

### 3.9 NOISE

The information in this section is based on the *SR-22/West Orange County Connection Traffic Noise Impact Technical Report* (December 2000) and the *Reduced Build Alternative Traffic Noise Impact Technical Report Addendum* (December 2000). For a more detailed analysis, these documents are available under a separate cover for review at Caltrans and OCTA.

#### 3.9.1 Fundamentals of Traffic Noise

What we hear as sound is a series of continuous air pressure fluctuations superimposed on the atmospheric pressure that surrounds us. The amplitude of fluctuation is related to the energy carried in a sound wave; the greater the amplitude, the greater the energy, and the louder the sound. The full range of sound pressures encountered in the world is so great that it is more convenient to compress the range by using a logarithmic scale, expressed in decibels (dB).

Another aspect of sound is the quality described as its pitch or frequency. Sound is measured using a sound level meter with a microphone designed to respond accurately to all audible frequencies. The human hearing system, however, does not respond equally to all frequencies. Very low and very high frequencies are not heard by the human ear. To approximate the way humans interpret sound, a filter is used, resulting in what are called A-weighted sound levels, expressed in A-weighted decibels or dBA. Community noise is usually characterized in terms of the A-weighted sound level. Table 3.9-1 illustrates the A-weighted levels of common sounds. The range of human hearing extends from about 0 dBA for young healthy ears (that have not been exposed to loud noise sources) to about 140 dBA. When sounds exceed 110 dBA, there is a potential for hearing damage, even with relatively short exposures. In quiet suburban areas far from major freeways, the noise levels during the late night hours will drop to about 30 dBA. Outdoor noise levels lower than this only occur in isolated areas where there is a minimum of natural noises, such as leaves blowing in the wind, crickets, or flowing water.

Another characteristic of environmental noise is that it is constantly changing. The noise level increase when a train passes is an example of a short-term change. Average noise levels during nighttime hours, when activities are at a minimum, are usually lower than noise levels during daytime hours. This is an example of daily patterns of noise level fluctuation. Because of these fluctuations, the A-weighted sound level at any one time is insufficient to describe the overall acoustic "environment." More useful noise descriptors average noise levels over time to provide an indication of the overall noise environment. Equivalent sound level (Leq) is a widely used descriptor for environmental noise. The Leq is a measure of the average noise level during a specified period of time. For example, Leq(h), expressed in dBA, is used for the average noise over one hour adjusted for human hearing.

Under controlled conditions in an acoustics laboratory, the trained healthy human ear is able to discern changes in sound levels of one dBA when exposed to steady, single-frequency ("pure tone") signals in the mid-frequency range. Outside of such controlled conditions, the trained ear can detect changes of two dBA in normal environmental noise. It is widely accepted that the average healthy ear, however, can barely perceive noise level changes of three dBA.

The following list contains some general rules for community noise:

- A three-dB change is barely perceptible, and is the minimum most people will notice in most environments.
- A five-dB change is a readily perceptible increase or decrease in sound level.
- Under free-field conditions, where there are no reflections or barriers, sound decreases at a rate of six dB for each doubling of distance for a point source and three dB for each doubling of distance for a line source (such as freeway traffic). For example, a point source sound level of 70 dB at a distance of 30 meters (100 feet) would decrease to 64 dB at 60 meters (200 feet) and a line source sound level of 70 dB would decrease to 67 dB over the same change in distance.
- Sounds such as sirens, bells, and horns are more noticeable and generally perceived as more annoying than normal noise.

- A ten-dB increase in sound level is perceived as an approximate doubling of the loudness of the sound and represents a substantial change in loudness.

**Table 3.9-1  
TYPICAL NOISE LEVELS**

<b>COMMON OUTDOOR ACTIVITIES</b>	<b>NOISE LEVEL dBA</b>	<b>COMMON INDOOR ACTIVITIES</b>
Jet Fly-over at 300 m (1000 ft)	---110---	Rock Band
Gas Lawn Mower at 1 m (3 ft)	---100---	
Diesel Truck at 15 m (50 ft), at 80 km/hr (50 mph)	---90---	Food Blender at 1 m (3 ft) Garbage Disposal at 1 m (3 ft)
Noisy Urban Area, Daytime	---80---	Vacuum Cleaner at 3 m (10 ft) Normal Speech at 1 m (3 ft)
Gas Lawn Mower, 30 m (100 ft)	---70---	
Commercial Area	---60---	Large Business Office Dishwasher Next Room
Heavy Traffic at 90 m (300 ft)	---50---	
Quiet Urban Daytime	---40---	Theater, Large Conference Room (Background)
Quiet Urban Nighttime	---30---	Library
Quiet Suburban Nighttime	---20---	Bedroom at Night, Concert Hall (Background)
Quiet Rural Nighttime	---10---	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	---0---	Lowest Threshold of Human Hearing

Source: Caltrans, TeNS, 1998.

### 3.9.2 Noise Measurement and Modeling

Within the project study area there are numerous noise receivers that need to be examined for future traffic noise impacts. It is not reasonable, or possible, to examine the impacts at all of these receivers. Therefore, receivers were carefully selected for the noise analysis to represent the existing noise-sensitive land uses. The following guidelines were followed in selecting noise measurement sites for this project:

1. The first row of existing residential land uses located along the freeway right-of-way were selected because they are expected to receive the highest future noise levels over the period covered by the analysis.
2. Other noise-sensitive locations, such as schools and parks, were included.
3. Receivers were selected to represent areas where the roadway was elevated, at-grade, or depressed.
4. Receivers located at different elevations to the roadway were also selected.

Based on this criteria, existing and reasonably expected (i.e., planned and programmed) future noise-sensitive land uses were identified. Existing noise levels for these receivers were determined by measurements and modeling. Short-term (15- to 20-minute) noise measurements were taken at 34 of these noise-sensitive land uses. Ten long-term (24-hour) noise measures were also taken at noise-sensitive land uses.

An additional 45 noise-sensitive receiver sites were "modeled" to supplement the 44 measurement sites. These modeling sites represent additional first-row residential receivers, schools, parks, and commercial

uses where frequent outdoor uses occur, such as outdoor seating for restaurants, outdoor shopping areas, or automobile sales lots. (Note: parking lots are not included as frequent outdoor use areas because the time spent in parking lots is generally brief.)

Figure 3.9-1, at end of this section, shows the location of these noise measurement and modeling sites. Table 3.9-2 lists the sites and the existing noise levels. In the figure and table, short-term noise measurement sites are indicated by a single number (1, 2, 3, etc.), while 24-hour measurement sites are indicated by single letter (A, B, C, etc.). Modeled sites are indicated by a hyphenated identifier (1-A, 1-B, G-A, etc.).

### 3.9.3 Existing Noise Levels

Table 3.9-2 includes both the existing noise levels, based on measurements, and the “highest noise hour” based on modeling. The existing noise levels for the 15-minute measurement sites are the equivalent or average noise level during the 15-minute measurement, which is representative of the traffic noise level over a one-hour period – Leq(h) – expressed in A-weighted decibels (dBA). The existing 24-hour measurements are expressed in Community Noise Equivalent Level (CNEL), dBA. CNEL is a 24-hour Leq that has been adjusted to add a “penalty” of five dBA for evening noise (between 7 p.m. and 10 p.m.) and ten dBA for nighttime noise (between 10 p.m. and 7 a.m.). This penalty is to account for the fact that background noises usually lessen during these hours and the remaining noise is more noticeable. The CNEL noise descriptor is used in California by local planning agencies in their general plan noise elements for land use compatibility planning.

The 24-hour measurements were used to determine when the noisiest traffic hour of the day occurs for use in worst-case modeling. The noise levels for the short-term (15-minute) measurements were first “expanded” to represent an hour, and then “adjusted” using the SOUND32 noise modeling program to represent the noisiest hour, which may be different than what was actually measured in the field. For the 24-hour measurements, the worst-case noise hour may actually be less than the 24-hour measurement, because the measurement includes the ten-dBA penalty for nighttime noise. The modeled noise level is expressed in Leq(h), dBA, that is, the equivalent or average noise level for the noisiest hour – Leq(h) – expressed in A-weighted decibels (dBA). Table 3.9-2 includes the 24-hour measurements in CNEL and the one-hour equivalent noise level in Leq(h).

In some cases, the measured one-hour noise level is higher than the modeled highest-hour noise level. There are a number of factors that cause this. First, random, short-term noise, such as airplane flyovers, dogs barking, children playing, or a particularly noisy vehicle passing, are often measured in the field, but are not included in the model. For 15-minute measurements, the attendant will halt and restart the measurements when this happens, but the 24-hour noise meters are not attended, so the measurement cannot be halted due to these random noises. Another factor that causes minor discrepancies between the measured and modeled noise levels is rounding, both in the measurements and in the modeling. This can account for up to a two-dBA difference. Finally, as explained above, the CNEL reading is a weighted measurement, which adds five or ten dBA to the measured reading during certain hours. It would be expected, therefore, to sometimes be higher than the Leq(h), as can be seen by comparing the measured levels in Leq(h) to the measured levels in CNEL.

**Table 3.9-2  
EXISTING NOISE LEVELS**

<b>Site ID No.</b>	<b>Site Description</b> <i>Distances expressed in meters (m) and feet (ft)</i>	<b>Measured Noise Level (dBA)</b>	<b>Modeled Noise Level (dBA)</b> <b>(highest noise hour)</b>
1	<b>11531 Martha Ann Drive, Rossmoor.</b> 15-minute measurement taken at 10:50 am at back of house, 7.5m (25 ft) behind existing noise barrier along I-605. Surrounding area: mainly single-family homes.	64 Leq(h)	66 Leq(h), dBA
1-A	<b>Martha Ann Drive at Piedmont Avenue.</b> Modeled. Single-family homes.	---	65 Leq(h), dBA
A	<b>12231 Martha Ann Drive, Rossmoor.</b> 24-hour measurement taken at rear of house, 18m (60 ft) from embankment adjacent to I-405/I-605 interchange. Surrounding area: single-family homes.	68 Leq(h) 70 CNEL	65 Leq(h), dBA
1-B	<b>Martha Ann Drive at Gertrude Drive, Rossmoor.</b> Modeled. Single-family homes.	---	61 Leq(h), dBA
2	<b>12691 Martha Ann Drive, Rossmoor.</b> 15-minute measurement taken at 12:40 pm at back of house, 11m (35 ft) behind existing noise barrier along I-405/I-605 interchange. Surrounding area: single-family homes.	64 Leq(h)	65 Leq(h), dBA
3	<b>Leisure World.</b> 15-minute measurement taken at 3:15 pm at 1.8m (6-ft) privacy wall along Beverly Manor Rd., 27m (90 ft) behind existing noise barrier along I-405/I-605 interchange. Surrounding area: residential retirement homes.	58 Leq(h)	63 Leq(h), dBA
4	<b>2982 Yellowtail Drive, Rossmoor.</b> 15-minute measurement taken at 1:20 pm at back of house, 18m (60 ft) behind existing noise barrier along I-405/I-605 interchange. Surrounding area: single-family residential.	64 Leq(h)	65 Leq(h), dBA
--	<b>Blue Bell Park, Almond Avenue, Seal Beach.</b> Modeled. Community park in single-family residential area. Primary use is community and recreational.	---	67 Leq(h), dBA
B	<b>3521 Columbine Street, Seal Beach.</b> 24-hour measurement taken at Almond Ave. side of house, directly across Almond Ave. from SR-22/I-405 noise barrier, 15m (50 ft) from house. Surrounding area: single-family homes.	72 Leq(h) 75 CNEL	67 Leq(h), dBA
--	<b>Almond Park, Almond Avenue, Seal Beach.</b> Modeled. Community park located in single-family residential area. Primarily use is community and recreational.	---	68 Leq(h), dBA
5	<b>3550 Sunflower Circle, Seal Beach.</b> 15-minute measurement taken at 11:30 am on Almond Dr. side of house, across street from SR-22/I-405 noise barrier. Surrounding area: mainly single-family homes.	63 Leq(h)	67 Leq(h), dBA
5-A	<b>3530 Pansy Circle, Seal Beach.</b> Modeled. Second-row house. Single-family homes.	---	67 Leq(h), dBA
5-B	<b>3560 Wisteria Street, Seal Beach.</b> Modeled. Single-family home at end of cul-de-sac. Existing noise barrier on westbound SR-22 to northbound I-405 connector.	---	66 Leq(h), dBA
6	<b>5382 Christal Avenue, Garden Grove.</b> 15-minute measurement taken at 12:00 noon at back of house 30m (100 ft) from Valley View St. westbound on-ramp to I-405/SR-22, behind 1.8-2.4m (6-8-ft) privacy wall. Surrounding area: single-family homes.	64 Leq(h)	68 Leq(h), dBA
6-A	<b>Christal Avenue at Bartlett Street, Seal Beach.</b> Modeled. Single-family homes.	---	68 Leq(h), dBA
7	<b>Garden Grove Boulevard at Via Los Alisos, Westminster.</b> 15-minute measurement taken at 1:40 pm along Garden Grove Blvd. at the 1.8m (6-ft) privacy wall behind mobile homes, beyond a 12m-wide (40-ft-wide) swath of grass/shrubs separating Garden Grove Blvd. and SR-22. No existing noise barrier. Surrounding area: mobile homes.	71 Leq(h)	73 Leq(h), dBA
C	<b>Anthony Avenue at Chase Street, Garden Grove.</b> 24-hour measurement taken at rear of home, 27m (90 ft) from SR-22, separated by 1.8m (6-ft) privacy wall. Surrounding area: single-family homes.	76 Leq(h) 76 CNEL	74 Leq(h), dBA
8	<b>6282 Anthony Avenue, Garden Grove.</b> 15-minute measurement taken at 2:15 pm at the back of the house, behind 1.8m (6-ft) privacy wall, 27m (90 ft) from SR-22, which is elevated 1.8m (6 ft). No existing noise barrier. Surrounding area: single-family homes.	72 Leq(h)	74 Leq(h), dBA
9	<b>6732 Anthony Avenue, Garden Grove.</b> 15-minute measurement taken at 2:50 pm at the back of the house, behind 1.8m (6-ft) privacy wall, 14m (45 ft) from SR-22. No existing noise barrier. Surrounding area: single-family homes.	71 Leq(h)	74 Leq(h), dBA

**Table 3.9-2 (continued)**  
**EXISTING NOISE LEVELS**

<b>Site ID No.</b>	<b>Site Description</b> <i>Distances expressed in meters (m) and feet (ft)</i>	<b>Measured Noise Level (dBA)</b>	<b>Modeled Noise Level (dBA)</b> <b>(highest noise hour)</b>
10	<b>Yuma Place at Garden Grove Boulevard, Westminster.</b> 15-minute measurement taken at 10:20 am at 1.2m (4-ft) property wall separating homes from Garden Grove Blvd, across street and 7m (120 ft) from SR-22. No existing noise barrier. Surrounding area: single-family homes.	71 Leq(h)	72 Leq(h)
10-A	<b>Palomar Street, Westminster.</b> Modeled. Single-family residences.	---	72 Leq(h)
11	<b>12892 Dumont Street, Garden Grove.</b> 15-minute measurement taken at 9:20 am at back of house, 18m (60 ft) from SR-22, which is elevated. No existing noise barrier. Surrounding area: single-family homes.	68 Leq(h)	71 Leq(h)
12	<b>7051 Natal Drive, Sutton Place Apartments, Westminster.</b> 15-minute measurement taken at 1:15 pm at back of apartments, 18m (60 ft) from SR-22, which is elevated 6m (20 ft). No existing noise barrier. Surrounding area: apartments/multi-family residences.	58 Leq(h)	68 Leq(h)
13	<b>7721 Benton Avenue, Westminster.</b> 15-minute measurement taken at 11:00 am at back of house, 23m (75 ft) from SR-22 eastbound off-ramp to Beach Blvd, which is elevated 12m (40 ft). No existing noise barrier. Surrounding area: single-family homes.	57 Leq(h)	69 Leq(h)
14	<b>8172 Larson Avenue, Garden Grove.</b> 15-minute measurement taken at 12:20 pm at back of apartment building, 2.4m (8 ft) behind 1.8m (6-ft) privacy wall, separated from SR-22 by 9m (30 ft) of grass/shrubs. No existing noise barrier. Surrounding area: mainly multi-family residences.	73 Leq(h)	73 Leq(h)
15	<b>13171 Monroe Street, Garden Grove.</b> 15-minute measurement taken at 3:00 pm in parking lot at back of apartment building, 11m (35 ft) behind 1.8m (6-ft) privacy wall separating parking lot from SR-22. No existing noise barrier. Surrounding area: mainly multi-family residences.	71 Leq(h)	70 Leq(h)
D	<b>Central Avenue at Wilson Street, Garden Grove.</b> 24-hour measurement taken at front of home, 18m (60 ft) from SR-22 noise barrier across Central Avenue. Surrounding area: single-family homes.	63 Leq(h) 67 CNEL	66 Leq(h)
15-A	<b>West of Newland Street and north of SR-22, Garden Grove.</b> Modeled. Mixture of single-family and multi-family residential. Existing 4.3m (14-ft) noise barrier.	---	65 Leq(h)
16	<b>Edgebrook Drive and Newland Street, Garden Grove.</b> 15-minute measurement taken at 1:20 pm at back of apartment complex, 8m (25 ft) behind 1.8m (6-ft) privacy wall, with 9m-wide (30-ft-wide) swath of shrubs/trees separating SR-22, which is elevated 9m (30 ft). No noise barrier. Surrounding area: multi-family residences.	67 Leq(h)	68 Leq(h)
16-A	<b>Mar Drive, Garden Grove.</b> Modeled. Multi-family residences.	---	75 Leq(h)
16-B	<b>Dakota Avenue, Garden Grove.</b> Modeled. Single-family homes.	---	73 Leq(h)
17	<b>8871 Boyd Avenue, Garden Grove.</b> 15-minute measurement taken at 1:45 pm at back of house, 18m (60 ft) from SR-22, which is elevated 6m (20 ft). No existing noise barrier. Surrounding area: single-family residential.	56 Leq(h)	66 Leq(h)
18	<b>9141 Enloe Way, Garden Grove.</b> 15-minute measurement taken at 2:10 pm at back of house, 12m (40 ft) from eastbound SR-22 on-ramp at Magnolia St., which is elevated. No existing noise barrier. Surrounding area: single-family homes and Garden Grove Park nearby.	62 Leq(h)	70 Leq(h)
18-A	<b>In-and-Out Burger, 9000 Trask Avenue, Garden Grove.</b> Modeled. Outside eating area. At intersection of Trask and Magnolia Avenues. Surrounding area: commercial.	---	70 Leq(h)
--	<b>Bolsa Grande High School, Westminster Avenue, Garden Grove.</b> Modeled at school playfield. High school and park located in single-family residential community. Park uses are primarily community and recreational.	---	69 Leq(h)
--	<b>Bolsa Grande High School, Westminster Avenue, Garden Grove.</b> Modeled at closest school building to SR-22.	---	60 Leq(h)
19	<b>9531 Mallard Drive, Garden Grove.</b> 15-minute measurement taken at 9:45 am at back of house, 9m (30 ft) behind 1.8m (6-ft) privacy wall, with trees/shrubs separating SR-22, which is slightly elevated. No existing noise barrier. Surrounding area: single-family homes and Bolsa Grande High School nearby.	65 Leq(h)	68 Leq(h)

**Table 3.9-2 (continued)**  
**EXISTING NOISE LEVELS**

<b>Site ID No.</b>	<b>Site Description</b> <i>Distances expressed in meters (m) and feet (ft)</i>	<b>Measured Noise Level (dBA)</b>	<b>Modeled Noise Level (dBA)</b> <b>(highest noise hour)</b>
19-A	<b>Nissan of Garden Grove, 9670 Trask Avenue, Garden Grove.</b> Modeled. North of SR-22 and south of Trask Avenue. Automobile dealers and other commercial land uses. North of Trask Avenue are single-family homes.	---	72 Leq(h)
20	<b>9711 Mallard Drive, Garden Grove.</b> 15-minute measurement taken at 10:00 am at back of house, 18m (60 ft) from SR-22. No existing noise barrier. Surrounding area: single-family homes and Jordan Intermediate School playground adjoining this location.	62 Leq(h)	69 Leq(h)
--	<b>Jordan Intermediate School, 9821 Woodbury Road, Garden Grove.</b> Modeled at nearest school building to SR-22.	---	69 Leq(h)
20-A	<b>Nicholas Chevrolet, 10000 Trask Avenue, Garden Grove.</b> Modeled. North of SR-22 and south of Trask Avenue. Automobile dealers and other commercial land uses. North of Trask Avenue are single-family homes.	---	71 Leq(h)
20-B	<b>Trask Avenue and Taft Street, Garden Grove.</b> Modeled. Elementary school located north of Trask Avenue (second-row receiver shielded by buildings to the south (office/commercial)).	---	62 Leq(h)
--	<b>Excelsior Elementary School, 10421 Woodbury Road, Garden Grove.</b> Modeled at playfields. School located in single-family residential community.	---	70 Leq(h)
--	<b>Excelsior Elementary School, 10421 Woodbury Road, Garden Grove.</b> Modeled at closest school building to SR-22.	---	66 Leq(h)
21	<b>13581 Hope Street, Garden Grove.</b> 15-minute measurement taken at 11:00 am at end of cul-de-sac, 12m (40 ft) from SR-22, which is elevated 4.6m (15 ft). No existing noise barrier. Surrounding area: single-family homes.	64 Leq(h)	72 Leq(h)
E	<b>10671 Mallard Drive, Garden Grove.</b> 24-hour measurement taken at back of house, 20m (65 ft) from SR-22, which is elevated. No existing noise barrier. Surrounding area: single-family homes.	71 Leq(h) 74 CNEL	71 Leq(h)
21-A	<b>Fernwood Drive, Garden Grove.</b> Modeled. Single-family homes.	---	72 Leq(h)
22	<b>13592 Lanning Street, Garden Grove.</b> 15-minute measurement taken at 11:30 am at end of cul-de-sac, 18m (60 ft) from SR-22, which is elevated 9m (30 ft). No existing noise barrier. Surrounding area: single-family homes.	64 Leq(h)	68 Leq(h)
22-A	<b>Lanning Street, Garden Grove.</b> Modeled. Single-family homes. Second-row receivers.	---	65 Leq(h)
22-B	<b>Trask Avenue, Garden Grove.</b> Modeled single-family residential	---	70 Leq(h)
23	<b>11930 Banner Drive, Garden Grove.</b> 15-minute measurement taken at 2:00 pm in front yard of home, separated from SR-22 by 170-180m (560-590 ft) of parking lot and grass/trees. No existing noise barrier. Surrounding area: single-family homes.	69 Leq(h)	66 Leq(h)
23-A	<b>Garden View Apartment Homes, Garden Grove.</b> Modeled. Multi-family residences.	---	72 Leq(h)
24	<b>Pearce Avenue at Rainbow Street, Garden Grove.</b> 15-minute measurement taken at 1:30 pm at back of home 12m (40 ft) behind existing noise barrier. Surrounding area: single-family homes.	61 Leq(h)	66 Leq(h)
25	<b>12391 Pearce Street, Garden Grove.</b> 15-minute measurement taken at 12:45 pm at back of house, 8m (25 ft) behind existing noise barrier. Surrounding area: single-family homes.	64 Leq(h)	67 Leq(h)
F	<b>13102 Partridge Street, Thunderbird Mobile Home Park, Garden Grove.</b> 24-hour measurement taken at back of mobile home park, 9m (30 ft) behind SR-22 noise barrier. Surrounding area: mobile homes.	68 Leq(h) 71 CNEL	66 Leq(h)
--	<b>Eisenhower Elementary School Playground, School Drive, Garden Grove.</b> Modeled. School located in single-family/multi-family residential area.	---	66 Leq(h)
--	<b>Eisenhower Elementary School Playground, School Drive, Garden Grove.</b> Modeled at nearest school building to SR-22.	---	67 Leq(h)
26	<b>13096 Roberta Place, Garden Grove.</b> 15-minute measurement taken at 1:30 pm at back of house, 14m (45 ft) from SR-22, behind existing noise barrier. Surrounding area: single-family homes.	61 Leq(h)	66 Leq(h)

**Table 3.9-2 (continued)**  
**EXISTING NOISE LEVELS**

<b>Site ID No.</b>	<b>Site Description</b> <i>Distances expressed in meters (m) and feet (ft)</i>	<b>Measured Noise Level (dBA)</b>	<b>Modeled Noise Level (dBA)</b> <b>(highest noise hour)</b>
27	<b>13252 Dunklee Avenue, Garden Grove.</b> 15-minute measurement taken at 2:15 pm at back of house, 18m (60 ft) from SR-22. No noise barrier. Surrounding area: mainly single-family homes.	67 Leq(h)	66 Leq(h)
27-A	<b>Dunklee Avenue, Garden Grove.</b> Modeled. Single-family homes.	---	73 Leq(h)
27-B	<b>El Prado Avenue, Garden Grove.</b> Modeled. Single-family and multi-family residential.	---	72 Leq(h)
G	<b>1288 Park Balboa Road, Orange.</b> 24-hour measurement taken at back of apartments, 70m (230 ft) from rear building wall, which acts as a noise barrier for SR-22. Surrounding area: multi-family residential.	62 Leq(h) 61 CNEL	63 Leq(h)
G-A	<b>3821 Park Balboa Avenue, Orange.</b> Modeled. Multi-family residential.	---	64 Leq(h)
28	<b>1047 Sherwood Lane, Santa Ana.</b> 15-minute measurement taken at 10:00 am at side of house facing SR-22, near I-5, 18m (60 ft) from noise barrier located atop a 6m-high (20-ft-high) embankment. Surrounding area: single-family homes.	63 Leq(h)	65 Leq(h)
28-A	<b>City Gardens Apartments, Santa Ana.</b> Modeled. Multi-family residential.	---	68 Leq(h)
28-B	<b>North Fallbrook Drive, Santa Ana.</b> Modeled. Park and single-family homes.	---	65 Leq(h)
28-C	<b>Fernwood Drive, Santa Ana.</b> Modeled single-family residential.	---	61 Leq(h)
29	<b>592 Crest Road, Orange.</b> 15-minute measurement taken at 11:00 am in front of house across street from noise barrier, with SR-22 depressed at this location. Surrounding area: single-family homes.	63 Leq(h)	67 Leq(h)
29-A	<b>Silktree Circle, Orange.</b> Modeled. Single-family homes.	---	69 Leq(h)
29-B	<b>Flower Circle, Orange.</b> Modeled. Multi-family residential.	---	63 Leq(h)
29-C	<b>The Meridian Apartments, Orange.</b> Modeled. Multi-family residential.	---	67 Leq(h)
29-D	<b>Parker Street, Orange.</b> Modeled. Multi-family residential.	---	69 Leq(h)
30	<b>646 Cypress Street, Orange.</b> 15-minute measurement taken at 1:00 pm behind apartment complex, 24m (80 ft) from SR-22, which is elevated 8m (25 ft). Surrounding area: multi-family residential.	64 Leq(h)	67 Leq(h)
30-A	<b>The Aspen Apartments, Orange.</b> Modeled. Multi-family residential.	---	68 Leq(h)
--	<b>Fairhaven Elementary School, 1415 Fairhaven Avenue, Santa Ana.</b> Modeled at the nearest school building to SR-22.	---	69 Leq(h)
31	<b>2725 Linwood Street, Santa Ana.</b> 15-minute measurement taken at 1:45 pm at back of house, 40m (130 ft) from SR-22, which is depressed, with 1.8m (6-ft) privacy wall separating house from freeway. Surrounding area: single-family homes and nearby elementary school.	61 Leq(h)	66 Leq(h)
H	<b>Greenview Drive near Fairview Drive, Orange.</b> 24-hour measurement taken at back of homes, 9m (30 ft) from privacy wall separating SR-22, which is depressed. Surrounding area: single-family homes.	65 Leq(h) 67 CNEL	63 Leq(h)
31-A	<b>Fairway Drive, Orange.</b> Modeled. Multi-family residential.	---	69 Leq(h)
31-B	<b>Northridge Street, Orange.</b> Modeled. Multi-family residential	---	73 Leq(h)
I	<b>372 Jennifer Lane, Orange.</b> 24-hour measurement taken at back of home, 11m (35 ft) from SR-55 noise barrier, which is atop 1.5m-high (5-ft-high) embankment. Surrounding area: single-family homes.	66 Leq(h) 69 CNEL	70 Leq(h)
32	<b>2035 Sterns Avenue, Orange.</b> 15-minute measurement taken at 2:30 pm at edge of house, 15m (50 ft) behind existing noise barrier along SR-55. Surrounding area: single-family homes.	62 Leq(h)	67 Leq(h)
32-A	<b>Breezy Way, Orange.</b> Modeled. Single-family homes.	---	68 Leq(h)
J	<b>Memory Lane, Santa Ana.</b> 24-hour measurement taken at end of cul-de-sac, in front of homes, 12m (40 ft) from I-5 noise barrier. Surrounding area: single-family homes.	65 Leq(h) 69 CNEL	65 Leq(h)
33	<b>14300 Clinton Street, Willowick Royal Mobile Home Park, Santa Ana.</b> 15-minute measurement taken at 9:40 am at side of mobile home park adjacent to former Pacific Electric right-of-way. No major roads nearby. Surrounding area: mobile homes, open space, and golf course nearby.	51 Leq(h)	51 Leq(h)
33-A	<b>Boyer Avenue, Santa Ana.</b> Modeled. Single-family residential.	---	51 Leq(h)

**Table 3.9-2 (continued)**  
**EXISTING NOISE LEVELS**

<b>Site ID No.</b>	<b>Site Description</b> <i>Distances expressed in meters (m) and feet (ft)</i>	<b>Measured Noise Level (dBA)</b>	<b>Modeled Noise Level (dBA) (highest noise hour)</b>
--	<b>Willowick Municipal Golf Course, 3017 West Fifth, Santa Ana.</b> Public Golf Course. (Note: No roadway noise at this location. "Highest-hour" based on 15-minute measurement for Site No. 33.)	---	51 Leq(h)
--	<b>Spurgeon Intermediate School, 2701 W. Fifth Street, Santa Ana.</b> Modeled at the school playfield. No roadway noise at this location. Highest-hour based on 15-minute measurement for site 34.	---	56 Leq(h)
	<b>Spurgeon Intermediate School, 2701 W. Fifth Street, Santa Ana.</b> Modeled at nearest school building to Pacific Electric right-of-way. No roadway noise at this location. Highest-hour based on 15-minute measurement for site 34.	---	56 Leq(h)
34	<b>2230 Seventh Street, Santa Ana.</b> 15-minute measurement taken at 10:15 am at back of home adjacent to former Pacific Electric right-of-way. Fairview St. is main noise source. Surrounding area: single-family homes.	56 Leq(h)	56 Leq(h)

Note: The "highest" noise hour may be lower than the measured. See Section 3.9.3 for an explanation.

Figure 3.9-1  
Noise Measurement and Modeling Sites

(same as Figure 6-2 in TR)

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