11. NOISE ELEMENT

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11. NOISE ELEMENT

11.1 INTRODUCTION

Section 65302 (f) of the California Government Code requires that a noise element be prepared as a part of all city and county general plans. This State law requires that a jurisdiction's noise element identify and work toward mitigation of noise problems in the community. This Noise Element analyzes and quantifies, to the extent practical as determined by the legislative body, current and projected noise levels for all of the following sources:

- Highways and freeways;
- Primary arterials and major local streets;
- Passenger and freight on-line railroad operations and ground rapid transit systems;
- Commercial and general aviation, heliport, helistop, and military airport operations; aircraft flyovers, jet engine test stands, and all other ground facilities and maintenance functions related to airport operation;
- Local industrial plants including, but not limited to, railroad classification (switching) yards; and
- Other ground stationary noise sources identified by local agencies as contributing to the community noise environment.

Noise contours are shown for many of these sources and stated in terms of the day/night average sound level (DNL or L_{dn}). The noise contours are to be used to guide land uses, as specified in the Land Use Element, so that the exposure of community residences to excessive noise is minimized.

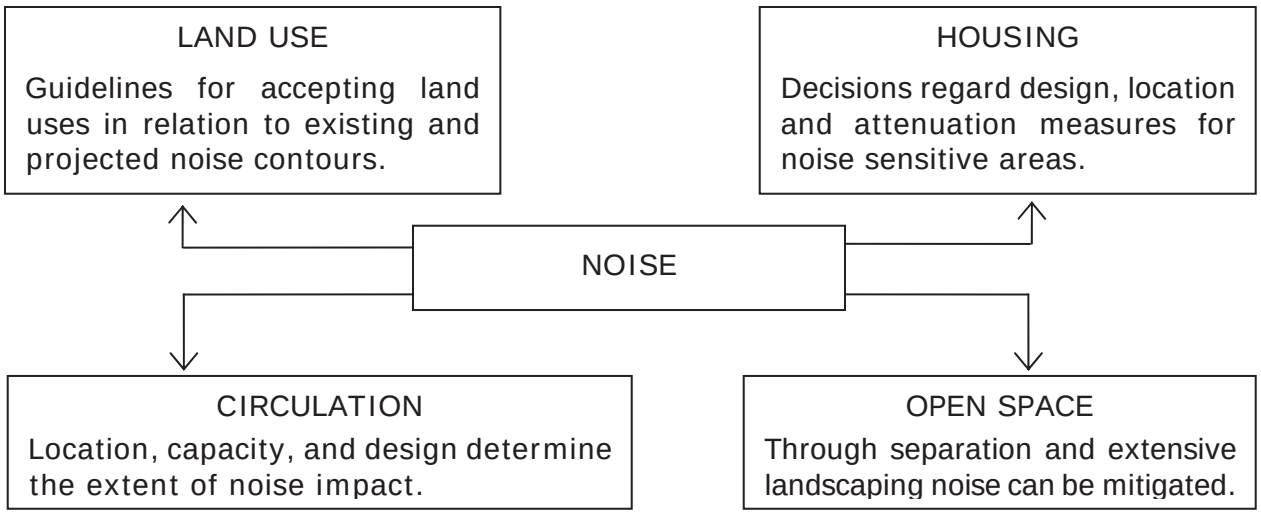
According to the Code, noise elements shall also include implementation measures and possible solutions that address any existing and perceivable noise problems. The adopted Noise Element shall serve as a guideline for compliance with the State Noise Insulation Standards. (Title 24, Part II, CCR.)

This Noise Element follows the guidelines established by the California Department of Health Services entitled, "Guidelines for the Preparation and Content of the Noise Element of the General Plan." The State Guidelines define noise metrics, discuss the process of Noise Element development, and present land use compatibility guidelines based on various noise levels. The contents of the State's guidelines document were reviewed in preparation of this Element and the relevant portions are incorporated into this document.

11.2 RELATIONSHIP TO OTHER GENERAL PLAN ELEMENTS

The General Plan elements are important tools used by elected officials to provide policy guidance and assist in decision making. All of the elements of the General Plan are related and interdependent to some degree. However, the Noise Element is most closely related to the Land Use, Housing, Circulation, and Open Space Elements, as shown in Table 11-1.

TABLE 11-1 RELATIONSHIP OF NOISE ELEMENT TO OTHER GENERAL PLAN ELEMENTS



The major objective of a noise element is to provide guidelines to achieve noise land use compatibility. The Land Use and Noise Elements, therefore, are related closely. By identifying noise-sensitive land uses and establishing compatibility guidelines for land use and noise, the Noise Element will influence the general distribution, location, and intensity of future land use. Effective land use planning can alleviate noise problems.

Residential areas are one of the noise-sensitive land uses. Therefore, the Housing Element is directly affected by the Noise Element. The Housing Element policies and programs should include safeguards against noise intrusion. The implementation of Land Use/Noise Compatibility Guidelines can reduce noise impacts in residential locations. In addition, proper noise mitigation measures during housing construction can guard against adverse noise impact.

A city's circulation system is one of the major sources of continuous noise. Therefore, the existing and future circulation system identified in the Circulation Element will influence greatly the Noise Element. Circulation routes such as freeways, highways, and truck routes should be located to minimize the noise impact on noise-sensitive land uses. The location and design of transportation facilities and possible mitigation of noise from existing and planned facilities will greatly influence the overall noise environment within the City.

Since noise can affect adversely the enjoyment of quiet activities in open space, the Noise Element is also related closely to the Open Space Element. Inversely, open space can be used as a noise buffer between incompatible land uses. This technique can reduce community noise levels and also provide usable open space for recreation.

The goals, policies and implementation measures contained in this Element are intended to guide planning for public and private projects that are subject either to approval of the County Planning Agency or to review by County staff, although they may be under the jurisdiction of other public agencies operating in the County. Such goals, policies and implementation measures are further intended to be in accordance with the other elements of the General Plan, as well as with other planning documents. This Element completely supersedes the 1975 Noise Element.

11.3 ACOUSTICAL STANDARDS

Many governmental agencies have promulgated noise standards for various types of projects. In general, these standards are intended to protect persons from excessive

exterior and interior noise. Most of these standards address vehicular traffic noise while others address rail, aircraft, or fixed sources.

The Department of Housing and Urban Development (HUD) has developed noise policies for Federal housing projects. These HUD policies are contained in The Noise Guidebook. The policies contained in the guidebook discuss various outdoor noise environments and recommend acceptable interior and exterior noise level goals.

The State of California has adopted Title 21 and Title 24, Part 2, of the California Code of Regulations. Title 21 limits airport noise near residential communities to minimize existing and future land use conflicts. Title 24, Part 2, is concerned with transportation and industrial noise sources and specifically regulates the maximum allowable interior noise level for hotels, motels, and multi-family housing. Title 24, Part 2, also establishes standards for sound isolation of party walls, corridor walls, and floor/ceiling assemblies in multi-family residential construction.

The Federal Highway Administration (FHWA) and California Department of Transportation (Caltrans) have similar policies for new roadway construction and roadway expansion. These policies contain maximum acceptable noise levels in areas adjacent to vehicular traffic. These policies also have guidelines for determining when noise barriers should be constructed.

The County's Airport Land Use Commission (ALUC) oversees development near airports. The ALUC has a plan which contains goals and policies. These policies are considered when a project is proposed near an airport or heliport in the County. In addition to a noise element, counties and cities can also adopt noise ordinances. A noise ordinance is intended to regulate sources such as amplified music, construction and mechanical equipment.

11.4 NOISE ELEMENT ORGANIZATION

The Noise Element is divided into six remaining sections. These sections define noise problems; quantify the noise problems; set up goals and policies; and, finally, provide implementation measures to minimize or eliminate the noise problems.

11.5 FUNDAMENTAL CONCEPTS OF ENVIRONMENTAL NOISE

BACKGROUND

Three aspects of community noise are important in determining subjective response:

- The level of the sound (i.e., magnitude or loudness);
- The frequency composition or spectrum of the sound; and
- The variation in sound level with time.

Airborne sound is a rapid fluctuation of air pressure and local air velocity. Sound levels are measured and expressed in decibels (dB) with 0 dB roughly equal to the threshold of hearing.

The frequency of a sound is a measure of the pressure fluctuations per second, measured in Hertz (Hz). Most sounds do not consist of a single frequency, but are comprised of a broad band of frequencies differing in level. The characterization of sound level magnitude with respect to frequency is the sound spectrum. A sound spectrum is often described in octave bands that divide the audible human frequency range (i.e., from 20 to 20,000 Hz) into ten segments. Figure 11-1 shows a range of sound spectra for various types of sound over the audible hearing range.

Figure 11.1 Range of Sound Spectra

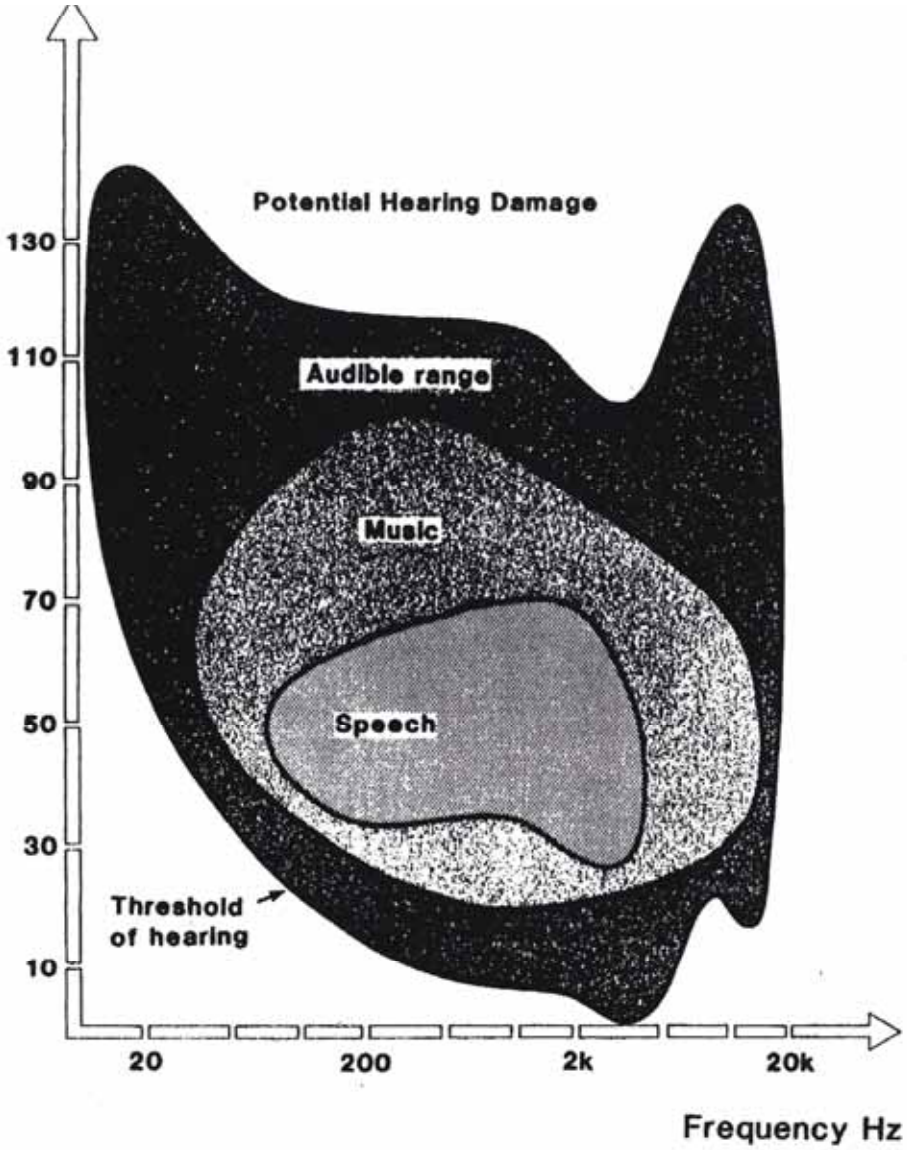
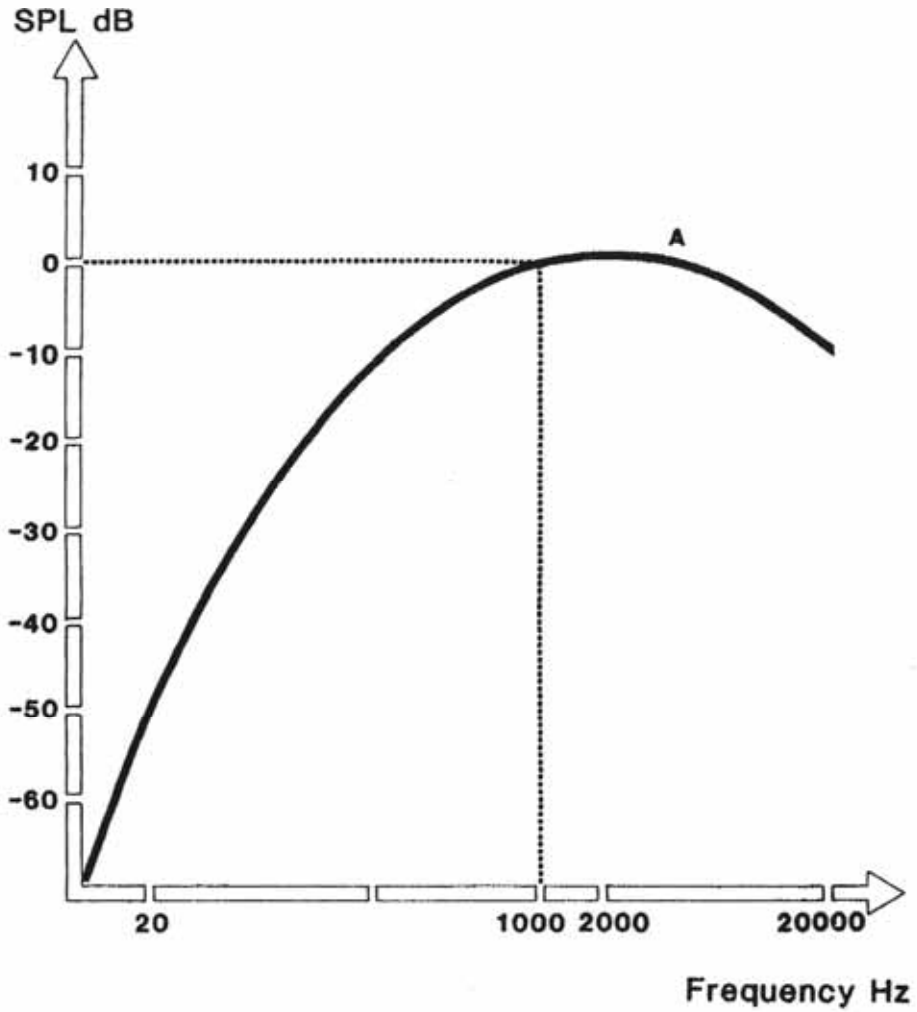


Figure 11.2 A-Weighting Network



FREQUENCY WEIGHTING

Many rating methods exist to analyze sound of different spectra. Generally, the simplest method is used so that measurements may be made and noise impacts readily assessed using basic acoustical instrumentation. This method evaluates all frequencies by using a single weighting filter that progressively de-emphasizes frequency components below 1000 Hz and above 5000 Hz. This frequency weighting, shown in Figure 11-2, reflects the relative decreased sensitivity of humans to both low and extremely high frequencies. This weighting is called A-weighting and is applied by an electrical filter in all U.S. and international standard sound level meters. Some typical A-weighted sound levels are presented in Figure 11-3.

NOISE EXPOSURE

Noise exposure is a measure of noise over a period of time, whereas the noise level is at an instant in time. Although a single sound level may describe adequately community noise at any moment, community noise levels vary continuously. Most community noise is produced by many distant noise sources that produce a relatively steady background noise having no identifiable source. These distant sources change gradually throughout the day and include traffic, wind in trees, and distant industrial activities. Superimposed on this slowly varying background is a succession of identifiable noise events of brief duration. These include nearby activities, such as single vehicle passbys or aircraft flyovers.

A single number called the equivalent sound level (L_{eq}) is used to describe the average noise level over a period of time (i.e., the total sound energy divided by the duration). Thus, the L_{eq} is the constant sound level that would contain the same acoustic energy as the varying sound level, during the same time period.

In determining the daily measure of community noise, it is important to account for the difference in human response to daytime and nighttime noise. Nighttime exterior background and household noise levels are generally lower than in the daytime. People are more sensitive to noise at night than during other periods of the day and exterior noise intrusions become more noticeable.

To account for human sensitivity to nighttime noise, the DNL (L_{dn}) descriptor was adopted by the Environmental Protection Agency to describe community noise exposure from all sources. The DNL is called the day-night sound level and represents the 24-hour A-weighted equivalent sound level with a 10-dB penalty added to the "nighttime" hourly noise levels (HNL) between 10:00 PM to 7:00 AM.

DNL and CNEL levels are typically computed by energy summation of HNL values, with the proper adjustment applied for the period of evening or night. The CNEL is computed identically to the DNL but with the addition of a 5-dB penalty to the evening HNL (i.e., 7:00 PM to 10:00 PM). The CNEL value is typically less than 1 dB above the DNL value. Figure 11-4 shows the adjustments applied for the DNL and CNEL measures. Noise exposure measures such as L_{eq}, HNL, DNL, and CNEL are all A-weighted, with units expressed in decibels.

SUBJECTIVE RESPONSE TO NOISE

The effects of noise on people can be classified into three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction;
- Interference with activities such as speech, sleep, and learning; and
- Physiological effects such as anxiety or hearing loss.

Figure 11-3 Typical Sound Levels Measured in the Environment and Industry

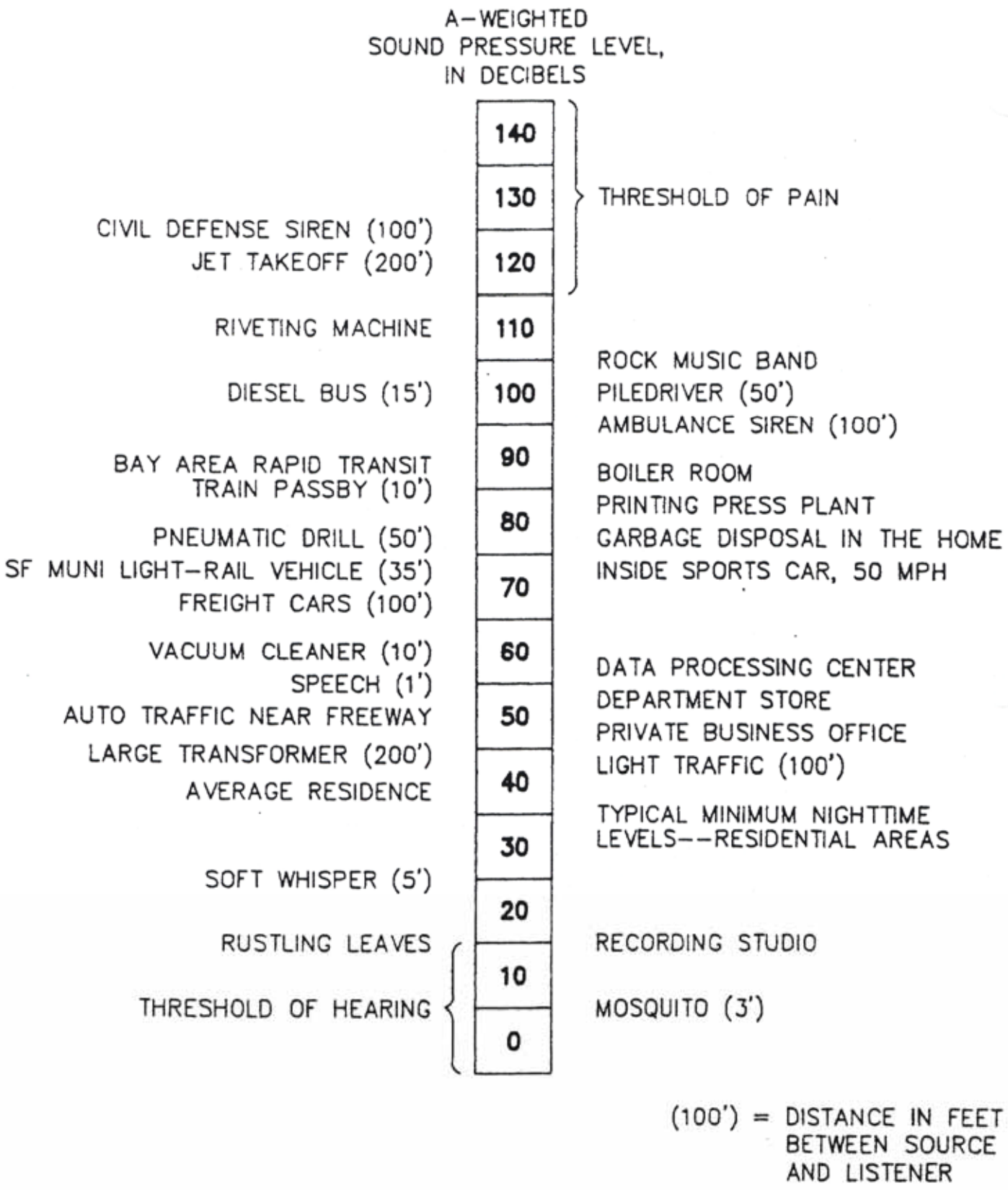
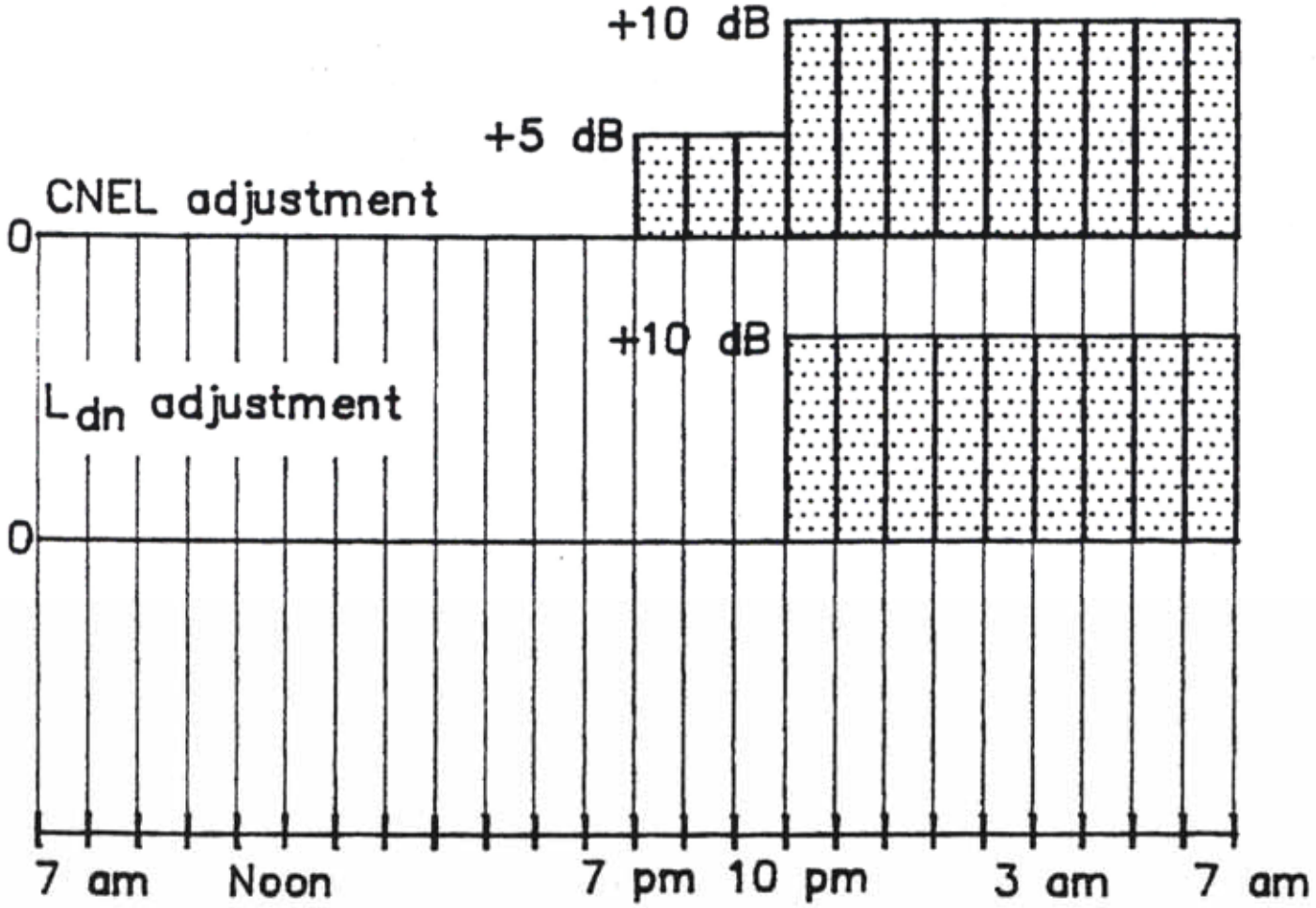


Figure 11-4 Hourly Noise Levels and Annual Metrics



The sound levels associated with community noise usually produce effects only in the first two categories. No universal measure for the subjective effects of noise has been developed, nor does a measure exist for the corresponding human reactions from noise annoyance. This is primarily due to the wide variation in individual attitudes regarding the noise source(s).

An important factor in assessing a person's subjective reaction is to compare the new noise environment to the existing noise environment. In general, the more a new noise level exceeds the prior existing level, the less acceptable it is. Therefore, a new noise source will be judged more annoying in a quiet area than it would be in a noisier location.

Knowledge of the following relationships is helpful in understanding how changes in noise and noise exposure are perceived.

- Except under special conditions, a change in sound level of 1 dB cannot be perceived;
- Outside of the laboratory, a 3 dB change is considered a just-noticeable difference;
- A change in level of at least 5 dB is required before any noticeable change in community response would be expected; and
- A 10 dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response.

COMBINATION OF SOUND LEVELS

Because we perceive both the level and frequency of sound in a non-linear way, the logarithmic decibel scale is used to describe sound levels. The frequency scale is also measured in logarithmic increments. Decibels, measuring sound energy, combine logarithmically. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a 3-dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus 3 dB). The rules for decibel addition used in community noise prediction are:

- If two sound levels are within 1 dB of each other, their sum is the highest value plus 3 dB;
- If two sound levels are within 2 to 4 dB of each other, their sum is the highest value plus 2 dB;
- If two sound levels are within 5 to 9 dB of each other, their sum is the highest value plus 1 dB; and
- If two sound levels are greater than 9 dB apart, the contribution of the lower value is negligible and the sum is simply the higher value.

11.6 NOISE IN CONTRA COSTA COUNTY

OVERVIEW

In Contra Costa County, traffic along freeways (e.g., Interstate 80, Interstate 680, State Route 24, and State Route 4), and major arterials (e.g., Willow Pass Road and Ygnacio Valley Road) are the primary sources of vehicular traffic noise.

Rail operations also contribute to the noise environment in the County. The Atchison Topeka and Santa Fe (ATSF) and Southern Pacific (SP) railroad corridors in the County are primarily freight lines. These lines generate high noise levels during passbys and their trains are required to sound their whistles when crossing roadways at-grade. The Bay

Area Rapid Transit (BART) system is an electrically driven passenger line. BART passbys are typically less noisy than the freight trains. BART trains do not have at-grade crossings.

Existing air traffic activity also contributes to the noise in Contra Costa County. Buchanan Field, near Concord, is the primary source of aircraft noise. Other sources of aircraft noise are local emergency airports and military helicopter activity.

The remaining noise sources are industrial plants such as oil refineries and materials processing plants. The Camp Parks Reserve Forces Training Area (RFTA) near San Ramon also is a noise source. Typical operations at Parks RFTA include small caliber weapons training, helicopter overflights, and vehicular activity.

ONGOING PROBLEMS

There are many areas within the County that have existing noise problems. Buchanan Field is a constant source of noise complaints. According to the County, it generated 375 complaints in 2003. Interstate 80, 680 and Route 4 also generate complaints. However, these complaints typically are handled by the California Department of Transportation. Rail switching yards in Martinez and Richmond are also noisy and have generated complaints. Industrial noise generation continues to be a concern.

Loud music, parties, sporting events at high schools, outdoors music at nightclubs, and, in the past, livestock, has also been the source of complaints to the County.

FORESEEABLE FUTURE PROBLEMS

Potential foreseeable future problems will be similar to many current problems. For example, residential land uses still will remain in relatively close proximity to some industrial noise sources. Currently, residential development is being built or proposed near Camp Parks RFTA. Although adequate setbacks and noise mitigation are usually incorporated into these projects, occasional complaints can be expected. Similarly, loud parties, outdoor music, and other industrial sources will continue to generate sporadic complaints. Activities at Buchanan Field are not anticipated to decrease in the future and may even increase. This activity would be expected to generate future complaints. Gas wells located in East County may be a source of future complaints. These wells generate a high-frequency hissing sound.

In preparing this Noise Element, all the existing noise complaints and potential future ones were considered in the development of goals and policies. The purpose of these goals and policies is to protect future residents from the negative impact of noise and, if possible, minimize and reduce the number of complaints the County receives.

11.7 NOISE CONTOURS

METHODOLOGY

Existing and future traffic noise levels are based on calculations using the Federal Highway Administration Traffic Noise Prediction Model (FHWA RD-77-108), continuous 24-hour noise measurements, and short-term 15-minute measurements along freeways and major arterials in the County. The FHWA method predicts the average hourly noise level along a roadway based on the number of vehicles, the speed of the vehicles, and the percentage of medium and heavy trucks.

The 24-hour average noise level (DNL) along a roadway, was calculated from the continuous 24-hour noise measurements. Along some roadways, however, only a 15-minute noise measurement was made. To calculate the DNL, the 15-minute measurement results were compared to the noise level measured during the same time

period at a 24-hour noise measurement location on a nearby or similar roadway. The difference between the measured hourly noise levels and the DNL then was calculated for the 24-hour measurement location and the same offset was applied for the 15-minute measurement location.

To determine the 24-hour noise level where no measurements were taken, the peak hour L_{eq} was calculated using the FHWA method and traffic volumes provided by the County The DNL was determined in a manner similar to that of the short-term measured roadways. By comparing the peak-hour noise level (L_{eq}) and the DNL from 24-hour noise measurements made in the vicinity of the roadway, a peak hour L_{eq} to DNL offset was determined. This offset was applied to the calculated peak hour level to determine the DNL at the non-measured location.

NOISE CONTOUR MAPS/TABLES

Roadways/Rail Lines

Existing and future DNL noise contours have been prepared for freeways, major arterials, and railways in the County. The contours were prepared on USGS quad maps. A reduced set of the future contours are provided in this document (see Figures 11-5A through 11-5V). Table 11-2 summarizes the information contained in the future noise contours. A complete set of full size existing and future noise contours is available for public review at the Conservation and Development Department offices.

Airports/Heliports

Existing and future CNEL noise contours are provided for Buchanan Field and Byron Airport. These contours were taken from the Airport Land Use Compatability Plan adopted by the Contra Costa County Airport Land Use Commission in December of 2000.

USE OF MAPS/TABLES

Noise contours are typically used for planning purposes in conjunction with new residential development. Since the actual full-size contour maps for roadways and rail lines are not contained in the Noise Element, Table 11-2 has been prepared. These tables and maps are designed to help planners, developers, and consultants identify a parcel or proposed residential project that is potentially impacted by noise. The table is intended to be used as follows:

Step 1. Determine distance of the project site from a major noise source such as a roadway, airport, or rail line.

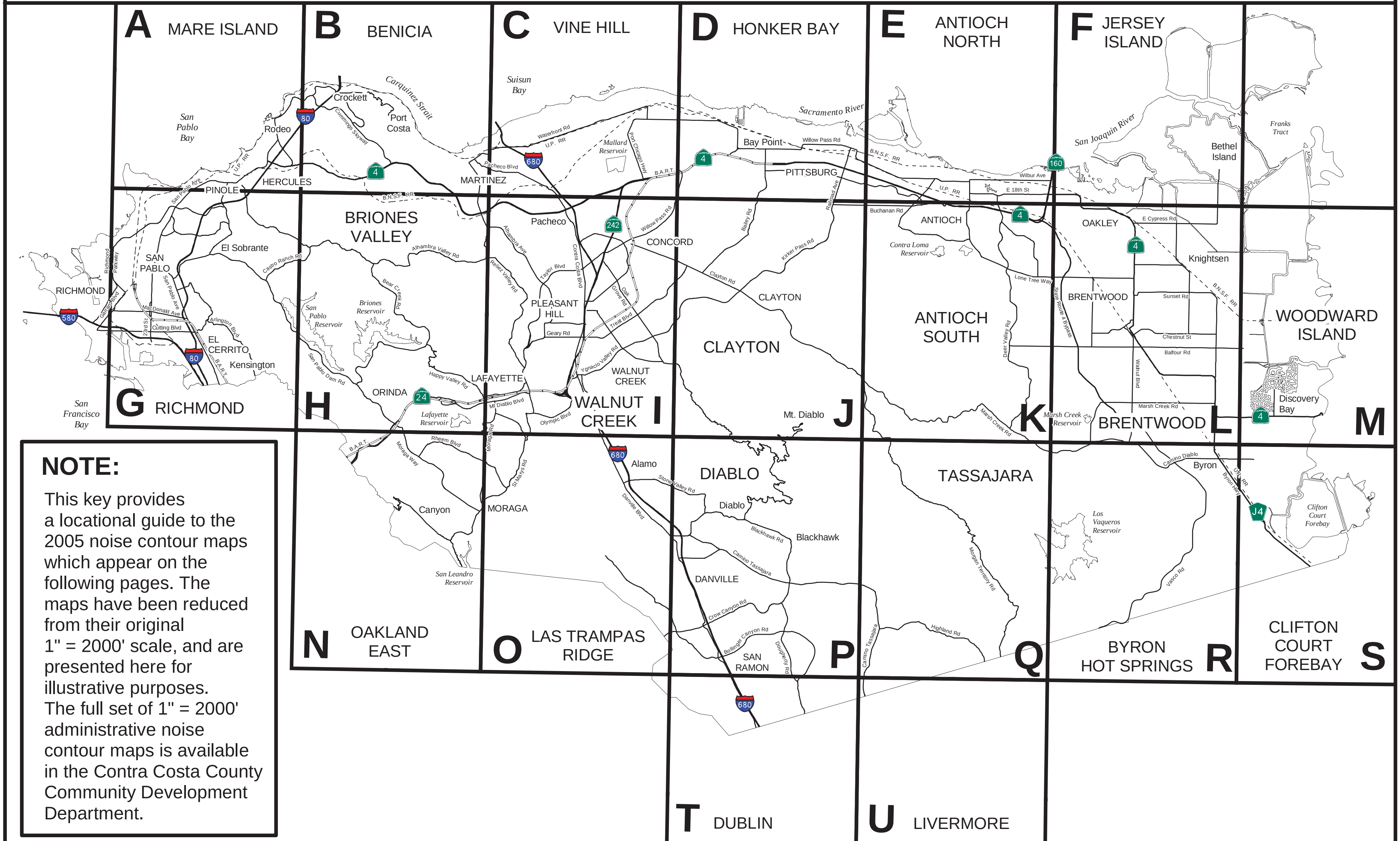
Step 2. If the noise source is a roadway or rail line: from Table 11-2, determine the distance from the rail line or roadway centerline to the future 60 DNL contour.

If the noise source is an airport, determine if the project is within the 60 CNEL contour.

Step 3. If the project is within the future 60 DNL or CNEL contour, an acoustical study should be initiated.

Noise contours do not always account for the acoustical shielding provided by site geometry or terrain. Therefore, these contours may overestimate the noise exposure of a particular site. However, noise contours should only be used as a screening tool. Site-specific noise levels and other acoustical issues should be addressed in the acoustical study for the project.

Figure 11-5 Key to 2005 Noise Contour Maps



NOTE:

This key provides a locational guide to the 2005 noise contour maps which appear on the following pages. The maps have been reduced from their original 1" = 2000' scale, and are presented here for illustrative purposes. The full set of 1" = 2000' administrative noise contour maps is available in the Contra Costa County Community Development Department.

1:300,000

0 2.5 5 10

Miles

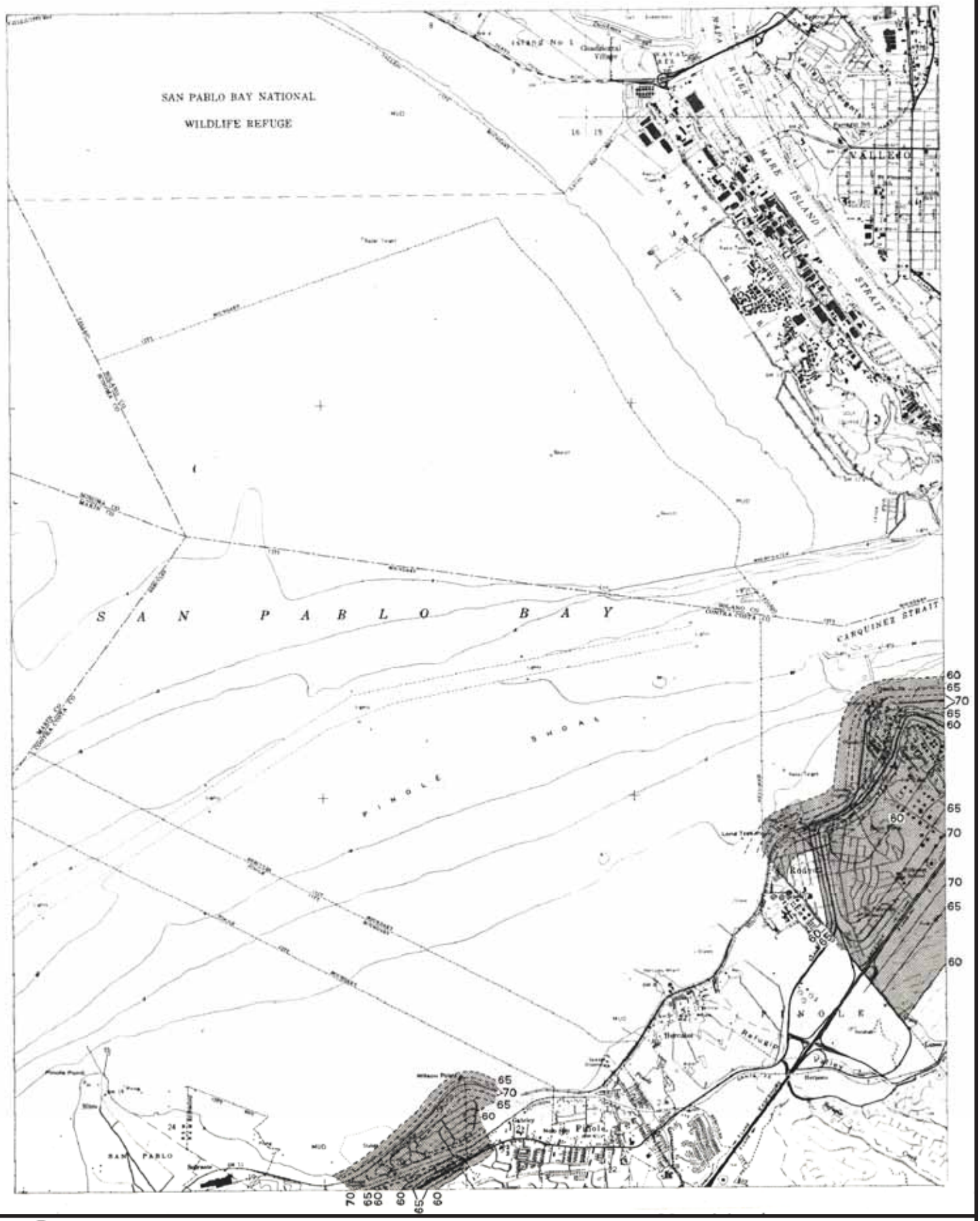
ANTIOCH Incorporated Areas
Alamo Unincorporated Areas

Freeways and Highways
Major Roads
Bay Area Rapid Transit
Railroads

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
Contra Costa County Community Development
651 Pine Street, 4th Floor - N. Wing, Martinez, CA 94553-0095
37:59:48.455N 122:06:35.384W

Figure 11-5A Noise Contours Mare Island



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Miles

2005 DNL and CNEL NOISE LEVELS (dB)

Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
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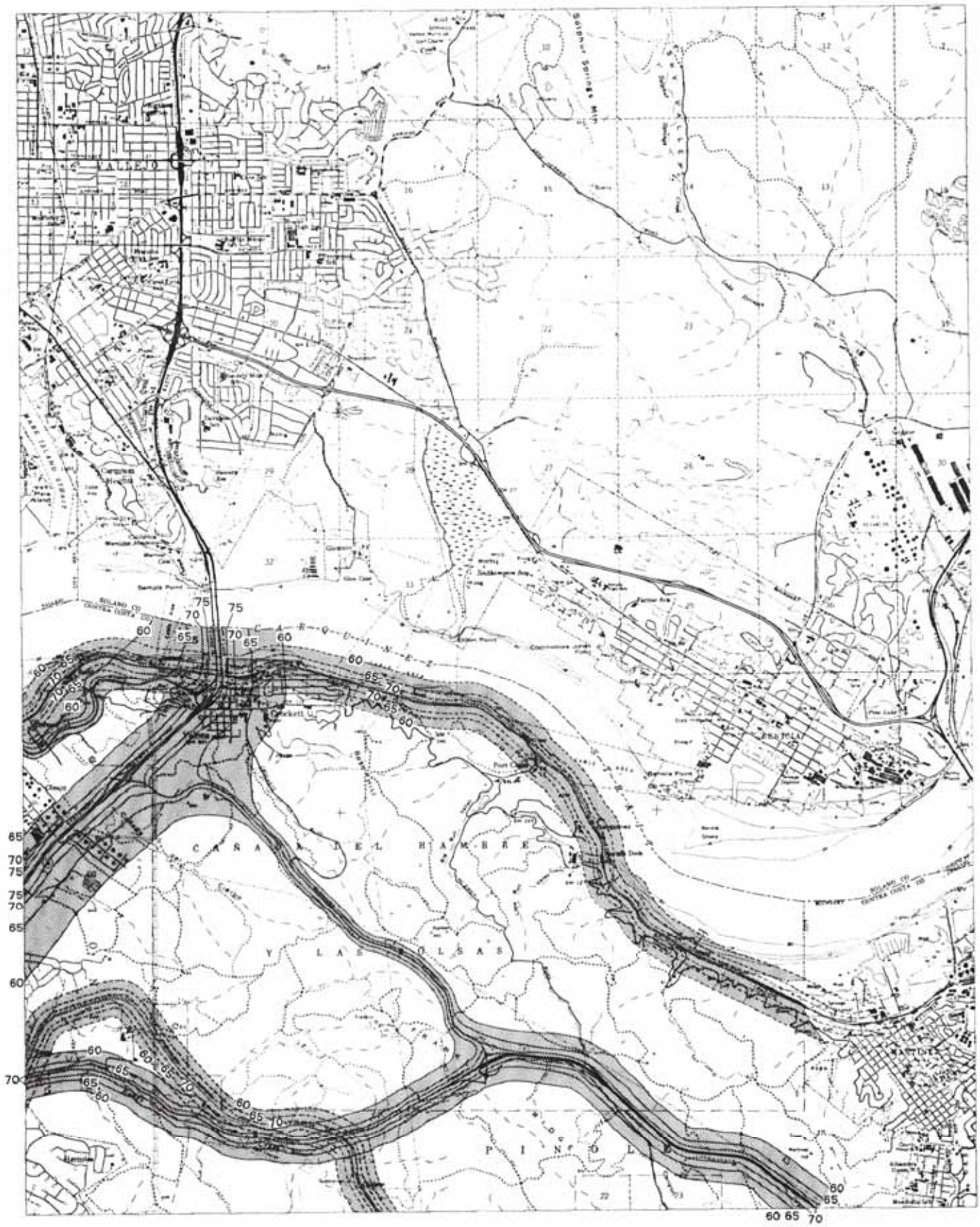
37:59:48.455N 122:06:35.384W

Figure 11-5 B Noise Contours Benicia



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Miles

2005 DNL and CNEL NOISE LEVELS (dB)

Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

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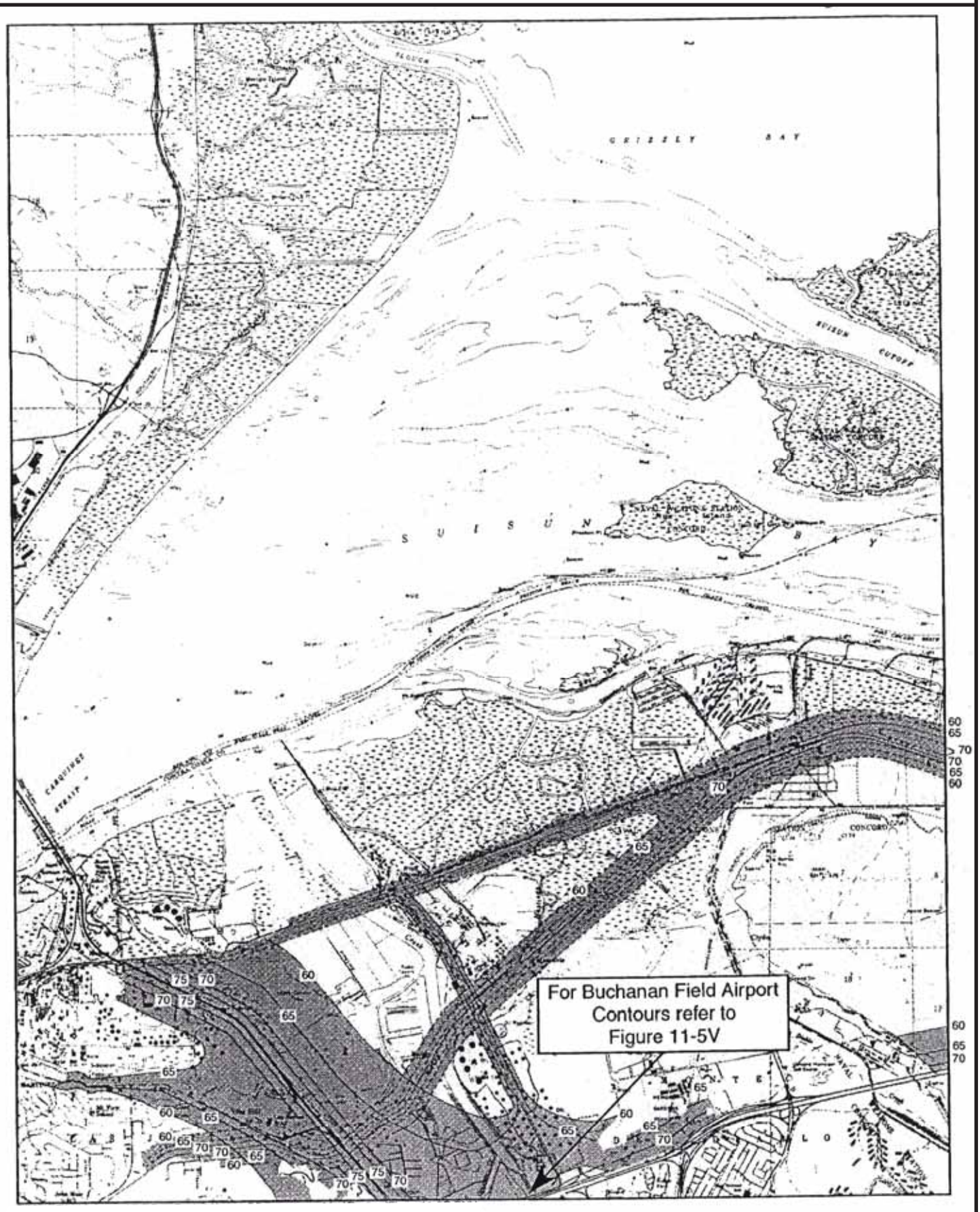
Figure 11-5C Noise Contours Vine Hill



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Miles

2005 DNL and CNEL NOISE LEVELS (dB)

Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
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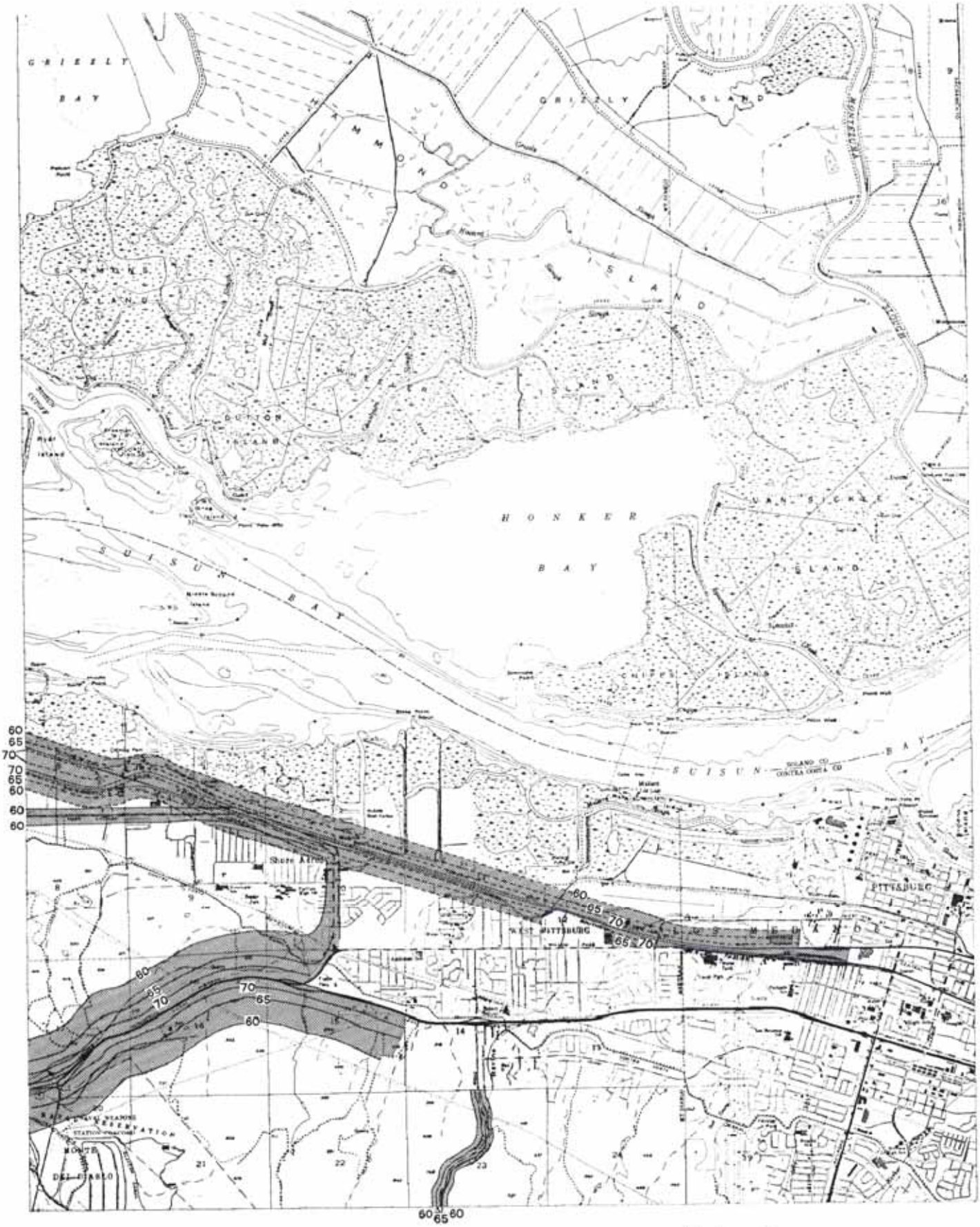
Figure 11-5 D Noise Contours Honker Bay



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Miles

2005 DNL and CNEL NOISE LEVELS (dB)

Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

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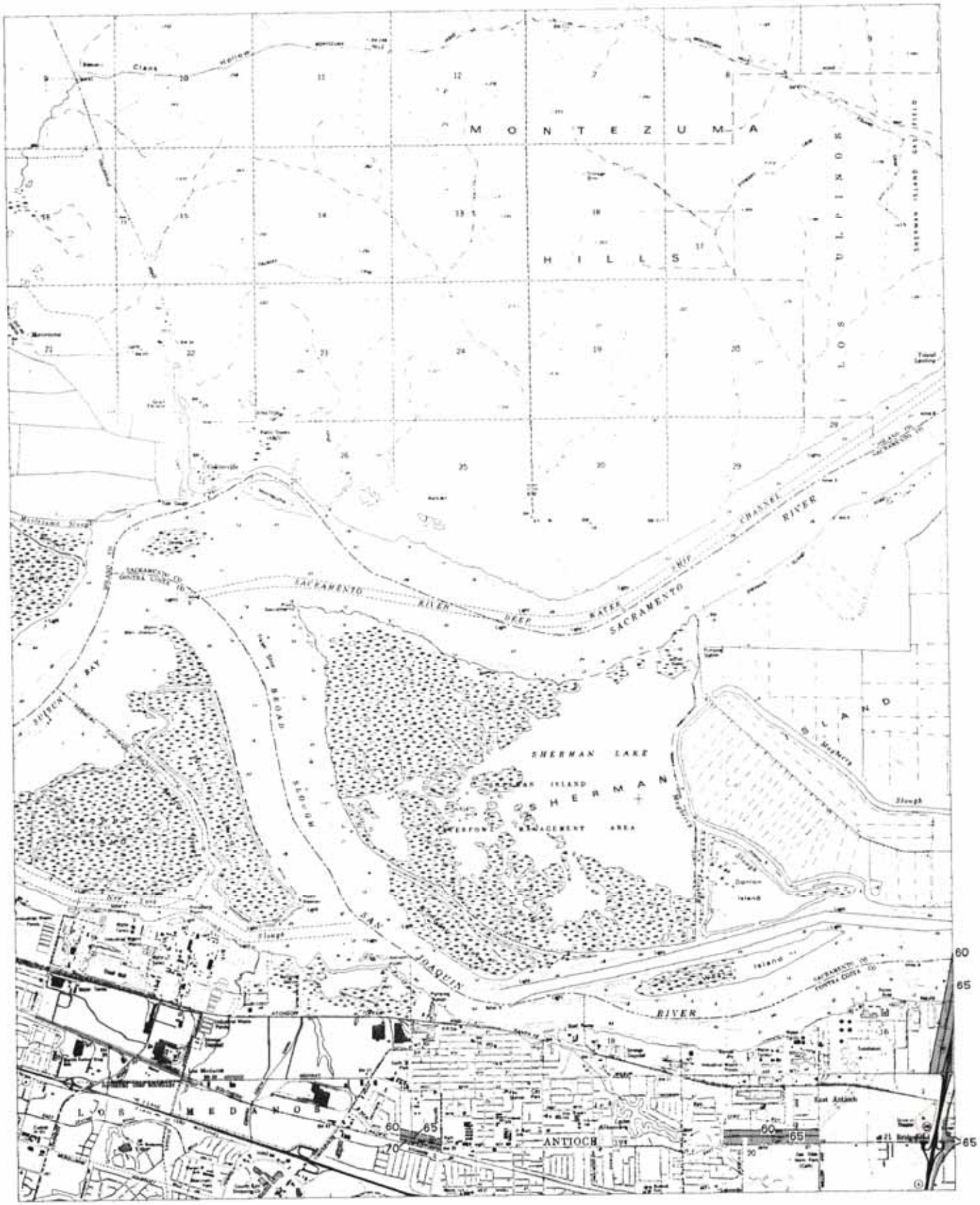
Figure 11-5 E Noise Contours Antioch North



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Miles

2005 DNL and CNEL NOISE LEVELS (dB)

Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
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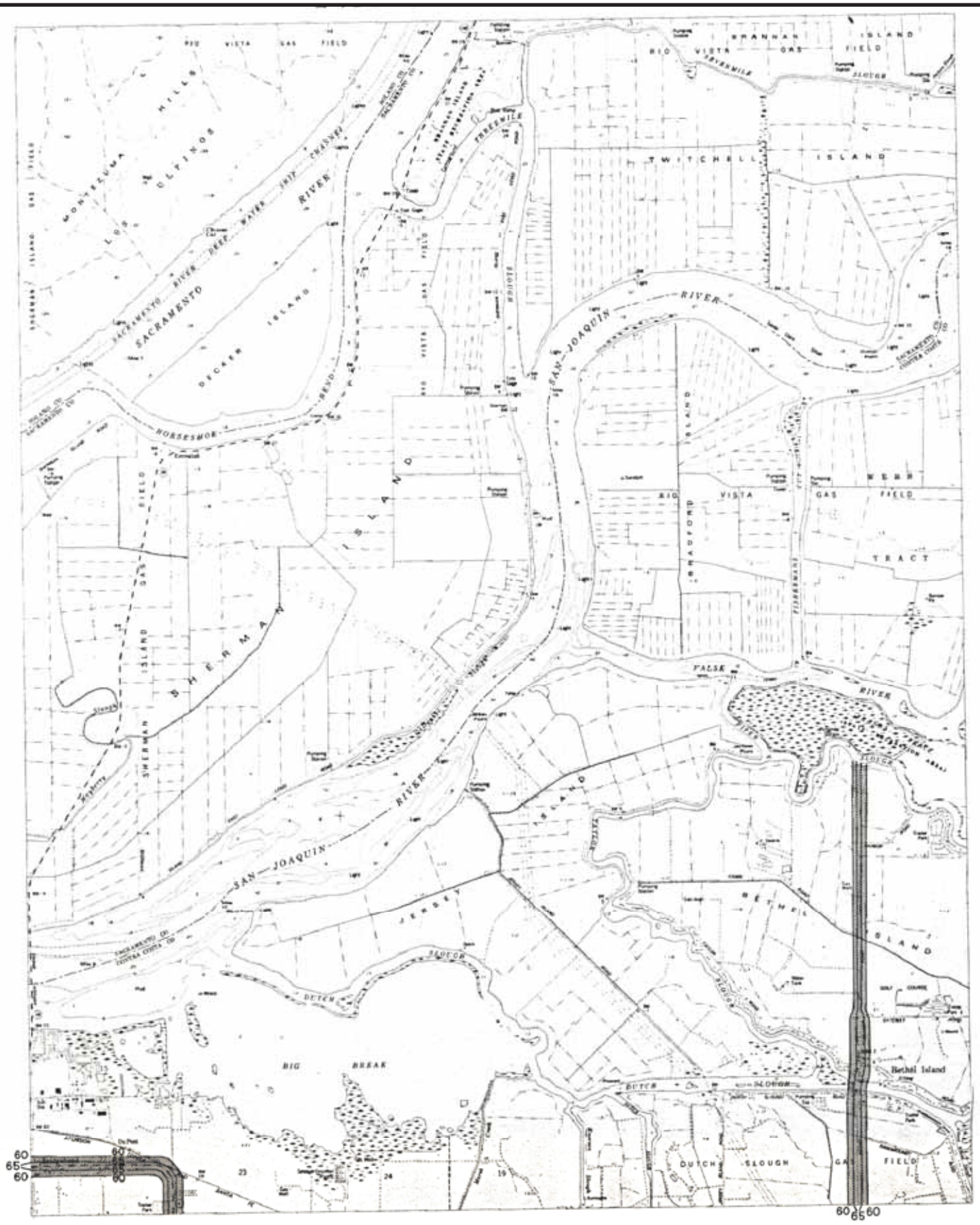
Figure 11-5 F Noise Contours Jersey Island



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Miles

2005 DNL and CNEL NOISE LEVELS (dB)

Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
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651 Pine Street, 4th Floor - N. Wing, Martinez, CA 94553-0095
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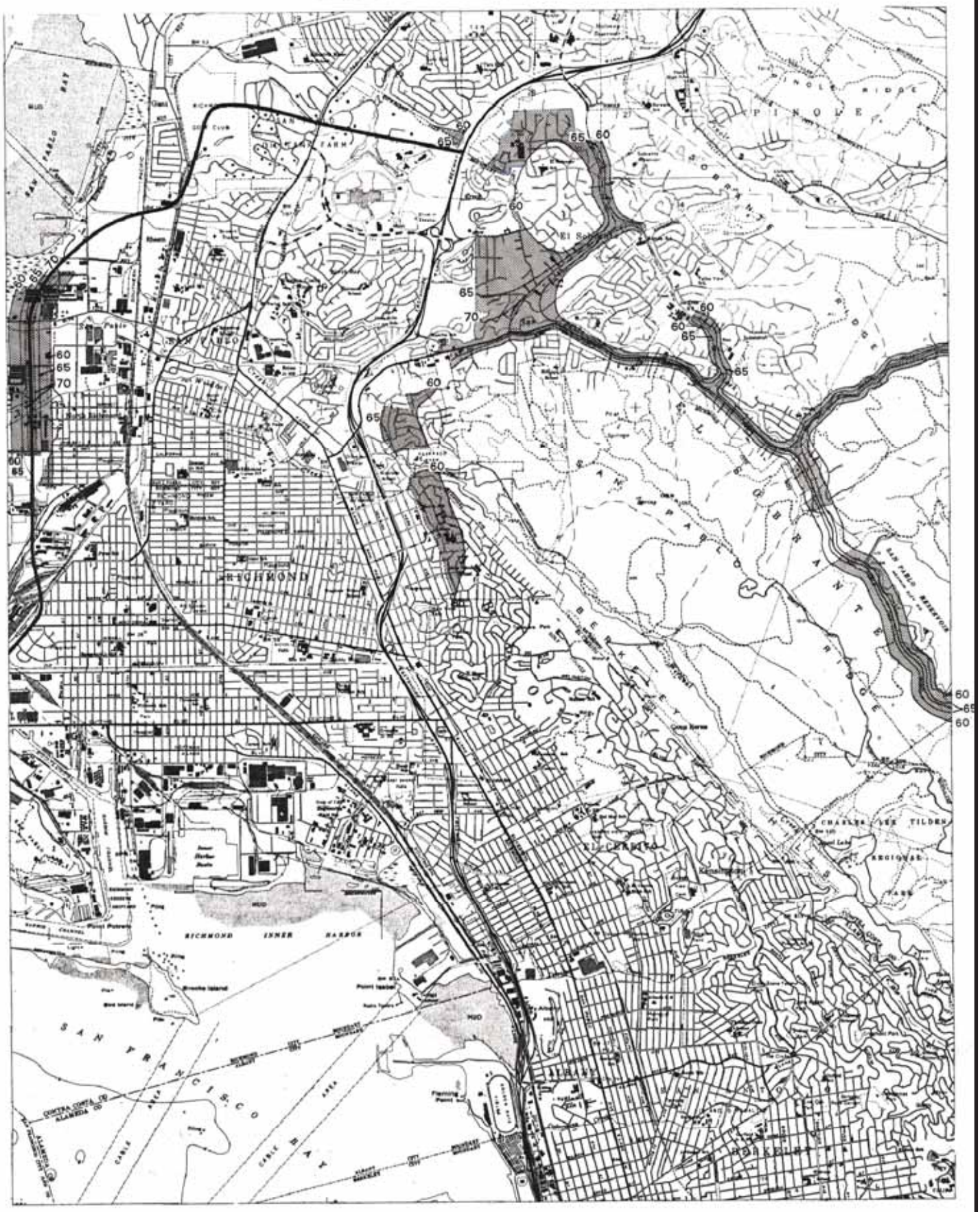
Figure 11-5 G Noise Contours Richmond



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Miles

2005 DNL and CNEL NOISE LEVELS (dB)

Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
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Figure 11-5 H Noise Contours Briones Valley

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Miles

2005 DNL and CNEL NOISE LEVELS (dB)

Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
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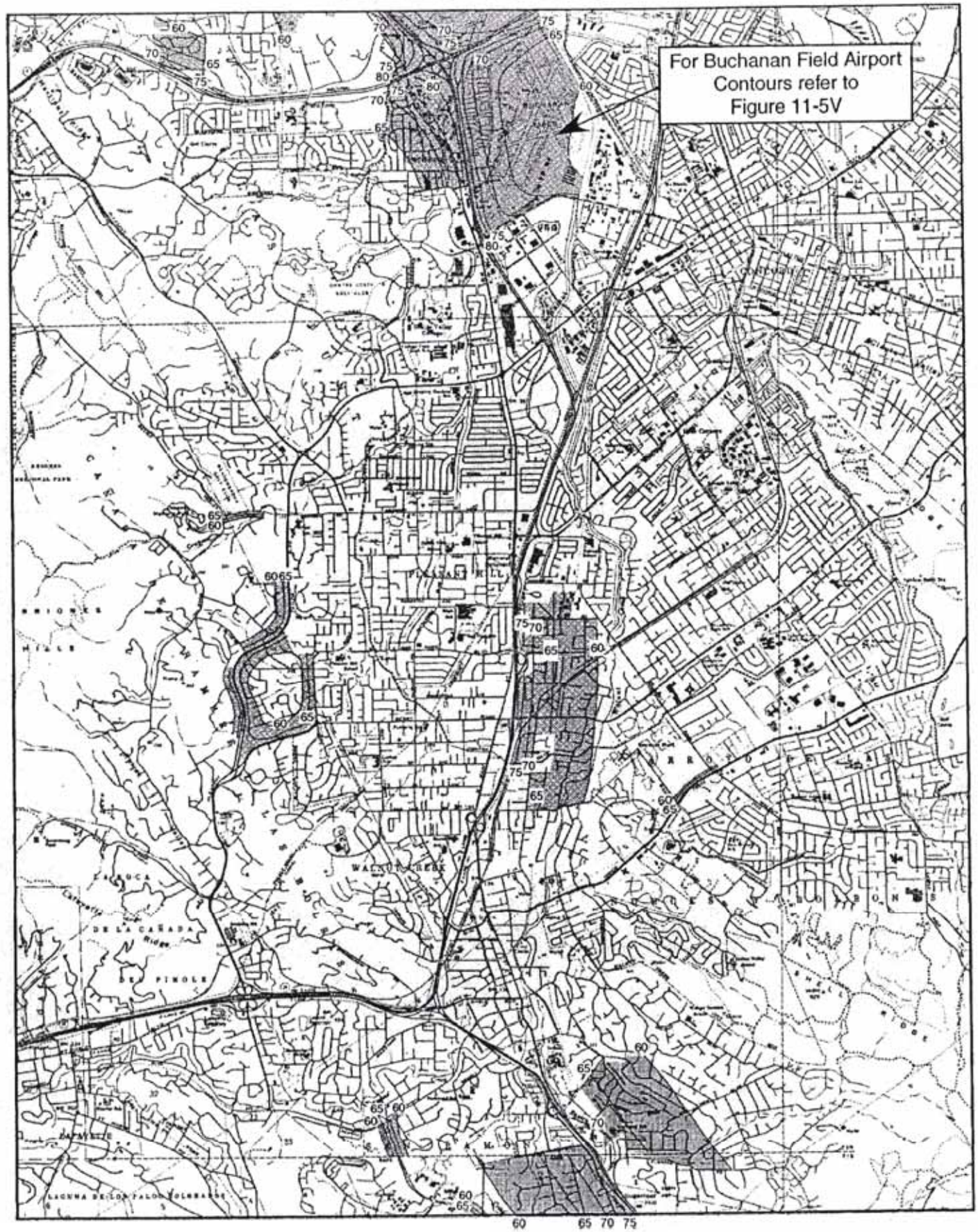
Figure 11-5I Noise Contours Walnut Creek



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Miles

2005 DNL and CNEL NOISE LEVELS (dB)

Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
Contra Costa County Community Development
651 Pine Street, 4th Floor - N. Wing, Martinez, CA 94553-0095
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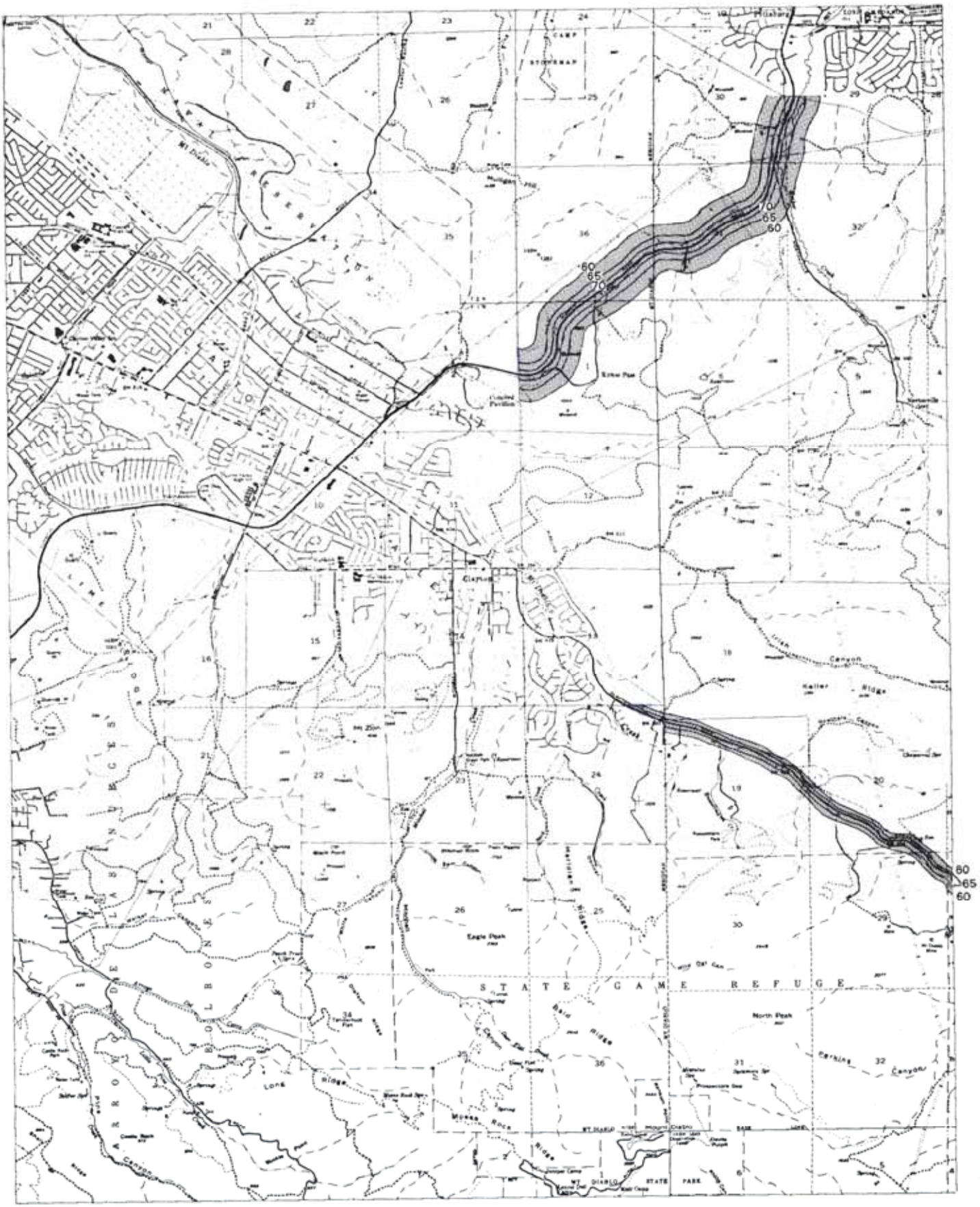
Figure 11-5 J Noise Contours Clayton



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Miles

2005 DNL and CNEL NOISE LEVELS (dB)

Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
Contra Costa County Community Development
651 Pine Street, 4th Floor - N. Wing, Martinez, CA 94553-0095
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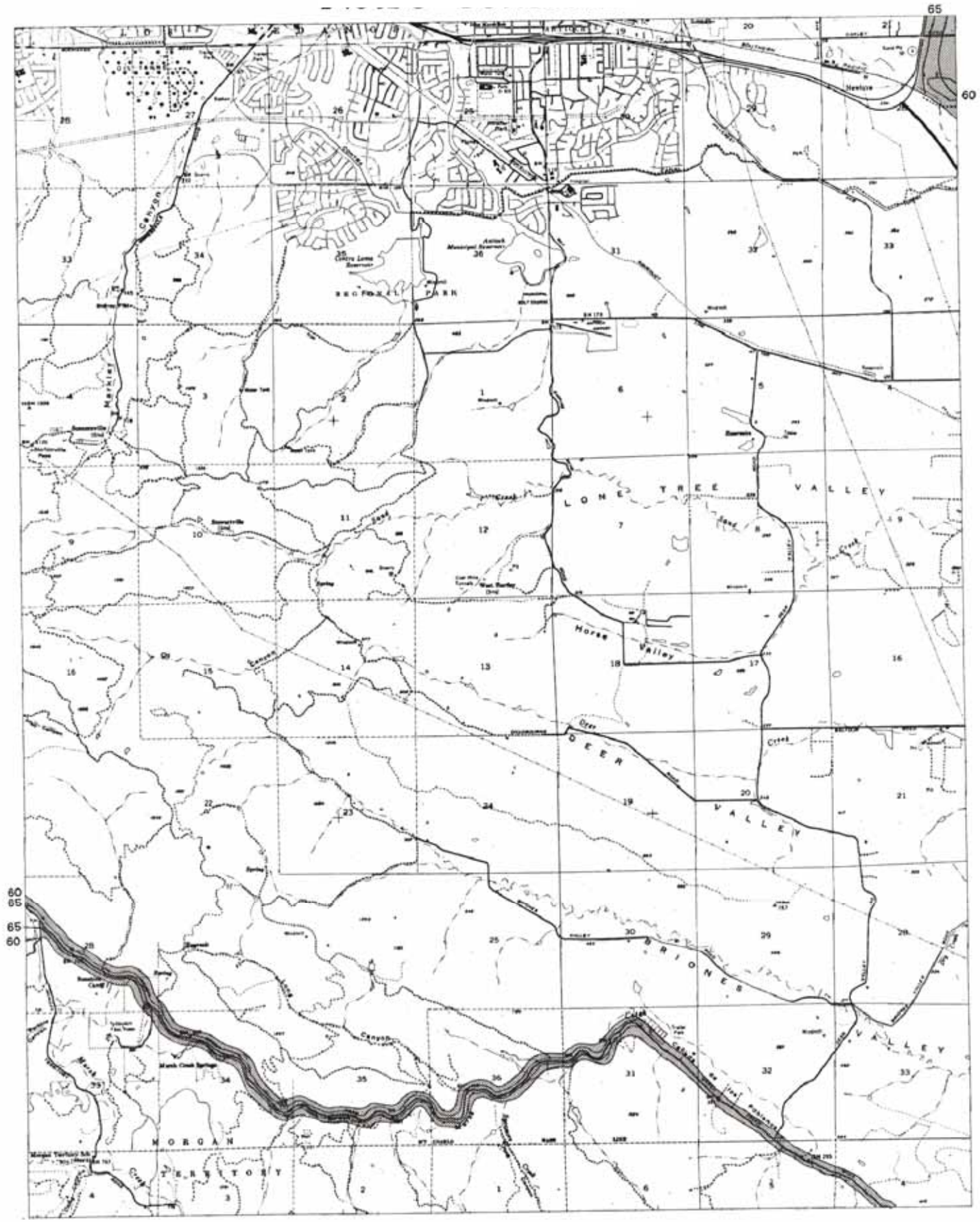
Figure 11-5 K Noise Contours Antioch South



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0 0.3 0.6 1.2

Miles

2005 DNL and CNEL NOISE LEVELS (dB)

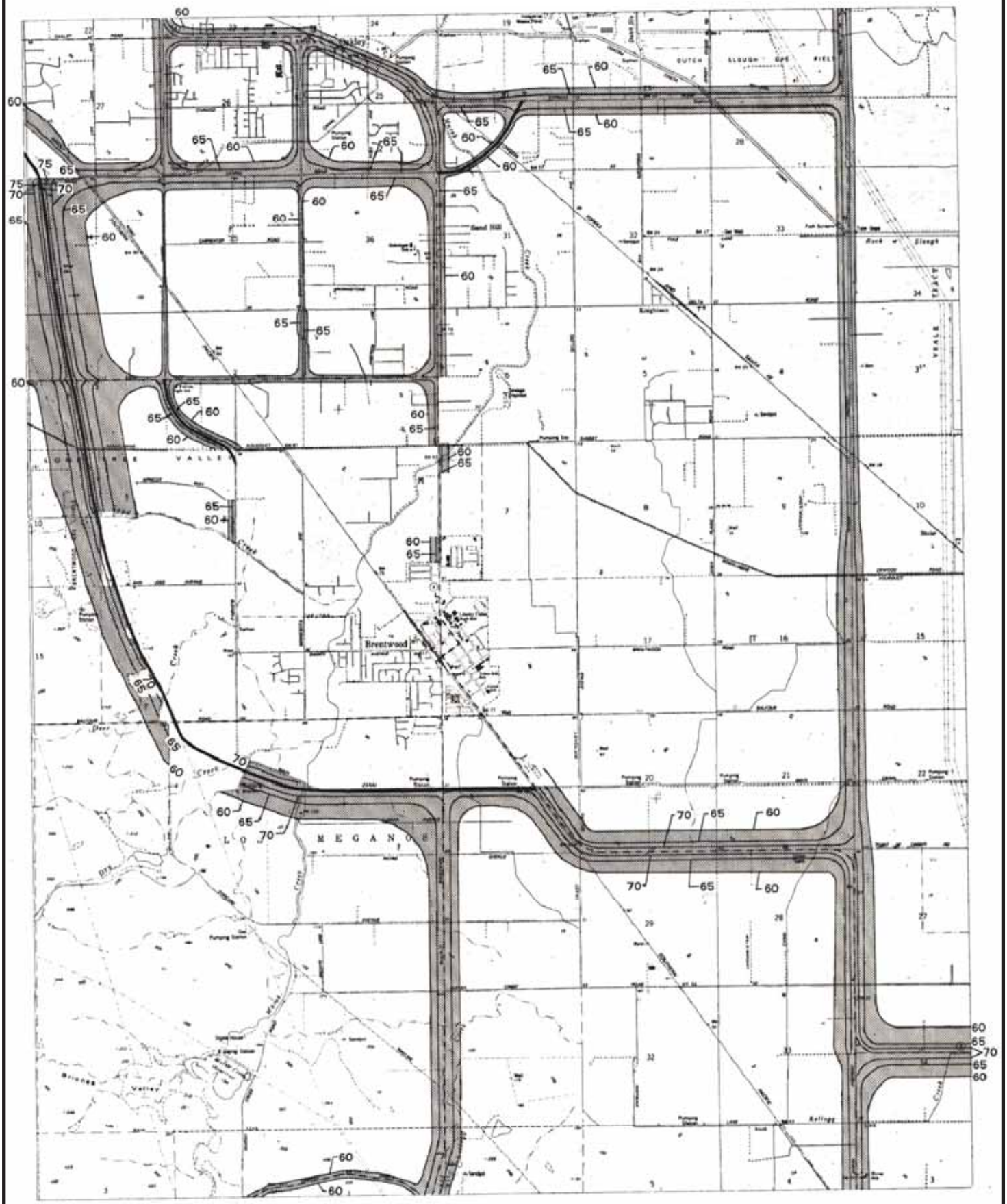
Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
Contra Costa County Community Development
651 Pine Street, 4th Floor - N. Wing, Martinez, CA 94553-0095
37:59:48.455N 122:06:35.384W

Figure 11-5 L Noise Contours Brentwood



1:60,000

0 0.3 0.6 1.2

Miles

2005 DNL and CNEL NOISE LEVELS (dB)

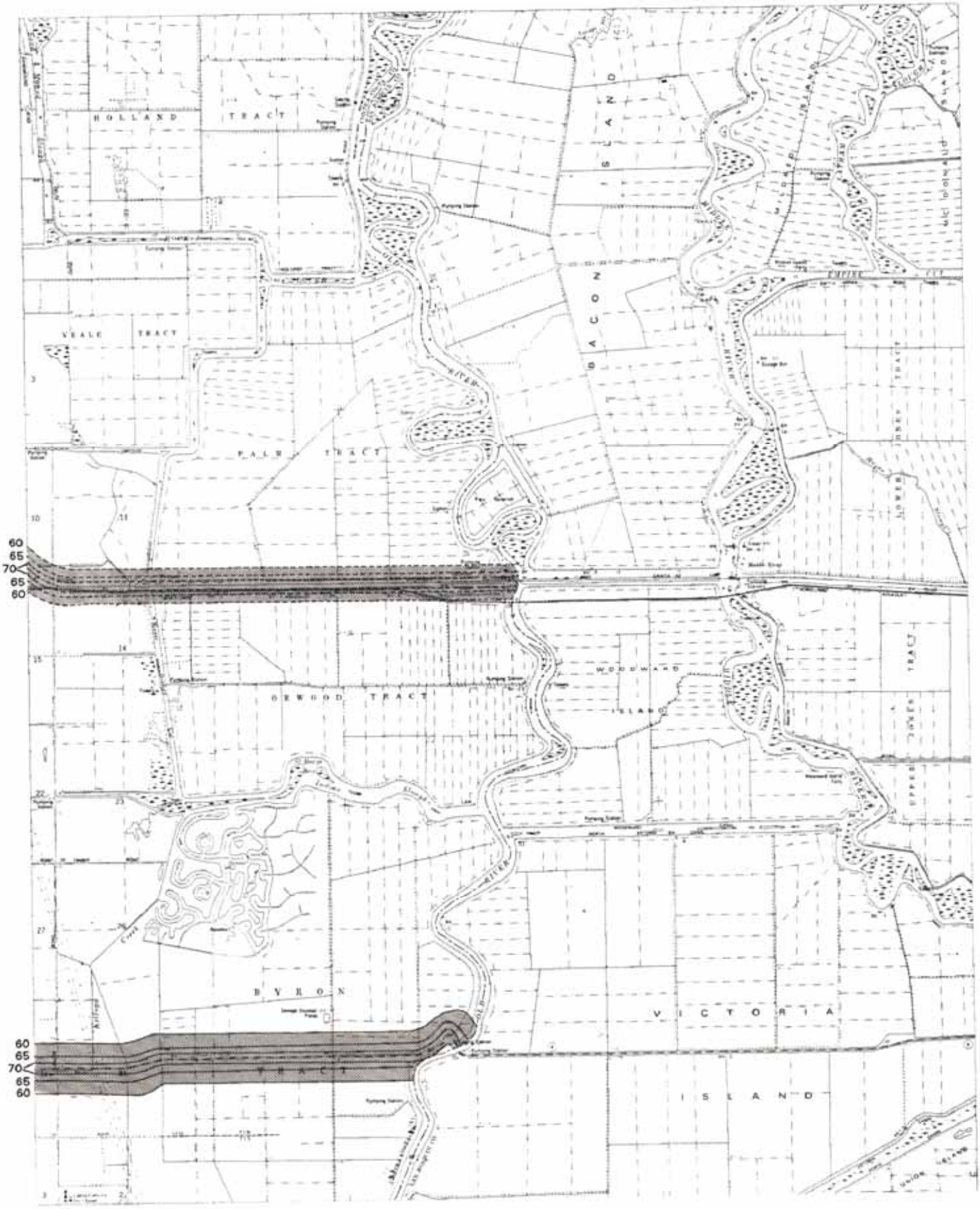
Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
Contra Costa County Community Development
651 Pine Street, 4th Floor - N. Wing, Martinez, CA 94553-0095
37:59:48.455N 122:06:35.384W

Figure 11-5 M Noise Contours Woodward Island



1:60,000

0 0.3 0.6 1.2

Miles

2005 DNL and CNEL NOISE LEVELS (dB)

Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
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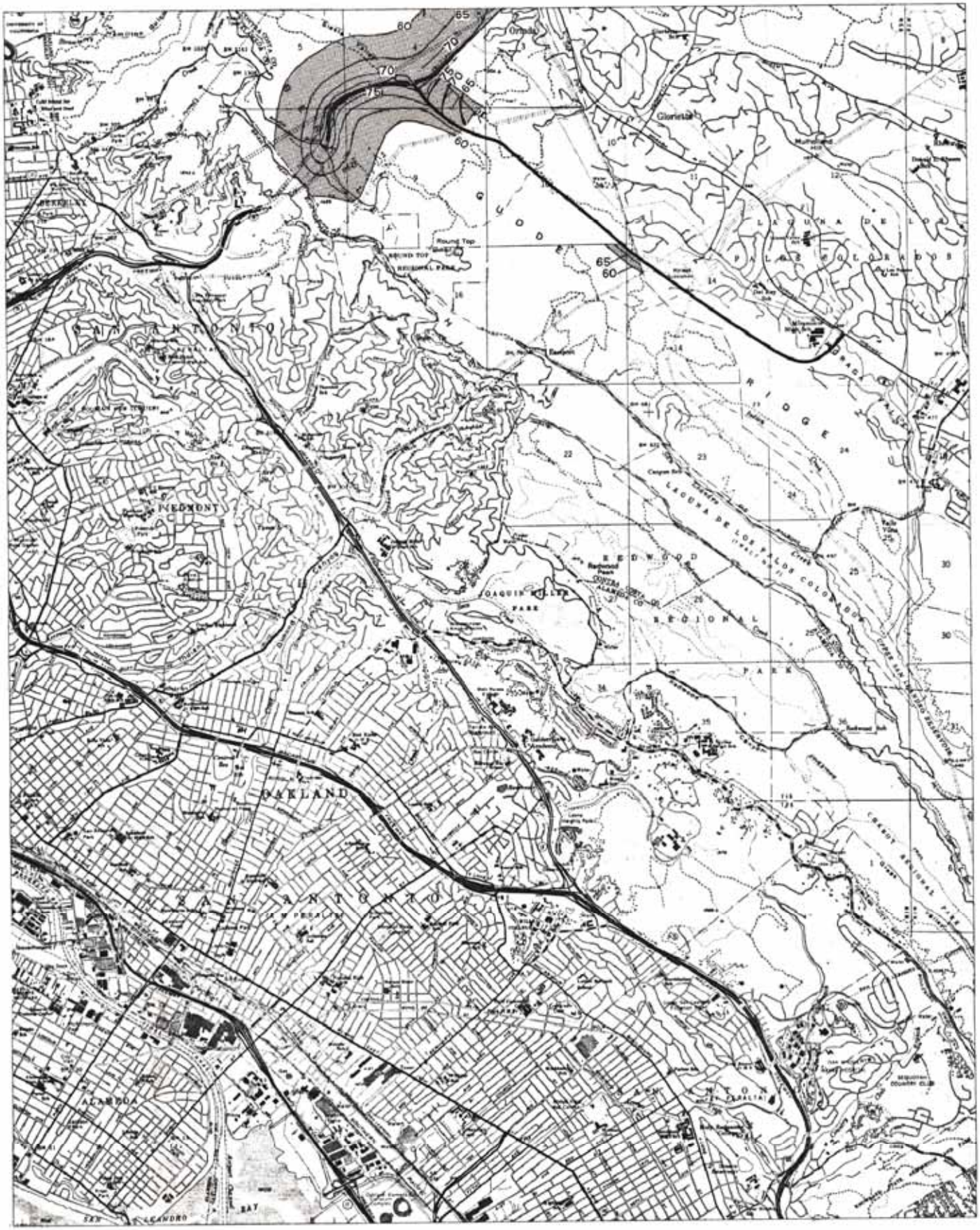
651 Pine Street, 4th Floor - N. Wing, Martinez, CA 94553-0095
37:59:48.455N 122:06:35.384W

Figure 11-5 N Noise Contours Oakland East



1:60,000

0 0.3 0.6 1.2

Miles

2005 DNL and CNEL NOISE LEVELS (dB)

Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
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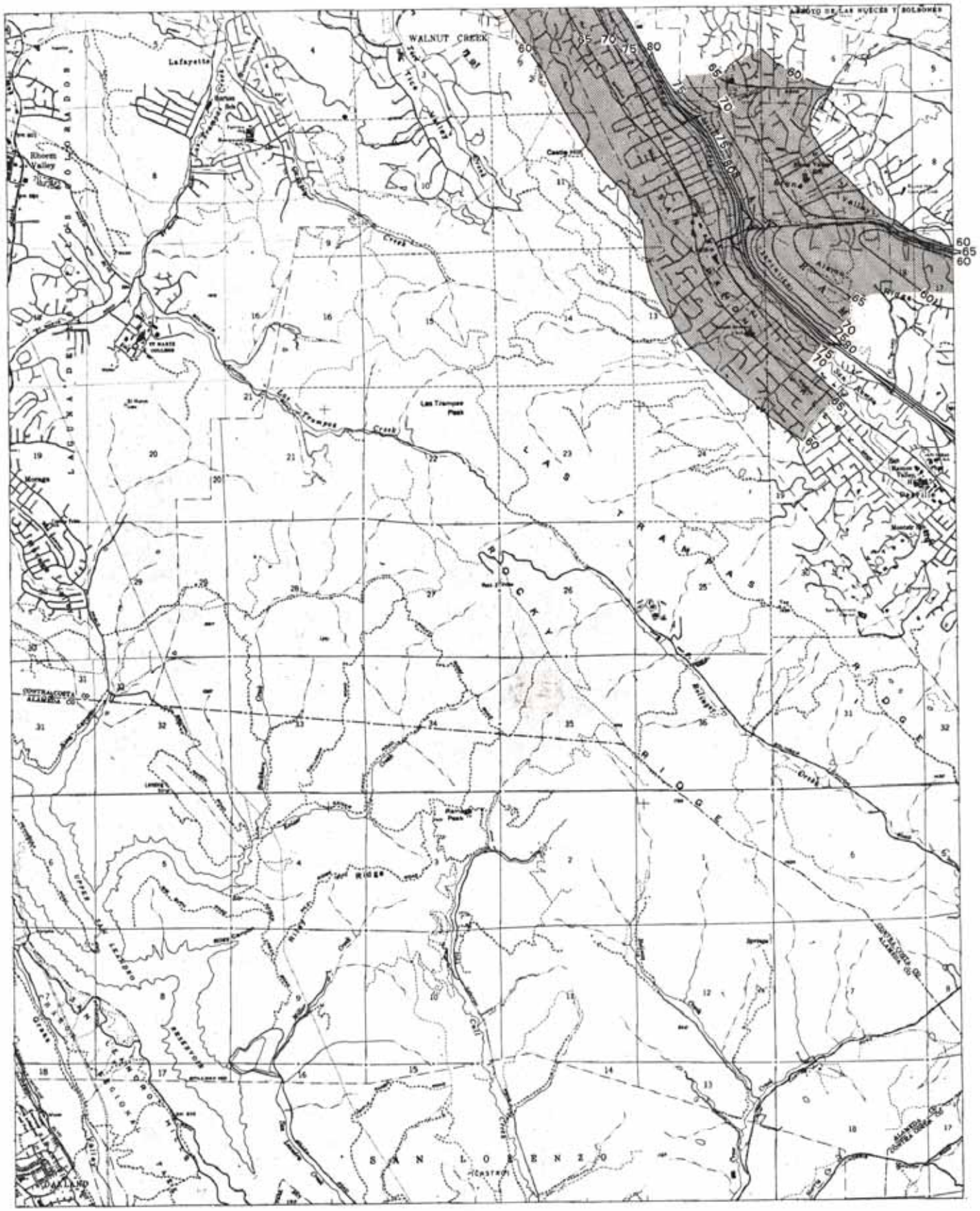
651 Pine Street, 4th Floor - N. Wing, Martinez, CA 94553-0095
37:59:48.455N 122:06:35.384W

Figure 11-5 O Noise Contours Las Trampas Ridge



1:60,000

0 0.3 0.6 1.2

Miles

2005 DNL and CNEL NOISE LEVELS (dB)

Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
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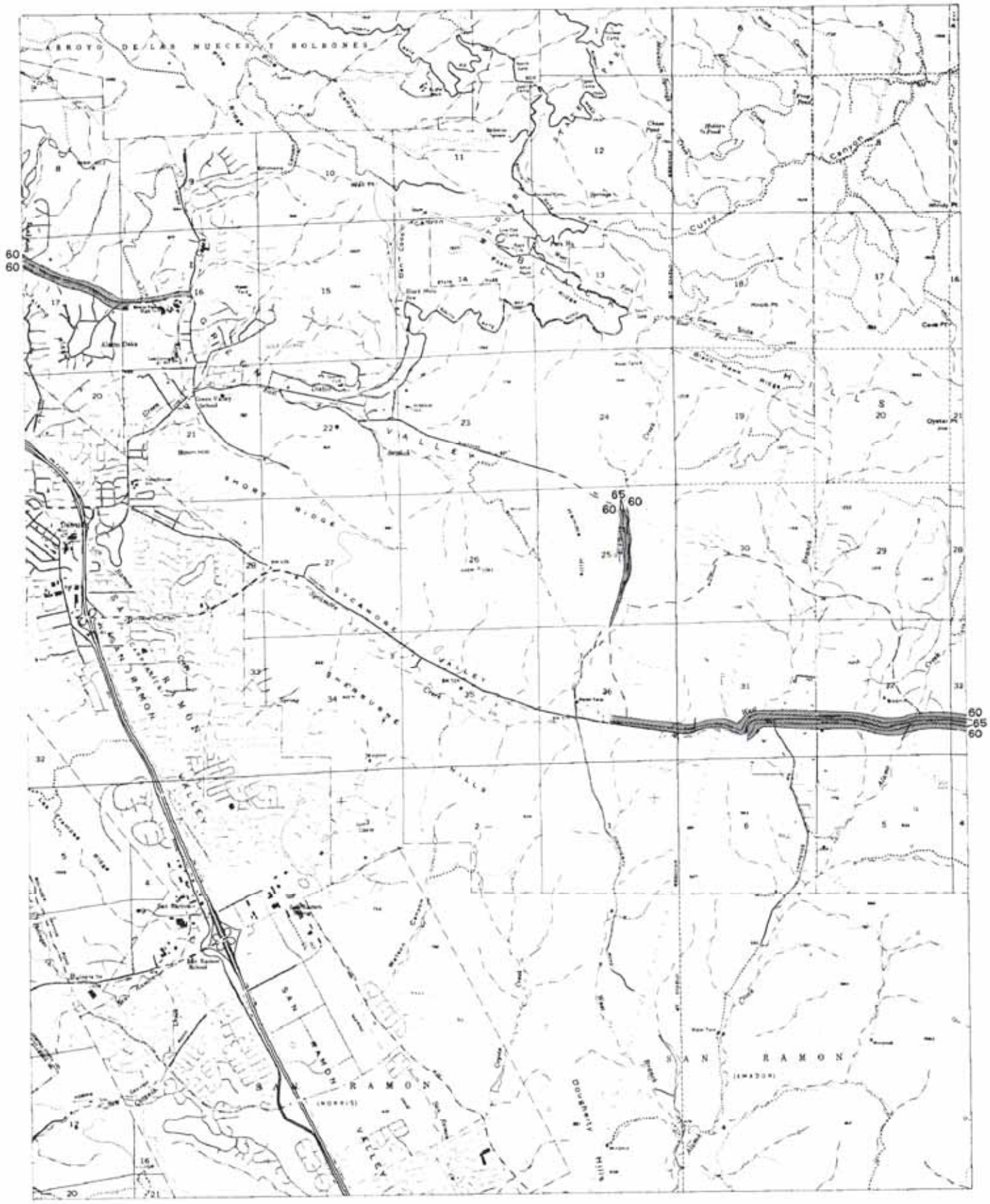
651 Pine Street, 4th Floor - N. Wing, Martinez, CA 94553-0095
37:59:48.455N 122:06:35.384W

Figure 11-5 P Noise Contours Diablo



1:60,000

0 0.3 0.6 1.2

Miles

2005 DNL and CNEL NOISE LEVELS (dB)

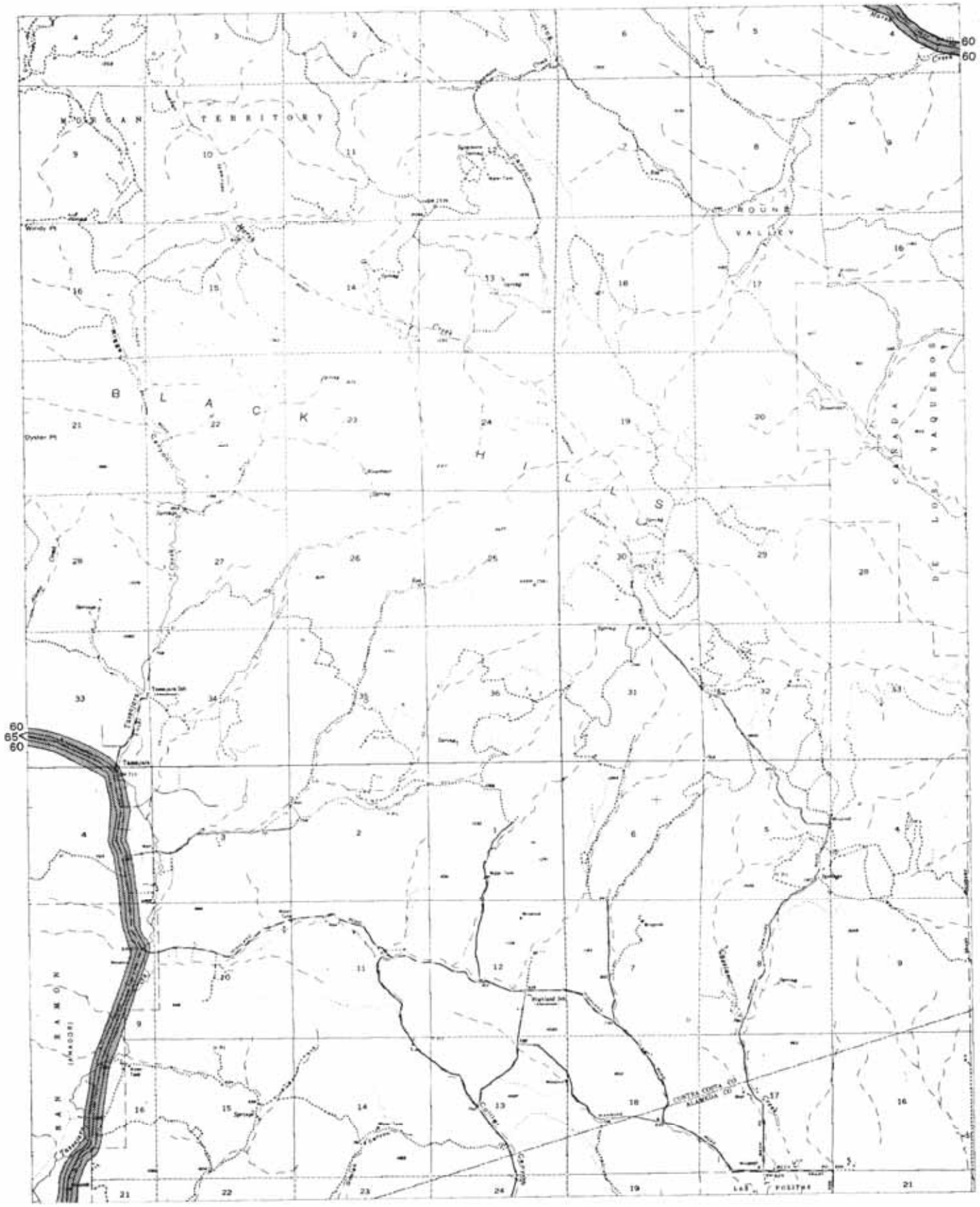
Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
Contra Costa County Community Development
651 Pine Street, 4th Floor - N. Wing, Martinez, CA 94553-0095
37:59:48.455N 122:06:35.384W

Figure 11-5 Q Noise Contours Tassajara



1:60,000

0 0.3 0.6 1.2

Miles

2005 DNL and CNEL NOISE LEVELS (dB)

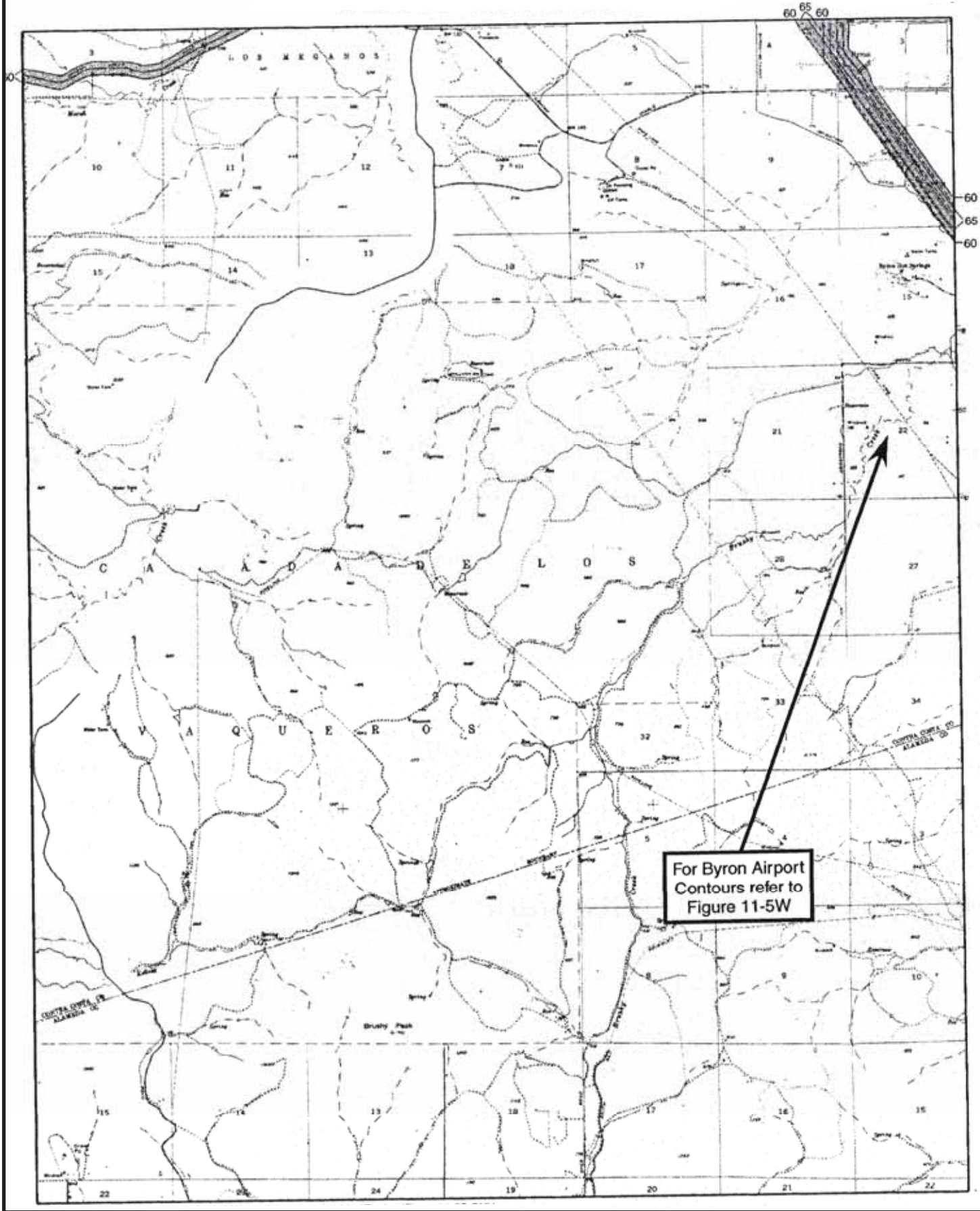
Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
Contra Costa County Community Development
651 Pine Street, 4th Floor - N. Wing, Martinez, CA 94553-0095
37:59:48.455N 122:06:35.384W

Figure 11-5R Noise Contours Byron Hot Springs



1:60,000

0 0.3 0.6 1.2

Miles

2005 DNL and CNEL NOISE LEVELS (dB)

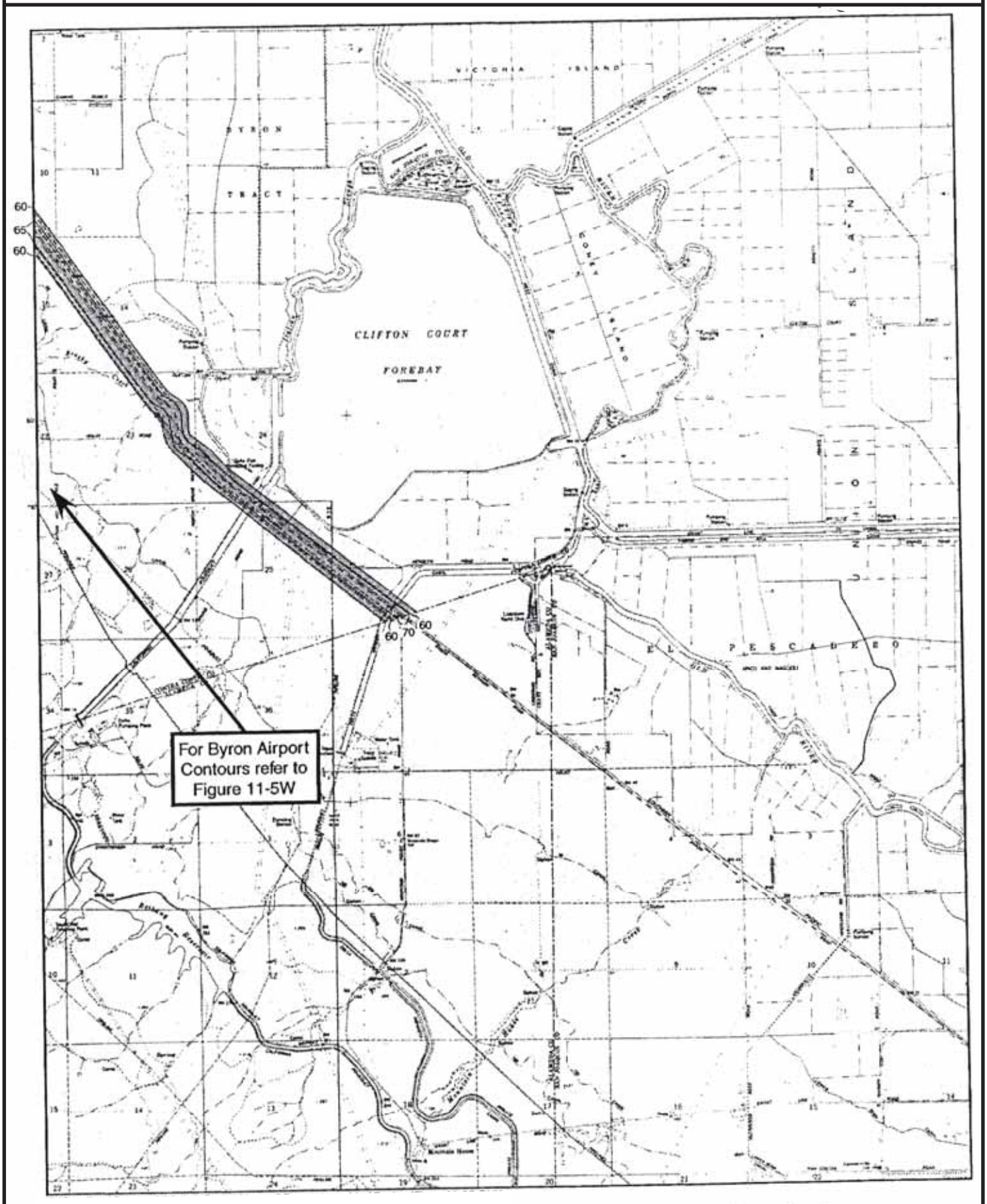
Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
Contra Costa County Community Development
651 Pine Street, 4th Floor - N. Wing, Martinez, CA 94553-0095
37:59:48.455N 122:06:35.384W

Figure 11-5S Noise Contours Clifton Court Forebay



1:60,000

0 0.3 0.6 1.2

Miles

2005 DNL and CNEL NOISE LEVELS (dB)

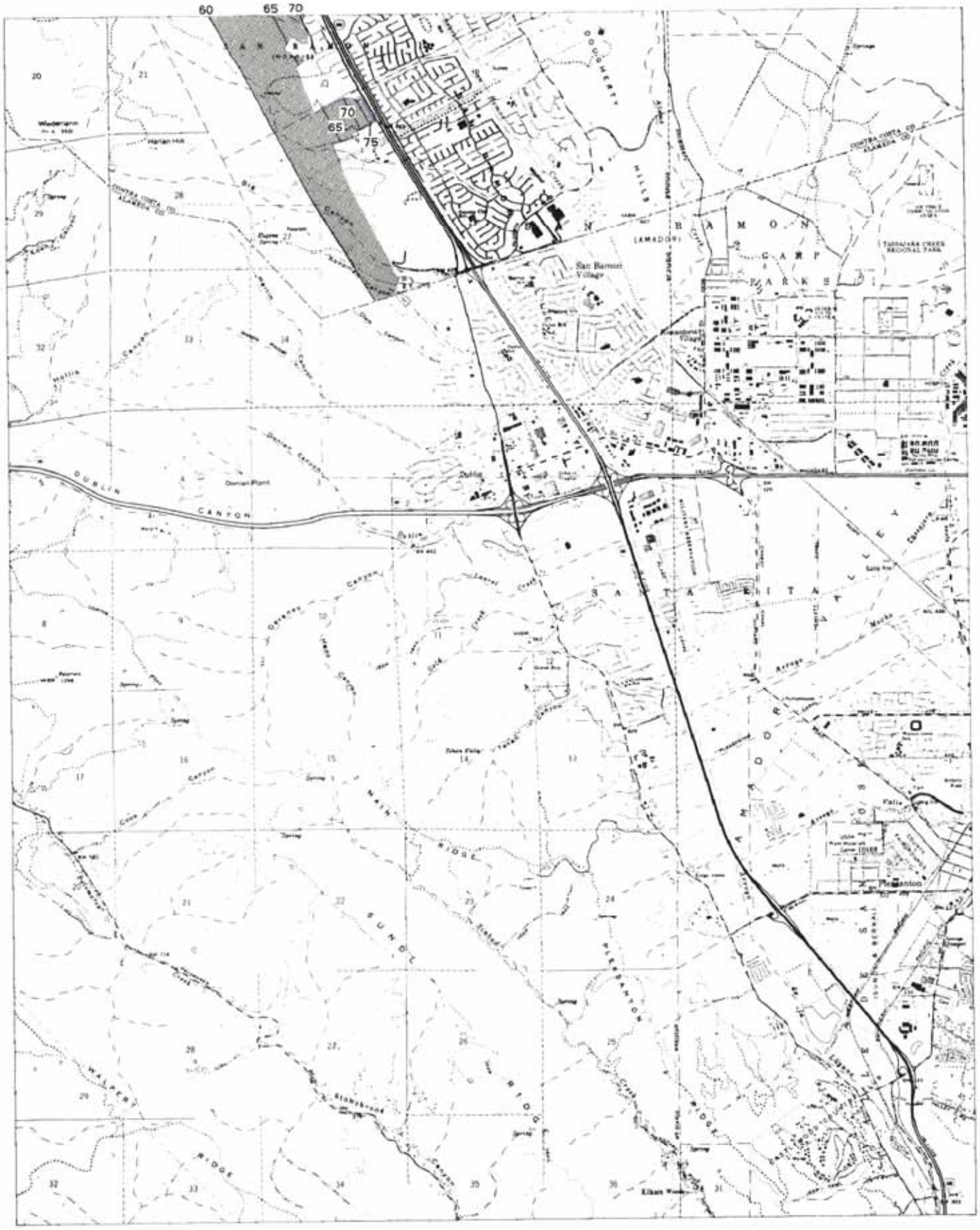
Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
Contra Costa County Community Development
651 Pine Street, 4th Floor - N. Wing, Martinez, CA 94553-0095
37:59:48.455N 122:06:35.384W

Figure 11-5 T Noise Contours Dublin



1:60,000

0 0.3 0.6 1.2

Miles

2005 DNL and CNEL NOISE LEVELS (dB)

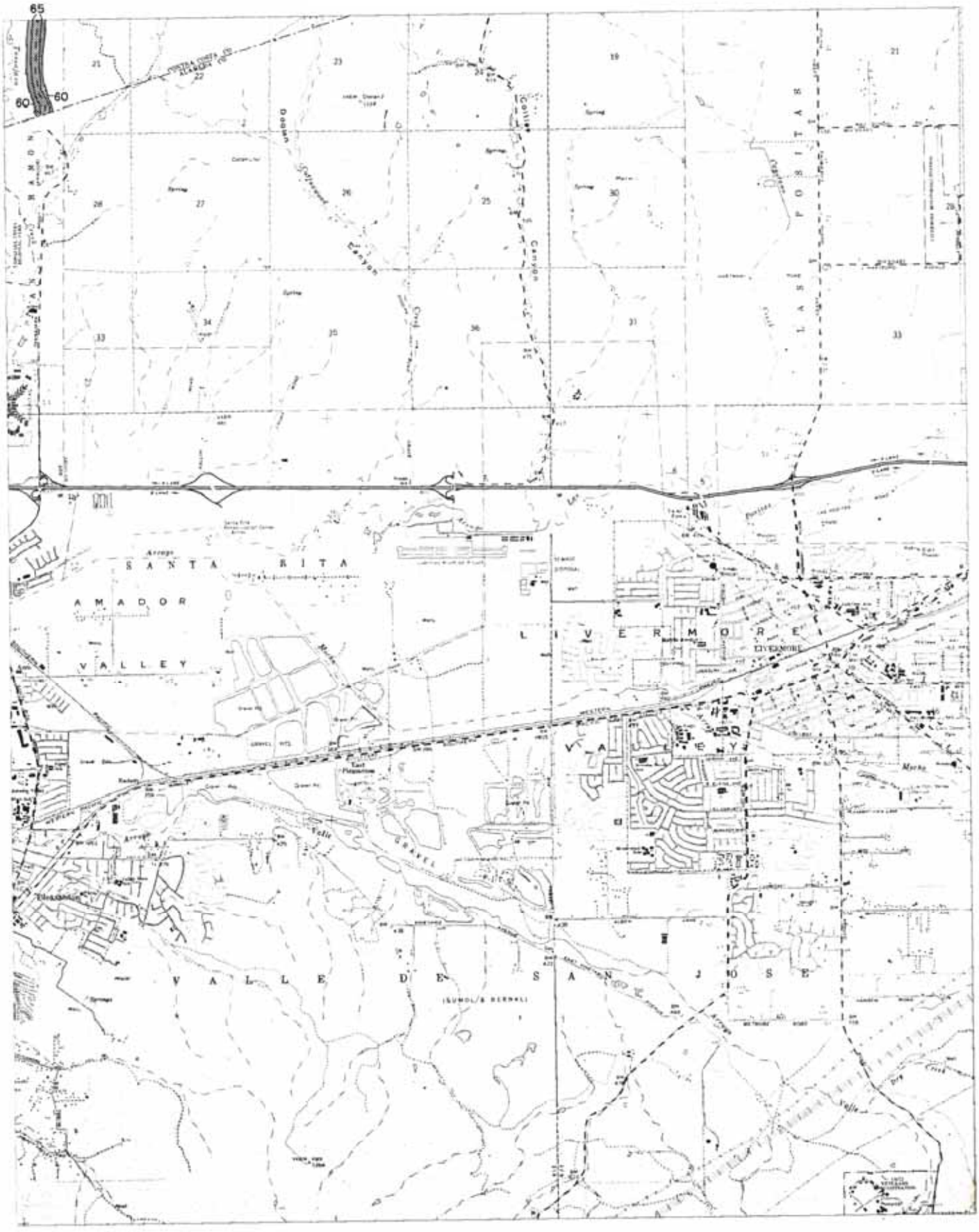
Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
Contra Costa County Community Development
651 Pine Street, 4th Floor - N. Wing, Martinez, CA 94553-0095
37:59:48.455N 122:06:35.384W

Figure 11-5 U Noise Contours Livermore



1:60,000

0 0.3 0.6 1.2

Miles

2005 DNL and CNEL NOISE LEVELS (dB)

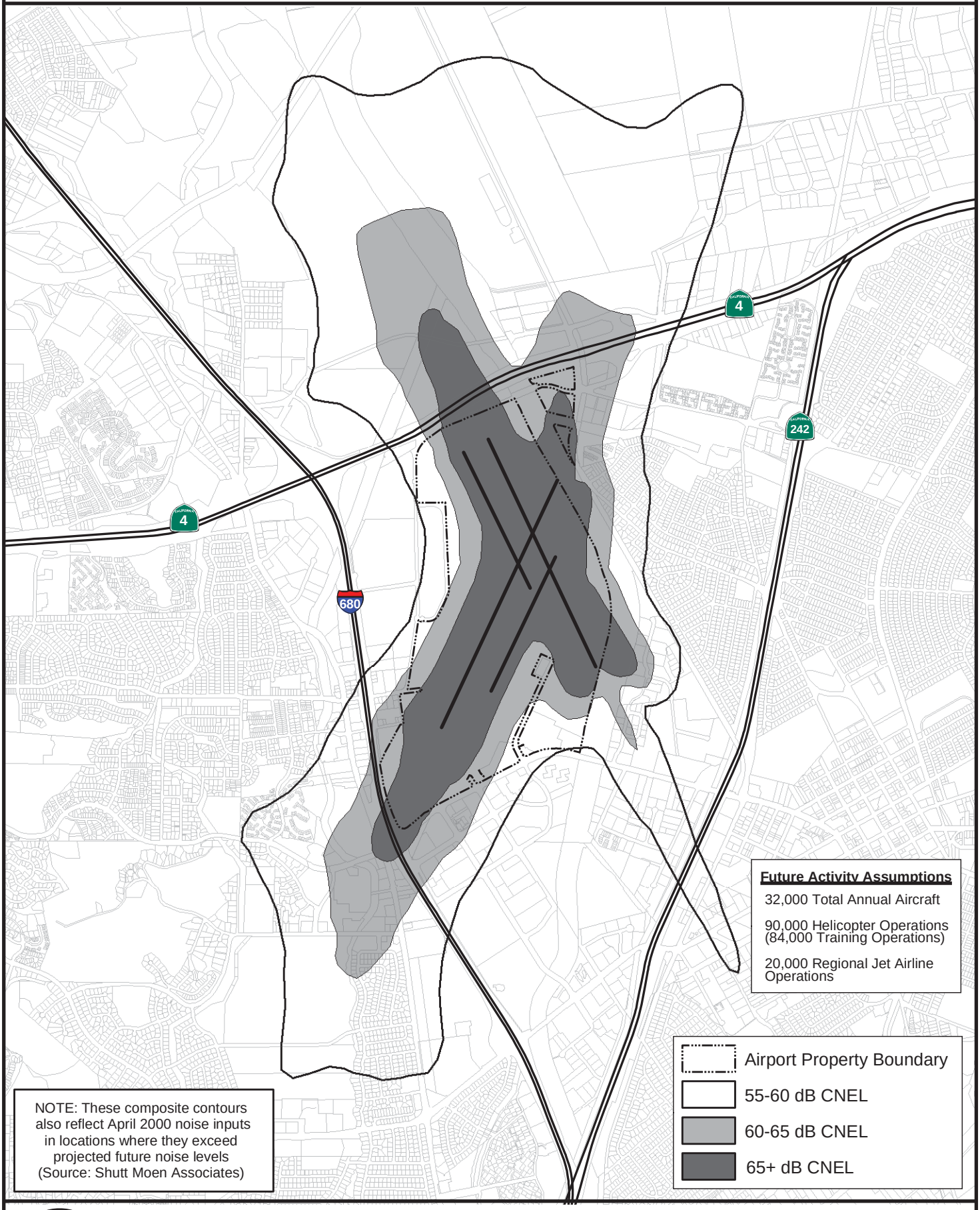
Roadways are DNL

Trains are DNL

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
Contra Costa County Community Development
651 Pine Street, 4th Floor - N. Wing, Martinez, CA 94553-0095
37:59:48.455N 122:06:35.384W

Figure 11-5 V Buchanan Airport Noise Contours



1: 28,000

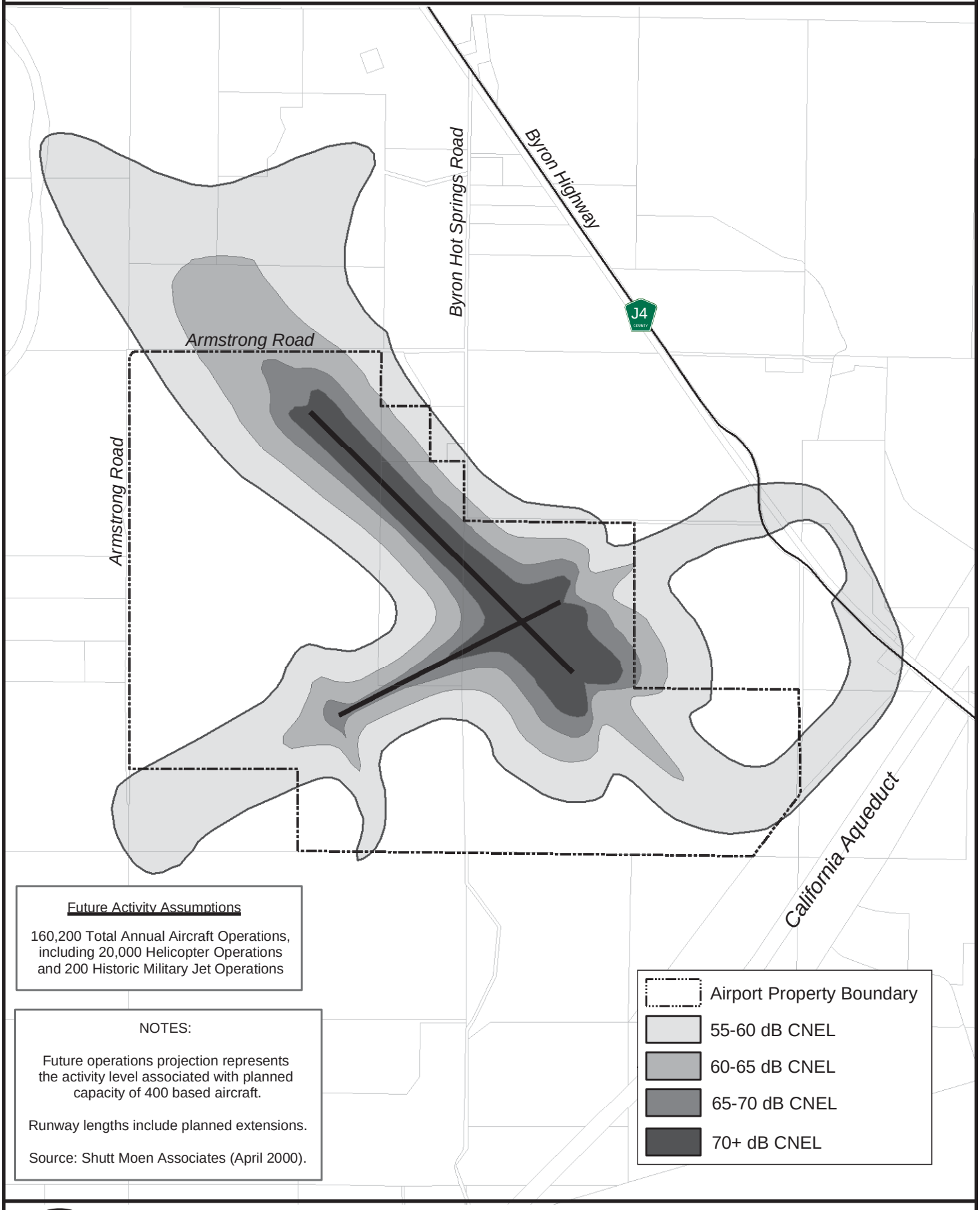
0 0.25 0.5 1

Miles

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
Contra Costa County Community Development
651 Pine Street, 4th Floor - N. Wing, Martinez, CA 94553-0095
37:59:48.455N 122:06:35.384W

Figure 11-5W Byron Airport Noise Contours



Future Activity Assumptions

160,200 Total Annual Aircraft Operations, including 20,000 Helicopter Operations and 200 Historic Military Jet Operations

NOTES:

Future operations projection represents the activity level associated with planned capacity of 400 based aircraft.

Runway lengths include planned extensions.

Source: Shutt Moen Associates (April 2000).

1:24,000

0 0.25 0.5 1

Miles

CONTRA COSTA COUNTY

Map Created on December 1st, 2004
Contra Costa County Community Development
651 Pine Street, 4th Floor - N. Wing, Martinez, CA 94553-0095
37:59:48.455N 122:06:35.384W

TABLE 11-2
FUTURE NOISE LEVELS
ALONG FREEWAYS AND MAJOR ARTERIALS

Road/Segment	DNL at 100 ft. (dB)	Distance to 60 DNL Contour (feet)
Appian Way		
Route 80 to Valley View Road	65	270
Valley View Road to San Pablo Dam Road	66	320
Bethel Island Road		
Cypress Road to Gateway Road	67	370
Bollinger Canyon Road	70	620
Byron Highway (J4)		
Cypress Road to Orwood Road	65	270
Orwood Road to Payne Avenue	67	370
Payne Avenue to Route 4	70	590
Camino Diablo Road		
Marsh Creek Road to Byron Highway	60	100
Clayton Road		
Kirker Pass Road to Marsh Creek Road	66	320
Crow Canyon Road		
Alameda County Line to Bollinger Canyon road	73	930
Cummings Skyway		
Route 80 to Route 4	65	270
Cypress Road		
Route 4 to Laurel Road	66	320
Laurel Road to Sellers Avenue	69	500
Sellers Avenue to Bethel Island Road	67	370
Danville Boulevard		
Rudgear Road to Stone Valley Road	62	160
Stone Valley Road to El Portal	60	100
Delta Expressway		
Route 4 to Laurel Road	77	1,700
Laurel Road to Sand Creek Boulevard	76	930
Sand Creek Boulevard to Walnut Boulevard	74	1,100
Walnut Boulevard to East	71	680
Dougherty Road (Realigned)	80	410
Gateway Boulevard		
Near Route 24	68	430
Near Moraga Way	67	370
Kirker Pass Road		
Concord Boulevard to Railroad Avenue	73	930
Laurel Road		
Delta Expressway to O'Hara Avenue	69	500
O'Hara Avenue to Route 4	68	430
Route 4 to Cypress Road	64	230
Marsh Creek Road		
Clayton to Deer Valley Road	65	270
Deer Valley Road to Camino Diablo Road	64	230
Camino Diablo Road to East	63	200
Lone Tree Way		
Empire Mine Road to O'Hara Avenue	68	430
O'Hara Avenue to Route 4	60	100
Pacheco Boulevard		
Pine Street to Morello Avenue	61	130
Morello Avenue to Route 4	65	270
Route 4 to Concord Avenue	66	320
Pleasant Hill Road		
Reliez Valley Road to Oak Park Boulevard	69	500

TABLE 11-2 (Continued)

Road/Segment	DNL at 100 ft. (dB)	Distance to 60 DNL Contour (feet)
Port Chicago Highway		
Pacifica Avenue to Willow Pass Road	64	230
Richmond Parkway	72	800
San Pablo Avenue		
Route 80 to Rodeo	67	370
Pinole to Richmond	63	200
San Pablo Dam Road		
San Pablo Avenue to Appian Way	70	590
Appian Way to Valley View Road	63	200
Valley View road to Castro Ranch Road	64	230
Castro Ranch Road to Bear Creek Road	67	370
Stone Valley Road		
Route 680 to Miranda Avenue	62	160
Miranda Avenue to Green Valley Road	61	130
Camino Tassajara Road		
Black Hawk Road to Finley Road	61	370
Finley Road to Alameda County Line	66	320
Taylor Boulevard		
Pleasant Hill Road South to Pleasant Hill Road North	68	430
Vasco Road		
Camino Diablo Road to Alameda County Line	71	680
Willow Pass Road		
Route 4 to Pittsburg	65	270
Windemere Parkway	65	210
Ygnacio Valley Boulevard		
Walnut Creek to Clayton Road	70	590
Route 4		
Route 80 to Cummings Skyway	72	800
Cummings Skyway to McEwen Road	73	930
McEwen Road to Alhambra Avenue	74	1,100
Alhambra Avenue to Morello Avenue	75	1,300
Morello Avenue to Solano Way	77	1,700
Solano Way to Route 242	78	2,000
Route 242 to Port Chicago Highway	77	1,700
Port Chicago Highway to Railroad Avenue	78	2,000
Lone Tree Way North to Route 160	72	800
Route 160 to Oakley Road	67	370
Oakley Road to Cypress Road	66	320
Cypress Road to Lone Tree Way East	65	270
Lone Tree Way East to Brentwood Road	67	370
Brentwood Road to Sellers Avenue	60	100
Sellers Avenue to Byron Highway	72	800
Byron Highway to San Joaquin County Line	73	930
Route 24		
Alameda County Line to Orinda	78	2,000
Route 80		
Solano County to Willow Avenue	79	2,300
Route 160		
Route 4 to Solano County Line	70	425
Route 680		
Solano County Line to Pacheco Boulevard	81	3,200
Pacheco Boulevard to Highway 4	82	3,700
Highway 4 to Concord Avenue	81	3,200
Oak Park Boulevard to Route 24	81	3,200
Route 24 to Alcosta Boulevard	82	3,700
Atcheson, Topeka and Santa Fe	73	650

TABLE 11-2 (Continued)

Road/Segment	DNL at 100 ft. (dB)	Distance to 60 DNL Contour (feet)
Southern Pacific		
Tracy-Martinez	70	425
Martinez-Pinole	77	1,050
Pinole-Richmond	76	930
BART		
Aerial	68	650
At-Grade	63	200

11.8 GOALS

11-A To improve the overall environment in the County by reducing annoying and physically harmful levels of noise for existing and future residents and for all land uses.

11-B To maintain appropriate noise conditions in all areas of the County.

11-C To ensure that new developments will be constructed so as to limit the effects of exterior noise on the residents.

11-D To recognize the economic impacts of noise control and encourage an equitable distribution of these costs.

11-E To recognize citizen concerns regarding excessive noise levels, and to utilize measures through which the concerns can be identified and mitigated.

11.9 POLICIES

11-1 New projects shall be required to meet acceptable exterior noise level standards as established in the Noise and Land Use Compatibility Guidelines contained in Figure 11-6. These guidelines, along with the future noise levels shown in the future noise contours maps, should be used by the county as a guide for evaluating the compatibility of “noise sensitive” projects in potentially noisy areas.

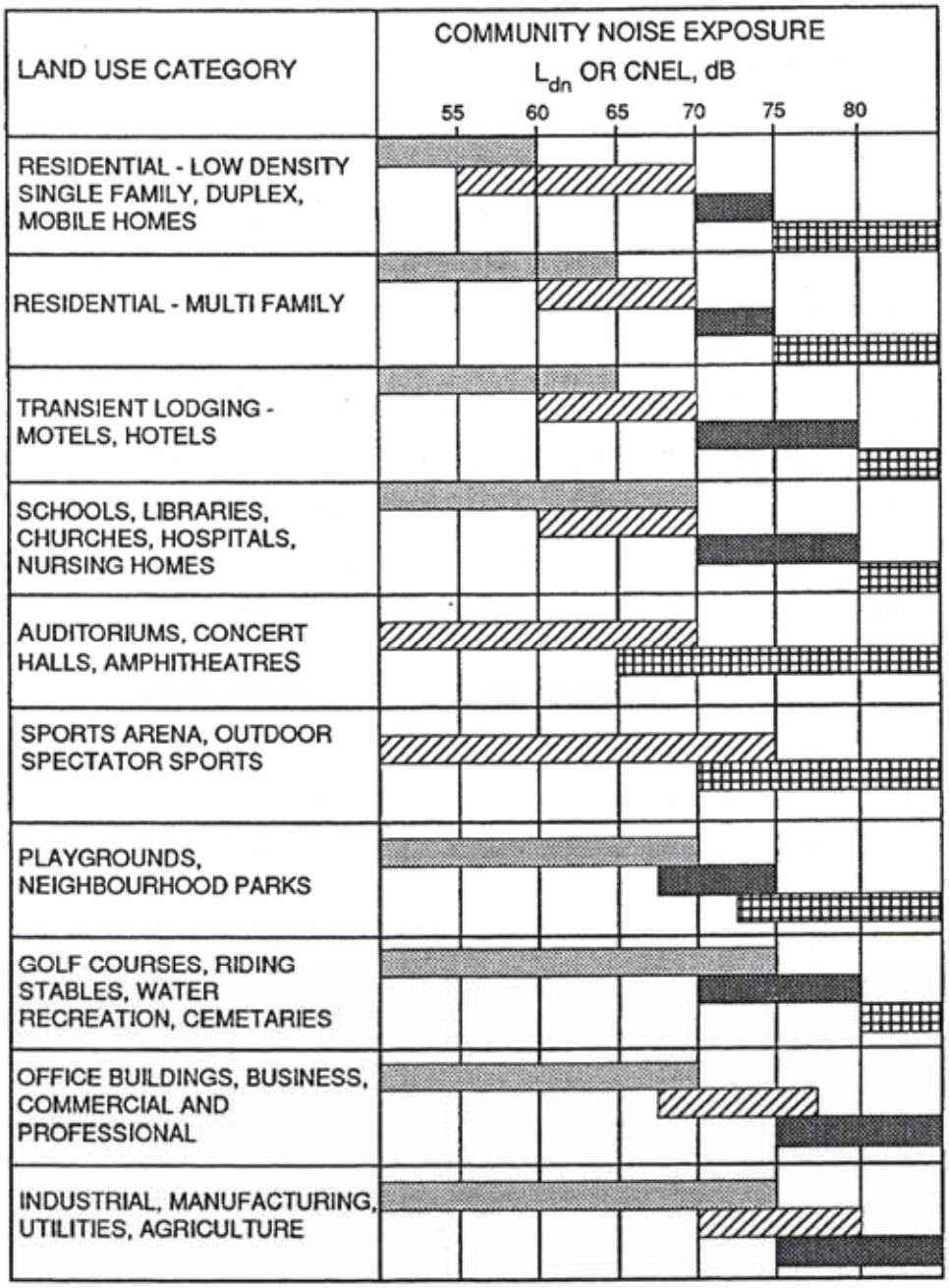
11-2 The standard for outdoor noise levels in residential areas is a DNL of 60 dB. However, a DNL of 60 dB or less may not be achievable in all residential areas due to economic or aesthetic constraints. One example is small balconies associated with multi-family housing. In this case, second and third story balconies may be difficult to control to the goal. A common outdoor use area that meets the goal can be provided as an alternative.

11-3 If the primary noise source is train passbys, then the standard for outdoor noise levels in residential areas is a DNL of 70 dB. A higher DNL is allowable since the DNL is controlled by a relatively few number of train passbys that are disruptive outdoors only for short periods. Even though the DNL may be high, during the majority of the time the noise level will be acceptable.

11-4 Title 24, Part 2, of the California Code of Regulations requires that new multiple-family housing projects, hotels, and motels exposed to a DNL of 60 dB or greater have a detailed acoustical analysis describing how the project will provide an interior DNL of 45 dB or less. The County also shall require new single-family housing projects to provide for an interior DNL of 45 dB or less.

11-5 In developing residential areas exposed to a DNL in excess of 65 dB due to single events such as train operation, indoor noise levels due to these single events shall not exceed a maximum A-weighted noise level of 50 dB in bedrooms and 55 dB in other habitable rooms. Single event indoor residential noise levels from airport related causes will be 45 dB CNEL.

Figure 11-6 Land Use Compatibility for Community Noise Environments



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

CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.

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

CLEARLY UNACCEPTABLE
New construction or development clearly should not be undertaken.

For lands within 3 miles of Buchanan Field and the East Contra Costa County Airports noise compatibility shall be adjusted to those of the ALUC which are roughly 5 CNEL lower than shown on this table.

11-6 If an area is currently below the maximum "normally acceptable" noise level, an increase in noise up to the maximum should not be allowed necessarily.

11-7 Public projects shall be designed and constructed to minimize long-term noise impacts on existing residents.

11-8 Construction activities shall be concentrated during the hours of the day that are not noise-sensitive for adjacent land uses and should be commissioned to occur during normal work hours of the day to provide relative quiet during the more sensitive evening and early morning periods.

11-9 Sensitive land use shall be encouraged to be located away from noise areas, or the impacts of noise on these uses shall be mitigated. If residential areas are planned adjacent to industrial noise sources, then a noise study shall be performed to determine the extent of any noise impacts and recommend appropriate noise mitigation measures.

11-10 Development located within 6,000 feet of the Camp Parks Reserve Forces Training Area shall be required to prepare a detailed acoustical analysis. The analysis shall determine if the project will be affected severely by noise and, if so, what noise mitigation measures are available.

11-11 Noise impacts upon the natural environment, including impacts on wildlife, shall be evaluated and considered in review of development projects.

11.10 IMPLEMENTATION MEASURES

DEVELOPMENT REVIEW

11-a Continue to require a review and analysis of noise-related impacts as part of the existing project development review procedures of the County.

11-b Evaluate the noise impacts of a proposed project upon existing land uses in terms of the applicable Federal, State, and local codes, and the potential for adverse community response, based on a significant increase in existing noise levels.

11-c Encourage use of the following mitigation measures to minimize noise impacts of proposed development projects:

1) Site planning. Proper site planning is the first mitigation measure that should be investigated to reduce noise impacts. By taking advantage of the natural shape and terrain of a site, it often is possible to arrange the buildings and other uses in a manner that will reduce and possibly eliminate noise impact. Specific site planning techniques include:

   a) Increasing the distance between the noise source and the receiver;

   b) Placing non-noise-sensitive land uses such as parking lots, maintenance facilities, and utility areas between the source and the receiver;

   c) Using non-noise-sensitive structures such as garages to shield noise-sensitive areas; and

   d) Orienting buildings to shield outdoor spaces from a noise source.

2) Architectural layout of buildings. In many cases, noise reduction can be attained by careful layout of noise-sensitive spaces. Bedrooms, for

example, should be placed away from freeways. Quiet outdoor spaces can be provided next to a noisy highway by creating a U-shaped development which faces away from the highway.

3) Noise Barriers: Noise barriers or walls are commonly used to reduce noise levels from ground transportation noise sources and industrial sources. While serving a dual purpose in that they can reduce noise level both outdoors and indoors, to be effective, a barrier must interrupt the line of sight between the noise source and the receiver. A barrier should provide at least 5 dB of noise reduction to achieve a noticeable change in noise levels.

4) Construction modifications: If site planning, architectural layout, noise barriers, or a combination of these measures does not achieve the required noise reduction, then construction modification to walls, roofs, ceilings, doors, windows, and other penetrations may be necessary.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) GUIDELINES

11-d Amend the County CEQA Guidelines to define projects that have the potential to increase long-term noise levels above the levels specified in the policy section of this Plan as generating a significant impact on the environment.

11-e Noise mitigation features shall be incorporated into the design and construction of new projects or be required as conditions of project approval.

ZONING AND OTHER ORDINANCE AMENDMENTS

11-f Adopt a noise ordinance as the method to regulate noise from sources other than transportation sources. The noise ordinance should include specific noise level limits for stationary sources (i.e., projects). These noise level limits should take into account the type of adjacent land use (i.e., residential, commercial, or industrial). The State of California Office of Noise Control has published a Model Community Noise Ordinance.

OTHER PROGRAMS

11-g Coordinate efforts among the County, the cities, BART, the State government, and other agencies to develop a multi-phased action program to mitigate noise impacts.

11-h Prepare and adopt a noise abatement program that is consistent with State and federal guidelines, legally valid, and cost-effective.