IV. ENVIRONMENTAL IMPACT ANALYSIS
H. NOISE

1. INTRODUCTION

The following analysis describes the existing noise environment within the proposed Project area and estimates future noise levels at surrounding land uses due to potential changes brought about by Project construction and operation.

2. ENVIRONMENTAL SETTING

a. Noise and Vibration Basics

(1) Noise

Sound is something that can be heard. Noise is generally defined as unwanted sound. Although sound can be easily measured, the perceptibility of sound is subjective and the physical response to sound complicates the analysis of its impact on people. People judge the relative magnitude of sound in subjective terms such as "noisiness" or "loudness." Sound pressure is measured and quantified using a logarithmic ratio, the scale of which gives the level of sound in decibels (dB). The human hearing system is not equally sensitive to sound at all frequencies. Therefore, to approximate this human, frequency-dependent response, the A-weighted system is used to adjust measured sound levels. The A-weighted sound level is expressed as "dBA." This scale de-emphasizes low frequencies to which human hearing is less sensitive and focuses on mid- to high-range frequencies. Due to the physical characteristics of noise transmission and reception, an increase of 10 dBA is normally required to achieve a doubling of the "loudness," as perceived by the human ear. In addition, a 3-dBA increase is recognizable to most people in the context of the community noise environment. A change in noise level will usually not be detectable unless the new noise source is at least as loud as the ambient conditions. Typical A-weighted sound levels measured for various sources, as well as people's responses to these levels, are provided in Table 44 on page 416.

Objects that obstruct the line-of-sight between a noise source and a receiver reduce the noise level if the receiver is located within the "shadow" of the obstruction, such as behind a sound wall. This type of sound attenuation is known as "barrier insertion loss." If a receiver is located behind the wall but still has a view of the source (i.e., line-of-sight not fully blocked), some barrier insertion loss would still occur, however to a lesser extent. Additionally, a receiver

Table 44

Sound Levels and Human Response

Noise Source	Noise Level (dBA)	Response
Military Jet Takeoff (50 ft.) Civil Defense Siren (100 ft.)	130	Pain Threshold
Commercial Jet Takeoff (200 ft.)	120	
Unmuffled Motorcycle Auto Horn (3 ft.) Riveting Machine	110	Physical Discomfort
Diesel Pile Driver (100 ft.) Ambulance Siren (100 ft.) Garbage Truck (3 ft.)	100	Very Loud and Annoying Hearing Damage (Steady 8-Hour Exposure)
Heavy Truck (50 ft.) Pneumatic Drill (50 ft.)	90	
Freight Train (50 ft.) Shouting (3 ft.)	80	Annoying
Freeway Traffic (50 ft.) Vacuum Cleaner (3 ft.) Power Mower (100 ft.)	70	Telephone Use Difficult
Dishwashers Air Conditioning Units (20 ft.)	60	Intrusive
Light Auto Traffic (100 ft.)	50	
Living Room Bedroom	40	Quiet
Library Soft Whisper (5 ft.)	30	Very Quiet
Broadcasting Studio	20	Just Audible

Source: Melville C. Branch, R. Dale Beland et al., 1970, Outdoor Noise in the Metropolitan Environment, p. 2.

located on the same side of the wall as a noise source may actually experience an increase in the perceived noise level as the wall reflects noise back to the receiver, thereby compounding the noise.

Time variation in noise exposure is typically expressed in terms of the average energy over time (L_{eq}), or alternatively, as a statistical description of the sound level that is exceeded over some fraction of a given period of time. For example, the L_{50} noise level represents the noise level that is exceeded 50 percent of the time. Half the time the noise level exceeds this level and half the time the noise level is less than this level. This level is also representative of

the level that is exceeded 30 minutes in an hour. Similarly, the L_8 and L_{25} represent the noise levels that are exceeded 8 and 25 percent of the time, respectively, or for 5 and 15 minutes during a 1-hour period, respectively.

Other values typically noted during a noise survey are the L_{min} and L_{max}. These values represent the minimum and maximum noise levels observed during a measurement period. Maximum and minimum noise levels, as compared to the L_{eq}, are a function of the characteristics of the noise source. For example, sources such as compressors, generators, and transformers have maximum and minimum noise levels that are similar to their L_{eq} levels since noise levels for steady-state noise sources do not substantially fluctuate. However, as another example, vehicular noise levels along local roadways result in substantially different minimum and maximum noise levels when compared to the L_{eq} since noise levels fluctuate during pass by events.

Although the A-weighted scale accounts for the range of people's response, and therefore, is commonly used to quantify individual event or general community sound levels, the degree of annoyance or other response effects also depends on several other perceptibility factors. These factors include:

- Ambient (background) sound level;
- Magnitude of sound event with respect to the background noise level;
- Duration of the sound event;
- Number of event occurrences and their repetitiveness; and
- Time of day that the event occurs.

Several methods have been devised to relate noise exposure over time to human response. A commonly used noise metric for this type of study is the Community Noise Equivalent Level (CNEL). The CNEL, originally developed for use in the California Airport Noise Regulation, adds a 5 dBA penalty to noise occurring during evening hours from 7:00 P.M. to 10:00 P.M., and a 10 dBA penalty to sounds occurring between the hours of 10:00 P.M. to 7:00 A.M. to account for the increased sensitivity to noise events that occur during the quiet evening and nighttime periods. Thus, the CNEL noise metric provides a 24-hour average of A-weighted noise levels at a particular location, with an evening and a nighttime adjustment, which reflects increased sensitivity to noise during these times of the day.

(2) Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Vibration velocity is most often described in terms of peak particle velocity (PPV) or in terms of root-mean-square (rms) vibration decibels (VdB) for purposes of ground-borne vibration analysis. Ground-borne vibration is generally a concern inside buildings and is rarely perceived as a problem outdoors. Vibration energy propagates from a source through intervening soil and rock layers, to the foundations of nearby buildings and from the foundation throughout the building structure. Building vibration may be perceived by the occupants as motion of building surfaces, rattling of items on shelves or hanging on walls, or as a low-frequency rumbling noise. The rumble noise is caused by the vibrating walls, floors and ceilings radiating sound waves.

Typical sources of ground-borne vibration are construction equipment, steel-wheeled trains, and occasional traffic on rough roads. Problems from ground-borne vibration and noise from these sources are usually localized to areas within 100 feet from the vibration source, although there are examples of ground-borne vibration causing interference out to distances greater than 200 feet.

Both construction and operation of development projects can generate ground-borne vibration. In general, demolition of structures during construction generates the highest vibrations. Construction equipment such as vibratory compactors, heavy trucks, and pavement breakers can generate perceptible vibration during construction activities at distances of 10 to 25 feet. Pile drivers can generate perceptible vibration at up to 100 feet. Figure 37 on page 419 shows common vibration sources and the human and structural response to ground-borne vibration. The threshold for human perception of vibration identified by the Federal Transit Administration (FTA) is shown to be approximately 65 VdB. The background vibration velocity level in residential areas is usually 50 vibration decibels (VdB) or lower, well below the 65 VdB threshold. Although the perceptibility threshold is about 65 VdB, human response to vibration is not usually significant unless the vibration exceeds 70 VdB.

b. Regulatory Framework

Many government agencies have established noise standards and guidelines to protect people from potential hearing damage and various other adverse physiological and social effects associated with noise and ground-borne vibration. Standards and guidelines that may be applicable to this project are discussed below.

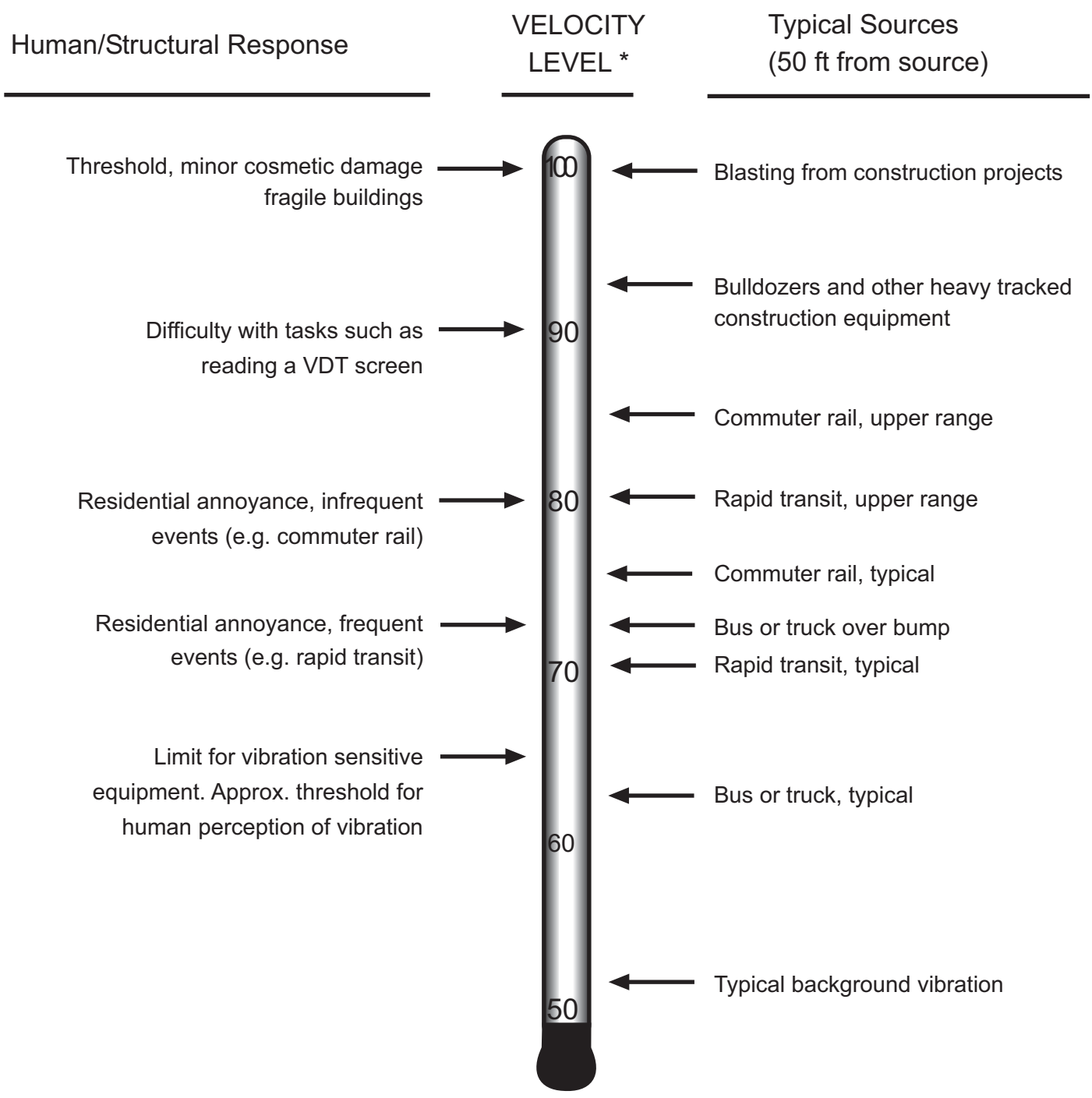

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Figure 37
Typical Levels of Ground-Borne Vibration

Source: Federal Transit Administration, US Department of Transportation, April 1995

(1) Applicable Federal Policies

(a) Noise

The U.S. Department of Housing and Urban Development (HUD) has set a goal of 45 dBA L_{dn} as a desirable maximum interior standard for residential units developed under HUD funding. While HUD does not specify acceptable exterior noise levels, construction standards for residential dwellings typically provide 20 dBA of acoustical attenuation with the windows closed and 10 dBA with the windows open. Based on this assumption, the exterior L_{dn} or CNEL should not exceed 65 dBA under normal conditions.

(b) Vibration

The U.S. Bureau of Mines suggests a PPV threshold of 0.5 inches/second for minor cosmetic cracking of plaster and 0.75 inches/second for cosmetic cracking of dry-wall within residential construction. Structural damage to engineered concrete and steel construction has a PPV threshold of 2.0 inches/second and buried pipes and mains have undergone vibration levels of 3.0 inches/second (PPV) without damage. These standards are the most widely used for both cosmetic and structural performance.

The Federal Transit Administration (FTA) has adopted vibration criteria/guidelines/ recommendations for ground-borne vibration based on the building types that neighbor roadway/transit corridors. Based on the FTA's document "Transit Noise and Vibration Impacts Assessments," April 1995, construction-period vibration levels of 0.2 inch-per-second should be considered as damage threshold criterion for "fragile" buildings and 0.12 inch-per-second for "extremely fragile" historic buildings. These vibration threshold criteria are stated in Peak Particle Velocity (PPV) which is most applicable to construction related vibration sources (i.e., machinery and equipment). The vibration criteria with respect to building damage to "well engineered" structures from construction activities is noted in Caltrans technical publication "Transportation Related Earthborne Vibrations, Caltrans Experience", July 24, 1992. As stated therein, a vibration level of 2.0 inch-per-second PPV is recommended as a safe criterion for well engineered structures.

(2) Applicable State of California Policies

(a) Noise

The California Department of Health Services (DHS) Office of Noise Control has studied the correlation of noise levels and their effects on various land uses. As a result, the DHS has established four categories for judging the severity of noise intrusion on specified land uses:

- Normally Acceptable: is generally acceptable, with no mitigation necessary.

- Conditionally Acceptable: may require some mitigation, as established through a noise study.

- Normally Unacceptable: requires substantial mitigation.

- Clearly Unacceptable: probably cannot be mitigated to a less than significant level.

The types of land uses addressed by the State standards and the acceptable noise categories for each land use are included in the *State of California General Plan* which is published and updated by the *Governor's Office of Planning and Research*. The State standards indicate, an exterior noise level up to 65 dBA CNEL is "normally acceptable" for multiple family residential uses, without special noise insulation requirements. A noise level between 60 CNEL and 70 CNEL is considered "conditionally acceptable" for multiple family residential uses, while a noise level of 75 dBA CNEL or more is identified as "clearly unacceptable" for all residential uses.

(b) Vibration

There are no adopted State policies or standards for ground-borne vibration. In most circumstances common vibrations related to roadway traffic and construction activities pose no threat to buildings or structures. However, Caltrans recommends that extreme care be taken when sustained pile driving occurs within 25 feet of any building, and 50-100 feet of a historic building or any building in poor condition.

(3) Applicable City of Carson Policies and Regulations

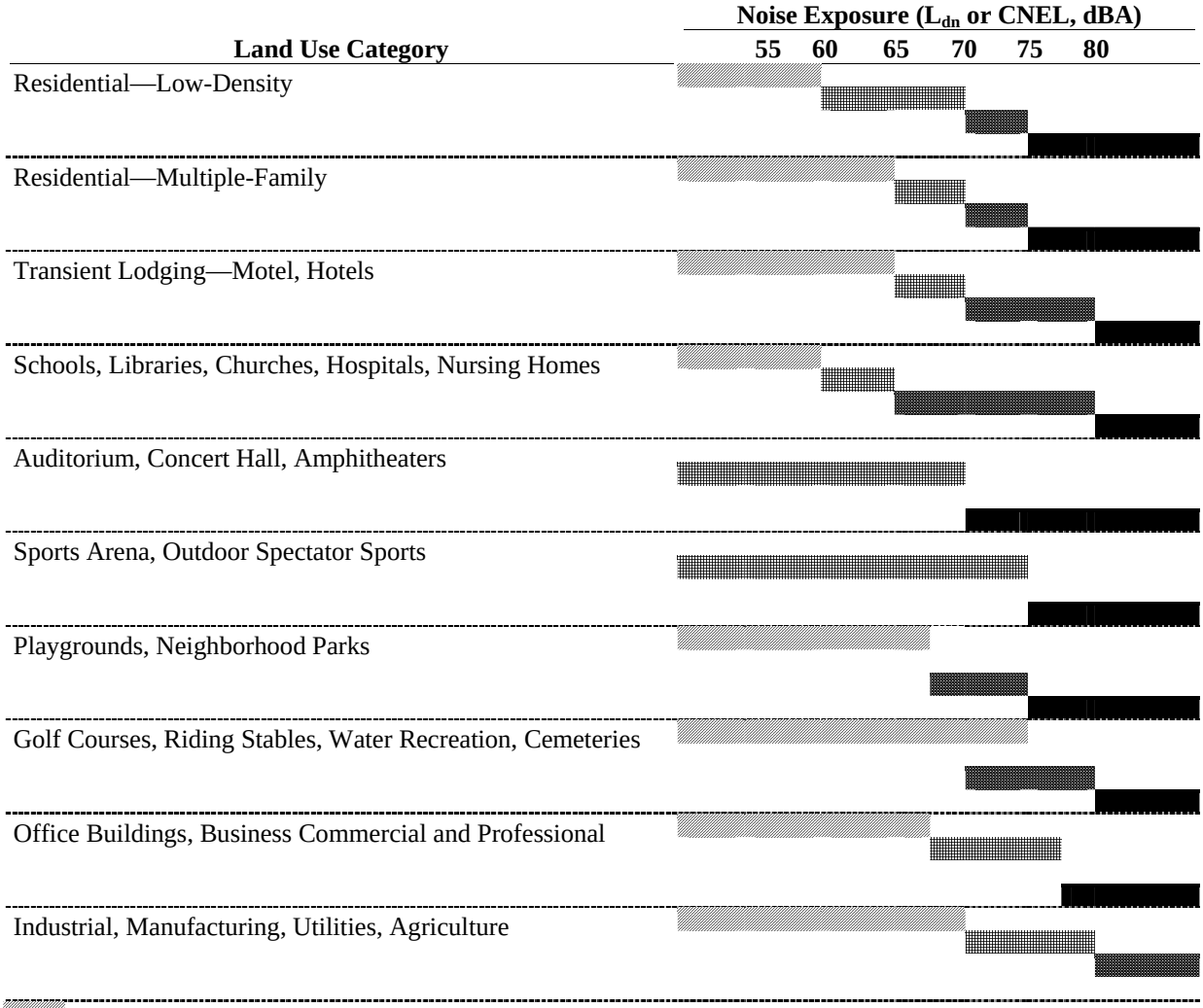
(a) Noise

General Plan Noise Element

Section 65302(f) of the California Government Code, requires each community to prepare and adopt a comprehensive long-range General Plan for its physical development containing seven mandatory elements, including a Noise Element. The Noise Element of a General Plan is a comprehensive program to limit the exposure of the community to excessive noise levels. The City of Carson has adopted local guidelines based on the community noise compatibility guidelines established by the California Department of Health Services, for use in assessing the compatibility of various land use types with a range of noise levels. The noise/land use compatibility adopted by the City's General Plan is presented in Table 45 on page 422. Furthermore, the General Plan includes interior and exterior noise standards as summarized in Table 45. This table shows standards and criteria that specify acceptable limits of noise for various land uses throughout the City of Carson. The City uses the standards identified in Tables 44 and 45 as the primary tools to ensure compatibility between land uses and outdoor ambient noise.

Table 45

Land Use Compatibility for Community Noise Sources



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

CONDITIONALLY ACCEPTABLE: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.

NORMALLY UNACCEPTABLE: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.

CLEARLY UNACCEPTABLE: New construction or development should generally not be undertaken. Construction costs to make the indoor environmental acceptable would be prohibitive and the outdoor environment would not be usable.

Source: City of Carson General Plan (Modified from the State of California Standards), 2003.

The Noise Element of the General Plan of the City of Carson includes the following policies that are applicable to the development of new projects such as the proposed Project:

- *Policy N-7.1* Incorporate noise considerations into land use planning decisions by establishing acceptable limits of noise for various land uses throughout the community.

  – *Implementation Measure N-IM-7.1* Adopt the noise standards presented in Table 45 on page 422, which identify interior and exterior noise standards in relation to specific land uses.

- *Policy N-7.2* Continue to incorporate noise assessments into the environmental review process, as needed. Said assessments shall identify potential noise sources, potential noise impacts, and appropriate sound attenuation. In non-residential projects, potential noise sources shall include truck pick-up and loading areas, locations of mechanical and electrical equipment, and similar noise sources. Require mitigation of all significant noise impacts as a condition of project approval.

  – *Implementation Measure N-IM-7.4* Require a noise impact evaluation for projects through the environmental review process, if determined necessary.

- *Policy N-7.3* Require all new residential construction in areas with an exterior noise level greater than 65 dBA CNEL to include sound attenuation measures that reduce interior noise levels to the standards shown in Table 46 on page 424. Sound attenuation measures include: sound walls, double glazing, building location, and/or facade treatment.

  – *Implementation Measure N-IM-7.3* Incorporate noise reduction features during site planning.

  – *Implementation Measure N-IM-7.6* Require that automobile and truck access to commercial and industrial developments, when located adjacent to residential neighborhoods, be located at the maximum practical distance from the residential parcel(s).

  – *Implementation Measure N-IM-7.8* Require that new commercial, industrial or any redevelopment projects or proposed developments near existing residential land uses demonstrate compliance with the City Noise Ordinance prior to approval of the project.

- *Policy N-7.4* Ensure acceptable noise levels near schools, hospitals, convalescent homes, churches, and other noise sensitive areas in accordance with Table 46. To this end, require buffers or appropriate mitigation of potential noise sources. Such

Table 46

Interior and Exterior Noise Standards

Land Use		CNEL, dBA	
Category	**Use**	**Interior** [a]	**Exterior** [b]
Residential	Single- and Multi-Family, Duplex,	45 [c]–55	50–60
	Mobile Home	45	65 [d]
Commercial Industrial Institutional	Hotel, Motel, Transient Lodging	45	—
	Commercial Retail, Bank, Restaurant	55	—
	Office Building, Research and Development, Professional Office, City Office Building	50	—
	Amphitheater, Concert Hall, Auditorium, Meeting Hall	45	—
	Gymnasium (Multipurpose)	50	—
	Sports Club	55	—
	Manufacturing, Warehousing, Wholesale, Utilities	65	—
	Movie Theaters	45	—
Institutional	Hospital, Schools' Classrooms	45	65
	Church, Library	45	—
Open Space	Parks	—	65

[a] *Indoor environment including: bathrooms, closets, and corridors.*

[b] *Outdoor environment limited to:*
- *Private yard of single-family residences*
- *Multi-family private patio or balcony which is served by a means of an exit from inside the dwelling (balconies 6 feet deep or less are exempt)*
- *Mobile home park*
- *Park's picnic area*
- *School's playground*

[c] *Noise level requirement with closed window. Mechanical ventilating system or other means of natural ventilation shall be provided per Chapter 12, Section 1205 of Uniform Building Code (UBC).*

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

Source: City of Carson General Plan, October 11, 2004. Chapter 7, Noise Element, Table N-3.

sources include, but are not limited to truck pickup and loading areas, mechanical and electrical equipment, exterior speaker boxes, and public address systems.

– *Implementation Measure N-IM-7.4 Require a noise impact evaluation for projects through the environmental review process, if determined necessary.*

- *Policy N-8.1* Require the design of mixed use structures to incorporate techniques to prevent transfer of noise and vibration from the commercial to the residential uses.

  – *Implementation Measure N-IM-8.1 Orient residential units away from major noise sources in mixed use projects.*

- *Policy N-8.2* Encourage commercial uses in mixed use developments which are not noise intensive.

  – *Implementation Measure N-IM-8.2 Locate balconies and operable windows of residential units in mixed use projects away from primary roadways and other major noise sources.*

City of Carson Municipal Code

The City of Carson adopted the "Los Angeles County Noise Ordinance" as the City's Noise Control Ordinance in 1995.[115] The adopted Noise Ordinance Standards, derived from Los Angeles County Code Section 12.08.390 (Exterior Noise Standards) and Section 12.08.400 (Interior Noise Standards), establish exterior and interior noise standards to regulate operational (post-construction) intrusive noises (e.g., stationary mechanical equipment, vehicles other than those traveling on public streets) within specific land use zones. These noise standards are summarized in Table 47 on page 426. The Noise Ordinance standards also allows for higher noise levels with shorter durations as presented in Table 48 on page 426. The second column of Table 48 lists the time limits for the maximum exterior noise levels (dBA at the receptor property), which cannot be exceeded. The third column lists the equivalent noise metric in terms of "percent noise level" or L%. The percent noise level describes the noise level that is exceeded during a certain percentage of the measurement period. For example, the L_{50} noise level is the level exceeded 50 percent of the measurement period or 15 minutes in half an hour. In the event that the ambient noise level exceeds any of the noise limit categories, the cumulative period applicable to that category shall be increased to reflect the ambient noise level.

As shown in Table 47, the Carson Municipal Code (CMC) sets a maximum noise level from any noise source in a residential zone at 50 dBA, when measured at the property line. However, if the existing ambient noise level exceeds 50 dBA, the limit is adjusted to reflect the measured ambient maximum noise level (e.g., the existing ambient L_{50} becomes the exterior noise level for Standard 1).

Section 5502 (c) of the CMC provides exterior noise standards that regulate construction noise near residential uses. Noise standards for non-scheduled, intermittent, short-term operations (less than 20 days), as well as standards for repetitively scheduled and relatively long-term construction operations (periods of 21 days or more) of equipment are summarized in Table 49 on page 427. As indicated in Table 49, the Ordinance provides two sets of limits on construction noise: (1) between the hours of 7:00 A.M. and 8:00 P.M., Monday through

[115] *Section 5500 of the Carson Municipal Code adopts Chapter 12.08 of Title 12 for the Los Angeles County Code, as amended and in effect on August 1, 1995, as the Noise Control Ordinance for the City of Carson.*

Table 47

Noise Ordinance Standards

Noise Zone	Land Use (Receptor Property)	Time Interval	Noise Level (dBA) Exterior	Noise Level (dBA) Interior
I	Noise-Sensitive Area	Anytime	45	—
II	Residential Properties	10:00 P.M. to 7:00 A.M.	45	—
		7:00 A.M. to 10:00 P.M.	50	—
III	Commercial Properties	10:00 P.M. to 7:00 A.M.	55	—
		7:00 A.M. to 10:00 P.M.	60	—
IV	Industrial Properties	Anytime	70	—
All Zones	Multi-Family Residential	10:00 P.M. to 7:00 A.M.	—	40
		7:00 A.M. to 10:00 P.M.	—	45

Source: City of Carson General Plan, October 11, 2004. Chapter 7, Noise Element, Table N-4.

Table 48

City Limits For Exterior Noise Exposure

Referenced Standard Number in CMC [a] § 5502(b)	Maximum Time of Exposure Within Any 30-Minute Period	Noise Metric	Exterior Noise Level Not to Be Exceeded [b]
1	15.0 Minutes	L_{50}	Standard 1 [b]
2	7.5 Minutes	L_{25}	Standard 1 + 5 dB
3	2.5 Minutes	$L_{8.3}$	Standard 1 + 10 dB
4	30.0 Seconds	$L_{1.7}$	Standard 1 + 15 dB
5	Any period of time	L_{max}	Standard 1 + 20 dB

[a] *CMC: Carson Municipal Code.*

[b] *If the ambient noise level (L_{XX}) exceeds the foregoing level, then the ambient noise level (L_{XX}) becomes the existing exterior noise level for the standard.*

Source: Carson Municipal Code Section 5502(b).

Saturdays; and (2) between the hours of 8:00 P.M. and 7:00 A.M. and on Sundays and on legal holidays.

Section 5502 (d) limits the loading and unloading operations to daytime hours. It states: "Loading, unloading, opening, closing or other handling of boxes, crates, containers, building materials, garbage cans or similar objects between the hours of 9:00 P.M. and 7:00 A.M. in such a manner as to cause noise disturbance is prohibited."

Table 49

Maximum Construction Noise Limits

Construction Time	Maximum Allowed Noise Level (dBA)	
	Single-Family Residential	Multi-Family Residential
a. Maximum noise levels for nonscheduled, intermittent, short-term operation of 20 days or less for construction equipment.		
Daily, except Sundays and legal holidays, 7:00 A.M. to 8:00 P.M.	75	80
Daily, 8:00 P.M. to 7:00 A.M. and all day Sunday and legal holidays	60	64
b. Maximum noise level for repetitively scheduled and relatively long-term operation (periods of 21 days or more) of construction equipment		
Daily, except Sundays and legal holidays, 7:00 A.M. to 8:00 P.M.	65	70
Daily, 8:00 P.M. to 7:00 A.M. and all day Sunday and legal holidays	55	60

Source: Carson Municipal Code Section 5502(c).

(b) Vibration

The City of Carson does not have adopted policies or standards for construction ground-borne vibration. The only applicable policy in the General Plan Noise Element is Policy N-8.1, which requires that the design of mixed-use structures incorporate techniques to prevent transfer of noise and vibration from the commercial uses to the residential uses. The Los Angeles County Noise Regulation (LAMC Section 12.08.350) provides a presumed perception limit of 0.01 inch per second RMS for sources of ground-borne vibrations during long-term activities.

c. Existing Local Noise Conditions

The predominant noise source within the Project site is roadway noise from the San Diego freeway (I-405), and local roadways such as Main Street which is located east and west of the Project site, respectively. Del Amo Boulevard, which separates District 3 from Districts 1 and 2 is also a predominant noise source at the Project site. Traffic on the Harbor Freeway (I-110) and Avalon Boulevard also contribute to existing noise levels at the Project site, although to a lesser degree due to the effect of distance and intervening buildings and topography. Other community noise sources include incidental noise from nearby existing commercial uses, and landscaping maintenance activities at nearby residential and commercial uses. Each of these noise sources is discussed in the following sections. As the Project site is currently vacant, no on-site noise generating activities presently occur.

(1) Noise Sensitive Receptors

Some land uses are considered more sensitive to intrusive noise than others, due to the types of activities typically involved at the receptor location. Specifically, the City of Carson has identified residences, public and private school classrooms, libraries, hospitals and elderly care facilities as noise sensitive receptors. The nearest sensitive residential receptors that may be affected by the proposed Project are the one- and two-story detached residences and mobile homes that are located across the Torrance Lateral drainage channel to the south and west of the Project site. The noise sensitive land uses in the Project area are depicted in Figure 38 on page 429.

(2) Ambient Noise Levels

Ambient sound measurements were conducted at four different locations around the perimeter of the Project site to characterize the existing noise environment in the Project vicinity. Each measurement was conducted for two consecutive days between July 12 and July 20, 2005. The measurement locations are also shown in Figure 38 and the sound measurement data are summarized in Table 50 on page 430. The measurement locations were selected based on their proximity to noise sensitive receptors that may potentially be affected by proposed Project noise sources. As shown in Table 50, the measured CNEL values range between 67.5 dBA and 73.8 dBA at the measurement locations. The CNEL at the locations near the two neighboring mobile home parks are 72.2 dBA and 73.8 dBA (Locations 3 and 4 on Figure 38). These noise levels exceed the City of Carson's exterior noise standard limits for sensitive receptors (see Table 46 on page 424); and are considered "normally unacceptable" based on the City's community noise/land use compatibility criteria, as presented in Table 45 on page 422. However, these noise levels are consistent with noise levels in similar noise measurement locations conducted for the City of Carson's General Plan EIR in 2003. Although measurement Location 2 is relatively close to the I-405 Freeway, the CNEL at this location is lower than the other measurement locations due to existing features (e.g., depressed grade of the freeway segment and the presence of earth berms along the site boundary) that cause attenuation of noise from the freeway.

To further characterize the existing noise environment in the Project area, the noise level from traffic on local roadways was forecasted using the traffic data included within the Project's traffic study. The traffic noise was modeled using a version of the Federal Highway Administration Traffic Noise Prediction Model (FHWA-RD-77-108). The model determines a predicted noise level through a series of adjustments to a reference sound level. To compute the L_{eq} during the peak hour of traffic, several parameters (such as traffic volumes, roadway geometry, and vehicle speed and mix) were input into the model for each roadway segment analyzed. In accordance with FHWA-RD-77-108, to calculate CNEL the peak-hour traffic volume was assumed to be 10 percent of the average daily traffic (ADT) volume. Table 51 on page 431 summarizes the traffic noise modeling results for existing conditions.

Figure 38
Noise Sensitive Receptors and Measurement Locations

Table 50

Summary of Ambient Noise Measurement Data (dBA) [a]

Location Number [b]	Measurement Location [b]	Long-Term (48-Hour) Monitoring Data						
		Daytime Hourly L_{eq}			Nighttime Hourly L_{eq}			
		Avg.	Min.	Max.	Avg.	Min.	Max.	CNEL
1	North of the Project site, south of Del Amo Blvd	67.5	63.6	70.1	61.8	52.5	67.7	70.0
2	Northeast, west of I-405	60.3	57.0	62.3	60.8	55.8	64.0	67.5
3	Southeast, across from Torrance Channel and the mobile homes	65.0	59.2	70.3	67.5	61.3	72.3	73.8
4	Northwest, across from Torrance Channel and mobile homes	68.3	54.4	75.4	65.1	54.5	69.9	72.2

[a] *Based on ambient sound measurements conducted from July 13 through July 20, 2005. Noise measurement data is provided in Appendix G of this EIR.*

[b] *Noise measurement locations are shown in Figure 38 on page 429.*

Source: PCR Services Corporation, 2005.

As shown in Table 51, the calculated CNEL for the analyzed roadway segments as a result of existing traffic volumes ranged from 56.7 dBA to 67.1 dBA at 50 feet from the roadway right-of-way. These levels are predicted based on surface-street traffic volumes only and are generally lower than the measured noise levels provided in Table 50. This is due to the fact that Project site is currently undeveloped and vacant, therefore, the area receives unshielded noise from I-405 Freeway traffic which increases the overall noise level experienced by the local community. Nevertheless, the roadway traffic noise levels, shown in Table 56 on page 443, indicate that all land uses located near the Project site, with the exception of residents south of Torrance Boulevard, are currently exposed to community noise levels above 65 CNEL. As such, these noise levels exceed the City of Carson's exterior noise standard limits for sensitive receptors (see Table 46 on page 424); and are considered "conditionally acceptable" based on the City's community noise/land use compatibility criteria as provided earlier in Table 45 on page 422. According to the roadway noise prediction model, CNEL of approximately 71 dBA occurs at the edge of Del Amo Boulevard along the northern boundary of the Project site and along Avalon Boulevard adjacent to the existing mobile homes. This CNEL is considered "normally unacceptable;" however, noise levels would be reduced at areas farther away from the edge of these two roadways.

Table 51

Calculated Traffic Noise Level for Existing Conditions[a]

Roadway Segment	Peak Hour L_{eq} (dBA) Adjacent to Right-of-Way	Predicted Existing CNEL (dBA) at Referenced Distances from Roadway Right-of-Way		
		Adjacent	50 feet	100 feet
Del Amo Boulevard				
South Main Street to Stamps Drive	69.4	70.7	66.7	64.7
East of Stamps Drive	69.7	70.9	67.0	64.9
South Main Street				
Del Amo Boulevard to Torrance Boulevard	67.7	68.9	65.2	63.3
Torrance Boulevard to 213th Street	68.6	69.9	66.4	64.5
Torrance Boulevard, East of South Main Street	60.9	62.2	56.7	54.4
Avalon Boulevard, I-405 SB Ramps to 213th Street	69.9	71.1	67.1	65.1
213th Street				
West of Avalon Boulevard	65.1	66.4	61.5	59.2
East of South Main Street	63.1	64.4	60.4	58.4

[a] *Noise modeling output files and assumptions, which include traffic volumes and vehicular fleet mix, are detailed in Appendix G.*

Source: PCR Services Corporation, 2005.

3. ENVIRONMENTAL IMPACTS

a. Methodology

A summary of the methodology used to evaluate noise and ground-borne vibration impacts, that may result from project construction and long-term operations is provided below.

(1) Short-Term Construction Noise

Construction noise impacts are evaluated by determining the noise levels generated by the different types of construction activity, calculating the construction-related noise level at nearby sensitive receptor locations, and comparing these construction-related noise levels to ambient noise levels (i.e., noise levels without construction noise). More specifically, the following steps were undertaken to calculate construction-period noise impacts:

1. Ambient noise levels at surrounding sensitive receptor locations were determined from field measurements (see Table 50 on page 430);

2. Noise levels for each construction phase and individual construction equipment were obtained from *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances* published by the EPA and the *Transit Noise and Vibration Impact Assessment* published by the FTA, respectively.

3. Distances between construction site locations (noise source) and surrounding sensitive receptors were measured;

4. The construction noise level was then calculated for sensitive receptor locations based on the standard point source noise-distance attenuation factor of 6.0 dBA for each doubling of distance;

5. Noise level increases were compared to the construction noise significance thresholds identified below.

6. Where significant impacts were identified, feasible mitigation measures were prescribed.

(2) Long-Term Operational Noise

(a) Roadway Traffic Noise

Roadway noise impacts were evaluated based on the Federal Highway Administration (FHWA) roadway traffic noise prediction model (RD-77-108). The model arrives at a predicted noise level through a series of adjustments to a reference sound level. Adjustments are made by the model to account for traffic flows, varying distances from the roadway, roadway configurations, barrier type and configuration (if any). Roadway-noise attributable to project development was calculated and compared to baseline noise levels that would occur under the "no project" condition to determine significance based on the significance criteria, described below.

(b) Stationary Point-Source Noise (During Project Operations)

Stationary point-source noise impacts are evaluated by identifying the noise levels generated by outdoor stationary noise sources such as rooftop mechanical equipment and loading dock activities, calculating the hourly L_{eq} noise level from each noise source at surrounding sensitive receiver property line locations, and comparing such noise levels to ambient noise levels to determine significance based on the previously described significance criteria.

(c) Ground-Borne Vibration

Ground-borne vibration impacts were evaluated by identifying potential vibration sources, measuring the distance between vibration sources and surrounding structure locations,

and making a significance determination based on the significance threshold levels as presented below in Section b.3.

b. Thresholds of Significance

(1) Construction Noise

Based on the City of Carson standards discussed above, the proposed Project would have a significant impact on noise levels during Project construction if:

- Construction activities lasting 20 days or less would exceed a maximum noise level of:
  - 75 dBA at single-family residential uses and 80 dBA at multi-family residential uses, between the hours of 7:00 A.M. and 8:00 P.M. Monday through Saturday;
  - 60 dBA at single-family residential uses and 64 dBA at multi-family residential uses, between the hours of 8:00 P.M. and 7:00 A.M. on Sunday or a national holiday.
- Construction activities lasting more than 20 days would exceed a maximum noise level of:
  - 65 dBA at single-family residential uses and 70 dBA at multi-family residential uses, between the hours of 7:00 A.M. and 8:00 P.M. Monday through Saturday;
  - 55 dBA at single-family residential uses and 60 dBA at multi-family residential uses, between the hours of 8:00 P.M. and 7:00 A.M. Monday through Saturday or any time on Sunday or a national holiday.

(2) Operational Noise

Based on the City of Carson General Plan and Municipal Code standards discussed above, the proposed Project would have a significant impact on noise levels during Project operations if:

- The Project causes the ambient noise level measured at the property line of affected uses to increase by 5 dBA in CNEL within the "normally acceptable" or "conditionally acceptable" category, or by 3 dBA in CNEL to or within the "normally unacceptable" or "clearly unacceptable" category (see Table 45 on page 422).
- On-site noise sources, other than roadway noise, increase ambient noise by 5 dBA, thus causing a violation of the City Noise Ordinance.

(3) Ground-Borne Vibration

The City of Carson does not have adopted policies or standards for construction or operational ground-borne vibration. However, the Federal Transit Authority (FTA) provides a construction equipment vibration damage threshold criterion of 0.20 inches per second PPV for fragile buildings (U.S.DOT, 1995) and 2.0 inch per second PPV for well engineered structures (Caltrans, 1992). Thus, an exceedance of the FTA standard for fragile buildings was used to determine construction related ground-borne vibration impacts, and the County of Los Angeles standard for human perception described earlier is used to evaluate potential impacts related to Project operations. Therefore, impacts relative to ground-borne vibration would be considered significant if the following were to occur:

- Project construction activities generate ground-borne vibration levels above 0.2 in/s PPV for mobile home residences and 2.0 in/s PPV for well-engineered structures (e.g., the single-family residential structures located south and west of the Project site).[116]

- Project operational activities generate a ground-borne vibration level of 0.01 RMS or higher at any off-site structure.

c. Analysis of Project Impacts

(1) Construction Impacts

(a) Construction Noise

(i) On-Site Construction Noise

The proposed Project would include construction of up to 1,550 residential units and the development of 1,995,125 square feet of commercial floor area. In addition to the proposed urban development program, the proposed Project includes the remediation of a former landfill on the 157-acre portion of the Project site that is located south of Del Amo Boulevard (i.e., Districts 1 and 2). Therefore, Project construction activities include site preparation, on-site remediation, and site construction. As part of the proposed Project involves the redevelopment of a former landfill, site preparation activities would include deep dynamic compaction (DDC) within the portion of the property that was used for landfill operations.[117] As such, site

[116] *As discussed previously, three mobile home parks are located to the southwest of the Project site. Mobile home building code requirements are different than standard wood-frame construction. Thus, the more conservative vibration significance threshold for fragile buildings was selected for use in this analysis.*

[117] *Deep dynamic compaction is a site preparation method used for compacting and strengthening loose or soft soils to support buildings, roadways, and other heavy construction. The method involves the systematic and*
(Footnote continued on next page)

preparation would involve mass grading, DDC, fill and cap installation, grading and the construction of building pads. Site preparation activities within Districts 1 and 2 would be integrated with remediation and subsurface construction in order to facilitate simultaneous construction activities of the landfill cap and the landfill gas collection system.

Construction of the on-site remediation program is designed to integrate the foundation supports cap construction to preserve the integrity of the cap during construction. The Remedial Action Plan (RAP) for the Upper OU, which was approved by the Department of Toxic Substances Control (DTSC) in 1995, includes: (1) containment of the contaminated soil and buried waste through the use of a clay cap; (2) extraction and treatment of the groundwater; (3) collection and treatment of landfill gases; and (4) long-term monitoring of the groundwater and landfill gases. However, the Applicant proposes to use a synthetic membrane cap rather than a clay cap for the waste prism. In addition, refinements may be used to enhance or supplement the landfill gas system and perform in-situ groundwater treatment. Changes in the design of the remediation would only be allowed if DTSC determines that the proposed design accomplishes the same performance objectives as the previously approved design and is protective of human health and the environment. Specific details on the remedial activities that would be implemented on the landfill site are provided in Section IV.D, Hazards.

Site construction, including the installation of foundation piles, the establishment of structural slab, utilities installation, building construction, parking lot surfacing, and the installation of landscaping, is anticipated to take approximately three years to complete. In addition, improvement of the Avalon Boulevard/I-405 interchange would occur concurrent with on-site Project construction. The Construction of this off-site improvement would take between fifteen months to two years to complete.

As with most construction projects, construction would require the use of a number of pieces of heavy equipment such as impact soil compactors (for DDC operations), pile drivers, bulldozers, backhoes, cranes, loaders, and concrete mixers. In addition, both heavy- and light-duty trucks would be required to deliver construction materials to and export construction debris from each construction site. The maximum noise level generated by typical, individual pieces of construction equipment is provided in Table 52 on page 436. As indicated in Table 52, construction equipment would produce maximum noise levels of 74 dBA to 101 dBA at a reference distance of 50 feet from the noise source. These maximum noise levels would occur when equipment is operating under full power conditions or at the "impact" moment such as during pile driving and DDC activities. Using the industry standard sound attenuation rate of 6 dB per doubling of distance for point sources (e.g., construction equipment), a noise level of 101

repetitive dropping of heavy weights in a pattern designed to remedy poor soil conditions at a proposed building site. Because the energy imparted is considerable, compaction can be achieved at substantial depths below the ground surface.

Table 52

Construction Equipment Maximum Noise Levels

Equipment	Noise Level (dBA) at 50 feet
Air Compressor	81
Backhoe	80
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	81
Grader	85
Jack Hammer	88
Loader	85
Paver	89
Pile Driver (Impact)	107
Pile Driver (Sonic)	96
Pneumatic Tool	85
Pump	76
Roller	74
Saw	76
Scraper	89
Truck	88

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, 1995.

dBA at a distance of 50 feet would be about 95 dBA at 100 feet, and 89 dBA at 200 feet. Furthermore, equipment used on construction sites often operates under less than full power conditions (i.e., partial power). Actual measurements performed while equipment is performing work, indicate that active noise levels are typically 2 to 15 dBA less than maximum noise levels. In addition, the impact noise associated with pile driving would substantially be reduced due to the lower density of material on site (i.e., trash with soil cover versus compact soils with rock).

In 1995, a DDC feasibility study was conducted for the Project site. Noise and vibration monitoring performed during the study indicates that the noise generated by the DDC operation could reach 65 dBA at a distance of approximately 500 feet from the operating DDC equipment.[118] However, the high noise level generated by the DDC mass impacting the ground

[118] *Woodward-Clyde, "Deep Dynamic Compaction Test Data Report for LA Metro Mall—Carson, California" December 1995.*

occurs for a very short time period, lasting less than one second per drop. On an average basis, a 65-dBA hourly L_{eq} would be reached at a distance of 200 to 370 feet from the DDC equipment depending on the intervening terrain and ground cover.[119]

The nearest sensitive receptors with potential to be disturbed by construction activities include the residential areas, consisting of the one-story and two-story detached residences and mobile homes, located to the south and west of the Project site. For example, the DDC activities, performed along the western and southern boundaries of the Project site, would be located as close as approximately 150 to 175 feet of the existing residences along the site boundary across the Torrance Lateral Flood Control Channel (a concrete-lined drainage channel, approximately 15 feet deep and 50 feet wide). During the time period that heavy-duty equipment operates near the boundary line, the maximum noise level (L_{max}) at a given moment would likely exceed 91 dBA for brief durations. Noise disturbances in those areas located adjacent to construction activities can be anticipated during construction. These disturbances would occur during site preparation activities and the subsequent construction of on-site structures. However, as construction activity moves toward the center of the Project site, the L_{max} noise level along portions of the nearest residential units would diminish considerably into dBA levels in the 60s and 70s.

With the exception of pile driving and DDC, composite construction noise (i.e., the noise generated from multiple pieces of construction equipment working concurrently) is best characterized in a study conducted by Bolt, Beranek, and Newman for the USEPA (USEPA December 31, 1971). The study concluded that noise during the heavier initial periods of construction is generally about 86 dBA L_{eq} when measured at a reference distance of 50 feet from the construction activity. This value takes into account both the number of pieces and spacing of the heavy equipment used in the construction effort, as well as the fraction of time the equipment works at full power. In later phases during building construction, noise levels are typically reduced from this value and the physical structures that are constructed often break up the line-of-sight noise transmission. The composite noise level for typical construction stages is shown in Table 53 on page 438.

In order to present a conservative analysis for construction noise, the 86 dBA noise level, the highest composite noise level, at a reference distance of 50 feet, was used to evaluate the proposed Project's construction noise impacts related to each of the construction stages except pile driving and DDC activities. The estimated aggregate construction noise levels during the heaviest periods of activity at residential uses on the west and south of the Project site are also provided in Table 53.

[119] *Ibid, p. 26–27.*

Table 53

Composite Average L_{eq} Noise Levels Per Construction Stage

Construction Stage	Composite Sound Level in dBA (L_{eq}) at Indicated Distance from Center of Construction Activity [a]				
	50 feet	100 feet	150 feet	200 feet	500 feet
Ground Clearing	82	76	72.5	70	62
Excavation, Grading	86	80	76.5	74	66
Foundation	77	71	67.5	65	57
Structural	83	77	73.5	71	63
Finishing	86	80	76.5	74	66
Deep Compaction [b]	83	77	73	71	63
Pile Driving [b]	99	93	89	87	79

[a] *A hard surface(e.g., areas that are not heavily vegetated) propagation path drop-off rate of 6 dB per doubling of distance is used.*

[b] *Assumed a combination of one truck and the impact equipment operating at an average of 60 percent of full power during one hour. Detailed calculations are provided in Appendix G.*

Source: EPA, Noise from Construction Equipment and Operations, Building Equipment and Home Appliances, PB 206717, 1971; and PCR Services Corporation, 2005.

As shown in Table 54 on page 439, the residences located to the west and south of the Project site immediately across the Torrance Lateral Channel, would occasionally experience construction noise levels of 76.5 dBA and 75.2 dBA (hourly L_{eq}), respectively, during the heaviest periods of construction. This is equivalent to an increase of 6.9 dBA and 11.5 dBA, respectively over the baseline ambient noise level (L_{eq}). As the worst-case hourly L_{eq} exceeds the ambient noise levels by more than the 5 dBA incremental significance threshold, construction of the proposed Project would result in a significant impact to off-site sensitive receptors without the incorporation of mitigation measures.

When pile driving occurs in the southern and western section of the Project site, nearby residences could experience short-duration, high impulse noise level (L_{max}) of 97.5 dBA and 96.5 dBA respectively. As the data from noise measurements (Table 6) indicate, the maximum ambient noise level (L_{eq}) at the residences located to the west and south of the Project site immediately across the Torrance Lateral, is 72.3 and 75.4 dBA. As such the maximum noise generated during pile driving and DDC would exceed the 20 dBA limit of the City's Municipal Code (as presented in Table 47 on page 426) without the incorporation of mitigation measures. Furthermore, due to the large number of driven piles that are required to construct the Project, the frequency of the noise impact results in the impact being concluded to be significant, even though the noise level of any individual driven pile would be less than significant.

Construction noise levels would be experienced intermittently as only portions of the Project site would be under construction at any one time. The majority of the time construction

Table 54

Highest Estimated L_{eq} Construction Noise Levels at Receptor Locations (During Heaviest Periods of Construction Activity for One-Hour Period)

Receptor Number and Land Use [a]	Measured Baseline Ambient Noise (dBA) [b]	Closest Distance to Construction Site (feet)	Predicted Aggregate Construction Noise (dBA) [c]	Increase Over Baseline (dBA)	Predicted Pile Driving Noise L_{max} (dBA)
1. Residential Uses to the South	68.3	175	75.2	6.9	96.1
2. Residential Uses to the West	65.0	150	76.5	11.5	97.5

[a] *Receptors are shown in Figure 38 on page 429.*
[b] *Based on the measured data shown in Table 50 on page 430 .*
[c] *Based on heaviest period of construction activity over a one-hour period.*

Source: PCR Services Corporation, 2005.

noise levels at sensitive locations would be much lower due to reduced construction activity and the phasing of construction (i.e., construction noise levels at a given location would be reduced as construction activities conclude or move to another more distant location of the site).

(ii) Off-Site Construction Noise

In addition to on-site construction noise, haul trucks, delivery trucks, and construction workers would require access to the site throughout the construction duration. While construction workers would arrive from many parts of the region, and thus different directions, haul trucks and delivery trucks would generally travel to the Project site via the I-405 freeway ramps at Avalon Boulevard (northbound travel) and Main Street (southbound travel), thus avoiding local streets with sensitive receptors. Furthermore, construction traffic would not be present during the noise-sensitive late evening and nighttime hours. As such, potential impacts would be less than significant, and no mitigation measures are necessary.

(iii) Impacts Due to Implementation of Proposed RAP Design Refinements

Construction activities required to implement the approved RAP would involve rough grading of the Project site and the installation of a clay cap over the waste prism within Districts 1 and 2. Constructing the clay cap consists of establishing a foundation layer that would be overlain by a 2-foot thick clay cover, and a 1.5-foot protective drainage layer. The proposed RAP design refinements include a geomembrane landfill cap constructed of prepared soil foundation, LLDPE (Linear Low Density Polyethylene) geomembrane, geotextile, composite drainage materials, and select cover soils. Thus, the proposed RAP design refinements would not require clay to be imported to the site, while the approved RAP construction would require

approximately 2,000 cubic yards of clay per day to be hauled to the site. This would require approximately 150 truck trips per 10-hour day, and 1.5 years to import the required amount of clay. This reduction in truck activity would eliminate potential off-site noise impacts attributable to this hauling activity, thereby reducing off-site noise impacts for those receptors that would be located along the haul route. While this reduction in off-site noise levels would occur under the proposed RAP design refinements, within the Project site itself, there would be only a limited change in the daily on-site equipment mix and the overall on-site construction noise levels would be similar under both the approved RAP and the proposed RAP design refinements.

(b) Construction Vibration

Construction can generate varying degrees of ground vibration, depending on the construction procedures and the construction equipment used. Construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receptor building(s). The results from vibration can range from no perceptible effects at the lowest vibration, to low rumbling sounds and perceptible vibrations at moderate levels, to damage at the highest levels. Notwithstanding, ground vibrations from construction activities rarely reach the levels that can damage structures. Typically, pile driving generates the highest vibration, although for the proposed Project, DDC activities would also result in potential vibration impacts. The FTA has published standard vibration velocities for construction equipment operations. The root mean square velocity level and peak particle velocities are shown in Table 55 on page 441. As shown in this data, vibration velocities from typical heavy construction equipment operations range from 0.003 to 0.644 inch/sec at 25 feet from the source of activity. At 75 feet from the source of activity, vibration velocities from typical heavy construction equipment operations range from 0.001 to 0.124 inch/sec. Within the Project site, the highest vibration from typical construction equipment (i.e., exclusive of DDC activities) would be generated during pile driving operations, while more consistent, but lower ground vibration would be generated during the clearing, excavation, and grading processes when heavy materials are moved. Residential sensitive land uses would be located at a sufficient distance (greater than 75 feet) from any potential pile driving activity so that vibration from such activities would be below the peak particle velocity threshold of 0.2 inch/sec. In addition, the vibration associated with pile driving would be substantially reduced due to the lower density of material on site (i.e., trash with soil cover versus compact soils with rock) and the intervening Torrance Lateral (i.e., impeding transmission of surface waves and higher-amplitude motion from pile driving).

Construction of the proposed Project also includes DDC of the portions of the property that were formerly used as a landfill site (i.e., Districts 1 and 2). DDC would be limited to approximately 60 acres of non-building space on the Project site. The DDC activities, performed along the western and southern boundaries of the Project site, would be located within

Table 55

Vibration Velocities for Construction Equipment

Equipment	Approximate Velocity Level at 25 ft, VdB	Approximate Peak particle Velocity at 25 ft, inch/second	Approximate Peak Particle Velocity at 75 ft, inch/second
Pile Driver (impact) [a]	104	0.644	0.124
Pile Driver (sonic) [a]	93	0.170	0.033
Hydromill (slurry wall in soil)	66	0.008	0.002
Hydromill (slurry wall in rock)	75	0.017	0.003
Large bulldozer	87	0.089	0.017
Caisson drilling	87	0.089	0.017
Loaded trucks	86	0.076	0.015
Jackhammer	79	0.035	0.007
Small bulldozer	58	0.003	0.001

[a] *Data reflects typical vibration levels.*

Source: USDOT Federal Transit Administration, 1995.

approximately 150 to 175 feet of the existing residences across the Torrance Lateral. As the Project site elevation is about 20 feet higher than these residences, a slope tapers down on the property edge and a drainage channel approximately 15 feet deep is located near the slope between the closest on-site areas wherein DDC would occur and the off-site residences.

The Applicant is proposing that the first step with regard to DDC operations is to conduct a testing or pilot program. The purpose of the pilot program is to assure that less than significant vibration impacts to off-site uses and/or facilities would occur once DDC operations are initiated on a site-wide basis. Under the pilot program the Applicant would install vibration monitors at the following locations: (1) along the Project's fenceline opposite the off-site residential uses located to the south and southwest of the Project site (i.e., within the Project site), and (2) along the far side of the Torrance Lateral Channel in line with the monitors placed within the Project site itself. Once the monitors are in place, DDC testing would commence. The testing procedures would consist of dropping increasing weights at increasing heights with concurrent checking of monitored levels so as to assure that off-site vibration levels do not exceed the 0.2 inches per second PPV significance threshold. Based on this testing program, an optimal set of DDC parameters would be established. Once the pilot program is completed, the off-site vibration monitors would remain in place throughout the DDC process, thereby providing ongoing protections for off-site uses and/or facilities throughout this phase of the Project's construction process. The pilot program, due to its importance with regard to precluding vibration impacts to off-site uses and/or facilities, has been incorporated as a mitigation measure which assures its implementation via the Project's Mitigation Monitoring and Reporting Program. Therefore, DDC activities near the western and southern boundaries of the Project site would not exceed the 0.2-inch-per-second PPV significance threshold for fragile structures, such

as the off-site mobile houses, and a less than significant short-term vibration impact to the existing mobile home residences along the Project site boundary would occur.

(2) Operational Impacts

(a) Operational Noise (Post-Construction)

The following analyses address potential noise impacts to neighboring noise-sensitive receiver locations, as well as the proposed on-site residential uses within the Project site, related to the long-term operations of the proposed Project, following completion of construction. Specific noise sources addressed in this analysis include roadway noise, mechanical equipment/point sources (i.e., loading dock and trash pick-up areas), and parking facilities.

(i) Off-Site Roadway Noise

According to the Project's traffic study, included as Appendix D to this Draft EIR, and summarized in Section IV.C, Traffic, Circulation and Parking, above, the proposed Project is forecasted to generate a maximum of 67,441 additional daily trips. The traffic volumes associated with these Project trips would have the potential to increase roadway noise levels on local roadways in and around the Project site. Table 56 on page 443 provides the calculated CNEL for analyzed roadway segments for the following: (1) existing conditions; (2) future without development of the proposed Project; and (3) future with development of the proposed Project. In addition, the increase attributed to Project-generated traffic volumes as well as cumulative increases (i.e., increase attributable to ambient growth, related projects, and proposed Project traffic volumes) above existing noise levels is also presented.

As shown in Table 56, the largest Project-related traffic noise impact is anticipated to occur along the segments of Del Amo Boulevard, between Stamps Drive and Figueroa Street (2.4 to 2.8 dBA increase in CNEL). However, no sensitive uses are located along these segments and impacts would be less than the 5 dBA significance threshold. Furthermore, impacts from Project-related traffic noise along all other local roadway segments, within proximity of the identified sensitive receptors, would be lower than the significance threshold of 3 dBA CNEL for sensitive receptors exposed to or within the "normally unacceptable" or "clearly unacceptable" categories. Thus, the Project's roadway noise impacts would be less than significant.

Noise/Land Use Compatibility Impacts

As mentioned above, and described in detail in the Project Description, the proposed Project includes approximately 1,550 residential units, consisting of condominiums and apartments. These residential uses would be located to the south and north of Del Amo Boulevard, within Development Districts 1 and 3, respectively. As the measured noise levels

Table 56

Roadway Traffic Noise Impacts at Representative Noise Sensitive Locations [a]

Roadway Segment	CNEL at 50 feet from Roadway Right-of-Way (dBA) Existing	Future (2010) No Project	Future (2010) With Project	Project Increment [b]	Cumulative Increment [c]
Del Amo Boulevard					
East of Stamps Drive	67.0	68.4	68.9	0.5	1.9
Stamps Drive to South Main Street	66.7	68.2	70.6	2.4	3.9
South Main Street to Figueroa Street	66.0	67.7	70.5	2.8	4.5
South Main Street					
North of Del Amo Boulevard	64.8	65.3	66.1	0.8	1.3
Del Amo Boulevard to Lenardo Drive	65.1	65.5	66.2	0.7	1.1
Leonardo Drive to Torrance Boulevard	67.9	68.3	69.8	1.5	1.9
Torrance Boulevard to 213th Street	65.1	65.5	66.4	0.9	1.3
213th Street to Carson Street	65.3	65.7	66.5	0.8	1.2
Leonardo Drive					
East of South Main Street	[d]	[d]	61.3	[d]	[d]
Torrance Boulevard					
East of South Main Street	56.7	56.9	56.9	0.0	0.2
West of South main Street	65.1	65.3	66.6	1.3	1.5
213th Street					
East of South Main Street	60.4	60.7	60.7	0.0	0.3
West of Avalon Boulevard	61.5	61.7	61.7	0.0	0.2
Carson Street					
East of South Main Street	66.9	67.4	67.8	0.4	0.9
West of Avalon Boulevard	66.3	66.7	67.1	0.4	0.8
East of Avalon Boulevard	66.4	66.7	67.1	0.4	0.7
Avalon Boulevard					
I-405 SB Ramps to 213th Street	67.1	67.7	68.5	0.8	1.4
213th Street to Carson Street	67.0	67.6	68.3	0.7	1.3

[a] *Exterior 24-hour CNEL noise levels.*
[b] *Increase relative to traffic noise levels comparing future (2010) Pre-Project conditions to future (2010) with development of the proposed Project.*
[c] *Increase relative to traffic noise levels comparing existing conditions to future (2010) with development of the proposed Project.*
[d] *Future intersection due to proposed Project development.*

Source: PCR Services Corporation, 2005.

within the Project site indicates, the proximity of the site to the I-405 freeway, results in noise levels of up to approximately 74 dBA CNEL (refer to Figure 38 on page 429 and Table 50 on page 430).

In addition, Table 57 on page 445 provides predicted CNEL contour distances for the Project in 2010 (i.e., Project buildout). As shown in this table, the 65 CNEL noise contour would be located approximately 123 to 182 feet from the edge of Del Amo Boulevard right-of-way; and 70 CNEL would occur at 57 feet from the edge of Del Amo Boulevard. As such, the roadway traffic would result in adverse impacts to the proposed residential uses located within 57 feet from the Del Amo Boulevard right-of-way. Impacts within this area would be potentially significant without the incorporation of mitigation measures. The dwelling units farther from the roadway would benefit from noise distance attenuation, as well as the shielding effect of the residences facing the roadway.

(ii) Stationary Point-Source Noise

This section considers potential noise impacts to neighboring noise-sensitive properties related to specific noise sources associated with the operation of the proposed Project. Such potential noise sources include:

- Mechanical equipment rooms (e.g., boiler, chiller, and emergency generator);
- Miscellaneous rooftop mechanical equipment;
- Loading dock and trash/recycling areas;
- Parking facility; and
- Certain of the on-site uses permitted under the proposed Carson Marketplace Specific Plan (e.g., outdoor theater).

A discussion of each of these noise sources is provided below, followed by a discussion of the potential composite noise level increase (due to multiple noise sources) at each sensitive receptor location.

Mechanical Equipment

Project development would include mechanical equipment, which could generate noise levels that are audible at both on- and off-site noise sensitive locations. Such equipment could include, but not be limited to, air conditioners, fans, blowers, compressors, and pumps that would be used to support the basic functioning of various structures and/or facilities that would be developed. However, most of this mechanical equipment would include noise control measures such as intake/exhaust silencers, acoustical linings, equipment enclosures, and parapet screens to ensure that the noise generated by mechanical equipment operations would meet City of Carson Municipal Code noise standards. As such, noise from stationary mechanical equipment

Table 57

Predicted CNEL Contour Distance—Buildout Year With Project

Roadway Segment	CNEL at 50 feet [a] (dBA)	Distance to 65 dBA CNEL Noise Contour (Feet)
Del Amo Boulevard		
East of Stamps Drive	68.9	123
Stamps Drive to South Main Street	70.6	182 [b]
South Main Street to Figueroa Street	70.5	177 [c]
South Main Street		
North of Del Amo Boulevard	66.1	64
Del Amo Boulevard to Lenardo Drive	66.2	66
Leonardo Drive to Torrance Boulevard	69.8	151
Torrance Boulevard to 213th Street	66.4	69
213th Street to Carson Street	66.5	71
Leonardo Drive		
East of South Main Street	61.3	[d]
Torrance Boulevard		
East of South Main Street	56.9	[d]
West of South main Street	66.6	72
213th Street		
East of South Main Street	60.7	[d]
West of Avalon Boulevard	61.7	[d]
Carson Street		
East of South Main Street	67.8	95
West of Avalon Boulevard	67.1	81
East of Avalon Boulevard	67.1	81
Avalon Boulevard		
I-405 SB Ramps to 213th Street	68.5	112
213th Street to Carson Street	68.3	107

[a] *Predicted CNEL for the buildout year (2010) with Project.*
[b] *Distance to 70 dBA CNEL contour is 62 feet.*
[c] *Distance to 70 dBA CNEL contour is 59 feet*
[d] *Noise level occurs within the roadway right-of-way.*

Source: PCR Services Corporation, 2005.

associated with the proposed Project would not exceed 50 dBA during daytime hours and 45 dBA during nighttime hours at the nearest sensitive receptors. Furthermore, as the existing ambient noise in the project area is above the typical noise level generated by these pieces of equipment, it is anticipated that the noise level increase, if any, would remain well below the 5 dBA L_{eq} (1-hour) significance threshold, or the 5-dBA CNEL significance threshold for conditionally acceptable noise environments. Therefore, impacts are anticipated to be less than significant and no mitigation measures are required.

Loading Dock and Refuse Collection/Recycling Areas

The various operations-related activities within the commercial center (e.g., loading, refuse collection, cardboard compaction, etc.) would occur at several different locations within the Project site. Based on standard design practices, these activities would occur mainly at the rear of the proposed on-site structures. All outdoor loading dock and trash/recycling areas would be fully or partially enclosed, or screened with portions of the building, architectural wing walls, and freestanding walls such that the line-of-sight between these noise sources and the noise sensitive land uses would be obstructed. By blocking the sound transmission path between the loading dock-area noise sources and nearby residential uses, noise levels would not exceed the 5-dBA hourly L_{eq} at 50 feet, or the 5-dBA CNEL significance threshold for conditionally acceptable noise environments at any off-site or on-site noise sensitive residential location. Therefore, Project impacts would be less than significant and no mitigation measures would be required.

Parking Facility Noise Levels

Various noise events would also occur within the on-site surface parking lots as well as any parking structures that may be constructed within the Project site. Within these parking facilities, the activation of car alarms, sounding of car horns, slamming of car doors, engine revs, and tire squeals would occur periodically. A summary of maximum noise levels related to typical parking facility noise events is provided in Table 58 on page 447. Automobile movements would comprise the most continuous noise source and would generate a noise level of approximately 65 dBA at a distance of 25 feet. Car alarm and horn noise events, which generate maximum noise levels as high as 69 dBA at a reference distance of 50 feet, would occur less frequently. As summarized in Table 13, a composite noise level of 60 dBA L_{eq} (1-hour) at a reference distance of 50 feet would be typical to a parking facility. The composite parking lot noise would be reduced to 54 dBA at the nearest sensitive receptors, including the on-site residential units and the residential uses across the Torrance Lateral Channel at the south and west side of the Project site. This would be well below the existing daytime average ambient noise level of 65.0 dBA and 68.3 dBA at these locations (see Table 50 on page 430). However, as proposed uses could include commercial uses with nighttime uses (e.g., nightclubs operating after midnight) and existing nighttime ambient noise levels are as low as 61.3 dBA and 54.5 dBA at these locations, parking facility noise levels could increase ambient nighttime noise levels by a maximum of 3 dBA. As this noise level increase would be less than the 5 dBA significance threshold, impacts from parking activities upon the noise-sensitive receptors near the Project site would be less than significant. Thus, no mitigation would be required.

Noise Intensive Land Uses

Some of the land uses that are permitted by the Carson Marketplace Specific Plan have noise characteristics that are potentially problematic (i.e., outdoor theater, passenger station (bus

Table 58

Typical Maximum Noise Level from Individual Surface Parking Lot Noise Events

Source	Reference Sound Level at 25 feet [a] (dBA)	Maximum Sound Level at 50 Feet [b] (dBA)	Frequency of Occurrence (%)	1-Hour L_{eq} Noise Level at 50 Feet (dBA)
Automobile at 14 mph	65	59	50.0	56
Car Alarm	75	69	1.0	49
Car Horn	75	69	0.5	46
Door Slam	70	64	5.0	51
Tire Squeal	76	70	10.0	56
Composite L_{eq} (1-hour)				**60**

[a] *Reference noise levels are based on actual measurement data.*
[b] *Since parking structure-related noise is more akin to a point-source, rather than a line-source, the 6-dBA per doubling of distance attenuation factor was used to distance-adjust all reference noise levels.*

Source: PCR Services Corporation, 2005.

station, rail station, taxi stand), or small recycling facility). If these land uses are developed as part of the proposed Project, while these uses would be required to meet the City's Noise Ordinance standards, there is a potential that they may result in a significant noise impact if the uses were to be located in proximity of the proposed residences or off-site residences to the south and west.

(iii) Composite Noise Level Impacts from Proposed Project Operations

An evaluation of noise from all proposed Project sources (i.e., composite noise level) was conducted to conservatively ascertain the potential maximum Project-related noise level increase that may occur at the noise-sensitive receptor locations included in this analysis. Based on a review of the noise-sensitive receptors and the Project's noise sources, noise sources considered in the analysis of composite noise include roadway traffic volumes, parking-related noise events, mechanical equipment, and loading dock/refuse collection area noise events.

The potential composite noise level impact at each sensitive receptor location was evaluated by conservatively assuming that the Project site operations would generate a steady-state equivalent noise level of 70 dBA at a 50-foot reference distance. This 70-dBA composite noise level (based on 1-hour L_{eq}), would account for each of the individual noise sources (i.e., mechanical equipment, loading dock/refuse collection areas, parking facility, etc.) present on the Project site.

Table 59 on page 448 provides a summary of potential impacts that may occur at each of the sensitive receptor locations. As shown in Table 59, maximum L_{eq} daytime noise level

Table 59

Operations Noise Impact Summary

Receptor Number and Land Use [a]	Measured Baseline Ambient Noise (dBA) [b] Day/Night [d]	Closest Distance to Construction Site (feet)	Composite Operational Noise at Receptor (dBA) [c]	With Project Noise Level (dBA) Day/Night [d]	Increase Over Baseline (dBA) Day/Night [d]
1. Residential Uses to the South	68.3/61.3	175	59.1	68.7/63.3	0.4/2.0
2. Residential Uses to the West	65.0/54.4	150	60.5	66.3/61.5	1.2/7.0

[a] *Receptors are shown in Figure 38 on page 429.*
[b] *Based on the measures data shown in Table 50 on page 430 .*
[c] *Based on 70 dBA Project site operational noise level over a one-hour period.*
[d] *Daytime hours are from 7:00 A.M. to 10 P.M. and nighttime hours are from 10 P.M. to 7 A.M.*

Source: PCR Services Corporation, 2005.

increases with proposed Project operations are forecasted to range from 59.1 dBA to 60.5 dBA L_{eq} (1-hour). These noise level estimates take into account distance attenuation only. As shown in Table 59, operations-period composite noise level impacts would not exceed the 5-dBA significance criterion during daytime hours at any sensitive receptor locations However, noise levels could exceed the nighttime ambient noise level by as much as 7 dBA, and as such, combined nighttime noise levels would be significant without incorporation of mitigation measures.

(b) Ground-Borne Vibration

Future ground-borne vibration in the Project vicinity of the Project site would continue to be generated by vehicular travel on the local roadways. As Project operations would not result in any additional long-term ground-borne vibration sources, operation of the proposed Project upon completion of its construction would not exceed the 0.01 RMS significance threshold for ground-borne vibration at the neighboring sensitive receptors. As such, impacts would be less than significant and no mitigation measures are required.

4. MITIGATION MEASURES

a. Construction

(1) Noise

As noise associated with on-site construction activity would have the potential to result in a significant impact, the following measure is prescribed to minimize construction-related noise impacts:

Mitigation Measure H-1: Prior to the issuance of any grading, excavation, haul route, foundation, or building permits, the Applicant shall provide proof satisfactory to the Building and Safety and Planning Divisions of the Development Services Department that all construction documents require contractors to comply with City of Carson Municipal Code Sections 4101 (i) and (j), which requires all construction and demolition activities including pile driving, to occur between 7:00 A.M. and 8:00 P.M. Monday through Saturday and that a noise management plan for compliance and verification has been prepared by a monitor retained by the Applicant. At a minimum, the plan shall include the following requirements:

1. Noise-generating equipment operated at the Project site shall be equipped with effective noise control devices (i.e., mufflers, intake silencers, lagging, and/or engine enclosures). All equipment shall be properly maintained to assure that no additional noise, due to worn or improperly maintained parts, would be generated.

2. Pile drivers used within 1,500 feet of sensitive receptors shall be equipped with noise control techniques (e.g., use of noise attenuation shields or shrouds) having a minimum quieting factor of 10 dBA.

3. Effective temporary sound barriers shall be used and relocated, as needed, whenever construction activities occur within 150 feet of residential property, to block line-of-site between the construction equipment and the noise-sensitive receptors (i.e., residential uses located on the west and south of the Project site).

4. Loading and staging areas must be located on site and away from the most noise-sensitive uses surrounding the site as determined by the Building and Safety Division of the Development Services Department.

5. An approved haul route authorization that avoids noise-sensitive land uses to the maximum extent feasible.

6. A construction relations officer shall be designated to serve as a liaison with residents, and a contact telephone number shall be provided to residents.

(2) Vibration

To mitigate the potential significant impact of construction vibration during the site compaction (DDC) activities:

Mitigation Measure H-2: The Applicant, prior to initiating DDC activities on a site-wide basis, shall conduct a DDC Pilot Program (Pilot Program). The Pilot Program shall be implemented via the following guidelines:

- Prior to the initiation of the Pilot Program, the Applicant shall locate vibration monitors at the following locations: (1) along the Project's fenceline opposite the off-site residential uses located to the south and southwest of the Project site (i.e., within the Project site), and (2) along the far side of the Torrance Lateral Channel in line with the monitors placed within the Project site itself.

- Continuous monitoring shall be conducted on an ongoing basis during the Pilot Program. All vibration levels measured by the monitors shall be logged with documentation of the measurements provided to the City.

- Initial DDC drops shall be limited in weight, height and/or location dictated by calculations which demonstrate that the potential vibration levels are below the 0.02 inches per second PPV threshold limit.

- Increases in DDC weight, height and/or location shall incur in small increments, with continuous monitoring to assure compliance with the 0.02 inches per second PPV threshold limit.

- If vibration levels at any time during the Pilot Program exceed the 0.02 inches per second PPV threshold level, DDC activity shall immediately stop, until new drop parameters are established that would reduce the vibration levels to less than the 0.02 inches per second PPV threshold level.

Mitigation Measure H-3: The monitors located on the far side of the Torrance Lateral Channel as part of the Pilot Program shall remain in place throughout the DDC phase of Project construction. Continuous monitoring shall be conducted on an ongoing basis. All vibration levels measured by the monitors shall be logged with documentation of the measurements provided to the City. If DDC vibration levels at any time exceed the 0.02 inches per second PPV threshold level, DDC activity shall immediately stop, until new drop

parameters are established that would reduce the vibration levels to less than the 0.02 inches per second PPV threshold level.

(3) Construction Management

Mitigation Measure H-4: A construction and construction-related monitor satisfactory to the Development Services General Manager shall be retained by the Applicant to document compliance with the mitigation measures. Said Monitor's qualifications, identification, address and telephone number shall be listed in the contracts and shall be placed in the pertinent files of the Development Services Department. The Monitor will be required to monitor all construction and construction-related activities on the site on a periodic basis; keep all written records which shall be open for public inspection; and to file monthly reports with City and appropriate permit granting authorities. In addition:

1. Information shall be provided on a regular basis regarding construction activities and their duration. A Construction Relations Officer shall be established and funded by the Applicant, and approved by the Development Services General Manager, to act as a liaison with neighbors and residents concerning on-site construction activity. As part of this mitigation measure, the Applicant shall establish a 24-hour telephone construction hotline which will be staffed between the hours of 8:00 A.M. and 5:00 P.M. on a daily basis throughout the Project's entire construction period for the purposes of answering questions and resolving disputes with adjacent property owners. The hotline number shall be posted on site.

2. The Applicant shall require in all construction and construction-related contracts and subcontracts, provisions requiring compliance with special environmental conditions included in all relevant entitlement approval actions of the City of Carson. Such provisions shall also include retention of the power to effect prompt corrective action by the applicant, its representative or prime contractor, subcontractor or operator to correct noticed noncompliance.

3. During construction loading and staging areas must be located on-site and away from the most noise-sensitive uses surrounding the site as determined by the Planning Manager.

b. Operation

(1) Noise

Mitigation Measure H-5: All parking lots near residential areas shall be located a minimum of 150 feet from an off-site residential use unless a minimum eight foot wall is provided along the property boundary to limit noise levels associated with parking lot activities.

Mitigation Measure H-6: All parking structures near residential areas shall be located a minimum of 150 feet from an off-site residential use unless the exterior wall of the parking structure that faces the off-site residential use is a solid wall or provides acoustical louvers (or equivalent noise reduction measures).

Mitigation Measure H-7: During operation of a building (following construction), truck delivery should be limited to non-peak traffic periods between 7:00 A.M. and 8:00 P.M., if feasible.

Mitigation Measure H-8: For the residential uses immediately south and north of Del Amo Boulevard, within Development Districts 1 and 3, all exterior walls and floor-ceiling assemblies (unless within a unit) shall be constructed with double-paned glass or an equivalent and in a manner to provide an airborne sound insulation system achieving a Sound Transmission Class of 50 (45 if field tested) as defined in the UBC Standard No. 35-1, 1982 edition. Sign-off by the Development Services General Manager, or his/her designee, is required prior to the issuance of the first building permit. The Applicant, as an alternative, may retain an engineer registered in the State of California with expertise in acoustical engineering, who would submit a signed report for an alternative means of sound insulation satisfactory to the City of Carson which achieves a maximum interior noise of CNEL 45 (residential standard). In addition:

Mitigation Measure H-9: The balconies of the first row of residential units facing Del Amo Boulevard or I-405 Freeway, should any such balconies be constructed, shall have a solid fence/wall with an appropriate height to reduce the noise received from traffic traveled on the adjacent Boulevard.

Mitigation Measure H-10: If any noise intensive uses (i.e., outdoor theater, passenger station (bus station, rail station, taxi stand), small recycling facility, or commercial uses (outdoor activities, amplified music, outdoor patios, etc)) are proposed within 300 feet of an on-site or off-site residential use, then as part of the site plan review process, a community noise study shall be completed and the study shall demonstrate that the use would not exceed the City of Carson Municipal Code noise standards and/or the standards established in this EIR.

5. CUMULATIVE IMPACTS

All of the identified related projects have been considered for the purposes of assessing cumulative noise impacts. The potential for noise impacts to occur are specific to the location of each related project as well as the cumulative traffic on the surrounding roadway network.

a. Construction Noise

Of the 36 related projects that have been identified within the proposed Project study area, there are a number of projects that have not already been built or are currently under construction. Since the Applicant has no control over the timing or sequencing of the related projects, and as such, any quantitative analysis that assumes multiple, concurrent construction projects would be entirely speculative. Noise impact of construction activities for the proposed Project and each related project (that has not already been built) would be short-term, limited to the duration of construction and would be localized. In addition, it is anticipated that each of the related projects would have to comply with the local noise ordinance, as well as mitigation measures that may be prescribed pursuant to CEQA provisions that require significant impacts to be reduced to the extent feasible. However, since noise impacts due to construction of the proposed Project would be significant on its own, noise impacts due to construction of the proposed Project in combination with any of the related projects would also be significant without mitigation.

b. Long-Term Operations

Each of the 36 related projects that have been identified within the general Project vicinity would generate stationary-source and mobile-source noise due to ongoing day-to-day operations. The related projects are of a residential, retail, commercial, office buildings, or institutional nature and these uses are not typically associated with excessive exterior noise generation. However, each project would produce traffic volumes that are capable of generating a roadway noise impact. As discussed previously, traffic volumes from the proposed Project and the 36 related projects, combined with ambient traffic growth, were analyzed and shown in Table 56 on page 443. Cumulative traffic volumes would result in a maximum increase of 4.5 dBA CNEL along Del Amo Boulevard, between South Main Street and Figueroa Street. As this noise level increase would be below the 5 dBA CNEL significance threshold for "normally acceptable" land uses, roadway noise impacts due to cumulative traffic volumes would be less than significant along segments of Del Amo Boulevard. Furthermore, impacts from Project-related traffic noise along all other local roadway segments with sensitive receptors would be lower than the significance threshold of 3 dBA CNEL for sensitive receptors exposed to or within "normally unacceptable" or "clearly unacceptable" categories and, thus, less than significant.

Due to Carson Municipal Code provisions that limit noise from stationary sources such as roof-top mechanical equipment and emergency generators, noise levels would be less than significant at the property line for each related project. For this reason on-site noise produced by any related project would not be additive to Project-related noise levels. As such, stationary-source noise impacts attributable to cumulative development would be less than significant.

6. LEVEL OF SIGNIFICANCE AFTER MITIGATION

a. Construction

The mitigation measures recommended in this section would reduce the noise levels associated with construction activities to some extent. However, these activities would continue to increase the daytime noise levels at nearby noise-sensitive uses by more than the 5-dBA significance threshold. As such, noise impacts during construction would be considered significant and unavoidable. Furthermore, noise impacts during pile driving are concluded to be significant due to the frequency with which this impact is going to occur and the circumstance in which this impact cannot be mitigated given the construction techniques that are required for the Project site. Vibration impacts associated with DDC operations during Project construction are concluded to be less than significant with the implementation of Mitigation Measures H-2 and H-3.

b. Operations

With implementation of Mitigation Measures H-7 through H-10 described above, operational noise impacts to the off-site existing residential uses located to the south and west of the Project site, as well as on-site residential developments, would be reduced to less than significant levels. In addition, the Project site would provide some noise-attenuation/shielding characteristics from I-405 traffic noise to the area, particularly for residential uses located south and west of the Project site.