4.10 Noise

This section analyzes the noise impacts that could result from implementation of the project. This analysis relies on the Irvine General Plan Update Traffic Noise Assessment prepared by Urban Crossroads, Inc. (Appendix G).

4.10.1 Existing Conditions

4.10.1.1 Fundamentals of Noise and Vibration

a. Fundamentals of Noise

Sound levels are described in units called the decibel (dB). Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, a doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB; a halving of the energy would result in a 3 dB decrease.

Additionally, in technical terms, sound levels are described as either a "sound power level" or a "sound pressure level," which while often confused, are two distinct characteristics of sound. Both share the same unit of measure, the dB. However, sound power, expressed as L_{pw}, is the energy converted into sound by the source. The L_{pw} is used to estimate how far a noise will travel and to predict the sound levels at various distances from the source. As sound energy travels through the air, it creates a sound wave that exerts pressure on receivers such as an ear drum or microphone and is the sound pressure level. Noise measurement instruments only measure sound pressure, and noise level limits used in standards are generally sound pressure levels.

The human ear is not equally sensitive to all frequencies within the sound spectrum. To accommodate this phenomenon, the A-scale, which approximates the frequency response of the average young ear when listening to most ordinary everyday sounds, was devised. When people make relative judgments of the loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Therefore, the "A-weighted" noise scale is used for measurements and standards involving the human perception of noise. Noise levels using A-weighted measurements are designated with the notation dB(A).

The impact of noise is not a function of loudness alone. The time of day when noise occurs and the duration of the noise are also important. Additionally, most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors has been developed. The noise descriptors used for this study are the one-hour equivalent noise level (L_{eq}) and the community noise equivalent level (CNEL). The CNEL is a 24-hour equivalent sound level. The CNEL calculation applies a 5 dB(A) penalty to noise occurring during evening hours, between 7:00 p.m. and 10:00 p.m., and a 10 dB(A) penalty is added to noise occurring during the night, between 10:00 p.m. and 7:00 a.m. These increases for certain times are intended to account for the added sensitivity of humans to noise during the evening and night.

Sound from a small, localized source (approximating a "point" source) radiates uniformly outward as it travels away from the source in a spherical pattern, known as geometric spreading. The sound level decreases or drops off at a rate of 6 dB(A) for each doubling of the distance.

Traffic noise is not a single, stationary point source of sound. The movement of vehicles makes the source of the sound appear to emanate from a line (line source) rather than a point when viewed over some time interval. The drop-off rate for a line source is 3 dB(A) for each doubling of distance.

The propagation of noise is also affected by the intervening ground, known as ground absorption. A hard site (such as parking lots or smooth bodies of water) receives no additional ground attenuation, and the changes in noise levels with distance (drop-off rate) are simply the geometric spreading of the source. A soft site (such as soft dirt, grass, or scattered bushes and trees) receives an additional ground attenuation value of 1.5 dB(A) per doubling of distance. Thus, a point source over a soft site would attenuate at 7.5 dB(A) per doubling of distance.

Human perception of noise has no simple correlation with acoustical energy. A change in noise levels is generally perceived as follows: 3 dB(A) barely perceptible, 5 dB(A) readily perceptible, and 10 dB(A) perceived as a doubling or halving of noise (California Department of Transportation [Caltrans] 2013, 2020).

b. Fundamentals of Vibration

Vibration consists of energy waves transmitted through solid material (Federal Transit Administration [FTA] 2018). Groundborne vibration propagates from the source through the ground to adjacent buildings by surface waves. Vibration may be composed of a single pulse, a series of pulses, or a continuous oscillatory motion. The frequency of a vibrating object describes how rapidly it is oscillating, measured in hertz (Hz). The normal frequency range of most groundborne vibration that can be felt generally starts from a low frequency of less than 1 Hz to a high of about 200 Hz (FTA 2018).

Groundborne vibration is measured by its peak particle velocity (PPV), which is normally described in inches per second (in/sec). PPV is appropriate for determining potential structure damage but does not evaluate human response to vibration. The ground motion caused by vibration may also be described in decibel notation (vibration decibels), referenced as VdB, which serves to compress the range of numbers required to describe vibration relative to human response. The general human response to different levels of groundborne vibration velocity levels is described in Table 4.10-1.

Table 4.10-1
Human Response to Different Levels of Groundborne Vibration

Vibration Velocity Level	Human Reaction
65 VdB	Approximate threshold of perception for many people.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find that transportation-related vibration at this level is unacceptable.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.

SOURCE: FTA 2018.
VdB = vibration decibel

Vibration energy spreads out as it travels through the ground, causing the vibration amplitude to decrease with distance away from the source. The way in which vibration is transmitted through the earth is called propagation. As vibration waves propagate from a source, the energy is spread over an ever-increasing area such that the energy level striking a given point is reduced with the distance from the energy source. This geometric spreading loss is inversely proportional to the square of the distance. Wave energy is also reduced with distance as a result of material damping in the form of internal friction, soil layering, and void spaces. The amount of attenuation provided by material damping varies with soil type and condition as well as the frequency of the wave.

Groundborne vibration can be a concern for nearby residents along a transit system route or maintenance facility, causing buildings to shake and rumbling sounds to be heard. Groundborne vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of groundborne vibration are trains; buses on rough roads; and construction activities such as blasting, pile-driving, and operating heavy earth-moving equipment.

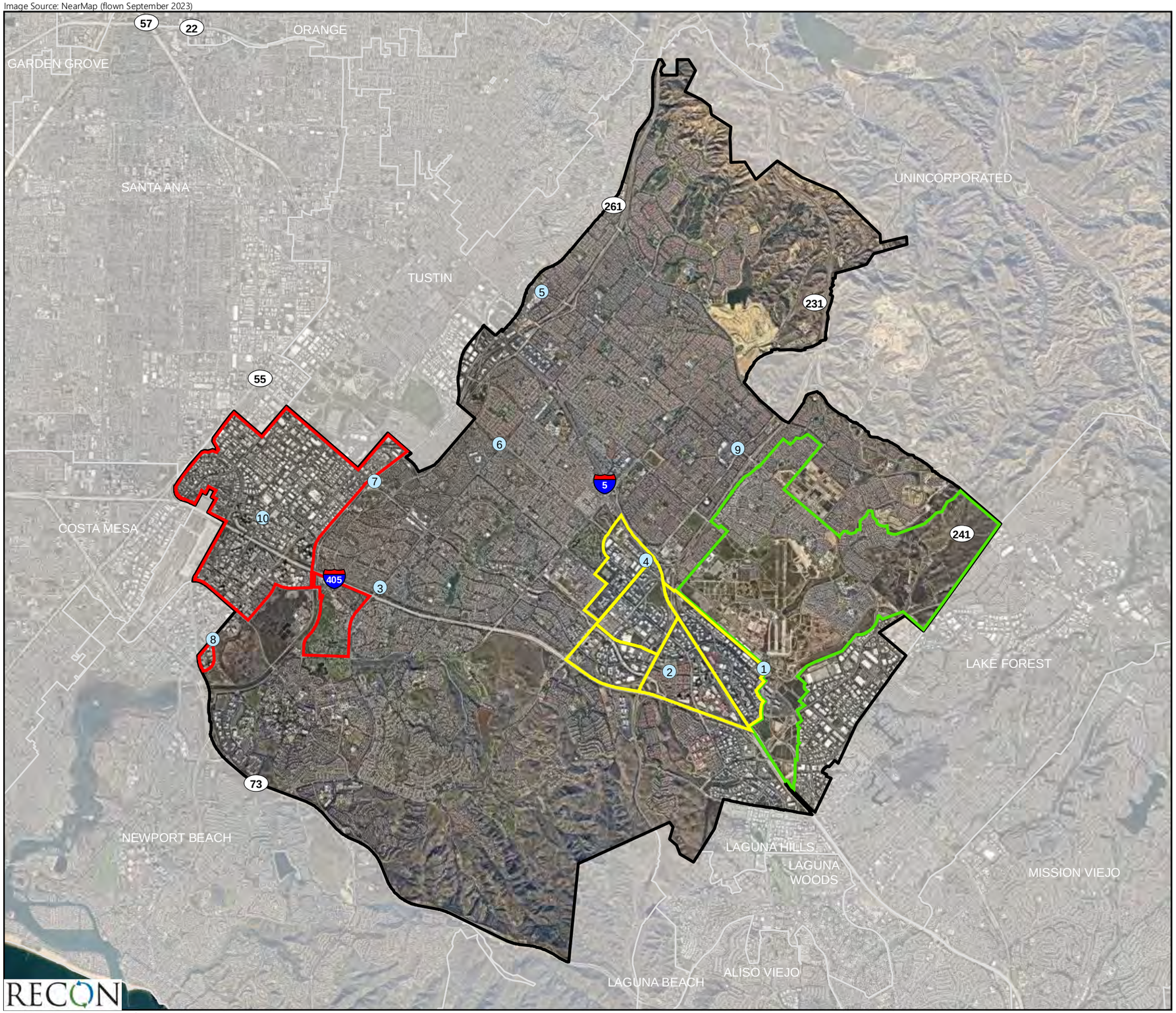
4.10.1.2 Ambient Noise Measurements

As part of this assessment, ambient noise levels were measured in the City to provide a characterization of the variability of noise and to assist in determining constraints and opportunities for future development. Eight 15-minute, one 1-hour, and one 19-minute daytime noise level measurements were conducted throughout the City. Noise measurements were taken with one Larson-Davis LxT Type 1 Integrating Sound Level Meters, serial number 3897. The following parameters were used:

Filter:	A-weighted
Response:	Slow
Time History Period:	5 seconds
Height of Instrument:	5 feet above ground level

Measurement locations are shown in Figure 4.10-1. A summary of the measurements is provided in Table 4.10-2, and traffic counts taken during measurements are summarized in Table 4.10-3. Based on the measurement data, daytime noise levels in the City are typical of an urban environment. Each measurement location and noise source observed during the measurements is discussed below.

Image Source: NearMap (flown September 2023)



Irvine City Boundary
Focus Area 1
Focus Area 2
Focus Area 3
Noise Measurement Location

0 Miles 1.5

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FIGURE 4.10-1
Noise Measurement Locations

Table 4.10-2 Noise Measurements				
Measurement	Location	Date	Time	L_{eq}
1	Irvine Transit Center	2:29 p.m. - 3:29 p.m.	1 hour	57.4
2	Alton Parkway, 30 feet from edge of nearest travel lane	2:02 p.m. - 2:17 p.m.	15 minutes	60.2
3	Culver Drive, 30 feet from edge of nearest travel lane	9:51 a.m. - 10:06 a.m.	15 minutes	62.8
4	Sand Canyon Avenue, western corner of intersection with Burt Road	1:22 p.m. - 1:41 p.m.	19 minutes	72.3
5	Irvine Boulevard, 50 feet from nearest travel lane	12:30 p.m. - 12:45 p.m.	15 minutes	60.2
6	Culver Drive, 100 feet from edge of nearest travel lane	11:54 a.m. - 12:09 p.m.	15 minutes	55.6
7	Barranca Parkway, 50 feet from edge of nearest travel lane	10:45 a.m. - 11:00 a.m.	15 minutes	58.2
8	Jamboree Road, 50 feet from edge of nearest travel lane	8:28 a.m. - 8:43 a.m.	15 minutes	65.3
9	Irvine Boulevard and Sand Canyon Avenue, 25 feet from edge of nearest Irvine Boulevard travel lane	3:47 p.m. - 4:02 p.m.	15 minutes	62.7
10	Main Street, western corner of intersection with Von Karman Avenue	9:05 a.m. - 9:20 a.m.	15 minutes	71.0
L_{eq} = one-hour equivalent noise level.				

Table 4.10-3 Traffic Counts						
Measurement	Roadway	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles
2	Alton Parkway	141	4	0	3	0
3	Culver Drive	535	15	2	2	0
4	Sand Canyon Avenue	325	8	3	1	0
5	Irvine Boulevard	340	0	0	0	0
6	Culver Drive	350	6	0	1	0
7	Barranca Parkway	122	5	0	1	0
8	Jamboree Road	300	12	1	0	0
9	Irvine Boulevard	803	7	0	3	1
10	Main Street	263	3	1	2	2

Measurement 1 was taken at the Irvine Transit Center (Metrolink Station) located at 15215 Barranca Parkway #1. The measurement was located at the fence adjacent to the Metrolink tracks, approximately 46 feet from the tracks. The main source of noise at this measurement location was two northbound trains and announcements over the speaker system. Other sources of noise included aircraft flyovers, buses and a garbage truck. The average measured noise level was 57.4 dB(A) L_{eq}.

Measurement 2 was located 30 feet from the nearest travel lane on Alton Parkway, and on the southern edge of 15615 Alton Parkway. The main source of noise at this location was vehicle traffic

on Alton Parkway. Traffic volumes on Alton Parkway were counted during the 15-minute measurement period. The average measured noise level was 60.2 dB(A) L_{eq}.

Measurement 3 was located 30 feet from the nearest travel lane on Culver drive, north of Interstate 405 (I-405), and along the edge of the Freeway trail. The main source of noise at this location was vehicle traffic on Culver Drive. Traffic volumes on Culver Drive were counted during the 15-minute measurement period. The average measured noise level was 62.8 dB(A) L_{eq}.

Measurement 4 was taken on the western corner of the Sand Canyon Avenue and Burt Road intersection. The main source of noise at this location was vehicle traffic on Sand Canyon Avenue. Other sources of noise included the cross walk signal. Traffic volumes on Sand Canyon Avenue were counted during the 19-minute measurement period. The average measured noise level was 72.3 dB(A) L_{eq}.

Measurement 5 was taken 50 feet from the nearest travel lane on Irvine Boulevard, approximately 368 feet northwest of the Irvine Boulevard and Marketplace intersection. The main source of noise at this location was vehicle traffic on Irvine Boulevard. Traffic volumes on Irvine Boulevard were counted during the 15-minute measurement period. The average measured noise level was 60.2 dB(A) L_{eq}.

Measurement 6 was taken 100 feet from the nearest travel land on Culver Drive, on the Walnut Trail, approximately 178 feet southwest of the Metrolink tracks. The main source of noise at this location was vehicle traffic on Culver Drive. Other sources included bird vocalizations. No train pass-bys were observed during the measurement period. Traffic volumes on Culver Drive were counted during the 15-minute measurement period. The average measured noise level was 55.6 dB(A) L_{eq}.

Measurement 7 was taken 50 feet from the nearest travel lane on Barranca Parkway, and south of Peters Canyon Trail. The main source of noise at this location was vehicle traffic on Barranca Parkways. Traffic volumes on Barranca Parkway were counted during the 15-minute measurement period. The average measured noise level was 58.2 dB(A) L_{eq}.

Measurement 8 was taken 50 feet from the edge of the nearest travel lane on the eastern corner of the Jamboree Road and Fairchild Road intersection. The main source of noise was vehicle traffic on Jamboree Road. Traffic volumes on Jamboree Road were counted during the 15-minute measurement period. The average measured noise level was 65.3 dB(A) L_{eq}.

Measurement 9 was taken 25 feet from the edge of the nearest Irvine Boulevard travel lane, approximately 140 feet northwest of the Irvine Boulevard and Sand Canyon Avenue intersection. The main source of noise was vehicle traffic on Irvine Boulevard and San Canyon Avenue. Other sources of noise included skateboards, bicycles, and a motorcycle. Traffic volumes on Irvine Boulevard were counted during the 15-minute measurement period. The average measured noise level was 62.7 dB(A) L_{eq}.

Measurement 10 was taken on the western corner of the Main Street and Von Karmen Avenue intersection. The main source of noise at this location was vehicle traffic on Main Street and Von Karmen Avenue. Other sources of noise included music from vehicles. Traffic volumes on Main Street were counted during the 15-minute measurement period. The average measured noise level was 71 dB(A) L_{eq}.

4.10.1.3 Existing Traffic Noise

The most pervasive noise in Irvine currently comes from mobile noise sources such as motor vehicles, railroads, and aircraft. The City is also exposed to noise emanating from sources such as industrial, commercial, and construction activities. Major roads/freeways generating the greatest noise level in the City are Interstate 5 (I-5) and I-405. Numerous other roads within the City are also major sources of noise. The noise contour distances represent the predicted noise level for each roadway without the attenuating effects of noise barriers, structures, topography, or dense vegetation. As intervening structures, topography, and dense vegetation would affect noise exposure at a particular location, the noise contours should not be considered site-specific but are rather guides to determine when detailed acoustic analysis should be undertaken.

Figure 4.10-2 shows the existing vehicle traffic noise contours for the City. As shown, existing noise levels at areas located closest to the roadways exceed 60 CNEL. The local freeways are the dominant noise sources in the City. Noise contours from the freeways in many cases overlap with and encompass the noise contours from local roadways.

4.10.1.4 John Wayne Airport Noise Contours

Aircraft noise generally affects areas within the airport vicinity during takeoffs and landings, and areas located around the flight tracks. Current airborne noise sources in the City result from civil air operations at John Wayne Airport, located immediately adjacent to the western boundary of the City. It is expected that over the years, noise impacts to the City from aircraft operations at John Wayne Airport will not increase due to agreements in place restricting the number of flights, hours of noise, and aggregate noise. As a civil airport, John Wayne Airport is subject to State Airport Noise Regulation (Title 21), requiring efforts to reduce airport noise impact on existing communities. The John Wayne Airport noise contours are shown in Figure 4.10-3 (Orange County Airport Land Use Commission [ALUC] 2008).

4.10.1.5 Railroad Noise

Railroad noise is the result of the mechanical processes of the engine, the interaction of the wheels with the track, and use of the whistle. The amount of noise generated is dependent upon the speed of the train and the number of cars. In the City, there are regular passenger rail services provided by Amtrak and Metrolink. The Irvine Station is located near the Spectrum Center in the southeastern part of the City. The railroad tracks are utilized by Metrolink's Orange County Line and Inland Empire–Orange County Line and Amtrak's Surfliner as well as Burlington Northern Santa Fe (BNSF) freight trains. The route alignment generally follows the I-5 corridor. Railroad noise contours are shown in Figure 4.10-4.

Image Source: NearMap (flown September 2023)

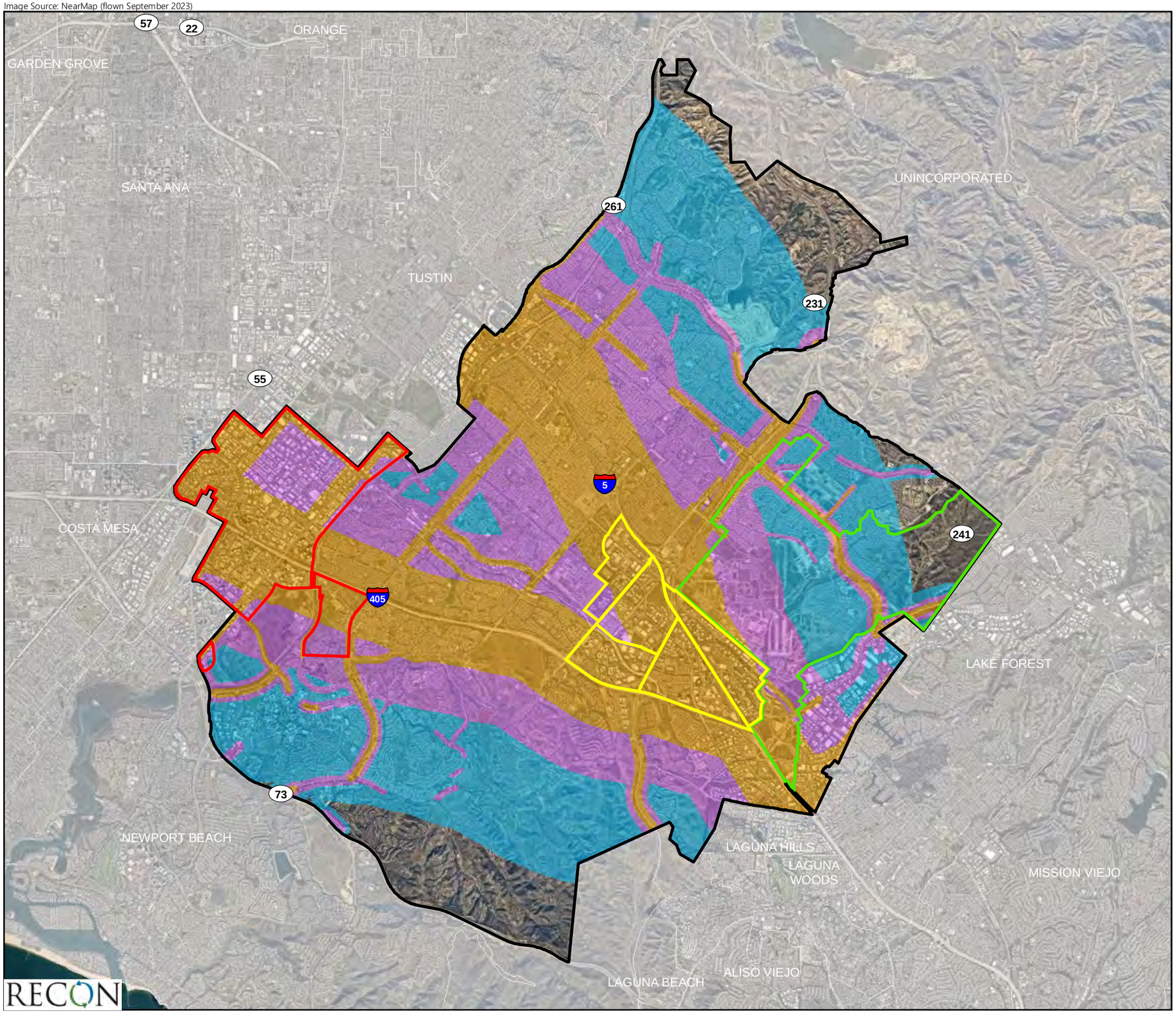

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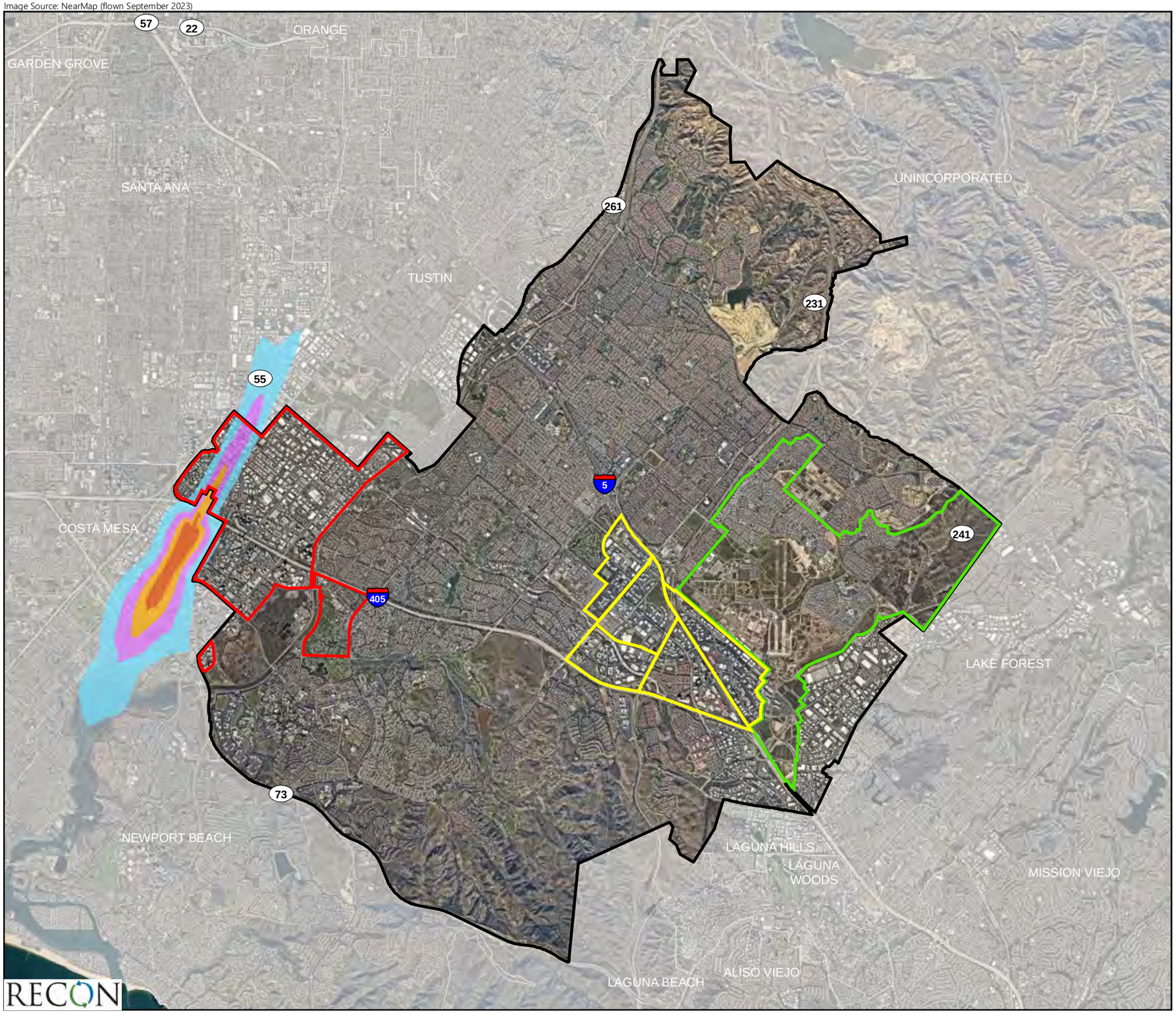
FIGURE 4.10-2
Existing Traffic Noise Contours

Image Source: NearMap (flown September 2023)



Irvine City Boundary
Focus Area 1
Focus Area 2
Focus Area 3

Airport Noise

60 CNEL
65 CNEL
70 CNEL
75 CNEL

0 Miles 1.5

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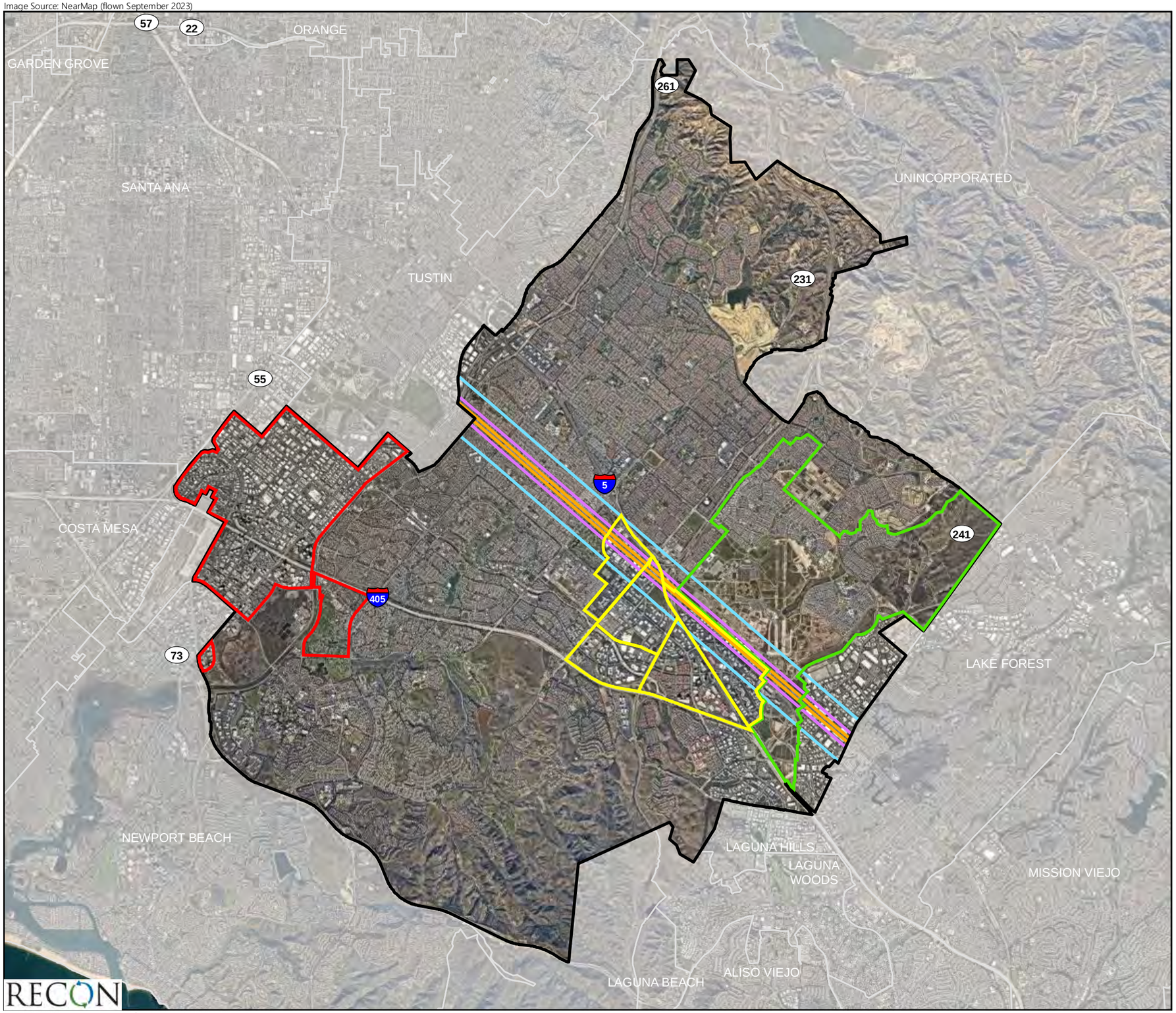
FIGURE 4.10-3
John Wayne Airport Noise Contours

Image Source: NearMap (flown September 2023)



Irvine City Boundary
Focus Area 1
Focus Area 2
Focus Area 3

Railroad Noise

60 CNEL
65 CNEL
70 CNEL

0 Miles 1.5

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FIGURE 4.10-4
Railroad Noise Contours

4.10.1.6 Stationary Noise

Stationary noise sources are the noise sources in the community such as industrial and mechanical equipment, which are often referred to as "fixed sources." Industrial noise generated by processing and operation is usually of long duration at relatively low frequencies. Industrial uses, including manufacturing, warehousing, and distribution-related uses, are another source of noise that can have a varying degree of impact on adjacent uses. Mechanical equipment, generators, and vehicles associated with these uses all contribute to noise levels at industrial sites. Construction sources generate high noise levels for temporary, but sometimes extended periods of time from operation of heavy equipment. Other land uses such as commercial development may result in generally nuisance noise exposure from high amounts of activity, maintenance activities, and mechanical noise. Examples of stationary sources within the City include:

- University of California, Irvine (special events)
- Frank R. Bowerman Landfill (hauling and operational activities)
- Heating, ventilation and air conditioning (HVAC) units
- Various power tools such as lawnmowers or leaf blowers; mechanical equipment required for operation such as car wash facilities
- Animal noise
- Human-related activities such as loud parties, loud music, radio, T.V., or children playing
- Event spaces and amphitheaters result in periodic noise exposure from amplified noise and crowd activity.

4.10.2 Applicable Regulatory Requirements

4.10.2.1 Federal

a. Construction Noise

The FTA provides financial and technical assistance to local public transit systems, including buses, subways, light rail, commuter rail, trolleys, and ferries. FTA also oversees safety measures. The FTA's Transit Noise and Vibration Impact Assessment manual indicates that 80 dB(A) L_{eq} is reasonable criteria for assessing construction noise levels at residential uses (FTA 2018). In the absence of local construction noise level limits, the FTA recommended 80 dB(A) L_{eq} criteria is often used to assess the significance of construction noise at residential receivers.

b. Vibration

The FTA provides criteria for acceptable levels of groundborne vibration for various types of buildings. Structures amplify groundborne vibration; wood-frame buildings, such as typical residential structures, are more affected by ground vibration than heavier buildings. The level at which groundborne vibration is strong enough to cause architectural damage has not been determined conclusively, but the standards recommended by the FTA are shown in Table 4.10-4.

Table 4.10-4 Construction Vibration Damage Criteria		
Building/Structural Category	PPV (in/sec)	Approximate VdB
I. Reinforced-concrete, steel or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Non-engineered timber and masonry buildings	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90
SOURCE: FTA 2018. PPV = peak particle velocity in/sec = inch per second VdB = vibration decibel		

The FTA also provides guidance for assessing vibration impacts from railroad operations. The criteria for determining the significance of impacts are presented in Table 4.10-5.

Table 4.10-5 Guidelines for Determining the Significance of Groundborne Vibration and Noise Impacts						
	Groundborne Vibration Impact Levels (VdB re 1 micro-inch per second)			Groundborne Noise Impact Levels (dB re 20 micro Pascals)		
Land Use Category	Frequent Events	Occasional Events	Infrequent Events	Frequent Events	Occasional Events	Infrequent Events
Category 1: Buildings where low ambient vibration is essential for interior operations (research & manufacturing facilities with special vibration constraints)6	65 VdB	65 VdB	65 VdB	N/A	N/A	N/A
Category 2: Residences and buildings where people normally sleep (hotels, hospitals, residences, & other sleeping facilities)6	72 VdB	75 VdB	80 VdB	35 dB(A)	38 dB(A)	43 dB(A)
Category 3: Institutional land uses with primarily daytime use (schools, churches, libraries, other institutions, & quiet offices)6	75 VdB	78 VdB	83 VdB	40 dB(A)	43 dB(A)	48 dB(A)
SOURCE: FTA 2018. VdB = vibration decibel; re = relative; N/A = not applicable "Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category. "Occasional Events" is defined as 30 to 70 vibration events per day. Most commuter trunk links fall into this category "Infrequent Events" is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.						

For Category 1 uses such as vibration sensitive equipment, the screening distance from the right-of-way is 600 feet. For Category 2 land uses such as residences and buildings where people would normally sleep, the screening distance is 200 feet. The screening distance for Category 3 land uses such as institutional land uses with primarily daytime uses, is 120 feet.

4.10.2.2 State

a. General Plan Guidelines

The state of California, through its General Plan Guidelines, discusses how ambient noise should influence land use and development decisions and includes a table of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable uses at different noise levels, expressed in CNEL (Governor's Office of Planning and Research 2017). This table provides a tool to gauge the compatibility of land uses relative to existing and future noise levels. It provides land use compatibility guidelines that local jurisdictions can use as a guide for establishing its own General Plan noise compatibility levels that reflect the noise-control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution. The compatibility guidelines identify normally acceptable, conditionally acceptable, and clearly unacceptable noise levels for various land uses. A conditionally acceptable designation implies new construction or development should be undertaken only after detailed analysis of the noise reduction requirements for each land use, and needed noise insulation features are incorporated in the design. By comparison, a normally acceptable designation indicates that standard construction can occur with no special noise reduction requirements.

b. California Code of Regulations

For residential uses, interior noise levels for habitable rooms are regulated also by Title 24 of the California Code of Regulations, California Noise Insulation Standards. Title 24, Chapter 12, Section 1206.4 of the 2022 California Building Code requires that interior noise levels attributable to exterior sources not exceed 45 CNEL in any habitable room within a residential structure. A habitable room is a room used for living, sleeping, eating, or cooking. Bathrooms, closets, hallways, utility spaces, and similar areas are not considered habitable rooms for this regulation.

For nonresidential structures, Title 24, Chapter 12, Section 1207.5 refers to 2022 California Green Building Standards, Chapter 5 – Nonresidential Mandatory Measures, Division 5.5 – Environmental Quality, Section 5.507 – Environmental Comfort, Subsection 5.507.4 – Acoustical Control. Pursuant to these standards, all nonresidential building construction shall employ building assemblies and components that achieve a composite sound transmission class rating of at least 50 or shall otherwise demonstrate that exterior noise shall not result in interior noise environment where noise levels exceed 50 dB(A) L_{eq} in occupied areas during any hour of operation.

4.10.2.3 Orange County Airport Land Use Commission

As discussed in Section 4.10.1.4, John Wayne Airport is located immediately adjacent to the western boundary of the City. The Orange County ALUC prepares airport land use compatibility plans (ALUCP) in order to promote compatibility between airports and the land uses surrounding them. ALUCPs set compatibility criteria applicable to local agencies in their preparation or amendment of land use plans and ordinances. The Airport Environs Land Use Plan (AELUP) for John Wayne Airport provides guidance specific to the airport. The AELUP noise compatibility standards are summarized in Table 4.10-6.

Table 4.10-6
AELUP Limitations on Land Use Due to Noise

Land Use Category	55	60	65	70	75	80
Residential (all types): Single and Multi-Family Residences						
Community Facilities: Churches, Libraries, Schools, Preschools, Day-Care Centers Hospitals, Nursing/Convalescent Homes & Other noise sensitive uses						
Commercial Retail, Office						
Industrial						

	NORMALLY CONSISTENT Conventional construction methods used. No special noise reduction requirements.
	CONDITIONALLY CONSISTENT Must use sound attenuation as required by the California Noise Insulation Standards, Title 25, California Code of Regulations. Residential use sound attenuation required to ensure that the interior CNEL does not exceed 45 dB. Commercial and industrial structures shall be sound attenuated to meet Noise Impact Zone "1" criteria.
	NORMALLY INCONSISTENT All residential units are inconsistent unless are sound attenuated to ensure that the interior CNEL does not exceed 45 dB, and that all units are indoor oriented so as to preclude noise impingement on outdoor living areas.

SOURCE: Orange County ALUC 2008.

4.10.2.4 City of Irvine

a. Current General Plan (2000)

The City's existing General Plan (2000) establishes acceptable interior and exterior noise standards (Table F-1) by land use type and establishes acceptable noise levels by each land use category to ensure land use compatibility (Table F-2). In addition, the existing General Plan includes the following objectives related to noise:

Objective F-1: Mobile Noise. Ensure that City residents are not exposed to mobile noise levels in excess of the CNEL Interior and Exterior Noise Standards (Table F-1), and Single Event Noise Standard.

Objective F-2: Stationary Noise. Ensure that City residents are not exposed to stationary noise levels in excess of the City Noise Ordinance standards.

Objective F-3: Noise Abatement. Achieve maximum efficiency in noise abatement efforts through intergovernmental coordination and public information programs.

b. Municipal Code

Operational Noise

The City regulates noise through the Municipal Code under Title 6 Public Morals, Division 8 Pollution, Chapter 2 Noise (Table 4.10-7). All properties are assigned to the following Noise Zones by the City:

1. Noise *zone 1:* All hospitals, libraries, churches, schools and residential properties.
2. Noise *zone 2:* All professional office and public institutional properties.
3. Noise *zone 3:* All commercial properties excluding professional office properties.
4. Noise *zone 4:* All industrial properties

Table 4.10-7
Municipal Code Noise Standards

Zone	Time of Day	Location	Noise Level dB(A) L_{eq} – Not to be exceed for:				
			30 minutes	15 minutes	5 minutes	1 minute	Anytime
1	7 a.m. to 10 p.m.	Exterior	55	60	65	70	75
		Interior	--	--	55	60	65
	10 p.m. to 7 a.m.	Exterior	50	55	60	65	70
		Interior	--	--	45	50	55
2	7 a.m. to 10 p.m.	Exterior	55	60	65	70	75
		Interior	--	--	55	60	65
3	Anytime	Exterior	60	65	70	75	80
		Interior	--	--	55	60	65
4	Anytime	Exterior	70	75	80	85	90
		Interior	--	--	55	60	65

SOURCE: Irvine Municipal Code Title 6 Public Morals, Division 8 Pollution, Chapter 2 Noise.

Construction Noise

The Municipal Code limits construction activities in Section 66-8-205(A), which states:

> Construction activities and agricultural operations may occur between 7:00 a.m. and 7:00 p.m. Mondays through Fridays, and 9:00 a.m. and 6:00 p.m. on Saturdays. No construction activities shall be permitted outside of these hours or on Sundays and federal holidays, except Columbus Day, unless a temporary waiver is granted by the Chief Building Official or his or her authorized representative. Trucks, vehicles, and equipment that are making or are involved with material deliveries, loading, or transfer of materials, equipment service, maintenance of any devices or appurtenances for or within any construction project in the City shall not be operated or driven on City streets outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the City. Any waiver granted shall take impact upon the community into consideration. No construction activity and agricultural operations will be permitted outside of these hours except in

> emergencies including maintenance work on the City rights-of-way that might be required.
>
> Deliveries to or pickups from any commercial property sharing a property line with any residential property may occur between 7:00 a.m. and 10:00 p.m. daily. No deliveries to or pickups from any such properties shall occur outside of these hours.

Construction noise is also addressed in Municipal Code Zoning Ordinance Chapter 5 Overlay Districts, Chapter 5-8 Irvine Business Complex Residential Mixed-Use Overlay District, Section 5-8-4 which states:

> Prior to issuance of grading permits, the project applicant shall incorporate the following measures as a note on the grading plan cover sheet to ensure that the greatest distance between noise sources and sensitive receptors during construction activities has been achieved.
>
> - Construction equipment, fixed or mobile, shall be equipped with properly operating and maintained noise mufflers consistent with manufacturer's standards.
> - Construction staging areas shall be located away from off-site sensitive uses during the later phases of project development.
> - The project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site, whenever feasible.
> - For construction of sound walls that have been incorporated into the project design, prior to construction of the building foundation, installation of temporary sound blankets (fences typically composed of poly-vinyl-chloride-coated outer shells with adsorbent inner insulation) shall be placed along the boundary of the project site during construction activities.

Vibration

The Municipal Code Zoning Ordinance Chapter 5 Overlay Districts, Chapter 5-8 Irvine Business Complex Residential Mixed-Use Overlay District, Section 5-8-4 Special development requirements states that projects involving vibration-intensive construction activities occurring near sensitive-receptors must be evaluated for potential vibration impacts. The use of less vibration intensive equipment or methods must be implemented if the construction-related vibration exceeds the Federal Transit Administration vibration-annoyance criteria for 78 VdB during the daytime.

c. Existing Plans, Programs, and Policies

Compliance measures are regulations imposed uniformly by the approving agency based on the proposed action taken and are required of the project to reduce its potential environmental effects. Because these features are standard requirements, they do not constitute mitigation measures. The

following measures are existing plans, programs, or policies (PPP) that apply to the project and will help to reduce and avoid potential impacts related to noise:

- PPP NOS-1: Compliance with the California Code of Regulations interior noise standards.
- PPP NOS-2: Compliance with the City's Municipal Code.
- PPP NOS-3: Compliance with Orange County ALUCP noise compatibility standards for John Wayne Airport.

d. Proposed General Plan Strategies and Policies

In addition to the above-listed PPPs, the following proposed goals, objectives, policies, and implementing actions are applicable to the analysis of noise and would replace existing goals, strategies, and policies outlined in the City's adopted General Plan following project approval.

Table 4.10-8 identifies the maximum interior and exterior noise levels for each land use category. The standards assume the incorporation of California state law requirements into all projects.

Table 4.10-8
Interior and Exterior Noise Standards Energy Average (CNEL)

Land Use Categories		Energy Average (CNEL)	
Categories	Uses	Interior[1]	Exterior[2]
Residential	Single-Family, Multiple Family	45[3] 55[4]	65[7]
	Mobile Home	--	65[5]
Commercial/Industrial	Hotel, Motel, Transient Lodging	45	65[6]
	Commercial, Retail, Bank, Restaurant	55	--
	Office Building, Professional Office, Research & Development	50	--
	Amphitheater, Concert Hall, Auditorium, Meeting Hall	45	--
	Gymnasiums (Multipurpose)	50	--
	Health Clubs	55	--
	Manufacturing, Warehousing, Wholesale, Utilities	65	--
	Movie Theatre	45	--
Institutional	Hospital, School/Classroom	45	65
	Church, Library	45	--
Open Space	Parks	--	65

[1]Interior environment excludes bathrooms, toilets, closets, and corridors.
[2]Outdoor environment limited to private yard of single-family or multi-family residences private patio which is accessed by a means of exit from inside the unit; mobile home park; hospital patio; park picnic area; school playground; and hotel and motel recreation area.
[3]Noise level requirement with closed windows. Mechanical ventilating system or other means of natural ventilation shall be provided pursuant to Appendix Chapter 12, Section 1208 of UBC.
[4]Noise level requirement with open windows if they are used to meet natural ventilation requirement.
[5]Exterior noise level shall be such that interior noise level will not exceed 45 CNEL.
[6]Except for those areas affected by aircraft noise.
[7]Multi-family developments with balconies that do not meet the 65 CNEL are required to provide occupancy disclosure notices to all future tenants regarding potential noise impacts.

Table 4.10-9 identifies the compatibility of proposed projects and future noise levels. The diagram is used in evaluating new development projects, including General Plan amendments, zone changes, tentative maps, conditional use permits and master plans.

Table 4.10-9
Land Use/Noise Compatibility

Land Use Categories		Energy Avenue (CNEL)						
Categories	Use	<	55	60	65	70	75	80>
RESIDENTIAL	Single-Family	A	A	B	B	C	D	D
RESIDENTIAL	Mobile Home	A	A	B	B	C	D	D
COMMERCIAL Regional	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D
COMMERCIAL Regional Community	Commercial Retail, Bank, Restaurant, Movie Theatre	A	A	A	A	B	B	C
COMMERCIAL Community **INDUSTRIAL & INSTITUTIONAL**	Office Building, Research & Development, Professional Office, City Office Building	A	A	A	B	B	C	D
COMMERCIAL Recreation **INSTITUTIONAL** General	Amphitheatre, Concert Hall, Auditorium, Meeting Hall	B	B	C	C	D	D	D
COMMERCIAL Recreation	Children's Amusement Park, Miniature Golf, Go-Cart Track, Health Club, Equestrian Center	A	A	A	B	B	D	D
COMMERCIAL Community **INDUSTRIAL** General	Automobile service station, Auto Dealer, Manufacturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B
INSTITUTIONAL General	Hospital, Church, Library, School/Classrooms	A	A	B	C	C	D	D
OPEN SPACE	Parks	A	A	A	B	C	D	D
OPEN SPACE	Golf Courses, Nature Centers, Cemeteries, Wildlife Reserves, Wildlife Habitat	A	A	A	A	B	C	C
AGRICULTURAL	Agriculture	A	A	A	A	A	A	A

Interpretation:
Zone A (Clearly Compatible): Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
Zone B (Normally Compatible): 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. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.
Zone C (Normally Incompatible): New construction or development should normally be discouraged. If new construction or development does proceed, a detailed analysis or noise reduction requirements must be made, and needed noise insulation features must be included in the design
Zone D (Clearly Incompatible): New construction or development should generally not be undertaken.

Single Event Noise Standard: The maximum interior noise levels of the loudest 10 percent of single noise events [$L_{max(10)}$] for noise-sensitive land uses within the 60 CNEL of aircraft and railroad noise sources shall not exceed 65 dBA between 7 a.m. and 7 p.m. nor 55 dBA between 7 p.m. and 7 a.m.

for typical occupancy. (Note: The samples for single event noise measurement must include representative aircraft operation.)

Goal 1: Noise Control Through Land Use Planning and Design

Objective N-1. Maintain healthy and safe noise environments consistent with the standards in Table 1 through site design and location.

- Policy (a): Require all plans submitted for development review to demonstrate whether the plan area is located within an existing or future Noise Element noise contour, including vehicle, rail, and aircraft noise contours.
- Policy (b): Avoid new residential development within the 65 CNEL contour for aircraft, roadway, or rail noise unless "normally compatible" exterior noise standards can be maintained in private open spaces, and interior noise standards can be achieved through building design.
- Policy (c): Require noise studies to be prepared in accordance with the City's environmental review procedure for all projects that are not "clearly compatible" with the future noise level at the site. Require proposed development projects located in areas that are not "clearly compatible" to demonstrate the incorporation of adequate noise attenuation techniques to achieve compatible interior noise levels.
- Policy (d): Require noise attenuation for private usable outdoor spaces (back yards and single-family housing developments, and balconies or recreation areas in multifamily housing developments) in all developments where projected exterior noise levels exceed "normally compatible" exterior noise standards.
- Policy (e): Require the following Single Event Noise Standard for noise-sensitive land uses within the 60 CNEL of aircraft and railroad noise sources: The maximum interior noise levels of the loudest 10 percent of single noise events [$L_{max(10)}$] shall not exceed 65 dB(A) between 7 a.m. and 7 p.m. nor 55 dB(A) between 7 p.m. and 7 a.m. for typical occupancy. Noise monitoring conducted to determine maximum single-event noise must include representative aircraft operation.
- Policy (f): Require noise studies conducted per Policy € to identify all the reduction measures necessary to reduce noise levels to meet the interior and exterior noise compatibility standards [Table 4.10-8] and Single Event Noise Standard (Policy (N-1e)), as applicable.
- Policy (g): Continue requiring conditional use permits for noise-sensitive land uses such as hospitals, libraries, churches, and schools located in areas not "clearly compatible" to demonstrate how exterior noise exposure would be minimized, such as building orientation, shielding, or limiting outdoor programs.
- Policy (h): Require that mixed-use and multi-family residential developments demonstrate noise compatibility between uses. Structures will adequately isolate noise between adjacent uses through features such as orientation, window, and building insulation, or separation of common walls. Nuisance noise areas such as loading areas, parking lots, driveways, trash enclosures, mechanical equipment, and other noise sources will be located away from the residential portion of the development when physically feasible.
- Policy (i): Require that new development plans demonstrate that implementation would maintain clearly or normally compatible noise levels at existing receptors. In areas where existing ambient noise levels exceed acceptable noise criteria, require that the project

demonstrates that implementation would not result in a more than 3 CNEL change in ambient conditions, including from project-generated vehicle noise sources.

Goal 2: Stationary Noise Sources

Objective N-2. Reduce noise from non-transportation sources such that City residents are not exposed to stationary noise levels that exceed City Noise Ordinance standards.

- Policy (a): Require any new construction to meet the City Noise Ordinance standards. The project applicant will be required to submit construction-related noise reduction strategies for review and approval prior to the issuance of grading permits.
- Policy (b): Require project applicants to depict, on any appropriate development application review (including, but not limited to, zone change, subdivisions, conditional use permit, site plan, and building plans), any potential noise sources known at the time of submittal and reduction measures that ensure these noise sources meet the City Noise Ordinance standards. Such sources include, but are not limited to, the following:
  - Truck pickup and loading areas.
  - Mechanical and electrical equipment such as air conditioning, swimming pool pumps and filters, and spa pumps.
  - Exterior nuisances such as speaker boxes and outdoor public address systems.
- Policy (c): Limit the hours of operation for portions of parks and active recreation uses adjacent to residential areas to daytime hours to minimize disturbance to residents.
- Policy (d): Require outdoor events with amplified noise to implement best management practices to reduce nuisance noise exposure.

Goal 3: Noise Abatement

Objective N-3. Achieve maximum efficiency in noise abatement efforts through establishing minimum standards, intergovernmental coordination, and public information programs.

- Policy (a): Coordinate efforts to reduce noise impacts with appropriate public and government agencies, such as aircraft and transit regulatory agencies.
- Policy (b): Monitor federal and state legislation and programs that will reduce noise in Irvine.
- Policy (c): Use police power to enforce the appropriate noise standards in the state's motor vehicle code and other state and federal legislation for mobile noise sources, including regulation of illegal or faulty exhaust systems, and excessive speed laws.
- Policy (d): Update highway/railroad noise levels (Table 2 of the Noise Element) whenever the City's Irvine Traffic Analysis Model (ITAM) has been significantly changed.
- Policy (e): Seek the cooperation of aircraft regulatory agencies in the modification and selection of flight paths that will reduce noise impacts on residential and other noise-sensitive areas.
- Policy (f): Ensure that any proposal to update aircraft noise contours used by the City of Irvine for planning analysis is submitted, before adoption by the City, to the Airport Land Use Commission
- Policy (g): Minimize the use of noise barriers to reduce noise exposure. Consider other attenuation strategies, such as alternative development siting, soundproofing sensitive receptors, building orientation and setbacks, providing buffer areas or landscape berms, modifying source operating hours, modifying roadway design, or utilizing quieter pavement strategies, as applicable, prior to proposing noise barrier installation.
- Policy (h): Consider the following in the design of new highways and streets to minimize noise exposure:
    - Alignment: The three-dimensional position of the road, as it relates to distance from sensitive receptors.
    - Barriers: Any solid material that shields a receiver from a given source of noise. Types of barriers include walls, berms, hills, and intervening structures.
    - Lateral separation: The horizontal distance between the road and a receiver, which may position an alignment to maximize the distance to the receiver

  - Vertical profile: The path of a roadway in the vertical direction, either below-grade (depressed), above-grade (elevated), or at-grade relative to areas adjacent to the road. Generally, traffic noise levels along depressed roadways are substantially lower than those along roadways that are at grade.
- **Policy (i)**: Examine the existing and projected future noise environment when considering amendments to the City's circulation system. Conduct a noise study to determine whether the project would increase ambient noise levels by more than 3 dBA or cause noise levels to exceed acceptable noise standards for adjacent designated land use categories. If so, implement project features, such as the installation of upgraded windows, to achieve acceptable interior noise standards [Table 4.10-8] at affected receptors. For federally funded roadway construction projects, the applicable sound limits shall be the Federal Highway Administration Standards.
- **Policy (j)**: Reduce noise impacts from mobile sources by encouraging the use of alternative modes of transportation. (See Circulation Element)
- **Policy (k)**: Participate in cooperative efforts with Orange County Transit Authority to fund and construct grade separations, where feasible, through residential areas of the City, giving consideration to all potential funding sources.
- **Policy (l)**: Disseminate public information regarding City noise regulations and programs, the health effects of high noise levels, and means of reducing such levels.
- **Policy (m)**: Reduce community noise levels by continuing to maintain roadways so that the paving is in good condition to reduce noise-generating cracks, bumps, and potholes.
- **Policy (n)**: Encourage rail operators to minimize the level of noise produced by train movements and whistle noise within the City by reducing the number of nighttime operations and improving vehicle system technology.
- **Policy (o)**: Limit "through truck traffic" to designated routes to minimize noise impacts to residential neighborhoods and other noise-sensitive uses (See Circulation Element).

Goal 4: Ground-Borne Vibration

Objective N-4. Minimize exposure to ground-borne vibration such that City residents are not exposed to nuisance vibration or potential building damage.

- **Policy (a)**: Coordinate with rail operators to minimize vibration exposure through routine maintenance of wheel and rail surfaces.
- **Policy (b)**: Require all plans submitted for development review that include the use of pile-driving and blasting during construction to consider alternative methods to minimize the potential for building damage and temporary nuisance exposure.
- **Policy (c)**: Require all plans submitted for development review to utilize vibration standards published by the Federal Transit Administration to evaluate the potential effects of vibration exposure from new vibration sources, such as construction, or siting of new receptors near existing vibration sources, such as rail operations.

4.10.3 Significance Determination Thresholds

Thresholds used to evaluate noise impacts are based on applicable criteria in the California Environmental Quality Act (CEQA) Guidelines (California Code of Regulations Sections 15000-15387), Appendix G. A significant impact would occur if the project would:

1) Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

2) Generate excessive groundborne vibration or groundborne noise levels; or

3) For a project located within the vicinity of a private airstrip or 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.

4.10.4 Methodology

4.10.4.1 Vehicle Traffic Noise

The estimated roadway noise impacts from vehicular traffic were calculated using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model-FHWA-RD-77-108. The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. 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 which flows each hour throughout a 24-hour period.

The off-site traffic noise analysis includes the following traffic scenarios.

- Existing Conditions
- Current General Plan Buildout/No Project Alternative
- Proposed Project (Conservative Alternative)
- Cumulative Proposed Project (Conservative) Alternative
- Reduced Project Alternative
- Cumulative Reduced Project Alternative

Noise contours were used to assess the project's incremental traffic-related noise impacts at land uses adjacent to roadways conveying project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 CNEL noise levels. The noise contours do not consider the effect of any existing noise barriers or

topography that may attenuate ambient noise levels. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the City. Existing and future vehicle traffic noise calculations are provided in Appendix E.

4.10.4.2 Railroad Noise

The Metrolink, Amtrak, and BNSF freight trains operate within the City. Noise associated with railroad operations was modeled using the FTA recommended Chicago Rail Efficiency and Transportation Efficiency (CREATE) railroad noise model (Harris Miller & Hanson, Inc. 2006). The number of Amtrak and Metrolink trains that operate during the daytime and nighttime hours were obtained from published schedules. It was assumed that one freight train per hour would operate during the night. Noise contour distances were calculated assuming flat-site conditions and no intervening buildings that would provide noise attenuation.

4.10.4.3 Stationary Noise

Stationary sources of noise include activities associated with a given land use. Various land uses contain on-site stationary noise sources, including rooftop HVAC equipment; mechanical equipment; emergency electrical generators; parking lot activities; loading dock operations; and recreation activities. Stationary noise is considered a "point source" and attenuates over distance at a rate of 6 dB(A) for each doubling of distance. The exact location and nature of future stationary noise sources is not known at this time, and therefore cannot be calculated in this analysis. Impacts were assessed in this analysis by identifying potential types of stationary sources and locations of mixed-use land use interfaces and identifying applicable regulations and mitigation framework for addressing impacts.

4.10.4.4 Construction Noise

Construction noise has the potential to result in temporary ambient noise increases due to construction activities. Construction noise is usually generated by activities such as diesel-powered construction equipment used for site preparation and grading; removal of existing structures and pavement; loading, unloading, and placing materials and paving. Diesel engine-driven trucks also bring materials to the site and remove the spoils from excavation. Table 4.10-10 summarizes typical construction equipment noise levels.

Typical construction equipment would generate maximum noise levels between 70 and 95 dB(A) L_{max} at 50 feet from the source when in operation. During excavation, grading, and paving operations, equipment moves to different locations and goes through varying load cycles, and there are breaks for the operators and for non-equipment tasks, such as measurement. Average construction noise levels were calculated for the simultaneous operation of three common pieces of construction equipment: backhoe, excavator, and loader. The usage factors were applied to the maximum noise level at 50 feet for each piece of equipment, and then noise levels were added logarithmically. Hourly average noise levels would be approximately 83 dB(A) L_{eq} at 50 feet from the center of construction activity when assessing three pieces of common construction equipment working simultaneously. Noise levels would vary depending on the nature of the construction including the duration of

specific activities, nature of the equipment involved, location of the particular receiver, and nature of intervening barriers.

Table 4.10-10
Typical Construction Equipment Noise Levels

Equipment	Noise Level at 50 Feet [dB(A) L_{eq}]	Typical Duty Cycle
Auger Drill Rig	85	20%
Backhoe	80	40%
Blasting	94	1%
Chain Saw	85	20%
Clam Shovel	93	20%
Compactor (ground)	80	20%
Compressor (air)	80	40%
Concrete Mixer Truck	85	40%
Concrete Pump	82	20%
Concrete Saw	90	20%
Crane (mobile or stationary)	85	20%
Dozer	85	40%
Dump Truck	84	40%
Excavator	85	40%
Front End Loader	80	40%
Generator (25 kilovolt ampts or less)	70	50%
Generator (more than 25 kilovolt amps)	82	50%
Grader	85	40%
Hydra Break Ram	90	10%
Impact Pile Driver (diesel or drop)	95	20%
In situ Soil Sampling Rig	84	20%
Jackhammer	85	20%
Mounted Impact Hammer (hoe ram)	90	20%
Paver	85	50%
Pneumatic Tools	85	50%
Pumps	77	50%
Rock Drill	85	20%
Roller	74	40%
Scraper	85	40%
Tractor	84	40%
Vacuum Excavator (vac-truck)	85	40%
Vibratory Concrete Mixer	80	20%
Vibratory Pile Driver	95	20%

SOURCE: FHWA 2006.
dB(A) = A-weighted decibels
L_{eq} = one-hour equivalent noise level.

4.10.4.5 Vibration

Potential sources of groundborne vibration include construction activities, railroad activities, and stationary sources. Table 4.10-11 lists vibration levels for construction equipment.

Table 4.10-11 Vibration Levels for Construction Equipment	
Equipment	Approximate PPV Vibration Level at 25 feet (inch/second)
Pile Driver, Impact (Upper Range)	1.518
Pile Drive, Impact (Typical)	0.644
Pile Driver, Sonic (Upper Range)	0.734
Pile Drive, Sonic (Typical)	0.170
Vibratory Roller	0.210
Large Bulldozer	0.089
Caisson Drilling	0.089
Loaded Trucks	0.076
Jackhammer	0.035
Small Bulldozer	0.003
SOURCE: FTA 2018. PPV = peak particle velocity	

Vibration impacts due to construction equipment were evaluated using these source vibration levels, and the FTA criteria shown in Table 4.10-4. Vibration impacts due to railroad operations were evaluated using the FTA criteria shown in Table 4.10-5 and the FTA screening distances for each land use category. Vibration impacts due to stationary sources were addressed qualitatively.

4.10.5 Topic 1: Increase in Ambient Noise

Would the project generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

4.10.5.1 Impact Analysis

a. Traffic Noise

Increase in Ambient Noise

Noise level increases resulting from the project are evaluated based on Appendix G of the State CEQA Guidelines described above at the closest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing baseline ambient noise levels, and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact. This approach recognizes that there is no single noise increase that renders the noise impact significant. This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called ambient environment.

In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will typically be judged. The Federal Interagency Committee on Noise (FICON) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (CNEL) and equivalent continuous noise level (L_{eq}).

The FICON guidance provides an established source of criteria to assess the impacts of substantial temporary or permanent increase in baseline ambient noise levels. Based on the FICON criteria, the amount to which a given noise level increase is considered acceptable is reduced when the without project (baseline) noise levels are already shown to exceed certain land-use specific exterior noise level criteria. The specific levels are based on typical responses to noise level increases of 5 dB(A) or readily perceptible, 3 dB(A) or barely perceptible, and 1.5 dB(A) depending on the underlying without project noise levels for noise-sensitive uses. These levels of increases and their perceived acceptance are consistent with guidance provided by both the FHWA and Caltrans.

Based on this guidance, long-term traffic noise that affects sensitive land uses would be considered substantial and constitute a significant noise impact if the project would:

- Increase noise levels by 5 dB or more where the no project noise level is less than 60 CNEL;
- Increase noise levels by 3 dB or more where the no project noise level is 60 CNEL to 65 CNEL; or
- Increase noise levels by 1.5 dB or more where the no project noise level is greater than 65 CNEL.

Implementation of the project would include updates to the City's General Plan (and the resulting increased development capacity of 57,656 residential units), the continued implementation of nonresidential uses at the same intensities permitted under the City's General Plan, implementation of nonresidential uses within the Great Park, and the extension of the Ada roadway.

The noise analysis is based on the baseline (year 2016 for which a complete data set exists) and future (year 2045) traffic volume data. Without the project, existing noise levels are up to 79.0 CNEL at the nearest receiving land uses. With the project, future noise levels are expected to range from 53.2 to 79.2 CNEL at the nearest receiving land uses. Off-site traffic noise level impacts would exceed the noise level increase thresholds along 147 roadway segments. Table 4.10-12 summarizes the existing and future noise levels at the impacted roadway segments under buildout of the project. Based on the significance criteria for off-site traffic noise, land uses adjacent to these study area roadway segments would experience a significant noise level increases due to the Project-related traffic as compared to the existing traffic noise levels.

Table 4.10-12
Significant Traffic Noise Increases Along Study Roadway Segments

ID	Road	Segment	CNEL at Receiving Land Use			Incremental Noise Level Increase Threshold	
			Existing	Future	Project Addition	Limit	Exceeded?
1	Ada	Barranca Parkway to Marine Way	0.0	70.8	70.8	5.0	Yes
2	Ada	Alton Parkway to Barranca Parkway	60.3	69.3	9.0	3.0	Yes
3	Alton Parkway	Enterprise to I-5 NB Off-Ramp	71.3	74.1	2.8	1.5	Yes
4	Alton Parkway	I-5 NB Off-Ramp to Technology Drive West	72.1	74.8	2.7	1.5	Yes
6	Alton Parkway	Gateway Boulevard to Enterprise	69.3	72.0	2.7	1.5	Yes
8	Alton Parkway	Daimler Street to Red Hill Avenue	63.7	70.7	7.0	3.0	Yes
11	Alton Parkway	Technology Drive West to Ada	70.2	72.6	2.4	1.5	Yes
13	Alton Parkway	Red Hill Avenue to Von Karman Avenue	68.1	70.6	2.5	1.5	Yes
15	Alton Parkway	Telemetry to Banting	69.0	70.5	1.5	1.5	Yes
18	Alton Parkway	Irvine Center Drive to Gateway Boulevard	68.6	71.3	2.7	1.5	Yes
19	Alton Parkway	Sand Canyon Avenue to Hospital	72.1	73.7	1.6	1.5	Yes
21	Alton Parkway	Technology Drive East to Barranca Pkwy/Muirlands Blvd	69.1	71.2	2.1	1.5	Yes
23	Alton Parkway	Banting to Pacifica	68.4	70.1	1.7	1.5	Yes
25	Alton Parkway	Ada to Technology Drive East	69.2	70.7	1.5	1.5	Yes
38	Alton Parkway	Pacifica to Meridian	69.7	71.7	2.0	1.5	Yes
40	Alton Parkway	Meridian to Irvine Center Drive	66.6	68.3	1.7	1.5	Yes
43	Astor	Lynx to Fairbanks	57.5	67.1	9.6	5.0	Yes
44	Astor	Cadence to Lynx	0.0	65.9	65.9	5.0	Yes
55	Barranca Parkway	Pacifica to Irvine Center Drive	70.5	73.3	2.8	1.5	Yes
56	Barranca Parkway	Banting to Pacifica	70.7	72.8	2.1	1.5	Yes
57	Barranca Parkway	I-5 HOV Ramp to Technology Drive West	69.8	73.0	3.2	1.5	Yes
58	Barranca Parkway	Technology Drive West to Ada	70.4	72.7	2.3	1.5	Yes
59	Barranca Parkway	Irvine Center Drive to I-5 HOV Ramp	69.3	72.6	3.3	1.5	Yes
63	Barranca Parkway	Ada to Alton Parkway	70.2	72.2	2.0	1.5	Yes
65	Barranca Parkway	Red Hill Avenue to Armstrong Avenue	73.3	74.8	1.5	1.5	Yes
66	Barranca Parkway	Discovery/Herchel to Banting	69.7	71.7	2.0	1.5	Yes
70	Barranca Parkway	Sand Canyon Avenue to Laguna Canyon Road	68.5	71.1	2.6	1.5	Yes
72	Barranca Parkway	Valley Oak Drive to Sand Canyon Avenue	69.1	70.8	1.7	1.5	Yes
75	Barranca Parkway	FedEx to Discovery/Herchel	68.8	70.6	1.8	1.5	Yes
76	Barranca Parkway	Jeffrey Road to Valley Oak Drive	68.3	70.5	2.2	1.5	Yes
77	Barranca Parkway	Laguna Canyon Road to FedEx	68.8	70.4	1.6	1.5	Yes
84	Beacon	Ridge Valley to Benchmark	0.0	59.7	59.7	5.0	Yes
85	Benchmark (LN Street)	Ridge Valley (O Street) to Bosque	0.0	56.5	56.5	5.0	Yes
94	Bosque	Great Park Boulevard to Beacon	0.0	56.8	56.8	5.0	Yes
95	Bosque	Beacon to S 5th Street	0.0	56.2	56.2	5.0	Yes
108	Cadence	Merit to Astor	0.0	59.4	59.4	5.0	Yes
109	California Avenue	University Drive to Academy Way	64.3	67.3	3.0	3.0	Yes
112	Campus Drive	Carlson Avenue to University Drive	70.9	73.3	2.4	1.5	Yes
113	Campus Drive	University Drive to Bridge Road	70.1	71.8	1.7	1.5	Yes
114	Campus Drive	Jamboree Road to Carlson Avenue	69.0	71.6	2.6	1.5	Yes
116	Campus Drive	California Avenue to Culver Drive	68.9	70.9	2.0	1.5	Yes
118	Campus Drive	Martin to Von Karman Avenue	67.5	69.2	1.7	1.5	Yes
120	Campus Drive	Von Karman Avenue to Teller Avenue	66.8	68.5	1.7	1.5	Yes
123	Carlson Avenue	Michelson Drive to Campus Drive	64.5	67.9	3.4	3.0	Yes
149	Culver Drive	Portola Parkway to Settlers	68.9	71.2	2.3	1.5	Yes
153	Culver Drive	Settlers to Furrow	0.0	68.6	68.6	5.0	Yes
155	Discovery Drive	Irvine Center Drive to Laguna Canyon Road	56.6	65.5	8.9	5.0	Yes
156	Discovery Drive	Waterworks Way to Irvine Center Drive	0.0	63.6	63.6	5.0	Yes
167	Fairbanks	Alton Parkway to Astor	61.3	69.9	8.6	3.0	Yes
168	Fairbanks	Irvine Boulevard to Alton Parkway	0.0	66.9	66.9	5.0	Yes

Table 4.10-12
Significant Traffic Noise Increases Along Study Roadway Segments

ID	Road	Segment	CNEL at Receiving Land Use			Incremental Noise Level Increase Threshold	
			Existing	Future	Project Addition	Limit	Exceeded?
170	Gateway Boulevard	Alton Parkway to Irvine Center Drive	57.0	63.5	6.5	5.0	Yes
173	Great Park Boulevard	Sand Canyon to Ridge Valley	70.5	74.6	4.1	1.5	Yes
174	Great Park Boulevard	Ridge Valley (O Street) to Bosque (LY Street)	64.0	70.4	6.4	3.0	Yes
175	Great Park Boulevard (EB)	Bosque to Skyhawk	0.0	69.1	69.1	5.0	Yes
176	Great Park Boulevard (WB)	Bosque to Skyhawk	0.0	68.4	68.4	5.0	Yes
186	Harvard Avenue	Irvine Center Drive to Deerfield Avenue	65.5	67.5	2.0	1.5	Yes
187	Harvard Avenue	Deerfield Avenue to Poplar Street	65.5	67.4	1.9	1.5	Yes
190	Harvard Avenue	Paseo Westpark to Irvine Center Drive	66.1	67.8	1.7	1.5	Yes
191	Harvard Avenue	Poplar Street to Walnut Avenue	66.8	68.9	2.1	1.5	Yes
197	Hornet (5th St)	Ridge Valley (O Street) to Bosque	0.0	57.5	57.5	5.0	Yes
224	Irvine Center Drive	Entertainment (Enterprise/Fortune) to I-405 SB Off- Ramp	71.3	72.8	1.5	1.5	Yes
225	Irvine Center Drive	Orange Tree to Valley Oak Drive	69.7	72.0	2.3	1.5	Yes
227	Irvine Center Drive	Irvine Valley College to Orange Tree	69.7	71.9	2.2	1.5	Yes
228	Irvine Center Drive	Fontaine Avenue to Jeffrey Road	69.5	71.7	2.2	1.5	Yes
229	Irvine Center Drive	Culver Drive to Deerwood	69.7	71.6	1.9	1.5	Yes
230	Irvine Center Drive	Deerwood to Yale Avenue	69.6	71.6	2.0	1.5	Yes
231	Irvine Center Drive	Yale Avenue to Fontaine Avenue	69.4	71.7	2.3	1.5	Yes
232	Irvine Center Drive	Jeffrey Road to Irvine Valley College	69.7	71.5	1.8	1.5	Yes
233	Irvine Center Drive	Alton Parkway to Spectrum	68.9	71.4	2.5	1.5	Yes
234	Irvine Center Drive	Spectrum to Pacifica	68.9	71.3	2.4	1.5	Yes
235	Irvine Center Drive	Hearthstone to Culver Drive	69.2	71.0	1.8	1.5	Yes
236	Irvine Center Drive	Charter to Barranca Parkway	68.1	71.0	2.9	1.5	Yes
238	Irvine Center Drive	Pacifica to Entertainment (Enterprise/Fortune)	69.1	70.7	1.6	1.5	Yes
239	Irvine Center Drive	Valley Oak Drive to Sand Canyon Avenue	68.1	70.7	2.6	1.5	Yes
241	Irvine Center Drive	Research to Hubble	67.9	70.0	2.1	1.5	Yes
242	Irvine Center Drive	Barranca Parkway to Gateway Boulevard	66.9	70.2	3.3	1.5	Yes
243	Irvine Center Drive	Bake Parkway to Muller	67.9	69.8	1.9	1.5	Yes
244	Irvine Center Drive	Discovery to Charter	67.3	70.2	2.9	1.5	Yes
245	Irvine Center Drive	Hubble to Bake Parkway	67.8	69.6	1.8	1.5	Yes
246	Irvine Center Drive	Muller to Tesla	67.7	69.4	1.7	1.5	Yes
247	Irvine Center Drive	Sand Canyon Avenue to Odyssey	67.6	69.4	1.8	1.5	Yes
248	Irvine Center Drive	Tesla to Scientific Way	67.1	69.1	2.0	1.5	Yes
249	Irvine Center Drive	Scientific Way to Lake Forest Drive	67.2	68.9	1.7	1.5	Yes
250	Irvine Center Drive	Gateway Boulevard to Alton Parkway	66.7	68.9	2.2	1.5	Yes
251	Irvine Center Drive	Laguna Canyon Road to Discovery	66.8	68.9	2.1	1.5	Yes
252	Irvine Center Drive	Odyssey to Laguna Canyon Road	66.8	68.9	2.1	1.5	Yes
253	Irvine Center Drive (Edinger)	Redhill Avenue to Jamboree Road	69.6	71.1	1.5	1.5	Yes
298	Laguna Canyon Road	Laguna Canyon Freeway to Quail Hill Parkway	67.7	70.0	2.3	1.5	Yes
299	Laguna Canyon Road	Discovery to Sand Canyon Avenue	64.8	69.5	4.7	3.0	Yes
300	Laguna Canyon Road	I-405 Overcrossing to Pasteur	66.0	68.0	2.0	1.5	Yes
301	Laguna Canyon Road	Irvine Center Drive to Discovery	63.6	69.0	5.4	3.0	Yes
302	Laguna Canyon Road	Quail Hill Parkway to I-405 Overcrossing	66.0	68.0	2.0	1.5	Yes
303	Laguna Canyon Road	Pasteur to Alton Parkway	65.5	67.1	1.6	1.5	Yes
304	Laguna Canyon Road	Waterworks to Irvine Center Drive	64.5	67.5	3.0	3.0	Yes
311	Lynx	Irvine Boulevard to Astor	0.0	53.2	53.2	5.0	Yes
324	Main Street	Gillette Avenue to Von Karman Avenue	69.4	70.9	1.5	1.5	Yes

Table 4.10-12
Significant Traffic Noise Increases Along Study Roadway Segments

ID	Road	Segment	CNEL at Receiving Land Use			Incremental Noise Level Increase Threshold	
			Existing	Future	Project Addition	Limit	Exceeded?
336	Marine Way	Sand Canyon Avenue to Ridge Valley (O Street)	67.8	72.3	4.5	1.5	Yes
337	Marine Way	Alton Parkway to Bake Parkway	0.0	69.5	69.5	5.0	Yes
338	Marine Way	Lynx to Barranca Parkway	0.0	69.3	69.3	5.0	Yes
339	Marine Way	County Access to Treble	59.3	68.5	9.2	5.0	Yes
340	Marine Way	Ridge Valley (O Street) to Skyhawk	62.0	68.3	6.3	3.0	Yes
341	Marine Way	Skyhawk to County Access	59.3	67.4	8.1	5.0	Yes
342	Marine Way	Barranca Parkway to Alton Parkway	52.7	66.8	14.1	5.0	Yes
343	Marine Way	Treble to Lynx	0.0	66.6	66.6	5.0	Yes
352	Michelson Drive	Riparian to Harvard Avenue	66.7	68.3	1.6	1.5	Yes
355	Michelson Drive	Parkside to Culver Drive	66.2	67.8	1.6	1.5	Yes
357	Michelson Drive	Carlson to Prince	65.4	67.3	1.9	1.5	Yes
361	Michelson Drive	Jamboree Road to Carlson	68.0	69.6	1.6	1.5	Yes
375	Oak Canyon Drive	Valley Oak Drive to Sand Canyon Avenue	66.2	69.7	3.5	1.5	Yes
381	Portola Parkway	Bee Canyon Access Road to Sand Canyon Avenue	70.3	71.8	1.5	1.5	Yes
382	Portola Parkway	Jeffrey Road to Bee Canyon Access Road	70.3	71.8	1.5	1.5	Yes
383	Portola Parkway	Arrowhead to Ridge Valley Parkway	69.6	71.5	1.9	1.5	Yes
384	Portola Parkway	Sand Canyon Avenue to Arrowhead	69.6	71.1	1.5	1.5	Yes
385	Portola Parkway	Portola Springs to SR-241 SB Off-Ramp	65.5	70.1	4.6	1.5	Yes
391	Portola Parkway	Yale Avenue to Jeffrey Road	68.6	70.4	1.8	1.5	Yes
393	Portola Parkway	Silverado to Portola Springs	66.5	68.7	2.2	1.5	Yes
405	Research Drive	Hubble to Bake Parkway	65.4	69.7	4.3	1.5	Yes
406	Research Drive	Scientific to Lake Forest Drive	65.6	67.8	2.2	1.5	Yes
409	Ridge Valley (O Street)	Irvine Boulevard to Trabuco Road (Great Park Boulevard)	65.5	67.3	1.8	1.5	Yes
415	Rockfield Avenue	Whatney to McLaren	66.3	67.8	1.5	1.5	Yes
418	Roosevelt	Jeffrey Road to Vision	65.2	66.7	1.5	1.5	Yes
424	Sand Canyon Avenue	Oak Canyon Drive to Burt Road	70.7	72.2	1.5	1.5	Yes
427	Sand Canyon Avenue	Burt Road to I-5 SB Off-Ramp	71.2	72.8	1.6	1.5	Yes
428	Sand Canyon Avenue	Marine to I-5 NB Off-Ramp	72.7	74.8	2.1	1.5	Yes
430	Sand Canyon Avenue	Barranca Parkway to Waterworks	69.2	71.0	1.8	1.5	Yes
432	Sand Canyon Avenue	Hospital to Barranca Parkway	69.3	70.9	1.6	1.5	Yes
438	Sand Canyon Avenue	Irvine Boulevard to Portola Parkway	68.0	70.3	2.3	1.5	Yes
445	Skyhawk	Great Park Boulevard to Marine Way	52.8	59.5	6.7	5.0	Yes
451	Technology Drive	Barranca Parkway to Alton Parkway	67.0	70.8	3.8	1.5	Yes
452	Technology Drive	Old Laguna Canyon Road to I-5/SR-133 Undercrossing	63.2	69.6	6.4	3.0	Yes
453	Technology Drive	I-5/SR-133 to Barranca Parkway	62.8	69.4	6.6	3.0	Yes
454	Technology Drive	Ada to Alton Parkway	57.8	63.7	5.9	5.0	Yes
465	Turtle Ridge Drive	Federation Way to Bonita Canyon	0.0	68.7	68.7	5.0	Yes
485	Valley Oak Drive	Hawkcreek to Barranca Parkway	63.0	68.1	5.1	3.0	Yes
486	Valley Oak Drive	Irvine Center Drive to Oak Canyon Drive	65.2	69.5	4.3	1.5	Yes
487	Valley Oak Drive	Barranca Parkway to Irvine Center Drive	62.9	67.2	4.3	3.0	Yes
489	Von Karman Avenue	Marriott to Morse Avenue	68.9	71.0	2.1	1.5	Yes
490	Von Karman Avenue	Michelson Drive to Quartz	68.8	70.9	2.1	1.5	Yes
491	Von Karman Avenue	McGaw Avenue to Alton Parkway	69.3	70.8	1.5	1.5	Yes
492	Von Karman Avenue	Alton Parkway to Barranca Parkway	68.4	70.4	2.0	1.5	Yes
493	Von Karman Avenue	Main Street to Anchor	69.2	70.7	1.5	1.5	Yes
496	Von Karman Avenue	Martin to Dupont Drive	67.8	69.7	1.9	1.5	Yes
497	Von Karman Avenue	Campus Drive to Martin	67.8	69.6	1.8	1.5	Yes
498	Von Karman Avenue	Dupont Drive to Michelson Drive	67.8	69.6	1.8	1.5	Yes

Table 4.10-12
Significant Traffic Noise Increases Along Study Roadway Segments

ID	Road	Segment	CNEL at Receiving Land Use			Incremental Noise Level Increase Threshold	
			Existing	Future	Project Addition	Limit	Exceeded?
499	Walnut Avenue	Jeffrey Road to I-5 SB Off-Ramp	68.9	71.0	2.1	1.5	Yes
531	Yale Avenue	West Yale Loop to Irvine Center Drive	65.0	66.6	1.6	1.5	Yes
539	Yale Avenue	University Drive to Royce	57.9	63.5	5.6	5.0	Yes

SOURCE: Appendix G.

It should be noted that without approval of the project, a significant increase in ambient noise levels would also occur with buildout with the adopted General Plan. This is due to regional growth under the adopted General Plan (2000). Buildout conditions will range from 53.5 to 79.1 CNEL, except along Ada Street since it would not exist under the current General Plan. Under buildout of the adopted General Plan, off-site traffic noise level impacts would exceed noise level increase thresholds along 86 segments.

The Noise Element Update includes measures to reduce vehicle noise. As discussed in detail in the Land Use Compatibility section below, future development under the project would be subject to policies under Goal N-1, Objective N-1, which would require future development to control noise through land use planning and design. Future development would be required to prepare noise studies in accordance with the City's environmental review procedure for all projects that are not "clearly compatible" with the future noise level at the site. These studies are required to identify all measures necessary to reduce noise levels to meet the City's interior and exterior noise compatibility standards and Single Event Noise Standard. Through implementation of these policies, noise levels at new noise-sensitive land uses would be evaluated and noise reduction techniques would be implemented to reduce noise exposure.

For existing land uses exposed to significant increase in noise, the Noise Element Update contains policies under Goal N-3, Noise Abatement, Objective N-3. Policy (i) that would require an examination of the existing and future noise environment when considering amendments to the City's circulation system. It requires the implementation of project features, such as the installation of upgraded windows, to achieve acceptable interior noise standards at affected receptors. Policy (j) seeks to reduce noise impacts from mobile sources by encouraging the use of alternative modes of transportation. Policy (m) reduces community noise levels by continuing to maintain roadways so that the paving is in good condition to reduce noise-generating cracks, bumps, and potholes. However, the increase in ambient noise levels adjacent to the roadway segments listed above would likely remain at levels that would expose existing noise-sensitive receptors to a significant increase in ambient noise levels, and impacts would be significant.

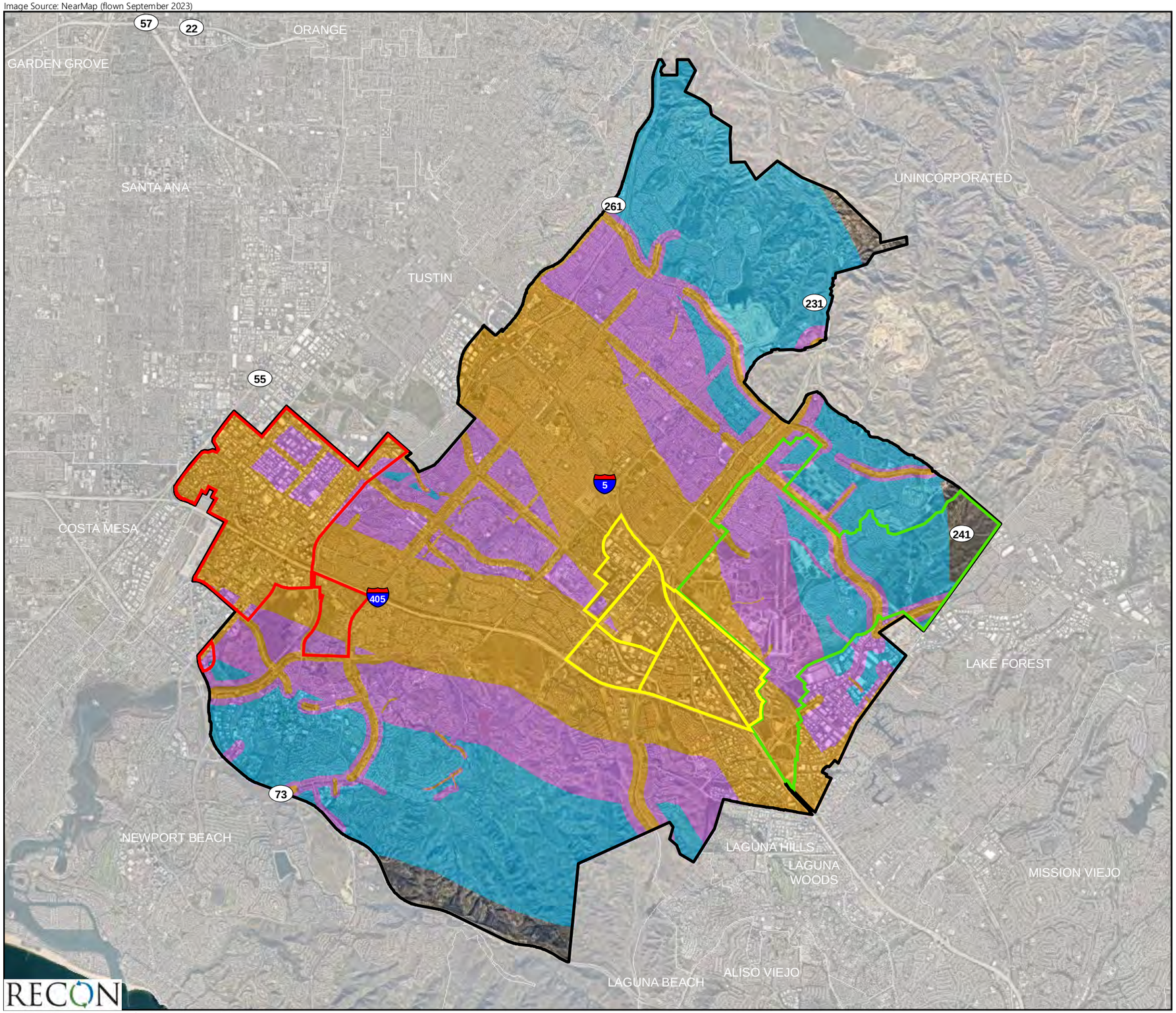
Land Use Compatibility

Future vehicle traffic noise contours are shown in Figure 4.10-5. These noise contours account for future traffic generated by development of the project, as well as the extension of Ada roadway. A significant impact would occur if implementation of the project resulted in an exposure of people to current or future motor vehicle traffic noise levels that exceed standards established in the Noise Element Update (see Tables 4.10-8 and 4.10-9).

The project focuses mixed-use development in existing urbanized areas throughout the City using overlay zones. Most of the increased density is proposed in Focus Areas 1, 2 and 3, which are located near existing or planned travel corridors. Focus Area 1 is in the Irvine Business Complex (IBC) and would expand residential and mixed-uses to sites previously designated for nonresidential uses through implementation of the proposed residential and residential mixed-use overlay. Focus Area 2 is in the Greater Spectrum Area and would expand residential uses through the implementation of the new overlay. Focus Area 3 is in the Great Park Neighborhood Transit Village and would also allow for residential uses on nonresidential properties through implementation of the proposed overlay. The Great Park Neighborhood is an existing mixed-use planning area that features a mix of residential uses at varying densities surrounding the Irvine Great Park. The project would increase the number of residential units permitted in the Great Park with a focus on higher density near or adjacent to the Irvine Transit Center. Additionally, the project utilizes a customized concept of transit-oriented development to suit the unique context of the Greater Irvine Business Complex Area, the Greater Spectrum Area, and the Great Park Neighborhood Transit Village Area. Transit-oriented development permits greater residential densities and a wider range of land uses, such as offices, housing, retail, and services, in select geographic areas.

As shown in Figure 4.10-5, these focus areas are located adjacent to freeways and other heavily traveled roadways. Noise-sensitive uses that are developed near higher-volume roadways could experience noise levels exceeding the proposed Noise Element Update noise standards, particularly for those uses located near freeways. The Noise Element Update contains policies under Goal N-1, Objective N-1 that would require future development implemented under the project to control noise through land use planning and design. Future development would be required to prepare noise studies in accordance with the City's environmental review procedure for all projects that are not "clearly compatible" with the future noise level at the site. These studies are required to identify all measures necessary to reduce noise levels to meet the City's interior and exterior noise compatibility standards and Single Event Noise Standard. Conditional use permits would be required for noise-sensitive land uses such as hospitals, libraries, churches, and schools located in areas not "clearly compatible" to demonstrate how exterior noise exposure would be minimized, such as building orientation, shielding, or limiting outdoor programs. Additionally, mixed-use and multi-family residential developments are required to demonstrate noise compatibility between uses. Further, the Noise Element Update contains the following implementing actions under Goal N-1:

Image Source: NearMap (flown September 2023)



Irvine City Boundary
Focus Area 1
Focus Area 2
Focus Area 3

Future Traffic Noise

60 CNEL
65 CNEL
70 CNEL

0 Miles 1.5

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FIGURE 4.10-5
Future Traffic Noise Contours

- Conduct comprehensive noise impact assessments for proposed development projects to evaluate potential noise sources and their impact on surrounding areas. Use predictive modeling and noise mapping techniques to assess noise levels at different locations and identify reduction measures to ensure compliance with noise standards.
- Prioritize site selection for new development projects in areas with lower ambient noise levels and minimal exposure to noise sources, such as heavy traffic or industrial activities. Consider proximity to noise-sensitive land uses, such as residential areas, schools, hospitals, and parks, when siting new developments.
- Establish noise buffer zones or green spaces between noise-generating activities and noise-sensitive land uses to mitigate the transmission of noise and protect vulnerable populations. Designate setbacks or open space corridors to create natural barriers that absorb or deflect noise away from sensitive receptors.
- Orient buildings and structures to minimize exposure to noise sources and maximize natural sound attenuation. Design building layouts and configurations to create quiet zones or shield noise-sensitive areas from adjacent noise sources, such as roads, railways, or industrial facilities.
- Incorporate sound-absorbing materials, insulation, and architectural features into building design and construction to reduce indoor noise levels and enhance occupant comfort. Utilize noise-reducing technologies, such as double-glazed windows, soundproofing walls, and resilient flooring, to mitigate noise intrusion from external sources.
- Implement traffic calming measures, such as speed limits, traffic calming devices, and road design modifications, to reduce vehicle-related noise emissions and enhance pedestrian safety. Design access routes and circulation patterns to minimize noise impacts on adjacent properties and improve traffic flow efficiency.
- Utilize landscaping and vegetation strategies to create natural barriers and absorb sound waves, reducing the transmission of noise between land uses. Plant trees, shrubs, and hedges strategically to create green buffers and enhance visual screening while providing habitat and aesthetic benefits.
- Establish noise easements or restrictive covenants as part of property agreements to limit future development or land uses that could exacerbate noise impacts in sensitive areas. Ensure that developers and property owners adhere to noise reduction requirements and maintain compliance with noise standards over time.
- Engage with local communities, stakeholders, and residents early in the planning and design process to solicit input, address concerns, and build consensus around noise mitigation strategies. Foster collaboration and partnership with community organizations, neighborhood associations, and advocacy groups to ensure that noise considerations are integrated into decision-making processes.
- Implement monitoring programs to assess compliance with noise standards and evaluate the effectiveness of noise reduction measures over time. Conduct regular inspections, noise surveys, and performance evaluations to verify compliance with approved plans and address any non-compliance issues promptly.

However, traffic noise would likely remain at levels that that would exceed exterior and interior standards, and impacts would be significant.

b. Railroad Noise

The Metrolink, Amtrak, and BNSF freight trains operate within the City. Railroad noise contours are shown in Figure 4.10-4 and contour distances are summarized in Table 4.10-13.

Table 4.10-13
Railroad Noise Contour Distances

Station	Noise Level at 50 feet (CNEL)	Distance to Noise Contour (feet)		
		70 CNEL	65 CNEL	60 CNEL
Irvine Station	75	155	490	1,551

CNEL = community noise equivalent level

As shown in Figure 4.10-4, Focus Areas 2 and 3 are exposed to significant railroad noise level. Noise-sensitive receivers in the vicinity of the railroad tracks could be exposed to noise levels that exceed the compatibility standards. However, the Noise Element Update contains policies under Goal N-1, Objective N-1 that would require future development implemented under the project to control noise through land use planning and design. This includes development exposed to railroad noise. Additionally, Policy (e) implements the Single Event Noise Standard for noise-sensitive land uses within the 60 CNEL of aircraft and railroad noise sources. Policy (n) encourages rail operators to minimize the level of noise produced by train movements and whistle noise within the City by reducing the number of nighttime operations and improving vehicle system technology. However, noise associated with railroad operations would likely remain at levels that would expose existing noise-sensitive receptors to a significant increase in ambient noise levels, and impacts would be significant.

c. Stationary Noise

A significant impact would occur if implementation of the project resulted in the exposure of people to noise levels that exceed property line limits established in Municipal Code under Title 6 Public Morals, Division 8 Pollution, Chapter 2 Noise (see Table 4.10-7). Stationary sources of noise include activities associated with a given land use. For example, noise sources from commercial land uses would include car washes, fast food restaurants, auto repair facilities, parking lots, and a variety of other uses. Noise generated by residential or commercial uses is generally short-lived and intermittent, while noise generated by auto-oriented commercial and industrial uses is usually sporadic, highly variable, and spatially distributed. Noise sources from industrial uses would include mechanical equipment, generators, and trucks. Additionally, potential noise conflicts could occur in mixed-use areas where residential uses are close to commercial and retail uses.

The type of land uses proposed under the project would be similar to land uses that currently exist in the City. The project would primarily focus future development and redevelopment within the three focus areas. Noise levels within the City are currently dominated by vehicle traffic on freeways and heavily traveled area roadways and would continue to be the primary source of noise under

project buildout. Therefore, future noise levels from stationary sources throughout the City would not be expected to increase the hourly or daily average sound level with respect to current conditions. While noise-sensitive residential land uses would be exposed to noise associated with the operation of commercial and industrial uses, future development would be required to show compliance with the Municipal Code. Additionally, the Noise Element Update contains policies to reduce impacts associated with stationary sources of noise. Specifically, Goal N-2, Objective N-2, Policy (b) requires project applicants to depict, on any appropriate development application review (including, but not limited to, zone changes, subdivisions, conditional use permit, site plan, and building plans), any potential noise sources known at the time of submittal and reduction measures that ensure these noise sources meet the City Noise Ordinance standards. Policy (c) limits the hours of operation for portions of parks and active recreation uses adjacent to residential areas to daytime hours to minimize disturbance to residents.

The Noise Element Update also includes a comprehensive list of measures that are required for outdoor events with amplified music. These events could be held at the Irvine amphitheater located in the eastern portion of the City and at parks and other open spaces. Noise from amplified music could be a disturbance to residences and other noise-sensitive land uses located in the vicinity. However, Goal N-2, Objective N-2, Policy (d) requires outdoor events with amplified noise to implement best management practices to reduce nuisance noise exposure. Noise minimization measures would be required as a part of the permitting process for events.

However, noise associated with stationary noise would likely remain at levels that would expose existing noise-sensitive receptors to a significant increase in ambient noise levels, and impacts would be significant.

d. Construction Noise

Implementation of the project would result in various development projects being constructed simultaneously and over the duration of General Plan buildout. Future development implemented under the project could result in a temporary ambient noise increase due to construction activities. Due to the developed nature of the City, there is a high likelihood that construction activities would take place adjacent to existing structures and that sensitive receptors would be close to construction activities.

Construction noise typically occurs intermittently and varies depending upon the nature or phase of construction (e.g., demolition; land clearing, grading, and excavation; erection). Construction noise would be short term and would include noise from activities such as site preparation, truck hauling of material, pouring of concrete, and the use of power tools. Noise would also be generated by construction equipment use, including earthmovers, material handlers, and portable generators, and could reach high noise levels for brief periods.

As discussed in Section 4.13.3.4 above, hourly average noise levels would be approximately 83 dB(A) L_{eq} at 50 feet from the center of construction activity when assessing three pieces of common construction equipment working simultaneously. Noise levels would vary depending on the nature of the construction activities including the duration of specific activities, the equipment involved, the location of the sensitive receivers, and the presence of intervening barriers. Construction noise levels

of 83 dB(A) L_{eq} at 50 feet would attenuate to 80 dB(A) L_{eq} at 70 feet. Therefore, significant impacts would occur if sensitive land uses are located closer than 70 feet of construction activities.

The City regulates construction noise through Municipal Code Section 66-8-205(A) and Municipal Code Zoning Ordinance Chapter 5 Overlay Districts, Chapter 5-8 Irvine Business Complex Residential Mixed-Use Overlay District, Section 5-8-4. The City limits construction activities to 7:00 a.m. and 7:00 p.m. Mondays through Fridays, and 9:00 a.m. and 6:00 p.m. on Saturdays. Additionally, Goal N-2, Objective N-2, Policy (a) requires any new construction to meet the City Noise Ordinance standards.

Implementation of the project would increase development capacity within the City. As noted previously, construction noise levels are variable and depend on specific locations, site plans, and construction details relative to specific projects. Significant noise impacts may occur associated with individual projects which have not yet been developed, particularly if construction techniques (e.g., pile driving) are proposed. However, construction would be localized and would occur intermittently for varying periods of time in accordance with the City's Municipal Code, Zoning Ordinance, and Noise Element.

Because project-level information is not yet available, it is not possible to quantify construction noise impacts at noise-sensitive receptors. In most cases, construction of individual projects would temporarily increase the ambient noise environment, potentially affecting existing and future sensitive receptors. Mitigation measure NOI-1 and Noise Element goals, objectives, and policies (Goal N-2, Objective N-2, Policy (a)) would serve to minimize construction noise. However, because construction activities may occur near noise-sensitive uses and because noise disturbances could occur for prolonged periods of time or during noise-sensitive hours of the day, construction noise impacts associated with future development would be significant and would require mitigation.

4.10.5.2 Significance of Impacts

a. Traffic Noise

Increase in Ambient Noise

The increase in ambient noise levels adjacent to roadway segments listed in Table 4.10-12 would expose existing noise-sensitive receptors to a significant increase in ambient noise levels, and impacts would be significant.

Land Use Compatibility

Per existing General Plan Noise Element Policy F-1(d) and the Noise Element Update, future development proposals within the City would be required to conduct site-specific exterior and interior noise analyses to demonstrate that the proposed development would not place sensitive receptors in locations where the existing or future noise levels would exceed the land use compatibility standards. However, because specific project details are not yet known, impacts associated with land use compatibility conflicts would be significant.

b. Railroad Noise

The Noise Element Update contains policies under Goal N-1, Objective N-1 that would require future development implemented under the project to control noise through land use planning and design. This includes development exposed to railroad noise. However, because specific project details are not yet known, railroad noise impacts associated with new development would be significant.

c. Stationary Noise

Future development would be required to show compliance with the Municipal Code. Additionally, the Noise Element Update contains policies to reduce impacts associated with stationary sources of noise. However, because specific project details are not yet known, impacts associated with stationary sources of noise would be significant.

d. Construction Noise

The City limits construction activities to 7:00 a.m. and 7:00 p.m. Mondays through Fridays, and 9:00 a.m. and 6:00 p.m. on Saturdays. Additionally, Goal N-2, Objective N-2, Policy (a) requires any new construction to meet the City Noise Ordinance standards. However, because specific project details are not yet known and because construction activities could expose noise-sensitive uses to periods of high level construction noise, construction noise impacts associated with future development under the project would be significant. Despite adherence with the City's Municipal Code, Zoning Ordinance, and Noise Element, impacts would remain significant.

4.10.5.3 Mitigation

a. Traffic Noise

Increase in Ambient Noise

Impacts associated with the increase in ambient noise and land use compatibility would be significant without mitigation. For existing noise sensitive land uses, possible noise-reduction measures would include retrofitting older structures with acoustically rated windows and doors featuring higher Sound Transmission Class ratings, which is a measure of exterior noise reduction performance. However, there is no mechanism in place for implementing such a retrofit program. Because the significant noise impacts would be to existing homes and other noise-sensitive uses in an already urbanized area, there is no feasible mitigation. Mitigation for future development under the project is presented below.

NOI-1: Prior to the issuance of building permits, site-specific exterior noise analyses that demonstrate that the project would not place residential receptors in locations where the exterior existing or future noise levels would exceed the City's noise compatibility standards shall be required as part of the review of future residential development proposals. Noise reduction measures, including but not limited to building noise barriers, increased building setbacks, speed reductions on surrounding roadways, alternative pavement surfaces, or other relevant noise attenuation measures, may be

used to achieve the noise compatibility standards. Exact noise mitigation measures and their effectiveness shall be determined by the site-specific exterior noise analyses.

NOI-2: Prior to the issuance of building permits, site specific interior noise analyses demonstrating compliance with the City's interior noise compatibility standards and other applicable regulations shall be prepared for noise sensitive land uses located in areas where the exterior noise levels exceed the City's noise compatibility standards. Noise control measures, including but not limited to increasing roof, wall, window, and door sound attenuation ratings, placing HVAC in noise reducing enclosures, or designing buildings so that no windows face freeways or major roadways may be used to achieve the noise compatibility standards. Exact noise mitigation measures and their effectiveness shall be determined by the site specific exterior noise analyses.

Land Use Compatibility

See mitigation measures NOI-1 and NOI-2 above.

b. Railroad Noise

See mitigation measures NOI-1 and NOI-2 above.

c. Stationary Noise

NOI-3: Prior to the issuance of a building permit, a site-specific acoustical/noise analysis of any on-site generated noise sources, including generators, mechanical equipment, and trucks, shall be prepared which identifies all noise-generating equipment, predicts noise levels at property lines from all identified equipment, and recommends mitigation to be implemented (e.g., enclosures, barriers, site orientation), to ensure compliance with the City's noise standards. Noise reduction measures shall include building noise-attenuating walls, limiting the hours of operation, or other attenuation measures. Additionally, future projects shall be required to buffer sensitive receptors from noise sources through the use of open space and other separation techniques as recommended after thorough analysis by a qualified acoustical engineer. Exact noise mitigation measures and their effectiveness shall be determined by the site specific noise analyses.

d. Construction Noise

NOI-4: Construction contractors shall implement the following measures for construction activities conducted in the City of Irvine. Construction plans submitted to the City shall identify these measures on demolition, grading, and construction plans submitted to the City:

- The City of Irvine Community Development Department shall verify that grading, demolition, and/or construction plans submitted to the City include these notations prior to issuance of demolition, grading, and/or building permits.

- Construction activity is limited to the hours: Between 7:00 AM to 7:00 PM Monday through Friday and 9:00 a.m. and 6:00 p.m. on Saturdays as prescribed in Municipal Code Section 66-8-205(A). No construction activities shall be permitted outside of these hours or on Sundays and federal holidays, except Columbus Day, unless a temporary waiver is granted by the Chief Building Official or their authorized representative.
- During the entire active construction period, equipment and trucks used for project construction shall use the best-available noise control techniques (e.g., improved mufflers, equipment re-design, use of intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds), wherever feasible.
- Impact tools (e.g., jack hammers and hoe rams) shall be hydraulically or electrically powered wherever possible. Where the use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used along with external noise jackets on the tools.
- Stationary equipment, such as generators and air compressors shall be located as far as feasible from nearby noise-sensitive uses.
- Stockpiling shall be located as far as feasible from nearby noise-sensitive receptors.
- Construction traffic shall be limited, to the extent feasible, to approved haul routes established by the City of Irvine Community Development Department.
- At least 10 days prior to the start of construction activities, a sign shall be posted at the entrance(s) to the job site, clearly visible to the public, that includes permitted construction days and hours, as well as the telephone numbers of the City's and contractor's authorized representatives that are assigned to respond in the event of a noise or vibration complaint. If the authorized contractor's representative receives a complaint, he/she shall investigate, take appropriate corrective action, and report the action to the City.
- Signs shall be posted at the job site entrance(s), within the on-site construction zones, and along queueing lanes (if any) to reinforce the prohibition of unnecessary engine idling. All other equipment shall be turned off if not in use for more than 5 minutes.
- During the entire active construction period and to the extent feasible, the use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only. The construction manager shall use smart back-up alarms, which automatically adjust the alarm level based on the background noise level or switch off back-up alarms and replace with human spotters in compliance with all safety requirements and laws.
- Erect temporary noise barriers (at least as high as the exhaust of equipment and breaking line-of-sight between noise sources and sensitive receptors), as necessary and feasible, to maintain construction noise levels at or below the performance standard of 80 dBA Leq. Barriers shall be constructed with a solid

material that has a density of at least 4 pounds per square foot with no gaps from the ground to the top of the barrier.

4.10.5.4 Significance of Impacts after Mitigation

a. Traffic Noise

Increase in Ambient Noise

Impacts to existing sensitive land uses located in areas that would experience a significant increase in ambient noise levels exceeding the applicable land use and noise compatibility level would be significant and unavoidable at this program level of review. Implementation of mitigation measures NOI-1 and NOI-2 would reduce noise exposure for future development to the extent feasible. However, site-specific development projects are not currently available, and there is a potential for noise to exceed the City's noise standards. Therefore, despite adherence to mitigation measures NOI-1 and NOI-2, impacts associated with increases in ambient noise would remain significant and unavoidable.

Land Use Compatibility

Implementation of mitigation measures NOI-1 and NOI-2 would reduce noise exposure for future development to the extent feasible. However, site-specific development projects are not currently available, and there is a potential for noise to exceed the City's noise standards. Therefore, despite adherence to mitigation measures NOI-1 and NOI-2, impacts associated with land use incompatibility would remain significant and unavoidable.

b. Railroad Noise

Implementation of mitigation measures NOI-1 and NOI-2 would reduce impacts related to railroad noise to a level less than significant.

c. Stationary Noise

Implementation of mitigation measure NOI-3 would reduce impacts related to stationary noise to a level less than significant.

d. Construction Noise

Implementation of mitigation measure NOI-4 would reduce impacts related to construction noise to a level less than significant.

4.10.6 Topic 2: Vibration

Would the project generate excessive groundborne vibration or groundborne noise levels?

4.10.6.1 Impact Analysis

a. Construction

Construction activities may include demolition of existing structures, site preparation work, excavation of parking and subfloors, foundation work, and building construction. Demolition for an individual site may last several weeks to months and may produce substantial vibration. Excavation for underground levels could also occur on some development sites, and vibratory pile driving could be used to stabilize the walls of excavated areas. Piles or drilled caissons may also be used to support building foundations.

As with any type of construction, vibration levels during any phase may at times be perceptible. However, non-pile driving or foundation work construction phases that have the highest potential of producing vibration (such as jackhammering and other high-power tools) would be intermittent and would only occur for short periods of time for any individual development site. By use of administrative controls, such as scheduling construction activities with the highest potential to produce perceptible vibration to hours with least potential to affect nearby properties, perceptible vibration can be kept to a minimum and as such would result in a less than significant impact with respect to perception.

Pile driving has the potential to generate the highest groundborne vibration levels and is the primary concern for structural damage when it occurs within close to structures. As shown in Table 4.10-11, vibration generated by construction equipment has the potential to be substantial, since it has the potential to exceed the FTA criteria for architectural damage (e.g., 0.12 PPV for fragile or historical resources, 0.2 PPV for non-engineered timber and masonry buildings, and 0.3 PPV for engineered concrete and masonry). Construction details and equipment for future project-level development is not known. Noise Element Update contains policies under Goal N-4, Objective N-4 to minimize impacts associated with construction vibration. Specifically, Policy (b) requires all plans submitted for development review that include the use of pile-driving and blasting during construction to consider alternative methods to minimize the potential for building damage and temporary nuisance exposure. Policy (c) requires all plans submitted for development review to utilize vibration standards published by the Federal Transit Administration to evaluate the potential effects of vibration exposure from new vibration sources, such as construction, or siting of new receptors near existing vibration sources, such as rail operations. Despite implementation of these policies and implementing actions, future development would result in potentially significant construction vibration impacts requiring mitigation.

b. Railroad

The Metrolink, Amtrak, and BNSF freight trains operate within the City. Construction of vibration-sensitive uses close to railroad tracks can cause rattling windows and vibration of floors. Train vibration depends upon a variety of factors. The weight of the train, the travel speed, the condition of the track and the character of the subsoil all affect the observed vibration level. Vibration impacts due to the proximity of land uses to the rail corridor were analyzed using the FTA criteria shown in Table 4.13-5. Based on published schedules, 34 Metrolink trains and 20 Amtrak trains operate through the City each day. These are considered occasional events (30 to 70 per day). As shown in Table 4.13-5, a significant vibration impact may occur if Category 1, 2, and 3 land uses are exposed to vibration levels of 65, 75, and 78 VdB, respectively, for occasional events.

Figure 4.10-6 shows the generalized ground surface vibration curves that are based on measurements of ground-borne vibration at representative North American transit systems (FTA 2018). These curves can be used to represent vibration characteristics for standard transportation systems. Using these curves, Category 1 land uses would be exposed to significant vibration levels within approximately 350 feet of the railroad tracks, Category 2 land uses would be exposed to significant vibration levels within approximately 140 feet of the railroad tracks, and Category 3 land uses would be exposed to significant vibration levels within approximately 120 feet of the railroad tracks. Additionally, the Noise Element Update contains policies under Goal N-4, Objective N-4 to minimize impacts associated with railroad vibration. Specifically, Policy (a) requires the City to coordinate with rail operators to minimize vibration exposure through routine maintenance of wheel and rail surfaces. Policy (c) requires all plans submitted for development review to utilize vibration standards published by the Federal Transit Administration to evaluate the potential effects of vibration exposure from new vibration sources, such as construction, or siting of new receptors near existing vibration sources, such as rail operations. Further, the Noise Element Update contains the following implementing actions under Goal N-4 related to railroad vibration:

- Explore the use of quieter vehicles, buses, or trains or retrofit existing infrastructure with noise-reducing technologies.
- Develop and promote building design guidelines that incorporate measures to reduce the transmission of ground-borne vibration, such as adequate building separation, resilient building materials, or structural isolation systems.

Despite implementation of these policies and implementing actions, future development could result in potentially significant railroad vibration impacts.

Source: FTA Report No. 0123, 2018

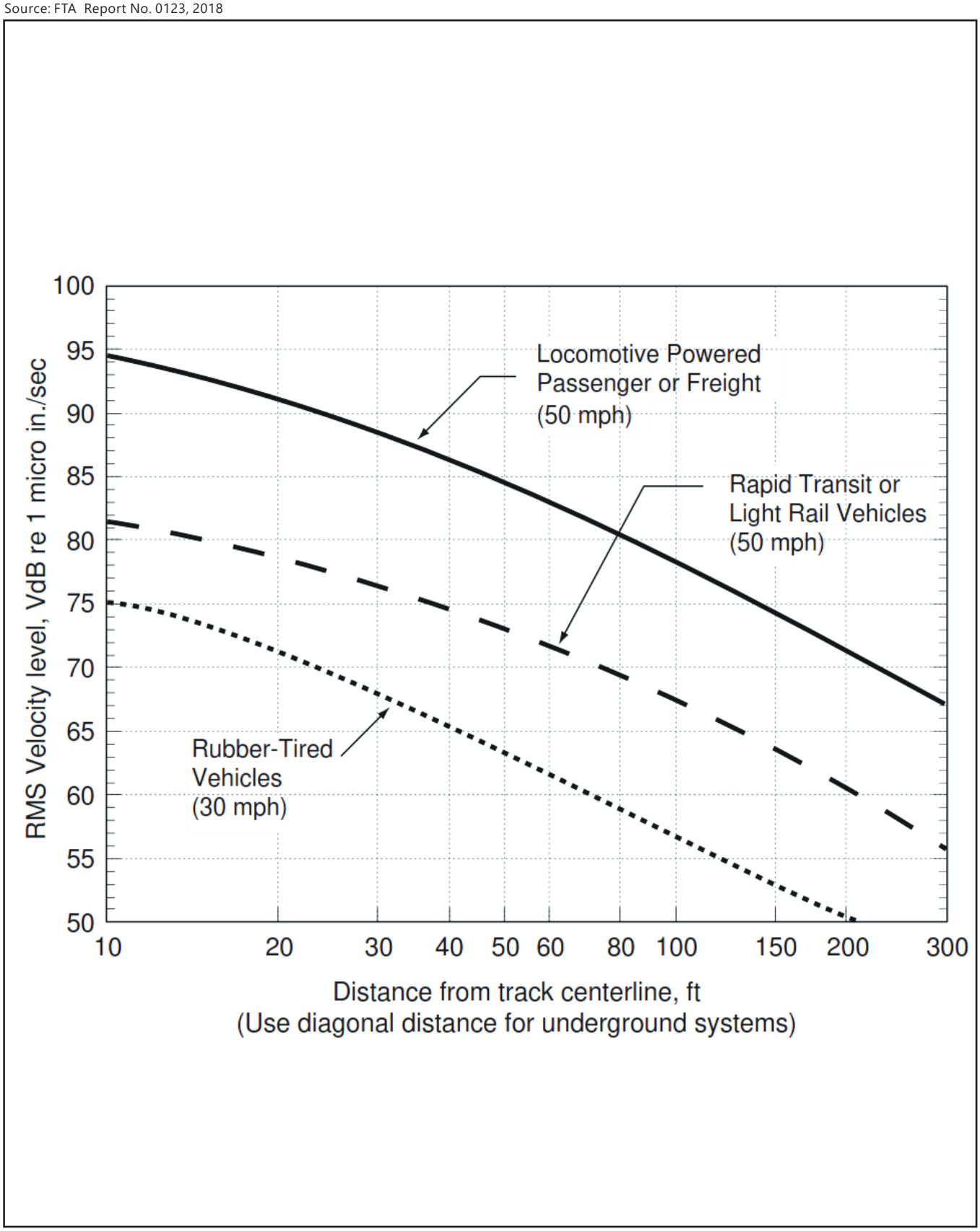

FIGURE 4.10-6
Generalized Ground Surface Vibration Curve

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c. Stationary Sources

Industrial manufacturing operations occasionally utilize equipment or processes that have a potential to generate groundborne vibration. However, vibrations found to be excessive for human exposure that are the result of industrial machinery are generally addressed from an occupational health and safety perspective. The residual vibrations are typically of such low amplitude that they quickly dissipate into the surrounding soil and are rarely perceivable at the surrounding land uses. Furthermore, the project does not propose any industrial manufacturing uses. Residential and commercial uses do not typically generate vibration. Therefore, vibration impacts associated with stationary sources would be less than significant.

4.10.6.2 Significance of Impacts

a. Construction

The Noise Element Update contains policies and implementing actions under Goal N-4, Objective N-4 to minimize impacts associated with construction vibration. However, because specific project details are not yet known, construction vibration impacts would be significant.

b. Railroad

The Noise Element Update contains policies under Goal N-4, Objective N-4 to minimize impacts associated with railroad vibration. However, because specific project details are not yet known railroad vibration impacts would be significant.

c. Stationary Sources

Vibration impacts associated with stationary sources would be less than significant.

4.10.6.3 Mitigation

a. Construction

NOI-5: Prior to issuance of a building permit for a project requiring pile driving during construction within 135 feet of fragile structures, such as historical resources, 100 feet of non-engineered timber and masonry buildings (e.g., most residential buildings), or within 75 feet of engineered concrete and masonry (no plaster); or a vibratory roller within 25 feet of any structure, the project applicant shall prepare a noise and vibration analysis to assess and mitigate potential noise and vibration impacts related to these activities. This noise and vibration analysis shall be conducted by a qualified and experienced acoustical consultant or engineer. The vibration levels shall not exceed Federal Transit Administration (FTA) architectural damage thresholds (e.g., 0.12 inches per second [in/sec] peak particle velocity [PPV] for fragile or historical resources, 0.2 in/sec PPV for non-engineered timber and masonry buildings, and 0.3 in/sec PPV for engineered concrete and masonry). If vibration levels would exceed this threshold, alternative uses such as drilling piles as opposed to pile driving and

static rollers as opposed to vibratory rollers shall be used. If necessary, construction vibration monitoring shall be conducted to ensure vibration thresholds are not exceeded.

b. Railroad

NOI-6: New residential projects (or other noise-sensitive uses) located within 200 feet of existing railroad lines shall be required to conduct a groundborne vibration and noise evaluation consistent with Federal Transit Administration (FTA)-approved methodologies.

c. Stationary Sources

Impacts would be less than significant. No mitigation is required.

4.10.6.4 Significance of Impacts after Mitigation

a. Construction

Implementation of mitigation measure NOI-5 would reduce exposure to construction vibration to the extent feasible. However, site-specific development projects are not currently available, and there is a potential for construction vibration to exceed the applicable standards. Therefore, despite adherence to mitigation measure NOI-5, impacts associated with construction vibration would remain significant and unavoidable.

b. Railroad

Implementation of mitigation measure NOI-6 would reduce exposure to railroad vibration to a level less than significant.

c. Stationary Sources

Impacts would be less than significant. No mitigation is required.

4.10.7 Topic 3: Airports

Would the project expose people residing or working in the project area to excessive aircraft noise levels?

4.10.7.1 Impact Analysis

John Wayne Airport is located immediately adjacent to the western boundary of the City, generally bounded by I-405, State Route 55, State Route 73, and Campus Drive. Airport noise contours are shown in Figure 4.10-3 and the Orange County ALUC noise compatibility criteria are shown in Table 4.10-6. The 60 CNEL noise contour extends into the western portion of Focus Area 1. The project would expand residential and mixed-uses to sites previously designated for nonresidential

uses within Focus Area 1. Residential and other noise sensitive land uses located within the 60 CNEL contour for John Wayne Airport could be exposed to significant airport noise levels. However, the Noise Element Update contains policies under Goal N-1, Objective N-1 that would require future development implemented under the project to control noise through land use planning and design. This includes development exposed to airport noise. Future development would be required to prepare noise studies in accordance with the City's environmental review procedure for all projects that are not "clearly compatible" with the future noise level at the site. These studies are required to identify all measures necessary to reduce noise levels to meet the City's interior and exterior noise compatibility standards and Single Event Noise Standard. Additionally, policies contained under Goal N-3, Objective N-3 relate to noise abatement of aircraft noise. Policy (a) requires the City to coordinate efforts to reduce noise impacts with appropriate public and government agencies, such as aircraft and transit regulatory agencies. Policy (e) seeks the cooperation of aircraft regulatory agencies in the modification and selection of flight paths that will reduce noise impacts on residential and other noise-sensitive areas. Policy (f) ensures any proposal to update aircraft noise contours used by the City of Irvine for planning analysis is submitted, before adoption by the City, to the ALUC. Therefore, adherence with the noise requirements of the ALUCP (PPP NOI-2), the Noise Element Update policies, and associated FAA requirements would ensure that future development would not expose people to excessive aircraft noise levels, and impacts would be less than significant.

4.10.7.2 Significance of Impacts

Adherence with the noise requirements of the ALUCP, the Noise Element Update policies, and associated FAA requirements would ensure that future development would not expose people to excessive aircraft noise levels, and impacts would be less than significant.

4.10.7.3 Mitigation

Impacts would be less than significant. No mitigation is required.

4.10.7.4 Significance of Impacts after Mitigation

Impacts would be less than significant. No mitigation is required.

4.10.8 Cumulative Analysis

As defined in Section 15130 of the State CEQA Guidelines, cumulative impacts are the incremental effects of an individual project when viewed in connection with the effects of past, current, and probable future projects within the cumulative impact area for noise. The analysis of vehicle traffic noise provided above is cumulative in nature because the analysis considers noise impacts associated with buildout of the entirety of the City and the traffic assumptions used in the analysis include cumulative traffic associated with regional growth. Cumulatively, there would be additional new future development and associated travel demand within the City and in the surrounding region. The residences and other sensitive land uses located along most of the City roadways are currently affected by the existing traffic noise, and cumulative growth would result in a significant increase in ambient noise and would potentially result in noise levels that exceed the City's compatibility

standards. As outlined in the Irvine General Plan Update Traffic Noise Assessment, cumulative off-site traffic noise level impacts are expected to exceed noise level increase thresholds along 147 segments. Based on the significance criteria for off-site traffic noise, land uses adjacent to these study area roadway segments would experience a significant cumulative noise level increases due to the Project-related traffic as compared to the existing traffic noise levels. Therefore, impacts associated with increases in ambient traffic noise would be cumulatively considerable and would remain significant and unavoidable.

Stationary source of noise, construction noise, and vibration are generally localized impacts that do not have regional or cumulative considerations. Noise sources associated with past, present, and future development in the region include construction equipment, landscape and building maintenance activities, mechanical equipment, solid waste collection, parking lots, commercial, office, and industrial activities, and residential, school, and recreation activities and events. However, construction vibration would be cumulatively considerable and would remain significant and unavoidable.