Noise Element of the General Plan

for the

City of Solvang

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SOLVANG NOISE ELEMENT

1.1 INTRODUCTION

1.1 OVERVIEW

1.1.1 Contents of Element

The Noise Element follows the recently revised State guidelines in the State Government code Section 653021(g) and Section 46050.1 of the Health and Safety Code. The element quantifies the community noise environment in terms of noise exposure contours for both near and long-term levels of growth and traffic activity. The information will become a guideline for the development of land use policies to achieve compatible land uses and provide baseline levels and noise source identification for local noise ordinance enforcement. The Noise Element is organized as follows:

2.0 Existing Conditions/Issue Analysis

3.0 Goals, Objectives, and Policies

4.0 The Plan for Control and Management of Noise

Appendix A - Noise Measurement Results

Appendix B - Glossary

1.1.2 Key Issues

1. Transportation Noise Control - Within the City of Solvang are a number of transportation related noise sources including major arterials and collector roadways. These sources are the major contributors of noise in Solvang. Cost effective strategies to reduce their influence on the community noise environment are an essential part of the Noise Element.

2. Community Noise Control for Non-Transportation Noise Sources - Residential land uses and areas identified as noise sensitive must be protected from excessive noise from

non-transportation sources including commercial and industrial operations. These impacts are most effectively controlled through the adoption and application of a City Noise Ordinance.

3. Noise and Land Use Planning Integration - Information relative to the existing and future noise environment within Solvang should be integrated into future land use planning decisions. The Element presents the noise environment in order that the City may include noise impact considerations in development programs. Noise and land use compatibility guidelines are presented, as well as noise standards for new developments.

1.2 PURPOSE

The Noise Element of a General Plan is a comprehensive program for including noise control in the planning process. It is a tool for local planners to use in achieving and maintaining compatible land use with environmental noise levels. The Noise Element identifies noise sensitive land uses and noise sources, and defines areas of noise impact for the purpose of developing programs to ensure that Solvang residents will be protected from excessive noise intrusion.

1.3 AUTHORIZATION

The State of California has mandated that each county and city prepare a Noise Element as part of its General Plan. Section 65302(g) of the California Government Code requires specifically:

> *"(g) A Noise Element shall identify and appraise noise problems in the community. The noise element shall recognize the guidelines established by the Office of Noise Control in the State Department of Health Services and shall analyze and quantify, to the extent practicable, as determined by the legislative body, current and projected noise levels for all of the following sources:*
>
> *Highways and freeways.*
>
> *Primary arterials and major local streets.*
>
> *Passenger and freight on-line 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.

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

Noise contours shall be shown for all of the sources and stated in terms of community noise equivalent level (CNEL) or day-night average level (LDN). The noise contours shall be prepared on the basis of noise monitoring or following generally accepted noise modeling techniques for the various sources identified in paragraphs (1) to (6), inclusive. The noise contours shall be used as a guide for establishing a pattern of land uses in the land use element that minimizes the exposure of community residents to excessive noise. The Noise Element shall include implementation measures and possible solutions that address existing and forseeable noise problems, if any. The adopted noise element shall serve as a guideline for compliance with the state's noise insulation standards."

The State Guidelines for Preparation and Content of Noise Elements of the General Plan indicates that the Noise Element should present the noise environment in terms of noise contours. For those areas identified as containing noise sensitive facilities, the noise environment is determined by monitoring.

2.0 EXISTING CONDITIONS/ISSUE ANALYSIS

2.1 DEFINITION OF NOISE

1. Noise Definitions. Sound is technically described in terms of the loudness (amplitude) of the sound and frequency (pitch) of the sound. The standard unit of measurement of the loudness of sound is the Decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner similar to the Richter scale used to measure earthquakes. In terms of human response to noise, a sound 10 dBA higher than another is judged to be twice as loud; and 20 dBA higher four times as loud; and so forth. Everyday sounds normally range from 30 dB (very quiet) to 100 dB (very loud).

Examples of various sound levels in different environments are shown in Exhibit 1.

Noise has been defined as unwanted sound and it is known to have several adverse effects on people. From these known effects of noise, criteria have been established to help protect the public health and safety and prevent disruption of certain human activities. These criteria are based on such known impacts of noise on people as hearing loss, speech interference, sleep interference, physiological responses and annoyance. Each of these potential noise impacts on people are briefly discussed in the following narratives:

HEARING LOSS is not a concern in community noise problems of this type. The potential for noise induced hearing loss is more commonly associated with occupational noise exposures in heavy industry or very noisy work environments. Noise levels in neighborhoods, even in very noisy airport environs, are not sufficiently loud to cause hearing loss.

SPEECH INTERFERENCE is one of the primary concerns in environmental noise problems. Normal conversational speech is in the range of 60 to 65 dBA and any noise in this range or louder may interfere with speech. There are specific methods of describing speech interference as a function of distance between speaker and listener and voice level. Exhibit 2 shows the impact of noise and speech interference.

SLEEP INTERFERENCE is a major noise concern because sleep is the most noise sensitive human activity. Sleep disturbance studies have identified interior noise levels that have the potential to cause sleep disturbance. Note that sleep disturbance does not necessarily mean awakening from sleep, but can refer to altering the pattern and stages of sleep.

PHYSIOLOGICAL RESPONSES are those measurable effects of noise on people which are realized as changes in pulse rate, blood pressure, etc. While such effects can be induced and observed, the extent is not known to which these physiological responses cause harm or are signs of harm.

ANNOYANCE is the most difficult of all noise responses to describe. Annoyance is a very individual characteristic and can vary widely from person to person. What one person considers tolerable can be quite unbearable to another of equal hearing capability.

2.2.1 Standards

Community noise is generally not a steady state and varies with time. Under conditions of

SOUND LEVELS AND LOUDNESS OF ILLUSTRATIVE NOISES IN INDOOR AND OUTDOOR ENVIRONMENTS

(A-Scale Weighted Sound Levels)

dB(A)	OVER-ALL LEVEL Sound Pressure Level Approx. 0.0002 Microbar	COMMUNITY (Outdoor)	HOME OR INDUSTRY	LOUDNESS Human Judgement of Different Sound Levels
130	UNCOMFORTABLY	Military Jet Aircraft Take-Off With After-burner From Aircraft Carrier @ 50 Ft. (130)	Oxygen Torch (121)	120 dB(A) 32 Times as Loud
120 110	LOUD	Turbo-Fan Aircraft @ Take Off Power @ 200 Ft. (90)	Riveling Machine (110) Rock-N-Roll Band (108-114)	110 dB(A) 16 Times as Loud
100	VERY	Jet Flyover @ 1000 Ft. (103) Boeing 707, DC-8 @ 6080 Ft. Before Landing (106) Bell J-2A Helicopter @ 100 Ft. (100)		100 dB(A) 8 Times as Loud
90	LOUD	Power Mower (96) Boeing 737, DC-9 @ 6080 Ft. Before Landing (97) Motorcycle @25 Ft. (90)	Newspaper Press (97)	90 dB(A) 4 Times as Loud
80		Car Wash @ 20 Ft. (89) Prop. Airplane Flyover @ 1000 Ft. (88) Diesel Truck, 40 MPH @ 50 Ft. (84) Diesel Train, 45 MPH @ 100 Ft. (83)	Food Blender (88) Milling Machine (85) Garbage Disposal (80)	80 dB(A) 2 Times as Loud
70	MODERATELY LOUD	High Urban Ambient Sound (80) Passenger Car, 65 MPH @ 25 Ft. (77) Freeway @ 50 Ft. From Pavement Edge, 10:00 AM (76 +or- 6)	Living Room Music (76) TV-Audio, Vacuum Cleaner	70 dB(A)
60		Air Conditioning Unit @ 100 Ft. (60)	Cash Register @ 10 Ft. (65-70) Electric Typewriter @ 10 Ft. (64) Dishwasher (Rinse) @ 10 Ft. (60) Conversation (60)	60 dB(A) 1/2 as Loud
50	QUIET	Large Transformers @ 100 Ft. (50)		50 dB(A) 1/4 as Loud
40		Bird Calls (44) Lower Limit Urban Ambient Sound (40)		40 dB(A) 1/8 as Loud
	JUST AUDIBLE	(dB[A] Scale Interrupted)		
10	THRESHOLD OF HEARING			

SOURCE: Reproduced from Melville C. Branch and R. Dale Beland, Outdoor Noise in the Metropolitan Environment, Published by the City of Los Angeles, 1970, p.2.

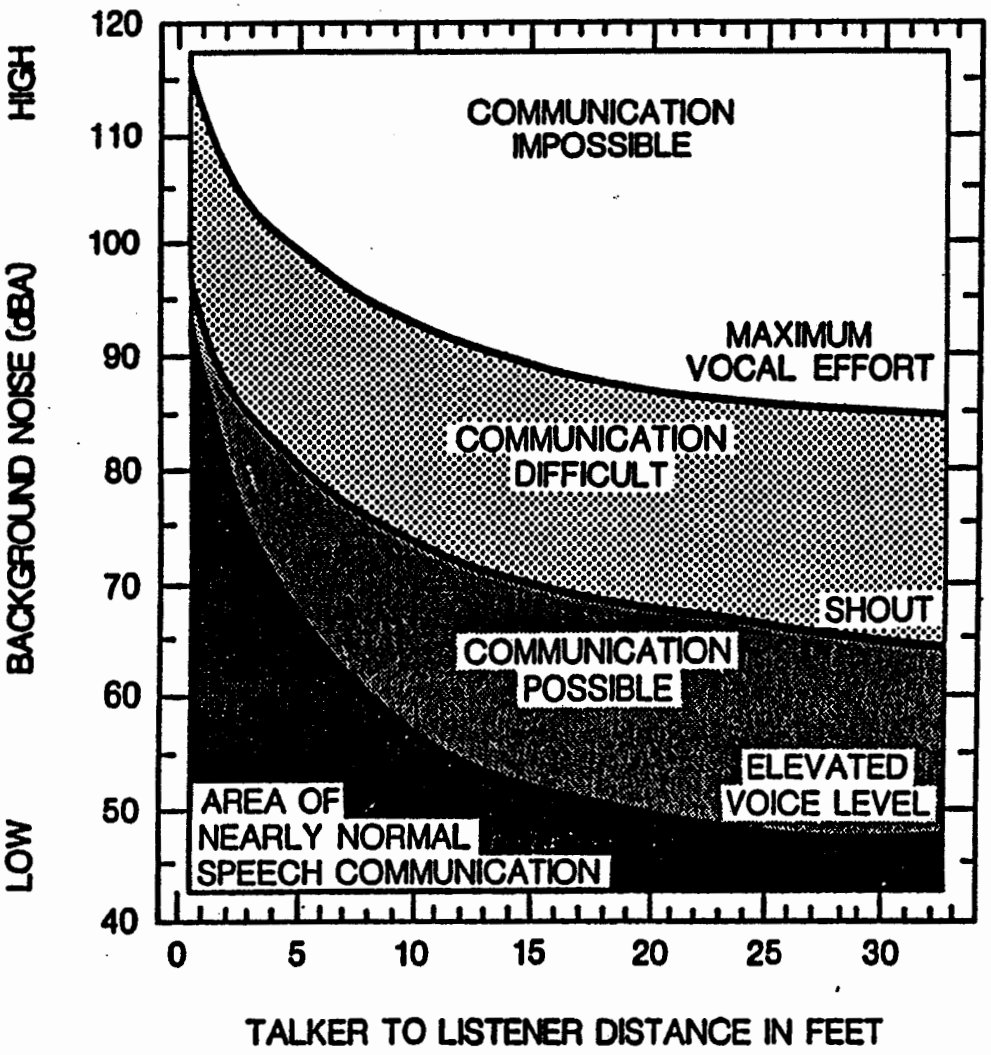


Exhibit 2
Effects of Noise on Speech Interference

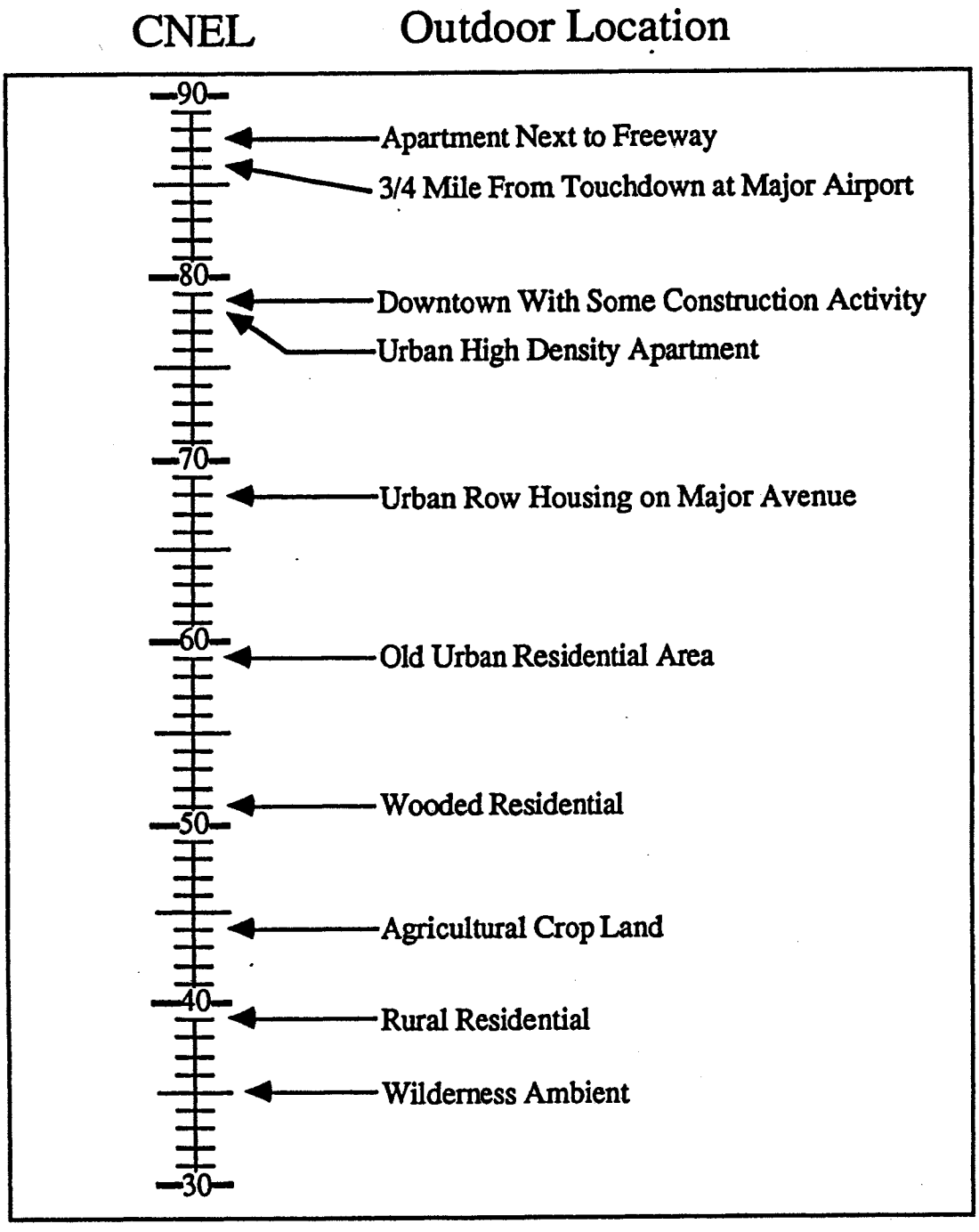
non-steady state noise, some type of statistical metric is necessary in order to quantify noise exposure over a long period of time. Several rating scales have been developed for describing the effects of noise on people. They are designed to account for the above known effects of noise on people.

Based on these effects, the observation has been made that the potential for noise to impact people is dependent on the total acoustical energy content of the noise. A number of noise scales have been developed to account for this observation. These scales are the: Equivalent Noise Level (LEQ), the Day Night Noise Level (LDN), and the Community Noise Equivalent Level (CNEL). These scales are described in the following paragraphs.

> **LEQ** is 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 the "energy" average noise level during the time period of the sample. LEQ can be measured for any time period, but is typically measured for 15 minutes, 1 hour or 24-hours.
>
> **LDN** is a 24-hour, time-weighted annual average noise level. Time-weighted refers to the fact that noise which occurs during certain sensitive time periods is penalized for occurring at these times. In the LDN scale, those events that take place during the night (10 pm to 7 am) are penalized by 10 dB. This penalty was selected to attempt to account for increased human sensitivity to noise during the quieter period of a day, where sleep is the most probable activity.
>
> **CNEL** is similar to the LDN scale except that it includes an additional 5 dBA penalty for events that occur during the evening (7pm to 10pm) time period. Either LDN or CNEL may be used to identify community noise impacts within the Noise Element. Examples of CNEL noise levels are presented in Exhibit 3.

The public reaction to different noise levels varies from community to community. Extensive research has been conducted on human responses to exposure of different levels of noise. Exhibit 4 relates LDN noise levels (approximately equal to CNEL noise levels) to community response from some of these surveys. Community noise standards are derived from tradeoffs between community response surveys, such as this, and economic considerations for achieving these levels.

Intermittent or occasional noise such as those associated with stationary noise sources is not of sufficient volume to exceed community noise standards that are based on a time averaged scale

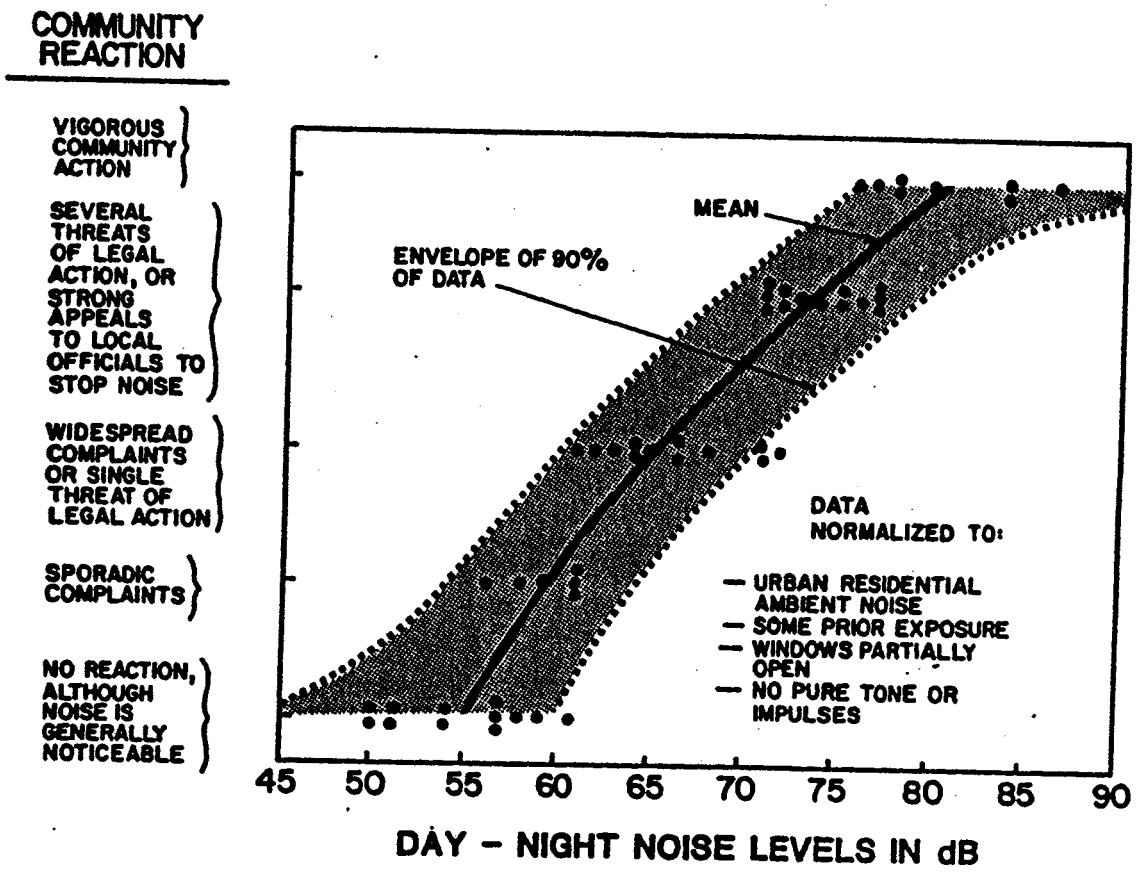


CITY OF SOLVANG

NOISE ELEMENT

Exhibit 3

Typical Outdoor Noise Levels


COMMUNITY REACTION
VIGOROUS COMMUNITY ACTION
SEVERAL THREATS OF LEGAL ACTION, OR STRONG APPEALS TO LOCAL OFFICIALS TO STOP NOISE
WIDESPREAD COMPLAINTS OR SINGLE THREAT OF LEGAL ACTION
SPORADIC COMPLAINTS
NO REACTION, ALTHOUGH NOISE IS GENERALLY NOTICEABLE
MEAN
ENVELOPE OF 90% OF DATA
DATA NORMALIZED TO:
— URBAN RESIDENTIAL AMBIENT NOISE
— SOME PRIOR EXPOSURE
— WINDOWS PARTIALLY OPEN
— NO PURE TONE OR IMPULSES
45 50 55 60 65 70 75 80 85 90
DAY – NIGHT NOISE LEVELS IN dB

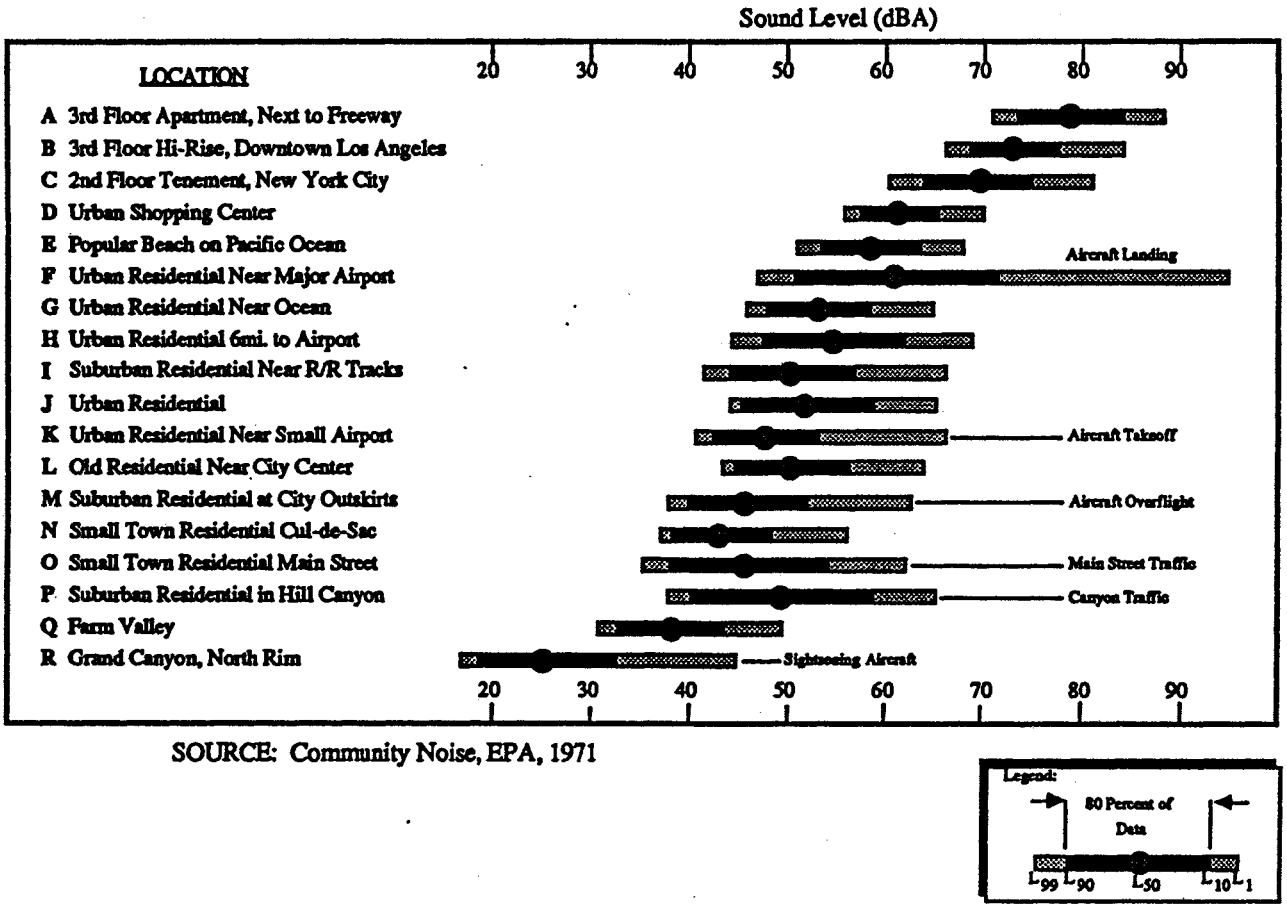
such as the LDN scale. To account for intermittent noise, another method to characterize noise is the Percent Noise Level (L%). The Percent Noise Level is the level exceeded X% of the time during the measurement period. Examples of various noise environments in terms of the Percent Noise Levels are shown in Exhibit 5.

Noise Ordinances are typically specified in terms of the percent noise levels. Ordinances are designed to protect people from non-transportation related noise sources such as music, machinery and vehicular traffic on private property. Noise Ordinances do not apply to motor vehicle noise on public streets or other transportation related noise sources that are preempted by the State or Federal government.

Noise/Land Use Compatibility Guidelines. The purpose of this section is to present information regarding the compatibility of various land uses with environmental noise. It is from these guidelines and standards, that the City of Solvang Noise Criteria and Standards have been developed. Noise/Land use guidelines have been produced by a number of Federal and State agencies including the Federal Highway Administration, the Environmental Protection Agency, the Department of Housing and Urban Development, the American National Standards Institute and the State of California. These guidelines, presented in the following paragraphs, are all based upon cumulative noise criteria such as LEQ, LDN or CNEL.

The ENVIRONMENTAL PROTECTION AGENCY published in March 1974 a very important document entitled "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare With an Adequate Margin of Safety" (EPA 550/9-74-004). Exhibit 6 presents a table of land uses and requisite noise levels. In this table, 55 LDN is described as the requisite level with an adequate margin of safety for areas with outdoor uses, this includes residences, and recreational areas. The EPA "levels document" does not constitute a standard, specification or regulation, but identifies safe levels of environmental noise exposure without consideration for economic cost for achieving these levels.

The FEDERAL HIGHWAY ADMINISTRATION (FHWA) has adopted and published noise abatement criteria for highway construction projects. The noise abatement criteria specified by the FHWA are presented in Exhibit 7 in terms of the maximum one hour Noise Equivalent Level (LEQ). The FHWA noise abatement criteria basically establishes an exterior noise goal for residential land uses of 67 LEQ and an interior goal for residences of 52 LEQ. The noise abatement criteria applies to private yard areas and assumes that typical wood frame homes with windows open provide 10 dB noise reduction (outdoor to indoor) and 20 dB noise



SOURCE: Community Noise, EPA, 1971

CITY OF SOLVANG

NOISE ELEMENT

Exhibit 5 - Examples of Daytime Outdoor Noise Levels

	Measure	Indoor Activity Interference	Indoor Hearing Loss Consideration	Indoor To Protect Against Both Effects (b)	Outdoor Activity Interference	Outdoor Hearing Loss Consideration	Outdoor 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)

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. (See Figure D-2 for noise levels as a function of distance which allow satisfactory communication.)
b. Based on lowest level.
c. Based only on hearing loss.
d. An $L_{eq(8)}$ 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 L_{eq} 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 : EPA

ACTIVITY CATEGORY	DESIGN NOISE LEVEL - LEQ	DESCRIPTION OF ACTIVITY CATEGORY
A	57 (Exterior)	Tracts of land in which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of open spaces, or historic districts which are dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas and parks which are not included in category A and residences, motels, hotels, public meeting rooms, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Category A or B above.
D	-	For requirements of undeveloped lands see FHWA PPM 773.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

reduction with windows closed.

The STATE OF CALIFORNIA requires each City and County to adopt Noise Elements of their General Plans. Such Noise Elements must contain a Noise/Land Use compatibility matrix. A recommended (but not mandatory) matrix is presented in the "Guidelines for the Preparation and Content of Noise Elements of the General Plan," (Office of Noise Control, California Department of Health, February 1976). Exhibit 8 presents this recommended matrix.

2.2.2 Methods of Measurement

The noise environment in Solvang was determined through the employment of a comprehensive noise measurement survey of existing noise sources and incorporating these results into computer noise models to model the noise environment (it is, of course, impossible to measure future noise levels so we must rely on computer noise models for future noise estimates). The noise environment is commonly presented graphically in terms of lines of equal noise levels, or noise contours. The following paragraphs detail the methodology used in the measurement survey and computer modeling of these results into noise contours.

Measurement Procedure. Fourteen sites were selected for measurement of the noise environment in Solvang. Discussions with City staff and identification of major noise sources in the community provided the initial base for development of the community noise survey. The measurement locations were selected on the basis of proximity to major noise sources and noise sensitivity of the land use.

The measurement locations are depicted in Exhibit 9. The Solvang Noise Element measurement survey utilized the Bruel and Kjaer Model 2230 Portable Noise Monitor. This instrument automatically calculates both the Equivalent Noise Level (LEQ) and the maximum and minimum noise levels for any specific time period. The system was calibrated with a Bruel and Kjaer calibrator with calibration traceable to the National Bureau of Standards. Calibration for the calibrator is certified through the duration of the measurements by Bruel & Kjaer. This measurement system satisfies the ANSI (American National Standards Institute) Standards 1.4 for Type 1 precision noise measurement instrumentation.

Based upon the identification of the major noise sources and the location of sensitive receptors, a noise measurement survey was conducted. The function of the survey is threefold. The first

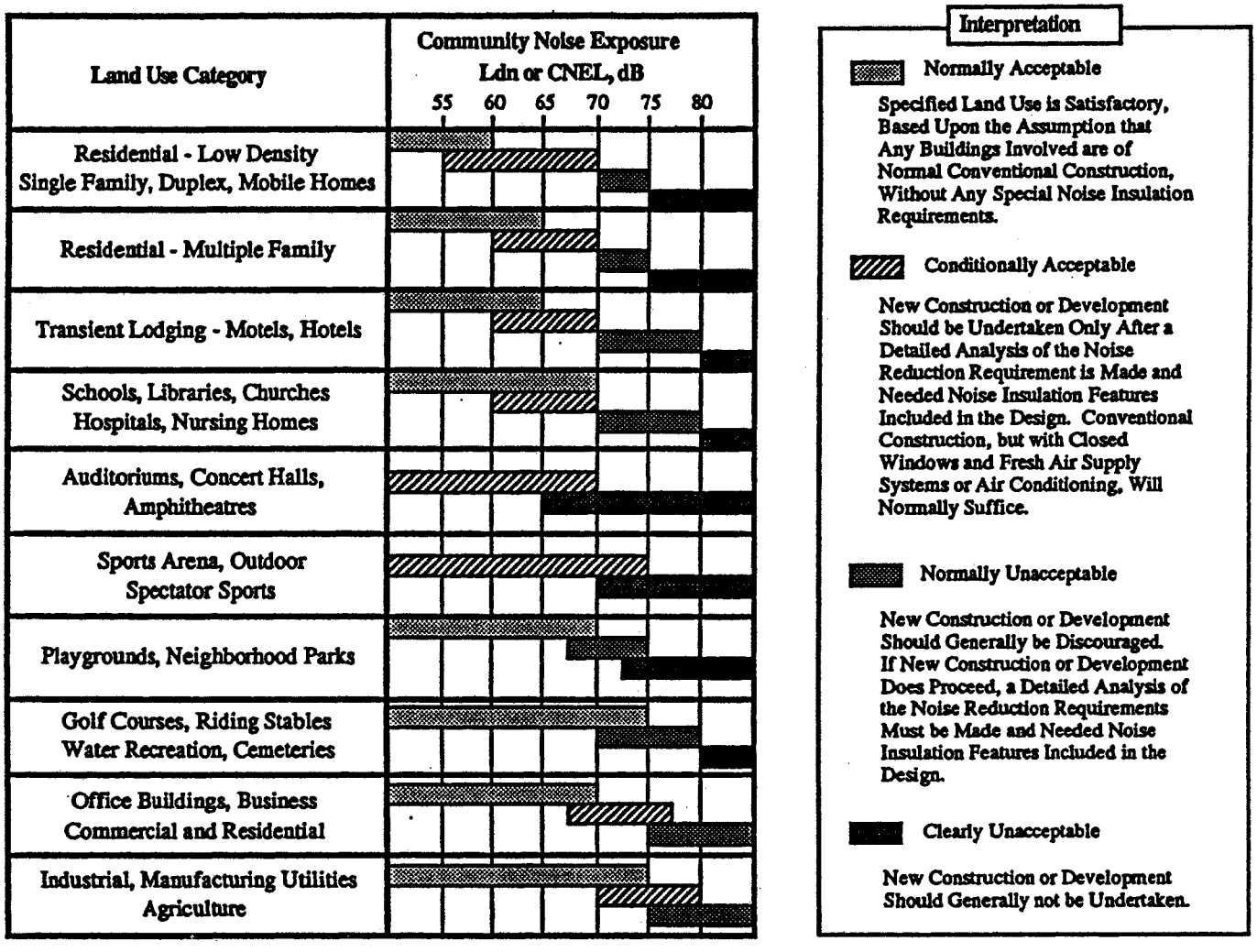
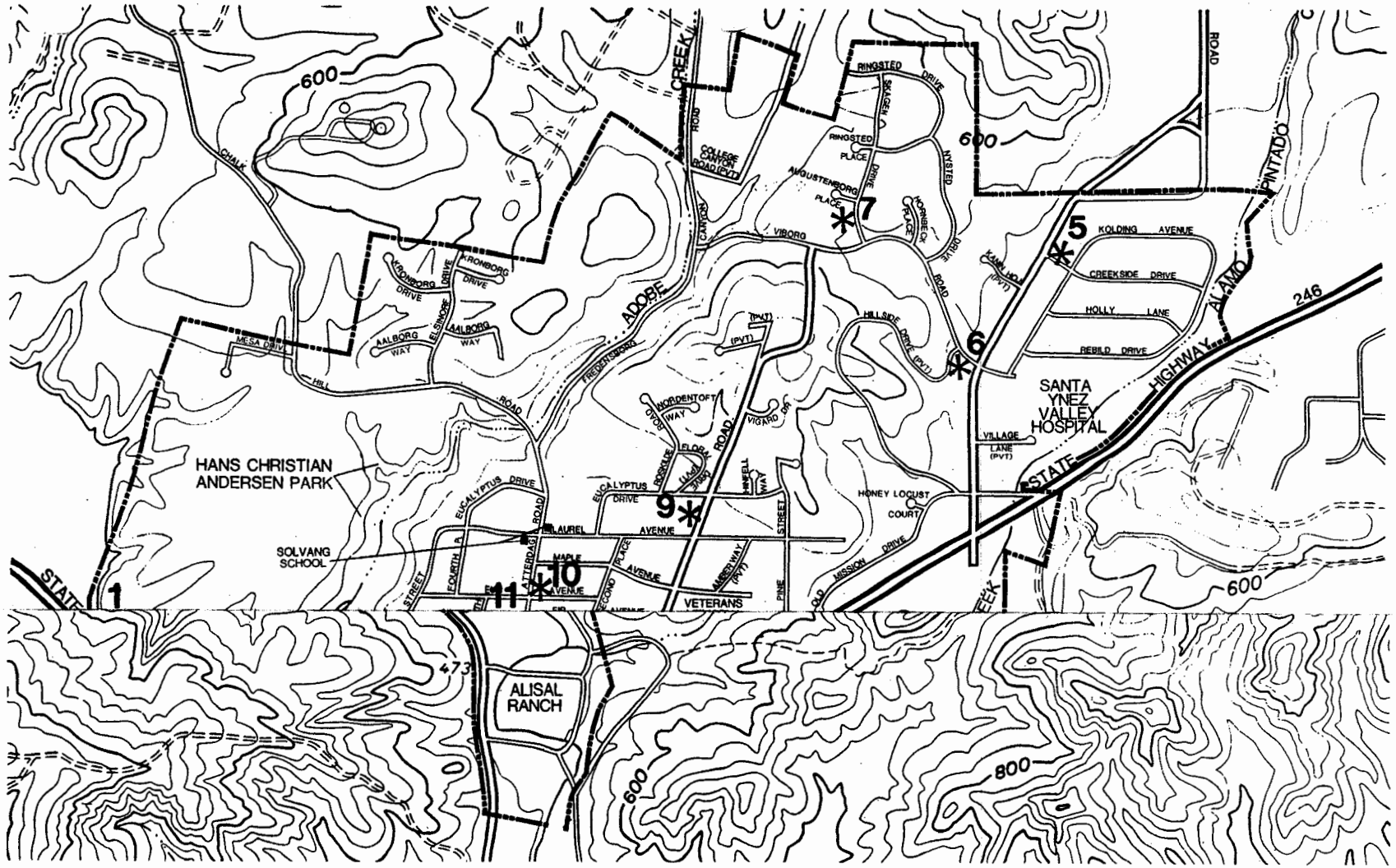


Exhibit 8 - California Land Use Compatiblity Studies



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Noise Measurement Locations

SOLVANG GENERAL PLAN

CITY OF SOLVANG

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MILES

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EXHIBIT 9

is to determine the existing noise levels at noise sensitive land uses. The second function is to provide empirical data for the correlation and calibration of the computer modeled noise environment. A third important aspect of the survey is to obtain an accurate description of the ambient noise levels in various communities throughout the City. The noise measurements were divided into two categories; ambient traffic noise and stationary source measurements. The ambient traffic noise measurements were designed to provide a "snapshot" indication of the traffic noise at the measurement site. (The noise contours based on the CNEL noise scale are perhaps a better indicator of the traffic noise at a given location.) The ambient traffic noise measurements were also used to provide an indication as to the validity of the FHWA traffic noise model used for the CNEL noise projections. The stationary source measurements (Site 2) were used to evaluate the batch plant operations.

Noise contours for all of the major noise sources in Solvang were developed based upon future traffic conditions. These contours were determined from the traffic levels for these sources. The contours are expressed in terms of the Community Noise Equivalent Level (CNEL). The existing conditions scenario is derived from 1987 traffic levels and environmental conditions. Future conditions are presented for the buildout of the General Plan.

2.3 EXISTING ACOUSTIC ENVIRONMENT

This section contains a detailed description of the current noise environment within the City. This description of the noise environment is based on an identification of noise sources and noise sensitive land uses, a community noise measurement survey and noise contour maps.

To define the noise exposure, this section of the report first identifies the major sources of noise in the community. The sources of noise in Solvang include: State Highway 246, arterial roadways, and the batch plant at the west end of town. To completely assess the noise environment in the City, noise sensitive receptors must also be identified. As mandated by the State, noise sensitive receptors include, but are not limited to, residential areas, areas containing schools, hospitals, rest homes, long-term medical or mental care facilities, or any other land use areas deemed noise sensitive by the local jurisdiction.

2.3.1 Noise Sources and Levels

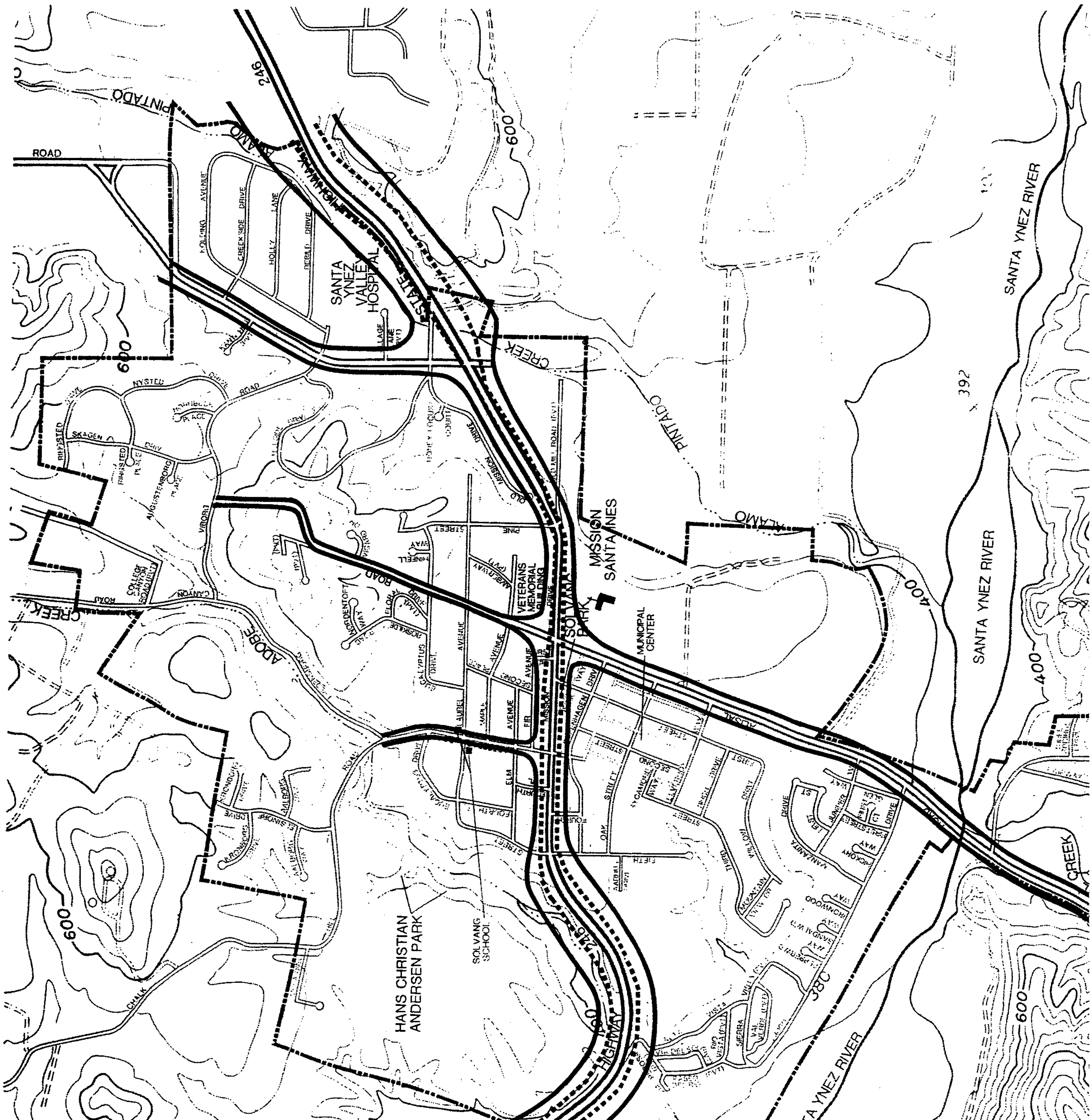
The predominant land use in the City is residential, and should also be considered the most noise sensitive. Other noise sensitive land uses include schools, hospitals, libraries and parks. In some ways the tourist/commercial area might also be considered noise sensitive. Maintenance of a relatively quiet ambience is important to maintaining the overall atmosphere of the area.

The predominant noise source in Solvang originates from motor vehicles. Several major arterial roadways pass through the City. The main roadway of concern is State Highway 246. The only other major source of noise within the city was found to be the batch plant at the west end of town near the highway. The noise levels generated by the batch plant as measured in the adjacent residential area were in a range that is normally considered to be acceptable. Maximum noise levels just under 70 dBA were measured at the nearby residences and were attributable to the batch plant trucks reverse warning beepers. Discussions with the local residents indicated that the noise levels are substantially higher periodically. If this is the case the batch plant noise levels may need to be controlled through the adoption and application of a Noise Ordinance.

Other noise sources monitored during the noise survey included high aircraft overflights, air conditioning units on commercial buildings, and human speech. None of these noise sources monitored appeared to be excessively loud, an in fact, they always contributed to the lower levels of ambient noise as opposed to the higher levels usually generated by traffic.

The noise environment for Solvang can be described using noise contours developed for the major noise sources within the City. The major noise source impacting the City is traffic noise. Existing and future noise contour maps have been developed for the City as part of this noise element.

The traffic noise contours for existing conditions are presented on Exhibit 10. (This map is available for review at the City at 1" = 800' scale.) The noise contours in a tabular format are presented in Table 2. The 55, and 60 CNEL contour levels are shown on the map. These traffic noise levels were computed using the Highway Noise Model published by the Federal Highway Administration ("FHWA Highway Traffic Noise Prediction Model,"


SANTA YNEZ RIVER
SANTA YNEZ RIVER
SANTA YNEZ RIVER
SANTA YNEZ RIVER
HANS CHRISTIAN ANDERSEN PARK
SOLVANG SCHOOL
MUNICIPAL CENTER
MISSION SANTA INES
VETERANS MEMORIAL BUILDING
SOLVANG PARK
SANTA YNEZ VALLEY HOSPITAL
STATE HIGHWAY
246
PINTADO
ALAMO
ADOBE
CANYON
ROAD
CREEK
CHALK
600
400
392
385
38C

FHWA-RD-77-108, December 1978). The FHWA Model uses traffic volume, vehicle mix, vehicle speed, and roadway geometry to compute the LEQ noise level. A computer code has been written which computes equivalent noise levels for each of the time periods used in CNEL. Weighting these noise levels and summing them results in the CNEL for the traffic projections used. The traffic data used to project these noise levels are derived from the Circulation Element for the City. The traffic mixes and time distributions for the arterials are presented in Table A1. The traffic mix data for the arterials are based on measurements for roadways in Southern California and are considered typical for arterials in this area.

Table A-1
TRAFFIC DISTRIBUTION PER TIME OF DAY
IN PERCENT OF ADT

	PERCENT OF ADT		
VEHICLE TYPE	DAY	EVENING	NIGHT
Automobile	75.51	12.57	9.34
Medium Truck	1.56	0.09	0.19
Heavy Truck	0.64	0.02	0.08

It appears that 60 CNEL for outdoor living areas and 40 CNEL for indoor areas may be a very reasonable noise standard for new developments, and a reasonable long term goal for existing residential areas. Most cities have adopted 65 CNEL and 45 CNEL noise standards for outdoor and indoor living areas, respectively. The 60 CNEL/40 CNEL standard will provide a better noise environment that many residents in other communities have desired, but unlike most other communities it is readily acheivable in the City of Solvang. The noise contour map indicates that currently and in the future 60 CNEL is only exceeded significantly along Highway 246. The remaining portions of the City experience noise levels generally of 55 CNEL or less. Adoption of the lower noise standards would be a statement by the City that they view the current quiet in the City as very important and something that should be preserved and carried into new developments.

TABLE 1
EXISTING (1988) TRAFFIC NOISE CONTOURS

Roadway	ADT	Speed	Distance to CNEL Contour (feet) 70 CNEL	65 CNEL	60 CNEL	55 CNEL
Highway 246						
West of Reposa	17.9	45	46	99	213	460
Reposa to 5th Street	16.9	45	44	95	205	442
5th Street to Alisal	16.9	30	23	49	105	227
Alisal to Alamo Pintado	20.2	30	26	55	119	256
East of Alamo Pintado	19.2	50	57	123	266	572
Atterdag Road						
North of Hwy 246	4.4	30	9	20	43	93
Alisal Road						
Hwy 246 to Viborg	4.4	30	9	20	43	93
Hwy 246 to Fjord	9.2	35	19	42	90	195
South of Fjord	4.6	45	19	40	86	186
Alamo Pintado Road						
Hwy 246 to Viborg	7.0	40	20	44	94	203
North of Viborg	3.3	45	15	32	69	149

ADT - Average Daily Traffic based on 1987 traffic counts by DKS Traffic Consultants.
Speed - Speed is in miles per hour.

One approach to reducing the noise levels along Highway 246 that has been suggested is to limit truck traffic on Highway 246. The truck percentages on this roadway were investigated. At each measurement site along Highway 246 counts of trucks were taken. Our counts of trucks ranged from 3 to 6 percent trucks. (Higher truck percentages were counted near the entrance to the batch plant at the west end of town.) The California Department of Transportation counts indicate a truck percentage of slightly over 3 percent on Highway 246 in this area. In other words, the truck percentage on Highway 246 is not excessively high, and is typical of the truck percentages on most arterial roadways. Elimination of the trucks from Highway 246 by itself will not result in a significant noise reduction.

2.3.2 Noise Sensitive Land Uses

The most noise sensitive land use in Solvang is residential development. It is considered especially noise sensitive because (1) considerable time is spent by individuals at home, (2) significant activities occur outdoors, and (3) sleep disturbance is most likely to occur in a residential area. Additionally, the City of Solvang has a number of public and private educational facilities, churches, and hospitals that are considered noise sensitive. The location of residential areas, schools, hospitals, and parks are shown on Exhibit 11. The distribution of these facilities varies from quiet residential areas to major arterial roadways.

The tourist recreation/commercial area may in some ways also be considered noise sensitive. Typical commercial areas are considered relatively insensitive to noise. However, the tourist recreation/commercial area in downtown Solvang has attempted to establish a peaceful, "old world" atmosphere. Tourist spend a considerable amount of time outdoors either window shopping or eating at the many outdoor restaurant areas. Therefore, this area is more sensitive to noise than other commercial areas.

The determination of the major noise sources and the identification of noise sensitive receptors provide the basis of developing a community noise survey. The noise measurement survey was conducted at locations which reflect the noise levels at these facilities. The measurement sites were split into two categories; (1) sites impacted by non stationary (traffic) noise sources and quiet ambient environments, and (2) Site 2 which is impacted by noise from the batch plant.

Noise contours represent lines of equal noise exposure, just as the contour lines on a topographic map are lines of equal elevation. The contours shown on the maps are the 60, and 55 CNEL noise level for the traffic noise contours. The noise contours presented should be used as a guide for land use planning. The 55 CNEL contour defines the Noise Referral Zone. This is the noise level for which noise considerations should be included when making land use policy decisions. The 60 CNEL contour describes the areas for which new noise sensitive developments will be permitted only if appropriate mitigation measures are included such that the standards contained in this Element are achieved.

The contours presented in this report are a graphic representation of the noise environment.

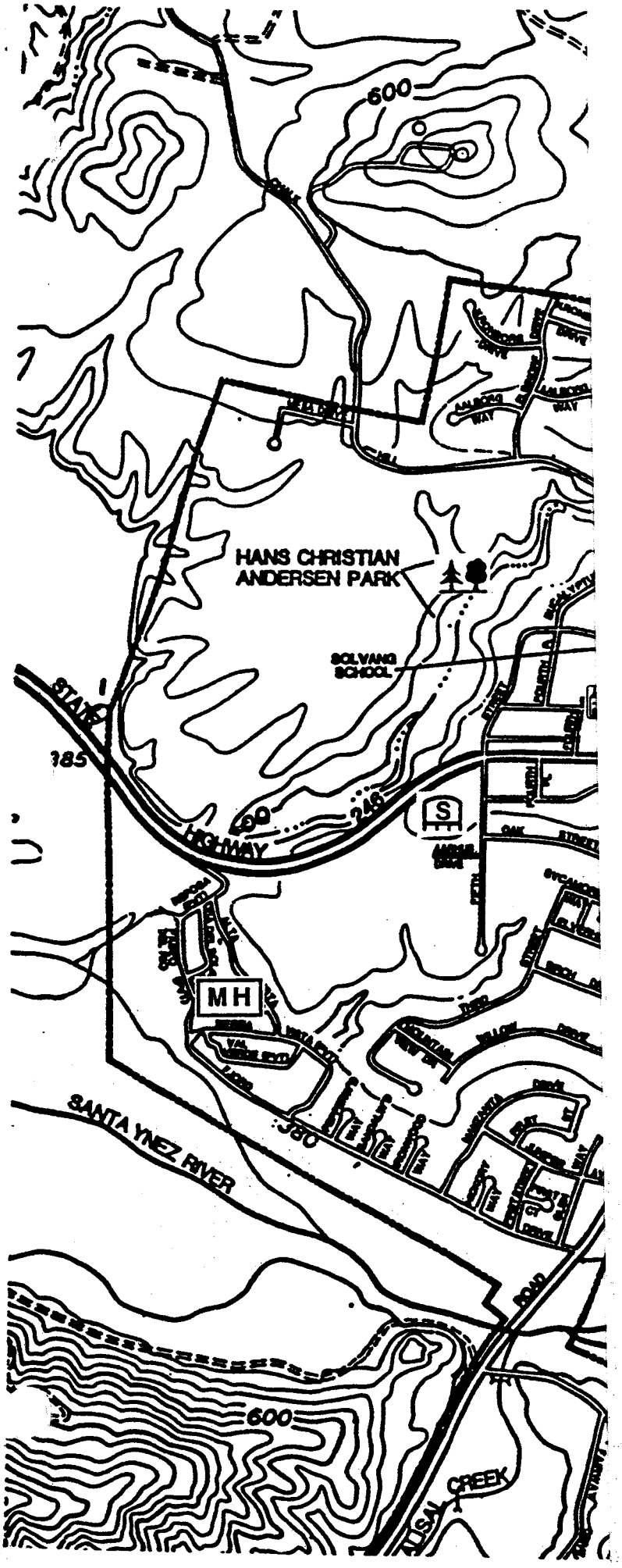


Exhibit 11

Noise Sensitive Land Uses

Topography and intervening buildings or barriers have a very complex effect on the propagation of noise. This topographic effect is not included in these contours.

2.4 FUTURE ACOUSTIC ENVIRONMENT

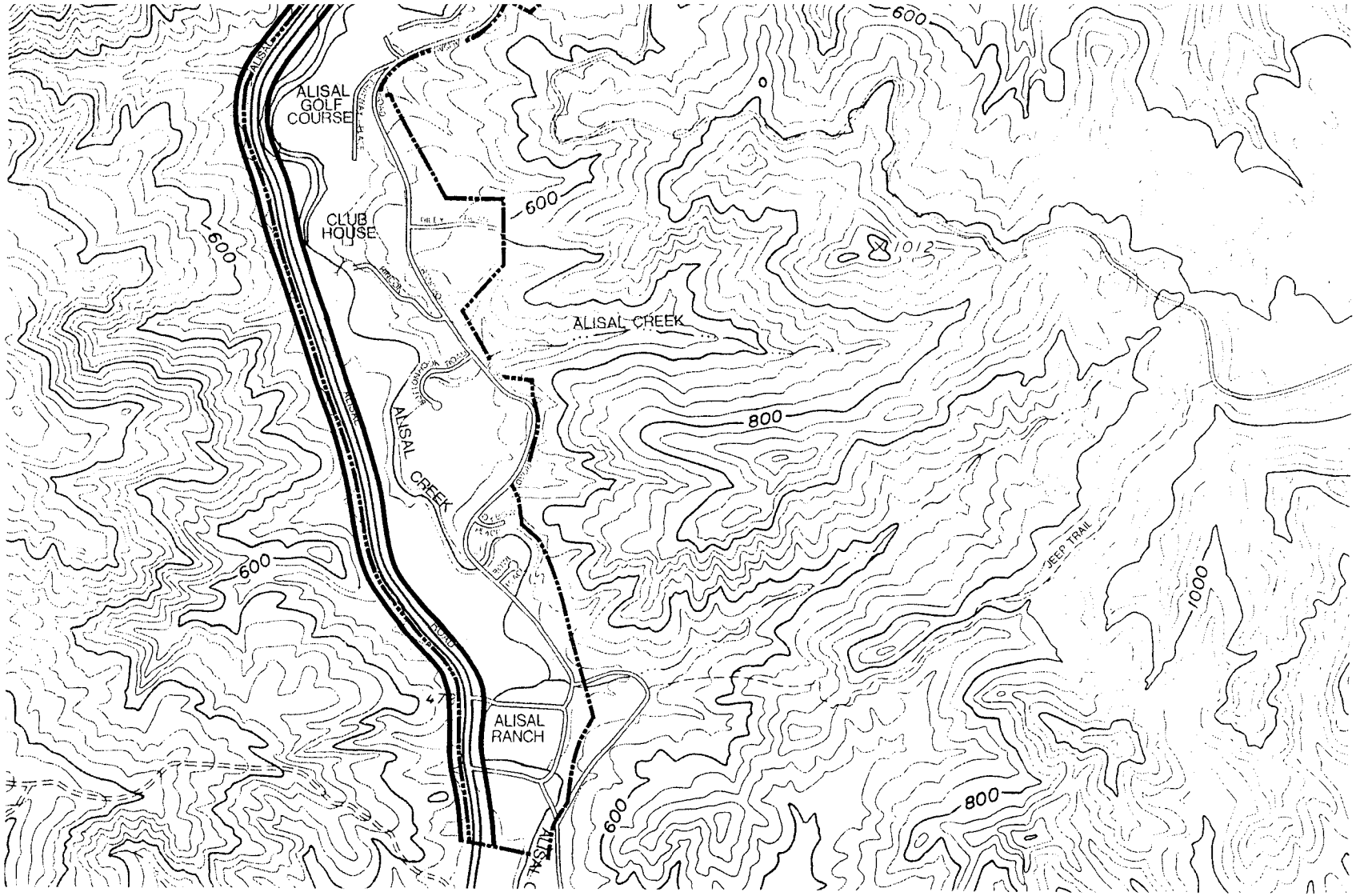
2.4.1 Noise Sources and Levels

Future traffic noise levels have been computed using the FHWA Highway Traffic Noise Prediction Model and projected traffic volumes presented in the circulation element. Table 2 and Exhibit 12 show the traffic noise contours along the city's principal highways that are projected to occur following buildout of the proposed general plan.

TABLE 2

FUTURE TRAFFIC NOISE CONTOURS (YEAR 2008)

Roadway	ADT	Speed	Distance to CNEL Contour (feet) 70 CNEL	65 CNEL	60 CNEL	55 CNEL
Highway 246						
West of Reposa	24.9	45	57	124	266	574
Reposa to 5th Street	19.0	45	48	103	222	478
5th Street to Alisal	19.0	30	25	53	114	246
Alisal to Alamo Pintado	22.5	30	28	59	128	275
East of Alamo Pintado	19.7	50	58	125	270	582
Atterdag Road						
North of Hwy 246	4.5	30	9	20	44	94
Alisal Road						
Hwy 246 to Viborg	5.3	30	10	23	49	105
Hwy 246 to Fjord	6.0	35	15	32	68	147
South of Fjord	5.4	45	21	45	96	207
Alamo Pintado Road						
Hwy 246 to Viborg	10.0	40	26	55	119	257
North of Viborg	5.0	45	20	42	91	196
Southeast Bypass	5.2	45	20	43	94	202
Southwest Bypass	5.1	45	20	43	92	199
Laurel Avenue Extension	0.25	30	1	3	6	14
Pine Street Extension	2.5	40	10	22	47	102



55 CNEL CONTOUR

60 CNEL CONTOUR

SOURCE: MESTRE GREVE ASSOCIATES

Future CNEL Noise Contours

SOLVANG GENERAL PLAN

CITY OF SOLVANG

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MILES

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EXHIBIT 12

Based on current and future traffic levels the only area of the City that experiences noise levels in excess of 60 CNEL is along Highway 246. Much of the land uses along this roadway are commercial or business uses which are generally considered insensitive to noise. However, there are some uses along this road which are considered noise sensitive; including, residences and a school. Other uses along this roadway which may be considered as noise sensitive include a park, grounds of the Santa Ines Mission, tourist/commercial areas, and the Santa Ynez Hospital. Therefore, future planning for the City should be directed at reducing noise levels along Highway 246, and limiting the future siting of noise sensitive land uses along the highway.

Table 3 shows the difference between existing traffic noise levels and those that would occur at general buildout.

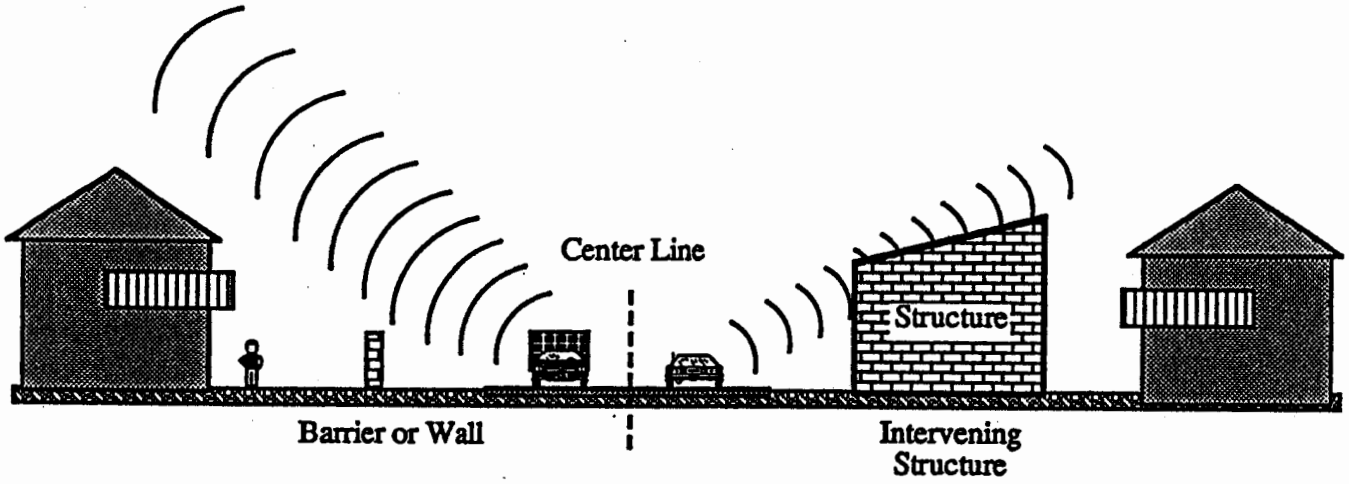
TABLE 3
CHANGE IN NOISE LEVEL OVER EXISTING CASE

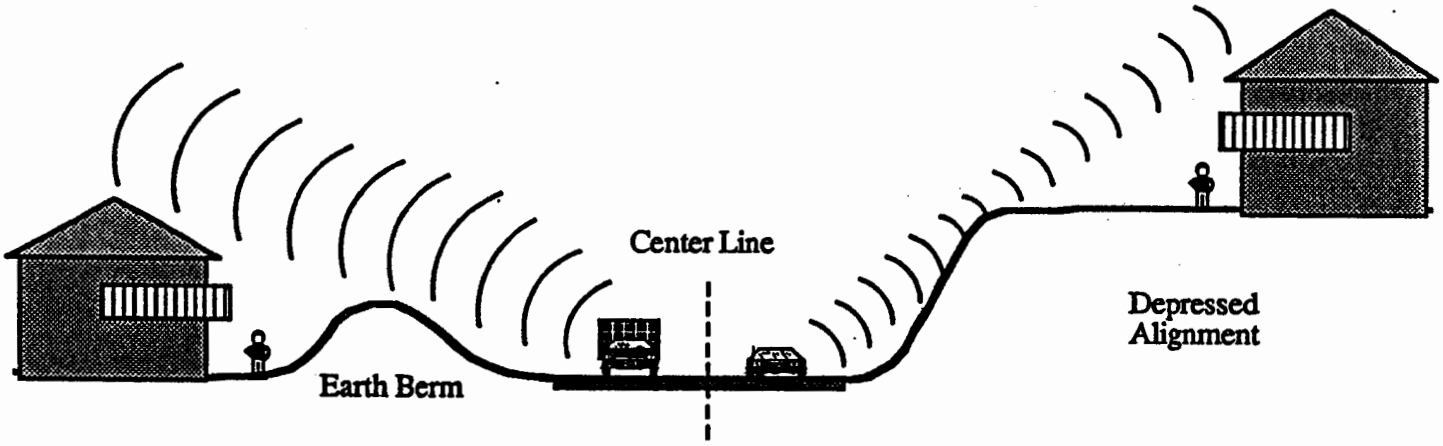
Roadway	Change in CNEL Noise Level (dBA) Proposed
Highway 246	
West of Reposa	1.0
Reposa to 5th Street	1.2
5th Street to Alisal	0.8
Alisal to Alamo Pintado	0.1
East of Alamo Pintado	1.2
Atterdag Road	
North of Hwy 246	-0.4
Alisal Road	
Hwy 246 to Viborg	-1.1
Hwy 246 to Fjord	-1.2
South of Fjord	3.0
Alamo Pintado Road	
Hwy 246 to Viborg	2.4
North of Viborg	2.5

In community noise assessment changes in noise levels greater than 3 dBA are often identified as significant, while changes less than 1 dBA will not be discernible to local residents. In the range of 1 to 3 dBA residents who are very sensitive to noise may perceive a slight change. No scientific evidence is available to support the use of 3 dBA as the significance threshold. In laboratory testing situations humans are able to detect noise level changes of slightly less than 1 dBA. However, in a community noise situation the noise exposure is over a long time period, and changes in noise levels occur over years, rather than the immediate comparison made in a laboratory situation. Therefore, the level at which changes in community noise levels become discernible is likely to be some value greater than 1 dBA, and 3 dBA appears to be appropriate for most people.

As previously discussed, the sources of noise in Solvang can be divided into two basic categories, transportation sources (primarily traffic) and non-transportation sources. A local government has little direct control of transportation noise at the source. State and Federal agencies have the responsibility to control the noise from the source, such as vehicle noise emission levels. The most effective method the City has to mitigate transportation noise is through reducing the impact of the noise onto the community (i.e. noise barriers and site design review). Mitigation through the design and construction of a noise barrier (wall, berm, or combination wall/berm) is the most common way of alleviating traffic noise impacts (Exhibit 13). The effect of a noise barrier is critically dependent on the geometry between the noise source and the receiver. A noise barrier effect occurs when the "line of sight" between the source and receiver is penetrated by the barrier. The greater the penetration the greater the noise reduction.

Another common approach to mitigating noise impacts is through the use of setbacks. This approach may be more desirable for the City of Solvang due to its low volume roadways and the desire to avoid a "walled in" look. The setback approach simply requires that the homes or noise sensitive uses be setback away from the roadway at a distance great enough so that they are outside the noise impact zone. The setback area is landscaped. The landscaping actually provides very little noise reduction, however, residents seem to become less aware of the noise probably because they can not see or have an obstructed view of the road.





CITY OF SOLVANG

NOISE ELEMENT

Exhibit 13

Examples of Noise Barrier Effect

2.4.2 Noise/Land Use Compatibility

Noise concerns should be incorporated into land use planning to reduce future noise and land use incompatibilities. This is achieved by establishing standards and criteria that specify acceptable limits of noise for various land uses throughout the City. These criteria are designed to integrate noise considerations into land use planning to prevent noise/land use conflicts. Exhibit 14 presents criteria used to assess the compatibility of proposed land uses with the noise environment. These criteria are the basis for the development of specific Noise Standards. The proposed standards, presented in Exhibit 15, represent (if adopted) City policies related to land uses and acceptable noise levels. These tables are the primary tools which allow the City to ensure integrated planning for compatibility between land uses and outdoor noise. The most effective method to control community noise impacts from non-transportation noise sources is through application of a Community Noise Ordinance.

3.0 GOALS, OBJECTIVES, AND POLICIES

The following are statements of the goals of the City of Solvang for the control of community noise.

TO PROTECT PUBLIC HEALTH AND WELFARE BY ELIMINATING EXISTING NOISE PROBLEMS AND BY PREVENTING SIGNIFICANT DEGRADATION OF THE FUTURE ACOUSTIC ENVIRONMENT.

3.1 POLICIES

In order to achieve the goals of the Noise Element the following policies should be considered by the City of Solvang:

Objective 1.0

Incorporate noise considerations into land use planning decisions.

Policy 1.a Establish acceptable limits of noise for various land uses throughout the community. The City adopts the noise standards presented in Exhibit 15 which identify interior and exterior noise standards in relation to specific land uses; particularly residential areas, schools, hospitals, open space preserves, and parks. The standards would specify the maximum noise levels allowable for new developments and impacted by transportation noise sources operating

LAND USE CATEGORIES		COMMUNITY NOISE EQUIVALENT LEVEL CNEL						
CATEGORIES	USES	≤55	60	65	70	75	80≥	
RESIDENTIAL	Single Family, Duplex, Multiple Family	A	A	B	B	C	D	D
RESIDENTIAL	Mobile Home	A	A	B	C	C	D	D
COMMERCIAL Regional, District	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D
COMMERCIAL Regional, Village District, Special	Commercial Retail, Bank Restaurant, Movie Theatre	A	A	A	A	B	B	C
COMMERCIAL INDUSTRIAL INSTITUTIONAL	Office Building, Research and Development, Professional Offices, City Office Building	A	A	A	B	B	C	D
COMMERCIAL Recreation INSTITUTIONAL Civic Center	Amphitheatre, Concert Hall Auditorium, Meeting Hall	B	B	C	C	D	D	D
COMMERCIAL Recreation	Childrens Amusement Park, Miniature Golf Course, Go-cart Track, Equestrian Center, Sports Club	A	A	A	B	B	D	D
COMMERCIAL General, Special INDUSTRIAL,INSTITUTIONAL	Automobile Service Station, Auto Dealership, Manufacturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B
INSTITUTIONAL General	Hospital, Church, Library Schools' Classroom	A	A	B	C	C	D	D
OPEN SPACE	Parks	A	A	A	B	C	D	D
OPEN SPACE	Golf Course, Cemeteries, Nature Centers Wildlife Reserves, Wildlife Habitat	A	A	A	A	B	C	C
AGRICULTURE	Agriculture	A	A	A	A	A	A	A

INTERPRETATION

ZONE A
CLEARLY COMPATIBLE

Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

ZONE B
NORMALLY COMPATIBLE

New construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.

ZONE C
NORMALLY INCOMPATIBLE

New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in the design.

ZONE D
CLEARLY INCOMPATIBLE

New construction or development should generally not be undertaken.

* Construction of new residential uses will not be allowed in the 65 CNEL for airport noise.

LAND USE CATEGORIES		ENERGY AVERAGE CNEL	
CATEGORIES	USES	INTERIOR [1]	EXTERIOR [2]
RESIDENTIAL	Single Family, Duplex, Multiple Family	40 [3]	60
	Mobile Home	—	60 [4]
COMMERCIAL INDUSTRIAL INSTITUTIONAL	Hotel, Motel, Transient Lodging	40	60 [5]
	Commercial Retail, Bank Restaurant	55	—
	Office Building, Research and Development, Professional Offices, City Office Building	45	—
	Amphitheatre, Concert Hall Auditorium, Meeting Hall	45	—
	Gymnasium (Multipurpose)	50	—
	Sports Club	55	—
	Manufacturing, Warehousing, Wholesale, Utilities	65	—
	Movie Theatres	45	—
INSTITUTIONAL	Hospital, Schools' classroom	45	65
	Church, Library	45	—
OPEN SPACE	Parks	—	60

INTERPRETATION

1. Indoor environment excluding: Bathrooms, toilets, closets, corridors.

2. Outdoor environment limited to: Private yard of single family
   Multi-family private patio or balcony which is served by a means of exit from inside.
   Mobile home Park
   Hospital patio
   Park's picnic area
   School's playground
   Hotel and motel recreation area

3. Noise level requirement with closed windows. Mechanical ventilating system or other means of natural ventilation shall be provided as of Chapter 12, Section 1205 of UBC.

4. Exterior noise level should be such that interior noise level will not exceed 45 CNEL.

5. Except those areas affected by aircraft noise.

on public or quasi-public property. (Sources on private property would be subject to the noise ordinance requirements, as called out in Policy 3.a.)

Policy 1.b The City shall require a noise impact evaluation for all projects as part of the design review process to determine if unacceptable noise levels will be created or experienced. Should noise abatement be necessary, the City shall require the implementation of mitigation measures based on a detailed technical study prepared by a qualified acoustical engineer (i.e., a Registered Professional Engineer in the State of California with a minimum of three years experience in acoustics).

Policy 1.c The City shall not approve projects that do not comply with the adopted standards.

Policy 1.d The City shall consider establishing a periodic noise monitoring program to identify progress in achieving noise abatement objectives and to perform necessary updating of the noise element and community noise standards. The California Department of Health Services recommends that noise elements be updated every 5 years.

Policy 1.e The City shall minimize potential transportation noise through proper design of street circulation, coordination of routing, and other traffic control measures.

Objective 2.0

Establish measures to reduce noise impacts from traffic noise sources.

Policy 2.a The City shall require the construction of barriers to mitigate sound emissions where necessary or where feasible. Action Items 1, 4, 5 and 6 provide specific measures for meeting this objective.

Policy 2.b The City shall require the inclusion of noise mitigation measures in the design of new roadway projects in Solvang. This would include but not be limited to the Southwest and Southeast Bypass roads currently under consideration.

Policy 2.c The City shall ensure the effective enforcement of City, State and Federal noise levels by all appropriate City divisions.

Policy 2.d The City shall actively advocate motor vehicle noise control requirements for production and sale.

Objective 3.0

Establish measures to control non-transportation noise impacts.

Policy 3.a The City shall establish new Community Noise Ordinance to mitigate noise conflicts between adjacent land uses. The Noise Ordinance establishes noise limits that can not be exceeded at the property line. The Noise Ordinance because it is a City statute can only control noise generated on private property. Therefore, the primary function of the Noise Ordinance is to control stationary noise sources and construction noise.

Policy 3.b Evaluate noise generated by construction activities, and subject them to the requirements of the Noise Ordinance.

Policy 3.c Establish and maintain coordination among the City agencies involved in noise abatement.

Policy 3.d The City shall ensure the effective enforcement of City, State, and Federal noise levels by all appropriate City divisions. The City shall provide quick response to complaints and rapid abatement of noise nuisances with the scope of the City's police powers.

Policy 3.e The City shall establish noise guidelines for City purchasing policy to take advantage of federal regulations and labeling requirements.

Policy 3.f The City shall coordinate with the California Occupational Safety and Health Administration (Cal-OSHA) to provide information on and enforcement of occupational noise requirements within the City.

4.0 THE PLAN FOR CONTROL AND MANAGEMENT OF NOISE

In order to achieve the goals and objectives of the Noise Element, an effective implementation program developed within the constraints of the City's financial and staffing capabilities is necessary. The underlying purpose is to reduce the number of people exposed to excessive noise and to minimize the future effect of noise in the City. The following are the actions that the City should consider implementing to control the impacts of noise in Solvang.

Issue 1 - Transportation Noise Control - The most efficient and effective means of controlling noise from transportation systems is reducing noise at the source. However, since the City has little direct control over source noise levels because of State and Federal preemption (i.e. State Motor Vehicle Noise Standards), policies should be focused on reducing the impact of the

noise on the community. Cooperative efforts with State and Federal offices are essential.

Action 1 Encourage the use of walls and berms in the design of residential or other noise sensitive land uses that are adjacent to major roads, commercial, or industrial areas.

Action 2 Provide for continued evaluation of truck movements and routes in the City to provide effective separation from residential or other noise sensitive land uses.

Action 3 Encourage the enforcement of State Motor Vehicle noise standards for cars, trucks, and motorcycles through coordination with the California Highway Patrol and Solvang Police Department.

Issue 2 - Noise and Land Use Planning Integration. Community noise considerations are to be incorporated into land use planning. These measures are intended to prevent future noise and land-use incompatibilities.

Action 4 Establish standards that specify acceptable limits of noise for various land uses throughout the City. These criteria are designed to fully integrate noise considerations into land use planning to prevent new noise/land use conflicts. Exhibit 14 shows criteria used to assess the compatibility of proposed land uses with the noise environment. These criteria are the bases for the development of specific Noise Standards. These standards, presented in Exhibit 15, define the City policies related to land uses and acceptable noise levels. These tables are the primary tools which allow the City to ensure noise integrated planning for compatibility between land uses and outdoor noise.

Action 5 Incorporate noise reduction features during site planning to mitigate anticipated noise impacts on affected noise sensitive land uses. The noise referral zones identified in Exhibits 10 and 12 (areas exposed to noise levels greater than 55 CNEL) can be used to identify locations of potential

conflict. New developments will be permitted only if appropriate mitigation measures are included such that the standards contained in this Element or and adopted ordinance are met.

Action 6 Enforce the State of California Uniform Building Code that specifies that the indoor noise levels for residential living spaces not exceed 45 dB LDN/CNEL due to the combined effect of all noise sources. The State requires implementation of this standard when the outdoor noise levels exceed 60 dB LDN/CNEL. The Noise Referral Zones (60 CNEL) can be used to determine when this standard needs to be addressed. The Uniform Building Code (specifically, the California Administrative Code, Title 24, Part 6, Division T25, Chapter 1, Subchapter 1, Article 4, Sections T25-28) requires that *"Interior community noise levels (CNEL/LDN) with windows closed, attributable to exterior sources shall not exceed an annual CNEL or LDN of 45 dB in any habitable room."* The code requires that this standard be applied to all new hotels, motels, apartment houses and dwellings other than detached single-family dwellings. The City can and is encouraged to reduce the noise standard from 45 CNEL to 40 CNEL. Additionally, the standard should be applied to single family homes.

Issue 3 - Community Noise Control for Non-Transportation Noise Sources. The focus of control of noise from non-transportation sources is the Community Noise Ordinance. The ordinance can be used to protect people from noise generated on adjacent properties.

Action 7 Amend and adopt a new comprehensive community noise ordinance to ensure that City residents are not exposed to excessive noise levels from existing and new stationary noise sources. A proposed Noise Ordinance is contained in Appendix B. The purpose of the ordinance is to protect people from non-transportation related noise sources such as music, machinery and pumps, air conditioners and truck traffic on private property. The Noise Ordinance does not apply to motor vehicle noise on public streets, but it does apply to vehicles on private property. The Noise Ordinance is designed to protect quiet residential areas from stationary noise sources.

The noise levels encouraged by the ordinance are typical of a quiet residential area.

Action 8 Enforce the new community Noise Ordinance. The most effective method to control community noise impacts from non-transportation noise sources is through application of the community noise ordinance.

Action 9 Require that new commercial projects, proposed for development near existing residential land use, demonstrate compliance with the City Noise Ordinance prior to approval of the project.

Action 10 All new residential projects to be constructed near existing sources of non-transportation noise (including but not limited to commercial facilities, public parks with sports activities) must demonstrate via an acoustical study conducted by a Registered Engineer that the indoor noise levels will be consistent with the limits contained in the noise ordinance.

Action 11 Require construction activity to comply with limits established in the City Noise Ordinance.

Action 12 Designate one agency in the City to act as the noise control coordinator. This will ensure the continued operation of noise enforcement efforts of the City.

Technical Appendices

Appendix A - Noise Measurement Results

Appendix B - Glossary

Appendix A

Noise Measurement Results

Exhibit A (Part 1)
Noise Measurement Results

SITE: # 1
LOCATION: *Highway 246 at Entrance to Rancho Llano Grande*

DATE: *March 19, 1987*
TIME: *2:35 p.m.*

MEASURED VALUES (dBA)

LEQ	Lmax	Lmin
67.2	*78.7*	*53.8*

PRIMARY NOISE SOURCES:
Traffic, Batch Plant across street

COMMENTS:
7.1% -Medium Trucks
2.8%-Heavy Trucks

SITE: # 2

LOCATION: *Near end of Via Reposa*

DATE: *March 19, 1987*
TIME: *3:10 p.m.*

MEASURED VALUES (dBA)

LEQ	Lmax	Lmin
57.5	*68.2*	*50.9*

PRIMARY NOISE SOURCES:
Building Supply Yard

COMMENTS:
Truck back-up beeper causes Lmax

SITE: # 3
LOCATION: *Alisal Road at Golf Course*

DATE: *March 19, 1987*
TIME: *3:27 p.m.*

MEASURED VALUES (dBA)

LEQ	Lmax	Lmin
57.9	*72.5*	*35.6*

PRIMARY NOISE SOURCES:
Traffic

COMMENTS:
Very quiet, no trucks.

SITE: # 4
LOCATION: *Hwy. 246 at High School*

DATE: *March 19, 1987*
TIME: *3:51 p.m.*

MEASURED VALUES (dBA)

LEQ	Lmax	Lmin
65.6	*75.3*	*55.4*

PRIMARY NOISE SOURCES:
Traffic

COMMENTS:
Only 3% Medium trucks
No aircraft observed.

SITE: # 5
LOCATION: *Alamo Pintado at Creekside*

DATE: *March 19, 1987*
TIME: *4:20 p.m.*

MEASURED VALUES (dBA)

LEQ	Lmax	Lmin
57.6	*76.7*	*41.7*

PRIMARY NOISE SOURCES:
Traffic

COMMENTS:
Single Family Residential Area

SITE: # 6
LOCATION: *Alamo Pintado at Vitborg*

DATE: *March 19, 1987*
TIME: *4:43 p.m.*

MEASURED VALUES (dBA)

LEQ	Lmax	Lmin
63.3	*74.8*	*46.1*

PRIMARY NOISE SOURCES:
Traffic on Alamo Pintado

COMMENTS:
Strong contribution from Vitborg

Exhibit A (Part 2)
Noise Measurement Results

SITE: *# 7*
LOCATION: *Viborg at Skagen*

DATE: *March 19, 1987*
TIME: *5:00 p.m.*

MEASURED VALUES (dBA)

LEQ	Lmax	Lmin
59.0	*73.8*	*40.2*

PRIMARY NOISE SOURCES:
Traffic with roadway grade

COMMENTS:
Residential area, rush hour traffic

SITE: *# 8*
LOCATION: *1880 Old Mill Road*

DATE: *March 20, 1987*
TIME: *10:40 p.m.*

MEASURED VALUES (dBA)

LEQ	Lmax	Lmin
55.0	*62.7*	*43.6*

PRIMARY NOISE SOURCES:
Traffic on Mission Road

COMMENTS:
6% trucks have grade on Mission Rd.

SITE: *# 9*
LOCATION: *Alisal Road near Laurel*

DATE: *March 20, 1987*
TIME: *11:08 a.m.*

MEASURED VALUES (dBA)

LEQ	Lmax	Lmin
60.6	*77.6*	*39.0*

PRIMARY NOISE SOURCES:
Traffic, lawnmower, high GA aircraft

COMMENTS:
Residential and School area

SITE: *# 10*
LOCATION: *Atterdag at Maple*

DATE: *March 20, 1987*
TIME: *11:32 a.m.*

MEASURED VALUES (dBA)

LEQ	Lmax	Lmin
62.3	*82.4*	*40.1*

PRIMARY NOISE SOURCES:
Traffic

COMMENTS:
Gravel truck cause of Lmax

SITE: *# 11*
LOCATION: *Hwy. 246 near Atterdag*

DATE: *March 20, 1987*
TIME: *11:57 a.m.*

MEASURED VALUES (dBA)

LEQ	Lmax	Lmin
69.7	*79.3*	*56.3*

PRIMARY NOISE SOURCES:
Traffic

COMMENTS:
3% trucks observed.

SITE: *# 12*
LOCATION: *Hwy. 246 in Solvang Park*

DATE: *March 20, 1987*
TIME: *12:19 p.m.*

MEASURED VALUES (dBA)

LEQ	Lmax	Lmin
62.2	*72.6*	*52.6*

PRIMARY NOISE SOURCES:
Traffic

COMMENTS:
4% medium trucks, 2% heavy trucks

Exhibit A (Part 3)
Noise Measurement Results

SITE: *# 13*
LOCATION: *Fjord near Hickory*

DATE: *March 20, 1987*
TIME: *1:57 p.m.*

MEASURED VALUES (dBA)

LEQ	Lmax	Lmin
55.7	*67.5*	*42.2*

PRIMARY NOISE SOURCES:
Traffic

COMMENTS:
Residential and Open Space

SITE: *# 14*
LOCATION: *Alisal near Elverhoy*

DATE: *March 20, 1987*
TIME: *2:13 p.m.*

MEASURED VALUES (dBA)

LEQ	Lmax	Lmin
61.6	*78.0*	*37.4*

PRIMARY NOISE SOURCES:
Traffic

COMMENTS:
Single Family Residential and Hotels

APPENDIX B - GLOSSARY

A-WEIGHTED SOUND LEVEL. The sound pressure level in decibels as measured on a sound level meter using the A-Weighted 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. A numerical method of rating human judgement of loudness.

AMBIENT NOISE LEVEL. The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

COMMUNITY NOISE EQUIVALENT LEVEL (CNEL). The average equivalent A-Weighted sound level during a 24-hour day, obtained after addition of five (5) decibels to sound levels in the evening from 7 p.m. to 10 p.m. and after addition of ten (10) decibels to sound levels in the night before 7 a.m. and after 10 p.m.

DAY-NIGHT AVERAGE LEVEL (LDN). The average equivalent A-Weighted sound level during a 24-hour day, obtained after addition of ten (10) decibels to sound levels in the night before 7 a.m. and after 10 p.m.

DECIBEL (dB). A unit for measuring the amplitude of a 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 micro-pascals.

dB(A). A-weighted sound level (see definition above)

EQUIVALENT SOUND LEVEL (LEQ). The sound level corresponding to a steady noise level over a given sample period with the same amount of acoustic energy as the actual time varying noise level. The energy average noise level during the sample period.

FREQUENCY. The number of times per second that a sound pressure signal oscillates about the

prevailing atmosphere pressure. The unit of frequency is the hertz. The abbreviation is Hz.

INTRUSIVE NOISE. That noise which intrudes over and above the ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, time of occurrence, and tonal or informational content as well as the prevailing ambient noise level.

L10. The A-Weighted sound level exceeded 10 percent of the sample time. Similarly L50, L90, L99, etc.

NOISE. Any unwanted sound or sound which is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying. The State Noise Control Act defines noise as "...excessive undesirable sound..."

NOISE ATTENUATION. The ability of a material, substance, or medium to reduce the noise level from one place to another or between one room and another. Noise attenuation is specified in decibels.

NOISE EXPOSURE CONTOURS. Lines drawn around a noise source indicating constant or equal level of noise exposure. CNEL and LDN are typical metrics used.

NOISE REFERRAL ZONES. Such zones are defined as the area within the contour defining a CNEL level of 55 decibels. It is the level at which either State or Federal laws and standards related to land use become important and, in some cases, preempted local laws and regulations. Any proposed noise sensitive development which may be impacted by a total noise environment of 55 dB CNEL or more should be evaluated on a project specific basis.

NOISE SENSITIVE LAND USE. Those specific land uses which have associated indoor and/or outdoor human activities that may be subject to stress and/or significant interference from noise produced by community sound sources. Such human activity typically occurs daily for continuous periods of 24 hours or is of such a nature that noise is significantly disruptive to activities that

occur for short periods. Specifically, noise sensitive land uses include: residences of all types, hospitals, places of worship and schools.

SOUND LEVEL (NOISE LEVEL). The weighted sound pressure level obtained by use of a sound level meter having a standard frequency-filter for attenuating part of the sound spectrum.

SOUND LEVEL METER. An instrument, including a microphone, an amplifier, an output meter, and frequency weighting networks for the measurement and determination of noise and sound levels.