Noise is an important and complex issue in South San Francisco. Almost every part of the city is susceptible to noise impacts, due mainly to the presence of major noise generators. Significant sources of noise in the city include San Francisco International Airport (SFO), major transportation corridors such as U.S. 101 and I-280, and extensive industrial uses. The city's land use pattern generally accommodates these conditions with industrial uses clustered close to the airport, separated from relatively noise-sensitive uses by U.S. 101. This element is intended to ensure compliance with State requirements and promote a comprehensive, long-range program of achieving acceptable noise levels throughout South San Francisco.
9.1 NOISE MEASUREMENT AND REPORTING

Noise can be defined as a sound or series of sounds that are intrusive, irritating, objectionable and/or disruptive to daily life. Noise varies widely in its scope, source, and volume, ranging from individual occurrences such as a barking dog, to the intermittent disturbances of overhead aircraft, to the fairly constant noise generated by traffic on U.S. 101.

Many uses are noise sensitive, such as residences, schools, churches, and hospitals. Noise needs to be controlled around other uses as well, although levels rarely exceed the recommended maximum. The known effects of noise on humans include hearing loss, communication interference, sleep interference, physiological responses, and annoyance.

When noise levels are reported, they are expressed as a measurement over time in order to account for variations in noise exposure. Levels also account for varying degrees of sensitivity to noise during daytime and nighttime hours. The Community Noise Equivalent Level (CNEL) and Day-Night Noise Level (Ldn) both reflect noise exposure over an average day with weighting to reflect this sensitivity. The CNEL is the reference level for State noise law and is used to express major continuous noise sources, such as aircraft or traffic.
9.2 NOISE SOURCES AND PROJECTIONS

For the purposes of this Plan, sources of noise are categorized as being either aircraft-generated or locally-generated. Existing and projected noise levels are depicted on noise contour maps. Each contour reflects linear bands subject to similar average noise levels. Figure 9-1 depicts existing and projected aircraft-generated noise levels in South San Francisco.

NOISE SOURCE EXISTING CONDITIONS AND STANDARDS

Aircraft-Generated Noise

Aircraft overflight noise is a particularly important issue in South San Francisco due to the city’s proximity to San Francisco International Airport (SFO). Aircraft noise continues to receive considerable attention in the city, due in part to the massive current terminal expansion project and to significant expected increases in average daily aircraft operations.

Existing Noise Levels

Average aircraft noise levels measured in 1997 indicate that areas in the southwestern part of the city experience noise levels in excess of 65 dB CNEL. A smaller area in the vicinity of El Camino Real near the San Bruno border has noise levels in excess of 70 dB CNEL. Existing and projected noise contours, as well as the Noise Insulation Program area, are shown on Figure 9-1.1

Assuming no change in SFO’s runway configuration, aircraft noise contours are projected to shift gradually eastward by 2010. As a result, areas east of the current flight path may experience an increase in average noise levels. At the same time, the 70 dB CNEL contour are expected to shrink, no longer impacting South San Francisco.

Single Event Flyover Noise

Noise contours are based on average noise levels. Single event noises such as aircraft flyovers need to occur frequently and at very high volumes in order to bring average noise levels to 65 dB CNEL. Even areas outside the 65 dB CNEL contours are impacted by flyovers. Thus, even the 65 dB CNEL noise contour is expected to

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1 Environmental Science Associates, SFO Runway Reconfiguration Study (1998); Figure 2.3.8-2.
shift eastward, flyovers will still expose areas throughout the southwestern part of the city to high noise levels.

**ALUC Noise Standards and Related Requirements**

ALUC’s 1995 SFO Land Use Plan establishes the 65 dB CNEL contour as the noise impact boundary for SFO, consistent with noise restrictions in the California Administrative Code, Title 21, Subchapter 6 “Noise Standards.” Local plans, policy actions, or development activities that affect areas within that boundary must receive ALUC approval or have a finding of overriding consideration prior to local permit issuance. ALUC determines the 65 dB CNEL boundary by examining both federal and State noise impact boundaries:

- **Federal Impact Boundary.** The federal 65 dB CNEL boundary is based on the Noise Exposure Map (NEM), as accepted by the FAA under the Federal Aviation Regulations (FAR) Part 150 Noise Compatibility Program. This 65 dB contour serves as the basis for FAA determination of local agency eligibility for federal grant money for noise insulation projects.

- **State Impact Boundary.** The State boundary is the 65 dB CNEL boundary as defined by the required airport noise monitoring system. The monitoring system consists of 27 off-site noise monitors, plus two additional monitors near the runway ends. The noise contour is updated each calendar quarter and submitted to San Mateo County and the State Division of Aeronautics. ALUC uses the latest SFO quarterly noise report to determine the compatibility of land use plans.

Local plans, policy actions, or development activities within the 65 dB CNEL boundary requires the approval of the San Mateo County Airport Land Use Commission (ALUC) prior to local permit issuance. To assist this process, the ALUC has established noise/land use compatibility standards as the basis of plan review (see Table 9.2-1). The City also applies these standards in its review of development applications located within the 65 dB CNEL boundary.

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2 Although the 1995 *SFO Land Use Plan* was adopted with the 1983 NEM, the FAA subsequently approved the 1995 NEM and 2000 projected NEM. The updated version of the Land Use Plan, expected in early 1999, is based on the 1995 NEM, which will need to be considered in preparation of the Specific Plan.

3 County of San Mateo Planning and Building Division, Senior Planner David Carbone, personal communication, December 30, 1998.
Figure 9-1
Aircraft Noise and Noise Insulation Program Area

Source: San Mateo County Airport Land Use Plan; San Francisco International Airport
San Francisco International Airport Master Plan Draft EIR
The City’s General Plan will be subject to ALUC review. All local land use plans within the designated noise impact area (NEM 65 dB CNEL contour) must receive explicit ALUC approval, and all plans within the larger ALUC planning area must be compatible with the SFO Land Use Plan. ALUC uses established noise/land use compatibility standards (Table 9.2-1) as the basis for plan review.

According to these standards, commercial uses would be acceptable within the 65 dB CNEL FAA-approved contour, and residential uses would be acceptable with noise insulation. In addition, according to the 1992 Memorandum of Understanding between SFO and San Mateo County jurisdictions, residences constructed after 1992 within the 65 dB CNEL contour are required to be insulated to meet the 45 dB interior noise standard. Residential noise insulation would also be required pursuant to any separate agreement between the City and SFO.

Locally-generated noise

The primary sources of noise generated within South San Francisco itself are streets and highways, rail, and industrial uses:

- **Traffic Noise.** One of South San Francisco’s most important locational advantages is its excellent road access; however, this access also results in fairly high noise impacts over much of the city. Traffic noise depends primarily on traffic speed—high frequency tire noise increases with speed—and the proportion of truck traffic—which generates engine, exhaust, and wind noise. The proximity of freeways and major streets, and the large amount of truck traffic serving industrial, warehousing, and freight forwarding uses in the city, make South San Francisco susceptible to traffic noise. Figure 9-2 illustrates roadways in the city producing noise levels greater than 65 dB CNEL.

- **Railroad Noise.** The Southern Pacific Railroad line is heavily used and generates relatively high average noise levels in surrounding areas. Caltrain runs 68 commuter trains each day through South San Francisco, and Southern Pacific freight trains also use the line. Since the line runs adjacent U.S. 101 and is generally surround by industrial and commercial land uses, rail operations have a negligible impact on land use in South San Francisco.

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**Table 9.2-1**

<table>
<thead>
<tr>
<th>Land Use</th>
<th>CNEL Range</th>
<th>General Land Use Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>Less than 65</td>
<td>Satisfactory; no special insulation requirements</td>
</tr>
<tr>
<td></td>
<td>65 to 70</td>
<td>Development requires analysis of noise reduction requirements and noise insulation as needed</td>
</tr>
<tr>
<td></td>
<td>over 70</td>
<td>Development should not be undertaken</td>
</tr>
<tr>
<td></td>
<td>less than 70</td>
<td>Satisfactory; no special insulation requirements</td>
</tr>
<tr>
<td></td>
<td>70 to 80</td>
<td>Development requires analysis of noise reduction requirements and noise insulation as needed</td>
</tr>
<tr>
<td></td>
<td>over 80</td>
<td>Airport-related development only; special noise insulation should be provided</td>
</tr>
<tr>
<td>Industrial</td>
<td>less than 75</td>
<td>Satisfactory; no special insulation requirements</td>
</tr>
<tr>
<td></td>
<td>75 to 85</td>
<td>Development requires analysis of noise reduction requirements and noise insulation as needed</td>
</tr>
<tr>
<td></td>
<td>over 85</td>
<td>Airport-related development only; special noise insulation should be provided</td>
</tr>
<tr>
<td>Open</td>
<td>less than 75</td>
<td>Satisfactory; no special insulation requirements</td>
</tr>
<tr>
<td></td>
<td>over 75</td>
<td>Avoid uses involving concentrations of people or animals</td>
</tr>
</tbody>
</table>

**Source:** City of South San Francisco General Plan Noise Element, SFO Airport Land Use Plan

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4 Memorandum of Understanding between the Director of Airports of the City and County of San Francisco, San Mateo County jurisdictions, the C/CAG, and the Airport/Community Roundtable, October 23, 1992, Section D-E.
Industrial Noise. Industrial uses in the city are an important part of the noise environment in South San Francisco. Industrial noise is generated from onsite activities or from associated truck traffic offsite. While industrial uses in East of 101 and south of Railroad Avenue do generate noise, impacts on noise-sensitive uses is minimal. In any case, these industrial areas are largely located within the 65 dB CNEL contour for aircraft noise.

This element prohibits industrial development that will result in noise levels of 60 dB CNEL or greater at noise-sensitive uses, a situation that could occur in the industrial areas west of U.S. 101, that border on residential uses north of Railroad Avenue and within the Mayfair Village subdivision.
9.3 NOISE PROJECTIONS

It is important that this element address not only the existing noise conditions in South San Francisco, but also the projected conditions over the horizon of this Plan. It is possible to project future levels of both aircraft- and locally-generated noise.

**Aircraft-generated Noise**

The 1989 SFO Master Plan outlined significant expansion and improvements to airport capacity, including a new international terminal, modified parking and circulation, and additional maintenance and support facilities. These improvements are underway and will result in the annual aircraft operations indicated in Table 9.3-1.

Table 9.3-1 indicates that the projected decrease in the population impacted by over-flight noise is expected to decrease, even though the overall number of flights to and from SFO will increase. This decrease is a function of a smaller 65 dB CNEL contour that will result from the elimination of Stage 2 aircraft (see Figure 9-1). SFO is currently preparing new contours as part of the analysis of aircraft operations expansion. These studies, which are expected to be formalized soon, indicate that the currently projected noise contours (see Figure 9-1) represent a conservative estimate, and the contours are likely to shrink, improving aircraft-related noise conditions in South San Francisco.

Although the elimination of Stage 2 aircraft will result in a net reduction in aircraft noise, much of this reduction has already occurred. Overall noise levels are actually projected to increase by one-half dB by 2006, with nighttime levels expected to increase by 1.2 dB due to increased operations. These increases are not considered perceptible or significant.

While overall average noise levels will be reduced, single-event flyover noise will continue to be problematic in South San Francisco. With the increased number of flights, single-event flyover noise is expected to become more frequent. SFO will implement mitigation measures to reduce flyover noise, including the potential revision of departure routes over San Mateo County and the potential reduction in use of Runway 28, which points in the direction of South San Francisco.\(^5\)

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**Table 9.3-1**

Aircraft Noise Projections, 1990-2006

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>2006</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual aircraft operations (takeoffs and landings)</td>
<td>427,475</td>
<td>538,464</td>
<td>26</td>
</tr>
<tr>
<td>Average daily operations</td>
<td>833</td>
<td>1,029</td>
<td>36</td>
</tr>
<tr>
<td>Impacted population(^1)</td>
<td>14,980</td>
<td>6,600</td>
<td>(56)</td>
</tr>
</tbody>
</table>

\(^1\) Population exposed to noise level of 65 dB CNEL or greater.

Source: Environmental Science Associates, SFO Master Plan Draft Environmental Impact Report
Figure 9-2
Projected Road and Rail Noise

9.9
Locally-generated noise

It is possible to project future levels of locally-generated noise over the horizon of this Plan simply by considering current and projected land use trends. Figure 9-2 depicts future locally-generated noise levels in the city.

- **Traffic Noise.** Traffic noise depends primarily on traffic speed and the proportion truck traffic. Traffic volume does not have a major influence on traffic noise levels; a doubling of traffic volume results in a 3 dB to 5 dB increase in noise levels. As a result, projected traffic increases on U.S. 101, Interstate 280, and major arterials within South San Francisco should have not have an appreciable impact on noise levels in the city. And as traditional industrial uses make way for less intensive research and development activities, it is expected that truck traffic will decline in South San Francisco, particularly in areas east of U.S. 101 and south of Railroad Avenue.

- **Railroad Noise.** The number of trains passing through South San Francisco on the Southern Pacific Railroad line is not expected to change significantly. While CalTrain ridership is expected to increase through 2010, it is unknown if this will result in any increase in the number of trains. In any case, the impacts of railroad noise are negligible due to the proximity of the line to U.S. 101, and the fact the line is generally surround by industrial and commercial land uses.

- **Industrial Noise.** It is expected that industrial activity in South San Francisco will continue its shift away from traditional manufacturing and warehousing toward biotech and high-tech activity. This transition toward office-based uses will result in reduced levels of industrial noise in East of 101 and south of Railroad Avenue. Associated truck traffic and noise should also be reduced. These industrial areas will also largely remain within the 65 dB CNEL contour for aircraft noise.

- **BART Extension.** The BART extension to SFO will pass through South San Francisco. The route will descend underground from the South San Francisco station, and ascend to the surface at the San Bruno station at the Tanforan Shopping Center. Since BART will remain underground through South San

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Francisco, airborne noise impacts are expected to be minor, provided mitigation along surface lengths is implemented as planned. Ground-borne noise and vibration impacts have also been determined by BART to be minor, as several mitigation measures (floating trackbeds, etc.) are available. This assessment is based on standards set by BART for both airborne and ground-borne noise.

GUIDING POLICIES: NOISE

9-G-1 Protect public health and welfare by eliminating or minimizing the effects of existing noise problems, and by preventing increased noise levels in the future.

9-G-2 Continue efforts to incorporate noise considerations into land use planning decisions, and guide the location and design of transportation facilities to minimize the effects of noise on adjacent land uses.

IMPLEMENTING POLICIES: NOISE

9-I-1 Work to adopt a pass-by (single event) noise standard to supplement the current 65 dB CNEL average noise level standard as the basis for aircraft noise abatement programs.

The simultaneous increase in aircraft operations at SFO and decrease in average noise levels resulting from improvements in jet engine technology presents a challenge for South San Francisco. The current 65 dB CNEL boundary represents an average noise level and provides the basis for FAA noise abatement funding and land use planning controls. As quieter jets cause this boundary to become smaller, FAA funding for retrofitting homes within the 65 dB CNEL boundary will also decline. At the same time, expected increases in air traffic will result in increased single-event noise occurrences in the city.

As a result, residents in some areas of South San Francisco not included in the 65 dB CNEL noise contour will be increasingly impacted by
the single-event flyover noise. Homes in these areas would not be eligible for noise abatement funding under the current standard. The City should consider adopting a single-event noise standard to complement the existing 65 dB CNEL standard to mitigate the impacts of noise in these areas through land use planning and noise abatement programs.

9-I-2 Work to adopt a lower average noise standard for aircraft-based mitigation and land use controls.

A lower average noise standard for aircraft-based noise mitigation and land use controls would address the impacts of aircraft flyovers in areas outside the existing 65 dB CNEL boundary. The current 65 dB CNEL boundary provides the basis for FAA noise abatement funding and land use planning controls limiting noise-sensitive uses. The City should work with the FAA and SFO to determine if the current average noise standard is adequately mitigating the impacts of aircraft noise in South San Francisco.

A lower average noise standard could be used in conjunction with the single-event noise standard proposed in Policy 9-I-1.

9-I-3 Pursue additional funding sources and programs for the noise insulation retrofit of homes not completed before the expiration of the Memorandum of Understanding in 2000.

The Memorandum of Understanding between SFO and San Mateo County jurisdictions, and the specific 1991 Agreement for Aircraft Noise Mitigation between the Airports Commission and South San Francisco establishes the parameters for the City’s retrofit program. This agreement requires the City to seek federal grants (to be matched by SFO) to retrofit noise-impacted homes constructed prior to 1983 with noise insulation. The Agreement runs out in 2000 and between 1,200 and 1,500 homes will still require retrofitting.
This program is beneficial and has significantly reduced noise-related impacts in residential areas. The City should begin to pursue the extension of the current agreement and possible boundary adjustments to include homes impacted by aircraft noise beyond the 65 dB CNEL limit.

9-I-4 Ensure that project applications for all new noise-sensitive land uses (plans and specifications), including hospitals and residential units proposed within the CNEL 60 dB to CNEL 69 dB aircraft noise contour include an acoustical study, prepared by a professional acoustic engineer, that specifies the appropriate noise mitigation features to be included in the design and construction of these uses, to achieve an interior noise level of not more than CNEL 45 dB in any habitable room, based on the latest official SFIA noise contours and on-site measurement data. (Amended by City Council Resolution 31-2010)

9-I-5 Ensure that project applications for new noise-sensitive land uses (plans and specifications), including schools and places of assembly, proposed within the CNEL 60 dB to CNEL 69 dB aircraft noise contour include an acoustical study, prepared by a professional acoustic engineer, that specifies the appropriate noise mitigation features to be included in the design and construction of these uses, to achieve an interior noise level of not more than Leq 45 dB for the noisiest hour of normal facility operation. (Amended by City Council Resolution 31-2010)

9-I-6 Require that applicants for new noise-sensitive development in areas subject to noise generators producing noise levels greater than 65 dB CNEL, obtain the services of a professional acoustical engineer to provide a technical analysis and design of mitigation measures.

9-I-7 Where site conditions permit, require noise buffering for all noise-sensitive development subject to noise generators producing noise levels greater than 65 dB CNEL. This noise attenuation method should avoid the use of visible sound walls, where practical.
Potential Infill Residential Development*

*Defined as areas where the General Plan update would result in increased residential density (allowing intensification) or would allow new residential development.

Figure 9-3
Potential Infill Residential Areas Relative to Noise Contours
9-I-8  Require the control of noise at source through site design, building design, landscaping, hours of operation, and other techniques, for new developments deemed to be noise generators.

9-I-9  Work with BART to ensure that its extension of the transit line to SFO through the city results in minimal impact from noise and ground-borne vibration.

9-I-10  Do not allow new residential or noise sensitive development in 70 dB+ CNEL areas impacted by SFO operations, as required by Airport Land Use Commission infill criteria. (Amended by City Council Resolution 31-2010)

9-I-11:  Require new residential development in area between the most recent FAA-accepted 65 and 70 dB CNEL aircraft noise contours for San Francisco International Airport (SFO) to grant an avigation easement to the City and County of San Francisco, as proprietor of SFO. (Amended by City Council Resolution 31-2010)
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