

Appendices

Appendix G: Noise Monitoring and Modeling

Appendices

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LOCAL REGULATIONS AND STANDARDS

NOISE

Studies have identified noise as an environmental pollutant that can have substantial and permanent impacts on human health and general well-being. Not only is noise a health hazard, excessive noise can be a source of annoyance, tension, and discomfort that disrupts everyday activities. Brea aims to substantially reduce noise and its impacts within the urban environment, with a focus on protecting residential neighborhoods, schools, and similar sensitive uses.

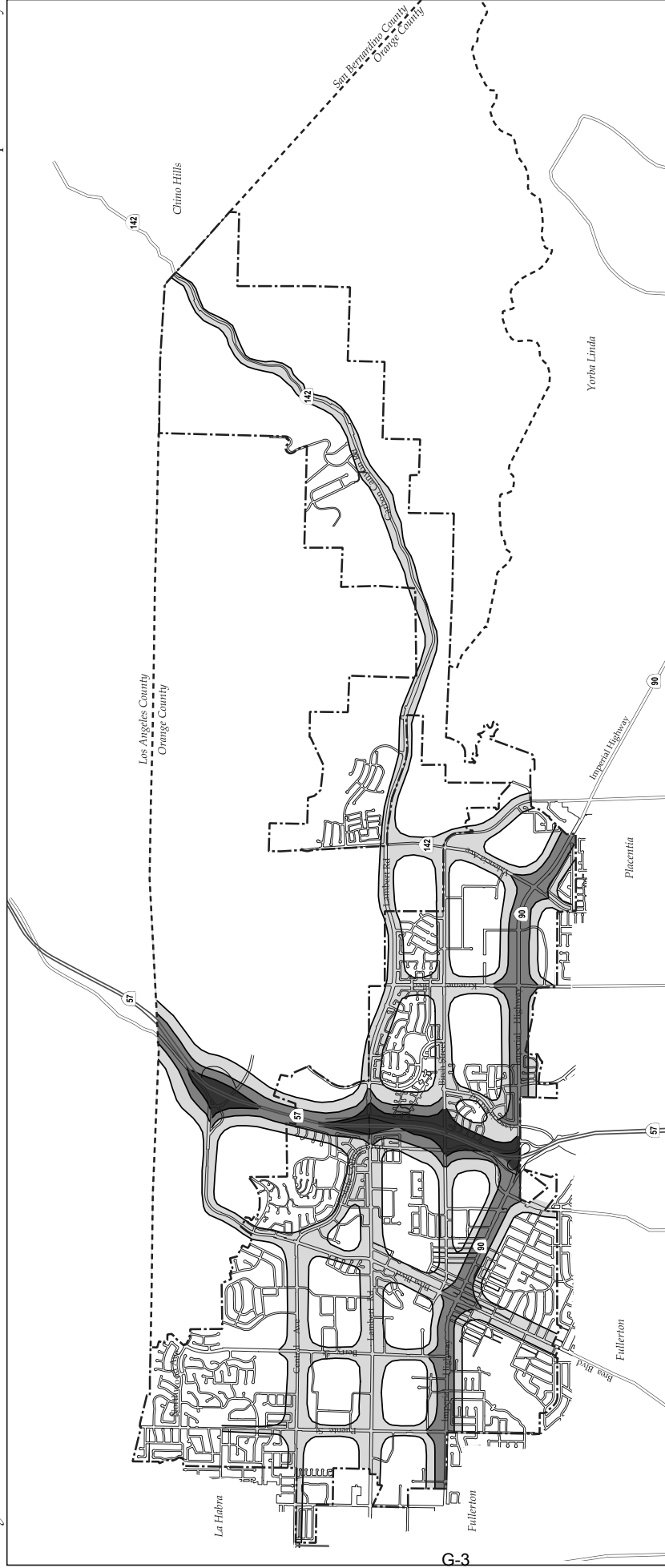
Context

In Brea, street and freeway traffic represent the primary noise sources. Industrial and commercial activity present concerns where adjacent to residential neighborhoods. In addition, mechanical equipment, playgrounds, leaf blowers, and construction equipment are examples of random noise sources that can contribute to neighborhood noise.

Figure PS-5 displays a composite picture of average noise levels in Brea in 2001. As Figure PS-5 illustrates, the loudest noise levels occur along State Highway 57, Imperial Highway, Brea Boulevard, and Valencia Avenue, where truck traffic associated with the Olinda Alpha landfill lingers past homes and places of business. Lambert Road also experiences loud noise levels due to access to State Highway 57.

Noise and Land Use Compatibility Guidelines

Noise generally is defined as unwanted or intrusive sound. Because noise consists of pitch, loudness, and duration, describing noise with a single unit of measure presents a challenge. The A-weighted decibel scale, or dB(A), has been developed to describe the loudness of a sound or sound environment based on the sensitivity of the human ear. A sound level meter that measures A-weighted decibels has an electrical circuit that allows the meter to have the same sensitivity to sound at different frequencies as the average human ear. Table PS-3 indicates criteria the State has established to reduce adverse noise effects on human health.



Source: Weiland Associates, 2001.



Community Noise Equivalent Level (CNEL) Contours



Legend

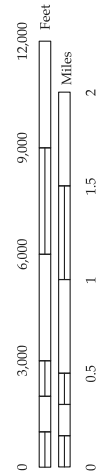
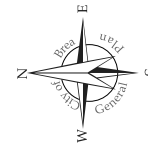


Figure PS-5
Noise Contours (2001)

Table PS-3
State Criteria for Minimizing Adverse Noise Effects on Humans

Objective	dB(A) Range
Prevent Hearing Loss	75-80
Prevent Physiological Effects (Other than hearing loss)	65-75
Prevent Speech Interference	50-60
Address People's Subjective Preference for Noise Control	45-50
Prevent Sleep Interruption	35-45

Source: California General Plan Guidelines, 2000.

The dB(A) descriptor only reports noise from a single source or combination of sources at a point in time. To allow a more comprehensive description of a noise environment, federal and State agencies have established noise and land use compatibility guidelines that use averaging approaches to noise measurement. Two measurement scales commonly used in California are the Community Noise Equivalent Level (CNEL) and the day-night level (Ldn). To account for increased human sensitivity at night, the CNEL level includes a 5-decibel penalty on noise during the 7:00 A.M. to 10:00 P.M. time period and a 10-decibel penalty on noise during the 10:00 P.M. to 7:00 A.M. time period. The Ldn level includes only the 10 decibel weighting for late-night noise. These values are nearly identical for all but unusual noise sources.

The City will use land use compatibility standards when planning and making development decisions in order to ensure that noise producers do not adversely affect sensitive receptors.

The City's primary goal with regard to community noise is to minimize the exposure of residents to unhealthful or excessive noise levels to the extent possible. To this end, the noise/land use compatibility guidelines in Figure PS-6, based on cumulative noise criteria for outdoor noise, are used to review development proposals and to identify and mitigation measures necessary to avoid or minimize impacts, including traffic noise impacts, a new use may have on established uses.

**Figure PS-6
Noise/Land Use Compatibility**

Land Use Category	Community Noise Equivalent Level (CNEL) or Day-Night Level (Ldn), dB							
	55	60	65	70	75	80	85	
Residential- Low-Density Single-Family, Duplex, Mobile Homes								
Residential- Multiple Family								
Transient Lodging - Motels, Hotels								
Schools, Libraries, Churches, Hospitals, Nursing Homes								
Auditoriums, Concert Halls, Amphitheaters								
Sports Arenas, Outdoor Spectator Sports								
Playgrounds, Neighborhood Parks								
Golf Courses, Riding Stables, Water Recreation, Cemeteries								
Office Buildings, Business, Commercial and Professional								
Industrial, Manufacturing, Utilities, Agriculture								

Nature of the noise environment where the CNEL or Ldn level is:

Below 55 dB

Relatively quiet suburban or urban areas, no arterial streets within 1 block, no freeways within 1/4 mile.

55-65 dB

Most somewhat noisy urban areas, near but not directly adjacent to high volumes of traffic.

65-75 dB

Very noisy urban areas near arterials, freeways or airports.

75+ dB

Extremely noisy urban areas adjacent to freeways or under airport traffic patterns. Hearing damage with constant exposure outdoors.

 **Normally Acceptable**

Specified land use is satisfactory, based on the assumption that any buildings 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 noise reduction requirements is made and needed noise insulation features included in design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.

 **Normally Unacceptable**

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

 **Clearly Unacceptable**

New construction or development should generally not be undertaken.

The Community Noise Equivalent Level (CNEL) and Day-Night Noise Level (Ldn) are measures of the 24-hour noise environment. They represent the constant A-weighted noise level that would be measured if all the sound energy received over the day were averaged. In order to account for the greater sensitivity of people to noise at night, the CNEL weighting includes a 5-decibel penalty on noise between 7:00 p.m. and 10:00 p.m. and a 10-decibel penalty on noise between 10:00 p.m. and 7:00 a.m. of the next day. The Ldn includes only the 10-decibel weighting for late-night noise events. For practical purposes, the two measures are equivalent for typical urban noise environments.

Noise Contours and Noise Impact Areas

The use of noise contours based on the major noise sources can describe the noise environment for the community. Noise contours outline areas of equal noise exposure. Future noise contours have been estimated using information about existing and projected land use development and transportation activity.

The projected noise contours and noise impact areas for Brea are displayed in Figure PS-7. These contours will serve as a guide for land use and development decisions. Contours of 60 dB(A) or greater define noise impact areas. An acoustical analysis must be prepared when noise sensitive land uses are proposed within noise impact areas. The analysis must show that the project is designed to attenuate noise to meet the City's noise standards in order to receive approval. If the project design does not meet the noise standards, mitigation can be recommended in the analysis. If the analysis demonstrates that the noise standards can be met by implementing the mitigation measures, the project can be approved conditioned upon implementation of the mitigation measures.

Transportation Related Noise

Transportation activity is the primary source of noise in Brea. The three major sources of transportation related noise are:

- Traffic on the Orange Freeway (SR-57)
- Commercial truck traffic associated with the Olinda Alpha landfill on Valencia Avenue and Imperial Highway
- Automobile traffic on Brea Boulevard, Brea Canyon Road, Central Avenue, and Lambert Road

Residential neighborhoods bordering the Orange Freeway are subject to loud noise levels. Properties directly adjacent to the freeway can experience decibels as high as 70 to 75 dB(A). Sound attenuation walls, landscaped buffers, and dirt mounds all help to reduce the sound intensity of the freeway. Figure PS-7 illustrates the projected noise contours along the freeway.

Commercial trucks associated with the Olinda Alpha landfill contribute to excessive noise levels via the Orange Freeway, Imperial Highway, and Valencia Avenue to connect with the landfill. Commercial trucks are not permitted to access Valencia Avenue via Lambert Road, minimizing some of the noise impacts to adjacent residential neighborhoods. Olinda Alpha is slated to close in the year 2013; however, the County of Orange is investigating extending the life of the landfill much further.

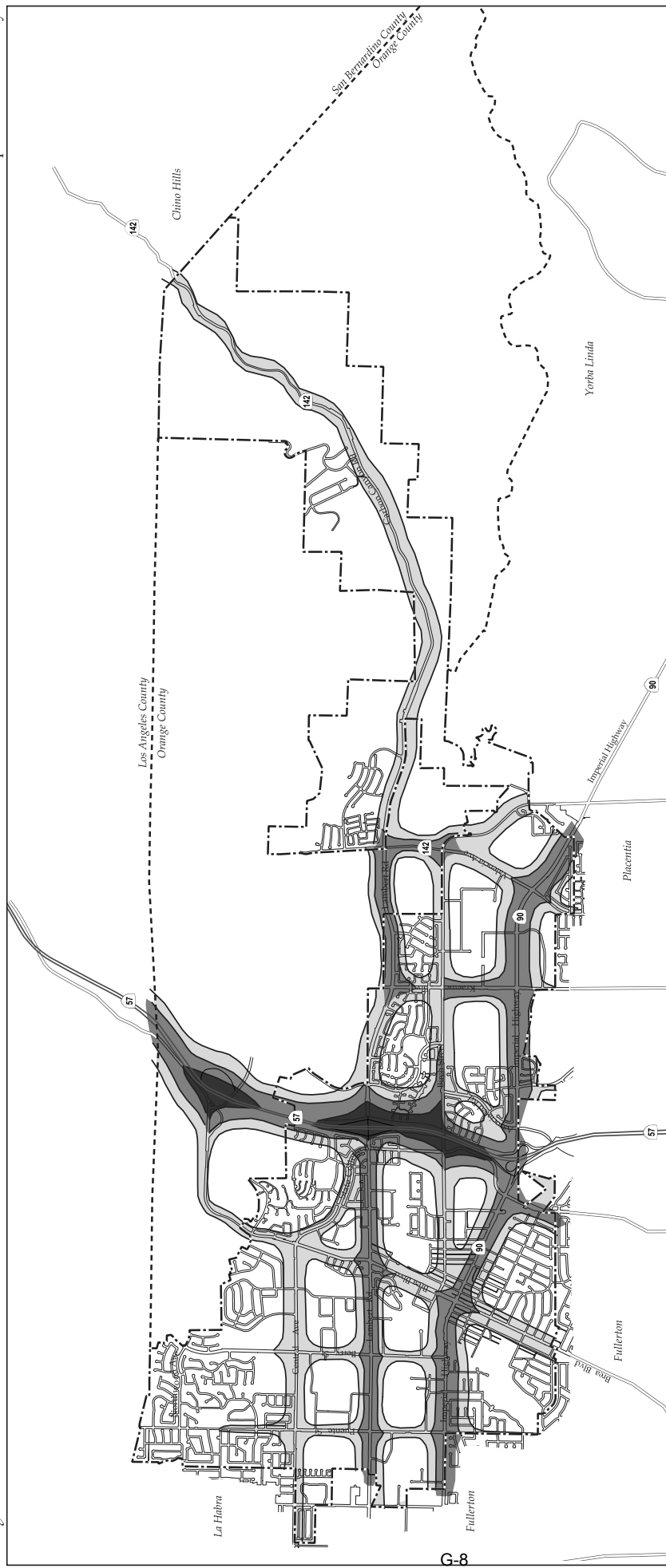
New residential development has been recently constructed at the northeast corner of Valencia Avenue and Carbon Canyon Road just south of the Olinda Alpha landfill entrance. Dense planting of deciduous and evergreen trees as well as a sound attenuation wall were set within the landscaped area to minimize the impacts to residential properties directly abutting Valencia Avenue.

Proposed residential land uses have also been designated for both sides of Valencia Avenue south of Lambert Road/Carbon Canyon Road. Residential, school, and park uses are proposed for the Hartley Research Center. Careful planning and mitigation within these areas will protect these sensitive uses from excessive noise levels.

Noise levels along Brea Boulevard, Brea Canyon Road, Central Avenue, and Lambert Road are above average and can impact sensitive uses adjacent to these streets.

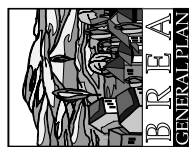
Traffic noise depends primarily on the speed of traffic and the percentage of truck traffic. The primary source of noise from automobiles is high-frequency tire noise, which increases with speed. In addition, trucks and older automobiles produce engine and exhaust noise.

The most efficient and effective means of controlling noise from transportation systems is to reduce noise at the source. However, the City has little direct control over noise produced by transportation sources because State noise regulations preempt local regulations. Because the City cannot control noise at the source, City noise programs focus on reducing the impact of transportation noise at reception sites. During the planning stages of the development process, potential impacts from transportation noise will be identified and mitigation measures will be required as needed to meet City noise standards.



G-8

Source: Weiland Associates, 2001.



Community Noise Equivalent Level (CNEL) Contours

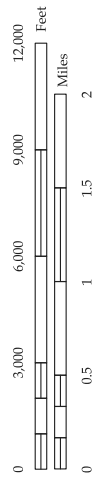
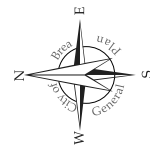
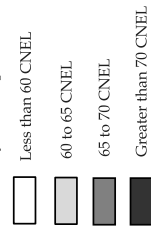


Figure PS-6
Future Noise Contours



Sound attenuation walls and limits on speed help to shield residential neighborhoods from automobile noise on Imperial Highway.

Non-Transportation Related Noise

When reviewing a proposed industrial, commercial, or public project, noise generation and potential impacts to surrounding development are considered in accordance with CEQA. Specific attention should be given to non-residential proposals adjacent to residential neighborhoods. An acoustical analysis is required for projects that will generate noise potentially affecting sensitive receptors. Where significant impacts are identified, mitigation measures are required. Common mitigation measures that could be applied when reviewing projects include acoustically treated and quiet design: 1) furnaces, 2) fans, 3) motors, 4) compressors, and 5) valves and pumps. The City may also require limited delivery hours and hours of operation to minimize impacts on adjacent residential users or other sensitive receptors.

Goals and Policies

Certain areas of Brea are subject to high levels of noise. This in turn can reduce the quality of life within these neighborhoods. Consideration of noise sources in the planning process and identification of who that noise impacts is an effective method of minimizing the impacts of noise on residents. Areas already impacted by noise can explore different noise attenuation and rehabilitative improvements.

Goal PS-9	Minimize the impact of point source noise and ambient noise levels throughout the community.
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- Policy PS-9.1 Evaluate the need to require acoustical studies for development proposals that address both direct and indirect, particularly traffic, noise impacts, and require such studies, with appropriate mitigation included, as warranted.
- Policy PS-9.2 Ensure that the noise standards set forth in the Municipal Code reflect standards most appropriate for Brea.
- Policy PS-9.3 Ensure that acceptable noise levels are maintained near schools, hospitals, convalescent homes, and other noise sensitive areas in accordance with the City's Municipal Code and noise standards contained in the General Plan.
- Policy PS-9.4 Employ creative methods of reducing noise pollution in the City.
- Policy PS-9.5 Avoid placing high-noise activity centers near residential areas.

Goal PS-2	Minimize the impacts of transportation-related noise.
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- Policy PS-2.1 Reduce transportation noise by imposing traffic restrictions where necessary.
- Policy PS-2.2 Work with the counties of Orange and Los Angeles to include noise mitigation measures in the design of new roadway projects.

Goal PS-3	Minimize noise impacts from sources other than transportation.
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- Policy PS-3.1 Require the inclusion of noise mitigation measures, techniques, and design features in the planning, design, and construction of future development and redevelopment projects.

- Policy PS-3.2 Require that mixed-use structures be designed to prevent transfer of noise and vibration from commercial/retail to residential use.
- Policy PS-3.3 Minimize stationary noise sources and noise emanating from construction activities and special events.
- Policy PS-3.4 Require that new non-residential development plan delivery areas away from existing residential areas.
- Policy PS-3.5 Continue active enforcement to limit commercial and industrial delivery hours adjoining residential areas.
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**Implementation
Guide**



See Section XXIII of the Implementation Guide for action programs.

Brea City Code

CHAPTER 8.20: NOISE CONTROL

Section

- 8.20.010 Declaration of policy
- 8.20.020 Definitions
- 8.20.030 Noise level measurement criteria
- 8.20.040 Designated noise zone
- 8.20.050 Exterior noise standards
- 8.20.060 Interior noise standards
- 8.20.070 Special provisions
- 8.20.080 Motor vehicle racing
- 8.20.090 Schools, hospitals and churches
- 8.20.100 Air conditioning; refrigeration; pool filters and fans
- 8.20.110 Noise level measurement
- 8.20.120 Manner of enforcement

§ 8.20.010 DECLARATION OF POLICY.

A. In order to control unnecessary, excessive and annoying sounds emanating from areas of the city, it is hereby declared to be the policy of the city to prohibit such sounds generated from all sources as specified in this chapter.

B. It is determined that certain sound levels are detrimental to the public health, welfare and safety, and contrary to the public interest.

('61 Code, § 7B.1) (Ord. 812, passed - -)

§ 8.20.020 DEFINITIONS.

For the purpose of this chapter, the following definitions shall apply unless the context clearly indicates or requires a different meaning.

AMBIENT NOISE LEVEL. The all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding the alleged offensive noise, at the location and approximate time at which a comparison with the alleged offensive noise is to be made.

CUMULATIVE PERIOD. An additive period of time composed of individual time segments which may be continuous or interrupted.

DECIBEL (dB). A unit which denotes the ratio between two (2) quantities which are proportional to power: the number of decibels corresponding to the ratio or two (2) amounts of power is ten (10) times the logarithm to the base ten (10) of this ratio.

DWELLING UNIT. A single unit providing complete, independent living facilities for one (1) or more persons including permanent provisions for living, sleeping, eating, cooking and sanitation.

EMERGENCY MACHINERY, VEHICLE, OR WORK. Any machinery, vehicle or work used, employed or performed in an effort to protect, provide or restore safe conditions in the community or for the citizenry, or work by private or public utilities when restoring utility service.

FIXED NOISE SOURCE. A stationary device which creates sounds while fixed or motionless, including but not limited to industrial and commercial machinery and equipment, pumps, fans, compressors, generators, air conditioners and refrigeration equipment.

GRADING. Any excavating or filling of earth material, or any combination thereof, conducted at a site to prepare said site for construction or other improvements thereon.

IMPACT NOISE. The noise produced by the collision of one mass in motion with a second mass which may be either in motion or at rest.

MOBILE NOISE SOURCE. Any noise source other than a fixed noise source.

NOISE LEVEL. The “A” weighted sound pressure level in decibels obtained by using a sound level meter at slow response with a reference pressure of twenty (20) micronewtons per square meter. The unit of measurement shall be designated as dB(A).

PERSON. A person, firm, association, co-partnership, joint venture, corporation or any entity, public or private in nature.

RESIDENTIAL PROPERTY. A parcel of real property which is developed and used either in part or in whole for residential purposes, other than transient uses such as hotels and motels.

SIMPLE TONE NOISE. A noise characterized by a predominant frequency or frequencies so that other frequencies cannot be readily distinguished.

SOUND LEVEL METER. An instrument meeting American National Standard Institute's Standard S1.4-1971 for Type 1 or Type 2 sound level meters or an instrument and the associated recording and analyzing equipment which will provide equivalent data.

SOUND PRESSURE LEVEL OF A SOUND, IN DECIBELS. Twenty (20) times the logarithm to the base ten (10) of the ratio of the pressure of the sound to a reference pressure, which reference pressure shall be explicitly stated.

('61 Code, § 7B.2) (Ord. 812, passed - -)

§ 8.20.030 NOISE LEVEL MEASUREMENT CRITERIA.

Any noise level measurements made pursuant to the provisions of this chapter shall be performed using a sound level meter as defined in § 8.20.020.

('61 Code, § 7B.3) (Ord. 812, passed - -)

§ 8.20.040 DESIGNATED NOISE ZONE.

The entire territory of the city is hereby designated as “Noise Zone 1.”

('61 Code, § 7B.4) (Ord. 812, passed - -)

§ 8.20.050 EXTERIOR NOISE STANDARDS.

A. The following noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone:

NOISE STANDARDS

<i>Noise Zone</i>	<i>Noise Level</i>	<i>Time Period</i>
1	55 dB(A)	7:00 a.m. - 10:00 p.m.
1	50 dB(A)	10:00 p.m. - 7:00 a.m.

In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five (5) dB(A).

B. It shall be unlawful for any person at any location within the city to create any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level, when measured on any other residential property, to exceed:

1. The noise standard for a cumulative period of more than 30 minutes in any hour; or

2. The noise standard plus five (5) dB(A) for a cumulative period of more than 15 minutes in any hour; or

3. The noise standard plus ten (10) dB(A) for a cumulative period of more than five (5) minutes in any hour; or

4. The noise standards plus fifteen (15) dB(A) for a cumulative period of more than one (1) minute in any hour; or

5. The noise standard plus twenty (20) dB(A) for any period of time.

C. In the event the ambient noise level exceeds any of the first four (4) noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

('61 Code, § 7B.5) (Ord. 812, passed - -)

§ 8.20.060 INTERIOR NOISE STANDARDS.

A. The following interior noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone:

INTERIOR NOISE STANDARDS

<i>Noise Zone</i>	<i>Noise Level</i>	<i>Time Period</i>
1	55 dB(A)	7:00 a.m. - 10:00 p.m.
1	45 dB(A)	10:00 p.m. - 7:00 a.m.

In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five (5) dB(A).

B. It shall be unlawful for any person at any location within the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level, when measured on any other residential property, to exceed:

1. The interior noise standard for a cumulative period of more than five (5) minutes in any hour; or
2. The interior noise standard plus five (5) dB(A) for a cumulative period of more than one (1) minute in any hour; or
3. The interior noise standard plus ten (10) dB(A) for any period of time.

C. In the event the ambient noise level exceeds any of the first two (2) noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the third noise limit category the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

('61 Code, § 7B.6) (Ord. 812, passed - -)

§ 8.20.070 SPECIAL PROVISIONS.

The following activities shall be exempted from the provisions of this chapter:

A. Activities conducted on the grounds of any public nursery, elementary, intermediate or secondary school or college.

B. Outdoor gatherings, public dances and shows, provided said events are conducted pursuant to a permit as required by this code.

C. Activities conducted on any park or playground, provided such park or playground is owned and operated by a public entity.

D. Any mechanical device, apparatus or equipment used, related to or connected with emergency machinery, vehicle or work.

E. Noise sources associated with construction, repair, remodeling, or grading of any real property, provided said activities do not take place between the hours of 7:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday.

F. All mechanical devices, apparatus or equipment which are utilized for the protection or salvage of agricultural crops during periods of potential or actual frost damage or other adverse weather conditions.

G. Mobile noise sources associated with agricultural operations; provided such operations do not take place between the hours of 7:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday.

H. Mobile noise sources associated with agricultural pest control through pesticide application, provided that the application is made in accordance with restricted material permits issued by or regulations enforced by the Agricultural Commissioner.

I. Noise sources, associated with the maintenance of real property, provided said activities take place between 7:00 a.m. and 7:00 p.m. on any day.

J. Any activity to the extent regulation thereof has been preempted by state or federal law.

('61 Code, § 7B.7) (Ord. 812, passed - -)

§ 8.20.080 MOTOR VEHICLE RACING.

It shall be unlawful to conduct motor vehicle racing, testing, timing or similar noise-producing activities at raceways, speedways, off-road vehicle courses, drag strips or other similar places, including, but not limited to, the operation of midget race cars, drag cars, motorcycles, off-road vehicles, and specialty automobiles, between the hours of 11:30 p.m. and 7:00 a.m.

('61 Code, § 7B.8) (Ord. 812, passed - -)

§ 8.20.090 SCHOOLS, HOSPITALS AND CHURCHES.

It shall be unlawful for any person to create any noise which causes the noise level at any school, hospital or church while same is in use to exceed the noise limits as specified in § 8.20.050 proscribed for the assigned noise zone in which the school, hospital or church is located, or which noise level unreasonably interferes with the use of such institutions or which unreasonably disturbs or annoys patients in the hospital, provided conspicuous signs are displayed in three (3) separate locations within one-tenth of a mile of the institution indicating the presence of a school, church or hospital.

('61 Code, § 7B.9) (Ord. 812, passed - -)

§ 8.20.100 AIR CONDITIONING; REFRIGERATION; POOL FILTERS AND FANS.

During the five (5) year period following the effective date of this chapter, the noise standards enumerated in §§ 8.20.050 and 8.20.060 shall be increased eight (8) dB(A) where the alleged offensive noise source is an air conditioning, or refrigeration system, fan, or swimming pool filter, or associated equipment which was installed prior to the effective date of this chapter.

('61 Code, § 7B.10) (Ord. 812, passed - -)

§ 8.20.110 NOISE LEVEL MEASUREMENT.

The location selected for measuring exterior noise levels shall be at any point on the affected property. Interior noise measurements shall be made within the affected dwelling unit. The measurement shall be made at a point at least four (4) feet from the wall, ceiling or floor nearest the alleged offensive noise source and may be made with the windows of the affected unit open.

('61 Code, § 7B.11) (Ord. 812, passed - -)

§ 8.20.120 MANNER OF ENFORCEMENT.

A. The Police Department, the Code Enforcement Officer and their duly authorized representatives are directed to enforce the provisions of this chapter.

B. No person shall interfere with, oppose or resist any authorized person charged with the enforcement of this chapter while such person is engaged in the performance of his or her duty.

('61 Code, § 7B.12) (Ord. 812, passed - -)

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§ 20.20.040 VIBRATION.

Every use shall be so operated that the ground vibration inherently and recurrently generated does not cause a displacement of the earth greater than .003 of one (1) inch as measured at the property line of the subject use.

(Ord. 425, passed 10-14-68)

CONSTRUCTION NOISE MODELING

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/26/2021
Case Description: Brea-03.3

**** Receptor #1 ****

Description	Baselines (dBA)			
	Land Use	Daytime	Evening	Night
Architectural Coating	Residential	60.0	55.0	50.0

Description	Equipment					
	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Compressor (air)	No	40	77.7	77.7	50.0	0.0

		Results													
		Noise Limits (dBA)						Noise Limit Exceedance (dBA)							
		Calculated (dBA)		Day		Evening		Night		Day		Evening		Night	
Equipment		Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Lmax	L10														
Compressor (air)		77.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A															
	Total	77.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A															

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/26/2021
Case Description: Brea 03.3

**** Receptor #1 ****

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Asphalt Demolition	Residential	65.0	60.0	55.0

Description	Impact Device	Equipment				
		Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Tractor	No	40	84.0	50.0	0.0	

Equipment Lmax Leq	Results						Noise Limits (dBA)						Noise Limit Exceedance (dBA)			
	Calculated (dBA)		Day		Evening		Night		Day		Evening		Night			
	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A																
Total	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A																

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 07/26/2021
Case Description: Brea 03.3

**** Receptor #1 ****

Baselines (dBA)				
Description	Land Use	Daytime	Evening	Night
Building Demo	Residential	65.0	60.0	55.0

Equipment					
Description	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance Shielding (dBA)
Excavator	No	40	80.7	50.0	0.0
Tractor	No	40	84.0	50.0	0.0
Front End Loader	No	40	79.1	50.0	0.0

Results													
Noise Limits (dBA)								Noise Limit Exceedance (dBA)					
Calculated (dBA)		Day		Evening		Night		Day		Evening		Night	
Equipment Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A													
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A													
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A													
Total	84.0	82.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A													

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/26/2021
Case Description: Brea 03.3

**** Receptor #1 ****

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Finish/Landscaping	Residential	65.0	60.0	55.0

Description	Impact Device	Equipment				
		Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Paver	No	50	77.2	50.0	0.0	
Roller	No	20	80.0	50.0	0.0	
Front End Loader	No	40	79.1	50.0	0.0	

Equipment Lmax Leq	Results						Noise Limits (dBA)						Noise Limit Exceedance (dBA)			
	Calculated (dBA)		Day		Evening		Night		Day		Evening		Night			
	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver N/A	77.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller N/A	80.0	73.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader N/A	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.0	79.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/26/2021
Case Description: Brea 03.3

**** Receptor #1 ****

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Paving	Residential	65.0	60.0	55.0

Description	Impact Device	Equipment				
		Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Paver	No	50	77.2	50.0	0.0	
Roller	No	20	80.0	50.0	0.0	
Front End Loader	No	40		79.1	50.0	0.0

Equipment Lmax Leq	Results						Noise Limits (dBA)						Noise Limit Exceedance (dBA)			
	Calculated (dBA)		Day		Evening		Night		Day		Evening		Night			
	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver N/A	77.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller N/A	80.0	73.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader N/A	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total N/A	80.0	79.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/26/2021
Case Description: Brea 03.3

**** Receptor #1 ****

Description	Baselines (dBA)				
	Land Use	Daytime	Evening	Night	
Retail/Residential Building Construction	Residential		65.0	60.0	55.0

Equipment						
Description	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Tractor	No	40	84.0	50.0	0.0	
Chain Saw	No	20		83.7	50.0	0.0
Crane	No	16		80.6	50.0	0.0

Results													

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 07/26/2021
Case Description: Brea 03.3

**** Receptor #1 ****

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Site Preparation	Residential	65.0	60.0	55.0

Description	Impact	Equipment				
		Device	Usage (%)	Spec Lmax (dBA)	Actual Receptor Lmax (dBA)	Estimated Distance Shielding (dBA)
Grader	No	40	85.0	50.0	0.0	
Grader	No	40	85.0	50.0	0.0	
Scraper	No	40	83.6	50.0	0.0	
Scraper	No	40	83.6	50.0	0.0	
Front End Loader	No	40	79.1	50.0	0.0	
Excavator	No	40	80.7	50.0	0.0	

Equipment	Results							Noise Limits (dBA)							Noise Limit Exceedance (dBA)						
	Lmax Leq		Calculated (dBA)		Day		Evening		Night		Day		Evening		Night						
Grader	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	83.6	79.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	83.6	79.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	85.0	87.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Brea Mall Option 1 & 2 Construction Noise Modeling Attenuation Calculations

Levels in dBA Leq

<i>Development Phase</i>		<i>Fitness/ Residential</i>	<i>Residential</i>	<i>Retail</i>	
	RCNM	Grace	Single-family		
	Reference	Covenant	homes/multifam	Craig Regional	
Construction Activity	Noise Level	Church NW	ily to south	Park	
<i>Distance in feet</i>	50	325	960	975	
Building Demo	83	66	57	57	
Asphalt Demo	80	64	54	54	
Site Preparation	87	71	61	61	
Building Construction	82	66	57	56	
Architectural Coating	77	60	51	51	
Paving	79	63	53	53	
Finish and Landscaping	79	63	53	53	

Attenuation calculated through Inverse Square Law: $L_p(R2) = L_p(R1) - 20\log(R2/R1)$

BREA-03.3 Vibration Annoyance Attenuation Calculations**Levels in VdB**

<i>Distance in feet</i>	Vibration @ 25	Screening Distance		Residential
	ft	<i>160</i>		<i>325</i>
Vibratory Roller	94.0	70		60.6
Hoe Ram	87.0	63		53.6
Large Bulldozer	87.0	63		53.6
Caisson Drilling	87.0	63		53.6
Loaded Trucks	86.0	62		52.6
Jackhammer	79.0	55		45.6
Small Bulldozer	58.0	34		24.6

BREA-03.3 Vibration Damage Attenuation Calculations

Levels in in/sec PPV

<i>Distance in feet</i>	Vibration Reference Level at 25 feet	Residential to east 20
Vibratory Roller	0.21	0.293
Large Bulldozer	0.089	0.124
Caisson Drilling	0.089	0.124
Loaded Trucks	0.076	0.106
Jackhammer	0.035	0.049
Small Bulldozer	0.003	0.004

TRAFFIC NOISE INCREASE CALCULATIONS

BREA-03.3 Option 1&2
Traffic Noise Calculations

Roadway Segment	Weekday Option 1						Weekday Option 2					
	ADT Volumes				dBA CNEL Increase		ADT Volumes				dBA CNEL Increase	
	Existing No Project	Existing Plus Project	Cumulative No Project	Cumulative Plus Project	Project Noise Increase	Cumulative Increase	Existing No Project	Existing Plus Project	Cumulative No Project	Cumulative Plus Project	Project Noise Increase	Cumulative Increase
Lambert Road, east of Berry Street	35,243	35,275	41,498	41,530	0.0	0.7	36,635	36,664	43,400	43,429	0.0	0.7
Lambert Road, east of Brea Boulevard	37,899	37,899	43,809	43,809	0.0	0.6	39,394	39,394	45,481	45,481	0.0	0.6
Lambert Road, west of Santa Fe Road/Kraemer Boulevard	34,102	34,154	36,912	36,964	0.0	0.3	35,450	35,497	38,411	38,458	0.0	0.4
Brea Boulevard, north of Birch Street	27,699	27,846	30,766	30,913	0.0	0.5	28,801	28,935	32,359	32,493	0.0	0.5
State College Boulevard, north of Birch Street	22,191	22,400	30,405	30,614	0.0	1.4	23,079	23,270	31,908	32,099	0.0	1.4
Kraemer Boulevard, south of Lambert Road	17,098	17,174	17,963	18,039	0.0	0.2	17,776	17,844	18,675	18,743	0.0	0.2
Birch Street, east of Brea Boulevard	18,225	18,427	21,216	21,418	0.0	0.7	18,954	19,138	22,149	22,333	0.0	0.7
Birch Street, east of Randolph Avenue	19,728	19,764	22,330	22,366	0.0	0.5	17,699	17,731	20,363	20,395	0.0	0.6
Birch Street, east of State College Boulevard	25,237	25,348	27,029	27,140	0.0	0.3	26,235	26,335	28,143	28,243	0.0	0.3
Birch Street, east of S Associated Road	24,730	24,841	26,464	26,575	0.0	0.3	25,709	25,809	27,553	27,653	0.0	0.3
Birch Street, east of N Associated Road	21,172	21,283	22,728	22,839	0.0	0.3	22,011	22,111	23,671	23,771	0.0	0.3
Randolph Street, south of Birch Street	7,762	8,616	8,429	9,283	0.5	0.8	7,985	8,766	8,663	9,444	0.4	0.7
State College Boulevard, south of Birch Street	13,849	14,134	17,454	17,739	0.1	1.1	14,410	14,670	18,277	18,537	0.1	1.1
Kraemer Boulevard, south of Birch Street	20,283	20,283	21,307	21,307	0.0	0.2	21,083	21,083	22,147	22,147	0.0	0.2
Imperial Highway, west of Puente Street	43,145	43,513	47,914	48,282	0.0	0.5	44,868	45,203	49,685	50,020	0.0	0.5
Imperial Highway, east of Berry Street	57,428	57,938	63,489	63,999	0.0	0.5	59,723	60,188	65,953	66,418	0.0	0.5
Imperial Highway, east of Brea Boulevard	54,620	55,451	59,787	60,618	0.1	0.5	56,824	57,582	61,974	62,732	0.1	0.4
Imperial Highway, east of State College Boulevard	73,993	75,310	81,688	83,005	0.1	0.5	76,980	78,180	84,738	85,938	0.1	0.5
Imperial Highway, east of SR-57 NB Ramps	54,932	55,565	58,692	59,325	0.0	0.3	57,132	57,709	60,954	61,531	0.0	0.3
Imperial Highway, east of Associated Road	52,740	53,258	55,893	56,411	0.0	0.3	54,848	55,320	58,020	58,492	0.0	0.3
Imperial Highway, east of Castlegate Lane/Placentia Avenue	52,822	53,143	56,089	56,410	0.0	0.3	54,921	55,213	58,230	58,522	0.0	0.3
Brea Boulevard, south of Imperial Highway	31,274	31,555	34,172	34,453	0.0	0.4	32,525	32,781	35,716	35,972	0.0	0.4
Kraemer Boulevard, south of Imperial Highway	20,284	20,284	21,304	21,304	0.0	0.2	21,084	21,084	22,132	22,132	0.0	0.2
				MAX	0.5	1.4				MAX	0.4	1.4

Traffic Noise Calculations

Roadway Segment	Weekend Option 1						Weekend Option 2					
	ADT Volumes				dBA CNEL Increase		ADT Volumes				dBA CNEL Increase	
	Existing No Project	Existing Plus Project	Cumulative No Project	Cumulative Plus Project	Project Noise Increase	Cumulative Increase	Existing No Project	Existing Plus Project	Cumulative No Project	Cumulative Plus Project	Project Noise Increase	Cumulative Increase
Lambert Road, east of Berry Street	36,635	36,664	43,400	43,429	0.0	0.7	36,635	36,632	43,400	43,397	0.0	0.7
Lambert Road, east of Brea Boulevard	39,394	39,394	45,481	45,481	0.0	0.6	39,394	39,394	45,481	45,481	0.0	0.6
Lambert Road, west of Santa Fe Road/Kraemer Boulevard	35,450	35,497	38,411	38,458	0.0	0.4	35,450	35,426	38,411	38,387	0.0	0.3
Brea Boulevard, north of Birch Street	28,801	28,935	32,359	32,493	0.0	0.5	28,801	28,770	32,359	32,328	0.0	0.5
State College Boulevard, north of Birch Street	23,079	23,270	31,908	32,099	0.0	1.4	23,079	23,042	31,908	31,871	0.0	1.4
Kraemer Boulevard, south of Lambert Road	17,776	17,844	18,675	18,743	0.0	0.2	17,776	17,789	18,675	18,688	0.0	0.2
Birch Street, east of Brea Boulevard	18,954	19,138	22,149	22,333	0.0	0.7	18,954	18,957	22,149	22,152	0.0	0.7
Birch Street, east of Randolph Avenue	17,699	17,731	20,363	20,395	0.0	0.6	17,699	17,754	20,363	20,418	0.0	0.6
Birch Street, east of State College Boulevard	26,235	26,335	28,143	28,243	0.0	0.3	26,235	26,304	28,143	28,212	0.0	0.3
Birch Street, east of S Associated Road	25,709	25,809	27,553	27,653	0.0	0.3	25,709	25,778	27,553	27,622	0.0	0.3
Birch Street, east of N Associated Road	22,011	22,111	23,671	23,771	0.0	0.3	22,011	22,080	23,671	23,740	0.0	0.3
Randolph Street, south of Birch Street	7,985	8,766	8,663	9,444	0.4	0.7	7,985	7,447	8,663	8,125	-0.3	0.1
State College Boulevard, south of Birch Street	14,410	14,670	18,277	18,537	0.1	1.1	14,410	14,386	18,277	18,253	0.0	1.0
Kraemer Boulevard, south of Birch Street	21,083	21,083	22,147	22,147	0.0	0.2	21,083	21,083	22,147	22,147	0.0	0.2
Imperial Highway, west of Puente Street	44,868	45,203	49,685	50,020	0.0	0.5	44,868	44,818	49,685	49,635	0.0	0.4
Imperial Highway, east of Berry Street	59,723	60,188	65,953	66,418	0.0	0.5	59,723	59,583	65,953	65,813	0.0	0.4
Imperial Highway, east of Brea Boulevard	56,824	57,582	61,974	62,732	0.1	0.4	56,824	56,560	61,974	61,710	0.0	0.4
Imperial Highway, east of State College Boulevard	76,980	78,180	84,738	85,938	0.1	0.5	76,980	76,850	84,738	84,608	0.0	0.4
Imperial Highway, east of SR-57 NB Ramps	57,132	57,709	60,954	61,531	0.0	0.3	57,132	57,078	60,954	60,900	0.0	0.3
Imperial Highway, east of Associated Road	54,848	55,320	58,020	58,492	0.0	0.3	54,848	54,824	58,020	57,996	0.0	0.2
Imperial Highway, east of Castlegate Lane/Placentia Avenue	54,921	55,213	58,230	58,522	0.0	0.3	54,921	54,952	58,230	58,261	0.0	0.3
Brea Boulevard, south of Imperial Highway	32,525	32,781	35,716	35,972	0.0	0.4	32,525	32,443	35,716	35,634	0.0	0.4
Kraemer Boulevard, south of Imperial Highway	21,084	21,084	22,132	22,132	0.0	0.2	21,084	21,084	22,132	22,132	0.0	0.2
				MAX	0.4	1.4				MAX	0.01	1.4