3.7 NOISE

Most sound consists of a broad range of frequencies. Because the human ear is not equally sensitive to sound at all frequencies, noise is measured using the "A-weighted" decibel scale (dBA), which estimates the way the human ear responds to noise levels.

Average noise exposure over 24 hours often is presented as a day-night average sound level (Ldn) or a community noise equivalent level (CNEL). Ldn values are calculated from hourly equivalent noise level (Leq) values, with the Leq values for the nighttime period (10:00 PM to 7:00 AM) increased by 10 dB to reflect the greater disturbance potential from nighttime noises. Leq values are used to develop single-value descriptions of average noise exposure over various periods. CNEL values are very similar to Ldn values but include a 5 dB annoyance adjustment for the evening period (7:00 PM to 10:00 PM) in addition to the 10 dB adjustment for nighttime Leq values. Unless otherwise noted, Ldn and CNEL values are assumed to be based on dBA measurements.

3.7.1 Noise Standards

Community noise consists of a wide variety of sounds, some near and some distant, that vary over a 24-hour day. Scientists and planners have found that humans respond generally to the 24-hour variation in noise based on the total energy content of the sound over the day, with a greater sensitivity to noise in the evening and at night.

State of California

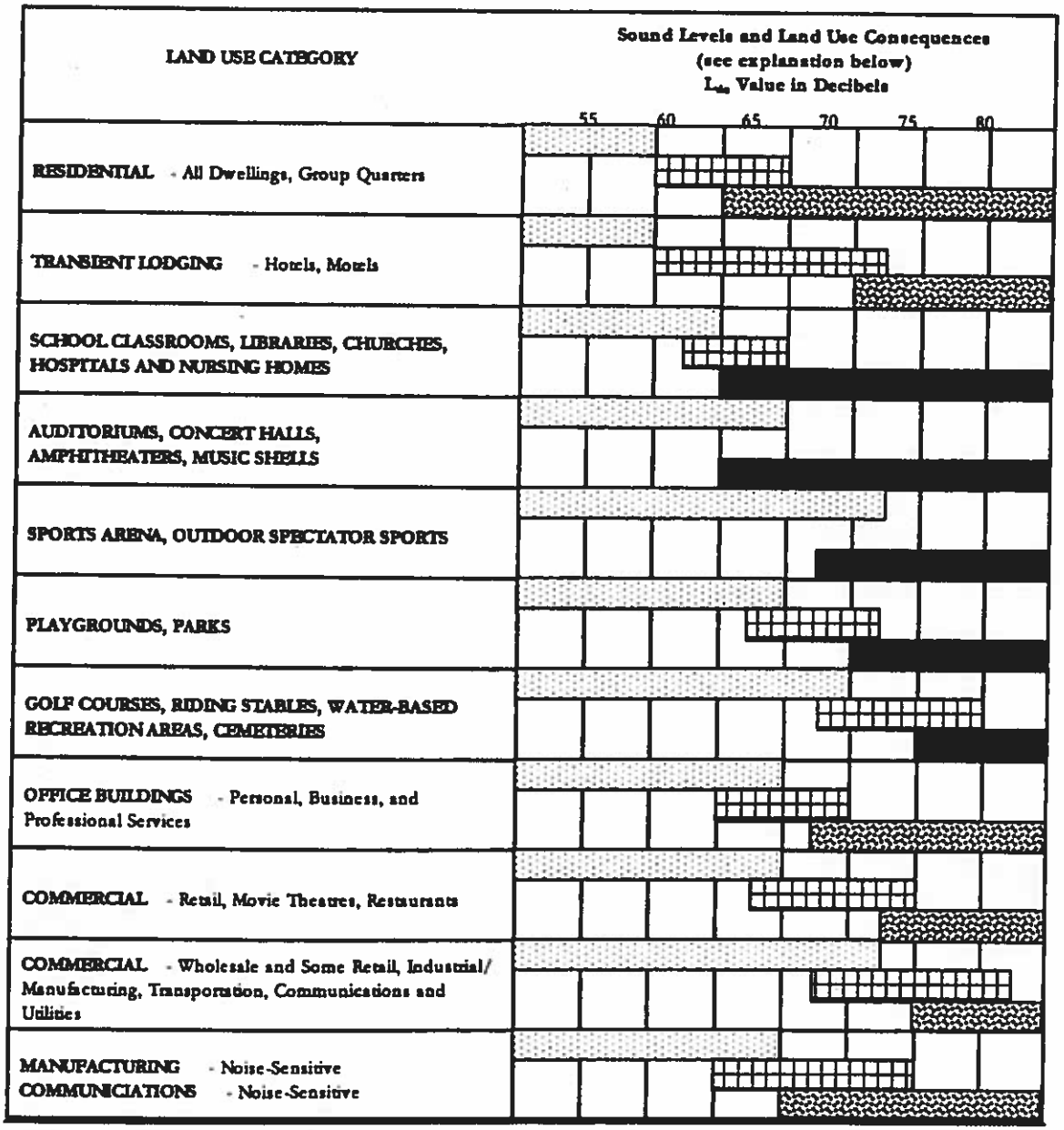
The California Department of Housing and Community Development has adopted noise insulation performance standards for new hotels, motels, and dwellings other than detached single-family structures (Cal. Code Regs. Title 25, § 4370). These standards require that hotels, motels, and multiple-unit dwellings be constructed so that outdoor noise sources will not cause interior noise levels to exceed an annual average CNEL value of 45 dB with windows closed.

City and County of San Francisco

The noise element for the San Francisco General Plan is in the Environmental Protection Element. The noise element includes a land use compatibility chart (Table 3.7-1). An Ldn of 60 dB is identified as the upper limit of satisfactory noise conditions for residential and transient lodging land uses. Ldn levels of 65 to 70 dB are generally satisfactory for most office and retail commercial land uses.

In addition to general policy guidance provided by the General Plan, San Francisco has adopted a noise ordinance (Article 29 of the Police Code) to regulate noise from fixed sources, portable equipment, construction activities, and other sources of unnecessary, excessive, or offensive noise. The ordinance contains general nuisance abatement provisions and specific noise limitations that vary by zoning district, time of day, and type of noise source. The general noise limitations specified in the noise ordinance are summarized in Table 3.7-2. The ordinance contains provisions for emergency work, emergency and safety signaling devices, and various types of impact tools, pavement breakers, and jackhammers. The ordinance provides for a variance process and a permit process for nighttime construction work.

Table 3.7-1. Land Use Compatibility Chart for Community Noise



Source: San Francisco 1974, 1991.

Satisfactory, with no special noise insulation requirements.

New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.

New construction or development should generally 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

New construction or development should generally not be undertaken.

Table 3.7-2. Summary of Noise Limits Established in the San Francisco Noise Ordinance

Noise Source	*Applicable Zoning District*	*Time Period*	*Noise Limits*
Construction Equipment (Except Impact Tools)	All Zoning Districts	7 AM – 8 PM	80 dBA at 100 feet limit does not apply to impact tools and equipment
		7 AM – 8 PM	5 dBA above ambient at property line without special permit
Waste Collection Equipment	All Zoning Districts	Any time	75 dBA at 50 feet
Off-Highway Vehicle Use - Off-Highway Vehicles - Heavy-Duty Vehicles - Motorcycles - Other Highway Vehicles	Public Zones	Any time	 70 dBA at 50 feet 82 dBA at 50 feet 77 dBA at 50 feet 74 dBA at 50 feet
Fixed Noise Sources	Low- and Medium-Density Residential Zones	7 AM – 10 PM	55 dBA at property line
		10 PM - 7 AM	50 dBA at property line
	High-Density Residential, Neighborhood Commercial, and Residential Commercial Zones	7 AM – 10 PM	60 dBA at property line
		10 PM - 7 PM	50 dBA at property line
	Commercial Zones	7 AM – 10 PM	70 dBA at property line
		10 PM - 7 AM	60 dBA at property line
	Light Industrial Zones	Any time	70 dBA at property line
	Heavy Industrial Zones	Any time	75 dBA at property line
Engine-Powered Model Vehicle Use	Low- and Medium-Density Residential Zones	7 AM – 10 PM	55 dBA at 50 feet
		10 PM - 7 AM	50 dBA at 50 feet
	High-Density Residential Neighborhood Commercial and Residential Commercial Zones	7 AM – 10 PM	60 dBA at 50 feet
		10 PM - 7 AM	50 dBA at 50 feet
	Commercial Zones	7 AM – 10 PM	70 dBA at 50 feet
		10 PM - 7 AM	60 dBA at 50 feet
	Light Industrial Zones	Any time	70 dBA at 50 feet
	Heavy Industrial Zones	Any time	75 dBA at 50 feet
	Public Zones	Any time	80 dBA at 50 feet

Note: The noise ordinance provides for certain exceptions and variances from these limits.
Source: San Francisco Police Code, Article 29.

3.7.2 Existing Treasure Island Noise Conditions

Most of Treasure Island is more than 0.5 mile (0.8 km) from the open portions of the SFOBB. Consequently, wind, occasional aircraft fly-over, and local traffic are the primary noise sources affecting Treasure Island.

Limited ambient noise monitoring conducted at NSTI during 1986 showed afternoon noise levels of 55 to 58 dBA at each of four different locations on Treasure Island (DON 1987). The noise monitoring locations on Treasure Island included the east side of Building 257 at 9th Avenue and Avenue E, the corner of 9th Avenue and Avenue B, in front of Building 369 (bachelor officer quarters), and the parking lot for Building 3. The 1986 noise monitoring results are a reasonable representation of conditions on Treasure Island at the time of closure (1993). Present noise levels are likely to be similar or lower than conditions in 1986 since there is currently far less activity on Treasure Island. The majority of Treasure Island is too far from the SFOBB to be measurably affected by traffic noise.

Short-term (10-minute) noise measurements conducted in a film studio parking lot near piers 11 and 12 on Treasure Island in 1998 showed a measured noise level of 62 dBA. Noise modeling performed to predict the highest noise period and level for existing SFOBB traffic conditions indicated a peak noise-hour level of 67 dBA at this location (Caltrans and FHWA 1998).

3.7.3 Existing Yerba Buena Island Noise Conditions

SFOBB traffic is the dominant noise source affecting Yerba Buena Island. During 1986 noise monitoring at NSTI, a noise level of 67 dBA was recorded at the north end of Yerba Buena Island near Building 213 (Former Fire Station No. 2), about 300 feet (91 m) from the SFOBB (DON 1987).

Noise monitoring also was conducted on Yerba Buena Island during January 1996 (DON 1996h). One location was monitored for a 24-hour period, and 12 locations were monitored for 15-minute periods. The 24-hour monitoring site was at the eastern end of Yerba Buena Island, approximately 80 feet (24 m) below the SFOBB. The Ldn measurement at this site was 76 dB, with a peak 1-hour noise level of 74 dBA (3:00 PM to 4:00 PM) and a minimum 1-hour noise level of 65 dBA (4:00 AM to 5:00 AM). A noticeable decrease in noise levels occurred during the afternoon rush hour due to reduced vehicle speeds caused by traffic congestion.

Noise levels measured at the short-term monitoring sites depended on proximity to the SFOBB and the extent that terrain shielded the noise source. The noisiest areas were close to the east and west side tunnel openings. Noise levels during the late morning and early afternoon were generally 65 to 73 dBA for sites near the SFOBB and 52 to 58 dBA for distant locations or locations shielded by buildings or terrain.

Additional noise monitoring conducted in 1998 at Yerba Buena Island showed that with the exception of noise measurements taken on US Coast Guard property south of the existing SFOBB, noise levels ranged from 66 to 74 dBA. Yerba Buena Island 24-hour noise measurements ranged from 59 dBA to 72 dBA (Caltrans and FHWA 1998).