



7.0 NOISE

The state *Noise Element Guidelines* require that major noise sources be identified and quantified by preparing generalized noise contours for current and projected conditions. Significant noise sources in the Paradise study area include traffic on major roadways and highways, airports, and representative industrial activities and fixed noise sources. Please refer to Appendix C for a glossary of acoustical terminology used in this section.

Noise modeling techniques and noise measurements were used to develop generalized L_{dn} noise contours for the major roadways and fixed noise sources in the Paradise study area for existing (1990 for major roadways and 1991 for fixed noise sources) conditions.

Noise modeling techniques use source-specific data including average levels of activity, hours of operation, seasonal fluctuations, and average levels of noise from source operations. Modeling methods have been developed for a number of environmental noise sources including roadways, railroad line operations, railroad yard operations, industrial plants and airports. Such methods produce reliable results as long as data inputs and assumptions are valid. The modeling methods used closely follow recommendations made by the state Office of Noise Control, and were supplemented where appropriate by field-measured noise level data to account for local conditions. The noise exposure contours are based upon annual average conditions. Because local topography, vegetation or intervening structures may significantly affect noise exposure at a particular location, the noise contours should not be considered site specific.

A community noise survey was conducted to describe existing noise levels in noise-sensitive areas within Paradise and the Paradise study area so that noise level performance standards can be developed to maintain an acceptable noise environment.

Roadways

The Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) was used to develop L_{dn} contours for all highways and major roadways in Paradise. The FHWA model is the analytical method presently favored for traffic noise prediction by most state and local agencies, including Caltrans. Short-term (fifteen-minute) traffic noise measurements and concurrent traffic counts were conducted for State Route 191/Clark Road, Skyway, Pearson Road and Elliott Road (See Figure 7-1) on March 14, 1991. The noise measurements were made to evaluate the noise exposure due to traffic on those roadways. Using traffic data and the FHWA methodology, traffic noise levels as defined by L_{dn} were calculated for existing (1990) traffic volumes. Distances from the centerlines of selected roadways to the L_{dn} contours are summarized in Table 7-1.



These calculations do not include consideration of shielding caused by local buildings or topographical features, so the distances reported in Table 7-1 are worst-case estimates of noise exposure along roadways in the community.

Existing traffic volumes were not provided for some of the local arterials. However, Figure 7-2, prepared using the FHWA model, may be used to estimate the distance to the 60 dB L_{dn} contour for projected volumes of arterial traffic. For arterial traffic, the predicted distance to the 60 dB L_{dn} contour is determined by the average daily traffic volume (ADT) and the posted speed limit. L_{dn} contours derived from Figure 7-2 are only indicators of potential noise conflicts, requiring more detailed analysis to determine traffic noise levels at any given location.

Industrial Noise

The production of noise is a result of many industrial processes, even when the best available noise control technology is applied. Noise exposures within industrial facilities are controlled by federal and state employee health and safety regulations (OSHA and Cal-OSHA), but exterior noise levels may exceed locally acceptable standards. Commercial, recreational and public service facility activities can also produce noise which affects adjacent sensitive land uses.

The following descriptions of existing fixed noise sources in the Paradise study area are intended to be representative of the relative noise impacts of such uses, and to identify specific noise sources which should be considered in the review of development proposals. The locations of these noise sources are shown by Figure 7-1.

- **Easy Street Industrial Park.** The Easy Street Industrial Park is located on the east side and adjacent to State Route 191 near the south Paradise town limit. Currently the industrial park is approximately thirty percent built out. Existing uses at the industrial park include Fashion Optical Displays, Arlin's RV Repair, Ken's Paradise Hitch and Welding, John H. Franklin Company (paving, excavating, septic systems and general engineering), Frontier Tours, PAL Plastics, CMT Tool Company, Paradise Solid Waste Systems, Inc. and the Paradise Animal Shelter. The industrial park is also used for heavy truck and equipment storage.

Based upon field observations at the Easy Street Industrial Park, the area noise environment is dominated by State Route 191 vehicle noise. Major noise sources associated with the industrial park included heavy truck traffic, machinery, heating ventilation and air conditioning systems, and dogs barking at the animal shelter. During the field observations, none of the noise sources could be isolated from area roadway traffic noise.

The Easy Street Industrial Park has adequate room for expansion in the future. Loud or obtrusive noise sources could be located at the industrial park in the future. Uses which inherently have loud or obtrusive noise sources, and could be located at the industrial park in the future include,



but are not limited to, sand and gravel operations, asphalt and concrete batch plants, machine shops, bottling and canning operations, and heavy equipment maintenance shops.

Airport Noise

The Paradise Skypark Airport is located south of the Town of Paradise town limits in the secondary study area. It is a private, public use general aviation airport. The airport has one runway 1,990 feet in length with a heading of 17/35. Based upon the December 1988 California Department of Transportation Division of Aeronautics *California Aviation System Plan*, the Paradise Skypark Airport has twenty-three single engine piston, one multi-engine piston, and one rotor-craft piston based aircraft with a total of 10,000 annual average aircraft operations. The Butte County Airport Land Use Commission adopted a revised policy plan for the Paradise Skypark in August 1985, and a *Comprehensive Land Use Plan* (CLUP) was adopted in March 1986.

Based upon the Paradise Skypark Airport Land Use Plan, the fifty-five dB L_{dn} noise contour for aircraft operations is confined to the airport property and does not extend into the Paradise town limits (see Figure 7-3). However, existing residential uses located within the southern town limits are located under the northern end of the Paradise Skypark approach zone (see Figure 7-4).

Community Noise Survey

A community noise survey was conducted to document noise exposure in areas of the community containing noise sensitive land uses. For that purpose, noise sensitive land uses in the Paradise study area were considered to include residential areas, parks, schools, day care centers, hospitals and other medical facilities. Noise monitoring sites were selected to be representative of typical conditions in the community.

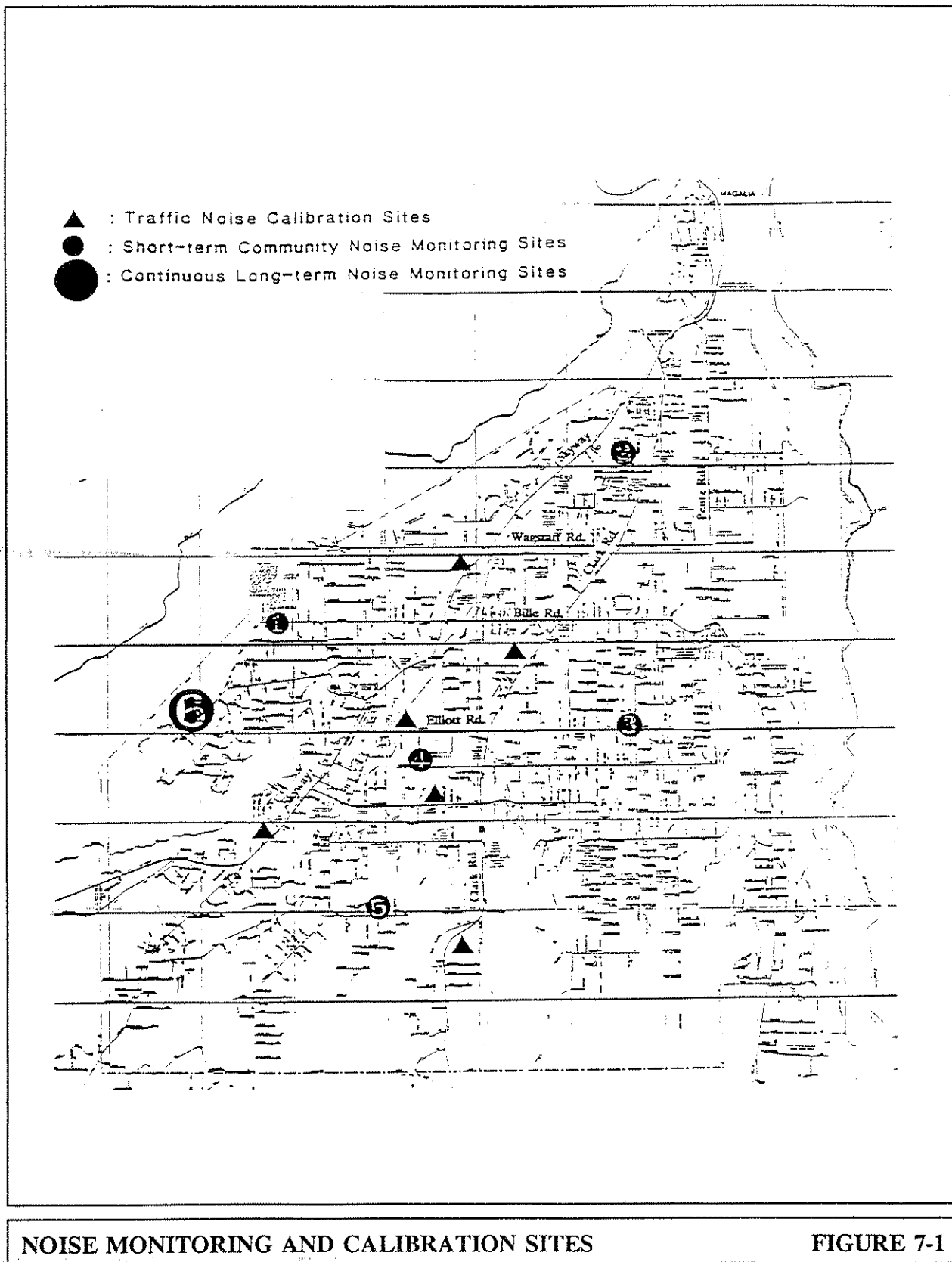
Short-term noise monitoring was conducted on March 13-14, 1991. Each site was monitored three different times during the day and night so that valid estimates of L_{dn} could be prepared. One long-term noise monitoring site was established in Paradise to record day-night statistical trends. The data collected included the L_{eq} and other statistical descriptors. Noise monitoring sites, measured noise levels and estimated L_{dn} values at each site are summarized in Table 7-2. Monitoring sites are shown by Figure 7-1.

The community noise survey results indicate that typical noise levels in noise sensitive areas of the study area are in the range of forty-five dB to fifty-six dB L_{dn} . Noise from traffic on local roadways and neighborhood activities is the controlling factor for background noise levels in the study area. In general, the areas of Paradise and the Study Area which contain noise sensitive uses are quiet.

The continuous monitoring data in Figure 7-5 show that ambient noise levels reach a minimum during the hours of 1:00-5:00 a.m., increasing during the daytime hours as a function of increased traffic and other



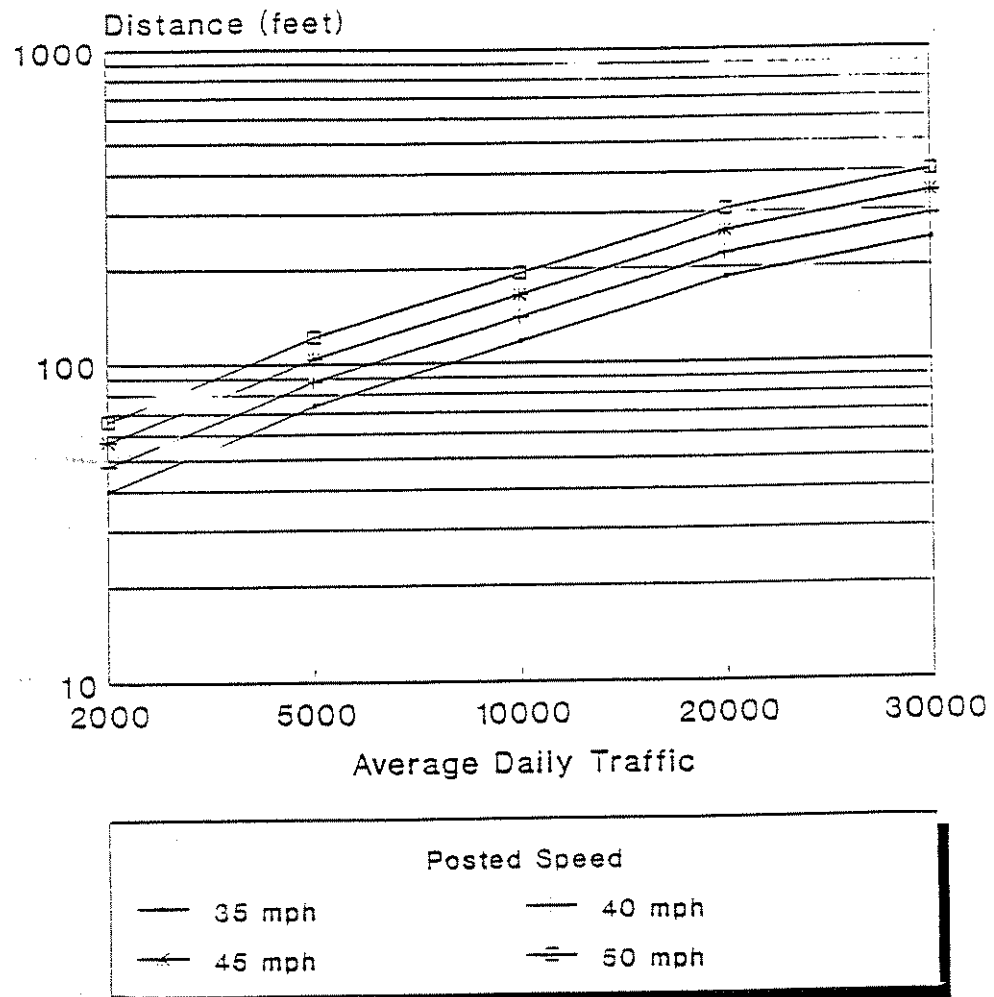
human activities. Figures 7-5, 7-6 and 7-7 show the results of the short-term community noise monitoring survey.



**TABLE 7-1
NOISE CONTOUR DATA
DISTANCE (FEET FROM CENTER OF ROADWAY
TO L_{dn} CONTOURS**

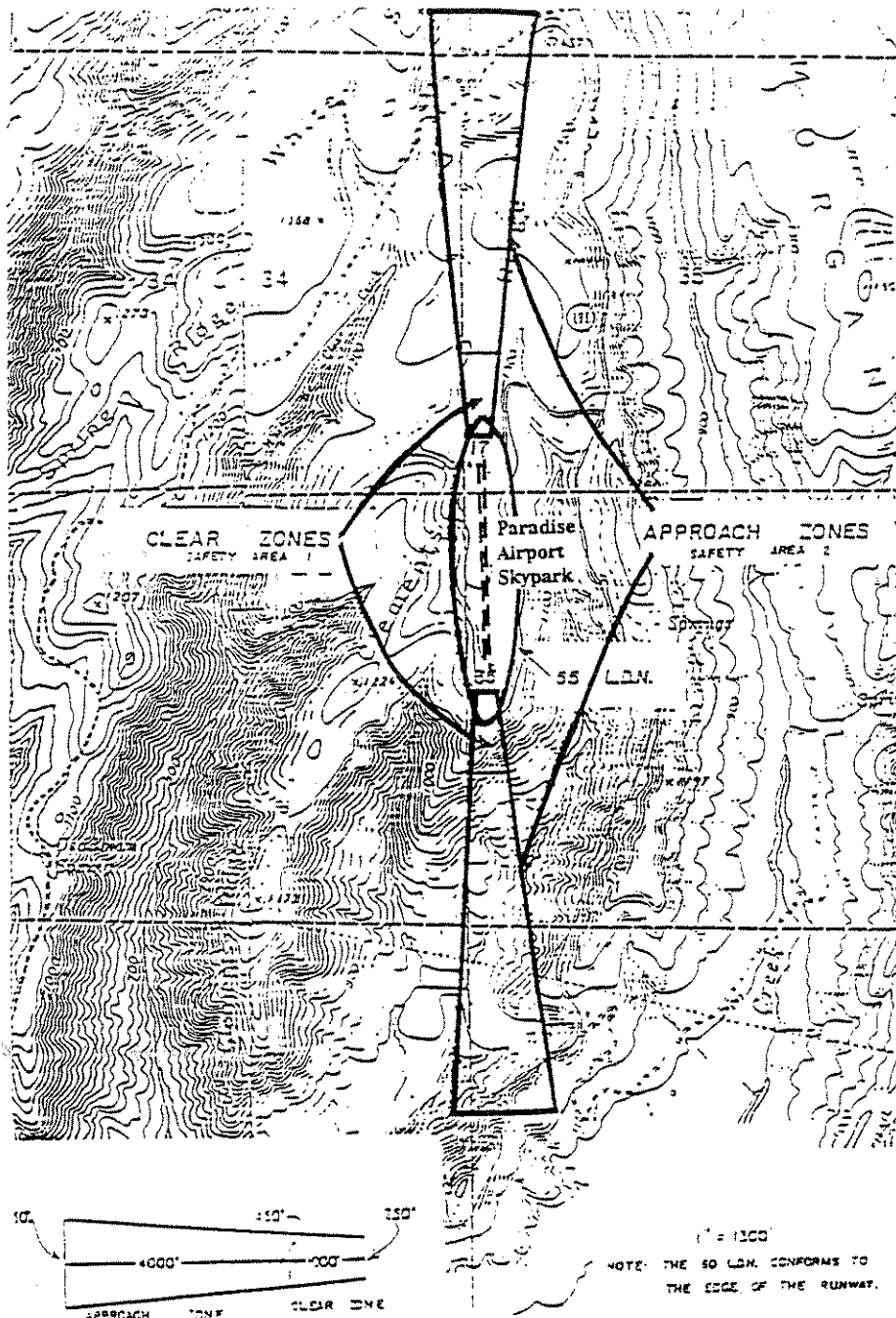
Segment	Description	Existing	
		60 dB	65 dB
SR 191/Clark Road:			
1	South town limits to Buschmann Road	144	67
2	Buschmann Road to Pearson Road	162	75
3	Pearson Road to Bille Road	175	81
4	Bille Road to Skyway	140	65
Skyway:			
5	West town limits to Pearson Road	140	65
6	Pearson Road to Wagstaff Road	156	72
7	Wagstaff Road to north town limits	102	47
Pentz Road:			
8	South town limits to Bille Road	71	33
9	Bille Road to Skyway	78	36
Pearson Road:			
10	Skyway to Clark Road	102	47
11	Clark Road to Pentz Road	68	31
Elliott Road:			
12	Skyway to Clark Road	151	70
13	Clark Road to Sawmill Road	93	43
Bille Road:			
14	Skyway to Clark Road	100	46
15	Clark Road to Pentz Road	102	47
Wagstaff Road:			
16	Skyway to Clark Road	64	30
17	Clark Road to Pentz Road	81	38

Source: Brown-Buntin Associates, Inc.



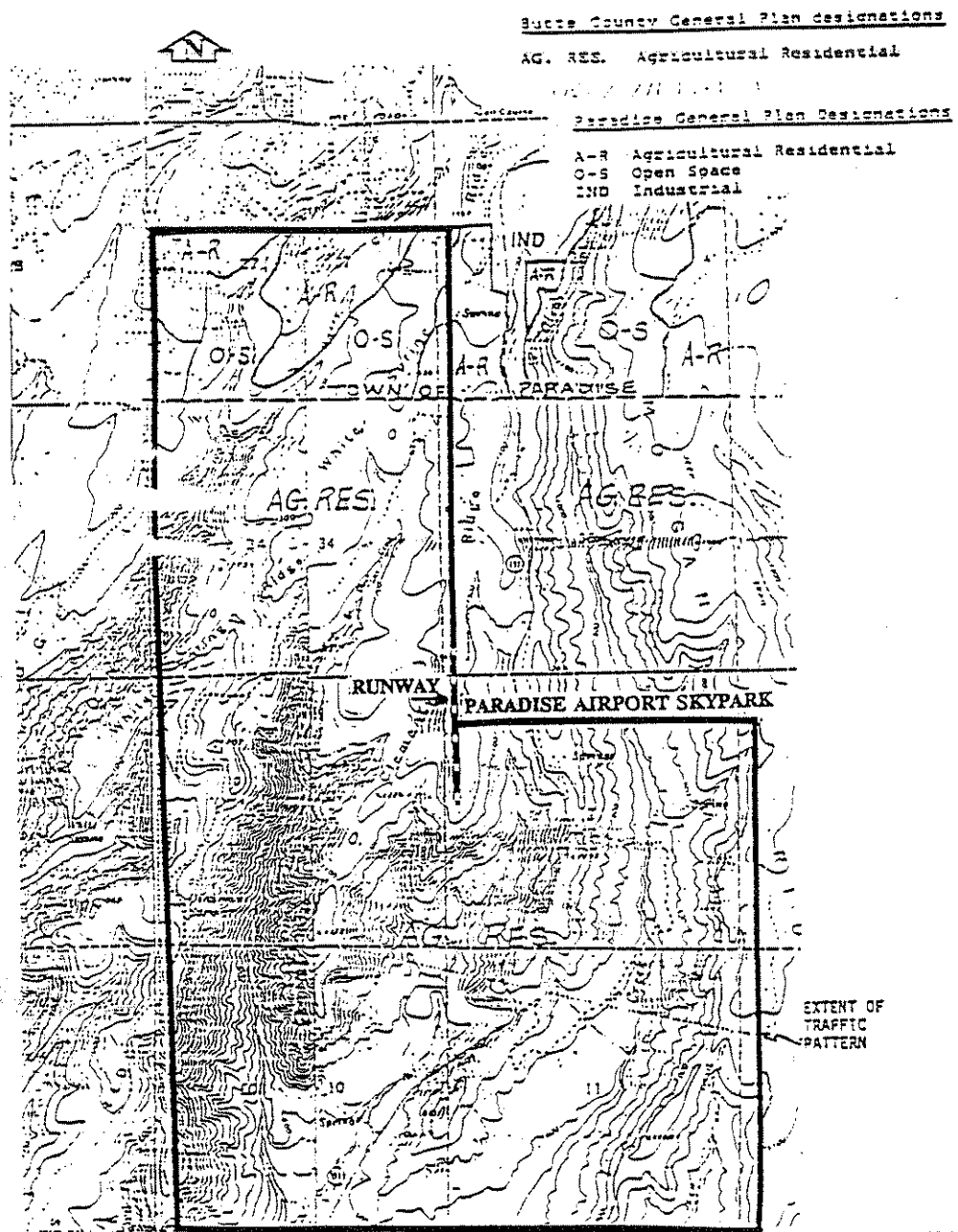
DISTANCE TO 60 dB L_{dn} CONTOUR ARTERIAL TRAFFIC

FIGURE 7-2



PARADISE SKYPARK AIRPORT APPROACH ZONE

FIGURE 7-3



PARADISE SKYPARK AIRPORT

FIGURE 7-4

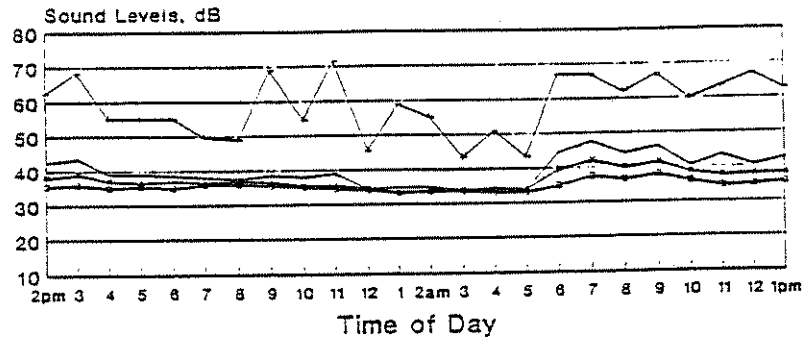
TABLE 7-2
SUMMARY OF MEASURED NOISE LEVELS AND ESTIMATED
DAY-NIGHT AVERAGE LEVELS (L_{dn}) IN AREAS
CONTAINING NOISE SENSITIVE LAND USES

Site	Location	Date	Time	Sound Level, dB					
				L ₉₀	L ₅₀	L ₁₀	L _{eq}	L _{max}	Est. L _{dn}
1	Bille Park	3/13/91	13:45	35.0	39.0	44.0	42.5	60.5	47.4
		3/14/91	22:00 09:00	37.0 40.0	40.0 44.0	43.0 45.0	40.5 44.0	58.0 49.0	
2	Ball Park	3/13/91	14:30	42.5	43.5	46.5	46.5	63.0	49.2
		3/14/91	22:15 09:30	38.0 36.5	41.0 38.0	44.5 39.5	42.5 38.5	55.0 46.5	
3	East end of Elliott Road	3/13/91	15:00	40.5	41.5	43.5	42.0	47.0	47.0
		3/14/91	22:35 10:05	39.0 35.5	40.0 37.5	41.5 42.0	40.5 40.5	46.5 54.5	
4	5921 Camino Drive	3/13/91	15:25	44.5	49.5	53.5	50.5	57.5	49.6
		3/14/91	23:00 10:30	43.5 41.5	47.5 46.0	51.0 52.5	48.5 48.5	55.5 56.0	
5	Corner of Roe and Scottwood in a wooded area	3/13/91	16:00	49.0	49.5	52.0	50.5	55.0	55.9
		3/14/91	23:15 11:05	41.0 47.5	47.5 48.0	51.5 50.0	49.5 48.5	55.0 54.0	
6	287 Valley View Drive ¹	3/13/91	16:00	35.0	37.0	41.5	39.0	55.0	45.5
		3/14/91	01:00 11:00	34.0 34.5	34.5 37.5	35.5 44.0	35.0 43.5	59.0 67.0	

¹ = Continuous monitoring site

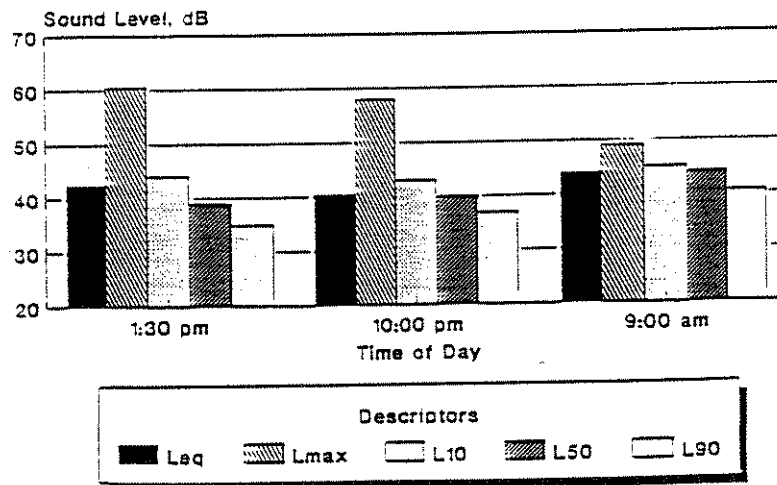
NOTE: The L₉₀ values shown represent background noise levels, where there are typically no identifiable local noise sources. The L₅₀ values represent median noise levels. The L₁₀ values represent the average noise energy during the sample periods, and show the effects of brief noisy periods. The L_{eq} were the basis of the estimated L_{dn} values. L_{max} values show the maximum noise levels observed during the samples, and are typically due to passing cars.

Hourly Noise Levels 287 Valley View Drive



March 13-14, 1991
Ldn = 46.5 dB

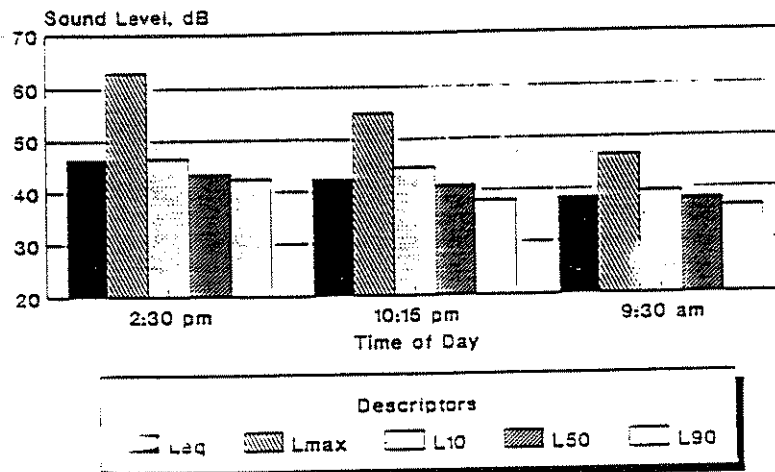
Community Noise Survey Bille Park



COMMUNITY NOISE SURVEY

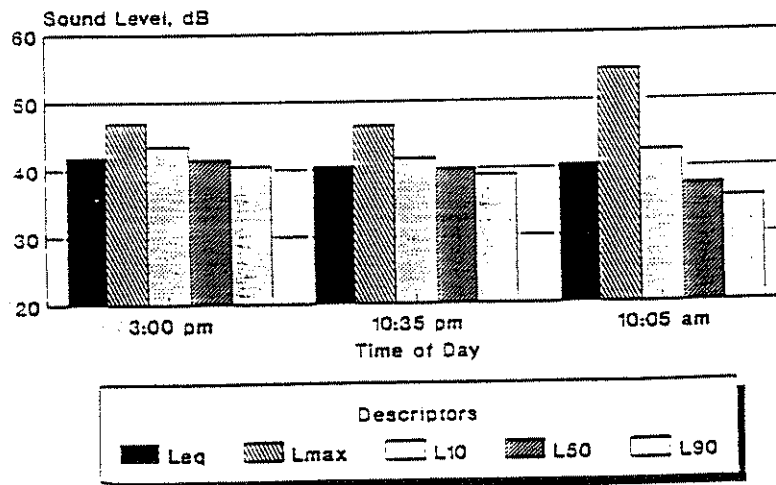
FIGURE 7-5

Community Noise Survey Ball Park



March 13-14, 1991
Ldn = 49.2 dB

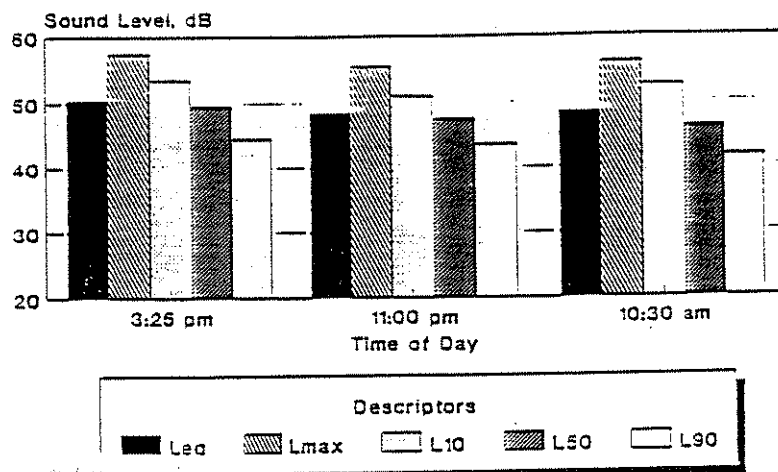
Community Noise Survey E. End of Elliot Rd.



COMMUNITY NOISE SURVEY

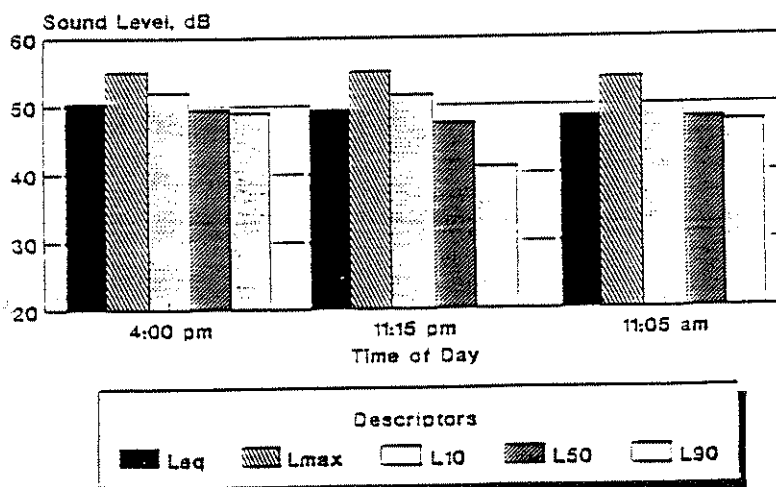
FIGURE 7-6

Community Noise Survey 5921 Camino Drive



March 13-14, 1993
Ldn = 49.6 dB

Community Noise Survey Corner of Roe and Scottwood



COMMUNITY NOISE SURVEY

FIGURE 7-7