City of Monrovia
General Plan

Noise Element

Adopted
June 12, 2002
Resolution No. 2002-41

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I. Introduction

This document updates the City of Monrovia's 1975 Noise Element of the City's General Plan. This Element was prepared with recognition that excessive noise levels are a significant and costly form of environmental pollution and, consequently, Federal and State laws have been enacted for the purpose of limiting and controlling sound generation and the amount of public exposure to sound.

It is intended that this Noise Element satisfy the State requirement that local General Plans contain a Noise Element. Noise Element requirements, contents, and preparation methods are determined by Section 65302(f) of the Government Code, and by the *Guidelines for the Preparation and Content of the Noise Element of the General Plan* (by the California Department of Health Services) which are included in the State of California *General Plan Guidelines*, published by the Governor's Office of Planning and Research of the State of California in 1998. It is required, as stated in the guidelines, that major noise sources and areas containing noise-sensitive land uses be identified and quantified by preparing generalized noise exposure contours for current and projected conditions. Contours may be prepared in terms of either the Community Noise Equivalent Level (CNEL) or Day-Night Average Level (L_{dn}), which are descriptors of total noise exposure at a given location for an annual average day. CNEL and L_{dn} are generally considered to be equivalent descriptors of the community noise environment within plus or minus 1 dB.

The Noise Element of the Monrovia General Plan is a statement of the City's policy and intent regarding land use in relation to environmental noise and the control of noise sources within the community. Its purpose is to provide a framework within which future planning and noise mitigating decisions will be made and implemented.

This Element consists of a survey of the current noise environment, indicating the major contributors of noise, and concludes with a proposed "noise control program," which includes certain practicable City actions towards reduction of noise and mitigation of its adverse effects.

II. Evaluating Noise Impacts

A. Defining Noise Exposure

Noise is often defined as unwanted sound. Sound is easily measured with instruments, but the human variability in subjective and physical responses to sound complicates the understanding of its impact on people. People judge the relative magnitude of sound by subjective terms such as "loudness" or "noisiness."

Physically, sound-pressure magnitude is measured and quantified in terms of a logarithmic scale in decibels (dB). Research on human hearing sensitivity has shown that a 3 dB increase in the sound is barely noticeable and a 10 dB increase would be perceived as twice as loud. Table 1 presents the subjective effect of changes in sound pressure level. The human hearing system, however, is not equally sensitive to sound at all frequencies. Therefore, a frequency-dependent adjustment called "A-weighting" has been devised so that sound may be measured similar to the way the human hearing system responds. The A-weighted sound level is often abbreviated "dBA" or "dB(A)." Figure 1 provides typical A-weighted sound levels of various noise sources and the responses people usually have to such sound levels.

Table 1. Subjective Effects of Changes in Sound Pressure Level

Change in Sound Level (dB)	Change in Power		Change in Apparent Loudness
	Decrease	Increase	
3	1/2	2	Just perceptible
5	1/3	3	Clearly noticeable
10	1/10	10	Half or twice as loud
20	1/100	100	Much quieter or louder

Source: Parsons Engineering Science

Community noise levels usually change continuously during the day. However, community noise exhibits a daily, weekly, and yearly pattern. Several descriptors have been developed to compare noise levels over different time periods. One of the most common descriptors is the energy equivalent sound level (L_{eq}). The L_{eq} is the equivalent steady-state A-weighted sound level that would contain the same acoustical energy as the time varying A-weighted sound level during the same time interval. The noise contours generated for this document are expressed using the descriptor of "Community Noise Equivalent Level" (CNEL). CNEL is defined as the average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five decibels to sound levels in the evening from 7 p.m. to 10 p.m. and after addition of 10 decibels to sound levels in the night from 10 p.m. to 7 a.m. These adjustments to noise levels at separate times will account for the increased sensitivity of people to noises in the evening and nighttime hours. Another descriptor, the Day-Night average sound level (L_{dn}), was developed to evaluate the total daily community noise environment. The Day-Night Average Level is the average equivalent A-weighted sound level during a 24-hour period, obtained after addition of 10 decibels to sound levels in the nighttime hours from 10 p.m. to 7 a.m. This adjustment is an effort to account for the increased sensitivity of most people to noise in the quiet nighttime hours. L_{dn} has been adopted by federal agencies including the Department of Defense, Environmental Protection Agency (EPA), the Federal Aviation Administration (FAA), and the Department of Housing and Urban Development (HUD) as the accepted unit for quantifying human annoyance to general environmental noise. CNEL and L_{dn} represent daily levels of noise exposure averaged on an annual or daily basis, while L_{eq} represents the equivalent energy noise exposure for a shorter time period, typically one hour.

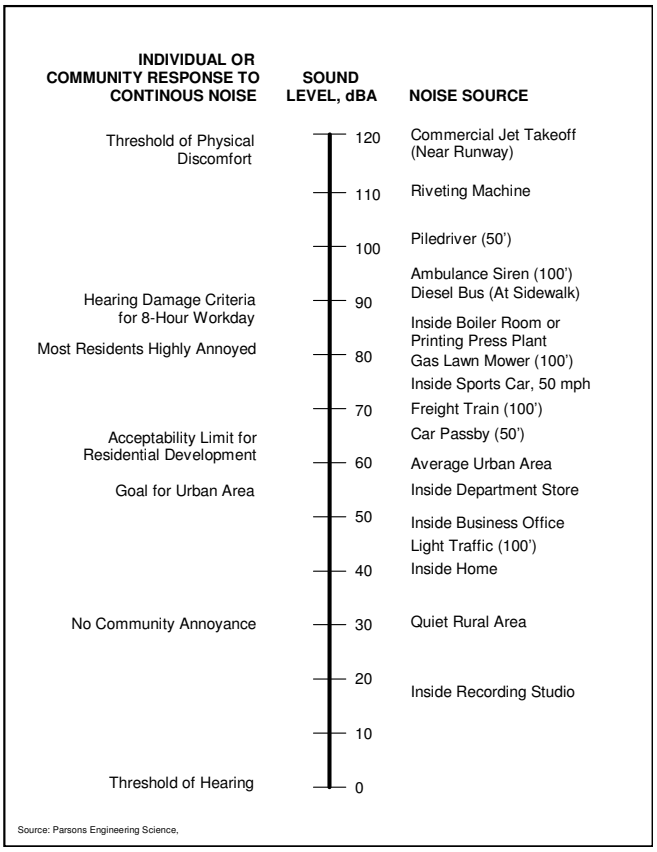


Figure 1 - Typical Sound Levels From Indoor and Outdoor Noise Sources

The maximum sound level (L_{max}) is the highest instantaneous sound level measured during a single noise measurement interval no matter how long this sound may persist and whether the noise source is ambient or project related.

B. Developing Noise Criteria

An effective program of noise control must be based upon realistic noise criteria, in terms of economic and technical feasibility and practicality of implementation. The development of these criteria must be based on consideration of the effects of noise on man.

The effects of noise on people and people's activities are varied and extremely complex. They can be divided into three general categories:

1. Physiological effects to both temporary (e.g., startle reactions and temporary hearing threshold shifts) and enduring (e.g., permanent hearing damage or the cumulative physiological effects of prolonged sleep loss or of prolonged nervous strain).

2. Behavioral effects are those involving interference with on-going activities such as conversation, learning, TV-watching, sleep or the performance of various tasks.

3. Subjective effects described by such words as "annoyance," "nuisance," dissatisfaction," "disturbance," etc., as a result of behavioral and physiological effects.

The upper limits of noise experienced in urban areas usually are not severe enough to produce measurable long-term physiological effects, with the exceptions of those resulting from prolonged nervous strain or sleep loss. For example, the noise levels produced by aircraft fly-over even at community positions relatively close to the runways are usually not intense enough to cause permanent loss of hearing. Thus the last two categories of noise effects - behavioral and subjective - provide the most usable guides for establishing noise criteria.

The effects of noise exposure are not easily quantifiable. However, guidelines based on:

1. Study of conversation and sleep interference; and
2. Social survey assessment of subjective response can be used to establish reasonable criteria for noise exposure.

Noise levels which exceed 85 dBA are generally considered to contribute to hearing loss. When exposed to such levels for long duration during each working day, any individual may experience severe temporary or even permanent hearing loss. State and Federal health and safety regulations currently protect workers at levels of exposure that exceed 90 dBA for each eight-hour work day.

Speech communication and speech intelligibility are impaired and may even become impossible at levels from 60 to 70 dBA. Sleep interference may be experienced at noise levels in excess of 35 dBA. By generally accepted standards, noise levels above 45 dBA are unacceptable for sleeping spaces.

C. Land Use Criteria for Noise Exposure

Guidelines for noise compatible land use, extracted from the State of California *Guidelines for the Preparation and Content of the Noise Element of the General Plan*, are presented in Figure 2. The guidelines provides land use compatibility with different ranges of CNEL or L_{dn} values, in terms of four categories of acceptability.

The compatibility guidelines given in Figure 2 are based on consideration of the type of activity that would normally take place for a particular land use. These include the requirements of that activity for speech communication, the typical sound insulation characteristics of buildings that might be found in these areas, and additional requirements for freedom from noise intrusions that might be imposed on other activities, such as sleep.

The noise exposure is such that the activities associated with the land use may be carried out with essentially no interference, e.g., for residential areas: both indoor and outdoor noise environments are pleasant.

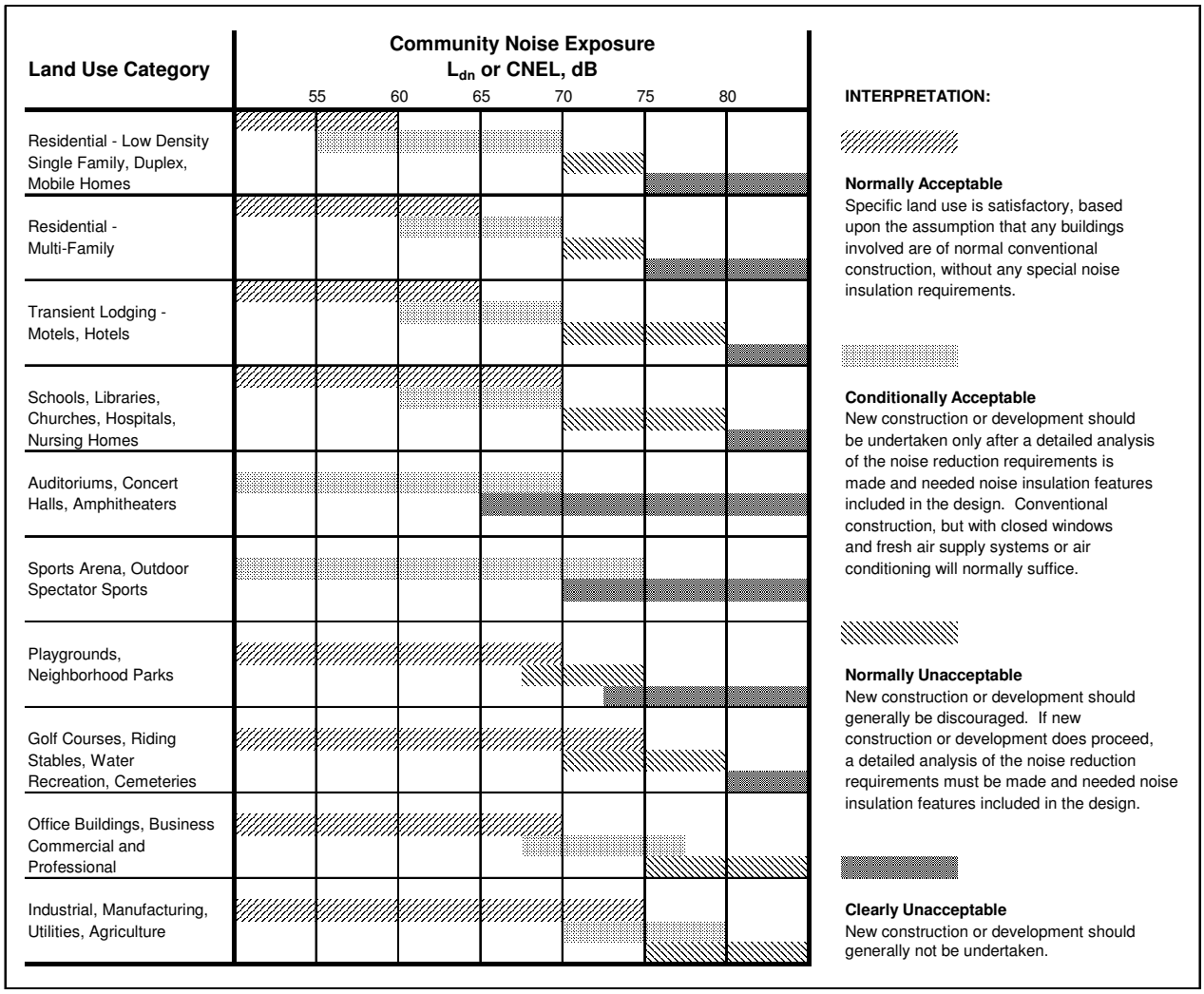
D. Acceptable Interior Noise Exposure

Section 1208A of the 1998 California Building Code (Title 24, Part 2, California Code of Regulations) establishes uniform minimum noise insulation performance standards to protect persons within new hotels, motels, dormitories, apartment houses and dwelling other than detached single-family dwellings from the effects of excessive noise. The regulations state that, "Interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric shall be either … Ldn or … CNEL, consistent with the noise element of the general plan." Additionally, it is stated that residential buildings or structures to be located where the Ldn or CNEL exceeds 60 dB shall require an acoustical analysis showing that the proposed building design will limit the intruding exterior noise to an interior CNEL (Ldn) of 45 dB.

E. Relationship to Noise Ordinance

Noise elements are directed at minimizing future noise conflicts, while noise ordinances are intended mainly to resolve noise conflicts. A noise control ordinance addresses noise generated by industrial, commercial, agricultural, and residential uses, which are not subject to Federal and State noise regulations. The regulation of noise such as traffic on public roads, rail line operations, and aircraft in flight is preempted by Federal and State regulations, meaning that such sources generally cannot be controlled by a local ordinance. The Noise Element can address the prevention of noise conflicts from all sources, however. The standard of a noise control ordinance should be consistent with the Noise Element, to achieve consistency in the implementation of noise control programs, and to provide businesses with consistent design criteria for development and expansion. The City adopted, occasionally amends, and enforces a noise control ordinance, which is Chapter 9.44 of the Municipal Code.

Figure 2. Land Use Compatibility Guidelines



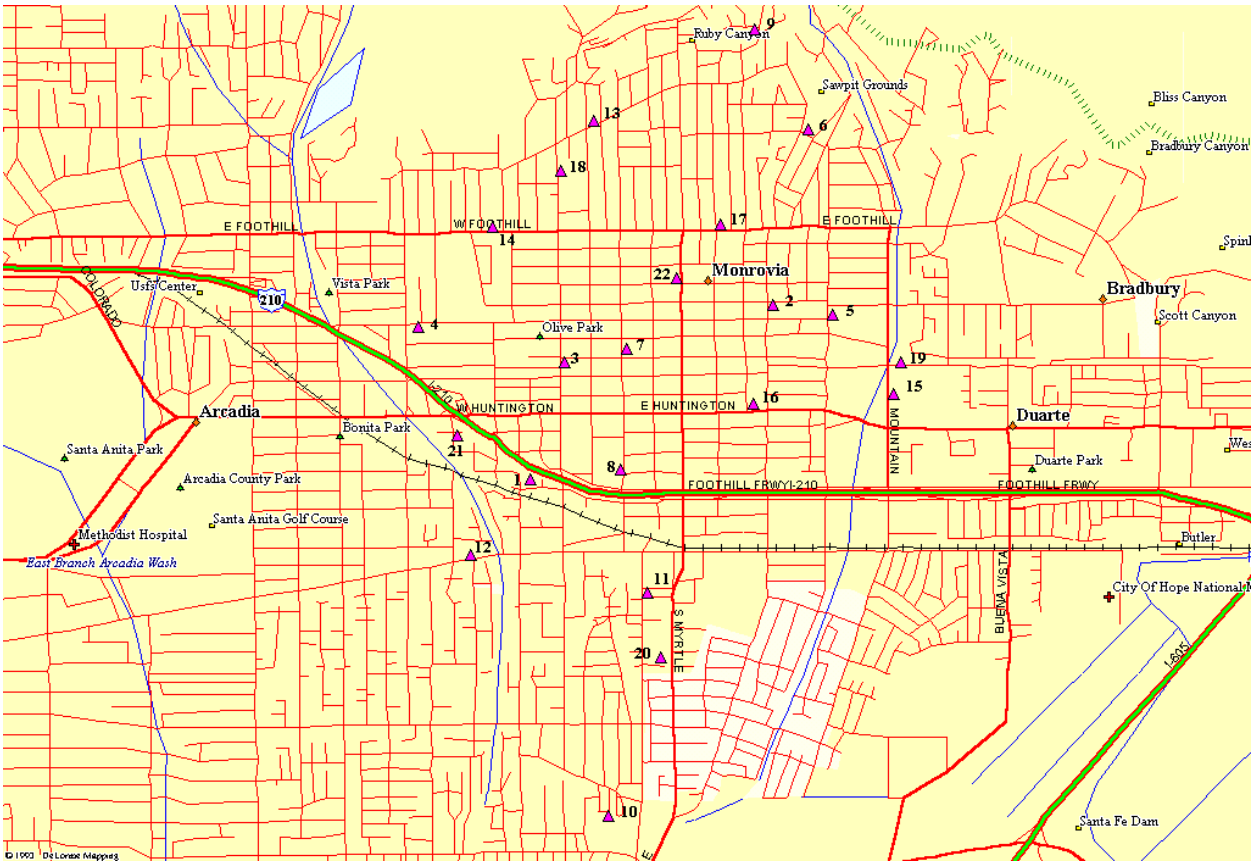
Source: *State of California General Plan Guidelines.* Governor's Office of Planning and Research, 1998.

III. Sources of Noise in Monrovia

The City assessed the existing noise environment by conducting noise measurements and analytical procedures using a computer noise prediction model. Traffic noise levels were evaluated using a simplified version of the Federal Highway Administration Traffic Noise Model (FHWA-RD-77-108). Projected Year 2010 noise levels and contours were also calculated and generated by Parsons. The major findings are included herein in the form of maps of existing and projected CNEL contours, summary tables, and a general discussion of the noise environment.

Noise measurements were conducted at twenty-two representative locations throughout the city. Continuous noise monitoring was conducted at six of the twenty-two locations, and short-term 20-minute to 1-hour measurements were conducted at the remaining sites. Measurement locations are presented in Figure 3. A listing of the measurement locations and the noise measurement results are included in Table 2.

Figure 3. Noise Measurement Locations



From the noise measurements and complimenting analytical procedures, CNEL contours were derived for traffic noise using traffic data provided by and obtained through the City. The latest traffic volumes that the City had available were for Year 1996 only, but through consultation with the City's traffic consultant, an annual increase of one percent was assumed and the existing Year 2000 and the projected Year 2010 traffic volumes were interpolated and used in this document. Traffic speeds, truck distributions, as well as day-, evening-, and nighttime-hour traffic volume distributions were derived from available information and through consultation with the City's traffic consultant. The traffic data used for calculating the traffic noise and generating the contours are presented on Table 3.

Noise contours are lines of equal noise exposure just as the contour lines on a topographic map are lines of equal elevation. The noise contours are simply approximations of noise levels. They should not be thought of as static lines because of the varying nature of noise sources and transmission paths. Also, for the intended planning purposes of the noise contours, the contours were calculated without taking into consideration any shielding factors for rows of buildings.

The existing and projected CNEL contour maps illustrate the penetration of traffic noise into adjacent neighborhoods. Each contour line represents the measured and calculated maximum penetration of noise at each particular "Community Noise Equivalent Level" (CNEL). As previously explained, CNEL is a time-integrated measure of noise over a 24-hour period with a weighted average which accounts for greater sensitivity to noise in the evening and nighttime hours. Existing Year 2000 CNEL contours are shown on Figures 4 and 5, and projected Year

2010 CNEL contours are shown on Figures 6 and 7. Tables 4 and 5 list the distances from major arterial streets to various noise contours for the existing Year 2000, and projected Year 2010 conditions, respectively.

Table 2. Summary of Noise Measurement Results

Rec. No.	Land Use	Monitoring Address	Date	Start Time	Duration	Noise Levels, dBA		
						Leq	Lmax	CNEL
1	SFR[1]	1402 B Alamitas Street	6/12/00	12:00	24 hours			74
2	SFR	402 East Lemon Avenue	6/12/00	2:00	24 hours			59
3	SFR	912 South Mayflower Avenue	6/14/00	10:00	24 hours			59
4	SFR	922 W. Colorado Boulevard	6/15/00	16:00	1 hour	60		
5	Park	Monrovia Recreation Park	6/13/00	9:11	30 min.	64	84	
6	SFR	305 Valle Vista Avenue	6/13/00	10:04	20 min.	54	69	
7	SFR	718 S. Magnolia Avenue	6/13/00	10:35	30 min.	63	85	
8	School	First Lutheran School	6/13/00	11:20	30 min.	64	66	
9	SFR	256 Canyon Crest Drive	6/13/00	15:45	30 min.	54	73	
10	School	Plymouth School	6/14/00	8:12	20 min.	51	67	
11	SFR	105 Spanner Street	6/14/00	8:45	30 min.	62	80	
12	SFR	809 W. Duarte Road	6/15/00	11:42	24 hours			68
13	SFR	329 W. Hillcrest Boulevard	6/14/00	12:22	24 hours			58
14	MFR[2]	731 West Foothill Boulevard	6/14/00	12:42	30 min.	68	75	
15	MH[3]	Ten Twenty Mobile Home Park	6/14/00	13:39	30 min.	68	86	
16	School	Canyon Learning Center	6/14/00	14:23	30 min.	61	77	
17	MFR	The Gables Senior Living Community	6/15/00	8:07	30 min.	71	82	
18	School	Mayflower Elementary School	6/15/00	8:45	20 min.	57	71	
19	SFR	1005 Royal Oaks Drive	6/15/00	9:17	30 min.	64	81	
20	SFR	2173 S. Myrtle Avenue	6/15/00	13:00	24 hours			62
21	SFR	830 Alta Street	6/15/00	15:20	30 min.	59	67	
22	Park	Library Park	6/15/00	15:51	30 min.	63	72	

Source: Parsons Engineering Science

1. SFR: Single Family Residence
2. MFR: Multi-Family Residence
3. MH: Mobile Home

A. Traffic Noise on Major Arterial Streets

Based upon the land use compatibility guidelines shown on Figure 2, traffic noise is not a problem at commercial and industrial locations within the city. In general, existing noise levels at most residential locations within the city are considered acceptable. Exceptions, of course,

exist at locations directly bordering major arterial streets and the freeway, particular in the residential areas located just south of the I-210 Freeway, between Fifth and Mayflower Avenues.

Freeway traffic noise can usually be effectively mitigated by erecting soundwalls. The California State Department of Transportation, has the responsibility and jurisdiction over the control of traffic noise generated from an interstate highway such as the I-210. The freeway soundwalls have been erected or are under construction adjacent to all residential areas in the City. The California State Department of Transportation does not erect soundwalls adjacent to commercial and industrial areas.

B. Industrial and Commercial Noise Activity

In general, industrial noise-producing activity within the City is minimal. A few isolated light industrial operations create levels of noise, which may be annoying to residential locations, particularly if activity occurs in the late evening or nighttime hours. The allowable noise levels at a residential property line are regulated by the City of Monrovia's current noise ordinance.

C. Schools, Parks, Hospitals, etc.

Noise levels at public facilities throughout the City (schools, parks, hospitals, etc.) are found to be compatible with the land use compatibility guidelines listed in Figure 2. Results of noise measurements conducted at several schools and parks, i.e., the First Lutheran School, Plymouth School, Canyon Learning Center, Mayflower School, the Monrovia Recreation Park, and Library Park, show that they are all within the acceptable noise exposure range.

D. Neighborhood Noise Sources

Noise exposures allowable at a citizen's property line due to sources such as radio, television, recreational and social activities, air conditioning equipment, swimming pool pumps, animals, sound amplification systems, etc., vary in level, time of day, day of week, and duration. These noise intrusions, as well as intrusion from industrial or commercial zones, are regulated by the City of Monrovia's current noise ordinance. Citizen understanding, participation and cooperation are essential for effectiveness.

E. Construction Activity

Short-term, temporary, and intermittent noise impacts associated with construction activities may be considered minimal during daytime hours. However, late evening and weekend disturbances related to construction activities experienced at nearby sensitive receptor locations may cause significant impacts.

Table 3. Traffic Data

LOCATION	Avg. Daily Traffic Volume For Year		Speed (mph)	Truck Percentages	
	2000	2010		Medium Trucks	Heavy Trucks
CALIFORNIA AVE.					
South City Bndry. to Duarte Rd	6,556	7,242	35	1.5%	1.5%
Duarte Rd. to Evergreen Ave.	7,596	8,391	35	1.5%	1.5%
Central Ave. to Huntington Dr.	6,556	7,242	35	1.5%	1.5%
Huntington Dr. to Colorado Blvd.	4,891	5,403	30	0.0%	0.0%
Colorado Blvd. to Foothill Blvd.	6,497	7,177	30	0.0%	0.0%
CENTRAL AVE.					
Magnolia Ave. to Myrtle Ave.	11,511	12,715	30	1.5%	1.5%
COLORADO BLVD.					
Fifth Ave. to Madison Ave.	8,429	9,311	30	0.0%	0.0%
Madison Ave. to Mayflower Ave.	6,452	7,127	30	0.0%	0.0%
Mayflower Ave. to Magnolia Ave.	6,151	6,794	30	0.0%	0.0%
Magnolia Ave. to Myrtle Ave.	3,746	4,138	30	0.0%	0.0%
Myrtle Ave. to California Ave.	3,018	3,333	30	0.0%	0.0%
California Ave. to Shamrock Ave.	2,497	2,759	30	0.0%	0.0%
DUARTE RD.					
Fifth Ave. to Mayflower Ave.	22,269	24,599	40	1.0%	1.0%
Magnolia Ave. to Myrtle Ave.	18,523	20,461	40	1.0%	1.0%
Myrtle Ave. to California Ave.	12,864	14,210	40	1.0%	1.0%
California Ave. to Shamrock Ave.	11,030	12,184	40	1.0%	1.0%
Shamrock Ave. to Moutain Ave.	11,045	12,201	40	1.0%	1.0%
FIFTH AVE.					
Duarte Rd. to Huntington Dr.	12,695	14,024	35	0.0%	0.0%
Huntington Dr. to Colorado Blvd.	4,891	5,403	35	0.0%	0.0%
Colorado Blvd. to Foothill Blvd.	3,850	4,253	35	0.0%	0.0%
Foothill Blvd. to Hillcrest Blvd,	940	1,038	35	0.0%	0.0%
FOOTHILL BLVD.					
Fifth Ave. to Madison Ave.	20,444	22,583	35	1.0%	1.0%
Madison Ave. to Mayflower Ave.	21,957	24,254	35	1.0%	1.0%
Mayflower Ave. to Magnolia Ave.	22,581	24,944	35	1.0%	1.0%
Myrtle Ave. to California Ave.	11,576	12,787	35	1.0%	1.0%
California Ave. to Shamrock Ave.	18,211	20,116	35	1.0%	1.0%
Shamrock Ave. to Mountain Ave.	13,632	15,058	35	1.0%	1.0%

Table 3 (cont'd). Traffic Data

LOCATION	Avg. Daily Traffic Volume For Year		Speed (mph)	Truck Percentages	
	2000	2010		Medium Trucks	Heavy Trucks
HILLCREST BLVD.					
Fifth Ave. to Madison Ave.	2,935	3,242	30	0.0%	0.0%
Mayflower Ave. to Magnolia Ave.	3,194	3,529	30	0.0%	0.0%
HUNTINGTON DR.					
West City Boundary to Fifth Ave.	12,175	13,449	35	1.0%	1.0%
Fifth Ave. to Foothill Freeway	17,274	19,081	35	1.0%	1.0%
Foothill Freeway to Monterey Ave	15,505	17,127	35	1.0%	1.0%
Monterey Ave. to Mayflower Ave.	28,721	31,725	35	1.0%	1.0%
Mayflower Ave. to Magnolia Ave.	19,513	21,555	35	1.0%	1.0%
Magnolia Ave. to Myrtle Ave.	25,495	28,162	35	1.0%	1.0%
Myrtle Ave. to Ivy. Ave.	27,894	30,813	35	1.0%	1.0%
Ivy Ave. to California Ave.	20,812	22,989	35	1.0%	1.0%
California Ave. to Shamrock Ave.	13,861	15,311	35	1.0%	1.0%
Shamrock Ave. to Mountain Ave.	17,932	19,808	35	1.0%	1.0%
Mountain Ave to East City Bndry.	27,056	29,886	35	1.0%	1.0%
MAGNOLIA AVE					
Duarte Rd. to Foothill Freeway	3,086	3,409	35	1.0%	1.0%
Foothill Freeway to Huntington Dr	5,931	6,552	35	1.0%	1.0%
Huntington Dr. to Colorado Blvd.	4,787	5,288	30	1.0%	1.0%
Colorado Blvd. Foothill Blvd.	3,434	3,793	30	1.0%	1.0%
Foothill Blvd. to Hillcrest Blvd.	1,353	1,494	30	1.0%	1.0%
MAYFLOWER AVE.					
South City Boundry to Duarte Rd.	6,452	7,127	35	1.0%	1.0%
Duarte Rd. to Foothill Freeway	7,797	8,612	35	1.0%	1.0%
Foothill Freeway to Huntington Dr	14,986	16,554	35	1.0%	1.0%
Huntington Dr. to Colorado Blvd.	10,302	11,380	30	1.0%	1.0%
Colorado Blvd. to Foothill Blvd.	6,452	7,127	30	1.0%	1.0%
Foothill Blvd. to Hillcrest Blvd.	2,073	2,290	30	1.0%	1.0%
MONTEREY AVE.					
Huntington Dr. to Colorado Blvd.	5,827	6,437	30	0.0%	0.0%
MOUNTAIN AVE.					
Duarte Rd. to Foothill Freeway	12,383	13,679	40	1.25%	1.25%
Foothill Freeway to Huntington Dr	22,477	24,829	40	1.25%	1.25%
Huntington Dr. to Royal Oaks Dr.	14,412	15,920	40	1.25%	1.25%
Royal Oaks Dr. to Foothill Blvd.	11,863	13,104	40	1.25%	1.25%

Table 3 (cont'd). Traffic Data

LOCATION	Avg. Daily Traffic Volume For Year		Speed (mph)	Truck Percentages	
	2000	2010		Medium Trucks	Heavy Trucks
MYRTLE AVE.					
South City Boundry to Duarte Rd.	21,228	23,449	40	1.25%	1.25%
Duarte Rd. to Foothill Freeway	24,974	27,587	35	1.25%	1.25%
Foothill Freeway to Huntington Dr.	26,015	28,737	35	1.25%	1.25%
Huntington Dr. to Colorado Blvd,	16,337	18,047	30	1.25%	1.25%
Colorado Blvd. to Foothill Blvd.	10,822	11,955	30	1.25%	1.25%
Foothill Blvd. to Hillcrest Blvd.	3,434	3,793	30	1.25%	1.25%
ROYAL OAKS DR.					
California Ave. to Shamrock Ave.	1,852	2,045	30	0.0%	0.0%
Shamrock Ave. to Mountain Ave.	3,122	3,448	30	0.0%	0.0%
Mountain Ave. to East City Bndry	7,284	8,046	30	0.0%	0.0%
SHAMROCK AVE.					
Duarte Rd. to Foothill Freeway	3,850	4,253	35	1.25%	1.25%
Foothill Freeway to Huntington Dr	6,244	6,897	35	1.25%	1.25%
Huntington Dr. to Royal Oaks Dr.	8,117	8,966	35	1.25%	1.25%
Royal Oaks Dr. to Foothill Blvd.	3,434	3,793	35	1.25%	1.25%

Table 4. Summary of Noise Contour Calculations – Year 2000

LOCATION	Approx. Distance from Roadway Centerline to CNEL Noise Contours, feet			
	70 dBA	65 dBA	60 dBA	55 dBA
CALIFORNIA AVE.				
South City Bndry. to Duarte Rd.	- -	- -	129	383
Duarte Rd. to Evergreen Ave.	- -	- -	148	438
Central Ave. to Huntington Dr.	- -	- -	129	383
Huntington Dr. to Colorado Blvd.	- -	- -	- -	124
Colorado Blvd. to Foothill Blvd.	- -	- -	51	155
CENTRAL AVE.				
Magnolia Ave. to Myrtle Ave.	- -	65	172	495
COLORADO BLVD.				
Fifth Ave. to Madison Ave.	- -	- -	54	169
Madison Ave. to Mayflower Ave.	- -	- -	- -	129
Mayflower Ave. to Magnolia Ave.	- -	- -	- -	123
Magnolia Ave. to Myrtle Ave.	- -	- -	- -	75
Myrtle Ave. to California Ave.	- -	- -	- -	60
California Ave. to Shamrock Ave.	- -	- -	- -	- -
DUARTE RD.				
Fifth Ave. to Mayflower Ave.	- -	147	425	1139
Magnolia Ave. to Myrtle Ave.	- -	125	360	981
Myrtle Ave. to California Ave.	- -	81	243	690
California Ave. to Shamrock Ave.	- -	70	210	604
Shamrock Ave. to Moutain Ave.	- -	70	210	605
FIFTH AVE.				
Duarte Rd. to Huntington Dr.	- -	- -	135	399
Huntington Dr. to Colorado Blvd.	- -	- -	53	163
Colorado Blvd. to Foothill Blvd.	- -	- -	- -	132
Foothill Blvd. to Hillcrest Blvd.	- -	- -	- -	- -
FOOTHILL BLVD.				
Fifth Ave. to Madison Ave.	- -	108	310	856
Madison Ave. to Mayflower Ave.	- -	115	331	909
Mayflower Ave. to Magnolia Ave.	- -	118	339	930
Myrtle Ave. to California Ave.	- -	66	179	513
California Ave. to Shamrock Ave.	- -	95	272	761
Shamrock Ave. to Mountain Ave.	- -	75	208	592

'- -' Less than 50 feet

Table 4 (cont'd). Summary of Noise Contour Calculations – Year 2000

LOCATION	Approx. Distance from Roadway Centerline to CNEL Noise Contours, feet			
	70 dBA	65 dBA	60 dBA	55 dBA
HILLCREST BLVD.				
Fifth Ave. to Madison Ave.	- -	- -	- -	- -
Mayflower Ave. to Magnolia Ave.	- -	- -	- -	- -
HUNTINGTON DR.				
West City Boundary to Fifth Ave.	- -	76	186	523
Fifth Ave. to Foothill Freeway	- -	96	254	709
Foothill Freeway to Monterey Ave.	- -	89	230	646
Monterey Ave. to Mayflower Ave.	- -	144	403	1081
Mayflower Ave. to Magnolia Ave.	- -	105	284	786
Magnolia Ave. to Myrtle Ave.	- -	130	362	981
Myrtle Ave. to Ivy. Ave.	- -	140	392	1056
Ivy Ave. to California Ave.	- -	106	287	794
California Ave. to Shamrock Ave.	- -	80	199	559
Shamrock Ave. to Mountain Ave.	- -	70	95	467
Mountain Ave to East City Bndry.	- -	131	364	986
MAGNOLIA AVE				
Duarte Rd. to Foothill Freeway	- -	- -	- -	143
Foothill Freeway to Huntington Dr.	- -	- -	89	266
Huntington Dr. to Colorado Blvd.	- -	- -	57	172
Colorado Blvd. Foothill Blvd.	- -	- -	- -	128
Foothill Blvd. to Hillcrest Blvd.	- -	- -	- -	- -
MAYFLOWER AVE.				
South City Boundry to Duarte Rd.	- -	- -	97	289
Duarte Rd. to Foothill Freeway	- -	- -	116	344
Foothill Freeway to Huntington Dr.	- -	72	216	620
Huntington Dr. to Colorado Blvd.	- -	- -	119	355
Colorado Blvd. to Foothill Blvd.	- -	- -	78	234
Foothill Blvd. to Hillcrest Blvd.	- -	- -	- -	79
MONTEREY AVE.				
Huntington Dr. to Colorado Blvd.	- -	- -	- -	116
MOUNTAIN AVE.				
Duarte Rd. to Foothill Freeway	- -	105	300	832
Foothill Freeway to Huntington Dr.	67	179	516	1350
Huntington Dr. to Royal Oaks Dr.	- -	110	328	906
Royal Oaks Dr. to Foothill Blvd.	- -	64	134	279

'- -' indicates less than 50 feet

Table 4 (cont'd). Summary of Noise Contour Calculations – Year 2000

LOCATION	Approx. Distance from Roadway Centerline to CNEL Noise Contours, feet			
	70 dBA	65 dBA	60 dBA	55 dBA
MYRTLE AVE.				
South City Boundry to Duarte Rd.	64	170	490	1291
Duarte Rd. to Foothill Freeway	- -	149	430	1150
Foothill Freeway to Huntington Dr.	- -	154	446	1188
Huntington Dr. to Colorado Blvd.	- -	78	237	675
Colorado Blvd. to Foothill Blvd.	- -	- -	152	448
Foothill Blvd. to Hillcrest Blvd.	- -	- -	- -	142
ROYAL OAKS DR.				
California Ave. to Shamrock Ave.	- -	- -	- -	- -
Shamrock Ave. to Mountain Ave.	- -	- -	- -	- -
Mountain Ave. to East City Bndry	- -	- -	- -	149
SHAMROCK AVE.				
Duarte Rd. to Foothill Freeway	- -	- -	98	293
Foothill Freeway to Huntington Dr.	- -	51	156	458
Huntington Dr. to Royal Oaks Dr.	- -	63	191	554
Royal Oaks Dr. to Foothill Blvd.	- -	- -	84	252

'- -' indicates less than 50 feet

Table 5. Summary of Noise Contour Calculations – Year 2010

LOCATION	Approx. Distance from Roadway Centerline to CNEL Noise Contours, feet			
	70 dBA	65 dBA	60 dBA	55 dBA
CALIFORNIA AVE.				
South City Bndry. to Duarte Rd.	- -	- -	142	419
Duarte Rd. to Evergreen Ave.	- -	54	163	479
Central Ave. to Huntington Dr.	- -		142	419
Huntington Dr. to Colorado Blvd.	- -	- -	- -	136
Colorado Blvd. to Foothill Blvd.	- -	- -	56	171
CENTRAL AVE.				
Magnolia Ave. to Myrtle Ave.	- -	70	189	541
COLORADO BLVD.				
Fifth Ave. to Madison Ave.	- -	- -	59	187
Madison Ave. to Mayflower Ave.	- -	- -	- -	143
Mayflower Ave. to Magnolia Ave.	- -	- -	- -	136
Magnolia Ave. to Myrtle Ave.	- -	- -	- -	83
Myrtle Ave. to California Ave.	- -	- -	- -	66
California Ave. to Shamrock Ave.	- -	- -	- -	55
DUARTE RD.				
Fifth Ave. to Mayflower Ave.	61	161	465	1233
Magnolia Ave. to Myrtle Ave.	- -	136	394	1064
Myrtle Ave. to California Ave.	- -	89	267	752
California Ave. to Shamrock Ave.	- -	77	231	659
Shamrock Ave. to Moutain Ave.	- -	77	231	659
FIFTH AVE.				
Duarte Rd. to Huntington Dr.	- -	- -	149	437
Huntington Dr. to Colorado Blvd.	- -	- -	59	179
Colorado Blvd. to Foothill Blvd.	- -	- -	- -	145
Foothill Blvd. to Hillcrest Blvd.	- -	- -	- -	- -
FOOTHILL BLVD.				
Fifth Ave. to Madison Ave.	- -	118	339	930
Madison Ave. to Mayflower Ave.	- -	125	362	987
Mayflower Ave. to Magnolia Ave.	- -	129	371	1010
Myrtle Ave. to California Ave.	- -	72	196	560
California Ave. to Shamrock Ave.	- -	104	298	826
Shamrock Ave. to Mountain Ave.	- -	81	228	646

'- -' indicates less than 50 feet

Table 5 (cont'd). Summary of Noise Contour Calculations – Year 2010

LOCATION	Approx. Distance from Roadway Centerline to CNEL Noise Contours, feet			
	70 dBA	65 dBA	60 dBA	55 dBA
HILLCREST BLVD.				
Fifth Ave. to Madison Ave.	- -	- -	- -	- -
Mayflower Ave. to Magnolia Ave.	- -	- -	- -	- -
HUNTINGTON DR.				
West City Boundary to Fifth Ave.	- -	81	203	571
Fifth Ave. to Foothill Freeway	- -	103	278	772
Foothill Freeway to Monterey Ave.	- -	95	252	704
Monterey Ave. to Mayflower Ave.	- -	157	440	1171
Mayflower Ave. to Magnolia Ave.	- -	114	311	853
Magnolia Ave. to Myrtle Ave.	- -	141	396	1064
Myrtle Ave. to Ivy. Ave.	- -	153	429	1144
Ivy Ave. to California Ave.	- -	115	314	862
California Ave. to Shamrock Ave.	- -	85	217	610
Shamrock Ave. to Mountain Ave.	- -	102	274	762
Mountain Ave to East City Bndry.	- -	142	398	1070
MAGNOLIA AVE				
Duarte Rd. to Foothill Freeway	- -	- -	52	157
Foothill Freeway to Huntington Dr.	- -	- -	98	293
Huntington Dr. to Colorado Blvd.	- -	- -	62	189
Colorado Blvd. Foothill Blvd.	- -	- -	- -	141
Foothill Blvd. to Hillcrest Blvd.	- -	- -	- -	- -
MAYFLOWER AVE.				
South City Boundry to Duarte Rd.	- -	- -	107	317
Duarte Rd. to Foothill Freeway	- -	- -	128	377
Foothill Freeway to Huntington Dr.	- -	80	237	676
Huntington Dr. to Colorado Blvd.	- -	- -	131	389
Colorado Blvd. to Foothill Blvd.	- -	- -	86	257
Foothill Blvd. to Hillcrest Blvd.	- -	- -	- -	87
MONTEREY AVE.				
Huntington Dr. to Colorado Blvd.	- -	- -	- -	142
MOUNTAIN AVE.				
Duarte Rd. to Foothill Freeway	- -	114	329	904
Foothill Freeway to Huntington Dr.	72	197	563	1457
Huntington Dr. to Royal Oaks Dr.		121	360	984
Royal Oaks Dr. to Foothill Blvd.	- -	101	301	836

'- -' indicates less than 50 feet

Table 5 (cont'd). Summary of Noise Contour Calculations – Year 2010

LOCATION	Approx. Distance from Roadway Centerline to CNEL Noise Contours, feet			
	70 dBA	65 dBA	60 dBA	55 dBA
MYRTLE AVE.				
South City Boundry to Duarte Rd.	69	187	536	1395
Duarte Rd. to Foothill Freeway	62	163	470	1245
Foothill Freeway to Huntington Dr.	64	169	488	1285
Huntington Dr. to Colorado Blvd.	- -	86	260	735
Colorado Blvd. to Foothill Blvd.	- -	55	168	490
Foothill Blvd. to Hillcrest Blvd.	- -	- -	52	157
ROYAL OAKS DR.				
California Ave. to Shamrock Ave.	- -	- -	- -	- -
Shamrock Ave. to Mountain Ave.	- -	- -	- -	72
Mountain Ave. to East City Bndry	- -	- -	54	164
SHAMROCK AVE.				
Duarte Rd. to Foothill Freeway	- -	- -	107	322
Foothill Freeway to Huntington Dr.	- -	56	171	501
Huntington Dr. to Royal Oaks Dr.	- -	69	210	605
Royal Oaks Dr. to Foothill Blvd.	- -	- -	92	276

'- -' indicates less than 50 feet

IV. Noise Control Program

The propagation of noise in a community can conceptually be considered to consist of three interrelated components: the source of the noise itself, the path over which the noise is transmitted, and the receiver (hearer) of the noise. Consequently, in considering the various approaches to controlling undesirable levels of noise exposure, modifications to one or more of these three components are required.

The most effective method of noise control involves physical or operational modifications at the source. For example, the source may be rerouted through a less sensitive area, or restrictions on operational speed, time of day or source type may be imposed. Elimination of night truck traffic on certain streets and a ban on blowing horns, are examples of such operational restrictions.

Modifications to the path along which the noise is propagated should also be considered in dealing with problems of noise exposure. In this regard, there are a wide range of options related to the use of barriers or shields between the source and the receiver. Often the most effective barrier is a wall or earth-berm/wall combination. The wall must be sufficiently high to shield the observer from all sources of noise, such as the exhaust stacks of diesel trucks, and sufficiently long to shield from the horizontal extent of the source. Alternatively, large commercial structures can be located in such a way as to shield single-family residential structures from a highway, for example. Multi-story apartment houses can be similarly used if planned so that there are no windows facing the highway, and the use of air conditioning in any building can permit occupants to close windows and doors; however, it must be recognized that these techniques themselves may present adverse effects. Careful attention to the acoustical details of wall constructions and the coverings of walls and floors can also greatly reduce the noise within any building.

As a further example, proper architectural planning can effectively limit intruding noise by ensuring that those functions that are more compatible with noise are placed in the noisier locations of the building, and that the noise sensitive areas are shielded by less sensitive areas.

The use of landscaping is often effective in alleviating noise problems, although it is usually improperly implemented because the reason for its effectiveness is usually misunderstood. Trees can provide reasonable attenuation of noise levels (on the order of 5 dB per hundred feet of thickness, up to about 10 dB maximum) if they are dense and high enough to completely shield the view of the noise source and the forested area is long enough to cover a wide angle of view. However, in most urban situations there is not sufficient room to introduce a thick enough belt of trees to yield any significant amount of attenuation, and the time involved in growing trees of sufficient height can be a major consideration. Nonetheless, even though the reduction in noise levels may not be significant, it has been found that the psychological benefit of even a moderately narrow strip of trees greatly reduces complaints about noise exposure.

Usually the most practical means of noise control for the City is modification of the portion of the path, which is closest to the receiver, namely the structure surrounding the receiver. This involves land use planning, including control of the use for development of currently vacant lands of all types, as well as conversion of existing land usage to usage more compatible with the noise exposure. Land use planning includes all the technological, planning, political, funding and operational processes essential to good management, and thereby may involve zoning processes, negotiated acquisition and condemnation.

In order to protect the citizens of the City from the adverse effects of an uncontrolled noise environment, the City of Monrovia will continue to undertake a "noise control program," including the control of noise at its source, and the attenuation of noise between the source and the receiver.

Program No. 1: The City will continue to implement and enforce the City of Monrovia's noise ordinance for the control of unnecessary and unwanted noises.

The ordinance should be enforced by the Building and Planning Department and the Police Department. The noise ordinance enforcement program should be provided with the necessary funding and expertise to ensure its effective enforcement.

Program No. 2: The City will extend the California Building Code (California Code of Regulations, Title 24, Part 2, Appendix Chapter 12) requirements for noise mitigation in the design and construction of new multi-family residential developments, hotels, motels, dormitories, and apartment houses to include all types of residential developments.

The regulations state that:

> "Interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric shall be either … Ldn or … CNEL, consistent with the noise element of the general plan."

Additionally, an acoustical design analysis shall be required of any planned residential building or structure which is to be located where the exterior CNEL or Ldn exceed 60 dB. The residential design should be such that the interior living spaces are exposed to an Ldn or CNEL of no more than 45 dB. This may be accomplished by implementing a combination of the following:

1. A reduction of the exterior noise to which the dwelling is exposed.

2. Installing sound rated windows suitable for the noise reduction required.

3. Configuring and insulating exterior walls and roofing systems to reduce the interior noise to acceptable levels.

4. Locating (or eliminating) vents, mail slots, etc., to minimize sound propagation into the home.

5. Installing forced air ventilation as needed to provide a habitable living space if the interior Ldn or CNEL level is to be met with all or some windows closed.

Program No. 3: The City may implement a noise zoning code, defining compatible land usage requirements based on the guidelines of Figure 2. The City would require an analysis of whether or not the proposed development would be in compliance with this code. If the development falls in the CNEL or Ldn range above that indicated for the normally acceptable category, noise control design steps must be included in the project plans.

Program No. 4: The City will periodically review other elements of the General Plan for inclusion of possible revisions giving recognition to noise level/land use relationships. To some degree, all the elements of the General Plan are related and interdependent. The Noise Element is closely related to a number of elements of the General Plan including Land Use, Circulation,

Housing, and Conservation and Open Space. The City should review these related elements and revise them where necessary to protect the noise environment of Monrovia.

Program No. 5: The California Motor Vehicle Code specifies maximum allowable noise levels for cars and trucks under a variety of operating conditions on State highways. The City will enforce them on City streets.

Program No. 6: Future projects within the City will reflect a consciousness on the part of the City regarding the reduction of unnecessary noise near noise-sensitive areas such as residences, schools, parks, hospitals, libraries, and convalescent homes.

Actions that can be taken to implement this program can include:

1. Maintain liaison with transportation agencies such as Caltrans and the FHWA regarding the reduction of noise from existing facilities. The design and location of new facilities will also be considered.

2. Consideration should be given to buffering noise-sensitive areas from noise-generating land uses.

3. Noise monitoring within the City will be an ongoing process conducted by the appropriate departments.

4. Ensure that the segment of the Pasadena Blue Line Extension project that would go through the City of Monrovia will be designed to meet FTA and other relevant noise criteria; close attention shall be paid to the potential adverse noise effects on residences and other noise sensitive receptors located in the vicinity of the proposed Blue Line station near the Myrtle Avenue / Duarte Road intersection, as well a along the transit route.

5. Close attention shall be paid to the noise evaluation in environmental assessments, environmental impact reports and environmental impact statements.

Program No. 7: The City will consider noise control requirements for all new equipment purchases. Noise levels produced by equipment will be considered a factor in the procurement process. Various City departments may be involved in the procurement of noise producing equipment such as compressors, air conditioners, and other fixed and mobile machinery. These types of operating equipment may be purchased with the necessary noise abating equipment installed.

V. Document Preparation Resources

1. Persons Contacted

City of Monrovia
Alice Griselle, AICP, Planning Division
Barbara Lynch, Planning Division

Regulatory Resources

- Section 1208A of the 1998 California Building Code (Title 24, Part 2, California Code of Regulations)
- City of Monrovia, Noise Control Ordinance, Chapter 9.44 of the Municipal Code.
- Land Use Compatibility, State of California General Plan Guidelines, Governor's Office of Planning and Research, 1998.

2. Document Preparers

Parsons Harland Bartholomew and Associates Inc.
100 West Walnut Street
Pasadena, California 91124
(626) 440-6224 (telephone)
(626) 440-6201 (facsimile)
Frank Wein, FAICP, DPDS, Project Manager
Greg Baer, Principal Planner
Vaidas Sekas, Associate Planner
Thanh Luc, Noise Engineer – Parsons ES