6.11 NOISE

6.11 NOISE

INTRODUCTION

This section evaluates the potential for the Draft Sutter County General Plan (proposed General Plan) to increase noise and vibration exposure of the County's population, either through the introduction of new noise/vibration sources to the policy area or through the location of increased population near existing/new noise and vibration sources. This section considers impacts related to a variety of noise sources in the policy area, including vehicular traffic on roadways, freeways and highways, aircraft, railways, and stationary sources.

No comments pertaining to noise or vibration were received during circulation of the NOP.

Information to prepare this section is based on information collected for the *2008 Sutter County General Plan Technical Background Report* (TBR), including ambient noise measurements taken during fall 2007, and appropriate analytic methodologies and models, including the Federal Transit Administration's *Transit Noise and Vibration Impact Assessment* document and the Federal Highway Administration (FHWA) Traffic Noise Model (TNM) User's Guide (version 2.5 Addendum). Traffic inputs for TNM were provided by the transportation consultant.

The TBR is available electronically on the County's website (http://www.co.sutter.ca.us/pdf/cs/ps/gp/tbr/tbr.pdf) and on CD at the back of this document.

ENVIRONMENTAL SETTING

The discussion of noise included below is presented on a countywide basis. There are no unique issues present in any of the five Growth Areas associated with noise issues; therefore, these areas of the county are not specifically discussed in the environmental setting.

Terminology and Definitions

Sound is created when vibrating objects produce pressure variations that move rapidly outward into the surrounding air. The main characteristics of these air pressure waves are amplitude, which we experience as a sound's loudness, and frequency, which we experience as a sound's pitch. The standard unit of sound amplitude is the decibel (dB); it is a measure of the physical magnitude of the pressure variations relative to the human threshold of perception. The human ear's sensitivity to sound amplitude is frequency-dependent; it is more sensitive to sounds in the mid-frequencies of the hearing range than to sounds with much lower or higher frequencies.

Most "real world" sounds (e.g., a dog barking, a car passing, etc.) are complex mixtures of many different frequency components each having different amplitudes. When a sound level meter is used to measure the average amplitude of such sounds, it is common for the meter to apply adjustment factors to each of the measured sound's frequency components. These factors account for the differences in perceived loudness of each of the sound's frequency components relative to those to which the human ear is most sensitive. This frequency-adjusted average, called A-weighting, has been found to be useful as a predictor of human response to sound exposure. The unit of A-weighted average sound amplitude is also the decibel. So, in reporting measurements to which A-weighting has been applied, an "A" is appended to dB (i.e., dBA) to make this clear. Environmental sound levels usually vary substantially over time and it is often useful to know the degree of variability. At a minimum, it is useful to report the minimum ($\mathbf{L_{min}}$) and maximum ($\mathbf{L_{max}}$) sound levels observed during a measurement period.

Noise is the term generally given to the intrusive, "unwanted" aspects of sound. Many factors influence how a sound is perceived and whether it is considered harmful to or disruptive by an individual or a community. These factors include the primary physical characteristics of a sound (e.g., amplitude, frequency, duration, etc.), but also secondary acoustic and non-acoustic factors (as detailed in Table 6.11-1) that can influence judgment regarding the degree to which it is intrusive and disruptive. Excessive noise can negatively affect the physiological or psychological well-being of individuals or communities.

All quantitative descriptors used to measure environmental noise exposure recognize the strong correlation between the high acoustical energy content of a sound (i.e., its loudness and duration) and the disruptive effect it is likely to have as noise. Because environmental noise fluctuates over time, most such descriptors average the sound level over the time of exposure, and some add "penalties" during the times of day when intrusive sounds would be more disruptive to listeners.

The most commonly used noise descriptors for environmental exposures are:

- **L_{eq}**, the equivalent-energy noise level, is the average acoustic energy content of noise over any chosen exposure time.[1] The L_{eq} is the constant noise level that would deliver the same acoustic energy to the ear as the actual time-varying noise over the same exposure time. L_{eq} does not depend on the time of day during which the noise occurs.

1 Averaging sound levels in decibels is not done by standard arithmetic averaging, but according to the following rule:

$L_{eq} = 10 \times \log ((1/n) \times (10^{L1/10} + 10^{L2/10} + \ldots + 10^{Ln/10}))$; where L_1, L_2, L_n are n individual sound levels.

For example, the L_{eq} of the sound levels L_1 = 60 dBA and L_2 = 70 dBA is 67.4 dBA, not 65 dBA as it would if standard arithmetic averaging were used. The larger individual sound levels contribute much more substantially to the L_{eq} than they would to an average done in the standard way.

TABLE 6.11-1

CHARACTERISTICS OF SOUND THAT INFLUENCE A LISTENER'S JUDGMENT OF ITS DISRUPTIVE POTENTIAL

PRIMARY ACOUSTIC FACTORS
Sound Amplitude Sound Frequency Sound Duration
SECONDARY ACOUSTIC FACTORS
Frequency Spectrum Fluctuations in Sound Level Fluctuations in Sound Frequency Rise-Time of the Sound (e.g., "fast" like an automobile horn, "slow" like an approaching train) Localization of Sound Source (i.e., is it obvious where the sound is coming from or not?)
NON-ACOUSTIC FACTORS
Physiology of the Listener (i.e., is the listener's hearing ability acute or not?) Listener's Adaptation from Past Experience (e.g., how long has the listener lived near the airport?) Listener's Activity during Exposure (e.g., was the listener sleeping, working, etc.?) Predictability of When the Sound Will Occur (e.g., is it an expected noontime whistle or a random car alarm at 2:00 A.M.?) Listener's Judgment of Personal Benefit from Activity Producing the Sound (e.g., has the street repair work been requested by local residents?) Other Individual Differences and Personalities
SOURCE: Adapted from *Handbook of Noise Control*, Cyril M. Harris, 1979.

- **L_{dn}**, the day-night average noise level, is a 24-hour average L_{eq} with a 10 dBA "penalty" added to noise during the hours of 10:00 pm to 7:00 am to account for increased nighttime noise sensitivity. Because of this penalty, the L_{dn} would always be higher than its corresponding 24-hour L_{eq}.
- **CNEL**, the community noise equivalent level, is an L_{dn} with an additional 5 dBA "penalty" added to noise during the evening hours between 7:00 pm and 10:00 pm.
- **SEL**, the sound exposure level, is the constant noise level that would deliver the same acoustic energy to the ear of a listener during a one-second exposure as the actual time-varying noise would deliver over its entire time of occurrence.[2] SEL is typically used to characterize the effects of short-duration noise events (e.g., aircraft fly-overs, train pass-bys, etc.).

Vibration is produced when moving objects in contact with the ground radiate mechanical energy through the ground. If the object is massive enough and/or close enough to an observer, the ground vibrations are perceptible. Vibration magnitude is measured in vibration decibels (VdB). Background vibration levels in most inhabited areas are usually 50 VdB or lower, well below the threshold of perception (i.e., typically about 65 VdB). In

2 For a sound lasting longer than one second, its SEL will be higher than that of the largest of the shorter-duration component sounds that make up the total. For example, if a sound with a ten-second-long duration made up of 10 one-second-long component sounds, each of 60 dBA amplitude, its SEL would be 70 dBA.

most cases, when environmental vibration is perceptible, people are in their homes, workplaces, etc., with the vibration source within the same building (i.e., operation of heating, ventilation and air-conditioning [HVAC] equipment, movement of other occupants, slamming of doors, etc.). The outdoor sources most commonly responsible for producing perceptible vibration are heavy construction equipment, steel-wheeled trains, and motor vehicle traffic on rough roads; if roadways are smooth, the vibration from traffic is rarely perceptible.

Noise Sources and Sensitive Receptors

Land uses within the county include a range of residential, commercial, institutional, industrial, recreational, agricultural, and open space areas. Although there are many noise sources within the County, the primary noise source is motor vehicle traffic. Significant noise also occurs from airplane traffic, railroads, and various stationary sources as described below.

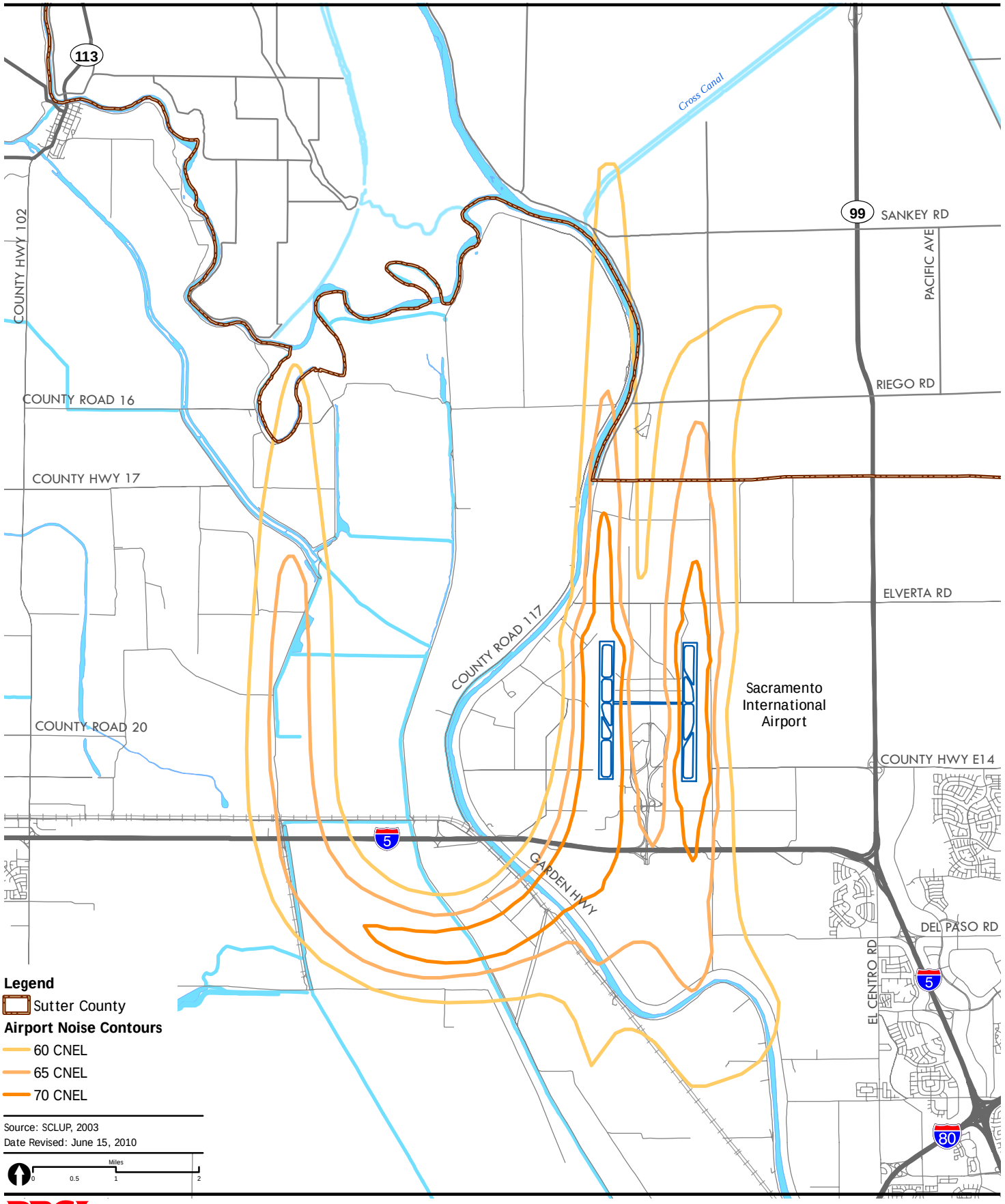
Sensitive noise receptors typically include residences, schools, child-care centers, hospitals, long-term health care facilities, convalescent centers, and retirement homes. Each of these land use types is present in the county.

Motor Vehicle Noise

Motor vehicle noise commonly causes sustained noise levels near busy roadways or freeways. Several highways run through Sutter County. These include State Route (SR) 20, SR 70, SR 99, and SR 113. Sutter County also has many local roads that experience very high traffic volumes, particularly high truck traffic volumes that contribute to traffic noise and vibration. Many noise-sensitive receptors throughout the county are located in these high-traffic corridors, including older residences, which are not usually protected by sound walls or other barriers like newer residences mostly built within or near incorporated cities, such as Yuba City. In most cases, the newer residences are protected by sound walls or include additional acoustic insulation as protection from noise intrusion.

Aircraft Noise

Sutter County is served by one publicly owned and operated airport, the Sutter County Airport. The Sutter County Airport is located on approximately 170 acres of land with a single paved runway 3,040 feet long and 75 feet wide. No commercial airlines use the Sutter County airport due to the proximity to the Sacramento International Airport just south of Sutter County. Airport noise contours are shown in Figure 6.11-1.



PBS&J

EXISTING AIRPORT NOISE CONTOURS
Figure 6.11-1

Sacramento International Airport is located in the northwest corner of Sacramento County, less than a half mile from the Sutter County line. The airport has two parallel runways oriented in a north/south direction. Because Sacramento International Airport serves the travel demands of the greater Sacramento region, many commercial flights arrive and depart from the airport frequently.

There are a number of small privately owned landing strips and airports located throughout the county. Flight activity at these private landing strips would be highly variable, particularly where landing strips are used mostly for crop dusting.

Railway Noise

Two active rail lines pass through Sutter County. A Union Pacific (UP) line that enters Sutter County from Sacramento County in the south, crosses through the communities of Trowbridge and Rio Oso, and exits into Yuba County in the north. In addition, another UP line (previously a Southern Pacific Transportation Company route) that enters Sutter County from Yuba County in the east near Yuba City, runs parallel to SR 99, crosses through the City of Live Oak, and exits into Butte County to the north. Noise is also generated at at-grade road crossings by the warning bells used to alert motorists of a train's arrival.

Stationary Source Noise

Stationary noise sources present in residential areas include HVAC equipment and maintenance equipment such as leaf-blowers and gasoline-powered lawnmowers. Commercial uses often included larger, rooftop-mounted HVAC equipment. Industrial uses can generate noise during normal operations from sources such as shipping and loading facilities, concrete crushing facilities, and recycling activities.

Other stationary sources of noise include natural gas extraction facilities that are located throughout the county. Special noise-control measures may be required if such a well is located within 500-feet of a residence. The Calpine-owned and -operated Sutter Energy Center, which began operation in 2001, is another stationary source located southwest of Yuba City that produces electricity using "combined-cycle" technology, integrating two combustion turbines and a single steam turbine.

Agricultural Activity Noise

Active agricultural areas can generate high noise from the operation of large agricultural equipment; also, such agricultural activities are often carried out at night. Thus, a potential for noise conflicts exists at the outskirts of urban areas, such as Yuba City and the City of Live Oak, where agricultural operations and urban development are proximate.

Existing Noise Levels

Existing ambient daytime noise levels were measured at ten selected locations in order to determine representative noise levels for certain sources in various portions of Sutter County. These locations are shown on Figure 6.11-2. The noise levels were monitored using a Larson-Davis Model 720 sound level meter, which satisfies the American National Standards Institute (ANSI) for general environmental noise measurement instrumentation. Measured noise levels for each location are identified in Table 6.11-2.

TABLE 6.11-2

DAYTIME NOISE MEASUREMENTS AT SELECTED LOCATIONS IN SUTTER COUNTY[1]

Noise Measurement Location/Time		Noise Sources	Noise Level Statistics[2]		
			L_{eq}	L_{min}	L_{max}
#1	Sacramento International Airport. Start time: 2:43 pm on 9/26/07.	Primary: Airplane flyovers. Secondary: Vehicular traffic on Power Line Road.	40.9	32.7	87.3
#2	East Nicolaus on Nicolaus Avenue near residential uses. Start: 1:45 pm on 9/26/07.	Primary: Vehicular traffic on Nicolaus Avenue. Secondary: Vehicular traffic on Highway 70	69.3	42.7	94.0
#3	Rio Oso on Highway 70 near residential uses. Start: 12:45 pm on 9/26/07.	Moderate vehicular traffic on Highway 70 with a high percentage of vehicles being heavy trucks.	69.4	46.7	84.2
#4	Calpine Sutter Energy Center near rural residential uses. Start: 11:35 am on 9/26/07.	Primary: Industrial operations at the Calpine power-generating facility. Secondary: Vehicular traffic on South Township Road	63.0	51.5	87.3
#5	Meridian on 4th Street near residential and agricultural uses. Start: 12:35 pm on 9/27/07.	Distant construction activities and traffic from Highway 20.	45.3	34.6	66.4
#6	Sutter on Highway 20 near residential uses. Start: 4:03 pm on 9/27/07.	Primary: Vehicular traffic on Highway 20. Secondary: Vehicular traffic on Acacia Avenue.	69.3	49.9	87.9
#7	Franklin Boulevard southwest of Yuba City. Start: 5:40 pm on 9/27/07.	Vehicular traffic on Franklin Boulevard.	70.4	44.6	86.8
#8	Sutter County Airport. Start: 2:40 pm on 9/27/07.	Primary: Airplane flyovers. Secondary: Vehicular traffic on Samuel Drive and construction noise in background.	48.7	79.9	40.4
#9	Live Oak on Highway 99 near residential uses. Start: 4:55 pm on 9/27/07.	Heavy vehicular traffic on Highway 99.	76.3	49.3	88.8
#10	Live Oak on UP Rail Line near residential uses. Start: 1:07 pm on 11/28/07.	Primary: Train pass-bys. Secondary: Vehicular traffic on Highway 99.	69.6	38.4	115.3

Notes:

1. Measurements were made on September 26 and 27, 2007. Each measurement was 15 minutes in duration with the exception of Location 1, which was a 20-minute reading. Location 10 was a 24-hour reading starting on November 28, 2007.
2. L_{eq} is the average noise level over the measurement period; L_{min} is the minimum instantaneous noise level during the measurement period; L_{max} is the maximum instantaneous noise level during the measurement period.

Source: PBS&J, 2007.

REGULATORY CONTEXT

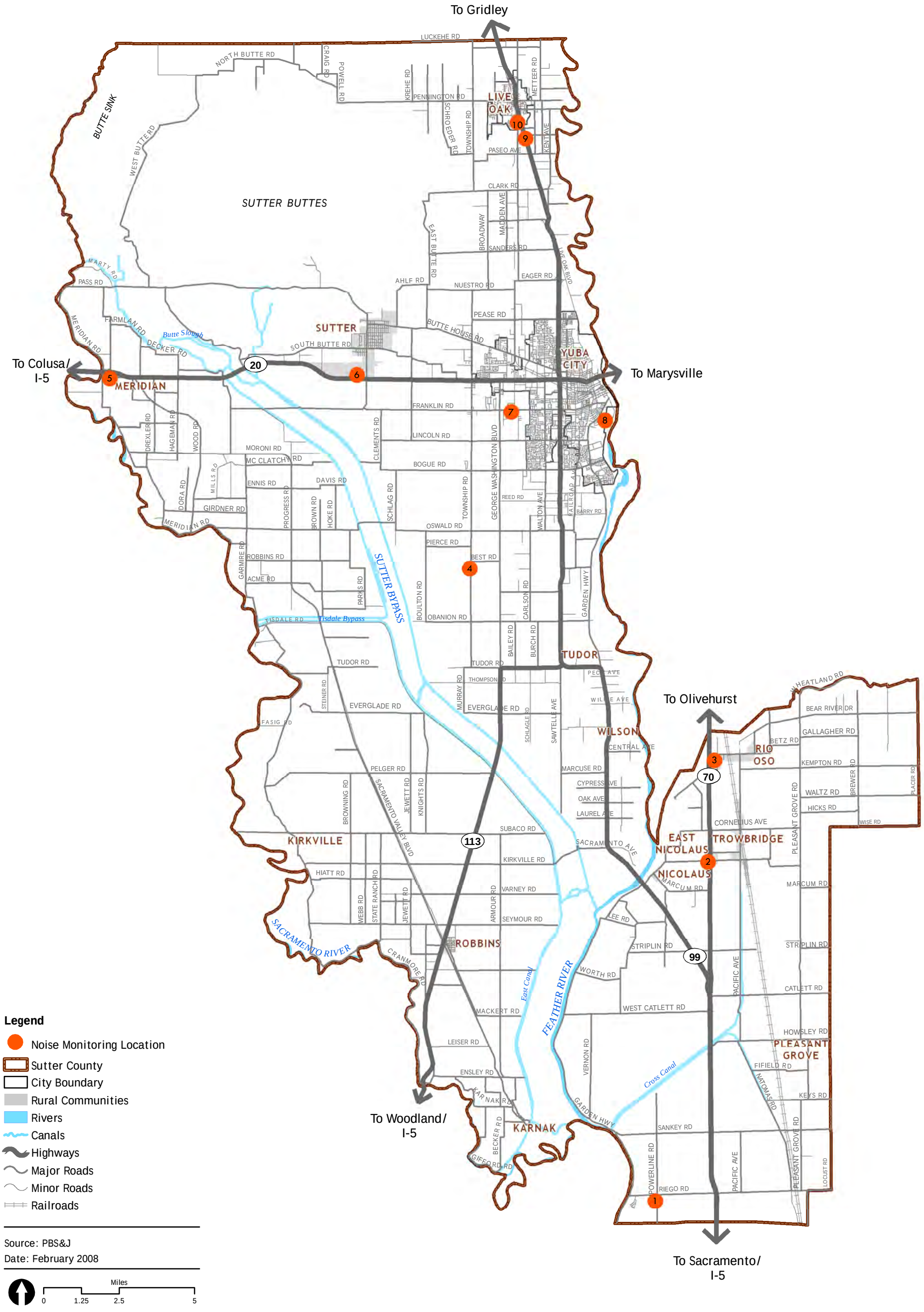
Federal

The federal Noise Control Act (1972) addressed the issue of noise as a threat to human health and welfare, particularly in urban areas. In response, the U.S. Environmental Protection Agency (EPA) published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA *Levels*). The EPA Levels recommended that the L_{dn} should not exceed 55 dBA outdoors or 45 dBA indoors to prevent significant activity interference and annoyance in noise-sensitive areas. In addition, the EPA *Levels* identified 5 dBA as an *"adequate margin of safety"* for a noise level increase relative to a baseline noise exposure level of 55 dBA L_{dn} (i.e., there would not be a noticeable increase in adverse community reaction with an increase of 5 dBA or less from this baseline level). The EPA did not promote these findings as universal standards or regulatory goals with mandatory applicability to all communities, but rather as advisory exposure levels below which there would be no risk to a community from any health or welfare effect of noise.

The Federal Transit Administration (FTA) has developed methodology and significance criteria to evaluate incremental noise impacts from surface transportation modes (i.e., on-road motor vehicles and trains) as presented in *Transit Noise Impact and Vibration Assessment* (FTA *Guidelines*). These incremental noise impact criteria, as presented in Table 6.11-3, are based on EPA findings and subsequent studies of annoyance in communities affected by transportation noise. The FTA extended the EPA's 5 dBA incremental impact criterion to higher ambient levels. As baseline ambient levels increase, smaller and smaller increments are allowed to limit expected increases in community annoyance. For example, in residential areas with a baseline ambient noise level of 50 dBA L_{dn}, a less-than-5 dBA increase in noise levels would produce a minimal increase in community annoyance levels, while at 70 dBA L_{dn}, only a 1 dBA increase could be accommodated before a significant annoyance increase would occur.

The FTA has also developed criteria, as shown in Table 6.11-4, for judging the significance of vibration impacts based on annoyance levels expected in communities exposed to vibration from transportation sources and construction activity.

Federal Aviation Administration (FAA) regulations (i.e., *Part 150, Airport Noise Compatibility Planning*) prescribe the methodology governing the development, submission, and review of airport noise exposure maps and noise compatibility programs for communities near airports. The noise exposure maps use average annual L_{dn}/CNEL contours around the airport as the primary noise descriptor. To the FAA, all land uses are considered compatible when aircraft noise effects are less than 65 dBA L_{dn}/CNEL. At higher noise exposures, increasing restrictions are applied to development within the aircraft noise contours



Legend

- Noise Monitoring Location
- Sutter County
- City Boundary
- Rural Communities
- Rivers
- Canals
- Highways
- Major Roads
- Minor Roads
- Railroads

Source: PBS&J
Date: February 2008

Miles
0 1.25 2.5 5

PBS&J

Noise Monitoring Locations
Figure 6.11-2

TABLE 6.11-3

FEDERAL TRANSIT ADMINISTRATION EXTERIOR INCREMENTAL NOISE IMPACT STANDARDS FOR NOISE-SENSITIVE USES (DBA)

Residences and buildings where people normally sleep[1]		Institutional land uses with primarily daytime and evening uses[2]	
Existing L_{dn}	Allowable Noise Increment	Existing Peak Hour L_{eq}	Allowable Noise Increment
45	8	45	12
50	5	50	9
55	3	55	6
60	2	60	5
65	1	65	3
70	1	70	3
75	0	75	1
80	0	80	0

Notes:

1. This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
2. This category includes schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material.

Source: Federal Transit Administration, *Transit Noise Impact and Vibration Assessment*, May 2006.

TABLE 6.11-4

GROUND-BORNE VIBRATION (GBV) IMPACT CRITERIA FOR GENERAL ASSESSMENT

Land Use Category	GVB Impact Levels (VdB)		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations	65[4]	65[4]	65[4]
Category 2: Residences and buildings where people normally sleep	72	75	80
Category 3: Institutional land uses with primarily daytime uses	75	78	83

Notes:

1. "Frequent Events" is defined as more than 70 vibration events of the same source per day.
2. "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.
3. "Infrequent Events" is defined as fewer than 30 vibration events of the same source per day.
4. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels.

Source: Federal Transit Administration, *Transit Noise Impact and Vibration Assessment,* May 2006.

depending upon the noise-sensitivity of the land use and the degree of noise attenuation required in the structures' interior spaces.

The FAA also recommends the use of supplemental metrics in environmental documents to describe aircraft noise impacts with respect to specific adverse noise effects on specific populations or activities.[3] Among the most commonly recognized adverse noise effects are

3 Federal Aviation Administration, *Environmental Desk Reference for Airport Actions*, October 2007.

increases in community annoyance, sleep disturbance, speech interference and disruption of learning in schools. The effect of aviation noise on sleep is often a particular concern of communities located near airports. Based on research carried out on sleep disturbance, the Federal Interagency Committee on Aviation Noise (FICAN) has recommended the adoption of standards based on single-event aviation noise events (as quantified by SEL) for predicting the percent of an exposed population (not including children) expected to be awakened in long-term residential settings, as shown in Table 6.11-5. In order to reduce potential aviation-related sleep disruption to acceptable levels in areas near airports, additional acoustic insulation may be necessary relative to what would be required to attain/maintain the 45 dBA interior L_{dn}/CNEL standard required by FAA Part 150.

TABLE 6.11-5

SLEEP DISTURBANCE FREQUENCY AS A FUNCTION OF AIRCRAFT SOUND EXPOSURE LEVEL (SEL)

Indoor SEL	Average Percent Awakened[a]	Maximum Percent Awakened[b]
45 dBA	0.8%	1.1%
50 dBA	1.0%	1.9%
55 dBA	1.2%	2.8%
60 dBA	1.5%	3.8%
65 dBA	1.8%	5.1%
70 dBA	2.2%	6.4%
75 dBA	2.8%	7.9%
80 dBA	3.4%	9.6%
85 dBA	4.2%	11.3%

Notes:

The tabulated awakening percentages (P_{ind}) apply only to a single aircraft noise event. The occurrence of multiple aviation noise events during a night (or day) would result in a higher compound awakening percentage for those exposed than that expected for one event. This compound awakening percentage (P_{tot}) would increase as the individual SEL and the number of events (n) increase according to the following formula:

$$P_{tot} = 1 - (1 - P_{ind})^n$$

For example, if the individual awakening probability for one event were 5%, with 10 such events per night the compound awakening probability would be 40%.

Sources:

a. Finegold and Bartholomew, *A Predictive Model of Noise Induced Awakenings from Transportation Noise Sources*, Noise Control Engineering Journal, 2001; The formula: %Awakened = $0.58 + (4.30 * 10^{-8}) * SEL^{4.11}$ was found to give the best-fit to the data.

b. Federal Interagency Committee on Aviation Noise (FICAN) in *Effects of Aviation Noise on Awakenings from Sleep*, June 1997.

State

The Governor's Office of Planning and Research (OPR) *General Plan Guidelines 2003* (OPR *Guidelines*) promotes use of L_{dn} or CNEL in California for evaluating the compatibility of various land uses with respect to their noise exposure. The designation of a level of noise exposure as "*Normally Acceptable*" for a given land use category implies that the exterior and interior noise levels would be acceptable to the occupants without the need for any noise abatement measures outside or special structural acoustic treatment for the interior spaces. The OPR *Guidelines* identify the suitability of various types of construction relative to a range of outdoor noise levels and provide each local community some flexibility in setting

local noise standards that allow for the variability in community preferences. Findings presented in the EPA *Levels* influenced the recommendations of the OPR *Guidelines*, most importantly in the choice of noise exposure metrics (i.e., L_{dn} or CNEL) and in the upper limits for the Normally Acceptable outdoor exposure of noise-sensitive uses.

The California Noise Insulation Standards (*California Code of Regulations, Title 25, section 1092*) establish uniform minimum noise insulation performance standards for new hotels, motels, dormitories, apartment houses and dwellings other than detached single-family dwellings. Specifically, *Title 25* states that interior noise levels attributable to exterior sources shall not exceed 45 dBA L_{dn}/CNEL (i.e., the same levels that the EPA *Levels* recommends for residential interiors) in any habitable room of new dwellings. Acoustical studies must be prepared for proposed multiple unit residential and hotel/motel structures where outdoor L_{dn}/CNEL is 60 dBA or greater. The studies must demonstrate that the design of the building will reduce interior noise to 45 dBA L_{dn}/CNEL, or lower. Dwellings are to be designed so that interior noise levels will meet this standard for at least ten years from the time of building permit application.

Recommendations by the State of maximum exterior and interior noise levels for various land use types are shown in Table 6.11-6.

TABLE 6.11-6

RECOMMENDED EXTERIOR/INTERIOR NOISE EXPOSURE

Land Use	Exterior "Normally Acceptable" Noise Levels for Outdoor Activity Areas	Interior Noise Level Standard	
	L_{dn}/CNEL, dB	L_{dn}/CNEL, dB	L_{eq}, dB
Residential (Low Density Residential, Duplex, Mobile Homes)	60	45	N/A
Residential (Multi Family)	65	45	N/A
Transient Lodging (Motels/Hotels)	65	45	N/A
Schools, Libraries, Churches, Hospitals, Nursing Homes, Museums	70	45	35
Theaters, Auditoriums	70	N/A	35
Playgrounds, Neighborhood Parks	70	N/A	N/A
Golf Courses, Riding Stables, Water Recreation, Cemeteries	75	N/A	N/A
Office Buildings, Business Commercial and Professional	70	N/A	45
Industrial, Manufacturing, Utilities, and Agriculture	75	N/A	45

Source: Governor's Office of Planning and Research, *2003 General Plan Guidelines,* Appendix C.

Local

Sutter County 2015 General Plan

The County's 2015 General Plan contains policies and standards to protect County residents from the harmful effects of exposure to excessive noise from transportation and non-transportation sources. Upon approval of the proposed 2030 General Plan, all policies and implementation measures in the 2015 General Plan would be superseded. Therefore, they are not included in this analysis.

IMPACTS AND MITIGATION MEASURES

Methods of Analysis

The analysis of the existing and future noise in the policy area is based on empirical observations, noise level measurements, and computer modeling (see Appendix G for model outputs). Existing noise levels were monitored at selected locations using a Larson-Davis Model 720 sound level meter, which satisfies the ANSI for general environmental noise measurement instrumentation. Traffic noise modeling involved the calculation of existing and future motor vehicular noise levels and noise contour distances along many roadway sections in the policy area, as provided by the project traffic consultant, using the FHWA model. It is not common for vibration from motor vehicles traveling on paved roads to cause disturbance in adjacent areas. The same cannot be said of vibration effects in areas along light and heavy rail routes, which can cause a noise disturbance to adjacent uses. Screening distances established by the FTA were used to assess the potential for operational vibration impacts along rail routes.

Construction noise and vibration levels were determined generically using equipment noise and vibration reference levels developed by the FTA. For construction noise, this analysis assumed that compliance with limits on the allowed times for construction activities, as specified in the Draft General Plan policies, would avoid the potential for significant noise impacts. For construction vibration, this analysis used FTA's vibration impact thresholds for annoyance within sensitive buildings, residences, and institutional land uses.

Proposed Sutter County General Plan Goals and Policies

The following goals and policies from the proposed Sutter County General Plan are relevant to noise control within the policy area:

NOISE AND VIBRATION ELEMENT (N)

Goal N 1 Protect the health and safety of County residents from the harmful effects of exposure to excessive noise and vibration.

Policies

N 1.1 **Exterior Environmental Noise Standards**. Require development of new noise-sensitive land uses to mitigate noise impacts where the projected exterior environmental noise levels exceed those shown in Table 1.

TABLE 1

MAXIMUM ALLOWABLE ENVIRONMENTAL NOISE STANDARDS

Land Use	Exterior Noise Level Standard for Outdoor Activity Areas[1]	Interior Noise Level Standard	
	Ldn/CNEL, dB	Ldn/CNEL, dB	Leq, dB[2]
Residential (Low Density Residential, Duplex, Mobile Homes)	60[3]	45	N/A
Residential (Multi Family)	65[4]	45	N/A
Transient Lodging (Motels/Hotels)	65[4]	45	N/A
Schools, Libraries, Churches, Hospitals, Nursing Homes, Museums	70	45	N/A
Theaters, Auditoriums	70	N/A	35
Playgrounds, Neighborhood Parks	70	N/A	N/A
Golf Courses, Riding Stables, Water Recreation, Cemeteries	75	N/A	N/A
Office Buildings, Business Commercial and Professional	70	N/A	45
Industrial, Manufacturing, Utilities, and Agriculture	75	N/A	45

1. Outdoor activity areas for residential developments are considered to be the back yard patios or decks of single-family residential units, and the patios or common areas where people generally congregate for multi-family development.
2. Outdoor activity areas for non-residential developments are considered to be those common areas where people generally congregate, including outdoor seating areas.
3. Where the location of outdoor activity areas is unknown, the exterior noise standard shall be applied to the property line of the receiving land use.
4. As determined for a typical worst-case hour during periods of use.
5. Where it is not possible to reduce noise in outdoor activity areas to 60 dB, Ldn/CNEL or less using a practical application of the best-available noise reduction measures, an exterior level of up to 65 dB, Ldn/CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.
6. Where it is not possible to reduce noise in outdoor activity areas to 65 dB, Ldn/CNEL or less using a practical application of the best-available noise reduction measures, an exterior level of up to 70 dB, Ldn/CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.

Note: Where a proposed use is not specifically listed on this table, the use shall comply with the noise exposure standards for the nearest similar use as determined by the Community Services Department.

N 1.2 **Exterior Incremental Environmental Noise Standards**. Require new development to mitigate noise impacts on noise-sensitive uses where the projected increases in exterior noise levels exceed those shown in Table 2.

TABLE 2

EXTERIOR INCREMENTAL ENVIRONMENTAL NOISE IMPACT STANDARDS FOR NOISE-SENSITIVE USES (DBA)

Residences and buildings where people normally sleep[1]		Institutional land uses with primarily daytime and evening uses[2]	
Existing Ldn	Allowable Noise Increment	Existing Peak Hour Leq	Allowable Noise Increment
45	8	45	12
50	5	50	9
55	3	55	6
60	2	60	5
65	1	65	3
70	1	70	3
75	0	75	1
80	0	80	0

Source: Federal Transit Administration, Transit Noise Impact and Vibration Assessment, May 2006.

1 This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.

2 This category includes schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material.

Note: Noise levels are measured at the property line of the noise-sensitive use.

N 1.3 **Interior Noise Standards**. Require new development to mitigate noise impacts to ensure acceptable interior noise levels appropriate to the land use type as shown in Table 1.

N 1.4 **New Stationary Noise Sources**. Require new stationary noise sources to mitigate noise impacts on noise-sensitive uses wherever the noise from that source alone exceeds the exterior levels specified in Table 3.

TABLE 3

NOISE LEVEL STANDARDS FROM STATIONARY SOURCES

Noise Level Descriptor	Daytime (7am to 10pm)	Nighttime (10pm to 7am)
Hourly L_{eq}, dB	55	45
Maximum level, dB	70	65
Note: Noise levels are measured at the property line of the noise-sensitive use.		

N 1.5 **Frequent, High-Noise Events**. Require development of noise-sensitive uses subject to a discretionary permit and proposed in areas subject to frequent, high-noise events (such as aircraft over flights, or train and truck pass-bys) to adequately evaluate and mitigate the potential for noise-related impacts to ensure that noise-related annoyance, sleep disruption, speech interference, and other similar effects are minimized using metrics and methodologies appropriate to the effect(s) to be assessed and avoided.[4]

N 1.6 **Construction Noise**. Require discretionary projects to limit noise-generating construction activities within 1,000 feet of noise-sensitive uses (i.e., residential uses, daycares, schools, convalescent homes, and medical care facilities) to daytime hours between 7:00 a.m. and 6:00 p.m. on weekdays, 8:00 a.m. and 5:00 p.m. on Saturdays, and prohibit construction on Sundays and holidays unless permission for the latter has been applied for and granted by the County.

N 1.7 **Vibration Standards**. Require construction projects and new development anticipated to generate a significant amount of vibration to ensure acceptable interior vibration levels at nearby noise-sensitive uses based on Federal Transit Administration criteria as shown in Table 4.

4 For example, the FAA recommends SEL as the appropriate metric to evaluate the sleep disturbance potential of aircraft fly-overs with respect to the determined awakening probabilities for individual aircraft operations, as shown in Table 6.11-5.

TABLE 4

GROUND-BORNE VIBRATION IMPACT CRITERIA FOR GENERAL ASSESSMENT

Land Use Category	Impact Levels (VdB)		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations	65[4]	65[4]	65[4]
Category 2: Residences and buildings where people normally sleep	72	75	80
Category 3: Institutional land uses with primarily daytime uses	75	78	83

Source: *Federal Transit Administration, Transit Noise Impact and Vibration Assessment*, May 2006.
1 "Frequent Events" is defined as more than 70 vibration events of the same source per day.
2 "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.
3 "Infrequent Events" is defined as fewer than 30 vibration events of the same source per day.
4 This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels.
Note: Vibration levels are measured in or near the vibration-sensitive use.

N 1.8 **Airport Noise Contour**. Limit noise sensitive uses within the 65 dBA CNEL airport noise contour, or in accordance with plans prepared by the Airport Land Use Commission. Only approve noise-compatible land uses within the 65 dBA CNEL airport noise contour.

Implementation Programs

N 1-A Require new noise-sensitive uses to prepare an acoustical study if the new noise-sensitive use is:

- Within the existing or future 60 dBA Ldn contour of a roadway for which the noise contours have been mapped or tabulated in the Sutter County General Plan Noise Element;
- Within 750 feet of a railroad line, 500 feet of a principal arterial roadway, or 100 feet of a minor arterial roadway for which noise contours have not been mapped or tabulated in the Sutter County General Plan Noise Element;
- Within the existing or future 60 dBA CNEL aircraft noise contour of an airport/airstrip for which noise contours have been mapped under FAA mandate or in an area near an airport/airstrip that may be subject to frequent, high-noise events from aircraft operations;
- Within an area around a stationary noise source that may be subject to noise levels higher than the standard appropriate to the new use as specified in the Sutter County General Plan Noise Element; or
- Determined to have the potential to exceed established noise standards specified in the Sutter County General Plan Noise Element by the Sutter County Community Services Director.

N 1-B Require new development that has the potential to generate noise that will exceed the levels contained in Tables 1 through 4 that may affect a noise-sensitive use to prepare an acoustical study.

N 1-C Where required as part of the environmental review process, a project applicant shall be required to have an acoustical study prepared. The acoustical study shall:

- Be prepared by a qualified person experienced in the fields of environmental noise assessment and architectural acoustics who is included on the County's approved consultant list. The person preparing the acoustical study shall consult with Planning Division staff to review specific issues or circumstances prior to commencing the study.
- Provide a general description of the project and the noise sources of concern. Appropriate maps shall be included.
- Describe the methodology that will be used to assess noise impacts. If computer models are to be used for noise predictions, they should be standard versions approved by the FHWA, FAA, Caltrans, or other government agencies.
- Include representative noise level measurements with sufficient sampling periods and locations to adequately describe local conditions and predominant noise sources.
- Estimate existing and projected noise levels and compare those levels to the adopted policies and standards of the Noise Element.
- Recommend appropriate mitigation to achieve compliance with the adopted policies and standards of the Noise Element. Where feasible, noise mitigation measures should focus on site planning and project design solutions rather than the creation of noise barriers. Mitigation measures must be written with specific mitigation needed (e.g. solid masonry wall) and include any proposed follow-up noise monitoring if needed.
- Estimate noise exposure after the prescribed mitigation measures have been implemented.

N 1-D: Adopt a Noise Ordinance that includes the following:

- Exterior and interior noise standards consistent with Tables 1 through 4;
- Guidelines and technical requirements for taking noise measurements, evaluating noise impacts, and preparing acoustical studies to determine conformance with provisions of this ordinance; and
- Standards for construction equipment and noise-emitting construction activities.

Standards of Significance

For the purposes of this EIR, noise or vibration impacts are considered significant if implementation of the proposed General Plan would:

- expose persons to or generate noise levels in excess of standards established in the local general plan (see Tables 1and 2) or noise ordinance, or applicable standards of other agencies;
- cause a substantial permanent increase in ambient noise levels (especially from transportation sources) in the plan area above current existing levels, as defined by the FTA (see Table 3);

- expose persons to or generate excessive ground borne vibration, as defined by the FTA (see Table 4);
- cause a substantial temporary or periodic increase in ambient noise levels in the plan area above existing levels. Temporary increases are normally associated with construction-related noise, and such activities are normally exempt, and are, thus, less than significant provided they occur during clearly defined, weekday daytime hours and that construction activities do not occur over excessively long periods of time;
- expose people residing or working within two miles of a public or private airport or airstrip, or within an airport land use plan, to excessive noise levels; or
- expose people residing, working or attending school to excessive noise levels from railroad and aircraft, including frequent, single-event noise incidents that would disturb sleep, as defined by the Federal Aviation Administration/Federal Interagency Committee on Aviation Noise (FAA/FICAN) (see Table 6.11-5), or interfere with speech by exceeding 35 dBA Leq indoors, as defined by the World Health Organization (WHO).

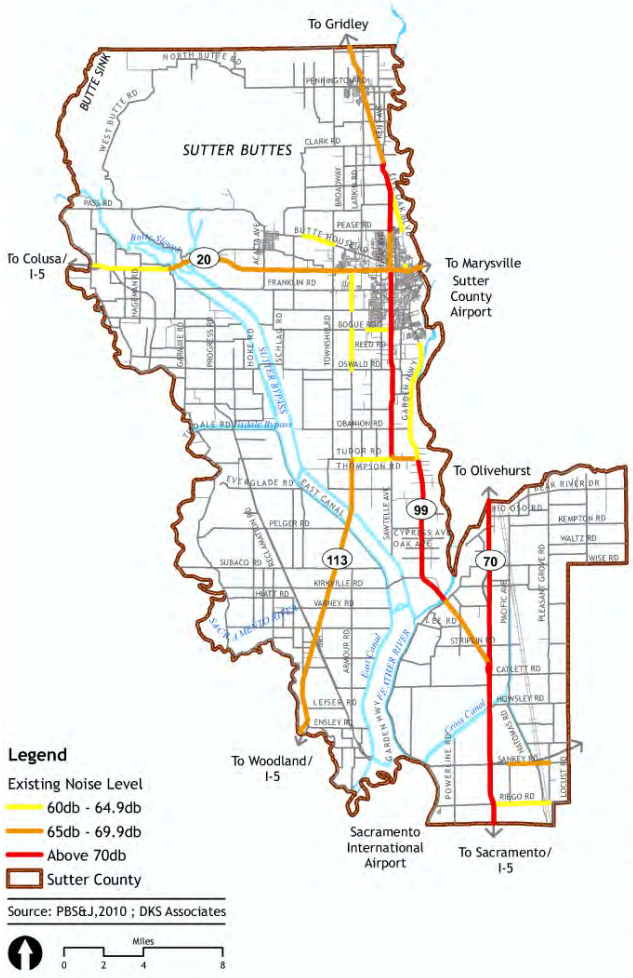
Impacts and Mitigation Measures

6.11-1 Implementation of the proposed General Plan would result in an increase in exterior noise levels.

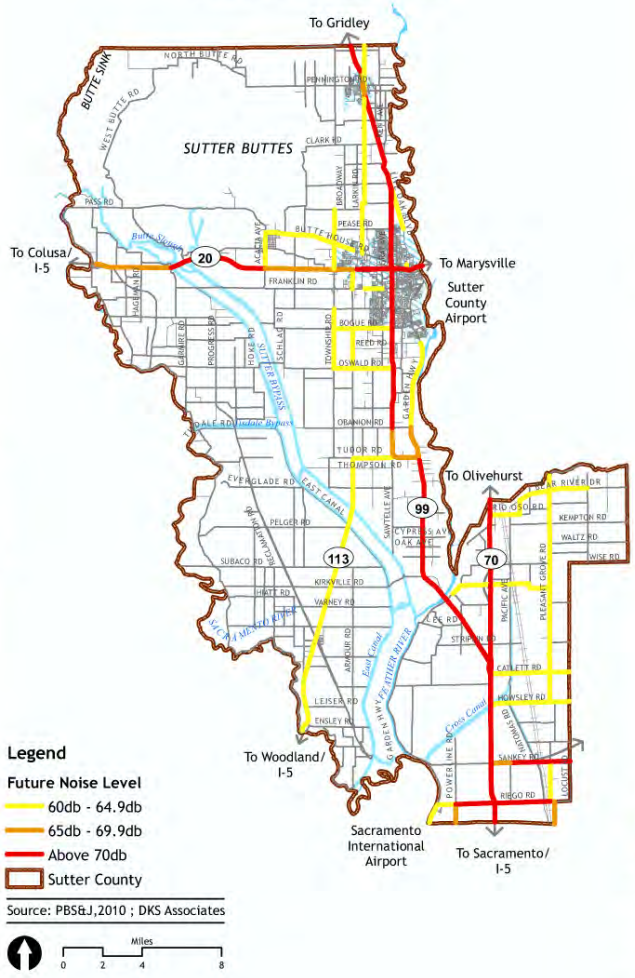
Based on noise measurements and on existing and future noise modeling, noise levels in excess of county standards currently occur and would continue to occur in many residential and other noise-sensitive uses throughout the policy area. "As shown in the map included in the center of Figures 6.11-3 and 6.11-4 (which both show future 2030 traffic noise levels under the proposed General Plan), there are numerous roadway segments in the policy area where 2030 noise levels under the proposed General Plan would exceed County standards for adjacent single-family residential uses (i.e., 60 dBA L_{dn} or CNEL), adjacent multi-family residential and transient lodging (i.e., 65 dBA L_{dn} or CNEL), and for any adjacent schools, libraries, churches, hospitals, and nursing homes (i.e., 70 dBA L_{dn} or CNEL). Substantial additional noise exposure can also be expected from aircraft, trains, and stationary noise sources for noise-sensitive uses located in areas influenced by these sources.

Implementation of the proposed General Plan policies would reduce to a less-than-significant level the exterior noise levels on future noise-sensitive land uses that could be developed under the proposed General Plan. However, the proposed policies could not guarantee the remediation or reduction of noise impacts on all existing noise-sensitive land uses in areas with current and continuing future high noise exposures. Therefore, the continuing exposure of existing noise-sensitive land uses to noise levels in excess of county

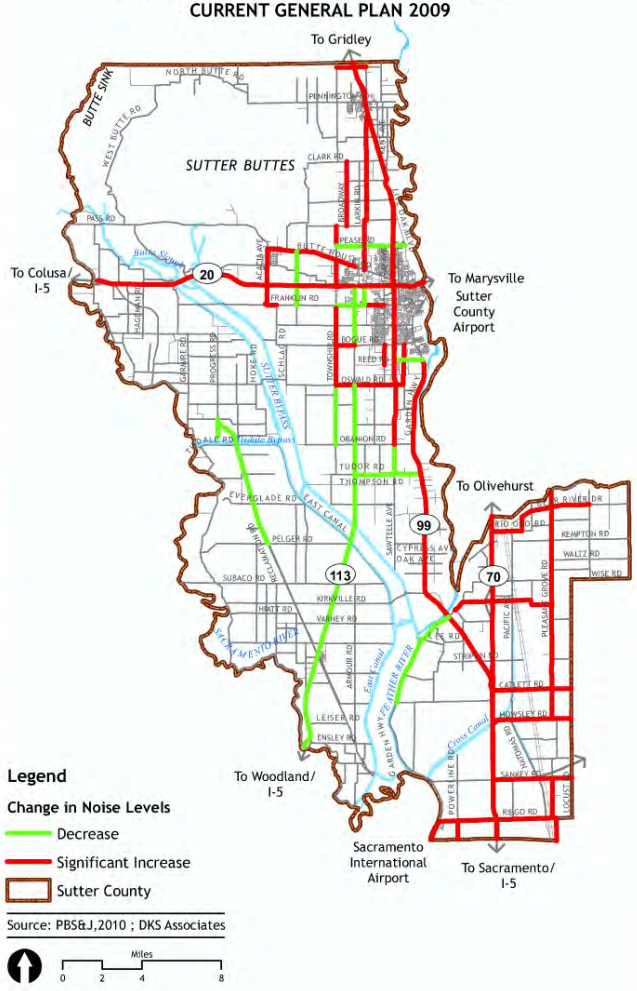
CURRENT GENERAL PLAN
2009 ROADWAY NOISE LEVELS



PROPOSED GENERAL PLAN
2030 ROADWAY NOISE LEVELS



ROADWAY NOISE LEVEL CHANGES
PROPOSED GENERAL PLAN 2030 COMPARED TO
CURRENT GENERAL PLAN 2009



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standards as a result of the future growth under the proposed General Plan is considered a *significant impact*.

Full Buildout Analysis

Full buildout of the general plan would occur beyond the 2030 planning horizon of the proposed General Plan and would generate more development and vehicle trips that would generate noise. The proposed General Plan contains policies that establish acceptable noise thresholds for interior and exterior areas for future development as well as thresholds for stationary sources, construction activities and other sources of noise.

While it is reasonable to assume that this additional growth would trigger additional noise, determination of the exact nature of those future effects is unknown and is, therefore, too speculative to analyze at this time. Future planning efforts and environmental analysis would address this additional growth and the potential implications of this growth on ambient noise levels.

Mitigation Measure

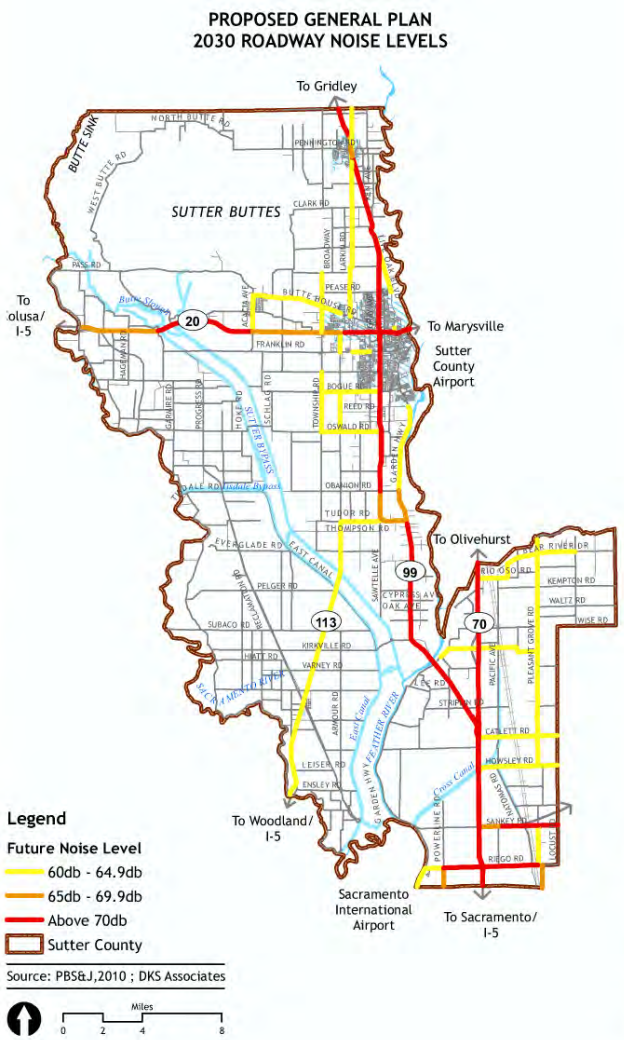
High exterior noise levels in existing and proposed noise-sensitive areas can be remediated by relocating roadways, building sound walls, providing buffer zones or choosing development sites in quiet areas, etc. For new development, it is anticipated that county standards could be met by incorporating the appropriate strategies listed above in the proposed policy requirements. However, it would not be possible to guarantee success in all cases of existing high noise exposure in the county because funding may not be available for sound wall construction, land may not be available for buffer zones, and it may be cost prohibitive to relocate existing roadways, etc. For example, many existing residences located in areas adjacent to roadways or other noise generating sources may continue to be exposed to high noise levels because implementation of noise reduction strategies are infeasible. Therefore, the impact would be considered ***significant and unavoidable***.

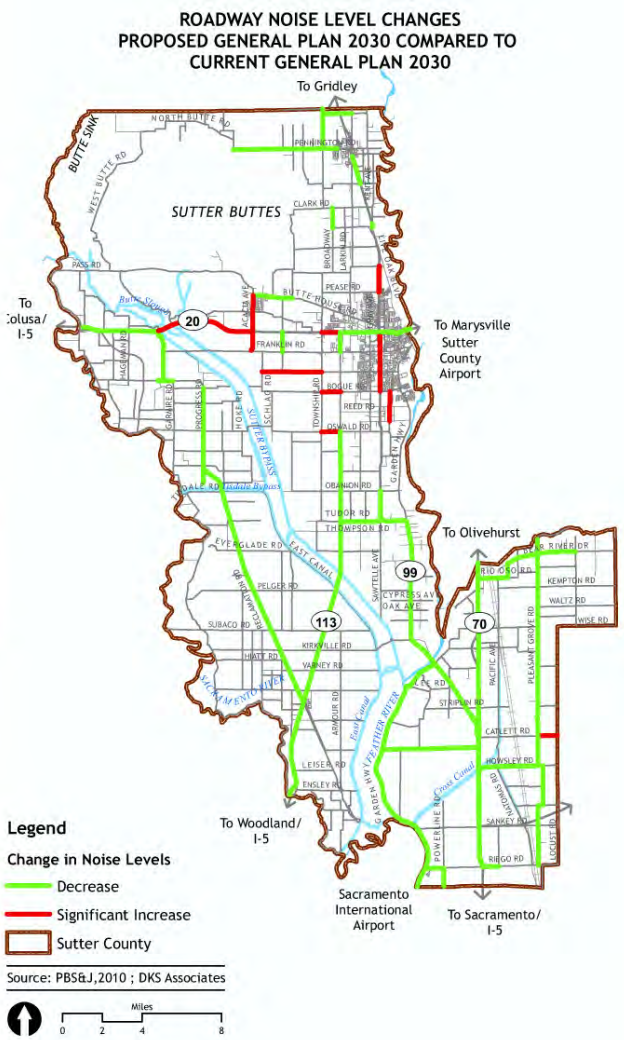
None available.

6.11-2 Implementation of the proposed General Plan would result in increases to exterior noise levels associated with traffic noise, per FTA standards.

The expected traffic noise increments are shown on the map included on the right site of Figure 6.11-3 (which compares future 2030 traffic noise levels under the proposed General Plan to existing 2009 traffic noise levels) and in the right-most map in Figure 6.11-4 (which compares future 2030 traffic noise levels under the proposed General Plan to future 2030 traffic noise levels under the current General Plan), compared to the FTA standards (see Table 6.11-3). Along most roadways, traffic noise levels would be higher in the future than they are now in the county (see Figure 6.11-3, right-most map). The primary cause of this


CURRENT GENERAL PLAN
2030 ROADWAY NOISE LEVELS
To Gridley
SUTTER BUTTES
To Marysville
Sutter County Airport
To Olivehurst
To Woodland/ I-5
Sacramento International Airport
To Sacramento/ I-5
Legend
Existing Noise Level
60db - 64.9db
65db - 69.9db
Above 70db
Sutter County
Source: PBS&J,2010 ; DKS Associates
Miles
0 2 4 8


PROPOSED GENERAL PLAN
2030 ROADWAY NOISE LEVELS
To Gridley
SUTTER BUTTES
To Marysville
Sutter County Airport
To Olivehurst
To Woodland/ I-5
Sacramento International Airport
To Sacramento/ I-5
Legend
Future Noise Level
60db - 64.9db
65db - 69.9db
Above 70db
Sutter County
Source: PBS&J,2010 ; DKS Associates
Miles
0 2 4 8


ROADWAY NOISE LEVEL CHANGES
PROPOSED GENERAL PLAN 2030 COMPARED TO
CURRENT GENERAL PLAN 2030
To Gridley
SUTTER BUTTES
To Marysville
Sutter County Airport
To Olivehurst
To Woodland/ I-5
Sacramento International Airport
To Sacramento/ I-5
Legend
Change in Noise Levels
Decrease
Significant Increase
Sutter County
Source: PBS&J,2010 ; DKS Associates
Miles
0 2 4 8

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increase would not be implementation of the proposed General Plan, but development both inside and outside of the policy area that is anticipated to occur regardless of whether the proposed General Plan is adopted or not. However, the General Plan would have some beneficial effects on traffic noise, by encouraging more of the anticipated future growth in areas in and near the county's existing urban centers, traffic volumes would increase to a greater degree on these close-in roadways and to a lesser degree on other county roadways than would occur under the existing General Plan (see Figure 6.11-4, right-most map). Nevertheless, where FTA standards would be exceeded relative to existing noise baseline levels, there would be a potential for increased annoyance in adjacent noise-sensitive communities.

Substantial additional contributions to increased noise levels can also be expected to affect existing and future noise-sensitive uses located in areas influenced by aircraft, trains, and stationary noise sources. Therefore, the exposure of existing and future noise-sensitive land uses to noise level increases as a result of the proposed General Plan is considered a *significant impact.*

Full Buildout Analysis

Full buildout of the general plan would occur beyond the 2030 planning horizon of the proposed General Plan, and would generate more development and vehicle trips that would generate noise. The proposed General Plan contains policies that establish acceptable noise thresholds for interior and exterior areas for future development as well as thresholds for stationary sources, construction activities and other sources of noise.

While it is reasonable to assume that this additional growth would trigger additional noise, determination of the exact nature of those future effects is unknown and is, therefore, too speculative to analyze at this time. Future planning efforts and environmental analysis would address this additional growth and the potential implications of this growth on ambient noise levels.

Mitigation Measure

Increases in exterior noise levels in existing and proposed noise-sensitive areas can be remediated by relocating roadways, building sound walls, providing buffer zones, or choosing development sites in quiet areas, etc. For new development, it is anticipated that county standards could be met by incorporating appropriate mitigation strategies in their conditions of approval. However, for existing uses, it would not be possible to guarantee success in all cases of increased noise exposure in the county because funding may not be available for sound wall construction, land may not be available for buffer zones, it may be cost prohibitive to relocate existing roadways, etc. For example, many existing residences located in areas adjacent to roadways or near other noise-generating sources may be

exposed to higher noise levels because implementation of noise reduction strategies are infeasible. Therefore, the impact would be considered ***significant and unavoidable***.

None available.

6.11-3 Implementation of the proposed General Plan would result in an increase in interior noise levels.

Similar to the high noise levels that currently exceed the County's exterior noise standards in many existing noise-sensitive areas (presented in Impact 6.11-1, above), interior noise levels within many existing structures are likely to exceed the acceptable interior levels recognized by the County and recommended by federal and state agencies (as shown in Tables 1 and 2 included in the proposed policies). This includes interior spaces within residential and institutional land uses (e.g., schools, libraries, theaters, and churches) where it is important to avoid interference with sleep, speech, reading, performances, religious services and meditation. Existing and proposed noise-sensitive uses that are located in areas influenced by flight operations from area airports (i.e., Sacramento International Airport and Sutter County Airport) or along busy rail or truck routes are especially likely to be subject to disruption caused by high average noise levels and frequent high-noise episodes from the above-mentioned sources.

Implementation of the proposed policies would reduce to a less-than-significant level interior noise impacts on future noise-sensitive land uses that would be developed under the proposed General Plan. However, similar to Impact 6.8-1, the General Plan policies would not guarantee a reduction in noise effects on existing noise-sensitive land uses in areas with high noise exposures. The continuing exposure of existing noise-sensitive land uses to noise levels in excess of city standards as a result of the future growth under the proposed General Plan is considered a *significant impact*.

Full Buildout Analysis

Full buildout of the general plan would occur beyond the 2030 planning horizon of the proposed General Plan, and would generate more development and vehicle trips that would generate noise. The proposed General Plan contains policies that establish acceptable noise thresholds for interior areas for future development as well as thresholds for stationary sources, construction activities and other sources of noise.

While it is reasonable to assume that this additional growth would trigger additional noise, determination of the exact nature of those future effects is unknown and is, therefore, too speculative to analyze at this time. Future planning efforts and environmental analysis would address this additional growth and the potential implications of this growth on ambient noise levels.

Mitigation Measure

Similar to Impact 6.8-1, interior noise in existing and proposed noise-sensitive areas can be remediated by such mitigation strategies as relocating roadways, building sound walls, providing buffer zones, retrofitting older homes with insulation or appropriate window treatments (i.e., double-paned windows, interior storm windows, etc.) or choosing development sites in quiet areas. For new development, it is anticipated that county standards could be met and substantial noise impacts could be avoided by incorporating such appropriate mitigation strategies. However, for existing noise-sensitive uses located in areas adjacent to roadways or rail lines, or close to airports or other stationary sources, it may not be possible or feasible to include noise reduction strategies to address interior noise impacts. Therefore, the impact would be considered ***significant and unavoidable***.

None available.

6.11-4 Implementation of the proposed General Plan could result in short-term noise from construction activities.

Under the proposed General Plan, the primary source of temporary noise-generating activity within the county would be construction. This involves both on-site equipment activity and the transport of workers and equipment to and from the construction sites. Construction noise is and would continue to be a major noise source in the county whether or not the proposed General Plan is adopted. Noise levels near individual construction sites under the proposed General Plan would not be substantially different from what they would be under the existing General Plan. However, new development would occur selectively in different areas of the county as determined by the new land use and zoning designations and proposed General Plan policy requirements.

To address future noise from construction activities the proposed General Plan includes policy N 1.6, which requires all development projects subject to discretionary approval to restrict their construction between the hours of 7 a.m. and 6 p.m. Monday through Friday, 8 a.m. and 5 p.m. on Saturday, and prohibit all such activity on Sundays and holidays. Compliance with the proposed General Plan policy would reduce the severity of construction noise from development under the proposed General Plan resulting in a ***less-than-significant impact***.

Full Buildout Analysis

Full buildout of the general plan would occur beyond the 2030 planning horizon of the proposed General Plan, and would generate more development and construction-related activities that would generate noise. The proposed General Plan contains policies that

establish acceptable noise thresholds for construction activities to ensure new construction can occur without resulting in noise impacts.

While it is reasonable to assume that this additional growth would trigger additional noise, determination of the exact nature of those future effects is unknown and is, therefore, too speculative to analyze at this time. Future planning efforts and environmental analysis would address this additional growth and the potential implications of this growth on ambient noise levels. However, it is anticipated that construction noise would not result in any significant impacts.

Mitigation Measure

None required.

6.11-5 Implementation of the proposed General Plan would result in substantial vibration impacts from construction activity in the policy area.

Future construction activities that would occur under the proposed General Plan would generate ground-borne vibration. Construction activities would occur at discrete locations throughout the policy area and vibration from such activities may impact existing buildings (i.e., through structural damage) and their occupants (i.e., through activity disruption, annoyance, etc.) if they are located close enough to the construction sites. In general, vibration-induced structural damage could only occur when certain types of construction activity (e.g., blasting, pile driving, heavy earth-moving) take place very close to existing structures, while vibration-induced disruption/annoyance could occur during more common types of construction activity (e.g., truck movements) at greater distance from the activity area.

Vibration-induced structural damage could be avoided in all cases by prohibiting any construction projects that have any potential for causing structural damage to nearby buildings, as determined by a pre-construction vibration assessment performed to demonstrate compliance with policy N 1.7. However, disruption/annoyance could be problematic if vibration levels would exceed the FTA's thresholds as shown in Table 6.11-4. Therefore, this is considered a *significant* impact.

Full Buildout Analysis

Full buildout of the general plan would occur beyond the 2030 planning horizon of the proposed General Plan, and would generate more development and construction-related activities that would generate vibration. The proposed General Plan contains policies that establish acceptable vibration thresholds in compliance with FTA standards.

While it is reasonable to assume that this additional growth would trigger additional vibration associated with new construction, determination of the exact nature of those future effects is unknown and is, therefore, too speculative to analyze at this time. Future planning efforts and environmental analysis would address this additional growth and the potential implications of this growth on ambient noise levels.

Mitigation Measure

Since there is no assurance that all construction-induced disruption/annoyance impacts could be avoided at all vibration sensitive uses near construction sites in the policy area, the residual potential for disruption/annoyance impacts at certain receptors would be ***significant and unavoidable***.

None available.

6.11-6 Implementation of the proposed General Plan could result in substantial vibration impacts at development sites close to strong operational vibration sources in the policy area.

Development proposed for sites alongside major rail lines or truck routes under the proposed General Plan could be affected by ground-borne vibration that may impact buildings (i.e., through structural damage) and their occupants (i.e., through activity disruption, annoyance, etc.) In general, the potential for vibration-induced structural damage from such sources would be low, but disruption/annoyance to the occupants could occur if the uses were close enough to such sources. However, such vibration-induced disruption/annoyance could be avoided by not approving vibration-sensitive uses in areas where FTA vibration criteria are exceeded. Thus, implementation of policy N 1.7 would assure that operational vibration impacts in new development would be ***less-than-significant***.

Full Buildout Analysis

Full buildout of the general plan would occur beyond the 2030 planning horizon of the proposed General Plan, and would generate more uses that could increase truck trips and/or train travel that could generate vibration. The proposed General Plan contains policies that establish acceptable vibration thresholds in compliance with FTA standards.

While it is reasonable to assume that this additional growth would trigger additional vibration associated with new construction, determination of the exact nature of those future effects is unknown and is, therefore, too speculative to analyze at this time. Future planning efforts and environmental analysis would address this additional growth and the potential implications of this growth on ambient noise levels.

Mitigation Measure

None required.

Growth Areas

Noise and vibration sources would vary from location to location, as would the potential for noise and vibration impacts from subarea to subarea within the entire policy area. Because future development within any of the growth areas would incorporate the proposed General Plan's policies to avoid siting noise-sensitive uses near known sources of noise and vibration, the general potential for noise and vibration impacts would, in some instances be less than as described in the countywide analysis.

Sutter Pointe Specific Plan Area

The Sutter Pointe Specific Plan (SPSP) project encompasses approximately 7,500 acres and is located in the southernmost portion of the county adjacent to the Sacramento County line and a portion of the Placer County line. Much of the land within the SPSP is designated for industrial or commercial uses, but it includes a minimum of 1,000 acres for schools, parks, open space, libraries and other community facilities, and about 2,900 acres of residential uses. Noise impacts were determined to be significant associated with the proximity to the Sacramento International Airport, proximity to existing rail lines and the increase in project traffic.

Cumulative Impacts and Mitigation Measures

The geographic context for the analysis of cumulative noise and vibration impacts associated with an increase in noise and vibration sources and levels includes future development within the policy area, as well noise and vibration sources in the surrounding counties that are close enough to have impacts on policy area receptors. Development in the region would change the intensity of land uses and increase the amount of traffic passing through or accessing the policy area for employment, shopping, or recreational activities. This increase in noise is accounted for in regional traffic volume conditions anticipated for year 2030 on all county roadways in the policy area modeled in the traffic analysis.

For construction-related impacts, noise and vibration generated by each and every construction project taking place in the policy area and in adjacent areas within the surrounding counties would be temporary, and, would be localized to the immediate vicinity of that site. Noise and vibration associated with construction activities is typically not evaluated on a cumulative level. Noise from stationary construction equipment would decrease at approximately 6 dBA per doubling of distance. Therefore, it would not be

common for construction-related noise from individual projects to result in a cumulative impact.

6.11-7 Implementation of the proposed General Plan would increase the noise and vibration levels in the policy area, which, along with noise and vibration sources from other development in the region, could result in an increase in cumulative interior and exterior noise levels.

Cumulative increases in noise would result from motor vehicles associated with development projects in the policy area, from other motor vehicles associated with other development in the region that pass through Sutter County, and possibly from other locally influential sources of noise from trains, aircraft and stationary sources. Thus, the cumulative increase in noise in many locations from multiple sources in the policy area would be a *significant impact*.

As discussed above under the project-specific analysis for Impacts 6.11-1, 6.11-2 and 6.11-3, implementation of the proposed General Plan policies would reduce both interior and exterior noise levels at future noise-sensitive land uses that could be developed under the proposed General Plan. However, the proposed policies could not guarantee that cumulative interior and exterior noise levels within existing noise-sensitive land uses in portions of the policy area with existing high noise exposures, or where substantial noise increases are expected would be less than significant. Further, the increase in noise as a result of future growth under the proposed General Plan would make it a considerable contribution to such cumulative impacts.

There are no feasible mitigation measures to address the cumulative increase in noise on both interior and exterior noise levels for existing noise-sensitive land uses. Therefore, the impacts collectively would remain ***cumulatively significant and unavoidable.***

Mitigation Measure

None available.