NOISE IMPACT ASSESSMENT

FOR

CITY OF PINOLE GENERAL PLAN UPDATE

MAY 2010

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TABLE OF CONTENTS

Introduction 1
Technical Background 1
Acoustic Fundamentals 1
Noise Descriptors 3
Human Response to Noise 3
Noise Reduction 4
Existing Conditions 5
Ambient Noise Levels 5
Noise-Sensitive Land Uses 6
Noise Sources 6
Stationary Sources 10
Regulatory Context 11
Federal 11
Federal Railroad Administration 11
U.S. Environmental Protection Agency (EPA) 11
Department of Housing and Urban Development (HUD) 11
State 12
Government Code 12
California Building Code 12
State of California General Plan Guidelines 12
Local 13
City of Pinole General Plan 13
City of Pinole Municipal Code 16
Impacts and Mitigation Measures 16
Standards of Significance 16
Methodology 17
Project Impacts and Mitigation Measures 17
Noise Impacts Associated with Development and Operation of Land Uses of the Proposed General Plan Update 17
Exposure to Construction Noise 19
Exposure to Surface Transportation Noise 21
Exposure to Aircraft Noise 28
Exposure to Stationary Noise 28
Exposure to Groundborne Vibration 30
Cumulative Setting, Impacts, and Mitigation Measures 32
Cumulative Setting 32
Cumulative Impacts and Mitigation Measures 32
Cumulative Transportation Noise Impacts 32
References 34

LIST OF TABLES

Table 1 Common Acoustical Descriptors 3
Table 2 Ambient Noise Levels 5
Table 3 Existing Traffic Noise Levels and Distances to Noise Contours in the Planning Area 9
Table 4 Railroad Noise Levels 9
Table 5 City of Pinole General Plan (1995) Applicable Noise Policies 13
Table 6 City of Pinole General Plan (1995) Land Use Compatibility for Community Noise Environments 14

Table 7 City of Pinole Maximum Allowable Noise Exposure for Stationary Noise Sources 15
Table 8 Typical Construction Equipment Noise 20
Table 9 Future Cumulative Traffic Noise Levels and Distances to Noise Contours in the Planning Area 24
Table 10 Predicted Changes in Traffic Noise Levels at Buildout of the General Plan Update as Compared to Existing Conditions 26

LIST OF FIGURES

Figure 1 Typical Community Noise Levels 2
Figure 2 Predicted Existing Noise Contours – Major Transportation Noise Sources 8
Figure 3 Predicted Future Noise Contours – Major Transportation Noise Sources 24

INTRODUCTION

This report describes terminology used to discuss noise and discusses and analyzes the ambient noise environment of the proposed City of Pinole General Plan Update project area. Construction noise, traffic noise, operational noise, and other noise impacts associated with implementation of the General Plan Update are analyzed.

TECHNICAL BACKGROUND

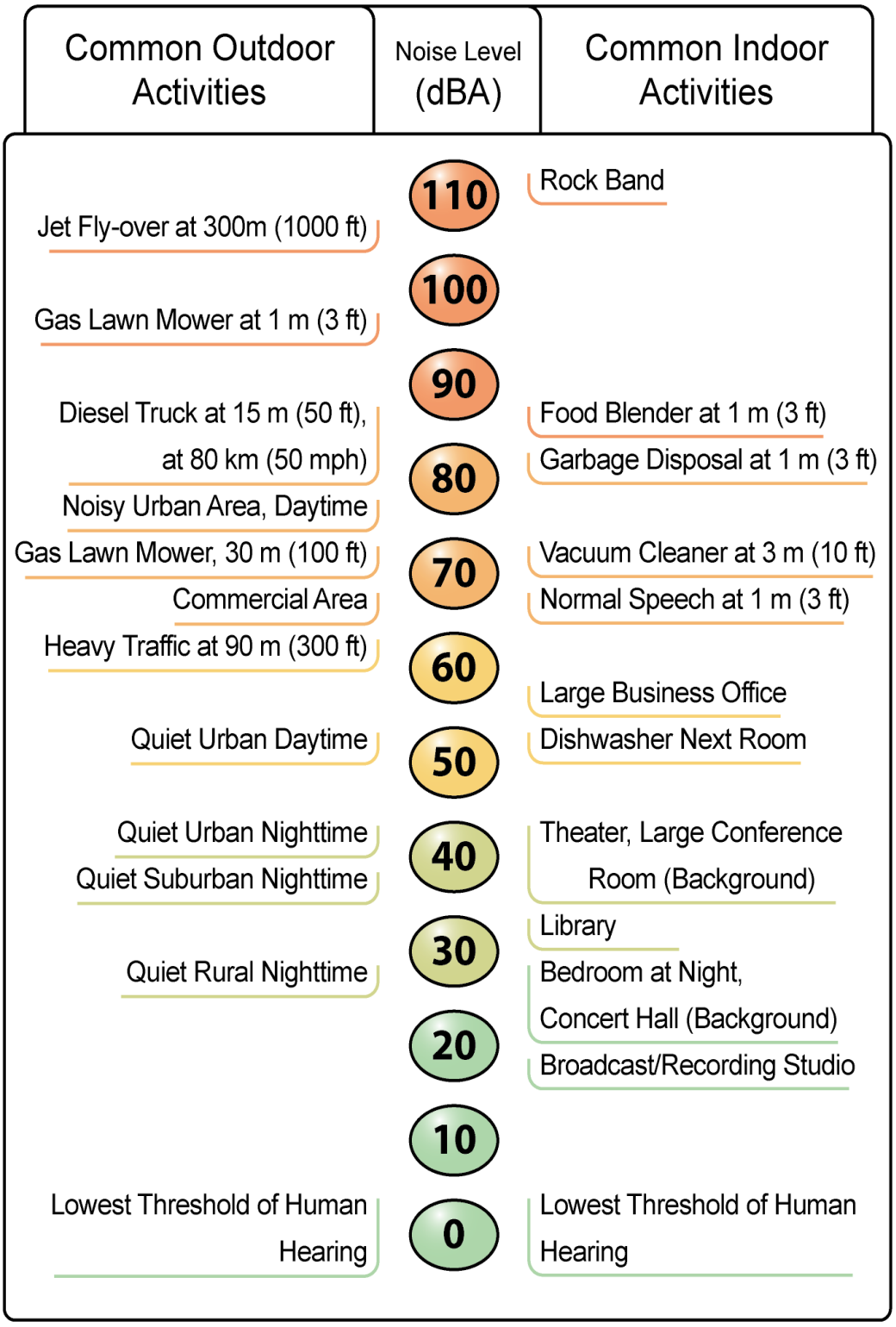
ACOUSTIC FUNDAMENTALS

Noise is generally defined as sound that is loud, disagreeable, or unexpected. Sound is mechanical energy transmitted in the form of a wave because of a disturbance or vibration. Sound levels are described in terms of both amplitude and frequency. Amplitude is defined as the difference between ambient air pressure and the peak pressure of the sound wave. Amplitude is measured in decibels (dB) on a logarithmic scale. For example, a 65 dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). Amplitude is interpreted by the ear as corresponding to different degrees of loudness. Laboratory measurements correlate a 10 dB increase in amplitude with a perceived doubling of loudness and establish a 3 dB change in amplitude as the minimum audible difference perceptible to the average person.

The frequency of a sound is defined as the number of fluctuations of the pressure wave per second. The unit of frequency is the Hertz (Hz). One Hz equals one cycle per second. The human ear is not equally sensitive to sound of different frequencies. For instance, the human ear is more sensitive to sound in the higher portion of this range than in the lower, and sound waves below 16 Hz or above 20,000 Hz cannot be heard at all. To approximate the sensitivity of the human ear to changes in frequency, environmental sound is usually measured in what is referred to as "A-weighted decibels" (dBA). On this scale, the normal range of human hearing extends from about 10 dBA to about 140 dBA (U.S. EPA, 1971). Common community noise sources and associated noise levels, in dBA, are depicted in **Figure 1**.

Noise can be generated by a number of sources, including mobile sources, such as automobiles, trucks and airplanes, and stationary sources, such as construction sites, machinery, and industrial operations. Noise generated by mobile sources typically attenuates at a rate between 3.0 to 4.5 dBA per doubling of distance. The rate depends on the ground surface and the number or type of objects between the noise source and the receiver. Mobile transportation sources, such as highways, hard and flat surfaces, such as concrete or asphalt, have an attenuation rate of 3.0 dBA per doubling of distance. Soft surfaces, such as uneven or vegetated terrain, have an attenuation rate of about 4.5 dBA per doubling of distance from the source. Noise generated by stationary sources typically attenuates at a rate of approximately 6.0 to 7.5 dBA per doubling of distance from the source (U.S. EPA, 1971).

FIGURE 1
TYPICAL COMMUNITY NOISE LEVELS



Caltrans 2009

NOISE DESCRIPTORS

The intensity of environmental noise fluctuates over time, and several descriptors of time-averaged noise levels are used. The three most commonly used descriptors are L_{eq}, L_{dn}, and CNEL. The energy-equivalent noise level, L_{eq}, is a measure of the average energy content (intensity) of noise over any given period. Many communities use 24-hour descriptors of noise levels to regulate noise. The day-night average noise level, L_{dn}, is the 24-hour average of the noise intensity, with a 10-dBA "penalty" added for nighttime noise (10:00 p.m. to 7:00 a.m.) to account for the greater sensitivity to noise during this period. CNEL, the Community Noise Equivalent Level, is similar to L_{dn} but adds an additional 5-dBA penalty for evening noise (7:00 p.m. to 10:00 p.m.). Another descriptor that is commonly discussed is the single-event noise exposure level (SENEL), also referred to as the sound exposure level (SEL). The SENEL/SEL describes a receiver's cumulative noise exposure from a single noise event, which is defined as an acoustical event of short duration (0.5 second), such as a backup beeper, the sound of an airplane traveling overhead, or a train whistle, and involves a change in sound pressure above a defined reference value (usually approximately 40 dBA). Noise analyses may also depend on measurements of L_{max}, the maximum instantaneous noise level during a specific period of time, and L_{min}, the minimum instantaneous noise level during a specific period. Common noise level descriptors are summarized in **Table 1**.

TABLE 1
COMMON ACOUSTICAL DESCRIPTORS

Descriptor	Definition
Energy Equivalent Noise Level (L_{eq})	The energy mean (average) noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value (in dBA) is calculated.
Minimum Noise Level (L_{min})	The minimum instantaneous noise level during a specific period of time.
Maximum Noise Level (L_{max})	The maximum instantaneous noise level during a specific period of time.
Day-Night Average Noise Level (DNL or L_{dn})	The 24-hour L_{eq} with a 10 dBA "penalty" for noise events that occur during the noise-sensitive hours between 10:00 p.m. and 7:00 a.m. In other words, 10 dBA is "added" to noise events that occur in the nighttime hours to account for increases sensitivity to noise during these hours.
Community Noise Equivalent Noise Level (CNEL)	The CNEL is similar to the L_{dn} described above, but with an additional 5 dBA "penalty" added to noise events that occur between the hours of 7:00 p.m. to 10:00 p.m. The calculated CNEL is typically approximately 0.5 dBA higher than the calculated L_{dn}.
Single Event Noise Level (SEL)	The level of sound accumulated over a given time interval or event. Technically, the sound exposure level is the level of the time-integrated mean square A-weighted sound for a stated time interval or event, with a reference time of one second.
Percent Exceeded Noise Level (L_n)	The level exceeded for *n* percent of the time. For instance, L_{10} is the level exceeded for 10% of the time. The commonly used values of n for the n-percent exceeded level, L_n, are 2, 10, 50, and 90.

HUMAN RESPONSE TO NOISE

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general

well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels. When community noise interferes with human activities or contributes to stress, public annoyance with the noise source increases. The acceptability of noise and the threat to public well-being are the basis for land use planning policies preventing exposure to excessive community noise levels.

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise over differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted: the so-called "ambient" environment. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged. Regarding increases in A-weighted noise levels, knowledge of the following relationships will be helpful in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dB cannot be perceived by humans;
- Outside of the laboratory, a 3-dB change is considered a just-perceivable difference;
- A change in level of at least 5 dB is required before any noticeable change in community response would be expected. An increase of 5 dB is typically considered substantial;
- A 10-dB change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

When evaluating noise impacts, based on the above relationships, it is generally recognized that an increase of greater than 3 dBA is considered potentially significant. However, increases in ambient noise levels need to also take into account the existing noise environment.

NOISE REDUCTION

Various methods can be employed to reduce noise levels, including enclosures, barriers, and sound-dampening materials. The methods employed are dependent on various factors, including source and receptor characteristics as well as environmental conditions. With regard to typical community noise sources, noise-reduction techniques typically focus on the isolation or shielding of the noise source from nearby noise-sensitive receptors. The more common methods include the use of buffers, enclosures, and barriers. In general, these techniques contribute to decreasing noise levels only when the structure breaks the "line of sight" between the source and the receiver. Buildings, concrete walls, and berms can all act as effective noise barriers. Wooden fences or broad areas of dense foliage can also reduce noise but are less effective than solid barriers. Changes in design specifications and use of equipment noise control devices (e.g., mufflers and silencers) are also commonly employed to reduce stationary-source (i.e., non-transportation) noise levels. Additional noise control techniques commonly used for transportation noise sources include traffic control, such as prohibiting heavy-duty trucks and reducing speed limits along primarily affected corridors. However, an approximate 20 mile per hour reduction in speed would typically be required to achieve a noticeable decrease in noise

levels. In some instances, the use of noise-reducing *pavements, such as rubberized asphalt,* has also been used to reduce traffic noise.

EXISTING CONDITIONS

AMBIENT NOISE LEVELS

The ambient noise environments in the City of Pinole are defined primarily by vehicle traffic on Interstate 80 (I-80), which runs northeast to southwest through the community, and railroad activities conducted along the Union Pacific Railroad (UPRR) and Burlington Northern Sante Fe (BNSF) railroad corridors. To a lesser extent, local vehicle traffic and typical neighborhood noise sources also contribute to the ambient noise environment. No significant noise-producing commercial or industrial activities are identified within the City of Pinole. The only concentration of such activities is in proximity to Highway 80, which tends to mask noise generated by these sources.

Short-term (10-minute) noise level measurements were conducted on April 22, 2010 for the purpose of documenting and measuring the existing noise environment in various areas in and around the City of Pinole. Measurements were conducted using a Larson Davis model 820 sound-level meter placed at a height of approximately 4.5 feet above the ground surface. Ambient noise measurement locations and corresponding measured values (i.e., L_{eq}, L_{min}, and L_{max}) are summarized in **Table 2**. Based on the monitoring conducted, hourly-average daytime noise levels (in L_{eq}) within the City generally range from the low to mid 40s at areas located away from major roadways to the mid to high 70s near I-80. In general, ambient noise levels during the quieter nighttime hours are typically 5 to 10 dBA less than daytime noise levels due to decreases in vehicle traffic on area roadways.

TABLE 2
AMBIENT NOISE LEVELS

Location	Monitoring Period	Noise Level (dBA)	
		L_{eq}	L_{max}
1401 Fitzgerald Dr., ~148 feet from near-travel-lane centerline of I-80	12:40 p.m. – 12:50 p.m.	75.9	78.4
Pinole Shores Park	13:15 p.m. – 13:25 p.m.	42.8	54.5
2742 Pinole Valley Rd., ~25 feet from near-travel-lane centerline	13:45 p.m. – 13:55 p.m.	63.1	70.2
1279 San Pablo Ave., ~25 feet from near-travel-lane centerline	14:20 p.m. -14-30 p.m.	64.3	69.8
2554 Appian Way, ~25 feet from near-travel-lane centerline	14:50 p.m. -15-00 p.m.	63.8	70.6
Pinole Valley Road at Simas, ~25 feet from near-travel-lane centerline	15:30 p.m. – 15:40 p.m.	65.4	74.3

Note: Ambient noise measurements were conducted on April 22, 2010 using a Larson Davis model 820 sound-level meter placed at a height of approximately 4.5 feet above the ground surface.

NOISE-SENSITIVE LAND USES

Noise-sensitive land uses are generally considered to include those uses that would result in noise exposure that could cause health-related risks to individuals. Places where quiet is essential are also considered noise-sensitive uses. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Other land uses such as parks, historic sites, cemeteries, and recreation areas are also considered sensitive to increases in exterior noise levels. School classrooms, places of assembly, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses.

NOISE SOURCES

Noise issues associated with stationary and transportation sources in the Planning Area are discussed below.

Transportation Sources

Roadway Traffic

Ambient noise levels in many portions of the City are defined primarily by traffic on I-80. To a lesser extent, vehicle traffic along other local roadways also contributes to ambient noise levels. The FHWA Highway Traffic Noise Prediction model (FHWA-RD-77-108) was used to predict traffic noise levels along major area roadways. Input data used in the model included average-daily traffic levels, day/night percentages of automobiles and medium and heavy trucks, vehicle speeds, ground attenuation factors, roadway widths, and ground elevation data. Vehicle distribution percentages were based on traffic data obtained during the site reconnaissance conducted for this project, as well as, heavy-duty truck distribution percentages obtained from the California Department of Transportation (Caltrans 2007).

Predicted traffic noise levels for roadway segments within the City, including distances to the predicted 60, 65, and 70-dBA Ldn/CNEL noise contours, are summarized in **Table 3**. Existing noise contours for I-80 are depicted in **Figure 2**. It is important to noise that predicted noise contours assume no natural or human-made shielding (i.e., intervening terrain, vegetation, berms, walls, buildings) and should be considered to represent bands of similar noise exposure, rather than absolute lines of demarcation. Although predicted noise contours are not considered site-specific, they are useful for determining potential land-use conflicts.

Railroads

Two railroad corridors are located within the City of Pinole, including the UPRR's Martinez Subdivision and BNSF's Stockton Subdivision railroads. There are no rail yards or junctions within the City. The UPRR's Martinez Subdivision railroad is a double-track railroad located along the northern boundary of the City near the shoreline of San Pablo Bay. The BNSF's Stockton Subdivision is located south of the UPRR and at a slightly higher elevation. The number of freight trains traveling along these corridors can vary from day to day, depending on demand, and there are currently no hourly limitations pertaining to freight train travel. The UPRR is also used for Amtrak service. Approximately 32 Amtrak Capitol Corridor trains and 8 Amtrak San Joaquin trains use this corridor on a daily basis (Amtrak 2010).

Noise levels generated by trains can vary depending on numerous factors, including train speed, number of engines used, track conditions (e.g., welded vs. jointed), the condition of train wheels, and shielding provided by intervening terrain. Additional factors, such as the sounding of the train horns as well as the operation of roadside signaling devices, can also contribute to overall noise levels. Depending on such factors, wayside noise levels associated with train passbys can reach levels of up to 110 dBA L_{max} at 50 feet from the track centerline (FTA, 2006).

The Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment Guidelines* (FTA, 2006) was used for the calculation of wayside noise levels generated by the trains traveling along the UPRR and BNSF corridors. Wayside noise levels were calculated based, in part, on average train speeds, train length, and assuming that the number of trains would be distributed equally among daytime and nighttime hours. Predicted noise levels were calculated with and without the sounding of warning devices at grade crossings. Predicted railroad noise levels and distances to noise contours are summarized in **Table 4** and depicted in **Figure 2**. With the sounding of train horns, the projected 60, 65 and 70 dBA L_{dn} noise contours near signalized grade crossings would extend to approximately 1,255, 585 and 158 feet from the track centerline of the UPRR, respectively. Along the BNSF railroad, the projected 60, 65 and 70 dBA L_{dn} noise contours with horns sounding would extend to approximately 681, 368, and 85 feet from the track centerline, respectively. Without horns sounding, the projected 60, 65 and 70 dBA L_{dn} noise contours would extend to 429, 199 and 46 feet, from the UPRR; and, to approximately 199, 92 and 21 feet from the BNSF railroad, respectively. It is important to note that these projected noise contours do not include shielding or reflection of noise from intervening terrain or structures and actual noise levels will vary depending on site-specific conditions. Although these predicted noise contours are not considered site-specific, they are useful for determining potential land use conflicts.

FIGURE 2
PREDICTED EXISTING NOISE CONTOURS – MAJOR TRANSPORTATION NOISE SOURCES

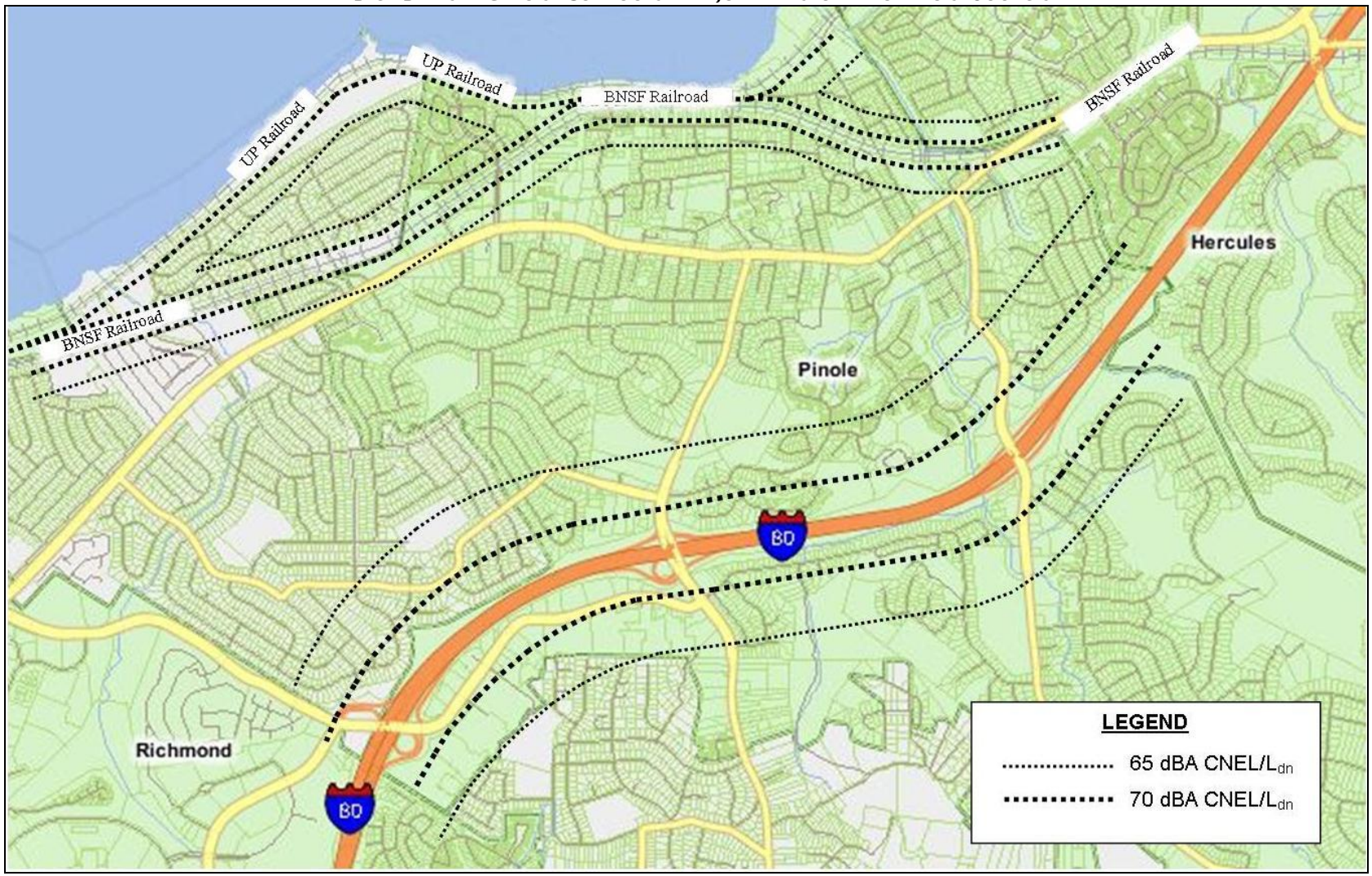


Image Source: Contra Costa County 2010
Note: Distances to noise contours are approximate. Noise contours assume no natural or human-made shielding (i.e., intervening terrain, vegetation, berms, walls, buildings) and should not be considered to represent absolute lines of demarcation.

TABLE 3
EXISTING TRAFFIC NOISE LEVELS AND DISTANCES TO NOISE CONTOURS IN THE PLANNING AREA

Roadway Segment	ADT	CNEL at 50 Feet from Near Travel-lane Centerline	Distance (feet) from Roadway Centerline to CNEL Contour		
			70	65	60
San Pablo Ave., W. of Del Monte Dr./Belmont Way	17,100	67.92	--	108.2	229.6
San Pablo Ave., W. of Appian Way	20,600	66.04	--	82.2	172.5
San Pablo Ave., E. of Pinole Valley Rd.	20,900	62.85	--	--	103.2
Appian Way, S. of Tara Hills Dr./Canyon Dr.	34,300	67.66	59.8	115.5	242.2
Appian Way, S. of Michael Dr.	27,500	67.29	--	98.6	208.7
Pinole Valley Rd., N. of Henry Ave.	14,100	61.14	--	--	80.2
Pinole Valley Rd., S. of Estate Ave.	19,000	64.08	--	62.5	128.5
Pinole Valley Rd., S. of Wright Ave.	3,200	57.82	--	--	--
Henry Ave., E. of Ridgecrest Dr.	1,700	51.11	-	--	--
Fitzgerald Dr., W. of Appian Way	18,100	64.09	--	59.8	124.0
Shea Drive, W. of Pinole Valley Rd.	3,500	54.25	--	--	--
I-80, W. of Appian Way	190,000	82.81	585.8	1,259.3	2,711.3
I-80, Appian Way to Pinole Valley Rd.	194,000	82.90	594.0	1,276.9	2,749.2
I-80, E. of Pinole Valley Rd.	182,000	82.62	569.3	1,223.7	2,634.7

Noise levels/contours were calculated using the FHWA roadway noise model based on Calveno vehicle reference noise levels and traffic data obtained from the traffic analysis prepared for this project. Refer to ***Appendix A*** *for modeling output files.*
-- Contours are within 50 feet of roadway centerline/ within roadway right-of-way

TABLE 4
RAILROAD NOISE LEVELS

Railroad Corridor	Without Horns Sounding				With Horns Sounding			
	L_{dn} at 100′	Distance From Track Centerline to L_{dn} Contour (feet)			L_{dn} at 100′	Distance From Track Centerline to L_{dn} Contour (feet)		
		60	65	70		60	65	70
UPRR/AMTRAK	69	429	199	46	77	1,255	585	158
BNSF	64	199	92	21	73	681	368	85

Airports

The Buchanan Field Airport is located on Sally Ride Drive in Concord, approximately 9 miles east of the City of Pinole. The City of Pinole is not located within the projected 60 dBA CNEL noise contour of this airport. As a result, the existing ambient noise environment of the City is not significantly influenced by aircraft noise, although aircraft fly-overs are possible.

Stationary Sources

Stationary noise sources include industrial and commercial land uses. Many industrial processes produce noise, even when the best available noise control technology is applied. Noise exposures within industrial facilities are controlled by federal and state employee health and safety regulations (i.e., regulations of the Occupational Safety and Health Administration of the U.S. Department of Labor [OSHA] and the California Division of Occupational Safety and Health [Cal-OSHA]). Exterior noise levels that affect neighboring parcels are typically subject to local standards. Commercial, recreational, and public facility activities can also produce noise that may affect adjacent noise-sensitive land uses. These noise sources can be continuous or intermittent and may contain tonal components that are annoying to individuals who live nearby. For instance, emergency-use sirens and backup alarms are often considered nuisance noise sources, but may not occur frequently enough to be considered incompatible with noise-sensitive land uses. In addition, noise generation from fixed noise sources may vary based upon climate conditions, time of day, and existing ambient noise levels.

From a land use planning perspective, fixed-source noise control issues focus on two goals: (1) preventing the introduction of new noise-producing uses in noise-sensitive areas; and (2) preventing encroachment of noise-sensitive uses upon existing noise-producing facilities. The first goal can be achieved by applying noise performance standards to proposed new noise producing uses. The second goal can be met by requiring that new noise-sensitive uses near noise-producing facilities include mitigation measures to ensure compliance with noise performance standards. Each of these goals stresses the importance of avoiding the location of new uses that may be incompatible with adjoining uses.

Commercial and Industrial Uses

Noise sources commonly associated with commercial and industrial uses often include the operation of power tools, material handling equipment (e.g., forklifts), and stationary equipment (e.g., compressors, compactors, etc.), as well as, noise associated with the loading and unloading of materials from delivery trucks. Noise levels from commercial and industrial uses are dependent on numerous factors and can vary substantially, depending of the specific activities conducted. For instance, noise associated with neighborhood commercial activities may be indiscernible from the ambient noise level, whereas noise levels associated with major industrial activities involving the use of heavy off-road equipment can generate intermittent levels of up to approximately 90 dBA at 50 feet. For this reason, noise generated by commercial and industrial uses and impacts to nearby noise-sensitive land uses should be evaluated on a project-by-project and site-specific basis.

Noise sources associated with service commercial uses such as automotive and truck repair facilities, light industrial uses, etc., are found near the Bay Shore on San Pablo Avenue within City limits. The noise emissions of these types of uses are dependent on many factors, and are therefore, difficult to quantify precisely. Nonetheless, noise generated by the these uses contributes to the ambient noise environment in the immediate vicinity of these uses, and should be considered where either new noise-sensitive uses are proposed nearby or where similar uses are proposed in existing residential areas.

Parks and School Playing Fields

Parks and school playgrounds, and their associated uses, are located throughout the City. Noise generated by these uses depends on the age and number of people utilizing the respective facilities at a given time, and types of activities they are engaged in. School play field activities tend to generate more noise than those of neighborhood parks, because the intensity of school playground usage tends to be much higher. At a distance of 100 feet from an elementary school playground being used by 100 students, average and maximum noise levels of 60 and 75 dB, respectively, can be expected. At organized events such as high-school football games with large crowds and public address systems, the noise generation is often significantly higher. As with service commercial uses, the noise generation of parks and school playing fields is variable.

REGULATORY CONTEXT

Federal, state, and local governments have established noise standards and guidelines to protect citizens from potential hearing damage and various other adverse physiological and social effects associated with noise. Those regulations most applicable to the community are summarized below.

FEDERAL

Federal Railroad Administration

The federal government, in response to safety concerns at at-grade crossings, enacted the Swift Rail Development Act of 1994. This act mandated that the Secretary of Transportation issue regulations requiring the use of locomotive horns at public grade crossings, but gave the agency the authority to make reasonable exceptions. On January 13, 2000, the Federal Railroad Administration published a Notice of Proposed Rule Making in the Federal Register addressing the use of locomotive horns at public road-rail grade crossings. Accordingly, locomotive horns must be sounded on approach and while entering public grade crossings, unless there is no significant risk of increased grade crossing collisions, the use of a locomotive horn is impractical, or where safety measures can be installed to fully compensate for the absence of the warning provided by the horn. The sounding of warning horns can greatly affect predicted noise contours within the community.

U.S. Environmental Protection Agency (EPA)

In 1974, the EPA Office of Noise Abatement and Control published a report entitled *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. Although this document does not constitute EPA regulations or standards, it is useful in identifying noise levels at which increased levels of annoyance would be anticipated. Based on an annual-average day-night noise level (expressed as L_{dn} or DNL), the document states that "undue interference with activity and annoyance" will not occur if outdoor noise levels in residential areas are below 55 dBA L_{dn} and indoor levels are below 45 dBA L_{dn} (EPA, 1974).

Department of Housing and Urban Development (HUD)

The Federal Department of Housing and Urban Development (HUD) guidelines for the acceptability of residential land uses are set forth in the Code of Federal Regulations, Title 24, Part 51, "Environmental Criteria and Standards." These guidelines identify an exterior noise exposure of 65 dBA L_{dn} or less as acceptable. Exterior noise levels of 65 to 75 dBA L_{dn} are considered normally acceptable, provided appropriate sound attenuation is provided to

reduce interior noise levels to within acceptable levels. Noise levels above 75 dBA L_{dn} are considered unacceptable. The goal of the interior noise levels is 45 dBA L_{dn} for noise-sensitive land uses. These guidelines apply only to new construction supported by HUD grants and are not binding upon local communities (Caltrans, 2002a).

STATE

Government Code

Government Code Section 65302(f) states that a noise element shall be included as part of all City General Plans. A summary of the required contents of a noise element is presented below:

- A noise element shall identify and appraise noise problems in the community. The noise element shall recognize the guidelines established by the Office of Noise Control in the State Department of Health Services and shall analyze and quantify, to the extent practicable, as determined by the legislative body, current and projected noise levels for all of the following sources:
  - Highways and freeways.
  - Primary arterials and major local streets.
  - Passenger and freight railroad operations and ground rapid transit systems.
  - Commercial, general aviation, heliport, helistop, and military airport operations, aircraft over-flights, jet engine test stands, and all other ground facilities and maintenance functions related to airport operation.
  - Local industrial plants, including, but not limited to, railroad classification yards.
  - Other ground stationary sources identified by local agencies as contributing to the community noise environment.

Noise contours shall be shown for the above noise sources based on noise monitoring and accepted noise modeling techniques. The noise contours are to be used as a guide for designating land uses within the land use element that minimizes the exposure of community residents to excessive noise.

California Building Code

Title 24 of the California Code of Regulations contains standards for allowable interior noise levels associated with exterior noise sources (California Building Code, 1998 edition, Volume 1, Appendix Chapter 12, Section 1208A). The standards apply to new hotels, motels, dormitories, apartment houses, and dwellings other than detached single-family residences. The standards state that the interior noise level attributable to exterior sources shall not exceed 45 dBA in any habitable room. Proposed residential structures to be located where the annual L_{dn} or CNEL exceeds 60 dBA shall require an acoustical analysis showing that the proposed building design would achieve the prescribed allowable interior noise standard. The noise metric shall be either the day-night average sound level (L_{dn}) or the community noise equivalent level (CNEL), consistent with the noise element of the local general plan. Worst-case noise levels, either existing or future, shall be used as the basis for determining compliance with these standards (Caltrans, 2002a).

State of California General Plan Guidelines

The *State of California General Plan Guidelines* (State of California 2003), published by the Governor's Office of Planning and Research (OPR), also provides guidance for the acceptability

of projects within specific L_{dn}/CNEL contours. The guidelines also present adjustment factors that may be used in order to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

LOCAL

City of Pinole General Plan

The Health and Safety Element of the Pinole General Plan contains policies designed to protect citizens from the harmful and annoying effects of excessive noise exposure. The Health and Safety Element of the Pinole General Plan establishes noise criteria for determination of compatibility of new development, based on land use type, within various noise environments and also identifies maximum allowable exterior noise levels for stationary noise sources. It is important to note, however, that whereas the land use compatibility noise criteria are applied at the project site, the noise standards for proposed stationary sources are applied at the property line of nearby "receiving" land uses and are not applied at the property line of the source.

The City's noise-related goals and policies are summarized in **Table 5**. The City's noise criteria for determination of land use compatibility for new development and the City's maximum allowable noise standards for stationary sources are depicted in **Tables 6 and 7**, respectively.

TABLE 5
CITY OF PINOLE GENERAL PLAN (1995)
APPLICABLE NOISE POLICIES

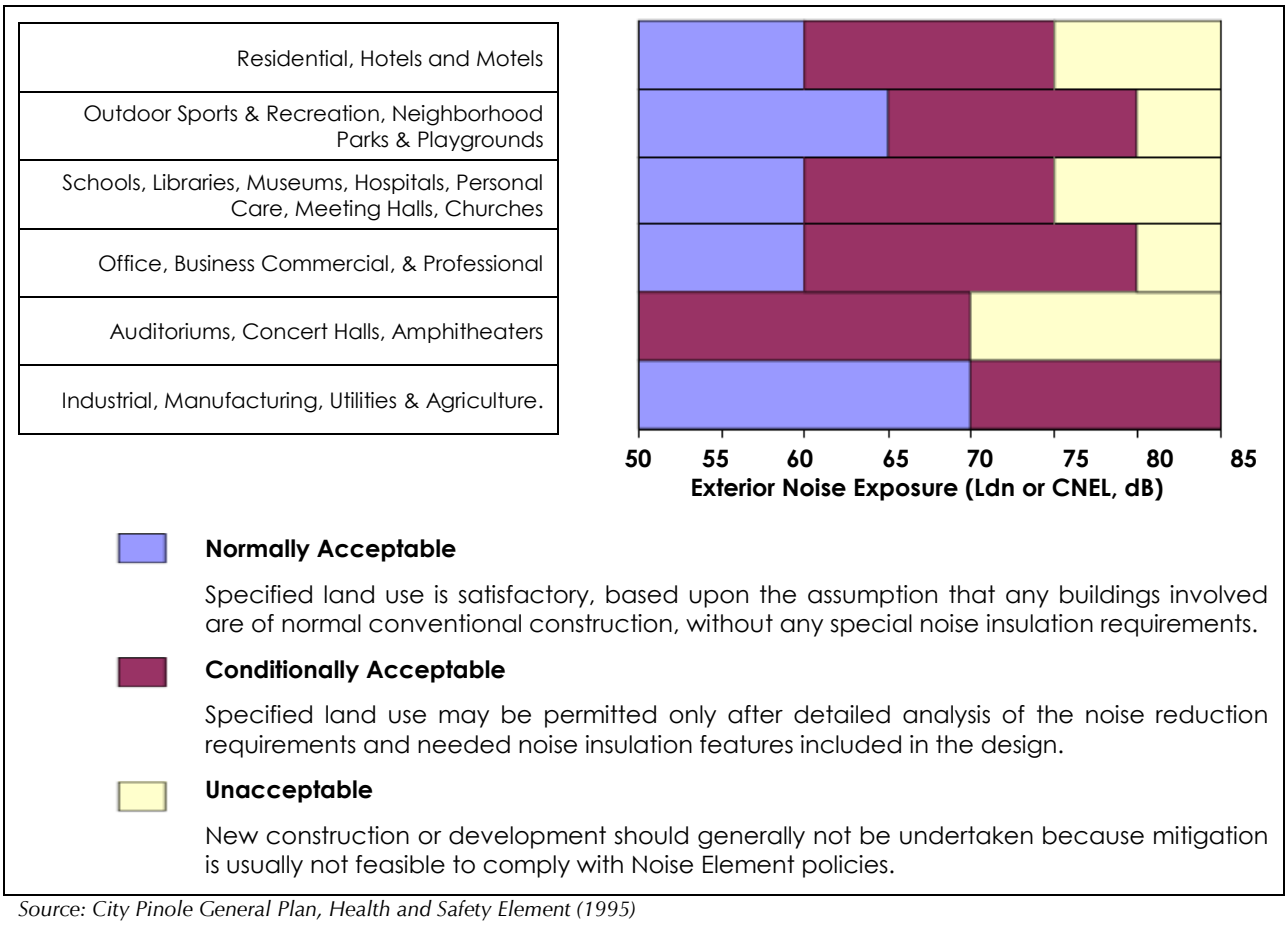
GOAL HS4	New development noise standards. Ensure all new development complies with the noise standards established in the Pinole Health and Safety Element and prevent all new noise sources from increasing the existing noise level above acceptable standards.
POLICIES	
HS4.1	**Noise Levels in New Residential Projects**. New residential development projects shall meet acceptable exterior noise level standards. The normally acceptable noise standards for new land uses are established in Land Use Compatibility for Community Exterior Noise Environments (as shown below), which shall be modified by Policies HS4.2, HS4.3, HS4.4, HS4.5, HS4.6, HS4.7 and HS4.B, below.
HS4.2	**Outdoor Noise Levels.** The goal for maximum outdoor noise levels in residential areas is an Ldn of 60 dB. This level is a requirement to guide the design and location of future development and is a goal for the reduction of noise in existing development. However, 60 Ldn is a goal which cannot necessarily be reached in all residential areas within the realm of economic or aesthetic feasibility. This goal will be applied where outdoor use is a major consideration (e.g., backyards in single-family housing developments and recreation areas in multi-family housing projects). The outdoor standard will not normally be applied to the small decks associated with apartments and condominiums but these will be evaluated on a case-by-case basis. Where the city determines that providing an Ldn of 60 dB or lower outdoors is not feasible, the outdoor goal may be increased to an Ldn of 65 dB at the discretion of the Planning Commission.
HS4.3	**Indoor Noise Levels**. The indoor noise level as required by the State of California Noise Insulation Standards must not exceed an Ldn of 45 dB in new housing units.
HS4.4	**Indoor Instantaneous Noise Levels**. Interior noise levels in new single-family and multi-family residential units exposed to an Ldn of 60 dB or greater should be limited to a maximum instantaneous noise level in the bedrooms of 50 dBA. Maximum instantaneous noise levels in other rooms should not exceed 55 dB. The typical repetitive maximum instantaneous noise level at each site would be determined by monitor. Examples would include truck passbys on busy streets, train passbys and train warning whistles.
HS4.5	**Impacts of Train Noise**. If the noise source is a railroad, then the outdoor noise exposure criterion should be 70 Ldn for future development, recognizing that train noise is characterized by relatively few loud events.
HS4.6	**New Commercial, Industrial and Office Noise Standards.** Appropriate interior noise levels in

TABLE 5
CITY OF PINOLE GENERAL PLAN (1995)
APPLICABLE NOISE POLICIES

	commercial, industrial, and office buildings are a function of the use of space and shall be evaluated on a case-by-case basis. Interior noise levels in offices generally should be maintained at 45 Leq (hourly average) or less.
HS4.7	**Areas Below Desired Noise Standards.** These guidelines are not intended to be applied reciprocally. In other words, if an area currently is below the desired noise standards, an increase in noise up to the maximum should not necessarily be allowed. The impact of a proposed project on an existing land use should be evaluated in terms of the increase in existing noise levels and potential for adverse community impact, regardless of the compatibility guidelines.
HS4.8	**Non-Transportation Related Noise Sources.** For non-transportation related noise sources, noise levels outdoors should not exceed the limits in the table below. Interior noise levels shall be 15 decibels lower than those shown in the table.
HS4.9	**Noise Environment in Existing Residential Areas.** Protect the noise environment in existing residential areas. In general, the City will require the evaluation of mitigation measures for projects under the following circumstances: a. The project would cause the Ldn to increase 3 dB(A) or more. b. Any increase would result in an Ldn greater than 60 dB(A). c. The Ldn already exceeds 60 dB(A). d. The project has the potential to generate significant adverse community response.
HS4 10	**Mitigating the Effects of Noise on Adjacent Properties.** Require proposals to reduce noise impacts on adjacent properties through the following and other means, as appropriate: a. Screen and control noise sources such as parking, outdoor activities and mechanical equipment. b. Increase setbacks for noise sources from adjacent dwellings. c. Wherever possible do not remove fences, walls or landscaping that serve as noise buffers, although design, safety and other impacts must be addressed. d. Use soundproofing materials and double glazed windows. e. Control hours of operation, including deliveries and trash pickup to minimize noise impacts.
GOAL HS5	Reduce existing objectionable noise sources, eliminate or reduce noise from existing or objectionable noise sources.
POLICIES	
HS5.1	**Commercial or Industrial Source Noise.** Noise created by commercial or industrial sources associated with new projects or developments shall be controlled so as not to exceed the noise level standards set forth in the table below (Maximum Allowable Noise Exposure for Stationary Noise Sources), as measured at any affected residential land use. (Refer to **Table 3** of this report).
HS5.2	**New Noise Reducing Technologies.** Support and employ new noise reducing technologies in the development and maintenance of local and regional infrastructure.

Note: Transportation noise sources are defined as traffic on public roadways, railroad line operations and aircraft in flight. Control of noise from these sources is preempted by Federal and State regulations. Other noise sources are presumed to be subject to local regulations, such as a noise control ordinance. Nontransportation noise sources typically include industrial operations, outdoor recreation facilities, HVAC units, loading docks, etc.
Source: City Pinole General Plan, Health and Safety Element (1995)

TABLE 6
CITY OF PINOLE GENERAL PLAN (1995)
LAND USE COMPATIBILITY FOR COMMUNITY NOISE ENVIRONMENTS



Source: City Pinole General Plan, Health and Safety Element (1995)

TABLE 7
CITY OF PINOLE
MAXIMUM ALLOWABLE NOISE EXPOSURE FOR STATIONARY NOISE SOURCES (1)

Noise Descriptor	Daytime (5) (7Am to 10PM)	Nighttime (2,5) (10PM to 7AM)
Hourly-Average (dBA, Leq) (3)	55	45
Maximum Level (dBA, Lmax) (3)	70	65
Maximum Level (dBA, Lmax)-Impulsive Noise (4)	65	60

(1) As determined at the property line of the receiving land use. When determining effectiveness of noise mitigation measures, the standards may be applied on the receptor side of noise barriers or other property line noise mitigation measures.
(2) Applies only where the receiving land use operates or is occupied during nighttime hours.

(3) Sound level measurements shall be made with "slow" meter response.
(4) Sound level measurements shall be made with "fast" meter response.
(5) Allowable levels shall be raised to the ambient noise levels where the ambient levels exceed the allowable levels. Allowable levels shall be reduced 5 dB if the ambient hourly Leq is at least 10 dB lower than the allowable level
Source: City Pinole General Plan, Health and Safety Element (1995)

City of Pinole Municipal Code

The City of Pinole Municipal Code does not include noise standards applicable to transportation or non-transportation noise sources. However, the City's Municipal Code (Title 15, Chapter II, Section 15.02.070, *General Regulations of Construction)* does include the following hourly restrictions and nuisance provisions pertaining to construction activities (City of Pinole 2010):

a) Saturday construction work is allowed in commercial zones only, from nine a.m. (9:00 a.m.) to six p.m. (6:00 p.m.), as long as it is interior work and does not generate significant noise.

b) Work be allowed from seven a.m. (7:00 a.m.) to five p.m. (5:00 p.m.) on non-federal holidays (holidays recognized by the City of Pinole, but not acknowledged federally are: Lincoln's Birthday (February 12), Ceasar Chavez Day (March 30) Admission's Day and the Day after Thanksgiving), but no inspections would be performed.

c) The Council designates the City Manager (or his/her representative) to further modify on a case-by-case basis the hours of construction in commercial zones. Additionally, the City Manager or his/her designee has the ability to revise the construction hours based on inclement weather conditions or certain construction procedures (such as setting up from a concrete pour) that may require working beyond 5pm on weekdays or six p.m. (6:00 p.m.) on Saturday.

d) Administrative citations and penalties penalize responsible parties who fail or refuse to comply with any city ordinance or fail to promptly abate a public nuisance.

e) The minimum fine for such a citation or penalty is one thousand dollars ($1,000.00), and escalates in one thousand dollars ($1,000.00) increments.

- Exception 1. Homeowners performing additions, repairs, or remodeling are allowed to work on their residences on weekends and holidays between nine a.m. (9:00 a.m.) and five p.m. (5:00 p.m.)
- Exception 2. By written authorization of the building official, a residential property owner with a valid permit to construct a single-family residence for personal occupancy shall be allowed to work on weekends and holidays between nine a.m. (9:00 a.m.) and five p.m. (5:00 p.m.). This authorization shall be granted to applicants who have not built a residence in Pinole in the previous five-year (5) period and who affirm in writing their intention to reside at the subject property.
- Work must be controlled to prevent causing a public nuisance due to dust, noise, vibrations, etc. (Ord. 2007-03 §1, 2007; Ord. 553 §2(part), 1992).

IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following State CEQA Guidelines Appendix G thresholds of significance. A noise impact is considered significant if implementation of the General Plan Update would:

- Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or of applicable standards of other agencies.
- Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.
- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
- Expose people residing or working in the project area to excessive noise levels for a project located within an airport land use plan area or, where such a plan has not been adopted, or within two miles of a public airport or a public use airport.
- Expose people residing or working in the project area to excessive noise levels for a project within the vicinity of a private airstrip.

METHODOLOGY

A combination of existing literature and general application of accepted noise thresholds was used to determine the impact of ambient noise levels resulting from and on development within the General Plan Planning Area. Short- and long-term impacts associated with transportation and non-transportation noise sources were qualitatively assessed based on potential increases in ambient noise levels anticipated to occur at noise-sensitive land uses. Traffic noise levels along major area roadways were estimated using the FHWA Highway Traffic Noise Prediction model (FHWA-RD-77-108.) The FHWA modeling was based upon the Calveno noise-emission factors for automobiles and medium- and heavy-duty trucks. Input data used in the model included average-daily traffic volumes, day/night percentages of automobiles and medium and heavy trucks, vehicle speeds, ground attenuation factors, and roadway widths. Traffic volumes were derived from the traffic analysis prepared for this project. Roadway data and vehicle distribution percentages were based on traffic data obtained during the site reconnaissance conducted for this project, as well as heavy-duty truck distribution percentages for I-80 obtained from Caltrans.

PROJECT IMPACTS AND MITIGATION MEASURES

Noise Impacts Associated with Development and Operation of Land Uses of the Proposed General Plan Update

Impact 1 The proposed General Plan Update could result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or of applicable standards of other agencies. However, the proposed Pinole General Plan Update's mitigating goals and policies ensure the impact will be less than significant. Therefore, noise impacts associated with the development and operation of land uses of the proposed General Plan Update would be **less than significant**.

The City's existing General Plan Noise Element identifies the goal of protecting residents from health hazards and annoyance associated with excessive noise levels. The existing General Plan Noise Element also identifies noise compatibility guidelines to evaluate new development and

sets forth policies to require noise analysis of proposed development projects, noise monitoring, and sound mitigation for noise sources.

The potential for noise conflicts from development under the proposed General Plan Update includes conflicts as a result of adjacent land uses and their operational aspects. While generally addressed through the land use designation and zoning identification process, there is the potential that some development allowed under current land use designations and zoning would have operational aspects that could create noise impacts on other adjacent land uses. The City's proposed noise goals and policies and their associated action steps provide expanded protection geared toward eliminating land use conflicts with respect to noise, including specific numeric noise level standards for new projects affected by or including both transportation and non-transportation noise sources and guidance in evaluating noise impacts and for identification of noise mitigation measures.

Applicable City Code Sections

The City's Municipal Code applies to existing land uses. No applicable City code sections have been identified that pertain to proposed future land uses.

Proposed General Plan Policies

The proposed General Plan Update policies include the following requirements that contain specific performance standards addressing noise impacts associated with proposed land uses.

GOAL HS.8 Ensure all new development complies with the noise standards established in the Pinole Health and Safety Element, and prevent all new noise sources from increasing the existing noise levels above acceptable standards.

POLICY HS.8.1 New development projects should meet acceptable exterior noise level standards. The normally acceptable noise standards for new land uses are established in Land Use Compatibility for Community Exterior Noise Environments (refer to **Table 6** of this report).

> **Action HS.8.1.1** Adopt a noise ordinance with noise level performance standards, including maximum allowable noise exposure, ambient versus nuisance noise, method of measuring noise, and enforcement procedures.
>
> **Action HS.8.1.2** Review development proposals to assure consistency with noise standards. Require new development of noise-creating uses to conform to the City's noise level standards.
>
> **Action HS.8.1.3** Require a combination of design features to reduce noise impacts on adjacent properties through the following and other means, as appropriate:
>
> - Screen and control noise sources such as parking, outdoor activities and mechanical equipment.
> - Increase setbacks for noise sources from adjacent dwellings.
> - Modify building designs and site planning to reduce noise exposure through a combination of sound attenuation (e.g., sound-rated windows and ventilation systems, insulation, physical and landscape buffers) and site planning (e.g., increased separation and private open area buffers) to reduce noise exposure.
> - Control hours of operation, including deliveries and trash pickup, to minimize noise impacts.
> - Require additional landscaping to assist with buffering where feasible.

POLICY HS.8.2 Ensure that proposed nonresidential land uses likely to exceed the City's standards do not create noise disturbances in existing noise-sensitive areas.

Action HS.8.2.1 Require an acoustical analysis as part of the environmental review process when noise-sensitive land uses are proposed in areas where current or projected exterior noise levels exceed the City's standards.

Action HS.8.2.2 Require that any potential noise impacts identified during the acoustical analysis be mitigated in the project design to the maximum extent feasible.

Action HS.8.2.3 Prepare and periodically update a map of citywide noise-sensitive areas.

POLICY HS.8.3 Work with the railroads and adjoining communities to seek quiet zone status for rail lines through Pinole.

GOAL HS.9 Eliminate or reduce noise from existing objectionable noise sources.

POLICY HS.9.1 Noise created by commercial or industrial sources associated with new projects or developments should be controlled so as not to exceed the noise level standards set forth in the table below (Maximum Allowable Noise Exposure for Stationary Noise Sources), as measured at any affected residential land use.

Action HS.9.1.1 Adopt the following allowable noise standards (Refer to **Table 7** of this report.)

Mitigation Measures

The proposed General Plan includes policies by which the compatibility of sensitive land uses that would be exposed to noise sources would be reviewed and appropriate mitigation measures incorporated to achieve acceptable noise levels. Implementation of the applicable policies and standards contained in the City's proposed *General Plan Update* would ensure that future development would either meet applicable noise criteria for land use compatibility and/or include noise attenuation features to meet applicable noise standards. With incorporation of the proposed General Plan policies, this impact would be considered **less than significant**.

Exposure to Construction Noise

Impact 2 Construction activities associated with the proposed General Plan Update could result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project and could result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or of applicable standards of other agencies. This impact would be considered **potentially significant**.

Construction noise typically occurs intermittently and varies depending upon the nature or phase (e.g., demolition/land clearing, grading and excavation, erection) of construction. Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. Temporary increases in ambient noise levels, particularly during the nighttime hours, could result in increased levels of annoyance and potential sleep disruption. Although noise ranges were found to be similar for all construction phases, the grading phase tends to involve the most equipment and resulted in slightly higher average-hourly noise levels. Typical noise levels for individual pieces of construction equipment and distances to predicted noise contours are summarized in **Table 8**. As depicted, individual equipment noise levels typically range from approximately 74 to 88 dBA L_{eq} at 50 feet. Typical operating cycles may involve 2 minutes of full power, followed by 3 or 4 minutes at lower settings. Intermittent noise levels can range from approximately 77 to 95 dBA L_{max}, the loudest of

which include blasting, and the use of pile drivers and impact devices (e.g., hoe rams, impact hammers).

TABLE 8
TYPICAL CONSTRUCTION EQUIPMENT NOISE

Equipment	Typical Noise Level (dBA) 50 feet from Source		Distance to Noise Contours (feet, dBA L_{eq})		
	L_{max}	L_{eq}	70 dBA	65 dBA	60 dBA
Air Compressor	80	76	105	187	334
Auger/Rock Drill	85	78	133	236	420
Backhoe/Front End Loader	80	76	105	187	334
Blasting	94	74	83	149	265
Boring Hydraulic Jack/Power Unit	80	77	118	210	374
Compactor (Ground)	80	73	74	133	236
Concrete Batch Plant	83	75	94	167	297
Concrete Mixer Truck	85	81	187	334	594
Concrete Mixer (Vibratory)	80	73	74	133	236
Concrete Pump Truck	82	75	94	167	297
Concrete Saw	90	83	236	420	748
Crane	85	77	118	210	374
Dozer/Grader/Excavator/Scraper	85	81	187	334	594
Drill Rig Truck	84	77	118	210	374
Generator	82	79	149	265	472
Gradall	85	81	187	334	594
Hydraulic Break Ram	90	80	167	297	529
Jack Hammer	85	78	133	236	420
Impact Hammer/Hoe Ram (Mounted)	90	83	236	420	748
Pavement Scarifier/Roller	85	78	133	236	420
Paver	85	82	210	374	667
Pile Driver (Impact/Vibratory)	95	88	420	748	1,330
Pneumatic Tools	85	82	210	374	667
Pumps	77	74	83	149	265
Truck (Dump/Flat Bed)	84	80	167	297	529

Note: Predicted noise contours associated with construction activities may vary depending on the type and number of pieces of equipment used, usage rates Predicted noise contours do not include shielding provided by intervening terrain and structures.
Sources: FHWA 2006

Depending on distances from nearby noise-sensitive land uses, construction activities associated with buildout of the General Plan Planning Area may result in temporary and periodic increases in ambient noise levels at nearby receptors. Increases in ambient noise levels, particularly during the nighttime hours, could result in increased levels of annoyance and potential sleep disruption

to occupants of nearby dwellings. As a result, because such increases could result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project and could result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, this impact is considered **potentially significant**.

Applicable City Code Sections

Municipal Code Section 15.02.070, *General Regulations of Construction*, identifies hourly restrictions pertaining to construction activities (City of Pinole 2010).

Proposed General Plan Update Policies

The proposed General Plan Update policies include the following requirements that contain specific performance standards related to construction-generated noise impacts.

GOAL HS.8 Ensure all new development complies with the noise standards established in the Pinole Health and Safety Element, and prevent all new noise sources from increasing the existing noise levels above acceptable standards.

POLICY HS.8.1 New development projects should meet acceptable exterior noise level standards. The normally acceptable noise standards for new land uses are established in Land Use Compatibility for Community Exterior Noise Environments (refer to **Table 6** of this report).

> **Action HS.8.1.1** Adopt a noise ordinance with noise level performance standards, including maximum allowable noise exposure, ambient versus nuisance noise, method of measuring noise, and enforcement procedures.
>
> **Action HS.8.1.2** Review development proposals to assure consistency with noise standards. Require new development of noise-creating uses to conform to the City's noise level standards.

Mitigation Measures

As noted above, the City's Municipal Code establishes hourly restrictions that pertain to construction-related activities. Due to the short-term nature of construction noise, the intermittent frequency of construction noise, and the required compliance with the construction noise standards established as part of the City's existing municipal code, construction noise level increases will not result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project that would result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or of applicable standards of other agencies. In addition, Action HS.8.1.1 would require the City to adopt a noise ordinance for the control of stationary noise sources. Action Items HS.8.1.1 and HS.8.1.2 would require future development projects to be reviewed to assure consistency with the City's noise level standards. The impact of new construction noise is reduced to a **less than significant** level through compliance with the City's Municipal Code requirements and the application of the General Plan Update's mitigating goals, policies and associated action steps.

Exposure to Surface Transportation Noise

Impact 3 The proposed General Plan Update could result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project and could result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan, as a

result of increased traffic on the roadway network. In addition, future development of noise-sensitive land uses could be exposed to roadway and/or railroad noise levels in excess of the City's noise standards. This impact would be considered potentially **significant**.

Surface transportation noise sources within the City of Pinole include vehicle traffic on area roadways as well as trains traveling along the UPRR and BNSF railroads. Noise-related impacts associated with roadway vehicle traffic and railroads are discussed in more detail below.

Roadway Vehicle Traffic

Projected future noise levels and distances to noise contours for major roadways within the Planning Area at buildout of the General Plan Update are summarized in **Table 9**. Noise levels/contours were calculated using the FHWA roadway noise model based on Calveno vehicle reference noise levels and traffic data obtained from the traffic analysis prepared for this project. As depicted in **Table 9**, the highest traffic noise levels within the City of Pinole are generated by vehicle traffic on I-80. Projected future traffic noise contours for I-80 are depicted in **Figure 3**. It is important to note, that the predicted noise levels and distance to noise contours do not take into account shielding of noise by intervening structures or terrain. As a result, these noise contours should not be considered as absolute lines of demarcation. Because distances to noise contours will vary depending on site-specific conditions, these contours should be used as a guide for establishing a pattern of land uses that minimizes the exposure of community residents to excessive noise.

Predicted increases in traffic noise levels associated with buildout of the General Plan Update are compared to existing traffic noise levels in **Table 10**. As noted in **Table 10** and in comparison to existing conditions, buildout of the General Plan Update would result in increases in traffic noise levels of up to approximately 7 dBA along area roadways. Of the major roadways analyzed, implementation of the proposed General Plan Update would result in noticeable increases in traffic noise levels (i.e., 3 dBA or greater) along San Pablo Avenue, east of Pinole Valley Road; Pinole Valley Road, south of Wright Ave.; Henry Avenue, east of Ridgecrest Drive; and Shea Drive, west of Pinole Valley Road. Significant increases in traffic noise levels along some smaller local roadways could also potentially occur, particularly in areas located near proposed future development projects.

The City of Pinole is largely built out and the City does not anticipate expanding its Sphere of Influence or annexing any land into the City in the foreseeable future. Future infill development is anticipated to occur along primary commercial corridors, as identified in the *Three Corridors Specific Plan*. As such, a majority of the City's future growth is anticipated to included mixed and multiple family residential uses along portions of San Pablo Avenue, Pinole Valley Road, and Appian Way. Development of future land uses could occur within the projected 60 dBA CNEL noise contours of these roadways. Predicted noise levels at future land uses, including residential, office, business commercial, and other land uses considered "noise-sensitive", could, therefore, exceed the City's "normally acceptable" noise level of 60 dBA CNEL (refer to **Table 6** of this report).

For the above-discussed reasons, implementation of the General Plan Update would be considered to result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project and result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan as a result of increased traffic noise levels. As a result, exposure to vehicular traffic noise on area roadways would be considered a **potentially significant** impact.

Railroads

Projected volumes for future years are not currently available. Based on conversations with UPRR staff, future train volumes would not be anticipated to increase substantially in comparison to existing conditions. However, as congestion on area roadways increases, it is conceivable that reliance on freight and Amtrak train service could increase.

Within the City of Pinole, railroad noise levels are highly influenced by the sounding of locomotive warning horns. The use of locomotive horns is typically required by law on approach to public at-grade crossings. The Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment Guidelines* (FTA, 2006) was used for the calculation of wayside noise levels generated by the trains traveling along the UPRR corridor. Wayside noise levels were calculated

TABLE 9
FUTURE CUMULATIVE TRAFFIC NOISE LEVELS AND DISTANCES TO NOISE CONTOURS IN THE PLANNING AREA

Roadway Segment	ADT	CNEL at 50 Feet from Near Travel-lane Centerline	Distance (feet) from Roadway Centerline to CNEL Contour		
			70	65	60
San Pablo Ave., W. of Del Monte Dr./Belmont Way	29,500	70.29	73.9	154.1	329.4
San Pablo Ave., W. of Appian Way	32,000	67.95	--	108.7	230.6
San Pablo Ave., E. of Pinole Valley Rd.	47,000	66.37	--	82.9	175.2
Appian Way, S. of Tara Hills Dr./Canyon Dr.	46,600	68.99	70.3	140.1	296.3
Appian Way, S. of Michael Dr.	41,000	69.02	62.0	127.5	271.7
Pinole Valley Rd., N. of Henry Ave.	18,800	62.39	--	--	96.3
Pinole Valley Rd., S. of Estate Ave.	19,900	64.28	--	64.2	132.4
Pinole Valley Rd., S. of Wright Ave.	6,600	60.97	--	--	64.8
Henry Ave., E. of Ridgecrest Dr.	8,000	57.84	--	--	--
Fitzgerald Dr., W. of Appian Way	30,000	66.28	--	81.8	172.8
Shea Drive, W. of Pinole Valley Rd.	8,600	58.16	--	--	--
I-80, W. of Appian Way	226,000	83.56	657.3	1,413.5	3,043.7
I-80, Appian Way to Pinole Valley Rd.	231,000	83.65	666.9	1,434.3	3,088.4
I-80, E. of Pinole Valley Rd.	217,000	83.38	639.8	1,375.8	2,962.4

Noise levels/contours were calculated using the FHWA roadway noise model based on Calveno vehicle reference noise levels and traffic data obtained from the traffic analysis prepared for this project. I-80 traffic volumes assumes 19% increase in projected future traffic volumes in comparison to existing conditions (CCTA 2009). Refer to ***Appendix A*** *for modeling output files.*
-- Contours are within 50 feet of roadway centerline/within roadway right-of-way

FIGURE 3
PREDICTED FUTURE NOISE CONTOURS – MAJOR TRANSPORTATION NOISE SOURCES

Image Source: Contra Costa County 2010
Note: Distances to noise contours are approximate. Noise contours assume no natural or human-made shielding (i.e., intervening terrain, vegetation, berms, walls, buildings) and should not be considered to represent absolute lines of demarcation.

TABLE 10
PREDICTED CHANGES IN TRAFFIC NOISE LEVELS
AT BUILDOUT OF THE GENERAL PLAN UPDATE AS COMPARED TO EXISTING CONDITIONS

Roadway Segment	CNEL at 50 Feet from Near Travel-lane Centerline		Predicted Change in Noise Level (CNEL)
	Existing	Future with Buildout of the General Plan Update	
San Pablo Ave., W. of Del Monte Dr./Belmont Way	67.92	70.29	2.37
San Pablo Ave., W. of Appian Way	66.04	67.95	1.91
San Pablo Ave., E. of Pinole Valley Rd.	62.85	66.37	3.52
Appian Way, S. of Tara Hills Dr./Canyon Dr.	67.66	68.99	1.33
Appian Way, S. of Michael Dr.	67.29	69.02	1.73
Pinole Valley Rd., N. of Henry Ave.	61.14	62.39	1.25
Pinole Valley Rd., S. of Estate Ave.	64.08	64.28	0.20
Pinole Valley Rd., S. of Wright Ave.	57.82	60.97	3.15
Henry Ave., E. of Ridgecrest Dr.	51.11	57.84	6.73
Fitzgerald Dr., W. of Appian Way	64.09	66.28	2.19
Shea Drive, W. of Pinole Valley Rd.	54.25	58.16	3.91
I-80, W. of Appian Way	82.81	83.56	0.75
I-80, Appian Way to Pinole Valley Rd.	82.90	83.65	0.75
I-80, E. of Pinole Valley Rd.	82.62	83.38	0.76

Notes: Traffic noise levels were estimated using the FHWA Highway Traffic Noise Prediction model (FHWA-RD-77-108) Traffic volumes were derived from the traffic analysis prepared for this project and assume that peak-hour volumes constitute approximately ten percent of average-daily volumes. Roadway data and vehicle distribution percentages were based on traffic data obtained during the site reconnaissance conducted for this project, as well as heavy-duty truck distribution percentages obtained from Caltrans.

based, in part, on average train speeds, train length, and the number of trains traveling during the daytime and nighttime hours. Predicted noise levels were calculated with and without the sounding of warning devices at grade crossings. With the sounding of train horns, the projected 60, 65 and 70 dBA L_{dn} noise contours near signalized grade crossings would extend to approximately 1,255, 585 and 158 feet from the track centerline of the UPRR, respectively.

Along the BNSF railroad, the projected 60, 65 and 70 dBA L_{dn} noise contours with horns sounding would extend to approximately 681, 368, and 85 feet from the track centerline, respectively. Without horns sounding, the projected 60, 65 and 70 dBA L_{dn} noise contours would extend to 429, 199 and 46 feet, from the UPRR; and, to approximately 199, 92 and 21 feet from the BNSF railroad, respectively. It is important to note that these projected noise contours do not include shielding or reflection of noise from intervening terrain or structures and actual noise levels will vary depending on site-specific conditions. Although these predicted noise contours are not considered site-specific, they are useful for determining potential land use conflicts.

Implementation of the proposed General Plan Update could result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or of applicable standards of other agencies. As a result, exposure to railroad noise would be considered a potentially significant impact.

Applicable City Code Sections

No applicable City code sections have been identified that provide mitigation.

Proposed General Plan Policies

The proposed General Plan Update policies include the following requirements that contain specific performance standards addressing transportation noise.

GOAL HS.8 Ensure all new development complies with the noise standards established in the Pinole Health and Safety Element, and prevent all new noise sources from increasing the existing noise levels above acceptable standards.

POLICY HS.8.1 New development projects should meet acceptable exterior noise level standards. The normally acceptable noise standards for new land uses are established in Land Use Compatibility for Community Exterior Noise Environments (refer to **Table 6** of this report).

> **Action HS.8.1.2** Review development proposals to assure consistency with noise standards. Require new development of noise-creating uses to conform to the City's noise level standards.
>
> **Action HS.8.1.3** Require a combination of design features to reduce noise impacts on adjacent properties through the following and other means, as appropriate:
>
> - Screen and control noise sources such as parking, outdoor activities and mechanical equipment.
> - Increase setbacks for noise sources from adjacent dwellings.
> - Modify building designs and site planning to reduce noise exposure through a combination of sound attenuation (e.g., sound-rated windows and ventilation systems, insulation, physical and landscape buffers) and site planning (e.g., increased separation and private open area buffers) to reduce noise exposure.
> - Control hours of operation, including deliveries and trash pickup, to minimize noise impacts.
> - Require additional landscaping to assist with buffering where feasible.

POLICY HS.8.3 Work with the railroads and adjoining communities to seek quiet zone status for rail lines through Pinole.

GOAL HS.9 Eliminate or reduce noise from existing objectionable noise sources.

Mitigation Measures

Implementation of the proposed General Plan Update noise policies identified above would reduce potential transportation noise impacts. Future development projects would be required to analyze project-related noise impacts and incorporate necessary noise-reduction measures sufficient to achieve the applicable noise standards of the City's Noise Element. Accordingly, future development projects to be reviewed to assure consistency with the City's noise level standards. Implementation of these policies and actions will help to reduce impacts associated with proposed development. Noise-reduction measures typically implemented to reduce traffic noise include increased insulation, setbacks, and construction of sound barriers. Some measures, such as construction of sound barriers, may have secondary impacts related to aesthetics and

safety. The feasibility of these measures would be determined on a project-by-project basis. However, it may not be possible to fully mitigate traffic and/or railroad noise in all areas, particularly in existing development that may be constrained due to age, placement, or other factors which limit the feasibility of mitigation (residences fronting on the roadway that limits the ability to utilize noise barrier). As a result, increases in transportation noise associated with the proposed General Plan Update would result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project and would result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or of applicable standards of other agencies, which is considered to be a **significant and unavoidable** impact.

Exposure to Aircraft Noise

Impact 4 Sensitive land uses would not be exposed to aircraft noise in excess of applicable noise standards for land use compatibility. This is considered a **less than significant** impact.

The Buchanan Field Airport is located on Sally Ride Drive in Concord, approximately 9 miles east of the City of Pinole. The *Contra Costa County Airport Land Use Compatibility Plan* addresses noise impacts. The *Contra Costa County Airport Land Use Compatibility Plan* was established to ensure that there are no direct conflicts with land uses, noise, or other issues that would impact the functionality and safety of airports located within the County. The City of Pinole is not located within the projected noise contours or within 2 miles of this nearest airport. For these reasons, the existing ambient noise environment of the City is not significantly influenced by aircraft noise. This impact is considered **less than significant**.

Exposure to Stationary Noise

Impact 5 Subsequent development associated with the proposed General Plan Update could result in new noise-sensitive land uses encroaching upon existing or proposed stationary noise sources or new stationary noise sources encroaching upon existing or proposed noise-sensitive land uses. This could result in a substantial permanent increase in ambient noise levels in the project vicinity above existing levels or could result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or of applicable standards of other agencies. As a result, this impact is considered **potentially significant**.

Implementation of the proposed General Plan Update could result in the future development of land uses that generate noise levels in excess of applicable City noise standards. Such land uses may include commercial, industrial, institutional (public schools), and recreational. In addition, new noise-sensitive land uses could be located in areas of existing stationary noise sources. Exposure of noise-sensitive land uses to non-transportation noise levels could result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project and could result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or of applicable standards of other agencies. As a result, this impact would be considered **potentially significant**.

Applicable City Code Sections that Provide Mitigation

No applicable City code sections have been identified that provide mitigation.

Proposed General Plan Update Policies that Provide Mitigation

The proposed General Plan Update policies include the following mitigation requirements that contain specific performance standards addressing stationary noise.

GOAL HS.8 Ensure all new development complies with the noise standards established in the Pinole Health and Safety Element, and prevent all new noise sources from increasing the existing noise levels above acceptable standards.

POLICY HS.8.1 New development projects should meet acceptable exterior noise level standards. The normally acceptable noise standards for new land uses are established in Land Use Compatibility for Community Exterior Noise Environments (refer to **Table 6** of this report).

> **Action HS.8.1.1** Adopt a noise ordinance with noise level performance standards, including maximum allowable noise exposure, ambient versus nuisance noise, method of measuring noise, and enforcement procedures.
>
> **Action HS.8.1.2** Review development proposals to assure consistency with noise standards. Require new development of noise-creating uses to conform to the City's noise level standards.
>
> **Action HS.8.1.3** Require a combination of design features to reduce noise impacts on adjacent properties through the following and other means, as appropriate:
>
> - Screen and control noise sources such as parking, outdoor activities and mechanical equipment.
> - Increase setbacks for noise sources from adjacent dwellings.
> - Modify building designs and site planning to reduce noise exposure through a combination of sound attenuation (e.g., sound-rated windows and ventilation systems, insulation, physical and landscape buffers) and site planning (e.g., increased separation and private open area buffers) to reduce noise exposure.
> - Control hours of operation, including deliveries and trash pickup, to minimize noise impacts.
> - Require additional landscaping to assist with buffering where feasible.

POLICY HS.8.2 Ensure that proposed nonresidential land uses likely to exceed the City's standards do not create noise disturbances in existing noise-sensitive areas.

> **Action HS.8.2.1** Require an acoustical analysis as part of the environmental review process when noise-sensitive land uses are proposed in areas where current or projected exterior noise levels exceed the City's standards.
>
> **Action HS.8.2.2** Require that any potential noise impacts identified during the acoustical analysis be mitigated in the project design to the maximum extent feasible.
>
> **Action HS.8.2.3** Prepare and periodically update a map of citywide noise-sensitive areas.

POLICY HS.8.3 Work with the railroads and adjoining communities to seek quiet zone status for rail lines through Pinole.

GOAL HS.9 Eliminate or reduce noise from existing objectionable noise sources.

POLICY HS.9.1 Noise created by commercial or industrial sources associated with new projects or developments should be controlled so as not to exceed the noise level standards set forth in the

table below (Maximum Allowable Noise Exposure for Stationary Noise Sources), as measured at any affected residential land use.

> **Action HS.9.1.1** Adopt the following allowable noise standards (Refer to **Table 7** of this report.)

Mitigation Measures

Implementation of the above policies and standards would reduce noise associated with new stationary noise sources and the placement of new noise-sensitive land uses over which the City has jurisdiction (e.g., commercial and industrial sites, residential uses). Future development projects to be reviewed to assure consistency with the City's noise level standards. However, some stationary noise impacts cannot be mitigated to a less than significant level due to limitations on the City to control the exact placement of substantial noise-generating uses (e.g., school facilities) in proximity to noise-sensitive land uses (e.g., residential). Accordingly, stationary source noise levels from activities on uses for which the City has limited control could result in noise levels that exceed the City's maximum allowable noise standards. Thus, this impact is considered **significant and unavoidable.** No additional feasible mitigation has been identified that would further reduce this impact.

Exposure to Groundborne Vibration

Impact 6 The proposed General Plan Update could result in exposure of persons to or generation of excessive groundborne vibration levels. As a result, this impact is considered **potentially significant**.

The effects of ground vibration can vary from no perceptible effects at the lowest levels, low rumbling sounds and detectable vibrations at moderate levels, and slight damage to nearby structures at the highest levels. At the highest levels of vibration, damage to structures is primarily architectural (e.g., loosening and cracking of plaster or stucco coatings) and rarely results in structural damage. The effects of ground vibration are influenced by the duration of the vibration and the distance from the vibration source.

There are no federal, state, or local regulatory standards for vibration. However, various criteria have been established to assist in the evaluation of vibration impacts. For instance, Caltrans has developed vibration criteria based on human perception and structural damage risks. For most structures, Caltrans considers a peak-particle velocity (ppv) threshold of 0.2 inches per second (in/sec) to be the level at which architectural damage (i.e., minor cracking of plaster walls and ceilings) to normal structures may occur. Below 0.10 in/sec there is "virtually no risk of 'architectural' damage to normal buildings." Damage to historic or ancient buildings could occur at levels of 0.08 in/sec ppv. In terms of human annoyance, continuous vibrations in excess of 0.1 in/sec ppv are identified by Caltrans as the minimum level perceptible level for ground vibration. Short periods of ground vibration in excess of 0.2 in/sec ppv can be expected to result in increased levels of annoyance to people within buildings (Caltrans, 2002b).

Groundborne vibration sources located within the city that could potentially affect future development would be primarily associated with railroad operations. Construction activities could also result in short-term groundborne vibration levels that could affect nearby sensitive land uses. Groundborne vibration levels and associated impacts as a result of trains traveling along the UPRR and BNSF railroads and short-term construction activities are discussed in more detail below.

Railroad

Groundborne vibration levels associated with railroad operations are dependent on various factors, including track type and condition, train speeds, site conditions, and train characteristics, such as the number of engines, number of cars, weight, and wheel type and condition. Site and geologic conditions can also influence how vibration propagates at increasing distance from the track. Based on Caltrans vibration measurement data, the highest train vibration level measured was 0.36 in/sec at 10 feet. Based on this level, Caltrans prepared a "drop-off curve" used to estimate maximum train vibration levels at distance from the track centerline. The curve represents maximum expected vibration levels from trains and thus is considered by Caltrans to be "very conservative" (Caltrans 2002b).

Based on the Caltrans drop-off curve for train vibration levels, predicted maximum groundborne vibrations levels along the UPRR corridors would not exceed 0.20 in/sec ppv beyond approximately 7.5 feet from the track centerline, the level above which architectural damage for typical building construction or increased levels of annoyance for individuals in buildings may occur (Caltrans, 2002b). The proposed General Plan Update would not result in the development of new land uses within 7.5 feet of railroad track centerlines which in turn would not result in the exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels. As a result, this impact would be considered **less than significant**.

Construction Activities

With the exception of pavement breaking, blasting, and pile driving, construction activities and related equipment typically generate groundborne vibration levels of less than 0.2 in/sec, which is the architectural damage risk threshold recommended by Caltrans. Based on Caltrans measurement data, use of off-road tractors, dozers, earthmovers, and haul trucks generates groundborne vibration levels of less than 0.10 in/sec, or one half of the architectural damage risk level, at 10 feet. The highest vibration level associated with a pavement breaker was 2.88 in/sec at 10 feet. During pile driving, vibration levels near the source depend mainly on the soil's penetration resistance as well as the type of pile driver used. Impact pile drivers tend to generate higher vibration levels than vibratory or drilled piles. Groundborne vibration levels of pile drivers can range from approximately 0.17 to 1.5 in/sec ppv. Caltrans indicates that the distance to the 0.2 in/sec ppv criterion for pile driving activities would occur at a distance of approximately 50 feet. However, as with construction-generated noise levels, pile driving can result in a high potential for human annoyance from vibrations, and pile-driving activities are typically considered as potentially significant if these activities are performed within 200 feet of occupied structures (Caltrans, 2002b). Vibration levels associated with blasting are highly variable, site-specific, and dependent on various factors, such as the amount of explosive used, soil conditions between the blast site and the receptor, and the depth where blasting would take place. Blasting that occurs below the surface would typically produce lower vibration levels at a receptor due to additional attenuation provided by distance and transmission through soil and rock. No applicable City Code sections or General Plan policies have been identified that would reduce this impact. As a result, this impact would be considered **potentially significant**.

Applicable City Code Sections that Provide Mitigation

The City's Municipal Code does not identify groundborne vibration criteria for groundborne vibration. As noted earlier in this report, the City's Municipal Code (Title 15, Chapter II, Section 15.02.070, *General Regulations of Construction)* includes hourly restrictions and nuisance provisions pertaining to construction activities (City of Pinole 2010).

Proposed General Plan Update Policies that Provide Mitigation

No applicable proposed General Plan policies have been identified that would reduce this impact.

Mitigation Measures

Similar to short-term noise from construction activities, vibrations from construction activities is inevitable and cannot be mitigated beyond a certain level. Thus, local agencies frequently tolerate short-term vibrations at levels that they would not accept for permanent vibration sources. A more severe approach would be impractical, and might preclude the kind of construction activities that are inevitable from time to time in urban environments. Most residents of urban areas recognize this reality, and expect to experience vibration from construction activities on occasion. Vibration from construction activities is considered to be temporary in the sense that once the construction activities cease, so to will the vibrations from the construction activities. Vibrations from construction activities are also considered to be intermittent due to the type, location and duration of construction equipment being used.

Due to the short-term nature of construction vibrations, the intermittent frequency of construction vibrations, and the required compliance with the City's Municipal Code hourly restrictions for construction-related activities, construction vibration level increases would typically not result in exposure of persons to or generation of excessive groundborne vibration. By restricting the hours of construction to avoid vibrations during times when it could potentially be more of a nuisance, the impact of new construction vibration is reduced to a **less than significant** level. In addition, individual development projects will be subject to site-specific environmental review, which will necessitate identification of site-specific mitigation in the event that significant impacts are identified.

CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative noise setting includes future development anticipated within Contra Costa County in addition to buildout of the proposed General Plan Update. The future (cumulative) ambient noise environment will be affected by buildout of the proposed Pinole General Plan. Cumulative development would alter the intensity of land uses in the region and increase housing, employment, shopping, and recreational opportunities. Such development would result in new noise generators and noise-sensitive land uses and potentially increase land use conflicts and hazards associated with noise.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Transportation Noise Impacts

Impact 7 Implementation of the proposed General Plan Update, in combination with other development in nearby unincorporated areas of the County, would increase transportation noise along area roadways. This would be a **cumulatively considerable** impact.

As identified in **Table 10**, implementation of the proposed General Plan Update, in combination with anticipated growth by the year 2030, would result in noticeable increases in traffic noise. In

comparison to existing conditions, increases in traffic noise levels of up to approximately 7 dBA CNEL would occur along area roadways. Of the major roadways analyzed, implementation of the proposed General Plan Update would result in noticeable increases in traffic noise levels (i.e., 3 dBA or greater) along San Pablo Avenue, east of Pinole Valley Road; Pinole Valley Road, south of Wright Ave.; Henry Avenue, east of Ridgecrest Drive; and Shea Drive, west of Pinole Valley Road. Significant increases in traffic noise levels along some smaller local roadways could also potentially occur, particularly in areas located near proposed future development projects. This would be a **cumulatively considerable** impact.

Proposed General Plan Policies that Provide Mitigation

The proposed General Plan Update policies include mitigation requirements that contain specific performance standards addressing transportation noise. These policies are listed under *Impact 3*.

Mitigation Measures

Implementation of the proposed General Plan Update noise policies identified under *Impact 3* would reduce potential transportation noise impacts in the city. Future development projects would be required to analyze project-related noise impacts and incorporate necessary noise-reduction measures sufficient to achieve applicable noise standards. Implementation of these policies and actions will help to reduce impacts associated with proposed development. Noise-reduction measures typically implemented to reduce transportation noise include increased insulation and building requirements, setbacks, and construction of sound barriers. Some measures, such as construction of sound barriers, may have secondary impacts related to aesthetics and safety. The feasibility of these measures would be determined on a project-by-project basis.

However, it is may not be possible to fully mitigate transportation noise in all areas of the city, particularly in existing development that may be constrained due to age, placement, or other factors which limit the feasibility of mitigation (residents fronting on the roadway that limits the ability to utilize noise barrier). In addition, the City does not have jurisdiction to implement noise mitigation outside of its boundaries to address potential noise impacts to the City of Richmond, The City of Hercules, or unincorporated area of Contra Costa County. As a result, the proposed General Plan Update's contribution to cumulative traffic noise would be **cumulatively considerable** and a **significant and unavoidable** impact.

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TRAFFIC NOISE MODELING

EXISTING CONDITIONS

SAN PABLO AVE, W OF DEL MONTE DR/BELMONT WAY

```
     TRAFFIC DISTRIBUTION PERCENTAGES
     DAY        EVENING    NIGHT
     ---        -------    -----
AUTOS      75.51      12.57      9.34
M-TRUCKS      1.56       0.09      0.19
H-TRUCKS      0.64       0.02      0.08
ADT:  17100     SPEED:  45     ACTIVE HALF WIDTH (FT):  21
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  67.92
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   0.0     108.2     229.6     492.8
```

SAN PABLO AVE, W OF APPIAN WAY

```
     TRAFFIC DISTRIBUTION PERCENTAGES
     DAY        EVENING    NIGHT
     ---        -------    -----
AUTOS      75.51      12.57      9.34
M-TRUCKS      1.56       0.09      0.19
H-TRUCKS      0.64       0.02      0.08
ADT:  20600     SPEED:  35     ACTIVE HALF WIDTH (FT):  21
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  66.04
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   0.0      82.2     172.5     369.4
```

SAN PABLO AVE, E OF PINOLE VALLEY RD

```
     TRAFFIC DISTRIBUTION PERCENTAGES
     DAY        EVENING    NIGHT
     ---        -------    -----
AUTOS      75.51      12.57      9.34
M-TRUCKS      1.56       0.09      0.19
H-TRUCKS      0.64       0.02      0.08
ADT:  20900     SPEED:  25     ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  62.85
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   0.0       0.0     103.2     219.5
```

APPIAN WAY, S OF TARA HILLS DRIVE/CANYON DRIVE

```
     TRAFFIC DISTRIBUTION PERCENTAGES
     DAY        EVENING    NIGHT
     ---        -------    -----
AUTOS      75.51      12.57      9.34
M-TRUCKS      1.56       0.09      0.19
H-TRUCKS      0.64       0.02      0.08
ADT:  34300     SPEED:  35     ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  67.66
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  59.8     115.5     242.2     518.5
```

APPIAN WAY, S OF MICHAEL DRIVE

```
     TRAFFIC DISTRIBUTION PERCENTAGES
     DAY        EVENING    NIGHT
     ---        -------    -----
AUTOS      75.51      12.57      9.34
M-TRUCKS      1.56      0.09      0.19
H-TRUCKS      0.64      0.02      0.08
ADT:  27500     SPEED:  35     ACTIVE HALF WIDTH (FT):  21
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  67.29
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   0.0      98.6     208.7     447.6
```

PINOLE VALLEY ROAD, N OF HENRY AVE

```
     TRAFFIC DISTRIBUTION PERCENTAGES
     DAY        EVENING    NIGHT
     ---        -------    -----
AUTOS      75.51      12.57      9.34
M-TRUCKS      1.56      0.09      0.19
H-TRUCKS      0.64      0.02      0.08
ADT:  14100     SPEED:  25     ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  61.14
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   0.0       0.0      80.2     169.3
```

PINOLE VALLEY ROAD, S OF ESTATE AVE

```
     TRAFFIC DISTRIBUTION PERCENTAGES
     DAY        EVENING    NIGHT
     ---        -------    -----
AUTOS      75.51      12.57      9.34
M-TRUCKS      1.56      0.09      0.19
H-TRUCKS      0.64      0.02      0.08
ADT:  19000     SPEED:  30     ACTIVE HALF WIDTH (FT):  21
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  64.08
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   0.0      62.5     128.5     273.8
```

PINOLE VALLEY ROAD, S OF WRIGHT AVE

```
     TRAFFIC DISTRIBUTION PERCENTAGES
     DAY        EVENING    NIGHT
     ---        -------    -----
AUTOS      76.14      12.66      9.52
M-TRUCKS      1.56      0.08      0.01
H-TRUCKS      0.01      0.01      0.01
ADT:  3200     SPEED:  35     ACTIVE HALF WIDTH (FT):  6
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  57.82
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   0.0       0.0       0.0      86.1
```

HENRY AVE, E OF RIDGECREST RD

```
     TRAFFIC DISTRIBUTION PERCENTAGES
     DAY        EVENING    NIGHT
     ---        -------    -----
AUTOS      76.14      12.66      9.52
```

M-TRUCKS 1.56 0.08 0.01
H-TRUCKS 0.01 0.01 0.01
ADT: 1700 SPEED: 25 ACTIVE HALF WIDTH (FT): 6
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 51.11
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
--- --- --- ---
0.0 0.0 0.0 0.0

FITZGERALD DRIVE, W OF APPIAN WAY
TRAFFIC DISTRIBUTION PERCENTAGES
DAY EVENING NIGHT
--- --- ---
AUTOS 75.51 12.57 9.34
M-TRUCKS 1.56 0.09 0.19
H-TRUCKS 0.64 0.02 0.08
ADT: 18100 SPEED: 30 ACTIVE HALF WIDTH (FT): 18
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 64.09
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
--- --- --- ---
0.0 59.8 124.0 265.0

SHEA DRIVE, W OF PINOLE VALLEY RD
TRAFFIC DISTRIBUTION PERCENTAGES
DAY EVENING NIGHT
--- --- ---
AUTOS 76.14 12.66 9.52
M-TRUCKS 1.56 0.08 0.01
H-TRUCKS 0.01 0.01 0.01
ADT: 3500 SPEED: 25 ACTIVE HALF WIDTH (FT): 6
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 54.25
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
--- --- --- ---
0.0 0.0 0.0 0.0

I-80, W OF APPIAN WAY
TRAFFIC DISTRIBUTION PERCENTAGES
DAY EVENING NIGHT
--- --- ---
AUTOS 74.91 12.58 8.33
M-TRUCKS 1.16 0.21 0.23
H-TRUCKS 1.64 0.55 0.39
ADT: 190000 SPEED: 65 ACTIVE HALF WIDTH (FT): 42
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 82.81
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
--- --- --- ---
585.8 1259.3 2711.3 5839.6

I-80, APPIAN WAY TO PINOLE VALLEY RD
TRAFFIC DISTRIBUTION PERCENTAGES
DAY EVENING NIGHT
--- --- ---
AUTOS 74.91 12.58 8.33
M-TRUCKS 1.16 0.21 0.23
H-TRUCKS 1.64 0.55 0.39
ADT: 194000 SPEED: 65 ACTIVE HALF WIDTH (FT): 42
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 82.90
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL 65 CNEL 60 CNEL 55 CNEL
--- --- --- ---
594.0 1276.9 2749.2 5921.3

I-80, E OF PINOLE VALLEY RD

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	74.91	12.58	8.33
M-TRUCKS	1.16	0.21	0.23
H-TRUCKS	1.64	0.55	0.39

ADT: 182000 SPEED: 65 ACTIVE HALF WIDTH (FT): 42
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 82.62
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
--- --- --- ---
569.3 1223.7 2634.7 5674.6

CUMULATIVE CONDITIONS

SAN PABLO AVE, W OF DEL MONTE DR/BELMONT WAY

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ADT: 29500 SPEED: 45 ACTIVE HALF WIDTH (FT): 21
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 70.29
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
--- --- --- ---
73.9 154.1 329.4 708.4

SAN PABLO AVE, W OF APPIAN WAY

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ADT: 32000 SPEED: 35 ACTIVE HALF WIDTH (FT): 21
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 67.95
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
--- --- --- ---
0.0 108.7 230.6 495.1

SAN PABLO AVE, E OF PINOLE VALLEY RD

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ADT: 47000 SPEED: 25 ACTIVE HALF WIDTH (FT): 18
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 66.37
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
--- --- --- ---
0.0 82.9 175.2 375.9

APPIAN WAY, S OF TARA HILLS DRIVE/CANYON DRIVE

```
     TRAFFIC DISTRIBUTION PERCENTAGES
     DAY        EVENING    NIGHT
     ---        -------    -----
AUTOS      75.51      12.57      9.34
M-TRUCKS      1.56       0.09      0.19
H-TRUCKS      0.64       0.02      0.08
ADT:  46600     SPEED:  35     ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  68.99
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  70.3     140.1     296.3     635.6
```

APPIAN WAY, S OF MICHAEL DRIVE

```
     TRAFFIC DISTRIBUTION PERCENTAGES
     DAY        EVENING    NIGHT
     ---        -------    -----
AUTOS      75.51      12.57      9.34
M-TRUCKS      1.56       0.09      0.19
H-TRUCKS      0.64       0.02      0.08
ADT:  41000     SPEED:  35     ACTIVE HALF WIDTH (FT):  21
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  69.02
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  62.0     127.5     271.7     583.8
```

PINOLE VALLEY ROAD, N OF HENRY AVE

```
     TRAFFIC DISTRIBUTION PERCENTAGES
     DAY        EVENING    NIGHT
     ---        -------    -----
AUTOS      75.51      12.57      9.34
M-TRUCKS      1.56       0.09      0.19
H-TRUCKS      0.64       0.02      0.08
ADT:  18800     SPEED:  25     ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  62.39
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   0.0       0.0      96.3     204.7
```

PINOLE VALLEY ROAD, S OF ESTATE AVE

```
     TRAFFIC DISTRIBUTION PERCENTAGES
     DAY        EVENING    NIGHT
     ---        -------    -----
AUTOS      75.51      12.57      9.34
M-TRUCKS      1.56       0.09      0.19
H-TRUCKS      0.64       0.02      0.08
ADT:  19900     SPEED:  30     ACTIVE HALF WIDTH (FT):  21
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  64.28
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   0.0      64.2     132.4     282.3
```

PINOLE VALLEY ROAD, S OF WRIGHT AVE

```
     TRAFFIC DISTRIBUTION PERCENTAGES
     DAY        EVENING    NIGHT
     ---        -------    -----
AUTOS      76.14      12.66      9.52
M-TRUCKS      1.56       0.08      0.01
```

H-TRUCKS 0.01 0.01 0.01
ADT: 6600 SPEED: 35 ACTIVE HALF WIDTH (FT): 6
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 60.97
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
--- --- --- ---
0.0 0.0 64.8 139.2

HENRY AVE, E OF RIDGECREST RD
TRAFFIC DISTRIBUTION PERCENTAGES
DAY EVENING NIGHT
--- --- ---
AUTOS 76.14 12.66 9.52
M-TRUCKS 1.56 0.08 0.01
H-TRUCKS 0.01 0.01 0.01
ADT: 8000 SPEED: 25 ACTIVE HALF WIDTH (FT): 6
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 57.84
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
--- --- --- ---
0.0 0.0 0.0 86.3

FITZGERALD DRIVE, W OF APPIAN WAY
TRAFFIC DISTRIBUTION PERCENTAGES
DAY EVENING NIGHT
--- --- ---
AUTOS 75.51 12.57 9.34
M-TRUCKS 1.56 0.09 0.19
H-TRUCKS 0.64 0.02 0.08
ADT: 30000 SPEED: 30 ACTIVE HALF WIDTH (FT): 18
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 66.28
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
--- --- --- ---
0.0 81.8 172.8 370.7

SHEA DRIVE, W OF PINOLE VALLEY RD
TRAFFIC DISTRIBUTION PERCENTAGES
DAY EVENING NIGHT
--- --- ---
AUTOS 76.14 12.66 9.52
M-TRUCKS 1.56 0.08 0.01
H-TRUCKS 0.01 0.01 0.01
ADT: 8600 SPEED: 25 ACTIVE HALF WIDTH (FT): 6
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 58.16
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
--- --- --- ---
0.0 0.0 0.0 90.5

I-80, W OF APPIAN WAY
TRAFFIC DISTRIBUTION PERCENTAGES
DAY EVENING NIGHT
--- --- ---
AUTOS 74.91 12.58 8.33
M-TRUCKS 1.16 0.21 0.23
H-TRUCKS 1.64 0.55 0.39
ADT*: 226000 SPEED: 65 ACTIVE HALF WIDTH (FT): 42
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 83.56
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL

```
------- -------  -------  -------
  657.3    1413.5    3043.7    6555.7
```
**ADT assumes 19% increase in projected future traffic volumes in comparison to existing conditions (CCTA 2009).*

I-80, APPIAN WAY TO PINOLE VALLEY RD

```
      TRAFFIC DISTRIBUTION PERCENTAGES
      DAY        EVENING    NIGHT
      ---        -------    -----
AUTOS       74.91       12.58       8.33
M-TRUCKS        1.16        0.21        0.23
H-TRUCKS        1.64        0.55        0.39
ADT*:  231000      SPEED:  65      ACTIVE HALF WIDTH (FT):  42
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  83.65
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
------- -------  -------  -------
  666.9    1434.3    3088.4    6652.0
```
**ADT assumes 19% increase in projected future traffic volumes in comparison to existing conditions (CCTA 2009).*

I-80, E OF PINOLE VALLEY RD

```
      TRAFFIC DISTRIBUTION PERCENTAGES
      DAY        EVENING    NIGHT
      ---        -------    -----
AUTOS       74.91       12.58       8.33
M-TRUCKS        1.16        0.21        0.23
H-TRUCKS        1.64        0.55        0.39
ADT*:  217000      SPEED:  65      ACTIVE HALF WIDTH (FT):  42
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  83.38
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
------- -------  -------  -------
  639.8    1375.8    2962.4    6380.5
```
**ADT assumes 19% increase in projected future traffic volumes in comparison to existing conditions (CCTA 2009).*

TRAFFIC NOISE MODELING

EXISTING CONDITIONS

SAN PABLO AVE, W OF DEL MONTE DR/BELMONT WAY

```
      TRAFFIC DISTRIBUTION PERCENTAGES
      DAY        EVENING    NIGHT
      ---        -------    -----
AUTOS       75.51       12.57       9.34
M-TRUCKS        1.56        0.09        0.19
H-TRUCKS        0.64        0.02        0.08
ADT:  17100     SPEED:  45     ACTIVE HALF WIDTH (FT):  21
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  67.92
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   0.0      108.2      229.6      492.8
```

SAN PABLO AVE, W OF APPIAN WAY

```
      TRAFFIC DISTRIBUTION PERCENTAGES
      DAY        EVENING    NIGHT
      ---        -------    -----
AUTOS       75.51       12.57       9.34
M-TRUCKS        1.56        0.09        0.19
H-TRUCKS        0.64        0.02        0.08
ADT:  20600     SPEED:  35     ACTIVE HALF WIDTH (FT):  21
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  66.04
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   0.0       82.2      172.5      369.4
```

SAN PABLO AVE, E OF PINOLE VALLEY RD

```
      TRAFFIC DISTRIBUTION PERCENTAGES
      DAY        EVENING    NIGHT
      ---        -------    -----
AUTOS       75.51       12.57       9.34
M-TRUCKS        1.56        0.09        0.19
H-TRUCKS        0.64        0.02        0.08
ADT:  20900     SPEED:  25     ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  62.85
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   0.0        0.0      103.2      219.5
```

APPIAN WAY, S OF TARA HILLS DRIVE/CANYON DRIVE

```
      TRAFFIC DISTRIBUTION PERCENTAGES
      DAY        EVENING    NIGHT
      ---        -------    -----
AUTOS       75.51       12.57       9.34
M-TRUCKS        1.56        0.09        0.19
H-TRUCKS        0.64        0.02        0.08
ADT:  34300     SPEED:  35     ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  67.66
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  59.8      115.5      242.2      518.5
```

APPIAN WAY, S OF MICHAEL DRIVE

```
      TRAFFIC DISTRIBUTION PERCENTAGES
      DAY        EVENING    NIGHT
      ---        -------    -----
AUTOS       75.51       12.57       9.34
M-TRUCKS        1.56        0.09        0.19
H-TRUCKS        0.64        0.02        0.08
ADT:  27500     SPEED:  35     ACTIVE HALF WIDTH (FT):  21
```

SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 67.29
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	98.6	208.7	447.6

PINOLE VALLEY ROAD, N OF HENRY AVE

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ADT: 14100 SPEED: 25 ACTIVE HALF WIDTH (FT): 18
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 61.14
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	80.2	169.3

PINOLE VALLEY ROAD, S OF ESTATE AVE

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ADT: 19000 SPEED: 30 ACTIVE HALF WIDTH (FT): 21
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 64.08
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	62.5	128.5	273.8

PINOLE VALLEY ROAD, S OF WRIGHT AVE

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	76.14	12.66	9.52
M-TRUCKS	1.56	0.08	0.01
H-TRUCKS	0.01	0.01	0.01

ADT: 3200 SPEED: 35 ACTIVE HALF WIDTH (FT): 6
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 57.82
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	86.1

HENRY AVE, E OF RIDGECREST RD

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	76.14	12.66	9.52
M-TRUCKS	1.56	0.08	0.01
H-TRUCKS	0.01	0.01	0.01

ADT: 1700 SPEED: 25 ACTIVE HALF WIDTH (FT): 6
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 51.11
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

FITZGERALD DRIVE, W OF APPIAN WAY

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19

H-TRUCKS 0.64 0.02 0.08
ADT: 18100 SPEED: 30 ACTIVE HALF WIDTH (FT): 18
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 64.09
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
--- --- --- ---
0.0 59.8 124.0 265.0

SHEA DRIVE, W OF PINOLE VALLEY RD
TRAFFIC DISTRIBUTION PERCENTAGES
DAY EVENING NIGHT
--- --- ---
AUTOS 76.14 12.66 9.52
M-TRUCKS 1.56 0.08 0.01
H-TRUCKS 0.01 0.01 0.01
ADT: 3500 SPEED: 25 ACTIVE HALF WIDTH (FT): 6
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 54.25
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
--- --- --- ---
0.0 0.0 0.0 0.0

I-80, W OF APPIAN WAY
TRAFFIC DISTRIBUTION PERCENTAGES
DAY EVENING NIGHT
--- --- ---
AUTOS 74.91 12.58 8.33
M-TRUCKS 1.16 0.21 0.23
H-TRUCKS 1.64 0.55 0.39
ADT: 190000 SPEED: 65 ACTIVE HALF WIDTH (FT): 42
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 82.81
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
--- --- --- ---
585.8 1259.3 2711.3 5839.6

I-80, APPIAN WAY TO PINOLE VALLEY RD
TRAFFIC DISTRIBUTION PERCENTAGES
DAY EVENING NIGHT
--- --- ---
AUTOS 74.91 12.58 8.33
M-TRUCKS 1.16 0.21 0.23
H-TRUCKS 1.64 0.55 0.39
ADT: 194000 SPEED: 65 ACTIVE HALF WIDTH (FT): 42
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 82.90
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
--- --- --- ---
594.0 1276.9 2749.2 5921.3

I-80, E OF PINOLE VALLEY RD
TRAFFIC DISTRIBUTION PERCENTAGES
DAY EVENING NIGHT
--- --- ---
AUTOS 74.91 12.58 8.33
M-TRUCKS 1.16 0.21 0.23
H-TRUCKS 1.64 0.55 0.39
ADT: 182000 SPEED: 65 ACTIVE HALF WIDTH (FT): 42
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 82.62
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
--- --- --- ---
569.3 1223.7 2634.7 5674.6

CUMULATIVE CONDITIONS

SAN PABLO AVE, W OF DEL MONTE DR/BELMONT WAY
TRAFFIC DISTRIBUTION PERCENTAGES

DAY EVENING NIGHT
--- ------- -----
AUTOS 75.51 12.57 9.34
M-TRUCKS 1.56 0.09 0.19
H-TRUCKS 0.64 0.02 0.08
ADT: 29500 SPEED: 45 ACTIVE HALF WIDTH (FT): 21
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 70.29
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
------- ------- ------- -------
73.9 154.1 329.4 708.4

SAN PABLO AVE, W OF APPIAN WAY
TRAFFIC DISTRIBUTION PERCENTAGES
DAY EVENING NIGHT
--- ------- -----
AUTOS 75.51 12.57 9.34
M-TRUCKS 1.56 0.09 0.19
H-TRUCKS 0.64 0.02 0.08
ADT: 32000 SPEED: 35 ACTIVE HALF WIDTH (FT): 21
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 67.95
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
------- ------- ------- -------
0.0 108.7 230.6 495.1

SAN PABLO AVE, E OF PINOLE VALLEY RD
TRAFFIC DISTRIBUTION PERCENTAGES
DAY EVENING NIGHT
--- ------- -----
AUTOS 75.51 12.57 9.34
M-TRUCKS 1.56 0.09 0.19
H-TRUCKS 0.64 0.02 0.08
ADT: 47000 SPEED: 25 ACTIVE HALF WIDTH (FT): 18
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 66.37
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
------- ------- ------- -------
0.0 82.9 175.2 375.9

APPIAN WAY, S OF TARA HILLS DRIVE/CANYON DRIVE
TRAFFIC DISTRIBUTION PERCENTAGES
DAY EVENING NIGHT
--- ------- -----
AUTOS 75.51 12.57 9.34
M-TRUCKS 1.56 0.09 0.19
H-TRUCKS 0.64 0.02 0.08
ADT: 46600 SPEED: 35 ACTIVE HALF WIDTH (FT): 30
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 68.99
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
------- ------- ------- -------
70.3 140.1 296.3 635.6

APPIAN WAY, S OF MICHAEL DRIVE
TRAFFIC DISTRIBUTION PERCENTAGES
DAY EVENING NIGHT
--- ------- -----
AUTOS 75.51 12.57 9.34
M-TRUCKS 1.56 0.09 0.19
H-TRUCKS 0.64 0.02 0.08
ADT: 41000 SPEED: 35 ACTIVE HALF WIDTH (FT): 21
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 69.02
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL 65 CNEL 60 CNEL 55 CNEL
------- ------- ------- -------
62.0 127.5 271.7 583.8

PINOLE VALLEY ROAD, N OF HENRY AVE

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ADT: 18800 SPEED: 25 ACTIVE HALF WIDTH (FT): 18
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 62.39
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	96.3	204.7

PINOLE VALLEY ROAD, S OF ESTATE AVE

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ADT: 19900 SPEED: 30 ACTIVE HALF WIDTH (FT): 21
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 64.28
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	64.2	132.4	282.3

PINOLE VALLEY ROAD, S OF WRIGHT AVE

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	76.14	12.66	9.52
M-TRUCKS	1.56	0.08	0.01
H-TRUCKS	0.01	0.01	0.01

ADT: 6600 SPEED: 35 ACTIVE HALF WIDTH (FT): 6
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 60.97
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	64.8	139.2

HENRY AVE, E OF RIDGECREST RD

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	76.14	12.66	9.52
M-TRUCKS	1.56	0.08	0.01
H-TRUCKS	0.01	0.01	0.01

ADT: 8000 SPEED: 25 ACTIVE HALF WIDTH (FT): 6
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 57.84
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	86.3

FITZGERALD DRIVE, W OF APPIAN WAY

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ADT: 30000 SPEED: 30 ACTIVE HALF WIDTH (FT): 18
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 66.28
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL

0.0 81.8 172.8 370.7

SHEA DRIVE, W OF PINOLE VALLEY RD

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	76.14	12.66	9.52
M-TRUCKS	1.56	0.08	0.01
H-TRUCKS	0.01	0.01	0.01

ADT: 8600 SPEED: 25 ACTIVE HALF WIDTH (FT): 6
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 58.16
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	90.5

I-80, W OF APPIAN WAY

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	74.91	12.58	8.33
M-TRUCKS	1.16	0.21	0.23
H-TRUCKS	1.64	0.55	0.39

ADT*: 226000 SPEED: 65 ACTIVE HALF WIDTH (FT): 42
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 83.56
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
657.3	1413.5	3043.7	6555.7

**ADT assumes 19% increase in projected future traffic volumes in comparison to existing conditions (CCTA 2009).*

I-80, APPIAN WAY TO PINOLE VALLEY RD

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	74.91	12.58	8.33
M-TRUCKS	1.16	0.21	0.23
H-TRUCKS	1.64	0.55	0.39

ADT*: 231000 SPEED: 65 ACTIVE HALF WIDTH (FT): 42
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 83.65
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
666.9	1434.3	3088.4	6652.0

**ADT assumes 19% increase in projected future traffic volumes in comparison to existing conditions (CCTA 2009).*

I-80, E OF PINOLE VALLEY RD

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	74.91	12.58	8.33
M-TRUCKS	1.16	0.21	0.23
H-TRUCKS	1.64	0.55	0.39

ADT*: 217000 SPEED: 65 ACTIVE HALF WIDTH (FT): 42
SITE CHARACTERISTICS: SOFT GRADE (PERCENT): .5
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE = 83.38
* * DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *

70 CNEL	65 CNEL	60 CNEL	55 CNEL
639.8	1375.8	2962.4	6380.5

**ADT assumes 19% increase in projected future traffic volumes in comparison to existing conditions (CCTA 2009).*