## 5.3 NOISE

This section of the Draft Supplemental Environmental Impact Report (DSEIR) evaluates the potential noise impacts of the City of Anaheim Housing Opportunity Sites Rezoning Project ("Proposed Project") to the noise impacts of the 2004 Anaheim General Plan and Zoning Code Update ("2004 Approved Project"). The analysis in this section is based on buildout of the Proposed Project; average daily traffic volumes (ADTs), provided by the traffic engineer for this project (Iteris, Inc.) as modeled using the Anaheim Transportation Analysis Model (ATAM) (see Appendix F to this DSEIR). The traffic noise model output sheets are included in Appendix E of this DSEIR.

### 5.3.1 Environmental Setting

#### Terminology/Noise Descriptors

Noise is most often defined as unwanted sound. Although sound can be easily measured, the perception of noise and the physical response to sound complicate the analysis of its impact on people. People judge the relative magnitude of sound sensation in subjective terms such as "noisiness" or "loudness."

The following are brief definitions of terminology used in this section:

- ***Sound*** is a disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.

- ***Noise*** is sound that is loud, unpleasant, unexpected, or otherwise undesirable.

- ***Decibel (dB)*** is a unitless measure of sound on a logarithmic scale.

- ***A-Weighted Decibel (dBA)*** Is an overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.

- ***Equivalent Continuous Noise Level ($L_{eq}$)*** is the mean of the noise level averaged over the measurement period, regarded as an average level.

- ***Day-Night Level ($L_{dn}$)*** is the energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the sound levels occurring during the period from 10:00 PM to 7:00 AM.

- ***Community Noise Equivalent Level (CNEL)*** is the energy average of the A-weighted sound levels occurring during a 24-hour period with 5 dB added to the levels occurring during the period from 7:00 PM to 10:00 PM and 10 dB added to the sound levels occurring during the period from 10:00 PM to 7:00 AM.

$L_{dn}$ and CNEL values rarely differ by more than 1 dB. As a matter of practice, $L_{dn}$ and CNEL values are considered to be equivalent and are treated as such in this assessment.

## Characteristics of Sound

When an object vibrates, it radiates part of its energy as acoustical pressure in the form of a sound wave. Sound can be described in terms of amplitude (loudness), frequency (pitch), or duration (time). The human hearing system is not equally sensitive to sound at all frequencies. Therefore, to approximate this human, frequency-dependent response, the A-weighted filter system is used to adjust measured sound levels. The normal range of human hearing extends from approximately 0 dBA to 140 dBA.

Unlike linear units such as inches or pounds, dB are measured on a logarithmic scale, representing points on a sharply rising curve. Because of the physical characteristics of noise transmission and of noise perception, the relative loudness of sound does not closely match the actual amounts of sound energy. Table 5.3-1 presents the subjective effect of changes in sound pressure levels.

*Table 5.3-1*

*Decibel Changes, Loudness and Energy Loss*

| *Sound Level Change* | *Reletive Loundness* | *Acoustic Energy Loss* |
|---|---|---|
| 0 dBA | Reference | 0% |
| -3 dBA | Barely Perceptible Change | 50% |
| -5 dBA | Readily Perceptible Change | 67% |
| -10 dBA | Half as Loud | 90% |
| -20 dBA | 1/4 as Loud | 99% |
| -30 dBA | 1/8 as Loud | 99.9% |

Source: *Highway Traffic Noise Analysis and Abatement Policy and Guidance*, U.S. Department of Transportation, Federal Highway Administration (FHWA), Office of Environment and Planning, Noise and Air Quality Branch, June 1995.

Sound levels are generated from a source and their dB level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. This phenomenon is known as spreading loss. Generally, sound levels from a point source will decrease by 6.0 dBA for each doubling of distance. Sound levels for a highway line source vary differently with distance because sound pressure waves propagate along the line and overlap at the point of measurement. A closely spaced, continuous line of vehicles along a roadway becomes a line source and produces a 3.0 dBA decrease in sound level for each doubling of distance. However, experimental evidence has shown that where sound from a highway propagates close to "soft" ground (e.g., plowed farmland, grass, crops, etc.), a more suitable drop-off rate to use is not 3.0 dBA, but rather 4.5 dBA per distance doubling (FHWA 2010).

When sound is measured for distinct time intervals, the statistical distribution of the overall sound level during that period can be obtained. The $L_{eq}$ is the most common parameter associated with such measurements. The $L_{eq}$ metric is a single-number noise descriptor that represents the average sound level over a given period of time. For example, the $L_{50}$ noise level is the level that is exceeded 50 percent of the time. This level is also the level that is exceeded 30 minutes in an hour. Similarly, the $L_{02}$, $L_{08}$ and $L_{25}$ values are the noise levels that are exceeded 2, 8, and 25 percent of the time or one, five, and 15 minutes per hour. Other values typically noted during a noise survey are the $L_{min}$ and $L_{max}$. These values represent the minimum and maximum root-mean-square noise levels obtained over the measurement period.

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, State law requires that, for planning purposes, an artificial dB increment be added to quiet-time noise levels in a 24-hour noise descriptor called the CNEL or $L_{dn}$.

### Effects of Noise Exposure

Human response to sound is highly individualized. Annoyance is the most comment issue regarding community noise. Physical damage to human hearing can occur with prolonged exposure to noise levels higher than 85 dBA. High ambient or background noise levels are widespread and generally more concentrated in urban areas than in less developed areas. Elevated ambient noise levels can result in noise interference (e.g., speech interruption/masking, sleep disturbance, disturbance of concentration) and cause annoyance. Table 5.3-2 shows the typical noise levels emitted by common noise sources.

*Table 5.3-2*
*Typical Noise Levels and Their Subjective Loudness and Effects*

| *Common Outdoor Activities* | *Common Indoor Activities* | *A-Weighted Noise Level (dBA)* | *Subjective Loudness* | *Effects of Noise* |
|---|---|---|---|---|
| Threshold of Pain | | 140 | Intolerable or deafening | Hearing Loss |
| Near Jet Engine | | 130 | | |
| | | 120 | | |
| Jet Flyover at 1,000 Feet | Rock Band | 110 | | |
| Loud Auto Horn | | 100 | Very Noisy | |
| Gas Lawn Mower at 3 Feet | | 90 | | |
| Diesel Truck at 50 Feet at 50 mph | Food Blender at 3 Feet | 80 | | Speech Interference |
| Noisy Urban Area, Daytime | Vacuum Cleaner at 10 Feet | 70 | Loud | |
| Heavy Traffic at 300 Feet | Normal Speech at 3 Feet | 60 | | |
| Quiet Urban Daytime | Large Business Office | 50 | Moderate | |
| Quiet Urban Nighttime | Theater, Large Conference Room (Background) | 40 | | Sleep Disturbance |
| Quiet Suburban Nighttime | Library | 30 | Faint | No Effect |
| Quiet Rural Nighttime | Bedroom at Night, Concert Hall (Background) | 20 | | |
| | Broadcast/Recording Studio | 10 | Very Faint | |
| Lowest Threshold of Human Hearing | Lowest Threshold of Human Hearing | 0 | | |

Source: Technical Noise Supplement by Caltrans, 2009.

### Vibration Fundamentals

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 is normally associated with activities such as railroads or vibration-intensive stationary sources, but can also be associated with construction equipment such as jackhammers, pile drivers, and hydraulic hammers. Vibration displacement is the distance that a point on a surface moves away from its original static position. The instantaneous speed that a point on a surface moves is described as the velocity and the rate of change of

the speed is described as the acceleration. Each of these descriptors can be used to correlate vibration to building damage, and acceptable equipment vibration levels.

During construction of a development project, the operation of construction equipment can cause groundborne vibration. During the operational phase of a project, receptors may experience annoyance due to noise generated from vibration of a structure or items within a structure. This type of vibration is best measured in velocity and acceleration.

The three main wave types of concern in the propagation of groundborne vibrations are surface or Rayleigh waves, compression or P-waves, and shear or S-waves.

- Surface or Rayleigh waves travel along the ground surface. They carry most of their energy along an expanding cylindrical wave front, similar to the ripples produced by throwing a rock into a lake. The particle motion is more or less perpendicular to the direction of propagation (known as retrograde elliptical).

- Compression or P-waves are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal, in a push-pull motion. P-waves are analogous to airborne sound waves.

- Shear or S-waves are also body waves, carrying their energy along an expanding spherical wave front. Unlike P-waves, however, the particle motion is transverse, or perpendicular to the direction of propagation.

The peak particle velocity (PPV) or the root mean square (RMS) velocity is usually used to describe vibration amplitudes. PPV is defined as the maximum instantaneous peak of the vibration signal and RMS is defined as the square root of the average of the squared amplitude of the signal. PPV is more appropriate for evaluating potential building damage.

The units for PPV velocity is normally inches per second (in/sec). Often, vibration is presented and discussed in dB units in order to compress the range of numbers required to describe the vibration. In this study, all PPV and RMS velocity levels are in in/sec and all vibration levels are in dB relative to one microinch per second (abbreviated as VdB). Typically, groundborne vibration generated by human activities attenuates rapidly with distance from the source of the vibration. Even the more persistent Rayleigh waves decrease relatively quickly as they move away from the source of the vibration. Human-made vibration problems are, therefore, usually confined to short distances (500 feet or less) from the source.

Construction operations generally include a wide range of activities that can generate groundborne vibration. In general, blasting and demolition of structures generate the highest vibrations. Vibratory compactors or rollers, pile drivers, and pavement breakers can generate perceptible amounts of vibration at distances within 200 feet of the vibration sources. Heavy trucks can also generate groundborne vibrations, which vary depending on vehicle type, weight, and pavement conditions. Potholes, pavement joints, discontinuities, differential settlement of pavement, etc., all increase the vibration levels from vehicles passing over a road surface. Construction vibration is normally of greater concern than vibration of normal traffic on streets and freeways with smooth pavement conditions. Trains generate substantial quantities of vibration due to their engines, steel wheels, and heavy loads.

## Existing Noise Environment

Like all highly urbanized areas, the City of Anaheim ("City") is subject to noise from a myriad of sources. The major source of noise is from mobile sources and most specifically, traffic traveling through the City on its various roadways and freeways. Aircraft also contribute to this noise. The City is not located within the 65 dBA CNEL contours for any commercial or private airports, and fixed-wing aircraft are typically too high to add measurably to local noise. However, local helicopter air traffic is commonplace throughout the City and was noted in many instances during the field survey preformed in drafting the General Plan Noise Element. In addition, both freight and commuter rail-traffic pass through the City and noise generated along these rail lines can be substantially higher than in areas that are located away from the tracks. Noise from trains and their associated horns and whistles are a particular concern to those residents that live along these railroad corridors.

The City also includes a variety of stationary noise sources. These are primarily associated with industrial land uses and for the most part are restricted to the appropriate areas. However, in some areas (e.g., along Orangethorpe Avenue and in central portions of the City) residential land uses abut industrial land uses and the sound of industrial processes is readily audible at exterior residential locations. Other sources of "stationary" noise are associated with the fireworks displays put on at Disneyland on a regular basis and special events at Angel Stadium of Anaheim. While the latter sources of noise are readily audible at proximate residential locations, they represent the existing setting. Furthermore, this noise is of short duration and as such, does not add substantially to the existing CNEL, which is based on a 24-hour, time-weighted average.

## Regulatory Setting

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the Federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise. The City regulates noise through the Anaheim Municipal Code. Potential noise impacts were evaluated based on the Anaheim Municipal Code and City's General Plan, Federal Highway Administration (FHWA) methodology, and Federal Transit Administration (FTA) methodology to determine whether a significant adverse noise impact would result from the Proposed Project as compared to the 2004 Approved Project.

### *State of California Noise Requirements*

The State regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise insulation standards and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared according to guidelines adopted by the Governor's Office of Planning and Research. The purpose of the Noise Element is to "limit the exposure of the community to excessive noise levels."

In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts. Under CEQA, a project has a significant impact if the project exposes people to noise levels in excess of thresholds, which can include standards established in the local general plan or noise ordinance.

### State of California Building Code

The State's noise insulation standards are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 2, and the California Building Code. These noise standards are applied to new construction in the State for the purpose of controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are located near major transportation noise sources, and where such noise sources create an exterior noise level of 60 dBA CNEL or higher. Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new residential buildings, schools, and hospitals, the acceptable interior noise limit for new construction is 45 dBA CNEL.

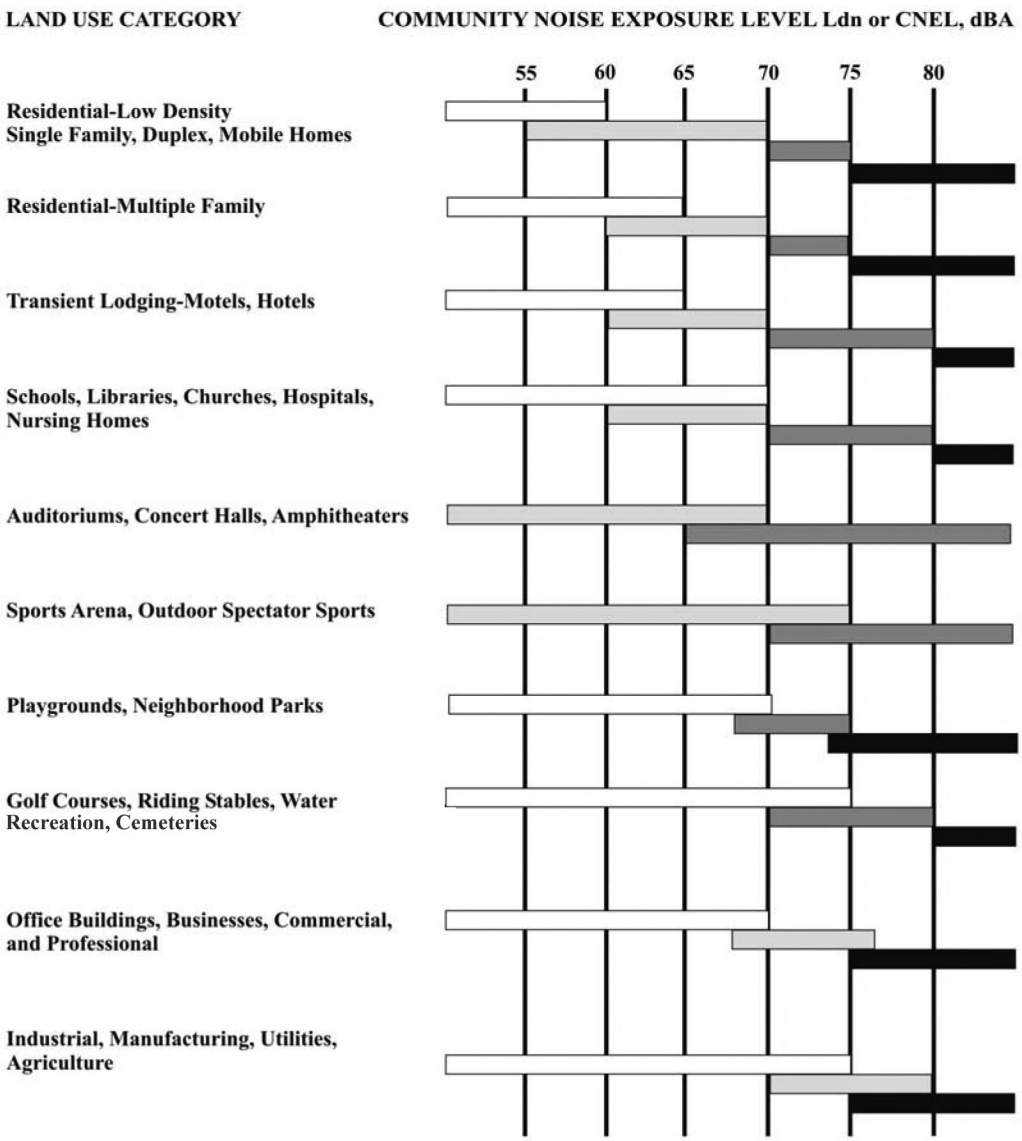
### City of Anaheim

The 2004 Approved Project is subject to the General Plan Noise Element and the Anaheim Municipal Code. The City has adopted, as part of the Noise Element, the State Noise Compatibility Guidelines, as included in Figure 5.3-1. Furthermore, according to Goal 1.1, Policy 6 the Noise Element, the siting sensitive uses in areas in excess of 65 dBA CNEL without appropriate mitigation shall be discouraged.

Stationary sources of noise are governed under Anaheim Municipal Code, Chapter 6.70, *Sound Pressure Levels*. Section 6.70.010 states that "No person shall, within the City, create any sound, radiated for extended periods from any premises which produces a sound pressure level at any point on the property in excess of [60 dB] (Re 0.0002 Microbar) read on the A-scale of a sound level meter. Readings shall be taken in accordance with the instrument manufacturer's instructions, using the slowest meter response." The section goes on to state "Traffic sounds, sound created by emergency activities and sound created by governmental units shall be exempt from the applications of this chapter. Sound created by construction or building repair of any premises within the City shall be exempt from the applications of this chapter during the hours of 7:00 [AM] and 7:00 [PM]."

Sound Attenuation for Residential Development is regulated by Section 18.40.090 of the Anaheim Municipal Code, which applies to residential developments involving the construction of two or more dwelling units, or residential subdivisions resulting in two or more parcels, and located within six hundred feet of any railroad, freeway, expressway, major arterial, primary arterial or secondary arterial, as designated by the Circulation Element of the General Plan. A noise level analysis is required for any new residential development or subdivision that meets these criteria to determine the projected interior and exterior noise levels within the development. The study must include mitigation measures that would be required to comply with applicable City noise standards. Minor deviations from the City's noise standards may be approved for the following reasons: 1) the deviation from prescribed levels does not pertain to interior noise levels; 2) the deviation does not exceed five dB CNEL above the prescribed levels for exterior noise; and, 3) the measures to attenuate noise to the prescribed levels would compromise or conflict with the aesthetic value of the project.

# Land Use Compatability Noise Exposure Guidelines



*This page intentionally left blank.*

### 5.3.2 Thresholds of Significance

Based on Appendix G of the CEQA Guidelines, the City has determined that a project would normally have a significant effect on the environment if the project would result in:

N-1 Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

N-2 Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

N-3 A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

N-4 A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

N-5 For a project located within an airport land use plan or where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.

N-6 For a project within the vicinity of a private airstrip, expose people residing or working the project area to excessive noise levels.

The Initial Study, included as Appendix A (also included in Chapter 7, *Impacts Found Not to Be Significant)*, concluded that thresholds N-5 and N-6 would not be significant for the Proposed Project, as compared to the 2004 Approved Project. The City determined that those impacts were sufficiently analyzed in the 2004 Certified EIR and that implementation of the changes proposed by the Proposed Project would not change the conclusions of the 2004 Certified EIR with respect to those impacts. Therefore, Thresholds N-5 and N-6 will not be addressed further in this section.

#### Noise Impact Thresholds

The applicable noise standards governing the project site are the noise standards set forth in the Anaheim Municipal Code. Mobile sources of noise, such as aircraft, truck deliveries, railroad and aircraft operations, are exempt from local ordinance but are still subject to CEQA and would be significant if the project generates a volume of traffic that would result in a substantial increase in mobile source-generated noise or sites sensitive land uses in incompatible noise areas.

The effects of changes in the noise environment to humans can be broken down into three categories. The first is “audible” increases, which refers to increases in noise level that are perceptible to humans. Audible increases in noise levels generally refer to a change of 3 dBA or more since this level has been found to be barely perceptible in exterior environments. A change of 5 dBA is readily audible to most people in an exterior environment. The second category, “potentially audible,” refers to a change in noise level between 1 and 3 dBA. This range of noise levels was found to be noticeable to sensitive people in laboratory environments. The last category includes changes in noise level of less than 1 dBA that are typically “inaudible” to the human ear except under quiet conditions in controlled environments. Only “audible” changes in noise level are considered potentially significant.

Mobile-source noise (i.e., vehicle noise) is preempted from local regulation, but is still subject to CEQA. Here, a change of 5 dBA would denote a significant impact if their resultant noise level were to remain within the objectives of the General Plan (e.g., 65 dBA CNEL at a residential location), or 3 dBA if the resultant level were to meet or exceed the objectives of the General Plan. It should also be noted that an impact is only potentially significant if it affects a noise-sensitive receptor. The 2004 Certified EIR utilized these criteria, which have been used for the noise analysis in this section.

### 5.3.3 The 2004 Approved Project

Noise impacts of the 2004 Approved Project were analyzed in the 2004 Certified EIR using the thresholds described above. Traffic noise modeling was conducted according to traffic volume forecasts provided by the Anaheim Circulation Report prepared by Parsons Brinckerhoff Quade and Douglas, Inc., dated September 3, 2003. The traffic volume forecasts were obtained from a version of the ATAM for a year 2025 year scenario. The 2004 Certified EIR identified the following conclusions regarding noise:

- Significant and Unavoidable Traffic Noise Impacts: The 2004 Certified EIR concluded that noise sensitive uses along several roadways would experience a substantial noise increase in excess of 65 CNEL. Mitigation measures were recommended to reduce potential noise impacts. Implementation of the proposed General Plan goals and policies, existing codes and regulations, and mitigation measures would reduce all potential short-term and long-term noise impacts to the extent feasible. However, even with implementation of mitigation measures and General Plan goals and policies, many roadways within the City would still be expected to generate significant noise impacts. As a result, in locations where these roadways are adjacent to existing sensitive land uses, the impacts related to traffic noise were anticipated to remain significant.

- Less Than Significant Noise Impacts: The 2004 Certified EIR concluded that short-term construction noise as well as other long-term operational noise sources such as events, railroad and aircraft activity would not result in significant noise and vibration impacts.

### 5.3.4 Environmental Impacts of the Proposed Project

#### Methodology

The following section outlines the methods and procedures used to model and analyze the future off-site noise environment and potential impacts of the Proposed Project.

#### *FHWA Traffic Noise Prediction Model*

The off-site traffic noise prediction model inputs are used to calculate the reference CNEL dBA noise levels at a distance of 50 feet from the centerline for the study area roadway segments. Noise level contours represent the distance to noise levels of a constant value and are measured from the center of the roadway. Noise level contours do not take into account the effect of any existing noise barriers or topography. The roadway noise impacts from vehicular traffic were projected using a computer program that replicates the FHWA Traffic Noise Prediction Model- FHWA-RD-77-108 ("FHWA Model"). The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial); the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway); the total average daily traffic (ADT); the travel speed; the percentages of automobiles, medium trucks, and heavy trucks in the

traffic volume; the roadway grade; the angle of view (e.g., whether the roadway view is blocked); the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping); and the percentage of total ADT that flows each hour throughout a 24-hour period. The FHWA Model roadway parameters used in the noise analysis of the Proposed Project and calculations are included in Appendix E of this DSEIR.

The City's General Plan Buildout 2035 ADT volumes were used for the off-site traffic-noise prediction model. The volumes were provided by the Traffic Impact Analysis prepared by ITERIS for the Proposed Project (see Appendix F of this DSEIR). Traffic forecasts were obtained from the new ATAM model for year 2035 conditions. To calculate the noise increases from the 2004 Approved Project with the Proposed Project, traffic forecasts for the approved project (for year 2025 conditions) were incorporated into the new traffic noise model to provide a comparison using up-to-date noise modeling methodologies.

Noise contours for the Proposed Project were based on updated traffic volumes forecasts from the new ATAM model for the 2035 General Plan Buildout year. The new ATAM model includes changes to land use forecasts related to the General Plan amendments completed since 2004, the Proposed Project, as well as other changes to future land use assumptions (Iteris 2013).

***IMPACT 5.3-1 SIMILAR TO THE 2004 APPROVED PROJECT, THE PROPOSED PROJECT WOULD NOT SUBSTANTIALLY ELEVATE TRAFFIC NOISE LEVELS ABOVE LOCAL NOISE STANDARDS AT NOISE-SENSITIVE RECEPTORS. [THRESHOLDS N-1 AND N-3]***

***Impact Analysis:*** To assess the off-site traffic-related exterior noise level impacts associated with the Proposed Project, the CNEL levels at a distance of 50 feet from the roadway segments included in the traffic study area were developed for the 2004 Approved Project and the Proposed Project.

### Off-site Traffic-Related Noise Contours

To quantify the Proposed Project's traffic noise impact on the surrounding off-site areas, the changes in traffic noise levels on the study area roadway segments were determined based on the anticipated changes in the ADT volumes compared to the 2004 Approved Project.

The purpose of the off-site noise contours is to assess the Proposed Project's incremental off-site traffic-related noise impacts at land uses adjacent to roadways. Noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 60, 65 and 70 dBA noise levels. The traffic noise model calculations that include the distance from the centerline of the roadway to the CNEL noise level contours are included in Appendix E. The off-site traffic noise contours do not take into account the effect of any existing noise barriers or topography that may affect ambient noise levels. In addition, they do not include the noise contribution from commercial and industrial activities within proximity to receptors along each roadway segment.

### Off-site Proposed Project Traffic-Related Noise Level Contributions

Based on the significance criteria presented earlier in Section 5.8-2, *Thresholds of Significance*, a change of 5 dBA would denote a significant impact if their resultant noise level were to remain within the objectives of the General Plan (e.g., 65 dBA CNEL at a residential location), or 3 dBA if the resultant

level were to meet or exceed the objectives of the General Plan. Table 5.3-3 presents an off-site traffic noise level comparison of the 2004 Approved Project (the baseline) to the Proposed Project.

As demonstrated in Table 5.3-3, the Proposed Project, as compared to the 2004 Approved Project, would result in a change to the off-site traffic noise levels of between -9.4 and 4.2 dBA CNEL on the roadway segments analyzed. Based on the criteria to deterine potential significant impacts outlined above, only the uses adjacent to the segment of Disney Way between Clementine Street to Interstate-5 (I-5) Freeway would experience a significant noise increase. Land uses along this roadway segment consist of hotels and commercial uses. The *Noise Compatibility Guidelines* included in the Noise Element shows that, for transient lodging-motels and hotels, an ambient noise level of up to 65 dBA CNEL is *normally acceptable*, an ambient noise level from 60 to 70 dBA CNEL is *conditionally acceptable*, and an ambient noise level from 70 to 80 dBA CNEL is normally unacceptable. Under *normally acceptable* conditions, the noise level exposure for the specified land use is satisfactory and no special noise insulation would be required. Under *conditionally acceptable* conditions, new construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed noise insulation features in the design are determined. Under *normally unacceptable* conditions, new construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed insulation features must be included in the design.

The anticipated noise level environment would remain under *conditionally acceptable* levels for the development of commercial uses. The two affected hotel sites, currently developed as a Motel 6 and a Residence Inn, do not have exterior living areas such as swimming pools facing Disney Way/Freedman Way. The affected hotels would continue to be exposed to noise levels that are *conditionally acceptable* for hotel uses. The outdoor use areas would not be affected as they are surrounded by two- and three-story buildings which provide substantial noise reduction greater than 20 dBA. Existing outdoor activity areas such as pools, playgrounds and dining patios would not be exposed to noise levels greater than the clearly acceptable 65 dBA CNEL noise level.

New hotel and commercial uses would be designed for the future noise environment and would have to comply with City's noise standards. Because the noise at the existing outdoor use areas would not be substantially affected, and because the land uses adjacent to that segment would remain under the *conditionally acceptable* category as it relates to the development of hotel and commercial uses to the noise environment, noise impacts to uses along the affected segment would be less than significant. Therefore, off-site traffic-related noise impacts are considered less than significant.

Table 5.3-3
Off-Site Project Related Traffic Noise Impacts

| Roadway | Segment | CNEL at 50 Feet (dBA) | | | Substantial Increase? |
|---|---|---|---|---|---|
| | | 2004 Approved Project[1] | Proposed Project[1] | Proposed Project Contribution | |
| Anaheim Boulevard | North of Cerritos Avenue to Cerritos Avenue | 72.8 | 75.7 | 2.9 | No |
| Ball Road | SR-57 (West Side) to SR-57 (East Side) | 78.8 | 79.1 | 0.3 | No |
| Ball Road | SR-57 (East Side) to West of Main Street | 78.2 | 79.5 | 1.4 | No |
| Ball Road | West of Main Street to Main Street | 78.2 | 79.5 | 1.3 | No |
| Cerritos Avenue | Euclid Street to Ninth Street | 69.1 | 69.2 | 0.1 | No |
| Cerritos Avenue | Ninth Street to West of Walnut Street | 69.1 | 69.2 | 0.1 | No |
| Cerritos Avenue | West of Walnut Street to Walnut Street | 69.1 | 69.2 | 0.1 | No |
| Cerritos Avenue | State College Blvd to West of Sunkist Street | 69.5 | 68.3 | -1.2 | No |
| Cerritos Avenue | West of Sunkist Street to Sunkist Street | 69.5 | 68.3 | -1.2 | No |
| Cerritos Avenue | Sunkist Street to Douglass Road | 68.3 | 69.1 | 0.8 | No |
| Disney Way/Freedman Way | Harbor Blvd to Clementine Street | 72.6 | 73.0 | 0.4 | No |
| Disney Way/Freedman Way | Clementine Street to I-5 (West Side) | 72.6 | 76.8 | 4.2 | **Yes** |
| Harbor Boulevard | SR-91 to SR-91 (South Side) | 87.7 | 78.3 | -9.4 | No |
| Harbor Boulevard | South Street to Ball Road | 78.9 | 77.8 | -1.1 | No |
| Haster Street/Anaheim Boulevard | Manchester Avenue to North of Gene Autry Way | 78.5 | 77.1 | -1.4 | No |
| Haster Street/Anaheim Boulevard | North of Gene Autry Way to Gene Autry Way | 78.5 | 77.1 | -1.4 | No |
| Imperial Highway | E La Palma Avenue to North of SR-91 | 81.1 | 79.3 | -1.8 | No |
| Katella Avenue | West of Walnut Street to Walnut Street | 78.6 | 78.0 | -0.6 | No |
| Katella Avenue | Walnut Street to West Street | 78.6 | 78.0 | -0.6 | No |
| Katella Avenue | West Street to West of Harbor Blvd | 87.0 | 87.4 | 0.4 | No |
| Katella Avenue | West of Harbor Blvd to Harbor Blvd | 87.0 | 87.4 | 0.4 | No |
| Katella Avenue | Harbor Blvd to Clementine Street | 87.4 | 86.8 | -0.6 | No |
| Katella Avenue | Clementine Street to West of Haster Street | 87.4 | 87.1 | -0.3 | No |
| Katella Avenue | West of Haster Street to Haster Street | 87.4 | 87.1 | -0.3 | No |
| Katella Avenue | Haster Street to I-5 (East Side) | 88.0 | 87.8 | -0.2 | No |
| Katella Avenue | I-5 (East Side) to Anaheim | 88.2 | 88.7 | 0.5 | No |

Table 5.3-3
Off-Site Project Related Traffic Noise Impacts

| Roadway | Segment | CNEL at 50 Feet (dBA) | | | Substantial Increase? |
|---|---|---|---|---|---|
| | | 2004 Approved Project[1] | Proposed Project[1] | Proposed Project Contribution | |
| | Blvd | | | | |
| Katella Avenue | Anaheim Blvd to Lewis Street | 88.2 | 88.7 | 0.5 | No |
| Katella Avenue | Lewis Street to East of Lewis Street | 87.7 | 88.1 | 0.4 | No |
| Katella Avenue | East of Lewis Street to West of State College Blvd | 87.7 | 88.1 | 0.4 | No |
| Katella Avenue | West of State College Blvd to State College Blvd | 87.7 | 88.1 | 0.4 | No |
| Katella Avenue | State College Blvd to SR-57 (West Side) | 87.4 | 88.0 | 0.6 | No |
| Katella Avenue | SR-57 (West Side) to Douglass Road | 87.4 | 88.0 | 0.6 | No |
| La Palma Avenue | Euclid Street to West of West Street | 72.4 | 72.3 | -0.1 | No |
| La Palma Avenue | West of West Street to West Street | 72.4 | 72.3 | -0.1 | No |
| La Palma Avenue | West Street to Citron Drive | 72.4 | 72.4 | 0.0 | No |
| La Palma Avenue | Kraemer Blvd to West of Miller Street | 78.7 | 76.1 | -2.6 | No |
| La Palma Avenue | West of Tustin Avenue to Tustin Avenue | 77.9 | 76.5 | -1.4 | No |
| La Palma Avenue | Imperial Highway to East of Imperial Highway | 76.8 | 74.7 | -2.1 | No |
| Lincoln Avenue | Lemon Street to Anaheim Blvd | 77.5 | 76.5 | -1.0 | No |
| Nohl Ranch Road | Nohl Ranch Road to East of Nohl Ranch Road | 70.2 | 67.7 | -2.5 | No |
| Nohl Ranch Road | East of Nohl Ranch Road to West of Meats Avenue | 70.2 | 67.7 | -2.5 | No |
| Nohl Ranch Road | Imperial Highway to East of Imperial Highway | 73.4 | 70.7 | -2.7 | No |
| Nohl Ranch Road | Anaheim Hills Road to Canyon Rim Road | 71.1 | 71.1 | 0.0 | No |
| Oak Canyon Drive | Serrano Avenue to West of Weir Canyon Road | 66.0 | 67.1 | 1.1 | No |
| Oak Canyon Drive | West of Weir Canyon Road to Weir Canyon Road | 66.0 | 67.1 | 1.1 | No |
| Orangewood Avenue | I-5 (East Side) to West of State College Blvd | 77.1 | 77.9 | 0.8 | No |
| Orangewood Avenue | West of State College Blvd to State College Blvd | 77.1 | 77.9 | 0.8 | No |
| Serrano Avenue | Nohl Ranch Road to East of Nohl Ranch Road | 69.9 | 69.2 | -0.7 | No |
| Serrano Avenue | East of Nohl Ranch Road to East of Nohl Ranch Road (1) | 69.9 | 69.2 | -0.7 | No |
| Serrano Avenue | East of Nohl Ranch Road (1) to West of Canyon Rim Road | 71.0 | 68.9 | -2.1 | No |

Table 5.3-3
Off-Site Project Related Traffic Noise Impacts

| Roadway | Segment | CNEL at 50 Feet (dBA) | | | Substantial Increase? |
|---|---|---|---|---|---|
| | | 2004 Approved Project[1] | Proposed Project[1] | Proposed Project Contribution | |
| Serrano Avenue | West of Canyon Rim Road to Canyon Rim Road | 71.0 | 68.9 | -2.1 | No |
| Serrano Avenue | Canyon Rim Road to East of Canyon Rim Road | 71.4 | 70.3 | -1.1 | No |
| Serrano Avenue | East of Canyon Rim Road to West of Oak Canyon Drive | 71.4 | 70.3 | -1.1 | No |
| Serrano Avenue | West of Oak Canyon Drive to Oak Canyon Drive | 71.4 | 70.3 | -1.1 | No |
| Serrano Avenue | Oak Canyon Drive to West of Weir Canyon Road | 72.2 | 70.9 | -1.3 | No |
| Serrano Avenue | West of Weir Canyon Road to Weir Canyon Road | 72.2 | 70.9 | -1.3 | No |
| State College Boulevard | Katella Avenue to Orangewood Avenue | 86.9 | 86.8 | -0.1 | No |
| State College Boulevard | Orangewood Avenue to North of I-5 | 86.6 | 86.1 | -0.5 | No |
| Sunkist Street | Ball Road to North of Cerritos Avenue | 69.6 | 67.0 | -2.6 | No |

Note: Traffic noise model outputs included in Appendix E.
**Bold** indicates a substantial increase between the noise impacts related to the 2004 Approved Project and the Proposed Project.

***IMPACT 5.3-2 SIMILAR TO THE 2004 APPROVED PROJECT, STATIONARY SOURCES OF NOISE GENERATED BY THE PROPOSED PROJECT WOULD COMPLY WITH THE CITY'S GENERAL PLAN NOISE ELEMENT AND ANAHEIM MUNICIPAL CODE STANDARDS AND WOULD NOT SUBSTANTIALLY INCREASE AMBIENT NOISE LEVELS AT SENSITIVE RECEPTORS PROXIMATE TO HOUSING OPPORTUNITY SITES. [IMPACTS N-1 AND N-3]***

***Impact Analysis:*** Project-related stationary source noise impacts would include activities associated with development of the 221 Housing Opportunity Sites to be developed as residential land uses, as presented in Tables 3-3, *Parcels to Apply Mixed Use (MU) Overlay Zone*, and Table 3-4, *Parcels to Apply Residential Opportunity (RO) Overlay Zone*. Of the 221 Housing Opportunity Sites, five are zoned for mixed use and the remaining are zoned residential. The stationary sources related to residential land uses generally include air conditioners, yard care equipment, trash trucks, delivery vehicles, street sweepers, and outdoor neighborhood recreation activities. The mixed-use sites are currently utilized for commercial uses. The stationary-source noise impacts expected from the Proposed Project are consistent with existing sources and/or those identified in the 2004 Certified EIR, as residential and mixed-use uses are not major sources of noise; rather they typically generate noise levels compatible with noise-sensitive uses.

The development of residential projects at each of the 221 Housing Opportunity Sites would be required to be designed to meet City's noise standards. Prior to issuance of building permits, the property owner/developer would be required to demonstrate that project's noise levels would be less than 65 dBA CNEL for future proposed outdoor use areas. Therefore, the Proposed Project's impacts concerning stationary noise and noise-sensitive receptors would be less than significant.

***IMPACT 5.3-3 SIMILAR TO THE 2004 APPROVED PROJECT, THE PROPOSED PROJECT WOULD NOT RESULT IN EXPOSURE OF PERSONS TO OR GENERATION OF EXCESSIVE GROUNDBORNE VIBRATION OR GROUNDBORNE NOISE LEVELS. [IMPACT N-2]***

***Impact Analysis:*** Buildout of the 2004 Approved Project or the Proposed Project could potentially cause vibration impacts during construction of individual projects on the 221 Housing Opportunity Sites. Excessive groundborne vibration is typically caused by activities such as blasting, or the use of pile drivers during construction. Construction under the 2004 Approved Project may require blasting activities in the Hill and Canyon Area of the City, and pile driving could occur which would produce vibration that could be felt at nearby land uses. These vibrations pose not only a nuisance, but also a risk to proximate structures. However, these impacts would be assessed at the time specific development applications are submitted.

As a reasonable worst-case scenario, an impact pile driver, which would generate greater vibrations, is assumed. While the City has no vibration standards, the California Department of Transportation ("Caltrans") sets the criterion level for pile driving at between 0.2 and 2 inches per second. A reasonable worst-case scenario assumes the use of the 0.2 inch per second criterion. Caltrans presents the vibration produced by a 50,000 foot-pound force with distance for both clayey and sandy/silt soils as a function of distance. Caltrans indicates that the distance to the 0.2 inch per second minimum criterion falls at a distance of approximately 50 feet. Still, like construction, pile driving carries a high nuisance factor and vibration related to pile-driving activities is considered as potentially significant if these activities are performed within 200 feet of any permanent structures.

***IMPACT 5.3-4 SIMILAR TO THE 2004 APPROVED PROJECT, THE PROPOSED PROJECT WOULD NOT RESULT IN EXPOSURE OF PERSONS TO OR GENERATION OF EXCESSIVE NOISE LEVELS DURING CONSTRUCTION. [IMPACT N-4]***

***Impact Analysis:*** The City recognizes that construction noise is difficult to control and restricts allowable hours for this intrusion. Section 6.70.010 of the Anaheim Municipal Code states that the sound created by construction or building repair of any premises within the City shall be exempt from the applications of the chapter between the hours of 7:00 AM and 7:00 PM. Compliance with these provisions is mandatory and, as such, does not constitute mitigation under CEQA. Still, construction, even when restricted to within these hours, presents a nuisance value when conducted in proximity to sensitive receptors and the impact is considered as potentially significant.

Short-term noise impacts would be impacts associated with demolition, site preparation, grading and construction of residential development on the Housing Opportunities Sites. Two types of short-term noise impacts could occur during construction. First, the transport of workers and movement of materials to and from a project site could incrementally increase noise levels along local access roads. The second type of short-term noise impact is related to noise generated at a project site during demolition, site preparation, grading and/or physical construction. Construction is performed in distinct steps, each of which has its own mix of equipment, and, consequently, its own noise characteristics. However, despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table 5.3-4 lists typical construction equipment noise levels recommended for noise impact assessments as based on a distance of 50 feet between the equipment and a noise receptor.

Composite construction noise is best characterized by Bolt, Beranek and Newman (EPA December 31, 1971). In their study, construction noise for commercial and industrial development is presented as 89 dBA $L_{eq}$ when measured at a distance of 50 feet from the construction effort. Residential development is slightly quieter with a composite noise level of about 88 dBA $L_{eq}$, again when measured at a distance of 50 feet from the construction effort. These values take into account both the number of pieces and spacing of the heavy equipment used in the construction effort. In later phases during building assembly, noise levels are typically reduced from these values and the physical structures further break up line-of-sight noise propagation.

*Table 5.3-4*
*Noise Levels Generated by Typical Construction Equipment*

| Type of Equipment | Range of Sound Levels Measured (dBA at 50 feet) | Suggested Sound Levels for Analysis (dBA at 50 feet) |
|---|---|---|
| Pile Drivers, 12,000 to 18,000 ft-lb/blow[1] | 81 to 96 | 93 |
| Rock Drills | 83 to 99 | 96 |
| Jack Hammers | 75 to 85 | 82 |
| Pneumatic Tools | 78 to 88 | 85 |
| Pumps | 68 to 80 | 77 |
| Dozers | 85 to 90 | 88 |
| Tractor | 77 to 82 | 80 |
| Front-End Loaders | 86 to 90 | 88 |
| Hydraulic Backhoe | 81 to 90 | 86 |
| Hydraulic Excavators | 81 to 90 | 86 |
| Graders | 79 to 89 | 86 |
| Air Compressors | 76 to 86 | 86 |
| Trucks | 81 to 87 | 86 |

Source: Noise Control for Buildings and Manufacturing Plants," Bolt, Beranek and Newman, 1987.
1 Pile drivers can be classified by striking energy per blow, which is a measure of power.

Based on the noise levels generated by typical construction equipment listed above, construction activities would have the potential to cause substantial noise increases at noise-sensitive uses surrounding a construction suite when compared to a typical urban environment of 50 to 70 dBA. As most construction equipment would have the potential to cause noise increases over 5 dBA, which is a noise increase considered clearly perceptible. Without mitigation, construction activities could cause significant noise impacts at noise sensitive uses adjacent to construction sites. Mitigation of these impacts to a level that is less than significant would be conducted both at the project level through the enforcement of the Anaheim Municipal Code and in a broader sense through the policies of the General Plan Noise Element. With implementation of MM 5.10-1 and implementation of the General Plan goals and policies included in the 2004 Approved Project, these impacts would be less than significant.

### Relevant Goals and Policies

The General Plan policies relating to operational noise include:

- Continue to enforce acceptable noise standards consistent with health and quality of life goals and employ effective techniques of noise abatement through such means as a noise ordinance, building codes, and subdivision and zoning regulations. (Noise Element, Goal 1, Policy 2)

- Discourage the siting of sensitive uses in areas in excess of 65 dBA CNEL without appropriate mitigation. (Noise Element, Goal 1, Policy 6)

- Require that site-specific noise studies be conducted by a qualified acoustic consultant utilizing acceptable methodologies while reviewing the development of sensitive land uses or development that has the potential to impact sensitive land uses. (Noise Element, Goal 1, Policy 7)

- Discourage new projects located in commercial or entertainment areas from exceeding stationary-source noise standards at the property line of proximate residential or commercial uses, as appropriate. (Noise Element, Goal 3, Policy 1)

- Prohibit new industrial uses from exceeding commercial or residential stationary-source noise standards at the most proximate land uses, as appropriate. (Industrial noise may spill over to proximate industrial uses so long as the combined noise does not exceed the appropriate industrial standards.) (Noise Element, Goal 3, Policy 2)

- Expand and enforce standards to regulate noise from construction activities. Particular emphasis shall be placed on the restriction of the hours in which work other than emergency work may occur. Discourage construction on weekends or holidays except in the case of construction proximate to schools where these operations could disturb the classroom environment. (Noise Element, Goal 3, Policy 3)

The General Plan policies relating to railroad noise include:

- Encourage the construction of noise barriers by the Public Utilities Commission, Southern California Regional Rail Authority, Union Pacific, Burlington Northern & Santa Fe and Amtrak where residences exist next to the track. (Noise Element, Goal 2, Policy 6)

- Encourage the Public Utilities Commission, Southern California Regional Rail Authority, Union Pacific, Burlington Northern & Santa Fe and Amtrak to minimize the level of noise produced by train movements and whistle noise within the City by reducing speeds, reducing the number of nighttime operations, improving vehicle system technology and developing improved sound mitigation where residences exist next to the track. (Noise Element, Goal 2, Policy 7)

- Encourage the use of sound-deadening matting (as opposed to wood) leading to, from and between the rails where public roads cross tracks in residential areas. (Noise Element, Goal 2, Policy 8)

The General Plan policies relating to construction noise include:

- Continue to enforce the noise standards of the State Motor Vehicle Code and other State and Federal legislation pertaining to motor vehicle noise. (Noise Element, Goal 2, Policy 1)

- Employ noise mitigation practices, as necessary, when designing future streets and highways, and when improvements occur along existing highway segments. Mitigation measures should emphasize the establishment of natural buffers or setbacks between the arterial roadways and adjoining noise-sensitive areas. (Noise Element, Goal 2, Policy 2)

- Maintain roadways so that the paving is in good condition to reduce noise generating cracks, bumps, and potholes. (Noise Element, Goal 2, Policy 4)

- Require sound walls, berms and landscaping along existing and future highways and railroad right-of-ways to beautify the landscape and reduce noise, where appropriate. (Noise Element, Goal 2, Policy 5)

The General Plan policies relating to reducing noise impacts to sensitive receptors include:

- Discourage the siting of sensitive uses in areas in excess of 65 dBA CNEL without appropriate mitigation. (Noise Element, Goal 1.1, Policy 6)

- Require that site-specific noise studies be conducted by a qualified acoustic consultant for the development of sensitive land uses utilizing acceptable methodologies while reviewing the development of sensitive land uses or development that has the potential to impact sensitive land uses. (Noise Element, Goal 1.1, Policy 7)

The General Plan policies relating to reducing noise impacts from industrial land use include:

- Discourage new projects located in commercial or entertainment areas from exceeding stationary-source noise standards at the property line of proximate residential or commercial uses, as appropriate. (Noise Element, Goal 3, Policy 1)

- Prohibit new industrial uses from exceeding commercial or residential stationary-source noise standards at the most proximate land uses, as appropriate (Industrial noise may spill over to proximate industrial uses so long as the combined noise does not exceed the appropriate industrial standards.). (Noise Element, Goal 3, Policy 2)

#### Existing Codes and Policies

The City shall restrict noise intensive construction activities to the hours specified under Chapter 6.70 of the Anaheim Municipal Code (i.e., 7:00 AM to 7:00 PM). These hours shall also apply to any servicing of equipment and to the delivery of materials to or from the site. In addition, construction shall be restricted to weekdays and Saturdays between the hours of 7:00 AM and 7:00 PM. Construction shall be prohibited on Sundays or Federally recognized holidays.

### *5.3.5 Applicable Mitigation Measures from the 2004 Certified EIR*

All of the mitigation measures related to noise that were specified in the 2004 Certified EIR and adopted in the MMRP for the 2004 Approved Project are set forth below. These mitigation measures will also be incorporated into the Proposed Project.

MM 5.10-1 Prior to the issuance of building permits for any project generating over 100 peak hour trips, the project property owner/developer shall submit a final acoustical report prepared to the satisfaction of the Planning Director. The report shall show that the development will be sound-attenuated against present and projected noise levels, including roadway, aircraft, helicopter and railroad, to meet City interior and exterior noise standards.

MM 5.10-2 Prior to issuance of a building permit, the project property owner/developer shall use the most current available Airport Environs Land Use Plan (AELUP) as a planning resource for evaluating heliport and airport operations as well as land use compatibility and land use

intensity in the proximity of Los Alamitos Joint Training Base and Fullerton Municipal Airport.

### 5.3.6 Level of Significance Before Additional Mitigation

Upon implementation of regulatory requirements, relevent goals and policies, and the mitigation measures adopted in the MMRP for the 2004 Approved Project, as listed above, Impacts 5.3-2, and 5.3-3 would be less than significant for the Proposed Project and the 2004 Approved Project. For Impact 5.3-1, even with implementation of mitigation measures and General Plan goals and policies, many roadways within the City would still be expected to generate significant noise impacts. As a result, in locations where these roadways are adjacent to existing sensitive land uses, similar to the 2004 Approved Project, the impacts are anticipated to remain significant for the Proposed Project.

### 5.3.7 Additional Mitigation Measures for the Proposed Project

No additional mitigation measures are required because there is no substantial increase in the severity of a previously identified significant effect. The mitigation measures identified in the 2004 Certified EIR and adopted in the MMRP for the 2004 Approved Project would reduce noise impacts of the Proposed Project to the extent practicable.

### 5.3.8 Level of Significance After Additional Mitigation

#### Impact 5.1-1

Similar to the 2004 Approved Project, with the Proposed Project, many roadways within the City would still be expected to generate significant noise impacts. Mitigation Measures 5.10-1 and 5.10-2 would reduce operational noise impacts to the extent feasible. Additionally, like the 2004 Approved Project, Impact 5.3-1 would remain significant and unavoidable for the Proposed Project even after the incorporation of mitigation.

#### Impacts 5.3-2, 5.3-3, and 5.3-4

With implementation of the existing regulations and mitigation measures outlined above from the 2004 Certified EIR, potential impacts of the Proposed Project associated with noise would be reduced to a level that is less than significant for Impact 5.3-2, Impact 5.3-3 and 5.3-4.

*This page intentionally left blank.*