3.9 NOISE

3.9.1 AFFECTED ENVIRONMENT

NOISE TERMINOLOGY

Sound levels are the audible intensities of air pressure vibrations, and are most often measured with the logarithmic decibel (dB) scale. To consider the human response to the pitch and loudness of a given sound in the context of environmental noise, the A-weighted frequency-dependent scale (dBA) is usually employed. The equivalent energy indicator, L_{eq}, is an average of noise over a stated time period, usually one-hour. The day-night average, L_{dn}, is a 24-hour average, which accounts for the greater sensitivity of most people to nighttime noise. Generally, a 3 dB difference at any time is noticeable to most people and a difference of 10 dB is perceived as a doubling of loudness.

NOISE-SENSITIVE USES

Certain types of land uses are considered to be more sensitive to ambient noise levels than others, due to the amount of noise exposure (in terms of both exposure time and intensity) and the types of activities typically involved with these land uses. Schools, libraries, churches, hospitals, convalescent and nursing homes, auditoriums, parks, and outdoor recreation areas are generally more sensitive to noise than are commercial and industrial land uses. Residences may also be considered noise-sensitive uses because residents may be disturbed by noise.

Land uses within the vicinity of the project study area include recreational, residential, office and open space uses. Sensitive receptors within the vicinity of the proposed treatment facility and subsurface storage reservoir consist of residential dwellings in Building 1029, approximately 300 feet west of the project site, and residential dwellings on Lyon Street and the Marina, which are one quarter mile to the east. Additionally, Crissy Field is a recreation area located approximately 1,000 feet north of the subject site, and can be considered as a sensitive use.

Sensitive receptors within the vicinity of the pipeline construction consist of those identified for the treatment facilities and, in particular, residential dwellings along Lyon Street, which are approximately 200 feet from the Gorgas Gate diversion point. Other receptors include residential uses along Sibert Loop (west of Arguello Boulevard) and Sumner Street (west of Presidio Boulevard). The Alternative 1 alignment would pass by a residential area along Ruckman Avenue, while the Alternative 2 pipeline alignment would pass by the Hitchcock Street residential area and a residential area along Amatury Loop (east of Park Boulevard).

EXISTING NOISE ENVIRONMENT

The area of analysis for potential noise impacts includes adjacent and off-site areas that could be affected by project-generated construction and operational noise. The existing noise environment in these areas is influenced primarily by surface-vehicle traffic, principally on Doyle Drive /

Highway 101, Richardson Avenue, Park Presidio Boulevard, Lombard Street and Presidio Boulevard.

Long-term 24-hour noise measurements were collected at Building 1029 and at the corner of Marina Boulevard and Lyon Street, which are residential areas. The noise environment of these areas is primarily effected by surface traffic on Doyle Drive and Marina Boulevard, respectively. The average daytime (7:00 a.m. to 10:00 p.m.) noise level at Building 1029 was recorded to be 60 dBA, while the average nighttime noise level was recorded to be 54 dBA and the Ldn was 62 dBA. For Lyon Street, the average daytime (7:00 a.m. to 10:00 p.m.) noise level was recorded to be 73 dBA, while the average nighttime noise level was recorded to be 67 dBA and the Ldn was 75 dBA.

NOISE REGULATIONS, PLANS, AND POLICIES

Local noise control for the urban neighborhoods surrounding the Presidio is governed by the San Francisco Noise Ordinance (Article 29 of the San Francisco Police Code, 1994). Section 2909 of the Code restricts noise levels generated by fixed noise sources, such as industrial or commercial loading operations. This section states that it is unlawful for any person to operate any fixed machinery or equipment, or similar mechanical device, in any manner so as to create any noise that would cause the noise level measured at the property line of the affected property to exceed the standards for a given zoning designation, as described below.

Residences along Lyon and Richardson Street and the rest of the Marina District are located in a RH-1 (low density residential) zoning district. The Palace of Fine Arts is designated in City Zoning maps as being located in a P (public) zoning district. The City generally adopts the standard of the adjacent land use for applying the ordinance standards to a given P district.

Application of the noise ordinance to the project site results in a fixed-source property line noise limit of 55 and 50 dBA at the eastern side of Lyon Street (including the Palace of Fine Arts) during daytime and nighttime hours, respectively. It should be noted that monitored noise levels at these locations are well above the fixed source standards, primarily due to vehicle traffic.

The noise ordinance also regulates construction noise and unnecessary, excessive, or offensive noise disturbances within the City. The construction noise regulations in Sections 2907 and 2908 of the San Francisco Police Code provide that:

- Construction noise is limited to 80 dBA at 100 feet from the equipment during daytime hours (7 a.m. to 8 p.m.). Impact tools are exempt, provided that they are equipped with intake and exhaust mufflers.

- Nighttime construction (8 p.m. to 7 a.m.) that would increase ambient noise levels by five dBA or more is prohibited, unless a permit is granted by the Director of Public Works.

3.9.2 ENVIRONMENTAL CONSEQUENCES & MITIGATION

ALTERNATIVE 1 (CENTRALIZED STORAGE)

Construction Noise Effects

Construction noise levels at and near locations on the treatment facility site and along pipeline alignments would fluctuate depending on the particular type, number, and duration of use of various types of construction equipment. The effect of construction noise would depend upon the type of construction activity, the distance between construction activities and the nearest noise-sensitive uses, and the existing noise levels at those uses.

Table 3.9-1 shows typical noise levels generated by different types of standard construction equipment. The proposed treatment facility would be located in an existing building, and most construction-related activity would be associated with building rehabilitation, which would occur inside the building. The building structure would serve as a noise barrier and help to reduce off-site noise impacts. However, nearby excavation would be necessary, first to remediate existing hazardous materials in this area, followed by construction of the proposed underground storage reservoir (Option A or B). Excavation activities would involve the use of an excavator shovel, which as shown in Table 3.9-1 would generate approximately 82 dBA at 50 feet. The receptors nearest the proposed storage reservoirs would be Building 1029, which is approximately 150 feet away from the nearest reservoir location. Noise at the nearest residences could be expected to be approximately 75 dBA during periods when excavation activities are nearest receptors. These predicted noise levels would not exceed the standards of the San Francisco Noise Ordinance, which allows for non-impact construction equipment to operate at 80 dBA or less at a distance of 100 feet between the hours of 7:00 a.m. and 8:00 p.m.

Trenching for pipelines would generally involve the use of a backhoe, which as shown in Table 3.9-1 would generate approximately 80 dBA at 50 feet. The receptors nearest the proposed Alternative 1 pipeline alignments would be residences on Lyon Street, within 200 feet of the easternmost segments, residences on Ruckman Avenue and residences at Building 1029, within 100 feet of trenching segments. The duration of trench excavation activities is expected to be relatively short-term in nature, as pipeline excavation typically occurs at a rate of approximately 150 to 200 feet per day. Consequently, noise levels would slowly increase over approximately two days at a given receptor, peak, and then recede for approximately two days, resulting in an impact period of less than one week.

Trenching construction noise during the noisiest phases of construction would be 80 dBA at 50 feet. Noise at the nearest residences could be expected to be approximately 74 dBA during periods when excavation activities are nearest receptors. These predicted noise levels would not exceed the standards of the San Francisco Noise Ordinance, which allows for non-impact construction equipment to operate at 80 dBA or less at a distance of 100 feet between the hours of 7:00 a.m. and 8:00 p.m.

TABLE 3.9-1
TYPICAL CONSTRUCTION EQUIPMENT NOISE LEVELS

Equipment	Noise Level at 50 feet (dBA, Leq)
backhoes	80
shovel	82
dozers	85
scrapers	89
truck	88
paver	89
pumps	76
generators	81
compressors /a/	81
Jack hammers	88
pile drivers	101

SOURCES: *Transit Noise and Vibration Impact Assessment*, Federal Transit Administration, April 1995.
/a/ U.S. Environmental Protection Agency, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, December 1971.

Temporary construction-related noise would be more noticeable during nighttime (since background noise is lower); however, implementation of the noise control measures identified in Section 2.3 (BMP-3: Noise Control) prohibit construction activity between 8:00 p.m. and 7:00 a.m. Project-related construction noise is considered to be less-than significant.

Construction-related noise impacts would be less-than significant, with implementation of BMP-3.

Operational Noise Effects

Operation of noise-generating equipment at the proposed treatment plant would include air blowers/odor control mechanisms within the building (which are proposed to be fitted with noise attenuation devices), and pumps that would be located within the treatment facility, at the proposed underground storage reservoir, and at the raw wastewater diversion structure. Specifically, a 50 hp pump would be located at the treatment plant, and a 50 hp submersible pump would be needed at the diversion structure. Pumps proposed for the reservoir would consist of a 100 hp pump at Phase 1 and an additional 200 hp pump at Phase 2.

A 50-horsepower pump generates a noise level of approximately 63 dBA at a distance of 50 feet. Assuming a distance of 100 feet to the nearest sensitive receptors, noise from one 50 hp pump would be reduced to 57 dBA at a distance of 100 feet. However, the proposed pump is submersible, and would be located below grade. The amount of attenuation afforded by the subsurface location of the pump depends on many factors, including the type of soil, the depth below grade, the size of any opening to the surface. A conservative estimate would be to assume a noise reduction of at least 20 dBA, which can be easily achieved with a modern residential structure with closed windows. Accounting for this attenuation, pump noise from the diversion site would be 34 dBA at a distance of 200 feet (the nearest residence), which would comply with the City's nighttime stationary source standard of 50 dBA. Existing nighttime noise levels at Lyon Street are 67 dBA, and noise from the pump at Gorgas Gate would not be detectable at nearby residences.

The noise environment of Building 1029 would be impacted by operation of both the 50 hp pump at the facility and the two reservoir pumps. A 150-horsepower pump generates a noise level of approximately 76 dBA at a distance of 50 feet. Assuming a distance of 100 feet to the nearest sensitive receptors and accounting for the shielding effects of the building and below-grade location of the submersible pumps, noise from two 150 hp pumps and one 50 hp pump would be conservatively estimated at 53 dBA. This noise level would exceed the standards of the San Francisco Noise Ordinance, which restricts fixed source noise impinging on a residential land use to 50 dBA during the night. However, the ambient nighttime noise level in the vicinity of Building 1029 is approximately 54 dBA, which also exceeds allowable standards and is due to surface traffic on Doyle Drive. Thus, considering that the existing ambient noise level exceeds the applicable standards, and considering that noise attenuation from the submersible pumps would likely be greater than the 20 dBA conservatively estimated, the potential noise impact would be less-than significant. However, however, implementation of the noise control measures identified in Section 2.3 (BMP-3: Noise Control) would require that noise reduction be considered in the project design and construction, such that plant operations would conform to the legal requirements of the San Francisco Noise Ordinance.

> *Operation-related noise impacts would be less-than significant with implementation of BMP-3.*

ALTERNATIVE 2 (MULTIPLE STORAGE SITES)

General Noise Effects

Since the primary difference under this alternative relates to storage and distribution facilities, operational effects related to the alternative treatment plant sites would be similar to those described above. The only difference with this alternative in terms of noise impacts would be the result of construction activities that would impact the Hitchcock Street residential area and a residential area along Amatury Loop instead of Ruckman Avenue residences. However, as

described under Alternative 1, these impacts are not expected to result in a substantial noise impact to the environment.

Alternative 2 would have no significant noise impacts, with implementation of BMP-3.

ALTERNATIVE 3 (NO ACTION)

General Noise Effects

Under the No Action alternative, there would be no construction related noise impacts as discussed above. Because no recycled water would be produced on-site, there would be no operational noise emissions associated with the No Action alternative.

The No Action Alternative would not generate noise impacts, and no mitigation is recommended or required.