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General Plan Guidelines

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(open-space zoning) is a state requirement for counties and general law cities, the other ideas are suggestions only and are meant to stimulate thinking about action programs. More detailed suggestions can be found in OPR's publication *Putting Action into the Open-Space Element*.

- ◆ Open-space zoning pursuant to §65910 (e.g., exclusive agriculture zones, large-lot zones, overlay zones for hazards areas, etc.).
- ◆ Public acquisition of open space (see Chapter 10).
- ◆ Private acquisition of open space (e.g., non-profit land trusts or conservancies).
- ◆ Preferential assessments (see Chapter 10).
- ◆ Application of the Quimby Act to subdivision approvals (see §66477).
- ◆ Provisions for open space in specific plans (see Chapter 10).
- ◆ Provisions for open space in development agreements (see Chapter 10).
- ◆ Transfer of development rights.
- ◆ Open space in planned unit developments.
- ◆ Action programs for open space within urbanized areas:
 1. Connect existing open spaces to the population with the greatest necessity for these open spaces. This can be facilitated by:
 - Extending the hours of existing recreational facilities by lighting them at night.
 - Creating a “vacant lot” task force to examine ways to allow publicly owned vacant parcels to convert to interim, passive use parks and community gardens.
 - Expanding parks and schools and assist schools to convert asphalt to turf.
 - Funding and expanding various types of parks and recreation programs.
 2. Impose impact fees on new development where justified:
 - Include open-space acquisition in capital improvement programs.
 - Employ land use controls to impose reasonable and proportional impact fees to acquire open-space.

NOISE ELEMENT

The purpose of the noise element is to limit the exposure of the community to excessive noise levels. In 1976, the California Department of Health Services issued the first Noise Element Guidelines pursuant to Health and Safety Code §46050.1, followed shortly thereafter by a model noise ordinance. In 1984, revisions to the general plan statutes made extensive changes to the noise element requirements (Chapter 1009, Statutes of 1984). These revisions shortened the list of issues required by statute and gave flexibility to local governments in analyzing the issues and subjects pertinent to the local planning area.

Local governments must “analyze and quantify” noise levels and the extent of noise exposure through actual measurement or the use of noise modeling. Technical data relating to mobile and point sources must be collected and synthesized into a set of noise control policies and programs that “minimizes the exposure of community residents to excessive noise.” Noise level contours must be mapped and the conclusions of the element used as a basis for land use decisions. The element must include implementation measures and possible solutions to existing and foreseeable noise problems. Furthermore, the policies and standards must be sufficient to serve as a guideline for compliance with sound transmission control requirements. The noise element directly correlates to the land use, circulation, and housing elements.

The noise element is to be used to guide decisions concerning land use and the location of new roads and transit facilities since they are commonly sources of excessive noise levels. The noise levels from existing land uses including mining, agricultural, and industrial activities must be closely analyzed to ensure compatibility, especially where residential and other sensitive receptors have encroached into areas previously occupied by these uses.

Caltrans administers several freeway noise control programs. In general, these are applied to residential and school uses that preexisted the particular freeway. For instance, noise attenuating walls are installed along the freeway frontages of qualified residential development under the New Construction or Reconstruction and Community

Noise Abatement programs. In addition, there are still a number of schools adjacent to freeways that have qualified for the School Noise Abatement Program funds for the acoustical attenuation of classrooms.

Local airports are subject to the noise requirements of the Federal Aviation Administration and noise standards under Title 21, §5000, et. seq., of the California Code of Regulations. These standards are designed to cause the airport proprietor, aircraft operator, local governments, pilots, and Caltrans to work cooperatively to diminish noise problems. The Federal Aviation Act however, pre-empts local regulations controlling noise at the airport itself, as well as limiting arrival and departure times of jet aircraft flights. (*See City of Burbank v. Lockheed Air Terminal (1973) 93 S. Ct 1854 and 53 Ops.Cal.Atty.Gen 75 (1970)*).

The Caltrans Office of Transportation Laboratory publishes the Caltrans Noise Manual and numerous reports on mitigating transportation noise. The *California Airport Land Use Planning Handbook*, published by Caltrans' Division of Aeronautics includes noise information relating to airports.

Court and Attorney General Interpretations

As of this writing, no noise element prepared since the statute's 1984 revision has been the subject of an appellate court decision or Attorney General opinion. However, three past appellate court cases remain germane.

The content of the noise element was one of the central issues in *Camp v. County of Mendocino (1981) 123 Cal.App.3d 334*. Mendocino County's element did not quantify noise levels, did not include an inventory of current and expected noise exposure (noise contours), and was apparently not supported by monitoring data. As a result, the court found the element to be inadequate. The county's argument that the existing element was sufficient for a quiet rural county was not persuasive of the court, since the statute was neither subjective nor geographical. The *Camp* decision underscores the importance of comprehensive data collection and analysis.

The decision in *Neighborhood Action Group v. County of Calaveras (1984) 156 Cal.App.3d 1176*, highlights the importance of including the noise element in the land use decision making pro-

cess. In this instance, where a conditional use permit for a surface mining operation was at issue, the appeal court stated: "a quantitative inventory of existing transportation noise must be compared with that added by a particular project. The aggregate noise level must be measured against policy statements and standards required to be in the general plan." It is apparent that the noise element must be adequate to serve as the basis for analyzing projects which may potentially increase noise levels.

Pursuant to the decision in *Guardians of Turlock's Integrity v. City of Turlock (1983) 149 Cal.App.3d 584*, a general plan is invalid if it lacks a noise element. Furthermore, in the words of the court: "unless the general plan sets noise guidelines, an EIR addressing noise issues lacks meaning."

Relevant Issues

The noise element should cover those issues and sources of noise relevant to the local planning area. The element should utilize the most accurate and up-to-date information available to reflect the noise environment, the stationary sources of noise, predicted levels of noise, and the impacts of noise on local residents. It should be as detailed as necessary to describe the local situation and offer solutions to local noise problems. The issues to be addressed by the noise element include the following:

- ◆ Identification and appraisal of major noise sources.
 - Mobile noise sources.
 - Stationary noise sources.
- ◆ Existing and projected levels of noise and noise contours for major noise sources.
- ◆ Inventory of existing and projected land use and locational relationship to existing and projected noise sources. (MAP)(LU)
- ◆ Inventory of existing and proposed sensitive receptors including:
 - Hospitals.
 - Convalescent homes.
 - Schools.
 - Churches.
 - Sensitive wildlife habitat including the habitat of rare, threatened, or endangered species.

- ◆ Determination of the extent of “noise problems in the community.”
 - Survey of community to determine location and extent.
- ◆ Selection and imposition of methods of noise attenuation and the protection of residences and other sensitive receptors from excess noise.
- ◆ Selection of implementation measures and possible solutions that address existing and foreseeable noise problems.
- ◆ Map noise level contours, expressed in CNEL or Ldn, for the area surrounding each of the identified noise sources.
- ◆ Project future noise sources, noise levels, and anticipated impacts upon existing and proposed land uses.
- ◆ Analyze the current and future impacts on community residents of noise emanating from the identified sources. (LU)
- ◆ Analyze current and predicted levels of transportation noise consistent with the requirements of the Federal Intermodal Surface Transportation Efficiency Act. (CI)

Ideas for Data and Analysis

The following are suggested topics for data collection and analysis:

Identification and appraisal of major noise sources

- ◆ Identify major noise sources including:
 - 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 industry, including, but not limited to, railroad classification yards.
 - Other ground stationary noise sources identified by local agencies as contributing to the community noise environment.
- ◆ Appraise major noise sources and the extent of the problems they create for the community currently and in the future.

Analysis and quantification of the local noise environment

- ◆ Select the method of noise measurement or modeling to be used in the noise element.
- ◆ Measure major sources of noise including, but not limited to, highways and freeways, arterial and major streets, railroads, railroad yards, ground rapid transit, airports and aviation-related sources, industrial plants, and other stationary ground sources.

Minimizing Noise Exposure

- ◆ Identify local noise problems and areas of conflict between noise sources and sensitive uses.
- ◆ Adopt noise impact and attenuation standards, consistent with the Noise Element Guidelines and the Uniform Building Code.
- ◆ Adopt policies, plan proposals, and implementation programs for mitigating noise impacts on residential areas, correlated with the land use and circulation elements. (LU, CI)

Ideas for Development Policies

The following are types of development policies that may be contained in a local noise element as relevant. The local agency should adopt policies for each of the issues identified in the element that:

- ◆ Guide zoning and development through the adoption of specified noise mitigation including provisions for increased building setbacks, buffer areas, compatibility zoning, and other land use strategies. (LU)
- ◆ Establish local standards and guidelines for noise evaluation including baseline specifications.
- ◆ Evaluate new residential and other sensitive uses for consistency with noise standards in areas adjacent to major sources of noise. (LU)
- ◆ Review all land use and development proposals for compliance with noise and land use compatibility standards.

- ◆ Evaluate the effects of noise on the community and provide efficient and effective means to mitigate or avoid future excessive exposure
- ◆ Protect existing developed areas from excessive noise levels
- ◆ Guide the location and design of transportation facilities to maintain acceptable noise levels. (CI, LU)
- ◆ Control stationary noise at the source through the use of insulation, berms, building design/orientation, buffer strips, staggered operating hours, and other techniques. (LU, OS)
- ◆ Minimize noise exposure around airports in correlation with the policies of the local Airport Land Use Plan and airport noise standards pursuant to Title 21, §5000, et seq., California Code of Regulations. (LU)
- ◆ Correlate noise element concerns with objectives, policies, and plan proposals of the land use, circulation, and open-space elements in order to minimize community noise exposure.
- ◆ Establish noise standards for reviewing development which is sensitive to noise.
- ◆ Achieve noise compatibility between residential, commercial, industrial and other surrounding land uses.

Technical Assistance

Various noise prediction models can be used to address transportation and aircraft noise in the noise element. For example, the Federal Highway Administration Traffic Noise Model can calculate noise levels using acoustical algorithms and emission levels for five standard vehicle types: automobiles, medium trucks, heavy trucks, buses, and motorcycles. More information can be obtained from the Federal Highway Administration's Turner-Fairbank Highway Research Center at www.tfhrc.gov. Information regarding noise models may also be obtained from the Federal Aviation Administration's Office of Environment and Energy at www.aee.faa.gov.

SAFETY ELEMENT

The aim of the safety element is to reduce the potential risk of death, injuries, property damage, and economic and social dislocation resulting from

fires, floods, earthquakes, landslides, and other hazards. Other locally relevant safety issues such as airport land use, emergency response, hazardous materials spills, and crime reduction may also be included. Some local jurisdictions have even chosen to incorporate their hazardous waste management plans into their safety elements.

The safety element overlaps topics also mandated in the land use, conservation, and open space elements. When preparing a new general plan or undertaking a comprehensive revision of an existing general plan, OPR suggests addressing these common topics in a single place rather than scattered among four separate elements. The key concern should be to effectively integrate these common issues into the decision-making process.

The safety element's identification of hazards and hazard abatement provisions are to guide local decisions related to zoning, subdivisions, and entitlement permits. The element should contain general hazard and risk reduction strategies and policies supporting hazard mitigation measures. Policies should address the identification of hazards and policies for emergency response, as well as mitigation through avoidance of hazards by new projects and reduction of risk in developed areas. Communities may use the safety element as a vehicle for defining "acceptable risk" and the basis for determining the level of mitigation necessary. Policies may not only address methods of minimizing risks, but also ways to minimize economic disruption and expedite recovery following disasters.

Seismic Hazards

The safety element must establish policies to minimize the loss of property and life as a result of earthquake. The Alquist-Priolo Earthquake Fault Zoning Act (Public Resources Code 2621, et seq.), the Seismic Hazards Mapping Act (Public Resources Code 2690, et seq.), the Unreinforced Masonry Law (Government Code 8875, et seq.), and the associated maps and regulations of the State Board of Geologists and Geophysicists and the State Mining and Geology Board offer crucial information and a starting point for local policies.

The Department of Conservation's California Geological Survey (CGS, also known as the Division of Mines and Geology), the Seismic Safety

APPENDIX C

Guidelines for the Preparation and Content of the Noise Element of the General Plan

The noise element of the general plan provides a basis for comprehensive local programs to control and abate environmental noise and to protect citizens from excessive exposure. The fundamental goals of the noise element are:

- ◆ To provide sufficient information concerning the community noise environment so that noise may be effectively considered in the land use planning process. In so doing, the necessary groundwork will have been developed so that a community noise ordinance may be utilized to resolve noise complaints.
- ◆ To develop strategies for abating excessive noise exposure through cost-effective mitigating measures in combination with zoning, as appropriate, to avoid incompatible land uses.
- ◆ To protect those existing regions of the planning area whose noise environments are deemed acceptable and also those locations throughout the community deemed “noise sensitive.”
- ◆ To utilize the definition of the community noise environment in the form of CNEL or Ldn noise contours as provided in the noise element for local compliance with the State Noise Insulation Standards. These standards require specified levels of outdoor to indoor noise reduction for new multifamily residential constructions in areas where the outdoor noise exposure exceeds CNEL (or Ldn) 60 dB.

The 1976 edition of the *Noise Element Guidelines*, prepared by the California Department of Health Services (DHS), was a result of SB 860 (Beilenson, 1975), which became effective January 1, 1976. SB 860, among other things, revised and clarified the requirements for the noise element of each city and county general plan and gave DHS the authority to issue guidelines for compli-

ance thereto. Compliance with the 1976 version of these guidelines was mandated only for those noise elements that were not submitted to the Office of Planning and Research by the effective date of SB 860 and to subsequent revisions of previously submitted noise elements.

A comparison between the 1976 *Noise Element Guidelines* and this revised edition will not reveal substantial changes. The basic methodology advanced by that previous edition remains topical. Where necessary, code references have been updated and the text revised to reflect statutory changes.

DEFINITIONS

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

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

L10: The A-weighted sound level that is exceeded ten percent of the sample time. Similarly, L50, L90, etc.

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

CNEL: Community Noise Equivalent Level. 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.

Ldn: Day-Night Average Level. The average equivalent A-weighted sound level during a 24-hour day, obtained after the addition of 10 decibels to sound levels in the night after 10 p.m. and before 7 a.m. (Note: CNEL and Ldn represent daily levels of noise exposure averaged on an annual or daily basis, while Leq represents the equivalent energy noise exposure for a shorter time period, typically one hour.)

Noise Contours: Lines drawn about a noise source indicating equal levels of noise exposure. CNEL and Ldn are the metrics utilized herein to describe annoyance due to noise and to establish land use planning criteria for noise.

Ambient Noise: 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.

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

Noisiness Zones: Defined areas within a community wherein the ambient noise levels are generally similar (within a range of 5 dB, for example). Typically, all other things being equal, sites within any given noise zone will be of comparable proximity to major noise sources. Noise contours define different noisiness zones.

NOISE ELEMENT REQUIREMENTS

Government Code Section 65302(f): 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:

- (1) Highways and freeways.
- (2) Primary arterials and major local streets.
- (3) Passenger and freight on-line railroad operations and ground rapid transit systems.
- (4) 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.
- (5) Local industrial plants, including, but not limited to, railroad classification yards.
- (6) Other ground stationary sources identified by local agencies as contributing to the community noise environment.

Noise contours shall be shown for all of these 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.

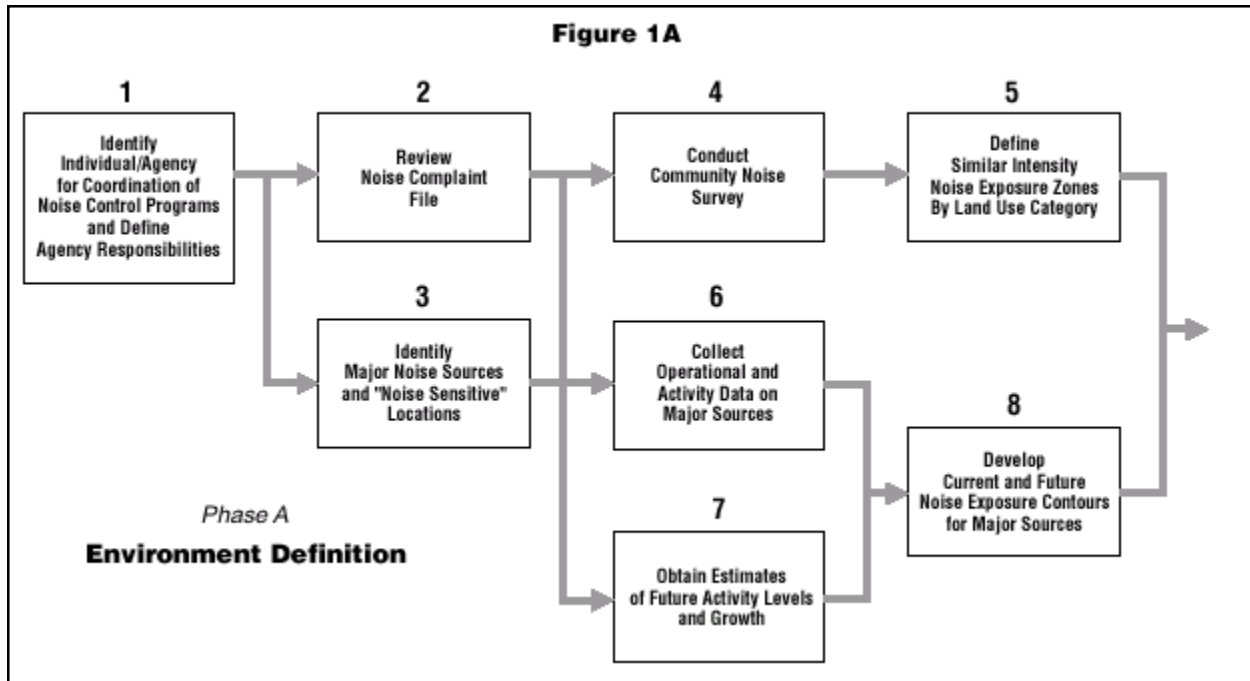
The noise contours shall be used as a guide for establishing a pattern of land uses in the land use element that minimizes the exposure of community residents to excessive noise.

The noise element shall include implementation measures and possible solutions that address existing and foreseeable noise problems, if any. The adopted noise element shall serve as a guideline for compliance with the state's noise insulation standards.

NOISE ELEMENT DEVELOPMENT PROCESS

The sequential steps for development of a noise element as an integral part of a community's total noise control program are illustrated in the flow diagrams of figures 1A and 1B. The concept presented herein utilizes the noise element as the central focus of the community's program and provides the groundwork for all subsequent enforcement efforts. The process may be described in terms of four phases:

- Phase A: Noise Environment Definition
- Phase B: Noise-Compatible Land Use Planning
- Phase C: Noise Mitigation Measures
- Phase D: Enforcement



These phases encompass a total of eighteen defined tasks, the first thirteen of which relate directly to the statutory requirements contained in Government Code §65302(f). The remainder relate to critical supportive programs (noise ordinances, etc.). Citations from §65302(f) are contained within quotation marks.

Phase A: Noise Environment Definition

The purpose of this phase is to adequately identify and appraise the existing and future noise environment of the community in terms of Community Noise Equivalent Level (CNEL) or Day-Night Average Level (Ldn) noise contours for each major noise source and to divide the city or county into noise zones for subsequent noise ordinance application.

Step 1:

Identify a specific individual or lead agency within the local government to be responsible for coordination of local noise control activities. This individual or agency should be responsible for coordinating all intergovernmental activities and subsequent enforcement efforts.

Step 2:

Review noise complaint files as compiled by all local agencies (police, animal control, health,

airport, traffic department, etc.) in order to assess the following:

1. Location and types of major offending noise sources.
2. Noise-sensitive areas and land uses.
3. Community attitudes towards specific sources of noise pollution.
4. Degree of severity of noise problems in the community.
5. Relative significance of noise as a pollutant.

Step 3:

Specifically identify major sources of community noise based upon the review of complaint files and interagency discussion and the following statutory subjects:

1. Highways and freeways.
2. Primary arterials and major local streets.
3. Passenger and freight on-line railroad operations and ground rapid transit systems.
4. 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.

5. Local industrial plants, including, but not limited to, railroad classification yards.
6. Other ground stationary noise sources identified by local agencies as contributing to the community noise environment. (§65302(f))

In addition, the land uses and areas within the community that are noise sensitive should be identified at the same time.

Step 4:

Given the identification of major noise sources and an indication of the community’s attitude toward noise pollution (when available), it is advisable to conduct a community noise survey. The purposes of the survey are threefold:

First and foremost, to define by measurement the current noise levels at those sites deemed noise sources and to establish noise level contours around them. The noise contours must be expressed in terms of CNEL or Ldn.

Second, the collected data will form the basis for an analysis of noise exposure from major sources.

Finally, the survey should define the existing ambient noise level throughout the community. Intrusive noises over and above this general predetermined ambient level may then be controlled through implementation of a noise ordinance.

Step 5:

Given the definition of existing ambient noise levels throughout the community, one may proceed with a classification of the community into broad regions of generally consistent land uses and similar noise environments. Because these regions will be varying distances from identified major noise sources, the relative levels of environmental noise will be different from one another. Therefore, subsequent enforcement efforts and mitigating measures may be oriented towards maintaining quiet areas and improving noisy ones.

Step 6:

Directing attention once again to the major noise sources previously identified, it is essential to gather operations and activity data in order to proceed with the analytical noise exposure pre-

diction. This data is somewhat source-specific but generally should consist of the following information and be supplied by the owner/operator of the source:

1. Average daily level of activity (traffic volume, flights per day, hours of operation, etc.).
2. Distribution of activity over day and night time periods, days of the week, and seasonal variations.
3. Average noise level emitted by the source at various levels of activity.
4. Precise source location and proximity to noise-impacted land uses.
5. Composition of noise sources (percentage of trucks on highway, aircraft fleet mix, industrial machinery type, etc.).

Step 7:

In addition to collecting data on the variables affecting noise-source emission for the existing case, future values for these parameters need to be assessed. This is best accomplished by correlating the noise element with other general plan elements (i.e. land use, circulation, housing, etc.) and regional transportation plans and by coordination with other responsible agencies (Airport Land Use Commission, Caltrans, etc.).

Step 8:

Analytical noise exposure modeling techniques may be utilized to develop source-specific noise contours around major noise sources in the community.

“The noise contours shall be prepared on the basis of noise monitoring or following generally accepted noise modeling techniques...” (§65302(f))

Simplified noise prediction methodologies are available through the Department of Health Services for highway and freeway noise, railroad noise, simple fixed stationary and industrial sites, and general aviation aircraft (with less than twenty percent commercial jet aircraft activity—two engine jet only). Noise contours for larger airport facilities and major industrial sites are sufficiently complex that they must be developed via sophisticated computer techniques available through rec-

ognized acoustical consulting firms. (Airport contours generally have already been developed in accordance with requirements promulgated by Caltrans' Division of Aeronautics: Noise Standards, Title 21, Section 5000, et seq., California Code of Regulations.)

Although considerable effort may go into developing noise contours that, in some instances, utilize rather sophisticated digital programming techniques, the present state of the art is such that their accuracy is usually no better than +/- 3 dB. In fact, the accuracy of the noise exposure prediction decreases with increasing distance from the noise source. In the near vicinity of the source, prediction accuracy may be within the range of +/- 1 dB, while at greater distances this may deteriorate to

+/- 5 dB or more. At greater distances, meteorological and topographic effects, typically not totally accounted for in most models, may have significant influence. Thus, while dealing with the concept of noise contours, it is best not to think of them as absolute lines of demarcation on a map (such as topographical contours), but rather as bands of similar noise exposure.

In addition to assessment of the present-day noise environment, it is recommended that the noise exposure data be projected through the time horizon of the general plan. The noise element should be updated and corrected every five years, or sooner as is necessary, and, at that time, the forecasted noise exposure should be projected an additional five years.

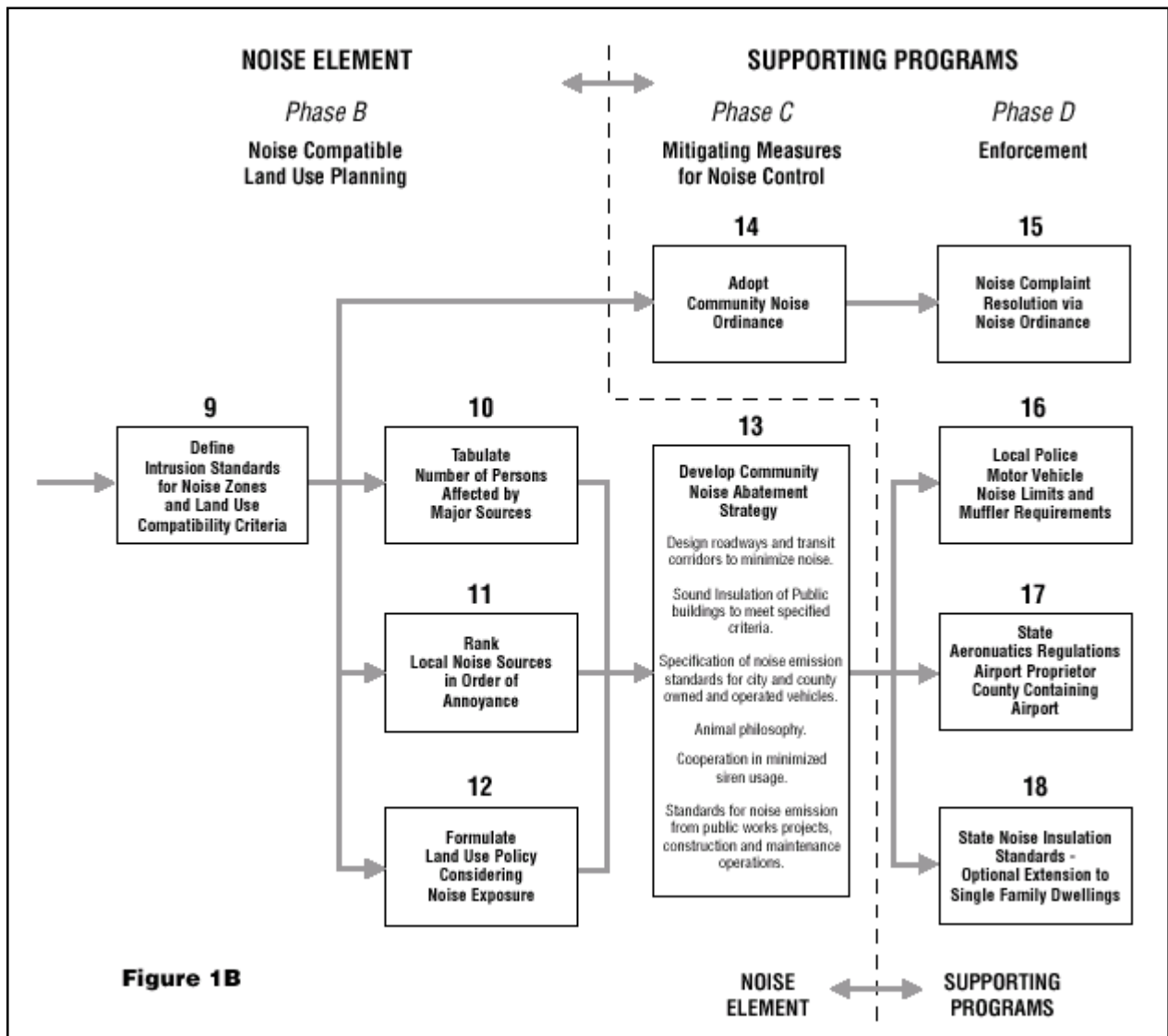
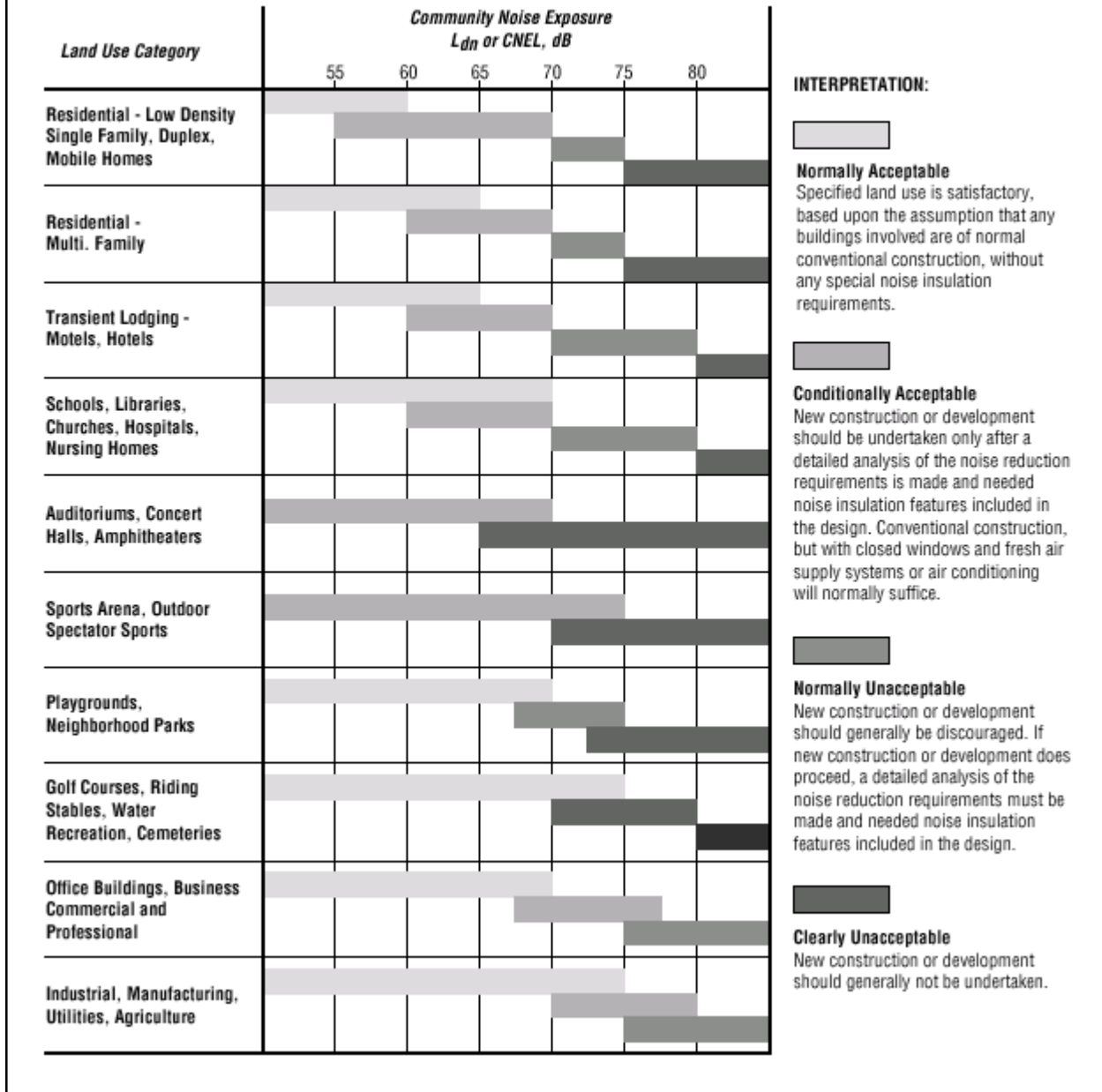


Figure 1B

FIGURE 2



Phase B: Noise-Compatible Land Use Planning

A noise planning policy needs to be rather flexible and dynamic to reflect not only technological advances in noise control, but also economic constraints governing application of noise-control technology and anticipated regional growth and demands of the community. In the final analysis, each community must decide the level of noise exposure its residents are willing to toler-

ate within a limited range of values below the known levels of health impairment.

Step 9:

Given the definition of the existing and forecasted noise environment provided by the Phase A efforts, the locality preparing the noise element must now approach the problem of defining how much noise is too much. Guidelines for noise-compatible land use are presented in Figure 2. The ad-

justment factors given in Table 1 may be used in order to arrive at noise-acceptability standards that reflect the noise-control goals of the community, the particular community's sensitivity to noise (as determined in Step 2), and the community's assessment of the relative importance of noise pollution.

Step 10:

As a prerequisite to establishing an effective noise-control program, it is essential to know, in

quantitative terms, the extent of noise problems in the community. This is best accomplished by determining, for each major noise source around which noise contours have been developed, the number of community residents exposed and to what extent. It is also useful to identify those noise-sensitive land uses whose noise exposure exceeds the recommended standards given in Figure 2. The exposure inventory can be accomplished by using recent census data, adjusted for regional growth,

| Table 1 | | |
|---|---|--|
| <i>Type of Correction</i> | <i>Description</i> | <i>Amount of Correction to be Added to Measured CNEL in dB</i> |
| Seasonal Correction | Summer (or year-round operation) | 0 |
| | Winter only (or windows always closed) | - 5 |
| Correction for Outdoor Residual Noise Level | Quiet suburban or rural community (remote from large cities and from industrial activity and trucking). | + 10 |
| | Quiet suburban or rural community (not located near industrial activity). | + 5 |
| | Urban residential community (not immediately adjacent to heavily traveled roads and industrial areas). | 0 |
| | Noisy urban residential community (near relatively busy roads or industrial areas). | - 5 |
| | Very noisy urban residential community. | - 10 |
| Correction for Previous Exposure and Community Attitudes | No prior experience with the intruding noise. | + 5 |
| | Community has had some previous exposure to intruding but little effort is being made to control the noise. This correction may also be applied in a situation where the community has not been exposed to the noise previously, but the people are aware that bona fide efforts are being made to control the noise. | 0 |
| | Community has had considerable previous exposure to the intruding noise and the noise maker's relations with the community are good. | - 5 |
| | Community aware that operation causing noise is very necessary and it will not continue indefinitely. This correction can be applied for an operation of limited duration and under emergency circumstances. | - 10 |
| Pure Tone or Impulse | No pure tone or impulsive character. | 0 |
| | Pure Tone or impulsive character present. | + 5 |

and tabulating the population census blocks within given noise contours.

Step 11:

Once the noise exposure inventory is completed, the relative significance of specific noise sources in the community (in terms of population affected) will become apparent. The local agencies involved may wish to use this information to orient their noise-control and abatement efforts to achieve the most good. Clearly, control of certain major offending sources will be beyond the jurisdiction of local agencies; however, recognition of these limitations should prompt more effective land use planning strategies.

Step 12:

A major objective of the noise element is to utilize this information to ensure noise-compatible land use planning:

“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.” (§65302(f))

The intent of such planning is to:

- (1) Maintain those areas deemed acceptable in terms of noise exposure.
- (2) Use zoning or other land use controls in areas with excessive noise exposure to limit uses to those which are noise compatible and to restrict other, less compatible uses.

Phase C: Noise Mitigation Measures

Step 13:

Based upon the relative importance of noise sources in order of community impact and local attitudes towards these sources, “[t]he noise element shall include implementation measures and possible solutions that address existing and foreseeable noise problems, if any” (§65302(f)).

Selection of these noise-mitigating measures should be coordinated through all local agencies in order to be most effective. Minimization of noise emissions from all local government-controlled or sanctioned activities should be a priority item. This includes low noise specifications for new city or county owned and operated vehicles (and noise re-

duction retrofitting where economically possible) and noise emission limits on public works projects. Local governments should insure that public buildings (especially schools) are sufficiently insulated to allow their intended function to be uninterrupted by exterior noise. Local agencies can work with state and federal bodies to minimize transportation noise, primarily through transitway design, location, or configuration modifications.

Additional measures might include such policies as limitation of siren usage by police, fire, and ambulance units within populated areas. Animal control units may be encouraged to minimize barking dog complaints through use of an improved public relations campaign termed “Animal Philosophy.” This involves working with pet owners to determine why the dog barks and attempting solutions rather than just issuing citations. Local zoning and subdivision ordinances may require the use of noise-reducing building materials or the installation of sound-insulating walls along major roads in new construction and subdivisions.

In general, local noise reduction programs need to address the problems specific to each community, with the ultimate goals being the reduction of complaint frequency and the provision of a healthful noise environment for all residents of the community.

The remaining steps are beyond the scope of the noise element requirements, but pertain to coordination with other state noise-control programs and achievement of the goals set forth in the noise element through development of an active local noise-control effort.

Step 14:

While the noise element identifies problem areas and seeks to develop medium- and long-range solutions to them, a community noise ordinance is the only viable instrument for short-term or immediate solutions to intrusive noise. A model noise ordinance that can be tailored to the specific needs of a given community by simply incorporating those sections deemed most applicable has been developed by the Department of Health Services. The model ordinance also suggests a cure for non-stationary or transient types of noise events, for which noise contours are generally meaningless.

Phase D: Enforcement

To adequately carry out the programs identified in the noise element and to comply with state requirements for certain other noise-control programs, specific enforcement programs are recommended at the local level.

Step 15:

Adopt and apply a community noise ordinance for resolution of noise complaints.

Step 16:

Recent studies have shown that the most objectionable feature of traffic noise is the sound produced by vehicles equipped with illegal or faulty exhaust systems. In addition, such hot rod vehicles are often operated in a manner that causes tire squeal and excessively loud exhaust noise. There are a number of statewide vehicle noise regulations that can be enforced by local authorities as well as the California Highway Patrol. Specifically, Sections 23130, 23130.5, 27150, 27151, and 38275 of the California Vehicle Code, as well as excessive speed laws, may be applied to curtail this problem. Both the Highway Patrol and the Department of Health Services (through local health departments) are available to aid local authorities in code enforcement and training pursuant to proper vehicle sound-level measurements.

Step 17:

Commercial and public airports operating under a permit from Caltrans' Aeronautics Program are required to comply with both state aeronautics standards governing aircraft noise and all applicable legislation governing the formation and activities of a local Airport Land Use Commission (ALUC). The function of the ALUC is, among other things, to develop a plan for noise-compatible land use in the immediate proximity of the airport. The local general plan must be reviewed for compatibility with this Airport Land Use Plan and amended if necessary (Public Utilities Code §21676). Therefore, the developers of the noise element will need to coordinate their activities with the local ALUC to ensure that compatible standards are utilized throughout the community

and that the noise element develops as part of a coherent master plan, of which the ALUP forms an integral component.

Step 18:

"The adopted noise element shall serve as a guideline for compliance with the State's noise insulation standards." (§65302(f))

Recognizing the need to provide acceptable habitation environments, state law requires noise insulation of new multifamily dwellings constructed within the 60 dB (CNEL or Ldn) noise exposure contours. It is a function of the noise element to provide noise contour information around all major sources in support of the sound transmission control standards (Appendix, Chapter 2-35, Part 2, Title 24, California Code of Regulations).

RELATIONSHIP OF THE NOISE ELEMENT TO OTHER GENERAL PLAN ELEMENTS

The noise element is related to the land use, housing, circulation, and open-space elements. Recognition of the interrelationship of noise and these four other mandated elements is necessary in order to prepare an integrated general plan. The relationship between noise and these four elements is briefly discussed below.

- ◆ **Land Use**—A key objective of the noise element is to provide noise exposure information for use in the land use element. When integrated with the noise element, the land use element will show acceptable land uses in relation to existing and projected noise contours. Section 65302(f) states that: "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."
- ◆ **Housing**—The housing element considers the provision of adequate sites for new housing and standards for housing stock. Since residential land use is among the most noise sensitive, the noise exposure information provided in the noise element must be considered when planning the location of new housing. Also, state law requires special

noise insulation of new multifamily dwellings constructed within the 60 dB (CNEL or Ldn) noise exposure contour. This requirement may influence the location and cost of this housing type. In some cases, the noise environment may be a constraint on housing opportunities.

- ◆ **Circulation**—The circulation system must be correlated with the land use element and is one of the major sources of noise. Noise exposure will thus be a decisive factor in the location and design of new transportation facilities and the possible mitigation of noise from existing facilities in relation to existing and planned land uses. The local planning agency may wish to review the circulation and land use elements simultaneously to assess their compatibility with the noise element.
- ◆ **Open Space**—Excessive noise can adversely affect the enjoyment of recreational pursuits in designated open space. Thus, noise exposure levels should be considered when planning for this kind of open-space use. Conversely, open space can be used to buffer sensitive land uses from noise sources through the use of setbacks and landscaping. Open-space designation can also effectively exclude other land uses from excessively noisy areas.

SELECTION OF THE NOISE METRIC

The community noise metrics to be used in noise elements are either CNEL or Ldn (as specified in §65302(f)). A significant factor in the selection of these scales was compatibility with existing quantifications of noise exposure currently in use in California. CNEL is the noise metric currently specified in the State Aeronautics Code for evaluation of noise impacts at specific airports that have been declared to have a noise problem. Local compliance with state airport noise standards necessitates that community noise be specified in CNEL. The Ldn represents a logical simplification of CNEL. It divides the day into two weighted time periods (Day—7 a.m. to 10 p.m. and Night—10 p.m. to 7 a.m.) rather than the three used in the CNEL measure (Day—7 a.m. to 7 p.m., Evening—7 p.m. to 10 p.m., and Night—10 p.m. to 7 a.m.) with no significant loss in accuracy.

CRITERIA FOR NOISE-COMPATIBLE LAND USE

Figure 2 summarizes the suggested use of the CNEL/Ldn metrics for evaluating land use noise compatibility. Such criteria require a rather broad interpretation, as illustrated by the ranges of acceptability for a given land use within a defined range of noise exposures.

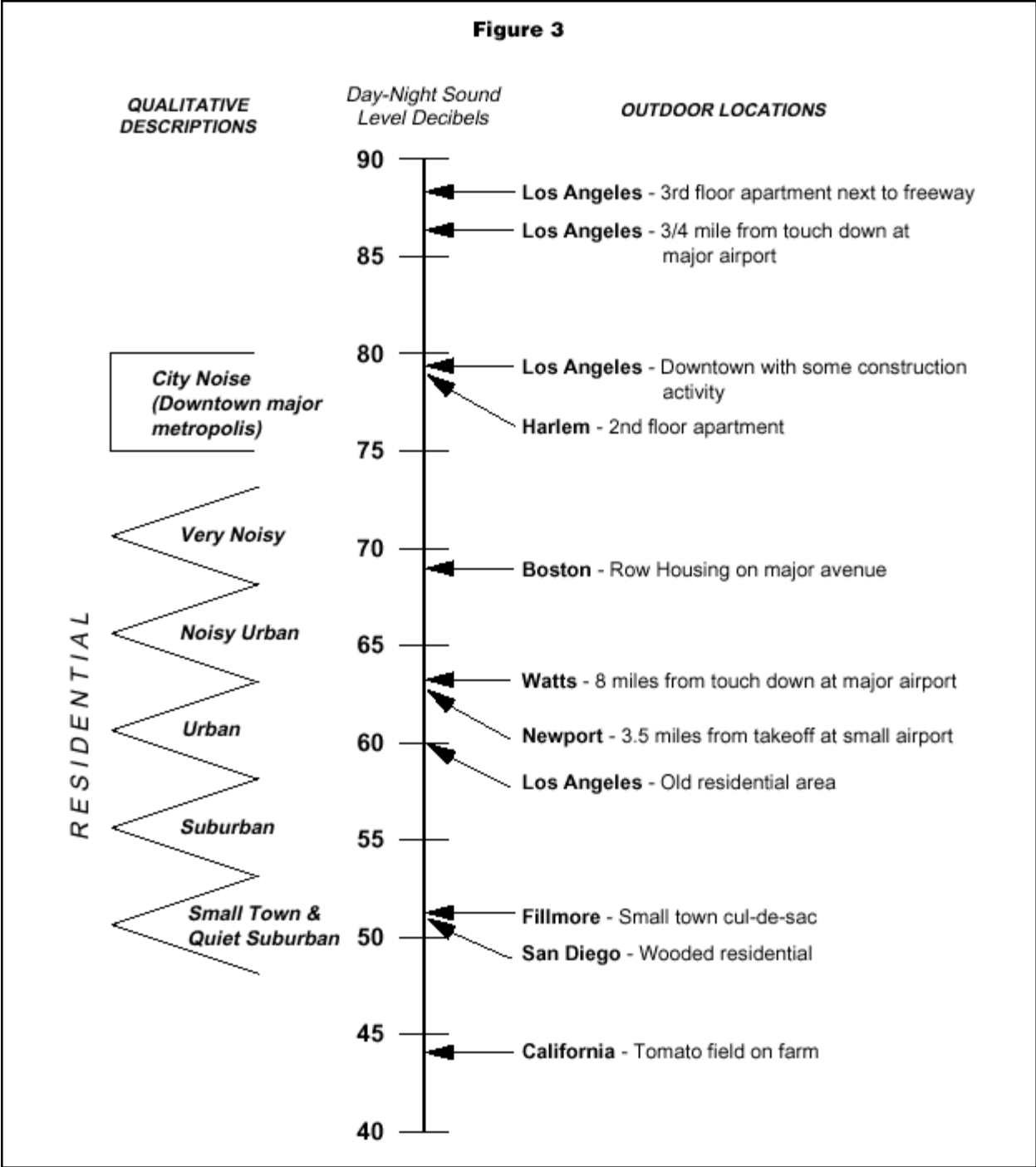
Denotation of a land use as “normally acceptable” on Figure 2 implies that the highest noise level in that band is the maximum desirable for existing or conventional construction that does not incorporate any special acoustic treatment. In general, evaluation of land use that falls into the “normally acceptable” or “normally unacceptable” noise environments should include consideration of the type of noise source, the sensitivity of the noise receptor, the noise reduction likely to be provided by structures, and the degree to which the noise source may interfere with speech, sleep, or other activities characteristic of the land use.

Figure 2 also provides an interpretation as to the suitability of various types of construction with respect to the range of outdoor noise exposure.

The objective of the noise compatibility guidelines in Figure 2 is to provide the community with a means of judging the noise environment it deems to be generally acceptable. Many efforts have been made to account for the variability in perceptions of environmental noise that exist between communities and within a given community.

Beyond the basic CNEL or Ldn quantification of noise exposure, one can apply correction factors to the measured or calculated values of these metrics in order to account for some of the factors that may cause the noise to be more or less acceptable than the mean response. Significant among these factors are seasonal variations in noise source levels, existing outdoor ambient levels (i.e., relative intrusiveness of the source), general societal attitudes towards the noise source, prior history of the source, and tonal characteristics of the source. When it is possible to evaluate some or all of these factors, the measured or computed noise exposure values may be adjusted by means of the correction factors listed in Table 1 in order to more accurately assess local sentiments towards acceptable noise exposure.

In developing these acceptability recommendations, efforts were made to maintain consistency



with the goals defined in the federal EPA's "Levels Document" and the State Sound Transmission Control Standards for multifamily housing. In both of these documents, an interior noise exposure of 45 dB CNEL (or Ldn) is recommended to permit normal residential activity. If one considers the typical range of noise reduction provided by residential dwellings (12 to 18 dB with windows par-

tially open), the 60 dB outdoor value identified as "clearly acceptable" for residential land use would provide the recommended interior environment.

Figure 3 has been included in order to better explain the qualitative nature of community noise environments expressed in terms of Ldn. It is apparent that noise environments cover a broad range and that, in general, it may be observed that the

quality of the environment improves as one moves further away from major transportation noise sources.

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