NOISE ELEMENT

CITY OF OAKLAND **GENERAL PLAN**

June 2005

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1 | INTRODUCTION

Legislative mandate ➲ California state law requires that each city and county adopt a general plan to guide its physical growth and development. The general plan is a policy document that forms the basis for a jurisdiction's official decisions regarding the future location of housing, business, industry, transportation facilities, parks, open space and other land uses, the conservation of natural resources, and the protection from environmental hazards. General plans must address locally relevant planning issues under various "elements," or subject categories, including noise.

➲ California Government Code, §65300-65303.4 and §65350-65362; §65302(f) for noise element requirements. The Governor's Office of Planning and Research issues *General Plan Guidelines,* a document interpreting the legal requirements for the preparation of a general plan; Appendix C of that document contains guidelines for the preparation of the noise element.

The noise element must analyze and quantify, to the extent practicable, current and projected noise levels from the following noise sources: major traffic thoroughfares, passenger and freight railroad operations, commercial and general aviation operations, industrial plants, and other ground stationary noise sources contributing to the community noise environment. Noise levels for these sources must be shown on noise contour maps prepared on the basis of noise monitoring or modeling techniques. Noise contours establish the locational relationship between existing and projected land uses and noise sources, and must be used to guide land use decisions to reduce noise impacts, especially on ➲ sensitive receptors. The noise element must include implementation measures that address any existing and foreseeable noise problems, and must serve as a guideline for complying with the state's noise insulation standards.

➲ Noise-sensitive receptors are land uses whose purpose and function can be disrupted or jeopardized by noise. Sensitive receptors include residences, schools, churches, hospitals, elderly-care facilities, hotels and libraries and certain types of passive recreational open space. Understandably, noise is of special concern when it occurs near sensitive receptors.

In preparing Oakland's noise element, staff conducted a thorough review of the noise elements from the following jurisdictions: Alameda and Contra Costa counties, and the cities of Alameda, Berkeley, Emeryville, Fremont, Hayward, Los Angeles, Oakland (the 1974 element), Palo Alto, Piedmont, Pittsburg, San Francisco, San Jose, San Leandro, South San Francisco, Union City and Walnut Creek.

Updating Oakland's noise element Oakland's original noise element was adopted in 1974. Since then, Oakland's land-use patterns have changed, and its population and economy have expanded. While noise cannot be eliminated, the City believes that by updating the noise element and the policy statements in it, it can continue to protect residents' exposure to excessive noise levels. This document is meant to satisfy the state's requirements for a noise element.

Policy statements At the heart of every element of a general plan is a set of goals, objectives, policies actions or other statements which are often collectively referred to as policy statements. The purpose of policy statements is to provide direction for a city or county and guide the development-related actions and decisions of its officials. Policy statements attempt to reconcile and accommodate the diverse and often competing interests of a community and its members. Oakland's noise element contains two types of policy statements: policies and actions. Policies identify specific areas in which the city will direct efforts in order to attain its goals. Actions are detailed and implementable steps that, if feasible, the city will undertake in order to carry out the policies. There is at least one action supporting every policy, and each action lists the city agency (or agencies) expected to assume the leading role in implementing that action.

It is important to keep in mind that actions are meant to apply only to those geographic and programmatic areas over which the City of Oakland has legal authority, and that the actions will only be implemented if they can be accomplished successfully given financial, environmental, legal, social and technological factors. Also, because the various elements of the Oakland general plan contain policies that address numerous different goals, some policies might compete with each other. In deciding whether to approve a proposed project, the City's Planning Commission and City Council must balance the various policies and decide whether the project is consistent (that is, in general harmony) with the general plan overall. (Incidentally, project conflicts with the general plan do not inherently result in a significant impact on the environment under the California Environmental Quality Act, since, under the act, impacts must be related to physical changes.)

Relationship to other elements By law, the elements of a general plan must be consistent with each other. Appendix C of the State's *General Plan Guidelines* ("Guidelines for the Preparation and Content of the Noise Element of the General Plan") discusses the relationship between noise and other elements, most importantly the land use and circulation elements (which in Oakland are aggregated as the land use and transportation element, or LUTE). Appendix C mentions that "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." Regarding the circulation element, Appendix C states that "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." Appendix C goes on to state that "the local planning agency may wish to review the circulation and land use elements simultaneously to assess their compatibility with the noise element."

As recommended by Appendix C of the *General Plan Guidelines*, Oakland's noise element provides noise-exposure information—in the form of noise contours (➲ CHAPTER 4) and a land use-noise compatibility matrix (➲ CHAPTER 5)—to inform land-use decisions. (The matrix illustrates the degree of acceptability of exposing specified land uses, including sensitive land uses, to a range of ambient-noise levels, as indicated on the noise contour maps.) Also, the noise element acknowledges that transportation is the main source of noise in Oakland, and correlates noise levels with the layout of the transportation system in the form of noise contour (➲ CHAPTER 4). It should be mentioned that the LUTE contains noise-related policies on public nuisances and nuisances from incompatible land uses, the impact of truck traffic on residential neighborhoods, the development of new transportation infrastructure, the development of sites near the seaport and airport and along airport flight paths, and the location of entertainment and large-scale commercial activities. In addition, the open space, conservation and recreation element contains policy statements addressing the provision of landscape as noise screens along freeways (➲ APPENDIX A).

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2 | Noise Primer

Description When an object vibrates, it radiates part of its energy as acoustic pressure in the form of sound waves. Noise can be thought of as sound that is intrusive, annoying or otherwise unwanted. Sound, and noise, can be described in terms of three technical variables:

- Amplitude, or Loudness, which is the difference in pressure between the peak and the trough of a sound wave; it is measured in decibels.
- Frequency, or Pitch, which is the number of cycles of a sound wave per unit of time; pitch rises as the number of cycles increases and drops as it decreases.
- Time Pattern. Sounds can be continuous (as that of a waterfall), fluctuating (traffic throughout the day), intermittent (the ringing of a phone) or impulsive (a handclap).

Measurement Ambient, or community, noise is measured in decibels using the ➲ A-weighted sound-pressure scale (dBA). The normal range of human hearing extends from 0 dBA to about 140 dBA (➲ Table 1, next page). Because sound can vary in intensity by over one trillion times within the range of human hearing, decibels are measured on a logarithmic scale, which compresses this range into a manageable set of numbers. On the logarithmic scale, sound intensity increases exponentially, so that ten decibels represents ten times more acoustic energy than one decibel but 20 decibels represents 100 more acoustic energy and 30 decibels, 1,000 times more. Also, noise sources do not combine in a simple additive fashion: if two sources produce noise levels

➲ The human ear is not equally sensitive to all frequencies of the sound spectrum. The A-weighting scale adjusts sound levels to correspond to the human hearing response by de-emphasizing the very low and very high sound frequencies that fall outside the human hearing range.

of 50 dBA each, combining them would produce a noise level of only 53 dBA, not 100 dBA (that is, a doubling in the amount of sound energy produces only a 3 dBA change).

RANGE OF HUMAN HEARING TABLE 1

NOISE SOURCE OR ENVIRONMENT (DISTANCE OR LOCATION)	NOISE LEVEL, DBA	LOUDNESS LEVEL (COMPARED TO 70 DBA)
	140	Deafening; eardrums bleed
	130	Threshold of pain (64 times louder)
Jet takeoff (at 200 feet)	120	Threshold of physical discomfort (32 times louder)
Fire engine siren (100 ft), near stage at rock concert, table saw	110	Extremely loud (16 times louder)
Passing train (at platform), unmuffled motorcycle	100	Very loud (8 times louder)
Pile driver, jackhammer (50 ft), airliner (under flight path)	90	Loud; hearing damage from prolonged exposure (4 times louder)
Freeway traffic (100 ft), passing truck, vacuum cleaner	80	Loud; annoying and highly intrusive (twice as loud)
Passing bus (on sidewalk), street traffic (100 ft)	70	Moderately loud; intrusive; telephone use is difficult (reference loudness)
Dishwasher, AC unit, passing car (on sidewalk)	60	Moderate (half as loud)
Normal conversation, light auto traffic (100 ft), office setting	50	Quiet; threshold of interference with human speech (1/4 as loud)
In typical living room, background music	40	Very quiet; threshold of interference with sleep (1/8 as loud)
In library or in bedroom at night, soft whisper	30	Faint (1/16 as loud)
Rustling leaves, inside recording studio	20	Very faint
Human breathing	10	Very faint; just audible
	0	Threshold of normal hearing

Compiled by City of Oakland staff from various sources

Human perception Because of the physical characteristics of noise transmission and of noise reception by humans, the relative loudness of sounds does not closely match the actual amounts of sound energy. A change in ambient noise levels of 1-2 dBA is not audible even to sensitive receptors; a change of 3 dBA (twice the sound energy) is considered a just-noticeable difference; a change of at least 5 dBA is necessary to elicit a noticeable change in response by the community; and it takes a change of 10 dBA to be perceived as a doubling in loudness. From this, it can be inferred that a reduction in community noise levels of 5-10 dBA is necessary to appease noise-related complaints.

Time-sensitive measurement The intrusiveness of noise depends not only on loudness but also on frequency, duration and time of day it occurs. To better gauge the impact to the community, ambient noise is measured over periods of time rather than at a given moment. The "equivalent sound level" (L_{eq}) can be thought of as the steady-state, or average, A-weighted sound level over a measurement period, typically one, eight or 24 hours. The "community noise equivalent level" (CNEL) and "day/night average sound level" (L_{dn}) are measures of the 24-hour L_{eq} reading at a given location with ➲ upward decibel adjustments, or penalties, to account for people's increased sensitivity to noise during the evening, night and morning. L_{max} and L_{min} are the maximum and minimum noise levels during a measurement period, while L_n refers to the sound level exceeded over a percentage "n" of the measurement period (for example, an L_{75} of 60 dBA indicates that the sound level exceeded 60 dBA 75 percent of the time).

➲ For CNEL, penalties are +5 dBA for readings made in the 7-10 pm period and +10 dBA for readings in the 10 pm-7 am period. For L_{dn}, there is only a penalty of +10 dBA during the 10 pm-7 am period. In practice, L_{dn} and CNEL values are considered equivalent, as they rarely differ by more than 1 dBA.

Sources Noise sources are classified as either stationary (or point) sources or as mobile sources. Common stationary sources include commercial and industrial equipment and activities (air compressors, generators and gas venting, for example); construction activities; car stereos and alarms; sporting and other entertainment events; and residential equipment and activities such as stereos, barking dogs, power tools and air-conditioning units. Stationary sources usually affect only small areas immediately adjacent to the source. Mobile sources—especially cars and trucks—are the most common and significant sources of noise in most communities. Because they stem from transportation activities, mobile sources often affect large areas along transportation corridors. The three main types of mobile noise sources are ground motor vehicles (including cars, trucks, buses, motorcycles and, more recently, motorized scooters), aircraft, and freight and passenger rail traffic. Traffic noise is generated by tire friction and wind resistance, and also by engines, mufflers, horns and sirens (in the case of emergency vehicles). Traffic noise levels depend on the speed of traffic and the percentage of trucks and, to a lesser extent, on traffic volume.

Propagation and attenuation Sound propagates, or travels outward, from its source in waves of acoustic pressure. The pattern of propagation is related to the geometry of the sound source. Sound from "point" sources (such as a piece of industrial equipment) propagates in a spherical pattern around the point. Sound from sources with a linear pattern (such as a moving train or a line of closely spaced moving cars) propagates in a cylindrical pattern parallel to the line. Finally, sound from sources with a quasi-linear pattern (which is between a point and a line, such as moving cars spaced far apart), propagates in a hybrid pattern between that of a sphere and a cylinder. As the sound travels away from its source, it also attenuates, or drops off in loudness. For each doubling of distance, noise levels attenuate by approximately 6 dBA from point sources, 4.5 dBA from quasi-line sources and 3 dBA from line sources.

Effects on people Noise can have significant effects on physical and mental human health and well-being. Adverse impacts and effects include interference with speech and other forms of communication such as television and radio; sleep disruption; negative mood and behavioral changes; and hearing loss (usually temporary and caused by occupational, rather than environmental, noise). Sleep disruption and interference with communication are the main sources of noise-related community complaints. It should be mentioned that people's tolerance to annoyance from noise is highly subjective, varying greatly among individuals.

Noise mitigation Noise impacts can be reduced by controlling the level of noise generation at the source, through site- and building-design techniques at the noise receptor, and by modifying the sound transmission path between source and receptor:

- AT THE SOURCE: The Federal and state governments establish uniform noise-emission standards for mobile sources and industrial and consumer machinery, while local governments may set limits on the operations of those sources and also adopt decibel-based noise-exposure guidelines for different land uses (➲ next section).
- AT THE RECEPTOR: Noise can be reduced by using wall sound insulation and sound-rated doors and windows; by fitting doors and windows properly and sealing openings and joints; and by locating openings in recognition of nearby noise sources (however, air conditioning might be needed for adequate ventilation).
- TRANSMISSION PATH: Barriers and buffers can be used to lessen noise. Reduction of traffic noise, for example, can be accomplished by placing walls or landscaped berms next to roadways, by re-routing traffic, by prohibiting residential development near major thoroughfares, and by designing building setbacks or other site features that orient dwelling units and outdoor areas away from traffic.

3 | Institutional Framework

Federal Based on its authority to regulate interstate commerce, Congress enacted the 1972 Noise Control Act (NCA) to provide noise-level standards for transportation, industrial and commercial equipment. Among other provisions, the NCA specifically reaffirmed earlier preemption by federal agencies over aircraft-noise control by state and local governments. In 1990, the Airport Noise and Capacity Act again preempted state and local authority by extending Federal Aviation Administration (FAA) authority over flight patterns, landing and departure times, and other operational aspects of public and private airports and heliports. The act grandfathered existing local ordinances controlling noise at airports, but it requires that new regulations receive FAA approval.

State The ➲ California noise insulation standards regulate the maximum allowable interior noise level in new multi-unit buildings (such as apartment buildings and hotels) by specifying the extent to which walls, doors and floor/ceiling assemblies must absorb sound. The standards establish a threshold of 45 dBA (CNEL) for noise from exterior sources in any habitable room with doors and windows closed, and require preparation of an acoustical analysis for units proposed in areas with ambient-noise levels of 60 dBA or greater to ensure that the threshold is not exceeded. In Oakland, the standards are enforced by the Building Services Division of the Community and Economic Development Agency (CEDA).

➲ California Code of Regulations, Title 24, Part 2. Title 24, Part 2 is published by the International Code Council, a non-governmental organization with sole publication and distribution rights. It may be examined free of charge at one of many "depository libraries" throughout the state, which are listed on the website of the Building Standards Commission.

➲ California Vehicle Code, §27000-27007, §27150-27159 and §27200-27207.

➲ California Code of Regulations, Title 21, §5000, et seq.

The state has established ➲ regulations—enforced by the California Highway Patrol or local law-enforcement agencies—which set limits on the operation of vehicle horns, sirens, and mufflers and exhaust systems, and which set maximum noise levels at which cars, trucks and motorcycles can be operated. The ➲ California airport noise regulations provide noise standards governing the operation of aircraft and aircraft engines for airports in the state (in California, federal and state airport-related regulations are enforced by Caltrans).

California Environmental Quality Act (CEQA) This state law requires public agencies such as the City of Oakland to identify any significant environmental effects of their "actions," including their approval of development projects, and to mitigate such effects if feasible. When evaluating projects under CEQA, the City considers the potential for a project to, among other things, expose persons to, excessive noise levels or to result in a substantial increase in ambient noise levels .

California Public Utilities Code, §21670-21679.5

County ➲ State law requires the establishment of airport land use commissions (ALUCs) at the county level. The main role of the ALUCs is to develop airport land-use plans (ALUPs) to advise cities and counties on the orderly expansion of public airports over a 20-year horizon and on minimizing land-use conflicts with surrounding areas over the issues of noise and building heights. Cities and counties must generally refer general plans, zoning ordinances and land-use development proposals near airports and heliports to the ALUC for determination of consistency with the ALUP. In Alameda County, the county's Community Development Agency acts as the ALUC, monitoring Oakland International Airport, Hayward Executive Airport and Livermore Municipal Airport; it last adopted an ALUP for the county in 1986.

Oakland Municipal Code, 17.120.050 ("Performance Standards—Noise"); and 8.18.010 ("Excessive and annoying noises prohibited") and 8.18.020 ("Persistent noises a nuisance").

Oakland The Oakland Municipal Code contains numerous regulations related to noise. The most important are the ➲ noise performance standards and the nuisance noise ordinance. The noise performance standards establish maximum noise levels generated by certain activities "across real property lines" which may be received by residential, commercial, manufacturing and other specified land uses. The standards also establish maximum noise levels for both short- and long-term construction and demolition activities, and for residential air-conditioning units, residential and commercial refrigeration units, and commercial exhaust systems. The nuisance noise ordinance generally prohibits "excessive or annoying" noise.

In general, noise complaints related to the performance standards are enforced by CEDA's Code Enforcement Division while complaints related to "nuisance" noise—yelling, loud music or barking dogs, for example—are investigated by the Oakland Police Department (OPD also enforces noise regulations related to ground motor vehicles). In addition, the City uses the zoning ordinance and the conditional-use permit process to limit the hours of operation for noise-producing activities and to identify noise-abatement requirements. In some cases, the discretionary review procedures in the zoning regulations—such as the use permit requirement for certain activities—provide the means for case-by-case review of potentially noisy uses.

OAK Oakland International Airport (OAK) has established noise-abatement policies and procedures regarding runway use, aircraft operation and flight patterns. The airport also operates an internal noise management office which administers a variety of noise-management programs: computerized systems to monitor airport-related noise levels in surrounding communities, sound-insulation programs for residences affected by airport noise, "flying quietly" education provided to pilots, periodic public meetings to address community concerns over noise, online information on runway use and operations and Bay Area air-traffic patterns, and a ➲ noise report hotline.

OAK's noise report hotline received 3,291 noise-related complaints in 2003. Of these, the vast majority (2,731 complaints, or 83 percent) came from Fremont and Alameda callers; Oakland callers represented just over 1.3 percent of the total (43 complaints). The hotline's phone number is 510/577.4194; the hotline is generally staffed weekdays from 8:30 am to 5 pm (at other times, messages are recorded).

"The Oakland Police Department receives many complaints about barking dogs… Owners of barking dogs may be in violation of the Oakland Municipal Code. Violations are punishable by law and owners or keepers of animals creating a nuisance may be required to pay a fine. The Oakland Police Department investigates all complaints of barking dogs in the City of Oakland. To file a complaint or for further information, call the Oakland Police Department at 415/777.3333 24 hours a day, 7 days a week."

—From the website of the Oakland Animal Shelter and Animal Control Field Services, a division of the Oakland Police Department

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4 | Local Noise Environment

Noise sources The major noise sources in Oakland, as in most cities, are transportation activities, specifically motor-vehicle traffic on major thoroughfares, which generates noise throughout the city continuously; rail operations (including those of the Bay Area Rapid Transit, or BART), which produce significant noise levels intermittently along railroad alignments; and operations at Oakland International Airport (OAK), which produce intermittent noise along flight paths. Finally, while a number of industrial noise sources exist throughout the city (mostly in West and East Oakland) which generate noise levels above those of their surroundings, none generates sufficient noise to affect the city's overall noise environment.

Technical study In 2004, as part of updating the noise element, the City of Oakland retained the noise consulting firm of Illingworth & Rodkin to evaluate the city's noise environment. The firm conducted a city-wide noise-monitoring survey in August 2004 (supplemented with results from project-specific noise studies conducted previously in Oakland) and presented the results in a report dated December 2004. Much of the information contained in this chapter of the noise element is derived from the Illingworth & Rodkin report. (More detailed information can be found in the report itself, which forms part of the noise element by reference, and which is available from the City.)

Noise monitoring survey As mentioned above, Illingworth & Rodkin conducted a city-wide noise-monitoring survey on August 17-24, 2004 to determine the local noise environment. Noise levels were measured long-term (for 24 hours) at 12 locations in the city, and short-term (for 1 hour) at 11 additional locations. These 23 measurements were supplemented with results from 14 noise studies conducted by others between 1999 and 2003 for specific development projects in Oakland (➲ FIGURE 1 for noise-measurement locations). ➲ APPENDIX B contains tables summarizing information related to the long-term measurements (➲ TABLE B-1), the short-term measurements (➲ TABLE B-2), and the previously conducted measurements (➲ TABLE B-3). The measurements captured noise from a variety of both mobile and stationary sources.

Roadway noise Illingworth & Rodkin used Caltrans' noise prediction model L_{eq}V2 to develop noise contours (measured in L_{dn}) for the major traffic thoroughfares in Oakland (including the state and interstate freeways), employing traffic data obtained from various government agencies. The data were input into the traffic noise model for calibration with the observed noise measurements, and existing noise levels along city streets and highways were then calculated using the calibrated traffic noise model (noise levels were estimated at 75 feet from the centerline of major local thoroughfares and 150 feet from the centerline of freeways). ➲ APPENDIX B contains tables summarizing existing noise levels and noise levels predicted for the year 2025 along various local streets (➲ TABLE B-4) and freeway segments (➲ TABLE B-5). The contours of the future traffic noise levels are shown on ➲ FIGURE 2. (Contours of existing traffic noise levels were not mapped because they would not be distinguishable from future contours, given the minor changes expected to occur in noise levels over the next 20 years.) As the noise contour map shows, freeways are the main source of noise in the city, with I-580, I-880, I-980 and highways 13 and 24 generating the highest noise levels, in excess of 70 L_{dn}.

It should be noted that given L_{dn} values, including as expressed in noise contours, are considered worst-case estimates because noise measurements do not account for noise-mitigation measures (such as sound walls or berms, building setbacks, and sound-rated construction methods); for this reason, it can be assumed that areas within a given noise contour or surrounding a measurement site experience noise at below the measured levels. It should also be noted that although considerable effort goes into developing noise contours, the present modeling technology is such that the accuracy of contours is usually no better than +/− 3 dB; noise contours should, therefore, not be thought of as absolute lines of demarcation on a map (such as topographical contours) but rather as bands of similar noise exposure.

Railroad noise There are two Union Pacific railroad right-of-ways in the city, both following north-south alignments. The two lines are parallel and near each other, contributing to cumulatively higher noise levels on the parcels between them. A typical train traveling at 25 mph may produce noise levels in excess of 95 dBA at a distance of 100 feet from the tracks, while train horns may approach 110 dBA. Brakes, coupling impacts and crossing guard warnings are additional common sources of noise along a railroad corridor. The aboveground BART lines—through West Oakland, along East 8th Street/East 12th Street/San Leandro Boulevard, along Highway 24, and along Martin Luther King Jr Way—are additional noise sources in the city. A typical BART train produces a noise level of 85 dBA at 100 feet (noise levels are lower near the stations due to the slower speeds of approaching and departing trains). BART trains run frequently through Oakland, at a combined rate of about 40 per hour on all lines during the daytime on weekdays and about 20 per hour during the early morning and evening on weekdays and during the weekend and holidays.

Using data collected for the San Leandro general plan update in 2000, Illingworth & Rodkin estimated noise levels along the Union Pacific and BART track alignments (including from train warning whistles) through Oakland. Distances from track centerlines to various L_{dn} levels are shown on ➲ TABLE B-6, while the noise contours are shown on ➲ FIGURE 3. (It should be remembered that noise generated by trains is intermittent, unlike noise from motor-vehicle traffic, which is continuous.) Given the unavailability of data regarding future railroad and BART operations, predicted future noise levels and noise contours along the rail corridors have not been prepared.

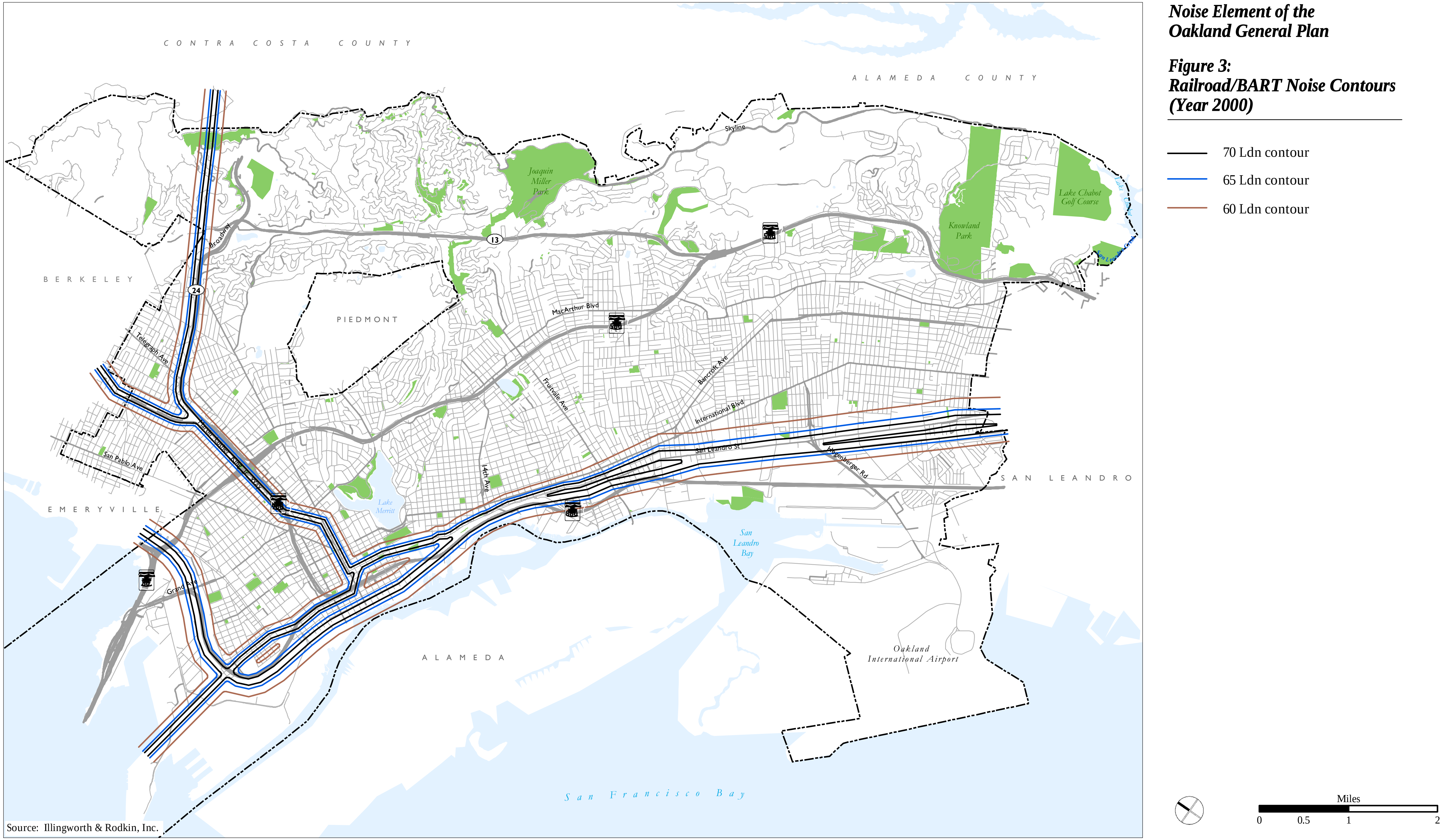
Aircraft noise ➲ FIGURE 4, obtained from Oakland International Airport (OAK), shows the noise contours, measured in ➲ CNEL, for existing overflight and ground airport operations (from the fourth quarter of 2004; it should be noted that noise from aircraft overflights is intermittent while noise from ground operations is relatively continuous). ➲ FIGURE 5, from the 1996 EIS/EIR for the Port of Oakland's proposed Airport Development Plan, shows the predicted CNEL contours from airport operations in the year 2010. As the maps show, noise levels in excess of 65 CNEL are primarily experienced at the airport, over water and over small areas areas of Bay Farm Island. In addition, it is acknowledged that airplane overflights and other airport operations affect several neighborhoods in Oakland, San Leandro and the City of Alameda that are nevertheless outside of the 65 CNEL contour.

Because the community noise equivalent level (CNEL) is the noise metric specified in the State Aeronautics Code, aircraft noise in California is described in terms of CNEL. CNEL is roughly equivalent to the day/night average sound level (L_{dn}) but includes a 5 dBA upward adjustment for the evening hours (7-10 pm).

Future noise levels The noise element must analyze and quantify, to the extent practicable, both current and projected noise levels for the major sources of community noise. As described above, noise levels were predicted for the year 2025 along various local streets (➲ TABLE B-4) and freeway segments (➲ TABLE B-5) based on traffic data obtained from various government agencies. The contours of the future traffic noise levels are shown on ➲ FIGURE 2. (For the noise element, the City chose a time horizon of 20 years from the document's expected publication in 2005. While traffic studies commonly have two time horizons—10 and 20 years—community noise levels in a built-out city like Oakland would not change sufficiently in ten years to also justify this earlier time horizon. As mentioned earlier, contours of existing traffic noise levels were not mapped because they would not be distinguishable from future contours, given the minor changes expected to occur in noise levels over the next 20 years.) Future noise levels were not predicted along rail corridors because there is no reliable data on how railroad and BART operations will change over the next 20 years. Finally, ➲ FIGURE 5, shows the predicted CNEL contours from airport operations in the year 2010 (there is no reliable data for predicting airport noise contours for the year 2025).

Noise Element of the Oakland General Plan

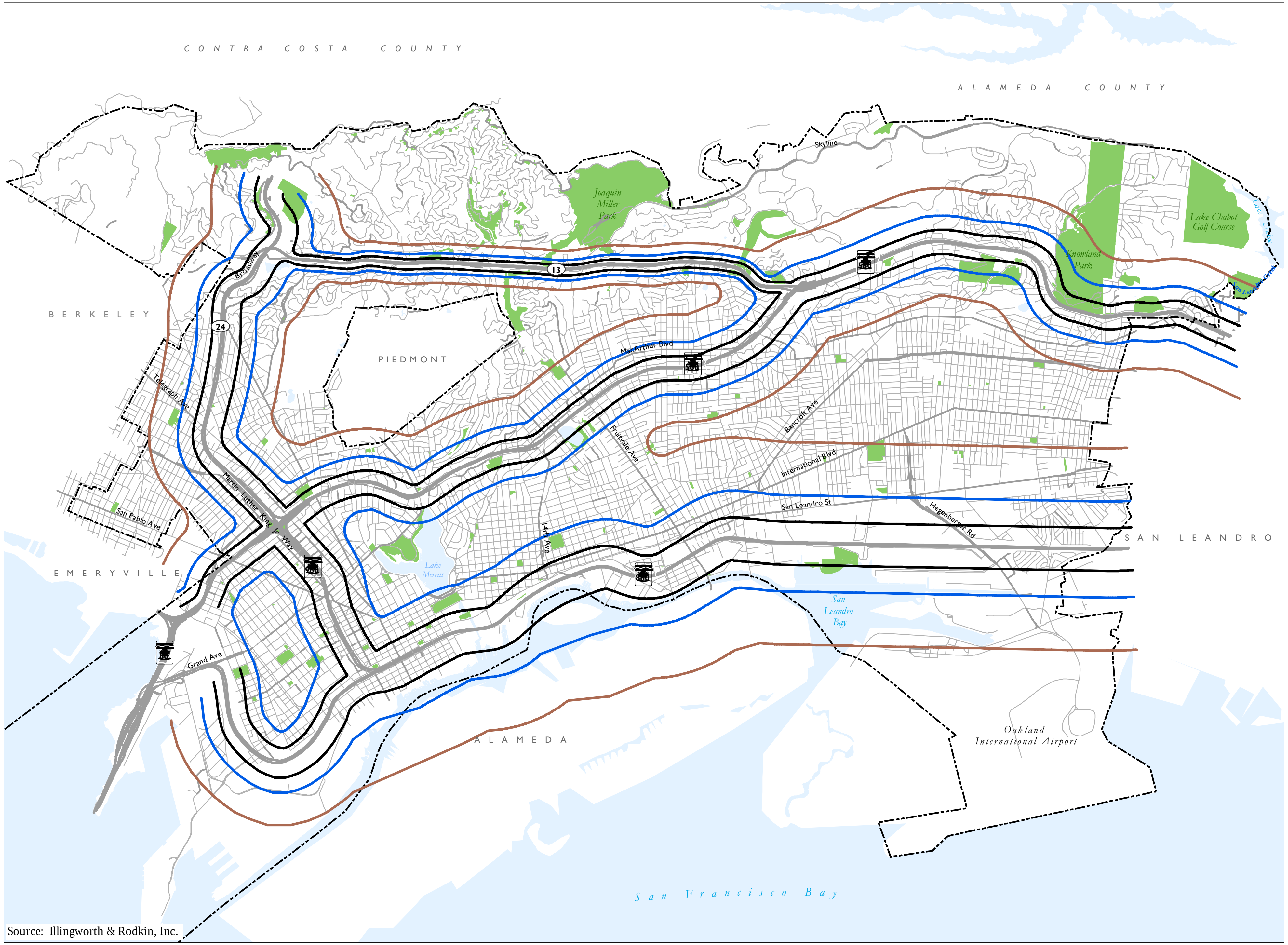
Figure 3: Railroad/BART Noise Contours (Year 2000)



Source: Illingworth & Rodkin, Inc.

Noise Element of the Oakland General Plan

Figure 2: Roadway Noise Contours (Year 2025)



70 Ldn contour

65 Ldn contour

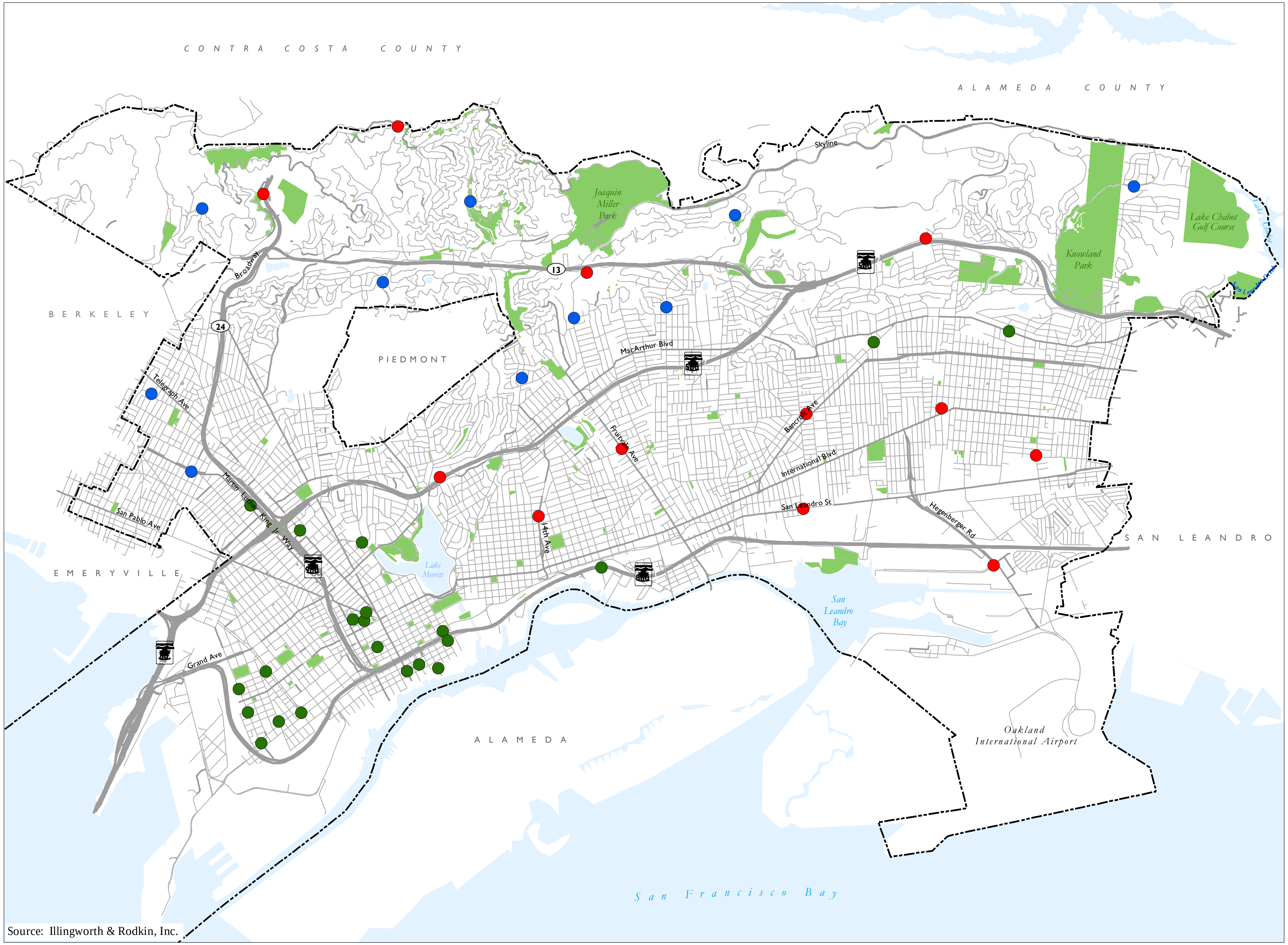
60 Ldn contour

Miles

0 0.5 1 2

Noise Element of the Oakland General Plan

Figure 1: Noise Monitoring Locations



Long-term measurement

Short-term measurement

Previous measurement

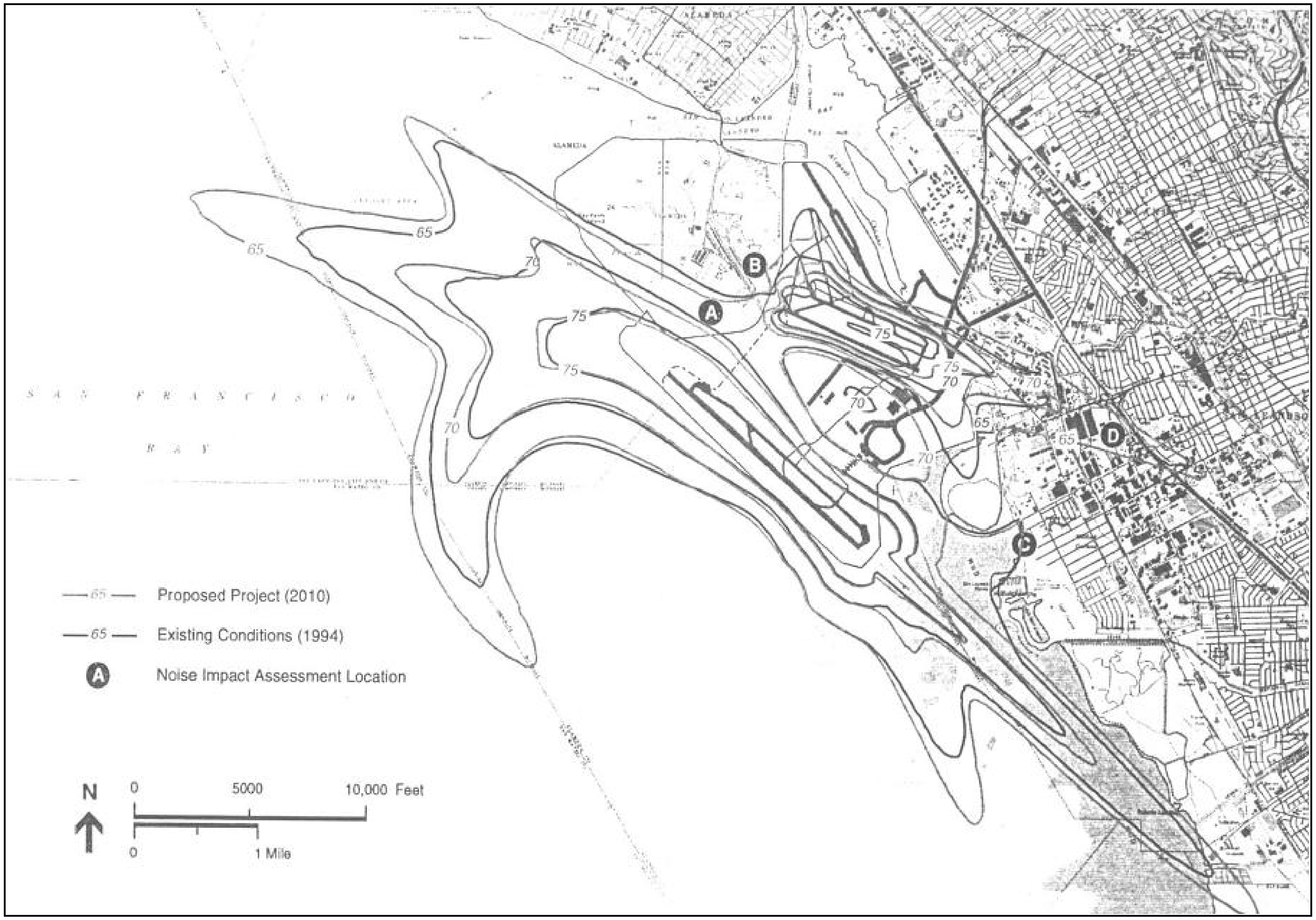
Miles

0 0.5 1 2

EXISTING (2004) CNEL NOISE CONTOURS FOR OAKLAND INTERNATIONAL AIRPORT OPERATIONS FIGURE 4

Source: Metropolitan Oakland International Airport

FUTURE (2010) CNEL NOISE CONTOURS FOR OAKLAND INTERNATIONAL AIRPORT OPERATIONS FIGURE 5



Source: Port of Oakland Environmental Impact Statement/Environmental Impact Report; *US Army Corps of Engineers, September 10, 1996*

5 | Noise-Land Use Compatibility

A key purpose of the noise contour maps in the noise element is to provide a basis for determining the acceptability of proposed land uses at their proposed sites. To help accomplish this, the California Department of Health Services developed receiver-based noise-compatibility guidelines, in the form of a matrix, for various land uses. The matrix illustrates the degree of acceptability of exposing specified land uses (including sensitive land uses) to a range of ambient-noise levels, as indicated on the noise contour maps. As part of the noise element update, the City of Oakland is adopting a version of the guidelines matrix (➲ FIGURE 6, at the end of this chapter). The matrix, in conjunction with the noise contour maps (➲ FIGURES 2-3, in Chapter 4) and when appropriate, site-specific noise assessments, should be used by the City when considering proposed development projects in order to gauge the acceptability of a proposed project (that is, its compatibility with noise levels at the proposed site).

The California *General Plan Guidelines* is of the opinion that the matrix criteria "require a rather broad interpretation." For one thing, noise contours should be thought of as bands of similar noise exposure, rather than as absolute lines of demarcation, due to the limited accuracy of existing noise modeling technology; for another, noise contours should be considered worst-case estimates because noise measurements do not account for noise-mitigation measures. In addition, the evaluation of proposed land uses for noise compatibility should, in general, include many factors. These include the type of noise source; the sensitivity of the noise receptor; the noise reduction likely to be provided by structures; the degree to which the noise source may interfere with speech, sleep or other activities characteristic of the land use; seasonal variations in noise source levels; existing outdoor ambient levels; general societal attitudes towards the noise source; prior history of the source; and tonal characteristics of the source. To the extent that any of these factors can be evaluated, the measured or computed noise exposure values may be adjusted in order to more accurately assess local sentiments towards acceptable noise exposure.

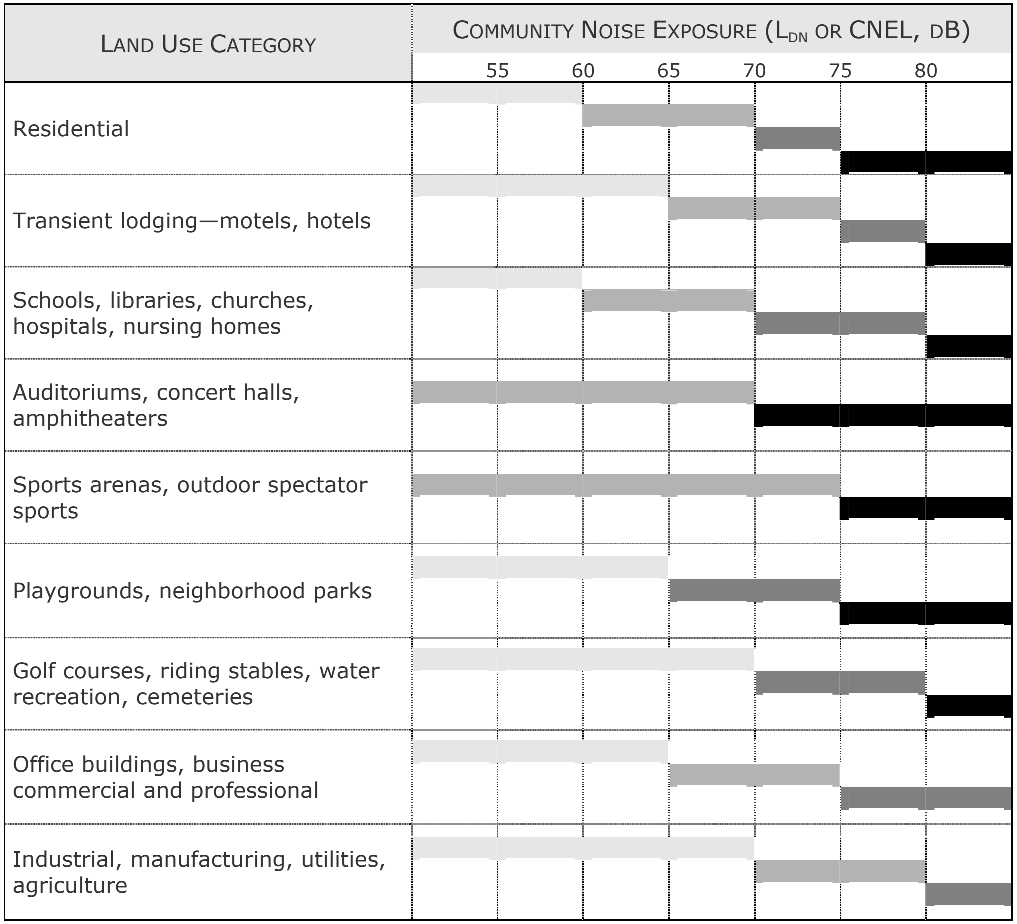
Conventional contemporary construction methods and materials decrease outdoor noise by 12-18 dB (with partially open windows). At the same time, according to common practice, the following are the maximum interior noise levels generally considered acceptable for various common land uses:

- 45 dB: residential, hotels, motels, transient lodging, institutional (churches, hospitals, classrooms, libraries), movie theaters
- 50 dB: professional offices, research and development, auditoria, meeting halls
- 55 dB: retail, banks, restaurants, sports clubs
- 65 dB: manufacturing, warehousing

Taking residential uses as an example, the above information implies that an ambient noise level of 60 dB is the threshold of a "normally acceptable" environment for residences (maximum interior noise level of 45 dB plus average noise mitigation of 15 dB). Higher ambient noise levels would require detailed noise analyses, sound-rated construction methods or materials, mechanical ventilation systems (so that windows may be kept closed), or noise shielding features such as sound walls, street setbacks and thoughtful site planning and building orientation. For example, considering that sound walls typically provide noise level reduction of 10 dB, residences could be built in areas exposed to noise levels of 70 dB if a suitable sound wall was provided.

Regarding the noise-land use compatibility guidelines, it is important to keep in mind two cautionary principles. First, the guidelines should not be used permissively to allow for the degradation of noise levels up to the maximum desired standards: for example, if the ambient noise level in an area currently zoned for residential uses is below 60 dB, an increase in noise up to that level should not necessarily be allowed. Second, even land uses proposed for "normally acceptable" noise environments should be evaluated in terms of any potential adverse noise impacts that such proposed projects would have on existing land uses nearby.

NOISE-LAND USE COMPATIBILITY MATRIX FIGURE 6



Adapted from State of California—General Plan Guidelines, 2003 *(Appendix C)*; *Governor's Office of Planning and Research*

INTERPRETATION

NORMALLY ACCEPTABLE: Development may occur without an analysis of potential noise impacts *to the proposed development* (though it might still be necessary to analyze noise impacts that the project might have *on its surroundings*).

CONDITIONALLY ACCEPTABLE: Development should be undertaken only after an analysis of noise-reduction requirements is conducted, and if necessary noise-mitigating features are included in the design. Conventional construction will usually suffice as long as it incorporates air conditioning or forced fresh-air-supply systems, though it will likely require that project occupants maintain their windows closed.

NORMALLY UNACCEPTABLE: Development should generally be discouraged; it may be undertaken only if a detailed analysis of the noise-reduction requirements is conducted, and if highly effective noise insulation, mitigation or abatement features are included in the design.

CLEARLY UNACCEPTABLE: Development should not be undertaken.

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6 | Policy Statements

Overview At the heart of every general plan element is a set of goals, objectives, policies, recommendations, strategies, actions and other statements which are often collectively referred to as policy statements. The purpose of policy statements is to provide direction for a city or county, and guide the development-related actions and decisions of its officials. Policy statements attempt to reconcile the diverse interests of a community, and are normally based on background technical information and issue analyses developed as part of the general-plan process.

Oakland's noise element uses a hierarchical, three-layer framework to organize the policy statements. At the top of the hierarchy are goals, or broad, general ends which the city desires to achieve by implementing the noise element. The noise element formulates two goals for the City:

- To protect Oakland's quality of life and the physical and mental well-being of residents and others in the City by reducing the community's exposure to noise; and
- To safeguard Oakland's economic welfare by mitigating noise incompatibilities among commercial, industrial and residential land uses.

Goals form the basis for policies, the next level of the hierarchy. Policies, which are less general than goals, identify specific areas in which the city will direct efforts in order to attain its goals. Below the policies are actions, detailed and implementable steps that, if feasible, the city will undertake in order to carry out the policies and, ultimately, the goals. There is at least one action supporting every policy, and each action lists the city agency or agencies expected to assume the leading role in implementing that action. (CEDA refers to the Community and Economic Development Agency, OPD to the Oakland Police Department, and PWA to the Public Works Agency.) It is important to note that the actions are underlain by two assumptions. First, the actions are meant to apply only to those geographic and programmatic areas over which the City of Oakland has legal authority. Second, the actions will only be implemented if they can be accomplished successfully given financial, environmental, legal, social and technological factors.

POLICY STATEMENTS

POLICY 1	Ensure the compatibility of existing and, especially, of proposed development projects not only with neighboring land uses but also with their surrounding noise environment.

- ACTION 1.1: Use the noise-land use compatibility matrix (Figure 6) in conjunction with the noise contour maps (especially for roadway traffic) to evaluate the acceptability of residential and other proposed land uses and also the need for any mitigation or abatement measures to achieve the desired degree of acceptability.

  ▶ **CEDA PLANNING AND ZONING DIVISION**

- ACTION 1.2: Continue using the City's zoning regulations and permit processes to limit the hours of operation of noise-producing activities which create conflicts with residential uses and to attach noise-abatement requirements to such activities.

  ▶ **CEDA PLANNING AND ZONING DIVISION**

- ACTION 1.3: Continue working with the Alameda County Community Development Agency (in its role as the county's airport land use commission) and with the Port of Oakland to ensure consistency with the county's airport land-use plan of the city's various master-planning documents, zoning ordinance and land-use development proposals near Oakland's airport.

▶ **CEDA PLANNING AND ZONING DIVISION**

POLICY 2	Protect the noise environment by controlling the generation of noise by both stationary and mobile noise sources.

- ACTION 2.1: Review the various noise prohibitions and restrictions under the City's nuisance noise ordinance and revise the ordinance if necessary.

  ▶ **OPD BUREAU OF FIELD OPERATIONS**

- ACTION 2.2: As resources permit, increase enforcement of noise-related complaints and also of vehicle speed limits and of operational noise from cars, trucks and motorcycles.

  ▶ **OPD BUREAU OF FIELD OPERATIONS**
  ▶ **CEDA CODE ENFORCEMENT DIVISION**

- ACTION 2.3: Encourage the Port of Oakland to continue promoting its noise-abatement office and programs for Oakland International Airport.

  ▶ **CEDA PLANNING AND ZONING DIVISION**

POLICY 3	Reduce the community's exposure to noise by minimizing the noise levels that are *received* by Oakland residents and others in the City. (This policy addresses the *reception* of noise whereas Policy 2 addresses the *generation* of noise.)

- ACTION 3.1: Continue to use the building-permit application process to enforce the California Noise Insulation Standards regulating the maximum allowable interior noise level in new multi-unit buildings.

  ▶ **CEDA BUILDING SERVICES DIVISION**

- ACTION 3.2: Review the City's noise performance standards and revise them as appropriate to be consistent with City Council policy.

  ▶ **CEDA PLANNING AND ZONING DIVISION**

- ACTION 3.3: Demand that Caltrans implement sound barriers, building retrofit programs and other measures to mitigate to the maximum extent feasible noise impacts on residential and other sensitive land uses from any new, widened or upgraded roadways; any new sound barrier must conform with City policies and standards regarding visual and aesthetic resources and quality.

  ▶ **PWA TRANSPORTATION SERVICES DIVISION**

7 | Resources

Below is a list of noise-related resources online, including many that were used to prepare the noise element. It should be kept in mind that a large percentage of Internet addresses become invalid every year, as web pages cease to exist or are moved to other locations on the Internet. Nevertheless, it was felt that providing online resources would be useful because many web pages do remain valid for at least several years and also because the noise element will be consulted by the public most frequently in the few months after its publication.

Government agencies

- FAA Office of Environment and Energy, Noise Division: aee.faa.gov/noise
- Oakland Community and Economic Development Agency: oaklandceda.com
- Oakland Police Department: www.oaklandpolice.com

Government resources

- Government information sources on noise pollution: www.libsci.sc.edu/bob/class/clis734/webguides/noise.html
- California law codes: leginfo.ca.gov/calaw.html
- California Code of Regulations: ccr.oal.ca.gov
- California *General Plan Guidelines:* opr.ca.gov/planning/PDFs/General_Plan_Guidelines_2003.pdf
- California Environmental Quality Act: ceres.ca.gov/ceqa

- Oakland Municipal Code: bpc.iserver.net/codes/oakland
- Oakland International Airport's Noise Management Program: flyoakland.com/noise/noise_management_pro.shtml

Noise-pollution control advocacy

- Noise Pollution Clearinghouse: nonoise.org
- Right to Quiet Society: quiet.org
- The League for the Hard of Hearing's Noise Center: lhh.org/noise
- Airport noise law: www.netvista.net/~hpb

APPENDIX A

NOISE-RELATED POLICY STATEMENTS FROM OTHER ELEMENTS OF THE OAKLAND GENERAL PLAN

FROM THE LAND USE AND TRANSPORTATION ELEMENT

Policy I/C4.2: Minimizing nuisances. The potential for new or existing industrial or commercial uses, including seaport and airport activities, to create nuisance impacts on surrounding residential land uses should be minimized through appropriate siting and efficient implementation and enforcement of environmental and development controls (p. 42).

Policy T1.5: Locating truck services. Truck services should be concentrated in areas adjacent to freeways and near the seaport and airport, while ensuring the attractiveness of the environment for visitors, local business, and nearby neighborhoods (p. 51).

Policy T1.6: Designating truck routes. An adequate system of roads connecting port terminals, warehouses, freeways and regional arterials, and other important truck destinations should be designated. This system should rely upon arterial streets away from residential neighborhoods (p. 51).

Policy T1.7: Routing freeway construction. New or expanded freeway construction should be routed through areas containing land uses which can tolerate any anticipated future noise impact, and/or incorporate special design features or traffic controls which will offset the impact.(p. 51).

Policy T1.8: Re-routing and enforcing truck routes. The City should make efforts to re-route traffic away from neighborhoods, wherever possible, and enforce truck route controls (p. 51).

Policy T6.1: Posting maximum speeds. Collector streets shall be posted at the lowest possible speed (usually a maximum speed of 25 miles per hour), except where a lower speed is dictated by safety and allowable by law (p. 60).

Policy T6.4: Rebuilding freeways. In the event of a major disaster, necessitating reconstruction of the I-880 freeway, it should be rebuilt below ground in the downtown/Jack London Square area (p. 60).

Policy D12.3: Locating entertainment activities. Large scale entertainment uses should be encouraged to concentrate in the Jack London Waterfront and within the Broadway corridor area. However, existing large scale facilities in the Downtown should be utilized to the fullest extent possible (p. 73).

Policy D12.4: Locating smaller scale entertainment activities. Small scale entertainment uses, such as small clubs, should be allowed to locate in the Jack London Waterfront area and to be dispersed throughout downtown districts, provided that the City works with area residents and businesses to manage the impacts of such uses (p. 73).

Policy W1.3: Reducing land use conflicts. Land uses and impacts generated from Port or neighborhood activities should be buffered, protecting adjacent residential areas from the impacts of seaport, airport, or other industrial uses. Appropriate siting of industrial activities, buffering (e.g., landscaping, fencing, transitional uses, etc.), truck traffic management efforts, and other mitigations should be used to minimize the impact of incompatible uses (p. 78).

Policy W2.2: Buffering of heavy industrial uses. Appropriate buffering measures for heavy industrial uses and transportation uses on adjacent residential neighborhoods should be developed and implemented (p. 78).

Policy W6.2: Developing areas adjacent to the airport. Development of sites proximate to airport flight paths should be in conformance with Federal and State standards, as articulated in Federal Aviation Regulation, Part 77 and Part 150 ALUC planning guidelines, and any other applicable regulations and amendments (p. 88).

Policy W7.1: Developing lands in the vicinity of the seaport/airport. Outside the seaport and airport, land should be developed with a variety of uses that benefit from the close proximity to the seaport and airport and that enhance the unique characteristics of the seaport and airport. These lands should be developed with uses which can buffer adjacent neighborhoods from impacts related to such activities (p. 88).

Policy N1.4: Locating large-scale commercial activities. Commercial uses which serve long term retail needs or regional consumers and which primarily offer high volume goods should be located in areas visible or amenable to high volumes of traffic. Traffic generated by large scale commercial developments should be directed to arterial streets and freeways and not adversely affect nearby residential streets (p. 104).

Policy N1.6: Reviewing potential nuisance activities. The City should closely review any proposed new commercial activities that have the potential to create public nuisance or crime problems, and should monitor those that are existing. These may include isolated commercial or industrial establishments located within residential areas, alcoholic beverage sales activities (excluding restaurants), adult entertainment, or other entertainment activities (p. 104).

Policy N3.9: Orienting residential development. Residential developments should be encouraged to face the street and to orient their units to desirable sunlight and views, while avoiding unreasonably blocking sunlight and views for neighboring buildings, respecting the privacy needs of residents of the development and surrounding properties, providing for sufficient conveniently located on-site open space, and avoiding undue noise exposure (p. 107).

Policy N5.2: Buffering residential areas. Residential areas should be buffered and reinforced from conflicting uses through the establishment of performance-based regulations, the removal of non-conforming uses, and other tools (p. 109).

Policy N11.4: Alleviating Public Nuisances. The City should strive to alleviate public nuisances and unsafe and illegal activities. Code Enforcement efforts should be given as high a priority as facilitating the development process. Public nuisance regulations should be designed to allow community members to use City codes to facilitate nuisance abatement in their neighborhood (p. 114).

FROM THE OPEN SPACE, CONSERVATION AND RECREATION ELEMENT

Policy OS-3.6: Open Space Buffers Along Freeways. Maintain existing open space buffers along Oakland's freeways to absorb noise and emissions… (p. 2-29).

- ACTION OS-3.6.1: LANDSCAPE SCREENING ALONG FREEWAYS. Require retention of existing landscape screening as a condition of development approval for any property adjacent to Highway 13, Highway 580 (east of Grand), or Highway 24 (above Broadway). Encourage Caltrans to include landscape screening for any sound wall project in these areas (p. 2-30).

- ACTION OS-3.6.3: FREEWAY BUFFERS. Encourage Caltrans to plant and maintain additional landscaping along Oakland's freeways, particularly those stretches of Interstate 880 adjacent to residential neighborhoods and other sensitive receptors (p. 2-30).

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Appendix B

Tables from the Technical Report

See pages that follow

SUMMARY OF LONG-TERM NOISE MONITORING RESULTS TABLE B-1

SITE	LOCATION (DISTANCE, IN FEET, FROM CENTERLINE OF ROAD)	DATE	DAYTIME NOISE LEVELS (DBA)	NIGHTTIME NOISE LEVELS	L_{DN}
LT-1	Hwy 24 (~144 ft), east of Broadway	8/17 to 8/19/04	74 to 80	67 to 78	80
LT-2	Skyline Pkwy (~20 ft), at 7293 Skyline Pkwy	8/17 to 8/19/04	55 to 68	32 to 58	61-63
LT-3	Hwy 13 (~90 ft), at Monterey and Maiden Ln	8/17 to 8/19/04	67 to 72	57 to 69	72
LT-4	Skyline Pkwy (~87 ft), at Mott Pl	8/17 to 8/19/04	52 to 61	42 to 55	57-58
LT-5	Fruitvale Av (~87 ft), at Davis St	8/17 to 8/19/04	63 to 67	54 to 63	67
LT-6	14th Av (~75 ft), at East 22nd St	8/17 to 8/19/04	64 to 68	55 to 64	68
LT-7	I-580 (~186 ft), at Wesley St	8/17/04	72 to 73	--	--
LT-8	San Leandro St (~30 ft), at the BART tracks	8/23 to 8/24/04	72 to 74	Down to 59	--
LT-9	55th Av (~132 ft), at Bancroft Av	8/23 to 8/24/04	64 to 74	55 to 74	72
LT-10	International Blvd (~75 ft), at 81st St	8/23 to 8/24/04	67 to 75	61 to 67	73
LT-11	98th St (~81 ft), at E St	8/23 to 8/24/04	69 to 72	60 to 68	72
LT-12	Hegenberger Rd (~81 ft), at Leet	8/23 to 8/24/04	68 to 72	62 to 69	74

SUMMARY OF SHORT-TERM NOISE MONITORING RESULTS TABLE B-2

SITE	LOCATION (DISTANCE, IN FEET, FROM CENTERLINE OF ROAD)	DATE AND TIME	L_{MAX}	L_{MIN}	L_1	L_{10}	L_{50}	L_{90}	L_{EQ}
ST-1	MLK Blvd (~84 ft)	8/18/2004; 10:30 am	96	55	83	73	68	60	74
ST-2	Alcatraz St (~36 ft), at 620-626 Alcatraz	8/18/2004; 11:10 am	84	48	75	71	65	53	68
ST-3	Intersection of Grandview and Gravatt	8/18/2004; 11:40 am	66	39	65	55	44	41	53
ST-4	Moraga (~54 ft), at Harbord Dr	8/18/2004; 12:15 am	74	45	72	70	63	55	65
ST-5	Pleasant Valley Av (~63 ft), at Home St	8/18/2004; 12:40 am	78	54	76	72	66	60	68
ST-6	Shepard Canyon Rd (~63 ft), at Paso Robles	8/18/2004; 2:00 am	77	41	70	63	52	44	59
ST-7	Park (~63 ft), at Everett	8/23/2004; 2:00 am	78	46	76	71	64	53	67
ST-8	Lincoln (~42 ft), at Burlington	8/23/2004; 2:20 am	83	42	77	67	56	46	65
ST-9	35th Av (~69 ft), at Harbor View	8/23/2004; 2:50 am	88	50	80	71	63	55	69
ST-10	Redwood Rd (~66 ft), at Via Rialto	8/24/2004; 12:00 am	76	48	74	70	61	52	65
ST-11	Golf Links Rd (~71 ft), at Dunkirk Av	8/24/2004; 12:40 am	73	39	68	63	52	44	58

During short-term measurements, vehicular traffic on the street network was the dominant noise source; however, there were contributions from overflight aircraft at ST-4, ST-5, ST-6, ST-8 and ST-11. Aircraft at ST-5 and ST-8 generated maximum levels of 70 dBA.

SUMMARY OF PREVIOUSLY CONDUCTED NOISE MEASUREMENTS TABLE B-3

LOCATION	DURATION	NOISE LEVEL (dBA)	DISTANCE (FEET)	MAJOR NOISE SOURCE	SOURCE OF INFORMATION
Oak & 4th Street	24 Hour	71 Ldn	Fence line	Traffic on Oak Street	ESA, 1999
Telegraph Ave & 32nd St	24 Hour	71 CNEL	50	Traffic on Telegraph Ave	ESA, 2000
NE corner of MacArthur BART	24 Hour	72 CNEL	*	Traffic on I-580, BART	ESA, 2000
MLK Jr Way btwn Apgar & 39th St	*	65 Leq	60	I-580, BART, MLK Jr Way traffic	ESA, 2000
62nd St btwn San Pablo & Marshall	*	60 Leq	25	Traffic on 62nd and San Pablo	ESA, 2000
San Pablo & 16th	30 Min	63 CNEL	30	Traffic on San Pablo Ave	Lamphier & Associates, 2000
16th & Clay	30 Min	62 CNEL	30	Traffic on 16th Street	Lamphier & Associates, 2000
16th Street btwn Jefferson and Clay	30 Min	61 CNEL	30	Traffic on 16th Street	Lamphier & Associates, 2000
17th Street btwn MLK and Jefferson	30 Min	66 CNEL	30	Traffic on 17th Street	Lamphier & Associates, 2000
9th St	24 Hour	65 CNEL	*	Traffic on 9th St	Charles Salter & Associates, 2000
8th St	24 Hour	66 CNEL	*	Traffic on 8th St	Charles Salter & Associates, 2000
Jefferson St.	24 Hour	71 CNEL	*	Traffic on Jefferson St.	Charles Salter & Associates, 2000
Clay St.	24 Hour	71 CNEL	*	Traffic on Clay St.	Charles Salter & Associates, 2000
Vernon Street north of Bay Place	24 Hour	58 Ldn	60	Traffic on Vernon Street	ESA, 2000
Bay Place	15 Min	64 peak	30	Traffic on Bay Place	ESA, 2000
Harrison Street	15 Min	66 peak	55	Traffic on Harrison Street	ESA, 2000
3rd/Broadway, NW Corner	15 Min	70 peak am	Sidewalk	I-880, railroad, local traffic	Jones & Stokes, 2001
3rd/Broadway, NW Corner	15 Min	67 Peak pm	Sidewalk	I-880, railroad, local traffic	Jones & Stokes, 2001
3rd/Broadway, SW Corner	15 Min	66 peak am	Sidewalk	I-880, railroad, local traffic	Jones & Stokes, 2001
3rd/Broadway, SW Corner	15 Min	68 peak pm	Sidewalk	I-880, railroad, local traffic	Jones & Stokes, 2001
3rd/Franklin NW Corner	15 Min	69 peak am	Sidewalk	I-880, railroad, local traffic	Jones & Stokes, 2001
3rd/Franklin NW Corner	15 Min	66 peak pm	Sidewalk	I-880, railroad, local traffic	Jones & Stokes, 2001
2nd/Broadway, SW Corner	15 Min	69 peak am	Sidewalk	I-880, railroad, local traffic	Jones & Stokes, 2001
2nd/Broadway, SW Corner	15 Min	69 peak pm	Sidewalk	I-880, railroad, local traffic	Jones & Stokes, 2001
Pine Street & Gross Street	24 Hour	68 CNEL	*	I-880, local traffic, BART, aircraft	G. Borchard & Associates, 2001
1109 Wood Street btwn 11th & 12th	24 Hour	64 CNEL	*	Local traffic, aircraft, I-880	G. Borchard & Associates, 2001

LOCATION	DURATION	NOISE LEVEL (dBA)	DISTANCE (FEET)	MAJOR NOISE SOURCE	SOURCE OF INFORMATION
So. side of 3rd St near Tower Lofts	24 Hour	68 Ldn	*	I-880, local traffic	Charles Salter & Associates, 2001
I-880 Freeway (South of Oak Street)	24 Hour	75 CNEL	500	Traffic on I-880	Lamphier-Gregory, 2002
Foothill Boulevard (At 68th Ave)	24 Hour	69 CNEL	50	Traffic on Foothill Blvd	Lamphier-Gregory, 2002
MacArthur Blvd (South of 90th Ave)	24 Hour	70 CNEL	50	Traffic on MacArthur Blvd	Lamphier-Gregory, 2000
San Pablo Avenue (at 32nd Street)	15 Min	69 CNEL	50	Traffic on San Pablo Ave	Lamphier-Gregory, 2003
West Grand Avenue (at Chestnut St)	15 Min	71 CNEL	50	Traffic on West Grand Ave	Lamphier-Gregory, 2003
Mandela Parkway (at 17th Street)	15 Min	64 CNEL	50	Traffic on Mandela Parkway	Lamphier-Gregory, 2003
16th Street (West of Wood Street)	24 Hour	66 CNEL	*	Traffic on 16th Street	Lamphier-Gregory, 2003
Peralta Street (at 8th Street)	15 Min	69 CNEL	50	Traffic on Peralta Street	Lamphier-Gregory, 2003
7th Street (at Mandela Parkway)	15 Min	72 CNEL	50	Traffic on 7th Street	Lamphier-Gregory, 2003
Alice St, entrance to 'The Landing'	24 Hour	66-67 Ldn	40	Amtrak activity and local traffic	ESA, 2003
Embarcadero near Alice St	24 Hour	72-73 Ldn	150 (Amtrak)	Amtrak activity and local traffic	ESA, 2003

CALCULATED TRAFFIC NOISE LEVELS FOR MAJOR LOCAL ROADWAYS TABLE B-4

STREET NAME	FROM	TO	EXISTING LDN (AT 75 FT)	DISTANCE (FT) TO NOISE CONTOUR FROM ROADWAY CENTER			FUTURE LDN (AT 75 FT)	DISTANCE (FT) TO NOISE CONTOUR FROM ROADWAY CENTER		
				70 LDN	65 LDN	60 LDN		70 LDN	65 LDN	60 LDN
14th / Beaumont	8th St	21st St	65	*	80	170	66	*	90	190
14th / Beaumont	East 24th St	East 27th St	67	50	100	210	67	50	100	220
23rd Ave	East 7th St	12th St	68	60	120	260	69	60	140	300
23rd Ave	29th Ave	East 7th St	68	60	120	260	69	60	140	300
35th Ave	Foothill Blvd	East 14th St	60	*	*	70	61	*	*	90
35th Ave	MacArthur Blvd	Foothill Blvd	66	*	80	180	66	*	90	190
42nd Ave	Foothill Blvd (S)	14th St	67	50	110	240	66	*	90	190
51st St	Shattuck Ave	Telegraph Ave	61	*	*	80	61	*	*	90
51st St	Telegraph Ave	Broadway	67	50	100	210	67	50	100	220
66th Ave	Oakport St	San Leandro St	66	*	80	180	66	*	90	190
73rd Ave	Bancroft Ave	MacArthur Blvd	69	60	130	280	70	70	160	350
73rd Ave	International Blvd	MacArthur Blvd	71	90	190	410	72	100	220	470
73rd Ave	Arthur St	Bancroft Ave	71	80	180	380	72	100	220	470
7th St	Fallon St	Fifth Ave	63	*	50	120	65	*	70	160
7th St	Wood St	Market St	66	*	90	190	67	50	100	220
98th Ave	Bancroft Ave	Golf Links Rd	66	*	90	180	65	*	70	160
98 th Ave	San Leandro St	Bancroft Ave	65	*	80	160	66	*	90	190
98 th Ave	I-880 (E)	San Leandro St	67	50	110	230	68	60	120	260
Alcatraz Ave	Telegraph Ave	Berkeley city limit	64	*	60	140	68	60	120	260
Alcatraz Ave	Berkeley city limit	Shattuck Ave	60	*	*	80	61	*	*	90
Bancroft Ave	Seminary Ave	Havenscourt Blvd	60	*	*	80	62	*	50	100
Bancroft Ave	Havenscourt Blvd	73rd Ave	66	*	90	200	67	50	100	220
Bancroft Ave	98th Ave	SL city limit	66	*	90	190	66	*	90	190
Bancroft Ave	73rd Ave	98th Ave	66	*	90	200	67	50	100	220
Broadway	Keith Ave	Rte 13 EB on-ramp	69	60	140	300	71	90	190	410
Broadway	MacArthur Blvd	Pleasant Valley Ave	66	*	90	200	67	50	100	220
Broadway	27th St	MacArthur Blvd (W)	67	50	100	220	66	*	90	190

Broadway	Pleasant Valley Ave	Keith Ave	68	60	120	260	69	60	140	300
Brush St	5th St	11TH St	67	50	100	230	69	60	140	300
Claremont Ave	College Ave	Berkeley city limit	65	*	80	160	66	*	90	190
Claremont Ave	Berkeley city limit	CCC LIMIT	67	50	100	230	66	*	90	190
Claremont Ave	Telegraph Ave	College Ave	66	*	90	190	65	*	70	160
Coliseum Way	46th Ave	66TH Ave (E)	66	*	90	190	61	*	*	90
Edes Ave	I-880 off-ramps	85TH Ave	66	*	90	180	63	*	60	120
Foothill Blvd	Lakeshore	5th Ave	58	*	*	60	59	*	*	60
Foothill Blvd	8th Ave	14TH Ave	63	*	50	110	61	*	*	90
Foothill Blvd	14th Ave	19TH Ave	59	*	*	60	60	*	*	70
Foothill Blvd	23RD Ave	Fruitvale Ave	61	*	*	80	60	*	*	70
Foothill Blvd	35th Ave	38th Ave	62	*	50	110	63	*	60	120
Foothill Blvd	38th Ave	42nd Ave (S)	63	*	50	110	61	*	*	90
Foothill Blvd	High St	Vicksburg Ave	61	*	*	90	62	*	50	100
Foothill Blvd	Vicksburg Ave	55th Ave	59	*	*	60	59	*	*	60
Foothill Blvd	55th Ave	Seminary Ave	60	*	*	80	59	*	*	60
Fruitvale Ave	Harold St	International Blvd	62	*	*	100	63	*	60	120
Fruitvale Ave	International Blvd	Alameda city limit	63	*	50	120	63	*	60	120
Golf Links Rd	Fontaine St	98th Ave	63	*	60	130	64	*	60	140
Grand Ave	MacArthur Blvd	Piedmont city limit	66	*	90	190	65	*	70	160
Grand Ave	Harrison St	MacArthur Blvd	69	60	130	280	69	60	140	300
Harrison St	Hamilton Pl	Santa Clara Ave	66	*	90	200	67	50	100	220
Harrison St	27th St	Hamilton Pl	66	*	90	200	67	50	100	220
Harrison St	Grand Ave	27th St	66	*	90	200	67	50	100	220
Havenscourt Blvd	International Blvd	Bancroft Ave	62	*	50	100	63	*	60	120
Hegenberger Rd	Edes Ave	San Leandro St	75	160	340	730	76	190	410	870
Hegenberger Rd	San Leandro St	14th St	74	140	290	640	75	160	350	750
Hegenberger Rd	Doolittle Dr	Pardee Dr	70	80	160	350	71	90	190	410
High St	Brookdale Ave	Redding St	64	*	70	140	66	*	90	190
High St	Alameda city limit	Oakport St	70	70	160	330	69	60	140	300
High St	Coliseum Way	San Leandro St	65	*	80	160	66	*	90	190
High St	Foothill Blvd	Brookdale Ave	64	*	60	140	64	*	60	140

International Blvd	1st Ave Pl	14th Ave	64	*	70	140	64	*	60	140
International Blvd	14th Ave	Fruitvale	66	*	90	180	63	*	60	120
International Blvd	Fruitvale Ave	42nd Ave	64	*	70	150	64	*	60	140
Lakeshore Ave	18th St East	12th St East	65	*	70	150	66	*	90	190
Lakeside Dr	Madison St	Harrison St	63	*	50	120	64	*	60	140
MacArthur Blvd	Fruitvale Ave	High St	66	*	80	180	66	*	90	190
MacArthur Blvd	High St	Buell St	66	*	90	190	66	*	90	190
MacArthur Blvd	Buell St	Seminary Ave (E)	68	50	110	240	68	60	120	260
Market St	55th St	Stanford Ave	66	*	90	180	65	*	70	160
MLK Way	27th St	MacArthur Blvd	63	*	60	120	64	*	60	140
MLK Way	47th St	END1	63	*	60	120	64	*	60	140
Miles Ave	College Ave	Rte 24 SB off-ramp	61	*	*	90	63	*	60	120
Moraga Ave	Piedmont city limit	Estates Dr	63	*	60	120	64	*	60	140
Moraga Ave	Estates Dr	Thornhill Dr	62	*	50	100	64	*	60	140
Moraga Ave	Thornhill Dr	Mountain Blvd	63	*	60	120	64	*	60	140
Mountain Blvd	Edwards Ave (S)	Keller Ave	74	140	300	660	74	140	300	640
Mountain Blvd	Holy Names College	Redwood Rd (S)	65	*	70	160	64	*	60	140
Mountain Blvd	Redwood Rd (S)	Carson St	62	*	50	100	62	*	50	100
Mountain Blvd	Moraga Ave	Park Blvd (N)	65	*	80	170	66	*	90	190
Park Blvd	Grosvenor Pl	Wellington St	69	60	130	280	69	60	140	300
Park Blvd	Leimert Blvd	Trafalgar Pl	64	*	60	130	64	*	60	140
Park Blvd	Spruce St	MacArthur Blvd	65	*	70	160	66	*	90	190
Park Blvd	Wellington St	Leimert Blvd	65	*	70	150	64	*	60	140
Redwood Rd	Aliso Ave	Skyline Blvd West	66	*	90	200	66	*	90	190
Redwood Rd	Aliso Ave	END3	66	*	80	180	66	*	90	190
San Leandro St	66th Ave	75th Ave	67	50	100	230	68	60	120	260
San Leandro St	75th Ave	SL city limit	68	50	120	250	69	60	140	300
San Leandro St	High St	66th Ave	65	*	70	160	67	50	100	220
San Leandro St	Fruitvale Ave	High St	66	*	90	200	66	*	90	190
Seminary Ave	Bancroft Ave	International Blvd	59	*	*	70	59	*	*	60
Seminary Ave	San Leandro St	International Blvd	60	*	*	70	58	*	*	60
Shattuck Ave	52nd St	55th St	61	*	*	90	62	*	50	100

Shattuck Ave	55th St	Alcatraz Ave	63	*	60	130	64	*	60	140
Stanford Ave	San Pablo Ave	Adeline St	65	*	70	150	67	50	100	220
Telegraph Ave	West Grand Ave	27th St	62	*	50	100	60	*	*	70
Telegraph Ave	27th St	W MacArthur Blvd	62	*	50	100	62	*	50	100
Telegraph Ave	40th St	50th St	62	*	50	100	63	*	60	120
Telegraph Ave	51st St	Aileen St	63	*	50	120	63	*	60	120
Telegraph Ave	Aileen St	Alcatraz Ave	68	60	120	260	68	60	120	260
Telegraph Ave	Alcatraz Ave	Berkeley city limit	68	60	120	260	68	60	120	260
W MacArthur Blvd	Market St	Telegraph Ave	66	*	90	200	67	50	100	220
W MacArthur Blvd	Telegraph Ave	Broadway	67	50	110	230	68	60	120	260
W MacArthur Blvd	Broadway	Fairmount Ave	68	50	110	240	68	60	120	260

*Distances of less than 50 feet are not included on this table

CALCULATED TRAFFIC NOISE LEVELS FOR HIGHWAYS AND FREEWAYS TABLE B-5

HIGHWAY	VICINITY	EXISTING LDN (150 FT)	DISTANCE (FT) TO NOISE CONTOUR FROM ROAD CENTER		
			70 LDN	65 LDN	60 LDN
SR 13	Oakland, Carson St	71	170	380	810
SR 13	Oakland, Redwood Rd	71	170	380	810
SR 13	Oakland, Lincoln Av	72	200	440	950
SR 13	Oakland, Park Blvd	73	240	510	1100
SR 13	Oakland, Moraga Av	72	200	440	950
SR 13	Oakland, Broadway Terr	73	240	510	1100
SR 13	Oakland, Jct SR 24	73	240	510	1100
SR 24	Oakland, Telegraph Av / Claremont Av	79	600	1290	2770
SR 24	Oakland, Broadway / Patton St	79	600	1290	2770
SR 24	Oakland, Jct SR 13 at Landvale Rd	80	700	1500	3230
SR 24	Oakland, Caldecott Lane	79	600	1290	2770
SR 24	Caldecott Tunnel	80	700	1500	3230
I-580	Oakland, Foothill Blvd	78	550	1180	2540
I-580	Oakland, 106th Av	78	540	1170	2510
I-580	Oakland, Golf Links Rd	79	570	1220	2630
I-580	Oakland, Keller Av	79	570	1230	2640
I-580	Oakland, Edwards Av	79	570	1230	2660
I-580	Oakland, Kuhnle Av	79	610	1320	2840
I-580	Oakland, Jct SR 13 North	79	600	1290	2770
I-580	Oakland, MacArthur Blvd	78	530	1130	2440
I-580	Oakland, High St	78	510	1100	2360
I-580	Oakland, 35th Av	78	550	1190	2560
I-580	Oakland, Coolidge Av	79	600	1290	2780
I-580	Oakland, Fruitvale Av	78	550	1190	2560
I-580	Oakland, Beaumont Av	79	610	1320	2840

HIGHWAY	VICINITY	EXISTING LDN (150 FT)	DISTANCE (FT) TO NOISE CONTOUR FROM ROAD CENTER		
			70 LDN	65 LDN	60 LDN
I-580	Oakland, Park Blvd	79	560	1200	2580
I-580	Oakland, Lakeshore Av / Park Blvd	79	620	1350	2900
I-580	Oakland, Van Buren Av / Grand Av	79	570	1230	2640
I-580	Oakland, Oakland Av / Harrison St	79	620	1340	2890
I-580	Oakland, Jct I-80 and I-880	79	610	1300	2810
I-880	Oakland, 98th Av	83	1070	2310	4980
I-880	Oakland, Hegenberger Rd	83	1030	2220	4790
I-880	Oakland, 66th Av	83	1090	2350	5060
I-880	Oakland, Jct SR 77, High St / 42nd Av	81	810	1750	3770
I-880	Oakland, 29th / Fruitvale Av	83	1120	2410	5180
I-880	Oakland, 23rd Av	83	1110	2400	5160
I-880	Oakland, Embarcadero	83	1180	2550	5490
I-880	Oakland, 5th Av	83	1180	2550	5490
I-880	Oakland, Oak St / Madison St	83	1170	2520	5430
I-880	Oakland, Jackson St / Broadway	83	1090	2360	5080
I-880	Oakland, Jct I-980; Market St	83	1100	2370	5100
I-880	Adeline St / Union St	80	700	1520	3270
I-880	7th St	80	730	1560	3370
I-880	West Jct. I-80	80	670	1440	3110
I-980	Oakland, 14th St	80	700	1500	3230
I-980	Oakland, 18TH St	81	810	1750	3770
I-980	Oakland, Jct. I-580	82	950	2040	4390

NOISE CONTOUR DISTANCES FOR RAILROAD LINES

TABLE B-6

RAILROADS	DISTANCE (FT) TO NOISE CONTOUR FROM TRACK			
	75 LDN	70 LDN	65 LDN	60 LDN
UPRR (whistle)	80	180	390	840
BART + UPRR	130	280	600	1290

APPENDIX C

OAKLAND CITY COUNCIL RESOLUTION ADOPTING THE NOISE ELEMENT

See pages that follow

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