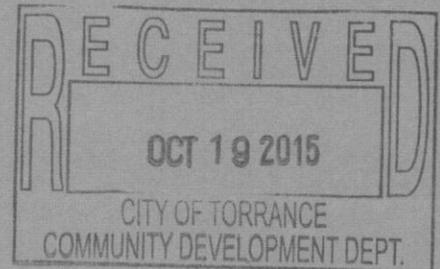


2015

ACOUSTICAL ANALYSIS REPORT

Proposed Mixed Used
Senior Citizen and Commercial

17550 Prairie Avenue
Torrance, CA 90504



Prepared by Cooke and Associates
RCE 77195 Project No. 2015-027
September 19, 2015

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FOREWORD

The purpose of this report is to review the building plans for the proposed development of the subject site into a four (4) story structure with mixed use located at 17600 Prairie Avenue, Torrance, CA 90504 for conformance to Title 24, acoustical requirements, County of Los Angeles Building Code Manual (BCM), Chapter 6 of the City of Torrance Municipal Code and applicable ordinances including City of Torrance General Plan adopted on April 6, 2010.

On Thursday September 3rd, 2015, an on-site noise survey at Prairie Ave. was conducted. The weather was clear (no rain) and wind speed varied but did not exceed 11mph at any time during the survey. Traffic flow was mild-to-clear with no irregularities. Noise meter was placed more than 10 feet away from reflecting surfaces. Microphone placement was free of noise contamination by sources other than those of interest and the placement was representative of the area and conditions of interest.

East to west sound waves were predominantly generated by vehicular traffic traveling south on Entrance Ramp to San Diego Freeway (Fwy 405). Ramp center-line is located approximately 62 feet north-east of property-line. San Diego Freeway center line is approximately 465 feet from proposed nearest building location.

The noise survey resulted in CNEL 69, Maximum Sound Level. Since this exceeded CNEL 60, an interior noise analysis was required. This revealed that any good quality dual-paned windows with DS glass, 7/8-inch thick exterior Stucco, 2x6 inches studs at 16 inches off center, R-13 insulation on all exterior walls would reduce interior noise levels to below CNEL 45. (See specific construction details pgs. 6-7)

Since interior noise levels will be met with door and windows closed, forced ventilation or air conditioning will be required.

This report is based on the related project information received, along with measured noise levels, and represents a true and factual analysis of the acoustical impacts associated with the construction and operation of the proposed project.

EXTERIOR NOISE ENVIRONMENT



Figure 1. Site Location.

1. Aircraft Noise:

The site is not on the low-flight path of vicinity airports. Aircraft noise is not a dominant noise factor due to the altitude observed by airplanes in route to Torrance Municipal Airport located 4.46 miles south of the site and Los Angeles International Airport (LAX) Located 4.91 miles north of the site. (See Appendix - Figure N-8)

Although air traffic volume may increase, elimination of stage 2 aircraft resulted in lower noise levels. The same will happen when present stage 3 aircraft are phased out in favor of stage 4.

NOTE:

Although there are proposals to increase LAX traffic, there are also indications that this may not occur. There is no present data available on this proposed air traffic increase.

2. Vehicle Noise:

East to west sound waves were predominantly generated by vehicular traffic traveling south on Entrance Ramp to San Diego Freeway. Ramp center-line is located approximately 62 feet north-east of property-line. San Diego Freeway center line is approximately 465 feet from proposed nearest building location.

Vehicle noise from the San Diego South Freeway entrance is the dominant noise source. It should be noted that since this can be considered a built out area, this represents both present and future noise levels.

INTERIOR NOISE ENVIRONMENT

1. Interior Noise:

Since the exterior noise environment exceeds 60 dBA, an acoustical analysis is required for interior noise.

Interior noise was computer modeled using the data for exterior CNEL and noise spectrum coupled with published and empirically derived transmission loss (noise barrier properties) for windows, doors, exterior wall assemblies and roof, interior noise spectra were determined. This was modified by the room constant (computer calculated) to determine the interior noise levels in dBA. The resulting CNELs for the site are below the required CNEL 45, as shown below.

NOTE:

- a. In the above calculations, the worst case analysis was made. For completion, the smallest 2nd floor room with largest windows were selected. Units located in closer proximity to predominant noise generators were prioritized. This resulted in the highest interior noise levels, and the highest required STC for windows. Configurations adequate for these rooms will be adequate for less demanding environments.
- b. In this case, any good quality dual-paneled w/DS window or SGD will suffice.
- c. Certain values are from those previously calculated noise levels.

Building Configuration	CNEL		
	Auto	A/C	Total
Exterior	69	64	70
North Wing			
Bedroom	42	36	43
Living/Dining Area	43	38	44
Central Building Area			
Access Hallway north-south	42	36	43
Proposed Dining and Common Area	41	39	43
South Wing			
Lobby	32	39	40
Living/Dining Area	33	41	42

- d. The above values are for present auto traffic with projected increase in 2030 traffic, CNEL's would increase 1 CNEL. Interior noise levels would remain at or below 45 CNEL interior noise limit. Mid-High Density Residential areas in City of Torrance projects Future Noise Conditions to be 60 CNEL. (See Appendix - Figure N-4)
- e.
- f. Instrument Manufacturer: Cirrus Research plc – Acoustic Calibrator – CR:513A and Electro Rent Corporation BK-2250C Handheld Sound Level Analyzer w Logging Software

CONSTRUCTION DETAILS

1. Exterior Walls.

- a. New walls that form the exterior portion of rooms shall be constructed as follows:
 - 1. Studs shall be at least 4 inches in nominal depth.
 - 2. Exterior finish shall be stucco, minimum 7/8-inch thickness, brick veneer, masonry, or any siding material allowed by local code. Wood or metal siding shall be installed over 1/2-inch solid sheathing.
 - 3. Wall insulation shall be at least R-13 glass fiber or mineral wool or equal and shall be installed continuously throughout the stud space.
 - 4. Interior wall finish shall be at least 5/8-inch thick gypsum wallboard or plaster.

2. Exterior Windows.

- a. Openable Windows. All openable Windows in the exterior walls of rooms shall have a laboratory Sound Transmission Class (STC) rating of at least 35 dB and shall have air infiltration rate of no more than 0.5 cubic feet per minute when tested according to ASTM E-283.
- b. Fixed Windows. All fixed windows in the exterior walls of habitable rooms shall be at least 1/4-inch thick and shall be set in non-hardening glazing materials.
- c. The total area of glazing in rooms used for sleeping shall not exceed 20 percent of the floor area.

3. Exterior Doors.

- a. Exterior hinged doors to rooms that are exposed to Freeway Traffic noise shall be a door and edge seal assembly that has a laboratory STC rating of at least 35 dB.
- b. Access doors from a garage to a room within a dwelling shall have a laboratory STC rating of at least 30 dB.

4. Roof/Ceiling Construction.

- a. Roof rafters shall be covered on their top surface with 1/2-inch solid sheathing and any roof covering allowed by Title 26, the Building Code.
- b. An accessible attic space shall be provided above rooms on the uppermost level of Group R buildings.
- c. Attic insulation shall be batt or blown-in glass fiber or mineral wool with a minimum R-30 rating applied between the ceiling joists.
- d. Attic ventilation shall be:
 - 1. Gable vents or vents that penetrate the roof surface that are fitted with transfer ducts at least 6 feet in length that are insulating flexible ducting or metal ducts containing internal 1-inch thick coated fiberglass sound absorbing duct liner. Each duct shall have a lined 90-degree bend in the duct so that there is no direct line-of-sight from the exterior through the duct into the attic, or
 - 2. Noise control louver vents, or
 - 3. Eave vents that are located under the eave overhang.
- e. Ceilings shall be finished with gypsum board or plaster that is at least 5/8-inch thick.

5. Floors.

The floor of the lowest habitable rooms shall be concrete slab on grade.

6. 6. Ventilation.

- a. A ventilation system shall be provided that will provide at least the minimum air circulation and fresh air supply requirements of Title 26, the Building Code, in each room without opening any windows, door or other opening to the exterior. Unless otherwise prohibited, all concealed duct work shall be insulated flexible glass fiber ducting that is at least 10 feet long between any two points of connection.
- b. Kitchen cooktop vent hoods shall be the non-ducted recirculating type with no ducted connection to the exterior.

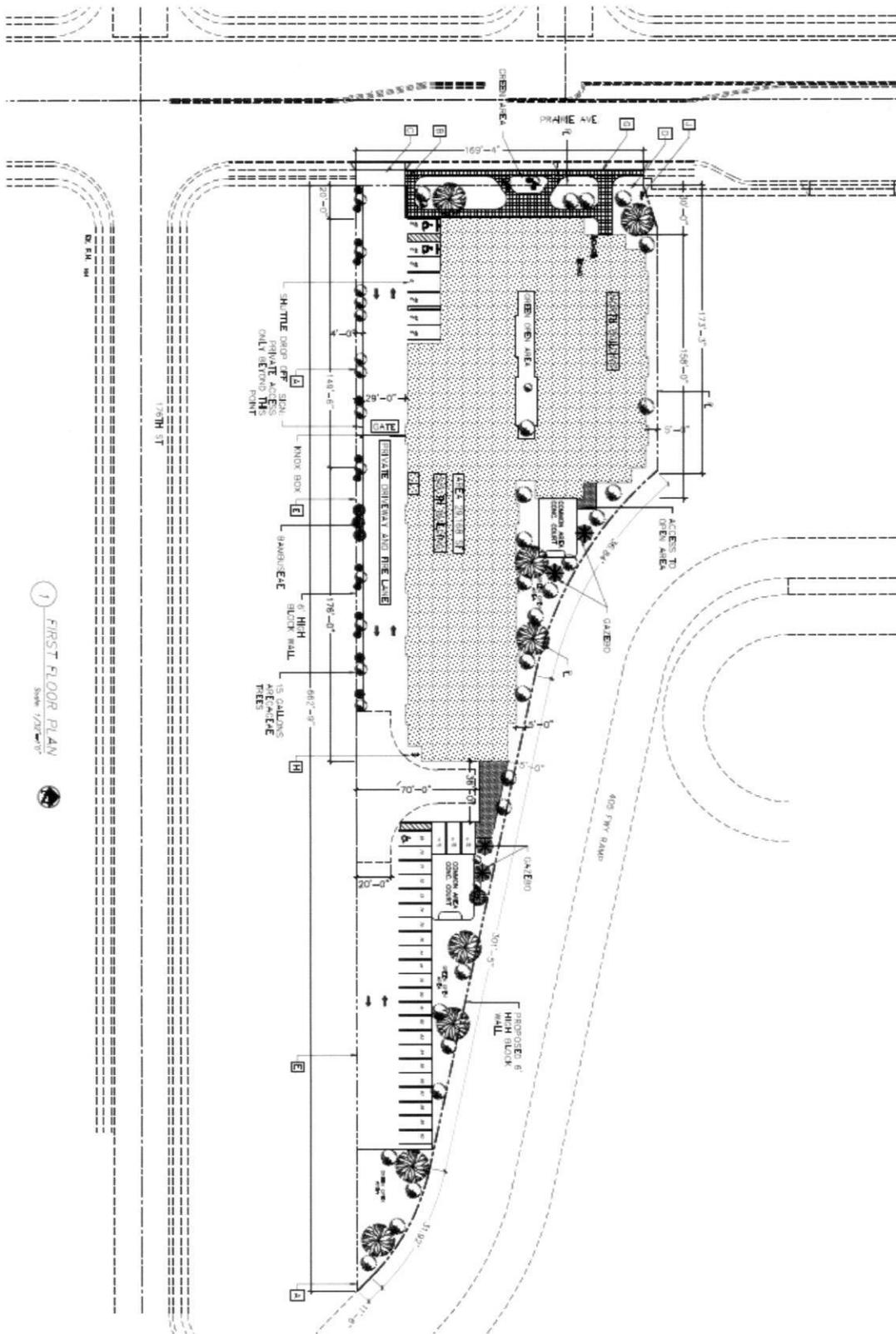
7. Fireplaces.

N/A

8. Wall and Ceiling Openings.

Openings in the shell of the residence that degrade its ability to achieve an interior CNEL rating of 45 dB or less when all doors and windows are closed are prohibited. Any access panels, pet doors, mail delivery drops, air conditioning, or other openings must be designed to maintain the 45 dB CNEL or less standard in the room to which they provide access.

SITE PLAN



1 FIRST FLOOR PLAN
Scale: 1/8" = 1'-0"

Vibration

Los Angeles County Municipal Code 12.08.560 Vibration.

Operating or permitting the operation of any device that creates vibration which is above the vibration perception threshold of any individual at or beyond the property boundary of the source if on private property, or at 150 feet (46 meters) from the source if on a public space or public right-of-way is prohibited. The perception threshold shall be a motion velocity of 0.01 inches per second over the range of 1 to 100 Hz.(Ord. 11778 § 2 (Art. 5 § 501(d)), 1978: Ord. 11773 § 2 (Art. 5 § 501(d)), 1978.)

County of Los Angeles Noise Element

Per the Noise Element of the County General Plan, noise levels up to 60 CNEL are considered "normally acceptable" for low-density residential development . Community Noise Exposure Level of 60 is conditionally accepted for General Commercial, land use category properties according to City of Torrance General Plan.

A. Unless otherwise herein provided, the following exterior noise levels shall apply to all receptor properties within a designated noise zone:

OPERATIONAL EXTERIOR NOISE STANDARDS			
Noise Zone	Designated Noise Zone Land Use (Receptor Property)	Time Interval	Exterior Noise Level (dB)
I	Noise-sensitive area	Anytime	45
II	Residential properties	10:00 p.m. to 7:00 a.m. (nighttime)	45
		7:00 a.m. to 10:00 p.m. (daytime)	50
III	Commercial properties	10:00 p.m. to 7:00 a.m. (nighttime)	55
		7:00 a.m. to 10:00 p.m. (daytime)	60
IV	Industrial properties	Anytime	70

¹ For the purposes of this report's analysis, the noise level limits presented in this table are considered to be expressed in dBA instead of dB, per the measurement methodologies expressed in Section 12.08.370 of the County Ordinance.

B. Unless otherwise herein provided, no person shall operate or cause to be operated, any source of sound at any location within the unincorporated county, or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person which causes the noise level, when measured on any other property either incorporated or unincorporated, to exceed any of the following exterior noise standards:

Standard No. 1 shall be the exterior noise level which may not be exceeded for a cumulative period of more than 30 minutes in any hour. Standard No. 1 shall be the applicable noise level from subsection A of this section; or, if the ambient L50 exceeds the foregoing level, then the ambient L50 becomes the exterior noise level for Standard No. 1.

Standard No. 2 shall be the exterior noise level which may not be exceeded for a cumulative period of more than 15 minutes in any hour. Standard No. 2 shall be the applicable noise level from subsection A of this section plus 5 dB; or, if the ambient L25 exceeds the foregoing level, then the ambient L25 becomes the exterior noise level for Standard No. 2.

Standard No. 3 shall be the exterior noise level which may not be exceeded for a cumulative period of more than five minutes in any hour. Standard No. 3 shall be the applicable noise level from subsection A of this section plus 20 dB; or, if the ambient L8.3 exceeds the foregoing level, then the ambient L8.3 becomes exterior noise level for Standard No. 3.

Standard No. 4 shall be the exterior noise level which may not be exceeded for a cumulative period of more than one minute in any hour. Standard No. 4 shall be the applicable noise level from subsection A of this section plus 15 dB; or, if the ambient L1.7 exceeds the foregoing level, then the ambient L1.7 becomes the exterior noise level for Standard No. 4.

Standard No. 5 shall be the exterior noise level which may not be exceeded for any period of time. Standard No. 5 shall be the applicable noise level from subsection A of this section plus 20 dB; or, if the ambient L0 exceeds the foregoing level then the ambient L0 becomes the exterior noise level for Standard No. 5.

(Ord. 11778 § 2 (Art. 4 § 403), 1978; Ord. 11773 § 2 (Art. 4 § 403), 1978.)
CALIFORNIA ENVIRONMENTAL QUALITY ACT SIGNIFICANCE THRESHOLDS

Construction Noise Significance Threshold

The Los Angeles County Code of Ordinances limits short-term, mobile operating equipment to 75 dBA at single-family residential structures between the hours of 7:00 a.m. and 8:00 p.m. on all days except Sunday and legal holidays. It is assumed that construction of the proposed project would be limited to these timeframes; therefore, the significance criteria used in the construction noise impact analysis is 75 dBA. Between 8:00 p.m. and 7:00 a.m., on Sundays, and on legal holidays, the maximum noise level allowed at single-family residential structures is limited to 60 dBA. If project-related construction activities were to occur during these times, significant construction noise-related impacts would occur.

Construction Vibration Significance Threshold

Per the Los Angeles County Code of Ordinances, construction vibration would be considered a significant impact if a motion velocity of 0.01 inches per second over the range of 1 to 100 Hz occurs at any individual at or beyond the property boundary of the source if on private property, or at 150 feet from the source if on a public space or public right-of-way.

Operation Noise Significance Threshold

Operational noise impacts would be considered significant if noise levels exceed those established in the Los Angeles County Code of Ordinances. The most restrictive noise level that would be associated with this project is the nighttime residential property-line threshold of significance of 45 dBA.

For transportation-related noise, a significant impact would occur if the proposed project results

in a 3 CNEL or greater increase in traffic noise on a roadway segment and the resultant noise levels exceeds 60 CNEL for residential uses.

Operation Vibration Significance Threshold

Per the Los Angeles County Code of Ordinances, operational vibration would be considered a significant impact if a motion velocity of 0.01 inches per second over the range of 1 to 100 Hz occurs at any individual at or beyond the property boundary of the source if on private property, or at 150 feet from the source if on a public space or public right-of-way.

CONSTRUCTION IMPACT

Construction Activities

This acoustical analysis assumes that construction activities would not occur between the hours of 8:00 p.m. and 7:00 a.m., on Sundays, or on legal holidays, as defined by the Los Angeles County Code of Ordinance. City of Torrance Municipal Code and regulations shall be observed at all time.

The noise source data for the equipment used in this analysis is shown in Table 1, Construction Noise Source Data, below.

Table 1 CONSTRUCTION NOISE SOURCE DATA										
Equipment	Noise Levels in dB ¹ Measured at Octave Frequencies in Hz									Overall Noise Level (dBA)
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1,000 Hz	2,000 Hz	4,000 Hz	8,000 Hz	
Excavator ²	117	122	115	114	114	110	118	105	100	116
Dozer as a Line Source	-	99.3	98.4	107.9	110.3	112.5	119.7	103.5	95.4	121.2

Table 1

¹ Based on Sound Power Levels (S_{wl}).

² An excavator does not work continuously at full power; the listed value is the noise source for an hourly average assuming full power for 40 percent of the time.

Construction Traffic

The proposed project would generate minimal traffic during construction. No soil export material would be transported off-site via trucks. Material transport trucks would temporarily elevate noise levels along the transport route during construction; however, the increase in truck noise would not affect noise-sensitive land uses, since the entirety of this route is located within

immediate access to main collectors and freeways. In addition, these truck trips would be infrequent, and occur intermittently during the 4 to 6-month construction period.

Construction Vibration Impacts

The vibration perception threshold is a motion velocity of 0.01 inches per second over the range of 1 to 100 Hz. Dozers and well-boring machines associated with project construction have the potential to create vibration impacts. A dozer could create significant vibration impacts at a distance of 50 feet. Test-boring activities would result in an increase in vibration close to the bore head; however, these operations typically occur far underground and rarely create perceptible vibration at the surface. As well boring rarely creates perceptible vibration at the surface, vibration impacts from boring would not be a factor due to the nature of the subject project located on a second floor of the existing structure.

MITIGATION

Project mitigation measures required to reduce noise impacts during construction and operation are outlined below.

The project's construction noise would have to be mitigated to reduce the property-line impacts from the hotel construction activities to below the 75-dBA threshold of significance. The following mitigation measure would reduce construction noise impacts to less than significant levels:

MM1 The contractor shall comply with Section 12.08.440 of the Los Angeles County Municipal Code related to construction noise. Specifically, the contractor shall conduct construction activities in such a manner that the maximum noise levels at residential structures shall not exceed 75 dBA. This condition could be achieved by limiting the types of equipment used near residences, erecting temporary noise barriers, and/or by other methods chosen by the contractor.

Significance After Mitigation: With the incorporation of the above mitigation measures, potential impacts related to construction and excavation activities would be reduced below a level of significance.

Operational Noise Mitigation

Operational noise levels associated with motors and large compressors would need to be mitigated to reduce the property-line impacts to below the 45-dBA threshold of significance. This shall be accomplished by the following mitigation measure:

MM2 The contractor shall install a closed-sided, open-topped, open-bottomed barrier (similar to a bathroom stall) at each location. The barriers shall be no further than 3 feet from the compressor surfaces and extend 2 feet above the top of the compressor and 2 feet below the base of mount. A door may be installed to allow access to the pump itself, as long as it meets the same design specifications as the barriers themselves.

The barrier walls shall meet the following specifications:

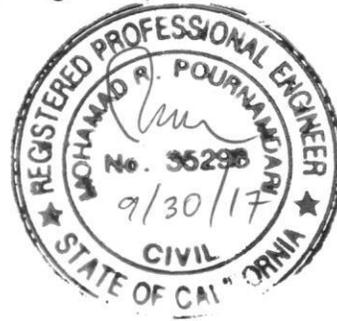
The sound attenuation barrier shall be steel with no cracks or gaps through the wall. Any seams or cracks must be filled or caulked. Sheet metal of 18-gauge (minimum) may be

used, if it meets the other criteria and is properly supported and stiffened so that it does not rattle or create noise itself from vibration or wind. Any door(s) or gate(s) must be designed with overlapping closures on the bottom and sides and meet the minimum specifications of the metal described above. The door(s) may be constructed from solid-sheet metal of at least 18-gauge metal, or an exterior-grade solid-core steel door with prefabricated door jambs.

The engineered noise barriers shall be built with interior noise-absorptive paneling with a minimum Noise Reduction Coefficient (NRC) rating of 0.8.

Operational noise impacts associated with construction would be below the most restrictive night-time residential property-line threshold of significance (45 dBA). Therefore, with the incorporation of the noise barrier described above, mitigated operational noise impacts would be reduced to less than significant.

Conway Cooke, P.E.
Cooke and Associates
Project No.: 2015-027



APPENDIX

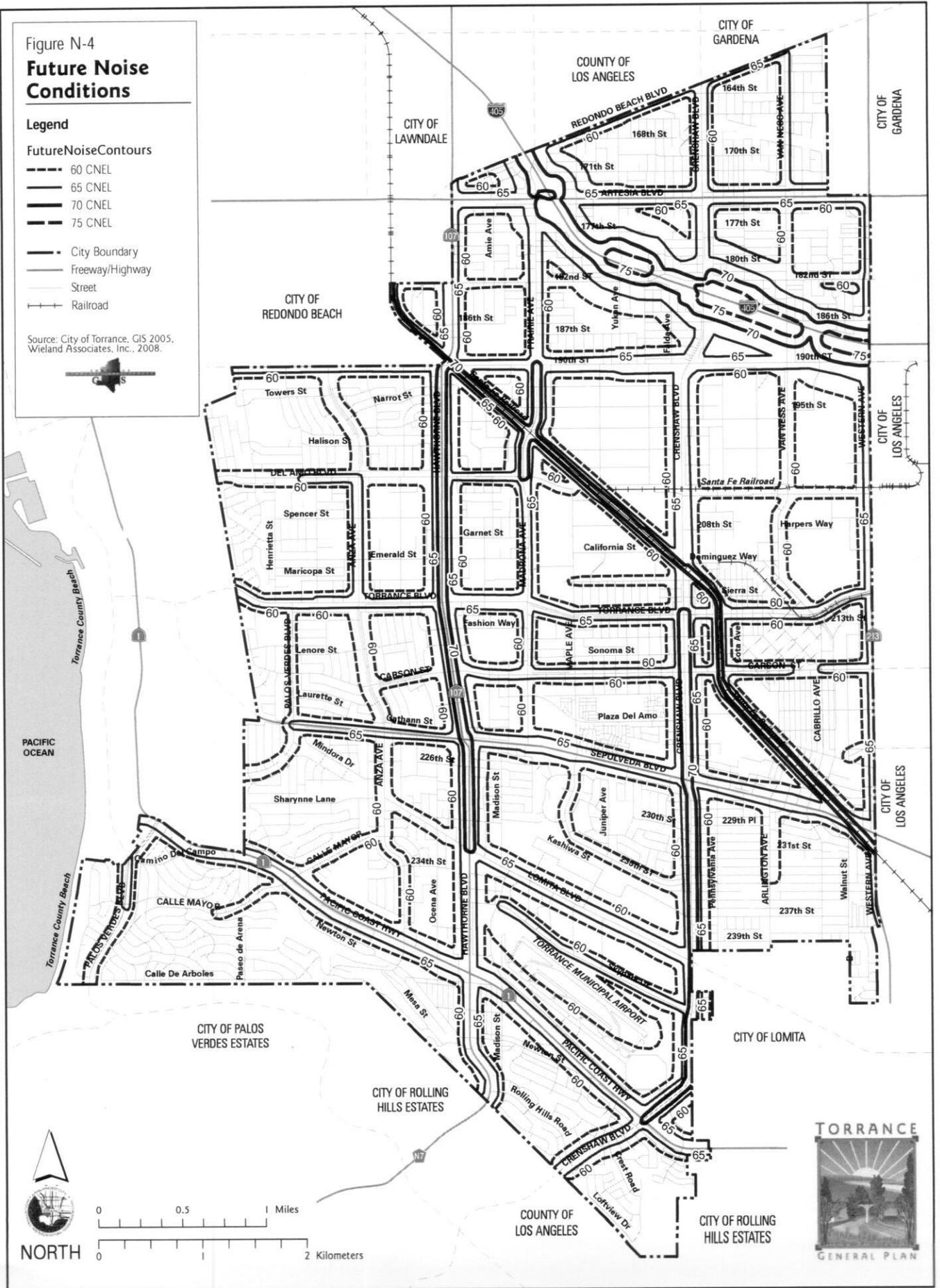
Figure N-4
Future Noise Conditions

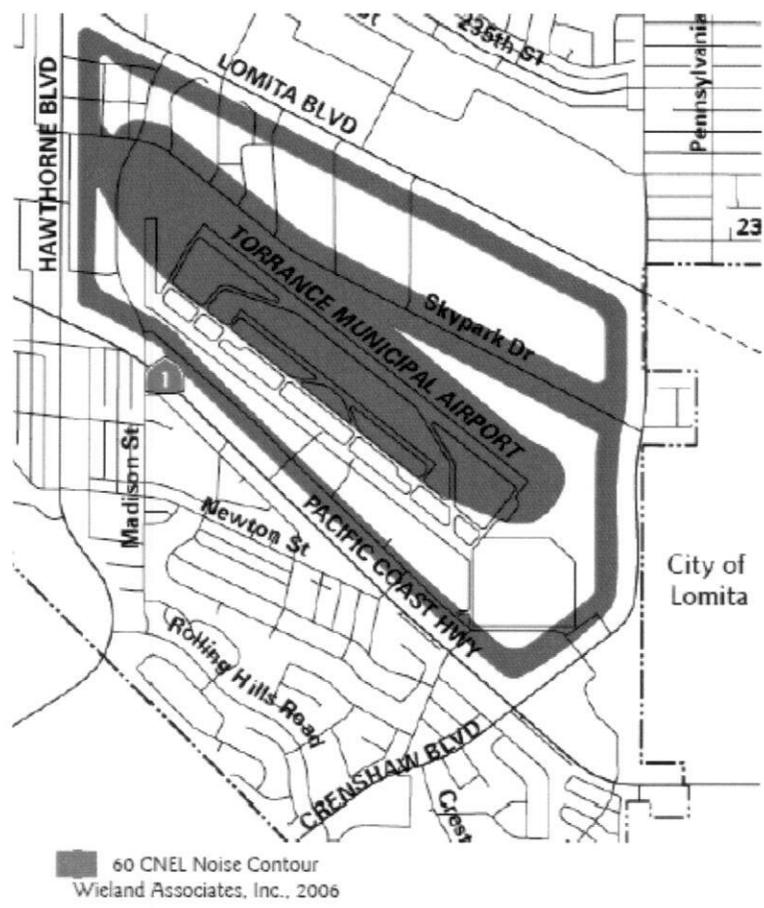
Legend

Future Noise Contours

- 60 CNEL
- - - 65 CNEL
- 70 CNEL
- 75 CNEL
- City Boundary
- Freeway/Highway
- Street
- Railroad

Source: City of Torrance, GIS 2005.
 Wieland Associates, Inc., 2008.





**Figure N-3:
Noise Conditions, Torrance Airport**