# 4.9 NOISE

This section incorporates by reference information from the Other Physical Attributes Baseline Study of Fort Ord, California which is available at the public information repository established at the Seaside Branch Library (U.S. Army Corps of Engineers, Sacramento District 1992e). This study includes existing noise-sensitive locations, sources of noise, Department of the Army noise standards, and local agency planning noise standards. Elements of the baseline study relevant to the discussion of noise impacts in Volume II, Section II.9, "Noise", are summarized here.

Sound level meters measure pressure fluctuations caused by sound waves. These measurements are reported in a logarithmic decibel (dB) scale. Most sounds consist of a broad range of sound frequencies. Because the human ear is not equally sensitive to all frequencies, several different frequency-weighting schemes have been used to develop composite dB scales that approximate the way the human ear responds to noise levels. The A-weighted dB scale (dBA) is the most widely used for this purpose. Typical A-weighted noise levels for various types of sound sources are summarized in Table 4.9-1.

Equivalent noise levels ($L_{eq}$) are used to develop single-value descriptions of average noise exposure over various periods. Such average noise exposure ratings often include additional weighting factors for annoyance potential attributable to time of day or other considerations. The $L_{eq}$ data used for these average noise exposure descriptors are generally based on A-weighted sound level measurements.

Average noise exposure over a 24-hour period is often presented as a day-night average sound level ($L_{dn}$). The $L_{dn}$ values are calculated from hourly $L_{eq}$ values, with the $L_{eq}$ values for the nighttime period (10 p.m.-7 a.m.) increased by 10 dB to reflect the greater disturbance potential from nighttime noises. The community noise equivalent level (CNEL) is also used to characterize average noise levels over a 24-hour period, with weighting factors for evening and nighttime noise levels. The $L_{eq}$ values for the evening period (7 p.m.-10 p.m.) are increased by 5 dB, while $L_{eq}$ values for the nighttime period (10 p.m.-7 a.m.) are increased by 10 dB. Except in unusual situations, the CNEL descriptor will be within 1.5 dB of the $L_{dn}$ descriptor for the same set of noise measurements.

The nature of dB scales is such that individual dB ratings for different noise sources cannot be added directly to give the dB rating of the combination of these sources. Two noise sources producing equal dB ratings at a given location will produce a composite noise level 3 dB greater than either sound alone. When two noise sources differ by 10 dB, the composite noise level will be only 0.4 dB greater than the louder source alone. A 10-dB increase in noise level is generally perceived as a doubling in loudness.

Most people have difficulty distinguishing the louder of two noise sources that differ by less than 1.5-2 dB. Except in controlled laboratory conditions, an increase of less than 1 dB cannot be perceived. Outside of laboratory conditions, an increase in noise of 3 dB is typically considered to be the threshold of perceptibility. An increase of at least 5 dBA can be described as being a distinctly noticeable increase and is typically required before a noticeable change in community response to noise can be expected. For this reason, an increase in noise of 5 dB is often used as the threshold for a substantial noise increase.

When distance is the only factor considered, sound levels from an isolated noise source will typically decrease by about 6 dB for every doubling of distance away from the noise source. When the noise source is essentially a continuous line (e.g., vehicle traffic on a highway), noise levels decrease by about 3 dB for every doubling of distance. An attenuation rate of 4.5 dB per doubling of distance is often used for traffic noise when the intervening ground between the roadway and the receptor is acoustically "soft" (i.e., the ground is covered with grass or vegetation).

Table 4.9-1 Weighted Sound Levels and Human Response

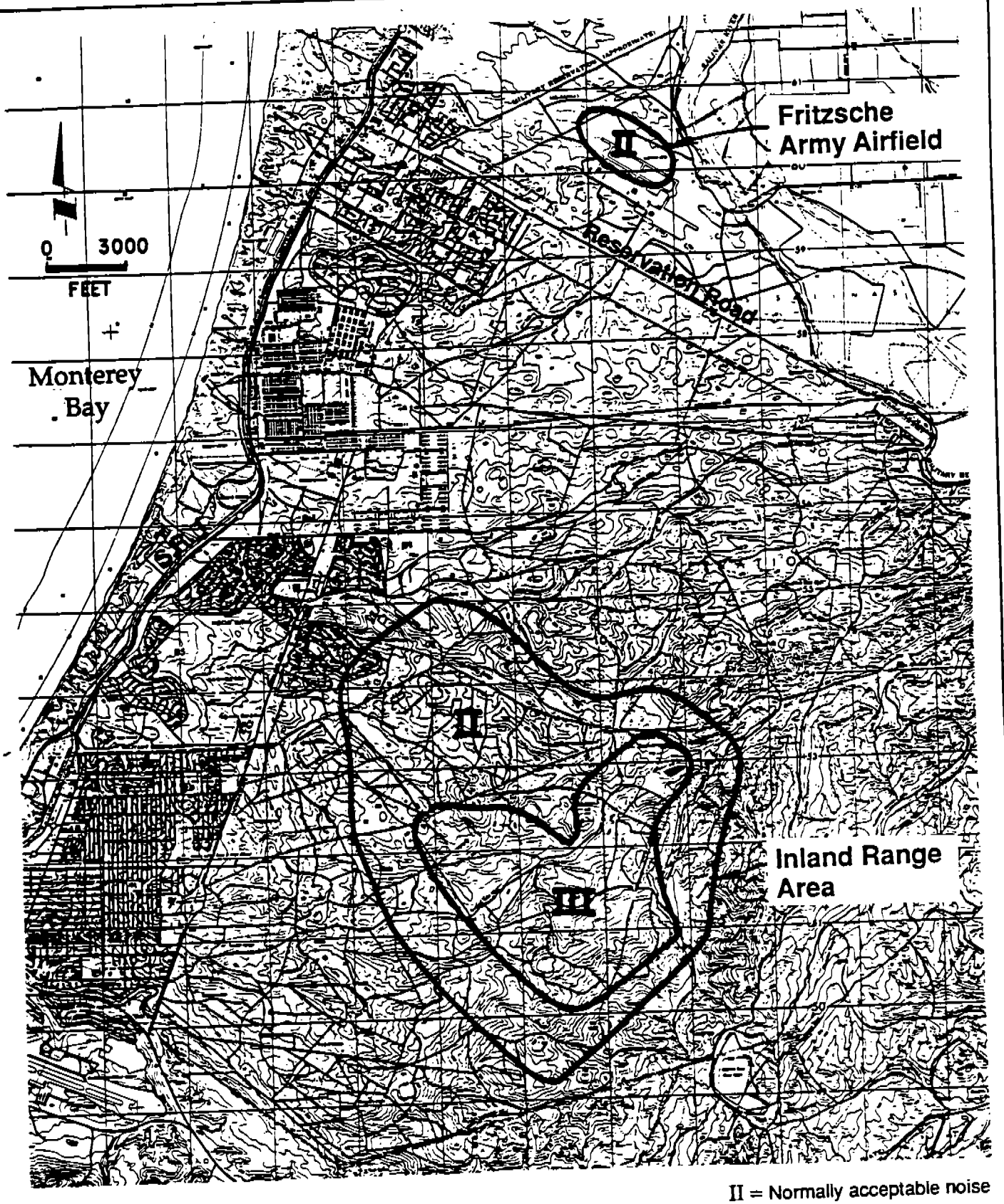
| Noise Source | dB(A)* | Human Response |
|---|---|---|
| Carrier Deck Jet Operation | 140 | |
| Limit of Amplified Speech | 130 | Painfully loud |
| Jet Takeoff (200 feet)<br>Automobile Horn (3 feet) | 120 | Threshold of feeling and pain |
| Riveting Machine<br>Jet Takeoff (2,000 feet) | 110 | |
| Shout (6 inches)<br>New York Subway | 100 | Very annoying |
| Heavy Truck (50 feet)<br>Pneumatic Drill (50 feet) | 90 | Hearing damage<br>(8-hour exposure) |
| Freight Train (50 feet)<br>Garbage Disposal in Home | 80 | Annoying |
| Freeway Traffic (50 feet) | 70 | Telephone use difficult |
| Air-conditioning Unit (20 feet)<br>Light Automobile Traffic | 60 | |
| Speech in Normal Voice (15 feet) | 50 | Quiet |
| In-house Movement of People, No Television or Radio | 40 | |
| Soft Whisper (15 feet) | 30 | Very quiet |
| Recording Studio | 20 | |
| | 10 | Very faint |
| | 0 | Threshold of hearing |

* Typical A-weighted sound levels. The A-weighted decibel scale approximates the frequency response of the human ear.

Source: U.S. Council on Environmental Quality 1970.

Noise-sensitive land uses in the vicinity of Fort Ord include residences, schools, healthcare facilities, religious facilities, libraries, open space/park areas, and habitat areas of noise-sensitive species. Figure 4.1-1, presented in Section 4.1, "Land Use", delineates existing noise-sensitive land uses around Fort Ord. Existing sources of noise include surface traffic, aircraft, and Army training activities. Figures 4.9-1 and 4.9-2 depict existing noise contours for Army training activity and aircraft activity at Monterey Peninsula

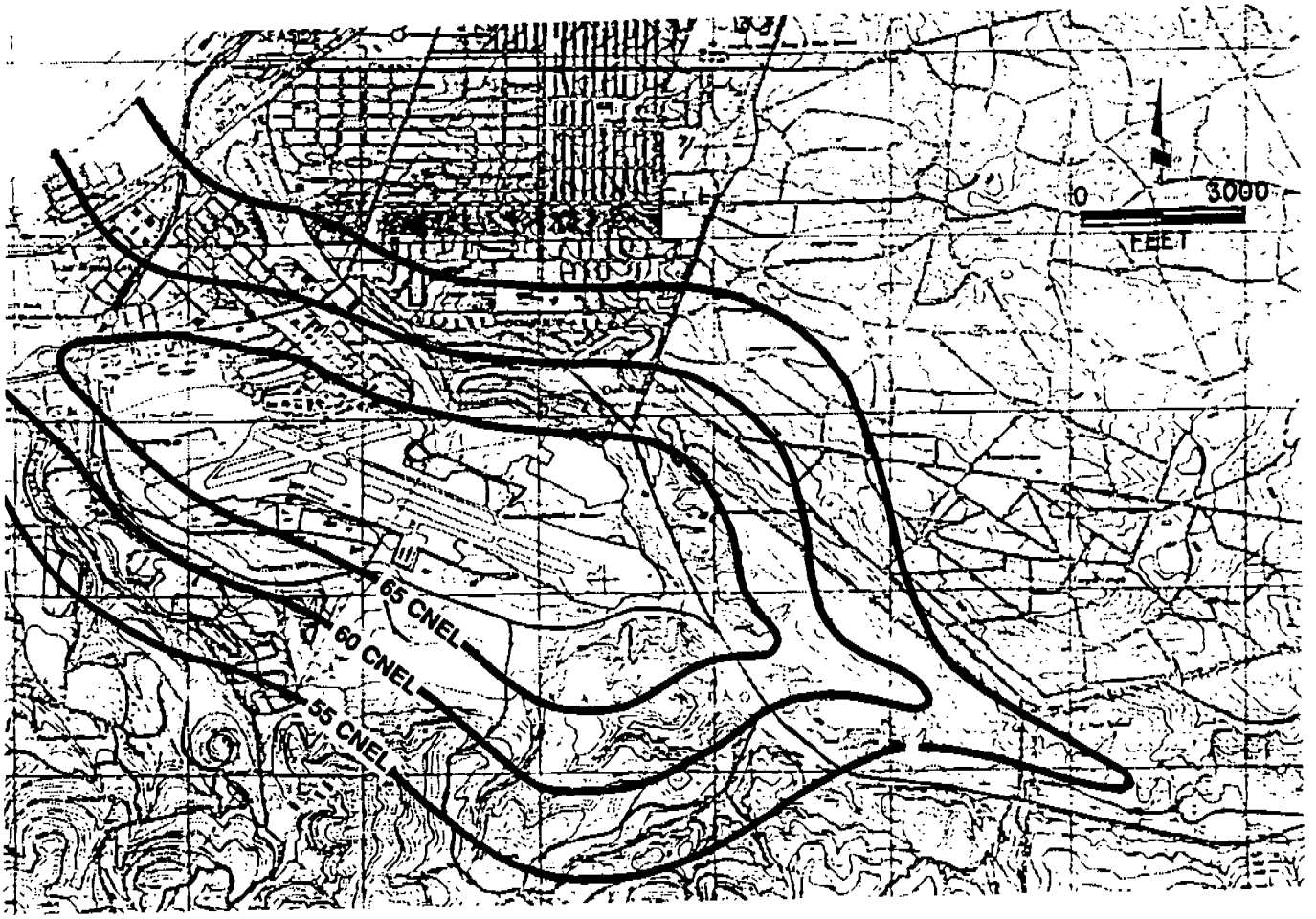
*Figure 4.9-1*
Noise Impact Zones at Fort Ord




II = Normally acceptable noise
III = Unacceptable noise

Source: Muir Planning Corporation 1987.

*Figure* 4.9-2
Monterey Peninsula Airport Noise Contours




Source: City of Seaside 1991.

Airport. In Figure 4.9-1, the contour line around noise zone III corresponds to 75-dBA $L_{dn}$ and the contour around noise zone II corresponds to 65-dBA $L_{dn}$.

Army noise standards and local agency planning noise standards are described in the Other Physical Attributes Baseline Study of Fort Ord, California (U.S. Army Corps of Engineers, Sacramento District 1992e). These standards are based on information developed by EPA on the levels of environmental noise considered to protect the public health and welfare with an adequate margin.

The local agency planning standards are from guidelines for the noise elements of local general plans published by the California Department of Health Services. For studies prepared under the Installation Compatible Use Zone program, the Army uses the $L_{dn}$ noise descriptor to define three noise zones. The zones are used to describe the acceptability of noise generated by Army activity. The local agencies use the CNEL and $L_{dn}$ descriptors interchangeably. For consistency, the $L_{dn}$ descriptors are used in this report.