12/15/2009	10	49.8
B4	11367 Pennsylvania Avenue	NB	Residential	10:15 AM	12/15/2009	10	50.2
B5	2032 Canal Street	SB	Residential	1:03 PM	12/15/2009	10	54.7
B6	3310 Casplan Avenue	SB	Residential	1:37 PM	12/15/2009	10	52.6
B7	211 Adams Avenue	SB	Residential	10:46 AM	12/22/2009	10	53.8
B8	11249 Pope Avenue	SB	Residential	2:31 PM	12/15/2009	10	56.9
B9	234 67th Street	WB	Residential	10:55 AM	6/16/2010	10	55.0
B10	6494 Gundry Avenue	EB	Residential	11:18 AM	6/16/2010	10	55.3
B11	5215 Katella Road	SB	Residential	10:41 AM	11/5/2007	10	52.1
B12	10001 W. Frontage Road	SB	Residential	11:11 AM	11/5/2007	10	54.6
B13	5732 Fostoria Street	NB	Residential	1:00 PM	11/5/2007	10	56.9
B14	4566 Leonis Street	SB	Residential	9:03 AM	11/6/2007	10	61.0
B15	4917 Jillson Street	NB	Residential	9:25 AM	11/6/2007	10	53.0
B16	1500 S. McDonnell Avenue	NB	Residential	10:09 AM	11/6/2007	10	57.0
B17	845 N. Humphreys Avenue	SB	Residential	1:35 PM	11/6/2007	10	56.8

Table 6-3-1 Summary of Long-Term Measurements Between Ocean Boulevard and I-405 in Long Beach, CA 90806 & 90810

Site	Address	Land Uses	Start Time	Start Date	Duration (Hours)	Noisiest Hour	
						Noise Level (dBA)	Time
NB-A	101 Golden Shore Street	Park	7:15 PM	1/12/2011	24	63.0	7:00 AM - 8:00 AM
NB-4	976 Loma Vista Drive	Residential	11:21 AM	1/4/2010	24	62.3	6:30 AM - 7:30 AM
SB-3	1980 Gale Avenue		2:00 PM	10/21/2009	24	66.6	8:51 AM - 9:51 AM
SB-11	2820 Gale Avenue		9:55 AM	10/26/2009	24	62.0	2:23 PM - 3:23 PM
SB-16	3618 Gale Avenue		1:59 PM	10/26/2009	24	64.7	9:31 AM - 10:31 AM

Figure 6-1 Long-Term Noise Monitoring Graph at Site #SB-3

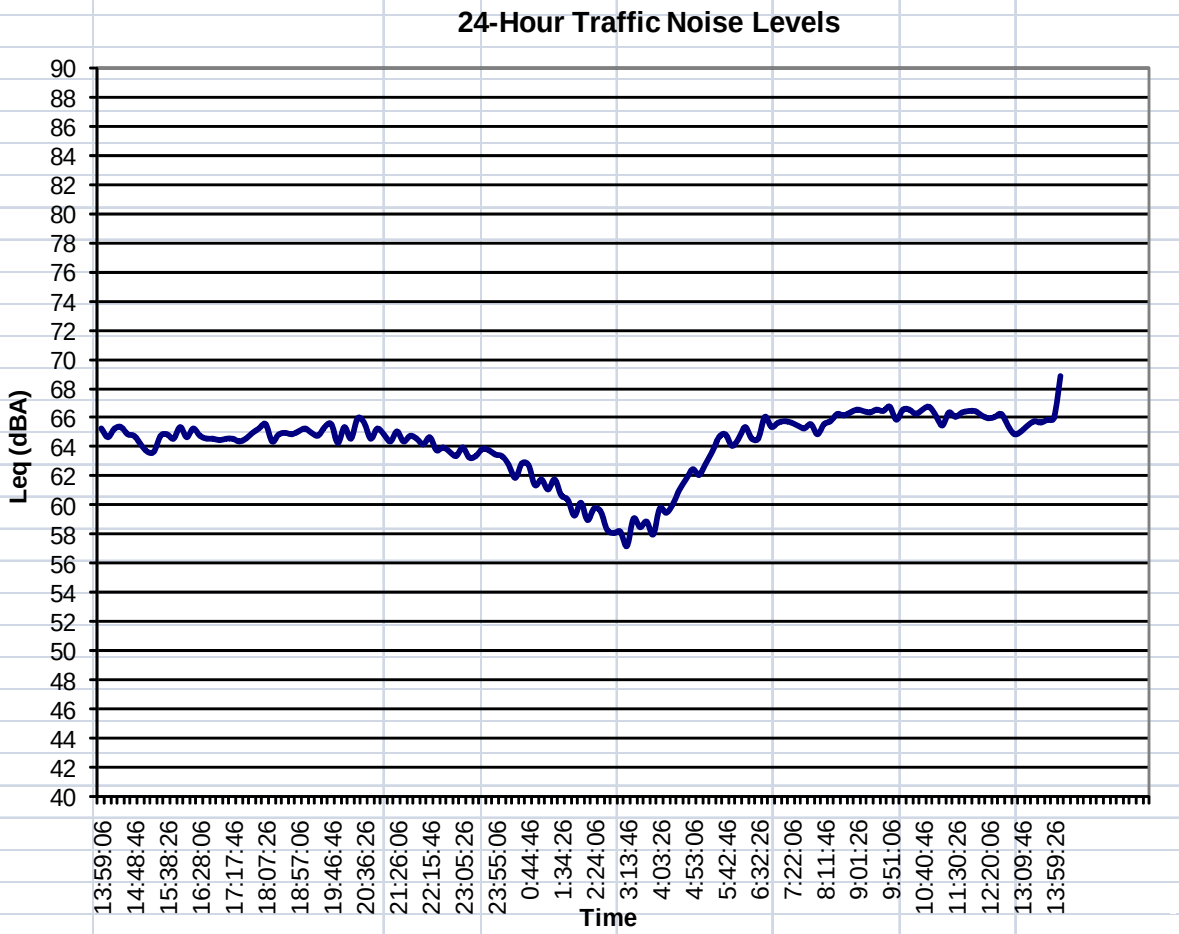


Table 6-3-2 Summary of Long-Term Measurements Between I-405 & SR-91 in Long Beach, CA 90805

Site	Address	Land Uses	Start Time	Start Date	Duration (Hours)	Noisiest Hour	
						Noise Level (dBA)	Time
NB-14	4921 Holly Avenue	Residential	2:05 PM	10/27/2009	24	61.1	8:25 AM - 9:25 AM
NB-18	165 Market Street		8:36 AM	11/2/2009	24	58.1	2:46 PM - 3:46 PM
SB-21	325 Scott Street		9:55 AM	11/3/2009	24	63.7	5:24 PM - 6:24 PM
EB-2	277 E. 65th Street		1:51 PM	6/9/2010	24	62.8	8:51 AM - 9:51 AM
EB-3	6691 Myrtle Avenue		10:20 AM	6/9/2010	24	60.9	6:58 AM - 7:58 AM
R2	3730 Magnolia Avenue		11:20 AM	5/31/2011	24	65.2	5:24 AM - 6:24 AM
R6	2005 Wardlow Road		11:40 AM	5/31/2011	24	64.0	2:20 PM - 3:20 PM

Figure 6-2 Long-Term Noise Monitoring Graph at Site # R2 (Along I-405)

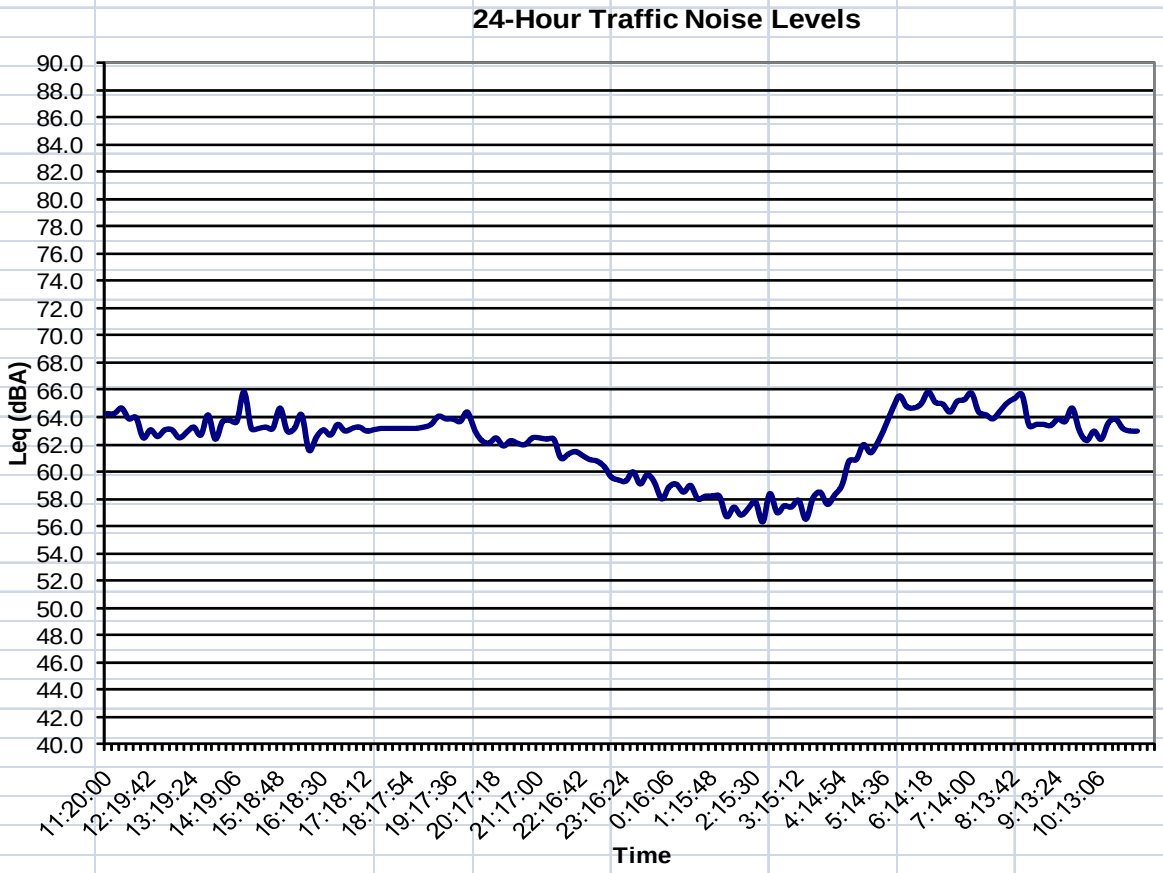


Table 6-3-3 Summary of Long-Term Measurements Between SR-91 and SR-90 (Imperial Highway) in Long Beach, Lynwood, Compton, Paramount, and Southgate

Site	Address	Land Uses	Start Time	Start Date	Duration (Hours)	Noisiest Hour	
						Noise Level (dBA)	Time
SB-27	1612 Atlantic Drive	Residential	9:33 AM	11/4/2009	24	62.3	6:39 AM - 7:39 AM
NB-34A	11523 Idaho Avenue		11:41 AM	11/16/2009	24	62.4	5:35 AM - 6:35 AM
SB-35	4930 E. San Marcus Street		9:16 AM	11/9/2009	24	63.1	5:42 AM - 6:42 AM
SB-36	4947 E. San Vicente Street		3:20 PM	11/9/2009	24	66.4	5:40 AM - 6:40 AM
SB-40	12310 Edgebrook Avenue		10:08 AM	1/11/2010	24	65.2	5:08 AM - 6:08 AM
SB-57	10969 Wright Road		11:43 AM	11/17/2009	24	72.6	6:55 AM - 7:55 AM

Figure 6-3 Long-Term Noise Monitoring Graph at Site #SB-35

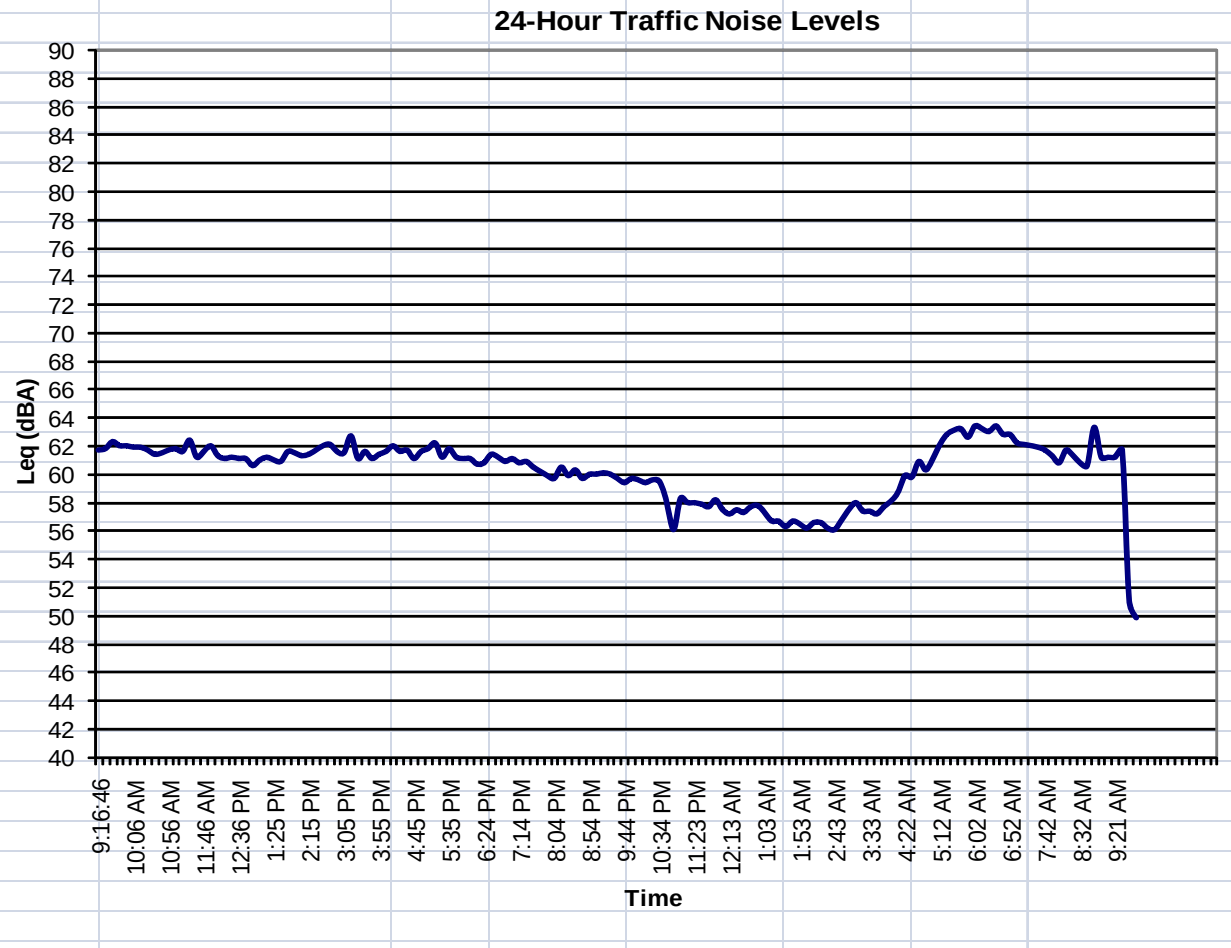
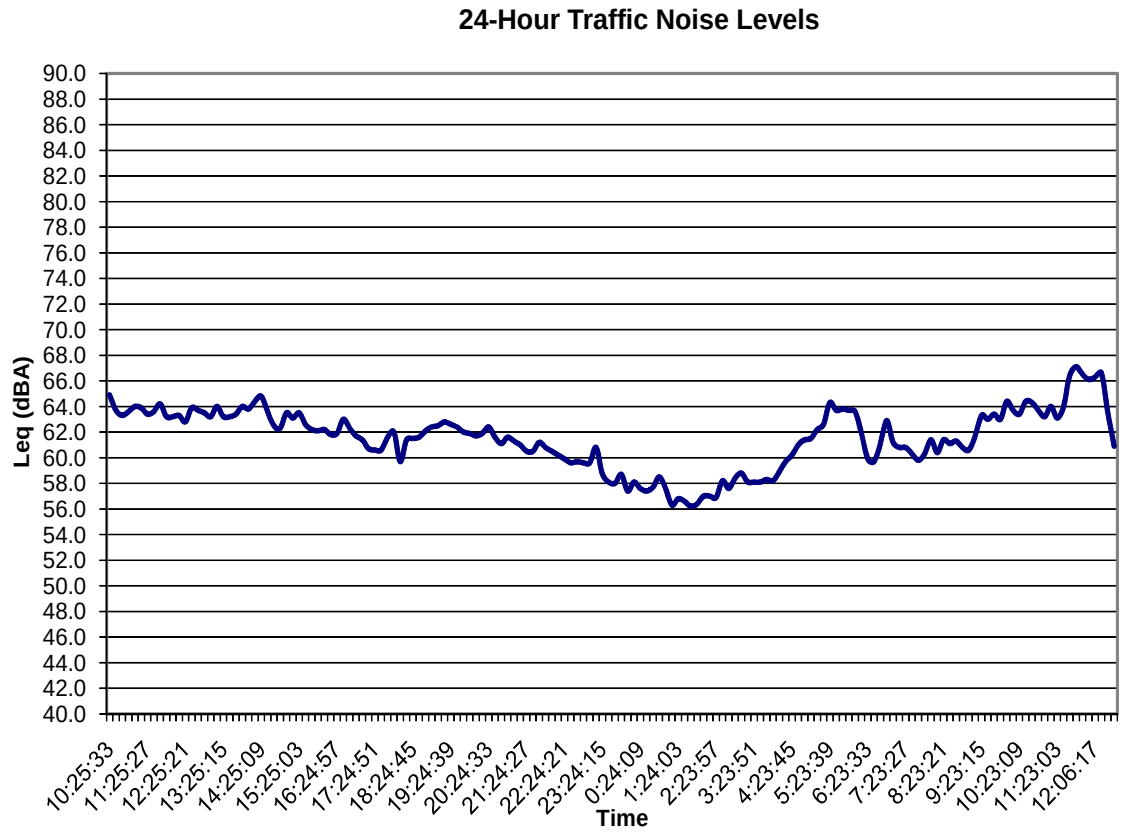


Table 6-3-4 Summary of Long-Term Measurements Between SR-90 (Imperial Highway) and SR-60 in Southgate, Bell Gardens, Bell, City of Commerce, and East Los Angeles

Site	Address	Land Uses	Start Time	Start Date	Duration (Hours)	Noisiest Hour	
						Noise Level (dBA)	Time
NB-36	8201 Specht Avenue	Residential	1:29 PM	6/5/2007	24	75.2	5:16 AM - 6:16 AM
NB-41	5510 Lanto Street		12:26 PM	6/6/2007	24	66.9	1:55 PM - 2:55 PM
NB-44	4701 Leonis Street		10:25 AM	6/11/2007	24	64.0	1:35 PM - 2:35 PM
SB-62	10442 Blumont Road		10:00 AM	6/5/2007	24	68.0	10:00 AM - 11:00 AM
SB-71	716 Sydney Drive		1:30 PM	6/12/2007	24	66.7	10:28 AM - 11:28 AM
SB-73	356 S. Humphreys Avenue		2:05 PM	6/13/2007	24	62.8	8:15 AM - 9:15 AM

Figure 6-4 Long-Term Noise Monitoring Graph at Site #NB-44



Chapter 7. Future Noise Environment, Impacts, and Considered Abatement

7.1. Future Noise Environment and Impacts

Future noise levels were predicted using traffic characteristics that would yield the worst hourly traffic noise impact on a regular basis. As described in Section 5.3 of this report, design year (2035) traffic volumes were used as the future traffic for area between Ocean Boulevard and SR-60.

Tables 7-1-1 through 7-1-8 summarize the traffic noise modeling results for existing conditions and design-year conditions with and without the project. Predicted design-year traffic noise levels with the project are compared to existing conditions and to design-year no-project conditions. The comparison to existing conditions is included in the analysis to identify traffic noise impacts under 23CFR772. The comparison to future no build condition indicates the traffic noise increase resulting from the project.

As stated in the TeNS, modeling results are rounded to the nearest decibel before comparisons are made. In some cases, this can result in relative changes that may not appear intuitive. An example would be a comparison between sound levels of 64.4 and 64.5 dBA. The difference between these two values is 0.1 dBA. However, after rounding, the difference is reported as 1 dBA. Predicted noise levels have been rounded (to the nearest whole number) only after the determination of traffic noise impacts.

Traffic noise impacts are predicted to occur at Activity Categories B, C, and D land uses within the project area, and noise abatement has been considered. The following is a discussion of noise abatement considered for each evaluation area where traffic noise impacts are predicted. For a detailed description of considered abatement (i.e. the location, length, height, and noise reduction of soundwalls) for the impacted receivers, please see Section 7.3 and Appendix B.

7.1.1. Activity Category A

There are no noise sensitive receptors under this activity category.

7.1.2. Activity Category B

Most of the noise sensitive land uses are residences along the I-710 between Ocean Boulevard and SR-60. Traffic noise impacts are considered to occur at receiver locations where predicted design-year noise levels are at least 12 dBA greater than existing noise levels (substantial noise increase), or where predicted design year noise levels approach (within 1) or exceed the NAC of 67 dBA. All impacted residential areas within the project limits have been considered for noise abatement and acoustically feasible soundwalls have been provided in this report. Please see

Table 7-1-1 through Table 7-1-8 for all the impacted sites where noise abatement has been considered. There are impacted residential areas where, due to the presence of an existing noise barrier, raising the height of the barrier did not achieve the minimum required 5 dB noise attenuation and at least 7 dB noise reduction at one or more benefited receptors. Please see the noise reduction charts in Appendix B for further details.

7.1.3. Activity Category C

This activity category includes parks and recreational areas, golf courses, a medical facility, places of worship, schools, and cemeteries.

1) Golden Shore RV Park (represented by Sites #NB-A and NB-B) is located south of Shorline Drive east of the Los Angeles River. Noise measurements were conducted at a swimming pool and modeled at a nearby RV in order to determine noise impacts. Noise impacts are predicted to occur for both Alternative 5 and 6A at this RV Park and noise abatement in the form of soundwall (SW-500 and SW-600 respectively) has been considered.

2) Cesar Chavez Park is located on the southeast corner of Shoreline Drive and 6th Street east of the Los Angeles River in the city of Long Beach and is represented by Sites #NB-1 and #NB-2. No noise impacts were identified due to the proposed project (Alternatives 5 and 6A) for this park, and therefore, no noise abatement has been considered.

3) Virginia Country Club is located between I-405 and Del Amo Boulevard along northbound I-710 in the city of Long Beach. Site #NB-13 represents an outdoor golf course area, where no noise impacts (under either build alternatives) were predicted to occur. Therefore, no noise abatement has been considered.

4) City of Compton Golf Course is located between Alondra Boulevard and Compton/Somerset Boulevard along northbound I-710 in the city of Compton. This city golf course is represented by Site #NB-27. Based on the noise analysis, noise impacts have been predicted to occur at this city golf course for Alternative 6A only. Therefore, noise abatement has been considered in the form of a soundwall (SW-613).

5) Dills Park is located between Compton Boulevard and Rosecrans Avenue along northbound I-710 in the city of Paramount and is represented by Site #NB-30. No noise impacts have been identified for this park under Alternative 5. However, there is a substantial noise increase at this park under Alternative 6A, resulting in noise impacts. A substantial noise increase occurs when the project's predicted worst-hour design-year noise level exceeds the existing worst-hour noise level by 12 dBA-Leq(h) or more. Noise abatement has been considered in the form of a soundwall (SW-615) under Alternative 6A only.

6) Hollydale Park is located between I-105 and State Highway 90 along northbound I-710 in the city of Southgate. It is represented by Site #NB-34. For both build alternatives, no freeway traffic noise impacts have been predicted to occur at this park as a result of the proposed project. Therefore, no noise abatement has been considered.

7) Julia Russ Asmus Park is located at 8321 Jaboneria Road in the city of Bell Gardens. Traffic noise impact has been predicted to occur at this park under both Alternatives 5 and 6A. The noise level at the bench (a noise sensitive area) is represented by the nearby Site NB-36. Noise abatement in the form of a soundwall (SW-510 for Alternative 5 and SW-617A/B + SW-617TL for Alternative 6A) has been considered.

8) Bandini Park (Site #NB-44M2) is located between Washington Boulevard and I-5 in the city of Commerce. Freeway traffic noise impacts have been predicted to occur under Alternatives 5 and 6A (J/M) at this park. Noise abatement has been considered for this area in the form of a soundwall [SW-512 for Alternative 5, SW-621A for Alternative 6A(J), and SW-621B for Alternative 6A(M)].

9) The Kingdom Hall (place of worship) is located along I-710 southbound off-ramp at Pacific Coast Highway; however, there is no exterior area of frequent human use that would benefit from a lowered noise level.

10) Iglesia Bautista (place of worship) is located on the southwest corner of I-710 and I-5 and has no exterior area of frequent human use that would benefit from a lowered noise level.

11) Cesar Chavez Elementary School is located between Ocean Boulevard and Shoemaker Drive along northbound I-710 in the city of Long Beach. Two noise readings represented by Sites #NB-1A (inside classroom) and NB-1B (outside area of frequent human use) were conducted to determine freeway noise impacts. Based on the analysis, no noise impacts were predicted to occur at this school for any build alternatives. Therefore, no noise abatement has been considered.

12) Edison Elementary School is also located between Ocean Boulevard and Shoemaker Drive along northbound I-710 in the city of Long Beach. Site #NB-3 (exterior) and Site #NB-3A are acoustically representative of this school. Based on the analysis, no noise impacts were predicted to occur at this school for any build alternatives. Therefore, no noise abatement has been considered.

13) Perry Lindsey Academy is located between Del Amo Boulevard and Long Beach Boulevard along northbound I-710 in the city of Long Beach. Site #NB-15 and Site #NB-15A represent the exterior/interior noise readings at this school. Since no noise impacts have been identified at this school due to the proposed project, no noise abatement has been considered.

14) Colin Powell Academy is located between Long Beach Boulevard and Artesia Boulevard/SR-91 along southbound I-710 in the city of Long Beach. This school is represented by Site #SB-19 (exterior) and Site #SB-19A (inside classroom). Based on the analysis, no noise impacts are predicted to occur at this school under either of the build alternatives. Therefore, no noise abatement has been considered.

15) Boystown of California School is located between Alondra Boulevard and Compton Boulevard along southbound I-710 in the city of Compton. Site #SB-34A (interior) and Site #SB-34B (exterior) acoustically represent this school. The exterior noise levels at this school exceed the noise abatement criteria under Alternative 6A for this school. Since noise impacts have been identified, noise abatement has been considered in the form of a soundwall. However, based on the analysis, it is determined that extending the existing 12 ft. soundwall to 20 ft. in combination with a 20 ft. soundwall on the truck lanes still does not provide the minimum required noise reduction of 5 dB for acoustical feasibility and 7 dB noise reduction to at least one receiver for reasonableness.

16) Marco Santonio Firebaugh High School is located between I-105 and Martin Luther King Jr. Boulevard along southbound I-710 in the city of Lynwood. This school is acoustically represented by Site #SB-49 (inside classroom) and Site #SB-50 (exterior). Based on the analysis, the exterior area of frequent human use at this school is impacted by freeway traffic noise under Alternative 6A only. Therefore, noise abatement has been considered in the form of a soundwall. However, based on the analysis, an 8 – 16 ft. soundwall along the freeway provides only 1-2 dB noise reduction. Additionally, the combination of a 20 ft. soundwall on the freeway and a 20 ft. soundwall on the truck lanes still provides 3 dB noise reduction, which does not meet the minimum required noise reduction of 5 dB for acoustical feasibility and 7 dB noise reduction to at least one receiver for reasonableness.

17) Vista High School is located between Martin Luther King Jr. Boulevard and State Highway 90 along southbound I-710 in the city of Lynwood. Site #SB-53 represents exterior noise monitoring at this school. Based on the analysis, noise levels did not approach or exceed the threshold of 67 dB for Activity Category C under either Alternative 5 or Alternative 6A.

18) Jefferson Clinton Elementary School is located between Alondra Boulevard and Compton Boulevard along northbound I-710 in the city of Compton. This school is acoustically represented by Site #NB-27A (inside classroom) and Site #NB-27C (exterior). The noise analysis indicates that there would be no freeway traffic noise impacts under either build alternative for both interior and exterior sites at this school. Therefore, no noise abatement has been considered.

19) Dominguez High School is also located between Alondra Boulevard and Compton Boulevard along northbound I-710 in the city of Compton. Site #27B (exterior) and Site

#27-D (inside classroom) represent noise measurements conducted at this school. Based on the analysis, traffic noise impacts have not been predicted to occur at this school for exterior or interior under either build alternative. Therefore, no noise abatement has been considered.

20) Hollydale School is located between I-105 and State Highway 90 along northbound I-710 in the city of Southgate. It is represented by Site #NB-32 (exterior) and Site #NB-33 (inside classroom). No freeway traffic noise impacts have been predicted to occur at this school as a result of the proposed project. Therefore, no noise abatement has been considered.

21) Bell Gardens Elementary School is located at 5620 Quinn Street in the city of Bell Gardens. The measured and predicted noise levels at Sites NB-36 and NB-37 represent the exterior noise levels near the freeway. The playing field near the freeway is generally not considered an area of frequent human use that would benefit from a lowered noise level. Classroom interior noise levels were not measured because they are more than 300 feet away from freeway. Acoustically feasible soundwalls SW-510 under Alternative 5 and SW-617 + SW-617TL under Alternative 6A would provide sufficient noise abatement for the Bell Gardens Elementary School.

22) Humphreys Avenue Elementary School is located at 500 South Humphreys Avenue in the city of Los Angeles. There are existing 12-foot soundwalls along the northbound I-710. The measured and predicted noise levels at Site NB-53 are representative of the school area. Noise abatement has been considered since freeway traffic noise impacts have been predicted for this area. However, based on the analysis, it is determined that extending the existing 10 – 12 ft. soundwall to 16 ft. only provides 1 – 2 dB noise reduction. Based on the principle of diminishing returns, a higher soundwall still would not provide the minimum required noise reduction of 5 dB for acoustical feasibility and 7 dB noise reduction to at least one receiver for reasonableness.

23) Los Angeles County Fire Station (which may contain housing for firefighters), represented by Site #SB-71M1, is located near the southwest corner of I-710 and Whittier Blvd. Because noise impacts have been identified (under both Alternatives 5 and 6A) here, noise abatement has been considered in the form of soundwall (SW-518 + SW-519 under Alternative 5 and SW-624 + SW-625 under Altenative 6A) along SB I-710.

24) Home of Peace Memorial Park (represented by Site #SB-70M5) is a cemetery located in the City of Los Angeles, along the southbound side of the 710 Freeway, at the southwest corner of Whittier Boulevard and South Eastern Avenue. Future predicted noise levels for Alternative 5 and Alternative 6A exceed the NAC level of 67 dBA-Leq(h). Therefore, noise abatement in the form of soundwalls (SW-517 + SW-518 under

Alternative 5 and SW-623 + SW-624 under Alternative 6A) has been considered for both design alternatives.

25) Calvary Cemetery is located in the City of Los Angeles, adjacent and north of Home of Peace Memorial Park. The nearest noise sensitive area is over 500 feet away from the freeway. Noise measurements were not conducted or modeled for this cemetery.

26) Serbian Cemetery (represented by Site #SB-74) is located in the City of Los Angeles, at the southwest quadrant of the I-710 and SR-60 interchange. This site is beyond the roadwork limits but is within the project limits. A noise measurement was taken at the adjacent chapel outdoor area. The future predicted noise levels for Alternative 5 and Alternative 6A indicate that there is a traffic noise impact at this site. Noise abatement in the form of a soundwall (SW-520 under Alternative 5 and SW-627 under Alternative 6A) has been considered for both design alternatives.

7.1.4. Activity Category D

There are several schools where interior noise measurements were conducted. The following is a school where exterior noise levels did not approach or exceed the noise abatement criteria, however its interior noise levels approached or exceeded the NAC of 52 dB and therefore resulted in noise impacts.

1) Vista High School is located between Martin Luther King Jr. Boulevard and State Highway 90 along southbound I-710 in the city of Lynwood. Site #SB-52 represents the noise monitoring at this school inside a classroom. Since noise impacts have been identified (under both Alternative 5 and Alternative 6A), noise abatement has been considered in the form of noise barrier for Vista High School. However, based on the analysis, an 8 – 16 ft. soundwall along the edge of shoulder provides only 1 – 2 dB noise reduction, and therefore does not meet the acoustical feasibility criteria of minimum of 5 dB noise reduction and reasonableness criteria of 7 dB noise reduction to at least one receiver.

7.1.5. Activity Category E

Noise sensitive land uses under this activity category includes a hotel, a motel, and a restaurant.

1) Hilton Hotel Long Beach is located on the northeast corner of Ocean Boulevard and Golden Avenue east of the Los Angeles River. There is a swimming pool situated

roughly 25-30 feet above ground elevation. No traffic noise impacts are predicted to occur at the swimming pool area.

2) Luxury Inn Motel is located just north of Long Beach Boulevard along southbound I-710. Site #SB-20 represents the exterior frequent human use area (spa) at the Luxury Inn Motel. The analysis indicated that this motel would not be impacted by freeway traffic noise.

3) A McDonald's restaurant (represented by Site #SB-70M4) in the City of Los Angeles, located at the southwest corner of Olympic Boulevard and Eastern Avenue, has an outdoor seating area. The future predicted noise level for Alternative 6A exceeds the NAC level of 72 dBA-Leq(h). Noise abatement in the form of a soundwall was considered. The noise analysis indicates that soundwalls at the edge-of-shoulder are acoustically feasible (16 ft. soundwall height would provide 5 dB noise reduction), but even a 20 ft. soundwall height would not reduce the noise level by 7 decibels, as required by the soundwall design goal under reasonableness.

7.1.6. Activity Category F

There are many industrial buildings, maintenance facilities, manufacturing, retail facilities, and warehousing located within the project limits. Also, there is a logging facility, a bus yard, and several rail yards identified along I-710 within project limits.

Table 7-1-1. Traffic Noise Measurements & Modeling Results - Route 710

Receiver	Direction	Location	Land Use	Noise Abatement Category	Field-Measured Noise Level	Modeled Noise Level	K-Factor	Existing Worst-Hour Noise Level	Future (2035) No Build Noise Level Alternative 1	Noise Increase (No Build Vs. Existing)	Future Worst-Hour Noise Level Alternative 5	Impact Type	Noise Increase (Build Vs. Existing)	Noise Increase (Build Vs. No Build)	Future Worst-Hour Noise Level Alternative 6A	Impact Type	Noise Increase (Build Vs. Existing)	Noise Increase (Build Vs. No Build)
NB-A[24]	Northbound	101 Golden Shore Street	P	C (67)	63.0	60.4	2.6	66.0	67.0	1.0	67.0	A/E	1.0	0.0	67.0	A/E	1.0	0.0
NB-B		Modeled Site	P	C (67)	-	65.0	-	65.0	66.0	1.0	67.0	A/E	2.0	1.0	67.0	A/E	2.0	1.0
NB-C		701 W. Ocean Boulevard	H	E (72)	61.6	62.5	-0.9	65.0	68.0	3.0	70.0	N	5.0	2.0	70.0	N	5.0	2.0
NB-1		401 Golden Avenue	P	C (67)	59.1	57.8	1.3	63.6	62.3	-1.3	60.9	N	-2.7	-1.4	62.6	N	-1.0	0.3
NB-1A		730 W. 3rd Street - Interior	S	D (52)	47.0	43.1	3.9	50.7	48.7	-2.0	48.7	N	-2.0	0.0	49.1	N	-1.6	0.4
NB-1B		730 W. 3rd Street - Ext.		C (67)	63.3	59.4	3.9	67.0	65.0	-2.0	65.0	N	-2.0	0.0	65.4	N	-1.6	0.4
NB-2		Cesar Chavez Park	P	C (67)	57.7	55.6	2.1	62.2	61.3	-0.9	60.5	N	-1.7	-0.8	61.5	N	-0.7	0.2
NB-3		625 Main Street - Exterior	S	C (67)	62.3	60.9	1.4	65.8	66.5	0.7	64.0	N	-1.8	-2.5	63.0	N	-2.8	-3.5
NB-3A		625 Main Street - Interior		D (52)	41.0	39.6	1.4	44.5	45.2	0.7	42.7	N	-1.8	-2.5	42.8	N	-1.7	-2.4
NB-4[24]		976 Loma Vista Dr.	R	B (67)	54.6	55.4	-0.8	59.5	59.4	-0.1	57.8	N	-1.7	-1.6	61.1	N	1.6	1.7
SB-1	Southbound	1302 Parade Street	R	B (67)	57.2	59.0	-1.8	57.2	61.3	4.1	65.2	N	8.0	3.9	68.5	A/E	11.3	7.2
MSB-1		Modeled Site			-	62.4	-	62.4	66.1	3.7	67.0	A/E	4.6	0.9	69.4	A/E	7.0	3.3
SB-2		1901 Gale Avenue			62.4	64.0	-1.6	62.4	66.0	3.6	71.7	A/E	9.3	5.7	72.6	A/E	10.2	6.6
MSB-2		Modeled Site			-	59.1	-	59.1	62.8	3.7	65.3	N	6.2	2.5	69.1	A/E	10.0	6.3
SB-3[24]		1980 Gale Avenue			66.6	66.8	-0.2	66.6	70.0	3.4	79.0	A/E	12.4	9.0	79.1	A/E	12.5	9.1
MSB-3		Modeled Site			-	62.0	-	62.0	65.7	3.7	72.6	A/E	10.6	6.9	72.8	A/E	10.8	7.1
SB-4		2100 Gale Avenue			61.4	64.3	-2.9	61.4	64.0	2.6	74.2	A/E	12.8	10.2	74.2	A/E	12.8	10.2
SB-5		1247 21st Street			58.5	60.0	-1.5	58.5	61.5	3.0	70.0	A/E	11.5	8.5	71.8	A/E	13.3	10.3
MSB-5		Modeled Site			-	62.3	-	62.3	65.3	3.0	69.4	A/E	7.1	4.1	71.8	A/E	9.5	6.5
SB-6		1228 23rd Street			63.5	65.7	-2.2	63.7	66.2	2.5	78.5	A/E	14.8	12.3	77.9	A/E	14.2	11.7
MSB-6		Modeled Site			-	63.4	-	63.6	66.5	2.9	71.2	A/E	7.6	4.7	72.4	A/E	8.8	5.9
SB-8		1265 W. 25th Street			59.3	61.1	-1.8	59.5	62.1	2.6	69.3	A/E	9.8	7.2	70.1	A/E	10.6	8.0
MSB-8		Modeled Site			-	66.3	-	66.5	69.3	2.8	77.7	A/E	11.2	8.4	77.1	A/E	10.6	7.8
MSB-8A		Modeled Site			-	62.5	-	62.7	65.6	2.9	69.1	A/E	6.4	3.5	71.2	A/E	8.5	5.6
MSB-8B		Modeled Site			-	65.1	-	65.3	68.2	2.9	75.2	A/E	9.9	7.0	75.6	A/E	10.3	7.4
MSB-8C		Modeled Site			-	63.0	-	63.2	65.9	2.7	71.6	A/E	8.4	5.7	71.9	A/E	8.7	6.0
SB-9		2556 Fashion Avenue			59.1	60.4	-1.3	59.8	62.0	2.2	68.4	A/E	8.6	6.4	69.3	A/E	9.5	7.3
NB-5	Northbound	1871 San Francisco Ave.			55.8	54.7	1.1	57.3	58.7	1.4	61.4	N	4.1	2.7	62.5	N	5.2	3.8
NB-6		2200 Deforest Avenue			48.3	50.5	-2.2	49.8	52.2	2.4	51.8	N	2.0	-0.4	55.0	N	5.2	2.8
NB-7		2530 Deforest Avenue			52.2	50.9	1.3	52.9	56.0	3.1	55.9	N	3.0	-0.1	60.3	N	7.4	4.3

Note: All noise levels are in dBA-Leq(h) [24] 24-Hour noise measurement site

Land Use: R=Residential; S=School; P=Park & Recreation; G=Golf Course; K=Cemetery; H=Hotel/Motel

Impact Type: N=No Impact; A/E=Approach/Exceed

Table 7-1-2. Traffic Noise Measurements & Modeling Results - Route 710

Receiver	Direction	Location	Land Use	Noise Abatement Category	Field-Measured Noise Level	Modeled Noise Level	K-Factor	Existing Worst-Hour Noise Level	Future (2035) No Build Noise Level Alternative 1	Noise Increase	Future Worst-Hour Noise Level Alternative 5	Impact Type	Noise Increase (Build Vs. Existing)	Noise Increase (Build Vs. No Build)	Future Worst-Hour Noise Level Alternative 6A	Impact Type	Noise Increase (Build Vs. Existing)	Noise Increase (Build Vs. No Build)
SB-10	Southbound	2701Gale Avenue	R	B (67)	60.8	63.5	-2.7	61.7	63.8	2.1	72.3	A/E	10.6	8.5	73.3	A/E	11.6	9.5
MSB-10		Modeled Site			-	59.7	-	60.6	63.1	2.5	69.0	A/E	8.4	5.9	70.0	A/E	9.4	6.9
MSB-10A		Modeled Site			-	57.1	-	58.0	60.4	2.4	66.0	A/E	8.0	5.6	68.5	A/E	10.5	8.1
SB-11[24]		2820 Gale Avenue			61.1	64.1	-3.0	62.0	64.1	2.1	74.9	A/E	12.9	10.8	74.4	A/E	12.4	10.3
MSB-11		Modeled Site			-	61.5	-	62.4	64.9	2.5	70.7	A/E	8.3	5.8	71.4	A/E	9.0	6.5
SB-12		1222 Spring Street			65.3	66.7	-1.4	66.2	68.2	2.0	78.6	A/E	12.4	10.4	77.6	A/E	11.4	9.4
SB-13		2990 Gale Avenue			60.8	63.2	-2.4	61.4	64.0	2.6	72.4	A/E	11.0	8.4	72.5	A/E	11.1	8.5
MSB-13		Modeled Site			-	61.7	-	62.3	65.0	2.7	70.1	A/E	7.8	5.1	71.1	A/E	8.8	6.1
MSB-13A		Modeled Site			-	66.5	-	67.1	68.9	1.8	76.1	A/E	9.0	7.2	74.4	A/E	7.3	5.5
MSB-13B		Modeled Site			-	62.3	-	62.9	65.0	2.1	70.2	A/E	7.3	5.2	69.8	A/E	6.9	4.8
SB-14		1223 33rd Street			66.0	67.7	-1.7	66.6	68.4	1.8	81.3	A/E	14.7	12.9	79.8	A/E	13.2	11.4
MSB-14		Modeled Site			-	63.9	-	64.5	66.6	2.1	74.1	A/E	9.6	7.5	73.4	A/E	8.9	6.8
MSB-14A		Modeled Site			-	65.0	-	65.6	68.0	2.4	71.7	A/E	6.1	3.7	71.3	A/E	5.7	3.3
SB-15		3540 Gale Avenue			67.2	68.9	-1.7	68.0	70.1	2.1	Full Right of Way Acquisition				Full Right of Way Acquisition			
MSB-15		Modeled Site			-	66.1	-	66.9	68.7	1.8	78.0	A/E	11.1	9.3	76.9	A/E	10.0	8.2
MSB-15A		Modeled Site			-	65.6	-	66.4	68.7	2.3	73.7	A/E	7.3	5.0	73.2	A/E	6.8	4.5
MSB-15B		Modeled Site			-	66.6	-	67.4	69.8	2.4	73.9	A/E	6.5	4.1	73.5	A/E	6.1	3.7
MSB-15C		Modeled Site			-	63.2	-	64.0	66.6	2.6	70.8	A/E	6.8	4.2	70.8	A/E	6.8	4.2
MSB-15D		Modeled Site			-	58.2	-	59.0	61.4	2.4	68.3	A/E	9.3	6.9	68.6	A/E	9.6	7.2
SB-16		3618 Gale Avenue			64.7	64.9	-0.2	64.7	68.1	3.4	Full Right of Way Acquisition				Full Right of Way Acquisition			
MSB-16		Modeled Site			-	64.4	-	64.4	67.8	3.4	75.8	A/E	11.4	8.0	75.4	A/E	11.0	7.6
SB-17		3635 Gale Avenue			61.6	64.0	-2.4	61.6	65.0	3.4	72.3	A/E	10.7	7.3	71.8	A/E	10.2	6.8
MSB-17		Modeled Site			-	63.7	-	63.7	67.2	3.5	67.5	A/E	3.8	0.3	67.4	A/E	3.7	0.2
MSB-17A		Modeled Site			-	68.9	-	68.9	72.7	3.8	70.8	A/E	1.9	-1.9	70.1	A/E	1.2	-2.6
MSB-17B		Modeled Site			-	64.1	-	64.1	67.9	3.8	67.6	A/E	3.5	-0.3	67.1	A/E	3.0	-0.8
NB-8	Northbound	2800 De Forest Avenue			49.0	48.4	0.6	49.3	52.3	3.0	54.1	N	4.8	1.8	56.7	N	7.4	4.4
NB-9		3095 San Francisco Ave.			45.7	48.6	-2.9	46.0	48.7	2.7	49.4	N	3.4	0.7	53.4	N	7.4	4.7
NB-10		3384 De Forest Ave.			48.7	52.7	-4.0	49.7	52.2	2.5	51.2	N	1.5	-1.0	53.6	N	3.9	1.4
MNB-10		Modeled Site			-	50.7	-	51.7	54.3	2.6	54.6	N	2.9	0.3	57.4	N	5.7	3.1

Note: All noise levels are in dBA-Leq(h) __[24] 24-Hour noise measurement site

Land Use: R=Residential; S=School; P=Park & Recreation; G=Golf Course; K=Cemetery; H=Hotel/Motel

Impact Type: N=No Impact; A/E=Approach/Exceed

Table 7-1-3. Traffic Noise Measurements & Modeling Results - Route 710

Receiver	Direction	Location	Land Use	Noise Abatement Category	Field-Measured Noise Level	Modeled Noise Level	K-Factor	Existing Worst-Hour Noise Level	Future (2035) No Build Noise Level Alternative 1	Noise Increase	Future Worst-Hour Noise Level Alternative 5	Impact Type	Noise Increase (Build Vs. Existing)	Noise Increase (Build Vs. No Build)	Future Worst-Hour Noise Level Alternative 6A	Impact Type	Noise Increase (Build Vs. Existing)	Noise Increase (Build Vs. No Build)
NB-13	Northbound	Virginia Country Club	G	C (67)	55.5	56.4	-0.9	60.5	56.7	-3.8	57.1	N	-3.4	0.4	59.0	N	-1.5	2.3
MNB-13A		Modeled Site	R	B (67)	-	52.5	-	53.0	54.9	1.9	56.0	N	3.0	1.1	58.0	N	5.0	3.1
MNB-13B		Modeled Site			-	53.6	-	54.1	55.0	0.9	55.7	N	1.6	0.7	57.0	N	2.9	2.0
NB-14[24]		4921 Holly Avenue			56.0	56.8	-0.8	61.0	57.4	-3.6	62.8	N	1.8	5.4	61.6	N	0.6	4.2
NB-15		5075 Daisy Ave. - Exterior	S	C (67)	57.4	57.0	0.4	58.5	59.0	0.5	61.7	N	3.2	2.7	64.2	N	5.7	5.2
NB-15A		5075 Daisy Ave. - Interior		D (52)	42.2	41.8	0.4	43.3	43.8	0.5	44.4	N	1.1	0.6	49.5	N	6.2	5.7
NB-17		156 W. Mountain View	R	B (67)	51.0	54.9	-3.9	54.9	54.4	-0.5	55.7	N	0.8	1.3	58.5	N	3.6	4.1
NB-18[24]		165 Market Street			55.7	57.7	-2.0	56.8	58.0	1.2	59.3	N	2.5	1.3	61.4	N	4.6	3.4
NB-19		Shady Acres Mobile Park #15			55.8	56.8	-1.0	59.7	58.7	-1.0	59.9	N	0.2	1.2	60.3	N	0.6	1.6
NB-20		5798 Chesnut Avenue			55.6	54.4	1.2	57.5	58.9	1.4	60.6	N	3.1	1.7	61.5	N	4.0	2.6
NB-21		101 E. 60th Street			58.2	56.2	2.0	60.8	61.8	1.0	62.6	N	1.8	0.8	65.3	N	4.5	3.5
NB-22		6255 De Forest Avenue			52.2	54.2	-2.0	54.2	56.3	2.1	56.8	N	2.6	0.5	60.3	N	6.1	4.0
NB-23		937 Paradise Lane			52.6	52.0	0.6	54.6	56.1	1.5	56.8	N	2.2	0.7	62.3	N	7.7	6.2
MNB-23		Modeled Site			-	55.5	-	57.5	57.8	0.3	57.5	N	0.0	-0.3	65.8	A/E	8.3	8.0
SB-19	Southbound	150 Victoria St. - Exterior	S	C (67)	55.3	56.6	-1.3	64.2	58.4	-5.8	64.2	N	0.0	5.8	64.2	N	0.0	5.8
SB-19A		150 Victoria St. - Interior		D (52)	41.5	42.8	-1.3	50.4	44.6	-5.8	50.4	N	0.0	5.8	50.4	N	0.0	5.8
SB-20		5950 Long Beach Blvd. - Exterior	H	E (72)	61.3	64.2	-2.9	62.8	65.0	2.2	70.8	A/E	8.0	5.8	71.4	A/E	8.6	6.4
SB-20C		261 E. Barclay Street	R	C (67)	61.9	65.1	-3.2	64.5	64.9	0.4	71.7	A/E	7.2	6.8	70.1	A/E	5.6	5.2
SB-21[24]		325 Scott Street			61.2	65.6	-4.4	63.4	64.4	1.0	65.0	N	1.6	0.6	65.0	N	1.6	0.6
SB-23		333 Forhan Street			59.2	64.2	-5.0	61.1	60.5	-0.6	64.6	N	3.5	4.1	66.8	A/E	5.7	6.3
MSB-23A		Modeled Site			-	62.9	-	64.8	65.5	0.7	66.1	A/E	1.3	0.6	69.9	A/E	5.1	4.4
MSB-23B		Modeled Site			-	65.8	-	67.7	68.5	0.8	69.1	A/E	1.4	0.6	71.9	A/E	4.2	3.4

Note: All noise levels are in dBA-Leq(h) __[24] 24-Hour noise measurement site

Land Use: R=Residential; S=School; P=Park & Recreation; G=Golf Course; K=Cemetery; H=Hotel/Motel

Impact Type: N=No Impact; A/E=Approach/Exceed

Table 7-1-4. Traffic Noise Measurements & Modeling Results - Route 710

Receiver	Direction	Location	Land Use	Noise Abatement Category	Field-Measured Noise Level	Modeled Noise Level	K-Factor	Existing Worst-Hour Noise Level	Future (2035) No Build Noise Level Alternative 1	Noise Increase	Future Worst-Hour Noise Level Alternative 5	Impact Type	Noise Increase (Build Vs. Existing)	Noise Increase (Build Vs. No Build)	Future Worst-Hour Noise Level Alternative 6A	Impact Type	Noise Increase (Build Vs. Existing)	Noise Increase (Build Vs. No Build)
SB-25	Southbound	6910 Coachella Avenue	R	B (67)	63.2	63.3	-0.1	64.5	65.0	0.5	69.1	A/E	4.6	4.1	69.2	A/E	4.7	4.2
SB-26		6911 Coachella Avenue			55.9	60.7	-4.8	57.2	57.5	0.3	62.5	N	5.3	5.0	64.0	N	6.8	6.5
SB-27[24]		1612 Atlantic Drive			60.6	63.3	-2.7	62.3	63.5	1.2	76.6	A/E	14.3	13.1	74.4	A/E	12.1	10.9
MSB-27		Modeled Site			-	62.9	-2.7	63.1	63.1	0.0	72.5	A/E	9.4	9.4	71.9	A/E	8.8	8.8
SB-28		1316 Atlantic Drive			56.3	59.9	-3.6	58.3	60.1	1.8	63.7	N	5.4	3.6	63.7	N	5.4	3.6
SB-29		1311 Atlantic Drive			56.7	59.3	-2.6	58.8	60.3	1.5	63.9	N	5.1	3.6	64.4	N	5.6	4.1
SB-30		16002 S. Atlantic Drive			59.3	61.0	-1.7	61.0	66.6	5.6	Full Right of Way Acquisition				Full Right of Way Acquisition			
MSB-30		Modeled Site			-	60.4	-1.7	62.1	66.1	4.0	75.6	A/E	13.5	9.5	75.1	A/E	13.0	9.0
SB-31		15539 S. Gibson Avenue			61.4	64.3	-2.9	62.5	65.4	2.9	Full Right of Way Acquisition				Full Right of Way Acquisition			
SB-32		15519 S. Gibson Avenue			60.0	64.2	-4.2	61.1	63.4	2.3	77.5	A/E	16.4	14.1	77.6	A/E	16.5	14.2
SB-33		4827 Rose Street			58.9	62.9	-4.0	60.3	65.1	4.8	65.9	A/E	5.6	0.8	68.4	A/E	8.1	3.3
SB-34A[24]		15116 S. Gibson Ave. - Int.	S	D (52)	40.9	45.8	-4.9	42.0	43.5	1.5	44.5	N	2.5	1.0	49.1	N	7.1	5.6
SB-34B		15116 S. Gibson Ave. - Ext.		C (67)	61.3	66.2	-4.9	62.4	63.9	1.5	64.9	N	2.5	1.0	69.5	A/E	7.1	5.6
SB-35[24]		4930 E. San Marcos	R	B (67)	61.5	64.2	-2.7	63.1	63.6	0.5	64.1	N	1.0	0.5	66.0	A/E	2.9	2.4
SB-36[24]		4947 E. San Vicente St.			65.8	64.8	1.0	66.4	66.2	-0.2	66.3	A/E	-0.1	0.1	68.0	A/E	1.6	1.8
SB-37		4955 E. San Juan Street			59.9	64.9	-5.0	60.3	61.2	0.9	61.7	N	1.4	0.5	63.2	N	2.9	2.0
SB-38		4951E. San Juan Street			59.9	65.5	-5.6	60.3	61.3	1.0	61.7	N	1.4	0.4	66.1	A/E	5.8	4.8
SB-39		4964 E. San Rafael Street			57.0	62.6	-5.6	57.8	58.3	0.5	58.2	N	0.4	-0.1	62.2	N	4.4	3.9
SB-40[24]		12310 Edgebrook Avenue			62.2	63.7	-1.5	67.8	65.9	-1.9	67.8	A/E	0.0	1.9	64.3	N	-3.5	-1.6
SB-41		12830 S. Manette Place			51.1	55.4	-4.3	54.1	54.4	0.3	54.9	N	0.8	0.5	57.0	N	2.9	2.6
SB-42		5450 McMillan Street			58.6	56.0	2.6	61.6	63.5	1.9	63.9	N	2.3	0.4	67.6	A/E	6.0	4.1
SB-43		12501 Edgebrook Avenue			64.1	62.1	2.0	67.5	68.7	1.2	70.5	A/E	3.0	1.8	70.7	A/E	3.2	2.0
SB-44		5520 Lavinia Avenue			56.6	59.1	-2.5	60.0	58.8	-1.2	64.1	N	4.1	5.3	62.1	N	2.1	3.3
SB-45		12323 Edgebrook Avenue			59.0	57.8	1.2	62.0	63.7	1.7	65.2	N	3.2	1.5	65.4	N	3.4	1.7
SB-46		5542 Pelleur Street			56.0	58.6	-2.6	59.0	60.9	1.9	62.2	N	3.2	1.3	62.7	N	3.7	1.8

Note: All noise levels are in dBA-Leq(h) [24] 24-Hour noise measurement site

Land Use: R=Residential; S=School; P=Park & Recreation; G=Golf Course; K=Cemetery; H=Hotel/Motel

Impact Type: N=No Impact; A/E=Approach/Exceed

Table 7-1-5. Traffic Noise Measurements & Modeling Results - Route 710

Receiver	Direction	Location	Land Use	Noise Abatement Category	Field-Measured Noise Level	Modeled Noise Level	K-Factor	Existing Worst-Hour Noise Level	Future (2035) No Build Noise Level Alternative 1	Noise Increase	Future Worst-Hour Noise Level Alternative 5	Impact Type	Noise Increase (Build Vs. Existing)	Noise Increase (Build Vs. No Build)	Future Worst-Hour Noise Level Alternative 6A	Impact Type	Noise Increase (Build Vs. Existing)	Noise Increase (Build Vs. No Build)
SB-49*	Southbound	5246 MLK Jr. Blvd. - Int.	S	D (52)	43.5	41.7	1.8	44.1	40.1	-4.0	42.1	N	-2.0	2.0	44.8	N	0.7	4.7
SB-50		5246 MLK Jr. Blvd. - Ext.		C (67)	65.9	64.1	1.8	66.5	63.0	-3.5	64.5	N	-2.0	1.5	67.2	A/E	0.7	4.2
SB-51		11323 Wright Road	R	B (67)	59.9	61.5	-1.6	62.3	57.8	-4.5	58.9	N	-3.4	1.1	62.3	N	0.0	4.5
SB-52		11300 Wright Road - Int.	S	D (52)	50.1	53.2	-3.1	51.2	51.6	0.4	54.2	A/E	3.0	2.6	55.6	A/E	4.4	4.0
SB-53		11300 Wright Road - Ext.		C (67)	59.6	62.7	-3.1	60.7	61.1	0.4	63.6	N	2.9	2.5	65.1	N	4.4	4.0
MSB-53		11638 Louise Avenue	R	B (67)	-	62.3	-3.1	63.3	63.4	0.1	65.0	N	1.7	1.6	66.4	A/E	3.1	3.0
SB-55		5327 Beechwood Avenue			56.8	60.0	-3.2	59.0	55.8	-3.2	55.6	N	-3.4	-0.2	61.0	N	2.0	5.2
SB-56		11111 Wright Road			60.2	63.4	-3.2	62.6	61.3	-1.3	60.6	N	-2.0	-0.7	62.8	N	0.2	1.5
SB-57[24]		10969 Wright Road			69.8	69.5	0.3	72.6	71.1	-1.5	61.3	N	-11.3	-9.8	69.1	A/E	-3.5	-2.0
SB-58		10914 Wright Road			64.8	67.0	-2.2	66.5	65.6	-0.9	58.1	N	-8.4	-7.5	65.6	A/E	-0.9	0.0
SB-59		10920 Duncan Avenue			65.0	65.2	-0.2	66.7	65.7	-1.0	59.6	N	-7.1	-6.1	67.0	A/E	0.3	1.3
NB-25	Northbound	6975 Atlantic Avenue	R	B (67)	61.6	60.2	1.4	63.0	64.1	1.1	64.1	N	1.1	0.0	69.7	A/E	6.7	5.6
NB-26		6312 Rancho Rio Road			56.4	58.4	-2.0	57.8	58.6	0.8	60.3	N	2.5	1.7	65.1	N	7.3	6.5
NB-27		6400 E. Compton Blvd.	G	C (67)	53.3	56.1	-2.8	54.3	60.1	5.8	63.6	N	9.3	3.5	68.2	A/E	13.9	8.1
NB-27A		6500 E. Compton Bl. - Int.	S	D (52)	43.5	42.9	0.6	45.0	45.0	0.0	38.0	N	-7.0	-7.0	46.0	N	1.0	1.0
NB-27C		6500 E. Compton Bl. - Ext.		C (67)	62.7	62.7	0.0	64.3	56.0	-8.3	57.3	N	-7.0	1.3	65.3	N	1.0	9.3
NB-27B		15301 San Jose - Exterior			57.0	56.4	0.6	59.5	55.5	-4.0	56.8	N	-2.7	1.3	64.8	N	5.3	9.3
NB-27D		15301 San Jose - Interior		D (52)	42.8	42.2	0.6	45.3	45.3	0.0	45.3	N	0.0	0.0	50.6	N	5.3	5.3
NB-28		6443 San Marcus Street	R	B (67)	49.5	54.2	-4.7	50.8	53.4	2.6	51.6	N	0.8	-1.8	63.7	SNI	12.9	10.3
NB-29		14703 San Antonio Ave.			51.6	54.7	-3.1	52.9	54.8	1.9	53.3	N	0.4	-1.5	65.5	SNI	12.6	10.7
NB-30		6500 San Juan Street	P	C (67)	48.0	53.9	-5.9	48.8	51.9	3.1	50.3	N	1.5	-1.6	63.1	SNI	14.3	11.2
NB-30A		6556 Rosecrans #S35	R	B (67)	53.1	52.2	0.9	54.0	54.8	0.8	54.0	N	0.0	-0.8	67.4	A/E	13.4	12.6
NB-31		13425 Rancho Camino			52.8	56.2	-3.4	55.1	55.4	0.3	55.5	N	0.4	0.1	59.9	N	4.8	4.5
MNB-31		7102 Cortland Avenue			-	61.6	-3.4	61.3	59.0	-2.3	56.2	N	-5.1	-2.8	61.1	N	-0.2	2.1
MNB-32		5511 Century Boulevard	S	C (67)	-	54.0	-3.4	53.2	53.1	-0.1	52.9	N	-0.3	-0.2	56.9	N	3.7	3.8
NB-34		11599 Rio Hondo Drive	P	C (67)	55.4	58.0	-2.6	57.7	57.9	0.2	57.8	N	0.1	-0.1	63.6	N	5.9	5.7
NB-35		11319 Idaho Avenue	R	B (67)	54.5	57.6	-3.1	56.8	56.8	0.0	56.6	N	-0.2	-0.2	62.5	N	5.7	5.7

Note: All noise levels are in dBA-Leq(h) __[24] 24-Hour noise measurement site

Land Use: R=Residential; S=School; P=Park & Recreation; G=Golf Course; K=Cemetery; H=Hotel/Motel

Impact Type: N=No Impact; A/E=Approach/Exceed; SNI=Substantial Noise Increase (Build Vs. Existing)

Table 7-1-6. Traffic Noise Measurements & Modeling Results - Route 710

Receiver	Direction	Location	Land Use	Noise Abatement Category	Field-Measured Noise Level	Modeled Noise Level	K-Factor	Existing Worst-Hour Noise Level	Future (2035) No Build Noise Level Alternative 1	Noise Increase	Future Worst-Hour Noise Level Alternative 5	Impact Type	Noise Increase (Build Vs. Existing)	Noise Increase (Build Vs. No Build)	Future Worst-Hour Noise Level Alternative 6A	Impact Type	Noise Increase (Build Vs. Existing)	Noise Increase (Build Vs. No Build)
NB-36[24]	Northbound	8201 Specht Avenue	R	B (67)	75.2	77.4	-2.2	75.2	78.0	2.8	82.9	A/E	7.7	4.9	82.7	A/E	7.5	4.7
NB-37		7940 Bell Garden Avenue			66.4	69.1	-2.7	68.0	69.6	1.6	79.8	A/E	11.8	10.2	79.5	A/E	11.5	9.9
NB-38		7728 Bell Garden Avenue			63.9	66.0	-2.1	65.1	66.2	1.1	66.8	A/E	1.7	0.6	75.3	A/E	10.2	9.1
NB-39		6809 Marlow Avenue			66.1	68.1	-2.0	66.5	68.5	2.0	69.3	A/E	2.8	0.8	72.0	A/E	5.5	3.5
NB-40		6516 Selfland Avenue			67.8	67.7	0.1	68.2	68.2	0.0	68.7	A/E	0.5	0.5	75.0	A/E	6.8	6.8
NB-41[24]		5510 Lanto Street			66.9	69.3	-2.4	66.9	69.4	2.5	70.3	A/E	3.4	0.9	75.0	A/E	8.1	5.6
NB-42		5517 Watcher Street			63.4	65.8	-2.4	64.3	65.8	1.5	67.5	A/E	3.2	1.7	72.0	A/E	7.7	6.2
NB-43		4721 Noble Street			71.9	69.3	2.6	72.6	62.8*	0.0	72.4	A/E	0.0	9.6	71.8 / 71.7	A/E	0.0 / 0.0	9.0 / 8.9
NB-44[24]		4701 Leonis Street			64.0	65.6	-1.6	64.0	61.9*	0.0	70.5	A/E	6.5	8.6	67.1 / 66.5	A/E	3.1 / 2.5	5.2 / 4.6
NB-44M1		4715 Leonis Street			-	69.2	-	69.2	62.3*	0.0	71.4	A/E	2.2	9.1	70.5 / 69.7	A/E	1.3 / 0.5	8.2 / 7.4
NB-44M2		4725 Astor Avenue	P	C (67)	-	70.9	-	70.9	63.0*	0.0	66.2	A/E	0.0	3.2	65.8 / 66.6	A/E	0.0 / 0.0	2.8 / 3.6
NB-45		4643 Noakes Street	R	B (67)	69.2	70.4	-1.2	69.8	63.7*	0.0	64.6*	N	0.0	0.9	70.1 / 71.7	A/E	0.3 / 1.9	6.4 / 8.0
NB-46		1448 Duncan Avenue			61.8	63.4	-1.6	62.2	63.2*	1.0	64.1*	N	1.9	0.9	72.4 / 73.4	A/E	10.2 / 11.2	9.2 / 10.2
NB-47		1354 Duncan Avenue			62.5	63.2	-0.7	62.8	65.5*	2.7	63.4*	N	0.6	0.9	66.7 / 66.7	A/E	3.9 / 3.9	1.2 / 1.2
NB-48		1278 Duncan Avenue			65.0	67.2	-2.2	65.2	67.2	2.0	68.5	A/E	3.3	1.3	71.3	A/E	6.1	4.1
NB-49		1269 Duncan Avenue			57.0	58.3	-1.3	57.4	58.4	1.0	59.5	N	2.1	1.1	61.4	N	4.0	3.0
NB-50		1118 Burger Avenue			66.5	68.6	-2.1	66.9	67.6*	0.7	73.6	A/E	6.7	6.0	66.6*	A/E	0.0	-1.0
NB-50M1		1148 Burger Avenue			-	70.6	-	70.6	66.9*	0.0	72.9	A/E	2.3	6.0	67.8*	A/E	0.0	0.9
NB-51		716 Burger Avenue			63.8	62.1	1.7	63.8	66.1*	2.6	74.5	A/E	10.7	8.4	67.5*	A/E	1.4	1.4
NB-52		604 Burger Avenue			67.9	68.4	-0.5	67.9	71.8*	4.2	74.8	A/E	6.9	3.0	72.7*	A/E	4.8	0.9
NB-53		438 Betty Avenue			60.7	64.1	-3.4	61.7	64.8	3.1	65.7	A/E	4.0	0.9	67.9	A/E	6.2	3.1
NB-54		426 Betty Avenue			63.0	64.2	-1.2	64.0	64.6	0.6	65.2	N	1.2	0.6	66.0	A/E	2.0	1.4
NB-55		4464 4th Street			60.0	62.5	-2.5	61.0	62.8	1.8	63.6	N	2.6	0.8	64.2	N	3.2	1.4
NB-56		4524 E. 2nd Street			64.0	64.5	-0.5	64.8	65.0	0.2	66.2	A/E	1.4	1.2	68.7	A/E	3.9	3.7
NB-57		4533 E. 2nd Street			62.1	63.6	-1.5	63.9	63.9	0.0	65.1	N	1.2	1.2	69.2	A/E	5.3	5.3

Note: All noise levels are in dBA-Leq(h) [24] 24-Hour noise measurement site * Noise level assuming soundwall proposed under EA 202100 will be constructed

Land Use: R=Residential; S=School; P=Park & Recreation; G=Golf Course; K=Cemetery; H=Hotel/Motel

Impact Type: N=No Impact; A/E=Approach/Exceed

Table 7-1-7. Traffic Noise Measurements & Modeling Results - Route 710

Receiver	Direction	Location	Land Use	Noise Abatement Category	Field-Measured Noise Level	Modeled Noise Level	K-Factor	Existing Worst-Hour Noise Level	Future (2035) No Build Noise Level Alternative 1	Noise Increase	Future Worst-Hour Noise Level Alternative 5	Impact Type	Noise Increase (Build Vs. Existing)	Noise Increase (Build Vs. No Build)	Future Worst-Hour Noise Level Alternative 6A	Impact Type	Noise Increase (Build Vs. Existing)	Noise Increase (Build Vs. No Build)
SB-61	Southbound	10518 Blumont Road	R	B (67)	66.4	69.2	-2.8	66.5	64.4*	0.0	66.2	A/E	0.0	1.8	69.5	A/E	3.0	5.1
SB-MS1		5230 Pendleton Ave			-	59.7	-	59.7	61.0	1.3	55.1	N	0.0	-5.9	56.0	N	0.0	-5.0
SB-62[24]		10442 Blumont Road			68.0	71.8	-3.8	68.0	72.7	4.7	67.2	A/E	0.0	-5.5	70.7	A/E	2.7	-2.0
SB-63		10334 Blumont Road			65.8	69.3	-3.5	65.8	69.9	4.1	67.0	A/E	1.2	-2.9	70.2	A/E	4.4	0.3
SB-64		#20 W. Frontage Road			74.2	75.8	-1.6	74.3	75.7	1.4	74.6	A/E	0.3	-1.1	75.6	A/E	1.3	-0.1
SB-65		#4 Frontage Road			74.7	77.0	-2.3	74.8	76.5	1.7	76.3	A/E	1.5	-0.2	77.0	A/E	2.2	0.5
SB-66		#221W. Frontage Road			78.7	80.4	-1.7	78.8	79.8	1.0	81.6	A/E	2.8	1.8	81.3	A/E	2.5	1.5
SB-67		4644 Leonis Street			65.8	67.5	-1.7	66.5	60.0*	0.0	64.9	N	0.0	4.9	Full Right Of Way Acquisition			
SB-67M2		4632 Leonis Street			-	69.8	-	69.8	62.7*	0.0	68.7	A/E	0.0	6.0	NA / 69.8	A/E	NA / 0.0	7.1
SB-67M3		2308 Connor Avenue			-	70.4	-	70.4	62.1*	0.0	70.2	A/E	0.0	8.1	NA / 71.6	A/E	NA / 1.2	9.5
SB-67M4		2326 Connor Avenue			-	70.0	-	70.0	60.9*	0.0	69.4	A/E	0.0	8.5	NA / 71.3	A/E	NA / 1.3	11.0
SB-67M5		2347 Connor Avenue			-	67.4	-	67.4	65.1*	0.0	68.7	A/E	1.3	3.6	NA / 68.9	A/E	NA / 1.5	3.8
SB-68		4627 Leonis Street			60.1	61.2	-1.1	60.8	57.5*	0.0	61.5	N	0.7	4.0	NA / 64.1	A/E	NA / 3.3	6.6
SB-69		1501S. Sydney Street			64.6	64.9	-0.3	65.2	62.9*	0.0	64.3*	N	0.0	1.4	Full Right Of Way Acquisition			
SB-69M1		4543 Dunham Street			-	63.3	-	63.3	61.6*	0.0	63.9*	N	0.6	2.3	67.6 / 68.2	A/E	4.3 / 4.9	6.0 / 6.6
SB-69M2		4497 Lovett Street			-	63.6	-	63.6	64.2*	0.6	66.2*	A/E	2.6	2.0	69.6 / 69.9	A/E	6.0 / 6.3	5.4 / 5.7
SB-69M3		4476 Triggs Street			-	63.3	-	63.3	64.2*	0.9	65.9*	A/E	2.6	1.7	68.9 / 69.0	A/E	5.6 / 5.7	4.7 / 4.8
SB-70		1334 Eastern Avenue			64.9	65.9	-1.0	64.5	66.5*	2.0	66.2*	A/E	1.7	-0.3	Full Right Of Way Acquisition			
SB-70M1		1333 S. Eastern Avenue			-	68.5	-	68.5	69.3*	0.8	70.6*	A/E	2.1	1.3	75.6 / 75.7	A/E	7.1 / 7.2	6.3 / 6.4
SB-70M2		4481Tuttle Street			-	67.4	-	67.4	68.7*	1.3	69.7*	A/E	2.3	1.0	72.2 / 72.2	A/E	4.8 / 4.8	3.5 / 3.5
SB-70M3		1226 Wilkens Avenue			-	62.7	-	62.7	63.7	1.0	63.9	N	1.2	0.2	66.8	A/E	4.1	3.1
SB-70M4		4480 E. Olympic Blvd	C	C (72)	-	65.6	-	65.6	66.3	0.7	69.9	N	4.3	3.6	72.2	A/E	6.6	5.9
SB-70M5		4334 Whittier Blvd	K	B (67)	-	69.0	-	69.0	69.0	0.0	71.1	A/E	2.1	2.1	71.5	A/E	2.5	2.5
SB-71[24]		716 Sydney Street	R		66.7	68.0	-1.3	66.7	66.4*	0.0	78.3	A/E	11.6	11.9	78.0	A/E	11.3	11.6
SB-71M1		930 S. Eastern Ave			-	63.4	-	63.4	66.6	3.2	69.2	A/E	5.8	2.6	69.8	A/E	6.4	3.2
SB-71M2		4334 Whittier Blvd	K		-	62.2	-	62.2	65.9	3.7	68.4	A/E	6.2	2.5	69.4	A/E	7.2	3.5
SB-72		43415th Street	R		64.1	63.3	0.8	63.8	65.7	1.9	67.0	A/E	3.2	1.3	68.0	A/E	4.2	2.3
SB-73[24]		356 S. Humphreys Avenue			62.8	64.8	-2.0	62.8	65.0	2.2	65.6	A/E	2.8	0.6	68.2	A/E	5.4	3.2
SB-74		211S. Humphreys Avenue	K		64.4	63.7	0.7	66.7	65.6	-1.1	68.0	A/E	1.3	2.4	67.4	A/E	0.7	1.8

Note: all noise levels are in dBA-Leq(h) __[24] 24-Hour noise measurement site * Noise level assuming soundwall proposed under EA 202100 will be constructed

Land Use: R=Residential; S=School; P=Park & Recreation; G=Golf Course; K=Cemetery; H=Hotel/Motel

Impact Type: N=No Impact; A/E=Approach/Exceed

Table 7-1-8. Traffic Noise Measurements & Modeling Results Along State Route-91 And Along Interstate-405

Receiver		Location	Land Use	Noise Abatement Category	Field-Measured Noise Level	Modeled Noise Level	K-Factor	Existing Worst-Hour Noise Level	Future (2035) No Build Noise Level Alternative 1	Noise Increase	Future Worst-Hour Noise Level Alternative 5	Impact Type	Noise Increase (Build Vs. Existing)	Noise Increase (Build Vs. No Build)	Future Worst-Hour Noise Level Alternative 6A	Impact Type	Noise Increase (Build Vs. Existing)	Noise Increase (Build Vs. No Build)
All Sites Along SR-91 (West and East of I-710) in Long Beach, CA 90805																		
EB-1	Eastbound	205 E. Neece Street	R	B (67)	62.0	63.1	-1.1	63.3	63.5	0.2	63.7	N	0.4	0.2	63.7	N	0.4	0.2
MEB-1		Modeled Site			-	59.2	-1.1	59.4	59.5	0.1	59.7	N	0.3	0.2	59.7	N	0.3	0.2
MEB-1A		171 W. Bort Street	S	C (67)	-	64.3	-1.1	64.5	64.4	-0.1	64.6	N	0.1	0.2	64.6	N	0.1	0.2
EB-2[24]		277 E. 65th Street	R	B (67)	61.5	63.4	-1.9	62.8	62.7	-0.1	62.8	N	0.0	0.1	62.8	N	0.0	0.1
EB-3[24]		6691 Myrtle Avenue			61.0	63.2	-2.2	61.0	62.4	1.4	62.4	N	1.4	0.0	64.0	N	3.0	1.6
MEB-3		Modeled Site			-	64.4	-2.2	64.4	63.5	-0.9	63.6	N	-0.8	0.1	65.7	A/E	1.3	2.2
MEB-3A		Modeled Site			-	68.9	-2.2	68.9	67.5	-1.4	67.5	A/E	-1.4	0.0	68.9	A/E	0.0	1.4
EB-4		1230 E. 67th Street			63.7	63.4	0.3	63.7	65.0	1.3	64.7	N	1.0	-0.3	69.4	A/E	5.7	4.4
EB-5		6679 Gaviota Avenue			66.6	64.3	2.3	66.6	68.0	1.4	66.6	A/E	0.0	-1.4	68.2	A/E	1.6	0.2
WB-1*	Westbound	233 Artesia Boulevard			68.4	68.7	-0.3	69.6	68.4	-1.2	65.2	N	-4.4	-3.2	65.2	N	-4.4	-3.2
MWB-1*		6255 De Forest Avenue	P	C (67)	-	64.1	-0.3	65.3	65.0	-0.3	63.2	N	-2.1	-1.8	63.3	N	-2.0	-1.7
WB-2		250 E. Artesia Boulevard	R	B (67)	64.2	62.1	2.1	64.8	67.7	2.9	69.7	A/E	4.9	2.0	69.3	A/E	4.5	1.6
WB-3		315 Artesia Lane			63.8	61.4	2.4	64.1	67.3	3.2	71.7	A/E	7.6	4.4	71.8	A/E	7.7	4.5
MWB-3		Modeled Site			-	62.3	2.4	64.2	67.7	3.5	67.9	A/E	3.7	0.2	67.9	A/E	3.7	0.2
WB-5		6757 Lime Avenue			62.9	62.3	0.6	63.6	64.1	0.5	64.1	N	0.5	0.0	66.5	A/E	2.9	2.4
MWB-5		Modeled Site			-	61.8	0.6	64.8	63.5	-1.3	65.3	N	0.5	1.8	68.6	A/E	3.8	5.1
WB-6		6755 Lewis Avenue			65.9	63.4	2.5	65.8	67.2	1.4	67.2	A/E	1.4	0.0	70.0	A/E	4.2	2.8
WB-7		1233 E. Eleanor Street			67.5	64.8	2.7	67.7	68.0	0.3	68.0	A/E	0.3	0.0	72.5	A/E	4.8	4.5
WB-8		6734 Gaviota Avenue			63.1	63.2	-0.1	63.3	63.8	0.5	63.9	N	0.6	0.1	70.9	A/E	7.6	7.1
All Sites Along I-405 (West and East of I-710) in Long Beach, CA 90805																		
R1	Northbound	Long Beach Golf Course	G	C (67)	63.5	-	-	65.7	65.7	0.0	65.7	A/E	0.0	0.0	65.7	A/E	0.0	0.0
MR1-A		Modeled Site	R	B (67)	-	-	-	-	62.1	-	64.4	N	-	2.3	64.4	N	-	2.3
MR1-B		Modeled Site			-	-	-	-	64.0	-	64.2	N	-	0.2	64.2	N	-	0.2
MR1-C		Modeled Site			-	-	-	-	65.2	-	65.3	N	-	0.1	65.3	N	-	0.1
R2[24]	Southbound	3730 Magnolia Avenue			65.2	-	-	65.2	65.2	0.0	65.2	N	0.0	0.0	65.2	N	0.0	0.0
MR2		Modeled Site			-	-	-	-	60.9	-	60.9	N	-	0.0	60.9	N	-	0.0
R3		3840 Golden Avenue			62.4	-	-	64.0	64.0	0.0	65.3	N	1.3	1.3	65.3	N	1.3	1.3
R4	Northbound	22117 Carlerick Avenue			61.4	-	-	62.1	62.1	0.0	63.1	N	1.0	1.0	63.1	N	1.0	1.0
R5		2850 221st Place			62.7	-	-	63.5	63.5	0.0	64.8	N	1.3	1.3	64.8	N	1.3	1.3
MR5-A		Modeled Site			-	-	-	-	63.3	-	63.3	N	-	0.0	63.3	N	-	0.0
MR5-B		Modeled Site			-	-	-	-	65.9	-	65.9	A/E	-	0.0	65.9	A/E	-	0.0
MR5-C		Modeled Site			-	-	-	-	63.0	-	63.0	N	-	0.0	63.0	N	-	0.0
R6[24]	Southbound	2005 Wardlow Road			64.0	-	-	64.0	64.0	0.0	64.0	N	0.0	0.0	64.0	N	0.0	0.0
MR6-A		Modeled Site			-	-	-	-	62.6	-	62.6	N	-	0.0	62.6	N	-	0.0
MR6-B		Modeled Site			-	-	-	-	63.1	-	63.1	N	-	0.0	63.1	N	-	0.0

Note: All noise levels are in dBA-Leq(h) __[24] 24-Hour noise measurement site *Predicted Noise Levels Exclude Noise Contribution From Artesia Blvd.

Land Use: R=Residential; S=School; P=Park & Recreation; G=Golf Course; K=Cemetery; H=Hotel/Motel

Impact Type: N=No Impact; A/E=Approach/Exceed

7.2. Preliminary Noise Abatement Analysis

In accordance with 23CFR772, noise abatement is considered where noise impacts are predicted in areas of frequent human use that would benefit from a lowered noise level. Potential noise abatement measures identified in the Protocol include the following:

- Avoiding the impact by using design alternatives, such as altering the horizontal and vertical alignment of the project;
- Constructing noise barriers;
- Acquiring property to serve as a buffer zone;
- Using traffic management measures to regulate types of vehicles and speeds; and
- Acoustically insulating public-use or nonprofit institutional structures.

All of these abatement options have been considered. However, because of the configuration and location of the project, abatement in the form of noise barriers is the only abatement that is considered to be practical.

Each noise barrier has been evaluated for feasibility based on achievable noise reduction. For each noise barrier found to be acoustically feasible, reasonable cost allowances were calculated using the 2011 figure of $55,000 per benefited residence. For any noise barrier to be considered reasonable from a cost perspective the estimated cost of the noise barrier should be equal to or less than the total cost allowance calculated for the barrier. The cost calculations of the noise barrier should include all items appropriate and necessary for construction of the barrier, such as traffic control, drainage modification, and retaining walls.

Construction cost estimates are not provided in this Noise Study Report, but are presented in the Noise Abatement Decision Report. The NADR is a design responsibility and is prepared to compile information from the NSR, other relevant environmental studies, and design considerations into a single, comprehensive document before public review of the project. The project engineer prepares the NADR after completion of the NSR and prior to publication of the draft environmental document. Noise abatement measures that are determined feasible and reasonable and likely to be incorporated into the project must be identified before adoption of the CE, FONSI, or ROD.

The purpose and goal of a NADR is to document noise abatement measures to be implemented as part of the proposed project, based upon an "overall reasonableness" analysis approach. The overall reasonableness is determined by these factors: noise reduction design goal, the cost of abatement, and viewpoints of benefited receptors (including property owners and residents of the benefited receptors). In order for a sound barrier to be considered reasonable, the 7 dB design goal must be achieved at one or more benefited receptors.

The design of noise barriers presented in this report is preliminary and has been conducted at a level appropriate for environmental review and not for final design of the project. Preliminary information on the physical location, length, range of heights of noise barriers, and cost allowance is provided in this report. If pertinent parameters change substantially during the final project design, preliminary noise barrier designs may be modified or eliminated from the final project. A final decision on the construction of the noise abatement will be made upon completion of the project design.

For acoustically feasible noise abatement measures outside the state right of way (i.e. on the private property line), all owners of property where barriers would be placed must support the proposed abatement measure, location, and material to be used for construction. A permanent easement for the affected property needs to be secured to construct and maintain the soundwall outside the state right of way. Additionally, each property owner must enter into a contract with Caltrans the agreements as listed in the Protocol.

If any noise barrier blocks the view of commercial property in order to provide sufficient noise reduction to the nearby impacted residents, then, an agreement must be reached with the affected residents and the commercial property owner.

In accordance with state and federal policies, noise barriers are not required to reduce noise levels to below the 67 dB threshold (or other NAC). A noise barrier, however, must be acoustically feasible (provide at least 5 dB noise reduction at impacted receivers) and reasonable (7 dB noise reduction to at least one receiver). Soundwalls (8 ft. to 16 ft in height) that did not provide 5-7 dB noise reduction have been modeled for additional heights. However, there is a principle of diminishing returns, which means that for these higher walls (18 ft., 20 ft., or upto 30 ft.), additional height does not necessarily provide additional noise reduction (but constant). The following section discusses the acoustically feasible sound barriers for this project.

7.3. Description of Acoustically Feasible Sound Barriers

Alternative 5: Southbound I-710

Soundwall SW-500 would benefit the residential area associated with Golden Shore RV Park located on the southwest corner of Shoreline Drive and Golden Shore Street. SW-500 (range of 8 to 14 ft.) would provide noise reduction of up to 11 dBA to the park residents.

Soundwall SW-501 would benefit the residential area consisting of single-family homes located between Pacific Coast Highway and Willow Street along southbound I-710. SW-501 would replace the entire existing 10 – 12 ft. high soundwall in this area to accommodate the widening along I-710.

Soundwall SW-502 would benefit the residential area consisting of mainly single-family homes located between Willow Street and just north of Wardlow Road along southbound I-710. SW-502 would completely replace the existing 10 ft. high soundwall in this area to accommodate the widening along I-710. The current loop off-ramp at Wardlow Rd. would be closed.

Soundwall SW-503 would benefit the residential area consisting of mostly single-family homes located between just north of Wardlow Road and I-405 along the southbound I-405 to southbound I-710 connector.

Soundwall SW-503A would benefit the residential area consisting of mostly single-family homes located between Long Beach Boulevard and Barclay Street along the southbound I-710. SW-503A soundwall would join the existing 8 ft. high soundwall located on the right of way between Barclay Street and Adams Street.

Soundwall SW-503B would benefit the residential area consisting of mostly single-family homes located between Barclay Street and Adams Street along SB I-710. This soundwall analyzes the existing 8 ft. high soundwall from 10 feet to 16 ft.

Soundwall SW-504 would begin at the I-710 Southbound to SR-91 Eastbound connector and end at the Atlantic Ave Bridge. Soundwall SW-504 would benefit the residential area consisting mainly of single-family residences located north of SR-91 and Atlantic Ave.

Soundwall SW-505 would begin at the north of Atlantic Ave and end at Alondra Blvd. Soundwall SW-506 is located along the edge of shoulder (along southbound I-710) of Alondra Blvd to 710 southbound on ramp. Soundwall SW-505 and SW-506 would benefit a mobile home area between Atlantic Ave and Alondra Blvd.

Soundwall SW-507 would begin at the north of Alondra Blvd (along southbound I-710) and would end at the Compton Blvd. Bridge; and it would benefit the residential area consisting mainly of single-family residences located north of Alondra Blvd. and south of Compton Blvd.

Soundwall SW-509 is located at the edge of shoulder, along the southbound I-710, between Imperial Highway and Firestone Boulevard. A 12 ft. soundwall (to be built under EA 202100) between Imperial Highway and the Los Angeles River is assumed to be existing and would be removed under this project. The proposed soundwall would attenuate the traffic noise impact at the residential area west of the Los Angeles River and the Thunderbird Villa Trailer Park along the southbound I-710, benefiting 55 to 272 noise sensitive receptors.

Soundwalls SW-513 and SW-514 are located at the southbound edge of shoulder between Washington Boulevard and Noakes Street. A 12 ft. soundwall (to be built under EA 202100) along the southbound off-ramp to Washington Blvd would be removed in this project. The

proposed soundwalls wall would attenuate noise impacts at the residential area west of the freeway.

Soundwalls SW-517 and SW-518 are located at the southbound edge of shoulder between Olympic Boulevard and Whittier Boulevard. These soundwalls would attenuate the noise impact at the Home of Peace Memorial Park cemetery and one residential property on South Eastern Avenue.

Soundwall SW-519 is located at the southbound mainline and off-ramp to South Eastern Avenue edge of shoulder between Olympic Boulevard and South Humphreys Avenue. The wall would provide feasible noise reduction for the Los Angeles County Fire Department Fire Station 3, Home of Peace Memorial Park cemetery, and the residential areas at Whittier Boulevard. Davita Doctors Dialysis Center of East LA and East Los Angeles Family Dentistry are medical facilities adjacent to Fire Station 3. The two medical facilities do not have outdoor areas of frequent human use and are not considered noise sensitive receptors. A 12 ft. soundwall (to be built under 202100) would be replaced with the proposed wall in this project.

Soundwall SW-520 is located on the right of way line at the southwest quadrant of the LA-710 and LA-60 Interchange. This soundwall would attenuate noise impacts at the areas of frequent human use outside the chapel for the Serbian Cemetery.

Alternative 5: Northbound I-710

Soundwall SW-510 is located at the right of way, along northbound I-710, between Firestone Boulevard and Clara Street. This soundwall would provide sufficient noise reduction for the residential area represented by Sites NB-36 and NB-37. This soundwall would also provide sufficient noise reduction for the Bell Gardens Elementary School (located between Sites #NB-36 and NB-37). Also, It would replace a section of the existing 12 ft. soundwall that would be removed due to freeway widening near Site NB-37. The north end of SW-510 would join the existing soundwall at STA 1013+00 along the right of way line.

Soundwalls SW-511 and SW-512 are located at the northbound edge of shoulder between Washington Boulevard and Noakes Street. A soundwall (to be built under EA 202100) along the northbound on-ramp from Washington Blvd would be removed in this project. The proposed soundwalls would attenuate noise impacts at the residential area east of the freeway.

Soundwalls SW-515 and SW-516 are located at the northbound edge of shoulder between Olympic Boulevard and South Humphreys Avenue. The existing soundwalls (to be built under EA 202101) would be demolished due to the mainline widening in Alternative 5. These

soundwalls are required to attenuate traffic noise at the impacted residential areas along the freeway.

Alternative 5: Northbound I-405

Soundwall SW-405A is located along the edge of shoulder and would replace the entire existing 10 ft. high soundwall from UPRR to Alameda Street off-ramp (northbound). Although acoustically not feasible, SW-405A must be constructed to replace the existing soundwall and must be at least 10 ft. in height.

Alternative 5: Southbound I-405

Soundwall SW-405B starts from the NB I-710 to SB I-405 connector edge of shoulder to match the existing 10 ft. high soundwall just south of Pacific Place/UPRR bridge. SW-405B would replace the entire existing 10 ft. high soundwall between Pacific Place off-ramp and Pacific Place due to widening of the freeway. Although acoustically not feasible, SW-405B must be constructed to replace the existing soundwall and must be at least 10 ft. in height.

Alternative 6A: Southbound I-710

Soundwall SW-600 would benefit the residential area associated with Golden Shore RV Park located on the southwest corner of Shoreline Drive and Golden Shore Street. SW-500 (range of 8 to 14 ft.) would provide noise reduction of up to 11 dBA to the park residents.

Soundwall SW-601 would benefit the residential area consisting of single-family homes located between Pacific Coast Highway and Willow Street along southbound I-710. SW-601 would replace the entire existing 10 – 12 ft. high soundwall in this area to accommodate the widening along I-710. Because of the presence of the elevated truck lanes and noise impacts associated with them, SW-601 would benefit far fewer homes. Therefore, SW-601TL, an 8 – 10 ft. high soundwall (in conjunction with SW-601) on the southbound truck lanes has been analyzed to provide the required noise reduction to all of the impacted residential communities between PCH and Willow Street along southbound I-710.

Soundwall SW-602 would benefit some the impacted residential area consisting of mainly single-family homes located between Willow Street and just north of Wardlow Road along southbound I-710. SW-602 would completely replace the existing 10 ft. high soundwall in this area to accommodate the widening along I-710. The current loop off-ramp at Wardlow Rd.

would be closed. SW-602TL, an 8 ft. and 10 ft. high soundwall (in conjunction with SW-602) on the southbound truck lanes have been analyzed for acoustical feasibility as they provide the required noise reduction to all of the impacted residential community between PCH and Willow Street along southbound I-710.

Soundwall SW-603 would benefit the residential area consisting of mostly single-family homes located between just north of Wardlow Road and I-405 along the southbound I-405 to southbound I-710 connector.

Soundwall SW-603A would benefit the residential area consisting of mostly single-family homes located between Long Beach Boulevard and Barclay Street along the southbound I-710. SW-503A soundwall would join the existing 8 ft. high soundwall located on the right of way between Barclay Street and Adams Street.

Soundwall SW-603B would benefit the residential area consisting of mostly single-family homes located between Barclay Street and Adams Street along SB I-710. This soundwall analyzes the existing 8 ft. high soundwall from 10 ft. to 16 ft.

Soundwall SW-608 begins at the I-710 Southbound to SR-91 Eastbound connector and ends at the Atlantic Ave Bridge. Soundwall SW-608 would benefit the residential area consisting mainly of single-family residences located north of SR-91 and Atlantic Ave.

Soundwall SW-610 is located along the edge of shoulder and begins north of Atlantic Ave. and ends at Alondra Blvd.

Soundwall SW-611 is located along the edge of shoulder of Alondra Blvd to 710 southbound on ramp. Soundwall SW-610 and SW-611 would benefit the mobile home area between Atlantic Ave and Alondra Blvd.

Soundwall SW-612 begins at the north of Alondra Blvd and ends at Rose Street, and it would benefit the residential area consisting mainly of single-family residences located north of Alondra Blvd.

Soundwall SW-614 begins at the north of Rosecrans Ave. and ends at Olanda St. SW-612 would benefit the single-family residences located between Rosecrans Ave. and Olanda St.

Soundwall SW-616 is located at the southbound edge of shoulder, between Imperial Highway and Firestone Boulevard. This wall would provide the minimum required noise reduction for the Thunderbird Villa Trailer Park without constructing soundwalls on the truck lane structure. A 12 ft. soundwall (to be built under EA 202100) between Imperial Highway and the Los Angeles River is assumed to be existing and would be removed under this project. The proposed soundwall would attenuate the traffic noise impact at the residential area west of the Los Angeles

River and the Thunderbird Villa Trailer Park along the southbound I-710, benefiting 19 to 71 noise sensitive receptors.

Soundwalls SW-616 and SW-616TL are located at the southbound edge of shoulder and on the truck lane structure, between Imperial Highway and Firestone Boulevard. A 10 ft. soundwall on the truck lane structure is required to meet the feasibility design goal for the residential area west of the Los Angeles River. A 12 ft. soundwall (to be built under EA 202100) between Imperial Highway and the Los Angeles River is assumed to be existing and would be removed under this project. The proposed soundwall would attenuate the traffic noise impact at the residential area west of the Los Angeles River and the Thunderbird Villa Trailer Park along the southbound I-710, benefiting 67 to 255 noise sensitive receptors.

Soundwalls SW-620A and SW-620B are located at the southbound edge of shoulders between Washington Boulevard and Noakes Street. These soundwalls are proposed to attenuate noise impacts for the residential area in Alternative 6AM. A 12 ft. soundwall (to be built under EA 202100) along the southbound off-ramp to Washington Blvd would be removed in this project.

Soundwalls SW-622A and SW-622B are located at the southbound edge of shoulders between Noakes Street and I-5 freeway. These soundwalls are proposed as a replacement for the existing soundwall and the 12 ft. soundwall (to be built under EA 202100), which would be removed in this project. Both soundwalls, as proposed along the mainline freeway, are not acoustically feasible. Soundwalls SW-622A and SW-622B, in combination with soundwalls on the viaduct, would have to be 24 ft. high to provide 7 dBA noise reduction at Site SB70M1. The combination of soundwalls would have to 30 feet high to provide 5 dBA noise reduction at Site SB69M1. The decision to provide soundwalls in excess of SW-622A and SW-622B would need to be made in the NADR document, based on feasibility and reasonableness criteria. This soundwall analysis is applicable to both Alternative 6AJ and 6AM.

Soundwalls SW-623, SW-624, and SW-625 are located at the southbound edge of shoulder between Olympic Boulevard and Whittier Boulevard. These soundwalls would attenuate the noise impact at the Home of Peace Memorial Park cemetery, the Los Angeles County Fire Department Fire Station 3 and one residential property on South Eastern Avenue. Davita Doctors Dialysis Center of East LA and East Los Angeles Family Dentistry are medical facilities adjacent to Fire Station 3. The two medical facilities do not have outdoor areas of frequent human use and are not considered noise sensitive receptors. SW-625 is an extension of a 12 ft. soundwall to be built under EA 202100. SW-626 would replace a section of the 12 ft. soundwall (to be built under EA 202100) due to freeway widening in this project.

Soundwall SW-626 is located at the southbound edge of shoulder between Whittier Boulevard and South Humphreys Avenue. Mainline freeway widening would remove a section of the existing 12 ft. soundwall near Site SB-71 (built under EA 202101). Soundwall SW-626 is required to replace the removed section and attenuate the traffic noise impact at the residential area.

Soundwall SW-627 is located on the right of way line at the southwest quadrant of the I-710 and SR-60 Interchange. The soundwall would attenuate noise impacts at the areas of frequent human use outside the chapel for the Serbian Cemetery. An 18 ft. soundwall is the minimum height wall that would meet the design goal of providing at least 7 dBA noise reduction at one or more benefited receptors.

Alternative 6A: Northbound I-710

Soundwall SW-604 would benefit the residential area consisting of single-family homes located between Ginger Drive and Artesia Boulevard along the edge of dike on the east side of Los Angeles River.

Soundwall SW-609A and SW-609B are acoustically feasible on the dike along the east side of the Los Angeles River, between SR 91 freeway and Alondra Blvd. SW-609A and SW-609B would benefit the residential area consisting mainly of single-family residences located south and north of Atlantic Ave. Based on the analysis, 12-16 ft. high soundwall on top of the truck lanes (NB) would provide 4 dB noise reduction (and a 20 ft. soundwall would provide 5 dB noise reduction) for the impacted receivers east of the Los Angeles River.

Soundwall SW-613 is located on the dike along the east side of the Los Angeles River, between Alondra Blvd and Somerset Blvd. SW-613 would benefit the golf course south of Summerset Blvd. Based on the analysis, 14-20 ft. high soundwall on top of the truck lanes (NB) would provide 4 dB noise reduction for the impacted receivers east of the Los Angeles River.

Soundwall SW-615 is situated on the dike along the east side of the Los Angeles River, between Somerset Blvd. and Rosecrans Ave. SW-615 would benefit the residential area consisting mainly of single-family residences located north of Somerset Blvd and south of Rosecrans Ave. Based on the analysis, 10-20 ft. high soundwall on top of the truck lanes (NB) would provide 2-5 dB noise reduction for the impacted receivers east of the Los Angeles River.

Soundwall SW-617A is located at the northbound right of way, between Firestone Boulevard and Clara Street. This soundwall is feasible without constructing soundwalls on the truck lane structure. The soundwall would attenuate noise impact at the areas represented by Site NB-36

and NB-37. It would replace a section of the existing 12 ft. soundwall that would be removed due to freeway widening near Site NB-37. The north end of this soundwall would join existing soundwall at the right-of-way line.

Soundwalls SW-617B, SW-617TLN, and SW-617TLS are located at the right of way and on the truck lane structures between Firestone Boulevard and Clara Street. A 10 ft. soundwall on both the northbound and southbound truck lane structures is required to meet the feasibility design goal for the residential area represented by Site NB-37.

Soundwalls SW-618, SW-619, SW-618TLN, and SW-618TLS are located at the right of way and on the truck lane structures between Florence Avenue and Slauson Avenue. The section of existing 14 ft. wall at the right of way line, along northbound mainline, would need to be raised or replaced with a higher soundwall. A 10 ft. soundwall on both the northbound and southbound truck lane structures is required to meet the feasibility design goal for the residential areas north and south of Gage Avenue.

Soundwalls SW-620 and SW-621A are located at the northbound edge of shoulder between Washington Boulevard and Noakes Street. These soundwalls are designed to attenuate noise impacts at the residential area in Alternative 6AJ. A soundwall (to be built under EA 202100) along the northbound on-ramp from Washington Blvd would be removed in this project. The soundwall (to be built under EA 202100) along the southbound off-ramp to Washington Blvd would also be removed in Alternative 6AJ.

Soundwalls SW-620 and SW-621B are located at the northbound edge of shoulder between Washington Boulevard and Noakes Street. These feasible soundwalls are provided to attenuate noise impacts for the residential area and Bandini Park area in Alternative 6AM. A soundwall (to be built under EA 202100) along the northbound on-ramp from Washington Blvd would be removed in this project.

Soundwall SW-622 is located at the northbound edge of shoulder between Noakes Street and I-5 interchange. The 12 ft. soundwall (to be built under EA 202101) would be demolished and soundwall SW-622 would be required to attenuate traffic noise impacts at the residential areas. This soundwall is required for both Alternative 6AJ and Alternative 6AM. A 12 ft. soundwall (to be built under EA 202100) and the existing 12 ft. soundwall along the I-5 to southbound I-710 connector would be removed in this project.

Alternative 6A: Eastbound SR-91

Soundwall SW-606 would benefit the residential area consisting of single-family homes located between Atlantic Boulevard and just east of Orange Avenue along eastbound SR-91. SW-606 is located on the retaining wall and would replace a portion of the existing 10 ft. high soundwall in this area to accommodate the widening along SR-91.

Alternative 6A: Westbound SR-91

Soundwall SW-607 would benefit the residential area consisting of single-family homes located between just east of Atlantic Boulevard and Rose Avenue along westbound SR-91. SW-607 is located on the retaining wall and would replace a major portion of the existing 10 ft. high soundwall in this area to accommodate the widening along SR-91.

Alternative 6A: Northbound I-405

Soundwall SW-405A is located along the edge of shoulder and would replace the entire existing 10 ft. high soundwall from UPRR to Alameda Street off-ramp (northbound). Although acoustically not feasible, SW-405A must be constructed to replace the existing soundwall and must be at least 10 ft. in height.

Alternative 6A: Southbound I-405

Soundwall SW-405B starts from the NB I-710 to SB I-405 connector edge of shoulder to match the existing 10 ft. high soundwall just south of Pacific Place/UPRR Bridge. SW-405B would replace the entire existing 10 ft. high soundwall between Pacific Place off-ramp and Pacific Place due to widening of the freeway. Although acoustically not feasible, SW-405B must be constructed to replace the existing soundwall and must be at least 10 ft. in height.

Table 7-3-1 Summary of Reasonableness Determination Data For Soundwalls On I-710: Alternative 5

Soundwall No.	Design Year (2035) Noise Level dBA Leq(h)	Noise Increase (dBA)	Height (Feet)	Approximate Length (Feet)	Noise Attenuation (dBA)	Number of Benefited Receivers	Reasonable Allowance Per Benefited Receiver	Total Reasonable Allowance Per Barrier
SW-500	68	2	8	623	8	16	$55,000	$880,000
			10	623	10	24	$55,000	$1,320,000
			12	623	10	24	$55,000	$1,320,000
			14	623	11	25	$55,000	$1,375,000
SW-501	79	15	8	5370	8	45	$55,000	$2,475,000
			10	5370	10	52	$55,000	$2,860,000
			12	5370	12	97	$55,000	$5,335,000
			14	5370	13	144	$55,000	$7,920,000
			16	5370	13	185	$55,000	$10,175,000
SW-502	81	15	8	7109	10	55	$55,000	$3,025,000
			10	7109	12	138	$55,000	$7,590,000
			12	7109	13	192	$55,000	$10,560,000
			14	7109	14	206	$55,000	$11,330,000
			16	7109	15	219	$55,000	$12,045,000
SW-503	72	11	8	1458	4	0	$55,000	$0
			10	1458	6	11	$55,000	$605,000
			12	1458	7	17	$55,000	$935,000
			14	1458	8	30	$55,000	$1,650,000
			16	1458	9	30	$55,000	$1,650,000
SW-405A*	66	1	8	2842	2	0	$55,000	$0
			10	2842	3	0	$55,000	$0
			12	2842	3	0	$55,000	$0
			14	2842	3	0	$55,000	$0
			16	2842	4	0	$55,000	$0
SW-405B*	65	0	8	2222	2	0	$55,000	$0
			10	2222	3	0	$55,000	$0
			12	2222	3	0	$55,000	$0
			14	2222	3	0	$55,000	$0
			16	2222	4	0	$55,000	$0
SW-503A	71	9	8	1365	1	0	$55,000	$0
			10	1365	1	0	$55,000	$0
			12	1365	3	0	$55,000	$0
			14	1365	5	10	$55,000	$550,000
			16	1365	5	10	$55,000	$550,000
SW-503B	70	6	10	1176	4	0	$55,000	$0
			12	1176	4	0	$55,000	$0
			14	1176	5	10	$55,000	$550,000
			16	1176	6	10	$55,000	$550,000
SW-504	77	14	8	2301	8	14	$55,000	$770,000
			10	2301	9	27	$55,000	$1,485,000
			12	2301	10	37	$55,000	$2,035,000
			14	2301	11	45	$55,000	$2,475,000
			16	2301	12	45	$55,000	$2,475,000
SW-505 + SW-506	76	14	8	1113+891	6	30	$55,000	$1,650,000
			10	1113+891	7	45	$55,000	$2,475,000
			12	1113+891	8	45	$55,000	$2,475,000
			14	1113+891	9	60	$55,000	$3,300,000
			16	1113+891	9	60	$55,000	$3,300,000
SW-507	78	16	8	2702	4	0	$55,000	$0
			10	2702	5	24	$55,000	$1,320,000
			12	2702	5	24	$55,000	$1,320,000
			14	2702	8	54	$55,000	$2,970,000
			16	2702	10	64	$55,000	$3,520,000

Feasibility Requirement: Soundwall must provide at least 5 dB noise reduction at impacted receiver
Reasonableness Requirement: Soundwall must provide at least 7 dB noise reduction at one or more benefited receptors
* Although not acoustically feasible, this soundwall must be provided as a replacement due to widening of I-405.

Table 7-3-2 Summary of Reasonableness Determination Data For Soundwalls On I-710: Alternative 5

Soundwall No.	Design Year (2035) Noise Level dBA Leq(h)	Noise Increase (dBA)	Height (Feet)	Approximate Length (Feet)	Noise Attenuation (dBA)	Number of Benefited Receivers	Reasonable Allowance Per Benefited Receiver	Total Reasonable Allowance Per Barrier
SW-509	82	3	8	5194	7	55	$55,000	$3,025,000
			10	5194	10	166	$55,000	$9,130,000
			12	5194	12	245	$55,000	$13,475,000
			14	5194	13	263	$55,000	$14,465,000
			16	5194	14	272	$55,000	$14,960,000
SW-510	83	12	8	2005	7	13	$55,000	$715,000
			10	2005	10	13	$55,000	$715,000
			12	2005	11	27	$55,000	$1,485,000
			14	2005	12	39	$55,000	$2,145,000
			16	2005	14	39	$55,000	$2,145,000
SW-511 + SW-512	72	7	8	507 + 1409	8	4	$55,000	$220,000
			10	507 + 1409	9	5	$55,000	$275,000
			12	507 + 1409	9	10	$55,000	$550,000
			14	507 + 1409	10	10	$55,000	$550,000
			16	507 + 1409	11	10	$55,000	$550,000
SW-513 + SW-514	70	1	8	331 + 1396	4	0	$55,000	$0
			10	331 + 1396	5	4	$55,000	$220,000
			12	331 + 1396	6	19	$55,000	$1,045,000
			14	331 + 1396	6	19	$55,000	$1,045,000
			16	331 + 1396	8	25	$55,000	$1,375,000
SW-515 + SW-516	75	10	8	496 + 2655	6	47	$55,000	$2,585,000
			10	496 + 2655	8	47	$55,000	$2,585,000
			12	496 + 2655	8	50	$55,000	$2,750,000
			14	496 + 2655	9	57	$55,000	$3,135,000
			16	496 + 2655	10	57	$55,000	$3,135,000
SW-517 + SW-518	71	2	8	514 + 600	6	9	$55,000	$495,000
			10	514 + 600	7	9	$55,000	$495,000
			12	514 + 600	8	9	$55,000	$495,000
			14	514 + 600	9	9	$55,000	$495,000
			16	514 + 600	9	9	$55,000	$495,000
SW-519	78	12	8	1398	8	4	$55,000	$220,000
			10	1398	9	16	$55,000	$880,000
			12	1398	11	20	$55,000	$1,100,000
			14	1398	12	20	$55,000	$1,100,000
			16	1398	12	20	$55,000	$1,100,000
SW-520	68	1	8	537	3	0	$55,000	$0
			10	537	4	0	$55,000	$0
			12	537	5	2	$55,000	$110,000
			14	537	6	2	$55,000	$110,000
			16	537	7	2	$55,000	$110,000

Feasibility Requirement: Soundwall must provide at least 5 dB noise reduction at impacted receiver
Reasonableness Requirement: Soundwall must provide at least 7 dB noise reduction at one or more benefited receptors

Table 7-3-3 Summary of Reasonableness Determination Data For Soundwalls On I-710: Alternative 6A

Soundwall No.	Design Year (2035) Noise Level dBA Leq(h)	Noise Increase	Height (Feet)	Approximate Length (Feet)	Noise Attenuation (dBA)	Number of Benefited Receivers	Reasonable Allowance Per Benefited Receiver	Total Reasonable Allowance Per Barrier
SW-600	68	2	8	623	8	16	$55,000	$880,000
			10	623	10	24	$55,000	$1,320,000
			12	623	10	24	$55,000	$1,320,000
			14	623	11	25	$55,000	$1,375,000
SW-601	79	14	8	5370	6	25	$55,000	$1,375,000
			10	5370	6	25	$55,000	$1,375,000
			12	5370	7	37	$55,000	$2,035,000
			14	5370	7	37	$55,000	$2,035,000
			16	5370	7	47	$55,000	$2,585,000
SW-601 + SW-601TL	79	14	8+8	5370 + 6205	8	45	$55,000	$2,475,000
			10+8	5370 + 6205	9	45	$55,000	$2,475,000
			12+8	5370 + 6205	10	60	$55,000	$3,300,000
			14+8	5370 + 6205	11	84	$55,000	$4,620,000
			16+8	5370 + 6205	12	84	$55,000	$4,620,000
			16+10	5370 + 6205	12	195	$55,000	$10,725,000
SW-602	80	13	8	7106	10	55	$55,000	$3,025,000
			10	7106	11	110	$55,000	$6,050,000
			12	7106	13	133	$55,000	$7,315,000
			14	7106	13	154	$55,000	$8,470,000
			16	7106	14	180	$55,000	$9,900,000
SW-602 + SW-602TL	80	13	8	6998 + 3896	10	58	$55,000	$3,190,000
			10	6998 + 3896	11	108	$55,000	$5,940,000
			12	6998 + 3896	13	130	$55,000	$7,150,000
			14	6998 + 3896	13	172	$55,000	$9,460,000
			16+8	6998 + 3896	14	184	$55,000	$10,120,000
			16+10	6998 + 3896	14	211	$55,000	$11,605,000
SW-603	72	10	8	1447	0	0	$55,000	$0
			10	1447	6	11	$55,000	$605,000
			12	1447	7	17	$55,000	$935,000
			14	1447	8	30	$55,000	$1,650,000
			16	1447	9	30	$55,000	$1,650,000
SW-405A*	66	1	8	2842	2	0	$55,000	$0
			10	2842	3	0	$55,000	$0
			12	2842	3	0	$55,000	$0
			14	2842	3	0	$55,000	$0
			16	2842	4	0	$55,000	$0
SW-405B*	65	0	8	2222	2	0	$55,000	$0
			10	2222	3	0	$55,000	$0
			12	2222	3	0	$55,000	$0
			14	2222	3	0	$55,000	$0
			16	2222	4	0	$55,000	$0
SW-603A	71	9	8	1365	1	0	$55,000	$0
			10	1365	1	0	$55,000	$0
			12	1365	3	0	$55,000	$0
			14	1365	5	10	$55,000	$550,000
			16	1365	5	10	$55,000	$550,000
SW-603B	70	6	10	1176	4	0	$55,000	$0
			12	1176	4	0	$55,000	$0
			14	1176	5	10	$55,000	$550,000
			16	1176	6	10	$55,000	$550,000
SW-604	66	8	8	2087	6	20	$55,000	$1,100,000
			10	2087	6	20	$55,000	$1,100,000
			12	2087	7	20	$55,000	$1,100,000
			14	2087	7	20	$55,000	$1,100,000
			16	2087	8	20	$55,000	$1,100,000
SW-605	70	5	8	1683	-	0	$55,000	$0
			10	1683	3	0	$55,000	$0
			12	1683	4	0	$55,000	$0
			14	1683	6	4	$55,000	$220,000
			16	1683	6	6	$55,000	$330,000

Feasibility Requirement: Soundwall must provide at least 5 dB noise reduction at impacted receiver
Reasonableness Requirement: Soundwall must provide at least 7 dB noise reduction at one or more benefited receptors
* Although not acoustically feasible, this soundwall must be provided as a replacement due to widening of I-405.

Table 7-3-4 Summary of Reasonableness Determination Data For Soundwalls On I-710: Alternative 6A								
Soundwall No.	**Design Year (2035) Noise Level dBA Leq(h)**	**Noise Increase**	**Height (Feet)**	**Approximate Length (Feet)**	**Noise Attenuation (dBA)**	**Number of Benefited Receivers**	**Reasonable Allowance Per Benefited Receiver**	**Total Reasonable Allowance Per Barrier**
SW-606	69	6	8	2423	3	0	$55,000	$0
			10	2423	4	0	$55,000	$0
			12	2423	5	20	$55,000	$1,100,000
			14	2423	5	22	$55,000	$1,210,000
			16	2423	6	28	$55,000	$1,540,000
SW-607	73	9	8	3665	6	40	$55,000	$2,200,000
			10	3665	7	44	$55,000	$2,420,000
			12	3665	8	51	$55,000	$2,805,000
			14	3665	8	54	$55,000	$2,970,000
			16	3665	9	54	$55,000	$2,970,000
SW-608	74	12	8	2301	6	14	$55,000	$770,000
			10	2301	7	27	$55,000	$1,485,000
			12	2301	9	37	$55,000	$2,035,000
			14	2301	10	45	$55,000	$2,475,000
			16	2301	10	45	$55,000	$2,475,000
SW-609A + SW-609B	69	7	8	489 + 1283	5	18	$55,000	$990,000
			10	489 + 1283	5	18	$55,000	$990,000
			12	489 + 1283	6	18	$55,000	$990,000
			14	489 + 1283	7	18	$55,000	$990,000
			16	489 + 1283	7	18	$55,000	$990,000
SW-610 + SW-611	75	13	8	1113 + 891	4	0	$55,000	$0
			10	1113 + 891	4	45	$55,000	$2,475,000
			12	1113 + 891	5	45	$55,000	$2,475,000
			14	1113 + 891	6	60	$55,000	$3,300,000
			16	1113 + 891	8	60	$55,000	$3,300,000
SW-612	78	16	8	2702	5	12	$55,000	$660,000
			10	2702	6	12	$55,000	$660,000
			12	2702	7	24	$55,000	$1,320,000
			14	2702	7	24	$55,000	$1,320,000
			16	2702	8	30	$55,000	$1,650,000
SW-613	68	14	8	1331	0	0	$55,000	$0
			10	1331	1	0	$55,000	$0
			12	1331	4	0	$55,000	$0
			14	1331	6	13	$55,000	$715,000
			16	1331	7	13	$55,000	$715,000
SW-614	67	5	8	2418	2	0	$55,000	$0
			10	2418	4	0	$55,000	$0
			12	2418	4	0	$55,000	$0
			14	2418	5	18	$55,000	$990,000
			16	2418	5	18	$55,000	$990,000
SW-615	66	14	8	2979	2	0	$55,000	$0
			10	2979	4	0	$55,000	$0
			12	2979	5	22	$55,000	$1,210,000
			14	2979	6	33	$55,000	$1,815,000
			16	2979	7	60	$55,000	$3,300,000

Feasibility Requirement: Soundwall must provide at least 5 dB noise reduction at impacted receiver
Reasonableness Requirement: Soundwall must provide at least 7 dB noise reduction at one or more benefited receptors

Table 7-3-5 Summary of Reasonableness Determination Data For Soundwalls On I-710: Alternative 6A								
Soundwall No.	**Design Year (2035) Noise Level dBA Leq(h)**	**Noise Increase**	**Height (Feet)**	**Approximate Length (Feet)**	**Noise Attenuation (dBA)**	**Number of Benefited Receivers**	**Reasonable Allowance Per Benefited Receiver**	**Total Reasonable Allowance Per Barrier**
SW-616	81	3	8	5194	4	0	$55,000	$0
			10	5194	6	19	$55,000	$1,045,000
			12	5194	7	51	$55,000	$2,805,000
			14	5194	8	57	$55,000	$3,135,000
			16	5194	9	71	$55,000	$3,905,000
SW-616 + SW-616TL	81	3	8+8	5194 + 6084	7	67	$55,000	$3,685,000
			10+8	5194 + 6084	10	70	$55,000	$3,850,000
			12+8	5194 + 6084	11	96	$55,000	$5,280,000
			14+8	5194 + 6084	11	105	$55,000	$5,775,000
			16+8	5194 + 6084	12	203	$55,000	$11,165,000
			16+10	5194 + 6084	12	255	$55,000	$14,025,000
SW-617A	83	8	8	1998	4	0	$55,000	$0
			10	1998	5	9	$55,000	$495,000
			12	1998	7	9	$55,000	$495,000
			14	1998	9	9	$55,000	$495,000
			16	1998	11	9	$55,000	$495,000
SW-617B + SW-617TLN + SW-617TLS	83	12	8+8	2643 + 3668 + 2751	5	9	$55,000	$495,000
			10+8		8	26	$55,000	$1,430,000
			12+8		10	26	$55,000	$1,430,000
			14+8		11	26	$55,000	$1,430,000
			16+8		12	26	$55,000	$1,430,000
			16+10		12	34	$55,000	$1,870,000
SW-618 + SW-619 + SW-618TLN + SW-618TLS	75	8	8+8	1029 + 1237 + 4202 + 2206	3	0	$55,000	$0
			10+8		4	0	$55,000	$0
			12+8		5	5	$55,000	$275,000
			14+8		5	15	$55,000	$825,000
			16+8		6	18	$55,000	$990,000
			16+10		7	18	$55,000	$990,000
SW-620 + SW-621A	72 (ALT-6AJ)	3	8	1015 + 1409	7	8	$55,000	$440,000
			10	1015 + 1409	8	14	$55,000	$770,000
			12	1015 + 1409	9	14	$55,000	$770,000
			14	1015 + 1409	9	14	$55,000	$770,000
			16	1015 + 1409	9	14	$55,000	$770,000
SW-620 + SW-621B	72 (ALT-6AM)	3	8	1015 + 1409	7	9	$55,000	$495,000
			10	1015 + 1409	8	16	$55,000	$880,000
			12	1015 + 1409	9	16	$55,000	$880,000
			14	1015 + 1409	10	16	$55,000	$880,000
			16	1015 + 1409	11	16	$55,000	$880,000

Feasibility Requirement: Soundwall must provide at least 5 dB noise reduction at impacted receiver
Reasonableness Requirement: Soundwall must provide at least 7 dB noise reduction at one or more benefited receptors

Table 7-3-6 Summary of Reasonableness Determination Data For Soundwalls On I-710: Alternative 6A								
Soundwall No.	**Design Year (2035) Noise Level dBA Leq(h)**	**Noise Increase**	**Height (Feet)**	**Approximate Length (Feet)**	**Noise Attenuation (dBA)**	**Number of Benefited Receivers**	**Reasonable Allowance Per Benefited Receiver**	**Total Reasonable Allowance Per Barrier**
SW-620A + SW-620B	72 (ALT-6AM)	2	8	1520 + 1003	8	5	$55,000	$275,000
			10	1520 + 1003	10	10	$55,000	$550,000
			12	1520 + 1003	11	20	$55,000	$1,100,000
			14	1520 + 1003	12	20	$55,000	$1,100,000
			16	1520 + 1003	13	20	$55,000	$1,100,000
SW-622	72 (ALT-6AJ)	10	8	1368	5	17	$55,000	$935,000
			10	1368	6	17	$55,000	$935,000
			12	1368	7	17	$55,000	$935,000
			14	1368	7	17	$55,000	$935,000
			16	1368	7	17	$55,000	$935,000
SW-622	73 (ALT-6AM)	11	8	1368	5	17	$55,000	$935,000
			10	1368	6	17	$55,000	$935,000
			12	1368	7	17	$55,000	$935,000
			14	1368	7	17	$55,000	$935,000
			16	1368	8	17	$55,000	$935,000
SW-622A + SW-622B*	76 (ALT-6AJ)	7	8	1186 + 459	4	0	$55,000	$0
			10	1186 + 459	4	2	$55,000	$110,000
			12	1186 + 459	5	2	$55,000	$110,000
			14	1186 + 459	5	2	$55,000	$110,000
			16	1186 + 459	5	2	$55,000	$110,000
SW-622A + SW-622B*	76 (ALT-6AM)	7	8	1186 + 459	3	0	$55,000	$0
			10	1186 + 459	4	0	$55,000	$0
			12	1186 + 459	4	0	$55,000	$0
			14	1186 + 459	4	0	$55,000	$0
			16	1186 + 459	4	0	$55,000	$0
SW-623 + SW-624 + SW-625	72	3	8	464 + 714 + 212	5	9	$55,000	$495,000
			10		6	10	$55,000	$550,000
			12		7	10	$55,000	$550,000
			14		7	10	$55,000	$550,000
			16		8	10	$55,000	$550,000
SW-626	78	11	8	294	7	8	$55,000	$440,000
			10	294	8	8	$55,000	$440,000
			12	294	10	8	$55,000	$440,000
			14	294	11	8	$55,000	$440,000
			16	294	12	8	$55,000	$440,000
SW-627	67	1	8	537	2	0	$55,000	$0
			10	537	3	0	$55,000	$0
			12	537	4	0	$55,000	$0
			14	537	5	2	$55,000	$110,000
			16	537	5	2	$55,000	$110,000
			18	537	7	2	$55,000	$110,000
Feasibility Requirement: Soundwall must provide at least 5 dB noise reduction at impacted receiver Reasonableness Requirement: Soundwall must provide at least 7 dB noise reduction at one or more benefited receptors								
* Although not acoustically feasible, these soundwalls must be provided as replacement due to widening of I-710.								

7.4. Nighttime Noise Levels

Nighttime noise levels have been analyzed under Alternative 6A for the Southern Terminus (i.e. from Ocean Boulevard to SR-91). For the purpose of this analysis, nighttime has been considered to be from 9:00 p.m. to 6:00 a.m. Three locations were used along southbound I-710 within Southern Terminus of the project. The existing nighttime noise levels based on the 24-hour noise monitoring ranged from 55 – 65 dB. Based on TNM modeling, the future (2035) nighttime noise levels after noise abatement are projected to 55 – 68 dB, indicating an increase of 0 – 3 dB. Based on research (as provided in the Caltrans TeNS manual), 3 dB is considered to be barely perceptible change by average healthy human ears. Therefore, the nighttime noise analysis concluded that there is no substantial noise increase (or impact) during the hours of 9 p.m. to 6 a.m. Please see Table 7-4 for the results of nighttime noise analysis.

Table 7-4. I-710 Nighttime Noise Levels - Alternative 6A

Receiver ID / Location	Existing Nighttime Noise Levels (dBA)	Existing SW Height (Ft.)	Future (2035) Peak Noise Level Without Soundwalls (dBA)	Future (2035) Nighttime Noise Levels With Abatement Same As Existing (dBA)	Future (2035) Nigttime Noise Levels With Maximum Noise Abatement (dBA)	Noise Increase (Difference Between Future NL With Max. SW AND Existing Nighttime NL - dBA)
Site #SB-3 / Pacific Coast Highway To Willow St.	60 - 65	12	79	69 - 76	61 - 68*	1 - 3
Site #SB-11 / Willow St. To I-405	55 - 60	10	74	58 - 65	55 - 62**	0 - 2
Site #SB-21 / Long Beach Blvd. To SR-91	55 - 60	8 - 12	65	60 - 65	58 - 63***	3

* 18 Ft. Soundwall Along Mainline (ES) and 10 Ft. Soundwall On Top Of Truck Lane Structure.

** 16 Ft. Soundwall Along Mainline (ES) and 8 Ft. Soundwall On Top Of Truck Lane Structure.

*** 16 Ft. Soundwalls Along Mainline (Edge of Shoulder & Right of Way).

Chapter 8. Construction Noise

23 CFR 772 requires that construction noise impacts be identified, but does not specify specific methods or abatement criteria for evaluating construction noise. However, the FHWA Roadway Construction Noise Model (Federal Highway Administration 2006) can be used to determine if construction would result in adverse construction noise impacts on land uses or activities in the project area.

During the construction phases of the project, noise from construction activities may intermittently dominate the noise environment in the immediate area of construction. Construction noise is regulated by Caltrans standard specifications, Section 7-1.01I, Sound Control Requirements. These requirements state that noise levels generated during construction shall comply with applicable local, state, and federal regulations.

Figure 8-1 summarizes typical noise levels produced by construction equipment commonly used on roadway construction projects. As indicated, equipment involved in construction is expected to generate noise levels ranging from 70 to 90 dBA at a distance of 50 feet. Noise produced by construction equipment would be reduced over distance at a rate of about 6 dBA per doubling of distance. Normally, construction noise levels should not exceed 86 dBA (Lmax) at a distance of 50 feet. No adverse noise impacts from construction are anticipated because construction would be conducted in accordance with Caltrans standard specifications and would be short-term, intermittent, and dominated by local traffic noise. Implementing the following measures would minimize temporary construction noise impacts:

1. Equipment Noise Control should be applied to revising old equipment and designing new equipment to meet specified noise levels.
2. In-Use Noise Control where existing equipment is not permitted to produce noise levels in excess of specified limits.
3. Site Restrictions is an attempt to achieve noise reduction through modifying the time, place, or method of operation of a particular source.
4. Personal Training of operators and supervisors is needed to become more aware of the construction site noise problems.

1. Equipment noise control is needed to reduce the noise emissions from construction sites by mandating a specified noise levels for design of new equipment, and updating old equipment with new noise control devices and techniques presented below:
    - Mufflers are very effective devices which reduce the noise emanating from the intake or exhaust of an engine, compressor, or pump. The fitting of effective mufflers on all new equipment and retrofitting of mufflers on existing equipment is necessary to yield an immediate noise reduction at all types of road construction sites.

- Sealed and lubricated tracks for crawler mounted equipment will lessen the sound radiated from the track assembly resulting from metal to soil and metal to metal contact. Contractors, site engineers, and inspectors should ensure that the tracks are kept in excellent condition by periodic maintenance and lubrication.
- Lowering exhaust pipe exit height closer to the ground can result in an off-site noise reduction. Barriers are more effective in attenuating noise when the noise source is closer to ground level.
- General noise control technology can have substantially quieter construction equipment when manufacturers apply state-of-the-art technology to new equipment or repair old equipment to maintain original equipment noise levels.

2. In–use site noise control is necessary to prevent existing equipment from producing noise levels in excess of specified limits. Any equipment that produces noise levels less than the specified limits would not be affected. However, those exceeding the limit would be required to meet compliance by repair, retrofit, or replacement. New equipment with the latest noise sensitive components and noise control devices are generally quieter than older equipment, if properly maintained and inspected regularly. They should be repaired or replaced if necessary to maintain the in-use noise limit. All equipment applying the in-use noise limit would achieve an immediate noise reduction if properly enforced.

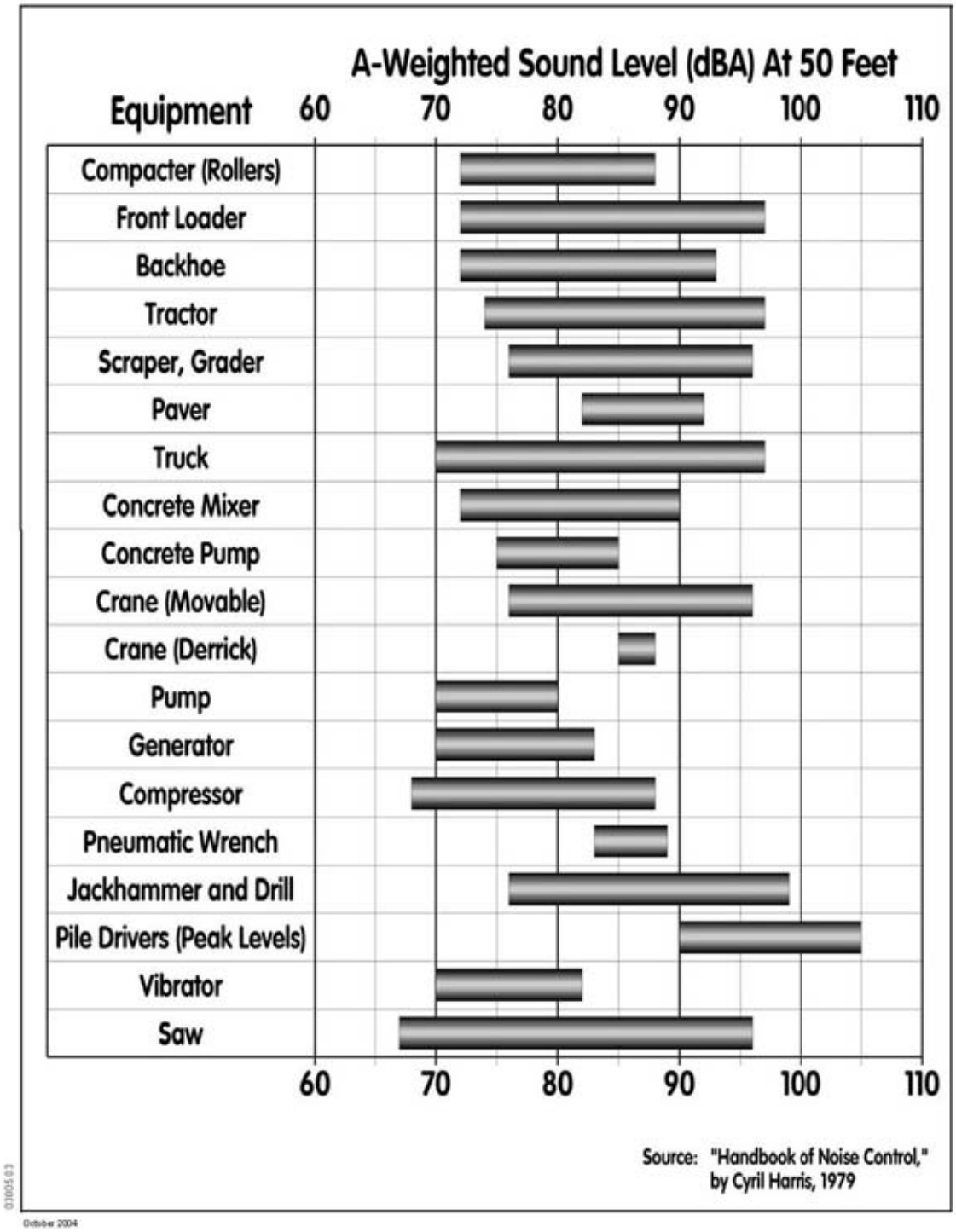
3. Site restrictions should be applied to achieve noise reduction through different methods, resulting in an immediate reduction of noise emitted to the community without requiring any modification to the source noise emissions. The methods include shielding with barriers for equipment and site, truck rerouting and traffic control, time scheduling, and equipment relocation. The effectiveness of each method depends on the type of construction involved and the site characteristics.
   - Shielding with barriers should be implemented at an early stage of a project to reduce construction equipment noise. The placement of barriers must be carefully considered to reduce limitation of site access. Barriers may be natural or man-made, such as excess land fill used as a temporary berm strategically placed to act as a barrier.
   - Efficient rerouting of trucks and control of traffic activity on construction site will reduce noise due to vehicle idling, gear shifting and accelerating under load. Planning proper traffic control will result in efficient workflow and reduce noise levels. In addition, rerouting trucks does not reduce noise levels but transfers noise to other areas that are less sensitive to noise.
   - Time scheduling of activities should be implemented to minimize noise impact on exposed areas. Local activity patterns and surrounding land uses must be considered in establishing site curfews. However, limiting working hours can decrease productivity. Sequencing the use of equipment with relatively low noise levels versus

equipment with relatively high noise levels during noise sensitive periods is an effective noise control measure.

- Equipment location should be as far from noise sensitive land use areas as possible. The contractor should substitute quieter equipment or use quieter construction processes at or near noise sensitive areas.

4. Educating contractors and their employees to be sensitive to noise impact problems and noise control methods. This may be one of the most cost-effective ways to help operators and supervisors become more aware of the construction site noise problem and to implement the various methods of improving the conditions. A training program for equipment operators is recommended to instruct them in methods of operating their equipment to minimize environmental noise. Many training programs are presently given on the subject of job safety. This can be extended to include the impact due to noise and methods of abatement.

Figure 8-1. Construction Equipment Noise Levels



Chapter 9. References

Caltrans. 2009. Technical Noise Supplement. November. Sacramento, CA: Environmental Program, Noise, Air Quality, and Hazardous Waste Management Office. Sacramento, CA. Available: (http://www.dot.ca.gov/hq/env/noise/pub/tens_complete.pdf).

———. 2011. Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects. May. Sacramento, CA.

Federal Highway Administration. 2004. FHWA Traffic Noise Model, Version 2.5 User's Guide. January. FHWA-PD-96-009. Washington D.C.

———. 2004. FHWA Traffic Noise Model, Version 2.5. February. FHWA-PD-96-010. Washington D.C.

———. 2006. Roadway Construction Noise Model. February, 15, 2006. Available: <http://www.rcnm.us/>.

Federal Transit Administration. 1995. *Transit noise and vibration impact assessment.* (DOT-T-95-16.) Office of Planning, Washington, DC. Prepared by Harris Miller Miller & Hanson, Inc. Burlington, MA.

1. California Department of Transportation. 2000. Traffic volumes on the California state highway system. Available: http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/2000all.htm

2. "Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects", California Department of Transportation, Environmental Program, Noise, Air Quality, and Hazardous Waste Management Office, May 2011.

3. "Technical Noise Supplement", California Department of Transportation, Environmental Program, Noise, Air Quality, and Hazardous Waste Management Office, November 2009.

4. Federal Transit Administration. 1995. Transit noise and vibration impact assessment. Washington, DC.

5. Federal Highway Administration. 1995. Highway traffic noise analysis and abatement policy and guidance. Washington, DC.

6. "Highway Design Manual", California Department of Transportation, Fifth Edition.

7. Statutes Relating to the California Department of Transportation, 1999.