Appendix 4.5-1

CVBMP WQ Sed Study, June 2006

ASSESSMENT OF MARINE WATER QUALITY AND SEDIMENT RESOURCES IN THE VICINITY OF THE CHULA VISTA BAYFRONT MASTER PLAN CHULA VISTA, CALIFORNIA

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June 2006

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INTRODUCTION TO THE AFFECTED ENVIRONMENT

Following preliminary review of the proposed project, the San Diego Unified Port District has determined that the construction and operation of the proposed project is subject to the guidelines and regulations of the California Environmental Quality Act (CEQA). This initial study addresses the potential direct, indirect, and cumulative environmental effects on local marine sediments and water quality associated with the proposed project.

MARINE HYDROLOGY AND WATER QUALITY

Regional Setting

The project area is located in San Diego Bay, the largest naturally occurring embayment between San Francisco and Scammon's Lagoon, Baja California. San Diego Bay originated from the alluvial plains of the Otay, San Diego, and Sweetwater rivers. In 1853, the construction of a dike diverted the San Diego River into what is now Mission Bay, decreasing freshwater input into San Diego Bay. The first known dredging activities in the bay occurred in 1888, making way for larger steam-powered ships. Dredging has continued periodically to the present day to make way for large container/cargo ships and naval vessels.

San Diego Bay is typically divided for reference into three regions, each with slightly different characteristics. The North San Diego Bay includes the bay mouth and entrance channels. Water in the north bay is relatively deep and receives good circulation and tidal exchange. This section is urbanized on the northern bank with several marinas and boat launches, the San Diego International Airport, and commercial business along the shore. To the south is the North Island Naval Air Station. Middle San Diego Bay is generally industrialized, with commercial shipyards and Naval facilities along the shorelines. This area of the bay has navigable channels for commercial ships, but some shallower areas are found along the shorelines. The middle bay extends from about the southern bend of San Diego Bay to just north of the Sweetwater River, with the Coronado Bridge in the approximate center of the region. South San Diego Bay is the least modified of the regions. Depths throughout much of the south bay are relatively shallow, with navigable channels maintained to provide access for small boats to several marinas in the area. Large areas of natural habitat, including eelgrass beds, mudflat, and marsh can still be found in South San Diego Bay. The South Bay Power Plant extracts cooling water from the south bay, discharging warmed water back into the bay.

Primary habitat types found in the bay include open-water habitat, deep subtidal (channel areas), shallow subtidal (-2 to -12 ft Mean Lower Low Water [MLLW]), and upland transition (those terrestrial habitats skirting the margins of the bay). There are approximately 45 miles of artificial substrate, including riprap, seawall, piers, and wharves, out of approximately 64 miles of shoreline, equivalent to 74% armored shoreline. The south bay is dominated by salt marsh habitat, though it is estimated that 88% of bay salt marsh has been lost to development. Other habitat types include moderately deep subtidal (-12 to -20 ft MLLW), vegetated and unvegetated shallow subtidal, intertidal, riparian, freshwater marsh, and salt evaporation ponds.

The project involves the redevelopment of the Chula Vista Marina, located in Chula Vista, California. The Chula Vista Marina is located on the southeastern shore of South San Diego Bay. Within the marina, primary habitat types are shallow open-water and shallow soft-bottomed subtidal habitats (MBC 2005). Along the shoreline of the marina, bulkheads and riprap provide hard-substrate intertidal and shallow subtidal habitat. A small mudflat is located in the northeast corner of the marina at the base of the riprap wall. Sparse growths of pickleweed (*Salicornia* *virginica*) occur on the upper mudflat at the base of the riprap and in a narrow band along the southern perimeter riprap. Eelgrass (*Zostera marina*) and ditchgrass (*Ruppia* sp) occur in a sparse band along the north side of the marina between the base of the riprap and the first set of floating docks, and a sparse batch of eelgrass occurs in the marina adjacent to the boat launch ramp inside the south entrance breakwater.

Tides

Tides along the California coast are mixed semi-diurnal, with two unequal high tides and two unequal low tides during each 25-hr period. In the eastern North Pacific Ocean, the tide wave rotates in a counterclockwise direction. As a result, flood tide currents generally flow upcoast and ebb tide currents generally flow downcoast.

Currents

In San Diego Bay, water circulation is primarily driven by tides. The tidal prism has been approximated to be 73 x 10^6 m^3 (Gautier 1972), with tidal current velocities at the harbor mouth ranging from 0.2 to 0.8 meters per second (Gartner et al. 1984). Tidal velocities in the bay vary as a result of depth and width variations and the presence of marinas and basins, with a detectable reduction in current velocities and increase in residence time with distance from the harbor entrance (Largier 1995). Thermal and salinity stratification of the water column also influences the characteristics of current flow in South San Diego Bay, with surface and bottom waters intermittently moving in opposite directions due to differences in density between oceanic and bay waters (Tenera and Merkel 2004).

Water Quality

Combinations of hydrology, currents, storm water runoff, industrial activities, boat traffic, and dredging activities affect water quality within San Diego Bay. In addition, climatological parameters such as solar radiation, humidity, and wind influence the condition of the water within the bay.

In the mid-1960s, cessation of the discharge of large volumes of sewage and industrial wastes in the bay led to noticeable improvements in water quality and available marine habitats. Continuing efforts in the 1960s also succeeded in reducing wastes discharged from industry and from vessels. By 1969, water quality parameters such as turbidity, nutrient levels, salinity, and transparency were greatly improved and plankton populations also grew. Legislation enacted in the 1970s, including the Federal Water Pollution Control Act, led to further improvements in water quality.

Average surface temperature in the bay is approximately 17.4°C (Smith 1972). Lapota et al. (1993) found warmest waters in the shallower south bay, the receiving waters for the South Bay Power Plant's thermal effluent, and coolest waters north of the Coronado Bridge in January (Lapota et al. 1993). Allen (1998) recorded temperatures in the bay between 14.9°C in January 1995 and 1997 to 27.3°C in July 1997. Maximum temperatures occur in July and August with minimum temperatures found in January and February when thermal gradients are generally absent and the bay becomes nearly isothermal and well mixed (USDN 1999). Dissolved oxygen (DO) concentrations have improved from mid-century, when DO measurements of less than 5.0 parts per million (ppm) were often recorded. In 2003, mean daily DO concentrations in South San Diego Bay were about 5.5 ppm, similar to DO values found at other Southern California embayments during the same sampling period (Tenera and Merkel 2004).

Salinity near the entrance of San Diego Bay is similar to that of the open ocean, averaging 34.3 parts per thousand (ppt) (SDUPD 1980). In South San Diego Bay, however, salinities are more variable. Evaporation and poor circulation in late summer results in salinities up to 5 ppt higher in the south bay than offshore, while during heavy winter rains, freshwater flow can reduce salinities in the south bay to 22 ppt (USDN 1999). Allen (1998) recorded salinities throughout the bay between 33.4 and 39.8 ppt. Mean salinities from 1994 to 1998 were highest in October and lowest from January to April (Allen 1998). Primary factors influencing salinity are evaporation, tidal flushing, and freshwater input.

Turbidity in San Diego Bay generally increases with distance from the bay entrance, with the highest water turbidities found in the south bay. In winter and spring, when persistent winds lead to prolonged wave action, fine bottom sediments are suspended from the stronger subsurface currents, leading to increased turbidity. Studies conducted in 2003 suggest that operation of the South Bay Power Plant does not contribute to the generation of turbidity in the south bay, although it can influence the distribution of turbid water within the south bay (Tenera and Merkel 2004). Other activities affecting turbidity include, but are not limited to, dredging, waste discharges, and storm water runoff.

Nutrients provide the mineral requirements that are essential for primary production by photosynthetic phytoplankton. High phytoplankton production and lower surface runoff in summer reduce nutrient concentrations, while reduced light (leading to lower primary production) and an increase in runoff in winter cause higher nutrient levels. High nutrient levels can lead to localized algal blooms, or red tides. In San Diego Bay, concentrations of phosphate, nitrate, and ammonia are typically highest in January, corresponding with high chlorophyll concentrations (Lapota et al. 1993, Lane 1980). Primary production is at its peak during this time, and nutrient levels in the south bay exceed those in the north bay.

Contaminants

Pollutants come from a variety of sources of both industrial and domestic origin. Oil and gasoline combustion release many substances, including cadmium, copper, chromium, lead, mercury, and zinc. These and other metals are used in paints, pigments, batteries, manufacturing, and protective coatings. Aerial fallout is a diffuse and potentially large source of contaminants derived from other sources, and may include metals, chlorinated hydrocarbons, and polycyclic aromatic hydrocarbons (PAHs) (SCCWRP 1973, 1986).

Some metals, such as copper, iron, and zinc, are required by aquatic organisms in small amounts to maintain biochemical functions, but are toxic to these same organisms in higher concentrations. Other metals, such as cadmium, mercury, and lead may have toxic effects on marine organisms even in low concentrations.

As these contaminants accumulate on the ground, they are washed into rivers and storm drains by rainfall, and are eventually deposited into the ocean. Contaminants commonly washed into the bay during storms include fertilizer and plant control chemicals associated with landscaping activities and oil residues that have accumulated on roads and parking lots (SDUPD 1980).

SEDIMENT CHARACTERISTICS AND CONTAMINATION

Sediment Characteristics

The distribution and abundance of marine organisms is often related to local sediment characteristics. Bottom sediment characteristics are influenced by both natural physical and climatological processes, such as currents and sediment input from other water sources, as well as by anthropogenic sources, such as dredging and turbulence from large vessels.

Sediments through much of South San Diego Bay are composed of coarse to fine sands, with varying amounts of shell and fine-grained sediments (silt and clay) (Tenera and Merkel 2004). In general, sediments at the mouth and along the western edge of San Diego Bay are comprised mostly of sandy material, while along the eastern and southern edges sediments are

Table 1. Comparisons of sediment chemistry parameters for current and previous studies in San Diego Bay and the Southern California Bight. Sources: MBC 2004, Exponent 2003, SDRWQCB 2001, Bight '98: Noblett et al. 2003, Bight '94: Schiff and Gossett, 1998.

Study	**MBC (2004)**		**Exponent (2003)**		**Exponent (2003)**		**SDRWQCB (2001)**		**SDRWQCB (2001)**		**Bight '98**	**Bight '94**	
Location	ISP Slip		NASSCO		Southwest Marine		NASSCO		Southwest Marine		So. Calif. Ports	So. Calif. Bight	
Sample Type	Surface Grab						Surface Grab		Surface Grab		Surface Grab	Surface Grab	
	Mean[1]	Max.	Mean[1]	Max.	Mean[1]	Max.	Mean	Max.	Mean	Max.	Mean[2]	Mean[2]	Max
Mean Grain Size (µm)	15	41											
Percent Fines (%)	88	100					40	85	45	87	64	43	100
Metals (mg/dry kg)													
Aluminum	34875	77000											
Antimony	1.4	1.4									2.04	0.21	0.84
Arsenic	13.0	15	11	18	15	73					10.07	5.1	20.4
Barium	93.5	110									144.37		
Beryllium	0.83	1										0.24	1.30
Cadmium	0.80	1.1	0.31	0.46	0.60	2.9					0.40	0.33	7.18
Chromium	72	78	70	100	70	110					51.76	39	361
Copper	263	340	250	510	400	1500	381.13	1500	594.51	2900	106.86	15	166
Iron	34375	40000											
Lead	91	120	90	130	120	430			161.56	770	44.94	10.9	77.7
Mercury	1.05	1.4	0.90	2.3	1.2	4.2			2.23	43.5	0.39	0.050	0.580
Nickel	27	49	17	27	20	100					21.50	18.1	84.7
Selenium	ND	ND	1.0	1.3	1.2	1.5					0.56	0.30	1.65
Silver	0.86	1.6									1.10	0.34	15.37
Zinc	304	330	320	620	500	3400	364.53	590	739.81	4600	179.51	59	294
Tributyltin (µg/dry kg)	6.0	6.0	200	1400	500	3300							
TOC (mg/dry kg)	27400	34900											
PCBs (µg/dry kg)													
Aroclor 1254	828	1200											
Aroclor 1260	ND	ND											
Total PCBs[3]	828	1200	600	1700	1900	7100			2.20	11.5	38.28	13.3	572.3
Pesticides (µg/dry kg)													
Aldrin	ND	ND											
4,4'-DDE	ND	ND											
Total DDT	ND	ND									30.77	40.8	2082.9
PAHs (µg/dry kg)													
Benzo(a)pyrene	ND	ND											
Indeno(1,2,3-cd)pyren	ND	ND											
Pyrene	ND	ND											
Total PAHs	ND	ND	4000	16000	14000	57000					2270.41	ND	ND

1 = Mean where detected
2 = Area-weighted mean
3 = 3 Aroclors analyzed in current study, 3 Aroclors +27 congeners in Bight '94, and 41 congeners in Bight '98
ND = Not detected

respective ERL and ERM values (Fairey et al. 1996). Respective Threshold Effects and Effects Range limits are presented in Table 2.

Table 2. Comparisons of NOAA and State of Florida sediment screening levels. From: Fairey et al. 1996.

SUBSTANCE	State of Florida (1) TEL	State of Florida (1) PEL	NOAA (2) ERL	NOAA (2) ERM
Organics (ug/kg- dry weight)				
Total PCBs	21.550	188.79	22.70	180.0
PAHs				
Acenaphthene	6.710	88.90	16.00	500.0
Acenaphthylene	5.870	127.89	44.00	640.0
Anthracene	46.850	245.00	85.30	1100.0
Fluorene	21.170	144.35	19.00	540.0
2-methylnaphthalene	20.210	201.28	70.00	670.0
Naphthalene	34.570	390.64	160.00	2100.0
Phenanthrene	86.680	543.53	240.00	1500.0
Total LMW-PAHs	311.700	1442.00	552.00	3160.0
Benz(a)anthracene	74.830	692.53	261.00	1600.0
Benzo(a)pyrene	88.810	763.22	430.00	1600.0
Chrysene	107.710	845.98	384.00	2800.0
Dibenz(a,h)anthracene	6.220	134.61	63.40	260.0
Fluoranthene	112.820	1493.54	600.00	5100.0
Pyrene	152.660	1397.60	665.00	2600.0
Total HMW-PAHs	655.340	6676.14	1700.00	9600.0
Total PAHs	1684.060	16770.54	4022.00	44792.0
Pesticides				
p,p'-DDE	2.070	374.17	2.20	27.0
p,p'-DDT	1.190	4.77		
Total DDT	3.890	51.70	1.58	46.1
Lindane	0.320	0.99		
Chlordane	2.260	4.79	0.50	6.0
Dieldrin	0.715	4.30	0.02	8.0
Endrin			0.02	45.0
Metals (mg/kg- dry weight)				
Arsenic	7.240	41.60	8.20	70.0
Antimony			2.00	2.5
Cadmium	0.676	4.21	1.20	9.6
Chromium	52.300	160.40	81.00	370.0
Copper	18.700	108.20	34.00	270.0
Lead	30.240	112.18	46.70	218.0
Mercury	0.130	0.70	0.15	0.7
Nickel	15.900	42.80	20.90	51.6
Silver	0.733	1.77	1.00	3.7
Zinc	124.000	271.00	150.00	410.0

In studies designed to determine potential impacts of pollutants in San Diego Bay sediments samples were collected throughout San Diego Bay including within the Chula Vista Marina and near the mouth of the Sweetwater River (Figures 1 and 2, Fairey et al. 1996). Six contaminants of concern (copper, zinc, mercury, low and high molecular weight PAHs, PCBs, and chlordane) were evaluated. Threshold ranges of chemical concentration were presented for each chemical: (1) below the TEL, (2) between the TEL and PEL and (3) above the PEL to the maximum concentration determined.

Copper levels at two stations in Chula Vista Marina were found to exceed the PEL level, while at a third station copper occurred at levels between the TEL and PEL concentrations (Figure 1, Fairey et al. 1996). Outside of the marina, copper levels in the south bay exceeded PEL levels at two stations in the mouth of the Sweetwater River, at several stations outside of the river and one station south of the river. Otherwise copper concentration stations in the South San Diego Bay were found at levels between the TEL and PEL thresholds.

Concentrations of zinc in the project area, including in the marina, were generally found in levels between the TEL and PEL threshold limits (Figure 1, Fairey et al 1996). North of the project area, mercury exceeded the PEL concentration at one station south of the Sweetwater River Mercury was found in lower levels that still exceeded the TEL limit at one station inside and one station outside of Chula Vista Marina. Mercury levels at two other stations in the marina were found in concentrations below the TEL.

High molecular weight PAHs were generally found in levels below the TEL limit throughout the south bay except in the vicinity of the Sweetwater River mouth (Figure 2, Fairy et al. 1996). Low molecular weight PAHs were found in sediments at levels below the TEL throughout the South San Diego Bay region (Figure 1). PCBs, while generally not elevated in the south bay, were found to exceed the TEL limit at one station in Chula Vista Marina, at a nearshore station north of the marina, and near the mouth of the Sweetwater River (Figure 2). Chlordane was found in levels below the TEL level inside and offshore of the marina, but north of the area exceeded TEL limits offshore of the Sweetwater River and exceed the PEL limit at some stations in the river mouth.

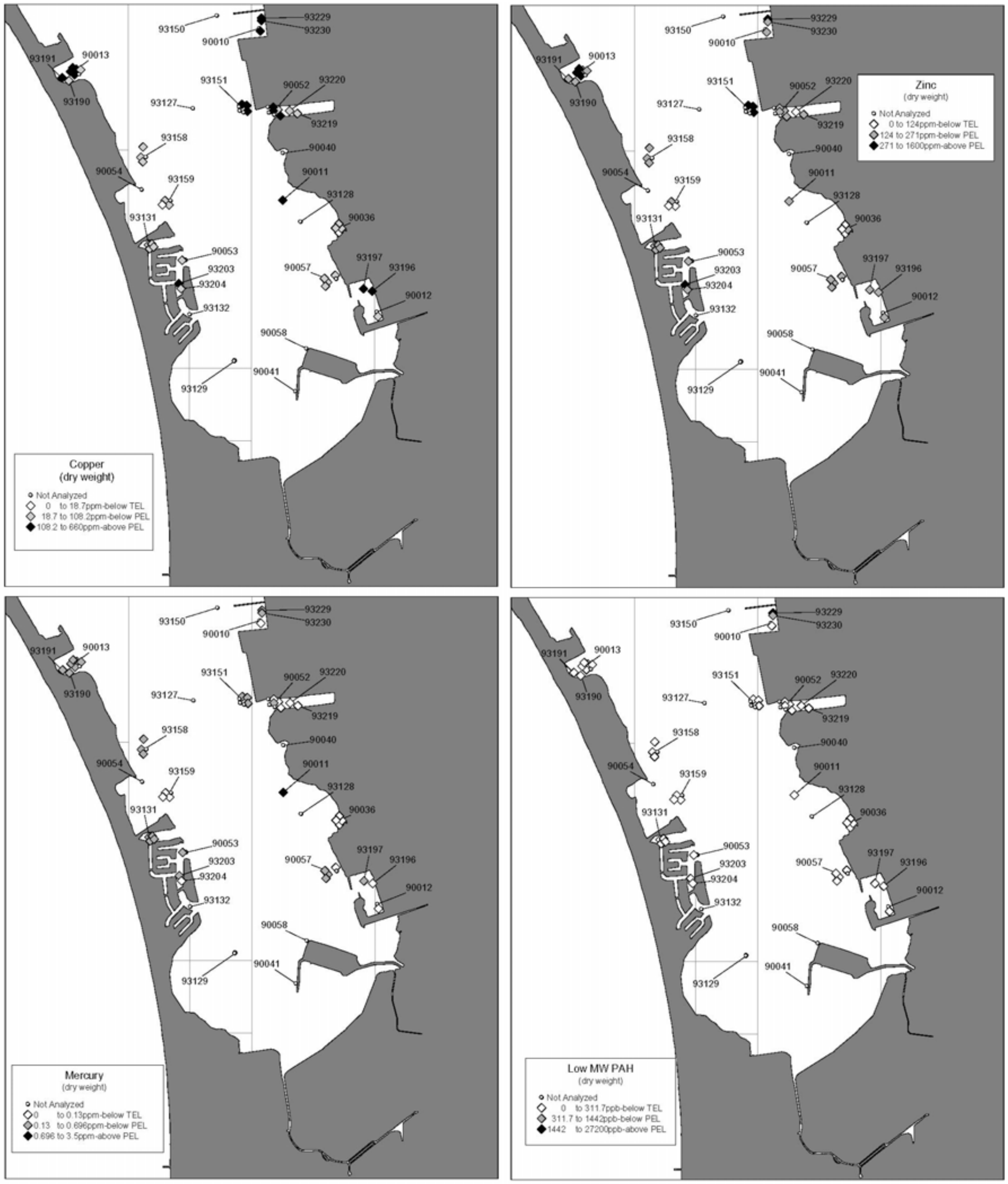

Figure 1. Constituent levels in sediments of South San Diego Bay. Fairey et al. 1966.

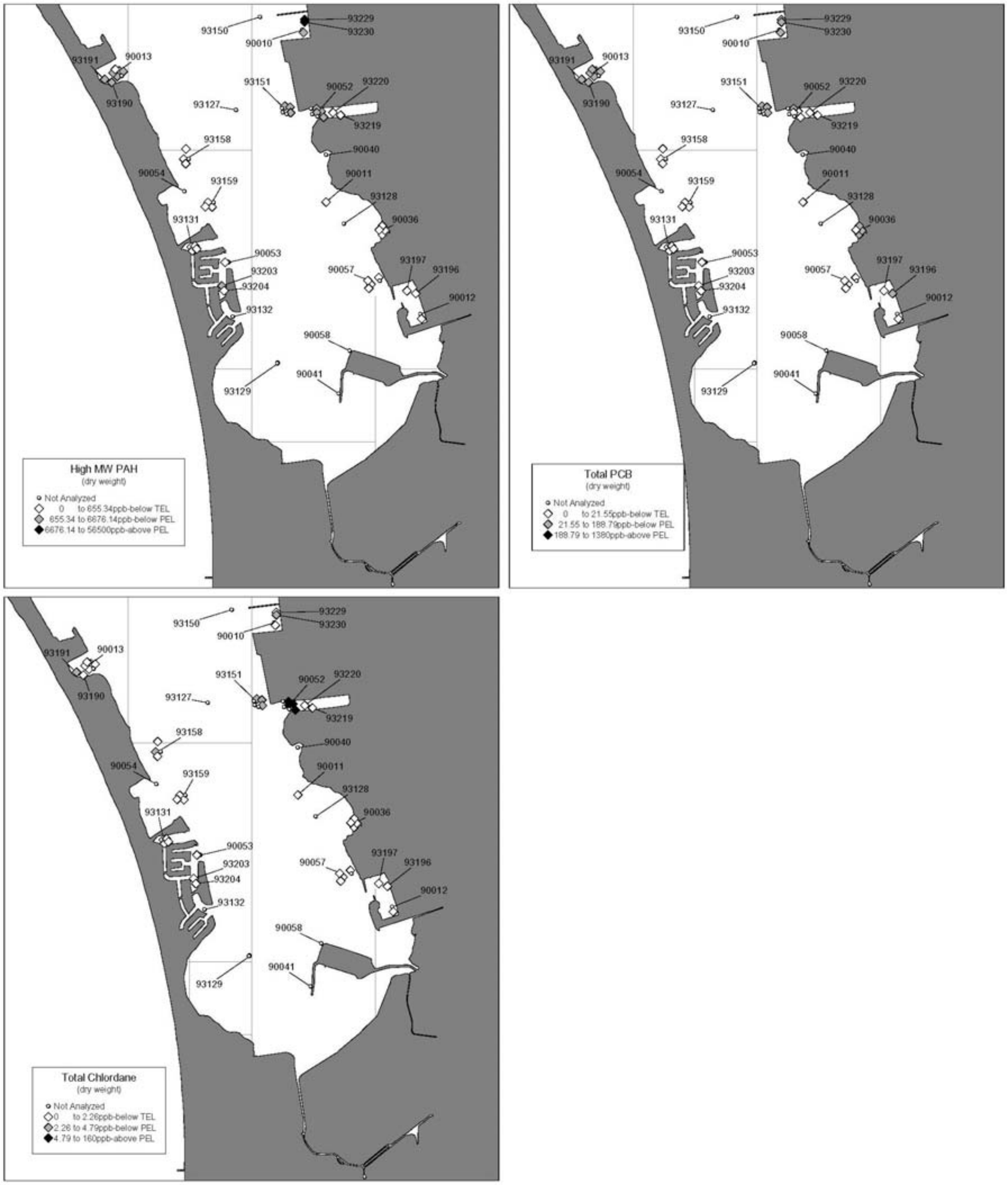

Figure 2. Constituent levels in sediments of South San Diego Bay. Fairey et al. 1966.

REGULATORY SETTING

There are several state and federal laws that apply specific quantitative and qualitative objectives to water quality parameters. The 1972 amendments to the Federal Water Pollution Control Act (the Clean Water Act) prohibit the discharge of pollutants to waters of the U.S. without a permit. Section 401 of the Clean Water Act created the National Pollutant Discharge Elimination System (NPDES) to enforce effluent limitations. The NPDES program prohibits the point-source discharge of pollutants unless an NPDES discharge permit has been obtained. The ultimate goal of the NPDES program is the complete elimination of all discharges.

Applicable Regulations

Clean Water Act. The Clean Water Act (CWA) of 1972 was designed to restore and maintain the physical, chemical, and biological integrity of the nation's waters. Sections of the CWA control the discharge of wastes and pollutants into aquatic environments. Section 401 requires any applicant for a federal license or permit to conduct activities which could result in water discharges to provide the licensing agency with a certification from the state where the activity is conducted (or the U.S. Environmental Protection Agency (USEPA)) that the discharge will comply with state Water Quality Standards. Section 402 requires an NPDES permit be issued for the discharge of any pollution discharges into waters of the United States. The source of pollution must meet the "best available technology" standards developed by the USEPA for different effluent sources. An NPDES permit also specifies effluent limitations, a compliance schedule, and a reporting requirement. Section 404 of the CWA established a program to regulate dredging and/or filling in U.S. waters. Under Section 404, the U.S. Army Corps of Engineers (USACE) can issue two types of permits: a general permit or an individual permit. The general permit is a type of permit issued to the public at large on a regional or national basis, and is only issued when the activities would cause only minimal direct or cumulative impacts. An individual permit is required for an applicant that wishes to conduct activities not already allowed under a general permit.

California Coastal Act of 1976. Several sections from the California Coastal Act of 1976 apply to development in San Diego Bay (State of California 1981). Chapter 3, Article 4, Section 30230 assures "Marine resources shall be maintained, enhanced, and, where feasible, restored... Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes." Section 30232 from Article 4 dictates "Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur."

California Water Pollution Control Act of 1949. This act provides that regional boards prescribe requirements based on the beneficial uses of the waters. The Act defined pollution as an "impairment of the quality of the water of the State by sewage or industrial waste to a degree that adversely or unreasonably affects such waters for various beneficial uses." Section 402 of the Federal Water Pollution Control Act of 1972 (the Clean Water Act) regulates the discharge of pollutants to surface water bodies through National Pollutant Discharge Elimination System (NPDES) permits, which are administered by the State Water Resources Control Board and the nine Regional Water Quality Control Boards on the authority of USEPA.

Rivers and Harbors Appropriations Act of 1899. The Rivers and Harbors Appropriations Act of 1899 authorizes the USACE to exercise control over all construction projects in U.S. navigable waters. The Rivers and Harbors Act was originally designed with the intent to protect navigation and navigable capacity. These objectives were later expanded to include environmental protection. The key provision to this Act is Section 13, which makes it a crime to discharge refuse into any navigable water without the permission of the USACE.

Oil Pollution Act of 1990. The Oil Pollution Act of 1990 requires that a state oil spill contingency plan be established with a specific component to include a marine oil spill contingency planning element. The Act also specifies area plans to be capable of removing a "worst case discharge of oil or a hazardous substance, and to mitigate or prevent a substantial threat of such a discharge, from a vessel, offshore facility, or onshore facility operating in or near the geographic area." Area Committees are responsible for pre-planning with state and local officials for joint response efforts.

Water Quality Control Plan for Enclosed Bays and Estuaries of California. The Bays and Estuaries Plan outlines the following objectives: 1) animal or plant communities and populations shall not be degraded as a result of waste discharge, 2) natural taste of aquatic resources used for human consumption shall not be impaired, 3) toxic pollutants shall not be discharged at levels that may accumulate to levels harmful to human health, and 4) concentrations of toxic pollutants shall not adversely affect beneficial uses (SWRCB 1991).

Comprehensive Water Quality Control Plan. The Comprehensive Water Quality Control Plan for the San Diego Basin lists the beneficial uses of San Diego Bay as industrial service supply, navigation, water contact recreation, non-contact water recreation, commercial and sport fishing, preservation of biological habitats of special concern, estuarine habitat, wildlife habitat, preservation of rare and endangered species, marine habitat, fish migration, and shellfish harvesting (SWRCB 1994).

PROPOSED ALTERNATIVES

Two harbor reconfigurations are being considered to facilitate the creation of a new active commercial marina in the Chula Vista area. Both reconfigurations would maintain the existing number of boat slips currently in the Chula Vista Marina. Both options include reconfiguration of the existing South Bay Boatyard commercial harbor north of the Chula Vista Marina into an approximately 200-slip marina.

The redevelopment project for the Chula Vista Marina would require dredging of the entrance channel and realignment of the access channel to north San Diego Bay. Much of the proposed access channel is too shallow for navigation, which would require dredging of the new channel and filling of the existing channel. An estimated 83 acres of the existing navigation channel would be filled from about -15 MLLW to -3 to -5.5 ft MLLW. The proposed navigation channel alignment overlays an existing channel though the south bay (Figure 3).

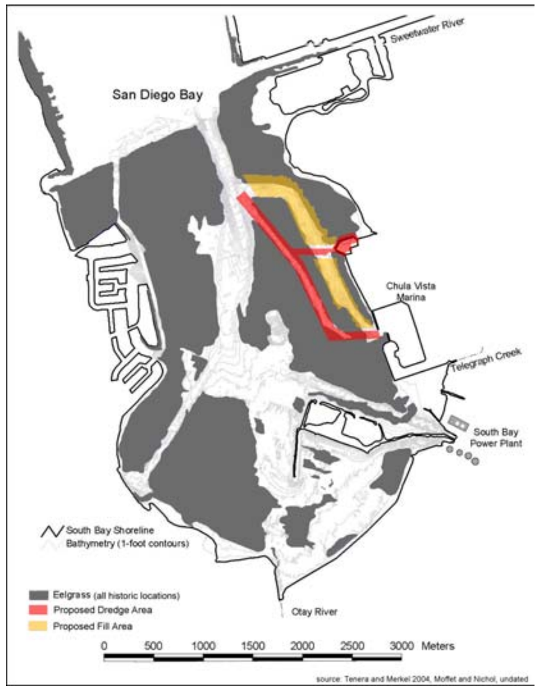

Figure 3. Historic eelgrass occurrence and proposed dredge and fill locations in South San Diego Bay.

Option 1. This proposed harbor reconfiguration would expand the harbor size to enclose all of the existing floating docks and approximately 900 boat slips (Figure 4). This configuration would require excavating the riprap walls and additional areas surrounding the harbor, reconfiguring the southern arm, and relocating the boat launch to increase the water area and improve boat navigability.

Option 2. This option proposes a configuration more similar to the existing marina, which could include some bulkheading of the existing riprap edge but would not require reconfiguring the southern arm or relocating the boat launch (Figure 5). Option 2 proposes approximately 500 boat slips within the harbor footprint and approximately 375 boat slips outside the harbor footprint adjacent to existing entrance to the Chula Vista Marina. The primary difference between the two reconfigurations is the placement of boat slips outside of the harbor in Option 2.

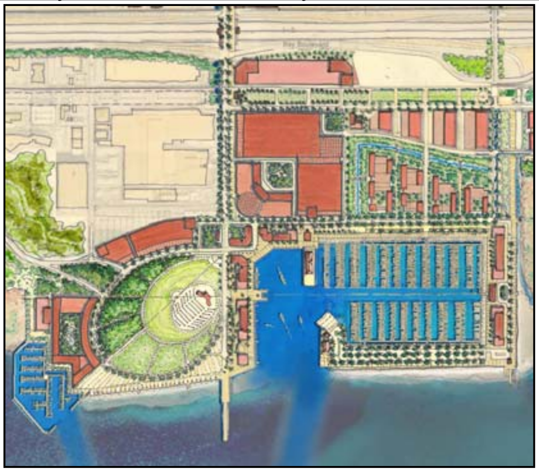

Figure 4. Chula Vista Marina reconfiguration Option 1. Source SDUPD 2005.

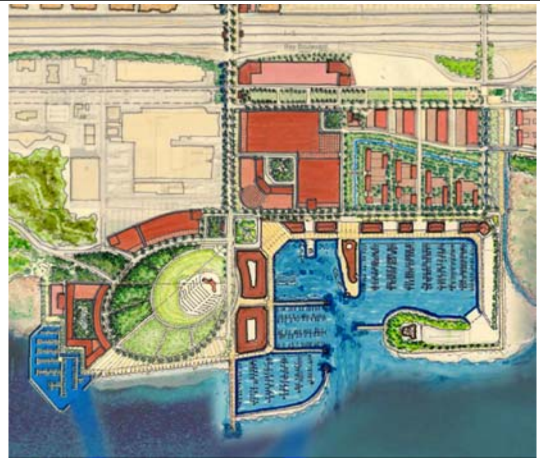

Figure 5. Chula Vista Marina reconfiguration Option 2. Source SDUPD 2005.

IMPACT ANALYSIS

Impact Significance Criteria

The California Environmental Quality Act (CEQA) Guidelines defines a significant effect on the environment as a "substantial, or potentially substantial adverse change in the environment." The effects of the project on water quality, hydrology, and oceanography are considered to be significant if the project would result in any of the following:

Discharges which create pollution, contamination, or nuisance, as defined in Section 13050 of the California Water Code (CWC), or that cause regulatory standards to be violated, as defined in the applicable NPDES stormwater permit or Water Quality Control Plan for the receiving water body would be adverse impacts that would need to be mitigated. Permanent adverse changes to the movement of surface water sufficient to produce a substantial change in the current or direction of water flow, tidal elevations, or wave heights and or a substantial reduction or increase in the amount of surface water in a water body would also be significant impacts.

Concerning contamination during project operation, input of contaminants to San Diego Bay would be considered significant if any of the following applied: 1) permanent deterioration or contamination of the aquatic habitat such that the aquatic ecosystem of the harbor is substantially disrupted, 2) generation of on-site runoff rates which exceed the capacity of existing storm drain systems, 3) substantial alteration of flood water flow due to a 100-year standard flood, resulting in on-site flooding, 4) discharges that create a pollution, contamination, or nuisance as defined in Section 13050 of the California Water Code, 5) release of toxic substances that would be deleterious to humans, fish, bird, or plant life, and/or 6) release of hydrocarbon or related contaminants to the surface waters in such concentrations that they would violate existing local, State or Federal statutes, or cause noticeable degradation to the biota within and proximal to the project site such that recovery of the biota would be substantially impaired, prevented or prolonged for extended periods.

Permanent Impacts

The redevelopment project for the Chula Vista Marina would require realignment of the access channel to the north San Diego Bay. This realignment would include dredging of a new navigation channel through South San Diego Bay and filling of the existing channel. The proposed navigation channel alignment overlays an existing channel though the south bay. This channel was created as a result of boaters cutting across the area instead of using the navigation channel (Figure 3). Dredging would be required to widen and deepen this channel for navigation safety. The proposed project would dredge approximately 67 acres of soft subtidal habitat. An estimated 83 acres of the existing navigation channel would be filled with the dredged sediments to a planned depth of -1 to -1.65 m Mean Lower-Low Water (MLLW). Focused sediment investigations would be required prior to dredge and fill operations to ensure that contaminated sediments are not exposed or redistributed as a result of the project. Presence of contaminants would require appropriate disposal of contaminated sediments to reduce significant permanent impacts. While temporary impacts associated with construction are possible, the proposed project is not likely to result in a long-term reduction in water or sediment quality or the loss of individuals or habitat in the area. No permanent impacts to the water or sediment quality in the project area are anticipated from the channel realignment.

Circulation patterns in the bay would change very little as a result of the dredging and filling activities. Tides would remain unchanged in the harbor as a result of the proposed dredging and fill because no restrictions to tidal flow would be created. Although tidal current velocities could be slightly lower due to the increased water depth in the dredged channel, slightly faster currents in the fill areas would compensate for this.

The reconfiguration of the South Bay Boatyard commercial harbor north of the Chula Vista Marina into a 200-slip marina would not modify the existing harbor boundaries, but dredging to deepen the boatyard would be conducted. Focused sediment investigations would be required prior to dredge operations to ensure that contaminated sediments are not exposed or redistributed as a result of the project. Presence of contaminants would require appropriate disposal of contaminated sediments to reduce significant permanent impacts. While temporary impacts associated with construction are possible, the proposed project is not likely to result in a long-term reduction in water or sediment quality or the loss of individuals or habitat in the area. No permanent impacts to currents, water or sediment quality in the project area are anticipated from the reconfiguration of the South Bay Boatyard.

Option 1. Option 1 would increase the size of the existing Chula Vista Marina by expansion into land parcels. Existing shoreline armoring would be removed in this option and the harbor expanded to the north, east and south of the existing boundaries, while the southern arm would be reconfigured and extended (Figure 4). The marina would be reconfigured to increase density of slips in the southern area, while the northern area would be configured to improve boat launching and navigation.

Removal of riprap and sheet pile within the Chula Vista Marina, dredging and placement of riprap associated with the construction of the proposed marina extension could potentially suspend bottom sediments in the water column. Focused sediment investigations would be required prior to dredge operations to ensure that contaminated sediments are not exposed or redistributed as a result of the project. Presence of contaminants would require appropriate disposal of contaminated sediments to reduce significant permanent impacts. Reconfiguration of the Chula Vista Marina opening is likely to improve water exchange and water quality in the northern marina area, while water quality in the southern docking area is expected to be similar to existing conditions. Temporary impacts associated with construction are possible, however the proposed project is not likely to result in a long-term reduction in water or sediment quality in the area. No permanent impacts to the water quality or marine resources in the project area are anticipated from Option 1.

Option 2. Option 2 would increase the size of the existing Chula Vista Marina by construction of an additional harbor adjacent to existing entrance to the Chula Vista Marina. This Option proposes a configuration more similar to existing conditions in the marina, which could include some bulkheading of the existing riprap edge (Figure 5). In this option approximately 14.5 acres of existing shallow subtidal habitat outside of the marina in San Diego Bay would be dredged to navigable depth, and the area surrounded by a riprap armor breakwater to protect the new marina extension with 375 boat slips. Most of the existing marina shoreline would not be modified, although slips within the marina would be reconfigured.

Construction of the harbor extension adjacent to Chula Vista Marina may reduce local currents in the project area, but is not expected to significantly impact circulation in South San Diego Bay. While temporary impacts associated with construction are possible, the proposed project is not likely to result in a long-term reduction in water or sediment quality or the loss of individuals or habitat in the area. No permanent impacts to the water quality or marine resources in the project area are anticipated from Option 2.

Removal of riprap and sheet pile within the Chula Vista Marina, dredging and placement of riprap associated with the construction of the proposed marina extension could potentially suspend bottom sediments in the water column and would be considered a significant impact if sediments are contaminated in the area. Impacts would be reduced to below a level of significance with implementation of the following mitigation: Prior to any dredge operations in the bay or harbor, 1) the project developer shall conduct focused sediment investigations to ensure that contaminated sediments are not exposed or redistributed as a result of the project. 2) If contaminated sediments are found to be present, the project proponent shall arrange for disposal of contaminated sediments in accordance with permitting requirements and to the satisfaction of the authorizing agency.

Temporary Impacts

Marine Sediment Suspension. Temporary impacts to water quality from the Chula Vista Marina redevelopment project are principally related to the suspension and dispersion of sediments. Dredge and fill activities necessary for channel realignment and harbor construction, removal of riprap and sheet pile and excavation and placement of bulkheads and riprap associated with the marina extension would suspend bottom sediments into the water column. Suspension of sediments reduces water clarity, and organic carbon found in high concentrations in bay sediments when dredged would bind with oxygen, decreasing dissolved oxygen available to marine organisms. These, and other impacts associated with sediment suspension can include reduction in hydrogen ion concentration (pH), increases nutrients and the redistribution or exposure of contaminated sediments would be considered significant.

Suspension of fine materials during the construction process would increase turbidity, accompanied by decreased water clarity, for a short 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 receiving water (USACE and LAHD 1992). The plume durations are expected to be generally of short duration with the concentration of suspended solids returning to background levels within 1 to 24 hours after dredging stops (Parish and Wiener 1987). The size of the turbidity plume, however, could be somewhat greater in the immediate vicinity of the filling operations than at the dredge sites. Mitigation to reduce temporary impacts includes the use of silt curtains to reduce the extent of the plume and monitoring during dredge and fill operations to ensure that water quality requirements are maintained.

Dissolved Oxygen (DO) levels in aquatic habitats are usually reduced by the introduction of high concentrations of suspended particulates. This is especially true if the particulates are from anaerobic sediments, which would place an oxygen demand on the surrounding waters.

Dissolved oxygen levels would be reduced in the immediate vicinity of dredging and filling activities by the introduction of high concentrations of suspended particulates and by the oxygen demand on the surrounding waters from anaerobic sediments. The reduction in DO levels, however, would be brief. A study of dredge material releases in San Francisco Bay showed a 3- to 4-minute reduction in DO levels near the point of release (USACE 1973). Another study in New York Harbor showed a small reduction in DO near the dredge but no reductions in DO levels 200 to 300 feet away from the dredging activities (Lawler, Matusky, and Skelly 1983).

Nutrients could be released into the water column during marine construction operations, increases in stormwater runoff, or point or non-point source releases to the storm water system. Release of nutrients may promote nuisance growths of phytoplankton if operations occur during warm water conditions. Observations of previous dredge projects indicate that phytoplankton blooms have occurred during the spring while dredging was underway. There is no evidence that this was not a natural occurrence or was exacerbated by dredging activities. Implementation of project design measures that incorporate storm water detention basins, filtering systems and other control facilities incorporating best available technologies would reduce the potential for significant impacts to below a level of significance from unauthorized releases of nutrient rich runoff into the bay or harbor.

Contaminants could be released into the water column during the dredge and fill operations. However, like pH and turbidity, 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 in the Los Angeles harbor have shown that substantial resuspension of contaminated sediments does not occur (AMEC 2004).

Water quality impacts related to suspension and dispersion of sediments from dredge and fill activities, removal of riprap and sheet pile and excavation, and placement of bulkheads and riprap are expected to be locally adverse, but of a short duration. Use of Best Management Practices (BMPs) and adherence to regulatory requirements, which may include use of silt curtains during all sediment suspension activities, would reduce local impacts. Although adverse, impacts would be less than significant due to the short duration of the effects.

Spills. Accidents and unintentional discharges resulting in spills of fuel, lubricants, or hydraulic fluid from the equipment used during dredging, fill and construction could occur during the project and adversely affect water quality. Impacts would depend on the amount and type of material spilled as well as specific conditions (e.g., currents, wind, temperature, waves, and vessel activity) at the site of the spill. In most cases, such spills would be small and cleaned-up immediately, causing less than significant impacts in the short-term. A larger spill that could have locally significant impacts on water quality is not expected to occur, even under reasonable worst-case conditions. Use of BMPs and adherence to regulatory requirements would contain accidental discharges and reduce local impacts. Although adverse, impacts would be less than significant due to the short duration of the effects.

Land Runoff. Additional impacts of marina redevelopment would be related to water runoff during storm events and the resulting erosion of soil surfaces exposed during land-based construction. This could result in increased sedimentation and introduction of contaminants in the marina and adjacent areas of the south bay. In addition, historic industrial uses in the area are known to have resulted in contamination of surface and ground water. Drilling for the placement of building footings, clearing, brushing and grading activities during site preparation, and future operations could increase the potential for spills or the spread of contamination via surface or ground water. However, with use of BMPs and adherence to regulatory requirements (State Water Resources Control Board [SWRCB] NPDES permit program), these impacts would not be significant.

Upon project completion, onshore operations are likely to have little effect on the water and sediment quality of the project area. Waste discharges from vessels in the marina could potentially affect local water quality. Current regulations guiding the discharge of wastes from boats into marine waters should prevent discharge of wastes into the basin. Stormwater runoff would likely have an insignificant effect on water quality with compliance with the SWRCB's NPDES program.

Unavoidable Adverse Impacts

Management practices, including BMPs and mitigation to control the unintentional release of excavated sediments and water into the local environment would reduce temporary impacts related to the proposed project. No unavoidable adverse impacts to marine biological resources as a result of the project are expected.

Cumulative Impacts

No significant cumulative impacts have been identified to biota or habitats in the project area. There are no other known projects in the vicinity of the proposed project that, when considered together, would result in significant adverse impacts to water quality, sediment quality, wildlife or habitats in the Chula Vista Marina area.

Mitigation Measures

The project proponent shall conduct focused sediment investigations prior to dredge operations to ensure that contaminated sediments are not exposed or redistributed as a result of the project. Concentrations of copper in Chula Vista Marina are known to be elevated. The proponent shall coordinate with the U.S. Army Corps of Engineers to determine suitability of dredged sediments for use in fill. If sediments are determined to be unsuitable, they must be disposed of properly prior to commencement of work. Disposal options could include off-site hauling of contaminated sediments or confined aquatic burial. Final deposition of unsuitable sediments would be determined by USACE.

Attempts should be made to reduce the extent of suspended sediments during demolition, dredge, fill and construction activities. The assessment of impacts for dredging and filling is based on regulatory controls and on the assumptions that the project would include a Section 401 (of the Clean Water Act) Certification from the Regional Water Quality Control Board (RWQCB) for dredging and filling activities that contains conditions including standard Waste Discharge Requirements (WDRs). Use of BMPs and adherence to regulatory requirements would be required during all phases of construction.

The project proponent shall provide a qualified professional to monitor water quality during dredging and placement of dredge materials associated with construction. A report shall be submitted to the RWQCB for review and approval. A copy of the report shall be submitted to the appropriate authorizing jurisdiction for review. This monitoring is designed to detect any impacts to water quality and to temporarily suspend or modify operations in the event that turbidity increases or dissolved oxygen concentrations are reduced to levels that exceed preestablished threshold limits. Monitoring requirements and threshold limits would be determined by the San Diego RWQCB as part of the permitting process for dredge and fill activities.

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