4.10 WATER RESOURCES

Potential water resources impacts resulting from disposal and reuse of NSTI are discussed in this section. This section is closely related to section 4.11 (Utilities), which discusses water supply and infrastructure for domestic use. Factors considered in determining whether an alternative has significant impacts to water resources included the extent or degree to which its implementation would:

1. Adversely affect drainage patterns to the extent that the physical, chemical, or biological character of nearby bodies of surface water would be substantially altered;
2. Degrade water quality below levels established by regulatory agencies; or
3. Increase risk to human health and safety, or for economic damage, by siting incompatible land uses and facilities within areas susceptible to flooding or ponding.

4.10.1 Alternative 1

Alternative 1 would require dredging to develop and maintain the marina (including periodic shoal dredging), for maintaining and using Pier 1 for ferry service, and possibly for developing the new ferry terminal pier proposed for the west side of Treasure Island.

The overall area of paved surfaces at NSTI would increase under this alternative. Assuming that approximately 75 percent of open space areas on NSTI are developed, Alternative 1 would generate an additional 37 acres (15 ha) of paved surfaces; therefore, the volume of stormwater discharges also would increase.

The volume of wastewater discharged as treated effluent would remain below the permitted capacity of the sewage treatment plant (see section 4.11.3).

Significant and Mitigable Impacts

Impact: Exposure of individuals and property to ponding from high tides (Factor 3). The installation of residential development in low-lying areas on Treasure Island would result in increased exposure of occupants, visitors, and property to ponding hazards due to seepage through the dike and underlying sediments during some high tide events. The rate of flow from the bay to the interior of the island is proportional to the difference in elevation between the bay and the water table on the island, so the rate of seepage increases with higher tidal stands. This seepage sometimes leads to water ponding in low-lying areas of the island. Compared to baseline conditions, there would be a net increase of about 2,395 residents, plus approximately 13,700 daily visitors. The exposure of people and structures to this type of flooding is considered a potential significant and mitigable impact.

Mitigation. Filling low-lying portions of the residential area to at least 9 feet (3 m) NGVD prior to development would mitigate this impact by ensuring that the ground surface is above the maximum average daily elevation of the bay. In addition, other low-lying areas within 500 feet (152 m) of the Treasure Island perimeter should be similarly filled before development is allowed.

Implementing this mitigation would reduce the impact to a not significant level.

Impact: Exposure of individuals and property to flooding (Factor 3). Developing and reusing Treasure Island under Alternative 1 could expose occupants, visitors, and property to flooding hazards caused by dike overtopping during storms, which could be a significant impact. In a worst-case scenario, a maximum high tide of 6.4 feet (2 m) NGVD, 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. As the existing perimeter dike is at elevations ranging from about 7.7 to 13.8 feet (2.3 to 4.2 m) NGVD, events of this magnitude would result in waves overtopping the dike in some areas.

Sea level rise also could increase potential flooding problems at NSTI. Predictions of future accelerated sea level rise due to global warming vary widely. The effect of sea level rise is increased on a land mass that is concurrently subsiding. The EPA projects a 50 percent likelihood that sea levels will rise about 4 inches (10 cm) (an average of 0.14 inches [0.36 cm]/year) by 2025 and about 8 inches (20 cm) (an average of 0.16 inches [0.39 cm]/year) by 2050. Such increases are the middle range of sea level rise estimates, which range from zero to over 18 inches (46 cm) (an average of 0.03 feet [0.009 m]/year) by 2050 (EPA 1995).

When the highest current tide (approximately 6.4 feet [2 m]) is superimposed on the EPA's estimates for rise in sea level (approximately 8 inches [20 cm]), high tides could reach approximately 7 feet (2 m) and 1 inch (2.5 cm) NGVD. Such estimates do not include compounding caused by high storm waves of approximately 7.5 feet (2 m) occurring simultaneously with high tides. They also do not include the effects of continued settlement of the island, which has been estimated to be on the order of approximately 1 foot (0.3 m) over the next 50 years (San Francisco 1995b). Therefore, significant flooding could still occur, even with raised dikes. This is considered a significant and mitigable impact.

Mitigation. Set back development inboard of the perimeter dike to allow room for periodic dike raising without substantially increasing bay fill. Raise the dike as necessary to account for site settlement, changes in maximum tidal heights, and rises in sea levels. In addition, inspect the dike after each major storm to identify repair needs, and repair the dike promptly.

Implementing this mitigation measure would reduce the impacts to a not significant level.

Not Significant Impacts

Dredging and dredge material disposal (Factors 1 and 2). Dredging associated with this alternative could disturb and disperse sediments, including any contaminated sediments, into the water column, reducing dissolved oxygen and increasing suspended particulates (COE 1992). Dredging also would cause temporary increases in water column sediment and turbidity as the sediments are raised through the water column. Contaminants released by dredging activities could significantly degrade water quality at or near the dredge sites, unless precautionary measures are taken.

Sediments will be tested in place prior to dredging. If contaminants are identified at concentrations capable of causing adverse water quality effects, appropriate measures will be evaluated and adopted prior to undertaking dredging. Dredging contaminated sediments

requires use of special dredging equipment, such as an environmental or closed bucket, high solids slurry pumps, marine excavators, and silt curtains. The site will be dredged using appropriate dredging technology suitable to the site-specific conditions and in accordance with future permit requirements placed by the appropriate regulatory agencies.

Sediment sampling conducted in late January through early February 1996 at the former Clipper Cove Skeet Range indicated that there are contaminated sediments in the marina area with elevated levels of lead and polychlorinated aromatic hydrocarbons (PAHs) (DON 1997q). Dredging operations typically do not cause significant short- or long-term fluctuations in salinity, temperature, or pH. However, temporary turbidity increases occur when the scow receiving the dredged materials is allowed to overflow with sediment-laden water so that it can be filled to capacity.

Dredging would require permits and approvals from BCDC, San Francisco Bay RWQCB, and the COE. Prior to dredging, and in compliance with the CWA (Section 404, EPA's 404[b][1] Guidelines of 1980 [40 C.F.R. Part 230]), all materials proposed for excavation and dredging must be tested for heavy metals, hydrocarbons, PCBs, tributyltin, pesticides, and any other contaminants of concern to the RWQCB. Careful delineation and segregation of any contaminated material would minimize the volume of contaminated sediments generated. Compliance with all applicable regulatory requirements would ensure that potential impacts would not continually violate water quality standards or requirements and therefore would be not significant. No mitigation is proposed.

Marine disposal of contaminated dredged sediments also could contaminate receiving waters. Uncontaminated dredge sediments could increase turbidity and suspended sediments at marine disposal sites. Runoff from drying and dewatering dredge materials also could adversely affect adjacent bay waters. However, similar to dredging, the dredge material disposal process is strictly regulated by federal and state agencies. Any contaminated dredging material must be disposed of in approved upland facilities. All sediment disposal programs and methods would need to comply with applicable LTMS sediment disposal priorities, which favor reusing sediments on land instead of disposing of them in the bay or ocean. Complying with the LTMS Implementation Plan for dredge material disposal and all other applicable regulatory requirements would ensure that dredging activities would not violate water quality standards or requirements; therefore, impacts would be not significant. No mitigation is proposed.

Construction impacts (Factors 1 and 2). Alternative 1 would result in construction of buildings, other structures, and infrastructure within the reuse plan area. Construction operations would lead to silt-laden runoff from construction sites due to storm events and watering to reduce PM_{10} emissions. Dewatering of construction sites also could be employed if extensive ground excavation, such as for deep foundations, were required. This runoff, which could contain relatively high levels of petroleum hydrocarbons, would contribute to degrading local and regional surface water quality. Construction would not impact groundwater in the regional aquifer because NSTI is isolated from the water-bearing aquifers in the Oakland area. Groundwater in the shallow aquifer beneath the islands might be locally lowered during construction. However, this impact would be temporary and would not impact water operations elsewhere in the Bay Area.

A stormwater management plan would be developed for NSTI consistent with Clean Water Act requirements for the Stormwater Pollution Prevention Program (SWPPP). The stormwater management plan would address monitoring, source reduction, BMPs, and treatment strategies. Examples of some general actions required by BMPs include the following:

- Schedule excavation and grading work for dry weather;
- Use as little water as possible for dust control;
- Use revegetation, if feasible, for erosion control after clearing, grading, or excavating; and
- Follow other BMPs required by general construction NPDES permits.

Therefore, construction impacts would not violate water quality standards or requirements and would be not significant. No mitigation is proposed.

Water quality (Factors 1 and 2). Alternative 1 would result in a small increase in impervious surface area (see below, for Factor 3), resulting in the potential for an increased rate of discharge of stormwater to the bay. Higher flow velocities or increased ponding in low areas could cause slightly increased loading of urban pollutants (e.g., sediments, oil and grease, etc.). Since the percentage increase in the volume of stormwater runoff would be small, it is unlikely to result in a significant increase in the amount of pollutants that flow into the bay.

Contaminants commonly associated with urban development include leaking motor oils, fuel, and other vehicular fluids, fertilizers and pesticides from landscaping, and trash. These contaminants can be washed by rain and carried with runoff into the bay. Ferry service to and from Treasure Island also could contribute to pollutants in the bay. Similar to construction, an SWPPP and BMPs may be required to limit the introduction of these contaminants into the bay.

As recommended in the Draft Reuse Plan, Alternative 1 would include implementation of BMPs to improve water quality prior to discharging to the bay. BMPs for stormwater runoff include limiting oil and grease runoff from parking areas, limiting contaminants in wash-down of the themed attraction, and managing herbicides and pesticides for open space areas and yards. Wherever possible, grassy swales and detention ponds should be used to provide on-site treatment of urban pollutants prior to water discharges to the bay.

Alternative 1 also could lead to dewatering of the high groundwater table beneath Treasure Island if deep foundations or utilities were to be built. Since groundwater beneath Treasure Island contains petroleum hydrocarbons, metals, and other contaminants, and this project would contribute runoff to the bay, this dewatering would need to comply with BMPs contained in the state's NPDES permit and local RWQCB permits. It is anticipated that most groundwater removed during dewatering activities would be discharged to the on-site wastewater treatment plant. Any contaminated water not treatable by the plant would be disposed of in an appropriately permitted facility. Discharge of the removed groundwater into the on-site drainage system would be allowed only after obtaining a San Francisco discharge permit. In reviewing the permit for discharge, the city would ensure that contaminant levels would be reduced to the extent required to be protective of the bay and in compliance with applicable permits from the RWQCB. If direct discharge to surface water is determined as the appropriate method for disposal of groundwater removed during dewatering, permits issued

by the RWQCB under the NPDES program would be required. Therefore, the impact of dewatering would not be significant.

Exposure of individuals and property to flooding (Factor 3). Although nearly all stormwater (except that which evaporates) must be discharged to the bay to prevent flooding, Alternative 1 would increase the amount of impervious surfaces, particularly in the residential area in the northwest portion of the site, and therefore could increase the average volume and speed of stormwater runoff. Developing sports fields on the central portion of Treasure Island, on the other hand, would reduce the area of impervious surface, and slow the rate of runoff. Because much of the island is already covered with impervious surfaces, the proposed net increase would not be substantial. It is estimated that Alternative 1 would generate an additional 37 acres (15 ha) of impervious surfaces. The small increase in the runoff rate is not expected to substantially increase the potential for flooding.

Tsunami and seiche wave heights are expected to be less than about 3 feet (0.9 m) (San Francisco 1995b). For flooding to occur, tsunamis would need to coincide with combined tide and wave heights of over 7.5 feet (2 m). The likelihood of a major tsunami (e.g., a 100- or 500-year event) occurring simultaneously with a high tide is highly remote. For example, if we estimate that over the next 100 years bay water levels (accounting for tidal levels, base swell, wind-driven waves, rise in sea level, and settlement of the dikes) will exceed the equivalent of 7.5 feet (2 m) NGVD about 20 percent of the time, then the probability of a 100-year tsunami or seiche occurring simultaneously with such a high tide would only be about 0.2 percent per year, or equivalent to about a once in 500 years event. This is not sufficiently probable to be considered a significant impact.

4.10.2 Alternative 2

Under Alternative 2, a golf course would be developed on the northern portion of Treasure Island, and development would occur on the southern half of the island. Similar to Alternative 1, dredging would be required for expanding and maintaining the marina, maintaining and using Pier 1, and constructing a ferry terminal on the west side of Treasure Island. Although stormwater runoff in the northwest portion of Treasure Island (where the golf course is proposed) would decrease, the overall amount of paved surfaces at NSTI would increase under this alternative.

Golf course development is estimated to result in a net loss of approximately 25 acres (10.1 ha) of paved surfaces. However, assuming that approximately 75 percent of open space areas on Treasure Island is developed, Alternative 2 would generate an additional 37 acres (15 ha) of paved surfaces, for a net increase of 12 acres (4.9 ha) of paved area. Therefore, the volume of stormwater discharges also would increase. The volume of wastewater discharged as treated effluent would remain below the permitted capacity of the sewage treatment plant.

Significant and Mitigable Impacts

Impact: Exposure of individuals and property to flooding (Factor 3). Compared to baseline conditions, this alternative would subject fewer residents (a net decrease of approximately 3,790) but more daily visitors (a net increase of 5,500) on the northern half of Treasure Island, where a golf course is proposed, to existing flood hazards. Flood hazards on the southern

portion of the site would be similar to those described for Alternative 1. This is considered a significant and mitigable impact.

Mitigation. Mitigation measures for flooding from dike overtopping would be the same as those described for Alternative 1.

Implementing these mitigation measures would reduce the impact to a not significant level. As described for Alternative 1, flooding due to tsunamis or seiches is not considered a significant impact.

Not Significant Impacts

Not significant impacts related to dredging and dredge material disposal, and construction impacts are the same as those described for Alternative 1. Ponding from high tides also would be considered a not significant impact because only minimal structures (e.g., golf club house, golf shop) are planned in the northern portion of the island where existing ponding occurs.

Water Quality (Factors 1 and 2). Not significant impacts to water quality would be similar to those described for Alternative 1 with the exception that Alternative 2 would have a slightly greater potential impact to water quality as a result of the development of a golf course. Chemicals associated with the golf course could adversely affect water quality if not adequately managed. Hazardous materials management would be subject to all regulatory controls. In addition, a chemical application and management plan would be required to address the management of these materials.

4.10.3 Alternative 3

Under Alternative 3, most existing facilities would be reused and existing interim uses, such as the firefighting training facility, would continue. Dredging would be required only for maintaining the existing marina. Dike improvements are proposed along the northwest and southeast portions of Treasure Island in the areas subject to rotational dike failure. It is anticipated that the overall amount of paved surfaces at NSTI would remain roughly the same under this alternative because minimal new development is proposed, so the volume of stormwater discharges would remain roughly the same. The volume of wastewater discharged as treated effluent would remain below the permitted capacity of the sewage treatment plant.

Significant and Mitigable Impacts

Impact: Exposure of individuals and property to flooding (Factor 3). Alternative 3 could subject occupants, visitors, and property to substantial flood hazards throughout Treasure Island. Compared to operational baseline conditions, there would be fewer residents (a net decrease of 990) but more daily visitors (an increase of 2,740) throughout NSTI exposed to these existing hazards. This is considered a significant and mitigable impact.

Mitigation. Mitigation measures for flooding from dike overtopping would be the same as those described for Alternative 1.

Implementing these mitigation measures would reduce the impact to a not significant level. As described for Alternative 1, potential flooding due to tsunamis or seiches is not considered a significant impact.

Impact: Exposure of individuals and property to ponding from high tides (Factor 3). Occupants of structures in the low-lying areas of the residential portion of Treasure Island would be susceptible to substantial ponding hazards. This is considered a significant and mitigable impact.

Mitigation. Mitigation measures for ponding during high tides would be the same as those described for Alternative 1.

Implementing these mitigation measures would reduce the impact to a not significant level.

Not Significant Impacts

Dredging and dredge material disposal (Factors 1 and 2). The only dredging activity proposed under this alternative is maintenance dredging at the existing marina. This level of dredging would be commensurate with historic maintenance dredging activities at NSTI and would not be considered a significant effect. No mitigation is proposed.

Construction impact (Factors 1 and 2). Construction-generated stormwater runoff from the development of Alternative 3 would be substantially less than but similar in nature to what would result for Alternative 1. Lower levels of runoff are expected because several existing buildings would be reused and there would be limited new construction. Impacts would not continually violate water quality standards or requirements and would be not significant. No mitigation is proposed.

Water quality (Factors 1 and 2). Compared to baseline conditions, Alternative 3 would generate about 17 percent fewer daily vehicle trips, and there would be no expected increase in boating activity. Therefore, potential water quality impacts associated with urban pollutants in stormwater runoff and boat discharges would not be significant. The existing firefighting training school is a contained facility, and all runoff is discharged directly to the sanitary sewer for treatment. No materials are burned, and no fire suppression chemicals are used during training exercises; therefore, there would be no significant impacts on runoff water quality generated at this facility. No mitigation is proposed.

4.10.4 No Action Alternative

Under the No Action Alternative, property available for disposal at NSTI would continue under federal ownership in an inactive caretaker status, and existing interim leases would be allowed to expire. There would be minimal use of the property and facilities under this alternative. Dike maintenance would provide continued flood protection under most conditions, although in large storm events it is expected that waves would overtop the dikes occasionally, resulting in flooding of low-lying areas unless the dike elevation is raised or sufficient pumping capacity is installed to drain off the water. Cleanup of hazardous materials, petroleum products, or waste sites also would be continued by the Navy. There would be no additional impervious surfaces; therefore, there would not be an increase in runoff into the stormwater system relative

to current conditions (except if the dikes were overtopped). Ponding of stormwater in low-lying areas would continue, as would settling of the sediments underlying the island, resulting in the potential for continued and possibly increased localized flooding. These impacts would be controlled through maintenance, such as by installing additional pumping capacity as needed, and would be not significant. Existing residual urban pollutants would continue to be discharged to the bay in stormwater runoff, resulting in not significant impacts on water quality. No dredging would be required. No impacts to water resources would occur under this alternative.