3.10 WATER RESOURCES

This section describes regulatory considerations, surface water resources on NSTI (including flood hazards and water quality), the ground water underlying the islands, and past dredging activities. Other water-related issues, such as stormwater runoff and contamination, are discussed in Utilities (sections 3.11 and 4.11) and Hazardous Materials and Waste (sections 3.13 and 4.13).

3.10.1 Regulatory Considerations

San Francisco Bay Regional Water Quality Control Board

The San Francisco Regional Water Quality Control Board (RWQCB) operates under authority delegated to it by the EPA and the State Water Resources Control Board (SWRCB). The RWQCB is the local enforcement agency for the federal Clean Water Act (Pub. L. 92-500, as amended, 33 U.S.C. §§ 1251-1387) and the State Porter-Cologne Water Quality Act (Cal. Water Code §§ 13000-13999.19). The RWQCB participates in the regionwide long-term management strategy (LTMS) program for dredging and disposing of material dredged from the Bay. The RWQCB also regulates urban runoff discharges under the National Pollutant Discharge Elimination System (NPDES) permit regulations. NPDES permitting requirements cover runoff discharged from point (e.g., industrial outfall discharges) and nonpoint (e.g., stormwater runoff) sources. The RWQCB implements the NPDES program by issuing construction and industrial discharge permits.

Construction projects of one or more acre are subject to NPDES Phase II permit regulations, which require the development of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP is designed to minimize water quality degradation through storm water monitoring, establishment of Best Management Practices (BMPs) (e.g., bioswales), implementation of erosion control measures, and implementation of spill prevention and containment measures. Separate SWPPPs are required for construction and post-construction operations.

All of the stormwater runoff from mainland San Francisco is directed to the city's sewage treatment plants for pretreatment prior to discharge into the Bay or ocean. The treatment plants operate under individual NPDES industrial discharge permits. However, unlike mainland San Francisco, Treasure Island has separate stormwater and wastewater systems.

The wastewater treatment plant at NSTI operates under an NPDES permit. The permit specifies discharge prohibitions, effluent limitations, receiving water limitations, and sludge requirements for the plant. Navy has a self-monitoring arrangement for effluent with RWQCB (DON 1996g). Under this arrangement, effluent constituents are continuously analyzed at one-minute intervals (San Francisco 1995b).

NSTI complies with the statewide General Permit for Stormwater Discharges Associated with Industrial Activities through a notice of intent that covers the entire base as a single industrial site. The permit includes a SWPPP and existing and proposed BMPs. The SWPPP includes a representative stormwater sampling program that evaluates stormwater quality from the most active industrial areas (DON 1998g). Under the three reuse alternatives, anyone conducting

specific industrial operations at the site would be required to comply with requirements of the statewide General Permit for Stormwater Discharges Associated with Industrial Activities.

The RWQCB also regulates water quality in accordance with state laws and policies identified in the San Francisco Basin Plan. The plan identifies beneficial uses of surface and ground waters, wetlands, and marshes, and sets forth water quality objectives to protect the beneficial uses. Beneficial uses for San Francisco Bay include industrial uses, processing, navigation, contact and noncontact recreation, fishing, commercial uses, wildlife habitat, species preservation, and fisheries habitat (RWQCB 1995). The San Francisco Bay RWQCB has determined that groundwater beneath Treasure Island is not a potential source of drinking water and is therefore not considered to be a beneficial use. Groundwater is not used for any beneficial use at NSTI. Stormwater discharges would need to be consistent with beneficial uses identified for San Francisco Bay as part of the basin plan. NPDES permit effluent discharge limitations are structured to achieve regional compliance with basin plan beneficial uses.

Long-term Management Strategy

The LTMS study is intended to identify long-term solutions to the problem of regional dredge material disposal for a 50-year planning period. An estimated average of approximately 300 million cubic yards (229 million m^3) per year of dredge materials will require disposal through the planning period (1995 to 2045). The LTMS includes provisions for disposing of, rehandling, and reusing dredge material in both construction and fill activities. Under the proposed reuse alternatives, dredged materials would be required to be disposed of in compliance with the LTMS Plan.

U.S. Army Corps of Engineers

The San Francisco Bay and shoreline is within the jurisdiction of the COE. The COE's regulatory authorities and responsibilities are based on the following laws:

- Sections 9 and 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. §§ 401, 403), which regulate diking, filling, or placing structures or work in or affecting navigable waters of the US;
- Section 404 of the Clean Water Act of 1972 (33 U.S.C. § 1344), which regulates disposal of dredged or fill material into the waters of the US; and
- Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. § 1413), which regulates the transportation of dredged material for purposes of disposing of it in ocean waters.

The COE also participates in the regionwide LTMS program for dredging and disposing of material dredged from the Bay. For a proposed project within its jurisdiction, the COE conducts a public interest review by soliciting comments on permit applications through a public notice process. The BCDC, RWQCB, CDFG, EPA, USFWS, and NMFS have specific review and comment responsibility for COE-permitted projects. The COE will review developments proposed under the reuse plan that involves structures or dredging within the Bay shoreline or proposed discharges of dredged material into U.S. waters.

3.10.2 Surface Water Resources

Surface Drainage

Surface drainage is the flow or runoff of rainfall from the site. This runoff can be over the ground surface in open drains or through a system of storm drainpipes. Area precipitation is mostly rainfall and averages about 20 inches (51 cm) annually between October through April. The two islands have very different topography; Treasure Island is relatively flat, with shoreline areas protected by a perimeter dike, while Yerba Buena Island has steep slopes and a natural bedrock shoreline. Storm drainage systems of the two islands are separate, but runoff from both systems flows to San Francisco Bay.

Treasure Island

Runoff from Treasure Island collects in a series of storm drain systems and is directed to the Bay via gravity outfalls and pump stations. The Treasure Island storm drainage system includes six storm drain lift stations, each with high capacity pumps for winter storms and lower capacity pumps for summer duty, primarily irrigation runoff. Twenty-five major outfalls serve Treasure Island, primarily steel or concrete pipes, ranging from 12 to 42 inches (31 to 107 cm) in diameter. Approximately 24 smaller outfalls supplement this system, ranging from 4-inch (10-cm) to 10-inch (25-cm) pipes of varied composition (San Francisco 1995a). The Treasure Island storm drain system is adequate in terms of capacity. It performed well in heavy rains during 1995-1996 and 1996-1997, and no ponding or other problems were noted during these events. The Treasure Island storm drain system was inspected in 1991-1992 and was repaired in 1993 (DON 1996i).

Localized ponding occurs on low-lying areas of Treasure Island, particularly on its northern side, from tidal seepage through the perimeter dikes during extreme high tides. This has not affected structures or foundations, which are above the seepage level, but has resulted in ponding in yard and open space areas.

Yerba Buena Island

Runoff from the generally undeveloped portions of Yerba Buena Island flows to the Bay via natural ravines and overland sheetflow; this runoff has caused erosion and slope failures (San Francisco 1998a). Runoff from developed areas flows to the Bay via a gravity stormwater drainage system that discharges at various points along the shoreline.

Flood Hazards

Treasure Island is protected from tidal flooding by a perimeter dike. The dike provides adequate protection from wind- and wake-generated waves (San Francisco 1995b). Tsunamis (also known as seismic sea waves or tidal waves) can be generated by offshore or distant seismic activity or by submarine landslides. Seiches are waves generated in an enclosed body of water caused by seismic shaking, climatic forces, or landslides into the water body. Although seiches are possible in San Francisco Bay, the largest ever measured in the Bay was 4 inches (10 cm) in the 1906 earthquake (Alameda Reuse and Redevelopment Authority 1995).

The site has not been mapped for flood hazards by the Federal Emergency Management Agency (FEMA) (DON 1988b).

Tide heights range from approximately zero to about 6 feet (2 m) NGVD, with 100-year highest estimated tides of 6.4 feet (2 m) NGVD (COE 1984). Waves generated by 60 mph (97 km/hour) storm winds may reach heights of approximately 7.5 feet (2 m) (DON 1985). Therefore, in a worst-case scenario, a maximum high tide, in combination with 60 mph (97 km/hour) storm winds, could result in waves reaching 13 to 14 feet (4 to 4.3 m) above sea level NGVD.

Predictions of future accelerated sea level rise due to global warming vary widely. The EPA projects a 50 percent likelihood that sea levels will rise approximately 4 inches (10 cm) (an average of 0.14 inches [0.36 cm]/year) by 2025 and approximately 8 inches (20 cm) (an average of 0.16 inches [0.39 cm]/year) by 2050 (EPA 1995).

Water Quality

NSTI surface runoff contains relatively low levels of urban pollutants, such as oil and grease, heavy metals, rubber, fertilizers, and pesticides (DON 1998e). Localized ground water contamination from spills and leaks of hazardous materials have been identified in areas of NSTI, and exceedances of the EPA's ambient water quality criteria for various organic compounds and metals have been measured. Areas of contamination are in proximity to the shoreline, and contaminants may reach the Bay via tidal influence (for further discussion, see section 3.13, Hazardous Materials and Waste).

San Francisco Bay in its entirety has water quality problems resulting from past and present practices, including urban waste disposal, runoff from agricultural areas into the Bay, contaminants entrained in urban street runoff, ship repair, and accidental spills or deliberate discharges from ships. The SWRCB has listed Central San Francisco Bay as impaired on the basis of field surveys of the water column, sediments, sediment toxicity, bivalve bioaccumulation, and water toxicity. This determination related to levels of copper, mercury, selenium, diazinon, and PCBs (SWRCB 1997; San Francisco 1998d). Regarding discharge of sewage from vessels at Treasure Island, since 1981, most military vessels have been equipped with holding tanks for both sewage and grey water, and there are adequate pump-out facilities at NSTI docks. However, the marina does not have a pump-out station for recreation boats (San Francisco 1998a).

The sewage treatment plant at NSTI provides for secondary treatment of sanitary sewage and discharge to the Bay via an outfall near the plant. Baseline (pre-closure) discharge volumes equaled approximately 600,000 gallons per day (2,271,000 liters per day) dry-weather flow in 1994 (DON 1994b). This quantity and the quality of discharge is permitted by the RWQCB, which has regulatory authority over Bay discharges. The quality of sediments in near-shore waters is addressed in section 3.13.

3.10.3 Ground Water

NSTI influences on regional ground water hydrology are considered minimal because the islands are isolated from water-bearing aquifers in the Oakland area. Ground water at Treasure Island is recharged by direct infiltration of precipitation, landscape irrigation, and leaking storm

drains (DON 1990b; RWQCB 1996). Ground water occurs at shallow depths throughout Treasure Island but is limited on Yerba Buena Island. The Treasure Island subsurface, whether fill, Bay Mud, or shoal deposits, is saturated at elevations of 0 to 6 feet (0 to 2 m) NGVD, depending on tidal influence. Average ground water elevations in the central part of the island were measured at 3 feet (0.9 m) NGVD in 1990 (DON 1990c) and at 4 feet (1 m) NGVD in 1995 (San Francisco 1995b).

The shallow ground water in fills and Bay Mud is hydrologically connected with the saline waters of San Francisco Bay; this connection is greatest at the edges of the island. Tidally influenced ground water table fluctuations have been observed at distances ranging from 90 to 250 feet (27 to 76 m) inland. Ground water at Treasure Island generally flows from the island center towards the shoreline. Tidal mixing with ground water has been noted up to about 100 feet (30.5 m) inland from the shoreline (DON 1995e), resulting in brackish ground water.

The San Francisco Groundwater Master Plan (San Francisco Public Utilities Commission 1996) does not consider ground water at Treasure Island to be an important water supply aquifer. The San Francisco Bay RWQCB conducted a Pilot Beneficial Use Project (RWQCB 1996), which considered Treasure Island to be of limited value as a water supply aquifer and recommended deleting water supply as a beneficial use for the island's ground water. The San Francisco Bay RWQCB determined that ground water beneath Treasure Island is not a potential source of drinking water, pursuant to SWRCB Resolution no. 88-63 and RWQCB Resolution No. 89-39, because of the quality and hydrologic conditions of the groundwater. Localized ground water contamination from spills and leaks of hazardous materials are discussed in the hazardous materials and waste section of this document (section 3.13).

3.10.4 Past Navy Dredging

Treasure Island and Yerba Buena Island form a cove east of the causeway, open to the northeast. A large shoal area from -3 to -5 feet (-0.9 to -1.5 m) mean lower low waterline (MLLW), which is about 3.1 feet (0.9 m) below NGVD, has formed across the cove, extending to within 150 yards (137 m) of Pier 1. Other depths in the cove, including the marina area, range to -20 feet (-6 m) MLLW. Berth soundings at Pier 1 are -28 feet (-8.5 m) MLLW on the north side and -15 to -28 feet (-4.5 to -8.5 m) MLLW on the south side.

Between 1970 and 1985, Navy dredged a 3-mile (5-km) long, 1,000- to 1,500-foot (305- to 457-m) wide channel to a depth of -35 feet (-11 m) MLLW adjacent to the northern and eastern shores of Treasure Island. This channel continues around the east side of Yerba Buena Island, extending about 3,000 feet (914 m) beyond its southern edge. Three contiguous berthing zones on the northern and eastern side of Treasure Island were dredged to a depth of -45 feet (-14 m) MLLW in 1970 and 1985. The dredging from these projects extracted approximately 763,000 cubic yards (583,355 cubic m) of material, averaging about 51,000 cubic yards (38,992 cubic m) per year from 1970 to 1985. In 1970, approximately 272,000 cubic yards (207,958 cubic m) of material was disposed of at open water sites. In 1985, about 35,000 cubic yards (26,759 cubic m) was disposed of on Treasure Island, and approximately 457,000 cubic yards (349,401 cubic m) was disposed of at the Alcatraz Island disposal site (COE 1996). Navy has maintenance dredged the marina and pier areas of NSTI. The last dredging in the marina area occurred in 1990.

Pursuant to Section 404 of the Clean Water Act (33 U.S.C. § 1344), dredge material is tested routinely for dissolved metals and other contaminants. Sediment quality in the southeast corner of Treasure Island was evaluated in 1984 for the potential homeport of the USS Missouri Battle Group, and no contaminants were detected (DON 1984b). Navy's Treasure Island Dredging Project reported no history of sediment contamination in the navigation channel (COE 1996). Few data are available to establish sediment quality in Clipper Cove, although data from nearby locations suggest that sediments at other locations in the Central Bay, including nearby at Yerba Buena Island, are contaminated by metals. In one study that compared the toxicities of sediments from various sites in the Bay, sediments from Clipper Cove were found to be toxic to sea urchin, mussel, and amphipod species. However, the source of the toxicity was thought to be high concentrations of ammonia and sulfides, rather than heavy metals. The concentration of copper, nickel, cadmium, zinc, and lead in the Clipper Cove sediments was found to be relatively low (Anderson et al. 1995).