NOISE ELEMENT

2. Noise Element

Introduction

Overview

A noise element is related to land use and housing elements in that its key objective is to provide noise exposure information for use in land use planning. When integrated with a land use element, a noise element will show acceptable land uses in relation to existing and projected noise contours. Since residential land uses are the most noise sensitive, the noise exposure information should be considered when planning new housing.

The key feature of a noise element is the quantification of the community noise environment in terms of noise exposure contours of both existing and future transportation activities. The contours serve as guidelines to achieve noise compatible land uses to minimize the exposure of community residents to excessive noise and to provide baseline noise levels.

Authority

A noise element as well as other general plan policies and implementing ordinances (zoning codes, noise ordinances, etc.) are effective tools in noise reduction and mitigation. Section 65302(g) of the California Government Code requires that each city have a noise element as part of the General Plan. The Lawndale Noise Element follows the guidelines adopted by the Office of Noise Control, pursuant to Section 46050.1 of the Health and Safety Code.

State guidelines are very specific about the content of a General Plan noise element. The Government Code (Section 65302(F)) states that the noise element should be prepared according to guidelines established by the Department of Health Services. At a *minimum*, the Government Code requires the element to analyze noise levels for the following:

- Highways and Freeways;
- Primary arterial and major local streets;
- Passenger and freight railroad operations and ground rapid transit systems;
- Commercial, general aviation, heliport, helistop, and military airport operations, aircraft overflights, jet engine test stands, and all other ground facilities and maintenance functions related to airport operation;
- Local industrial plants, including but not limited to railroad classification yards; and

- Other ground sources identified by the local agencies as contributing to the community noise environment.

Organization

This Noise Element is organized into the major categories of Introduction, Assessment, and Goals and Policies. The assessment begins with an overview of noise, followed by a general discussion of related plans and programs. The assessment concludes with an analysis of noise in the City of Lawndale and identifies major existing and buildout year (2010) noise sources. The final section of the Noise Element deals with goals and policies designed to provide an environment free from excessive or harmful noise.

Assessment

One of the most prominent consequences of the increasing complexity of urban and suburban living is our increased exposure to noise. Aircraft, automobiles, trucks, railroads, construction equipment, factories and even home appliances contribute to the noise environment of modern life. Generally, motor vehicles are the most pervasive contributors to urban noise. Consequently, the expanding developments in cities produce a corresponding increase in traffic, which in turn leads to increased noise levels. Other major noise sources common in the urban and suburban environment are power gardening equipment, amplified music, power tools and air-conditioners. Table 1 is a summary of noise sources considered as noisy by a survey of 1200 people. Table 2 identifies familiar noise sources and their approximate noise level (in decibels).

For most people, the usual consequences of noise are associated with speech interference, distractions at home and at work, disturbance with rest and sleep, and the disruption of recreational pursuits. The long term effects of noise are physical as well as psychological. Physical effects may include headaches, nausea, irritability, high blood pressure, changes in the heart and respiratory rate and increased muscle tension. Prolonged exposure to high noise levels may result in hearing damage. Psychological effects may result from the stress and irritability associated with a change in sleeping pattern due to noise. In addition, noise may adversely affect property values or job performance and can sometimes lead to accidents and injuries. Table 3 is a summary of sound levels identified by the Environmental Protection Agency as requisite to protect the public health and welfare with a margin of safety.

Noise is generally defined as unwanted or annoying sound, and may be considered as having an adverse effect on the environment. The State of California recognizes the relationship between noise and noise sensitive land uses, and emphasizes the need to control noise through land use regulation.

Airborne sound is a rapid small scale fluctuation of the instantaneous air pressure above and below the local barometric pressure. Sound levels are usually measured and expressed in decibels (dB). Most sounds that we hear in the environment do not consist of a single frequency, but rather a mixture of frequencies, with each frequency differing in sound level. The intensities of each frequency add to generate sound. The method commonly used to quantify environmental sounds consists of evaluating all the frequencies of a sound according to a weighting system that reflects the fact that human hearing is less sensitive at low frequenci and at extremely high frequencies than at the mid-range frequencies. This is calle

Source	Percentage
Motor Vehicle	55
Aircraft	15
Voices	12
Radio and TV Sets	2
Home Maintenance Equipment	2
Construction	1
Industrial	1
Other Noises	6
Not Ascertained	8

Source: Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, U.S. Environmental Protection Agency, March 1974.

Percent Contribution of Each Source Identified by Respondents Classifying Their Neighborhood as Noisy (72% of 1200 Respondents) Table 1

Noise Source (at a Given Distance)	Scale of A-Weighted Sound Level in Decibels	Noise Environment	Human Judgement of Noise Loudness (Relative to a Reference Loudness of 70 Decibels*)
	140		
Military Jet Take-off with After-burner (50 ft) Civil Defense Siren (100 ft)	130	Carrier Flight Deck	
Commercial Jet Take-off (200 ft)	120		Threshold of Pain *32 times as loud
Pile Driver (50 ft)	110	Rock Music Concert	*16 times as loud
Ambulance Siren (100 ft) Newspaper Press (5 ft) Power Lawn Mower (3 ft)	100		Very Loud *8 times as loud
Motorcycle (25 ft) Propeller Plane Flyover (1000 ft) Diesel Truck, 40 mph (50 ft)	90	Boiler Room Printing Press Plant	*4 times as loud
Garbage Disposal (3 ft)	80	High Urban Ambient Sound	*2 times as loud
Passenger Car, 65 mph (25 ft) Living Room Stereo (15 ft) Vacuum Cleaner (3 ft) Electronic Typewriter (10 ft)	70		Moderately Loud *70 dB (Reference Loudness)
Normal Conversation (5 ft) Air Conditioning Unit (100 ft)	60	Data Processing Center Department Store	*1/2 as loud
Light Traffic (100 ft)	50	Private Business Office	*1/4 as loud
Bird Calls (distant)	40	Lower Limit of Urban Ambient Sound	Quiet *1/8 as loud
Soft Whisper (5 ft)	30	Quiet Bedroom	
	20	Recording Studio	Just Audible
	10		Threshold of Hearing
	0		

Sound Levels of Typical Noise Sources and Noise Environments (A-Weighted Sound Levels)

Table 2

Table 3

Yearly Average* Equivalent Sound Levels Identified as Requisite to Protect the Public Health and Welfare With an Adequate Margin of Safety

	Measure	Indoor			Outdoor		
		Activity Interference	Hearing Loss Consideration	To Protect Against Both Effects(b)	Activity Interference	Hearing Loss Consideration	To Protect Against Both Effects(b)
Residential with Outside Space and Farm Residences	L_{dn}	45		45	55		55
	$L_{eq}(24)$		70			70	
Residential with No Outside Space	L_{dn}	45		45			
	$L_{eq}(24)$		70				
Commercial	$L_{eq}(24)$	(a)	70	70(c)	(a)	70	70(c)
Inside Transportation	$L_{eq}(24)$	(a)	70	(a)			
Industrial	$L_{eq}(24)$(d)	(a)	70	70(c)	(a)	70	70(c)
Hospitals	L_{dn}	45		45	55		55
	$L_{eq}(24)$		70			70	
Educational	$L_{eq}(24)$	45		45	55		55
	$L_{eq}(24)$(d)		70			70	
Recreational Areas	$L_{eq}(24)$	(a)	70	70(c)	(a)	70	70(c)
Farm Land and General Unpopulated Land	$L_{eq}(24)$				(a)	70	70(c)

Table 3 (cont.)

Yearly Average* Equivalent Sound Levels Identified as Requisite to Protect the Public Health and Welfare With an Adequate Margin of Safety

Code:

a Since different types of activities appear to be associated with different levels, identification of a maximum level for activity interference may be difficult except in those circumstances where speech communication is a critical activity.

b Based on lowest level.

c Based only on hearing lost.

d An Leq(8) of 75 dB may be identified in these situations so long as the exposure over the remaining 16 hours per day is low enough to result in a negligible contribution to the 24-hour average, i.e., no greater than an Leq of 60 db.

Note: Explanation of identified level for hearing loss: the exposure period which results in hearing loss at the identified level is a period of 40 years.

*Refers to energy rather than arithmetic averages.

Source: Information levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, U.S. Environmental Protection Agency, March 1974.

"A" weighting, and the decibel level measured is called the A-weighted sound level and is denoted dB(A).

Although the A-weighted sound level may adequately show the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a conglomeration of noise from distant sources that create a relatively steady background noise in which no particular source is identifiable. Noise measurement metrics such as Day-Night Average Sound Level (Ldn) and Equivalent Sound Level (Leq) have been developed to quantify sound over time and are widely accepted. Definitions of terms commonly used in environmental acoustics are defined in the Definitions section.

Related Plans and Programs

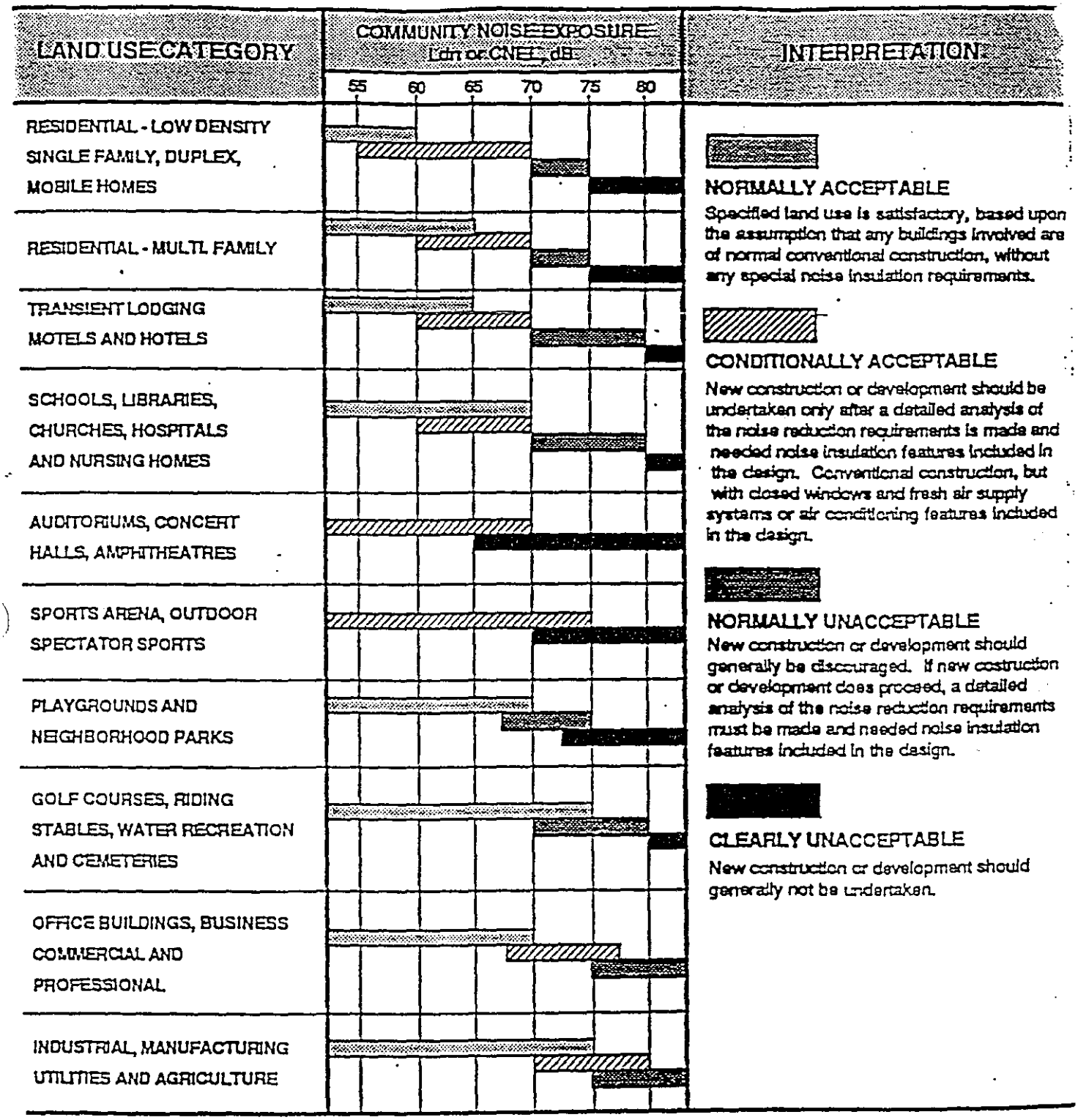
The Noise Control Act of 1972 (PL 92-574) established a national policy "to promote an environment for all Americans free from Noise that jeopardizes their public health and welfare." The Act provides for a division of powers between the Federal, state and local governments, in which the primary Federal responsibility is for noise source emission control, with the states and other agencies retaining the rights to control noise sources and the level of noise within their communities and jurisdiction. The Noise Control Act was supplemented by the Quiet Communities Act of 1978 (PL 95-609).

As a result of the Federal-Aid Highway Act of 1970, the Federal Highway Administration (FHWA) is concerned with traffic and construction noise associated with Federal-Aid Highways. In general, the noise policy is applicable to new highways, but the FHWA is also concerned with noise associated with changes to the horizontal or vertical alignment of existing highways. The principle mitigation measure has been placement of barriers at noise sensitive locations. In the State of California, the California Department of Transportation (Caltrans) has implemented a retrofit program to place noise barriers adjacent to noise sensitive locations along interstate highways.

A number of federal and state agencies have prepared guidelines that identify standards and regulations concerning noise compatibility in the work place and in residences. The California Department of Health Services Office of Noise Control and the U.S. Department of Housing and Urban Development have identified standards and regulations concerning noise mitigation and land use compatibility. The former published the Guidelines that are the basis for the preparation of this Element. Figure A summarizes the land use compatibility standards adopted by the Office of Noise Control.

California Administrative Code, Title 24, Section 3501, Sound Transmission Control, identifies minimum noise insulation performance standards to protect persons within new hotels, motels, dormitories, long-term care facilities, apartment houses, and dwellings other than detached single family dwellings from the effects of excessive noise. The Code requires that residential new structures located where the CNEL or Ldn exceeds 60 dB(A) must have an acoustical analysis performed to ensure that the proposed design will limit the interior noise level to 45 dB(A) or below in any habitable room.

The objective of noise and land use compatibility guidelines are to provide an acceptable community noise environment and to minimize noise related complaints. Figure A is an example of noise compatibility guidelines developed by the State of



Source: California Department of Health Services Noise Element Guidelines, 1987.

Land Use Compatibility for Community Noise Environments

Figure A

California Office of Noise Control which the City of Lawndale may consider adopting to evaluate the compatibility between land uses and future noise levels. The compatibility guidelines are used in conjunction with the future noise exposure contours to identify projects or activities which may require special treatment to minimize noise exposure. The recommended noise metric to be used is the Community Noise Equivalent Level (CNEL). CNEL is the noise metric currently specified in the State Aeronautics Code for evaluation of noise impacts in aircraft operations. Additionally, CNEL is specified in the State Sound Transmission Control Standards for new multifamily residential structures as well as in the State Guidelines for the preparation and content of Noise Elements. According to the guidelines, a land use or proposed project in the "Normally Acceptable" category will be considered compatible with the noise levels indicated in Figure A without special noise abatement measures. A land use or proposed project in an area that is "Conditionally Acceptable" should only be allowed following an acoustical study which recommends site-specific noise attenuation measures that can effectively reduce interior and exterior noise exposure to acceptable levels.

Highways and Vehicular Traffic

The major source of noise in the City of Lawndale is vehicular traffic, which includes automobiles, trucks, buses and motorcycles. The level of vehicular traffic noise varies with the volume of traffic, the percent of trucks, the speed of traffic, and the distance from the centerline of the roadway. Noise generated by vehicular traffic is greatest along I-405, Hawthorne Boulevard, Inglewood Avenue, Prairie Avenue, Rosecrans Avenue, Marine Avenue, Manhattan Beach Boulevard, 166th Street, Redondo Beach Boulevard and Artesia Boulevard. Noise-sensitive land uses such as residences, hotels and motels, and schools are mostly affected. Vehicular traffic noise will also dominate the noise environment in the year 2010.

Modeling

The Federal Highway Administration's Stamina 2.0 Traffic Noise Prediction Model was used to calculate noise levels along all roadways determined to have an Average Daily Traffic Volume (ADT) of greater than 2000 vehicles. Roadways with less than 2000 ADT generally do not generate noise at levels to be considered significant. The model input included traffic volume, vehicle mix (percent cars, medium trucks, and heavy trucks) and average vehicle speed. The model assumed "hard site" conditions that allows for a propagation loss of 3 dB(A) per doubling of distance. The model did not account for the effects of grade, stop and go conditions or the noise mitigation effects of intervening topography or barriers such as walls or buildings. The results are consider a worst case condition.

Tables 4 and 5 depict the existing and future (year 2010) roadway noise levels within the City of Lawndale. The tables identify the approximate distance in feet from the roadway centerline to the 60, 65, 70 and 75 CNEL contour. Figures B and C illustrate the approximate location of the contours. The contour lines show the unmitigated cumulative effect of all roadways. All of the modeled roadway segments generate a CNEL greater than 60 dB(A).

The accuracy of noise exposure predictions is generally no better than ± 3 dB(A). In the near vicinity of the source the accuracy may be within ± 1 dB(A), but, as the distance from the source increases the accuracy may fall to ± 5 dB(A). In addition situations outside of normal conditions may go counter to the contour lines. For example, a building located adjacent to an elevated freeway may have higher noise levels at the upper floors than at ground level. Also, a row of houses can generally have a sound attenuation of as much as three to five decibels according to sound penetration studies. Walls or dense vegetation can further reduce noise levels.

Street Segment	Class*	ADT	Distances in Feet 75 dBA	70 dBA	65 dBA	60 dBA
Hawthorne Boulevard						
Rosecrans Ave.–147th St.	6M	49,000	–i	85	225	542
147th St.–Marine Avenue	6M	46,200	–	80	217	525
Marine Avenue–154th St.	6M	41,800	–	74	200	492
154th St.–Manhattan Beach Blvd.	6M	48,200	–	83	225	542
Manhattan Beach Blvd–I-405	6M	52,400	–	89	240	567
I-405–166th St.	8M	58,500	–	100	280	617
166th St.–170th St.	6M	57,400	–	96	258	600
170th St.–Redondo Beach Blvd	6M	55,000	–	93	250	590
Inglewood Avenue						
Rosecrans Ave–Marine Avenue	4M	25,900	–	–	156	344
Marine Avenue–I-405	4M	38,000	–	64	182	457
I-405–Manhattan Beach Blvd	4M	50,200	–	83	230	550
Manhattan Beach Blvd–162nd St	4M	40,400	–	68	192	475
162nd St.–Artesia Blvd	4M	35,100	–	60	169	429
Prairie Avenue						
Rosecrans Ave–Marine Avenue	4M	36,500	–	62	175	443
Marine Avenue–154th St	4M	31,200	–	53	153	394
154th St–Manhattan Beach Blvd	4M	35,400	–	60	171	436
Manhattan Beach Blvd–161st St	4M	31,400	–	53	157	394
161st St–166th St	4M	34,500	–	58	168	421
166th St–Redondo Beach Blvd	4M	35,200	–	59	169	429
Rosecrans Boulevard						
Inglewood Avenue–Firmona Avenue	6M	41,300	–	73	196	483
Firmona Avenue–Hawthorne Blvd	6M	40,100	–	72	193	475
Hawthorne Blvd–Prairie Avenue	6M	41,600	–	74	200	492
Marine Avenue						
I-405–Inglewood Avenue	4S	30,000	–	50	147	381
Inglewood Avenue–Hawthorne Blvd	4S	21,700	–	–	109	295
Hawthorne Blvd–Freeman Avenue	4S	22,600	–	–	114	306
Freeman Avenue–Prairie Avenue	4S	23,400	–	–	118	317
Manhattan Beach Boulevard						
Inglewood–I-405	4M	28,900	–	–	143	371
I-405–Hawthorne Blvd	4M	28,600	–	–	142	369
Hawthorne Blvd–Prairie Avenue	4M	22,500	–	–	114	306
166th Street						
West of Hawthorne Blvd	2LC	4,500	–	–	–	74
Hawthorne Blvd–Freeman Avenue	2C	3,200	–	–	–	51
Freeman–Prairie Avenue	2C	2,500	–	–	–	<50
Redondo Beach Boulevard						
Hawthorne Blvd–I-405	4M	25,100	–	–	125	333
I-405–Prairie Avenue	4M	23,000	–	–	116	311
Artesia Boulevard						
Inglewood Avenue–Firmona St	4M	46,600	–	77	217	525
Firmona–Redondo Beach Blvd	4M	48,300	–	79	225	542
I-405						
Redondo Beach Blvd–Hawthorne Blvd	8F	206,000	315	760	1600	–
Hawthorne Blvd–Inglewood Avenue	8F	221,000	363	790	1630	–

* Number = Number of lanes, M = Major, S = Secondary, C = Collector, LC = Local Collector. F = Freeway, I = 405

Note: The contours do not reflect the attaining affects of topography or barriers such as walls and buildings. The sound level assumes a direct line-of-sight from the noise source to the receiver.

Lawndale Peak Period
Distance to Existing Noise Contours

Table 4

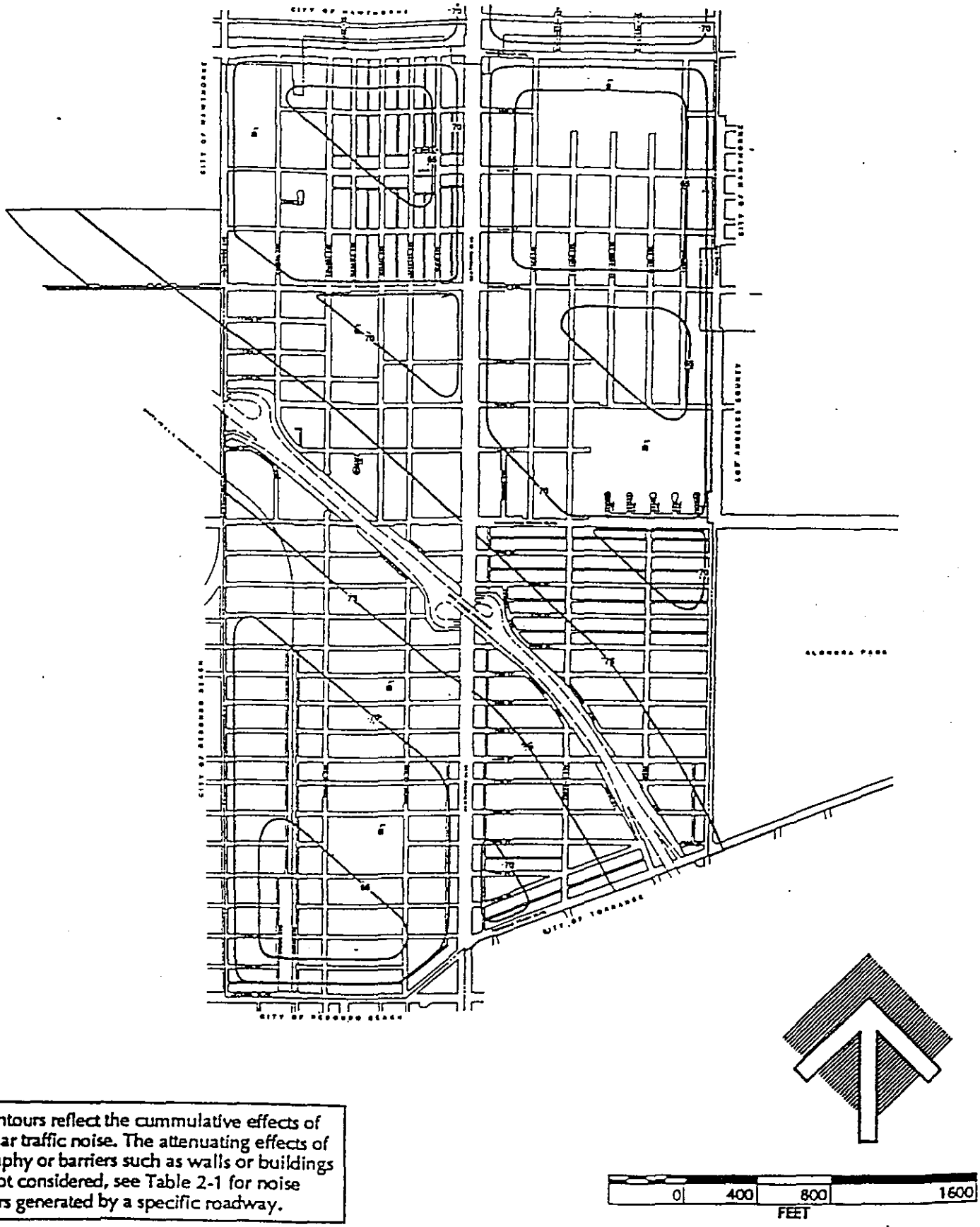
Street Segment	Class*	ADT	Distances in Feet 75 dBA	70 dBA	65 dBA	60 dBA
Hawthorne Boulevard						
Rosecrans Ave.–147th St.	6M	61255	53	109	276	637
147th St.–Marine Avenue	6M	57755	52	104	266	612
Marine Avenue–154th St.	6M	52254	–	97	245	575
154th St.–Manhattan Beach Blvd.	6M	60255	52	108	275	635
Manhattan Beach Blvd–I-405	6M	65505	55	114	290	660
I-405–166th St.	8M	73131	57	125	315	713
166th St.–170th St.	6M	71756	56	123	312	700
170th St.–Redondo Beach Blvd	6M	68756	55	118	300	683
Inglewood Avenue						
Rosecrans Ave–Marine Avenue	4M	32010	–	55	170	450
Marine Avenue–I-405	4M	46965	–	78	220	750
I-405–Manhattan Beach Blvd	4M	62043	–	100	275	637
Manhattan Beach Blvd–162nd St	4M	49931	–	82	230	550
162nd St.–Artesia Blvd	4M	43381	–	72	205	500
Prairie Avenue						
Rosecrans Ave–Marine Avenue	4M	45533	–	75	212	793
Marine Avenue–154th St	4M	38921	–	64	187	845
154th St–Manhattan Beach Blvd	4M	44160	–	72	205	505
Manhattan Beach Blvd–161st St	4M	39171	–	64	185	470
161st St–166th St	4M	43038	–	70	200	500
166th St–Redondo Beach Blvd	4M	43911	–	72	204	508
Rosecrans Boulevard						
Inglewood Avenue–Firmona St	6M	44162	–	78	205	509
Firmona St–Hawthorne Blvd	6M	42879	–	77	200	500
Hawthorne Blvd–Prairie Avenue	6M	44463	–	80	208	511
Marine Avenue						
I-405–Inglewood Avenue	4S	31488	–	52	150	398
Inglewood Avenue–Hawthorne Blvd	4S	22777	–	–	115	310
Hawthorne Blvd–Freeman Avenue	4S	23721	–	–	118	320
Freeman Avenue–Prairie Avenue	4S	24561	–	–	122	350
Manhattan Beach Boulevard						
Inglewood Avenue–I-405	4M	31884	–	52	155	402
I-405–Hawthorne Blvd	4M	31553	–	51	153	400
Hawthorne Blvd–Prairie Avenue	4M	24623	–	–	122	325
166th Street						
West of Hawthorne Blvd	2LC	5945	–	–	–	96
Hawthorne Blvd–Freeman Avenue	2C	4227	–	–	–	68
Freeman–Prairie Avenue	2C	3303	–	–	–	57
Redondo Beach Boulevard						
Hawthorne Blvd–I-405	4M	26602	–	–	133	350
I-405–Prairie Avenue	4M	24377	–	–	123	325
Artesia Boulevard						
Inglewood Avenue–Firmona St	4M	49389	–	80	225	550
Firmona St–Redondo Beach Blvd	4M	51191	–	83	230	560
I-405						
Redondo Beach Blvd–Hawthorne Blvd	8F	277900	420	890	1650	–
Hawthorne Blvd–Inglewood Ave	8F	279500	418	885	1640	–

* Number = Number of lanes, M = Major, S = Secondary, C = Collector, LC = Local Collector. F = Freeway, I = 405

Note: The contours do not reflect the attaining affects of topography or barriers such as walls and buildings. The sound level assumes a direct line-of-sight from the noise source to the receiver.

Lawndale Peak Period
Distance to Future Noise Contours

Table 5

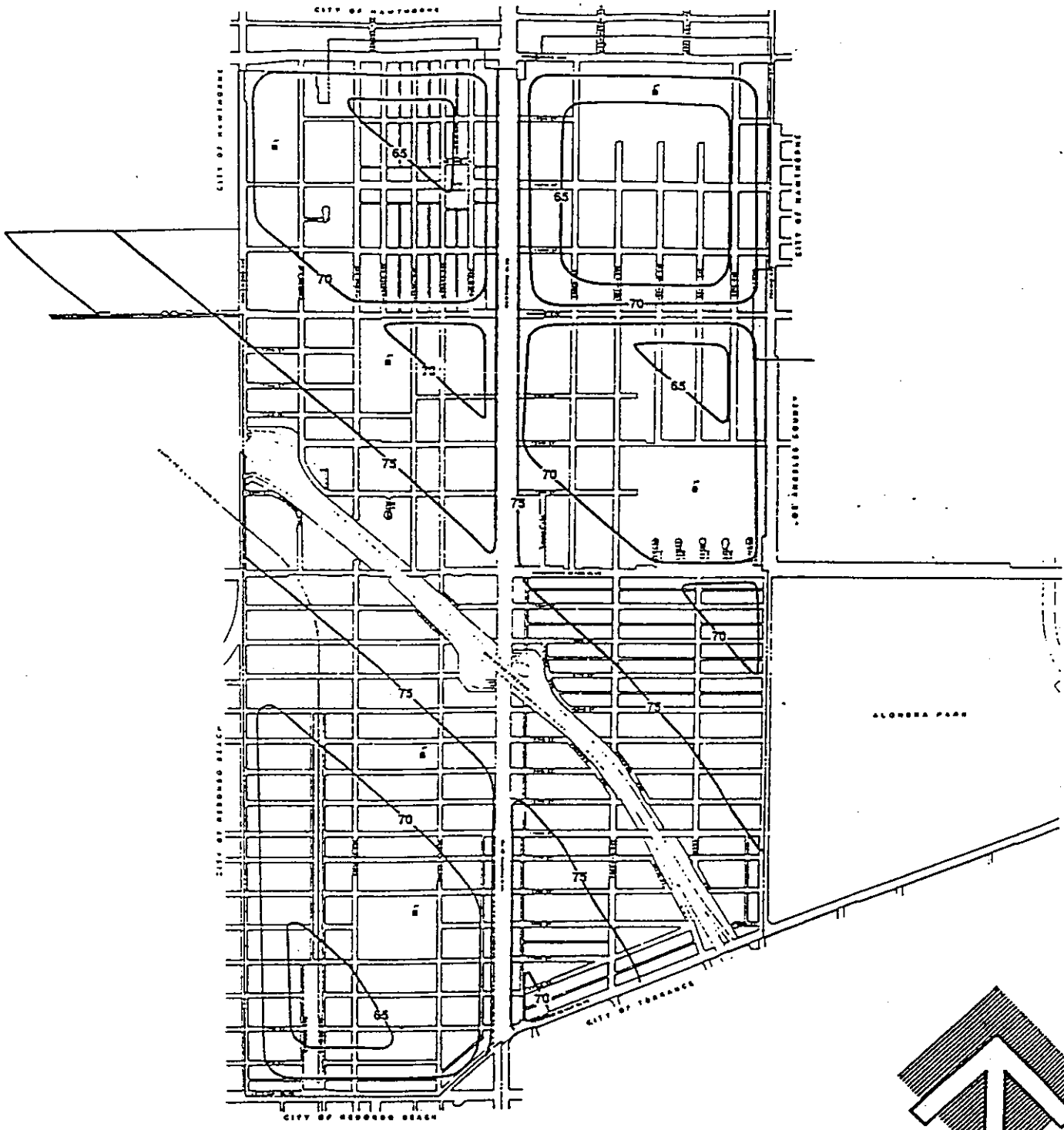


The contours reflect the cummulative effects of vehicular traffic noise. The attenuating effects of topography or barriers such as walls or buildings were not considered, see Table 2-1 for noise ntours generated by a specific roadway.

0 400 800 1600
FEET

Existing Noise Contours

Figure B



The contours reflect the cummulative effects of vehicular traffic noise. The attenuating effects of topography or barriers such as walls or buildings were not considered, see Table 3-1 for noise contours generated by a specific roadway.

Future Noise Contours (Year 2010)

Figure C

The difficulty with predicting precise noise levels at all locations within the City of Lawndale should not detract from the usefulness of the contour lines. The developed noise contours are considered to be a tool to be used by planners to identify areas that have significant noise levels. A site-specific acoustical analysis should always be conducted for noise sensitive developments whenever the predicted CNEL is greater than 60 dB(A) to comply with the interior and exterior noise standards.

Sound Level Measurements

A series of short-term (one-hour) sound level measurements were conducted along major roadways and near sensitive receptors to validate the results of the computer modeling and to approximate the noise environment in the community. All sound level measurements were conducted with a calibrated Larson-Davis Model 700 integrating sound level meter, which meets the American National Standards Institute (ANSI) requirements for a type 2 meter. The sound level meter was positioned at approximately 25 or 50 feet from the roadway centerline and at height of 5 feet above the ground to approximate the height of the human ear. All sound level measurements conducted along major roadways were taken at peak traffic hours (6:00 a.m. to 9:00 a.m. or 3:00 p.m. to 6:00 p.m.). The results of sound level measurements during peak traffic hours are generally consistent with the estimated CNEL. Sound level measurements conducted in other noise sensitive areas, such as next to schools or parks, were conducted between 9:00 a.m. and 3:00 p.m. The measurement period reflects the hours of primary usage for such land uses. Tables 6 and 7 summarize the results of the sound level measurements. Figure D identifies the location of the sound level measurements.

Rail

Atchison Topeka and Santa Fe

The Atchison Topeka and Santa Fe railroad operates on the north-south track located east of Inglewood Avenue. The stretch of land bordering the Santa Fe railway line from Artesia Boulevard to Manhattan Beach Boulevard is a high noise zone. The area from Artesia Boulevard to 170th Street has been subject to a number of mitigatory measures:

A 6-foot block wall separates the homes that border the western railroad right-of-way; the land adjacent to the railway line is designated a parkway and landscaping has been installed.

Railroad volumes were obtained from the San Bernardino office of the Santa Fe Railroad. Typically two freight train operations occur daily, Monday through Saturday: one southbound trip between 8:00 p.m. and 9:00 p.m. and one northbound trip between 1:30 a.m. and 3:00 a.m. Each train is estimated to have 75 to 100 cars. One single switcher car operation occurs between 6:30 p.m. and 9:00 p.m., Monday through Friday. One single light engine typically runs on Sunday night.

The train traffic noise was calculated using a model developed by Wyle Laboratories (Assessment of Noise Environments Around Railroad Operations, July 1973). The contour distances are summarized in Table 8. The model did not account for the effects of intervening topography or barriers such as walls. The results depict a worst case condition. No significant change in the operatic parameters are expected for the year 2010; therefore, significant changes to the future community noise exposure levels are not expected.

Measurement Location	L_{eq}	L_{10}	L_{50}	L_{90}	L_{max}	L_{min}
Inglewood Avenue between Marine Avenue and 149th Street	69.4	72.0	67.5	61.5	86.0	57.0
Rosecrans Avenue east of Washington Avenue	61.8	74.5	70.5	64.5	80.5	55.0
Prairie Avenue at 148th Street	69.9	73.5	68.0	60.5	80.0	52.0
Manhattan Beach Boulevard at Osage Avenue	70.0	73.0	68.0	61.0	81.5	54.5
Hawthorne Boulevard north of Manhattan Beach Boulevard	73.3	76.0	71.5	65.5	83.5	62.0
Marine Avenue at Grevillea Avenue	72.9	76.0	71.0	61.0	90.0	55.0
166th Street east of Hawthorne Boulevard	60.0	64.5	56.4	54.0	75.5	51.5
Redondo Beach Boulevard east of Hawthorne Boulevard	69.4	73.0	67.0	58.0	84.5	52.5
Artesia Boulevard east of Kingsdale Avenue	70.6	73.0	69.0	64.0	84.0	54.5
Inglewood Avenue north of Manhattan Beach Boulevard	71.6	73.0	69.0	63.0	86.0	56.5
Inglewood Avenue north of 168th Street	69.6	73.0	66.5	58.0	84.0	50.0
* Condon Avenue south of 154th Street adjacent to I-405	65.6	67.5	65.0	62.5	71.0	58.5
* Grevillea Avenue at 160th Street adjacent to I-405	65.8	68.0	65.0	62.5	72.5	55.5
* 168th Street at 167th Street adjacent to I-405	65.1	66.5	64	62.5	71.0	57.0

Peak Hour Sound Level Measurements in dB(A)

Table 6

Measurement Location	L_{eq}	L_{10}	L_{50}	L_{90}	L_{max}	L_{min}
* 168th Street at Osage Avenue adjacent to I 405 (Frank T. Hogan Park)	70.1	71.0	68.5	67.0	73.5	62.5
* Grevillea Avenue and 159th Street adjacent to I-405	62.4	64.5	61.5	59.4	70.5	57.5
Hawthorne Blvd. at 167th Street	74.1	78.0	72.0	62.0	85.0	56.5
Marine Avenue at Osage Street	69.9	72.5	67.5	60.5	79.5	56.5
Manhattan Beach Blvd. at Firmona Street	69.1	72.0	67.5	62.5	79.5	57.5

One hour sound level measurements conducted during peak traffic period (6:00 a.m.–9:00 a.m. or 3:00 p.m.–6:00 p.m.).

Measurements were conducted at approximately 50 feet from the roadway centerline.

* Measurements were conducted at approximately 50 feet from the edge of I-405. The measurement site was located 25 feet or more below I-405.

Peak Hour Sound Level Measurements in dB(A)

Table 6 (cont.)

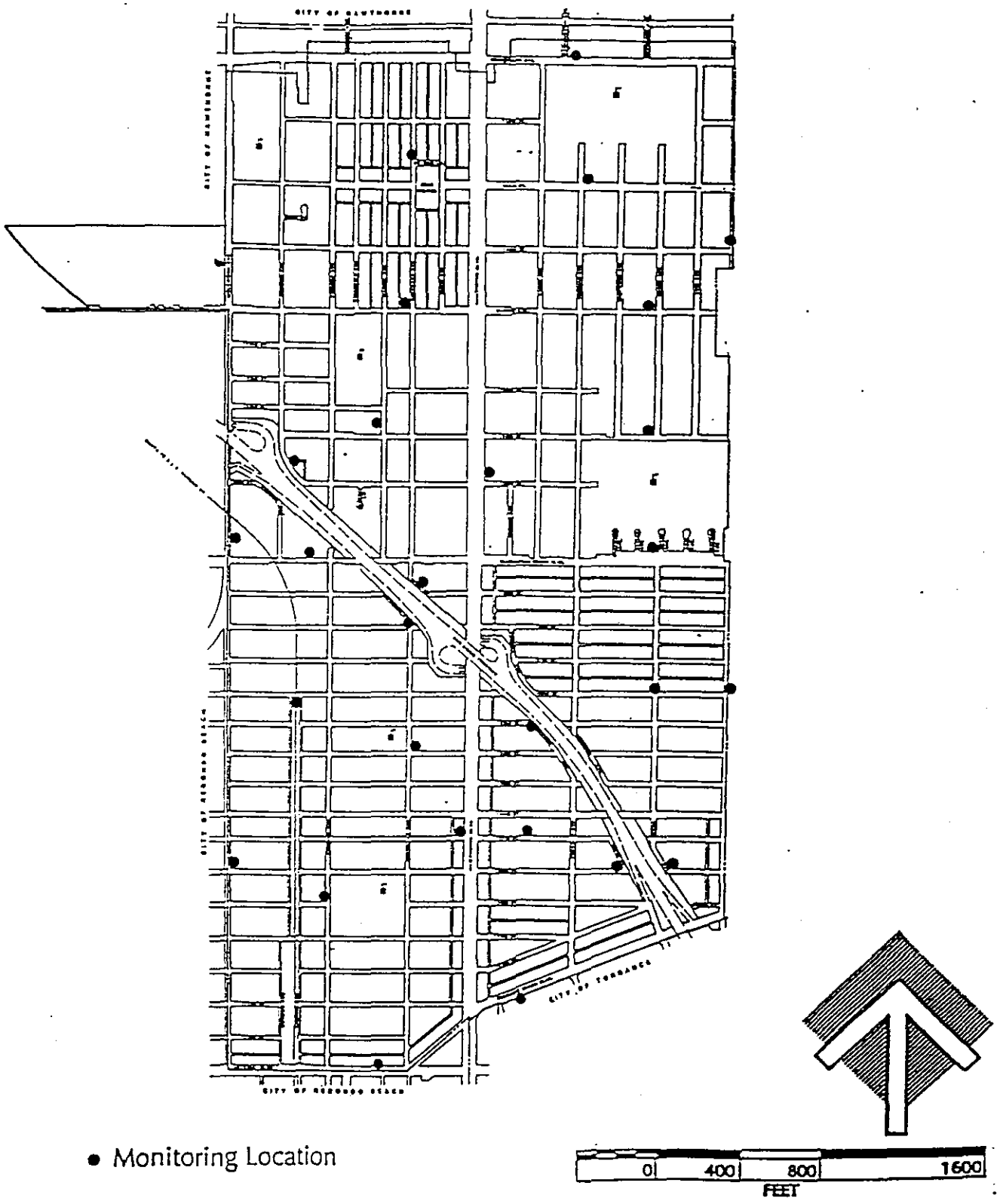
Measurement Location	L_{eq}	L_{10}	L_{50}	L_{90}	L_{max}	L_{min}
147th Street at Freeman Avenue adjacent to Lawndale School District	57.6	62.0	53.0	46.5	71.0	44.0
Grevillea Avenue at De Oro Lane adjacent to Smith School	54.1	56.0	53.0	50.5	62.0	48.0
Mansel Avenue at 153th Street adjacent to Jane Addams School	58.6	61.5	55.5	52.5	72.5	51.0
Firmona Street at 169th Street adjacent to William Green Park	53.9	57.5	49.0	42.5	70.5	40.0
Grevillea Avenue at 164th Street adjacent to Masada CDC	57.0	63.0	55.0	48.0	70.5	45.0
Prairie Avenue at 162nd Street adjacent to Golf Course*	68.0	71.0	66.0	62.5	75.0	55.0
154th Street at Osage Avenue adjacent to Will Rogers School	58.3	62.5	49.0	44.0	74.5	40.0
Osage Avenue at 162nd Street	58.4	61.0	55.5	51.0	75.5	48.5
Freeman Avenue at 163rd Street adjacent to I-405	59.2	60.5	58.5	57.0	55.5	55.0
162nd Street at Condon Avenue	58.1	62.0	54.0	49.0	78.5	44.5

One hour sound level measurements conducted during peak traffic period (6:00 a.m.–9:00 a.m. or 3:00 p.m.–6:00 p.m.).

* Measurements were conducted approximately 25 feet from the roadway centerline.

Daytime Sound Level Measurements in dB(A)

Table 7



Location of Sound Level Measurements

Figure D

Table 8

RAILROAD OPERATIONS NOISE CONTOURS

	Community Noise Equivalent Level (CNEL)			
	75	70	65	60
Approximate Distance in Feet to CNEL contour	--	50	160	500

Green Line

In addition to the noise generated by the AT&SF, the Los Angeles County Transportation Commission is proposing an extension of the Green Line. The proposed south segment begins at Space Park and turns through the AT&SF right-of-way southeasterly to Manhattan Beach Boulevard, then east in the median of Manhattan Beach Boulevard and along the southwest embankment of I-405 and finally entering the median of Hawthorne Boulevard at the freeway interchange. An aerial guideway is proposed for the median of Hawthorne Boulevard. According to the Route Refinement Study, Coastal Corridor Rail Transit Project, South Segment, May 1990 the typical noise exposure from the Green Line is expected to range from 66.8 to 68.2 CNEL.

The Green Line also proposes to construct a station at Hawthorne Boulevard and 166th Street to serve Lawndale and the surrounding communities. The station would be located in the median along Hawthorne Boulevard. Surrounding land uses are primarily commercial along Hawthorne Boulevard, and residential to the east and west. In addition, there would be a recessed bus bay for northbound buses on Hawthorne Boulevard and an area for short-term parking for about 30 cars. No information is currently available on the expected noise generated at the station.

Airports

The City of Lawndale has no airport or helipad within its boundary. The closest airports are Hawthorne Municipal Airport located approximately 1.5 miles to the northeast and Los Angeles International Airport located approximately 4 miles to the northwest. The City of Lawndale is well outside the airport's 60 dB(A) CNEL contour and is not significantly affected by aircraft noise. No significant changes are expected for the year 2010.

Commercial and Industrial

The noise level associated with an industrial and commercial land use varies with the type of businesses and the distance from the noise source. Little benefit is to be gained by attempting to quantify the noise at each business. Therefore, a summary of potentially significant noise generating commercial and industrial areas will be described. A site-specific noise study is recommended whenever a noise sensitive development is proposed to be located next to a commercial or industrial noise generator.

Noise associated with industrial and commercial land uses within the City of Lawndale is limited. Light industrial land uses are primarily concentrated to the areas bounded by Manhattan Beach Boulevard on the south, I-405 on the east and north, and Inglewood Avenue on the west; and by 153rd Street on the south, Hawthorne Boulevard on the east, Marine Avenue on the north and Manual Avenue on the west. Commercial land uses are located primarily next to Hawthorne Boulevard, Inglewood Avenue, Prairie Avenue, Rosecrans Avenue, Marine Avenue, Manhattan Beach Boulevard and Artesia Boulevard. The business are generally associated with home improvement, automobile repair and sales, food service, and shopping centers. Residential noise receptors are located next to many light industrial and commercial businesses. The City Planning Department does not have a record of citizen complaints from industrial or commercial noise sources. No heavy industrial sources were identified. In the year 2010 the commercial and industrial areas are expected to be similar to its present form.

Goals and Policies

The following goals and policies emphasize the control and abatement of noise through standards, site planning, and noise mitigation.

Noise Goal 1

To achieve and maintain an environment which is free from excessive or harmful noise through identification, control and abatement.

Policies

Policy 1a
Control and abate undesirable sounds through the development of land use compatibility guidelines and a noise ordinance.

Policy 1b
Encourage the development of industrial and commercial land uses which do not produce excessive noise.

Policy 1c
Discourage development of noise sensitive land uses in area impacted by high noise levels.

Policy 1d
Ensure that sensitive land uses are not subjected to inappropriate noise levels resulting from transportation systems.

Policy 1e
Maintain coordination of noise control policies and standards with the surrounding cities and Caltrans.

Policy 1f
Provide for implementation, periodic review and revision of the Noise Element.

Policy 1g
Provide for the education of the community in the nature and extent of noise in the City of Lawndale.

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nplementation Programs

1.1 Comprehensive Noise Ordinance Adoption
Adopt a comprehensive noise ordinance to prohibit unwanted and unnecessary sound. The ordinance shall identify acceptable property line sound level limits and control noise sources such as barking dogs, mechanical equipment, amplified music, construction activity and other noise identified as disturbing, excessive or offensive.

1.2 Noise Compatibility Standards
Adopt the land use noise compatibility standards presented in Figure A for general planning and zoning purposes.

1.3 Noise Insulation Standards
Enforce the California Administrative Code, Title 24, Noise Insulation Standards. Title 24 requires that an acoustical analysis be performed for all new multi-family construction in areas where the exterior sound level exceeds 60 CNEL. The analysis shall ensure that the building design limits the interior noise environment to 45 CNEL or below.

1.4 Noise Insulation Standards for Single-Family Dwellings
Adopt a policy or implementation ordinance making California Administrative Code, Title 24, Noise Insulation Standards applicable to new single-family dwellings.

1.5 Project Review
Review actions or projects that may have the potential to generate noise impacts which may impact existing land uses.

1.6 Acoustical Analysis
Require noise studies for projects where exterior noise levels exceed 60 dB CNEL to identify potential noise impacts, analyze mitigation alternatives, and identify methods to monitor the effectiveness of the mitigation following implementation.

1.7 Transportation Noise Standards
Develop noise standards for use in reviewing the construction and improvement of any roadway, railroad, or other transit system.

1.8 Enforce Motor Vehicle Code
Enforce the provisions of the State Motor Vehicle Code which requires that all vehicles be equipped with a properly maintained muffler and that the exhaust system not be modified.

1.9 Regulate Traffic Flow
Review traffic flow systems and synchronize signals to avoid traffic stops which produce excessive noise wherever possible.

1.10 Limit Truck Noise
Limit truck traffic in noise sensitive areas.

- Increasing the distance from the noise source to sensitive receptors by creation of setbacks;

- Placing non-noise sensitive uses such as parking lots and utility areas between the noise source and receiver; and

- Orient usable outdoor living space such as balconies, patios, and children play areas away from roadways.

Barriers

Noise barriers such as walls and earthen berms are commonly used to mitigate noise from ground transportation and industrial sources. Noise barriers can be used to reduce the noise level both outdoors and indoors. The effectiveness of a barrier depends upon factors such as the relative height of the barrier relative to the line-of-sight from the source to the receiver, the distance from the barrier to the source and to the receiver and the reflections of sound. To be effective, a barrier must block the line-of-sight from the source to the receiver. A barrier must also be of solid construction (i.e masonry) without holes or gaps and be long enough to prevent sound from passing around the ends. Under the best of circumstances, a properly designed noise barrier can reduce noise as much as 15 decibels. A site-specific acoustical analysis is required to determine the proper height and placement of a barrier.

A row of houses or other buildings may act as a barrier. A row of one- or two-story houses (with about 30 percent open gaps) provides a barrier attenuation of approximately 3 to 5 decibels; two rows of houses, 6 to 10 decibels; and three or more rows of houses, 10 to 12 decibels.

Building Design

The location of a building on its site, the arrangement of rooms, and the location of doors and windows all have a bearing on interior noise control. The sides of a building which face a roadway or other noise source should house those activities that can tolerate the greatest amount of noise. Noise sensitive areas include bedrooms, living rooms and dens. Less noise sensitive areas may include kitchens and bathrooms. Hallways, closets and storage rooms are generally not noise sensitive.

Indoor noise levels are controlled by the noise reduction characteristics of the building shell. In general, doors and windows are the acoustical weak link in a building. Therefore, careful consideration should be given to there placement. By limiting the number and size of these openings on the sides of the building exposed to noise, interior noise levels will be reduced.

Often it is necessary to allow for a closed window condition to control interior noise. When this occurs an alternative means of ventilation such as heat pumps or forced air units are required to meet the Uniform Building Code requirements. Heavy pane or double-pane windows are frequently required to increase the sound insulation within a room. Doors facing a noise source should be solid core and should be equipped with an appropriate gasket.

Definitions

A-Weighted Sound Level (dBA): An A-Weighted sound level is the sound pressure level in decibels as measured on a sound level meter using the A-Weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and provides good correlation with subjective reactions to noise.

Ambient Noise: The composite of noise from all sources near and far. In this context, ambient noise levels constitutes the normal or existing level of environmental noise at a given location.

CNEL: Community Noise Equivalent Level. The average equivalent A-Weighted sound level during a 24-hour day, obtained after addition of 5 decibels to sound levels in the evening (7:00 p.m. to 10:00 p.m.), and 10 decibels to sound levels in the night (10:00 p.m. to 7:00 a.m.). CNEL represents daily levels of noise exposure averaged on an annual basis.

Decibel, dB: A unit of measure describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).

L_{10}: The sound level exceeded 10 percent of the time during a given period.

L_{50}: The sound level exceeded 50 percent of the time during a given period.

L_{90}: The sound level exceeded 90 percent of the time during a given period.

Ldn: Day-Night Average Sound Level. The average equivalent A-Weighted sound level during a 24-hour day, obtained after addition of 10 decibels to sound levels in the evening (10:00 p.m. to 7:00 a.m.). Ldn represents daily levels of noise exposure averaged on an annual basis.

Leq: Equivalent sound level. The sound level corresponding to a steady state sound level containing the same total energy as a time varying signal over a given sample period. Leq is typically computed over 1-, 8-, or 24-hour sample periods.

Lmax: The greatest A-Weighted sound level measured during a designated period.

Lmin: The lowest A-Weighted sound level measured during a designated period.

Noise Contours: Lines drawn about a noise source showing constant levels of noise exposure. This Element uses the CNEL or Ldn metrics to describe noise exposure contours.

Noise Sensitive Uses: Noise sensitive uses are land uses associated with indoor and/or outdoor human activities that may be subject to stress and/or significant interference from noise. They include residential (single and multi-family dwellings, mobile home parks, dormitories and similar uses); transient lodging (including hotels, motels, and similar uses); hospitals, nursing homes, convalesc[illegible] hospitals, and other facilities for long term medical care; and public or priv[illegible] educational facilities, libraries, churches, and other places of public gathering.

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