recontamination from bioturbation, a 1-foot gravel layer underneath a 2-foot layer of sand will be incorporated into the cap in the eelgrass habitat area. This layer of gravel will serve as a barrier to species that will colonize the eelgrass bed. For the engineered cap, a 2-foot layer of surficial armoring stone will be placed over a 1-foot layer of gravel, preventing bioturbation from occurring. These parameters will ensure that impacts from bioturbation will be less than significant.

Hydrodynamic Conditions

Waves

Costa (2002) performed a detailed wind wave analysis for the project site to evaluate the stability of the capping material. That study concluded that, at the project location, wave heights are generally less than 1 foot, with wave periods ranging between 0.5 to 1.6 seconds. In addition, the study concluded that waves generated by vessels passing through the basin along the main navigation channel will be comparable in size to the wind waves. These waves are too small to cause significant erosion at the project site. The earlier study by Costa (2002) also concluded that the waves at the project site might cause sand erosion only at areas shallower than -3 feet MLLW. Because the proposed grading of the habitat area is between -6 and -4 feet MLLW, it is unlikely that the capping sand will be eroded by waves. Therefore, impacts from waves will be less than significant.

Tidal Currents

Costa (2002) also provided an evaluation of the tidal currents at the project location based on a gage maintained by the NOAA at the G Street Pier, north of the project site. The average maximum current speeds are between 0.3 and 0.8 knots (0.5 and 1.35 ft/sec). Costa (2002) estimated that tidal currents along the navigation channel will probably generate very weak eddies in the Campbell Shipyard basin, with current speeds that are only about 1 to 10% of the main channel current speed (i.e., with current speeds of 0.01 to 0.1 ft/sec). Based on tidal currents at the Fifth Street Marina Entrance, which has a narrower entrance than the Campbell Shipyard entrance but similar basin areas, Costa (2002) estimated that the tidal current within the Campbell Shipyard basin would be about 0.06 ft/sec. Therefore, impacts from tidal currents will be less than significant.

Impact of the Engineered Cap-In-Place on Circulation

The proposed engineered cap stays within the former Campbell Shipyard basin, and therefore will not have any impact along the San Diego Bay navigation channel adjacent to the basin, or the rest of San Diego Bay. Any impact the engineered cap may have on tidal circulation will be confined to within the former Campbell Shipyard basin. The engineered cap will occupy a large area of the former Campbell Shipyard basin and will change the existing bathymetry at some locations. A qualitative description of the potential impact was conducted, based on the change in bathymetry within the basin from the proposed engineered cap. The tidal currents within the former Campbell Shipyard are relatively small to begin with, and changes in bathymetry caused by the Alternative 1: Engineered Cap-In-Place will not dramatically alter the hydrodynamic conditions of the project area. Thus, the changes to bathymetry will not have any significant impacts on circulation within the former Campbell Shipyard basin.

The engineered cap will leave a navigation channel along the south side of the basin for the Tenth Avenue Marine Terminal (TAMT). The change in geometry may result in slightly higher tidal currents along the south side of the basin. However, because the existing tidal currents are small, and the engineered cap will not drastically change the hydrodynamic conditions of the project area, the change is expected to be minimal, and will not create any significant impacts in circulation on the south side of the basin.

Propeller Wash

A Technical Memorandum dated October 16, 2002 (Anchor Environmental, LLC 2002c) presented preliminary results of using a numerical propeller wash model (PROPWASH) to evaluate propeller wash currents at the project site, using standard tugboat characteristics understood to be applicable to the project site. In February 2003, a field program was conducted at the project site to collect site-specific propeller wash data that were used to calibrate the PROPWASH model. Propeller wash analyses were conducted for each region of the cap due to the different circumstances pertaining to each region. The demarcations of Region A, Region B, and the habitat area are shown on Figure 4.2-3.

Region A

As discussed above, the PROPWASH model requires information about specific vessels and the site configuration to predict propeller jet velocities. Tugboat operations at TAMT were obtained by interviewing Port of San Diego wharfingers, and local tugboat operators. The following two tugboat power usage assumptions were used in evaluating the design propeller wash currents for the engineered cap areas:

- Operation Scenario 1: Full power 10% of the time and half power 90% of the time.
- Operation Scenario 2: Full power 25% of the time and half power 75% of the time.

A probabilistic approach was used to evaluate the design currents for Region A of the engineered cap areas. Centerline bottom velocities for six modes of tugboat operations at TAMT over a range of water levels corresponding to three different tugboats (Crawley, Foss, and Harbor Department) operating at two different throttles (full power and half power) were developed. These six centerline bottom velocities were then combined to provide the overall probability of occurrence of the maximum bottom velocity at

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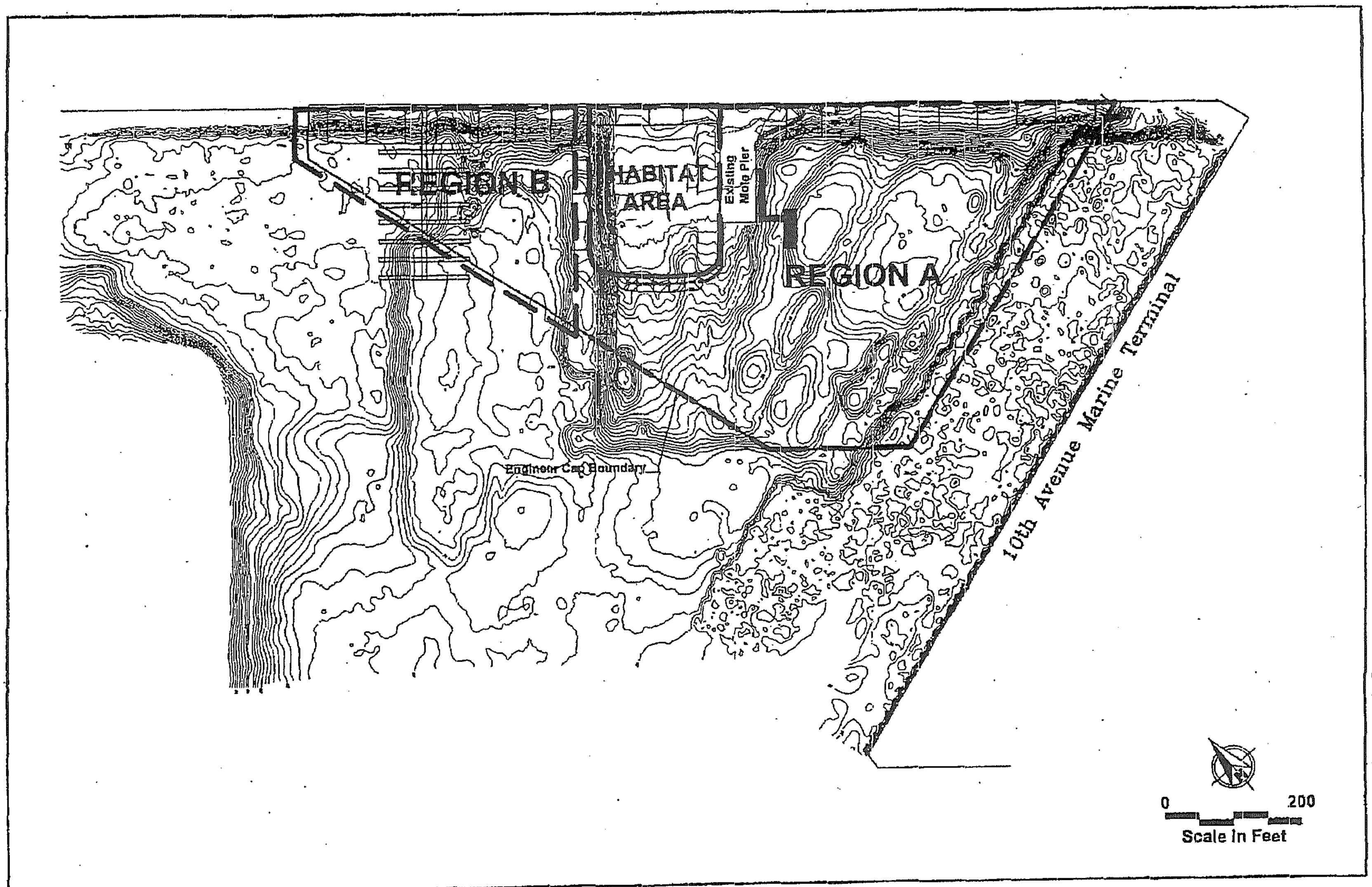

Source: Anchor Environmental, L.L.C.

Engineered Cap Regions and Habitat Area

Figure 4.2-3

P&D Environmental Services

Region A on an annual basis. Using this information, it was determined that the 1% design velocity for Region A of the engineered cap areas will be 5.6 and 5.8 ft/sec under Operation Scenarios 1 and 2, respectively.

These erosive events would have a very short duration, and would result in a modest rearrangement of surface armoring material. Erosion-induced "damage" to the armor layer would not amount to an actual breaching of the cap, but rather would consist of a modest repositioning or shifting, but little to no actual displacement, of armoring rocks. Therefore, it is anticipated that impacts created by propeller wash in Region A will not be significant. Long-term visual monitoring would identify if repairs and/or additional mitigation measures are needed.

Region B

The types and numbers of the recreational boats that will be using the potential future transient marina in Region B have not been determined. However, it is projected that "super yachts" up to 150 feet long may be allowed to dock at the proposed marina. Since boat operations at the proposed transient marina have not been defined, the design velocity at Region B was developed based on a typical super yacht (the White Heaven III) operating at half power. Half power is assumed because it is likely there will be posted speed limits for safety.

Two methods were followed in selecting the proper capping armor stones for the engineered cap areas based on the design velocities presented above. Method 1 follows the recommendations for armor layer design for in-situ capping of contaminated sediments (EPA 1998). Method 2 is based on recommendations by the ACOE in sizing riprap to prevent channel bottom erosion. Method 2 is also presented in guidelines published by the Permanent International Association of Navigation Congress (PIANC) for the design of armored protection under propeller wash (PIANC 1997).

For a given velocity, Method 1 recommends the use of larger armor stones than Method 2. Based on the design velocities established above, the required capping stone dimensions to resist erosion by propeller currents were calculated and summarized in Table 4.2-3.

Based on the 1% exceedance design velocities, the required capping stone dimension for Region A is about 0.4 and 1.5 feet (depending on the method being used), with an average of about 1 foot in diameter. The capping stone for Region B is between 0.3 and 1 foot in diameter.

Table 4.2-3
Capping Stone Sizes for Region A and Region B

Engineered Cap Regions	Operation Scenario	Design Velocity (Ft/Sec)	Armor Stone Size d_{50} (Feet)	
			Method 1	Method 2
A	1	5.6	1.41	0.40
A	2	5.8	1.52	0.43
B	--	4.6	0.95	0.27

For the purposes of preliminary design, a uniform 2-foot armor layer (approximately two layers of capping stone with a median diameter d_{50} of 1 foot) is assumed throughout the engineered cap area for protection against erosion and for geotechnical stability. A 2-foot layer over Region A is underdesigned according to Method 1, but overdesigned according to Method 2. Following Method 1, a 1-foot-diameter stone can resist movement under a propeller wash current of about 4.7 ft/sec, which still has a low probability of occurrence. A 2-foot capping layer over Region B may be overdesigned, but considering the undefined recreational boat operations at the potential future marina, and that Region B is relatively small, assuming a uniform design throughout the engineered cap area simplifies the subsequent cap stability analyses and cost estimates. The capping stone needs to be placed over an underlayer of smaller stone, which would act as a filter layer. A 1-foot-thick layer of well-graded gravel will likely suffice for this purpose, and is frequently used as an underlayer for riprapped slopes. With the implementation of these project design elements, impacts created by propeller wash in Region B will not be significant.

Eelgrass Habitat Area

In an earlier study to assess habitat and biological conditions at the project site, Merkel and Associates (Merkel 2003) concluded that sediments with grain sizes of 0.1 to 0.2 millimeter (i.e., sand) will be an ideal capping material in the eelgrass habitat area. Based on the Hjulstrom's curve, sediment of these grain sizes can resist erosion of current velocities of about 30 to 50 centimeters per second (1 to 1.5 ft/sec).

The flow velocity field over the eelgrass habitat area resulting from operating tugboat propeller wash jets is highly three dimensional, due to the fact that the characteristic dimensions of the habitat site are comparable to those of the approaching jet. Full evaluation of velocities over the habitat cap would require numerical or physical modeling. For purposes of this report, instead of trying to evaluate the velocities over the habitat cap, the analysis focuses on evaluating how likely it would be that flows over the habitat cap exceed 1 to 1.5 ft/sec - velocities that may erode the sandy capping material. Following similar procedures in developing the probabilities of exceedance for bottom velocities at the engineered cap area, the probabilities of exceedance of bottom velocities approaching the habitat area were determined. The 1% exceedance velocities were found to be approximately 2.1 and 2.3 ft/sec for tug Operation Scenarios 1 and 2, respectively.

The wave reflector has a crest elevation of 0 feet Mean Lower Low Water (MLLW). The effectiveness of the wave reflector in preventing propeller wash from propagating over the eelgrass habitat area depends on its crest elevation relative to the water depth (i.e., water level). At MLLW, the crest of the wave reflector will pierce the water surface, and hence would be very effective in stopping propeller wash over the habitat area. It is only during high tide that the wave reflector will become less effective in protecting the habitat area. At MHHW, the effective water depth over the habitat area is 11.7 feet, while the wave reflector extends 6 feet above the sea floor. The wave reflector would provide a relatively low degree of protection for the eelgrass habitat area against propeller wash. However, keeping in mind that the 1% exceedance velocity in front of the wave reflector is only about 2 ft/sec, partial protection from the wave reflector may be sufficient to reduce the velocity to below 1 to 1.5 ft/sec behind the wave reflector. In addition, water levels higher than MHHW occur less than 7% of the time, so it is unlikely that a tugboat will have its propeller jet directed directly towards the eelgrass habitat area while the water level is high. If the jet is directed towards the eelgrass habitat area at an angle, the resulting propeller wash currents will be even smaller. Therefore, impacts created by propeller wash on the eelgrass habitat area will not be significant.

Potential Long-Term Water Quality Impacts

Modeling was completed to predict the long-term quality of pore water that could potentially migrate to the biologically active zone at the surface of the cap over an assumed 100-year design period. The Boudreau Model (Boudreau 1997), which follows the principles for predicting contaminant flux out of a cap established by the ACOE (1998) and EPA (1998), was used to conduct this assessment. This model has been used on a number of sediment capping projects to assess long-term water quality.

The predicted long-term water quality concentrations were compared against appropriate water quality standards. California Ocean Plan six-month average values were used for the metals water quality criteria. No data exist in the California Ocean Plan for fluoranthene or pyrene, so ecological screening values (Department of Energy, 1996) for aquatic organisms were used for these chemicals.

Table 4.2-4 summarizes the predicted pore water quality 1 centimeter below the cap surface. Similar to the conservative case used in the bottom consolidation model, these results reflect the typical worst-case values for all parameters. The pore water concentrations of all chemicals were found to be below the established thresholds of significance. Therefore, impacts from pore water concentration will be less than significant.

Table 4.2-4
Pore Water Concentration (µg/l) at 1 Centimeter Below the Cap Surface Under Conservative Conditions (Cap Thickness of 2 Feet)

Chemical	10 Years	50 Years	100 Years	Water Quality Criteria (µg/l)	Criteria Source
Copper	0.912	0.984	0.99	3	California Ocean Plan (6-Month Average)
Lead	0.0511	0.0448	0.0446	2	California Ocean Plan (6-Month Average)
Zinc	9.24	3.64	3.23	20	California Ocean Plan (6-Month Average)
Fluoranthene	0.000952	0.000139	0.000138	39.8	Ecological Screening Value, Savannah River
Pyrene	0.000883	0.00200	0.00199	0.025	Ecological Screening Value, Savannah River

Note: µg/l = micrograms per liter.

Potential Recontamination

Pile Driving

Marina construction and future maintenance over the proposed cap once it has been completed will involve pile driving and potentially pile pulling. The predominant environmental concern with pile driving is that contaminated sediments will be exposed or contaminants mobilized through pore water movement to the biologically active zone or overlying water column. Potential effects that were investigated include sediment displacement, sediment instability, and sediment resuspension from pile driving.

Through their water quality analysis, Anchor found that pile driving does not cause subsurface sediments to erupt through an overlying layer such as a cap, and that sediment displacement and changes in pore water pressure do not significantly impact surficial sediments. However, concerns may be warranted where small pore water pressure changes may influence contaminant migration when utilizing a thin cap. Thus, pile driving activities pose a potential significant impact.

Historical Sources of Contamination

Ninyo and Moore compiled a summary of historical site uses in 2001. As mentioned previously, RWQCB, based on the historical uses of the site, established cleanup levels for different COCs. These COCs are consistent with the types of wastes associated with ship repair and the ship building industry. Over the years, historical upland sources of contamination have been removed. In the last two years, the Campbell Shipyard upland leasehold underwent a major cleanup effort under the direction of the RWQCB and the Port of San Diego Environmental Services Department. There are ongoing efforts to remove subsurface soils contaminated with manufactured gas plant waste in the east parking lot area. Based on the success of these remedial efforts, the remaining potential for recontamination of the Campbell waterside lease from these historical upland sources is not considered to be significant.

Resuspension of Contaminated Sediments in the Vicinity of the Leasehold Area

Sediment samples were collected along the outer edge of the Campbell leasehold in May of 2002. Because these samples are located at the perimeter of the proposed cap, they represent materials that may be resuspended by wind, scouring storm waves, propeller wash, and boat waves and redeposited on top of the cap. The analysis of these samples indicated that the concentrations of metals, PCBs, TPH, and TBT are well below the CAO objectives at the outer boundaries of the proposed cap. However, the results from one core show there is a poorly delineated area of sediments with high concentrations of HPAHs at the southwestern tip of the proposed engineered cap area. Hence, sediments in this area could serve as a potential source of contamination if they are subjected to erosive forces. However, this potential source of recontamination will not be significant because of the limited amount of sediment that could be resuspended.

4.2.4 Significant Impacts Summary

1. Turbidity

Short-term turbidity impacts could occur as a result of resuspended sediments at the point of dredging or during cap placement, or through the loss of sediment offsite in the form of turbidity.

2. Pile Driving

Marina and hotel dock construction and future maintenance over the proposed cap once it has been completed could include driving piles through the cap,. which may expose contaminated sediments or mobilized contaminants through pore water movement to the biologically active zone or overlying water column.

4.2.5 Mitigation Measures

Mitigation Measure 1: Turbidity

Operational controls will be in place during construction to ensure sediment disturbance is kept to a minimum. During capping, the contractor will place the initial layers of the cap in thin lifts using either a clamshell bucket or by hydraulically placing the material from a barge. These placement methods reduce the vertical impact and lateral spreading of the cap material, thus reducing the potential for resuspending the bottom sediment. Controlled placement also minimizes the mixing of cap and underlying sediment by allowing the sediment to slowly gain strength before subsequent layers are deposited.

For dredging operations, operational controls such as selection of appropriate dredge buckets, use of silt curtains, and/or control of cycle times minimize potential sediment resuspension and related turbidity. Water quality monitoring will be conducted during construction to ensure that significant resuspension of sediments to the water column are not occurring beyond the mixing zone boundaries.

Mitigation Measure 2: Pile Driving

To prevent impacts from piles being driven into the cap, potential displacement and pore water pressure changes shall be incorporated into the design of the cap whether it is thick (i.e., >3 feet) or thin (i.e., approximately 6 inches). Follow-up procedures to the design to ensure cap effectiveness might include placing additional cover material in areas of depression surrounding the pile or divots upslope after pile driving has been completed. When a cap design anticipates the impacts associated with the installation of piles, it is reasonable to assume that the affected portion of the cap may have a reduced efficiency for a short time. However, the overall potential for reduced effectiveness of the cap is negligible compared to the potentially affected area versus the overall surface area of a cap. The possible short-term impacts of pile driving will be monitored as part of the project's overall monitoring and maintenance program.

Mitigation and Monitoring Program

To assess water quality within the project area, the following mitigation and monitoring program developed by Anchor (2003b) will be implemented. Short-term water quality monitoring will take place at designated reference (background) stations upstream and downstream of the project site and near the point of active remedial activities. Water quality analyses will include measurements of turbidity, dissolved PCBs, dissolved HPAHs, dissolved metals, and other contaminants, if appropriate. These measurements will ensure that Waste Discharge Requirements (WDR) imposed by the San Diego Regional Water Quality Control Board for the project are maintained.

Long-term water monitoring of contaminant mobility through the sediment will involve the evaluation of sediment cores at key locations through the eelgrass mitigation area for the COCs to determine if vertical migration of the contaminated sediment through the caps is occurring. Core samples should not penetrate into contaminated sediments. Any recently deposited surface sediments in the top 10 centimeters of the cap in all areas will be analyzed for COCs, to determine if recontamination associated with deposition of sediments from surface waters is occurring.

The stability of the remedial measures will be evaluated by recording the bathymetry of the site, and performing visual diving inspections. These surveys will be utilized to assess the integrity of structural features (berms, revetments, mole piers), assess the impacts of erosion and shoaling in the area, and assess the impacts of tugs and other vessels operating in the area on the surface of the cap.

A contingency plan will be prepared to respond to degradation of structural features associated with the remediation, erosion of caps, breaks, or other means by which biota or flora are exposed to contaminated sediments in the project area. If there is an instability, or breach of the remedial structures, those features will be repaired in a timely manner. If it is impossible to repair the affected area, an alternative cleanup plan will be adopted.

4.2.6 Significance of Impacts After Mitigation

With the implementation of all necessary mitigation measures, all impacts are reduced to below a level of significance.

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4.3 Geology and Soils

The following analysis is based upon the findings of a technical report prepared by Ninyo & Moore (2002) and Anchor Environmental, LLC (2003). The complete analysis is included in Appendix D and Appendix C.3.

4.3.1 Existing Conditions

Regional Geology

The project site lies within the San Diego Embayment Graben, a down-dropped structural block, roughly defined by the La Nacion system to the east (with down-to-the-west faults), and the down-to-the-east faults offshore, and in San Diego Bay. The formation of San Diego Bay is a direct result of the relative downward displacement of the San Diego Embayment Graben.

Faulting and Seismicity

The southern California region is subject to significant hazards from moderate to large earthquakes that are related to the San Andreas fault system. The project site is located near the southerly end of the Rose Canyon fault zone. Other significant active fault zones within 66 miles of the project include Coronado Bank, San Diego Trough, Newport-Inglewood (Offshore), San Clemente (Offshore), Elsinore-Julian, Earthquake Valley, Elsinore-Temecula, Elsinore-Coyote Mountain, Catalina Escarpment, Palos Verdes, San Jacinto-Coyote Creek, San Jacinto-Anza, Elsinore-Glen Ivy, and San Jacinto-Borrego.

Site and Subsurface Conditions

The project site is located along the westerly edge of a large man-made fill that was placed during the mid-1920s, and southwest of the intersection of Eighth Avenue and Gull Street at the former Campbell Shipyards.

The former Campbell Shipyards originated when a man-made hydraulic fill was placed westerly of Harbor Drive on a gently westerly-sloping sequence of relatively dense, interbedded Pleistocene-age, fluvial and marine coastal margin terrace deposits commonly mapped as the Bay Point Formation. A review of geologic maps and borings indicates that within the project site, the general surface of the Bay Point Formation (excluding excavations for dry docks and basins) rises from an elevation of approximately -33 feet [Mean Lower Low Water (MLLW)] near the westerly end of the shipway's ramp to approximately -14 feet at the seawall. Upland projections suggest that the Bay Point Formation is inclined at 1 to 2 degrees from the horizontal.

The hydraulic fill comprising the upland area of the shipyard is separated from the bay-side area of the property by a seawall bulkhead, which is comprised of three distinct wall sections. Fronting the seawall bulkhead is a sloping fill that overlies the Bay Point Formation.

Bayward of the seawall, the project site is comprised of the remnants of centrally located shipways. A review of geologic maps and borings indicates that the shipways are likely comprised of hydraulic fill that is underlain by the Bay Point Formation. Flanking the central shipways are the remnants of excavated basins where dry docks and pile-supported piers were located. These basins were likely excavated into the Bay Point Formation. Currently, the bay floor is covered with a variably thick mantle of loose and soft sediments. Borings and core samples suggest that these sediments generally vary in thickness on the order of 3 to 10 feet, with thicker and shallower deposits locally.

For purposes of our evaluation, the Bay Point Formation is considered a competent material comprised of interbedded dense, silty to clayey sands and very stiff to hard sandy to silty clays. In addition, the hydraulic fill soils are considered to be comprised of loose to medium dense sands with variable fines that are, in general, liquefiable.

Groundwater at the site is anticipated to vary between -2 to +8 feet (MLLW).

Lastly, there are likely bay deposits located between the hydraulic fill and Bay Point Formation. These deposits appear to be thin and primarily of interest with respect to the seawall bulkhead.

Geologic Site Hazards

Tsunamis, seiches, liquefaction, ground shaking, and ground rupture are considered likely hazards at the project site. No known landslides or fault traces have been mapped within the project site boundaries. As such, landslides and fault ruptures are not considered likely hazards for this project. A review of documents suggests that no fault hazard studies have been performed for this project.

4.3.2 Impact Significance Criteria

Significance criteria for impacts to geology and soils were developed based on Appendix G of the CEQA Guidelines.

- Alternative 1: Habitat Cap will have a significant impact if it exposes people or structures to potential substantial adverse effects, including the risk or loss, injury, or death from strong seismic shaking.

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The performance objective is to ensure that the remediation project is capable of withstanding a design-level seismic event without significant loss or exposure of contaminated material to the surrounding environment. Thus, using the seismic guidelines developed by the American Society of Civil Engineers (ASCE) for United States port facilities (ASCE 1998), the following seismic performance criteria have been selected for this project.

Design Level 1

For a Design Level 1 seismic event, a given sediment remediation alternative is to be designed to remain undamaged with no exposure of contaminated materials. A "Level 1" seismic event is defined as a seismic event that has a 50% chance of exceedance in a 50-year period. Such an event is oftentimes referred to as a moderate earthquake. A 6.4-magnitude earthquake is identified as the threshold. To ensure safety during such an earthquake, structures must be designed to meet a factor of safety of 1.1.

Design Level 2

For a Design Level 2 seismic event, a given sediment remediation alternative is to be designed to avoid large-scale exposure of contaminated materials and that may require only straightforward and readily accomplished earthwork repair. A "Level 2" seismic event is defined as a seismic event that has a 10% chance of exceedance in a 50-year period. Such an event is oftentimes referred to as a major earthquake. A 6.85-magnitude earthquake is identified as the threshold. To ensure safety during such an earthquake, structures must be designed to meet a factor of safety of 1.5.

4.3.3 Impact Analysis

Engineered Cap

The primary geotechnical and seismic concerns of the engineered cap include bearing capacity, settlement, seismic stability, and construction considerations. A discussion of these concerns is presented below.

Bearing Capacity

The engineered cap will mantle the surface of contaminated sediments and will be placed on top of unconsolidated Bay Deposits, consolidated Bay Deposits, Bay Point Formation, and San Diego Formation. The bearing capacity of these foundation soils and the minimum foundation soil strength were assessed by using guidelines for the evaluation of bearing capacity of subaqueous caps [Environmental Protection Agency (EPA) 1998 and Department of Energy Research (DOER) 2000] and with bearing capacity equations (Atkinson 1981). The minimum required undrained shear strength of a foundation soil needed to support a 5-foot-thick cap of sand, armor stone, and gravel, with a factor of safety of 2, is approximately 150 pounds per square foot (PSF).

The most problematic of the materials that will support the cap are the unconsolidated Bay Deposits. The undrained shear strength of the unconsolidated Bay Deposits is estimated to vary between 10 to 100 PSF. On the basis of these undrained shear strengths, the maximum differential thickness of cap that can be supported ranges from 0.7 to 3 feet. Thus, the maximum lift placement thickness and maximum thickness of cap at the edge of the placement area for caps placed on unconsolidated Bay Deposits will either need to be restricted to mitigate the potential for bearing capacity failures, or the foundation soils will need to be strengthened to support the anticipated cap thicknesses. The placement of the maximum cap lift thickness can be controlled during construction. However, it is unlikely that the minimum required cap thickness at the edge of the cap area can be reduced to limit the potential for bearing capacity failure. As such, the foundation soils along the edge of the capped areas will likely need to be strengthened. Alternatively, the edges of the caps could be tapered out to limit the amount of unbalanced loads on underlying sediments. This would likely require sloping the tapered cap down at an angle of 10H:1V or flatter.

In order to strengthen the foundation soils at the margins of the capped area, a rock foundation will be placed into the existing soft sediments. Excavations within the unconsolidated Bay Deposits will likely be unstable. This rock foundation will be constructed by placing rocks on the sea floor to displace the weak sediments until a stable foundation is obtained. Placing this rock foundation will reduce the potential weakness of the engineered cap's bearing capacity to below a level of significance.

Settlement

Settlements of the placed engineered cap and the underlying sediments were evaluated using the U.S. Army Corps of Engineers (ACOE) computer program PSDDF (Stark 1996), and qualitatively checked by a simplified finite strain consolidation procedure described in the ACOE Engineer Manual for Confined Disposal of Dredged Material (1987).

During this assessment three cases were evaluated that corresponded to the engineered cap being placed on 5, 10, and 15 feet of unconsolidated Bay Deposits. Both single and double drainage conditions were considered in the assessment, and the placement of the cap was modeled as occurring in two steps. The first half of the cap was placed at time equals zero and the remaining half placed at the end of 90 days. Lastly, the rate of settlement was projected over a 10-year period. Results of the settlement evaluation are presented below in Table 4.3-1.

In the results presented above, the computed settlement of the cap itself was not included. Since the anticipated engineered cap material is to be clean sands and gravels, the actual settlement of the engineered cap is anticipated to be limited and relatively quick. The estimated settlement of the cap itself is anticipated to be a few inches, and will take place near the time of cap placement itself.

Table 4.3-1
Settlement of the Unconsolidated Bay Deposits
Due to Placement of a 5-Foot Cap

Sediment/Thickness	Settlement (Feet)				
	After 1 Year	After 2 Years	After 5 Years	After 10 Years	Total
5 feet (single drainage)	0.4	0.5	0.5	0.6	0.7
10 feet (single drainage)	0.4	0.5	0.6	0.7	1.0
15 feet (single drainage)	0.4	0.5	0.6	0.7	1.1
5 feet (double drainage)	0.5	0.6	0.7	0.7	0.7
10 feet (double drainage)	0.5	0.6	0.7	0.9	1.0
15 feet (double drainage)	0.4	0.5	0.7	0.9	1.19

Seismic Concerns

Liquefaction

Liquefaction of the sand portion of the engineered cap is possible under both seismic design level earthquakes. Consequences of this liquefaction could include migration of pore water due to seismically induced excess pore pressures and sand boils, although the extent of sand boiling will be affected to a certain degree by the presence of near-surface gravel layers. This potential for liquefaction poses a potential significant impact.

Seismic Stability

For qualitative purposes, the amount of lateral spreading was estimated using Barlett and Youd's empirical relationships for lateral spreading (Kramer 1996). For a Design Level 1 earthquake, the estimated magnitude of lateral spreading is less than 1 foot. For a Design Level 2 earthquake, the estimated magnitude of lateral spreading is greater than 10 feet. As such, seismic instability as manifested in lateral spreading of the engineered cap is likely under the Design Level 2 seismic event. The potential consequences associated with the lateral spreading of the cap include the possible development of extension gaps or cracks in the cap, which in turn could lead to exposure of underlying contaminated sediments. This potential seismic instability under a Design Level 2 earthquake poses a potential significant impact.

Eelgrass Habitat and Shipways

The primary geotechnical and seismic concerns related to the static and seismic stability of the eelgrass habitat area include the northward widening of the shipways embankment, the foundation support of the proposed wave reflector structure, the foundation support of the retention berm, and the dredging and demolition of the shipways area within the proposed eelgrass habitat area. A brief discussion of these issues and concerns is presented below.

Overall Stability of the Eelgrass Habitat Area

Lateral Stability

Concerns over the lateral stability of the edges of the cap adjacent to the top of the embankment slope are related to the potential seismic instability of the engineered cap itself. As was discussed earlier, the proposed engineered cap will likely liquefy under both design level earthquakes and will undergo lateral spreading during a Design Level 2 event. In addition to the potential impacts described above for the engineered cap, portions of the cap within the eelgrass habitat area are located adjacent to the top of a slope. As such, portions of the cap near these slopes will likely be displaced down the slope due to both liquefaction and lateral spreading. To prevent this potential for loss due to sliding, a rock containment berm or dike will be constructed to provide lateral support that will deter the lateral movement of the cap edges. Construction of the rock containment berm will reduce all impacts associated with lateral stability of the eelgrass habitat area to below a level of significance.

Seismic Stability

The issues related to the general seismic stability of the embankment include:

- Potential impacts associated with partial loss of eelgrass habitat due to the failure of the slope mass, either due to induced seismic force or liquefaction of the embankment mass.

- Potential impacts associated with the damage of the downslope engineered cap due to encroachment of portions of the failed embankment.

Conceptual stability analyses indicate that embankment failure can be prevented with the placement of a rock revetment fronting the embankment slope and/or by constructing a strong-enough embankment. The proposed embankment extension for this project will consist of a rock revetment outer layer that is placed over a loose clean sand core. Placement of the a rock revetment outer layer will reduce all impacts associated with seismic stability to below a level of significance.

Widening of Shipways Embankment

The primary static stability issue associated with constructing the eelgrass habitat area is the stability of the widened shipways embankment area and slope located along the northeasterly edge of the existing shipways ramp. Factors that impact the stability of the new area include:

- The foundation conditions for the support of the new embankment.
- The incorporation of the new embankment into the old embankment.
- The area and placement of capping material along the slope of the new embankment.
- The armoring requirements for the new embankment slope.

The stability of the proposed embankment widening was evaluated with the computer program SLOPE-W. Results of the stability analyses indicated that portions of the foundation soils supporting the extended embankment will need to be strengthened. This foundation improvement will likely consist of a dumped rock foundation. Assuming stable foundation conditions, a stable slope configuration can be achieved. Parametric studies indicate that the extended embankment slopes will generally be stable at inclinations of 2 to 1 (2 horizontal to 1 vertical) or flatter when the extended embankment is constructed with loosely placed clean sand. Furthermore, the use of a rock revetment will improve the overall stability of the slope. Implementation of the above design characteristics will reduce all impacts associated with the widening of the shipways embankment to below a level of significance.

Wave Reflector Structure and Retention Berm

The proposed wave reflector structure and retention berm are structural elements required to maintain the integrity of the proposed eelgrass habitat. The primary geotechnical and seismic issues associated with these structures pertain primarily to the stability of their foundations. To provide suitable support, these structures will need to be founded into, and on, adequate Bay Point Formation and/or San Diego Formation soils. Fortunately, the proposed demolition and dredging for the eelgrass habitat will result in these materials being located near the surface. As such, limited excavation of foundation preparation will be conducted for these structures. The necessary foundation preparation will depend upon the foundation requirements of each structure. Assuming that these structures will be founded directly on the formational materials, the depths of potential gravel-filled foundation keys will be on the order of 2 to 4 feet. Constructing these structures on adequate Bay Point Formation and/or San Diego Formation soils with the necessary foundation preparation will reduce all impacts associated with the wave reflector structure and retention berm to below a level of significance.

Existing Sheet-Pile Seawall

The primary geotechnical and seismic issues related to the existing and future seawall pertain to the overall seismic stability of the wall and potential impacts and damage to the engineered cap if the wall were to fail.

A previous study (URS 2000) found that the existing seawall system is seismically unstable. This study found that the existing seawall bulkhead would likely fail under a Design Level 2 earthquake. As such, portions of the proposed engineered cap near the base of the wall could be potentially damaged, with the integrity of the cap breached and/or compromised such that a release of contaminated soil could occur. To prevent the failure of the existing seawall and proposed extension, a rock revetment that fronts the seawall alignment will be constructed. Furthermore, the project will be designed to strengthen the retained soils and to reduce the potential for liquefaction within the seawall's tie-back anchor zone sufficiently to preclude failure of the seawall system during the Design Level 2 earthquake.

Hotel Dock and Transient Marina

The primary geotechnical issue pertains to the installation of the foundation systems for the hotel dock and the potential disturbance of isolated contaminated sediments. The likely foundation system for the hotel and marina docks will consist of shallow footings and an abutment for the landside portion of the project, and piles for the floating docks.

With respect to the landward foundations, the primary impacts will be associated with encountering contaminated soils. If encountered, these materials will be handled in accordance with project requirements. This will result in these materials being processed and transported for disposal at an appropriate upland facility, thus eliminating any potential significant impacts.

With respect to the floating dock pile foundation, the predominant environmental concern with pile driving is that contaminated sediments will either be exposed or contaminants themselves will be mobilized through pore water migration to the biologically active zone or overlying water column. However, Boudreau el al. (2003) found that the majority of capping projects that had been subject to pile driving did not suffer from an exposure of, or mobilization of, contaminated sediments. In addition, long-term lateral movements of the piles may result in local damage and/or disturbance of the engineered cap. To avoid disturbance and exposure of capped material, several installation alternatives could be employed:

- The area of the pile foundation could be predredged to remove contaminated soils. In this case there will be no soils to disturb during the pile installation and thus, no potential significant impacts.

- Using driven casing through the cap to create containment areas within the contaminated materials. This way the materials within the casings could either be excavated and disposed of in accordance with project requirements or disturbed within during pile installation without release to the environment, and then sealed and/or recapped after pile installation. Likewise, the annulus of the casing could be used to provide a buffer zone between the lateral movement of the pile and the engineered cap. Implementation of these measures will eliminate any potential significant impacts.

4.3.4 Significant Impacts Summary

It is assumed that all design measures discussed in the analysis are incorporated into the final plans and specifications. With implementation of these design measures, all impacts have been reduced to below a level of significance, with the exception of seismic and settlement issues.

1. Liquefaction of the Engineered Cap

Liquefaction of the sand portion of the engineered cap could cause migration of pore water due to seismically induced excess pore pressures and sand boils during both seismic design level earthquakes.

2. Seismic Stability of the Engineered Cap

Extension gaps or cracks in the cap, which in turn could lead to exposure of underlying contaminated sediments, could occur due to lateral spreading during a Design Level 2 seismic event.

4.3.5 Mitigation Measures

Mitigation Measure 1. Liquefaction of the Engineered Cap

Several liquefaction mitigation measures are possible for the cap; while they may improve overall cap stability, they will not fully eliminate the potential for damage in a seismic event. Such measures include:

- Incorporating gravel layers for pore pressure relief.
- Incorporating filter layers within the cap to inhibit the migration of soil particles.
- Densification of the cap to prevent liquefaction (although this alternative may not be economically feasible).
- Assessing potential damage to the engineered cap after the earthquake and recapping impacted areas as needed.

Mitigation Measure 2. Seismic Stability of the Engineered Cap

Three potential measures to mitigate the effects of lateral spreading are:

- The inclusion of rock retaining berms along the edges of the cap and within the interior of the cap areas.
- Reducing the inclination of the engineered cap surface, particularly if the slope angle can be reduced to approximately 5 to 7 degrees (the slope angle above which 'flow'-type liquefaction failures could occur).
- Assessing the damage after the earthquake and recapping the impacted areas.

Mitigation and Monitoring

To assess the condition of the engineered cap, the following mitigation and monitoring program developed by Anchor Environmental, LLC (2003b) will be implemented. Short-term geologic monitoring will entail inspection of the contractor's work on a regular basis to ensure that project plans and specifications are being met. Construction monitoring will also include the following:

- Bathymetric surveys to evaluate cap thicknesses and dredge depths.
- Bathymetric and diver surveys to assess the accuracy of berm placement and quality of berm construction.
- Cap consolidation monitoring.

At the end of the remediation project, soundings of the affected area will be made and mapped. A report summarizing the sounding results will be prepared for timely review. Any areas that are deficient in meeting the specifications for the project will be addressed at that time.

Long-term monitoring will entail recording the bathymetry of the site, and performing visual diving inspections. These surveys will be utilized to assess the integrity of structural features (berms, revetments, mole piers), and assess the impacts of erosion and shoaling in the area. Subbottom profiling, by core sampling or using a sediment profiling camera, may be used intermittently over the life of the project to assess the physical integrity of the cap. Core samples will be retrieved in a manner that does not threaten the integrity of clean caps. Markers will also be established so that potential long-term erosional problems can be identified.

A contingency plan will be prepared to respond to degradation of structural features associated with the remediation, erosion of caps, breaks, or other means by which biota or flora could be exposed to contaminated sediments in the project area. If there is an instability, or breach of the remedial structures, those features will be repaired in a timely manner. If it is impossible to repair the affected area, an alternative cleanup plan will be adopted.

4.3.6 Significance of Impacts After Mitigation

With the implementation of all necessary mitigation measures, all impacts can be mitigated to below a level of significance.

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4.4 Air Quality

The following analysis is based upon the findings of a technical report prepared by Giroux and Associates (2003). The complete analysis is included as Appendix E.

4.4.1 Existing Conditions

Project area air quality can be best characterized from ambient measurements made by the San Diego County Air Pollution Control District (SDAPCD), the agency responsible for air quality planning, monitoring, and enforcement in the San Diego Air Basin (SDAB). The SDAPCD air quality monitoring station located on Island Avenue in downtown San Diego is the closest station to the project area that monitors a fairly complete spectrum of air quality. Table 4.4-1 summarizes the last seven years of monitoring data from the station. Healthful air quality is seen in almost every pollution category. The only national standards that were exceeded in the last seven years (one violation per year is allowed under federal guidelines) was one violation of the hourly ozone standard in 1995. Since 1995, the more stringent State standards for ozone and the State standard for respirable particulates (PM_{10}) were also occasionally exceeded. Ozone, and to some extent particulates, are pollutants whose precursors are generated elsewhere and then carried into the local area by prevailing wind patterns. Levels of carbon monoxide or nitrogen oxides, which are more indicative of local source/receptor relationships, are seen in Table 4.4-1 to be very low in the proposed project area.

With two violations of the federal one-hour ozone standard in four years (1999-2002) in the entire region, the SDAPCD has initiated a request for redesignation of the basin as "attainment" for the one-hour standard. If the basin is designated as "nonattainment" for the eight-hour federal standard as anticipated, no major change in the attainment planning process is anticipated. The attainment plan will continue to contain emissions reduction programs to achieve the eight-hour standard, now that the one-hour standard has been met.

Federal standards for PM_{10} have never been exceeded in downtown San Diego. The federal $PM_{2.5}$ standard has been exceeded once in three years. The much more stringent state $PM_{2.5}$ standard, when implemented this year, will be exceeded on a considerable number of days.

Sources of Pollution

Nitrogen oxides (NO_x) and reactive organic gases (ROG) are the two precursors to photochemical smog formation. In San Diego County, 63% of the 239 tons per day of ROG emitted comes from mobile sources (cars, ships, planes, heavy equipment, etc.). For NO_x, 91% of the 234 tons emitted daily are from mobile

Table 4.4-1
Downtown San Diego Air Quality Monitoring Summary (Number of Days Standards Were Exceeded and Maximum Levels During Such Violations)

Pollutant/Standard	1995	1996	1997	1998	1999	2000	2001
Ozone (O_3)							
1-Hour >0.09 ppm	3	1	5	1	0	1	1
1-Hour >0.12 ppm	1	0	0	0	0	0	0
8-Hour >0.09 ppm	0	0	0	0	0	0	0
Max 1-Hour Conc. (ppm)	0.13	0.11	0.12	0.10	0.09	0.12	0.10
Carbon Monoxide (CO)							
1-Hour >20 ppm	0	0	0	0	0	0	0
8-Hour >9 ppm	0	0	0	0	0	0	0
Max 1-Hour Conc. (ppm)	8	8	8	8	7	7	7
Max 8-Hour Conc. (ppm)	5.9	5.5	5.5	4.8	4.6	4.6	4.8
Nitrogen Dioxide (NO_2)							
1-Hour >0.25 ppm	0	0	0	0	0	0	0
Max 1-Hour Conc. (ppm)	0.14	0.11	0.14	0.09	0.12	0.12	0.10
Sulfur Dioxide (SO_2)							
1-Hour >0.25 ppm	0	0	0	0	0	0	0
24-Hour >0.045 ppm	0	0	0	0	0	0	0
Max. 1-Hr. Conc. (ppm)	0.06	0.05	0.05	0.04	0.04	0.04	0.05
Max. 24-Hr. Conc. (ppm)	0.018	0.012	0.014	0.011	0.008	0.010	0.012
Inhalable Particulates (PM_{10})							
24-Hour >50 µg/m³	9/60	1/59	3/60	0/56	4/59	6/60	5/60
24-Hour >150 µg/m³	0/60	0/59	0/60	0/56	0/59	0/60	0/60
Max. 24-Hr. Conc. (µg/m³)	115	92	74	48	69.	65.	66.
Ultrafine Particulates ($PM_{2.5}$)							
24-Hour >65 µg/m³	-	-	-	-	0/289	1/273	0/317
Max. 24-Hr. Conc. (µg/m³)	-	-	-	-	46.9	66.3	54.1

Note: - = No data until 1999.

sources (California Air Resources Board, "2001 California Almanac of Emissions & Air Quality"). Computer modeling of smog formation has shown that attainment of the federal one-hour ozone standard is possible at these emission levels on days when there is no substantial transport of pollution from the South Coast Air Basin or other airshed. As noted above, the federal one-hour ozone standard has been met at all basinwide air monitoring stations since 1999.

4.4.2 Impact Significance Criteria

CEQA guidelines define a potentially significant air quality impact as one that:

1. Conflicts with or obstructs implementation of the applicable air quality plan.

2. Violates any air quality standard or contributes substantially to an existing or projected air quality violation.

3. Results in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

4. Exposes sensitive receptors to substantial pollutant concentrations.

5. Creates objectionable odors affecting a substantial number of people.

Odor has traditionally not been an issue with excavation of channel sediments. Dredging projects, particularly for water-based disposal options, generate negligible land-based traffic that will contribute to any "hot spots" formation. These secondary significance criteria were therefore not explicitly addressed, because the project will have limited impacts to these issues.

CEQA-based significance thresholds are typically adopted by Lead Agencies, or the standards/guidelines from a responsible agency may be used in the absence of such standards. The Port has not established its CEQA thresholds for projects under Port jurisdiction. Published standards from other agencies such as the City of San Diego and/or the SDAPCD are therefore reasonable thresholds for the proposed remediation project. Impact significance thresholds for air quality are normally based upon the air breathed by "sensitive receptors". However, many air pollutants require additional transformation after their release to reach their most unhealthful forms. Emissions from any single project are generally highly diluted by the time this process is completed. Most air quality significance thresholds therefore use the volume of emissions generated by a project as a surrogate for the incremental impact likely to occur, even if that impact is unquantifiably small.

The City of San Diego has adopted emission-based significance thresholds focused on both regional (ozone) impacts and possible localized CO "hot spots". However, City significance guidelines do not include the full spectrum of air pollution. Since the SDAB does not meet the airborne particulate matter (PM_{10}) standard, such emissions may also be important. A comparison of City guidelines with other candidate criteria suggests that the City CO/ROG criteria could be slightly expanded. Candidate significance threshold levels are described in Table 4.4-2.

Table 4.4-2
Candidate Significant Threshold Levels
(Pounds/Day)

Agency	Significant Emissions				
	CO	ROG	NO_x	SO_x	PM_{10}
SDAPCD Rule 20.2[1]	550	NAT	250	250	100
South Coast AQMD[2]	550	55	55	150	150
City of San Diego[3]	550[4]	100[5]	NAT	NAT	NAT

Notes: [1] Requires an ambient air quality analysis (AQIA);
[2] South Coast Air Quality Management District (SCAQMD) CEQA Air Quality Handbook (1993).
[3] City Significance Determination Guidelines (1991).
[4] In areas of congested traffic.
[5] In areas of free-flow traffic.
NAT = No applicable threshold.

The Rule 20.2 standards incorporate the City of San Diego guideline levels and include other pollutants as well. For purposes of analysis, the SDAPCD Rule 20.2 (AQIA-trigger) is a reasonable compromise between the most stringent and most lenient of the three possible significance thresholds noted above. Its use is recommended for the proposed project. In the absence of ROG-based threshold values in the SDAPCD regulation, the City of San Diego criteria are used to supplement the Rule 20.2 levels.

4.4.3 Impact Analysis

Historical violations of national Ambient Air Quality Standards in the SDAB required that a plan be developed outlining the pollution controls that were to be undertaken to improve air quality. In San Diego County, this attainment planning process is embodied in a regional air quality management plan developed jointly by the SDAPCD and San Diego Association of Governments (SANDAG). Several plans had been adopted in the late 1970s and early 1980s under the title "Regional Air Quality Strategies" (RAQS).

The Alternative 1: Engineered Cap-in-Place relates to the RAQS through the land use and growth assumptions that are incorporated into the air quality planning document. If a proposed project is consistent with the Port of San Diego Master Plan, then the project presumably has been anticipated within the regional air quality planning process. Because the project is only a construction project that does not generate any general areawide development, it does not affect land use and growth. Rules and regulations of the SDAPCD are part of the air quality plan. Any regulated sources of air emissions associated with the project, such as dredge or rock extraction activities for the armor rock placement, will be peripherally associated with the RAQS/SIP (State Implementation Plan). Compliance with SDAPCD regulations is presumed to be evidence of project consistency with the air quality plan.

The Alternative 1: Engineered Cap-in-Place will remove contaminated sediments that are subject to a Cleanup and Abatement Order, and then construct a cap consisting of 3 to 5 feet of clean sand, gravel, and armoring materials. The Alternative 1: Engineered-Cap-In-Place also will include the construction of a protected area to mitigate for the loss of existing eelgrass as a result of construction activities. A variety of additional improvements such as to storm drains, bulkheads, a hotel dock, a transient marina, and other infrastructure will generate construction and possibly small amounts of operational activity air emissions. Construction will be sequential, with initial removal of heavily contaminated sediments as the most intensive activity. Dredging will involve both equipment operations to extract the material and deliver it to a drying area, as well as trucking the semidried material to a final disposal area. Later phases of work to deposit clean fill will require barges and some materials handling to load the barges, but not the additional operation of a dredge.

Maximum air quality impacts will result during the initial dredging phase of the project, and will depend on whether an electrified dredge or a diesel-powered hopper dredge is used. An electrified dredge will be a nonpolluting source; however, there is no nonpolluting means for transporting the dredged material to a disposal site. Tugboats used to transport barges of dredged material have a high emission rate of nitrogen oxides (NO_x) from their diesel engines. NO_x is one of the two critical smog precursor emissions.

To analyze a worst-case scenario, it is assumed the proposed maximum emissions (dredging) activities will occur using a diesel-powered hopper dredge. The dredge will load barges which will be towed to shore and unloaded. The dredged materials will be dewatered at a staging site and then trucked to an upland disposal and/or recycling facility.

Project-related air emissions were calculated by combining project activity factors with appropriate emissions factors to establish an average daily emissions burden which is then compared to recommended significance thresholds. The relevant emissions factors are shown in Table 4.4-3. The corresponding daily emissions, based upon emissions data in Table 4.4-3, are combined with the estimated daily hours under equivalent full-load operations and are shown in Table 4.4-4 for each separate activity. A comparison of daily totals with significance thresholds is also shown (Table 4.4-4).

NO_x emissions from project implementation will exceed the recommended significance threshold by 136% on a daily basis. Therefore, temporary construction impacts due to NO_x emissions could create a significant impact to air quality. If the dredging phase is conducted using an electrified dredge, Table 4.4-5

Table 4.4-3
Construction Activity Emissions Factors
[Pounds/Hour (100% Load)]

	CO	NO_x	SO_x	PM_{10}	ROG
Stationary Sources					
Derrick Crane - Marine	1.0	2.3	0.2	0.2	0.2
Winch	0.7	1.8	0.2	0.1	0.2
Compressors	0.5	2.2	0.2	0.2	0.1
Generators	0.7	3.0	0.2	0.2	0.1
Crane - Land Side	0.7	1.7	0.1	0.1	0.2
Pile Driver	0.4	2.0	0.1	0.1	0.6
Diesel Dredge - Pumps	5.9	27.0	1.8	1.8	1.9
Diesel Dredge - Propulsion	6.2	30.5	8.0	1.7	1.6
Auxiliary Equipment - Electrical Dredge	2.6	8.9	0.8	0.6	0.3
Auxiliary Equipment - Diesel Dredge	7.8	34.0	2.3	2.4	2.0
Electrical Power - Dredge	1.1	6.4	0.7	0.2	<0.1
Loader	0.6	1.9	0.2	0.2	0.2
Mobile Sources					
Tugboat	4.8	33.0	4.7	1.9	1.5
Crew Boat	0.5	3.3	0.5	0.2	0.1
Support Boat	11.9	<0.1	<0.1	Negl.	Negl.
Launch	0.2	1.6	0.2	0.1	Negl.
Trucks (In-Port)(1)	24.5	27.4	0.3	5.0	0.6
Trucks (On-Road)(1)	15.1	28.3	0.3	5.0	0.6

Note: (1) Pounds/1,000 miles.

shows that the maximum emissions phase could be conducted with NO_x levels that do not exceed the daily significance threshold. The initial materials extraction phase will have daily emissions that are similar to the subsequent cap placement activity, with peak daily NO_x emissions that are less the 70% of the SDAPCD significant source trigger level.

The above calculations assume that dredges are "new" emissions sources that will be introduced solely for the Alternative 1: Engineered Cap-in-Place. In California, diesel-powered dredges are required to obtain a statewide air quality permit. A portion of the emissions associated with the statewide registered dredge fleet has been allocated to the San Diego Air Basin. If the diesel-powered dredge to be used during the early project phases is a California-registered source, any associated air emissions have already been analyzed as part of the environmental clearance for the statewide dredge source registration program. Use of a dredge that has a valid state operating permit will thus not cause "new" emissions that exceed the adopted significance threshold.

Table 4.4-4
Theoretical Peak Activity Day Emissions
(Pounds/Day)

	Hours/Day At 100% Load	Daily Emissions				
		CO	NO_x	SO_x	PM_{10}	ROG
Stationary Sources						
Diesel Dredge - Pumps	8	47.2	216	14.4	14.4	15.2
Diesel Dredge - Auxiliary Equipment	8	62.4	272	18.4	19.2	16.0
Crane - Land Side	4	2.8	6.8	0.4	0.4	1.6
Total Stationary		*112.4*	*494.8*	*33.2*	*34.0*	*32.8*
Mobile Sources						
Tug	2	9.6	66.0	9.4	3.8	3.0
Loaders (2)	4	4.8	15.2	1.6	1.6	1.6
Trucks (On-Road)(1)	500 miles	7.6	14.2	0.2	2.5	0.3
Total Mobile		*22.0*	*95.4*	*11.2*	*7.9*	*4.9*
Combined Total		**134.4**	**590.2**	**44.4**	**41.9**	**37.7**
Significance Threshold (Recommended)		550	250	250	100	100
Exceeds Threshold?		No	Yes	No	No	No
Percentage of Threshold		24.4%	236%	17.8%	41.9%	37.7%

Note: (1) Pounds/1,000 miles.

Table 4.4-5
Mitigated Construction Activity Emissions
(Pounds/Day)

	Hours/Day At 100% Load	Daily Emissions				
		CO	NO_x	SO_x	PM_{10}	ROG
Stationary Sources						
Electric Dredge	8	20.8	71.2	6.4	4.8	2.4
Crane - Land Side	4	2.8	6.8	0.4	0.4	1.6
Total Stationary		*23.6*	*78.0*	*6.8*	*5.2*	*4.0*
Mobile Sources						
(same as unmitigated)						
Total Mobile		*22.0*	*95.4*	*11.2*	*7.9*	*4.9*
Combined Total		45.6	173.4	18.0	13.1	8.9
Significance Threshold		550	250	250	100	100
Exceeds Threshold?		No	No	No	No	No

4.4.4 Significant Impacts Summary

Using a diesel-powered dredge not registered with the State of California will create NO_x emissions that could exceed significance thresholds and create a significant air quality impact.

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4.4.5 Mitigation Measures

NO_x emissions can be maintained at less-than-significant levels if a diesel-powered dredge is used that has a valid state operating permit. Mitigation of the NO_x impacts is also possible through the use of an electrified dredge instead of a diesel-powered dredge. Use of either a state-registered dredge, or an electric dredge will reduce NO_x emissions to below a level of significance.

4.4.6 Significance of Impacts After Mitigation

With the implementation of all necessary mitigation measures, all impacts can be reduced to below a level of significance.

4.5 Noise

The following analysis is based upon the findings of Giroux and Associates. The complete analyses are included as Appendix F.

4.5.1 Existing Conditions

Affected Environment

The region of influence for project-related noise will be the area surrounding the dredge site materials transportation corridors and the dewatering staging site, within which noise from the project might be heard above background noise. The size of this area will vary depending on the existing ambient noise. Noise-sensitive receptors that could be affected by noise from the dredging project are included in the region of influence. The nearest noise-sensitive receivers, the Embarcadero Marina Park South and the San Diego Convention Center (Convention Center), are located northwest and north-northwest, respectively, to the proposed dredging operations site.

The noise in and around the proposed dredging site results from a wide variety of sources on the water and in the surrounding community. Primary noise sources on the water include shipping activities and pleasure boating from the nearby Marriott Hotel and Marina. Noise from the community will primarily be generated from mobile noise sources such as trains, trolleys, automobiles, and trucking near the warehouse facilities. The steady-state hum of traffic can be punctuated by ship whistles and train horns. The noise environment may also be affected by aircraft flying overhead.

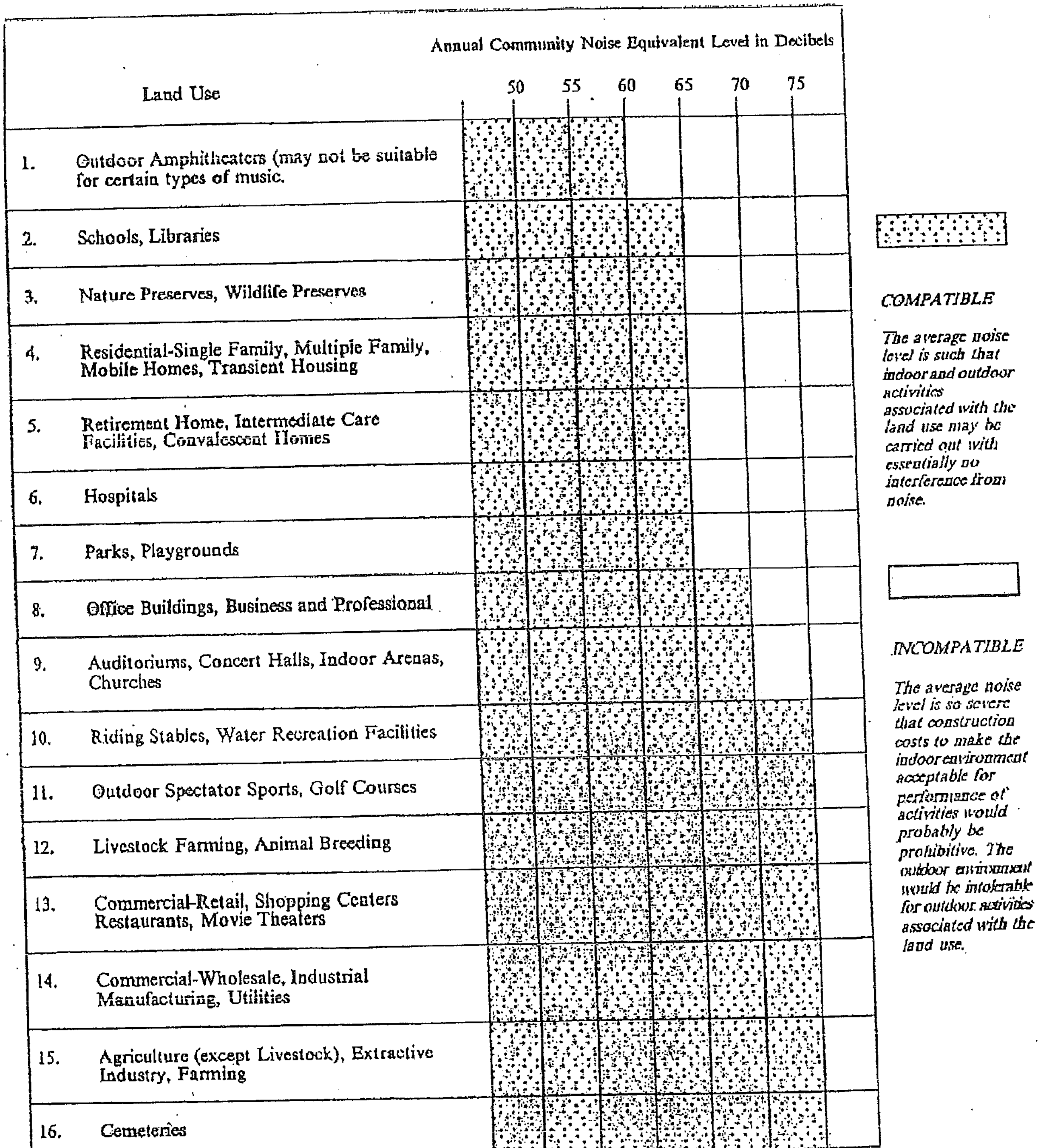
Existing Standards and Regulations

Noise Standards

There are two types of noise standards used to evaluate the noise impact potential. For ambient noise under the control of other agencies, such as from on-road vehicles, aircraft, trains, etc., the City of San Diego determines the suitability of the noise environment for a given type of land use. Such noise/land use compatibility standards are articulated in the Noise Element of the City's General Plan. Noise generators that are amenable to local regulation (stationary equipment, amplified sounds, off-road equipment, etc.) are regulated through the noise ordinance in the municipal code.

The community noise and land use compatibility guidelines set forth in the Noise Element in the Port Master Plan are shown in Figure 4.5-1. The Noise Element, in turn, is compatible with the Significance Determination Guidelines in the San Diego Planning Department Environmental Analysis Section. The

CITY OF SAN DIEGO NOISE LAND USE COMPATIBILITY CHART



Source: Progress Guide and General Plan (Transportation Element)

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City of San Diego
Noise and Land Use Compatibility Chart

Figure 4.5-1

P&D Environmental Services

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guidelines are based primarily on noise/land use recommendations from the State Department of Health compatible with Embarcadero Marina Park South as the nearest noise-sensitive (Category 7) land use. A level of 65 dB CNEL is similarly considered compatible with hotel uses planned for the adjacent former Campbell Shipyard property (Category 4). The Convention Center (Category 9 - Auditoriums, Indoor Arenas) is considered moderately noise sensitive, with acceptable exposures of 70 dB CNEL. The Tenth Avenue Marine Terminal (Category 14 - Industrial) is also not considered a noise-sensitive land use.

Noise Ordinance for Construction

The City of San Diego Noise Ordinance (Municipal Code Ordinance No. 59.5.0404) limits the hours of allowable construction activities and establishes performance standards for construction noise at any residentially zoned property. Provisions of the City Ordinance are as follows:

Section 59.5.0404 - Construction Noise

A. It shall be unlawful for any person, between the hours of 7:00 PM of any day and 7:00 AM of the following day, or on legal holidays as specified in Section 21.04 of the San Diego Municipal Code, with exception of Columbus Day and Washington's Birthday, or on Sundays, to erect, construct, demolish, excavate for, alter or repair any building or structure in such a manner as to create disturbing, excessive or offensive noise unless a permit has been applied for and granted beforehand by the Noise Abatement and Control Administrator.

B. Except as provided in Subsection C hereof, it shall be unlawful for any person, including the City of San Diego, to conduct any construction activities so as to cause, at or beyond the property lines of any property zoned residential, an average sound level greater than 75 decibels during the 12-hour period from 7:00 AM to 7:00 PM.

C. The provisions of Subsection B of this section shall not apply to construction equipment used in connection with emergency work, provided the Administrator is notified within 48 hours after commencement of work.

The nearest residential zoning is well away from the project site and screened by intervening structures. Any noise ordinance constraints will be solely as to allowable times of construction. If, during such activities, surrounding uses were adversely affected by noise, such as during an event at the Embarcadero Marina Park South or on the Convention Center terrace, the impact might still be significant, even though the activities are conducted within allowable hours for construction.

Long-term project-vicinity noise measurements were conducted on January 12-14, 2000 as part of the South Embarcadero Redevelopment Plan Program 2. To minimize the effects of local traffic, and because of access constraints to the former Campbell Shipyard property, these measurements were made at the closest point in Embarcadero Marina Park South. Noise conditions typical of the project site shoreline area are summarized in Table 4.5-1.

Table 4.5-1
Project Vicinity Baseline Noise Measurements, 2000 (dBA)

Parameter	Jan. 12-13, 2000	Jan. 13-14, 2000
24-Hour CNEL	66	65
Maximum 1-Hour L_{eq}	70	66
Time	10-11 AM	1-2 PM
Second-Highest Hour L_{eq}	69	65
Time	7-8 AM	8-10 AM
Minimum 1-Hour L_{eq}	47	51
Time	1-2 AM	1-2 AM
Maximum 1-Second	81	84
Minimum 1-Second	45	48

4.5.2 Impact Significance Criteria

Community noise problems typically occur at levels that are well below the threshold for hearing loss. Noise at less than hearing loss levels, however, may nevertheless create a variety of negative effects through loss of sleep, interference with communication, or lack of concentration. Noise-induced stress varies from one person to another and varies even within the same person from one day to the next. There are therefore no clear-cut limits that characterize a stress-free noise environment.

Noise impacts will be considered significant if they cause standards to be exceeded where they are currently met, or if they create a measurable increase in noise levels in an already noisy environment. Appendix G of the California Environmental Quality Act (CEQA) guidelines lists the following noise and/or vibration impacts as potentially significant:

- Levels exceeding standards in general plans or noise ordinances.
- Excessive groundborne vibration or groundborne noise.
- A substantial permanent increase.
- A substantial temporary or periodic increase.
- Exposure of sensitive receptors living or working within 2 miles of a public airport to excessive noise levels.

Noise analysis methods are accurate only to the nearest whole decibel, and most people only notice a change in the noise environment when pre- and post-project differences are around 3 dB. Masking effects of existing traffic at any offsite receivers possibly affected by increases in project-related transportation will likely minimize project perceptibility. A clearly perceptible (+3 dB) increase in noise exposure of sensitive receivers will be considered significant. Given, however, the logarithmic nature of the decibel scale, it generally requires a doubling of activity levels for noise increases to be sufficient to reach these thresholds in areas of already elevated noise volumes.

Noise/land use compatibility standards apply to those noise sources preempted from local control. These include on-road vehicles, trains, ships, or aircraft. Noise sources such as mechanical equipment, amplified sound, construction equipment, etc. are regulated by ordinance. Ordinance limits may be expressed as numerical standards, or as a simple prohibition against creating a nuisance. Impacts amenable to control by ordinance could derive from pumps, generators, or other stationary remediation equipment. The Alternative 1: Engineered Cap-in-Place is a construction project without long-term operation of any major noise-generating sources. The noise ordinance exempts stationary noise sources from "normal" ordinance standards, and makes special provisions for temporary construction noise impacts. Project construction activity noise generation that violates noise ordinance requirements would be considered a significant impact. If such activities were to substantially interfere with activities at nearby noise-sensitive uses, such as the Embarcadero Marina Park South or Convention Center, the impact could be considered significant, even if ordinance requirements are met.

4.5.3 Impact Analysis

Ambient Noise Monitoring

Project-vicinity noise levels were recently monitored to update the previous measurements described in Section 4.5.1. Monitoring was conducted both at the Embarcadero Marina Park South, and near Harbor Drive and Eighth Avenue. Two monitoring sites at each location were selected to reduce any local contamination effects. The results of the measurements are shown in Table 4.5-2.

The noise levels in the Embarcadero Marina Park South in 2003 were slightly lower than in 2000. Levels of Sites 1 and 2 in the Embarcadero Marina Park South were higher on January 29, 2003 than on the day before, probably due to wind and wave action. Along Harbor Drive, the day-to-day variation was somewhat less. The 2000 data suggested that noise levels in the Embarcadero Marina Park South were already near the City standard of 65 dB CNEL. These updated measurements indicate that limited temporary remediation activity noise could be accommodated without creating a significant noise impact to

Table 4.5.2
Project Vicinity Baseline Noise Measurements, 2003
(dBA)

Parameter	Site 1(1)		Site 2(2)		Site 3(3)		Site 4(4)	
	01/28/03	01/29/03	01/28/03	01/29/03	01/28/03	01/29/03	01/28/03	01/29/03
24-Hour CNEL	59	64	59	62	70	71	68	69
Maximum 1-Hour L_{eq}	61	61	63	61	71	70	67	67
Time	9-10 AM	1-2 PM	11-12 PM	1-2 PM	8-9 AM	1-2 PM	10-11 AM	1-2 PM
Second-Highest Hour L_{eq}	61	61	63	60	71	69	67	67
Time	10-11 AM	7-8 AM	9-10 AM	7-8 AM	10-11 AM	7-8 AM	5-6 PM	7-8 AM
Minimum 1-Hour L_{eq}	47	55	43	51	53	56	52	55
Time	1-2 AM	12-1 AM	2-3 AM	1-2 AM	2-3 AM	2-3 AM	2-3 AM	2-3 AM
Maximum 1-Second	78	81	76	78	92	90	82	87
Minimum 1-Second	44	51	39	48	42	48	33	45

Notes: (1) Embarcadero Marina Park South - northeast corner.
(2) Embarcadero Marina Park South - near restaurant.
(3) Corner of Eighth Avenue and Harbor Drive.
(4) 100 feet southeast of Site 3.

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Embarcadero Marina Park South users. The somewhat elevated noise levels near Eighth and Harbor also will indicate that baseline noise conditions will mask any contribution from materials trucking, if daily truck traffic were within reasonable volumes, and thus negate any potential significant impacts.

Operations at the Tenth Avenue Marine Terminal may periodically affect project vicinity land uses during the unloading of cargo. Noise measurements were made during unloading of a cargo of structural steel. The measurements were made on the dock at the marine terminal. These readings were then adjusted for source-receiver distance, and for the fact that the ship itself will block some of the noise for offsite receivers.

The maximum marine terminal dock noise levels were 80 dB CNEL with a peak hour reading of 89 dB L_{eq}, and an instantaneous peak of 113 dB. For offsite receivers such as the Embarcadero Marina Park South or the Convention Center, distance spreading losses will reduce the above measurements by -10 dB. The attenuation due to partial screening by the ship superstructure was estimated to produce an additional -5 dB reduction. Applying the -15 dB reduction to the maximum readings above suggests the following noise characteristics during unloading of noisy cargo such as steel:

CNEL	65 dBA
Peak 1-Hour L_{eq}	74 dBA
Instantaneous Peak	98 dBA

The noise level due to the most intensive Tenth Avenue Marine Terminal operations are just at the noise standard for sensitive land uses. Project remediation operations could create a cumulative noise effect that causes standards to be exceeded, if both activities were to occur simultaneously. This poses a potential significant impact. However, operations at the Tenth Avenue Marine Terminal very rarely reach these high noise levels. Furthermore, these high noise levels will only create an impact when special events are taking place at the San Diego Convention Center or Embarcadero Marina Park South. Thus, this potential impact is highly unlikely and may never even occur.

Construction Noise Impacts

Sediment Dredging

The main noise source at the remediation site will be from a hydraulic dredge. A dredge generates noise from the suction of material, as well as from the motors that power the suction pumps. Noise levels measured for a hydraulic dredge working in the Ventura harbor indicate that such dredges have a reference noise level of 75 dB at 50 feet. Dredging will occur at approximately 400 feet from the nearest sensitive receptor (Embarcadero Marina Park South). Spreading losses will reduce dredging noise at the park site by

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18 dB, or to a level of 57 dB. Daytime noise levels at the Embarcadero Marina Park South were measured to be near 60 dB. Dredging noise may be audible to park users, but not at levels that will be considered substantial. Further spreading losses between the remediation site and the Convention Center will decrease dredging activity noise by an additional 6 dB, for 51 dB at the terrace area. Such levels are well below ambient conditions, and thus do not pose a potential significant impact.

Materials Placement/Transport

The engineered cap will be created by material brought in by a bottom dump barge. The barges will be driven by diesel-powered tugs. Noise levels from tugs under full power are reported to be 87 dB at 50 feet. The maximum noise level due to tug operations will be 71 dB at the Embarcadero Marina Park South, and 65 dB at the Convention Center. However, because a single tug passage is highly transitory, the significance criterion will be met with a wide margin of safety at the nearest noise-sensitive uses. Short-term maxima of 80 dB were recorded at the Embarcadero Marina Park South, and almost 90 dB near Harbor Drive. Brief periods of tug engine noise during barge movement will not be substantially different from existing noise levels. Noise created by diesel-powered tugs bringing cap material into the project area will not create any significant impacts.

Disposal of dredged materials will likely be via trucks to a dewatering and upland disposal site. Peak truck traffic of 200 loads per day may occur at the Eighth Avenue and Harbor Drive site access. Noise levels from 40 trips per hour (20 in/20 out) will create hourly noise levels of 65 dB L_{eq}. Measured daytime noise levels along Harbor Drive were generally in the upper 60-dB L_{eq} range. Peak dredging spoils disposal hauling will not create a significant noise impact along Harbor Drive.

Pile Driving

The noisiest construction activity will be pile driving that will occur as a part of the seawall repair and small boat dock for the hotel. Pile drivers generate peak noise levels exceeding 100 dB. Pile drivers are more related to single-event peak noise than to sustained average noise levels. Pile-driving noise can be clearly heard as far as two to three blocks away, even within enclosed buildings. Because most project-vicinity, noise-sensitive uses are reasonably removed from the area where potential pile driving will occur in conjunction with proposed improvements, pile-driving noise will be an adverse, but less-than-significant impact, as long as such activities occur during daytime hours. Pile-driving noise could be intrusive for public events at the Embarcadero Marina Park South or the Convention Center terrace, and thus poses a potential significant impact.

4.5.4 Significant Impacts Summary

1. Ambient Noise Monitoring

Project remediation operations, combined with the most intensive Tenth Avenue Marine Terminal operations, could create a cumulative noise impact if they were to occur at the same time as special events at the Convention Center and Embarcadero Marina Park South.

2. Construction

Pile-driving noise could be intrusive for public events at the Embarcadero Marina Park South or the Convention Center terrace.

4.5.5 Mitigation Measures

Mitigation Measure 1. Ambient Noise Monitoring

Coordination of project remediation operations with the most intensive Tenth Avenue Marine Terminal operations and special events at the San Diego Convention Center and the Embarcadero Marina Park South will reduce noise impacts.

Mitigation Measure 2. Construction

Coordination of the pile-driving schedule with any planned outdoor events at the Embarcadero Marina Park South or the Convention Center outdoor terrace will be needed to preclude noise interference.

4.5.6 Significance of Impacts After Mitigation

With the implementation of all necessary mitigation measures, all impacts can be reduced to below a level of significance.

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4.6 Traffic and Circulation

The following analysis is based upon the findings of technical reports prepared by Linscott, Law, and Greenspan Engineers (2003). The complete analysis is included as Appendix G.

4.6.1 Existing Conditions

The specific study area includes the following intersections and street segments, which are along the designated haul route:

Signalized Intersections

- Harbor Drive/Eighth Avenue;
- Harbor Drive/Crosby Street;
- Harbor Drive/Sampson Street;
- Harbor Drive/28th Street;
- 28th Street/Main Street; and
- 28th Street/Boston Avenue.

Street Segments

- Harbor Drive: Eighth Avenue to Crosby Street;
- Harbor Drive: Crosby Street to Sampson Street;
- Harbor Drive: Sampson Street to 28th Street; and
- 28th Street: Main Street to Boston Avenue.

The two roads that would be impacted by the project are Harbor Drive and 28th Street. Harbor Drive is classified as a four-lane Major Arterial within the designated haul route. Harbor Drive is currently a divided roadway providing two lanes of travel per direction. Bike lanes are provided and curbside parking is prohibited along both sides of the roadway. The speed limit is posted at 40 Miles Per Hour (MPH) and 45 MPH within the project area. 28th Street is classified as a four-lane Major Arterial within the designated haul route. It is currently a divided roadway providing two lanes of travel per direction. Bike lanes are not provided and curbside parking is prohibited along both sides of the roadway. The speed limit is posted at 40 MPH within the project area. Trucks would leave the former Campbell Shipyard, drive south on Harbor Drive, turn left on 28th Street, and continue north until reaching Boston Avenue, where trucks would turn right (east) and proceed to the I-5 southbound on ramp. The return trip would be a reversal of this haul route, with the exception that trucks returning to the Shipyard would exit northbound I-5 at National Avenue, turn left, and proceed to 28th Street. Figure 4.6-1 shows the haul route the trucks will use.

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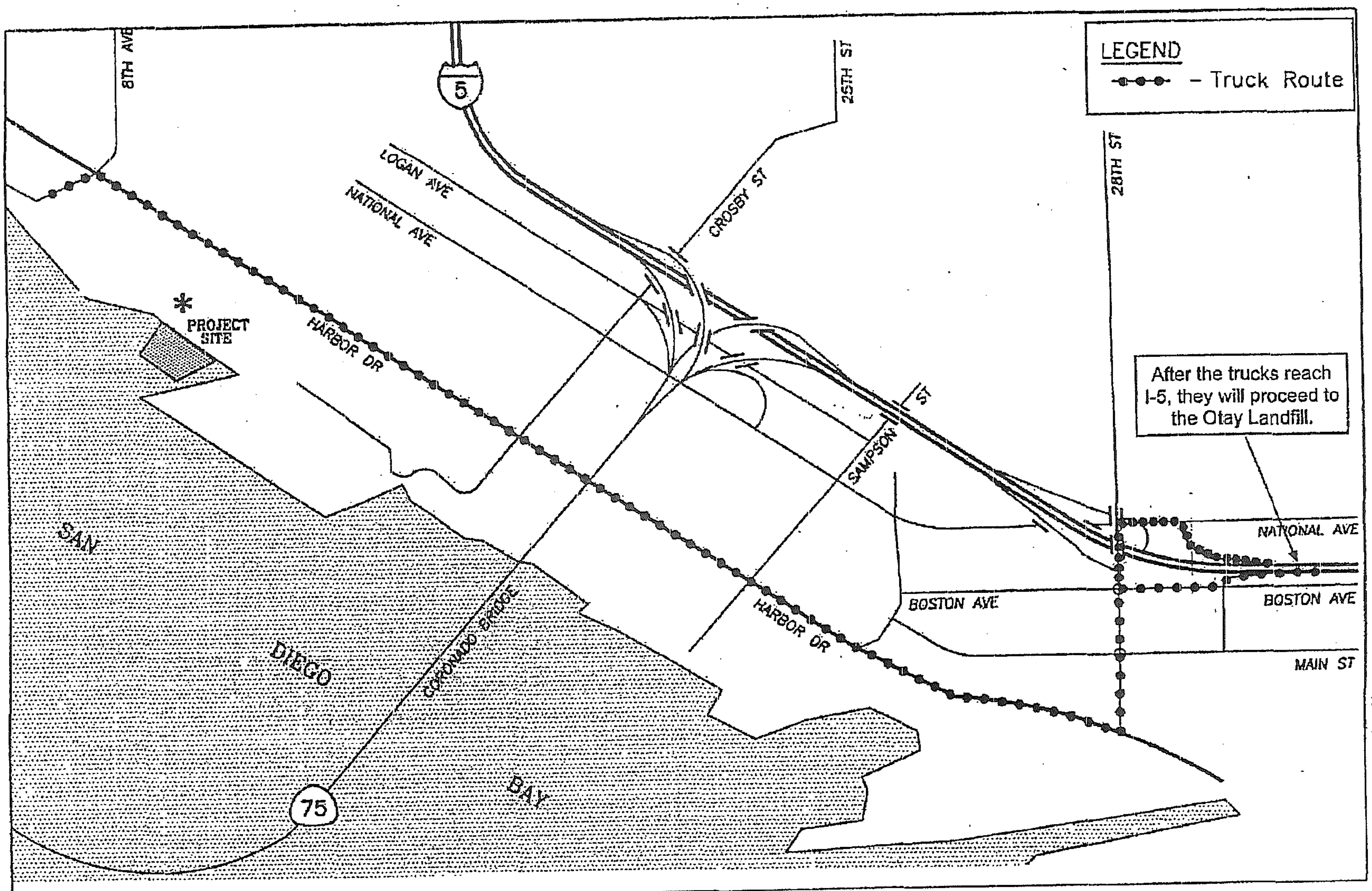

Source: Linscott, Law & Greenspan

Truck Route

Figure 4.6-1

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Existing Traffic Volumes

Existing average daily traffic volumes (ADTs) on affected roadways were estimated, assuming that the PM peak hour comprises 10% of the ADT. Analysis of existing weekday morning (7-9 AM) and afternoon (4-6 PM) traffic volumes were conducted at the key intersections in January 2003. These times where chosen based on the estimated times that the trucks would be entering and leaving the shipyard, in conjunction with peak commuter time periods. Table 4.6-1 details the existing ADTs.

Table 4.6-1
Existing ADTs

Street Segment	Year	ADT(1)
Harbor Drive		
Eighth Avenue to Crosby Street	2003	16,600
Crosby Street to Sampson Street	2003	13,700
Sampson Street to 28th Street	2003	15,700
28th Street		
Main Street to Boston Avenue	2003	19,400

Note: (1) Volumes are estimated assuming that the PM peak hour comprises 10% of the ADT.

4.6.2 Impact Significance Criteria

According to the *City of San Diego Traffic Impact Manual, July 1998* and consultation with City staff, a project is considered to have a significant impact if the new project traffic decreases the operations of surrounding roadways by a City-defined threshold. The City-defined threshold by roadway type or intersection is shown in Table 4.6-2. If the project exceeds the thresholds in Table 4.6-2, then the project may be considered to have a significant impact. A significant impact can also occur if a project causes the Level of Service (LOS) to degrade from D to E, even if the allowable increases in Table 4.6-2 are not exceeded.

LOS is used to denote the different operating conditions which occur on a given roadway segment under various traffic volume loads. It is a qualitative measure used to describe a quantitative analysis, taking into account factors such as roadway geometries, signal phasing, speed, travel delay, freedom to maneuver, and safety. LOS provides an index to the operational qualities of a roadway segment or an intersection. LOS designations range from A to F, with LOS A representing the best operating conditions (little or no delay) and LOS F representing the worst operating conditions (severe congestion, long delays). The LOS designation is reported differently for signalized intersections and for roadway segments, as described below.

Table 4.6-2
City of San Diego
Traffic Impact Significance Thresholds

Parameter	Measurement
Level of Service with Project	E & F(1)
Allowable Increase Due to Project Impacts(2)	
Freeways V/C(3)	0.01
Roadway Segments V/C(3)	0.02
Roadway Segments Speed(4)	1 MPH
Intersections Delay(5)	2 seconds
Ramp Metering Delay(5)	2 minutes(6)

Notes: (1) The acceptable LOS standard for roadways and intersections in San Diego is LOS D. However, for undeveloped locations, the goal is to achieve a LOS C.
(2) If a proposed project's traffic impacts exceed the values shown in the table, then the impacts are deemed "significant". The project applicant shall identify "feasible mitigations" to achieve LOS D or better.
(3) Volume to Capacity Ratio (capacity at LOS E should be used).
(4) Arterial speed for Congestion Management Program (CMP) analyses.
(5) Average stopped delay per vehicle.
(6) The impact is only considered significant if the total delay exceeds 15 minutes.

For signalized intersections, LOS criteria are stated in terms of the average control delay per vehicle for a 15-minute analysis period. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Table 4.6-3 summarizes the delay thresholds for signalized intersections. Signalized intersection calculation worksheets and a more detailed explanation of the methodology are also attached in Appendix C.

Table 4.6-3
Level of Service Thresholds for Signalized Intersections

Average Control Delay per Vehicle (Seconds/Vehicle)	LOS
$\leq$10.0	A
10.1 to 20.0	B
21.1 to 35.0	C
35.1 to 55.0	D
55.1 to 80.0	E
$\geq$80.1	F

Source: Highway Capacity Manual, 2000.

LOS A describes operations with very low delay (i.e., less than 10.0 seconds per vehicle). This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

LOS B describes operations with delay in the range of 10.1 seconds to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths.

LOS C describes operations with delay in the range of 20.1 seconds to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.

LOS D describes operations with delay in the range of 35.1 seconds to 55.0 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or higher v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are more frequent.

LOS E describes operations with delay in the range of 55.1 seconds to 80.0 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.

LOS F describes operations with delay in excess of over 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation (i.e., when arrival flow rates exceed the capacity of the intersection). It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

4.6.3 Impact Analysis

Table 4.6-4 summarizes the amount of traffic to be generated by the Alternative 1: Engineered Cap-in-Place. These data were generated using the assumptions that 140 trucks per day will exit the former Campbell Shipyard site and 25 trucks enter the Shipyard site during any one-hour period. The trucks per day were based upon a worst-case exportation of approximately 135,000 cubic yards of sediment to the Otay Mesa Landfill. Passenger Car Equivalence (PCE) is defined as the number of passenger cars that are displaced by a single heavy vehicle of a particular type under the prevailing traffic conditions. Heavy vehicles have a greater traffic impact than passenger cars since: (1) they are larger than passenger cars, and therefore, occupy more roadway space; and (2) their performance characteristics are generally inferior to passenger cars, leading to the formation of downstream gaps in the traffic stream (especially on upgrades) which cannot always be effectively filled by normal passing maneuvers. All of the project-generated traffic consists of heavy vehicles (trucks). Therefore, a PCE factor was applied to the generated truck trips. Assuming that every truck counts as 1.5 cars, the project is calculated to generate the equivalent of 420 ADT (210 in/210 out), with 38 inbound/outbound trips during both the AM and PM peak hours.

Table 4.6-4
Project Traffic Generation

Parameter	Actual Trips	PCE Trips[1] (x1.5)
Amount (Inbound Only)	140 Trucks[2]	
Daily Trip Ends (ADT)		
Rate	2.0	
Volume	280	420
AM and PM Peak Hours[3]		
Volume In	25	38
Volume Out	25	38

Notes: [1] PCE factor of 1.5 applied to trips to account for the fact that trucks are more impactive to roadway system than cars, per the Highway Capacity Manual (2000).
[2] Maximum of 140 trucks per day haul sediment to the Otay Mesa landfill.
[3] Assumes maximum of 25 trucks enter the site during a one hour period within peak commuter hours (generally 7:00-9:00 AM and 4:00-6:00 PM).

The street segment analysis is based upon the comparison of daily traffic volumes (ADTs) to the City of San Diego's *Roadway Classification Level of Service, and ADT Tables*. These tables provide segment capacities for different street classifications, based on traffic volumes and roadway characteristics. The results of the analysis for the signalized intersection operations during peak-hour conditions are summarized in Table 4.6-5. The table shows that with the addition of project traffic, all intersections are calculated to continue to operate at LOS D or better, for both the AM and PM peak-hour conditions. Therefore, implementation of Alternative 1: Engineered Cap-in-Place will not create any significant impacts to signalized operations during peak-hour conditions.

The results of the analysis for street segment operations are summarized in Table 4.6-6. The table shows that the daily segment levels of service with the addition of project traffic are calculated to continue to operate at LOS B or better. Therefore, implementation of Alternative 1: Engineered Cap-in-Place will not create any significant impacts to street segment operations.

Table 4.6-5
Signalized Intersection Operations

Intersection	Peak Hour	Existing		Existing + Project		Delay Increase Due to Total Project	Significant?[3]
		Delay[1]	LOS[2]	Delay	LOS		
Harbor Drive/ Eighth Avenue	AM	10.8	B	13.5	B	2.7	No
	PM	11.5	B	14.6	B	3.1	No
Harbor Drive/ Crosby Street	AM	27.6	C	28.0	C	0.4	No
	PM	19.7	B	20.2	C	0.5	No
Harbor Drive/ Sampson Street	AM	18.7	B	19.0	B	0.3	No
	PM	15.5	B	15.8	B	0.3	No
Harbor Drive/ 28th Street	AM	20.8	C	22.7	C	1.9	No
	PM	19.5	B	20.6	C	1.1	No
28th Street/ Main Street	AM	26.7	C	27.0	C	0.3	No
	PM	35.1	D	35.3	D	0.2	No
28th Street/ Boston Avenue	AM	13.7	B	14.0	B	0.3	No
	PM	19.5	B	20.2	C	0.7	No

Notes: (1) Average delay expressed in seconds per vehicle.
(2) See Appendix C of traffic report for delay thresholds.
(3) Significant project impacts based on Significance Criteria.

Table 4.6-6
Street Segment Operations

Street Segment	Existing Capacity (LOS E)[1]	Existing			Existing + Project		
		ADT	V/C	LOS	ADT	V/C	LOS
Harbor Drive							
Eighth Avenue to Crosby Street	40,000	16,600	0.41	B	17,020	0.43	B
Crosby Street to Sampson Street	40,000	13,700	0.34	A	14,120	0.35	A
Sampson Street to 28th Street	40,000	15,700	0.39	B	16,120	0.40	B
28th Street							
Main Street to Boston Avenue	40,000	19,400	0.49	B	19,820	0.50	B

Note: (1) Capacities based on City of San Diego Roadway Classification & LOS Table (see Appendix D of traffic report).

4.6.4 Significant Impacts Summary

Based on the established significance criteria, no significant traffic impacts were calculated for the study area key intersections and street segments.

4.6.5 Mitigation Measures

No mitigation measures are required.

4.6.6 Significance of Impacts After Mitigation

All impacts will be below a level of significance.

4.7 Navigational Safety

This section describes the existing and proposed navigation conditions near the former Campbell Shipyard, focusing on the Tenth Avenue Marine Terminal (TAMT), and how these conditions may affect the Alternative 1: Engineered Cap-In-Place at the former Campbell Shipyard.

4.7.1 Existing Conditions

The San Diego Bay navigation channel ranges in depth from -41 feet Mean Lower Low Water (MLLW) in the main channel south of the Aircraft Carrier Turning Basin and varies in depth near the TAMT (-38 to -42 feet MLLW). The depths at the TAMT berths also vary from -35 feet MLLW at Berths 10-1 and 10-2 to -42 feet MLLW along the bay face near Berths 10-7 and 10-8. The former Campbell Shipyard remediation project is located adjacent to the TAMT, Berths 10-1 and 10-2 (Figure 3.1-3).

Tenth Avenue Marine Terminal

The TAMT is a commercial shipping facility. The main products currently moved through the terminal include white bulk products (soda ash, potash, sodium sulfate), cement, fertilizer, newsprint, fresh fruit, and petroleum. More recently, shipments have begun by the Dole shipping lines for refrigerated containers of fruit. In addition, steel structures and rolled steel are handled at the facility. The vessels that deliver these products to the terminal include bulk vessels, cargo ships, and barges ranging in size from 10,000 dead weight tons (DWT) to 60,000 DWT. Container vessels are currently limited to 20,000 Twenty-foot Equivalent Units (TEU) capacity. Sizes range from 150-foot-long tugboats to 725-foot container vessels.

The main cargo vessels to use Berths 10-1 and 10-2 at the TAMT are Dole container ships delivering fresh produce from Central and South America. The larger of these Dole ships have a 725-foot length and 70-foot beam, and they use bow thrusters for maneuvering. Only one of these large vessels will use Berths 10-1 or 10-2 at a time, leaving the other berth available for a smaller vessel. These large Dole vessels currently visit the TAMT once per week. During the fall season, additional shipping companies utilize the port approximately twice per week to ship avocados during their prime season. Generally, these avocado shipments arrive in smaller vessels than the Dole ships mentioned above. The typical length of stay for the container vessels and barges is one to three days (San Diego Marine Information URL http://www.sdmis.org/schedules).

Ferry Landing

The ferry landing dock is located on the northwest side of the proposed project area. Vessels currently accessing this dock include storage and construction barges, passenger vessels, and large private yachts

(Todd Roberts, personal communication, March 2003). These barges are approximately 200-foot-long vessels, which generally access the quaywall adjacent to the ferry landing dock to load/unload construction equipment. Passenger vessels (dinner cruise vessels) access the dock biweekly, and are approximately 200 feet long with a 6- to 13-foot draft. The large yachts which access this dock are generally over 120 feet long and use the dock irregularly.

Navigational Requirements

The container ships require tugboats for maneuvering to and from the TAMT. The larger Dole container vessels generally require one or two tugboats, depending on weather conditions. The tugboats pick up the vessel near the Broadway Pier and maneuver it down the navigation channel, turning it towards TAMT Berths 10-1 and 10-2. Typically, the tugboats use 25 to 50% of their horsepower to maneuver. Once or twice a month the tugboats use 100% power for short spurts, which usually coincide with windy weather or rough conditions in the bay.

The most difficult scenario for tugboat operations is when a wide vessel is docked at Berth 10-2 and the tugboats need to maneuver another vessel to or from Berth 10-1. Under this scenario, the tugboat propellers could be positioned up to 300 feet from the berth face (70-foot beam of ship at Berth 10-2, plus 40 feet of safety distance between ships, plus 70-foot beam of ship going to Berth 10-1, plus tug length of approximately 100 feet). See Figure 4.7-1.

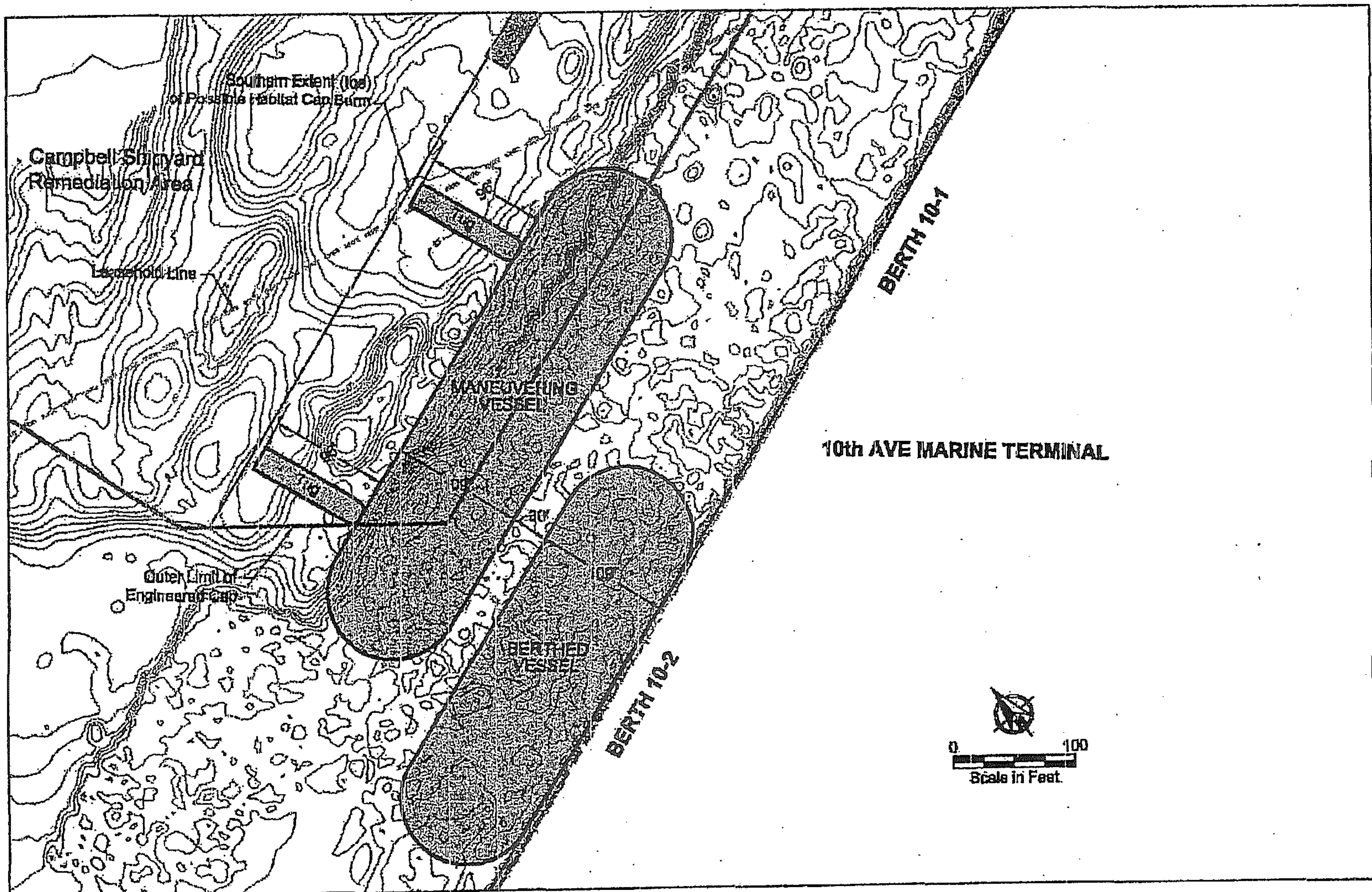
Proposed Conditions and Operations

Berths 10-1 and 10-2 are expected to continue to be used by Dole container vessels. The frequency of use by these vessels is not expected to increase in the near future, nor is the size of the larger vessels which access the TAMT. Maintenance dredging was conducted at Berths 10-1 and 10-2 to remove infill from past operations.

4.7.2 Impact Significance Criteria

Significance criteria for impacts to navigational safety were developed based on Appendix G of the CEQA Guidelines. Because the project is a water-dependent project, the significance criteria have been tailored for a port project.

- The proposed project will have a significant impact if it results in a change in boat traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.



Source: Anchor Environmental

Extreme Tug Configuration

Figure 4.7-1

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- The proposed project will have a significant impact if it substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

Any impacts created by the project that will hinder the ability of tugboats to successfully bring container ships to dock will be considered a significant impact.

4.7.3 Impact Analysis

Construction Impacts

During construction of the Alternative 1: Engineered Cap-In-Place at the former Campbell Shipyard, there may be minimal conflicts between the marine equipment required to place the cap and the vessels transiting the TAMT Berths 10-1 and 10-2. The construction equipment will be required to move away from the tug/ship during the berthing operation, which should be included in any contract language. This impact may indirectly impact the other terminals at TAMT, by requiring use of the other berths during construction if Berth 10-1 cannot be accessed for short periods. This will require advanced coordination with operations at the TAMT. During the fall when there is an increase in produce shipments, this impact may be more frequent. Thus, construction of the engineered cap poses a potential significant impact to navigational safety.

Operational Impacts

If a vessel is at Berth 10-2 and another vessel needs to be maneuvered around Berth 10-2 to or from Berth 10-1, then up to 300 feet may be required for safe movement. Adequate space will exist for vessels and tugboats to operate safely with the current configuration of the cap. Thus, implementation of the Alternative 1: Engineered Cap-In-Place will cause no significant operational impacts. However, vessels accessing or departing Terminal 10-1 with a draft over 20 feet may have difficulty maneuvering around another vessel berthed at Terminal 10-2, since the proposed engineered cap shifts the -20-foot contour approximately 50 feet further south (closer to TAMT) than the existing –20-foot contour. This decreases the maneuvering room of deeper-draft vessels by at least 50 feet, leaving a distance of approximately 190 feet between the TAMT and the -20-foot contour and approximately 175 feet between the TAMT and the –35-foot contour.

Currently, only one of the larger Dole vessels berths at 10-1 or 10-2 at a time, leaving the other berth available for a smaller vessel. Future operations would be limited by this narrower berth configuration to either the current condition, or limiting vessel size accessing the remaining berth to a maximum beam of 30 feet. Additional room is required for the tug operations, although a lesser draft of –20 feet could be used for that activity. If future TAMT operations require a larger vessel accessing one of these terminals, such as a

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Panamax vessel with a 100-foot-plus beam, then no other vessels could be berthed at the adjacent terminals. It is more likely that very small vessels would use the spare berth during the larger docking operations in any case, since the combined berth length of Terminals 10-1 and 10-2 is approximately 1,100 feet. Thus, the decreased maneuvering room for vessels with drafts over 20 feet poses a potential significant impact.

Proposed Dock Impacts

Hotel Dock

The proposed hotel dock is located over 300 feet from the TAMT. The dock should not impact TAMT operations, since there is an adequate distance between the dock and the TAMT. Vessels calling or departing the hotel dock should coordinate with TAMT operations, to avoid vessel conflicts. The hotel dock will have a minimum depth of -20 feet MLLW. This depth should be adequate for most vessels, but some larger vessels may be depth limited. This limited depth surrounding the hotel dock poses a potential significant impact.

Floating Dock

The proposed Floating Dock is located over 300 feet from the TAMT and approximately 125 feet from the proposed Hotel Dock. This dock should not impact TAMT operations, since it is located even further than the proposed Hotel Dock. Vessels calling to the Floating Dock and the Hotel Dock should maintain coordination to avoid conflicts. Propeller wash from tugboats maneuvering vessels to the TAMT may cause disturbances to any vessels berthed at the Hotel Dock and Floating Dock. Thus, impacts created by propeller wash may be significant.

Transient Marina

A proposed Large Transient Yacht Marina is proposed on the northwest side of the project area, approximately 100 feet southeast of the existing Ferry Landing. The slips on the southeast side of the proposed transient marina are located approximately 150 feet from the proposed rock revetment surrounding the shallow subtidal habitat area. This distance should be adequate for normal operating conditions; however, maneuvering may become difficult during dangerous weather conditions and may cause vessels to veer towards the proposed revetment and Shallow Subtidal Habitat area. Thus, impacts to vessels docking at the transient marina created by certain weather conditions may be significant.

Ferry Landing Impacts

The northwest end of the Alternative 1: Engineered Cap-In-Place is adjacent to the Ferry Landing dock. The berth immediately east of the Ferry Landing dock will have a 3- to 5-foot-thick cap, and a rock revetment will be constructed along the seawall from the Ferry Landing Dock to the eastern edge of the project limits. The proposed cap depth should be adequate for the ferry vessels; however, the proposed revetment may limit the size (length and draft) of vessels accessing the east Ferry Landing dock. Larger vessels may be depth-limited on the eastern berth of the Ferry Landing dock. Furthermore, the Ferry Landing dock is also located approximately 100 feet west of the proposed Large Transient Yacht Marina. This distance should be adequate for normal operating conditions, although vessels calling to these docks will have to maneuver around the adjacent dock, and coordination should be maintained with other incoming and outgoing vessels to avoid conflicts. However, maneuvering may become difficult during dangerous weather conditions and may cause vessels to veer towards the Yacht Marina or become grounded on the proposed revetment. Thus, the proposed revetment poses a potential significant impact.

4.7.4 Significant Impacts Summary

1. Construction

Construction of the engineered cap could potentially create a significant impact by creating a conflict between construction materials and tug boats bringing container ships to dock. If final plans result in less than 300 feet of free navigation from the face of the berth, significant impacts will occur.

2. Operational

Construction of the engineered cap may limit the ability of larger vessels departing Terminal 10-1 to maneuver around a vessel berthed at Terminal 10-2.

3. Proposed Dock: Hotel Dock

Large vessels could become depth-limited in the shallower depths surrounding the hotel dock.

4. Proposed Dock: Floating Dock

Propeller wash from tugboats maneuvering vessels to the TAMT may cause disturbances to any vessels berthed at the floating dock.

5. Proposed Dock: Transient Marina

Vessels attempting to dock at the transient marina could become grounded on the crest of the revetment during dangerous weather conditions.

6. Ferry Landing

Large vessels could become depth-limited in the shallower depths surrounding the ferry landing and vessels attempting to dock could become grounded in the waters above the revetment slope during dangerous weather conditions.

4.7.5 Mitigation Measures

Mitigation Measure 1. Construction

During construction of the cap alternative, coordination with the TAMT will be required to ensure that minimal disturbance to the throughput is maintained. The southern portion of the cap alternative will be more efficiently constructed outside of the fall season, when there is an increase in produce vessels using the TAMT. Construction coordination will ensure that at least one berth between Berths 10-1 and 10-2 is always available. Furthermore, it is critical that the cap is constructed in a way that will allow at least 300 feet of free navigation area from the face of the berths. With these mitigation measures, impacts to navigation and the TAMT will be reduced to below a level of significance.

Mitigation Measure 2. Operational

The TAMT will coordinate with the Port Wharfinger to prevent conflicts from arising between larger vessels departing Terminal 10-1 and vessels berthed at Terminal 10-2.

Mitigation Measure 3. Proposed Dock: Hotel Dock

The Port shall provide signage displaying the depths surrounding the hotel dock in order to make boaters aware of the depths of water surrounding these areas.

Mitigation Measure 4. Proposed Dock: Floating Dock

The Port shall provide signage indicating that the loading or unloading of passengers must be avoided while tugboats are maneuvering vessels to the TAMT.

Mitigation Measure 5. Proposed Dock: Transient Marina

The Port shall provide signage indicating that the berthing of vessels along the transient marina shall be avoided during dangerous weather conditions.

Mitigation Measure 6. Ferry Landing

The Port shall provide signage displaying the depths surrounding the ferry landing in order to make boaters aware of the depths of water surrounding these areas, and that the berthing of vessels along the ferry landing shall be avoided during dangerous weather conditions.

4.7.6 Significance of Impacts After Mitigation

With the implementation of all necessary mitigation measures, all impacts are reduced to below a level of significance.

5.0 ALTERNATIVES

Section 15126.6 of the CEQA Guidelines states that the EIR shall "describe a range of potential alternatives to the Alternative 1: Engineered Cap-In-Place, or to the location of the Alternative 1: Engineered Cap-In-Place, which can feasibly attain the basic objectives of the Alternative 1: Engineered Cap-In-Place but will avoid or substantially reduce any of the significant impacts of the project, and evaluate the comparative merits of the alternatives." The range of alternatives evaluated in the EIR is governed by the "rule of reason" that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice. An EIR need not consider an alternative with effects that cannot be reasonably ascertained and with implementation that is remote and speculative [Section 15126.6(a) of the CEQA Guidelines].

In developing the alternatives to be addressed in this EIR, the potential alternatives were evaluated in terms of their ability to meet the basic objectives of the project, while reducing or avoiding the environmental impacts of the project identified in Section 4.0, Environmental Analysis, of this EIR. Based on the results of the environmental impacts analysis contained in Section 4.0 of the EIR, alternatives were identified and evaluated on the basis of their ability to eliminate or substantially reduce significant impacts associated with the following issues:

- Marine Biological Resources;
- Water Quality;
- Geology/Soils;
- Air Quality;
- Noise;
- Traffic and Circulation; and
- Navigational Safety.

Based on the environmental analysis, the alternatives analysis discusses the following alternatives:

- Alternative 2: Habitat Cap;
- Alternative 3: Hybrid Cap;
- Alternative 4: Dredge and Sediment Disposal; and
- Alternative 5: No Project.

A comparison of alternatives and significance of impacts is presented in Table 5.0-1.

Table 5.0-1
Comparison of Project Impacts With Alternatives

Project Area/ Issues	Alternative 1: Engineered Cap-In-Place*	Alternative 2: Habitat Cap	Alternative 3: Hybrid Cap	Alternative 4: Dredge and Sediment Disposal	Alternative 5: No Project	Cumulative
	Capping in-place the affected sediment. Placement of armoring material on the surface of the cap to prevent erosion. A floating dock marina with approximately 20 to 30 slips to be built on the leasehold. Removal of approximately 29,500 CY of sediment, including 1,000 cubic yards (CY) of petroleum-contaminated soil from the former shipyard area. The average thickness of the cap will be 4.5 to 5 feet. Required construction time is approximately 6 months.	*Placement of a clean habitat cap over contaminated sediment. A perimeter retaining berm will form the outer portion of the cap, with an outward face armored with stone. A small, approximately 2,800-square-foot (SF) dock will be located over the engineered cap for hotel use. Approximately 27,500 CY of material will be removed. Approximate thickness of the cap will range from 10 feet up to 20 feet. Anticipated to require approximately 1 year to be constructed.*	*An engineered cap will be placed over the affected sediment that contains COC concentrations greater than cleanup levels. A transient marina containing 20 to 30 slips for large recreational boats will be built above the cap. A small habitat cap will be installed in the northern corner of the former Campbell Shipyard waterside leasehold. Approximately 35,500 CY of soil will be removed from the site. Approximate thickness of the cap will range from 10 feet up to 20 feet. Anticipated to require about 1 year to be constructed.*	*Dredging of sediment containing COC concentrations. Removal of approximately 135,000 CY of sediment, including 1,000 CY of petroleum-contaminated soil from the former shipyard area. Material will be placed on barges, hauled to the shore, and offloaded onto a staging area for treatment. Disposal of the dredge material will be in an approved location offsite. Portions of the site will be backfilled with imported sand. A 20-to 30-slip transient marina and hotel deck would be built. The alternative will require 1.5 to 2 years to complete.*	*The contamination site will remain in its current condition. No action will be taken.*	
Marine Biological Resources	SM	SM	SM	SM	NS	CNS
Water Quality	SM	SM	SM	SU	SU	CSU
Geology/Soils	SM	SM	SM	SM	NS	CNS
Air Quality	SM	SM	SM	SM	NS	CNS
Noise	SM	SM	SM	SM	NS	CNS
Traffic and Circulation	NS	NS	NS	NS	NS	CSU
Navigational Safety	SM	SM	SM	NS	NS	CSU

Notes: SU = Significant Unmitigable, SM = Significant Mitigable, NS = Not Significant, CSU = Cumulative Significant Unmitigable, and CNS = Cumulative Not Significant.
*Alternative 1 is deemed the Environmentally Preferred Alternative.

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5.1 Alternative 2: Habitat Cap

5.1.1 Overview

Alternative 2: Habitat Cap involves placing a clean habitat cap over contaminated sediments that contain constituents of concern (COCs) at concentrations greater than cleanup levels. The habitat cap will isolate contaminated sediments from the marine environment, and provide a clean habitat for flora and fauna. The majority of the cap will be thick (up to 20 feet in places), with a gently sloping surface at water depths suitable to recreate shallow subtidal and intertidal habitats. These habitats have been lost in San Diego Bay over the years. Figure 5.1-1 shows the different features (areas to be dredged before filling, location of riprap, and final habitat types based upon water depth) associated with this alternative. Figure 5.1-2 depicts the cross section plan.

Habitat Cap

The cap is anticipated to consist of clean dredged material obtained from local maintenance dredging, or a new work project. The cap material will primarily be delivered to the site by barges; however, some transportation of materials may occur via truck. A perimeter retaining berm will form the outer portion of the cap, with the bayward face armored with stone from the bay bottom to the top of the cap, to hold the cap material in place and to protect against erosion from propeller wash, wind waves, and ship waves. Up to 130,000 cubic yards (CY) of clean imported material are required to reach the desired elevations for the habitat cap, and up to 35,000 CY of rock material are required to reach the desired elevation for the retaining berm.

The habitat cap will cover the shipways area, which will be demolished and dredged beforehand to remove petroleum-contaminated soil (PCS) underneath. It is currently assumed that PCS will be removed from the seawall to the 0 feet Mean Lower Low Water (MLLW) bathymetric contour line; however, additional characterization of the extent of PCS below the shipways is required, and planned for the near future. Demolition of the ways will include removal of concrete, steel rails, piles supporting the rails, and steel sheetpiling, which will be either recycled or disposed of at appropriate upland facilities. That demolition is expected to create approximately 8,600 square feet (SF) of new open water, some of which will be used for habitat.

In addition to the PCS, approximately 2,900 CY of polychlorinated biphenyls (PCB) contaminated sediments with concentrations above 3 milligrams per kilogram (mg/kg) will be removed from localized areas near the seawall prior to cap emplacement. The PCB, PCS, and other contaminated material will be disposed of at an upland disposal facility.

Engineered Caps

Deeper water engineered caps will be constructed in the northern and southern portions of the site to isolate contaminated sediments in these areas from the environment. The top of both engineered caps will be at an elevation of -20 feet MLLW. to provide a sufficient depth for navigation and berthing at adjacent facilities.

The more extensive of the two engineered caps will cover the southern area of the site, adjacent and parallel to the Tenth Avenue Marine Terminal (TAMT). It is estimated that this engineered cap will be approximately 5 feet thick, comprised of sand and gravel layers, and include a surficial layer of armoring materials that will resist scour effects from propeller wash of vessels that call at the TAMT. This armoring layer will also provide a barrier to bioturbation from deep burrowing marine species (e.g., ghost shrimp). Up to 15,000 CY of existing sediment will be dredged from this area and disposed of at an upland disposal site.

A less extensive engineered cap which will occupy the extreme northern end of the site will also be approximately 5 feet thick. It will cover an area measuring 40 feet between the northern property line and the toe of the retaining berm. This 40-foot offset will provide a maneuvering area for vessel traffic on the adjoining property to the north. Up to 1,000 CY of existing sediment will be dredged from this area and disposed of at an upland disposal site.

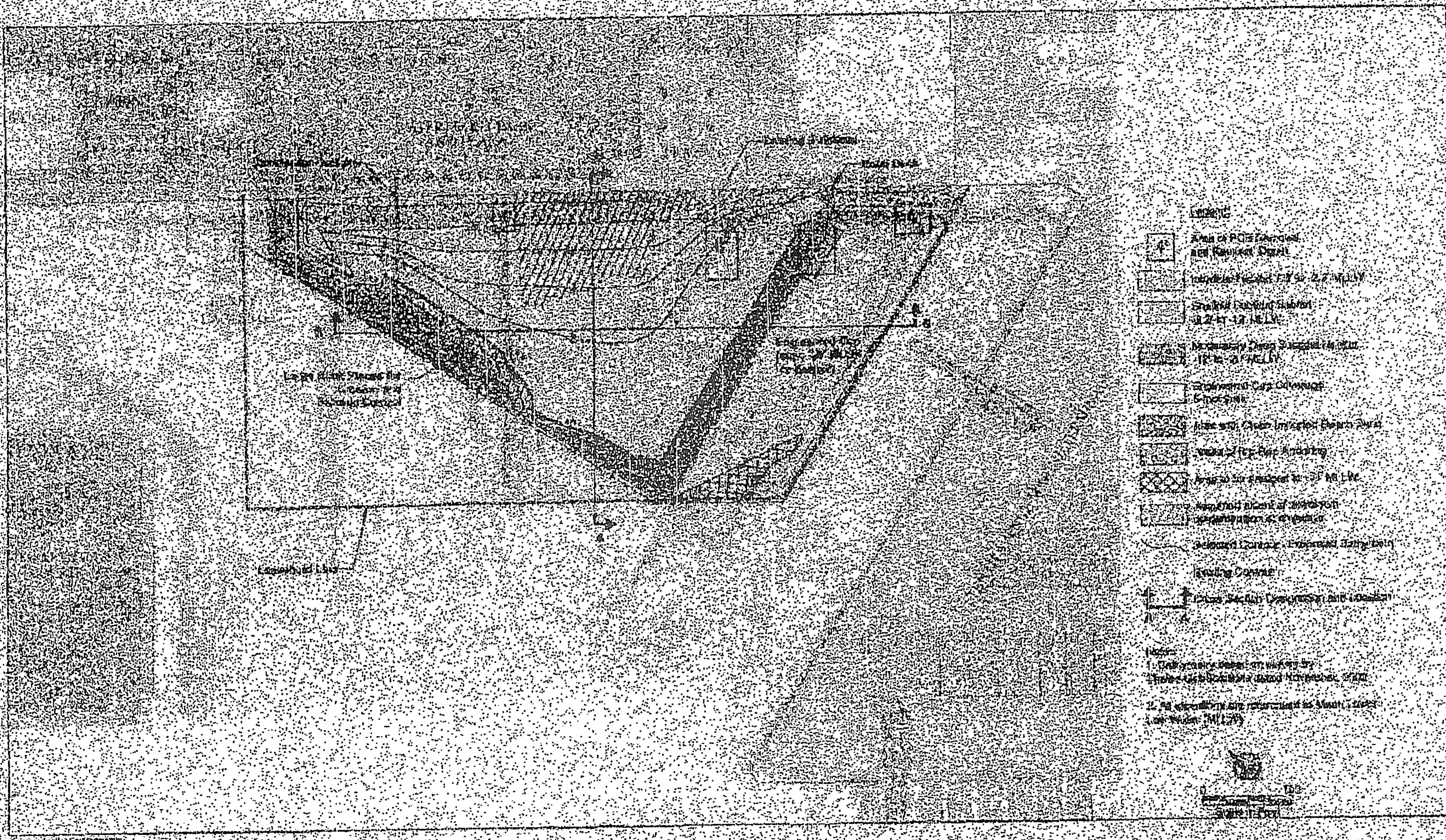
Other Features

Construction of the cap will include stabilization and reconfiguration of part of the existing seawall. The temporary seawall south of the shipyard ways will be extended towards the Bay so that it is aligned with the existing seawall north of the shipyard ways. This realignment will remove approximately 2,500 SF of water area and intertidal habitat. The habitat cap along the seawall will provide structural stability to that structure in case of an earthquake. To prevent cap liquefaction, material will be compacted after placement.

The project will also require extension of the Eighth Avenue storm drain outfall to the edge of the cap to prevent discharge onto its surface. Finally, a small, approximately 2,800-SF dock could be located over the engineered cap for hotel use on the southern edge of the habitat cap.

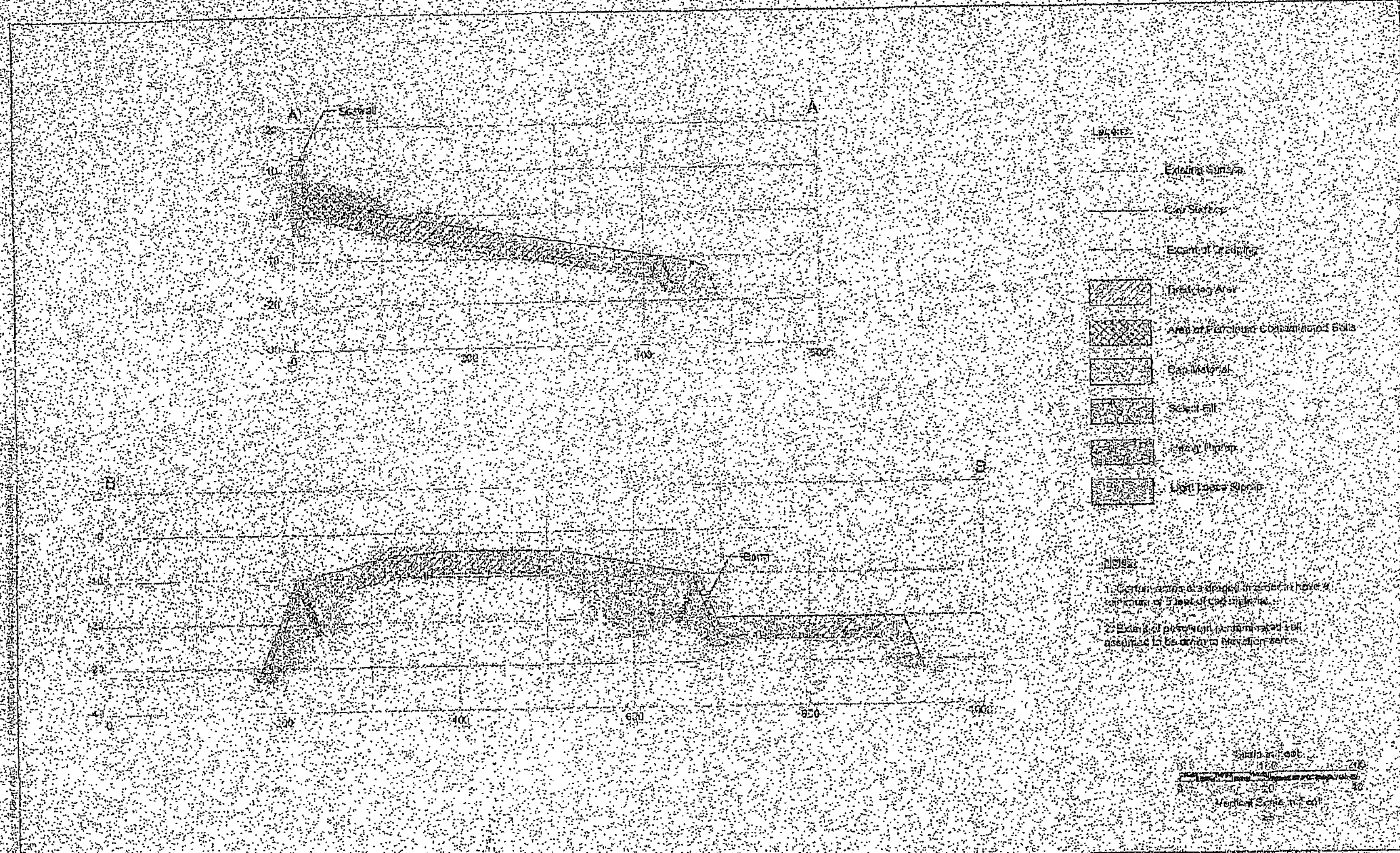
Schedule

The cap construction is anticipated to last for about one year. The hotel dock will be designed and built after construction of the cap.



Plan View of Alternative 2: Habitat Cap

Figure 5.1-1



Cross Sections - Alternative 2: Habitat Cap

Figure 5.1-2

P.D. Environmental Services

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Environmental Conditions

The Alternative 2: Habitat Cap will impact about 9.1 acres of the site, and will result in the conversion of 2.9 acres of deep and moderately deep subtidal habitat to a higher-value, shallow and intertidal subtidal habitat. In addition, approximately 6,100 SF of water area will be created from the project, because of the net effect of the shipways demolition and extension of the seawall.

The following four main habitat zones, on the water side of the former Campbell Shipyard leasehold, are affected:

- Intertidal: +7.8 to -2.2 feet MLLW
- Shallow Subtidal: -2.2 to -12 feet MLLW
- Moderately Deep Subtidal: -12 to -20 feet MLLW
- Deep Subtidal: <-20 feet MLLW.

The approximate net change in area for each of these habitat zones in the alternative is summarized in Table 5.1-1.

Table 5.1-1
Net Change in Habitat Zone Area for the Alternative 2: Habitat Cap (all quantities in acres and all elevations in feet MLLW)

Habitat Zones	Intertidal +7.8 to -2.2 feet	Shallow Subtidal -2.2 to -12 feet	Moderately Deep Subtidal -12 to -20 feet	Deep Subtidal <-20 feet
Baseline Condition[1]	1.2	1.6	2.6	7.3
Postconstruction Condition	2.4	3.5	1.4	5.6
Net Change[2]	+1.2	+1.9	-1.2	-1.7

Notes: [1] Based on existing site bathymetry within the leasehold line, from November 2002 survey by Thales. Approximately 0.2 acre, in the shipways area, is above the intertidal zone (elevation +7.8 feet MLLW), and thus is not counted in this row.
[2] Net change in habitat zone area was developed using the entirety of the leasehold and capping footprint (12.9 acres).

The thick cap will cover the existing colonized marine substrate, and approximately 0.33 acre of eelgrass. However, the cap will provide a clean substrate for benthic organisms to recolonize, and the flatter topography will facilitate eelgrass establishment, invertebrate colonization, and fish utilization. The hotel dock will create approximately 2,800 SF of shaded area.

5.1.2 Environmental Analysis

Marine Biology

Table 5.1-2 shows that upon completion of the project, the project site will contain approximately 0.2 acre of armored intertidal habitat, 2.2 acres of nonarmored intertidal habitat, 0.4 acre of armored shallow subtidal habitat, 3.1 acres of nonarmored shallow subtidal habitat, 1.4 acres of armored moderately deep subtidal habitat, and 5.6 acres of nonarmored deep subtidal habitat.

Table 5.1-2
Postconstruction Habitat Types Present for the Alternative 2: Habitat Cap

Habitat Type	Preconstruction Condition (Acres)	Armored Area/ Nonarmored Area (Acres)	Change from Preconstruction Condition (Acres)
Intertidal[1] (+7.8 to -2.2 feet MLLW)	1.2	0.2 / 2.2	+1.2
Shallow Subtidal (-2.2 to -12 feet MLLW)	1.5	0.4 / 3.1	+2.0
Moderately Deep Subtidal (-12 to -20 feet MLLW)	2.6	1.4 / 0.0	-1.2
Deep Subtidal (<-20 feet MLLW)	7.4	0.0 / 5.6	-1.8
Total Water Area	12.7	2.0 / 10.9	+0.2

Note: (1) Includes 0.1 acre of intertidal habitat resulting from the construction of the mole structure.

Impacts to biology that may result from this alternative are similar in type to those of the Alternative 1: Engineered Cap-In-Place. Because the Alternative 2: Habitat Cap will not have a floating dock or transient marina, this alternative will have a smaller substrate on which intertidal and subtidal communities can establish themselves. However, this alternative covers a smaller area with engineered caps, which is more favorable for the establishment of benthic invertebrate communities. This alternative contains a larger area of highly productive intertidal and shallow subtidal habitats, making a more productive habitat and making eelgrass mitigation less difficult to implement compared to the Alternative 1: Engineered Cap-In-Place. With the implementation of the mitigation measures stipulated in Section 4.1.5, all impacts to marine biology will be reduced to below a level of significance.

Water Quality

Impacts to water quality created by the Alternative 2: Habitat Cap will not be greater than those created by the Alternative 1: Engineered Cap-in-Place. Therefore, implementation of the mitigation measures stipulated in Section 4.2.5 will reduce all impacts to below a level of significance.

Geology and Soils

Impacts on geology and soils created by the Alternative 2: Habitat Cap will be similar to those created by the Alternative 1: Engineered Cap-in-Place. However, the Alternative 2: Habitat Cap will also have a potential significant impact related to settlement of the habitat cap. Depending on the type of material used, the habitat cap may settle to below an elevation suitable for targeted species to survive. If a capping material is chosen that is likely to sink below an elevation suitable for serving as a habitat for targeted species due to settlement, a more extensive armor cap will be needed at the surface to avoid erosion. This cap will likely be a combination of sands and gravels. This armor cap will likely be thick, since the underlying fine-grained materials will have low strength and, as such, require a bearing layer to limit mixing of soils between the general cap and the armor cap. With the implementation of the mitigation measures stipulated in Section 4.2.5, as well as the above-stated measures for preventing settlement (Mitigation Measure G3: Settlement), all impacts to geology and soils will be reduced to below a level of significance.

Mitigation Measure G3: Settlement

If a capping material is chosen that is likely to sink below an elevation suitable for serving as a habitat for targeted species due to settlement, a more extensive armor cap will be needed at the surface to avoid erosion. This cap will likely be a combination of sands and gravels. This armor cap will likely be thick, since the underlying fine-grained materials will have low strength and, as such, require a bearing layer to limit mixing of soils between the general cap and the armor cap.

Air Quality

Air quality impacts created by Alternative 2: Habitat Cap will not be greater than those created by Alternative 1: Engineered Cap-in-Place. NO_x emissions can be maintained at less-than-significant levels if a diesel-powered dredge is used that has a valid state operating permit. Mitigation of the NO_x impacts is also possible by using an electrified dredge instead of a diesel-powered dredge. Use of either a state-registered dredge, or an electric dredge, will reduce NO_x emissions to below a level of significance.

Noise

Noise impacts created by the Alternative 2: Habitat Cap will not be greater than those created by the Alternative 1: Engineered Cap-in-Place. Therefore, implementation of the mitigation measures stipulated in Section 4.5.5 will reduce all impacts to below a level of significance.

Traffic and Circulation

Impacts to traffic and circulation created by the Alternative 2: Habitat Cap will not be greater than those described for the Alternative 1: Engineered Cap-In-Place. Therefore, implementation of the Alternative 2: Habitat Cap will not create any significant impacts to traffic and circulation.

Navigational Safety

Impacts on navigational safety created by the Alternative 2: Habitat Cap will be similar to those created by the Alternative 1: Engineered Cap-in-Place. However, the north side of the hotel dock will be located over a riprap armor slope that will limit the access of larger vessels. Additionally, maneuvering may become difficult during rare dangerous weather conditions. In order to mitigate these impacts, berthing of vessels along the north side of the hotel dock should be avoided during rare dangerous weather conditions. With the implementation of the mitigation measures stipulated in Section 4.7.5, as well as the above-stated measures for the north side of the hotel dock (Mitigation Measure NG7: Hotel Dock), all impacts to navigational safety will be reduced to below a level of significance.

Mitigation Measure NG7: Hotel Dock

The Port shall provide signage stating that the berthing of vessels along the north side of the hotel dock must be avoided during dangerous weather conditions.

5.1.3 Conclusions

Significant mitigable effects were identified for marine biological resources, water quality, geology and soils, air quality, noise, and navigational safety. Impacts to traffic and circulation will be less than significant under this alternative.

5.2 Alternative 3: Hybrid Cap

5.2.1 Overview

This alternative involves the creation of a habitat cap area with adjacent engineered caps, to contain affected sediments that exhibit COC concentrations greater than cleanup levels in the former Campbell Shipyard leasehold. The alternative provides self-mitigating habitat acreage within the project area, and adequate water space for development of a marina. Figure 5.2-1 shows the different features associated with this alternative and Figure 5.2-2 shows the cross sections of the alternative.

Habitat Cap

The habitat cap will isolate contaminated sediments from the marine environment, and provide a clean habitat for flora and fauna. It will cover approximately 4.8 acres and will be 10 to 20 feet thick, with a relatively flat surface, at water depths suitable to recreate shallow subtidal and intertidal habitats that have been lost in San Diego Bay over the years.

The habitat cap will cover the shipways area, which will be demolished and dredged beforehand to remove the PCS underneath. The PCS will be removed from the seawall to approximately -4 feet MLLW based on recent field investigations (Ninyo & Moore, May 13, 2003). Demolition of the ways will include removal of concrete, steel rails, piles supporting the rails, and steel sheetpiling, which will either be recycled or disposed of at appropriate upland facilities. Approximately 16,000 CY of sediment will be dredged and disposed of from the shipways area. The contaminated material will be disposed of at an upland disposal facility. That demolition is expected to create approximately 29,000 SF of water area.

In addition to the PCS, approximately 2,900 CY of PCB contaminated sediments, with concentrations above 3 mg/kg will be removed from localized areas near the seawall prior to cap emplacement. The PCB, PCS, and other contaminated material will be disposed of at an upland disposal facility.

The perimeter of the south side of the habitat cap will consist of a retaining berm with the bayward face armored with stone from the bay bottom to the top of the cap, to protect against erosion from propeller wash, wind waves, and ship waves. The key excavation for the berm will require approximately 8,000 CY of sediment dredging and upland disposal. A mole structure will bind the north end of the cap to retain the habitat cap material, and protect it from vessels that will potentially operate in a marina on the northern portion of the site.

Engineered Caps

Deep water engineered caps will be located at portions of the site adjacent and parallel to the TAMT to provide a sufficient depth for navigation and berthing at the TAMT, and in the northern portion of the leasehold (Figure 5.2-1) below the proposed marina. It is estimated that this engineered cap will be approximately 5 feet thick, and comprised of sand and gravel layers that include a surficial layer of armoring materials that will resist scour effects from the propeller wash of vessels that call at the TAMT. This armoring layer will also provide a barrier to bioturbation from deep burrowing marine species (e.g., ghost shrimp).

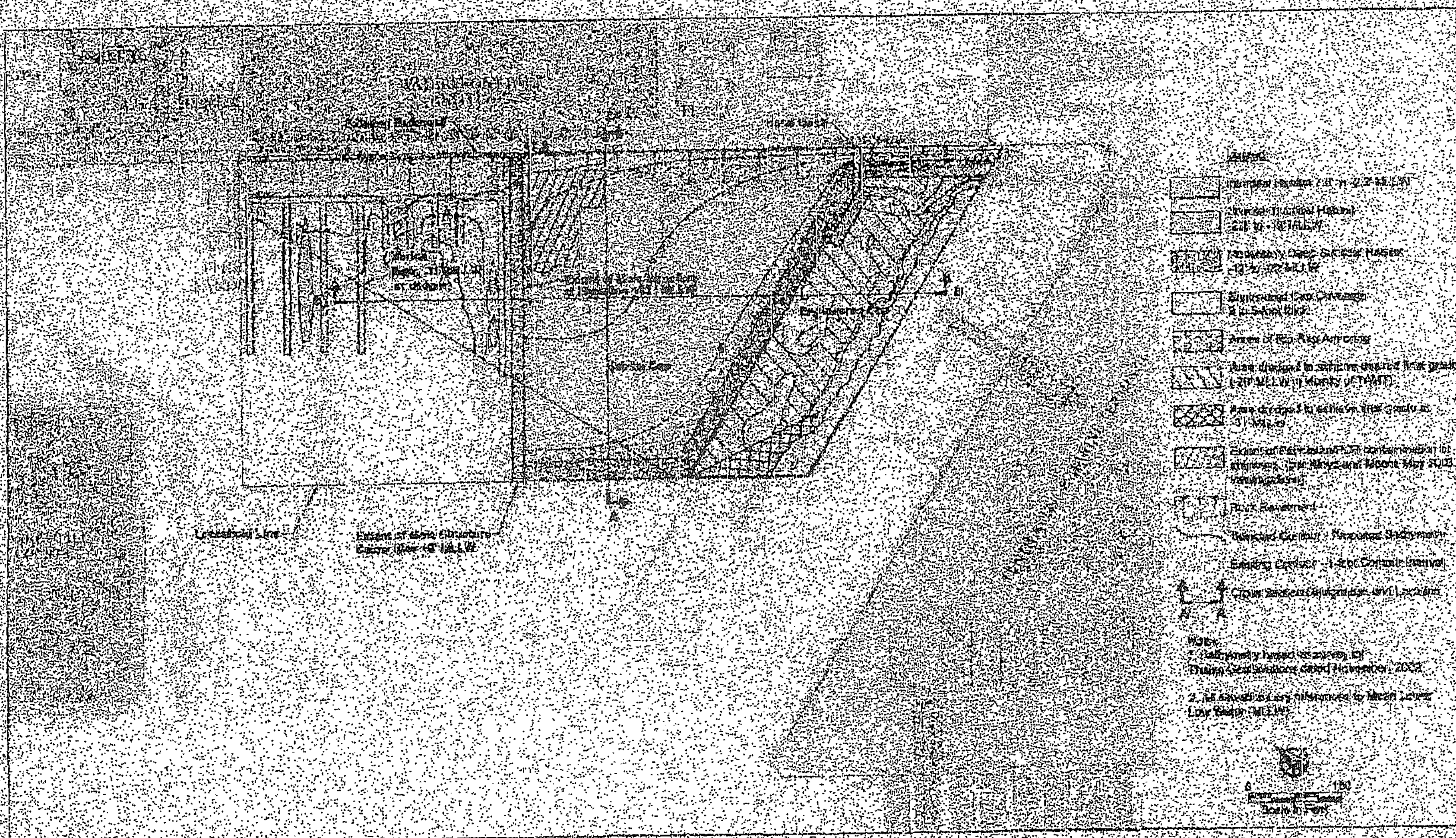
The top of the engineered cap on the TAMT side is at an elevation of -20 feet MLLW. To construct this cap and maintain navigation depths, approximately 11,500 CY of sediment will need to be dredged and disposed of offsite. The surface of the engineered cap on the north side of the habitat cap will be no shallower than -15 feet MLLW for recreational boat maneuvering.

Other Features

This alternative allows for future construction of a marina in the northern portion of the former Campbell Shipyard leasehold area adjacent to the habitat cap. This marina will be sited within the former Campbell Shipyard leasehold line, adjacent to and immediately north of the habitat cap, in an area that is sufficiently large for berthing three to four large recreational boats (mega yacht vessels, approximately 200 feet long) and four to six smaller vessels up to 60 feet long. Gangways will be built to allow handicap access to the headwalk and finger piers.

A "mole" retaining structure will be built perpendicular to the existing seawall and will function as a barrier between the habitat cap and the marina area. A mole structure consists of two sheetpiles driven parallel to each other and linked by tie rods. The minimum thickness of the mole pier for structural integrity in this setting is 20 feet. The area between the sheetpiles will be filled with rocks and sand, and capped with a concrete pad, which provides rigidity to the structure, and can transform it into a pier, or a promenade.

To minimize the loss of water space, the mole structure will be constructed with "steps" at different elevations. The mole structure will be topped at an elevation of +12 feet MLLW from the seawall out to a distance of approximately 200 feet from the seawall. The wall will then "step down" to an elevation deeper than +5 feet MLLW for the remaining 300 feet of its length.



Plan View of Alternative 3: Hybrid Cap

Figure 5.2-1

P&D Environmental Services

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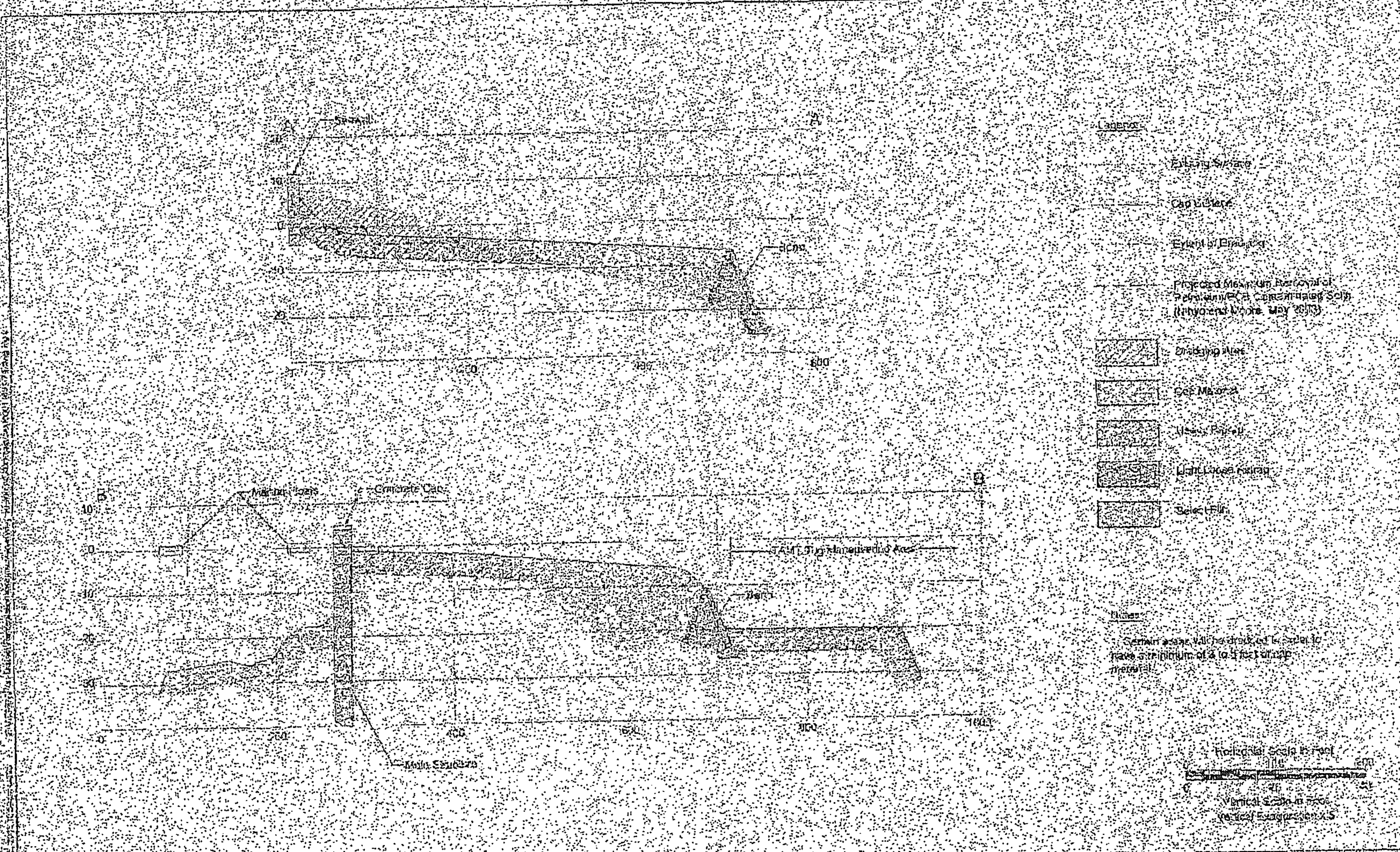

Cross Sections - Alternative 3: Hybrid Cap

Figure 5.2-2

E&D Environmental Services

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This alternative also involves the stabilization and reconfiguration of part of the existing seawall. The temporary seawall south of the shipyard ways will be extended towards the Bay so that it is aligned with the existing seawall north of the shipyard ways. This realignment will remove approximately 2,500 SF of intertidal habitat and water area. A rock revetment will be constructed along the seawall north of the habitat cap for added stabilization during seismic events. The rock revetment will also be constructed in areas where the habitat cap is present along the seawall, since it is expected that the relatively loose material composing the habitat cap will not be sufficiently strong on its own to stabilize the seawall in a seismic event. Finally, this alternative includes the possible construction of an approximately 2,800-SF dock that may be located over the engineered cap for hotel use.

Schedule

The construction of the engineered and habitat caps is anticipated to last for about one year. The marina and hotel dock structures and facilities will be designed and built after completion of the engineered and habitat caps.

Environmental Effects

The Alternative 3: Hybrid Cap will impact about 9.6 acres of the site, and will result in a substantial gain in the acreage of shallow subtidal habitat. The approximate net change in area for each habitat zone in the alternative is summarized in Table 5.2-1.

Table 5.2-1
Net Change in Habitat Zone Area for the Alternative 3: Hybrid Cap
(all quantities in acres and all elevations in feet MLLW)

Habitat Zones	Upland >+7.8 feet	Intertidal +7.8 to -2.2 feet	Shallow Subtidal -2.2 to -12 feet	Moderately Deep Subtidal -12 to -20 feet	Deep Subtidal <-20 feet
Baseline Condition[1]	0.2	1.2	1.5	2.6	7.4
Postconstruction Condition	0.1	0.4	4.3	0.9	7.2
Net Change[2]	-0.1	-0.8	+2.8	-1.7	-0.2

Notes: (1) Based on existing site bathymetry within the leasehold line, from surveys by Thales (2002) for offshore and subtidal areas, and San Diego Unified Port District (Port, 2003) for intertidal and upland areas.
(2) Net change in habitat zone area was developed using the entirety of the leasehold and capping footprint (12.9 acres).

The cap will provide a clean substrate for benthic organisms to recolonize, and the flatter topography will facilitate invertebrate colonization and fish utilization, which will increase the biological value of the area over existing conditions. The Alternative 3: Hybrid Cap will cover the existing colonized marine substrate and approximately a third of an acre of eelgrass. The engineered portion of the cap will not support eelgrass; however, eelgrass establishment is possible in areas of the habitat cap. It is anticipated that it will take approximately one to three years for the site to return to full function.

The marina and hotel dock will provide greater access for large recreational boats to the bay; however, the marina pier and hotel docks will produce approximately 0.3 acre of shaded areas beneath them that inhibit the biological productivity of the area. Also, the mole wall will occupy 10,400 SF (0.25 acre) of otherwise open area, and the seawall reconfiguration 2,500 SF (about 0.05 acre). In total, 0.3 acre of water area will be lost.

5.2.2 Environmental Analysis

Marine Biology

Table 5.2-2 shows that upon completion of the project, the project site will contain approximately 0.1 acre of upland, 0.3 acre of armored intertidal habitat, 0.1 acre of nonarmored intertidal habitat, 0.7 acre of armored shallow subtidal habitat, 3.6 acres of nonarmored shallow subtidal habitat, 0.9 acre of armored moderately deep subtidal habitat, 0.8 acre of armored deep subtidal habitat, and 6.4 acres of nonarmored deep subtidal habitat.

Table 5.2-2
Postconstruction Habitat Types Present for the Alternative 3: Hybrid Cap

Habitat Type	Preconstruction Condition (Acres)	Armored Area/ Nonarmored Area (Acres)	Change from Preconstruction Condition (Acres)
Intertidal[1] (+7.8 to -2.2 feet MLLW)	1.2	0.3 / 0.1	-0/8
Shallow Subtidal (-2.2 to -12 feet MLLW)	1.5	0.7 / 3.6	+2.8
Moderately Deep Subtidal (-12 to -20 feet MLLW)	2.6	0.9 / 0.0	-1.7
Deep Subtidal (<-20 feet MLLW)	7.4	0.8 / 6.4	-0.2
Total Water Area	**12.7**	**2.5 / 10.3**	**+0.1**

Note: [1] Includes 0.1 acre of intertidal habitat resulting from the construction of the mole structure.

Impacts to biology that may result from this alternative are similar in type to those of the Alternative 1: Engineered Cap-In-Place. The Alternative 3: Hybrid Cap will impact approximately 9.6 acres of the site, an increase of approximately 0.5 acre over the Alternative 1: Engineered Cap-In-Place. This alternative covers a smaller area with engineered caps, which is more favorable for the establishment of benthic invertebrate communities. The marina and dock will inhibit biological activity by shading about 0.3 acre of water area. However, this shading will be substantially less than the shading associated with the piers and pilings of the former Campbell Shipyard. This alternative contains a larger area of highly productive intertidal and shallow subtidal habitats, making a more productive habitat and making eelgrass mitigation less difficult to implement compared to the Alternative 1: Engineered Cap-In-Place. With the implementation of the mitigation measures stipulated in Section 4.1.5, all impacts to marine biology will be reduced to below a level of significance.

Water Quality

Impacts to water quality created by the Alternative 3: Hybrid Cap will not be greater than those created by the Alternative 1: Engineered Cap-in-Place. Therefore, implementation of the mitigation measures stipulated in Section 4.2.5 will reduce all impacts to below a level of significance.

Geology and Soils

Impacts on geology and soils created by the Alternative 3: Hybrid Cap will be most similar to those created by the Alternative 2: Habitat Cap, due to the habitat cap portion of this alternative. With the implementation of the mitigation measures stipulated in Section 4.3.5, as well as the measures for preventing settlement discussed in the Alternative 2: Habitat Cap section (Mitigation Measure G3: Settlement), all impacts to geology and soils will be reduced to below a level of significance.

Air Quality

Air quality impacts created by Alternative 3: Hybrid Cap will not be greater than those created by Alternative 1: Engineered Cap-in-Place. NO_x emissions can be maintained at less-than-significant levels if a diesel-powered dredge is used that has a valid state operating permit. Mitigation of the NO_x impacts is also possible by using an electrified dredge instead of a diesel-powered dredge. Use of either a state-registered dredge, or an electric dredge, will reduce NO_x emissions to below a level of significance.

Noise

Noise impacts created by the Alternative 3: Hybrid Cap will not be greater than those created by the Alternative 1: Engineered Cap-in-Place. Therefore, implementation of the mitigation measures stipulated in Section 4.5.5 will reduce all impacts to below a level of significance.

Traffic and Circulation

Impacts to traffic and circulation created by the Alternative 3: Hybrid Cap will not be greater than those described for the Alternative 1: Engineered Cap-In-Place. Therefore, implementation of the Alternative 3: Hybrid Cap will not create any significant impacts to traffic and circulation.

Navigational Safety

Impacts to navigational safety created by the Alternative 3: Hybrid Cap will be similar to those created by the Alternative 1: Engineered Cap-in-Place. However, the north side of the hotel dock will be located over a riprap armor slope that will limit the access of larger vessels. Additionally, maneuvering may become difficult during rare dangerous weather conditions. In order to mitigate these impacts, berthing of vessels along the north side of the hotel dock should be avoided during dangerous weather conditions. The Alternative 3: Hybrid Cap will also have a 300-foot mole structure with an elevation of +5 feet MLLW that may become submerged during higher high tide events. In order to avoid conflicts with the habitat cap and mole structure, navigational buoys may be needed to mark where the submerged mole structure is located. The proposed transient marina's proximity to the ferry landing will make docking on the east of the ferry landing unsafe. Therefore, the proposed transient marina will preclude the use of the east side of the ferry landing. With the implementation of the mitigation measures stipulated in Section 4.7.5, as well as the above-stated measures for the north side of the hotel dock (Mitigation Measure NG7: Hotel Dock), the mole structure (Mitigation Measure NG8: Mole Structure), and the east side of the ferry landing (Mitigation Measure NG9: Ferry Landing), all impacts to navigational safety will be reduced to below a level of significance.

Mitigation Measure NG8: Mole Structure

The Port shall provide navigational buoys to mark where the submerged mole structure is located in order to avoid conflicts with the habitat cap and mole structure.

Mitigation Measure NG9: Ferry Landing

The Port shall provide signage stating that the east side of the proposed ferry landing will not be available for berthing.

5.2.3 Conclusions

Significant mitigable effects were identified for marine biological resources, water quality, geology and soils, air quality, noise, and navigational safety. Impacts to traffic and circulation will be less than significant under this alternative.

5.3 Alternative 4: Dredge and Sediment Disposal

5.3.1 Overview

Dredging

This alternative involves dredging approximately 135,000 CY of sediment containing COC concentrations greater than cleanup levels specified in Cleanup and Abatement Order (CAO) No. 95-21. Figure 5.3-1 shows the different features associated with this alternative, and Figure 5.3-2 shows the cross sections of this alternative. The dredged material will be hauled by barges to the shore, and offloaded to an adjacent staging site. The material will be dewatered or stabilized before being transported to an approved offsite disposal facility by truck or rail.

The portions of the site with a dredged elevation shallower than -20 feet MLLW will be nominally restored to grade for habitat purposes by backfilling with imported sand. The sand will be delivered by barge and placed either through the use of a derrick, or by pushing the material off the deck of a barge with a bulldozer as the barge is moved across the site. Trucks may be used for near-shore areas.

This alternative also accounts for the demolition of the shipways, and the dredging of the material underneath to remove the PCS. Demolition of the ways will include removal of concrete, steel rails, piles supporting the rails, and steel sheetpiling, which will either be recycled or disposed of at appropriate upland facilities. Also, this demolition will create approximately 8,600 SF of water area.

Other Features

The alternative includes stabilization and reconfiguration of part of the existing seawall. The seawall south of the shipyard ways will be extended towards the Bay so that it is aligned with the existing seawall north of the shipyard ways. This realignment will remove approximately 2,500 SF of intertidal habitat and water area. Also, this alternative includes the placement of a revetment along the seawall to provide stability in case of an earthquake. Overall, this alternative will create approximately 6,100 SF of water area. Finally, an approximately 2,800-SF dock will be located over the dredged area for hotel use on the south side of the property. In addition, a transient marina with approximately 20 to 30 slips could be built on the northern area of the leasehold.

Schedule

The project is anticipated to require one and a half to two years to complete. The marina and hotel dock structures and facilities will be designed and built after dredging activities are completed.

Environmental Effects

The Alternative 4: Dredge and Sediment Disposal will impact approximately 9 acres of the former Campbell Shipyard site; however, there is no net change in area for any of the existing habitat zones, other than those that result from realignment of the seawall. Dredging and backfilling activities will remove the existing benthic communities and eelgrass beds. It is anticipated that it will take approximately one to three years to restore these communities.

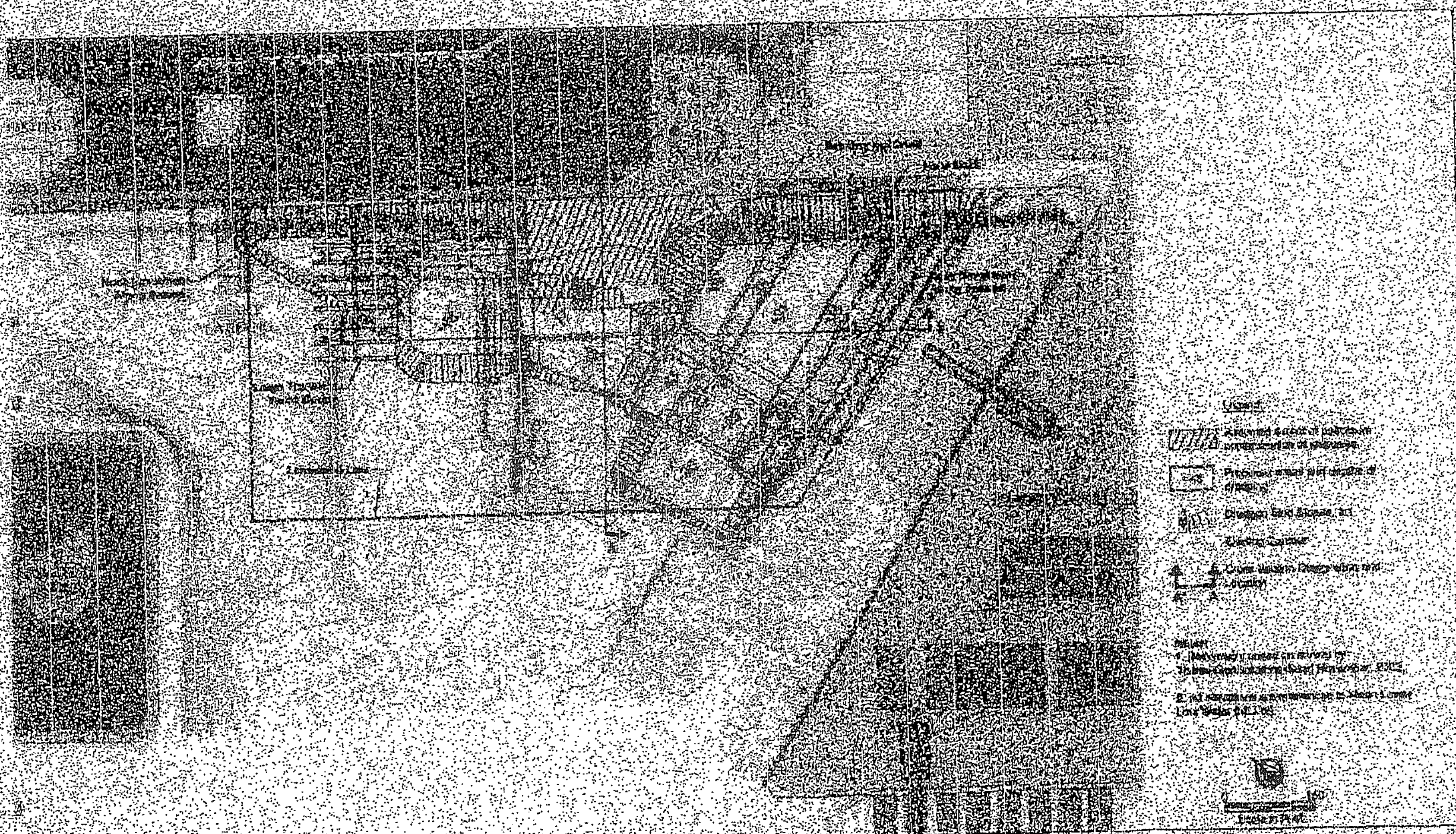
Silt curtains may be used to limit suspended sediments that might result in exceedance of water quality criteria for turbidity. Construction techniques or special equipment could also be used to limit the release of suspended sediments. This alternative will forego the opportunity to recreate shallow subtidal and intertidal habitat.

The marina and hotel dock will provide greater access for large recreational boats to the bay; however, the marina pier and hotel docks will produce approximately 0.36 acre of shaded area that inhibits the biological productivity of the area.

5.3.2 Environmental Analysis

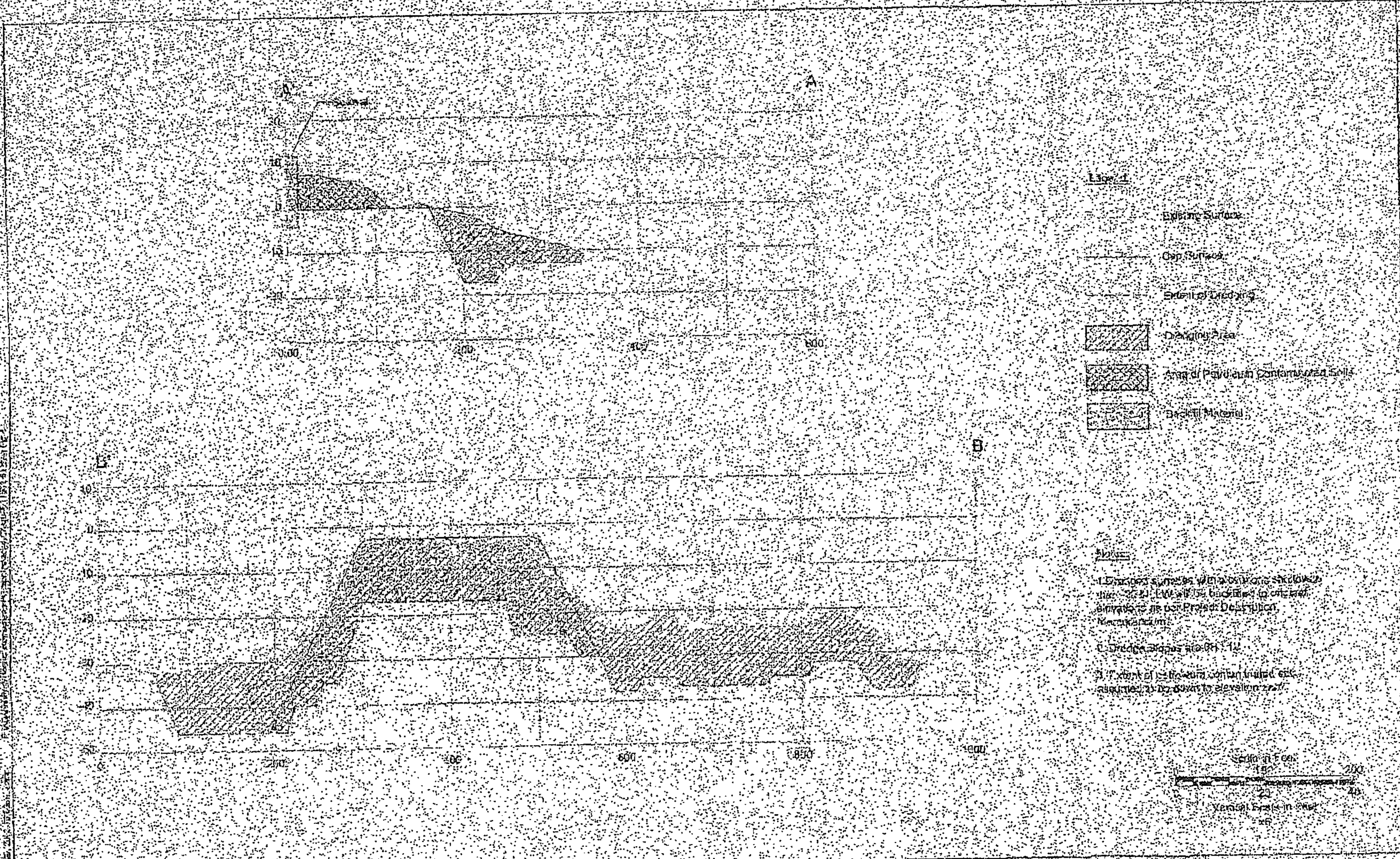
Marine Biology

The process of dredging will suspend large amounts of sediment. The use of a silt curtain, specified in Mitigation Measure B1: Construction Related, will mitigate the impacts from suspended sediments to less than significant. Impacts associated with this alternative also include the removal of benthic and eelgrass communities. Some care will be needed in the restoration of previous bottom elevations shallower than -20 feet MLLW to ensure that there is a sufficient amount of habitat to mitigate for the loss of the eelgrass bed. If there is not a large enough habitat on which eelgrass can become established, offsite mitigation will be required (Mitigation Measure B3: Eelgrass). The marina and dock will inhibit biological activity by shading approximately 0.1 acre of water area. However, this shading will be substantially less than the shading associated with the previous piers and pilings of the former Campbell Shipyard and thus will not be significant. The use of imported sand as backfill in some sections of the site will also lower the quality of the bottom substrate at the project site, impacting benthic communities. However, because the site will be recolonized and there are no listed or endangered species within the project site, no significant impacts will



Plan View of Alternative 4: Dredge and Sediment Disposal

Figure 5.3-1



Cross Sections - Alternative 4: Dredge and Sediment Disposal

Figure 5.3-2

Source: Anchor Environmental

D Environmental Services

occur. With the implementation of the mitigation measures stipulated in Section 4.1.5, all impacts will be reduced to below a level of significance.

Water Quality

Impacts to water quality created by the Alternative 4: Dredge and Sediment Disposal will potentially be greater than those created by the Alternative 1: Engineered Cap-in-Place. Due the large amount of material that will be dredged in this alternative, mitigation measures stipulated in Section 4.2.5 may not be enough to prevent all impacts. Therefore, impacts to water quality could potentially be significant and unmitigable.

Geology and Soils

Because this alternative will excavate and remove all contaminated soils, there will be no significant geology/soils impacts.

Air Quality

Air quality impacts created by Alternative 4: Dredge and Sediment Disposal will not be greater than those created by Alternative 1: Engineered Cap-in-Place. NO_x emissions can be maintained at less-than-significant levels if a diesel-powered dredge is used that has a valid state operating permit. Mitigation of the NO_x impacts is also possible by using an electrified dredge instead of a diesel-powered dredge. Use of either a state-registered dredge, or an electric dredge, will reduce NO_x emissions to below a level of significance.

Noise

Noise impacts created by the Alternative 4: Dredge and Sediment Disposal will not be greater than those created by the Alternative 1: Engineered Cap-in-Place. Therefore, implementation of the mitigation measures stipulated in Section 4.5.5 will reduce all impacts to below a level of significance.

Traffic and Circulation

Impacts to traffic and circulation created by the Alternative 4: Dredge and Sediment Disposal will not be greater than those described for the Alternative 1: Engineered Cap-In-Place. Implementation of the Alternative 4: Dredge and Sediment Disposal will not create any significant impacts to traffic and circulation.

Navigational Safety

Impacts to navigational safety created by the Alternative 4: Dredge and Sediment Disposal will be similar to those created by the Alternative 1: Engineered Cap-in-Place. With the implementation of the mitigation measures stipulated in Section 4.7.5, all impacts to navigational safety will be reduced to below a level of significance.

5.3.3 Conclusions

Significant mitigable effects were identified for marine biological resources, air quality, noise, and navigational safety under this alternative. Impacts to geology and soils and traffic and circulation will be less than significant. Significant and potentially unmitigable impacts will occur to water quality.

Implementation of this alternative poses the highest potential risk, due the large amount of material that will be dredged in this alternative.

5.4 Alternative 5: No Project

5.4.1 Overview

This alternative involves the impacts to the project site if no action is taken to remediate the contaminated sediment. This action will directly conflict with Regional Water Quality Control Board (RWQCB) CAO 95-21, which requires the remediation of contaminated sediments within the former Campbell Shipyard. Under the Alternative 5: No Project, the contamination site will remain in its current condition. No action will be taken to remediate the contaminated material.

5.4.2 Environmental Analysis

Marine Biology

Under this alternative, no impacts to eelgrass or other biological communities will occur, except that the contaminated sediment within the shipyard will continue to accumulate in and affect biological organisms at the site. This alternative does not meet the project objectives.

Water Quality

Implementation of the Alternative 5: No Project will allow existing contamination to continue in the former Campbell Shipyard. On May 24, 1995, the San Diego RWQCB issued CAO No. 95-21 addressing contaminated bay sediments, soils, and groundwater at the former facility. COCs included copper, lead, zinc, total petroleum hydrocarbons, high-molecular-weight polynuclear aromatic hydrocarbons (HPAHs), PCBs, and tributytlin (TBT). By not taking action, the Port will allow these COCs to continue to contaminate the former Campbell Shipyard basin. Thus, implementation of the Alternative 5: No Project will allow the existing water quality conditions to continue to exist, in violation of acceptable Water Quality Control Plan thresholds, and pose a significant and unmitigated water quality impact.

Geology and Soils

Implementation of the Alternative 5: No Project will preserve geology and soil resources as they exist currently. These resources are described in the Existing Conditions discussion of the Geology and Soils section of Chapter 4.0. Therefore, implementation of the Alternative 5: No Project will not have any significant impacts on existing geology and soil resources, with the exception of an additional release of contamination in the event of a seismic event.

Air Quality

Implementation of the Alternative 5: No Project will preserve air quality conditions as they exist currently. These conditions are described in Section 4.4.1 of the air quality analysis. Therefore, implementation of the Alternative 5: No Project will not have any significant impacts on existing air quality.

Noise

Implementation of the Alternative 5: No Project will preserve noise conditions as they exist currently. These conditions are described in Section 4.5.1 of the noise analysis. Therefore, implementation of the Alternative 5: No Project will not have any significant impacts on existing noise.

Traffic and Circulation

Implementation of the Alternative 5: No Project will preserve traffic conditions as they exist currently. These conditions are described in Section 4.6.1 of the traffic and circulation analysis. Therefore, implementation of the Alternative 5: No Project will not have any significant impacts on existing traffic.

Navigational Safety

Implementation of the Alternative 5: No Project will preserve navigational safety resources as they exist currently. These resources are described in the Existing Conditions discussion of the navigational safety section of Chapter 4.0. Therefore, implementation of the Alternative 5: No Project will not have any significant impacts on existing navigational safety conditions.

5.4.3 Conclusions

The Port entered into a Joint Powers Agreement with the Redevelopment Agency for the City of San Diego to remediate the Campbell Shipyard area using the Polanco Redevelopment Act (the "Act"; California Health and Safety Code Sections 33459 et seq.). After entering into this Agreement, the Port entered into a Polanco Agreement with the RWQCB to use the Act to comply with the directives of CAO 95-21. The Alternative 5: No Project would cause the Port to fail to meet its contractual agreements with the redevelopment agency and the RWQCB. Therefore, the Alternative 5: No Project is not feasible. The Alternative 1: Engineered Cap-in-Place, or any of the other alternatives, will provide a greater degree of protection to the environment in the project area than the Alternative 5: No Project.

6.0 CUMULATIVE IMPACTS

Section 15130 of CEQA requires that an EIR address cumulative impacts of an activity when the activity's incremental effect will be cumulatively considerable. Cumulatively considerable means that the incremental effects of an individual activity will be considerable when viewed in connection with the effects of past, current, or probable activities. A cumulative effect is not considered considerable if the effect is essentially the same whether the proposed activity is implemented or not. Probable activities include those that: (1) have an application on file at the time the Notice of Preparation is released; (2) are included in an adopted capital improvement program, general plan, regional transportation plan, or similar plan; (3) are included in a summary of projections of activities designated in a general plan or similar plan; (4) are anticipated as later phases of approved activities; or (5) are included in money budgeted by public agencies.

The basis for the analysis of cumulative impacts is dependent on the nature of the issue. According to Section 15130 of the CEQA Guidelines, the discussion of cumulative effects need not provide as great a detail as is provided for the effects attributable to the project alone. The discussion should be guided by the standards of practicality and reasonableness.

The evaluation of cumulative impacts is required to be based on either: (1) a list of past, present, and probable activities producing related or cumulative impacts; or (2) a summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified which described or evaluated regional or areawide conditions contributing to the cumulative impact.

Reasonable mitigation measures must be discussed; however, CEQA acknowledges that with some projects, the only feasible mitigation measures for cumulative impacts may involve the adoption of ordinances or regulations, rather than the imposition of conditions on a project-by-project basis.

6.1 Cumulative Projects

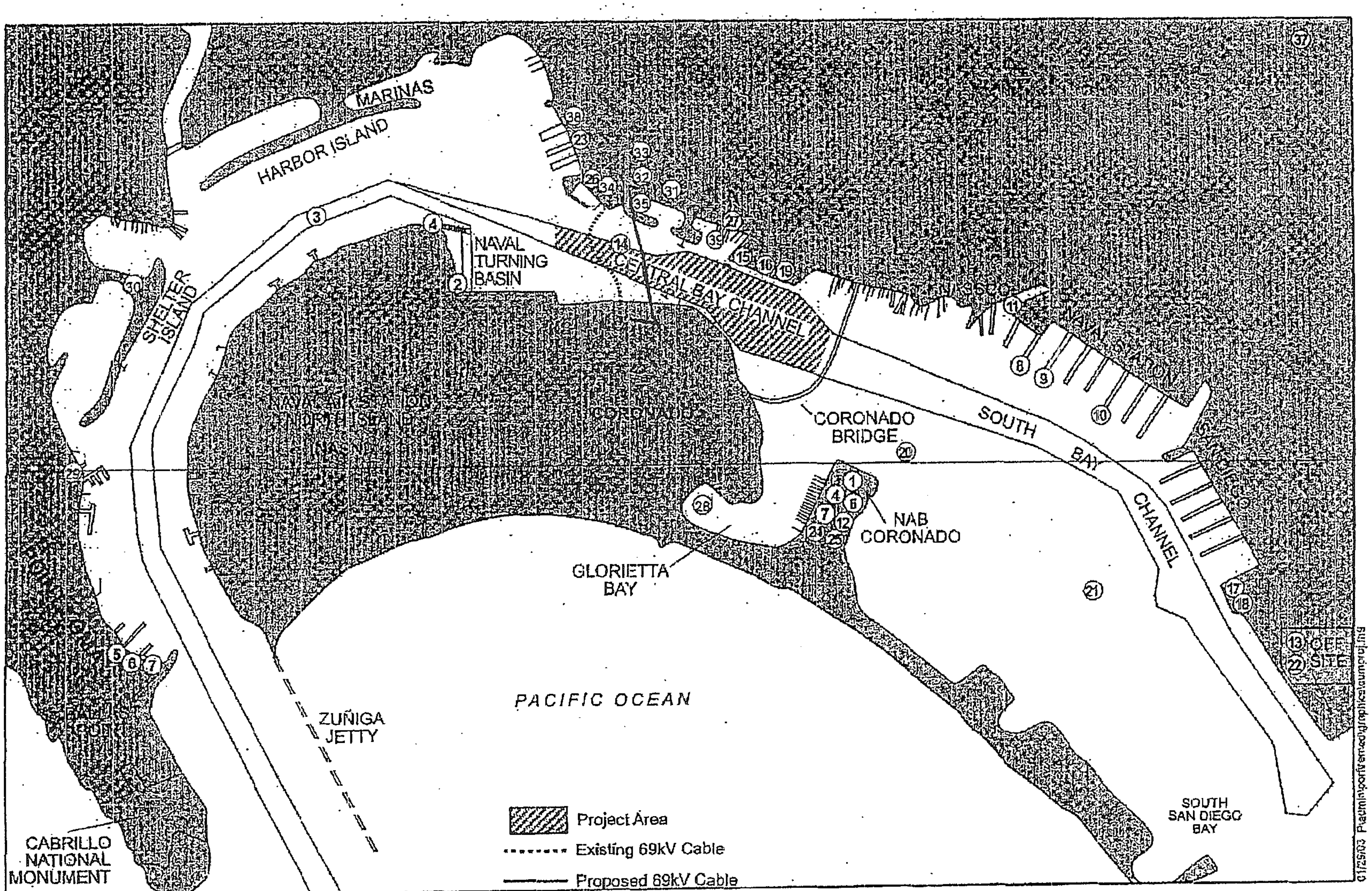
Table 6.1-1 is a list of the surrounding projects that were considered in the project vicinity for this cumulative analysis. Following is a brief description of these projects. The project numbers are listed according to their location on Figure 6.1-1.

Table 6.1-1
List of Cumulative Projects

Project No.	Project Name	Project Description	Project Status	Expected Completion Date
1	NAB-Coronado Special Operations Force - Patrol Craft Pier Upgrade	The construction of a concrete-pile-supported berthing pier. Approximately 31,478 cubic meters (CM) were dredged.	Completed	1998
2	NASNI - CVN Turning Basin	Approximately 1.2 million CM were dredged.	Completed	Sept. 1998
3	NASNI - Channel Dredging	Dredging in San Diego Bay to accommodate homeporting of one transient carrier.	Completed	1998
4	NASNI - CVN Wharf	Creation of a wharf in the Pier J/K area for CVNs. Approximately 389,925 CM were dredged.	Completed	2002
5	Point Loma – Maintenance Dredging	Maintenance dredging of 22,937 CM at Pier 180.	Completed	1999
6	SUBASE - ARCO Dredging	Maintenance dredging of approximately 20,643 CM at the ARCO floating dry-dock at SUBASE.	Ongoing	
7	Ballast Point Dredging	Approximately 31,347 CM were dredged from Ballast Point in 1995 and approximately 26,760 CM of sediment were dredged from Ballast Point in 2000.	Ongoing	
8	Pier 2 Dredging at NAVSTA	Approximately 178,143 CM were dredged from the approach to Pier 2.	Completed	1996
9	Pier 3 Dredging at NAVSTA	Approximately 252,317 CM were dredged from the approach and berthing areas at Pier 3.	Completed	Nov. 2000
10	Pier 6 Dredging and Upgrade	Project will involve the dredging at Pier 6 to a depth of -11.3 meters.	Ongoing	2005
11	Chollas Creek	Approximately 78,456 CM were dredged from the mouth of Chollas Creek.	Completed	1997
12	NAB - Small Craft Berthing Pier	The construction of a small berthing pier at NAB Coronado.	Completed	1999
13	SDG&E South Bay Power Plant	Maintenance dredging of 382,300 CM of the cooling water intake channel for South Bay Power Plant in Chula Vista in 1994.	Completed	1994
14	San Diego Harbor Deepening	Dredging 550,000 cubic yards (CY) of sediment.	Ongoing	2004
15	TAMT Maintenance Dredging, Berths 10-1 and 10-2	Maintenance dredging of approximately 15,500 CY from the TAMT Berths 10-1 and 10-2.	Completed	2002

Project No.	Project Name	Project Description	Project Status	Expected Completion Date
16	TAMT Maintenance Dredging, Berths 10-3 to 10-6	Deepening of TAMT Berths 10-3 to 10-6 to match deeper channel depth.	Begins 2004	2004
17	NCMT Wharf Extension Project	Dredge 125,000 CY.	Completed	September 2003
18	National City Marina	Planned construction of a marina and associated commercial recreational facilities to be located between Sweetwater Channel and 24th Street.	Begins Summer 2003	Winter 2004
19	Marine Terminal Improvements CIP	Project involved making repairs to the TAMT Seawall and deepening Berths 10-7 and 10-8.	Completed	1997
20	Channel Deepening Phase II		Suspended	
21	Chula Vista Channel Dredging		Suspended	
22	South San Diego Bay National Wildlife Refuge Management Plan	Project has established an approved boundary, and negotiated and acquired land within this boundary to add lands to the NWRS.	Ongoing	Winter 2002
23	North Embarcadero Alliance Visionary Plan	Planned improvements to the Embarcadero.		
24	NAB - Special Operations Force - Waterfront Operations, Storage, and Alterations	Project involved the expansion, renovation, and new construction of support facilities, operational locker rooms, and craft storage immediately adjacent to and south of the P-211 site.	Completed	1999
25	NAB - Waterfront Operations Building	Construction of operations facilities for the Navy.	Completed	2001
26	Convention Center Expansion	Expansion that has roughly doubled the size of the San Diego Convention Center.	Completed	2001
27	Seaport Village Expansion	Expansion of the themed waterfront retail/restaurant center.	On Hold	
28	Glorietta Bay Master Plan	Redevelopment of 13.5 acres on the northern end of the Silver Strand.	Approval Phase	
29	Point Loma - Marine Mammal Research Facility	Construction of a Marine Mammal Research Facility at the Magnetic Silencing Facility.	Completed	1993
30	America's Cup Harbor Redevelopment	Redevelopment of the America's Cu p Harbor/Shelter Island.	EIR Completed	May 2004
31	101 Market	The construction of 151 apartments, 1,021 square meters (SM) [11,000 square feet (SF)] of commercial space, and 186 parking spaces.	Ongoing	Winter 2002

Project No.	Project Name	Project Description	Project Status	Expected Completion Date
32	Children's Mu seum Tower	A 35-story, 198-unit luxury condominium development.	Begins September 2002	September 2004
33	Citywalk	A development of 109 town homes, single-level units, and lofts.		
34	Hyatt Regency Expansion	Construction of a 750-room, 33-story tower.	Ongoing	July 2003
35	Park Place	A 30 story development including 178 condominiums and 333 parking spaces.	Ongoing	Late Summer 2002
36	Renaissance	A development of 221 condominiums, 1,207 SM of retail space, and 430 parking spaces in two 22-story towers.	Ongoing	May 2003
37	Ballpark and Ancillary Development	A redevelopment of a 75-acre area within the East Village south of Market Street, adjacent to the Gaslamp Quarter and across from the Convention Center Expansion. Project will include residential lofts, restaurants, shops, entertainment, cultural activities, and conference facilities.	Ongoing	
38	Maritime Master Plan	A series of plan elements related to the enhancement of San Diego's cruise industry and maritime commerce for long-term economic and public benefits to the San Diego region.	Ongoing	
39	South Embarcadero Redevelopment Program 2	Construction of the San Diego Convention Hotel and the Fifth Avenue Landing Hotel.	2004	2006



Source: Blaylock Engineering Group

Cumulative Projects

Figure 6.1-1

P&D Environmental Services

CBL-P031270

6.1.1 Dredging Projects

(1) Naval Amphibious Base (NAB) Coronado Special Operations Force - Patrol Craft Pier Upgrade (P-2II)

This project, completed in 1998, included the construction of a concrete-pile-supported berthing pier that will provide four berths for six double-nested Patrol Coastal (PC-1) class ships, a concrete launching and recovery ramp for small craft, demolition of existing Pier 15, dredging to -4 meters (-13 feet) Mean Lower Low Water (MLLW), and rock revetment. Approximately 31,478 CM (41,173 CY) were dredged. The project included near-shore and ocean disposal, and the creation of eelgrass habitat (U.S. Navy, 1998). As a separate project in 1999, an administrative support facility for the Coastal Patrol Ship Maintenance Support Team was added near Building 19 adjacent to P-211.

(2) NASNI - CVN Turning Basin (P-549)

This project was completed in conjunction with the homeporting of one additional nuclear-powered aircraft carrier (CVN) at Naval Air Station North Island (NASNI). The project provided for dredging of approximately 1.2 million cubic meters (CM) [1.6 million cubic yards (CY)] of sediments and creation of a fill site with a portion of the dredged material.

(3) NASNI - Channel Dredging (P-706)

Dredging in San Diego Bay to accommodate homeporting of one CVN and one transient carrier was completed several years ago. This project was comprised of MILCONs P-700, P-701, P-703, and P-706. The project began in April 1996 and was completed in September 1998.

(4) NASNI - CVN Wharf (P-700A)

This project includes a wharf in the Pier J/K area for CVNs. The project will require fill behind the wharf [approximately 0.6 hectare (1.48 acres)]. This fill will be mitigated by creation of 0.61 hectare (1.51 acres) of habitat adjacent to Pier Bravo on the north side of the island. The project also created a 2.43-hectare (6.0-acre) intertidal enhancement site at the NAB. Approximately 389,925 CM (510,000 CY) were dredged at the new wharf site, and material remaining after the fill and enhancement will be disposed of at the United States Environmental Protection Agency (USEPA) approved Ocean Disposal Site LA-5. The project was awarded in February 2000 and completed in April 2002 (Alcom, 2002).

(5) Point Loma - Maintenance Dredging - FISC Fuel Pier (Pier 180)

Maintenance dredging of 22,937 CM (30,000 CY) at Pier 180 was completed in April 1999. Upland disposal of the dredged material was completed in October 1999.

(6) SUBASE - ARCO Dredging

Maintenance dredging took place in 2002 at the Atlantic Richfield Company (ARCO) floating dry-dock at the Submarine Base (SUBASE). Approximately 20,643 CM (27,000 CY) of sediment were dredged and disposed of in the ocean.

(7) Ballast Point Dredging

During a one-week period in 1995 the United States Coast Guard (USCG) dredged approximately 31,347 CM (41,000 CY) of sediment from Ballast Point on the north side of the San Diego Bay entrance. The dredged material was disposed of at a near-shore disposal site near Imperial Beach. Also, during a two-month period in 2000, the USCG dredged approximately 26,760 CM (35,000 CY) of sediment from Ballast Point on the north side of the San Diego Bay entrance. The dredged material was also disposed of at a near-shore disposal site near Imperial Beach. It is anticipated that this maintenance dredging will be required approximately every five years.

(8) Pier 2 Dredging at NAVSTA (P-332S)

This dredging project at the Naval Station (NAVSTA) was completed in July 1996. Dredging took place at the approach to Pier 2, south of the 28th Street Pier and Chollas Creek, to provide a safe navigational depth for an increasing number of homeported deep draft power intensive (DDPI) ships. The dredged material volume was approximately 178,143 CM (233,011 CY) and was disposed of near shore at Imperial Beach for beach replenishment purposes (U.S. Navy, 1998).

(9) Pier 3 Dredging at NAVSTA (P-338S)

This project included dredging the approach and berthing areas at Pier 3 at NAVSTA to provide a safe navigational and berthing depth for DDPI ships reassigned to NAVSTA. The dredged material volume, approximately 131,281 CM (171,715 CY), was disposed of at LA-5 in 1995. An additional 121,036 CM (158,315 CY) of material that did not meet the USEPA criteria for ocean disposal were dredged. The material was stored at the base and partly disposed of in upland areas (U.S. Navy, 1998). Because ordnance was found within the material, the remainder of the material was returned to the base and disposed of offshore (Alcom, 2002).

(10) Pier 6 Dredging and Upgrade (P-331)

This project consists of an upgrade to Pier 6 at NAVSTA. It includes dredging at the pier to a depth of -11.3 meters MLLW and upgrading electrical facilities. This project has a prospective completion date of 2005 (U.S. Navy, 1998).

(11) Chollas Creek (MI-93)

This NAVSTA project was completed in 1997 and resulted in the dredging of approximately 76,456 CM (100,000 CY) of material from the mouth of Chollas Creek, of which 32,111 CM (43,000 CY) were disposed of at LA-5 (U.S. Navy, 2000).

(12) NAB - Small Craft Berthing Pier (P-187)

This project was completed in 1999 and included construction of a pier at NAB Coronado. This project is included as a potential cumulative impact project due to consideration of shading effects, if any, by piers constructed or removed from the Bay.

(13) San Diego Gas and Electric South Bay Power Plant

This project involved maintenance dredging of the cooling water intake channel for the South Bay Power Plant in Chula Vista in 1994. Approximately 382,300 CM (500,000 CY) of dredged material were removed for ocean disposal at LA-5.

(14) San Diego Harbor Deepening Environmental Impact Study/Environmental Impact Report (EIS/EIR)

This project involves the deepening of the Federal Central Navigation Channel in San Diego Bay. The Channel will be deepened from the turning basin at NASNI to within approximately 75 meters (250 feet) northwest of the San Diego-Coronado Bay Bridge centerline. The dredged material will be disposed of at a near-shore disposal site near Imperial Beach. Furthermore, the EIS/EIR addressed the relocation, disposal, and abandonment of a 69-kV electrical cable. The Draft EIS/EIR was circulated for public review in December 2002. A Final EIS/EIR was certified in May 2003. Dredging could begin in September 2004.

6.1.2 Marine-Related Projects

(15) TAMT Maintenance Dredging, Berths 10-1 and 10-2

The San Diego Unified Port District (Port) conducted maintenance dredging of approximately 15,500 CY of sediment from Tenth Avenue Marine Terminal's (TAMT) Berth 10-1, Berth 10-2, and the approach area. Sediment has been deposited in the area, bringing the depth to -27 feet MLLW in some areas. These shallow depths have created a safety concern for deep-water craft operating in the area. A clamshell dredge working from a barge was used to dredge the area to a uniform depth of approximately -32 feet MLLW plus 1 foot over dredge. The material was placed on a barge and mixed with a reagent to bind the soil. The material was subsequently taken by trucks for disposal at the local sanitary landfill. Construction began in September 2002 and was completed in October 2002.

(16) TAMT Dredging, Berths 10-3 to 10-6

The Port proposes to deepen TAMT Berths 10-3 to 10-6 to match the deeper channel depth and to increase the Port's flexibility in accommodating a wider variety of ships. The proposed work will deepen a 200-foot-wide area along the length (2,600 feet) of the west face of the TAMT to an elevation of -42 feet MLLW. This will require removal of all of the existing rock originally placed in front of the existing seawall; grading of the bay bottom within 25 feet of the wall foundation to smooth out the area; placing gravel to fill large depressions as required; demolition and removal of waste concrete remaining from overpour of the original seawall foundation; and placement of geotextile and articulating closed-cell concrete mats along the face of the seawall to protect the bay bottom against propeller scour. A total of 50,000 CY of material will be dredged from this area (2,600 feet by 200 feet). The intent is to barge and dispose of these dredge spoils at LA-5. During construction, the dredge contractor will be required to phase his work to minimize disruption to terminal activities and berthing of vessels along the west face of the terminal. It is anticipated the work will be completed within six months in 2004.

(17) NCMT Wharf Extension Project

The National City Marine Terminal (NCMT) Wharf Extension Project is the extension of Terminal's existing wharf approximately 1,025 feet to the south and approximately 220 feet to the west (from the existing shoreline), to match the existing wharf at Berths 24-3 and 24-4. Once constructed, the wharf would provide approximately 2,035 linear feet (1,010 feet of existing wharf frontage plus the proposed 1,025 feet of new wharf area) of contiguous wharf. In addition, the project proposes deepening a portion of Berth 24-1 and maintenance dredging Berths 24-2 through 24-4 to accommodate deeper draft vessels. Approximately 227,000 CY of sediment would be dredged and disposed of in-bay or offshore. Construction began in 2002 and is expected to conclude Fall 2003.

(18) National City Marina

The marina and associated commercial recreation facilities are planned to be located between Sweetwater Channel and 24th Street and will contain approximately 234 boat slips. Excavation and dredging of an area adjacent to the Sweetwater River Channel began in 2002. Commercial recreational facilities will be associated with the marina. The anticipated dredging volume is 642,000 CY. The majority of the material will be disposed of at various upland sites as construction fill. Preconstruction activities began in January 2002, with construction set to begin in Spring 2003 and expected to take approximately one year to complete (Port, 2002).

(19) Marine Terminal Improvements Capital Improvement Program

In 1995, the Port approved a Negative Declaration for the TAMT Seawall Repair and Berths 10-7 and 10-8 Deepening. The study addressed environmental impacts associated with repairs to the cyclopean seawall and above-water portions of the terminal, including timber fender system components, marine borders, and a concrete cap. The seawall is triangular with a 15-meter (49-foot) wide base and 15-meter (49-foot) high front face. The back face tapers upwards at an angle of approximately 45 degrees.

Improvements were completed in 1997 and included reinforcement of the seawall footing with 9-meter (30-foot) long steel columns and a form in place below the water concrete foundation; placement of a steel sheetpile in front of the existing seawall to retain the pumped-in-place concrete fill; extension of the above-water concrete cap and attachment of foam-filled fenders for boat mooring; deepening of Berth 10-7 and a portion of Berth 10-8; and placement of a closed cell concrete mat along the channel bottom adjacent to the seawall foundation at Berths 10-7 and 10-8 only, to prevent scouring from propeller blades and the undermining of footings (Port, 1998).

(20) Channel Deepening Phase II

This project is the second element of the harbor channel extension south to the National City Marine Terminal, of which the proposed action is Phase I. This project is currently suspended (Port, 2001).

(21) Chula Vista Channel Dredging

This project involves dredging to remove bends in the channel. The project proposes to dispose of the dredged material in the Bay. Plans and specifications are at an early stage; however, this project is currently suspended.

(22) South San Diego Bay National Wildlife Refuge Comprehensive Conservation Plan

This project has established an approved boundary, and negotiated and acquired land within this boundary to add lands to the National Wildlife Refuge System (NWRS). The project seeks to protect, manage, and restore natural ecosystems of endangered species and maintain and enhance the biological diversity of native plants and animals. The project encompasses 21,355 hectares (52,768 acres), stretching westward from Sweetwater Channel to just north of Crown Cove, southward around the salt ponds, and northward along the Bay's edge. The management plan for operation of the refuge was expected to be completed in late 2003 (Maher, 2000).

(23) North Embarcadero Alliance Visionary Plan

The North Embarcadero Plan area is located along the western edge of downtown San Diego adjacent to San Diego Bay. The plan covers approximately 295 acres and includes both land and water area. The area is bounded by Laurel Street to the north, the railroad tracks to the east, Harbor Drive to the south, and the U.S. Pierhead line (located in the Bay) to the west. The plan proposes to revitalize the area and attract people to the San Diego waterfront. Emphasis will be placed on enhanced access to the Bay, and providing and promoting a wide variety of activities at the water's edge. The Final EIR, entitled *North Embarcadero Alliance Visionary Plan*, was certified.

The plan includes the establishment of new east/west streets and view corridors, improvements to existing piers and the addition of new piers, expansion of the promenade, the addition of landscaping and other amenities, and improvements to the street network and traffic flow. The project also includes various development projects located within the Plan area. The projects are as follows:

Bayfront Esplanade

The Bayfront Esplanade is a continuous linear public open space along San Diego Bay. The Esplanade will be 100 feet wide and include a 25-foot-wide promenade along its western edge. The Esplanade is part of a larger bayside open space network connecting Harbor Island to South Embarcadero (Port, 1999).

Broadway Landing (Broadway Plaza)

Broadway Landing will be bounded by B Street and Broadway at the edge of the existing B Street Pier to the north and Pier 11A to the south. It includes the Broadway Pier and a large expanse of the harbor for the berthing of vessels. Broadway Landing will be an expansive public space that reaches from an oval-shaped landscaped park (Broadway Plaza) on the Bayfront Esplanade, and extends out over the water. The Plan proposes a public boardwalk along the water's edge (Port, 1999).

Crescent Pier

This project will involve the construction of a new crescent pier in the area between Laurel and Hawthorn Streets (Port, 1999). This pier will replace the existing three Grape Street piers. The pier will be designated for a park/plaza and a small commercial/recreational facility (i.e., bait and tackle shop).

County Administration Center Terrace

The County Terrace will be bounded by the proposed Grape Street pier to the north and an expanded Maritime Museum pier to the south. The County Terrace will include a passive green space along the bayfront of the County Administration Center (Port, 1999).

Lane Field

This development may include a hotel, office buildings, and parking facilities. Lane Field is about 5.9 acres in size; however, with the possible addition of 1220 Pacific Highway (3.4 acres), the total development area will be 9.3 acres.

Cruise Ship Terminal

The Cruise Ship Terminal is located west of North Harbor Drive at the B Street Pier. The Visionary Plan calls for a remodeled terminal and parkway area on the pier. There will be no expansion of the pier's footprint.

County Administration Center Parking Lots

The County Administration Center Parking Lots are located north and south of the existing County Administrative Center.

North Lot: Office/Ancillary Retail

Development of the North Lot will consist of a six-story, 300,000-SF office building with ancillary retail on the ground floor. The proposed project includes one level of underground parking and a six-level aboveground parking structure to accommodate about 1,050 cars.

South Lot: Hotel

Development of the South Lot will consist of a six- to seven-story hotel with ancillary retail on the ground floor. This includes one level of underground parking and a three-level aboveground parking structure to accommodate 840 cars. The hotel rooms will sit atop two stories of public/support space of the hotel and the at-grade floor level of the parking garage.

The above description reflects the maximum amount of development that can occur; however, the County Board of Supervisors directed that development at this site will be significantly less; i.e., development shall not exceed 200,000 SF (the "Active O pen Space Alternatives").

Midway Museum

The Midway aircraft carrier museum will be located adjacent to and on the south side of Pier 11A (Navy Pier), at the southern end of North Harbor Drive. The 12.8-acre site includes the use of the parking lot on Pier 11A.

6.1.3 Land-Based Projects

(24) NAB - Special Operations Force - Waterfront Operations, Storage, and Alterations (Q-202)

This project involved expansion, renovation, and new construction of support facilities, operational locker rooms, and craft storage immediately adjacent to and south of the P-211 site. It provided additional facilities for storage of small craft and safety equipment, as well as office space for the administrative staff needed to support the increased number of small craft at NAB Coronado.

The impacts of this project were analyzed in the corresponding Environmental Assessment (May 1997) that analyzed both Q-202 and P-211. Construction was completed in 1999.

(25) NAB - Waterfront Operations Building (P-144)

This project was completed in 2001. The project provided facilities for Explosive Ordnance Demolition, Mobile Unit 3; included an administrative building, vehicle maintenance facility, concrete pier, boat ramp, relocated mammal pens, and floating docks from another location at NAB; and demolished several World War II vintage facilities. The impacts of this project were presented in the corresponding Environmental Assessment (EA) (Alcom, 2002).

(26) Convention Center Expansion

Construction is complete on an expansion that has roughly doubled the size of the San Diego Convention Center to 157,930 SM (1.7 million SF). The building now features 48,838 SM (525,701 SF) of contiguous exhibit space; an additional 8,361 SM (90,000 SF) of multifunction space in the Center's Sails Pavilion that can also be used as exhibit space; 18,962 SM (204,114 SF) of meeting space including two 3,716-SM (40,000-SF) ballrooms; and 26,430 SM (284,494 SF) of prefunction, lobby, and registration areas. The expansion was completed in September 2001 (Centre City Development Corporation, 2002).

(27) Seaport Village Expansion

The planned $40 million expansion of this themed waterfront retail/restaurant center covers an additional 17,000 meters (183,000 SF). This project is currently on hold.

(28) Glorietta Bay Master Plan

The Glorietta Bay Master Plan addresses redevelopment of the Glorietta Bay project site that encompasses approximately 5.5 hectares (13.5 acres) located on the northern end of Silver Strand along the shoreline of Glorietta Bay, Coronado. The City of Coronado has jurisdiction over a majority of the project site, with part of the area under jurisdiction of the Port (Coronado Yacht Club), and the U.S. Navy has ownership of the southern end near the NAB. The project includes demolition of the existing City Hall and construction of a new building of about 1,951 gross SM (21,000 gross SF); 3,716 SM (40,000 SF) for a new Community Center, enhanced pedestrian promenade, two small passive-use parks, relocation of the existing boat launch ramp, shoreline stabilization and seawall reinforcement, landscaping, and street right-of-way modifications. The City of Coronado Glorietta Bay Master Plan Draft EIR/EA was circulated for public review in March 2000 and certified in September 2000. The EIR/EA was submitted to the CCC for approval in August 2001.

(29) Point Loma - Marine Mammal Research Facility (P-122)

Construction of a Marine Mammal Research Facility at the Magnetic Silencing Facility was completed in 1993. Construction included replacement of an existing concrete finger pier on Pier 160 and installation of floating walkways at Piers 159, 160, and 302. The installation of floating walkways on Pier 302 occurred within a least tern foraging area.

(30) America's Cup Harbor Redevelopment

In March 2000, the Board of Port Commissioners approved the proposed America's Cup Harbor/Shelter Island Master Plan Study. Elements of the Master Plan include redesign of the Kettenburg Boatyard; development of a continuous public promenade, a park/plaza, and public parking; street enhancement to Shelter Island Drive and North Harbor Drive; and various Port Master Plan land use designation changes. The project will also include maintenance dredging of the basin. Site design options for projects in America's Cup Harbor are being developed. The Draft EIR was completed in August 2001, with the public review period subsequently ending in October 2001 (Port, 2001). The Final EIR was certified in May 2002.

(31) 101 Market

A total of 151 apartments, 1,021 SM (11,000 SF) of commercial space, and 186 parking spaces will be constructed on the block bounded by Market Street and First, Second, and Island avenues. Construction began in September 2000, with project completion targeted by the end of 2002 (CCDC, 2002).

(32) Children's Museum Tower

This project is a 35-story, 198-unit luxury condominium development on the block surrounded by Island Avenue and Market, Front, and Union streets. Pinnacle Residence will be the tallest residential tower in San Diego, rising over 450 feet. It will include three levels of below-grade parking and over 891 SM (9,600 SF) of retail space. The project also includes the construction of a new 3,716- to 5,388-SM (40,000- to 58,000-SF) Children's Museum on the block. Construction began in September 2002, with completion targeted in September 2004 (CCDC, 2002).

(33) Citywalk

Citywalk is a development of 109 town homes, single-level units, and lofts on the block bounded by State, G, Union, and Market streets. Construction is underway, with completion targeted for late 2002 (CCDC, 2002).

(34) Hyatt Regency Expansion

Construction of a 750-room, 33-story tower adjacent to both the existing Hyatt Regency and Seaport Village is currently underway. Project completion is anticipated in July 2003 (CCDC, 2002).

(35) Park Place

The 30-story development includes 178 condominiums and 333 parking spaces. It is situated on the northwest corner of Harbor Drive and Kettner Boulevard. Construction activity began in October 2000, with completion anticipated in late summer 2002 (CCDC, 2002).

(36) Renaissance

The project includes a total of 221 condominiums, 1,207 SM (13,000 SF) of retail space, and 430 parking spaces in two 22-story towers. It is situated on the block bounded by First Avenue and Front, Market, and

G streets. Construction activity began in December 2000, with completion of the first tower anticipated in August 2002, and May 2003 for the second tower (CCDC, 2002).

(37) Ballpark and Ancillary Development

The Ballpark and ancillary development projects are proposed within the East Village south of Market Street, adjacent to the Gaslamp Quarter and across from the Convention Center expansion. The project will include redevelopment surrounding the ballpark such as residential lofts, restaurants, shops, entertainment, cultural activities, and conference facilities, and will be approximately 75 acres.

The ballpark represents the central element of the Ballpark Project and will cover approximately 15 acres. The ballpark will provide fixed seating for approximately 42,500 fans, plus an additional capacity of 3,500 in the "Park at the Park". The ballpark will include two "garden buildings". These buildings will be connected to the ballpark through bridges and walkways and include concessions, retail uses, ticket offices, business offices, and limited parking, amounting to a total of 259,000 SF. Other facilities include a 3,000-SF auditorium and a 3,000-SF Hall of Fame/Interactive Learning Center.

The Park at the Park will be located just beyond the outfield fence of the ballpark and will be surrounded on the other three sides by office, retail, and entertainment uses. The approximately 1-acre park will be accessible only to ticket holders during events, and open to the public at all other times. A mixed-use development area will be located around the perimeter of the Park at the Park. The retail, entertainment, and office uses may comprise a total of 400,000 SF. A series of parking facilities, one parking structure and four surface lots, will provide approximately 2,383 parking spaces. An EIR for the project, entitled *Ballpark and Ancillary Development Projects, and Associated Plan Amendments*, was certified by CCDC in October 1999.

(38) Maritime Master Plan

The Board of Port Commissioners adopted the Maritime Master Plan on October 5, 1999. The Master Plan involves a series of plan elements related to enhancement of San Diego's cruise industry and maritime commerce for long-term economic and public benefits to the San Diego region, and is based on a 20-year forecast (to 2020). The Master Plan elements are as follows:

- Develop the TAMT in a phased manner into a container terminal. The anticipated total cost of all phases is $60.3 million to purchase new equipment (mobile crane, railed cranes), expand the land area of the NCMT, dredge the main shipping channel to a depth of -42 feet MLLW, construct a container lay-down area, and provide limited secondary access.

- Continue development of the NCMT for storage and distribution of lumber and automobiles, and expand these operations as the market conditions demand.
- Provide for a limited secondary access roadway in front of the Port's maintenance facilities for truck access to the TAMT.

(39) South Embarcadero Redevelopment Program 2

The project includes the construction of the San Diego Convention Hotel and the Fifth Avenue Landing Hotel. The San Diego Convention Hotel is a proposed 1,200-room high-rise "Conv ention Headquarters" hotel with meeting room space, restaurants, a parking garage, and other facilities. The main entrance would also provide access to a 2,000-space, six-level above-grade parking garage located along Eighth Avenue, set back approximately 100 feet from Harbor Drive. The Fifth Avenue Landing Hotel is proposed as a 250-room boutique hotel with meeting room space, restaurants, ferry terminal, and other facilities. The project EIR was certified May 2001. It is expected that construction for the Convention Hotel would begin in 2004. The Fifth Avenue Landing Hotel (aka Spinnaker Hotel) would begin construction in 2005.

6.2 Cumulative Impact Analysis

6.2.1 Marine Biological Resources

Impacts to intertidal and subtidal biota, phytoplankton, benthic infauna, macroalgae, and eelgrass are likely to affect the foraging activities of fish, birds, and marine mammals in and around the project site. A reduction in the availability of these primary producers will have repercussions on higher trophic levels in the food web. However, these impacts are less than significant due to their temporary nature, and the availability of many other foraging and habitat areas within San Diego Bay. The remediation of the project site is expected to increase its overall biological productivity and habitat quality within the project site.

The proposed project is being conducted in response to a Cleanup and Abatement Order issued by the Regional Water Quality Control Board. The San Diego Convention Hotel and Fifth Avenue Landing Hotel projects are also planned for this area. This future project includes the construction of two hotels north of the project site, and the construction of approximately 116,000 SF (SF) of a promenade, ferry terminal, and transient marina in the northwest corner of the current project site. Potential effects of this new construction include increased shading from the marina, docks, and the promenade; increased suspended sediment in the basin during construction from runoff; increased foot and vehicular traffic in the area adjacent to the project site; and an increase in the amount of hard substrate available in the basin for the establishment of intertidal and subtidal biotic communities. The current project involves the remediation of contaminated sediments in the basin and creation of an additional intertidal and shallow subtidal habitat.

The proposed project is not expected to contribute to potential adverse impacts of future planned projects in and around the project site. Extensive analyses of the impacts of increased marina traffic, installation of the marina pilings, and effects of shading on the productivity of the basin have been performed. These analyses have found that if proper safeguards are implemented, impacts to biological communities due to the construction of the Convention Center and Fifth Avenue Landing hotels and marina will be less than significant.

Mitigation Measures

No mitigation measures are required other than those proposed in Section 4.1.5 of this EIR.

6.2.2 Water Quality

The region of influence for water quality includes the San Diego Bay watershed, the area in which local water sources are related. Projects occurring in this area have the potential to impact the water quality of the region as a whole.

Many past, present, and reasonably foreseeable projects involve dredging that will create an incremental increase in bathymetry changes in San Diego Bay. Implementation of the Alternative 1: Engineered Cap-in-Place will also involve dredging that will create changes in the bathymetry of San Diego Bay at the project site. Some minor, localized changes in circulation (Bay currents) will result from modifications to the bathymetry. However, these effects will not result in persistent adverse impacts on water quality or biological resources. Most current and reasonably foreseeable development projects are local in their scope and effect (e.g., naval dredging projects, the Central Channel Dredging, the North Embarcadero Alliance Visionary Plan, and the Glorietta Bay Master Plan). The dredging programs have been proposed to ensure that ships have an adequate water depth to navigate the Bay. Thus, there are no cumulative significant impacts to the bathymetry.

Recent or current and reasonably foreseeable projects in the project vicinity affecting water quality include both Navy dredging and Port projects. The proposed action will have a limited region of influence within central San Diego Bay that is largely removed from other projects. It is unlikely that the proposed action and reasonably foreseeable projects will occur concurrently. Due to the temporary nature of dredging and the physical and temporal separation of the proposed action and other reasonably foreseeable projects, their combined cumulative impact on marine water quality will be less than significant.

Of the listed projects for the San Diego Bay region, the additional CVN Homeporting, NAVSTA pier deepening projects, NAVSTA maintenance dredging projects, maintenance dredging for the ARCO floating dry-dock at SUBASE, Central Navigational Channel Deepening, TAMT Maintenance Dredging of

Berths 10-1 and 10-2, TAMT Dredging of Berths 10-3 to 10-6, and south- and central-bay dredging projects will have direct impacts on marine water quality. Types of impacts on water quality from these projects are similar to those described for the Alternative 1: Engineered Cap-in-Place (turbidity and chemical contamination). The cumulative projects also will be subject to regulatory requirements, including Section 303(d) of the Clean Water Act, that will reduce their impacts to less than significant. Similar to the Alternative 1: Engineered Cap-in-Place, some of these reasonably foreseeable projects will likely result in removal of unsuitable sediments from the Bay, which could have a net beneficial impact to water quality. Therefore, the cumulative impact on marine water quality will result from several actions whose individual effects will have been reduced to less than significant. The proposed action and other reasonably foreseeable development projects will be located throughout the Bay and will not be occurring at the same time. Therefore, their cumulative effect will be less than significant, as the concentrations of any discharges and releases will be diffused over space and time.

However, a potential exists for recontamination from urban runoff. Two sources that have the potential to carry contaminated fine and coarse-grained sediments that could be deposited on the remediated area are Switzer Creek and the 30-inch storm drain outfall located north of the existing shipways. Switzer Creek is an urban stream that flows from the western edges of Balboa Park and through the urban center of San Diego. It flows into San Diego Bay via an outfall in front of the TAMT. Both the Creek and the sediments in the vicinity of the above-mentioned outfall were sampled and analyzed on behalf of the Port. The analysis of these samples showed that:

- The concentrations of copper and zinc are well below bay sediment cleanup levels defined in CAO 95-21.
- Total concentrations of lead in two of the samples were above the CAO cleanup criteria of 231 milligrams per kilogram (mg/kg).
- Very few pesticides exist at detectable levels (CAO 95-21 does not specify cleanup levels for these compounds); only Dichloro Diphenyl Dicholoro (DDD), Dichloro Diphenyl Trichloro (DDT), and chlordane were observed at concentrations above the detection limits.
- Although low levels of PCBs are associated with urban runoff sediments upstream of the Campbell Shipyard site, they do not exist at levels above the CAO 95-21 objective of 0.95 mg/kg.
- HPAH concentrations in stream and stream bank sediments exceed the CAO objective for HPAHs of 44 mg/kg.

In addition to Switzer Creek sediments, Ninyo and Moore (2002b) analyzed data from different studies (AMEC 2002, Hart Crowser 2001) at Berths 10-1 and 10-2. Because of the proximity of the sampling sites to the Switzer Creek outfall, these data also likely represent the characteristics of suspended sediments in storm water runoff from the watershed that could be deposited on the cap. Data from the evaluation show that the sediments in front of the Switzer Creek Outfall at the TAMT meet the Objectives of CAO 95-21 for copper, zinc, TBT, HPAH, and TPH. However, one sample had a concentration of lead (238 mg/kg) that exceeded the CAO objective of 231 mg/kg; yet, the 80% upper confidence limit (UCL) for lead of 170 mg/kg is well below the objective. Four samples were above the CAO objective for PCBs of 0.95 mg/kg, with concentrations ranging between 0.998 mg/kg to 1.90 mg/kg, and 80% UCL for PCBs at 0.965 mg/kg. These analyses showed that there is a potential for recontamination of the remediated area by lead and PCB contaminated sediments in storm water runoff from Switzer Creek, especially during and after high-flow storm events. Because the sources of recontamination are outside of the jurisdiction of the Port, the Port is unable to mitigate these impacts. Thus, recontamination from urban runoff poses a cumulative significant and unmitigable impact.

Mitigation Measures

No mitigation measures are required other than those proposed in Section 4.2.5 of this EIR.

6.2.3 Geology and Soils

The region of influence for geology and soils includes the greater San Diego Bay region, due to the interrelated nature of the geology and soils of this region.

Many of the reasonably foreseeable projects in San Diego Bay involve new structural development (e.g., piers, wharves, or buildings) that will be exposed to earthquake-related hazards such as ground acceleration, ground shaking, fault rupture, liquefaction, and settlement. Most of these reasonably foreseeable projects are also located adjacent to San Diego Bay, where hydraulic fill soils with a high potential for liquefaction are prevalent. Cumulative project construction will be primarily within previously developed areas and on nearly level slopes, but could also lead to soil erosion if not designed properly. Implementation of proper mitigation measures will prevent soil erosion and protect the engineered cap from earthquake-related hazards such as ground acceleration, ground shaking, fault rupture, liquefaction, and settlement. Furthermore, by removing and capping contaminated sediments, implementing the Alternative 1: Engineered Cap-in-Place will improve the sediment quality of the San Diego Bay. Therefore, implementation of the Alternative 1: Engineered Cap-in-Place will not have any significant cumulative impacts on soil quality.

Mitigation Measures

No mitigation measures are required other than those proposed in Section 4.3.5 of this EIR.

6.2.4 Air Quality

The analysis of air pollutant emissions to determine conformance to ambient air quality standards is a regional analysis that, by its nature, is cumulative. The state implementation plan (SIP) and 2010 emissions inventory consider foreseeable projects (including those on the cumulative list) and cumulative growth. Section 4.5 demonstrates conformance with the SIP. Because the project has been reviewed and determined to be in conformance with the SIP, there will be no significant cumulative air quality impacts.

Mitigation Measures

No mitigation measures are required other than those proposed in Section 4.4.5 of this EIR.

6.2.5 Noise

Project-specific short-term noise impacts will be significant if project remediation operations are combined with the most intensive TAMT operations, or pile driving is conducted at the same time as events at the Embarcadero Marina Park South or Convention Center. Mitigation measures have been prescribed in Section 4.5 of the document to reduce these impacts to less than significant. Following completion of the Alternative 1: Engineered Cap-in-Place, no noise impacts will occur. Thus, the project will not contribute to cumulative long-term operational noise impacts. Depending on their timing, simultaneous construction of the cumulative projects could result in short-term, cumulatively adverse noise impacts. These impacts will be temporary, ceasing upon completion of construction. Other cumulative construction projects will occur in maritime industrial or urban areas that have a high ambient noise level, such that impacts will be less than significant. Due to the short-term nature of noise generated from the proposed action and other reasonably foreseeable projects, their widespread geographic distribution that will prevent their noise contours from overlapping with one another, and the fact that adjacent project construction will not likely occur simultaneously, cumulative noise impacts will be less than significant.

Mitigation Measures

No mitigation measures are required other than those proposed in Section 4.5.5 of this EIR.

6.2.6 Traffic and Circulation

The region of influence for ground transportation includes the roadway network surrounding San Diego Bay, including I-5 and the local road networks near the Convention Center.

Ground traffic volumes on the study area roadways will steadily increase as a result of regional growth and other development projects in the project area. Traffic generated by the Alternative 1: Engineered Cap-in-Place will create temporary impacts on local traffic conditions. Reasonably foreseeable projects could increase traffic on local roadways. These reasonably foreseeable projects, including disposal of dredged material from the NAVSTA pier deepening and maintenance dredging and Central Channel Deepening, could result in short-term traffic delays and increased congestion should upland disposal be required. Depending on their timing, simultaneous construction of these projects could result in short-term, cumulatively adverse traffic impacts, due to the interconnected nature of the roads that will be impacted by the Alternative 1: Engineered Cap-in-Place. These impacts will be temporary, ceasing upon completion of construction. Due to the short-term nature of traffic generated from the proposed action and other reasonably foreseeable projects, their widespread geographic distribution, and the fact that adjacent project construction will not likely occur simultaneously, cumulative impacts on traffic volumes on study area roadways will be less than significant.

Mitigation Measures

No mitigation measures are required other than those proposed in Section 4.6.5 of this EIR.

6.2.7 Navigational Safety

The effects the Alternative 1: Engineered Cap-in-Place will have on navigational safety will be very local. Thus, the analysis of how project implementation affects cumulative effects only looks at those existing operations and future projects to take place in the vicinity of the project site.

During construction at the former Campbell Shipyard, there may be minimal conflicts between the marine equipment required to place the cap and the vessels transiting the TAMT Berths 10-1 and 10-2. The construction equipment will be required to move away from the tug/ship during the berthing operation. This impact may indirectly impact the other terminals at TAMT, by requiring use of the other terminals during construction if Berth 10-1 cannot be accessed for short durations. This poses a short-term significant impact.

The proposed TAMT Container Facilities Development project will affect approximately 33 acres of the TAMT and facilities. The project area is located in a developed area of the marine terminal and will include the demolition of seven industrial structures, and various reconstruction activities, on the project site. The project should not affect or be affected by the Alternative 1: Engineered Cap-in-Place project, since the project does not include any in-water work.

The Port and the U.S. Army Corps of Engineers are in the process of investigating channel deepening alternatives that will access the TAMT. Should the Navigation Channel Dredging project be approved, the construction can be completed as early as ~~April 2004~~ and will provide a 42-foot-deep channel. This work is not expected to have any impact on navigational safety.

Furthermore, the project is not expected to induce more boating trips into the former Campbell Shipyard site, and thus will not create more boating traffic. Therefore, implementation of the Alternative 1: Engineered Cap-in-Place will potentially create short-term significant cumulative impacts to navigational safety. Implementation of Mitigation Measure 1, described in Section 4.7, will reduce these impacts to below a level of significance.

Mitigation Measures

No mitigation measures are required other than those proposed in Section 4.7.5 of this EIR.

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7.0 OTHER REQUIRED CONSIDERATIONS

7.1 Growth Inducing Impacts

Section 15126.2(d) of the CEQA Guidelines requires that an EIR discuss the ways in which the Alternative 1: Engineered Cap-In-Place could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. The EIR must also discuss the characteristics of some projects which may encourage and facilitate other activities that could significantly affect the environment.

Induced growth is any growth which exceeds planned growth and results from new development which will not take place without the implementation of the Alternative 1: Engineered Cap-In-Place. Typically, the growth-inducing potential of a project will be considered significant if it results in growth or a population concentration that exceeds those assumptions included in pertinent general plans, land use plans, or projections made by regional planning authorities. However, the creation of growth-inducing potential does not automatically lead to growth. Additionally, the State CEQA Guidelines also state that the lead agency must not assume that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

The environmental effects of induced growth are secondary or indirect impacts of the Alternative 1: Engineered Cap-In-Place. Secondary effects of growth could result in significant, adverse environmental impacts, which could include increased demand on community or public services, increased traffic and noise, degradation of air and water quality, and conversion of agricultural land and open space to developed uses. This increase in demand for services will be the result of residential growth within the area. That creates the need for additional development of adequate services to accommodate the growing community.

The Alternative 1: Engineered Cap-In-Place involves the construction of an engineered cap over affected sediment containing constituents of concern (COCs) at concentrations greater than cleanup levels. The Alternative 1: Engineered Cap-In-Place also will include the construction of a protected area to mitigate for the loss of existing eelgrass as a result of construction activities. The engineered cap is expected to consist of 3 to 5 feet of clean sand, gravel, and armoring materials designed to protect against migration and breakthrough of underlying chemical contaminants, provide a clean surface habitat for flora and fauna, protect against boat propeller wash and other erosive forces, and act as a barrier to bioturbation from deep burrowing marine species. The project site consists of approximately 12.9 acres of submerged tidelands and shipways located within the former Campbell Shipyard at the foot of Eighth Avenue. The site is bordered by a concrete bulkhead along the waterfront, the Tenth Avenue Marine Terminal (TAMT) along the southeast, the San Diego Convention Center and Embarcadero Marina Park South to the northwest, and open water shipways of the San Diego Bay to the south. No new housing is proposed with this Alternative 1: Engineered Cap-In-Place. Additionally, minor short-term employment associated with construction will be generated by the Alternative 1: Engineered Cap-In-Place.

Because the Alternative 1: Engineered Cap-In-Place does not propose the development of new structures or the expansion of existing or new utility and public services, it is not considered significantly growth inducing. It will eliminate the potential release of contaminated material by placing an engineered cap over the area of concern. It should be noted that the Alternative 1: Engineered Cap-In-Place is intended to serve as a remediation effort to ensure the containment of potentially contaminated sediments from exposure to the surrounding environment.

7.2 Significant Environmental Effects That Cannot Be Avoided

Section 15126.2(b) of the CEQA Guidelines requires that an EIR describe any significant impacts of the Alternative 1: Engineered Cap-In-Place that cannot be mitigated to below a level of significance. An EIR should also describe where there are impacts that cannot be alleviated without imposing an alternative design, their implications, and the reasons why the project is being proposed, notwithstanding their effect.

Significant environmental effects have been identified in Section 4.0 of this EIR. All significant effects associated with the Alternative 1: Engineered Cap-In-Place can be mitigated to below a level of significance.

7.3 Significant Irreversible Environmental Changes

Section 15126.2(c) of the CEQA Guidelines requires that an EIR describe the significant irreversible environmental changes that will be caused by the Alternative 1: Engineered Cap-In-Place, should it be implemented. The implementation of the Alternative 1: Engineered Cap-In-Place will result in some environmental changes, including a commitment of nonrenewable resources during construction of the Alternative 1: Engineered Cap-In-Place; however, the use of nonrenewable resources will be relatively small and not significant. No indirect or secondary effects of the Alternative 1: Engineered Cap-In-Place were identified in Section 4.0.

7.4 Effects Found Not to be Significant

Section 15128 of the CEQA Guidelines requires that an EIR include a brief statement indicating the reasons that various possible significant effects of a project were determined not to be significant and not discussed in detail. The following issue area is not considered significant and was not discussed in detail in this EIR:

7.4.1 Aesthetics

In accordance with Appendix G of CEQA, the project will have significant aesthetic impacts if the project results in the following:

- Substantial adverse effects on a scenic vista;
- Substantial damage to scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantial degradation of existing visual character or quality of the site and its surroundings; and
- A new source of substantial light or glare which will adversely affect day or nighttime views in the area.

The Alternative 1: Engineered Cap-In-Place involves the construction of an engineered cap over affected sediment containing COCs at concentrations greater than cleanup levels. The Alternative 1: Engineered Cap-In-Place also will include the construction of a protected area to mitigate for the loss of existing eelgrass as a result of construction activities. The engineered cap is expected to consist of 3 to 5 feet of clean sand, gravel, and armoring materials designed to protect against migration and breakthrough of underlying chemical contaminants, provide a clean surface habitat for flora and fauna, protect against boat propeller wash and other erosive forces, and act as a barrier to bioturbation from deep burrowing marine species.

This Alternative 1: Engineered Cap-In-Place is a proposed remediation effort to prevent exposure to the surrounding environment. This remediation consists of approximately 12.9 acres of submerged tidelands and shipways located within the former Campbell Shipyard at the foot of Eighth Avenue. The site is bordered by a concrete bulkhead along the waterfront, the TAMT along the southeast, the San Diego Convention Center and Embarcadero Marina Park South to the northwest, and open water shipways of the San Diego Bay to the south. Capping will occur under the water surface and will not be visible to the public.

Temporary barges in the area are located adjacent to the working marine terminal. Visually, this does not result in a significant contrast with adjacent uses. Additionally, barges will be used intermittently during construction. The addition of a boat dock was evaluated in the Program Environmental Impact Report (PEIR) for South Embarcadero Redevelopment Program 2 and the Port Master Plan, and no visual impacts associated with this addition were determined.

The Alternative 1: Engineered Cap-In-Place is to occur predominantly under the water surface at depths ranging from +7.8 to -33 feet Mean Lower Low Water (MLLW). Therefore, aesthetic impacts were considered to be less than significant to the surrounding land uses. Implementation of the Alternative 1: Engineered Cap-In-Place will not be visible to the public or surrounding land uses.

7.4.2 Agricultural Resources

In accordance with Appendix G of CEQA, in determining whether impacts to agricultural resources are significant environmental effects, the following considerations must be taken into account. Will the project:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resource Agency, to nonagricultural use;
- Conflict with existing zoning for agricultural use, or a Williamson Act contract; and/or
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to nonagricultural use?

The project site consists of approximately 12.9 acres of submerged tidelands and shipways located at the foot of Eighth Avenue in San Diego, California. No agricultural resources were identified on the project site during the preparation of the initial study. Furthermore, because of the location of the site and the project setting, implementing agricultural uses on the site will be considered infeasible. There is no existing agricultural zoning designation on the project site which will conflict with the Alternative 1: Engineered Cap-In-Place. Therefore, it was determined that the Alternative 1: Engineered Cap-In-Place will not result in significant adverse impacts to existing agricultural uses. Furthermore, implementation of the Alternative 1: Engineered Cap-In-Place will not prevent the use of the site for agricultural uses, because of its location in the San Diego Bay and surrounding uses.

7.4.3 Cultural Resources

The Alternative 1: Engineered Cap-In-Place consists of approximately 12.9 acres of submerged tidelands and shipways located within the former Campbell Shipyard at the foot of Eighth Avenue. The site is bordered by a concrete bulkhead along the waterfront, the TAMT along the southeast, the San Diego Convention Center and Embarcadero Marina Park South to the northwest, and open water shipways of the San Diego Bay to the south.

Appendix G to the State CEQA Guidelines defines significant project impacts as those which will result in the following:

- Cause a substantial adverse change in the significance of a historical resource as defined by §5064.5;
- Cause a substantial adverse change in the significance of an archaeological resources pursuant to §15064.5;
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; and/or
- Disturb any human remains, including those interred outside of formal cemeteries.

Based on the results from the initial study, it was determined that the Alternative 1: Engineered Cap-In-Place will not cause a substantial adverse change in the significance of historical or archaeological resources. No historical or archaeological resources were identified onsite. Ninyo & Moore prepared a geotechnical analysis (November 2002) of the project site to identify any potential geologic hazards onsite. No unique geological features were identified which may be impacted by the Alternative 1: Engineered Cap-In-Place. The site was a working boatyard, thus, no significant underwater cultural resources are likely to be affected. There are no known human remains or cemeteries within the project footprint. Additionally, the Alternative 1: Engineered Cap-In-Place will not impact any new areas of land that have not been previously disturbed. Therefore, implementation of the Alternative 1: Engineered Cap-In-Place does not pose a significant impact to cultural resources.

7.4.4 Land Use/Planning

Appendix G to the State CEQA Guidelines defines significant project impacts as those which will result in the following:

- Physically divide an established community;

- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect; and

- Conflict with any applicable habitat conservation plan or natural community preservation plan.

The project site is located between the San Diego Convention Center and the Tenth Avenue Marine Terminal and is bounded by the Convention Center and Convention Center Way/Eighth Avenue to the north, the TAMT to the southeast, and San Diego Bay to the west. The site is made up of three land parcels: one is vacant land formerly occupied by the former Campbell Shipyard, the second is leased to Fifth Avenue Landing Associates, and the third is existing Port and general services The project area encompasses 12.9 acres of water area.

The Alternative 1: Engineered Cap-In-Place is consistent with the existing land and water uses designated in the Port Master Plan. The site will ultimately be used for recreational boating and specialized berthings. This is consistent with the goals and policies of both the Port Master Plan and California Coastal Commission. The Alternative 1: Engineered Cap-In-Place will provide benefits to the marine biota, thus, the Alternative 1: Engineered Cap-In-Place will not conflict with the City's Subarea Plan.

7.4.5 Mineral Resources

In determining the impacts to mineral resources, the following criteria must be considered. As noted in Appendix G to the State CEQA Guidelines, impacts associated with the Alternative 1: Engineered Cap-In-Place will be considered significant if the project will:

- Result in the loss of availability of a known mineral resource that will be of value to the region and the residents of the state; and/or

- Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

The Alternative 1: Engineered Cap-In-Place will not impact any new areas that have not been previously impacted by natural effects from the bay environment or structural development. No significant mineral resources were identified onsite, nor has the project site been designated a potential area containing mineral resources valuable to the region or the state. Therefore, implementation of the Alternative 1: Engineered Cap-In-Place will not result in the loss of significant mineral resources.

7.4.6 Recreation

Appendix G to the State CEQA Guidelines defines significant project impacts as those which will result in the following:

- Will the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility will occur or be accelerated?
- Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

The Alternative 1: Engineered Cap-In-Place is a remediation project which involves the construction of an engineered cap over affected sediment located within the San Diego Bay adjacent to the former Campbell Shipyard. The Alternative 1: Engineered Cap-In-Place is consistent with the existing land and water uses designated in the Port Master Plan. The site will ultimately be used for recreational boating and specialized berthing.

In accordance with Appendix G to the State CEQA Guidelines, it was determined that the Alternative 1: Engineered Cap-In-Place will not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of a facility will occur or be accelerated. The project site is currently vacant and consists of 13 acres of water area.

7.4.7 Population/Housing

Appendix G to the State CEQA Guidelines defines significant project impacts as those which will result in the following:

- Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?
- Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

The Alternative 1: Engineered Cap-In-Place is a remediation project for contaminated bay sediments. This is primarily a "water-based" project, and will involve minimal activity on the land side of the project site. The Alternative 1: Engineered Cap-In-Place does not involve the construction of housing units, nor does it displace current residents by removing existing housing. No permanent structures or extensions of existing utility/service systems are proposed to be developed for the Alternative 1: Engineered Cap-In-Place. The Alternative 1: Engineered Cap-In-Place will not induce substantial population growth in the local area, as the construction of the project is of a short duration (one to two years). Once the project is completed, only monitoring and maintenance will be required. The local work force will be able to do the work required for the Alternative 1: Engineered Cap-In-Place, and an influx of labor from out of the area is not anticipated.

7.4.8 Utilities/Service Systems

Appendix G to the State CEQA Guidelines defines significant project impacts as those which will result in the following:

- Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?
- Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?
- Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?
- Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

The Alternative 1: Engineered Cap-In-Place will not require the extension of existing utility/service systems, nor will the Alternative 1: Engineered Cap-In-Place create a disruption of services to the surrounding land uses. The Alternative 1: Engineered Cap-In-Place involves the construction of an engineered cap over contaminated sediments that contain COCs at concentrations greater than cleanup levels. No new utilities/service systems are required to implement the Alternative 1: Engineered Cap-In-Place.

Construction of the cap will require extension of the Eighth Avenue storm drain outfall to the edge of the Alternative 1: Engineered Cap-In-Place to prevent discharge onto its surface. This expansion is not anticipated to create any additional hazards to the surrounding environment. The relocation of the drain outfall prevents additional disturbance to the engineered cap.

Because there are no new permanent structures to be developed with this Alternative 1: Engineered Cap-In-Place, new utility/service systems will not be required. Therefore, implementation of the Alternative 1: Engineered Cap-In-Place will not result in an increased demand for utility/service systems or require the extension of existing utility/service systems.

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Justin Semion

I confirm that to the best of my knowledge, the statements and information contained in this report are correct and true, and that all known information concerning the potentially significant environmental effects of the proposed action has been included and addressed in the Environmental Impact Report.

Betty Dehoney, CEP Principal	Date

11.0 Mitigation Monitoring and Reporting Program

The following mitigation measures (Table 11.0-1) shall be incorporated into the final design program. These measures are specifically focused for the Alternative 1: Habitat Cap. In the event that one of the alternatives is selected, that project will be reviewed to ensure that these measures are implemented. These measures will be monitored by the San Diego Unified Port District Environmental Review Coordinator.

Table 11.0-1
Mitigation Monitoring and Reporting Program

Mitigation Measure	Monitoring Request	Responsible for Mitigation Implementation	Completion Request	Agency Responsible for Verification
Marine Biology				
Mitigation Measure B-1. Water Quality To minimize the potential short-term impacts to water quality from dredge and fill activities, certain operational controls will need to be implemented. ▪ **The use of a silt curtain will reduce impacts related to the resuspension of sediment, turbidity, and potential spills.** The use of a silt curtain will prevent areas outside of the project site from being impacted by the proposed project. Silt curtains have been shown to confine suspended sediments to specific areas, and can also be effective in controlling any possible spills from machinery used during construction. All crews will be trained in proper procedures to follow in the event of such a spill. ▪ **During capping, controlled placement of the initial layers of cap material on existing sediment will reduce the amount of suspended sediment in the project site and also reduce the amount of contaminated sediment present in the water column during construction.** The contractor shall place initial layers of cap material in thin lifts, using either a clamshell dredge or hydraulically spraying the material from a barge, will be sufficient to avoid the resuspension of contaminated sediments.	A condition will be placed on the plans and specifications	Port of San Diego	Approval of final design/site plans	Port of San Diego
Mitigation Measure B-2. Construction Related Adequate facilities shall be provided in which to dispose of garbage, and workers shall be trained as to the requirement to and importance of controlling waste during construction at the project site.	A condition will be placed on the plans and specifications	Port of San Diego	Approval of final design/site plans	Port of San Diego

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Table 11.0-1. Mitigation Monitoring and Reporting Program (Continued)

Mitigation Measure	Monitoring Request	Responsible for Mitigation Implementation	Completion Request	Agency Responsible for Verification
Mitigation Measure B-3. Eelgrass The 0.33-acre eelgrass bed present on the project site will be impacted as a result of this project. A site-specific mitigation plan shall be prepared, and pursuant to the Southern California Eelgrass Mitigation Policy, the following components shall be included (see below). Any additional requirements laid out in the Army Corps of Engineer's (ACOE) 404 permit and Section 10 of the Rivers and Harbors Act permit and conditions as stipulated by the NMFS will also be followed. ▪ **Demonstrate avoidance and minimization of impacts to eelgrass where possible.** Since the eelgrass beds are growing on sediment which must be remediated, avoidance of the eelgrass is not possible while still accomplishing the project's goals. ▪ **Survey and map the eelgrass coverage prior to construction.** Mapping efforts must be completed no earlier than 120 days prior to the start of construction if conducted between March 1 and August 1. If the mapping survey is conducted between August 1 through October 31, the survey is valid until March of the following year. All active eelgrass beds, as well as those areas that have the proper depth and substrate for eelgrass but which currently lack vegetation, are to be included in this survey. These areas are to be mapped according to protocols outlined in the Southern California Eelgrass Mitigation Policy. ▪ **Survey and map the eelgrass coverage following construction.** Within 30 days of construction, a postconstruction survey shall be completed to determine the actual area of impact of the project. If it is determined that the entire area of eelgrass was impacted, this survey may not be necessary.	A condition will be placed on the plans and specifications	Port of San Diego	Approval of final design/site plans	Port of San Diego

Table 11.0-1. Mitigation Monitoring and Reporting Program (Continued)

Mitigation Measure	Monitoring Request	Responsible for Mitigation Implementation	Completion Request	Agency Responsible for Verification
▪ **Identify appropriate mitigation site.** Factors such as distance from the project, depth, sediment type, distance from ocean connection, water quality, and currents are among those that should be considered in evaluating a potential site. For this project, onsite mitigation in an area of the project site that is similar to the impacted area, and will not be impacted by the future installation of marina piers is most appropriate. ▪ **Mitigate for the loss of eelgrass habitat at a ratio of 1.2 to 1.** A 1.2 to 1 mitigation ratio is required for all impacts greater than 100 square meters, with mitigation occurring following the start of the project. A 1 to 1 mitigation ratio is required if the project impacts less than 100 square meters of eelgrass habitat. ▪ **Mitigation technique for construction and planting of eelgrass mitigation shall be consistent with best available technology.** Donor material used in mitigation shall be taken from the area of impact whenever possible, but should also include material from a minimum of two additional distinct sites, to better ensure genetic diversity of the donor plants. No more than 10% of an existing unimpacted bed shall be harvested for transplanting purposes. ▪ **Transplanting should begin no later than 135 days following the completion of construction.** If mitigation cannot begin within 135 days of project completion, the mitigation obligation shall increase at a rate of 7% for each month of delay. ▪ **Five-year monitoring program.** Monitoring activities shall determine the area and density of eelgrass at the mitigation site and shall be conducted at 3, 6, 12, 24, 36, 48, and 60 months after the completion of the transplant.				

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Table 11.0-1. Mitigation Monitoring and Reporting Program (Continued)

Mitigation Measure	Monitoring Request	Responsible for Mitigation Implementation	Completion Request	Agency Responsible for Verification
Water Quality				
Mitigation Measure WQ-1: Turbidity Operational controls will be in place during construction to ensure sediment disturbance is kept to a minimum. During capping, the contractor will place the initial layers of the cap in thin lifts using either a clamshell bucket or by hydraulically placing the material from a barge. These placement methods reduce the vertical impact and lateral spreading of the cap material, thus reducing the potential for resuspending the bottom sediment. Controlled placement also minimizes the mixing of cap and underlying sediment by allowing the sediment to slowly gain strength before subsequent layers are deposited. For dredging operations, operational controls such as selection of appropriate dredge buckets, use of silt curtains, and/or control of cycle times minimize potential sediment resuspension and related turbidity. Water quality monitoring will be conducted during construction to ensure that significant resuspension of sediments to the water column are not occurring beyond the mixing zone boundaries.	A condition will be placed on the plans and specifications	Port of San Diego	Approval of final design/site plans	Port of San Diego

Table 11.0-1. Mitigation Monitoring and Reporting Program (Continued)

Mitigation Measure	Monitoring Request	Responsible for Mitigation Implementation	Completion Request	Agency Responsible for Verification
Mitigation Measure WQ-2: Pile Driving To prevent impacts from piles being driven into the cap, potential displacement and pore water pressure changes shall be incorporated into the design of the cap whether it is thick (i.e., >3 feet) or thin (i.e., approximately 6 inches). Follow-up procedures to the design to ensure cap effectiveness might include placing additional cover material in areas of depression surrounding the pile or divots upslope after pile driving has been completed. When a cap design anticipates the impacts associated with the installation of piles, it is reasonable to assume that the affected portion of the cap may have a reduced efficiency for a short time. However, the overall potential for reduced effectiveness of the cap is negligible compared to the potentially affected area versus the overall surface area of a cap. The possible short-term impacts of pile driving will be monitored as part of the project's overall monitoring and maintenance program	A condition will be placed on the plans and specifications	Port of San Diego	Approval of final design/site plans	Port of San Diego
Monitoring and Monitoring Program To assess water quality within the project area, the following mitigation and monitoring program developed by Anchor (2003b) will be implemented. Short-term water quality monitoring will take place at designated reference (background) stations upstream and downstream of the project site and near the point of active remedial activities. Water quality analyses will include measurements of turbidity, PCBs, HPAHs, metals, and other contaminants, if appropriate. These measurements will ensure that Waste Discharge Requirements (WDR) imposed by the San Diego Regional Water Quality Control Board for the project are maintained.	A condition will be placed on the plans and specifications	Port of San Diego	Approval of final design/site plans	Port of San Diego

Table 11.0-1. Mitigation Monitoring and Reporting Program (Continued)

Mitigation Measure	Monitoring Request	Responsible for Mitigation Implementation	Completion Request	Agency Responsible for Verification
Long-term water quality monitoring will involve the evaluation of sediment cores at key locations through the engineered and habitat caps, up to 5 feet long, for the constituents of concern to determine if vertical migration of the contaminated sediment through the caps is occurring. Core samples will generally be taken at thinner portions of the cap, and will not penetrate into contaminated sediments. Surface sediments for the top 10 centimeters of the caps will also be analyzed for constituents of concern, to determine if recontamination associated with deposition of sediments from surface waters is occurring. A contingency plan will be prepared to respond to degradation of structural features associated with the remediation, erosion of caps, breaks, or other means by which biota or flora are exposed to contaminated sediments in the project area. If there is an instability, or breach of the remedial structures, those features will be repaired in a timely manner. If it is impossible to repair the affected area, an alternative cleanup plan will be adopted.				
Geology and Soils				
Mitigation Measure G-1. Liquefaction Several liquefaction mitigation measures are possible for the cap; while they may improve overall cap stability, they will not fully alleviate the potential for damage in a seismic event. Such measures include: ▪ Incorporating gravel layers for pore pressure relief. ▪ Incorporating filter layers within the cap to inhibit the migration of soil particles. ▪ Densification of the cap to prevent liquefaction (although this alternative may not be economically feasible). ▪ Assessing potential damage to the engineered cap after the earthquake and recapping impacted areas as needed.	A condition will be placed on the plans and specifications	Port of San Diego	Approval of final design/site plans	Port of San Diego

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Table 11.0-1. Mitigation Monitoring and Reporting Program (Continued)

Mitigation Measure	Monitoring Request	Responsible for Mitigation Implementation	Completion Request	Agency Responsible for Verification
Mitigation Measure G-2. Seismic Stability Three potential measures to mitigate the effects of lateral spreading are: ▪ The inclusion of rock retaining berms along the edges of the cap and within the interior of the cap areas. ▪ Reducing the inclination of the engineered cap surface, particularly if the slope angle can be reduced to approximately 5 to 7 degrees (the slope angle above which 'flow'-type liquefaction failures could occur). ▪ Assessing the damage after the earthquake and recapping the impacted areas.	A condition will be placed on the plans and specifications	Port of San Diego	Approval of final design/site plans	Port of San Diego
Mitigation Measure G-3. Settlement If a capping material is chosen that is likely to sink below an elevation suitable for serving as a habitat for targeted species due to settlement, a more extensive armor cap will be needed at the surface to avoid erosion. This cap will likely be a combination of sands and gravels. This armor cap will likely be thick, since the underlying fine-grained materials will have low strength and, as such, require a bearing layer to limit mixing of soils between the general cap and the armor cap.	A condition will be placed on the plans and specifications	Port of San Diego	Approval of final design/site plans	Port of San Diego
Monitoring and Monitoring Program To assess the condition of the engineered cap, the following mitigation and monitoring program developed by Anchor Environmental, LLC (2003b) will be implemented. Short-term geologic monitoring will entail inspection of the contractor's work on a regular basis to ensure that project plans and specifications are being met. Construction monitoring will also include the following:	A condition will be placed on the plans and specifications	Port of San Diego	Approval of final design/site plans	Port of San Diego

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Table 11.0-1. Mitigation Monitoring and Reporting Program (Continued)

Mitigation Measure	Monitoring Request	Responsible for Mitigation Implementation	Completion Request	Agency Responsible for Verification
▪ Bathymetric surveys to evaluate cap thicknesses and dredge depths. ▪ Bathymetric and diver surveys to assess the accuracy of berm placement and quality of berm construction. ▪ Cap consolidation monitoring. At the end of the remediation project, soundings of the affected area will be made and mapped. A report summarizing the sounding results will be prepared for timely review. Any areas that are deficient in meeting the specifications for the project will be addressed at that time. Long-term monitoring will entail recording the bathymetry of the site, and performing visual diving inspections. These surveys will be utilized to assess the integrity of structural features (berms, revetments, mole piers), and assess the impacts of erosion and shoaling in the area. Subbottom profiling, by core sampling or using a sediment profiling camera, may be used intermittently over the life of the project to assess the physical integrity of the cap. Core samples will be retrieved in a manner that does not threaten the integrity of clean caps. Markers will also be established so that potential long-term erosional problems can be identified. A contingency plan will be prepared to respond to degradation of structural features associated with the remediation, erosion of caps, breaks, or other means by which biota or flora could be exposed to contaminated sediments in the project area. If there is an instability, or breach of the remedial structures, those features will be repaired in a timely manner. If it is impossible to repair the affected area, an alternative cleanup plan will be adopted.				

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Table 11.0-1. Mitigation Monitoring and Reporting Program (Continued)

Mitigation Measure	Monitoring Request	Responsible for Mitigation Implementation	Completion Request	Agency Responsible for Verification
Air Quality				
Mitigation Measure AQ-1. NO_x Emissions NO_x emissions can be maintained at less-than-significant levels if a diesel-powered dredge is used that has a valid state operating permit. Mitigation of the NO_x impacts is also possible through the use of an electrified dredge instead of a diesel-powered dredge. Use of either a state-registered dredge, or an electric dredge will reduce NO_x emissions to below a level of significance.	A condition will be placed on the plans and specifications	Port of San Diego	Approval of final design/site plans	Port of San Diego
Noise				
Mitigation Measure N-1. Ambient Noise Monitoring Coordination of project remediation operations with the most intensive Tenth Avenue Marine Terminal operations and special events at the San Diego Convention Center and the Embarcadero Marina Park South will reduce noise impacts.	A condition will be placed on the plans and specifications	Port of San Diego	Approval of final design/site plans	Port of San Diego
Mitigation Measure N-2. Construction Coordination of the pile-driving schedule with any planned outdoor events at the Embarcadero Marina Park South or the Convention Center outdoor terrace will be needed to preclude noise interference.	A condition will be placed on the plans and specifications	Port of San Diego	Approval of final design/site plans	Port of San Diego

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Table 11.0-1. Mitigation Monitoring and Reporting Program (Continued)

Mitigation Measure	Monitoring Request	Responsible for Mitigation Implementation	Completion Request	Agency Responsible for Verification
Navigational Safety				
Mitigation Measure NG-1. TAMT Construction During construction of the cap alternative, coordination with the TAMT will be required to ensure that minimal disturbance to the throughput is maintained. The southern portion of the cap alternative would be more efficiently constructed outside of the fall season, when there is an increase in produce vessels using the TAMT. Construction coordination will ensure that at least one berth between Berths 10-1 and 10-2 is always available. Furthermore, it is critical that the cap is constructed in a way that will allow at least 300 feet of free navigation area from the face of the berths. With these mitigation measures, impacts to navigation and the TAMT will be reduced to below a level of significance.	A condition will be placed on the plans and specifications	Port of San Diego	Approval of final design/site plans	Port of San Diego
Mitigation Measure NG-2. Operational The TAMT will coordinate with the Port Wharfinger to prevent conflicts from arising between larger vessels departing Terminal 10-1 and vessels berthed at Terminal 10-2.	A condition will be placed on the plans and specifications	Port of San Diego	Approval of final design/site plans	Port of San Diego
Mitigation Measure NG-3. Proposed Dock: Hotel Dock The Port shall provide signage displaying the depths surrounding the hotel dock in order to make boaters aware of the depths of water surrounding these areas.	A condition will be placed on the plans and specifications	Port of San Diego	Approval of final design/site plans	Port of San Diego
Mitigation Measure NG-4. Proposed Dock: Floating Dock The Port shall provide signage indicating that the loading or unloading of passengers must be avoided while tugboats are maneuvering vessels to the TAMT.	A condition will be placed on the Coastal Development Permit	Port of San Diego	Coastal Development Permit	Port of San Diego

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Table 11.0-1. Mitigation Monitoring and Reporting Program (Continued)

Mitigation Measure	Monitoring Request	Responsible for Mitigation Implementation	Completion Request	Agency Responsible for Verification
Mitigation Measure NG-5. Proposed Dock: Transient Marina The Port shall provide signage indicating that the berthing of vessels along the transient marina shall be avoided during dangerous weather conditions.	A condition will be placed on the Coastal Development Permit	Port of San Diego	Coastal Development Permit	Port of San Diego
Mitigation Measure NG-6. Ferry Landing The Port shall provide signage displaying the depths surrounding the ferry landing in order to make boaters aware of the depths of water surrounding these areas, and that the berthing of vessels along the ferry landing shall be avoided during dangerous weather conditions.	A condition will be placed on the Coastal Development Permit	Port of San Diego	Coastal Development Permit	Port of San Diego
Mitigation Measure NG-7. Hotel Dock The Port shall provide signage stating that the berthing of vessels along the north side of the hotel dock must be avoided during dangerous weather conditions.	A condition will be placed on the Coastal Development Permit	Port of San Diego	Coastal Development Permit	Port of San Diego
Mitigation Measure NG-8. Mole Structure The Port shall provide navigational buoys to mark where the submerged mole structure is located in order to avoid conflicts with the habitat cap and mole structure.	A condition will be placed on the Coastal Development Permit	Port of San Diego	Coastal Development Permit	Port of San Diego
Mitigation Measure NG-9. Ferry Landing The Port shall provide signage stating that the east side of the proposed ferry landing will not be available for berthing.	A condition will be placed on the Coastal Development Permit	Port of San Diego	Coastal Development Permit	Port of San Diego

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CONSTRUCTION QUALITY ASSURANCE REPORT AND DOCUMENTATION OF CONSTRUCTION COMPLETION

SEDIMENT REMEDIATION AND AQUATIC ENHANCEMENT FORMER CAMPBELL SHIPYARD SITE

(CAMPBELL SHIPYARD BAY SEDIMENT CAP)

U.S. Army Corps of Engineers Permit No. 199915203-JLB

Regional Water Quality Control Board Order No. R9-2004-0295

Prepared for

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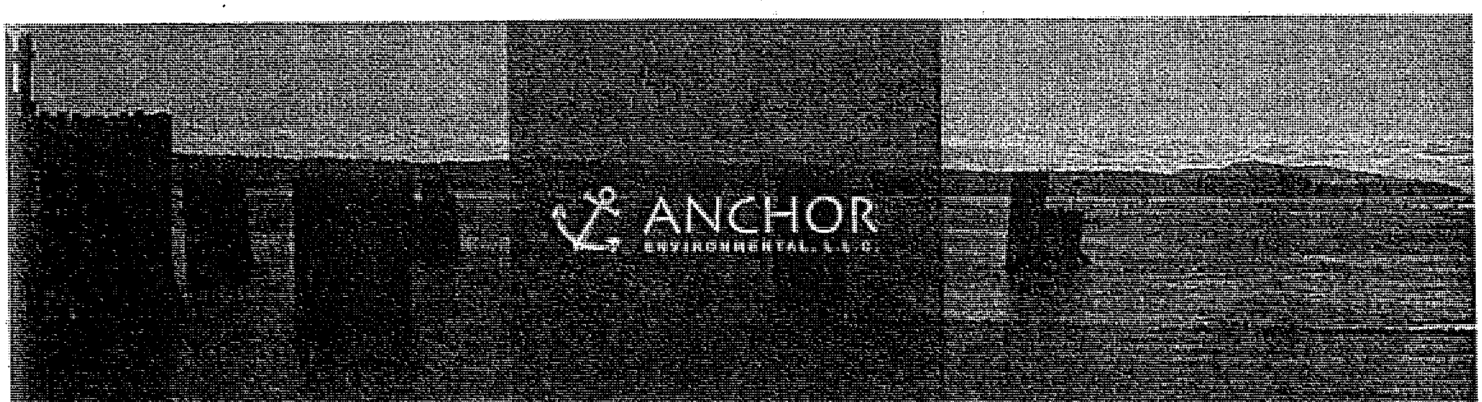
June 2008



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EXECUTIVE SUMMARY

This report documents the San Diego Unified Port District's (Port's) completion of cleanup activities for sediments at the former Campbell Shipyard site in San Diego, California. These actions were required by Cleanup and Abatement Order (CAO) No. 95-21 issued by the Regional Water Quality Control Board (RWQCB) in 1995 (and amended in 2001). The purpose of the sediment cleanup was to remediate sediments known to be contaminated by copper, lead, zinc, petroleum hydrocarbons, tributyltin (TBT), and other organic compounds.

The CAO also mandated cleanup of upland soils and groundwater, which was conducted as a separate action by the Port and prior to the sediment work. This report briefly summarizes the Port's completion of upland soils and groundwater cleanup activities and its documentation and acknowledgement by the RWQCB.

Construction work for the sediment cleanup consisted of localized demolition and debris removal, dredging to required minimum depths, and construction of a sediment cap consisting of a 2-foot-minimum thickness of sand overlain by gravel and armor rock layers. The cap was also underlain by a layer of filter fabric. In some areas, soft sediments were strengthened by the addition of foundation rock in order to provide a firm surface upon which the cap could be built. An eelgrass habitat cap area was also constructed in the middle of the site and bordered on two sides by a protective rock dike.

Sand and gravel materials used for constructing the cap were tested to ensure compliance with site chemistry requirements and were found to meet these criteria without exception. The majority of the sand material used to construct the cap was excavated from the Grand Caribe Island, at the Coronado Cays in the southern portion of the San Diego Bay. Later in the project, additional sand was obtained from a private aggregate pit in Mission Valley.

The Port also completed the construction of a capped eelgrass area as required for mitigation of eelgrass loss during construction. The eelgrass area occupied a footprint of 1.6 acres and had a final surface elevation ranging from approximately -3 to -6 feet mean lower low water (MLLW).

Both the contractor (i.e., Traylor Pacific) and the Port carried out detailed programs for quality control and quality assurance during the sediment cleanup construction work. These programs were intended to evaluate compliance of construction activities with the requirements of the

contract documents and regulatory permits. Regular progress surveys and field inspections (including diver inspections of placed cap material) were used to document construction progress and consistency with project requirements. This report includes the results of key progress surveys, which when combined with diver inspections, confirmed that the necessary amounts and thicknesses of capping materials were successfully installed at the site.

In June 2008, the Port will be initiating a long-term monitoring program for the sediment cap, which will include sampling of cap material and porewater, diver inspections, and cap surveys to be conducted at prescribed frequencies over a 20-year period.

1 OVERVIEW OF PROJECT

The San Diego Unified Port District (Port) has completed remedial actions at the former Campbell Shipyard site in San Diego, California, as required under Cleanup and Abatement Order (CAO) No. 95-21, issued by the Regional Water Quality Control Board (RWQCB; RWQCB 1995 and 2001a). The purpose of this report is to document the completion of remedial actions at the site and provide verification that the cleanup actions were accomplished in full compliance with the CAO and with the project plans and specifications.

This report is intended to meet the requirements of Item H, "Final Report for Completion of Dredging," in the Monitoring and Reporting Program (MRP) issued by the RWQCB on October 13, 2004. Specifically, this report is equivalent to the "Final Construction Quality Assurance (CQA) Report" that is specified in Item H of the MRP.

Although not specifically required by the MRP, this report also includes a summary of activities and documentation related to the completion of landside cleanup activities at the site (as required by the CAO).

1.1 Site Description and Cleanup Requirements

The former Campbell Shipyard site is located on the northeastern shore of the San Diego Bay, between the San Diego Convention Center and the Tenth Avenue Marine Terminal. The general location of the site is shown on Figure 1-1. The remediation area extends along approximately 1,200 linear feet of shoreline and encompasses both the upland area behind the site seawall and offshore sediments.

In 1995, the RWQCB issued CAO No. 95-21 to Campbell Industries in order to initiate cleanup of contaminated upland soils, groundwater, and bay sediments at the site. Based on the results of numerous site investigations and sampling programs, CAO No. 95-21 ordered the cleanup of sediments contaminated by the following constituents:

- Copper
- Zinc
- Lead
- Total Petroleum Hydrocarbons (TPHs)
- High Molecular Weight Polyaromatic Hydrocarbons (HPAHs)

- Polychlorinated Biphenyls (PCBs)
- Tributyltin (TBT)

Primary project goals were as follows:

- Removing and/or isolating contaminated sediments that pose a threat to human and ecological health
- Maintaining existing and planned site uses for the former shipyard and the surrounding properties
- Restoring and mitigating for ecological habitat

1.2 Review of Completed Cleanup Actions

Remediation of soil and groundwater for the upland portion of the site was completed by the Port in 2001. This work was completed in a segmental fashion, as is described in Section 2 of this report, and sediment remediation was done as a separate activity.

For sediment remediation, various cleanup alternatives were considered and compared, as documented in a Draft Environmental Impact Report (DEIR) for the project. The selected and preferred alternative was the "Cap-in-Place" alternative, which was judged by the Port as best suited to meeting a wide variety of needs for all site and project stakeholders. In particular, this cleanup alternative was estimated to have the following advantages:

- Provides clean substrate over contaminated sediments and effectively isolates those sediments from human and ecological receptors, including benthic organisms, fish, birds, and mammals
- Provides an adequate area for operating large vessels and tugboats at Berths 10-1 and 10-2 at the adjacent Tenth Avenue Marine Terminal
- Provides water depths that allow room for recreational and commercial boating activities over a large area of the leasehold
- Is consistent with the North Embarcadero Master Plan
- Provides navigation access to the bay
- Is the most cost-effective solution that meets a large cross section of stakeholder needs

Sediment remediation was conducted between 2005 and 2007 under a single construction contract that was administered by the Port and awarded to Traylor Brothers (conducting business as Traylor Pacific). Cleanup actions for offshore sediments were effectively completed in December of 2007 and planting of new eelgrass in the eelgrass habitat area was completed in April of 2008.

1.3 Summary of This Report

This report is divided into the following subsections that describe and present various aspects of the construction work that was performed at the site:

- Section 2 presents a summary of landside cleanup actions undertaken by the Port prior to 2001
- Section 3 describes the Construction Quality Assurance (CQA) management organization for the project
- Section 4 describes regular CQA testing protocols and results, including the results of construction progress surveys and environmental monitoring
- Section 5 documents testing, reporting, and certification for testing of materials used on the project
- Section 6 describes the long-term monitoring program that will be used for the completed sediment cap

Supporting information is provided in the form of tables, figures, and appendices following the main body of the report.

2 COMPLETION OF LANDSIDE CLEANUP

The work documented in this section was conducted and overseen by the Port of San Diego, their consultant Ninyo and Moore, and their representatives (who prepared this section). Anchor Environmental CA, L.P. (Anchor), the overall author of this report, was not involved with the landside cleanup work.

This section presents a summary of landside cleanup activities undertaken by the Port as part of the process of meeting the requirements of CAO No. 95-21. The landside work was undertaken in numerous steps and was ultimately completed in 2006. Figure 2-1 presents an overview of the extent of the landside cleanup activities. Relevant letters documenting the completion of upland soils and groundwater cleanup, and the RWQCB's acknowledgement of this completion, are provided as Appendix A.

2.1 Historical Setting

The former Campbell Shipyard landside lease parcel is bounded by the present Dole leasehold to the east, Fifth Avenue Landing to the west, Harbor Drive and Convention Way to the north, and the San Diego Bay to the south (Figure 2-1).

Historical site uses resulting in environmental impacts to the landside areas included:

- A shipyard operated by Campbell Industries Marine Construction and Design Company (Campbell) from approximately 1915 to the 1990s
- A fueling wharf, a gasoline underground storage tank (UST), an aboveground tank farm, and aboveground and belowground petroleum pipelines operated by General Petroleum (predecessor of ExxonMobil Corporation) from 1935 to 1976
- A tar basin and gas works settling tank associated with the former Station A manufactured gas plant (MGP; located across Harbor Drive) operated by San Diego Consolidated Gas & Electric Company (SDCG&E, predecessor of San Diego Gas & Electric Company) from the 1880s to the 1930s
- A rubbish dump and burn site, referred to as the 8th Avenue Tidelands dump, operated by the City of San Diego

Due to numerous environmental concerns associated with these and other industrial uses of the site and vicinity, the RWQCB issued CAO No. 95-21 establishing Contaminants of

Concern (COCs) and associated cleanup levels for on-shore soil and groundwater, and offshore bay sediments (RWQCB 1995). In June 2001, the RWQCB issued revised soil and groundwater cleanup levels for the site in Addendum No. 3 of the CAO (RWQCB 2001a).

The Port divided the landside environmental impacts into three general cleanup program areas based on historical uses described in the CAO:

- Program 1 consisted of the area north of former Gull Street, impacted by MGP waste from former SDCG&E operations, and referred to as the East Parking Lot site. In addition to MGP wastes, burned refuse, and/or buried refuse, associated with the former 8th Avenue Tidelands Dump, and a former incinerator was also known to have been present in the area (Ninyo and Moore 2001a). Groundwater monitoring data indicated that the burned refuse/ash had not impacted groundwater and therefore, did not require remediation under the CAO (Ninyo and Moore 2001b).
- Program 2 consisted of the landside areas south of former Gull Street and impacted by petroleum hydrocarbon releases from the operations by the former General Petroleum.
- Program 3 was on the bay side portion of the lease and consisted of impacted bay sediments.

This section briefly describes the site characterization, remediation, and closure of the landside cleanup areas in Programs 1 and 2.

2.2 Landside Petroleum Cleanup

Numerous environmental site assessments by the Port showed petroleum hydrocarbon impacts on the landside areas of the former Campbell Shipyard site, including free product on groundwater and soil impacts exceeding CAO cleanup levels (Kleinfelder 2000). These impacts were addressed as three areas:

- Area 1 impacts were caused by releases from the General Petroleum's former aboveground tank farm.
- Area 2 impacts were caused by releases from the General Petroleum former aboveground and belowground petroleum pipelines that traversed the seawall.
- Area 3 impacts were caused by releases from the General Petroleum former 2,000-gallon UST.

To address the presence of free product on groundwater and concentrations of COCs in soil and groundwater exceeding CAO cleanup levels, the RWQCB requested a corrective action plan.

Kleinfelder prepared a Remedial Action Work Plan (RAWP), dated December 6, 2000, to remediate petroleum-impacted soil in Areas 1, 2, and 3 (Kleinfelder 2000). In 2001, the Port retained Roy F. Weston, Inc. (Weston) to implement the RAWP. The RWQCB approved the RAWP and Weston work plans and sampling plans (Weston 2001a, b) in a letter dated August 17, 2001 (RWQCB 2001b).

Weston remediated the landside cleanup Areas 1, 2, and 3 by removing free product on groundwater and remediating petroleum-impacted soil by excavating the soil, stabilizing the soil by mixing with 5 percent Portland cement in a pug mill, and placing the soil above groundwater. The extent of removal was verified by excavation area sidewall and bottom confirmation sampling. Permanent shoring was placed adjacent to the seawall to facilitate soil excavation. On the south side of Area 2, the seawall, tie back anchors, and a deadman were removed and soil mixed with 10 percent Portland cement was used to buttress the soil behind the former seawall. Free product and soil-impacts further south of Area 2 (toward the bay) could not be remediated since these impacts were beyond the high tide line and required a Section 404 Permit from the U.S. Army Corps of Engineer (USACE). The former 2,000-gallon gasoline UST was removed from the Area 3 excavation. The landside petroleum cleanup was completed, and the site backfilled and paved in December of 2001. The remediation and site restoration activities are described in a closeout report prepared by Weston (2002). In a letter dated June 17, 2002, the RWQCB accepted the cleanup performed by Weston and directed post-remediation groundwater monitoring to evaluate the long-term effectiveness of the cleanup (RWQCB 2002a).

Ninyo and Moore installed a network of monitoring wells in and around landside cleanup Areas 1, 2, and 3 in accordance with the RWQCB directive (Ninyo and Moore 2002a). Six events of groundwater monitoring, over approximately 18 months, indicated that groundwater quality in a majority of the wells had attained the CAO No. 95-21 Addendum 3 cleanup goals (Ninyo and Moore 2003a, b, 2004a). Monitoring well MW-22, located adjacent to and east of the former UST in Area 3, had benzene concentrations exceeding the cleanup goals. Monitoring well MW-24 had concentrations of dissolved nickel higher than other site wells. Locations of former monitoring wells MW-22 and MW-24 are shown on Figure 2-1. In a letter dated March 1, 2004, the RWQCB issued case closure for the landside petroleum cleanup program with directions to further investigate the source of petroleum hydrocarbon impacts in groundwater at MW-22, investigate the source of dissolved nickel in groundwater at MW-24 (RWQCB 2004a), and abandon the other site wells.

2.3 Spinnaker Petroleum Cleanup

The Spinnaker Petroleum Cleanup area, also referred to as "Area 3A," addressed petroleum hydrocarbon impacts in groundwater at monitoring well MW-22 that were encountered during the post-remediation groundwater monitoring of the landside petroleum cleanup program. As noted in the previous section, Area 3 was remediated by Weston in December of 2001 in order to remove petroleum hydrocarbon sources of groundwater contamination caused by releases from the former 2,000-gallon gasoline UST.

Ninyo and Moore performed a series of subsurface site assessments and delineated the sources of the groundwater contamination in MW-22 (Ninyo and Moore 2002b, 2003c, d, e, f). The sources of groundwater contamination were identified as areas of phase separated hydrocarbons (PSH), or free product, in the soil matrix and groundwater. These areas were referred to as Excavation A and Excavation C in Area 3A (Figure 2-1).

In July of 2004, Environ International Corporation (Environ), environmental consultant to ExxonMobil Oil Corporation, performed a supplemental investigation and installed groundwater monitoring wells to further evaluate groundwater impacts at the site (Environ 2003, 2004a, b, c). Based on the source evaluation and delineation investigations performed by Ninyo and Moore and Environ, the RWQCB requested a corrective action work plan to remediate the source areas (RWQCB 2003a, b, 2004a).

A RAWP was submitted on April 14, 2004 (Ninyo and Moore 2004b), to remove sources of groundwater contamination. The RWQCB reviewed the RAWP and requested revisions to the cleanup levels (RWQCB 2004b, c, d, e). The revised RAWP, dated May 3, 2004, incorporated the RWQCB revisions and recommended excavation and off-site disposal of soil exceeding site-specific cleanup levels and removal of free product as the preferred remedial alternative (Ninyo and Moore 2004c). The RWQCB approved the revised RAWP in a letter dated September 22, 2004, and directed site activities to commence by December 1, 2004 (RWQCB 2004f).

In October of 2004, the Port retained Remedial Construction Services, L.P. (RECON), as the remediation contractor to implement the RWQCB-approved RAWP. Approximately 7,200 tons of petroleum-impacted soil and 10,500 gallons of free product and petroleum-impacted groundwater were removed from two excavation areas (identified as Excavation A and Excavation C in Figure 2-1) and transported off site under manifest and properly disposed of at permitted facilities. Confirmation soil samples were collected from the excavation sidewalls and floor to verify that the sources of groundwater contamination had been removed. The Excavation A and Excavation C were backfilled with clean overburden and gravel to match existing grade, and the surface paved with asphalt concrete. The site remediation activities were documented in the Project Closeout Report for Remediation of the Spinnaker Hotel site prepared by Ninyo and Moore and dated March 23, 2005 (Ninyo and Moore 2005a).

The RWQCB accepted the Project Closeout Report documenting remediation activities and directed the Port to implement 1 year of groundwater monitoring to confirm the long-term effectiveness of remediation of Area 3A (RWQCB 2005a). The Port retained Ninyo and Moore to install and monitor a network of groundwater monitoring wells at Area 3A for a period of 1 year (Ninyo and Moore 2005b, c; RWQCB 2005b, c). The results of the monitoring indicated attainment of the CAO groundwater cleanup goals (Ninyo and Moore 2005d, 2006a). The RWQCB accepted the recommendation for no further action in Area 3A and directed removal of the wells in a letter dated June 21, 2006 (RWQCB 2006a).

2.4 Shipways Cleanup

A concrete shipways structure used as a former boat ramp existed south of Area 2 with petroleum hydrocarbon impacts from the former aboveground and belowground General Petroleum fuel pipelines that traversed the seawall. This area was not remediated by Weston in 2001, because a Section 404 permit was not obtained at that time. During subsequent investigations, free product was observed through the concrete cracks in the shipways ramp. Environmental site assessment of the former shipways ramp area indicated the general extent of free product and elevated concentrations of TPHs, PCBs, and metals including total chromium, lead, and mercury (Ninyo and Moore 2003g).

A RAWP was prepared by Ninyo and Moore to remediate the free product and impacted soil through excavation, skimming of free product, dewatering, and offsite disposal (Ninyo and Moore 2004d). The RWQCB reviewed and approved the RAWP, requested clarification of waste disposal, and directed additional investigation of the south mole pier area (RWQCB 2005d). Ninyo and Moore prepared a work plan to investigate the mole pier area (Ninyo and Moore 2005e) and clarified waste disposal issues for the shipways cleanup (Ninyo and Moore 2005f). Investigation of the mole pier indicated that the remediation would have to be extended to the mole pier area in order to remove free product and impacted soil. The RAWP was modified to include excavation of the mole pier area (Ninyo and Moore 2005g).

The Port retained RECON to implement the RAWP in March of 2005. The remediation was performed under the USACE 404 permit and RWQCB 401 permit, which were obtained for construction of the sediment cap. RECON demolished the shipways structures and removed free product from bay water through skimming and pumping. Releases to the bay were prevented using perimeter booms and a silt curtain. Approximately 10,600 tons of impacted soil/sediment and 28,200 gallons of free product and impacted groundwater were removed for offsite disposal. The remediation activities were documented in a Closeout Report prepared by RECON (2006).

The shipways petroleum cleanup actions immediately preceded the start of waterside demolition and debris removal by the sediment cleanup contractor (i.e., Traylor Pacific) in 2005. This work is described in more detail in Section 4 of this report.

2.5 Hilton Hotel Petroleum Cleanup

In April of 2006, during construction of the Hilton Hotel's foundation, Hensel Phelps (general contractor) notified the Port that petroleum product was observed within the foundation excavation. Based on observation of product on groundwater in test pits excavated in the area, Ninyo and Moore and the Port evaluated approximately 3,500 square feet of impacted soil and free product. In May of 2006, the Port directed Hensel Phelps to remove impacted soil and free product by excavation for offsite disposal. Ninyo and Moore observed the removal of approximately 1,500 tons of impacted soil and documented that the free product impacts had been removed. The area of excavation is shown on Figure 2-1.

The investigation and remediation activities were documented in the Report of Soil Excavation (Ninyo and Moore 2006c). The RWQCB accepted the findings of the report and issued case closure in a letter dated September 27, 2006 (RWQCB 2006b).

2.6 Investigation of MW-24

The results of six quarters of groundwater monitoring, to evaluate the long-term effectiveness of the landside petroleum cleanup in Areas 1, 2, and 3, indicated dissolved nickel concentrations in monitoring well MW-24 were consistently higher than those measured in other site wells (Figure 2-1). Nickel has not been identified as a COC in soil, groundwater, or sediment. There are no cleanup goals for nickel in CAO No. 95-21; however, RWQCB staff requested an investigation into possible sources of the dissolved nickel concentrations (RWQCB 2004a).

Ninyo and Moore performed several source characterization studies including nickel leaching tests on soil samples from within the soil-cement block south of Area 2, nickel leaching tests on samples from the underlying native formation, installing of a new well adjacent to MW-24, and sampling groundwater in the area to delineate the extent of impacts. The investigations could not determine the source of dissolved nickel in groundwater; however, the extent of dissolved nickel impacts was evaluated as limited to the immediate vicinity of former monitoring well MW-24. The results of the investigation with a recommendation for no further action on this issue were presented to the RWQCB in a report prepared by Ninyo and Moore (2006b). The RWQCB accepted the findings and recommendation of the report and issued a letter for no further action dated August 3, 2006 (RWQCB 2006c).

2.7 East Parking Lot Cleanup

The portion of the former Campbell Shipyard south of Harbor Drive, north of former Gull Street, and east of Convention Way (former 8th Avenue) is referred to as the East Parking Lot (Figure 2-1). Historical research and environmental site assessments showed that the East Parking Lot and portions of the General Services Facility were impacted by MGP wastes from the Station A facility (located across Harbor Drive), which was owned and operated by SDCG&E. Site investigation indicated that impacts to soil and groundwater from MGP wastes included polynuclear aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs; AMEC 2001; Ninyo and Moore 2000, 2001a, b, c, d, 2002a, c).

Based on site assessment results, which indicated that target contaminants were exceeding the CAO-specified levels, the RWQCB directed the preparation of a RAWP to remediate MGP impacts in this area (RWQCB 2001c). Ninyo and Moore prepared a RAWP in July of 2002 (Ninyo and Moore 2002d, e, f) and, based on comments from the RWQCB (RWQCB 2002a, b, c, d) and ENV America, consultants to SDG&E (ENV 2003a, b), finalized the RAWP in June of 2003 (Ninyo and Moore 2003h). The RWQCB reviewed and approved the RAWP in June of 2003 (RWQCB 2003c).

The Port retained RECON to implement the RWQCB-approved RAWP by excavating and removing MGP waste and impacted soil for offsite disposal. Soil verification samples were collected from the excavation sidewalls and floor to confirm removal of soil and MGP waste exceeding the site-specific cleanup levels.

Approximately 35,000 cubic yards of MGP waste and impacted soil were removed by excavation for offsite disposal and approximately 11.7 million gallons of groundwater were removed by dewatering to facilitate excavation and sampling. The remediation activities were documented in the Project Closeout Report prepared by ERM-West, Inc. (2004), and the final excavation limits are shown on Figure 2-1. In a letter dated July 19, 2004, the RWQCB accepted the results of the remediation and requested groundwater monitoring to evaluate the long-term effectiveness of the East Parking Lot cleanup (RWQCB 2004g).

ENV America, consultants to SDCG&E, installed a network of groundwater monitoring wells in and around the East Parking Lot cleanup footprint. Results of 1 year of groundwater monitoring indicated that the groundwater cleanup goals in CAO No. 95-21, Addendum 3 had been achieved. Based on these results, the RWQCB issued a closure letter dated June 24, 2005, concurring that no further action was needed in the East Parking Lot area and that the monitoring wells could be removed (RWQCB 2005e). The monitoring wells were subsequently removed by ENV America.

A summary of the upland soils and groundwater cleanup activities and final reporting completion letters received from the RWQCB is included as Appendix A.

3 CONSTRUCTION QUALITY ASSURANCE MANAGEMENT ORGANIZATION AND OVERALL PROJECT QUALITY CONTROL BY CONTRACTOR AND THE PORT

This section documents methods and organization for quality control (QC) and quality assurance (QA) of the sediment cleanup project. Quality control was accomplished by the contractor, as part of their contractual QC obligations. QA was provided separately by the Port, who managed the project with support from a team of consultants. This section describes both the contractor's QC and the Port's QA management systems for the project.

3.1 Contractor Quality Control Plan

Project specifications required the contractor to prepare a Contractor's Quality Control Plan (CQC Plan), which was submitted to the Port in November of 2005 (Traylor Pacific 2005). As a means for overall QC during construction, the contactor was required to implement a CQC Plan to document that all construction activities were performed in accordance with the contract requirements. The CQC Plan implemented by the contractor consisted of a three-part inspection system, preparatory inspections (prior to the commencement of any portion of work), initial inspections (at the beginning of each portion of work), and follow-up inspections (during construction).

A Daily Construction Quality Control Report was also implemented as a method to document all QC inspections, QC operations, construction activities, and construction deficiencies. This report was mandated as part of the required contractor's Daily Construction Quality Control Report. A compilation of all the daily reports received from the contractor during the construction period are included in Appendix B (provided on CD).

The contractor also implemented various environmental QC plans pertinent to specific portions of the work, which are discussed in detail in Section 4.

3.2 Port Quality Assurance and Construction Management Program

3.2.1 Construction Management Organization

As the contracting entity, the Port was responsible for administering and managing the construction contract. Construction management was aided by a team of consultants, who were also involved with the design of the project:

- Anchor (lead design firm and prime consultant for construction phase support)

- Blaylock Engineering Group (structural engineering subconsultant)
- Merkel and Associates (habitat construction subcontractor)
- TerraCosta Consulting Group (geotechnical engineering subconsultant)
- Ninyo and Moore (sediment disposal subconsultant)

On August 10, 2005, key representatives from the Port and Anchor met to review construction management goals, logistics, roles, and communications. A project-wide construction management organizational chart was developed for the Port and their consultant team, as presented in Figure 3-1. The Port's construction management efforts were led by Bill Melton (resident engineer) and Mahmoud Akhavain (project manager). They were supported by Anchor's Michael Whelan, who worked with the Port and contractor representatives on a regular basis. Michael Whelan was supported on an as-needed basis by Ed Berschinski, Tom Wang, and John Verduin (also with Anchor).

3.2.2 Inspections and Quality Assurance

The Port implemented their own QA program as a means to manage the project and for the contractor to ensure compliance with applicable local, state, and federal water quality criteria and all permit conditions. As part of that program, the following components were conducted throughout the construction of the project:

- Weekly meeting were attended by the contractor and the Port's representatives, with the Port maintaining minutes of all weekly meetings
- At least one inspector from the Port was present at the job site on a daily basis
  - Daily field reports were completed by the Port inspectors
- Numerous photographs were taken by the Port's inspectors to document project conditions and progress through the duration of the construction activities
- Bathymetry surveys were performed by the Port's survey crew (under the supervision of Chuck Sefkow) to verify contractor dredging and capping performance
  - Key surveys by the Port's survey crew are presented as figures in Section 4.
- Water quality monitoring was conducted daily, as described in Section 4
- Diver inspections were used to supplement the contractor's progress surveys in evaluating the thickness of placed material layers, as discussed in Section 4

4 CONSTRUCTION ACTIVITIES AND CONTRUCTION QUALITY ASSURANCE TESTING PROTOCOLS AND RESULTS

To verify the contractor was completing work in accordance with project documents, continuous testing protocols were implemented by both the contractor, as required by the contract specifications, and by the Port, as part of its CQA and construction management program. This section describes the construction activities that were accomplished for the sediment cleanup work and the testing protocols and results that were used to verify that the work was accomplished in accordance with the CAO and the project plans and specifications.

Bathymetric surveys were used throughout the construction process to indicate site elevations and to reveal the thicknesses of placed layers through the use of differential bathymetry (i.e., differences in seabed elevation). A pre-construction survey was conducted by the Port to serve as a baseline bathymetric condition against which later surveys could be compared. The pre-construction survey is presented as Figure 4-1.

4.1 Demolition and Debris Removal

Immediately following completion of the shipways petroleum cleanup by RECON (as described above in Section 2), the sediment remediation contractor (i.e., Traylor Pacific) commenced with demolition of the remainder of the former shipways structures (i.e., concrete slabs, steel rails, timber piles, and other remnant structural elements) and removal of debris from various other areas of the site, including:

- Shoreline debris and old armoring structures from along the seawall
- Individual debris elements from throughout the project site
- Remnant timber pile stubs from the location of the former pier structures and marine railways

All removed debris was sent to a local upland landfill facility (Otay Landfill, administered by Allied Waste) for disposal, except for creosote-coated timber piles, which were sent to an alternative facility (Miramar Landfill). Manifests of all truck trips for demolition and debris material were collected by the contractor and provided to the Port.

Dredging of underlying and surrounding sediments followed (and in some cases overlapped) the completion of demolition and debris removal, as is described in the next section.

4.2 Dredging

Dredging was accomplished in two phases. The first phase of dredging included the entire contract dredge area. The second phase provided additional deepening of the south capping area and the area near the mole pier, to ensure that subsequent capping would not exceed project elevation requirements, per the contract documents. Figure 4-2 shows the required dredging boundaries and depths, and Figures 4-3 and 4-4 show the site bathymetry after each of the two dredging phases. Table 4-1 presents the dates the work was performed and total dredged volumes.

Table 4-1
Summary of Dredged Volumes

Dates	Work Performed	Volume Dredged (cy)
December 17, 2005 to June 12, 2006	first phase of dredging	30,570
February 14, 2007 to March 9, 2007	second phase of dredging	17,676
Total		**48,246**

All dredged material was initially placed in a barge and the free water allowed to drain back into the bay (after passing through filter fabric that is used to capture suspended sediment). Within 1 or 2 days, the sediment was moved into an upland containment and staging area where it was reworked and allowed additional time to dewater. When the sediment was determined by the contractor to be suitably dry for transportation, it was placed into lined truck trailers and transported to Otay Landfill for disposal where it was subject to paint-filter testing to confirm its suitability for disposal. Manifests of all truck trips were collected by the contractor and provided to the Port.

Additional debris was generated during the dredging process in areas where the debris had not been fully removed during the demolition and debris removal steps.

When possible the debris was stockpiled and disposed separately from the sediment (primarily for the Port's measurement and payment purposes).

4.2.1 Testing Protocols

During dredging operations, the contractor performed progress surveys to ensure construction operations and procedures conformed to the Contract Drawings and permit requirements.

During the first 7 days of dredging operations and then every 5 days thereafter, progress surveys were conducted by the contractor on a daily basis. All progress surveys were conducted using an Echobeam (multi-beam) digital global positioning system (GPS) depth sounder. Survey extents covered the entire area of construction conducted between surveys. Results were presented in contour form to the Port for review against the pre-dredge construction survey and design dredge sections indicated on the Contract Drawings.

Additionally, the contractor estimated dredge quantities on a daily basis using either their progress surveys and/or barge displacement records and submitted these quantities in the daily reports to the Port.

Diver inspections were conducted by the Port for each dredge area to verify all debris had been removed from the project site. As a result of those inspections, the contactor was required to send divers into the water to cut and remove timber piles that were not adequately removed during dredging operations.

For final review of dredging, the Port performed a post-dredge survey to determine that the dredging was completed to the full required depth and to establish a basis for contractor payment. The first post-dredging survey is shown on Figure 4-3.

A second round of dredging was conducted by the contractor after initial capping (the Pilot Cap) indicated that they would have difficulty meeting the final elevation grade restrictions that the cap surface was subject to, as required by the contract documents to preserve navigational use at the site (primarily for the adjacent Tenth Avenue Marine Terminal facility). The contractor elected to dredge additional sediment so that they could build the cap starting from a deeper elevation. Again, all dredged sediment was sent to Otay Landfill for disposal. The second (and final) post-dredging survey is shown on Figure 4-4.

4.3 Capping

Sediment capping was conducted segmentally, consistent with contract requirements. Placement of cap materials was preceded by installation of foundation rock in localized areas of the site (as required to stabilize soft sediment on slopes and around the perimeter of the project) and placement of a layer of geotextile fabric over the seabed (as required to minimize mixing between site sediment and the subsequently placed capping materials). The Port utilized contractor progress surveys and diver inspections to verify that foundation rock and geotextile fabric were placed in accordance with the project specifications.

The sediment cap was constructed in various layers of material to minimum thicknesses as listed below:

- The "Armored Cap" (placed over the majority of the project site) consisted of:
  - Two-foot-thick layer of rock armor for protection against erosive forces
  - One-foot-thick layer of gravel filter for separation between rock and sand, and for protection against bioturbation
  - Two-foot-thick Base Cap (sand) layer for isolation of underlying contaminants
- The "Revetment Cap" (placed along site side slopes) consisted of:
  - Two-foot-thick layer of revetment rock armor for slope protection against erosive forces
  - One-foot-thick layer of gravel filter for separation between rock and sand and for protection against bioturbation
  - Two-foot-thick Base Cap (sand) layer for isolation of underlying contaminants
- The "Eelgrass Habitat Cap" (placed in a 1.7-acre portion of the site that was set aside for eelgrass growth) consisted of:
  - One-foot-thick layer of habitat backfill to provide a surface suitable for eelgrass planting and growth
  - Six-inch-thick layer of gravel filter in some areas
  - Two-foot-thick Base Cap (sand) layer (or isolation of underlying contaminants

Figure 4-5, the Capping Plan, shows the respective capping and eelgrass areas and indicates the overall sequence in which they were built. The construction sequence, along with dates the work was performed, is presented in Table 4-2.

Table 4-2
Capping Construction Sequence

Task	Start Date	End Date
Pilot Cap Construction Sequence (Sta 2+00 to Sta 4+00)		
Geotextile Placement	July 21, 2006	July 24, 2006
Pilot Cap Installation	July 25, 2006	September 8, 2006
North Area Capping (Sta 2+00 to Sta 4+50)		
Foundation Rock Placement	September 12, 2006	September 13, 2006
Geotextile Placement	September 14, 2006	September 20, 2006
Base Cap Placement	September 21, 2006	October 13, 2006
Gravel Filter Placement	October 14, 2006	October 19, 2006
Armor Rock Placement	October 20, 2006	November 7, 2006
South Capping Area (Sta 6+80 to Sta 12+00)		
Base Cap Placement	May 3, 2007	June 12, 2007
Gravel Filter Placement	June 15, 2007	July 5, 2007
Armor Rock Placement	July 6, 2007	August 16, 2007
Revetment Rock placement from Sta 9+00 to Sta 2+20	August 16, 2007	August 21, 2007
Revetment Rock Placement from Sta 6+80 to Sta 9+00	August 22, 2007	August 28, 2007
Revetment Rock Placement at -6.0 MLLW	August 30, 2007	September 6, 2007
Eelgrass Area Completion		
Base Cap Placement	September 7, 2007	September 14, 2007
Revetment Rock Placement at North Habitat	September 17, 2007	September 26, 2007
Geotextile Placement	September 27, 2007	October 1, 2007
Gravel Filter Placement	October 2, 2007	October 2, 2007
Habitat Backfill Placement at Area A	October 3, 2007	October 5, 2007
Habitat Backfill Placement at Area B	October 5, 2007	October 5, 2007
Final Completion of North Area (Sta 0+00 to Sta 2+00)		
Geotextile Placement	October 15, 2007	October 16, 2007
Base Cap Placement	October 17, 2007	October 18, 2007
Gravel Filter Placement	October 19, 2007	October 19, 2007
Armor Rock Placement	October 22, 2007	October 26, 2007
Revetment Rock Placement	October 27, 2007	November 1, 2007

Notes:
MLLW = mean lower low water
Sta = station
n/a = survey not applicable; condition was verified by diver survey

4.3.1 Surveys and Testing protocols for Cap Material Placement

During capping operations, the contractor conducted progress surveys on a daily basis using multibeam sonar equipment and made these progress surveys available for Port review. The contractor mathematically processed their surveys to create approximate representations of placed material thickness on the seafloor. These surveys were judged to be helpful in identifying overall trends of material placement, although at the fine scale, inherent limitations in survey accuracy and coverage limited the Port's ability to draw full conclusions about the adequacy of installed layers. As a result, in order to supplement the information contained in these processed surveys, the Port also conducted diver inspections on a regular basis to directly observe and "ground-truth" the placed material thicknesses at numerous representative locations. The diver inspections were typically done by swimming transect lines across the area(s) or material placement and making observations and measurements at regular intervals along each line. This approach to cap layer approval was a key element of the project specifications. When observing placed sand cap material, the divers pushed probes into the sand to obtain a measurement of cap thickness. The gravel rock layer was inspected by digging into the gravel to verify its thickness. Armor rock was visually inspected to verify full coverage and no voids.

All diver inspections performed by the Port confirmed that the material thickness indicated in contractor submitted surveys were representative of, or in some cases under-represented, the actual placed material thicknesses. Part of the surveys' occasional tendency to under-represent layer thickness was attributed to compression of underying sediments beneath the weight of the placed material. It also appeared that in many cases the processing of differential surveys was less accurate for areas of sloping or highly irregular topography, likely the result of small variations in horizontal control translating into apparent variations in differential layer thicknesses.

In the end, the Port required placement of additional materials as necessary to fill "holidays" (areas where the thickness was not sufficient) until, based on a consideration of the factors cited above, the Port team concluded that sand and gravel placement was completed to the specified thicknesses, such that placement of additional materials would be unnecessary. Each material layer was thus approved individually for each of the capping segments; after which the contractor proceeded with placement of the next overlying material layer.

Following completion of capping activities, the Port performed a survey of the post-capping bathymetry. This survey is depicted on Figure 4-6. This survey demonstrated that in the end, the overall capped thickness ranged from 5 feet to as much as 8 feet throughout the Armored Cap portion of the site, and that the total cap thickness in the Eelgrass Habitat Cap area was similarly consistent with project requirements. This survey also documented the fact that the specified final cap elevations were met.

4.4 Environmental Protection Requirements and Compliance

The contractor implemented an Environmental Protection Plan (EPP) to ensure all Best Management Practices (BMPs) for construction work were adhered to. The EPP served as the basis for establishing and maintaining QC for all items of work. In conjunction with the EPP, a Stormwater Pollution Prevention Plan (SWPPP) was developed to further establish BMPs and QCs. This section describes the various measures undertaken by the contractor to achieve environmental protection and the oversight and monitoring actions undertaken by the Port to ensure compliance with the project specifications and regulatory permits.

4.4.1 Contractor Environmental Protection

Preventative measures were taken in the field to prevent the accidental introduction of potentially hazardous materials into the air, the ground, or any water body. These measures included:

1. Wind Erosion controls:
    - Dust control measures (consisting of soil binders, plastic coers, or periodic water application) were implemented to stabilize roadways and stockpiles.
    - Stabilized construction entrances were implemented to reduce debris being tracked into or out of the project site. Any debris tracked out of the project site was removed by manual or mechanical sweeping or vacuuming.
    - Construction materials delivered to the site were stored in designated areas away from storm drain inlets. Enclosures or berms were constructed around

the storage area to prevent stormwater from contacting the materials and entering the storm drains and/or receiving waters.

- All stockpiles were covered when not in use and at the end of each day and were protected with sediment barriers or placed in secondary containment.

2. Spill Prevention and Control:
   - Fueling was only allowed in controlled and contained areas.
   - Any fuel products, lubricating fluids, grease, or other products and/or waste released by the contractor's vehicles, equipment, or construction methods were collected and properly disposed of immediately.
   - All materials at the project site were used in accordance with the manufacturer's directions and/or project specifications.
3. Waste Management Practices
   - The site was inspected and cleaned of litter on a daily basis.
   - Non-hazardous construction wastes were collected on a daily basis and stored in covered dumpsters. All waste materials were removed from the project site and transported to an offsite permitted landfill or appropriate recycling facility.
   - All sanitary wastes were collected and managed through the use of portable toilet facilities. Sanitary wastes were disposed off at an offsite permitted facility.
4. Hazardous Materials and Waste Management Practices:
   - All hazardous materials were stored in bermed storage areas and covered as necessary.
   - Liquid hazardous waste were placed in appropriate holding tanks or containers and were placed within secondary containment.
5. Contaminated Sediment Management:
   - Contaminated soils were removed and disposed of according to Port guidelines.
   - Contaminated soils were stockpiled contained to prevent them from coming in contact with stormwater runoff.
6. Vehicle and Equipment Cleaning, Fueling, and Maintenance:
   - Vehicle fueling and maintenance were only conducted in designated onsite areas.

4.4.2 Spill Containment and Cleanup

There was never a need to conduct a spill containment or cleanup, but in the event that one was needed, the following procedures were outlined by the contractor:

- The superintendent was responsible for implementing and supervising the containment and cleanup.
- A 200-foot long containment boom and cleanup kit, absorbent pads, and other materials necessary to safely remove and dispose of the spill material were readily available at the job site.

In the event of any unforeseen contamination, Ocean Blue Environmental had on hand any equipment needed to contain a spill that was not available at the job site. Procedures for minor spills, semi-significant spills and significant/Hazardous Spills were also outlined procedurally by the contractor in the event cleanup efforts needed to be implemented.

4.4.3 Erosion and Turbidity Control

Perimeter sediment controls of straw bale barriers, gravel bag berms/barriers, or fiber rolls were used and maintained throughout the duration of construction activities.

A temporary spill apron was installed along the existing seawall to prevent dredged material from spilling into the bay during offloading activities from the haul barge onto the landside.

4.4.4 Silt Curtain Usage and Maintenance

To ensure that turbid waters or free product were contained within a containment zone, double silt curtains were installed prior to the beginning of any overwater operation. The silt curtains were inspected regularly by the Port's representatives as part of the regular water quality monitoring program, and any deficiencies noted in the silt curtain were immediately brought to the contractor's attention and remedied by the contractor.

4.4.5 Control of Sediment Movement

To prevent loss and spreading during transfer and hauling of dredged, excavated, or imported material, the contractor implemented the following BMPs:

- A 3-foot-high barricade was installed around the perimeter of the barge to contain material.
- During the material dewatering process on the barge, fiber rolls and filter fabric were used to remove suspended particulates from the equipment before it returned to the bay.
- A spill apron was installed to prevent dredge material from spilling into the bay during offloading activities from the barge.
- The off-loading area was contained with a concrete barrier to prevent material from leaving the area.

4.5 Contractor's Stormwater Pollution Prevention Plan

The second part of the contractor's Construction Management and QC Plan was the SWPPP. This plan was a program consisting of inspections and monitoring to ensure BMPs were performing adequately during construction.

The contractor's compliance program consisted of the following items:

1. Training – A person adequately trained in stormwater management oversaw the requirements of the SWPPP. Periodic on-site training was conducted during safety tailgate meetings and a log documenting the site specific stormwater topics covered and those who attended the training have been kept.
2. Inspection and Monitoring – Site inspections and monitoring served as the primary methods to verify that the BMPs performed. Qualified personnel conducted inspections and monitoring of the BMPs prior to anticipated storm events, during extended storm events and after actual storm events to determine areas that may have contributed to a discharge of storm water. When a storm event did not occur, inspection and monitoring of the BMPs were performed twice a month. A record of each inspection was kept in accordance with annual compliance requirements.
3. Contingency plan – Although there was never a need, in the event a known pollutant had been discharged but could not be visually observed, a contingency sampling plan would be performed. The contingency sampling plan consisted of

collecting samples where a BMP failure occurred. At least one background sample would have been collected where an area was not believed to be impacted and the two were compared against each other. If the laboratory analysis showed that the impacted storm water samples significantly exceed the background sample concentration, the bmps would have been re-inspected and re-evaluated. If necessary, the BMPs would have repaired or an alternative BMP would have been implemented.

4.6 Environmental Monitoring During Construction

4.6.1 Water Quality Monitoring

Pursuant to the Waste Discharge Requirements Order issued for this project, the Port performed daily water quality monitoring in accordance with Monitoring and Reporting Program No. R9-2004-0295. A copy of the Long-term Monitoring and Reporting Plan is included as Appendix C. Water quality exceedances, when detected, were immediately rectified by the contractor either though temporarily stopping or slowing operations or by performing maintenance or repairs to the silt curtains.

The Port maintained records of all water quality monitoring events and submitted these records to the RWQCB on a monthly basis, along with monthly letters summarizing the water quality results and any corrective actions taken by the contractor.

5 CONSTRUCTION QUALITY ASSURANCE REPORT OF TESTING, REPORTING, AND CERTIFICATION

This section discusses the requirements for testing, reporting, and certification of the various materials placed within the project site.

5.1 Aggregates

All aggregate materials that were used for cap construction were subjected to chemical testing for a variety of chemical families to verify that they were sufficiently free of key chemical contaminants named in the project CAO. The required tests were:

- Grain Size Distribution (American Society for Testing and Materials [ASTM] method D422-63).
- In situ Moisture Content (American Society of Testing and Materials [ASTM] method D2216).
- Total Organic Carbon (Standard Methods [SM] method 5310B).
- Priority Pollutant Metals (U.S. Environmental Protection Agency [USEPA] publication SW846, the 6000/7000 method series).
- VOCs (USEPA publication SW846, method 8260 as modified by Puget Sound Estuarine Protocols [PSEP]).
- Semivolatile Organic Compounds (USEPA publication SW846, method 8270 as modified by PSEP).
- PCBs (USEPA publication SW846, method 8082 as modified by PSEP).
- TPH (USEPA method 8015 modified, carbon range C7-C44, with carbon chain identification).
- TBT (USEPA method 8270 [modified]).

Table 5-1 specifics the chemical criteria that were established and required to be met for all materials used in constructing the cap.

Table 5-1
Capping Material Chemical Criteria

Chemical Constituent	Maximum Allowable Concentration (mg/kg dry weight)	Cleanup Level Mandated by Project CAO (mg/kg dry weight)
Copper	25	810
Lead	10	231
Zinc	50	820
TPAHs	0.35	44
PCBs	0.05 or nondetect	0.95
TPH	5	4,300
TBT	0.01	5.75

Each of these criteria were chosen to be conservative and significantly lower (by one or more orders of magnitude) than the sediment cleanup action levels mandated by the CAO.

At the time chemical testing was performed, additional laboratory testing was conducted to verify that grain size distribution of the material also met project specifications.

Table 5-2 presents a summary of the capping materials, testing criteria, and testing results. Complete chemistry testing results are included in Appendix D.

Table 5-2
Summary of Chemical Testing on Capping Materials

Contaminant of Concern		Copper	Lead	Zinc	TPAHs	PCBs	TPH	TBT
Maximum Allowable Concentration (mg/kg)		25	10	50	0.35	ND	5	0.01
Monitoring Action Level (mg/kg), per CAO		264	88	410	3.47	0.11	14	0.121
Base Cap Materials and Sources								
Grand Caribe Island		24 samples tested. See Ninyo and Moore report (cite reference) for chemistry results						
Mission Valley Source	V/MV-FS15	7.15	8.46	28.6	ND	ND	ND	ND
Mission Valley Source	H/TAMT	3.26	0.572	14.3	ND	ND	ND	ND
Gravel Filter and Sources								
Otay Quarry Source	SA #2	ND	1.95	29.3	ND	ND	ND	ND
Otay Quarry Source	LN-G	9.54	3.55	43	ND	ND	ND [1]	ND
Hanson Vigilante Plant	H/V - C2B	11.7	3.77	30.4	ND	ND	ND	ND
Habitat Backfill								
Vulcan Aggregates	SRM/L - 30S	12.5	4.72	39.2	ND	ND	ND	ND
Vulcan Aggregates	A1-A2-A3-A4	3.49	3.76	21.2	ND	ND	ND	ND

Notes
1. Test was re-run for TPH using silica gel cleanup. Results presented in laboratory report dated January 4, 2007.

5.2 Base Cap

The primary source of the base cap sand was the Grand Caribe Island borrow site, located at Coronado Cays in the southern portion of San Diego Bay.

Ninyo and Moore provided a subsurface evaluation of the material at the Grand Caribe Island borrow site to assess its use at the project site in terms of chemical contamination and grain size distribution. The assessment concluded that based on field finding and analytical data, the sediment was suitable for re-use at the project site. A complete copy of the evaluation report is included in Appendix D.

When this borrow site ran out of sand, the remainder of the base cap sand was supplied from an alternate sand source, the Vulcan Materials sand and gravel plant in Mission Valley. Separate laboratory analysis for sediments provided from the Mission Valley Plant were preformed and were detemined to be acceptable for use at the project site (Table 5-2).

5.3 Gravel Filter (Crushed Rock)

Gravel filter was initially provided by the Otay Quarry; however, this plant shut down operations in late 2006 and Hanson Vigilante Plant provided the remainder of the material as an alternate source. Laboratory testing confirmed the material had concentrations of chemical constituents below those specified for this project (Table 5-2).

5.4 Habitat Backfill

The source for material used as the habitat backfill was from Hanson Vigilante Plant, which was selected by the contractor. The contractor submitted samples of the material that were then tested and approved for use (Table 5-2).

5.5 Armor Rock and Revetment Rock

A representative from Anchor visited the Hanson Aggregates Otay Quarry borrow site to visually inspect the material and to ensure its physical compliance with project requirements. Visual inspections confirmed that the armor rock material was free of deleterious material and it was approved for use at the project site. Note that chemistry testing was not appropriate nor required for armor rock and revetment rock owing to the fact that the material size far exceeded the limits for meaningful laboratory chemistry testing.

6 LONG-TERM MONITORING

6.1 Long-term Monitoring and Reporting Plan

A Long-Term Monitoring and Reporting Plan was prepared by Ninyo and Moore (2005h) as required by the Waste Discharge Requirements (WDRs) and the Monitoring and Reporting Plan Requirements (order No. R9-2004-0295) issued by the San Diego RWQCB. The WDR established requirements for the Port to implement, monitor, maintain, and if necessary, conduct repairs to the cap at a specified frequency and for a specified duration of time (20 years).

The primary objectives of the monitoring program is to ensure that the integrity of the cap is maintained, ensure that the cap is effective in isolating contaminants, and ensure that the habitat has colonized, as designed.

The Long-Term Monitoring and Reporting Plan consists of monitoring the following four elements:

- Cap integrity
- Chemical isolation
- Biological and bioaccumulation analyses
- Habitat restoration (eelgrass) monitoring

6.2 Cap Integrity

Forces and events that could destabilize cap integrity include erosion of the cap by currents, propeller wash, or storms; cap breach by external forces; settlement of the unconsolidated bay deposits of the engineered cap; and lateral deformation of the cap slopes. The parameters will be monitored by bathymetric surveys and visual inspections.

6.2.1 Bathymetric Surveys

Bathymetric surveys will be conducted to provide an assessment to the depth of the cap surface and to note any substantial changes in the cap surface bathymetry, such as lateral deformation, differential settlement, and cap erosion. The bathymetric survey area will include the sediment cap area from the bulkhead to approximately 25 feet beyond the outside edge of the perimeter berm or cap edge.

6.2.2 Visual Dive Inspection and Cap Probing

Visual monitoring of the cap will be conducted by divers in SCUBA gear to access cap long-term integrity and to identify areas that require periodic maintenance. During the dive, divers will be inspecting for side slope damage, cracks in the sediment, gashes, debris, bioturbation, slope failure, and other evidence of damage. Photographs will document conditions of the sand cap, perimeter berm, and eelgrass. The habitat cap will also be probed to measure its thickness to determine if the cap has eroded or if additional sediments have been deposited on top of the cap at the site.

6.3 Chemical Isolation

To monitor the effectiveness of the sand cap as a chemical isolation layer as it was designed, sediment sampling of the cap and laboratory bioaccumulation testing will be performed. In the armored engineered cap area, specially designed monitoring stations will be used to obtain samples that are representative of the sand Base Cap layer that underlies the surficial armor rock. In the eelgrass habitat area, cores will be obtained from the surface sand unit, and samples obtained from the nearsurface material and from the underlying sand. The intention is to distinguish between chemical impacts from the underlying sediments and sediments that have been redeposited from outside the project site.

The objective of the sediment sampling is to compare COC with the action levels approved for this project per Table 6-1 below.

Table 6-1
Action Levels for Contaminants of Concern

Contaminants of Concern	Concentration (mg/kg by dry weight)
Copper	264
Lead	88
Zinc	410
PTAHs	3.47
PCBs	.11
TPH	<14
TBT	0.121

6.3.1 Habitat Cap

Sediment samples will be collected from three random locations within the habitat cap by coring. Sediments from the top and bottom of each core will be analyzed for project COCs and their concentrations compared to the corresponding action levels in Table 6-1.

6.3.2 Engineered Cap

Sediment samples will be collected by divers in SCUBA gear from each of the six permanent sediment sampling stations that have been incorporated into the cap structure. The sediment samples that are collected will represent sand in the Base Cap layer and will be analyzed for COC concentrations and compared to action levels approved for this project. Background samples of bay water near each sampling location will also be collected and analyzed for COCs and will indicate conditions at the time of sampling.

6.3.3 Armor Rock

If sediment deposits are observed over the armor rock layers, samples will be collected in laboratory supplied containers. The samples will be analyzed for COCs, and concentrations will be compared to the project action levels. These samples will represent recently deposited material that originates from outside the capped area.

6.4 Biological and Bioaccumulation Analyses

The biological monitoring program will include laboratory bioaccumulation and infaunal studies to evaluate biological conditions in sediments within the eelgrass habitat area and to determine the degree to which colonization of the new substrate has occurred.

6.4.1 Bioaccumulation

Bioaccumulation monitoring will consist of performing laboratory bioaccumulation tests according to standard procedures that are recognized by the regulatory agencies. Samples will be collected within the project site and from a nearby reference site and tissue samples will be analyzed for chemical and maximum detection limits as presented in Table 6-2.

Table 6-2
Chemical Analyses for Tissue Samples

Analyte	Analysis Method	Tissue Target Detection Limits
Copper	USEPA Method 6020	0.1 mg/kg
Lead	USEPA Method 6020	0.1 mg/kg
Zinc	USEPA Method 6020	1.0 mg/kg
TPH	USEPA Method 8270C	20 µg/kg
PCB	USEPA Method 8082	20 µg/kg

Source:
Ninyo and Moore 2005h

6.4.2 Infaunal Invertebrate Monitoring

A total of 12 cores will be collected at four different sampling stations in the eelgrass habitat area. Three cores will be collected at each site and transferred to a laboratory where they will be sorted into major taxonomic phyla and corrected to present infaunal densities per square meter. This will allow comparisons between pre- and post-construction invertebrate communities at the site and will allow comparison to data collected in the region on other projects using other sampling methods.

6.5 Habitat Restoration (Eelgrass) Monitoring

Habitat restoration monitoring will be conducted in accordance with the Southern California Eelgrass Mitigation Policy (Revision 10), adopted by the National Marine Fisheries Services, U.S. Fish and Wildlife Service, and the California Department of Fish and

Game. A reference site with the same ecological subregion as the project site will be selected and monitored concurrently. A comparison of eelgrass and areal coverage and density between the two sites will be the basis for mitigation success, as determined by the criteria specified in the Southern California Eelgrass Mitigation Policy. All monitoring surveys will be performed during the active eelgrass growth period and will be performed by certified divers experienced in eelgrass surveys.

The schedule for each monitoring program is summarized in Table 6-3.

Table 6-3
Long-term Monitoring Schedule

Year Following Construction	0	1	2	3	4	5	6	7	10	15	20
Cap Integrity (Visual dive and Bathymetric Surveys)	X	X	X	X	X	X	X	X	X	X	X
Sediment Sampling (Annual)			X	X	X		X	X			
Sediment Sampling (Quarterly)	X	X				X			X	X	X
Biological Sampling (Bioaccumulation and Infaunal Studies)		X		X		X		X	X	X	X
Habitat Restoration (Eelgrass Monitoring)	X	X	X	X	X						

Source:
Ninyo and Moore 2005h

Additionally, monitoring will be required when a destabilizing event, such as a major earthquake, tsunami, or storm event with strong winds occurs. Detailed information on the specific methods, procedures, schedules, reporting, and performance standards for the above mentioned monitoring program and parameters of concern can be found in the Long-term Monitoring and Reporting Plan included inAppendix E.

7 CONCLUSIONS

As documented herein, the Campbell Shipyard site and sediments have undergone full remediation in compliance with the CAO. The sediment cap was constructed to meet or exceed the requirements of the CAO, the contract documents, and regulatory permits. This was demonstrated throughout the construction process by the CQC Plan and regular progress surveys in combination with the Port's own management, oversight, and inspection of the work. The thickness of the sediment cap is at least 5 feet over the entire area and in most cases is 6 to 7 feet in thickness.

The eelgrass habitat cap was successfully completed to the acreage (1.6 acres) required for on-site mitigation and to elevations (-3 to -6 feet mean lower low water [MLLW]) that are amenable to eelgrass growth. In March of 2008, the Port planted eelgrass in this area under a separate contract.

Monitoring of the sediment cap is slated to begin in 2008, which will extend for a 30-year period, to evaluate the effectiveness of the cap in isolating the underlying sediments.

In conclusion, the Port has fulfilled the requirements of CAO No. 95-21. All design, permit, and construction requirements have been successfully met and exceeded.

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Geotechnical and Environmental Sciences Consultants

LONG-TERM MONITORING AND REPORTING PLAN SEDIMENT REMEDIATION AND AQUATIC ENHANCEMENT PROJECT FORMER CAMPBELL SHIPYARD SAN DIEGO, CALIFORNIA RWQCB NO. LD: 06-0990.02

PREPARED FOR:
Environmental Services Department
San Diego Unified Port District
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PREPARED BY:
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April 20, 2005
Project No. 104399075

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EXHIBIT NO. 1282
Barter

Ninyo & Moore

Geotechnical and Environmental Sciences Consultants

April 20, 2005
Project No. 104399075

Mr. Paul Brown
Environmental Services Department
San Diego Unified Port District
3165 Pacific Highway
San Diego, California 92101

Subject: Long-Term Monitoring and Reporting Plan
Sediment Remediation and Aquatic Enhancement Project
Former Campbell Shipyard
San Diego, California
RWQCB No. LD: 06-0990.02

Dear Mr. Brown:

In accordance with your request, we have prepared this Long-Term Monitoring and Reporting Plan for the Sediment Remediation and Aquatic Enhancement Project at the Former Campbell Shipyard. The plan was prepared to comply with the objectives set forth in the Waste Discharge Requirements and the Monitoring and Reporting Plan Requirements (Order No. R9-2004-0295) issued by the San Diego Regional Water Quality Control Board on October 13, 2004, the Memorandum of Understanding between the Bay Council and the San Diego Unified Port District dated August 27, 2004, and the Department of Army Permit issued for the sediment cap construction project. A draft version of this plan was submitted to the regulatory agencies and the environmental groups for their review. Recommended changes from the San Diego Baykeeper, the Sierra Club, the Audubon Society, and the US Army Corps of Engineers were incorporated into the current plan.

This plan defines the monitoring objectives, identifies the key physical, chemical, and biological parameters of concern to be monitored, presents a tiered approach to the monitoring activities, and describes the methods and procedures to be followed for monitoring the parameters of concern.

We appreciate the opportunity to provide continued services on this important project. If you have any questions regarding this monitoring plan, please contact the undersigned at your convenience.

Sincerely,
NINYO & MOORE

Sree Gopinath, P.E.
Principal Engineer

Stephan A. Beck, C.E.G., HG, R.E.A. II
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1. INTRODUCTION AND SITE DESCRIPTION

The former Campbell Shipyard site is located on the northeastern shore of San Diego Bay between the San Diego Convention Center and the Tenth Avenue Marine Terminal (TAMT) at Eighth Avenue and Harbor Drive (Figure 1).

Approximately 9.2 acres of the 12.9-acre San Diego Unified Port District (District) leasehold at the former Campbell Shipyard, extending into San Diego Bay, will undergo remediation to comply with Cleanup and Abatement Order (CAO) 95-21 issued by the California Regional Water Quality Control Board, San Diego Region (RWQCB), as amended (1995). The preferred engineered cap remedy will include an isolation layer (to prevent contaminant mobility) and an armor layer to prevent cap erosion from external forces, as described in the Final Supplemental Environmental Impact Report (P&D, 2003). The project will consist of dredging 35,900 cubic yards (cy) of sediment, creation of a 1.6-acre shallow subtidal habitat area, demolition of the existing shipways and marine rails, retrofitting an existing mole pier, repair and reconstruction of 1,230 feet of existing seawall, and placement of rock revetment for seismic retrofit of the existing seawall. The engineered and habitat cap extent and general areas of dredging are shown on Figure 2.

On October 13, 2004, the RWQCB adopted Order No. R9-2004-0295, Waste Discharge Requirements and a Monitoring and Reporting Program (WDR) for the Port of San Diego Campbell Shipyard Bay Sediment Cap, Closure and Post Closure Maintenance, San Diego Bay (RWQCB, 2004). The WDR establishes requirements for the District to implement, monitor, maintain, and if necessary, conduct repairs to the cap through the year 2025.

On August 27, 2004, the District, the San Diego Baykeeper and the Surfrider Foundation (jointly referred to as the Bay Council) entered into a Memorandum of Understanding (MoU) to design and implement specific monitoring requirements for the sediment cap.

The United States Army Corps of Engineers (COE), Los Angeles District, issued a Department of the Army Permit for the sediment cap project on October 29, 2004. The permit specifies requirements for the long-term monitoring and maintenance plan for the habitat and engineered cap construction.

This Monitoring and Reporting Plan (MRP) describes the methods and procedures for the long-term monitoring of the sediment cap and addresses the requirements set forth in the WDR, the MoU, and the COE permit. The RWQCB is the state agency responsible for overseeing compliance with the MRP.

2. SUMMARY OF PREVIOUS INVESTIGATIONS

Environmental site assessment activities associated with characterizing the bay sediments within the leasehold boundary of the former Campbell Shipyard were performed by several consultants both prior and subsequent to RWQCB CAO No. 95-21. A chronological list of site assessment activities performed is provided below. A brief summary of these assessments is included in Appendix A.

RWQCB, *Results of Sediment Sampling in the Vicinity of Campbell Industries, unpublished data collected by the San Diego Regional Water Quality Control Board,* 1989.

ERC Environmental and Energy Co., *Chemical Characterization of Marine Sediments, Campbell Industries, San Diego, California,* September 1989.

PTI Environmental Services, *Study Proposal, Campbell Shipyards Sediment Characterization-Phase 2,* July 1990.

PTI Environmental Services, *Data Report, Campbell Shipyards Sediment Characterization Volumes and II,* June 1991.

PTI Environmental Services, *Remedial Action Alternatives and Analysis Report, Review Draft,* October 1993.

PTI Environmental Services, *Preliminary Design Plan, Bay Sediment, Upland Soil, and Groundwater Remediation,* September 1995.

OHM Remediation Services Corporation, *Draft Post Cleanup Sampling Plan, Campbell Industries, Eight Avenue at Harbor Drive, San Diego, California, 92112,* August 1998.

Ecosystems Mgt. Associates., Inc., *Campbell Shipyard NPDES Permit Marine Sediment Monitoring and Reporting,* August 1999.

Hart Crowser, Inc., *Sample and Analysis Plan for Dredged Sediment Characterization, Campbell Shipyard, San Diego, California, Case # 1999-153-03.* October 1999.

Hart Crowser, Inc., *Sediment Characterization Report Campbell Shipyard, San Diego, California,* March 2000.

Hart Crowser, Inc., *Final Phase II Sediment Characterization Report, Campbell Shipyard, San Diego, California, Volumes I and II, draft version,* April 2001.

Anchor Environmental, L.L.C., *Campbell Shipyard Data Gap Sediment Field Sampling Report,* September 2002.

3. REGULATORY FRAMEWORK

The regulatory framework for the site is discussed briefly in this section.

3.1. Cleanup and Abatement Order

In June 1995, the RWQCB issued CAO No. 95-21 to Campbell Industries Marine Construction and Design Company, establishing cleanup levels at the Campbell Shipyard for upland soils, groundwater, and offshore bay sediments that were adjacent to the Campbell Shipyard wharves and boat ways (RWQCB, 1995). The contaminants of concern (COC) and respective sediment cleanup levels were based on previous limited site assessment work performed at the former Campbell Shipyard by other consultants (RWQCB, 1995). The COC and cleanup levels established in CAO 95-21 for offshore bay sediments included: copper, lead, zinc, total petroleum hydrocarbons (TPH), high-molecular-weight polynuclear aromatic hydrocarbons (HPAHs), polychlorinated biphenyls (PCBs), and tributyltin (TBT). Elevated levels of these COC were identified in bay sediments and were attributed to releases of contaminants at the site from various sources.

In general, the CAO indicated that concentrations of copper, zinc, TBT, HPAHs, and TPH were highest along the shoreline and adjacent to the dry docks, with concentrations decreasing away from the shipyard. Concentrations of lead were identified adjacent to four stormdrains at the site suggesting that these drains may have also contributed lead to bay sediments. Concentrations of PCBs in sediments were greatest in the area where shipyard activities were conducted. The following table indicates RWQCB sediment cleanup levels as indicated in CAO No. 95-21. It should be noted that these cleanup levels are specific to the project and are not a model for San Diego Bay.

Table 1 – RWQCB CAO No. 95-21 Sediment Cleanup Levels

Constituent	Cleanup Level (mg/kg) (Dry Weight)
Copper	810
Zinc	820
Lead	231
TPH	4,300
HPAHs	44
PCBs	0.95
TBT	5.75

Note:
mg/kg = milligrams per kilogram

The District and its consultants evaluated various remedial action alternatives in accordance with the California Environmental Quality Act (CEQA). These alternatives consisted of an engineered cap, a habitat cap, a hybrid cap, dredge and dispose, no action; and combinations of the above (P&D, 2003). A 5-foot thick engineered sediment cap with a 1.6-acre eelgrass habitat area was selected as the preferred alternative. At the time of preparation of this plan, the project was being advertised for bid.

4. SITE CHARACTERISTICS

The marine habitat adjacent to the former Campbell Shipyard consists of approximately 12.9 acres of open-water areas with depths down to about -33 feet mean lower low water (MLLW). Bathymetry at the site varies significantly due to the presence of old shipways, piers, and berths. Under current National Marine Fisheries Service operational definitions, the entire area below the high tide line (+7.8 feet MLLW) is considered Essential Fish Habitat.

Campbell Shipyard completed demolition of piers on April 16, 2001. Old timber piles from the subtidal zone and debris on the waterfront have been removed. A concrete bulkhead borders the waterfront and the land along the shoreline supports little vegetation.

Dive surveys of the entire area (LEES, 2000a and 2000b) reported that the substrate consists mostly of soft sediments predominately composed of fine, sandy-silt. However, waters of about -10 feet MLLW and shallower supported either eelgrass (*Zostera marina*) or various species of red algae. Scattered debris in the subtidal zone provides a limited amount of hard substrate.

The following habitats have been identified within the former Campbell Shipyard leasehold:

- Eelgrass beds
- Soft-Bottom Invertebrate Community
- Piling, Bulkhead, and Concrete Debris Invertebrate Communities
- Fish
- Birds
- Marine Mammals

Further discussion of these habitats and the associated biological communities is provided in Appendix B.

5. MONITORING OBJECTIVES

The primary objectives of the monitoring program are listed below.

- To ensure that the integrity of the cap is maintained.
- To ensure that the cap is effective in isolating contaminants.
- To ensure that the habitat has colonized, as designed.

The components of the monitoring program may be identified on the basis of physical, chemical, and biological parameters of concern (POCs). The POCs are identified in this plan with a standard of performance for each parameter, if applicable. Unacceptable adverse effects to the POCs and unreasonable degradation of the sediment cap are also defined.

A tiered approach has been developed to evaluate the POCs relative to their established standard of performance. The tiered approach would return one of two outcomes: 1) the initial (first tier) monitoring results did not exceed the defined parameters and monitoring continues on the initial schedule, or 2) the initial results returned unacceptable results and the degree or frequency of testing, or both, would be elevated in the second tier monitoring. The tier monitoring approach is shown as a work flow diagram on Figure 3 and is summarized in Section 10.

The monitoring program for the engineered cap and habitat cap are essentially the same and include the same physical, chemical, and biological POCs. The only difference in the monitoring is in the method of obtaining physical core samples from the sand layer, which performs the basic cap function of chemical isolation of the underlying contaminants. The difference in the sampling methods is discussed in the sediment sampling section.

6. CONTAMINANTS OF CONCERN AND ACTION LEVELS

The chemical COCs and their corresponding cleanup levels were established in CAO 95-21 based on previous studies and investigations (RWQCB, 1995). The COCs are copper, zinc, lead, TPH, HPAHs, PCBs, and TBT. The engineered cap was designed to contain COC in sediment with concentrations exceeding the cleanup levels listed in CAO 95-21.

The effectiveness and permanence of the cap in isolating the COCs will be measured by action levels established in the WDRs and the MoU. These action levels, by being lower than the CAO cleanup levels, provide some warning prior to exceedance of the CAO cleanup levels. The action levels are presented in the table below.

Table 2 – Action Levels for Contaminants of Concern

Contaminants of Concern	Concentration (mg/kg by dry weight)
Copper	264
Lead	88
Zinc	410
Total Polyaromatic Hydrocarbons (TPAHs)	3.47
Polychlorinated biphenyls (PCBs)	0.11
Total Petroleum Hydrocarbons (TPH)	<14
Tributyltin (TBT)	0.121

7. LONG-TERM MONITORING

This part of the monitoring plan specifies procedures and methods to evaluate the integrity of the cap by monitoring physical POCs, the effectiveness of the chemical isolation layer by monitoring chemical POCs, and the biological recolonization of the habitat area by monitoring biological POCs.

If the parameters that are monitored on the recommended schedule are within the specified standards of performance, the monitoring will continue with the degree and frequency indicated in this plan. However, if the first tier monitoring indicates an exceedance of performance standards of the first tier parameters (specified herein), the second tier monitoring would be triggered, which would include the appropriate notifications and additional monitoring.

Exceeding the performance standards for the second tier monitoring (specified herein) would indicate unacceptable performance of the cap system and would trigger the third tier action, including appropriate notifications, preparation of a remedial work plan, implementing as-needed remedial measures to the cap, and revising the monitoring schedule to evaluate the performance of the remedy and the cap system. Figure 3 provides an overview of the first tier monitoring, the POCs that are monitored, and the potential second and third tier monitoring requirements. A summary of the POCs, tolerance limits and actions for the first and second tier monitoring and third tier action are presented in Section 10.

7.1. Cap Integrity

This section defines the various POCs for assessing cap integrity and presents methods and procedures to evaluate the POCs and their performance standards. The forces and events that could destabilize cap integrity include:

- erosion of the cap by currents, propeller wash, or storms,
- cap breach by external forces such as boat keels,
- settlement of the unconsolidated Bay Deposits underlying the engineered cap, and
- lateral deformation of the cap slopes caused by seismic events.

Some erosion, settlement, and slope movement is expected within tolerable limits without causing a breach of the cap or release of COCs.

Visual dive inspections and cap probing would detect cap erosion that compromises the integrity of the cap or breach of the cap. Bathymetric surveys would detect settlement and slope movements that may exceed tolerable limits but are not easily detectable by visual dive surveys. Procedures for visual dive inspection and bathymetric surveys are explained in later sections. The following sections describe the anticipated settlement mechanism in the cap, the quantified tolerable movement, and procedures for monitoring the movement.

7.1.1. Settlement

Settlement of the engineered sediment cap is anticipated to occur by the following:

- settlement of the underlying unconsolidated Bay Deposits (reduction in void space due to expulsion of water).
- settlement of the sand, gravel and armor rock layers.

Due to their granular nature, primary settlement of the sand, gravel, and armor rock layers will occur immediately (during construction) without long-term effects. Since this settlement occurs during construction, the loss in thickness, if any, will be made up by quality control exercised during construction. Settlement within the sand, gravel or armor rock layers is anticipated to be negligible after construction of the cap.

Due to the material properties of the unconsolidated Bay Deposits, including fines content, the settlement of this layer will likely occur over a longer period of time, which may extend past construction. This potential settlement was analyzed during the cap design and is documented in the Basis of Design Report (BDR) (Anchor, 2004). The settlement varies according to the thickness of the unconsolidated Bay Deposits beneath the engineered cap.

If the settlement of the unconsolidated Bay Deposits is uniform causing the engineered cap to settle uniformly, then the thickness of the engineered cap is maintained and the integrity of the cap in isolating contaminants is not compromised.

If the settlement of the unconsolidated Bay Deposits is non-uniform, then there would be differential settlement of the engineered cap that needs to be considered and monitored. Since the cap is constructed of free-draining granular material (sand, gravel, and armor rock), the material would be self-healing, that is, the sand would flow and the grains would re-arrange themselves and maintain continuous cap coverage. Since the engineered cap is made of non-cohesive materials, differential settlement of the underlying Bay Deposits would not cause shear failure in the base sand cap, the gravel layer, or the armor rock layer.

However, this re-arrangement of the grains will result in an elongation of the cap element and a slight reduction in cap thickness. The chemical migration of contaminants in the pore water was modeled during the cap design and the results of the modeling are presented in the BDR (Anchor, 2004). The modeling showed that an 18-inch thick cap is sufficient to isolate the contaminants. The present configuration of the cap is 24 inches, which allows for a 6-inch reduction in cap thickness. Using a factor of safety of 2.5, the tolerable reduction in cap thickness would be 2.4 inches, or 10 percent of the total sand layer thickness of 24 inches. Therefore, for the purpose of the first tier monitoring, the performance standard for reduction in cap thickness is 2.4 inches.

Using the allowable reduction in cap thickness of 2.4 inches (10 percent), the corresponding allowable differential settlements per foot of horizontal distance (differential settlement is measured between two points) for a flat surface or a slope is presented in the table below.

Table 3 – Allowable Differential Settlement

Initial Surface Gradient	Allowable Differential Settlement/foot (horizontal)
0	6 inches
1/2	3 inches

Using this 10 percent allowable (trigger) criteria, the worst-case scenario was considered. The worst case occurs on the north side of the proposed habitat cap, where the unconsolidated Bay Deposits are at their thickest (17 feet) with an approximate 2:1 (horizontal:vertical) slope. The anticipated settlement in this area would be approximately 1.3 feet (based on settlement calculations in the BDR), and the differential would occur over approximately 45 feet, which corresponds to a differential settlement of approximately 4 inches per foot, which is within the tolerable limit shown on the table.

The combination of bathymetric surveys, visual dive inspections, and topographical surveys of the sediment stations (Figure 2) will indicate if there is differential settlement exceeding the tolerable limits.

7.1.2. Lateral Deformation

Lateral deformation may occur due to slope creep or movement caused by a seismic event. Lateral deformation may also cause a reduction in cap thickness. The magnitude of lateral deformation is a function of the length of slope face. Allowable lateral deformations were calculated based on an allowable reduction in cap thickness of 2.4 inches (10 percent of the 24-inch sand thickness) discussed in the preceding section. For every foot length of slope face, the allowable lateral deformation was calculated as 0.1 feet. The calculations are included in Appendix C.

The following sections describe general procedures for bathymetric surveys and visual dive inspections.

7.1.3. Bathymetric Surveys

Bathymetric surveys will provide an assessment of the depth of the cap surface and substantial changes in the cap topography, including slopes. Bathymetric surveys will be conducted in general accordance with the procedures outlined in this section. The first bathymetric survey will be done within 15 days of the completion of the engineered and habitat caps and will serve as the baseline survey. All subsequent surveys will be compared to the baseline survey to determine changes in the cap configuration such as settlement, slope failure or creep, and other noticeable deformation.

The bathymetric survey area will include the sediment cap area from the bulkhead to approximately 25 feet beyond the outside edge of the perimeter berm or cap edge.

The depth of the wave berm along the eastern perimeter of the habitat cap does not provide enough draft for a survey vessel and, therefore, those portions of the habitat cap that are inaccessible by boat will be surveyed from land. Accordingly, the survey will be performed in two stages:

- Stage 1 will include a bathymetric survey from a boat, and
- Stage 2 will include a profiling survey using a surveyor with a backpack global positioning system (GPS) unit with sub-centimeter accuracy.

7.1.3.1. *Stage 1 Bathymetry Standards*

The error budget for this survey will be nominally defined by the US Army Corps of Engineers, EM 1110-2-1003, and shown in the table below, with exceptions as noted.

Table 4 – Error budget for Bathymetric Survey

Project Classification	Navigation and Dredging Support Surveys		Other Non-Navigation Surveys
	Hard Bottom	Soft Bottom	
Horizontal Positioning System Accuracy (95% Confidence Level)	< 2 m	2 m	5 m
Resultant Depth Accuracy (95% Confidence Level)	D < 15' ± 0.5' 15 < D < 40 ± 1.0' D > 40' ± 1.0'	D < 15' ± 0.5' 15 < D < 40 ± 1.0' D > 40' ± 2.0'	D < 15' ± 1.0' 15 < D < 40 ± 2.0' D > 40' ± 2.0'
100% Bottom Search	Required	Not Required	Not Required
System Detection Capability Minimum Object Size Minimum Number of acoustic hits	0.5 m cube 3 hits	1 m cube 3 hits	Not Applicable
Maximum Line Spacing	Not Applicable as 100% Mechanical or Acoustic Sweep Coverage Compulsory	Not to Exceed 200'	Not to Exceed 500'

7.1.3.2. *Stage 1 Positioning*

Positioning shall be done using the World Geodetic System 1984 (WGS84) system according to the local Universal Transverse Mercator (UTM) grid. The National

Oceanic and Atmospheric Administration (NOAA) tide gauge located on the Navy Pier (one pier south of the Broadway Pier) will be used for all tidal corrections.

Two onshore permanent monuments shall be established at the site by geodetic surveying. Horizontal positioning of the survey vessel shall be done using Inertially Aided Post Processed Kinematic (IAPPK) GPS with an accuracy of 0.2 meters (m), or better. Point-to-point accuracy shall be 0.1 m, or better.

All data shall be referenced to MLLW and the WGS84 ellipsoid. Vertical Accuracy of the bathymetric survey shall be +/- 0.2 m, or better. Two tide gauges will be installed to record water levels during all bathymetric surveying.

7.1.3.3. Stage 1 Bathymetry and Cap Profiling

A multibeam echo sounder (MBES) shall be used operating at a minimum 455 kilo Hertz (kHz). The MBES will produce 240 discrete beams over a 120-degree swath. Beam width shall be 0.5 degrees across track and 1.0 degree along track. MBES depth resolution shall be 6 millimeters (mm). Sounding density shall be sufficient to generate at least 3 hits on a 0.5 meter (m) cube. All features such as, but not limited to, rock outcrops, coastline, man-made features, and seabed breakpoints, such as slope changes and sudden nearly vertical steps, shall be identified. A motion reference unit shall be incorporated in the data acquisition process (POSMV or equivalent). A grid spacing that suits the survey standards (see below) and the equipment should be used. On the inshore, the boat will come in as close as safety permits in the vicinity of the rip rap seawall, at the discretion of the boat operator.

Sub-bottom acoustic profiling was considered to supplement the cap surface survey; however, the dense nature of the armor rock layer on the cap surface would preclude obtaining useful sub-bottom data in this area.

A side scan of the sediment cap edge, including the rock berm, will also be obtained during the survey. The side scan will provide a visual image of the cap edge and will allow a qualitative evaluation of conditions along the cap edge. A side scan survey report shall be prepared documenting the equipment and methods used, and including print outs of the lines surveyed parallel to the cap edge.

7.1.3.4. *Stage 2 Surveying*

For Stage 2, the profiling of the habitat cap would be done with land-based GPS or a total station and rod man. Profiles would be obtained every 50 feet, perpendicular to the seawall. These profiles would be set up as permanent transects and would be used for each survey for comparison with the baseline profile. A minimum of three profiles will be surveyed over the eastern side of the habitat cap berm. The west berm of the habitat cap would be covered in Stage 1 by boat.

7.1.3.5. *Data Analysis and Reporting*

The data from Stage 1 and 2 will be merged into a single database with x, y, x co-ordinates. The data will be gridded to generate a bathymetric map with 1 foot contours. Software such as the current version of Surfer, or equivalent, will be utilized for gridding and map production.

The baseline survey report will include the following information:

- survey field conditions,
- survey equipment used,
- a brief description of the procedures followed and deviations from the procedures provided in this plan,
- information on data processing and quality control procedures used before, during and after deployment of equipment
- general information on data reduction procedures, corrections applied to the data (e.g. Magnetic North to True North correction),
- description of calibration procedures,
- calibration results and special findings/problems,

- list of malfunctions and actions taken to overcome any system problems,
- a map of survey area with vessel tracks and profile lines,
- the bathymetric map from merged Stage 1 and Stage 2 surveys,
- profiles of Stage 2 data across the habitat cap, and
- dxf files of contour maps for import into the District's Geographic Information System (GIS).

In addition to the information requested above, reports for non-baseline surveys shall also include:

- a map of changes in elevation generated by subtracting the latest gridded file from the base map, and
- profiles of the current Stage 2 data, overlying the base Stage 2 data.

Each non-baseline survey will be compared with the baseline survey and areas with differential settlement and lateral slope movement exceeding the respective tolerance limits will be identified and evaluated in the second tier monitoring.

7.1.4. Visual Dive Inspections

The caps shall be monitored by divers in SCUBA gear. The dives shall occur during periods of sufficient visibility to document conditions on the cap surface. The divers shall perform visual inspections to ensure long-term integrity and identify areas that require periodic maintenance. Photographs of the top deck and side slopes, for both engineered and habitat caps shall be taken to document the condition of the sand cap, perimeter berm, eelgrass, and other associated facilities. Subsequent dive surveys and photo-documentation will be compared to the baseline survey to assess changes to the observable structure.

The habitat cap shall be probed to measure its thickness to determine whether the cap has eroded or if additional sediment has been naturally deposited at the site. Divers shall inspect the cap and side slopes for damage, including cracks in the sediment, gashes from boat keels, localized erosion, debris penetrating the cap, bioturbation, slope failure, or other visual evidence of damage. The perimeter berm shall be inspected for damage such as settling and slope failure. Berm monitoring shall be done by surveying the average elevation of the crest of the berm and the average width at both the base and crest of the berm. The berm surveys will be supplemented with side scan images of the berm. The dimensions of the berm shall be obtained from the bathymetric survey. Each survey shall be compared with the baseline survey and prior surveys to assess discernible changes in the cap structure.

If the visual dive inspections and probing indicate that the cap thickness is less than 4.5 feet or that the integrity of the armor rock layer has been compromised, additional armoring and gravel, or sand will be added to maintain the engineered cap at a thickness of 5 feet. If visual dive inspections and cap probing indicate that the habitat backfill is less than 6 inches in Area A, or if the gravel layer is exposed in Area B of the habitat cap, additional habitat backfill will be added to maintain the total cap thickness at 3 feet.

Divers shall verify navigational warning buoys are in good condition and that the warning signs mounted on the buoys are intact and legible. If possible, the same divers should conduct each visual inspection to more easily identify changes. Prior to conducting the inspections, the divers should review the design of the cap and the results of previous inspections.

7.1.5. Schedule for Cap Integrity Monitoring

The schedule for visual dive inspections, cap probing, and bathymetric surveys shall be done at 1, 2, 3, 4, 5, 6, 7, 10, 15, and 20 years starting in March following the year of cap construction, if the third tier action is not triggered. A baseline survey will be performed within 15 days of cap construction. Based on the anticipated schedule for cap construction, the baseline survey (including visual dive inspection, probing, and bathymetric survey) will occur in 2006 and subsequent cap integrity monitoring will be performed in March of the subsequent years. If the third tier action is triggered, the schedule will be reset following repairs to the cap.

7.2. Chemical Containment

The primary objective of the engineered cap is to chemically isolate the COCs exceeding concentrations established in the CAO. The efficiency of the sand cap as a chemical isolation layer will be monitored by collecting and analyzing samples from the cap and comparing the COCs concentrations with the action levels discussed in this plan to evaluate if there is a breakthrough of COCs through the base cap. The habitat cap will be monitored by obtaining core samples (described below). Due to the inaccessibility of the sand layer beneath the armor rock and the gravel layer, permanent sediment sampling stations will be utilized with replaceable sand packs for COC analysis in the engineered cap areas. If the sampling and analysis indicate an exceedance of the action levels in the sediment samples or a statistically evaluated trend of elevated COC concentrations in the pore water samples and ambient bay water samples, the second tier monitoring will be initiated.

The sediment sampling will be performed quarterly for some years and annually for others. For the two years following cap construction (2006 and 2007) and the 5th, 10th, 15th, and 20th year following cap construction (2011, 2016, 2021, and 2026), sediment sampling shall be performed on a quarterly basis. For the years 2008, 2009, 2010, 2012, and 2013, sediment sampling shall be done on an annual basis. This schedule will be followed if the third tier action is not triggered. If the third tier action is triggered, the schedule will be reset following repairs to the cap.

7.2.1. Habitat Cap Sediment Sampling

For each monitoring event, sediment samples will be collected from three random locations in Area A of the habitat cap (Figure 2) using a clear, clean polycarbonate tube, with a recommended length of 1 foot and a diameter of 2 inches, inserted into the surface of the habitat backfill. The tube will be pushed down until it is just above the geotextile layer. The depth of penetration of the core tube at each sample location will be recorded and reported. After the core tubes are withdrawn, they will be checked to verify that the sediment remained in the tube, and then capped at both ends.

Three samples will be collected from each core tube; from the bottom, middle, and top of the sediment column. Each sample will be a 3-inch segment of sediment from their respective location in the core tube. The bottom and top segments will be analyzed first for the COCs listed on Table 2 and the results compared to the corresponding action levels. Detection COCs above the action levels in the bottom sample would suggest leakage through the underlying 2-foot thick base cap layer into the habitat backfill. COCs detected above action level concentrations only in the top sample may indicate possible settling from sources outside the cap system.

The middle sample will be held, but not analyzed, unless the analyses of the top or bottom samples reveal concentrations of COCs at the action level concentrations (by dry weight) or greater. Analysis of the middle sample will indicate the extent of recontamination of the sediment if COCs are detected above action level concentrations in the top or bottom sample.

Sample collection, handling, and custody shall be performed using protocols and techniques appropriate for sampling COC-contaminated materials. Personnel handling the samples shall decontaminate sampling equipment after each use to avoid potential cross-contamination or direct contact.

7.2.2. Engineered Cap Sediment and Pore Water Sampling

The 2-foot thick armor rock section designed for protecting the base cap from erosion and the 1-foot thick gravel section designed to protect the base cap against bioturbation preclude the collection of sediment core samples similar to those obtained from the habitat cap.

Establishment of permanent portals for core sampling of the base cap through the armor rock and gravel layers, such as a well casing system would result in compromising the chemical isolation layer by repeated removal of base cap material for sediment sampling. Therefore, to achieve the objectives of obtaining sediment samples for monitoring the chemical POCs without compromising the cap integrity, it is proposed to establish six permanent sediment sampling stations. The stations will comprise 4-foot high by 5-foot diameter monolithic reinforced concrete cylinders with an embedded one-foot diameter hardened steel casing, containing 4-inch diameter and 2-inch diameter well casing. The sediment sampling station detail and plan view are shown on Figures 4 and 5.

The sediment station locations were selected based on the following criteria, which indicated potential instability relative to other locations:

- thickness of unconsolidated Bay Deposits underlying the engineered cap, with a thickness of up to 17 feet within the cap extent,
- gradient of the underlying unconsolidated Bay Deposits, with a gradient of up to 2:1 (horizontal:vertical) within the cap extent,
- gradient of the underlying Bay Point Formation, with a gradient of up to 2:1 (horizontal:vertical) within the cap extent, and
- gradient of the cap surface (excluding berm areas), with a maximum gradient of up to 2:1 (horizontal:vertical).

Six locations were selected to represent a "worst-case" of one or more of the above criteria. The locations are shown on Figure 2. The rationale for the selection of each location is listed below.

- Station SS-1 is located in an area where:
  - the underlying unconsolidated Bay Deposits have an approximate gradient of 3:1 (horizontal:vertical),
  - the underlying Bay Point Formation has an approximate gradient of 3:1 (horizontal:vertical), and
  - the cap surface has an approximate gradient of 3:1 (horizontal:vertical).
- Station SS-2 is located in an area where the thickness of the underlying soft Bay Deposits is approximately 17 feet,

- Station SS-3 is located in an area where the underlying Bay Point Formation has an approximate gradient of 3:1 (horizontal:vertical),
- Station SS-4 is located in an area where:
  - the thickness of the underlying unconsolidated Bay Deposits is approximately 13 feet,
  - the gradient of the underlying Bay Point Formation is approximately 2:1 (horizontal:vertical), and
  - the gradient of the cap surface is approximately 3:1 to 4:1 (horizontal:vertical).
- Station SS-5 is located adjacent to an area where the gradient of the cap surface is approximately 2:1 (horizontal:vertical),
- Station SS-6 is located in an area where the gradient of the underlying unconsolidated Bay Deposits is approximately 2:1 (horizontal:vertical).

The sediment sampling structure will consist of a 4-inch diameter polyvinyl chloride (PVC) well casing and screen and a 2-inch diameter PVC well casing and screen inside the 1-foot diameter central steel casing. The screened interval of the wells will be approximately 3-inches in length and will extend into the base cap material on installation. The 2-inch diameter well casing will consist of a 1/4-inch diameter Chemflour® or equivalent tubing secured inside the 2-inch diameter casing with centralizers. The tubing will have a valve at one end of the casing and will extend into a sand pack in the screened interval. The purpose of the tubing is to extract pore water samples from the sand pack (Figure 4).

The 4-inch diameter casing will be used to contain a 3-inch by 4-inch nylon screen mesh bag containing base cap material. The mesh bag will be placed in the 3-inch screened interval that extends into the engineered base cap (Figure 4).

The sediment station structure will be fabricated at an upland staging area and deionized water will be used to generate equipment blank samples for analysis prior to installation of the structure at the final station locations. The equipment blanks will be analyzed for the COCs and will provide assurance that the PVC casing and sand packs have not been cross-contaminated prior to installation.

The structures will be placed at the six locations after completion of the 2-foot thick base cap material and prior to placement of the gravel or the armor rock layers. The structures will be lowered to the sand surface at each of the six locations such that there is no damage to the PVC screens or casing. The structure will be installed such that there is a 3-inch embedment of the 2-inch diameter and 4-inch diameter screened PVC well casing into the base cap.

Potential contaminant migration through the base cap isolation layer is anticipated to occur by diffusion in the pore water. The pore water in the top portion of the base cap material will be in equilibrium with the pore water inside the sand pack in the 2-inch diameter screened well casing. Therefore, a sample of the pore water obtained from the 2-inch diameter well casing will be representative of pore water near the top base cap. The pore water in the base cap material sample inside the nylon mesh bag will be in equilibrium with the pore water in the top of the base cap. Therefore, the base cap material sample inside the nylon mesh bag will be representative of the sand in the top of the base cap. After completion of the gravel and armor rock layers, the 4-inch diameter and 2-inch diameter well casing will be extended for better access to divers (Figure 4).

During each sampling event, divers in SCUBA gear will obtain samples from each station. The divers will obtain background samples of bay water near each station location in laboratory-supplied containers. The background bay water samples will be analyzed for COCs and will indicate conditions at the time of sampling.

The divers will utilize a Masterflex pump, or equivalent, and secure it to the tubing inside the 2-inch diameter casing. The valve will be turned to the "on" position and 3 times the volume of the tubing casing will be evacuated without obtaining a sample. After which, samples of the pore water will be dispensed from the tubing into watertight laboratory-supplied containers without entry of the surrounding bay water into the containers.

The divers will then access the 4-inch diameter well casing by removing the well cap and using the nylon rope to bring up the nylon mesh bag containing a sample of the base cap material. The bag will be quickly placed in a watertight resealable plastic bag. A replacement identical nylon mesh bag containing clean base cap material will be secured to the rope and lowered to the base of the 4-inch diameter well casing.

The ambient bay water samples and pore water samples will be filtered and analyzed for COCs. The base cap material sample will be analyzed for the COCs and compared to the action levels presented in Table 2. If the base cap material samples have COC concentrations exceeding the action levels, the second tier monitoring will be triggered. The pore water and ambient bay water COC concentrations will be analyzed for statistically significant trends over time, to evaluate if a release of COCs is occurring through the base chemical isolation layer.

The sediment sampling stations are permanent immobile stations, which will also serve as survey markers. The stations will be periodically surveyed to provide additional data for cap integrity monitoring such as settlement or lateral movement.

A stockpile of base cap material will be containerized in 55-gallon drums, labeled, and placed in a secure location at the Tenth Avenue Marine Terminal.

7.2.3. Sediments Accumulating on the Armor Rock

Near each sediment sample station, if sediment deposits are observed over the armor rock layers, samples will be collected in laboratory-supplied containers. These samples will also be analyzed for COCs. If the COCs concentrations exceed the action levels presented in Table 2, but if the bottom samples from the sediment core samples obtained from the habitat cap do not show exceedances of COC concentrations, then recontamination of the cap surface is likely occurring from other sources. In such a case, sediment