Chapter 3.9
Water Quality and Oceanography

3.9.1 Introduction

This chapter focuses on an evaluation of water quality and oceanographic issues for the proposed project. A description of the setting for these issue areas is provided, followed by a discussion of the environmental impacts and mitigation measures associated with the proposed project and each alternative. The majority of the analysis presented in this section is based on the Ports of Long Beach and Los Angeles Year 2000 Baseline Study of San Pedro Basin (MEC Analytical Systems 2002), and Years 1967–2001 Water Quality Data (Port of Los Angeles unpublished).

3.9.2 Setting

3.9.2.1 Regional Setting

The project is located in and adjacent to the West Channel of Los Angeles Harbor. This environment has been physically modified through past dredging and filling projects, as well as construction of breakwaters and other structures. Los Angeles Harbor is adjacent to Long Beach Harbor and oceanographically they function as one unit due to an inland connection via Cerritos Channel and because they share Outer Harbors behind the San Pedro, Middle, and Long Beach Breakwaters. The combined Los Angeles/Long Beach Harbor (from this point forward referred to as just “the harbor” unless specified) oceanographic unit has two major hydrologic character divisions. The harbor is marine, primarily influenced by the southern California coastal marine environment known as the Southern California Bight. The main freshwater influx into the harbor is through Dominguez Channel, which drains approximately 80 square miles of urban and industrial areas. There are also several major storm drains that discharge into the harbor. Another freshwater contributor to the harbor is the discharge of treated sewage from the Terminal Island Treatment Plant into the Outer Harbor.

The traditional means of distinguishing Inner and Outer Harbor areas is by physical definition, with the Inner Harbor considered to end at the entrance to the Main Channel and the Outer Harbor consisting of the area south of the Main Channel. However, another definition based on habitat value is used by regulatory agencies in making biological mitigation decisions. Due to improvements in harbor biological conditions, the areas of low habitat value (Inner Harbor) have receded and the areas of higher habitat value (Outer Harbor) have increased. The habitat value definition extends from the Outer Harbor to north of the Vincent Thomas Bridge, with the exception of slips. The West Channel is classified as Inner Harbor.

A summary of existing water quality and oceanographic conditions is presented below.

3.9.2.2 Water Quality

General Conditions

Water quality in the Los Angeles Harbor is influenced by a number of factors including climate, circulation, biological activity, surface runoff, effluent discharges, and accidental discharges of pollutants related to shipping activities. Water quality outside the harbor is influenced by water flushed from the harbor and vessel activity. Because this site is relatively close to the Pacific Ocean, water temperature would be colder relative to the inner portions of the Harbor. Accordingly, it is expected that the salinity, pH, and turbidity would be lower and the levels of dissolved oxygen would be higher. These factors would generally result in good overall water quality (LAHD 1997).

The LAHD has been monitoring water quality on a monthly basis in the harbor since 1967. There has been a general improvement of the water quality parameters over time. Four monitoring stations are located in the immediate vicinity of the project. The sampling locations, LA1, LA3, LA5, and LA6, are located just outside the breakwater (near Angels Gate), halfway on the western perimeter of the Glenn Anderson Ship Channel (adjacent to a channel buoy/bell beacon), about 200 feet from Cabrillo Beach, and at Berth 38 at the West Channel area (see Figure 3.9-1).

Dissolved Oxygen

Dissolved Oxygen (DO) is a principal indicator of water quality. The EPA and the LARWQCB have established a DO concentration of 5 milligrams per liter (mg/l) as the minimum concentration for aquatic habitats (EPA 1986; LARWQCB 1994). The LARWQCB also requires that the mean annual DO concentration be 6 mg/l or greater, with no event less that 5 mg/l. DO concentrations may vary considerably based on the influence of a number of parameters:

- respiration of plants and other organisms,
- waste (nutrient) discharges,
- surface water mixing through wave action,

- diffusion rates at the water surface,
- depth of the sample, and
- disturbance of anaerobic bottom sediments.

As recently as the late 1960s, DO levels in some portions of Los Angeles Harbor were so low that little or no marine life could survive. Since that time government regulations have reduced direct waste discharges into the harbor, resulting in improved DO levels throughout the harbor. The Outer Harbor generally has higher concentrations of DO than the Inner Harbor slips and channels due to better circulation and other factors. Occasional planktonic blooms still occur under conditions of high solar radiation and high nutrient levels such as on sunny days following storm events. These blooms result in severely reduced DO levels, but the effects are usually localized and short-lived. The disturbance of anaerobic sediments by dredging activities also results in short-term, localized DO reductions.

Recent water quality monitoring found DO generally greater than 6 mg/l near the proposed project. During 2001, the sampling location closest to the proposed project (LA6), within the West Channel, had DO below 6 mg/l (5.9 and 5.8 mg/l) during August and September and less than 5 mg/l (4.7 mg/l) during November. However, average annual DO at the sampling location was greater than 6 mg/l. Therefore, although water quality has significantly improved over past conditions, DO still occasionally is at levels below LARWQCB standards at the proposed site (Port of Los Angeles unpublished).

pH

Hydrogen ion concentration (pH) in marine waters is affected by: plant and animal metabolism, mixing with water with different pH values from external sources, and (on a small scale) disturbances in the water column that cause redistribution of waters with varying pH levels or the re-suspension of bottom sediments. Frequently, pH levels correlate to DO concentrations. In the open ocean, pH levels typically range from 8.0–8.3. In the Los Angeles and Long Beach Harbors, annual mean pH values for surface, mid-depth, and bottom waters at individual stations ranged from 7.86 to 8.09, 7.88 to 8.03, and 7.81 to 7.99, respectively. The LARWQCB has established an acceptable range of 6.5–8.5 with a change tolerance level of no more than 0.2 due to discharges.

Transparency

Water clarity, or the measure of the ability of water to transmit light, is known as transparency. Transparency is measured by the distance a white disk, called a Secchi disk, can be seen through the water. Turbidity is the measure of suspended solids in the water column. Increased turbidity usually results in decreased transparency. Turbidity generally increases as a result of one or a combination of the following conditions: fine sediment from terrestrial runoff;

planktonic bloom resulting from favorable environmental conditions such as abundant light and high nutrient loads; vessel-related disturbances; and dredging activities. Historically, water clarity in the harbor has varied tremendously, with Secchi disk readings of 0.0–40 feet. There has been a general increase in clarity since 1967; however, individual readings still vary greatly.

Contaminants

Potential water column contaminants include heavy metals (particularly cadmium, chromium, copper, lead mercury, nickel, silver, and zinc), oil and grease, chlorinated hydrocarbons (i.e., DDT and DDE), and PCBs. These contaminants were found in harbor sediments prior to the Los Angeles Harbor Deepening Project (ACOE and LAHD 1984). In conjunction with channel deepening and maintenance dredging activities, some contaminated sediments have been removed. However, some localized contaminated sediments remain.

Data for trace metals in harbor waters are very limited. Sampling for the Pier J project in Long Beach Harbor found concentrations of chromium at 1.9–16 micrograms per liter (µg/l), copper at 8.7–14 µg/l, lead at 0.21–0.26 µg/l, nickel at 0.0–0.4 µg/l, silver at 0.0–0.07 µg/l, and zinc at 6.2–9.6 µg/l TBT, an active biocide in marine anti-fouling paints, has also been found in harbor waters, particularly in areas of commercial and private vessel moorage and repair facilities (ACOE and LAHD 1992). In 1986, surface water concentrations of TBT in Los Angeles-Long Beach Harbor ranged from 3 nanograms per liter (ng/l) to 119 ng/l. Section 113(a) of the State Harbors and Navigation Code currently limits use of TBT paints to vessels greater than 25 meters (82 feet) in length.

Sources of contaminants include municipal and industrial wastewaters, and stormwater runoff. Data from the LARWQCB indicated that there are 10 major NPDES dischargers that consist of POTWs, generating plants, and refineries; 58 minor discharges; and 62 discharges covered by general permits (LARWQCB 2002). Additional stormwater runoff enters the harbors through the Dominguez Channel and several other major storm drains. Maintenance-dredging and long-term effluent limitations imposed by the LARWQCB appear to be responsible for decreased chemical contamination in harbor waters and sediments.

Nutrients

The photosynthetic production of organic matter by phytoplankton may be limited by the availability of inorganic nutrients, in addition to the availability of light. Major nutrients that may limit phytoplankton photosynthesis are phosphates and nitrates. Spatial and temporal variations in phosphates and nitrates change from day to day and are influenced by the local environment. Factors that influence nutrient concentrations include biological processes, wastewater discharge, and stormwater runoff. The enclosed nature of the harbor has created seasonal and spatial levels of nutrient concentrations that vary from the so-called "normal" levels found in areas outside the breakwater.

Depending on the location, depth, and season, nutrients in the Los Angeles/Long Beach Harbor complex may vary in concentration by several orders of magnitude. The following ranges were measured in 1978 by Harbor Environmental Projects (HEP 1980): phosphate, 0.172–12.39 ppm; ammonia, 0.12–119.28 ppm; nitrate, 0.00–82.97 ppm; and nitrite, 0.00–5.38 ppm. Nutrient concentrations were high during periods of high stormwater runoff. Localized high-nutrient concentrations observed in the Outer Los Angeles Harbor are due to the City of Los Angeles' Terminal Island Treatment Plant (TITP) discharge.

Temperature

The seasonal and spatial variation in water temperature in the harbor reflects the influence of the ocean, local climate, the physical configuration of the harbor, and circulation patterns. Expected trends in water temperature consist of uniform, cooler temperatures throughout the water column in the winter and spring, and stratified, warmer surface temperatures with cooler waters at the bottom in the summer and fall. The stratified summer and fall conditions may be attributed to warmer ocean currents, local warming of surface waters through insolation, and reduced runoff into nearshore waters.

Salinity

Marine waters dominate the salinity of Los Angeles Harbor. Variations in salinity occur due to the effects of stormwater runoff, waste discharges, rainfall, and evaporation. Harbor salinities usually range from 30.0–34.2 parts per thousand (ppt), but salinities ranging from less than 10.0 ppt to greater than 39.0 ppt have been reported (ACOE and LAHD 1984). Salinity in the Outer Harbor was generally higher in the summer than in the winter, and deeper Outer Harbor sampling stations were typically more saline than shallower stations (MEC Analytical Systems 1988). Typical seawater is 33 ppt.

3.9.2.3 Oceanography

Los Angeles Harbor is a southern extension of the relatively flat coastal plain, and is bounded on the west by the Palos Verdes Hills. The Palos Verdes Hills offer protection to the bay from prevailing westerly winds and ocean currents. The harbor was originally an estuary that received freshwater from the Los Angeles and San Gabriel Rivers. Over the past 80–100 years, development of the Los Angeles/Long Beach Harbor complex, through dredging, filling, and channelization, has completely altered the local estuarine physiography.

Tides

Sea level variations (tides) are the result of astronomical and meteorological conditions. Tidal variations along the coast of southern California are caused by the passage of two harmonic tide waves, one with a period of 12.5 hours and the other with a period of 25 hours. This combination of two harmonic tide waves usually produces two high and two low tides each day. The twice-daily (semidiurnal) tide of 12.5 hours predominates over the daily (diurnal) tide of 25 hours in Los Angeles Harbor, generating a diurnal inequality, or mixed semidiurnal tide. This causes a difference in height between successive high and low waters ("water" is commonly used in this context instead of "tide"). The result is two high waters and two low waters each day, consisting of a higher high water and a lower high water, and a higher low water and a lower low water, respectively referred to as HHW, LHW, HLW, and LLW.

A greater-than-average range between HHW and LLW occurs when the moon, sun, and earth are aligned with each other to create a large gravitational effect. This spring tide corresponds to the phenomenon of a new or full moon. Neap tides, which occur during the first and third quarters of the moon, have a narrower range between HHW and LLW. In this situation, the moon, sun, and earth are perpendicular to each other, thereby reducing the gravitational effect on the water levels.

The mean tidal range for the Outer Harbor, calculated by averaging the difference between all high and low waters, is 3.76 feet; and the mean diurnal range, calculated by averaging the difference between all the HHW and LLW, is approximately 5.6 feet (ACOE and LAHD 1992). The extreme tidal range (between maximum high and maximum low waters) is about 10.5 feet; the highest and lowest tides reported are 7.96 feet above MLLW and -2.56 feet below MLLW, respectively (written as 7.96 MLLW and -2.56 MLLW) (ACOE and LAHD 1992). MLLW is the mean of all lower low waters, equal to 2.8 feet below mean sea level. It is the datum from which southern California tides are measured.

Available Los Angeles Harbor tide data indicate that the highest water elevations usually occur during November through March. The more severe offshore storms usually occur along the California coast during this same period. These higher water elevations typically range from +7 to +7.5 feet MLLW.

Waves

Ocean waves impinging on the southern California coast can be divided into three primary categories according to origin: Southern Hemisphere swell, Northern Hemisphere swell, and seas generated by local winds. Los Angeles Harbor is directly exposed to ocean swells entering from two main exposure windows to the south and southeast, regardless of swell origin. The more severe waves from extra-tropical storms (Hawaiian storms) enter from the south to southeast direction. The Channel Islands, particularly Santa Catalina Island, provide some sheltering from these larger waves, depending on the direction of approach. The other major exposure window opens to the south, allowing swells to enter from storms in the Southern Hemisphere, tropical storms (chubascos), and southerly waves from extra-tropical storms. Waves and seas entering Los Angeles Harbor are greatly diminished by the time they reach the Inner Harbor. Most swells from the Southern Hemisphere arrive at Los Angeles from May through October. Southern hemisphere swells characteristically have low heights and long wave periods *(wave period* is a measurement of the time between two consecutive peaks as they pass a stationary location). Typical swells rarely exceed 4 feet in height in deep water. However, with periods as long as 18–21 seconds, they can break at over twice their deepwater wave height.

Northern hemisphere swells occur primarily from November through April. Deepwater significant wave heights have ranged up to 20 feet, but are typically less than 12 feet. Northern hemisphere wave periods generally range from 12–18 seconds.

Local wind-generated waves are predominantly from the west and southwest. However, they can occur from all offshore directions throughout the year, as can waves generated by diurnal sea breezes. Local waves are usually less than 6 feet in height, with wave periods of less than 10 seconds.

Circulation and Flushing

Circulation patterns are established and maintained by tidal currents. Flood tides in Los Angeles Harbor flow into the harbor and up the channels, while ebb tides flow down the channels and out of the harbor. In the Outer Harbor, near Angels and Queen's Gates, maximum surface tidal velocities reach approximately 0.8 feet per second (fps), while minimum tidal velocities of 0.088 fps occur in the Inner Harbor area following the construction of the Pier 400 landfill (Wang 1995).

Circulation patterns in the harbor are determined by a combination of tide, wind, thermal structure, and local topography. A large clockwise gyre is found in the surface waters of Outer Los Angeles and Long Beach Harbors during both rising and falling tides (LAHD 1993b). However, subsurface currents can reverse the direction of this gyre. Smaller gyres near Cabrillo Beach are clockwise during ebb tides and counterclockwise during flood tides (HEP 1980). The net tidal exchange is inward through Angels Gate, and outward through Queen's Gate and the gap between the eastern end of Long Beach Breakwater and Alamitos Bay. Thus, there is a net eastward flow within the harbor (LAHD 1993b).

Mixing is less in the Inner Harbor than in the Outer Harbor. Tidal-induced water exchange in the Inner Los Angeles Harbor is 22% of the total harbor water volume per day (ACOE and LAHD 1980). Neglecting discharges, flushing efficiency of the harbor has been determined using the tidal prism method. Overall tidal exchange rates fluctuate between 8 and 25%, with the flushing rate estimated at 90 tidal cycles (Maloney and Chan 1974).

Surge

Surge in a harbor generally refers to the significant oscillation of water within harbor basins induced by long waves. Amplification of longer-period wave heights through basin resonance can occur at various specific wave periods, ranging from 35 seconds to several minutes. The level of surge can escalate to resonance (with significantly amplified wave heights and horizontal water oscillations within the harbor basins) if the periods of the incident long waves are at or near the natural periods of the harbor basins. Such conditions can cause damaging stresses to the mooring systems of the ships in the harbor, especially when the periods of the surging long waves coincide with, or approach, the natural periods of the ships. However, the oscillations are generally of little significance to small craft except when an entire unit of floating berth with boats resonates with the harbor oscillations (LAHD 1980a).

Surge in Los Angeles Harbor is primarily caused by long waves propagating from offshore through Angels Gate. The long-wave climate off Angels Gate, as represented by the data collected during 1985–88 at Platform Edith about 8 miles to the south, is characterized by a strong correlation of long wave energy with offshore storm events and a relatively low energy level during summer. The summer is the most active time of the year for recreational boating. The wave-period range containing the most energetic long waves is typically 75–175 seconds in summer, and can go up to about 350 seconds in winter.

Amplification factors at the Watchorn Basin were studied to determine if surge took place. Results indicated that excessive wave heights at the end of Watchorn Basin were not realized. This result was confirmed by a long-time employee (25 years) at the Cabrillo Boat Shop, who did not remember having any trouble with surging (LAHD and EDAW Inc. 1988).

More recent modeling studies support the notion that surging will not be a problem in the future at the Watchorn Basin, either (ACOE 1995). With Pier 400 at full build-out (both Stage I and Stage II), there was no significant change of wave height amplification compared to existing harbor conditions (without Pier 400) for existing berth locations.

3.9.3 Regulatory Setting

In 1972, the Federal Water Pollution Control Act (also referred to as the CWA) was amended to provide that the discharge of pollutants to waters of the United States from any point source is unlawful unless the discharge is in compliance with an NPDES permit. The 1987 amendments to the CWA added Section 402(p), which establishes a framework for regulating municipal and industrial stormwater discharges under the NPDES Program. On November 16, 1990, the EPA published final regulations that establish stormwater permit application requirements for specified categories of industries. The regulations provide that discharges of stormwater to waters of the United States from industrial activities and from construction projects that encompass 5 or more acres of soil disturbance are effectively prohibited unless the discharge is in compliance with an NPDES permit.

Federal regulations allow two permitting options for stormwater discharges (individual permits and general permits). The SWRCB has elected to adopt one statewide general permit for construction activity, and one statewide general permit for industrial activity, at this time. The General Construction Activities Storm Water Permit (GCASP) applies to all stormwater discharges associated with construction activity, except for those on tribal lands, those in the Lake Tahoe Hydrologic Unit, and those performed by Caltrans.

Currently, the GCASP requires all dischargers where construction activity disturbs 5 acres or more to:

- develop and implement a Stormwater Pollution Prevention Plan (SWPPP), which specifies BMPs that will prevent all construction pollutants from contacting stormwater and with the intent of keeping all products of erosion from moving offsite into receiving waters;
- eliminate or reduce non-stormwater discharges to storm sewer systems and other waters of the United States; and
- perform inspections of all BMPs.

Beginning on March 10, 2003, construction projects disturbing 1 acre or more will also be subject to the above requirements under the GCASP.

On August 19, 1999, the SWRCB reissued the GCASP (Water Quality Order 99-08-DWQ). Several parties filed a petition for writ of mandate challenging the permit in the Superior Court, County of Sacramento. The Court issued a judgment and writ of mandate on September 15, 2000. The Court directed the SWRCB to modify the provisions of the GCASP to require permittees to implement specific sampling and analytical procedures to determine whether BMPs implemented on a construction site are

- preventing further impairment by sediment in stormwaters discharged directly into waters listed as impaired for sediment or silt; and
- preventing other pollutants on construction sites that are known or should be known by permittees, and that are not visually detectable in stormwater discharges, from causing or contributing to exceedances of water quality objectives.

The monitoring provisions in the GCASP have been modified pursuant to the court order.

The General Industrial Activities Storm Water Permit (GIASP) was originally issued by the SWRCB on November 19, 1991 (Water Quality Order 02-01-DWQ) and applies to all stormwater discharges requiring a permit except construction activities or other discharges covered by an individual NPDES permit. Modifications and updates to the GIASP have occurred since that time. Similar to the GCASP, the GIASP requires industrial stormwater dischargers to:

- development and implement and SWPPP to reduce or prevent industrial pollutants in stormwater discharges;
- eliminate unauthorized non-storm discharges; and
- conduct visual and analytical stormwater discharge monitoring to indicate the effectiveness of the SWPPP in reducing or preventing pollutants in stormwater discharges.

On January 26, 2000, the LARWQCB adopted and approved Board Resolution No. R-00-02, which requires new development and significant redevelopment projects in Los Angeles County to control the discharge of stormwater pollutants in post-construction stormwater. The Regional Board Executive Officer issued the approved Standard Urban Storm Water Mitigation Plans (SUSMPs) on March 8, 2000. The SWRCB in large part affirmed the LARWQCB action and SUSMPs in State Board Order No. WQ 2000-11 issued on October 5, 2000.

The City of Los Angeles is covered under the Permit for Municipal Storm Water and Urban Runoff Discharges within Los Angeles County (LARWQCB Order No. 01-182) and is obligated to incorporate provisions of this document in City permitting actions. The municipal permit incorporates SUSMP requirements and these include a treatment control BMP for projects falling within certain development and redevelopment categories. The treatment control BMP requirement applies to the Cabrillo Way Marina project and requires infiltration, filtration, or treatment of the runoff from the first 0.75 inches of rainfall (or equivalent numerical design criteria) prior to its discharge to a stormwater conveyance system.

3.9.4 Impacts and Mitigation

3.9.4.1 Methodology

Impacts to water quality and oceanography are evaluated based on qualitative assessments of project-related effects in the context of the existing setting of the Port. Existing information related to water quality within the Port was gathered from available reports and publications, including water quality monitoring data from the Port of Los Angeles for 2001.

3.9.4.2 Thresholds of Significance

The following criteria are based on *Draft Los Angeles CEQA Thresholds Guide* (City of Los Angeles 1998), and are the basis for determining the significance of impacts on water quality and oceanography resulting from project development.

The proposed project would normally result in a significant impact if it would result in any of the following:

WQ-1: The project would cause discharges that create a pollution, contamination, or nuisance as defined in Section 13050 of the California Water Code;

WQ- 2: The project would result in discharges that violate standards defined in the applicable NPDES permit or Water Quality Control Plan for the receiving water body;

WQ- 3: The project would release toxic substances that would be deleterious to human, fish, bird, or plant life;

WQ- 4: The project would cause creation of site conditions which may result in soil erosion and sediment runoff during construction or following project completion;

WQ- 5: The project would result in permanent adverse impacts to water circulation as a result of the project; or

WQ- 6: The project would substantially reduce or increase the amount of surface water in Los Angeles Harbor.

3.9.4.3 Project Impacts

Direct and Indirect Impacts

Impact WQ-1: The Project Would Not Cause Discharges That Create a Pollution, Contamination, or Nuisance As Defined In Section 13050 of the California Water Code

Construction and operation of the proposed project could result in minimal discharges that affect water quality. However, these impacts are not considered significant through compliance with applicable regulations. The potential sources of impacts and water quality effects are discussed in greater detail below.

Reduced Dissolved Oxygen

DO levels in aquatic habitats are usually reduced by the introduction of high concentrations of suspended particulates, which may occur during dredging and filling activities. This is especially true if the particulates are from anaerobic sediments, which will place an oxygen demand on the surrounding waters. The reduction in DO levels is typically brief. A study of dredge material release in San Francisco Bay showed a 3–4 minute reduction in DO levels near the point of release (ACOE 1973). Another study in New York Harbor showed that there were no reductions of DO levels 200–300 feet from the dredge site (Lawler, Matusky, and Skelly 1983). No impacts were detected during water quality monitoring associated with Stage I of Pier 400 construction in Los Angeles Harbor (LAHD 1998). Any measurable change in DO will likely be both highly localized and short-term in duration. Thus, impacts on DO would be negligible and not significant.

Reduced pH

Hydrogen ion concentration (pH) will likely decrease in the immediate vicinity of dredging and disposal locations. This change is due to the introduction of disturbed sediments suspended in the water column. However, seawater contains carbonic acid and boric acids as well as their salts and is, therefore, a buffer solution (Sverdrup et al. 1942). Buffer solutions act to repress any change in pH. Therefore, any measurable change in pH will likely be both highly localized and short-term in duration. No impacts were detected during water quality monitoring associated with Stage I of Pier 400 construction (LAHD 1998). Thus, water quality impacts from reduced pH are not expected to occur.

Reduced Transparency

Turbidity will increase temporarily and be accompanied by decreased water clarity with the suspension of fine materials during the dredging/excavation process, landfilling/diking operations, and for a settling period following each operation. The length of time it takes for the suspended material to settle out, combined with the current velocity, determines the size and duration of the turbidity plume. Settling rates are largely determined by the grain size of the suspended material but are also affected by the chemistry of the particle and the water.

Dredging and landfill activities will re-suspend silt, clays, and organic material in the bottom sediments. The dredging of the materials in the Watchorn Basin area is expected to generate a small turbidity plume. The plume durations are expected to be generally short, with the concentration of suspended solids returning to background levels within 1–24 hours after dredging stops (Parish and Wiener 1987 . No impacts were detected during water quality monitoring associated with Stage I of Pier 400 construction. Landfilling operations have been shown to meet LARWQCB turbidity criteria within 4 hours of disposal to a confined disposal area (LAHD 1980a). Excavation of specified upland that will be removed will also generate turbidity with a re-suspension pattern similar to that in dredging and landfilling operations.

Shoreline erosion conditions during construction will be controlled to avoid excessive turbidity. Except for normal stormwater discharges, the factors that affect turbidity or siltation in the West Channel area are limited. There is no major freshwater input source in the immediate project vicinity. The turbidity during construction will be controlled by the implementation of standard engineering BMPs and compliance with respective permits issued for such work by the respective regulatory agencies. Further, the new landfill will not result in erosion due to deflected wave or water current energy on the new land area. The shore protection work for the entire land/water perimeter, including the new landfill, will be designed to limit erosion due to wave action along the shoreline.

Dredging and filling activities would increase turbidity in the vicinity of the activity, but terrestrial and shoreline sources of turbidity would be controlled and minimized by implementing construction BMPs. Any turbidity impacts are expected to be short-term and localized, quickly returning to background levels. Water quality impacts from turbidity are expected to be less than significant.

Boat Wastes

The 1992 Clean Vessel Act identifies vessel sewage discharges as “a substantial contributor to localized degradation of water quality in the United States.” Since there are about 890,000 registered boats in California as of December 1997, the illegal discharge of boater-generated sewage has a large impact on water quality, especially if vessels dump wastes overboard in confined areas—such as harbors, marinas, coves, inlets, or sloughs.

Raw or poorly treated sewage discharged overboard can spread disease, contribute unsightly floatables, contaminate shellfish beds, and lower oxygen levels in water. Human waste can contain disease-causing organisms such as bacteria, viruses, and parasites. Swimmers, water-skiers, surfers, and others who come in contact with water that has been contaminated with human waste can become ill. The most common symptoms are nausea, stomachache, vomiting, and diarrhea. When boaters discharge human waste overboard in shellfish bed areas, the sewage and associated bacteria reach the bottom, where it is taken up by the clams, oysters, and mussels. When people eat raw or partially cooked contaminated shellfish, they may become ill.

It takes oxygen to decompose sewage in water. The amount of dissolved oxygen in the water required to decompose organic matter is measured in terms of “Biological Oxygen Demand” or “BOD.” Discharge of untreated sewage from recreational boats can lead to high BODs in marinas and poorly flushed areas where boaters congregate. The result can be low dissolved oxygen levels and fish kills. In order to keep untreated sewage out of the water, federal regulations require the installation of a Marine Sanitation Device (MSD) on boats. Every boat with an installed marine toilet must have it connected to an operable Coast Guard-approved MSD. It is illegal to discharge untreated sewage anywhere within the 3-mile territorial limit—a region that includes the entire southern California coastline. It is illegal to discharge even treated waste in harbor waters.

Toilets and shower facilities will be provided for the convenience of marina tenants. A pumpout station for sewage contained in on-boat holding tanks will also be provided as part of the project. Signs containing information on environmental rules, regulations, and good housekeeping practices will be posted in the marina. The LAHD, in cooperation with the marina operator, will conduct an educational outreach regarding minimization of boat-related waste. Water quality impacts from boat waste are expected to be less than significant.

As discussed above, impacts resulting from the proposed project would be negligible and would be considered less than significant. No mitigation is required.

Mitigation Measures

No mitigation is required.

Residual Impacts

Impacts would be less than significant.

Impact WQ- 2: The Project Would Not Result in Discharges that Violate Standards Defined in the Applicable NPDES Permit or Water Quality Control Plan for the Receiving Water Body

Several sources of pollutants could potentially discharge to waters, thereby reducing water quality. The potential sources and effects on water pollution are discussed below. Through compliance with the NPDES program, significant impacts would be avoided.

Nutrients

Nutrients could be released into the water column during the dredge and disposal operation. Release of nutrients may promote nuisance growths of phytoplankton if operations occur during warm water conditions. Blooms of phytoplankton can result in reduced DO (see Reduced Dissolved Oxygen, above) because, as the bloom subsides, oxygen is consumed during the decomposition of the phytoplankton. However, observations of previous dredge projects suggest that phytoplankton blooms have never occurred as a result of dredging and are not likely to occur in response to this project (LAHD 1998). Impacts on water quality from nutrients (similar to DO) are not expected to occur.

Stormwater Runoff

Stormwater runoff plays an important role in the pollution of coastal waters. The City of Los Angeles (Watershed Protection Division in the Department of Public Works) is coordinating an aggressive program to reduce pollution in stormwater and urban runoff. One objective of this program is to educate residents and businesses about the connection between stormwater runoff and coastal water pollution.

Any accidental spills of construction related materials that are not contained onsite and cleaned up could enter the harbor through the storm drains and degrade water quality. The spread and ultimate dispersal of the spill would depend on the physical properties of the material spilled (e.g., solubility and density), the volume spilled, the location of spill entry into the harbor, and the timing of the spill within the tidal cycle. The time of year is also important, since this influences tidal flushing. Evaporation of volatile products and flushing would further reduce concentrations.

Facility operations would be in conformance with requirements in the statewide GIASP. Implementation of applicable BMPs to facility operations would be incorporated into operations and maintenance plans in the new development. In addition, the project will incorporate the SUSMP provisions of the municipal stormwater permit, including treatment control BMPs. Stormwater runoff occurs as a result of the existing marina; the proposed project would not increase impacts from stormwater runoff. Thus, operations would have negligible impacts on water quality through discharges of surface runoff.

Prior to the initiation of any construction phase, the project applicant shall submit a SWPPP to the City, consistent with current NPDES (GCASP) requirements, which indicate the methods to be used to stabilize any barren portions of the project site that may be scheduled for construction under later phases. These methods may include:

- the construction of temporary debris basins,
- the immediate stabilization of soils through hydroseeding and use of soil stabilizers, and/or
- the emplacement of jute or other netting over the soil surface.

Stabilization of exposed soils must be accomplished prior to September 30 of a given year.

Mitigation Measures

No mitigation is required. The SWPPP will implement protective measures to minimize the impacts associated with increased stormwater runoff.

Residual Impacts

Impacts would be less than significant.

Impact WQ- 3: The Project Could Potentially Release Toxic Substances that Would Be Deleterious to Human, Fish, Bird, or Plant Life

The proposed project could potentially result in the accidental release of toxic or hazardous substances. There is a potential for accidental spills at the fuel dock. Regular inspection of tanks and pipelines should prevent spills from facility failures, but accidents during loading and unloading of products could still occur, primarily as a result of operator error. The addition of new pipelines in the harbor area would also increase the potential for accidental spills that could enter harbor waters. Regular inspections of the pipeline would identify any leaks so that repairs could be made before harbor waters are contaminated. The amount of product spilled would depend on the location of valves that could shut off the flow and the speed that they could close. Such valves are part of the project.

Although the fueling operation will be relatively minor in scale compared to the handling of liquid bulk petroleum products (e.g., crude, gasoline, etc.) at Marine Oil Terminals, a leak could still cause a sizable sheen on surface water. Even a single quart of oil can pollute an area equivalent to three football fields (about 2 acres). The installation of automatic cutoff nozzles would significantly lower the probability of spills due to fuel overflows.

In the event of an accidental fuel spill, several operational features would serve to minimize the spill and provide immediate containment of the spill. Such features include emergency shutdown procedures, spill notification procedures, drip pans at wharf manifolds, and spill equipment available for immediate deployment.

Despite the implementation of comprehensive spill prevention, containment, and clean-up procedures, the potential for a product spill to harbor waters would still exist. The impact on water quality from a petroleum spill would be contamination of receiving waters with hydrocarbons and other toxic constituents. With implementation of operational procedures to control accidental spills, impacts on water quality from facility operations are expected to be insignificant. The effect of product spills on marine organisms is discussed in Chapter 3.10, "Biota and Habitats."

The project applicant shall submit a Spill Prevention Plan to the City that is consistent with current permitting requirements and that describes comprehensive spill prevention, containment, and clean-up procedures, including emergency shutdown procedures, spill notification procedures, and spill equipment available for immediate deployment. The Spill Prevention Plan will minimize the potential for impacts associated with accidental spills.

Mitigation Measures

MM WQ-3.1: Obtain certification under the Non-Point Source (NPS) Pollution Control Program

The project applicant shall design above ground fuel tanks in accordance with the Marina and Recreational Boating Management Measures defined under the State Nonpoint Source Pollution Control Program administered by the State Water Resources Control Board (SWRCB).

MM WQ-3.2: Develop an approved Source Control Program

Prior to their construction, Westrec Marinas will develop an approved Source Control Program (SCP) for the aboveground fuel tanks in accordance with LAHD guidelines established in the General Marine Oil Terminal Lease Renewal Program (Appendix J). The SCP will address immediate leak detection, tank inspection, and tank repair.

Residual Impacts

This impact would be less than significant.

Impact WQ- 4: The Project Would Not Cause Creation of Site Conditions that May Result In Soil Erosion and Sediment Runoff During Construction or Following Project Completion

Water quality of Los Angeles Harbor and the surrounding waters of San Pedro Bay will be impacted during the excavation and dredging operations, and from landfill activities. Impacts that are expected include increased turbidity, decreases in dissolved oxygen, increases in nutrients, and increases in some contaminants including metals and organic chemicals. These impacts are temporary and generally confined to the construction phase of the project.

The main source of operational impacts to water quality in the project area will be stormwater runoff from the land-side development, marina operations, and related facilities; however, implementation of existing regulations will reduce this to less than significant.

Erosion or runoff of materials during construction of onshore facilities and remediation activities could adversely impact water quality in the immediate area. Surface runoff containing eroded or washoff materials could increase turbidity and levels of toxic materials and decrease dissolved oxygen concentration in receiving waters. Water quality could also be impacted by spills of materials used during construction. Fuels, solvents, paints, and other similar substances used during construction could impact local surface water quality if they are accidentally spilled directly into the harbor, or if they reach receiving waters through the runoff collection and disposal system.

Facility construction would be undertaken in accordance with the statewide General Permit. Adequate erosion control techniques would be used to prevent erosion and washoff of materials, and all requirements governing waste discharges in the appropriate permits would be met during construction. Good housekeeping practices would limit chances of accidental spills reaching receiving waters. Therefore, no significant impacts are expected.

Contaminants could be released into the water column during the dredge and disposal operation. However, any increase in contaminant levels in the water is expected to be very localized and of short duration. Previous water quality monitoring efforts associated with both project and maintenance dredging have shown that significant re-suspension of contaminants does not occur (LAHD 1998). Water quality impacts from contaminants are not expected to occur.

Soil erosion and sediment runoff are expected to be minimal during the operation of the facility. Revetted slopes and bulkheads will be installed to minimize the potential for erosion and sediment runoff. In addition, the sheltered nature of the project area and the enforcement of a “no wake” policy within the marina minimize the potential for erosion of the shore from waves. With incorporation of BMPs and SUSMP provisions, water quality impacts from contaminants are not expected to occur.

Mitigation Measures

No mitigation is required.

Residual Impacts

This impact would be less than significant.

Impact WQ- 5: The Project Would Not Result in Permanent Adverse Impacts on Water Circulation as a Result of the Project

The proposed project could potentially result in changes to oceanography and water circulation within the harbor. However, these changes would be minimal and would not be significant. The various possible effects are discussed in greater detail below.

Circulation and Flushing

Circulation patterns, which are established and maintained by tidal currents, are not expected to be impacted. Flushing is expected to increase slightly as a result of the fractional increase in water volume in the reconfigured Watchorn Basin caused by the dredging and excavation. However, this is a beneficial impact that is not expected to have a measurable effect.

Surge

An earlier study (LAHD and EDAW, Inc. 1988) identified a potential surge problem at the West Channel area, particularly for moored vessels in the basin closest to the entrance, based on long waves in the 7–18 second range. Ocean waves propagate to the marina area by diffracting through Angels Gate and refracting along the bottom contours until they reach the marina entrance. Unlike long waves, wind waves or short-period waves do not penetrate well into the marina and lose their energy at the entrance area to the marina. Further, the more recent physical modeling work (ACOE 1995) done for long-period waves, albeit for the 25–519 second range, did not find significant changes from "base" or existing conditions. This result held true even when modeled under storm conditions (January and February). Therefore, impacts to the proposed project associated with surge would be considered less than significant.

Artificially produced surge by passing vessels is controlled by designation of the marina area as a "No Wake Zone." This reminds passing vessels to keep a low speed to prevent the generation of waves, which could cause surge to marina slips. Therefore, based on the foregoing, no significant surge impacts are expected at the replacement marina.

Mitigation Measures

No mitigation is required.

Residual Impacts

This impact would be less than significant.

Impact WQ- 6: The Project Would Not Substantially Reduce or Increase the Amount of Surface Water in Los Angeles Harbor

The proposed project would not result in a substantial reduction or increase in the amount of surface water in Los Angeles Harbor. Project construction will result in the excavation of 1.1 acres of existing land and filling of 3.5 acres of existing water area (as measured at +4.8 MLLW). The net loss of 2.4 acres of water area would not be a significant adverse impact from a water quality and oceanography perspective. Mitigation to replace water habitat lost from these activities is already incorporated as part of Mitigation Measure MM BIO-1.1 (Chapter 3.10, "Biota and Habitats." No significant impacts would occur.

Mitigation Measures

No mitigation is required.

Residual Impacts

This impact would be less than significant.

Cumulative Impacts

Water Quality Cumulative

There are no other projects in the vicinity of the proposed project that, when considered together, would result in any cumulative impacts to water quality and oceanography. Similar to the proposed project, each project is subject to regulatory standards that must be achieved during construction and operation. Accordingly, mitigation measures for the respective projects would be incorporated and are expected to reduce impacts to less-than-significant levels. More importantly, the water quality impacts associated with the proposed project would be mitigated to less-than-significant levels. Thus, adherence to regulatory standards and implementation of mitigation would avoid the contribution toward significant impacts to water quality and oceanography. Therefore, the project would not make a considerable contribution to the cumulative impacts related to water quality and oceanography.

3.9.4.4 Mitigation Monitoring Plan Summary

Impact	Mitigation Measure	Timing and Method	Responsible Parties	Residual Impacts
WQ- 3: The project could potentially release toxic substances that would be deleterious to human, fish, bird, or plant life	MM WQ-3.1: Obtain certification under the Non-Point Source (NPS) Pollution Control Program.	Timing: Prior to construction. Methods: The project applicant shall design above ground fuel tanks in accordance with the Marina and Recreational Boating Management Measures defined under the State Non-Point Source Pollution Control Program administered by the State Water Resources Control Board (SWRCB).	LAHD, SWRCB	Less Than Significant
	MM WQ-3.2: Develop an approved Source Control Program.	Timing: Prior to installation of the fuel tanks. Methods: The Marina operator will prepare an approved SCP in accordance with the General Marine Oil Terminal Lease Renewal Program (Appendix J). The operator will inspect facilities at approved intervals and submit compliance reports to the Port.	LAHD, Westrec Marinas	Less Than Significant