3.7 NOISE

Introduction

This section discusses the potential for noise and vibration impacts throughout Napa County as a result of the proposed transportation improvement expenditure plan. This section describes existing noise levels in Napa County, applicable laws and regulations governing acceptable noise levels, and the proposed project's noise impacts on nearby receptors. Information presented in this section is gathered from county and city general plans and municipal codes.

Environmental Setting

Fundamentals of Sound and Environmental Noise

Sound

Sound is created when objects vibrate, resulting in air pressure variations characterized by their amplitude (loudness) and frequency (pitch). The standard unit of sound amplitude is the decibel (dB). The decibel scale is logarithmic; it describes the physical intensity of the pressure variations. The pitch of the sound is related to the frequency of the pressure variation. The human ear's sensitivity to sound is frequency-dependent. The A-weighted decibel scale ("dBA") measures sound intensity while discriminating against frequencies in a manner approximating that of the human ear.

Environmental Noise

Noise is "unwanted" sound. A typical noise environment consists of a base of steady "background" noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background is the noise from individual distinguishable local sources. These sources can vary from an occasional aircraft or train passing by to the virtually continuous noise from traffic on a local roadway. Table 3.7-1 lists representative environmental noise levels.

Several descriptors are commonly used to gauge the noise exposure level of individuals and communities. These descriptors are sensitive to noise intensity over time and, in some cases, to the time of day when the noise occurs. Those that are applicable to this analysis are as follows:

Table 3.7-1
Representative Environmental Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	—110—	Rock Band
Jet Fly-over at 100 feet		
	—100—	
Gas Lawnmower at 3 feet		
	—90—	
		Food Blender at 3 feet
Diesel Truck going 50 mph at 50 feet	—80—	Garbage Disposal at 3 feet
Noisy Urban Area during Daytime		
Gas Lawnmower at 100 feet	—70—	Vacuum Cleaner at 10 feet
Commercial Area		Normal Speech at 3 feet
Heavy Traffic at 300 feet	—60—	
		Large Business Office
Quiet Urban Area during Daytime	—50—	Dishwasher in Next Room
Quiet Urban Area during Nighttime	—40—	Theater, Large Conference Room (background)
Quiet Suburban Area during Nighttime		
	—30—	Library
Quiet Rural Area during Nighttime		Bedroom at Night, Concert Hall (background)
	—20—	
		Broadcast/Recording Studio
	—10—	
Threshold of Human Hearing	—0—	Threshold of Human Hearing

Source: California Department of Transportation, 1998.

- **L_{eq}**, the equivalent energy noise level, is the average acoustic energy content of noise over any chosen exposure time. 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.
- **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 p.m. to 7:00 a.m. 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} (e.g., a constant 60 dBA noise over 24 hours would have a 60 dBA L_{eq}, but a 66.4 dBA L_{dn}).
- **CNEL**, the community noise equivalent level, is an L_{dn} with an additional dBA "penalty" for the evening hours between 7:00 p.m. and 10:00 p.m.

Community noise exposures are typically represented by 24-hour descriptors, such as a 24-hour L_{eq}, L_{dn}, or CNEL. One-hour and shorter-period descriptors are useful for characterizing noise caused by short-term activities, such as the operation of construction equipment.

Community noise environments are generally perceived as "quiet" when the 24-hour average noise level is below 45 dBA, "moderate" in the 45 to 60 dBA range, and "loud" above 60 dBA. Very noisy urban residential areas are usually around 70 dBA L_{dn}/CNEL. Along major thoroughfares, roadside noise levels are typically between 65 and 75 dBA L_{dn}/CNEL. A 5 dBA increment to an existing one-hour L_{eq}, or to the L_{dn}/CNEL is commonly used as a threshold for an adverse community reaction to a noise increase. But there is evidence that 5 dBA may not be significantly protective in residential areas where L_{dn}/CNEL is already high (i.e., above 60 dBA); in these areas limiting noise increases to 3 dBA or less is recommended.[1] Any noise intrusions that cause short-term interior levels to rise above 45 dBA at night can disrupt sleep. Eight-hour or longer exposures to noise levels greater than 85 dBA can cause permanent hearing damage.

Groundborne Vibration

Vibrating objects in contact with the ground radiate energy through that medium; if a vibrating object is massive enough and/or close enough to the observer, its vibrations are perceptible. The rumbling sound caused by the vibration of room surfaces is called ground-borne noise. The ground motion caused by vibration is measured as particle velocity in inches per second and in the U.S. is referenced as vibration decibels (VdB).

The background vibration velocity level in residential and educational areas is usually around 50 VdB. The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for many people. Most perceptible indoor vibration is caused by sources within buildings such as the operation of mechanical equipment, movement of people, or the slamming of doors. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the groundborne vibration from traffic is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration velocity level to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings.

The general human response to different levels of groundborne vibration velocity levels is described in Table 3.7-2.

[1] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, DOT-T-95-16, April 1995.

Table 3.7-2
Human Response to Different Levels of Groundborne Vibration

Vibration Velocity Level	Human Reaction
65 VdB	Approximate threshold of perception for many people.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find that transportation-related vibration at this level is unacceptable.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.

Source: Federal Railroad Administration, 1998.

Existing Noise Sources

The existing noise environment in Napa County is relatively quiet. The majority of noise sources in the county are traffic related. In the southern portion of the county where there is generally more traffic from tourist activity, the ambient noise level from roadways is 20 dBA above the ambient noise levels from roadways in the more rural northern portion of the county. An analysis of roadway noise sources in the Napa County *General Plan* identified 60 dBA noise level contours between 200 feet and 400 feet from the edge of the roadway for areas where roadway improvements are recommended. Roads that were on this improvement list included American Canyon Road and sections of SR 29.

There are two sources of airport noise, Napa County airport just south of the City of Napa and the Pacific Union College Flight Center in the unincorporated community of Angwin. The Calistoga airport is closed and will not reopen, and therefore no longer contributes to airport noise. Airport noise is a major concern and CNEL noise contours for overflights in Napa County are larger than usual for a general aviation facility. This is primarily due to the airline pilot training program and the wide range of multi-engine and jet aircraft.

Each city and county is required to prepare a noise element for their general plan. The noise element includes a land use compatibility chart to indicate acceptable noise levels for different land use types. Generally, residential uses are acceptable where the noise environment is 60 dBA or less, schools and medical facilities are acceptable below 70 dBA, commercial use below 70 dBA, and industrial use below 75 dBA. When the exterior noise level is above the acceptable level, a land use may be conditionally acceptable if noise reduction features are included with the design.

Regulatory Setting

Federal Regulations

Federal Highway Administration

The Federal Highway Administration (FHWA) is the agency responsible for administering the Federal-aid highway program, and the FHWA requires that a noise study be prepared to determine what noise impacts, if any, will result from the proposed highway improvement and what measures will be taken to lessen these noise impacts. If noise impacts are expected, noise-reduction measures that are determined by the State highway agency and the FHWA to be practicable, reasonable, and acceptable to the public must be incorporated into the highway improvement.

A noise impact occurs when either the noise levels approach or exceed the noise abatement criteria (NAC) shown in Table 3.7-3, or if there is a substantial increase over existing noise levels in the area.[2] While there is no standard for determining whether there is a substantial increase over existing noise levels, most state agencies use either 10-15 dBA increases or a sliding scale to define substantial increases. If traffic noise impacts are identified, various noise abatement measures are considered to mitigate the adverse impacts. The construction of a noise barrier is most commonly associated with noise abatement. Other possible noise abatement measures include traffic management measures, creating buffer zones, planting vegetation, installing noise insulation in buildings, and relocating the highway.

Table 3.7-3
FHWA Noise Abatement Criteria (NAC)
Hourly A-Weighted Sound Level - decibels (dBA)[1]

Activity Category	L_{eq}	L_{10}	Description of Activities
A	57 (Exterior)	60 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	75 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	—	—	Undeveloped lands.
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: FHWA, Code of Federal Regulations (23 CFR 772).

Note: [1] Either $L_{10}(h)$ or $L_{eq}(h)$ (but not both) may be used on a project.

[2] FHWA, *Highway Traffic and Noise in the United States Problem and Response*, April 2000.

Local Regulations

Regulation of noise is guided by the Napa County *General Plan* and the general plans of incorporated cities and town in the county. The Napa County *General Plan* encompasses all of the unincorporated areas in the county. The following discussion summarizes the relevant noise goals and policies of the county and city general plans and municipal codes.

Napa County General Plan

- **Noise Element Policy 1:** Establish noise standards for future transportation facilities that meet the minimum standards required for the public health, welfare and safety.
- **Noise Element, Policy 3:** Minimize future noise impacts in currently quiet areas.
- **Noise Element, Policy 5:** Require that environmental assessment documents for new projects include an analysis of existing and anticipated noise impacts if such are likely to impact on or be produced by the product(s).
- **Noise Element, Policy 9:** Establish acceptable noise standards consistent with health and quality of life goals and employ effective techniques of noise abatement through such means as building code, noise, subdivision, and zoning standards.

Napa County Municipal Code

Chapter 8.16, Noise Control Regulations of the Napa County Municipal Code provides standards for interior and exterior noise levels. The interior standards are for residential uses and the exterior noise standards are based on land use and noise zone (rural, suburban, or urban).

The interior noise standards are established in Section 8.16.060 and state that the maximum permissible dwelling interior sound levels for residential units generated by noise sources outside the dwelling unit are 55 dBA for the hours of 10 p.m. to 7 a.m. and 60 dBA for the hours of 7am to 10 p.m. This noise standard is not to be exceeded for:

- a cumulative period of more than five minutes in any hour;
- the noise standard plus five dB for a cumulative period of more than one minute in any hour; or
- the noise standard plus ten dB or the maximum measured ambient, for any period of time.

The exterior noise standards are established in Section 8.16.070. Table 3.7-4 shows the maximum permissible sound levels by receiving land use. These standards are not to be exceeded for:

Table 3.7-4
Exterior Noise Limits

Receiving Land Use Category	Time Period	Noise Level (dBA) Noise Zone Classification[1]		
		Rural	Suburban	Urban
Residential	10 p.m. – 7 a.m.	45	45	50
Single and double	7 a.m. – 10 p.m.	50	55	60
Residential multiple and country	10 p.m. – 7 a.m.	45	50	55
	7 a.m. – 10 p.m.	50	55	60
Commercial	10 p.m. – 7 a.m.	60		
	7 a.m. – 10 p.m.	65		
Industrial, including wineries	Anytime	75		

Source: Napa County Municipal Code.

Note:

[1] The classification of different areas of the county in terms of environmental noise zones shall be determined by the NCO, based upon assessment of county noise survey data. Industrial noise limits are intended primarily for use at the boundary of industrial zones rather than for noise reduction within the zone.

- a cumulative period of more than thirty minutes in any hour;
- the noise standard plus five dB for a cumulative period of more than fifteen minutes in any hour;
- the noise standard plus ten dB for a cumulative period of more than five minutes in any hour;
- the noise standard plus fifteen dB for a cumulative period of more than one minute in any hour; or
- the noise standard plus twenty dB or the maximum measured ambient level, for any period of time.

Section 8.16.080, Specific Types of Noise Prohibited, identifies exceptions to the noise standard for construction or demolition activities. Table 3.7-5 describes the noise limits for construction activities as specified in the Napa County Municipal Code.

Table 3.7-5
Noise Limits for Construction Activities

	Residential	Commercial	Industrial
Daily: 7 a.m. to 7 p.m.	75 dBA	80 dBA	85 dBA
Daily: 7 p.m. to 7 a.m.	60 dBA	65 dBA	70 dBA

Source: Napa County Municipal Code.

American Canyon General Plan

The following objectives and policies of the American Canyon General Plan apply to the proposed transportation improvement expenditure plan programs.

- **Noise Element Objective 11.3:** Minimize the adverse impacts of traffic-generated noise on residential and other "noise-sensitive" uses.

- **Noise Element Policy 11.3.1:** Minimize motor vehicle noise impacts from streets and highways through proper route location and sensitive roadway design by employing the following strategies:

    a. Consider the impacts of truck routes, the effects of a variety of truck traffic, and future motor vehicle volumes on noise levels adjacent to master planned roadways when improvements to the circulation system are planned.

    b. Mitigate traffic volumes and speed through residential neighborhoods.

    c. Work closely with the State of California Department of Transportation (Caltrans) in the early stages of highway improvements and design modifications to ensure that proper consideration is given to potential noise impacts on the City.

- **Noise Element Policy 11.3.2:** Consider that all new nonresidential development design and configure onsite ingress and egress points to divert traffic (and its resultant noise) away from "noise-sensitive" land uses to the greatest degree practicable.

- **Noise Element Objective 11.7:** Minimize the impacts of construction noise on adjacent uses.

- **Noise Element Policy 11.7.1:** Limit non-emergency construction activities adjacent to existing noise-sensitive uses to daylight hours between 6:30 a.m. and 8:00 p.m.

- **Noise Element Policy 11.7.2:** Require construction activities to employ practical techniques and practices that minimize the generation of adverse and/or excessive noise impacts on adjacent land uses.

American Canyon Municipal Code

The noise ordinance (Chapter 8.12, Community Noise) for the City of American Canyon is developed from the Napa County Municipal Code. Table 3.7-4, above, shows the applicable exterior noise limits and Table 3.7-5 shows the noise limits for construction equipment. Interior noise limits are 55 dBA for the hours of 10 p.m. to 7 a.m. and 60 dBA for the hours of 7 a.m. to 10 p.m.

Calistoga General Plan

The following objective and policy of the Calistoga General Plan apply to the proposed transportation improvement expenditure plan programs:

- **Noise Element Objective N-1.4:** Minimize the potential for new development projects to create unacceptable noise levels at sensitive receptors such as residential areas, hospitals, convalescent homes and schools.

- **Noise Element Policy P.2:** A noise study, including field noise measurement, shall be required for any proposed project which would place a potentially intrusive noise source near an existing noise sensitive receptor.

Calistoga Municipal Code

Title 8 Health and Safety, Chapter 8.20 Nuisances of Calistoga's municipal code provides noise limits for construction related activities. The noise limits in the Calistoga General Plan prohibits professional construction activity on Sunday or between 7:00 p.m. to 7:00 a.m. at any time during the week. This does not include work performed by home owners on their primary residence, a public utility or city public works crew in response to an emergency situation, or scheduled maintenance by the city's public works.

Napa General Plan

The following policies related to construction and new transportation-related noise sources apply to the proposed transportation improvement expenditure plan programs.

- **Noise Element Policy HS-9.9:** When feasible and appropriate, the City shall limit construction activities to that portion of the day when the number of persons occupying a potential noise impact area is lowest.

- **Noise Element Policy HS-9.10:** The City shall encourage new development to maintain the ambient sound environment as much as possible. The City shall require new transportation-related noise sources that cause the ambient sound levels to exceed the compatibility standards in Table 8-1 to incorporate conditions or design modifications to reduce the potential increase in the noise environment.

Napa Municipal Code

Noise from construction activity is regulated by the Napa Municipal Code, Chapter 8.08, Noise Control Regulations. Construction activities are allowed between the hours of 7:00 a.m. to 7:00 p.m., Monday through Friday, and between the hours of 8:00 a.m. to 4:00 p.m. on weekends or legal holidays. The following activities are restricted during the hours listed below on Monday through Friday.

- Start up of machines or equipment prior to 8:00 a.m.
- No delivery of materials or equipment prior to 7:30 a.m. or past 5:00 p.m.
- No cleaning of machines or equipment past 6:00 p.m.
- No servicing of equipment past 6:45 p.m.

St. Helena General Plan

The following policies of the St. Helena General Plan apply to the proposed transportation improvement expenditure plan programs:

- **Noise Element Policy 8.3.10:** Require an acoustical study, prepared by a qualified acoustical consultant, for:
    a. All proposed projects that are likely to be exposed to noise levels greater than the standards,
    b. All proposed projects that would generate noise whose impacts on other uses would be greater than the standards,
    c. Any project exposed to outdoor noise at or above L_{dn} 60 for any noise source that could create such outdoor noise levels for adjacent uses, and
    d. For any project exposed to or which creates noise which exceeds the standards for residential or non-residential receptors.
- **Noise Element Policy 8.3.11:** Require construction operations to use noise suppression devices and techniques and limit noisy construction activities to the least noise-sensitive times (8 a.m. to 5 p.m., Monday through Friday).
- **Noise Element Policy 8.3.12:** Include appropriate noise attenuation techniques in the design of all new arterial streets. Such techniques would include the use of site planning, building orientation, buffer distances, and the use of correctly engineered acoustical barriers and berms where deemed necessary.

St. Helena Municipal Code

The St. Helena Municipal Code Chapter 8.24 identifies generally unnecessary noise sources including construction and landscaping activities. Construction activities are restricted to the hours of 8:00 a.m. to 5:00 p.m. Monday through Saturday, and the delivery, cleaning, and servicing of materials, machines, or equipment are restricted to 7:00 a.m. to 6:00 p.m. Monday through Saturday. No construction activities are allowed on Sundays and holidays. Activities associated with landscape maintenance are allowed Monday through Saturday from 8:00 a.m. to 5:00 p.m. and are prohibited on Sundays and holidays.

Yountville General Plan

The following policy of the Yountville General Plan applies to the proposed transportation improvement expenditure plan programs:

- **Noise Element Policy 1.3:** Require the review of new development applications for potential noise problems, and if needed, provisions for adequate mitigation measures.

Yountville Zoning Ordinance

Yountville does not have a noise ordinance. However, Yountville's zoning ordinance provides guidance for regulation of noise in the town. Two impact categories are identified in the zoning ordinance including Impact Category I, which is for uses located adjacent to existing or planned residential areas, and Impact Category II, which is for uses which are not adjacent to and will have no significant impact on established or planned residential developments. The zoning guidance for noise is as follows:

Noise – The Town Council shall establish a Noise Ordinance, within one year of adoption of this Ordinance, which governs the following impact categories:

- **Impact Category I:** All noise generating operations to be buffered so that they do not exceed a specified ambient noise level during daytime hours.

- **Impact Category II:** All noise generated by industrial or commercial operations.

Vibration

- **Impact Category I:** No perceptible vibrations shall be permitted off the development site;

- **Impact Category II:** Same as above.

Impacts and Mitigation Measures

Significance Criteria

The proposed transportation expenditure plan programs would have significant noise and vibration impacts if they would:

- Expose persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- Expose persons to or generation of excessive groundborne vibration or groundborne noise levels.
- Cause a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
- Cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
- For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels.

Transportation land uses typically have not been shown to conflict with airport noise or functions; therefore, implementation of the proposed transportation improvement expenditure plan would not be expected to cause airport-related noise impacts. This topic is not discussed further in this impact analysis.

Impacts and Mitigation Measures of the Jamieson Canyon Corridor Program

NO-1. Implementation of the proposed Jamieson Canyon Corridor Program could result in permanent increases in ambient noise levels that exceed established local noise standards or other applicable standards. (PS)

The proposed Jamieson Canyon Corridor Program projects include the Jamieson Canyon widening of SR 12, the airport interchange at the intersection of SR 12/Airport Boulevard and SR 29, and the Soscol Flyover to connect southbound SR 221 to southbound SR 12/SR 29. These projects are designed to reduce congestion and increase safety in the affected roadways. Projections of roadway traffic, discussed in Section 3.5, Transportation, indicate that future traffic increases would be due to population and employment increases in the area and cannot be attributed to the proposed transportation improvements expenditure plan programs. While these projects would not directly increase traffic on the roadway, the potential increase in roadway capacity from widening of SR 12 could indirectly lead to traffic volume increases. Because implementation of these projects could indirectly result in increases of traffic volume, the Jamieson Canyon Corridor Program projects may allow for permanent increases in traffic-

related noise and groundborne vibration. In addition, the Jamieson Canyon Corridor Program projects may change the elevation or distance of the noise sources in relation to the receptors. An indirect increase in traffic volume or a decrease in the distance from the roadway to the receptor could substantially increase noise exposure. If the distance were cut in half, there would be an increase of 3 dB with the same traffic volume. Without project-specific roadway design information, this impact is considered potentially significant.

Vibration impacts for roadways are typically associated with design features which would result in an uneven road surface. While it is unlikely that the Jamieson Canyon Corridor Program projects would include such design features, without project-specific roadway design information, this impact is considered potentially significant.

MITIGATION MEASURE. Implementation the exposure assessment, below, would identify project-specific impacts and appropriate mitigation measures. In some cases, these mitigation measures may not reduce the impact to a less-than-significant level. As a result, changes to ambient noise and groundborne vibration would remain significant and unavoidable. (SU)

NO-1.1 *Implement Project-specific Noise and Vibration Mitigation Measures*. As part of the project-specific environmental review, each lead agency shall conduct a detailed noise and vibration analysis to determine a specific project's contribution to the increase in ambient noise and vibration based on applicable federal, state and local thresholds at specific sensitive receptor locations and identify appropriate mitigation measures, if necessary. The lead agency would implement all feasible mitigation measures recommended by the exposure assessment. The noise and vibration analysis shall be conducted before implementation of any specific project proposed under the transportation improvement expenditure plan.

NO-2. Implementation of the proposed Jamieson Canyon Corridor Program Projects could result in short-term increases in noise and ground-borne vibration levels due to construction-related activities. (PS)

Construction of the proposed Jamieson Canyon Corridor Program projects could require the use of heavy trucks and a variety of construction equipment. These projects may also require the use of smaller power tools, generators, and other sources of noise and ground-borne vibration. During construction, there would be a variety of these types of equipment operating depending on project stages, and related noise levels may vary. Typical noise levels from construction activities would diminish with distance from the source (i.e., construction site) at an approximate rate of 6 dBA L_{eq} per doubling of distance.

The general plan and noise ordinances established by Napa County and each of the incorporated cities contain specific noise limitations regarding construction as noted above under "Regulatory Setting." These noise limits are established to ensure construction-related noise sources are limited to the less sensitive hours of the day when the least number of

sensitive receptors would be affected. Sensitive noise receptors primarily include residential, school, and hospital land uses. Sensitive receptors located adjacent to construction sites would experience the greatest effects. However, each lead agency would reduce short-term increases in noise, where feasible. In spite of best efforts to reduce noise to established standards, there may be instances when established standards could be exceeded. Therefore, this impact is considered potentially significant.

MITIGATION MEASURE. Implementation of the following mitigation measures may reduce construction-related noise impacts to less-than-significant levels. However, even with noise reduction measures and best efforts to comply, the noise standards could be exceeded. This would result in significant and unavoidable noise impacts. (SU)

NO-2.1 *Implement Site-Specific Construction Mitigation Measures to Reduce Noise Impacts to Sensitive Receptors below the Applicable Standards*. As part of the construction plans for projects located adjacent to sensitive receptors, the lead agencies of a specific project shall include noise mitigation measures to reduce the noise levels at the sensitive receptor locations below the applicable standards. Noise and vibration mitigation measures may include:

- Restrict construction activities to the daytime hours when the least number of people will be affected.
- Locate noise- and vibration-generating equipment as far as practicable from sensitive receptors.
- Operate earthmoving equipment on the construction lot as far away from vibration-sensitive sites as possible.
- Provide enclosures for stationary equipment and barriers around particularly noisy areas on the site or around the site.
- Use shields, impervious fences, or other physical sound barriers, to inhibit the transmission of noise to sensitive receptors.
- Require that all construction equipment engines be properly tuned and muffled according to manufacturers' specifications.
- Shut off noise-generating equipment and machinery when not in use.
- Require construction vehicles to use the shortest possible route to and from the site, provided that they do not expose additional receptors to noise.
- Phase demolition, earthmoving, and ground-impacting operations so as not to occur in the same time period. Unlike noise, the total vibration level

produced could be significantly less when each vibration source operates separately.

- Avoid vibratory rollers and packers near sensitive areas.
- If pile driving is required near a sensitive receptor, pre-drill pile holes when feasible. This measure will reduce the force necessary to install piles and decrease the duration of noise and vibration exposure as well as the noise and vibration level. Shielded pile drivers or vibratory pile drivers may be used, where geotechnical conditions allow, to reduce noise levels.
- Notify neighbors within 500 feet of construction areas of the construction schedule in writing, prior to onset of construction.
- Designate a "disturbance coordinator" who would be responsible for responding to any local complaints regarding construction noise. The coordinator would determine the cause of the complaint and implement reasonable measures to correct the problem. A telephone number of the noise disturbance coordinator would be posted at the construction site fence and on the notification sent to neighbors adjacent to the site.

Impacts and Mitigation Measures of the Transportation Demand Management Program

The Fairfield/Suisun to Napa Express Bus Service, Commuter Trip Reduction Program, and Senior Mobility Program would have no construction impacts, because they would use existing infrastructure and would not require new development. However, the proposed Napa VINE Transit Center could result in short-term impacts from construction-related noise. Construction of this component could also require the use of heavy trucks and a variety of construction equipment, such as small power tools, generators, and other sources of noise and ground-borne vibration. The construction impacts associated with the proposed Napa VINE Transit Center would not differ from those described above under impacts to the Jamieson Canyon Corridor Program projects and would result in potentially significant impacts related to construction noise. Implementation of Mitigation Measure NO-2.1, above, would reduce impacts, but not necessarily to a less-than-significant level. As such, this impact would remain significant and unavoidable.

The operation of new transit transfer centers, express bus lines, or senior bus programs could result in increased noise and vibration levels in an area. An increase in vehicle trips could significantly increase the traffic-related noise in an area, especially for noise sensitive receptors. The locations of specific projects under the TDM Program may be close to sensitive receptors such as residential, school, and medical facilities. As such, implementation of the proposed transportation improvements under this program could increase the noise exposure level for sensitive receptors in the area. Similar to the Jamieson Canyon Corridor Program projects, increases in noise levels may exceed established significance thresholds. Without project-specific roadway design information, this impact would thus

be considered potentially significant. Implementation of Mitigation Measure NO-1.1, above, would reduce these impacts, but not necessarily to a less-than-significant level. As such, this impact would remain significant and unavoidable.

Impacts and Mitigation Measures of the Safe Streets and Roads Maintenance and Congestion Relief Program

Implementation of the Safe Streets and Roads Maintenance and Congestion Relief Program projects, including repair and maintenance of exiting facilities, and construction of new facilities (for example, the extension of Flosden Road), would result in an increase in ambient noise levels or expose sensitive receptors to excessive noise levels during construction activities. Some projects that could occur under this program would not require construction and would not contribute to this impact. Noise impacts resulting from construction associated with the Safe Streets and Roads Maintenance and Congestion Relief Program Projects would not differ from those described above for the Jamieson Canyon Corridor Program projects. Therefore, implementation of this program would result in potentially significant impacts related to construction noise levels. Implementation of Mitigation Measure NO-2.1, described above, would reduce impacts, but not necessarily to a less-than-significant level. As such, this impact would remain significant and unavoidable.

In addition, projects that would result in an increased roadway capacity or that would change the design of the roadway would have the potential to increase ambient noise levels after construction if the projects would result in an indirect increase in traffic volume or a decrease in the distance from the roadway to the receptor, which could occur for projects that widen roadways or construct new roads. Projects in the Safe Streets and Roads Maintenance and Congestion Relief Program such as traffic signal, safety, or drainage improvements would have no impact on ambient noise levels after construction is complete. As with the Jamieson Canyon Corridor Program project, an increase in noise levels may not exceed the established significance thresholds. Without project-specific roadway design information, this impact would be considered potentially significant. Implementation of Mitigation Measure NO-1.1, described above, would reduce impacts, but not necessarily to a less-than-significant level. As such, this impact would remain significant and unavoidable.