



City of San Mateo
Community Development Department
Planning Division

Noise Study Info

Noise Element Standards

Attached is a copy of the Noise Element from the City of San of San Mateo General Plan. It defines the City's noise standards (both interior and exterior), upon which the findings of any required noise study should be based.

CEQA Noise Standards

In addition to the noise standards described in the Noise Element of the General Plan, the California Environmental Quality Act (CEQA) requires that the project be evaluated for the following potential noise related impacts:

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies,
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels,
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project, and
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

Noise Study Format

Also attached is an example of a noise study for a new multi-family development in San Mateo. All noise studies prepared for projects within the City of San Mateo should be formatted in a similar fashion, and should include:

- A description of the existing noise environment and a summary of noise measurement data, including a vicinity map indicating relevant information, such as the location of sound measurements,
- A review of the noise standards against which the project's anticipated noise levels are evaluated,
- An explanation of anticipated future noise sources,
- A summary of potential noise impacts and recommended mitigation measures, if necessary, and
- A conclusion.

For more details regarding noise studies, please contact the Planning Division at (650) 522-7212.

VIII. Noise

A. INTRODUCTION

The extent of exposure of the population to noise constitutes a major component of overall quality of life in the community. The Noise Element sets forth the City's goals and policies regarding the control of environmental noise and the protection of citizens from excessive noise exposure.

B. BACKGROUND

The following information does not attempt to fully describe all principles and data related to noise generation, but rather provides a setting for the goals and policies of this Element.

BASIC CONCEPTS OF ENVIRONMENTAL NOISE

Noise is commonly defined as unwanted sound. Environmental noise is a part of modern society – noise from transportation vehicles, machinery, and amplified sound. People can tolerate a certain amount of noise, but excessive levels become a nuisance and can ultimately result in hearing impairment.

Noise level or intensity is measured in decibels (dB), and ranges from 0 dB at the threshold of hearing to 140 dB, which is the threshold of pain. The sensitivity of human hearing decreases at extremely low and high frequencies and this is taken into account by the “A-weighted” decibel scale, which is sometimes expressed as “dBA.” All references to decibels in this document refer to the A-weighted decibel scale. In evaluating noise increases, it is important to know that a 3 dB change in noise level is just noticeable to the human ear, a 5 dB change is easily noticeable, and a 10 dB increase is perceived as a doubling of loudness.

Since community noise levels vary continuously, a variety of noise metrics (i.e., descriptors) were created to describe the time-varying character of environmental noise. One of the most common metrics is the average (equivalent) sound level, or L_{eq} . The L_{eq} is the average A-weighted sound level during a stated time period (often a one-hour period).

To evaluate community noise impacts, a descriptor was developed to account for human sensitivity to noise during the nighttime (sleeping) hours and to account for the overall lower community noise levels encountered at night. This descriptor is called the L_{dn} (or DNL); the L_{dn} represents a 24-hour average sound level with a 10 dB penalty added for nighttime noise between the hours of 10:00 p.m. and 7:00 a.m.

For suburban/rural highways and most roadways, the average noise level during the peak traffic periods (i.e., rush hour) is approximately equal to the L_{dn} . For urban highways, the L_{dn} is typically one to two dB higher than the peak hour L_{eq} .

HOW LOUD IS LOUD? Sound Level in Decibels (dBA)

Jet takeoff (200')	120	Threshold of pain
Rock music band	110	
Jackhammer (25')	100	
Motorcycle accelerating (25')	90	
Power lawn mower (20')	80	
Steady urban traffic (25')	70	
Normal conversation (3')	60	
Daytime street, no nearby traffic	50	
Inside average residence	40	
Inside quiet home	30	
Rustling leaves	20	
Mosquito (3')	10	
	0	Threshold of hearing

Every increase of 10 dB doubles the perceived loudness of noise. For example, a motorcycle accelerating (90 dB) seems twice as loud as a power lawn mower (80 dB).

NOISE IN SAN MATEO

A noise measurement survey was conducted in San Mateo during September 2008 to determine noise levels throughout the community. The results are represented as a contour map in Figure N-1. The noise contours show lines of equal sound level, but the contours are conservative since the shielding effect of buildings and local topography is not taken into account when creating the noise contours. Noise exposure in San Mateo is dominated by traffic and the Southern Pacific (SPRR)/Caltrain rail line. Aircraft activity associated with San Francisco International Airport does not significantly affect noise levels in San Mateo, although some neighborhoods in the northeastern portion of the City are impacted by the airport approach path. Localized noise sources include the San Mateo County Fairgrounds (when events are being held). Generally, noise created by manufacturing uses does not have a major impact on the community, although occasional complaints are received from neighbors immediately adjacent to the manufacturing sites.

The noise contour map is used to determine the suitability of land uses for different types of development, depending upon the extent of noise exposure in the area. The City of San Mateo has developed a list of “noise-sensitive” uses (see Tables N-1 and N-2), which include residential dwellings, schools, hospitals, hotels, and outdoor recreation areas. These uses should ideally be located in areas not exceeding 60 dB (L_{dn}) and 65 dB (L_{eq}) for outdoor recreational uses, but this is not reasonable in San Mateo where existing noise levels exceed 60 dB (L_{dn}) in all but a few of the western portions of the City (see Figure N-1). “Noise-sensitive” land uses could be located in areas having noise levels between 60 and 70 dB (L_{dn}) if noise mitigating construction measures are used to reduce interior sound levels to 45 dB (L_{dn}) or below as required by the State Building Code for multi-family dwellings, and extended by the City of San Mateo to new single-family dwellings. Exterior sound levels for new multi-family common open space should be reduced to below 67 dB (L_{dn}). For parks or playgrounds, the exterior sound level should be reduced to 65 dB (L_{eq}) during the noisiest hour; this can be accomplished by locating these spaces away from noise sources or buffering them by the placement of buildings between the noise source and the open space.

The areas of greatest noise impact in San Mateo, where 70 dB (L_{dn}) is exceeded and are therefore unsuitable for the location of new “noise-sensitive” uses, are in the residential neighborhoods adjacent to the Bayshore Freeway (US 101) and the SPRR/Caltrain rail corridor (see Figure N-1). Narrow portions adjacent to SR 92 and El Camino Real (SR 82) also exceed the City's guidelines. The projected cumulative noise increases in the year 2030 are shown in Figure N-2, and are very similar to existing conditions, with noise increases generally due to traffic increases.

MITIGATING NOISE IMPACTS

Noise mitigation measures fall into two general categories: physical mitigation and administrative regulation. Physical mitigation involves reducing the noise level, ideally at the source, through methods such as enclosing a noisy piece of equipment with a barrier or by substituting quieter machinery. Reduction in the overall community sound level can also occur

by limiting noise exposure of receivers to roadways and railways. This can be accomplished by installing sound walls, using sound-absorbing building materials, and through careful site planning (e.g., orienting buildings away from the noise source and eliminating narrow corridors open to the noise source). The walls and windows of a building typically reduce noise by approximately 20 dB. Noise barriers, such as sound walls and earthen berms provide varying reductions of noise, depending on their height and size. A solid wall that just breaks the line-of-sight between the noise source and receiver attenuates noise by 5 dB.

If noise cannot be reduced at the source as described above, the distance between the source and the receiver can be increased to attenuate the noise. A doubling of the distance from a fixed noise source (e.g., an air conditioning unit, train engine, or whistle) results in a 6 dB decrease in noise level; a doubling of distance from a linear source (e.g., a highway or roadway) results in a 3 dB decrease. Vegetation does little to reduce noise – a densely planted strip 50 feet wide is needed to reduce noise by 5 dB.

Administrative regulation reduces noise generation by limiting the operating hours or duration of the noise source, regulating locations where a noisy activity may occur, or enforcing State standards that limit noise emissions, such as automobile and boat muffler requirements.

TABLE N-1
NOISE SENSITIVE LAND-USE COMPATIBILITY GUIDELINES FOR
COMMUNITY NOISE ENVIRONMENTS¹
Day-Night Average Sound Level (L_{dn}), Decibels

Land-Use Category	Normally Acceptable²	Conditionally Acceptable³	Normally Unacceptable⁴
Single-Family Residential	50 to 59	60 to 70	Greater than 70
Multi-Family Residential	50 to 59	60 to 70	Greater than 70
Hotels, Motels, and Other Lodging Houses	50 to 59	60 to 70	Greater than 70
Long-Term Care Facilities	50 to 59	60 to 70	Greater than 70
Hospitals	50 to 59	60 to 70	Greater than 70
Schools	50 to 59	60 to 70	Greater than 70
Multi-Family Common Open Space Intended for the Use and Enjoyment of Residents	50 to 67	--	Greater than 67

TABLE N-2
NOISE GUIDELINES FOR OUTDOOR ACTIVITIES
Average Sound Level (L_{eq}), Decibels

Land Use Category	Normally Acceptable²	Conditionally Acceptable³	Normally Unacceptable⁴
Parks, Playgrounds	50 to 65*	--	Greater than 65*

¹ These guidelines are derived from the California Department of Health Services, Guidelines for the Preparation and Content of the Noise Element of the General Plan, 2003. The State Guidelines have been modified to reflect San Mateo's preference for distinct noise compatibility categories and to better reflect local land-use and noise conditions. It is intended that these guidelines be utilized to evaluate the suitability of land-use changes only and not to determine cumulative noise impacts. Land uses other than those classified as being "noise sensitive" are exempt from these compatibility guidelines.

² Normally Acceptable – Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

³ Conditionally Acceptable – New construction should be undertaken only after a detailed analysis of the noise reduction requirement is conducted and needed noise insulation features included in the design.

⁴ Normally Unacceptable – New construction should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

* Average Sound Level (L_{eq}) for peak hour.

C. GOALS AND POLICIES

GOALS AND POLICIES

GOAL 1: Protect “noise sensitive” land uses from excessive noise levels.

POLICIES:

- N 1.1: Interior Noise Level Standard.** Require submittal of an acoustical analysis and interior noise insulation for all “noise sensitive” land uses listed in Table N-1 that have an exterior noise level of 60 dB (L_{dn}) or above, as shown on Figure N-1. The maximum interior noise level shall not exceed 45 dB (L_{dn}) in any habitable rooms.
- N 1.2: Exterior Noise Level Standard.** Require an acoustical analysis for new parks, play areas, and multi-family common open space (intended for the use and the enjoyment of residents) that have an exterior noise level of 60 dB (L_{dn}) or above, as shown on Figure N-1. Require an acoustical analysis that uses peak hour L_{eq} for new parks and play areas. Require a feasibility analysis of noise reduction measures for public parks and play areas. Incorporate necessary mitigation measures into residential project design to minimize common open space noise levels. Maximum exterior noise should not exceed 67 dB (L_{dn}) for residential uses and should not exceed 65 dB (L_{eq}) during the noisiest hour for public park uses.

Implementation of N 1.1 and N1.2: Interior and Exterior Noise Level Standards.

As part of the development review process, an acoustical analysis is required for all new project types listed on Tables N-1 and N-2 when the site noise levels exceed the noise level standards established in the General Plan. Mitigation measures to reduce both exterior and interior noise to acceptable levels are required as part of the analysis, and are incorporated into the conditions of project approval.

Lead: Planning Division reviews General Plan and consults with Building Division on scope of analysis. Building Division approves content of final report and administers conditions of project approval. (Ongoing)

Most of San Mateo has existing noise levels that exceed the normally acceptable levels for “noise-sensitive” uses. Since the majority of the City is within the “conditionally acceptable” range of between 60 dB and 70 dB (L_{dn}), some form of noise mitigation will have to be incorporated into building and site design for new “noise-sensitive” land uses. While the State currently requires that multi-family dwellings in areas exceeding 60 dB (L_{dn}) incorporate mitigation measures to achieve an interior sound level of 45 dB (L_{dn}), the City of San Mateo will

extend this requirement to single-family dwellings. In most cases, the necessary sound attenuation can be accomplished with sound-rated double-pane windows.

A few of San Mateo's residential neighborhoods that border highways, El Camino Real (SR 82), and the railway line are subject to sound levels exceeding 70 dB (L_{dn}), which is in the “normally unacceptable” range for “noise-sensitive” uses. Rather than precluding new residential development in these areas, the City will require that building construction techniques be utilized that reduce interior sound to 45 dB (L_{dn}) or less.

Also of concern are outdoor recreation areas in new parks and schools. The City will require a feasibility study to determine whether measures to reduce exterior sound levels, such as sound walls, sheltering open space areas from noise sources by building walls, and placement of active use areas away from noise sources are feasible. Particular attention should be paid to the design of sound barriers so they are visually pleasing; this can often be accomplished through extensive landscape screening.

GOAL 2: Minimize unnecessary, annoying, or unhealthful noise.

POLICIES:

N 2.1: Noise Ordinance. Continue implementation and enforcement of the City's existing noise control ordinance: a) which prohibits noise that is annoying or injurious to neighbors of normal sensitivity, making such activity a public nuisance, and b) restricts the hours of construction to minimize noise impact.

Implementation of N 2.1: Noise Ordinance.

Noise nuisances, as defined in the City's Municipal Code, are abated through a standardized enforcement process, which includes referral to the Housing and Advisory Appeals Board. This includes noise generated by building construction and equipment at unauthorized times.

Lead: Code Enforcement Division. (Ongoing)

Enforcement of a noise control ordinance can reduce nuisance noise generated by commercial uses or from residential sources such as amplified music, parties, leaf blowers, or barking dogs. Construction activities also generate substantial short-term noise impacts, which can be limited to specified hours and days of the week.

N 2.2: Minimize Noise Impact. Protect all “noise-sensitive” land uses listed in Tables N-1 and N-2 from adverse impacts caused by the noise generated on-site by new developments. Incorporate necessary mitigation measures into development design to minimize noise impacts. Prohibit long-term exposure increases of 3 dB (L_{dn}) or greater at the common property line, or new uses which generate noise levels of 60 dB (L_{dn}) or greater at the property line, excluding existing ambient noise levels.

“Noise-sensitive” land uses, such as residential neighborhoods, hotels, hospitals, schools, and outdoor recreation areas must be protected from new development that causes discernable increases in noise levels as a result of on-site activities. Noise generators such as machinery or parking lots must be mitigated through physical measures or operational limits.

- N 2.3: Minimize Commercial Noise.** Protect land uses other than those listed as “noise sensitive” in Table N-1 from adverse impacts caused by the on-site noise generated by new developments. Incorporate necessary mitigation measures into development design to minimize noise impacts. Prohibit new uses that generate noise levels of 65 dB (L_{dn}) or above at the property line, excluding existing ambient noise levels.

Commercial and industrial areas typically tolerate higher noise levels than residential neighborhoods. However, some control is necessary for new development within non-residential areas so that exceptionally noisy uses are restricted.

Implementation of N 2.2 and N 2.3: Minimize Noise.

Where the potential exists for noise impacts inconsistent with these policies, a noise report identifying noise impacts and mitigation measures is required as part of the development review process. Mitigation measures are then incorporated as conditions of the project approval.

Lead: Planning Division reviews the General Plan and consults with the Building Division on the scope of the analysis. The Building Division approves the content of the final report and administers the conditions of project approval. (Ongoing)

- N 2.4: Traffic Noise.** Recognize projected increases in ambient noise levels resulting from traffic increases, as shown on Figure N-2. Promote the installation of noise barriers along highways where “noise-sensitive” land uses listed in Table N-1 are adversely impacted by unacceptable noise levels [60 dB (L_{dn}) or above]. Require adequate noise mitigation to be incorporated into the widening of SR 92 and US 101. Accept noise increases on El Camino Real at existing development, and require new multi-family development to provide common open space having a maximum exterior noise level of 67 dB (L_{dn}).

Implementation N 2.4: Traffic Noise.

Sound walls have been constructed along US 101. Preliminary design work has not yet started on the widening of SR 92; however, the issue of sound walls will be addressed during both the design and environmental review phases of the project. Noise standards for development along El Camino Real are imposed on a case-by-case basis consistent with this policy's guidelines. New multi-family developments are required to comply with exterior noise standards as part of the development review process for consistency with the State Building Code.

Lead: The Public Works Department coordinates sound wall construction with Caltrans. Planning and Building Divisions coordinate the review and application of conditions of approval for new development regarding compliance with this policy. (Ongoing)

The City recognizes that traffic will increase during the next 20 years, and that mitigating traffic noise is very difficult, except in certain instances. The installation of sound walls along highways is supported as an effective means of reducing this major impact. Sound walls are not appropriate, however, in residential neighborhoods or along major streets due to their visual impact and the need for street access points, which diminishes the effectiveness of the barriers.

N 2.5: Railroad Noise. Promote the installation of noise barriers along the railroad corridor where “noise-sensitive” land uses are adversely impacted by unacceptable noise levels [60 dB (L_{dn}) or greater]. Promote adequate noise mitigation to be incorporated into any rail service expansion or track realignment. Study the need of depressing the rail line to eliminate at-grade crossings or other mitigation measures to decrease noise levels prior to substantial expansion of the rail service.

Implementation N 2.5: Railroad Noise.

The Joint Powers Authority has completed a study of electrification of the rail lines, and has adopted a policy for its implementation. Electrification of the rail line, in conjunction with the elimination of at-grade crossings, would greatly reduce railroad noise impacts. Installation of noise barriers is analyzed on a project-by-project basis for development adjacent to the railroad. Noise impacts were also considered in the examination of alignment alternatives in the railroad corridor study.

Lead: The Public Works Department coordinates with the Joint Powers Authority on railroad alignment. The Planning and Building Divisions coordinate the review and application of conditions of approval for new development adjacent to the rail corridor regarding noise impacts. (Ongoing)

Another noise source that can be mitigated is the railroad corridor. The City supports the installation of sound walls along the rail line. If substantial increases in rail service occur as projected in the Circulation Element, the need for both noise mitigation and grade separation of the rail line and streets will increase. To achieve both objectives, the City and the Joint Powers Authority should consider depressing the rail line, particularly in the Downtown.



EXISTING NOISE CONTOURS

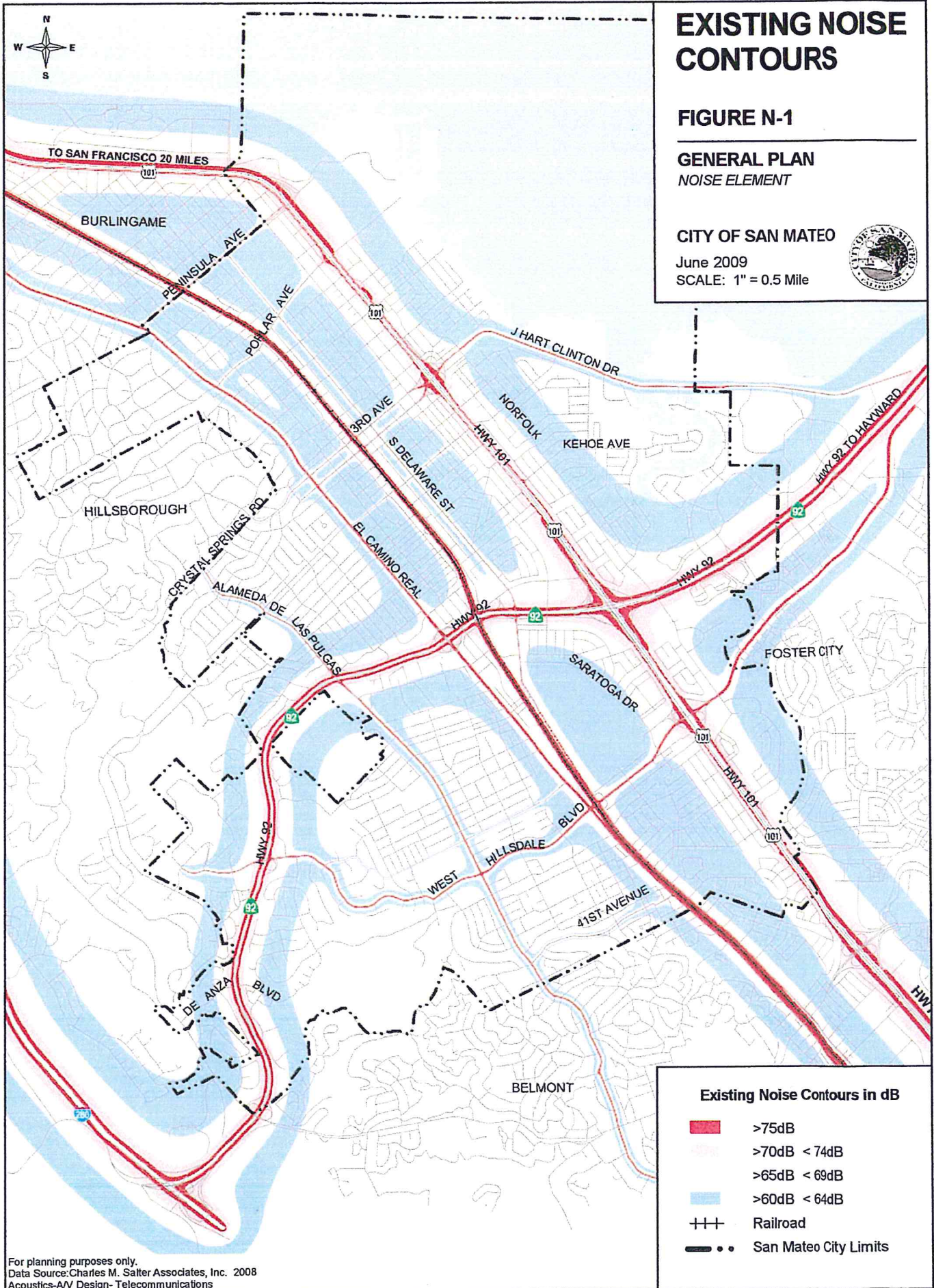
FIGURE N-1

GENERAL PLAN
NOISE ELEMENT

CITY OF SAN MATEO

June 2009

SCALE: 1" = 0.5 Mile





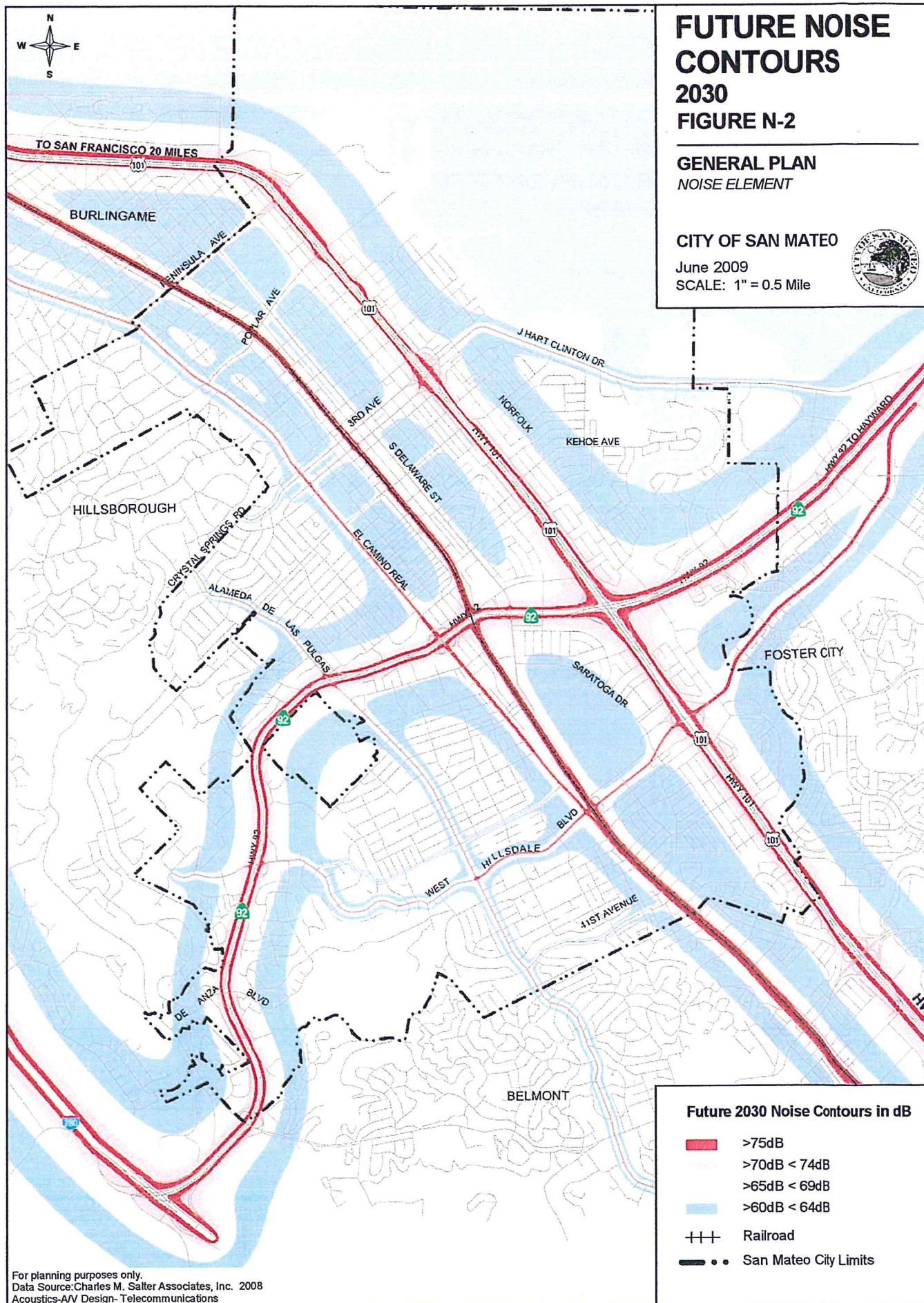
FUTURE NOISE CONTOURS 2030 FIGURE N-2

GENERAL PLAN
NOISE ELEMENT

CITY OF SAN MATEO

June 2009

SCALE: 1" = 0.5 Mile



7 March 2001

Evelyn Baker
City of San Mateo Development Department
330 West 20th Avenue
San Mateo, CA 94403-1388
Fax: 650/522-7201

Subject: 827 Fourth Avenue, San Mateo – Acoustical Consulting
CSA Project No. 01-0081

Dear Evelyn:

We have completed our environmental noise analysis for the subject project. This letter describes the existing and future noise environment at the project site and surrounding areas. In addition, potential impacts from construction activities, increases in traffic and operation of the project are discussed. Mitigation measures are proposed to reduce impacts where necessary.

EXISTING NOISE ENVIRONMENT

The major noise source affecting the project site is vehicular traffic along 4th Avenue, 3rd Avenue, and South Grant Street. Other noise sources included general aviation and jet aircraft flyovers. To quantify the existing noise environment, one continuous 24-hour measurement and three short-term 15-minute measurements were made at the project site.

Based on our measurement, the Day/Night Average Sound Level (DNL)¹ would be 70 dBA along the south elevation (4th Avenue) 63 dBA along the east elevation, 62 dBA along the west elevation, and 64 dBA along the north elevation of the project. The results of the noise measurements are summarized in Table 1.

Table 1: Noise Measurement Data – 827 Fourth Avenue, San Mateo, 7 February 2000

Site	Location	Date/Time	A-Weighted Sound Levels (dBA)	
			L _{eq} ²	DNL
1	- 24 feet north of 4th Avenue center line - 36-feet west of South Grant Street center line - @ 12-feet above grade	7 February 2001 24 hours	---	74
2	- 128 feet north of 4th Avenue center line - 38 feet west of South Grant Street center line - @ 5-feet above grade	7 February 2001 13:00-13:15 PM	65	67
3	- 50 feet north of 4th Avenue center line - 76 feet west of South Grant Street center line - @ 5 feet above grade	7 February 2001 13:00-13:15 PM	67	67
4	- 130 feet north of 4th Avenue center line - 110 feet west of South Grant Street center line - @ 17 feet above grade	7 February 2001 13:00-13:15 PM	56	59

ACOUSTICAL CRITERIA

State of California

The California Noise Insulation Standard (Title 24, Part II) requires that multifamily residences achieve an indoor DNL of 45 dB if the outdoor DNL exceeds 60 dB. If

¹ Day-Night Average Sound Level (DNL)--A descriptor established by the U.S. Environmental Protection Agency to describe the average day-night level with a penalty applied to noise occurring during the nighttime hours (10 pm - 7 am) to account for the increased sensitivity of people during sleeping hours.

² L_{eq}--The equivalent steady-state A-weighted sound level that, in a stated period of time, would contain the same acoustic energy as the time-varying sound level during the same period.

windows must remain closed to meet the goal, the design must show how the units will be ventilated to achieve a habitable interior environment.

City of San Mateo

Noise Element of the General Plan

The Noise Element of the City of San Mateo General Plan contains guidelines for land use compatibility. For the purpose of this study, we used the following multifamily land use compatibility guidelines:

- DNL between 50 dB and 59 dB is considered "normally acceptable." Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal, conventional construction, without any special noise insulation requirements.
- DNL between 60 dB and 70 dB is considered "conditionally acceptable." New construction should be undertaken only after a detailed analysis of the noise reduction requirement is made and needed noise insulation features included in the design.

- DNI greater than 70 dB is considered "normally unacceptable." New construction should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made, and needed noise insulation features included in the design.

In addition to the land use compatibility guidelines, the Noise Element has the following policy:

N1.1 Interior noise Level Standard. The maximum interior noise level shall not exceed 45 dB (DNL) in all habitable rooms.

N1.2 Exterior Noise Level Standard. The maximum exterior noise level shall not exceed 67 dB (L_{eq}) for residential uses during the noisiest hour.

N2.2 Protect all (noise-sensitive) land uses listed in Table 2 from adverse impacts caused by the noise generated onsite by new developments. Incorporate necessary mitigation measures into development design to minimize noise impacts. Prevent long-term exposure increases of 3 dB (DNL) or above at the common property line or new uses which generate noise levels of 60 dB (DNL) or above at the property line excluding ambient noise levels."

San Mateo Municipal Code

The City of San Mateo does not have specific noise level limits for construction. The City does, however, limit hours of construction. According to section 23.06.017 of the Municipal Code, "No work regulated by the Code shall be permitted between the hours of 7 p.m. and 7 a.m., Monday through Friday, nor prior to 10 a.m. or after 6 p.m. on Saturday nor prior to 12 noon or after 4 p.m. on Sundays. In addition, a standard condition of approval prohibits earthen berm and material deliveries to the site between the hours 7:30 to 8:30 a.m. and 4 p.m. to 5 p.m.

Traffic Noise

Future Noise Environment

Future traffic volume estimates were obtained from a local traffic study³. According to the study, existing volumes along 4th Avenue and other nearby roadways will increase due to cumulative growth. Therefore, we estimate the future noise level along all streets will increase by 2 dB or less due to the cumulative growth. The resulting DNL would be 72 dB along the south elevation, 65 dB along the east elevation, 64 dB along the west elevation and 66 dB along the north elevation.

³ Traffic study prepared for the Classic Community Townhomes project, June 15, 2001.

The proposed project will add 7 and 9 a.m. and p.m. peak hour trips respectively. These would be expected to add less than 1 dB to the existing DNL and be less than significant.

IMPACTS AND MITIGATION MEASURES

Compatibility of the Proposed Project with Existing and Future Noise Environment

The existing noise environment at the setback of the project would be a DNL of 62 to 70 dB. In the future, the DNL could increase up to 72 dB along 4th Avenue. According to the City's compatibility guidelines, this noise level is considered "normally unacceptable." If new construction is to proceed, a detailed analysis of noise reduction requirements must be made and included in the design.

Outdoor use spaces located along the south facade of the project will reach an L_{eq} of 69 dBA in the future. The City's exterior noise level standard requires that maximum exterior noise should not exceed 67 dB for residential uses. Based on our analysis, no special mitigation features will be required for other outdoor use areas.

Mitigation 1 – Exterior Noise

In order to meet the City's goal, a solid balcony rail will be needed. The railing should block line-of-sight from the roadway to a seated person. This generally corresponds to a 42-inch railing height.

Mitigation 2 – Interior Noise

Standard exterior wall constructions with sound-rated windows would enable the project to meet the City and State indoor noise requirements of a DNL of 45 dB. We have reviewed the project window submittal which indicates STC 32 windows and doors. This will meet the City and State acoustical requirements. Other windows may be acceptable but must be reviewed by an acoustical consultant during the design phase. In addition, mechanical ventilation will be needed for all rooms facing roadways as per the Title 24 acoustical requirement.

Impact of Mechanical Noise

Noise from ventilation systems could affect adjacent uses. Typical equipment includes air-conditioners and kitchen exhaust fans. The City of San Mateo does not have specific goals for mechanical use. In absence of specific mechanical noise criteria, the goal is to control noise so that it does not increase the long-term noise exposure of 3 dB (DNL) at the common property line or exceed a DNL of 60 dB.

Mitigation 3 – Mechanical Noise

A detailed analysis of mechanical noise must be performed during the design phase so as to minimize the noise impact to the surrounding neighbors. The goal of the analysis would be to limit mechanical noise so as to not exceed an increase of 3 dB (DNL) and a DNL of 60 dB at the common property line.

Impact of Construction Noise

Normal phases of construction include grading work, foundation work, framing and then construction of the buildings. Typical noise levels from these activities are summarized in Table 4.

Table 4: Typical Total U.S. Construction Equipment Sound Levels

Equipment	Typical Sound Level @ 50 Ft (in dBA)
Dump truck	88
Portable air compressor	81
Concrete mixer (truck)	85
Jackhammer	88
Scraper	88
Dozer	87
Paver	89
Generator	76
Rock drill	98
Pump	76
Pneumatic tools	85
Backhoe	85

Source: U.S. Environmental Protection Agency, Background Document for Proposed Portable Air Compressor Noise Emission Regulations, October 1974, p. 2-3.

For offsite uses, the maximum noise levels from the construction could reach 88 to 98 dB where they occur near the perimeter of the project site. These levels would be loud enough to disrupt speech while people are outside. Inside buildings with standard glazing, the noise levels from louder activities such as impact tools could also disrupt speech.

However, most normal construction activities would be reduced to acceptable levels.

Construction noise is considered a significant short-term impact.

Evelyn Baker
7 March 2001
Page 10

Mitigation 4 – Construction Noise

During demolition and construction, the following should be required to minimize annoyance:

- Comply with the City's Ordinance, which restricts hours of construction times and times for material delivery.
- Locate stationary noise sources such as generators away from the perimeter of the site to minimize noise levels near buildings or pedestrian pathways.
- If complaints are received, then the contractor must designate a construction noise coordinator. This person would be responsible for responding to the complaint and taking appropriate actions to reduce the noise. These measures may include rescheduling of noisy operations, local noise barriers or other measures.

Sincerely,

CHARLES M. SALTER ASSOCIATES, INC.

Robert P. Alvarado
Senior Consultant

Alan T. Rosen
Vice President

RPA/rk
mr7rpa.doc/rk/ck
Enclosure