4.12 NOISE

This section of the Environmental Impact Report (EIR) evaluates the potential noise impacts associated with construction and operation of the proposed Nakase Nursery/Toll Brothers Project (proposed Project). The analysis in this section is based on the information provided in the *Noise and Vibration Impact Analysis* (Urban Crossroads 2018a) prepared for the Project, which is included in Appendix J of this EIR.

4.12.1 Scoping Process

The City of Lake Forest (City) received 28 comment letters during the public review period of the Initial Study/Notice of Preparation (IS/NOP). For copies of the IS/NOP comment letters, refer to Appendix A of this EIR. Seven comment letters included comments related to Noise.

- The letter from Southern California Edison (SCE) (August 14, 2018) suggests analysis of the noise impacts associated with project-related utility work.

- The letter from Loretta Herin (July 25, 2018) suggests the addition of a wall along Bake Parkway and installation of special pavement to reduce traffic noise at adjacent residents.

- The letter from the Saddleback Valley Unified School District (SVUSD) (July 25, 2018) requested that the EIR address environmental issues related to potential noise impacts to District schools and, specifically, potential noise impacts to the proposed school site from traffic traveling on Bake Parkway and Rancho Parkway.

- The letter from Andrea Alexander (August 6, 2018) expressed concern about existing truck and motorcycle noise on Bake Parkway and lack of noise ordinance enforcement. The commenter suggested triple-paned windows and a 10- to 12-foot (ft) wall to protect existing residents from additional traffic noise.

- The letter from Judy Esposito (August 6, 2018) expressed concern about potential increases in noise.

- The letter from the Autumnwood Homeowner's Association (HOA) (August 8, 2018) requested the EIR to evaluate noise impacts.

- The letter from Robert and Melissa Leech (August 9, 2018) stated that the existing daytime noise levels exceed 90 A-weighted decibels (dBA), and noise levels would be exacerbated as a result of the proposed Project. They also suggested a curfew on industrial traffic between 10:00 p.m. and 6:00 a.m., installation of a higher wall or landscaping to reduce traffic noise, and conducting a noise study to compare with the original environmental studies.

4.12.2 Existing Environmental Setting

4.12.2.1 Existing Project Site and Vicinity

The Project site is located southeast of Bake Parkway and southwest of Rancho Parkway in Lake Forest. State Route 241 (SR-241) is located roughly 300 ft northwest of the Project site. The Project site is currently occupied by the Nakase Brothers Wholesale Nursery, an agricultural wholesale plant nursery. Existing residential uses are located northwest of the Project site, and office and commercial uses are located northwest, northeast, southeast, and southwest of the Project site. The Serrano Creek Trail runs adjacent to the southeastern Project site boundary.

4.12.2.2 Existing Noise Levels

The ambient noise levels in the Project study area are dominated by transportation-related noise associated with the arterial roadway network. As described in Section 4.12.4, Methodology, eight 24-hour noise level measurements were taken at sensitive receiver locations in the vicinity of the Project site to determine existing noise levels in the vicinity of the Project site. The receiver locations are described in Table 4.12.A and are shown on Figure 4.12.1. The existing ambient noise levels are also detailed in Table 4.12.A. The daytime and nighttime average noise levels (L_{eq}) shown in this table represent the average of all hourly noise levels observed during the time periods. The median noise levels (L_{50}) represent the noise levels occurring 50 percent of the time. The 24-hour noise level is represented by the Community Noise Equivalent Level (CNEL), which is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours.

Table 4.12.A: Existing Noise Levels

Receiver No.	Distance to Project Site (ft)	Location	Average Noise Level (dBA L_{eq})		Average Noise Level (dBA L_{50})		24-hour Noise Level (CNEL)
			Daytime	Nighttime	Daytime	Nighttime	
L1	140	North of the Project site on Rancho Parkway adjacent to existing commercial uses	64.1	60.0	58.9	48.0	67.8
L2	115	East of the Project site adjacent to an existing pedestrian trail and an Extended Stay America hotel	54.4	50.1	50.8	42.8	57.8
L3	45	Southeast of the Project site at an adjacent pedestrian trail near existing office buildings on Lake Forest Drive	46.2	42.3	43.2	39.4	49.8
L4	0	Western Project site boundary adjacent to an existing parking lot for office uses	52.2	49.9	48.5	46.6	57.0
L5	151	Southwest of the Project site within an existing parking lot for office uses	50.0	48.4	47.0	46.1	55.3
L6	390	Northwest of the Project site near existing residential homes on Agave	46.7	43.8	43.9	41.8	51.1
L7	250	North of the Project site across Bake Parkway adjacent to an existing Staybridge Suites hotel	56.6	53.8	54.4	52.0	61.1
L8	0	Northwestern Project site boundary adjacent to Bake Parkway	75.1	71.5	69.5	56.0	79.0

CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = feet
L_{50} = median noise level
L_{eq} = equivalent continuous noise level

LSA

FIGURE 4.12.1

N

Nakase Nursery/Toll Brothers
Noise Measurement Locations

SOURCE: Urban Crossroads

I:\CLF1801\G\Noise_Measure_Locations.cdr (7/5/2019)

This page intentionally left blank

4.12.3 Regulatory Setting

4.12.3.1 Federal Regulations

No federal regulations related to noise were used in the preparation of this analysis.

4.12.3.2 State Regulations

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element, which is to be prepared per guidelines adopted by the Governor's Office of Planning and Research (OPR). The purpose of the Noise Element is to limit the exposure of the community to excessive noise levels. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts.

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

4.12.3.3 Regional Regulations

There are no regional regulations applicable to noise.

4.12.3.4 Local Regulations

City of Lake Forest General Plan. The City of Lake Forest has adopted a Safety and Noise Element of the General Plan to address public safety and quality of life issues. The Safety and Noise Element specifies the maximum exterior and interior noise levels for new developments impacted by transportation noise sources (e.g., arterial roads, freeways, airports, and railroads). In addition, the Safety and Noise Element identifies noise standards designed to protect, create, and maintain an environment free from noise that may jeopardize the health or welfare of sensitive receivers, or degrade quality of life.

The noise criteria identified in the City of Lake Forest Safety and Noise Element are guidelines to evaluate the land use compatibility of transportation-related noise (Table 4.12.B). The land use compatibility criteria provides the City with a planning tool to gauge the compatibility of land uses relative to existing and future exterior noise levels. The Noise/Land Use Compatibility Matrix in the City of Lake Forest General Plan provides guidelines to evaluate the acceptability of transportation-related noise-level impacts. These guidelines are based on the Governor's OPR and are used to assess the long-term traffic noise impacts on land uses. Noise-sensitive land uses such as

Table 4.12.B: Noise/Land Use Compatibility Matrix

Land Use Category	Community Noise Equivalent Level CNEL						
	55	60	65	70	75	80	
Residential – Single-Family, Multifamily, Duplex	A	A	B	C[1]	C		
Residential – Mobile Homes	A	A	B	C	C		
Transient Lodging – Motels, Hotels	A	A	B	B	C	C	
Schools, Libraries, Churches, Hospitals, Nursing/Convalescent Homes, Preschools, Day Care Centers (1)[2]	A	A	B	C	C		
Auditoriums, Concert Halls, Amphitheaters, Meeting Halls	B	B	C	C			
Sports Areas, Outdoor Spectator Sports, Amusement Parks	A	A	A	B	B		
Playgrounds, Neighborhood Parks	A	A	A	B	C		
Golf Courses, Riding Stables, Cemeteries	A	A	A	A	B	C	C
Office and Professional Buildings	A	A	A	B	B	C	
Commercial Retail, Banks, Restaurants, Theaters	A	A	A	A	B	B	C
Industrial, Manufacturing, Utilities, Wholesale, Service Stations	A	A	A	A	B	B	B
Agriculture	A	A	A	A	A	A	A

Source: Table SN-3, City of Lake Forest General Plan, Safety and Noise Element (June 21, 1994).

Zone A. **Normally Acceptable**—Specified land use is satisfactory, based on the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

Zone B. **Conditionally Acceptable**—New construction or development should be undertaken only after detailed analysis of noise reduction requirement is 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 Unacceptable**—New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in the design.

Notes: (1) Religious institutions (Churches, synagogues, temples and other places of worship) of a small size (occupancy of 100 persons or less) may occupy existing buildings within areas of exterior noise levels ranging from 65 to 75 dB CNEL without providing additional noise insulation for the building.

(2) Shaded areas indicate new construction or development should generally not be undertaken. Source: J.J. Van Houten & Associates.

[1] General Plan Amendment 95-01, dated May 16, 1995.
[2] General Plan Amendment 94-01, dated July 11, 1995.

dB = decibels
dBA = A-weighted decibels
CNEL = Community Noise Equivalent Level

single-family homes and schools are considered normally acceptable with exterior noise levels below 60 dBA CNEL and are conditionally acceptable with noise levels below 65 dBA CNEL. For conditionally acceptable land use, new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design.

The City provides exterior and interior noise level standards as shown in Table 4.12.C. These land use specific noise level standards are used to regulate transportation-related noise levels for noise sensitive uses.

Table 4.12.C: Interior and Exterior Noise Standards

Land Use	Noise Standards	
	Interior[1]	Exterior
Residential: Single-Family, Multifamily, Duplex, Mobile Home	45 dBA CNEL	65 dBA CNEL[2]
Residential: Transient Lodging, Hotels, Motels, Nursing Homes, Hospitals	45 dBA CNEL	65 dBA CNEL
Private Offices, Church Sanctuaries, Libraries, Board Rooms, Conference Rooms, Theaters, Auditoriums, Concert Halls, Meeting Halls, etc.	45 dBA $L_{eq}(12)$[3]	—
Schools	45 dBA $L_{eq}(12)$	67 dBA $L_{eq}(12)$[4]
General Offices, Reception, Clerical, etc.	50 dBA $L_{eq}(12)$	—
Bank Lobby, Retail Store, Restaurant, Typing Pool, etc.	55 dBA $L_{eq}(12)$	—
Manufacturing, Kitchen, Warehousing, etc.	65 dBA $L_{eq}(12)$	—
Park, Playgrounds	—	65 dBA CNEL
Golf Courses, Outdoor Spectator Sports, Amusement Parks	—	70 dBA CNEL

Source: *Noise and Vibration Impact Analysis* (Urban Crossroads 2018a)

[1] Noise standard with windows closed. Mechanical ventilation shall be provided per Uniform Building Code requirements to provide a habitable environment. Indoor environment excludes bathrooms, toilets, closets, and corridors.

[2] Outdoor environment limited to rear yard of single-family homes, multifamily patios and balconies (with a depth of 6 ft or more), and common recreation areas.

[3] Religious institutions (churches, temples, and other places of worship) of a small size (occupancy of 100 persons or less) may occupy existing buildings within areas of exterior noise levels ranging from 65 to 75 dBA CNEL without providing additional noise insulation for the building.

[4] Outdoor environment limited to playground areas, picnic areas, and other areas of frequent human use.

CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = feet/foot
$L_{eq}(12)$ = the A-weighted equivalent sound level averaged over a 12-hour period (usually the hours of operation)

City of Lake Forest Municipal Code. To analyze noise impacts originating from a designated fixed location or private property such as the Project, stationary-source (operational) noise such as the proposed playgrounds, sports fields, outdoor pool/spa activities, a dog park, and school parking lot vehicle movements are typically evaluated against standards established under a jurisdiction's Municipal Code. The Project operational noise impacts are governed by the City of Lake Forest Municipal Code, Title 11 – Peace and Safety, Division II – Offenses Against Public Peace, Chapter 11.16 – Noise Control. Section 11.16.040 , Exterior Noise Standards, of the Municipal Code identifies the maximum permissible exterior noise levels for residential uses that shall be no greater than 55 dBA 7:00 a.m. to 10:00 p.m. and no greater than 50 dBA 10:00 p.m. to 7:00 a.m. for a period of 30 minutes. Further thresholds that are dependent on the duration of activity are described below.

In order to properly assess the impact of events at exterior residential property that occur for periods of time less than 30 minutes within a given hour, Section 11.16.040(B) provides the following noise level additions:

1. The noise standard for a cumulative period of more than 30 minutes in any hour; or
2. The noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour; or
3. The noise standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour; or
4. The noise standard plus 15 dBA for a cumulative period of more than 1 minute in any hour; or
5. The noise standard plus 20 dBA for any period of time.

If the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to said category shall be increased to reflect that ambient noise level. If the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under the fifth category shall be increased to reflect the maximum ambient noise level. Additionally, In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by 5 dBA.

A summary of the exterior daytime and nighttime noise level standards are presented in Table 4.12.D below.

Table 4.12.D: Summary of Stationary-Source Noise Level Standards

Land Use	Time Period	Maximum Permissible Exterior Noise Levels[1]				
		L_{50} (30 min)	L_{25} (15 min)	L_8 (5 min)	L_2 (1 min)	L_{max} (Anytime)
Residential	Daytime (7:00 a.m.–10:00 p.m.)	55	60	65	70	75
	Nighttime (10:00 p.m.–7:00 a.m.)	50	55	60	65	70

Source: Sections 11.16.040(A) and (B) of the City of Lake Forest Municipal Code.

[1] The percent noise level is the level exceeded "n" percent of the time during the measurement period. List the noise level exceeded 25% of the time.

L_{max} = maximum instantaneous noise level
min = minutes

In regard to the regulation of construction noise impacts, the City's Municipal Code, Section 11.16.060(H), exempts the following type of noise:

> Noise sources associated with construction, repair, remodeling, or grading of any real property, provided said activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a legal City of Lake Forest holiday.

Noise from construction activities are typically limited to the hours of operation established under a city's Municipal Code. However, both the City of Lake Forest Municipal Code and the City's *CEQA Significance Thresholds Guide* (City of Lake Forest 2009) consider construction noise exempt from the Municipal Code stationary-source noise level standards (Section 11.16.060 of the Municipal Code), and do not establish a numeric maximum acceptable construction-source noise level threshold for potentially affected receivers, which would allow for a quantified determination of potential impacts under CEQA.

To evaluate whether the Project will generate potentially significant construction noise levels at off-site sensitive receiver locations, a construction-related noise level threshold is adopted from the *Criteria for Recommended Standard: Occupational Noise Exposure prepared by the National Institute for Occupational Safety and Health* (NIOSH). A division of the U.S. Department of Health and Human Services, NIOSH identifies a noise level threshold based on the duration of exposure to the source. The construction-related noise level threshold starts at 85 dBA for more than 8 hours per day, and for every 3 dBA increase, the exposure time is cut in half. This results in noise level thresholds of

88 dBA for more than 4 hours per day, 92 dBA for more than 1 hour per day, 96 dBA for more than 30 minutes per day, and up to 100 dBA for more than 15 minutes per day.

For the purposes of this analysis, the lowest, more conservative construction noise level threshold of 85 dBA L_{eq} is used as an acceptable threshold for construction noise at the nearby sensitive receiver locations. Since this construction-related noise level threshold represents the energy average of the noise source over a given time, they are expressed as L_{eq} noise levels. Therefore, the noise level threshold of 85 dBA L_{eq} over a period of 8 hours or more is used to evaluate the potential Project-related construction noise level impacts at the nearby sensitive receiver locations.

4.12.4 Methodology

Evaluation of noise and vibration impacts associated with the proposed Project included the following:

- Determination of the short-term construction noise and vibration impacts
- Determination of the long-term noise impact impacts resulting from off-site traffic and Project operation stationary sources
- Determination of the land use compatibility of the proposed Project as compared to the City's exterior and interior noise criteria

The evaluation of noise and vibration impacts was prepared in conformance with appropriate standards, utilizing procedures and methodologies in the City of Lake Forest Safety and Noise Element and Municipal Code as well as the *Criteria for Recommended Standard: Occupational Noise Exposure prepared by the National Institute for Occupational Safety and Health* (NIOSH). The Federal Highway Administration (FHWA) Traffic Noise Prediction Model (FHWA-RD-77-108) was used to determine traffic noise impacts. Please refer to the *Noise and Vibration Impact Analysis* (Urban Crossroads 2018a) for additional details on the noise and vibration modeling methodology and assumptions used to estimate construction and operation impacts of the proposed Project.

4.12.4.1 Receiver Locations

To assess the potential for long-term operational and short-term construction noise impacts, the following receiver locations as shown on Figure 4.12.2, Sensitive Receptor Locations, were identified as representative locations for focused analysis. Land uses that are considered relatively insensitive to noise include commercial, and office developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, natural open space, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

This page intentionally left blank

LEGEND:

- Receiver Locations
- Distance from receiver to Project site boundary (in feet)
- 6' Existing Barrier Height (in feet)
- Existing Barrier

LSA

FIGURE 4.12.2

N

Nakase Nursery/Toll Brothers
Sensitive Receptor Locations

SOURCE: Urban Crossroads

I:\CLF1801\G\Receptor Locations.cdr (7/5/2019)

This page intentionally left blank

Sensitive receivers near the Project site include existing homes, hotels, and the existing Serrano Creek Trail area, as described below. Other sensitive land uses in the Project study area that are located at greater distances than those identified in this report would experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding by intervening structures.

- **R1:** Located approximately 197 ft north of the Project site, R1 represents existing residential north of Bake Parkway.
- **R2:** Location R2 represents the existing Staybridge Suites hotel, which is located roughly 264 ft north of the Project site across Bake Parkway.
- **R3:** Location R3 represents the existing Extended Stay America hotel, which is located approximately 216 ft southeast of the Project site on Lake Forest Drive.
- **R4:** Location R4 represents the existing Serrano Creek Trail area, which is located adjacent to the southern Project site boundary approximately 80 ft southeast.

4.12.5 Thresholds of Significance

The thresholds for noise impacts used in this analysis are consistent with Appendix G of the *State CEQA Guidelines*. The following thresholds were used to evaluate the potential noise impacts of the proposed Project:

Threshold 4.12.1: Would the project result in the generation of 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?

Threshold 4.12.2: Would the project result in the generation of excessive groundborne vibration or groundborne noise levels?

Threshold 4.12.3: 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, would the project expose people residing or working in the Project area to excessive noise levels?

None of the thresholds for noise were scoped out in the Initial Study, which is included in Appendix A of this EIR. Therefore, all of the thresholds listed above are addressed in the following analysis.

4.12.5.1 City Significance Criteria Summary

According to the criteria presented above, noise and vibration impacts shall be considered significant if any of the following occur as a direct result of the proposed development. Table 4.12.E shows the significance criteria summary matrix.

Table 4.12.E: Significance Criteria Summary

Analysis	Receiving Land Use	Condition(s)	Significance Criteria	
			Daytime[1]	Nighttime[2]
Off-Site Traffic Noise	Noise- Sensitive	Exterior Noise Level Criteria	≥ 3 dBA CNEL Project Increase & Resulting With Project Noise Level > 65 dBA CNEL	
On-Site Traffic Noise	Residential & School	Exterior Noise Level Standard	65 dBA CNEL	
		Interior Noise Level Standard	45 dBA CNEL	
Operational Noise	Noise- Sensitive	Exterior Noise Level Standards	See Table 4.12.D.	
Construction Noise & Vibration	Noise- Sensitive	Noise Level Threshold	85 dBA L_{eq}	N/A
		Vibration Level Threshold (Building Damage)	0.3 in/sec PPV	N/A
		Vibration Level Threshold (Distinctly Perceptible)	0.04 in/sec PPV	N/A

[1] Daytime = 7:00 a.m. to 10:00 p.m.
[2] Nighttime = 10:00 p.m. to 7:00 a.m.
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
in/sec = inches per second
L_{eq} = equivalent continuous sound level
N/A = no nighttime construction activity is permitted, so no nighttime construction noise level limits are identified.
PPV = peak particle velocity

- **Off-Site Traffic Noise:** When both of the following criteria are met at noise-sensitive land uses (e.g., residential, hotels, motels, nursing homes, hospitals, parks, playgrounds and recreation areas, and schools):
    - Project traffic will cause a noise level increase of 3 dBA CNEL or more on a roadway segment adjacent to a noise-sensitive land use; and
    - The resulting "future with project" noise level exceeds the 65 dBA CNEL exterior noise level standard for sensitive land uses.
- **On-Site Traffic Noise:** If the on-site noise levels:
    - Exceed the exterior noise level standard of 65 dBA CNEL for outdoor areas (e.g., rear yard of single-family homes, multi-family patios and balconies (with a depth of 6 ft or more), common recreation areas, playgrounds, or picnic areas); or
    - Exceed an interior noise level of 45 dBA CNEL for noise-sensitive uses.
- **Operational Noise:** If Project-related operational (stationary source) noise levels exceed the noise level standards for sensitive land uses as presented in Sections 11.16.040(A) and (B) of the City of Lake Forest Municipal Code as well as in Table 4.12.D.
- **Construction Noise and Vibration:**
    - If Project-related construction activities create noise levels that exceed the 85 dBA L_{eq} acceptable noise level threshold at the nearby sensitive receiver locations; or
    - If Project-related construction activities generate vibration levels that exceed the California Department of Transportation (Caltrans) building damage vibration level threshold for older

residential structures of 0.3 inches per second (in/sec) peak particle velocity (PPV), or the *distinctly perceptible* human annoyance vibration level threshold of 0.04 in/sec PPV at nearby sensitive receiver locations.

4.12.6 Project Impacts

Threshold 4.12.1: Would the Project result in the generation of 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?

Potentially Significant Impact.

Construction Noise Impacts. This section summarizes potential impacts resulting from the short-term construction activities associated with the development of the proposed Project. Based on the reference construction noise levels, the Project-related construction noise levels when the highest reference noise level is operating at the edge of primary construction activity nearest each sensitive receiver location would range from 53.3 to 65.2 dBA L_{eq} at the sensitive receiver locations, and therefore would not exceed the construction noise level threshold of 85 dBA L_{eq} at any receiver location. The noise impact due to unmitigated Project construction noise levels is, therefore, considered a less than significant impact at all receiver locations, and no mitigation is required.

Off-Site Traffic Noise Impacts. To assess the off-site transportation CNEL noise level impacts associated with development of the proposed Project, noise contours were developed based on *Nakase Property Traffic Impact Analysis* (Urban Crossroads 2019c). Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were developed for the following scenarios:

- **Existing Conditions Without/With Project:** This scenario refers to the existing present-day noise conditions without and with the proposed Project.

- **Interim Year 2020 Without/With Project:** This scenario refers to Interim Year noise conditions without and with the proposed Project.

- **2040 General Plan With Approved Business Park Land Use Without Portola Extension Without/With Project:** This scenario refers to the ambient noise conditions at future Year 2040 without and with the proposed Project, and includes all cumulative projects identified in the Traffic Impact Analysis (TIA).

- **2040 General Plan With Approved Business Park Land Use With Portola Extension Without/With Project:** This scenario refers to the ambient noise conditions at future Year 2040 without and with the proposed Project, and includes all cumulative projects identified in the TIA.

Noise contours were used to assess the proposed Project's incremental traffic-related noise impacts at land uses adjacent to 39 study area roadway segments 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 dBA 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 Project study area.

The off-site traffic noise modeling shows conditions would range from 63.6 to 78.5 dBA CNEL and the proposed Project would generate noise level increases of 0.1 to 0.72 dBA CNEL on the study area roadway segments for all scenarios. The Project-related noise level increases are considered less than significant at the noise-sensitive land uses adjacent to roadways conveying Project traffic since they would not result in an exceedance of the 3 dBA CNEL increase criteria when the with Project noise level exceeds the 65 dBA CNEL noise level standard for sensitive land uses. No mitigation is required.

Off-Site Operational Noise Impacts. This section summarizes the potential operational noise impacts that may result from the Project's stationary noise sources on the off-site sensitive receiver locations. The hourly noise levels associated with the playgrounds, sports fields, outdoor pool/spa activities, a dog park, and school parking lot vehicle movements are expected to range from 17.9 to 32.5 dBA L_{50} at the sensitive off-site receiver locations.

To demonstrate compliance with local noise regulations, the Project-only operational noise levels were evaluated against the exterior noise level threshold based on the City's exterior noise level standards. Table 4.12.F shows that the with Project operational noise levels would not exceed the City's daytime and nighttime exterior noise level standards at any receiver location, and therefore are considered a less than significant noise impact. No mitigation is required.

Table 4.12.F: Unmitigated Operational Noise Level Compliance

Receiver Location	Land Use	Noise Level at Receiver Locations (dBA)					Threshold Exceeded?[1]
		L_{50} (30 min)	L_{25} (15 min)	L_8 (5 min)	L_2 (1 min)	L_{max} (<1 min)	
Daytime	Residential Standards	55	60	65	70	75	–
Nighttime		50	55	60	65	70	–
R1	Residential	17.9	21.2	25.8	30.1	46.1	No
R2	Hotel	27.1	31.0	36.2	40.1	58.0	No
R3	Hotel	27.3	31.0	35.5	39.1	55.8	No
R4	Recreation	32.5	35.6	39.3	42.6	55.5	No

[1] Refer to Table 4.12.D for operational noise level standards
dBA = A-weighted decibels
L_{max} = maximum instantaneous noise level
min = minutes

On-Site Noise Impacts. A noise impact analysis has been completed to determine the noise exposure levels that would result from adjacent and dominant traffic noise sources in the Project study area. The primary source of traffic noise affecting the Project site is anticipated to be from SR-241, Bake Parkway, Rancho Parkway, and Lake Forest Drive. The proposed Project would also experience some traffic noise impacts from the Project's internal local streets. Due to the low traffic volume and low speeds of vehicles traveling within the Project site, traffic noise from these roadways would not make a significant contribution to the noise environment beyond the right-of-way.

Exterior Noise Analysis. Using the FHWA traffic noise prediction model, the expected future exterior noise levels were calculated at the noise-sensitive residential and school uses within the Project site. The future exterior traffic noise levels are expected to range from 51.6 to 64.7 dBA CNEL at the outdoor areas (e.g., residential private yards and school playground and picnic areas) within the Project site with the planned 6 ft high noise barriers for residential uses. No exterior noise barriers are required to satisfy the City's 65 dBA CNEL exterior noise level standard at the school outdoor playground and picnic areas. With the planned noise barriers, the future exterior noise levels are considered to be a less than significant noise impact and no mitigation is required.

Interior Noise Analysis. To ensure that the interior noise levels comply with the City of Lake Forest interior noise level standards, future noise levels were calculated at the building façades.

Noise Reduction Assumptions. The interior noise level is the difference between the predicted exterior noise level at the building façade and the noise reduction of the structure. Typical building construction will provide a Noise Reduction (NR) of approximately 12 dBA with "windows open" and a minimum 25 dBA noise reduction with "windows closed." However, sound leaks, cracks and openings within the window assembly can greatly diminish its effectiveness in reducing noise. Several methods may be incorporated into the Project design in order to achieve required sound attenuation, including, but not limited to: (1) weather-stripped solid core exterior doors; (2) dual-glazed windows; (3) mechanical ventilation/air conditioning; and (4) exterior wall/roof assembles free of cut-outs or openings.

Use of dual-paned windows is required by the CBC for energy conservation in new residential construction. In addition, all residential and school windows and exterior doors would have a minimum sound transmission class (STC) rating of 27 or higher. As required by the CBC, the proposed Project would install heating, ventilating, and air conditioning (HVAC) units in all residential units because window closure is a necessary condition to meet the interior noise exposure standard (refer to Regulatory Compliance Measure [RCM] NOI-1). In addition, roof sheathing would be per manufacturer's specification or caulked plywood of at least 0.5 inch thick, ceilings in residential and school uses would be per manufacturer's specification or well-sealed gypsum board of at least 0.5 inch thick, and insulation with at least a rating of R-19 would be used in the attic space to provide additional sound attenuation.

Interior Noise Level Assessment. The analysis shows that the buildings associated with the proposed Project would require a windows-closed condition and a means of mechanical ventilation (e.g. air conditioning) (refer to RCM NOI-1). The future exterior noise levels at the first-floor building façades are expected to range from 51.7 to 62.2 dBA CNEL. The first-floor interior noise level analysis shows that the City of Lake Forest 45 dBA CNEL residential and school interior noise level standard can be satisfied with incorporation of the design features described above (e.g., dual-pane windows with an STC rating of 27 or higher).

The future exterior noise levels at the second-floor building façades are expected to range from 56.9 to 69.2 dBA CNEL. The second-floor interior noise level analysis shows that the City's 45 dBA CNEL residential and school interior noise level standard can be satisfied by incorporation of the design features described above (e.g., dual-pane windows with an STC rating of 27 or higher). Therefore, impacts related to interior noise levels are anticipated to be less than significant, but a final noise study would be required to verify design and building performance. Mitigation Measure 4.12.1 requires that a final noise study be prepared prior to obtaining building permits for the Project. This report would utilize the precise grading plans, architectural floor plans and elevations, and actual building design specifications, and may include additional measures, if necessary, to ensure that the City's 45 dBA CNEL interior noise level standards are met.

Threshold 4.12.2: Would the project result in the generation of excessive groundborne vibration or groundborne noise levels?

Less than Significant Impact. Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent localized effects. The proposed Project's construction activities most likely to cause vibration impacts are:

- **Heavy Construction Equipment:** Although all heavy mobile construction equipment has the potential of causing at least some perceptible vibration while operating close to buildings, the vibration is usually short-term and is not of sufficient magnitude to cause building damage.

- **Trucks:** Trucks hauling building materials to construction sites can be sources of vibration intrusion if the haul routes pass through residential neighborhoods on streets with bumps or potholes. Repairing the bumps and potholes generally eliminates the problem.

Ground-borne vibration levels resulting from construction activities occurring within the Project site were estimated using data published by the Federal Transit Administration (FTA). Construction activities that would have the potential to generate low levels of ground-borne vibration within the Project site include mobile equipment activities and pile driving, among others. Using the vibration source level of construction equipment and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts.

Based on the reference vibration levels provided by the FTA, a large bulldozer represents the peak source of vibration with a reference velocity of 0.089 in/sec PPV at 25 ft. At distances ranging from 130 to 304 ft from primary Project construction activities, construction vibration velocity levels are expected to range from 0.002 to 0.008 in/sec PPV. Therefore, the Project construction vibration levels would remain below the Caltrans building damage threshold of 0.3 in/sec PPV at all receiver locations, and no mitigation is required.

Compared with the Caltrans construction vibration standard for human annoyance, the proposed Project construction activities would remain below the distinctly perceptible vibration standard of 0.04 in/sec PPV at all receiver locations. Therefore, Project-related vibration impacts at the nearby sensitive receiver locations would be less than significant, and no mitigation is required.

Additionally, the Project site would require up to 150,000 cubic yards (cy) of soil export during the construction process. Truck vibration levels are dependent on vehicle characteristics, load, speed, and pavement conditions. When haul trucks are traveling to and from the project site along local roadways, typical vibration levels for the Nakase Property heavy truck activity at normal traffic speeds would approach 0.004 in/sec PPV at 25 ft based on the FTA *Transit Noise Impact and Vibration Assessment Manual*. This would be below the Caltrans building damage threshold of 0.3 in/sec PPV and human annoyance threshold of 0.04 in/sec PPV for the receptors along the surrounding roadways. No mitigation is required.

Once on site, trucks would be traveling at very low speeds so it is expected that delivery truck vibration levels at adjacent properties would approach 0.002 in/sec PPV at 25 ft and would remain well below the Caltrans building damage threshold of 0.3 in/sec PPV and human annoyance threshold of 0.04 in/sec PPV for all surrounding uses. No mitigation is required.

During operation, the proposed Project would not include any activities that would generate substantial ground-borne vibration or ground-borne noise. Therefore, operation of the proposed Project would not result in excessive ground-borne vibration or ground-borne noise levels, and no mitigation is required.

Threshold 4.12.3: 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, would the project expose people residing or working in the Project area to excessive noise levels?

Less than Significant Impact. The closest airport to the Project site is John Wayne Airport, which is located approximately 11 miles (mi) northwest of the Project site. The Project site is not located within 2 mi of a public airport or within an airport land use plan nor is the Project within the vicinity of a private airstrip. As such, the Project site would not be exposed to excessive noise levels from airport operations; therefore, impacts are considered less than significant and no mitigation is required.

4.12.7 Cumulative Impacts

Less than Significant Impact. The off-site impacts related to noise and vibration are associated with off-site traffic. For the proposed Project, two scenarios for the Year 2040 conditions with the project were analyzed, the first being without the Portola Extension and the second with the Portola Extension.

For the first scenario, the 2040 General Plan With Approved Business Park Land Use Without Portola Extension with Project conditions would range from 65.6 to 78.5 dBA CNEL, and the proposed Project would generate a noise level increase of up to 0.1 dBA CNEL on the study area roadway segments. The Project-related noise level increases are considered less than significant under 2040 General Plan With Approved Business Park Land Use Without Portola Extension with Project conditions at the noise-sensitive land uses adjacent to roadways conveying Project traffic because they would not result in an increase of 3 dBA CNEL when the with Project noise level exceeds the 65 dBA CNEL noise level standard for sensitive land uses. No mitigation is required.

For the second scenario, the 2040 General Plan With Approved Business Park Land Use With Portola Extension with Project conditions would range from 65.6 to 78.5 dBA CNEL, and the proposed Project would generate a noise level increase of up to 0.2 dBA CNEL on the study area roadway segments. The Project-related noise level increases are considered less than significant under 2040 General Plan With Approved Business Park Land Use With Portola Extension with Project conditions at the noise-sensitive land uses adjacent to roadways conveying Project traffic because they would not result in an increase of 3 dBA CNEL when the with Project noise level exceeds the 65 dBA CNEL noise level standard for sensitive land uses. No mitigation is required.

4.12.8 Level of Significance Prior to Mitigation

The following potential noise impacts would be less than significant prior to mitigation: (1) general construction activities; (2) long-term traffic-related noise impacts to off-site uses; (3) long-term off-site stationary source noise impacts from on-site uses; (4) long-term traffic related noise impacts to proposed exterior on-site uses; (5) vibration; and (6) noise associated with aircraft and airport operations. Impacts related to interior noise levels would be potentially significant and mitigation is required.

4.12.9 Regulatory Compliance Measures and Mitigation Measures

4.12.9.1 Regulatory Compliance Measures

RCM NOI-1 **Ventilation Requirements.** Prior to the issuance of building permits, documentation shall be provided to the City of Lake Forest Director of Community Development, or designee, demonstrating that Project buildings meet ventilation standards required by the CBC with the windows closed. It is likely that a form of mechanical ventilation, such as an air-conditioning system, will be required as part of the Project design for all on-site buildings/units.

4.12.9.2 Mitigation Measures

Mitigation Measure 4.12.1 **Final Acoustical Study.** Prior to issuance of any building permits, the Project Applicant/Developer shall submit a final acoustical study, prepared by a qualified acoustical consultant, to the City of Lake Forest. The Director of Community Development of the City of Lake Forest, or designee, shall verify that the final acoustical study demonstrates that all residential units will comply with the City's interior noise standard (45 dBA CNEL). Noise reduction techniques will be incorporated into construction plans in order to reduce interior noise levels. These techniques include, but are not limited to, weather-stripped solid core exterior doors, dual glazed windows with a minimum sound transmission class rating of 27, and/or exterior wall/roof assembles free of cut-outs or openings.

4.12.10 Level of Significance after Mitigation

With implementation of Mitigation Measure 4.12.1, all potential impacts related to noise would be less than significant.

This page intentionally left blank