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## STAFF REPORT AND RECOMMENDATION

## ON CONSISTENCY DETERMINATION

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| Consistency Determination No. | CD-031-01 |
| Staff: | LJS-SF |
| File Date: | 3/28/2001 |
| 60th Day: | 5/27/2001 |
| 75th Day: | 6/11/2001 |
| Commission Meeting: | 5/9/2001 |

**FEDERAL AGENCY:** **U.S. Navy**

**PROJECT LOCATION:** Naval Station San Diego (Exhibits 1 and 2).

**PROJECT DESCRIPTION:** Demolition of Piers 10 and 11, construction of a replacement pier, dredging 764,000 cu.yds. of sediment to deepen berths at the new pier, and disposal of dredged sediments at LA-5 and an inland landfill.

**SUBSTANTIVE FILE DOCUMENTS:**

1. CD-51-87 (U.S. Navy, Pier 12 construction and dredging at Naval Station San Diego).
2. CD-64-92 (U.S. Navy, Maintenance dredging at Naval Station San Diego)
3. CD-51-94 (U.S. Navy, Pier 3 construction and dredging at Naval Station San Diego).
4. ND-66-97 (U.S. Navy, additional dredging at Pier 3, Naval Station San Diego).
5. CD-89-99 (U.S. Navy, CVN Homeporting at Naval Air Station North Island, San Diego).

## EXECUTIVE SUMMARY

The Navy has submitted a consistency determination for demolition of Piers 10 and 11 at Naval Station San Diego (NSSD), construction of a replacement pier at the same location, dredging of 764,000 cu.yds. of sediment to deepen the berthing areas at the new pier, and disposal of dredged materials at the LA-5 ocean disposal site and at an inland landfill. The project is the third in a series of pier replacement and deepening projects at NSSD in order to provide modern berthing, logistics, maintenance, and utility support to ships currently homeported in the San Diego region. The proposed dredging, disposal, and pier construction are consistent with the dredge and fill policies of the California Coastal Management Program (CCMP; Section 30233(a) of the Coastal Act). Sediments were tested, were determined to be too fine-grained for beach replenishment, and, except for approximately 48,000 cu.yds. of contaminated sediments to be transported to an inland landfill, were found suitable for ocean disposal at LA-5. Dredging, disposal, and pier construction will generate minor, short-term effects on water quality at the project sites. The replacement pier includes extensive construction and operational water quality control elements, environmental commitments, and mitigation measures which make the project consistent with the water quality policies of the CCMP (Sections 30230, 30231, and 30232 of the Coastal Act). The replacement pier will lead to a net two-acre decrease in bay surface water available for seabird foraging. However, the project includes measures to enhance foraging opportunitites for the endangered California least tern, will not generate significant adverse effects on the least tern, and is consistent with the environmentally sensitive habitat policy of the CCMP (Section 30240 of the Coastal Act). The project is consistent with the commercial and recreational fishing, sand resource, and public access and recreation policies of the CCMP (Sections 30230, 30243, 30233(b), 30210-30213, 30220, and 30223 of the Coastal Act).

## STAFF SUMMARY AND RECOMMENDATION:

### I. Project Description.

The U.S. Navy proposes to construct a replacement pier at Naval Station San Diego (NSSD) to support the berthing, logistics support, maintenance, and utility requirements of ships currently berthed in the San Diego Naval Complex (Exhibits 1 and 2). NSSD is a major port for the U.S. Navy Pacific Fleet, is the major West Coast logistics facility for surface forces of the Navy, and currently has 14 piers with over 50 available berths for destroyers, cruisers, and support ships. The Navy reports that the project is needed due to the current shortfall in the San Diego Naval Complex of pier infrastructure adequate to support modern Navy ships. The new pier would be constructed between existing Piers 10 and 11 (after their demolition) and provide four berths for guided missile destroyers and amphibious assault ships (Exhibits 3 and 4). It would be a single-deck, pile-supported pier with pre-cast concrete piles, cast-in-place concrete pile caps, and a concrete deck. The pier would be 1,500 feet long and 120 feet wide (covering approximately four acres of water), would support a 90-ton truck crane, would provide upgraded utility

services, and include direct bilge water transport through double-walled pipes from berthed ships to the existing sanitary sewer system.

Piers 10 and 11 (both 30 feet wide and 1458 feet long, and each covering approximately one acre of water) were constructed in 1946 and would be demolished as they have deteriorated beyond repair and are structurally unsound for heavy equipment and berthing force requirements of modern Navy ships. The Navy has identified a potential diversion away from regional landfills of 85-90 percent of the solid waste from demolition of both piers, and has developed a waste management plan for the project to define specific measures for recycling, re-using, and salvaging the concrete, wood, steel, plastic, and asphalt materials from the two piers.

The project also includes dredging over a 38-acre area spanning the Pier 10/11 site to a depth of –37 feet mean lower low water to accommodate the drafts of the ships the Navy plans to berth at the new pier. Dredging is expected to take between two and five months to complete and will yield approximately 764,000 cu.yds. of sediment. The dredged materials are not suitable for beach replenishment because the sediments are primarily fine-grained (less than 20 percent sand and coarser materials) or are compacted at lower depths comprising the Bay Point Formation. The Navy reports that all but 48,000 cu.yds. of dredged materials are suitable for disposal at the LA-5 ocean disposal site, located five miles off Point Loma (Exhibit 5). The unsuitable materials do not meet the criteria outlined in the Corps of Engineers/EPA "Evaluation of Dredged Material Proposed for Ocean Disposal" manual (the "Green Book"). These sediments will be dewatered and transported to an inland landfill certified to accept dredged material. Prior to transport to a landfill, the sediments will be dewatered using one or more existing confined disposal facilities at NSSD (Exhibit 6).

The Draft EIS for the project also discusses the potential for munitions in the dredged material:

> *A previous dredging project at NAVSTA (Pier 3 in 1999) discovered various munitions (including machine gun rounds, rifle bullets, and other ordnance) in dredged material (see Appendix B). Given the proximity and similar existing uses of the proposed pier replacement sites, it is possible that dredged material from the proposed action would also contain munitions. This possibility precludes beach nourishment as a practical disposal option and requires that additional safety precautions be taken for upland disposal. For this reason, dredged material identified for upland disposal would be handled in a similar manner to the material from the Pier 3 project, including screening through a 1-inch screen prior to disposal. Additional discussion of munitions concerns is presented in Appendix B.*
>
> *Although low densities of munitions are expected in the dredged material, the amount is too small to exhibit reactivity under the Resource Conservation and Recovery Act (RCRA) but may present a health and safety concern. To ensure proper handling by trained personnel of any ordnance detected or observed at the disposal site, an explosive safety plan and an education program for onsite workers will be developed and implemented. The plan and implementation program will assure that the explosive safety standards of DOD Directive 6055.9, "DOD Ammunition and Explosive Safety Standards" are applied.*

The Navy estimates that project construction will take approximately two years and work is expected to start in early 2002. Some in-water construction activity will occur within the California least tern nesting season (April 1 to September 15) due to the need to coordinate pier demolition and construction so as to minimize disruption to ship berthing schedules and operations at NSSD.

**II. Status of Local Coastal Program.**

The standard of review for federal consistency determinations is the policies of Chapter 3 of the Coastal Act, and not the Local Coastal Program (LCP) of the affected area. If the LCP has been certified by the Commission and incorporated into the CCMP, it can provide guidance in applying Chapter 3 policies in light of local circumstances. If the LCP has not been incorporated into the CCMP, it cannot be used to guide the Commission's decision, but it can be used as background information. The City of San Diego LCP and the San Diego Unified Port District Port Master Plan have been certified by the Commission and incorporated into the CCMP.

**III. Federal Agency's Consistency Determination.**

The U.S. Navy has determined the project consistent to the maximum extent practicable with the California Coastal Management Program.

**IV. Staff Recommendation.** The staff recommends that the Commission adopt the following motion:

***MOTION:*** **I move that the Commission agree with consistency determination CD-031-01, that the project described therein is fully consistent, and thus is consistent to the maximum extent practicable, with the enforceable policies of the California Coastal Management Program (CCMP).**

***STAFF RECOMMENDATION:***

*Staff recommends a **YES** vote on the motion. Passage of this motion will result in an agreement with the determination and adoption of the following resolution and findings. An affirmative vote of a majority of the Commissioners present is required to pass the motion.*

***RESOLUTION TO AGREE WITH CONSISTENCY DETERMINATION:***

*The Commission hereby **agrees** with consistency determination CD-031-01 by the U.S. Navy, on the grounds that the project described therein is fully consistent, and thus is consistent to the maximum extent practicable, with the enforceable policies of the CCMP.*

**V. Findings and Declarations.**

The Commission finds and declares as follows:

A. **Background.** The proposed project is the third in a series of projects reviewed by the Commission to replace and upgrade piers at Naval Station San Diego (NSSD) in order to provide the berthing, logistics support, maintenance, and utility requirements of ships currently homeported in the San Diego region. This submittal is similar to previously concurred with consistency determinations for pier construction and dredging at Naval Station San Diego (CD-51-94, CD-64-92, and CD-51-87) and at Naval Air Station North Island (CD-89-99). In those decisions, the Commission found that the projects were allowable uses for dredging and filling of coastal waters for pier construction and berth deepening, that dredge spoils were suitable for ocean disposal because they met "Green Book" standards, and that the projects complied with water quality, commercial and recreational fishing, beach replenishment, public access and recreation, and environmentally sensitive habitat policies of the Coastal Act. The adopted findings from the aforementioned consistency determinations are incorporated by reference into this report.

B. **Dredging and Filling.** Section 30233(a) of the Coastal Act provides:

*The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:*

*(l) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities.*

*(2) Maintaining existing, or restoring previously dredged, depths in existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps.*

*(3) In wetland areas only, entrance channels for new or expanded boating facilities; and in a degraded wetland, identified by the Department of Fish and Game pursuant to subdivision (b) of Section 30411, for boating facilities if, in conjunction with such boating facilities, a substantial portion of the degraded wetland is restored and maintained as a biologically productive wetland. The size of the wetland area used for boating facilities, including berthing space, turning basins, necessary navigation channels, and any necessary support service facilities, shall not exceed 25 percent of the degraded wetland.*

*(4) In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities and the placement of structural pilings for public recreational piers that provide public access and recreational opportunities.*

*(5) Incidental public service purposes, including but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.*

*(6) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas.*

*(7) Restoration purposes.*

*(8) Nature study, aquaculture, or similar resource dependent activities.*

The proposed dredging and fill activity at Naval Station San Diego (NSSD) needs to be examined for consistency with Section 30233 of the Coastal Act. Under Section 30233(a), dredging and filling of open coastal waters and estuaries is limited to those cases where the proposed project is an allowable use, where there is no feasible less environmentally damaging alternative, and where mitigation measures are provided to minimize environmental impacts. The dredging and placement of pier pilings at NSSD for the proposed replacement pier between Piers 10 and 11 are allowable uses under Section 30233(a)(1). The proposed fish habitat mitigation structures to be placed at the Naval Amphibious Base (NAB) Enhancement Area are allowable uses under Section 30233(a)(7).

The Navy examined in its Draft Environmental Impact Statement (DEIS) several alternatives to the proposed project:

Pier Location: Constructing a new pier at existing Piers 10 and 11, existing Piers 11 and 12, and existing Pier 14 at NSSD, and additional sites at Naval Submarine Base Point Loma, Naval Air Station North Island, Naval Amphibious Base Coronado, and Naval Complex/Broadway Pier.

Pier Design: Pile-supported pier using pre-cast concrete structural piles, and a mole pier constructed on new landfill.

Dredged Material Disposal: LA-5 ocean disposal site, beach replenishment, confined aquatic disposal site, confined nearshore disposal site, and upland disposal site.

The selection of a pile-supported pier at the location of existing Piers 10 and 11, the disposal at LA-5 of clean sediments not suitable for beach nourishment, and the disposal of contaminated sediments at an upland landfill are the project elements that comprise the least environmentally damaging alternative. A mole pier on new landfill would generate significant adverse effects on marine habitat and resources, constructing a new pier outside NSSD would not be feasible given the requirements to berth Navy vessels at NSSD, and disposal of contaminated sediments at confined in-water locations can be avoided given the availability of inland landfill sites in the San Diego region that can accept dewatered dredged sediments.

As discussed in the sections below, the proposed project will generate no significant adverse impacts on coastal resources and no additional mitigation measures (beyond the measures already incorporated into the project by the Navy) are necessary. Therefore, the Commission finds that the proposed project is consistent with the dredge and fill policies (Section 30233(a)) of the Coastal Act.

C. **Water Quality.** The Coastal Act provides the following:

***Section 30230***

*Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

***Section 30231***

*The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

***Section 30232***

*Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur.*

1. Dredging Operations. The potential impacts from dredging on marine water quality include temporary increased turbidity, reductions in dissolved oxygen, and potential resuspension, remobilization, and redistribution of any chemical contaminants present in the sediments. Dredging would result in temporary losses of infauna, epifauna, and some demersal fish within the dredge footprint. These impacts are typical of all dredge projects, and the Commission has historically determined no additional mitigation is necessary where the need for dredging is established and where turbidity monitoring, silt curtains, or other turbidity-minimizing methods are used.

The consistency determination states that:

*Dredging and disposal would be conducted in accordance with permit specifications and other requirements of EPA, COE, and RWQCB. Permit conditions would include use of specific dredging equipment, including silt curtains, or procedures to minimize losses or spillage to adjacent waters. Silt curtains will be used during dredging, and if jetting is used during pile removal, to minimize dispersion of suspended sediments. No spillage of*

*sediment from the barge would be permitted. Any dredged material spilled accidentally into the bay during transport processes would be redeposited on the bay floor and would not cause significant toxicity or contaminant bioavailability. The quantity of sediment spilled into the bay would be minimized by placing catch basins beneath transport systems.*

In addition, the Draft EIS for the project states that:

- Dredging would be performed using both hydraulic and clamshell dredges.
- Water quality monitoring would occur during dredging to ensure compliance with conditions specified in the project water quality permit, including turbidity levels, suspended solids concentration, and chemical constituent levels.
- Localized changes to water quality would not persist for periods greater than several hours after dredging stops.
- Results from bioassay tests of bottom sediments from the Pier 10/11 area (USDN 2000) indicate that potential for significant acute toxicity (as defined by ACOE/EPA "Green Book" testing protocols) was associated only with sediments from the nearshore portion of Pier 10, which corresponds to approximately 48,000 cu.yds. or about 6 percent of the total dredged volume. Sediments from this area would be dredged using a clamshell dredge, which maintains the dredged materials in a cohesive state and minimizes losses to surrounding waters.

The Commission finds that no additional water quality protection measures, beyond the measures incorporated into the project by the Navy and the conditions routinely attached to Corps of Engineers and RWQCB dredging permits, are necessary for the proposed dredging activity.

2. Dredged Sediment Characteristics. To determine the appropriate disposal alternative for the project's dredged sediments, the sediments were evaluated by the Navy pursuant to the procedures described in the Corps/EPA "Green Book" (Evaluation of Dredged Material Proposed for Ocean Disposal, 1991). The consistency determination summarizes the sediment chemistry test results:

*Dredging for the proposed Pier 10/11 would result in approximately 763,545 cubic yards of dredged material. Of this amount, approximately 47,966 cubic yards would be classified as "unsuitable" sediments. Unsuitable sediments are those with contaminant levels that do not meet the criteria outlined in the "Evaluation of Dredged Material Proposed for Ocean Disposal" manual.*

The Draft EIS discusses in further detail sediment chemistry characteristics at the project site (Exhibit 7 illustrates the ten sediment collection sites):

*Sediment quality (chemical contaminant concentrations, toxicity, and contaminant availability) within the project area was evaluated by USDN (2000), as summarized in Appendix E. In general, sediments collected at ten locations near Piers 10 and 11 contained low total organic carbon (0.08 to 0.41 percent), sulfides (less than 0.1 to 2.7 mg/kg), total recoverable petroleum hydrocarbons (less then 5 to 21 mg/kg), ammonia (3.9 to 28 mg/kg), and no detectable water soluble sulfides. Sediments also contained low or non-detectable levels of chlorinated pesticides, polychlorinated biphenyls (PCBs), phenols, and phthalate esters (Table 3.1-1). Polycyclic aromatic hydrocarbons (PAHs) were detected at all sites but at concentrations consistently below expected biological levels (e.g., effects range-low). The specific PAH compounds detected were characteristic of combustion products, rather than petroleum sources, which are common in urban runoff. Concentrations of the metals copper, mercury, and silver exceeded the respective effects range-low (the lower 10$^{th}$ percentile of ranked data where a chemical level was associated with a toxic biological affect) values at several sites, but only mercury concentrations at one site (Site 5) exceeded the effects range-median (the 50$^{th}$ percentile of ranked data and represents the level above which effects are expected to occur) value. The solid phase bioassay test results indicated significant toxicity at only one of the ten sites, near the inshore end of Pier 10 (Site 1).*

The Final Report, Dredged Material Testing, Deep-Draft Power-Intensive (DDPI), Ship Berthing/Logistics/Maintenance Pier, MILCON Project P-326, U.S. Naval Station, San Diego, California (August 2000), contains additional information on sediment chemistry characteristics at the project site (Exhibit 8 includes the results and discussion sections from the Final Report):

- The sediment testing program followed the procedures outlined in the "Green Book."
- The bioassay tests included: (1) suspended particulate phase analyses to determine water column effects; (2) solid phase tests to determine whole sediment benthic effects; and (3) bioaccumulation phase tests to analyze potential food web impacts.
- The project area was broken down into ten test sites, which all received full Tier III analyses.
- Site 1 was the only site in which significant solid phase toxicity was observed. Copper, mercury, and silver were above the ER-L. Site 1 also had the highest concentrations of PAHs and phthalates of any of the sites. The combination of these factors may have been responsible for the toxicity observed in the amphipod bioassay, as well as the abnormal mussel larvae development in the 100 percent suspended particulate phase concentration.
- Exposure to Site 1 sediment resulted in statistically significant toxicity in the amphipod bioassay. Site 1, therefore, does not meet the benthic effects LPCs (limiting permissible concentrations) for LA-5 disposal.
- Sites 2 through 10 meet both the benthic effects and water column effects LPCs for LA-5 disposal.

- The conclusion of this study is that all test sites, with the exception of Site 1 (due to solid phase toxicity), are suitable for unconfined aquatic disposal.

Based on these test results, the Navy proposes to dispose approximately 715,000 cu.yds. of project dredged materials at the LA-5 ocean disposal site (48,000 cu.yds. from Site 1 will not go to LA-5). The Commission staff spoke with a representative from EPA regarding the sediment characteristics report and the Navy's disposal plan. EPA provided a preliminary approval of the disposal plan in early 2001 and a final report is expected in early May. EPA staff confirmed that the Navy's sediment test procedures followed the "Green Book" standards and that the sediments from Site 1 appear to be the only dredged materials at the project site which are unsuitable for ocean disposal.

The contaminated Site 1 sediments will be dewatered and then transported to an inland landfill disposal site outside the coastal zone. The consistency determination states that:

> *Prior to removal from NAVSTA, dredged sediments would be dewatered utilizing one or more of the* [NAVSTA] *CDF* [confined disposal facility] *sites. The CDF sites are identified in the EIS as the DRMO Boat Repair Yard, 7th Street CDF, Recycling Yard, PWC Yard, and Small Boat Storage Area.*
>
> *Dewatering would be completed in accordance with RWQCB waste discharge requirements. To avoid significant impacts during dewatering at upland CDF sites, standard engineering measures, BMPs, and other control measures would be used. Waste discharge requirements may be required by the RWQCB for this discharge and BMPs would be implemented to minimize loss of dredged material to the bay. A clamshell would offload dredged material from the barges into dump trucks with sealed beds for transport to the CDF. An impervious cover would be constructed below the swing path of the dredge to keep the sediments from falling into the bay. Alternatively, dredged material could be loaded onto an earth-moving conveyor belt system that would have a containment trough beneath the belt to catch falling sediment.*

The runoff from dewatering operations would first pass through a filtration system and then discharged into San Diego Bay. A representative from the San Diego RWQCB confirmed that because contaminants present in the project sediments typically bond to sediment particles rather than turning soluble in seawater, and based on monitoring of previous Navy sediment dewatering operations in the region, runoff from the proposed dewatering operation is not expected to serve as a significant source of water pollution and will not adversely affect water quality in San Diego Bay. The Commission finds that based on the water quality protection measures discussed above, and the Navy's plan to place contaminated sediments from the project site at an upland location, the proposed dredging and disposal operations at NSSD and LA-5 will not generate significant adverse impacts on water quality.

3. Pier Construction and Operation. The consistency determination provides that:

*Stormwater runoff from the existing piers at Naval Station San Diego is regulated under the State Industrial Activities Storm Water General Permit (General Permit), National Pollutant Discharge Elimination System (NPDES) Permit No. CAS000001. Stormwater runoff from the completed replacement pier would be similar to that associated with the existing piers and would also be covered under the General Permit. In accordance with the General Permit, implementation of a Storm Water Pollution Prevention Plan (SWPPP) and best management practices (BMPs) would minimize impacts on surface and marine water quality due to stormwater runoff from piers* (Exhibit 9).

*Additionally, the Navy would incorporate new stormwater BMPs into the replacement pier. The construction contract will be a design-build contract with functional, operational, and material requirements for the pier. The contractor will be required to design the pier to meet the requirements stipulated in the contract, including stormwater measures to preclude direct runoff into San Diego Bay. Requirements for the stormwater collection and filter system will include the following:*

- *The pier will be required to slope to collection points in the deck. These inlets, either catch basins or trench drains, will be fitted with filter inserts for initial filtration.*

- *Stormwater runoff collected on the deck will be transported shoreward to a larger filter unit or units at the head of the pier. Filter units will remove additional suspended solids, oils, and grease. Stormwater will be discharged into the bay only following this filtration.*

- *The stormwater system will be sized to accommodate the requirements of the San Diego Municipal permit.*

*The new pier would also be included in the Naval Station San Diego Stormwater Monitoring and Reporting Program. Stormwater runoff from piers are sampled and analyzed to measure BMP effectiveness in preventing stormwater pollution, as per the General Permit.*

*This project would result in the removal of over 100 creosote pier pilings. Creosote pier pilings discharge Polycyclic Aromatic Hydrocarbons (PAHs) into San Diego Bay. The pilings would be replaced with recycled plastic pier pilings that are inert and do not discharge pollutants into the receiving water. The Navy has calculated that removing the creosote pilings would eliminate the discharge of approximately 37kg/yr of PAHs. This project would therefore result in a lowering of PAH concentrations in San Diego Bay.*

*During project construction, stormwater runoff would be managed in accordance with the State Construction Activities Storm Water General Permit, NPDES Permit No. CAS000002. In accordance with the construction permit, a Storm Water Pollution Prevention Plan and BMPs would be implemented to minimize impacts on surface and marine water quality due to stormwater runoff. A debris management plan would be prepared to identify types of debris expected during pier demolition, separation and retrieval methods, and disposal*

*methods. Any accidental debris spills would be cleaned up according to construction specifications.*

*The Navy has a comprehensive spill prevention and response program. As part of the program the following oil and hazardous substances prevention and response plans have been developed: Spill Prevention, Control, and Countermeasures Plan; Hazardous Materials Response Plan; and Facility Response Plan. The new replacement pier would be included in these plans. The Navy program also includes regular training for ship and shore personnel on spill prevention and response procedures.*

*Several structural measures would be implemented for the new pier to protect against oil and hazardous substance releases. Ships berthed at the piers transfer bilge water through hoses to risers installed on the pier. Secondary containment will be installed around the risers to capture potential bilge water drips/spills. In addition, the piping used to transfer bilge water from the piers to the* [Naval] *Base treatment plant would be double-walled with a leak detection system. Permanent oil containment booming would be installed around the pier.*

In addition, the Draft EIS for the project discusses ballast water discharges:

*Offloading of ballast water would not occur at the replacement pier. In accordance with Navy regulations (OPNAV 5090 1B, Section 19-10), consistent with ship safety considerations, discharge of ballast water into the bay is not permitted. Ballast water must be offloaded either greater than 12 miles from shore or at an approved facility such as Pier 13* [Naval Station San Diego]. *Thus, significant concerns related to potential introduction of non-indigenous aquatic organisms or pathogens from these discharges would not occur.*

After reviewing the water quality protection measures in the consistency determination and the Draft EIS, the Commission staff requested that the Navy clarify several aspects of the water quality program for the replacement pier. The following are the Commission staff requests and the Navy's responses:

The staff requested a regular inspection and maintenance schedule for all structural BMPs on this proposed pier, especially for the proposed filters in catch basins and/or trench basins on the pier to provide initial filtration of the stormwater.

*Navy response: A regular maintenance schedule will be developed for all structural BMPs. The maintenance schedule will be based on the type and use of equipment and will be at a frequency to ensure the equipment is maintained in good working condition. The filter units will be regularly inspected to ensure the filters are functioning properly and to determine when the filters require cleaning and replacement.*

The staff requested that the additional filter unit or units at the head of the pier be regularly inspected and maintained as well.

*Navy response: The additional filter units will be regularly inspected to ensure the filters are functioning properly and to determine when the filters require cleaning and replacement.*

The staff noted that "the storm water system will be sized to accommodate the requirements of the San Diego Municipal permit" is a good idea in principle, but somewhat detached from the realities of the NPDES permit, as proposed/issued by the San Diego Regional Water Quality Control Board. The subject NPDES permit requires the co-permittees (municipalities) to develop Standard Urban Storm Water Mitigation Plan (SUSMPs). These SUSMPs will then dictate that post-construction structural BMPs for new development and significant redevelopment under eight designated categories be designed to one of four numerical sizing criteria. These four criteria essentially require similar levels of stormwater treatment and they are basically comparable to the Commission's own numeric design goal. Essentially, the criteria require that volume-based BMPs be designed with the capacity to infiltrate, filter, or treat stormwater runoff from "Each runoff event up to and including the 85$^{th}$ percentile 24-hour runoff event determined as the maximized capture stormwater volume for the area." In the San Diego area, this means treating the "volume of runoff produced from each and every storm event up to and including 0.6 inches of rainfall, prior to its discharge to a stormwater conveyance system."

However, since the Navy is proposing the use of filters, it is more appropriate to conform to the design criterion for flow-based BMPs. In the San Diego area it means that "BMPs shall be sized to handle the flow generated from a rain event up to and including the 0.2 inches/hour rain event." It is important that whichever design criteria is used it should be clearly defined. Currently, the San Diego Municipal NPDES Permit merely requires application of the numeric design criteria to eight development categories. The Navy's pier replacement does not seem to fit under any of the categories unless it is in a location adjacent to or discharging to an Environmentally Sensitive Area. To avoid confusion and future dispute over Navy's intent to "accommodate the requirements of the San Diego Municipal permit," the Commission staff requested that the Navy clearly state its willingness to employ the numerical design criteria even if they are not currently required by the Regional Water Board.

*Navy response: The Navy will require the contractor to design the filtration system using the SUSMPs numeric sizing criteria found in the San Diego Municipal Storm Water Permit. This requirement will be completed regardless of whether the Navy is covered by the permit or the pier fits into one of the categories listed under the SUSMPs.*

The staff requested that BMPs be strengthened for equipment maintenance on-site. Potential areas of concern include, but are not limited to: distance away from water; chemical use both in type and quantity; and runoff prevention and control.

*Navy response: The only equipment maintenance performed on the pier is for equipment that is installed on the pier (pipes, valves, filters, containment berms, etc.) The Storm Water Pollution Prevention Plan (SWPPP) for the completed pier will include BMPs that address maintenance on the pier. Requirements will be included for covering drains, using tarps,*

*storing chemicals in a manner to prevent spills into the bay (away from the water), secondary containment, etc.*

The staff requested that "good housekeeping" measures similar to those for the CVN wharf be implemented. This includes regular pavement sweeping at least once every two weeks, and vacuum sweeping on a monthly basis when a vessel is at berth.

*Navy response: The SWPPP will include housekeeping measures similar to the CVN Wharf. The Navy will perform, at a minimum, pavement sweeping once every two weeks and vacuum sweeping on a monthly basis when a vessel is at berth.*

The staff requested runoff from storm drains be monitored regularly. Monitoring areas and parameters need to be identified, similar to that agreed to by the Navy in the consistency determination for the CVN project. (See CVN staff report.)

*Navy response: The storm water monitoring program will be developed and implemented in accordance with the State General Industrial Storm Water Permit. The storm water monitoring program will include sampling and analysis for at least two storm events during the wet season (October – May), monthly storm water observations during each month of the wet season, quarterly observations of all discharge points to ensure there are no illicit discharges (non-storm water discharges, spills, etc.) and an annual comprehensive compliance evaluation of the entire storm water program (BMP effectiveness, storm water monitoring results, training programs, etc.). In accordance with the State General Industrial Storm Water Permit, the storm water samples will be analyzed for the four basic parameters (Total Suspended Solids, Oil and Grease, pH, Specific Conductivity) and other pollutants that may be present in storm water discharges (metals - copper, zinc, lead, chromium, silver, nickel, etc., semi-volatiles and surfactants). The contractor will be required to design the filtration system so that storm water samples can be collected at a location downstream of the filters and is representative of the discharge into San Diego Bay. The Navy will also perform regular inspections on the pier by environmental compliance staff to ensure all BMPs are being properly implemented.*

*The project includes the installation of a filtration system to remove oil and grease from stormwater prior to its discharge into San Diego Bay. While the existing piers at Naval Station, San Diego are meeting stormwater control limits for oil and grease, should the water quality monitoring and reporting data for the proposed project indicate that oil and grease limits are exceeded (even with a storm water filtration system) then the Executive Director could recommend that the Commission find that additional structural (e.g. stormwater diversion facilities) or non-structural (increased pavement sweeping and cleaning) BMPs be implemented to ensure that the project adequately protects water quality and remains consistent with the California Coastal Management Program.*

The staff requested that any failures in structural BMPs and/or stormwater noncompliance in general be corrected immediately, to the extent practicable, and that no noncompliance should remain uncorrected prior to the beginning of the following wet season.

*Navy response: The Navy will correct failures in structural BMPs and/or stormwater noncompliance immediately, to the extent practicable. Noncompliance will be corrected prior to the beginning of the following wet season.*

The staff requested review of additional submittals needed (based on plans similar to those of the CVN wharf project), including (1) Storm Water Pollution Prevention Plans for both construction and post-construction phases; and (2) A Monitoring and Reporting Plan.

*Navy response: The Navy will submit a copy of the construction and post construction SWPPPs and the Monitoring and Reporting Plan to the CCC. The construction SWPPP will be submitted prior to start of construction. The draft post construction SWPPP and Monitoring and Reporting Plan have not been completed for the pier, but will be submitted to the CCC by the end of the first week of May 2001.*

The Commission finds that the Navy's water quality protection program for the replacement pier project at Naval Station San Diego, as outlined above, is comparable to the water quality measures concurred with by the Commission in the recent CVN homeporting project at Naval Air Station North Island (CD-89-99). In both projects, during construction and in the subsequent operational phase, structural and non-structural elements will be in place to protect against the degradation of water quality in San Diego Bay. With these measures, the Commission concludes that the proposed dredging, pier demolition, and pier construction will not adversely affect the water quality of San Diego Bay, and that the project is consistent with the water quality and marine resource protection policies (Sections 30230, 30231, and 30232) of the Coastal Act.

**D. Environmentally Sensitive Habitat.** Section 30240 of the Coastal Act provides:

*(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.*

*(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.*

The Draft EIS reports that no eelgrass beds occur in the vicinity of the project site, and that shading from the replacement pier and temporary and localized increases in turbidity from dredging and pile placement would therefore not generate significant adverse effects on this type of environmentally sensitive habitat. Disturbance and loss of marine infauna and epifauna from dredging and pier construction would not be significant and recolonization of the dredged area would occur within several months to one year.

The Draft EIS examines potential impacts to the endangered California least tern and states that:

*California least terns infrequently use the shoreline and open waters near Piers 10 and 11* (Exhibit 10). *The general low use and lack of occurrence of important nesting and foraging areas in the Naval Station region is summarized in the recent Draft Integrated Natural Resources Management Plan (USDN, SWDIV 1999)(Figure 3.2-3). Nesting areas at the D Street Fill and Sweetwater River mouth are located south of NAVSTA. Recent least tern nesting in this area has included 25 pairs in 1996*

The status of the least tern on U.S. Navy installations in the San Diego region is evaluated annually, and the current Memorandum of Understanding between the USFWS and the Navy summarizes the commitments by the Navy and the USFWS to least tern conservation and enhancement in San Diego Bay. In accordance with this agreement, in-water construction by the Navy within designated least tern foraging zones during the April 1 to September 15 nesting season requires prior consultation with USFWS. Designated foraging zones include the shallows along the northwest side of the Naval Radio Receiving Facility, nearshore areas on both sides of the Silver Strand on the NAB, the ASW (anti-submarine warfare) boat channel, and the nearshore on the southern shore of North Island.

Demolition of Piers 10 and 11 and construction of the replacement pier would result in a net decrease of approximately two acres in bay surface water for foraging (Piers 10 and 11 cover two acres and the replacement pier would cover four acres). In addition, demolition and construction activities will generate adverse effects on turbidity which could affect the ability of seabirds to successfully forage in this part of San Diego Bay. The consistency determination addresses potential project impacts on marine habitat and resources at and adjacent to the project site:

*The footprint of the proposed project occurs within an area that has a relatively low density index for mean abundance of combined fish species in San Diego Bay, relatively low utilization by California least tern for foraging, and documented low prey species abundance (USDN, SWDIV 1999, corresponding to the San Diego Bay Integrated Natural Resources Management Plan). Further, no special aquatic sites or eelgrass beds occur within or immediately adjacent to the pier footprint.*

. . .

*Potential impacts from shading would be less than significant based on studies conducted by the Navy (Merkel & Associates 1999) at NAVSTA Pier 13. This study determined that invertebrate and fish communities under Pier 13, representing a similar-sized structure as that proposed for Pier 10/11, were not significantly different under (i.e., shaded) as compared to outside the pier area (i.e., unshaded).*

*No significant impacts (injury or harassment) are expected on marine mammals, sea turtles, threatened, endangered, and special status species, or essential fish habitat. This is due to the lack of important habitat for these species and/or low abundance in the project vicinity, and the small project area compared to available bay habitat, as noted above. This would also be true for cumulative impacts due to the limited context and intensity of any potential*

*effects. Further, enhancements will be included in the project which will result in further protection of the marine environment: (1) a study to evaluate foraging success of California least tern near man-made structures such as piers in San Diego Bay; and (2) creation of two fish habitat structures at the NAB Enhancement Area.*

Notwithstanding the Navy's position that the project area is not a heavily used least tern foraging area, the Commission staff and representatives from state and federal fish and wildlife agencies expressed concerns regarding potential adverse impacts on California least tern foraging due to dredging and pier construction that will extend over the two-year construction period. As a result of those concerns and subsequent coordination between the Navy and the resource agencies, the Navy agreed to incorporate the following enhancements into the proposed project to address potential impacts on least tern activities:

Construction of Additional Intertidal Habitat at NAB Enhancement Area. An additional two acres of intertidal habitat will be created at the NAB Enhancement Area (in addition to the original six acres included in CD-89-99 (CVN Homeporting)) as recommended in the Integrated Natural Resource Management Plan (SWDIV 1999). The additional two acres of intertidal habitat will offset the coverage and shading of bay waters arising from construction of the replacement pier at NSSD. The additional intertidal acreage will come from reshaping the Enhancement Area. The reshaped Enhancement Area will constitute higher quality habitat for use by least terns and other species (e.g., more appropriate water depths for development of eelgrass beds), while maintaining all requirements of the existing Enhancement Area. The reshaping of the Enhancement Area will result in the additional intertidal acreage and will result in a reduced basal footprint on the bottom of the bay.

Construction of Fish Habitat Structures. Fish habitat structures will be constructed at the NAB Enhancement Area using concrete piling debris from demolition of Piers 10 and 11 (Exhibit 11). Two fish habitat structures will be constructed using broken piles or concrete crushed to a minimum of 24 inches and no greater than 48 inches in diameter. Concrete will be free of protruding rebar and other metal debris. The structures will be placed beside the existing revetment with an approximate 10' by 20' footprint, with a design elevation extending to –4 feet mean lower low water. The purpose of the structures is to increase the amount of fish habitat and the abundance of prey species in this area for foraging by seabirds, including the California least tern.

California Least Tern Study. A team comprised of Navy, USFWS, California DFG, and local experts will collaboratively design a study to evaluate foraging success near and around selected structures (e.g., piers) as compared to open water areas. The multi-agency effort to design the study parameters and methodologies for determining foraging success has begun but is yet to be completed; the actual study will not commence until the 2002 breeding season (April 1 to September 15). Study results will be used to indicate whether there are significant adverse impacts to foraging success as a result of the structures, and will be assumed to apply broadly to future projects in San Diego Bay.

The Commission staff coordinated with representatives from the National Marine Fisheries Service, U.S. Fish and Wildlife Service, and California Department of Fish and Game regarding the proposed pier replacement. With the aforementioned enhancements now incorporated into the project by the Navy, the agencies agree that the project will not adversely affect marine habitat and resources, including California least tern foraging, at or adjacent to the project area at NSSD. Therefore, the Commission finds that the proposed dredging, pier demolition, and pier construction will not adversely affect the California least tern and that the project is consistent with the environmentally sensitive habitat policy (Section 30240) of the Coastal Act.

**E. Fishing Resources.** The Coastal Act provides:

***Section 30230***

*Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

***Section 30234***

*Facilities serving the commercial fishing and recreational boating industries shall be protected and, where feasible, upgraded. Existing commercial fishing and recreational boating harbor space shall not be reduced unless the demand for those facilities no longer exists or adequate substitute space has been provided. Proposed recreational boating facilities shall, where feasible, be designed and located in such a fashion as not to interfere with the needs of the commercial fishing industry.*

***Section 30234.5***

*The economic, commercial, and recreational importance of fishing activities shall be recognized and protected.*

In reviewing previous consistency determinations for Navy dredging in San Diego Bay and disposal at LA-5, the Commission found that these activities would not adversely affect commercial and recreational fishing. The Commission noted that EPA would continue to monitor and evaluate impacts to fisheries from disposal activities at LA-5. Given that there is no new information indicating that disposal at LA-5 of suitable dredged sediments from the pier replacement project would affect fisheries at and adjacent to this site, the Commission finds that the proposed project is consistent with the fishing resource policies (Sections 30230, 30234, and 30234.5) of the Coastal Act.

**F. Sand Resources.** Section 30233(b) of the Coastal Act provides:

> *Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation. Dredge spoils suitable for beach replenishment should be transported for such purposes to appropriate beaches or into suitable long shore current systems.*

Sediment testing for the project established that the dredged material is predominantly fine-grained (generally less than 20 percent sand and coarser materials) and not suitable for beach replenishment. Therefore, the Commission finds that the material proposed to be dredged does not contain enough sand to be suitable for beach disposal, and that the ocean and upland disposal of this material is consistent with the sand resource policy (Section 30233(b)) of the Coastal Act.

**G. Public Access and Recreation.** The Coastal Act provides the following:

***Section 30210***

*In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.*

***Section 30211***

*Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.*

***Section 30212***

*(a) Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where:*

> *(1) It is inconsistent with public safety, military security needs, or the protection of fragile coastal resources. . . .*

***Section 30213***

*Lower cost visitor and recreational facilities shall be protected, encouraged, and, where feasible, provided. Developments providing public recreational opportunities are preferred.*

***Section 30220***

*Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.*

***Section 30223***

*Upland areas necessary to support coastal recreational uses shall be reserved for such uses, where feasible.*

The pier demolition, replacement pier construction, dredging, and contaminated sediment dewatering sites are within the boundaries of Naval Station San Diego. Public access to San Diego Bay is prohibited within the Naval Station due to military security requirements. The Commission has historically determined that projects located within restricted military areas that do not generate access burdens do not entail the need for public access provisions. Therefore, the Commission finds that that the proposed pier replacement project at Naval Station San Diego will not adversely affect public access and recreation on San Diego Bay, and is consistent with the public access and recreation policies (Sections 30210, 30211, 30212, 30213, 30220, and 30223) of the Coastal Act.

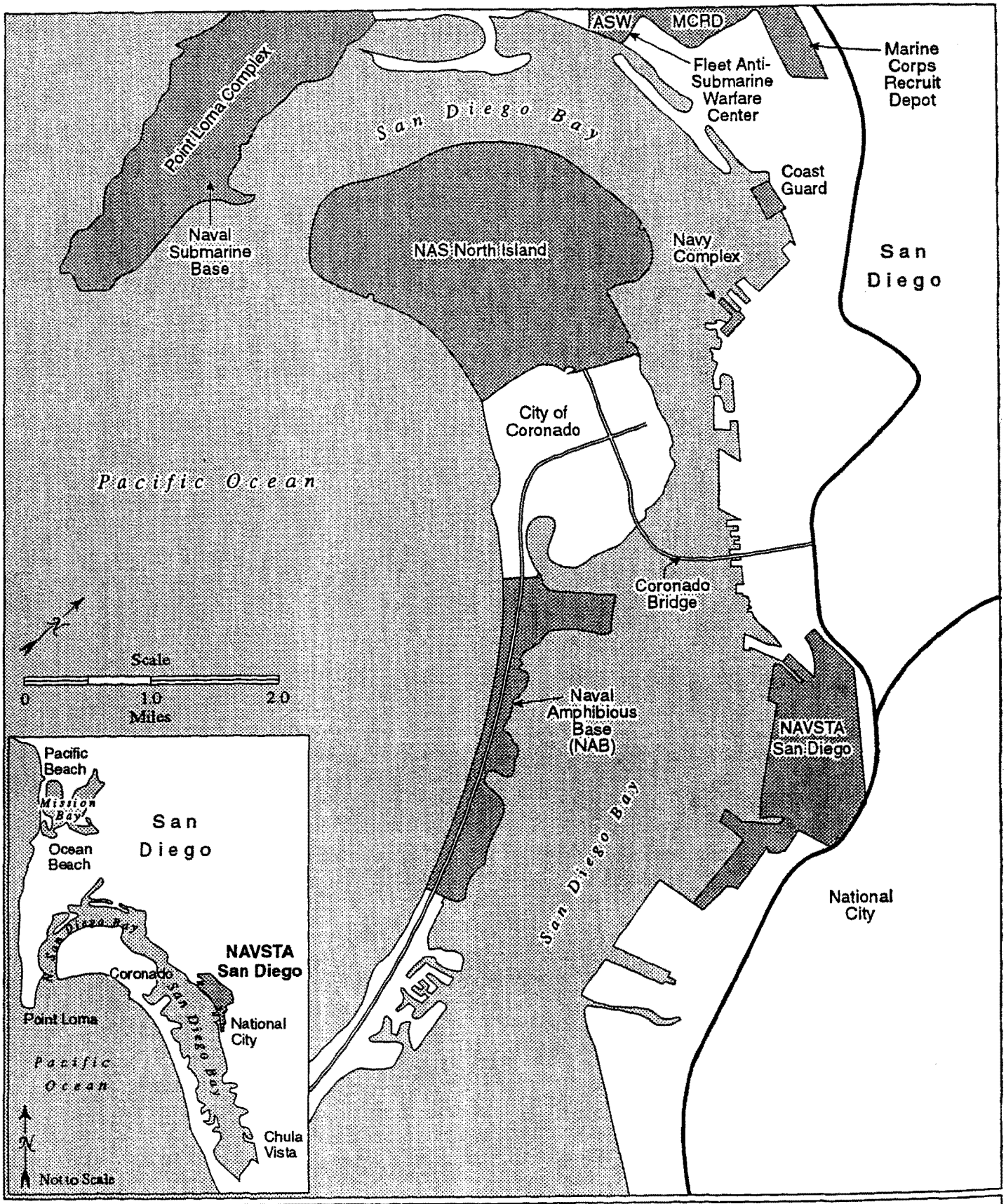



**Figure ES-1**

**LOCATION OF NAVSTA SAN DIEGO**

EXHIBIT NO. 1
APPLICATION NO.
CD-31-01
California Coastal Commission

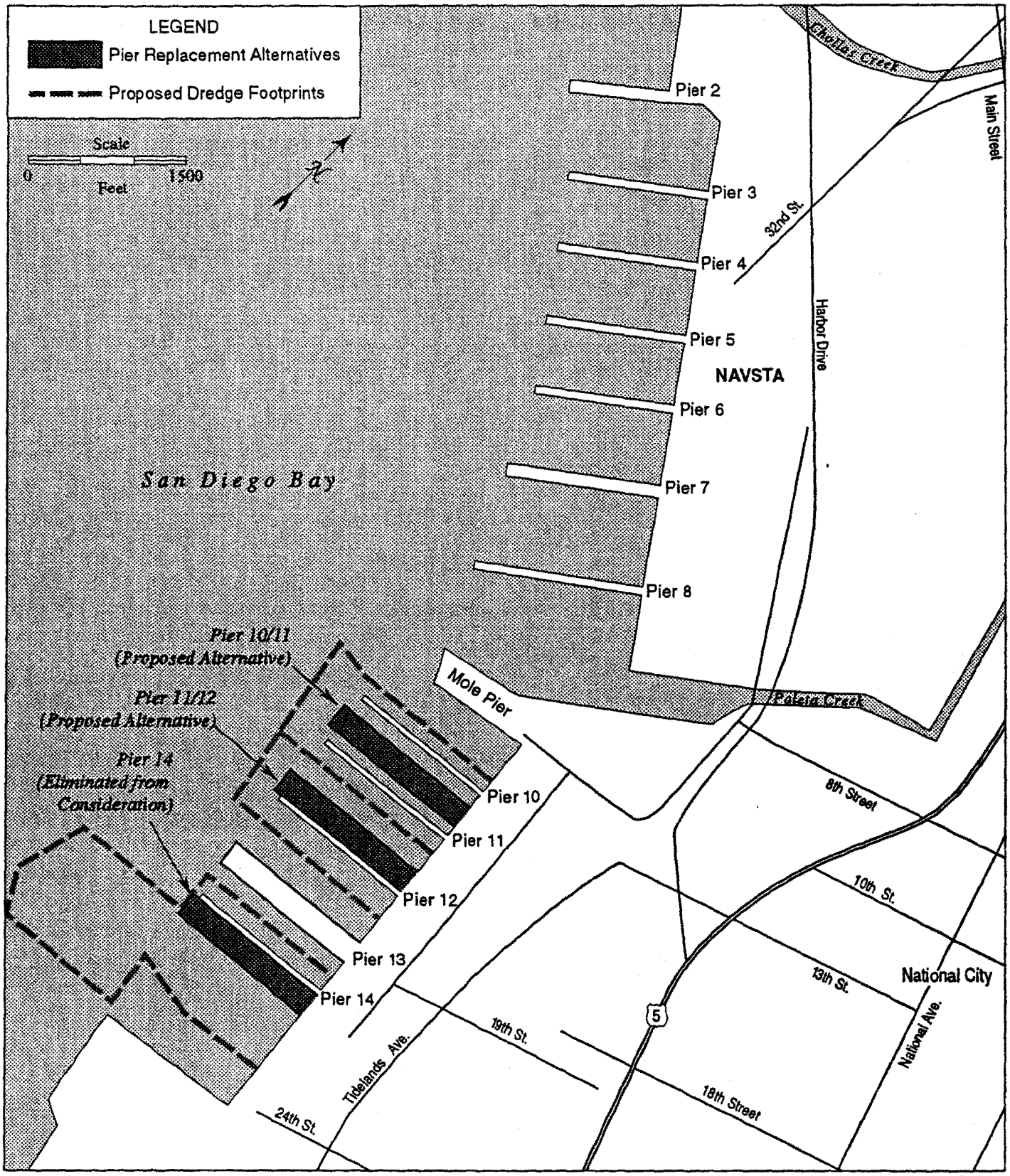
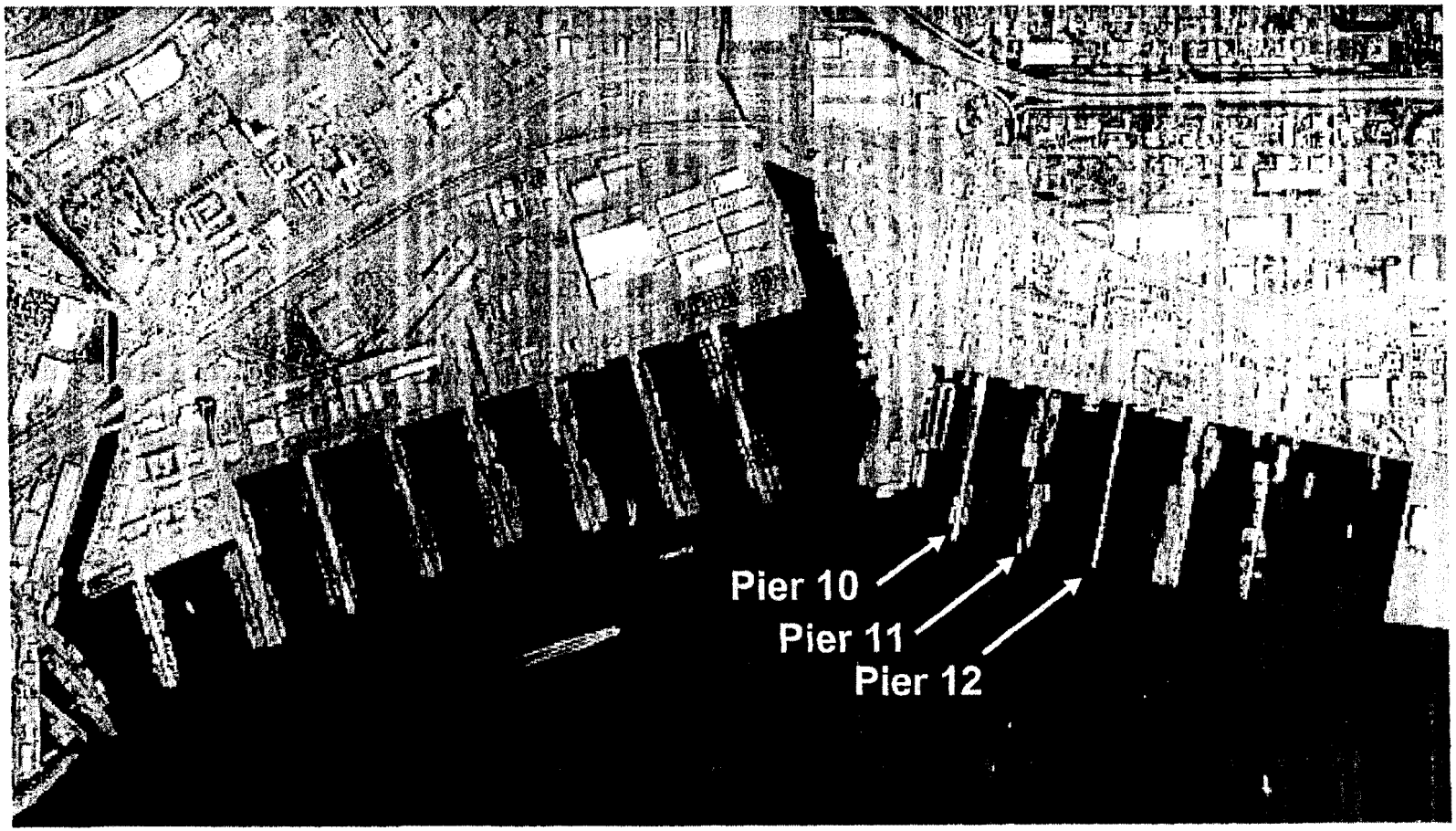


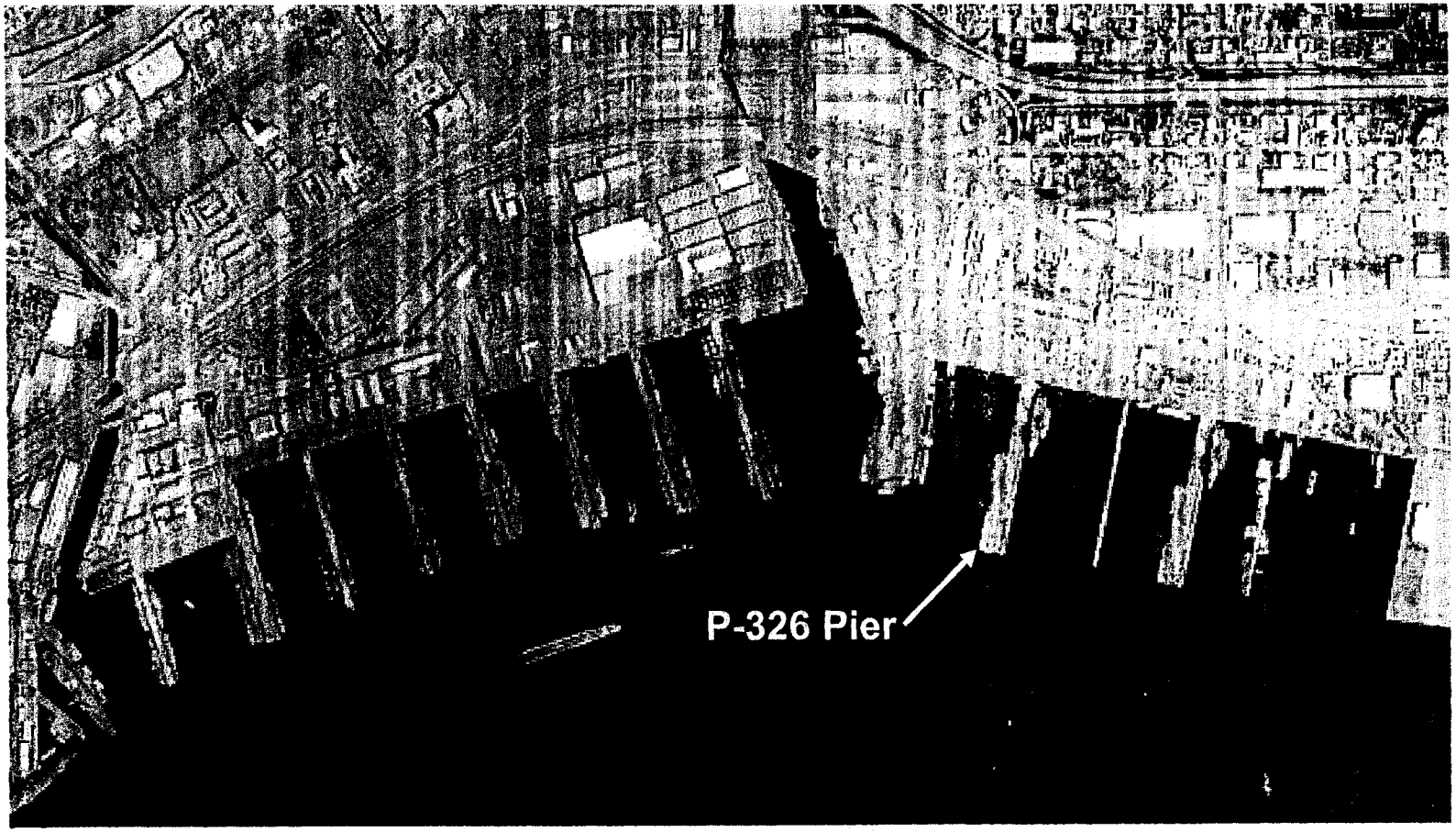

**Figure ES-2**

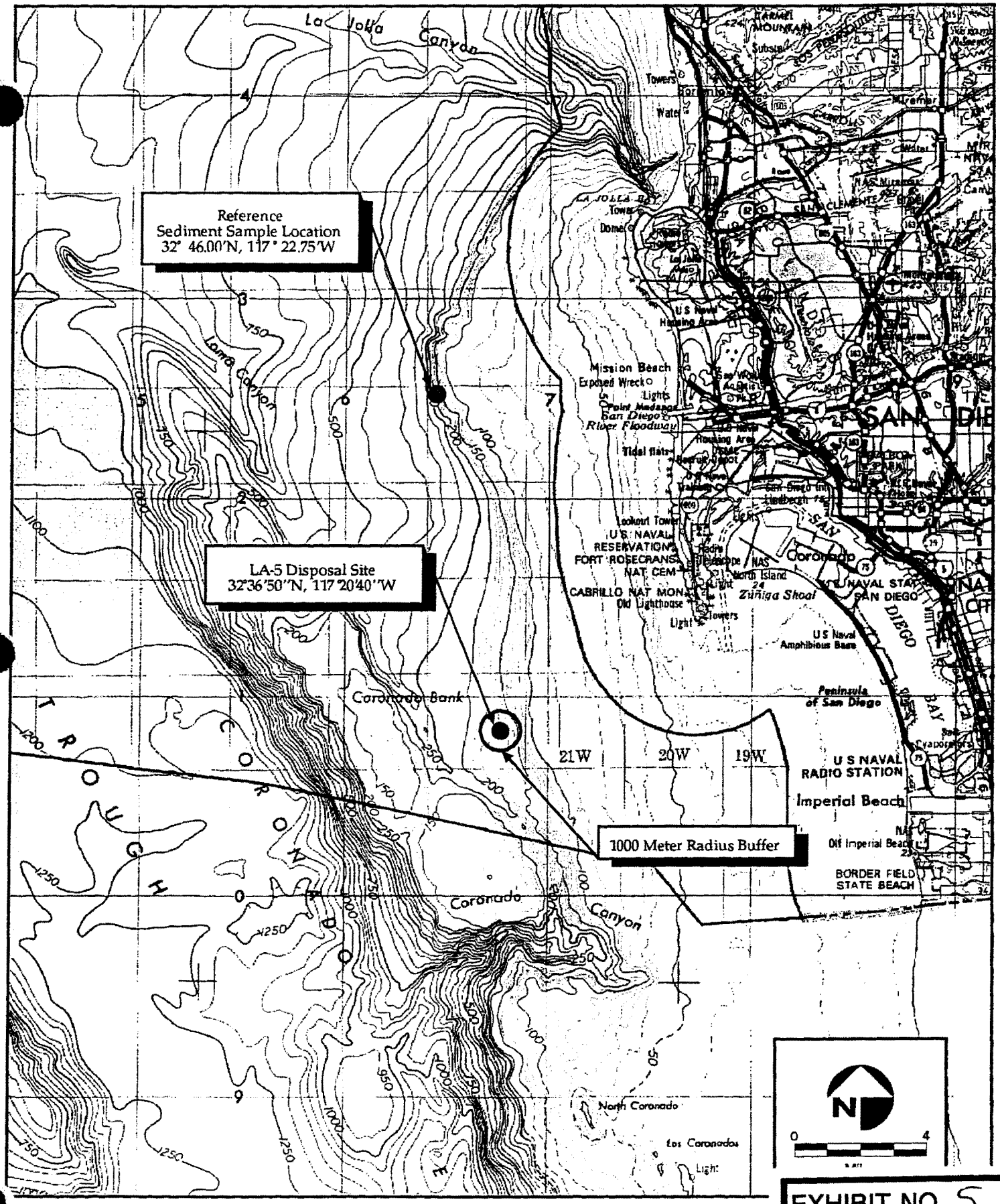
**PIER REPLACEMENT ALTERNATIVE SITES**

# Naval Station San Diego (2000)



# Naval Station San Diego (future)






**LA-5 Ocean Disposal Site and Reference Sediment Collection Location**

EXHIBIT NO. 5
APPLICATION NO.
CD-31-01
California Coastal Commission

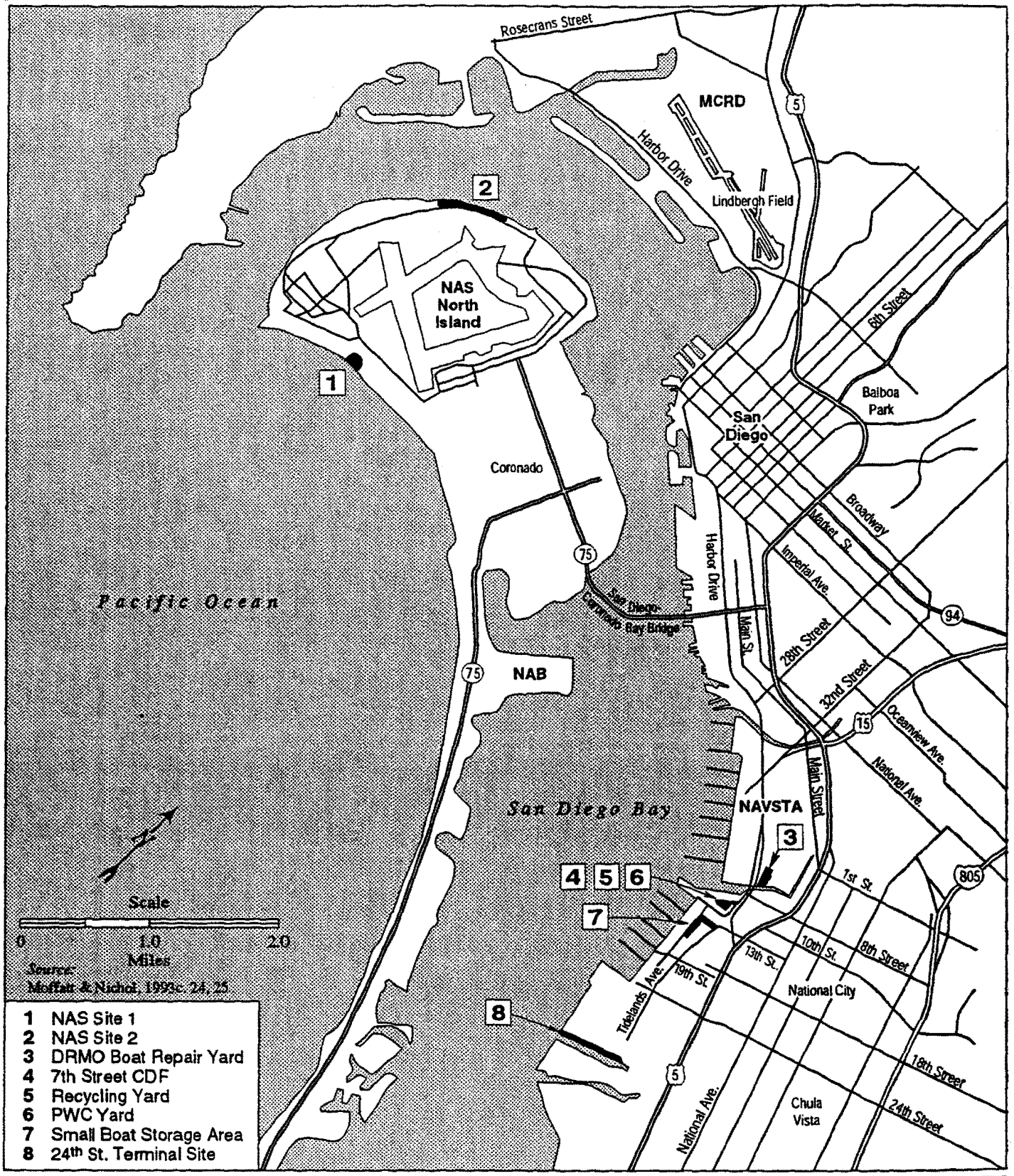



**Figure 2-5**

**CONFINED DISPOSAL FACILITY (CDF) SITES**

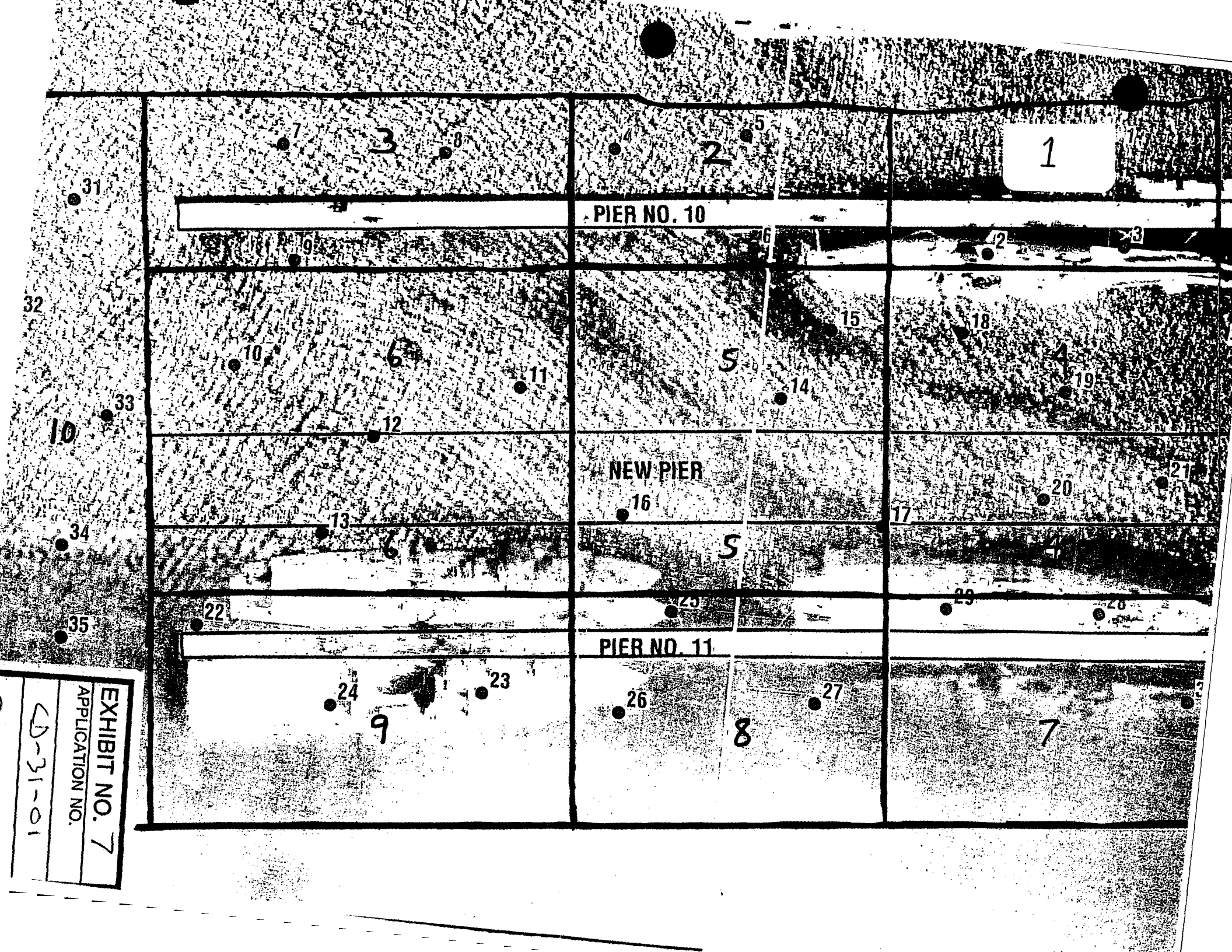



EXHIBIT NO. 7
APPLICATION NO.
CD-31-01

# SECTION 3
# RESULTS

This section details the results of the Green Book Tier III toxicity study conducted on P-326 sediment.

## 3.1 Sediment Collection

The total number of cores proposed in the SAP (35) was achieved; however, several cores needed to be relocated due to obstructions (e.g., ships). The core penetration ranged from 22 to 100 percent. It is very common to hit the Bay Point Formation, a partially lithified sediment layer, which prevents further vibracore penetration. The coring program log and station positions (Figure 2) are outlined in Table 12 and Appendix A. Photographs of each core are contained in Appendix B.

## 3.2 Physical Test Results

The results of the physical analyses conducted on P-326 sediment are outlined in Table 13. The sediment was found to be primarily sandy-silt with a relatively low total organic carbon (TOC) level. These results are typical of sediments found in southern California harbors. Raw grain size results are contained in Appendix C.

## 3.3 Chemical Test Results

Sediment chemistry results are presented in this section. Table 14 outlines the heavy metal, ammonia, and sulfide results. Organic chemicals, with the exception of PAHs, are listed in Table 15. PAH results are outlined in Table 16. Analytical data sheets from the chemistry laboratories can be found in Appendix D. A discussion of the chemical results and how they compare to the bioassay results and commonly used sediment quality guidance is contained in Section 4.

## Table 12

## VIBRACORE CORE LOG AND DGPS POSITIONS
## P-326 PROJECT

| Station Number | Number of Cores Taken | Sample Date | Latitude North | Longitude West | Target Penetration (ft) | Actual Penetration (ft) | Percent Penetration (%) | Comments |
|---|---|---|---|---|---|---|---|---|
| 1A | 2 | 01/18/2000 | 32 40.075 | 117 7.204 | 15 | 11 | 73 | Top 3.5 ft gray silt/clay w/ shell hash; mid 1 ft gray fine silt/sand; bottom 4.5 ft brown coarse sand |
| 1B | 2 | 01/17/2000 | 30 40.049 | 117 7.234 | 12 | 11 | 92 | Top 3 ft fine gray sand/silt; bottom brown sand |
| 1C | 2 | 01/19/2000 | 32 40.054 | 117 7.199 | 14.5 | 10 | 69 | Top 5 ft gray silt; bottom fine/med brown sand |
| 2A | 2 | 01/18/2000 | 32 40.062 | 117 7.333 | 12 | 6 | 50 | Top 4 ft gray fine sand; bottom brown sand with plug |
| 2B | 1 | 01/18/2000 | 32 40.068 | 117 7.299 | 13 | 11 | 85 | Top 2 ft fine gray sand/silt; shell debris; bottom brown medium sand |
| 2C | 2 | 01/17/2000 | 32 40.044 | 117 7.294 | 12.5 | 8 | 64 | Top 2 ft fine gray sand/silt; bottom fine brown sand |
| 3A | 2 | 01/18/2000 | 32 40.055 | 117 7.419 | 9 | 7 | 78 | Top 2 ft fine gray silt/clay; bottom coarse sand w/ shell debris |
| 3B | 1 | 01/18/2000 | 32 40.057 | 117 7.377 | 13 | 10 | 77 | Top 6 ft gray clay; bottom gray medium sand with shell debris; hard sand plug |
| 3D | 2 | 01/17/2000 | 32 40.030 | 117 7.413 | 10.5 | 5 | 48 | Top loose gray silt followed by consolidated gray silt; bottom gray sand/silt; hard plug at bottom |
| 4A | 2 | 01/22/2000 | 32 40.031 | 117 7.238 | 13 | 8 | 62 | Top 4 ft gray silt; bottom fine brown sand |
| 4B | 2 | 01/22/2000 | 32 40.021 | 117 7.210 | 13 | 6 | 46 | Top 3 ft fine gray silt; bottom fine brown sand; plug at 6 ft fine brown sand with clay |
| 4C | 2 | 01/20/2000 | 32 39.997 | 117 7.212 | 13 | 8 | 62 | Top gray silt; bottom med brown sand |
| 4D | 2 | 01/20/2000 | 32 40.004 | 117 7.182 | 14 | 8 | 57 | Top gray silt; bottom fine brown sand |
| 5A | 2 | 01/21/2000 | 32 40.012 | 117 7.283 | 11.5 | 7 | 61 | Top 4.5 ft gray silt with shells; bottom tan clay with some fine sand |
| 5B | 1 | 01/22/2000 | 32 40.028 | 117 7.272 | 11.5 | 8 | 70 | Top 2 ft loose gray silt; 1 ft fine sand/silt; at 4 ft coarse brown sand; at 6 ft tan plug |
| 5C | 2 | 01/21/2000 | 32 39.983 | 117 7.321 | 13.5 | 3 | 22 | Top loose silt; bottom brown clay |
| 5D | 1 | 01/21/2000 | 32 39.987 | 117 7.253 | 12.5 | 8 | 64 | Top 3.5 ft gray silt w/ some sand; bottom fine sand |

## Table 12 (Continued)

## VIBRACORE CORE LOG AND DGPS POSITIONS
## P-326 PROJECT

| Station Number | Number of Cores Taken | Sample Date | Latitude North | Longitude West | Target Penetration (ft) | Actual Penetration (ft) | Percent Penetration (%) | Comments |
|---|---|---|---|---|---|---|---|---|
| 6A | 2 | 01/21/2000 | 32 40.006 | 117 7.426 | 10 | 5 | 50 | Top 3.5 ft gray silt; shell hash, tan clay plug |
| 6B | 2 | 01/21/2000 | 32 40.008 | 117 7.351 | 13.5 | 8 | 59 | Top 6 ft sticky gray silt; bottom hard, coarse sand |
| 6C | 2 | 01/21/2000 | 32 39.994 | 117 7.388 | 13 | 8 | 62 | Top 6 ft loose silt; gray silt sand; bottom brown clay |
| 6D | 2 | 01/21/2000 | 32 39.972 | 117 7.399 | 11 | 7 | 64 | Top 3.5 ft gray silt; bottom fine brown sand/clay |
| 7A | 2 | 01/19/2000 | 32 39.974 | 117 7.194 | 14 | 9 | 64 | Top 4 ft loose gray silt; bottom fine/med brown sand |
| 7B | 2 | 01/19/2000 | 32 39.971 | 117 7.234 | 13 | 9 | 69 | Top 1 ft loose gray silt/sand; bottom brown med sand |
| 7C | 2 | 01/19/2000 | 32 39.957 | 117 7.169 | 12 | 7 | 58 | Top 2.5 ft gray silt; bottom fine brown sand |
| 8A | 2 | 01/17/2000 | 32 39.963 | 117 7.306 | 15 | 6 | 40 | Top brown clay, shell debris; bottom fine silt; plug |
| 8B | 2 | 01/17/2000 | 32 39.940 | 117 7.317 | 12.8 | 7 | 55 | Top fine gray silt followed by sand/shell; bottom fine sand |
| 8C | 2 | 01/19/2000 | 32 39.947 | 177 7.265 | 10 | 10 | 100 | Top gray/silt; bottom clay/silt |
| 9A | 2 | 01/17/2000 | 32 39.949 | 117 7.429 | 11 | 5 | 45 | Top 3 ft fine gray silt; shell debris than tan plug |
| 9B | 2 | 01/18/2000 | 32 39.341 | 117 7.353 | 13 | 7 | 54 | Top 5.5 ft loose gray silt/clay; sand near bottom |
| 9C | 2 | 01/19/2000 | 32 39.935 | 117 7.392 | 11 | 8 | 73 | Top 3.5 ft gray silt; some fine sand near bottom |
| 10A | 2 | 01/20/2000 | 32 40.038 | 117 7.472 | 8 | 4 | 50 | Top 2.5 ft gray fine sand/silt, bottom tan clay, plug |
| 10B | 2 | 01/20/2000 | 32 40.011 | 117 7.484 | 6 | 4 | 67 | Top 1 ft loose gray silt; shell hash, bottom fine sand |
| 10C | 3 | 01/20/2000 | 32 39.992 | 117 7.458 | 6 | 3.5 | 58 | Top 1.5 fine sand; bottom med/coarse sand; plug |
| 10D | 2 | 01/20/2000 | 32 39.963 | 117 7.466 | 8 | 8 | 100 | Top 2 ft fine sand/silt; shell hash, bottom tan clay |
| 10E | 2 | 01/20/2000 | 32 39.943 | 117 7.464 | 7 | 6 | 86 | Top 4.5 ft loose gray silt; fine sand, bottom tan clay |

## Table 13

## PHYSICAL RESULTS
## P-326 PROJECT

| Fraction | TDL | Units | Reference Site | Site 1 | Site 2 | Site 3 | Site 4 | Site 5 |
|---|---|---|---|---|---|---|---|---|
| Solids | 0.1 | % | 62.9 | 70.0 | 71.6 | 64.2 | 78.7 | 72.0 |
| Gravel | 0.1 | % | 0.2 | 10.4 | 2.9 | 12.0 | 2.2 | 7.5 |
| Sand | 0.1 | % | 28.0 | 60.5 | 69.2 | 50.2 | 68.6 | 65.2 |
| Silt | 0.1 | % | 58.7 | 18.4 | 17.0 | 23.4 | 18.9 | 15.4 |
| Clay | 0.1 | % | 13.1 | 10.7 | 10.9 | 14.4 | 10.3 | 11.9 |
| TOC | 0.01 | % | 0.37 | 0.22 | 0.19 | 0.26 | 0.09 | 0.23 |

| Fraction | TDL | Units | Reference Site | Site 6 | Site 7 | Site 8 | Site 9 | Site 10 |
|---|---|---|---|---|---|---|---|---|
| Solids | 0.1 | % | 62.9 | 58.8 | 77.2 | 77.5 | 63.8 | 71.4 |
| Gravel | 0.1 | % | 0.2 | 18.8 | 3.0 | 10.3 | 10.0 | 10.8 |
| Sand | 0.1 | % | 28.0 | 24.0 | 74.3 | 67.4 | 31.2 | 60.8 |
| Silt | 0.1 | % | 58.7 | 30.4 | 14.2 | 12.9 | 33.2 | 17.7 |
| Clay | 0.1 | % | 13.1 | 26.8 | 8.5 | 9.4 | 25.6 | 10.7 |
| TOC | 0.01 | % | 0.37 | 0.42 | 0.15 | 0.10 | 0.27 | 0.26 |

TDL = target detection limit for the laboratory to achieve
TOC = total organic carbon

## Table 14

## HEAVY METAL, AMMONIA, AND SULFIDE RESULTS
## P-326 PROJECT

| Analyte | TDL | Units | Reference Site | Site 1 | Site 2 | Site 3 | Site 4 | Site 5 |
|---|---|---|---|---|---|---|---|---|
| Arsenic | 0.1 | mg/kg | 2.44 | 2.97 | 2.61 | 3.42 | 1.43 | 2.36 |
| Cadmium | 0.1 | mg/kg | 0.268 | 0.695 | 0.48 | 0.32 | 0.219 | 0.59 |
| Chromium | 0.1 | mg/kg | 20.8 | 30.6 | 26.7 | 28.2 | 17.7 | 26 |
| Copper | 0.1 | mg/kg | 10.5 | 87.5 | 43.7 | 32 | 26.4 | 39.1 |
| Lead | 0.1 | mg/kg | 6.19 | 27.5 | 18.4 | 14.9 | 8.24 | 15 |
| Mercury | 0.02 | mg/kg | 0.062 | 0.318 | 0.223 | 0.304 | 0.109 | 1.55 |
| Nickel | 0.1 | mg/kg | 11.7 | 7.83 | 8.86 | 9.69 | 5.35 | 8 |
| Selenium | 0.1 | mg/kg | ND | ND | ND | ND | ND | ND |
| Silver | 0.1 | mg/kg | 0.168 | 1.44 | 0.727 | 0.457 | 0.315 | 0.798 |
| Zinc | 0.1 | mg/kg | 34.6 | 107 | 87.2 | 64.8 | 46.3 | 63.5 |
| Ammonia | | mg/kg | 24 | 12 | 8.9 | 28.2 | 3.9 | 8.9 |
| Total Sulfides | 0.1 | mg/kg | 0.3 | 2.7 | 1.5 | 1.7 | ND | ND |
| Soluble Sulfides | 0.1 | mg/kg | ND | ND | ND | ND | ND | ND |

| Analyte | TDL | Units | Reference Site | Site 6 | Site 7 | Site 8 | Site 9 | Site 10 |
|---|---|---|---|---|---|---|---|---|
| Arsenic | 0.1 | mg/kg | 2.44 | 4.07 | 1.73 | 2.23 | 3.00 | 2.73 |
| Cadmium | 0.1 | mg/kg | 0.268 | 1.12 | 0.278 | 0.268 | 0.456 | 0.173 |
| Chromium | 0.1 | mg/kg | 20.8 | 41.1 | 19 | 47.2 | 33 | 21.2 |
| Copper | 0.1 | mg/kg | 10.5 | 40.1 | 41.2 | 32.2 | 32.3 | 37.5 |
| Lead | 0.1 | mg/kg | 6.19 | 25.2 | 15.6 | 11 | 19 | 11.7 |
| Mercury | 0.02 | mg/kg | 0.062 | 0.499 | 0.132 | 0.115 | 0.338 | 0.18 |
| Nickel | 0.1 | mg/kg | 11.7 | 13 | 5.57 | 6.33 | 11.6 | 7.32 |
| Selenium | 0.1 | mg/kg | ND | ND | ND | ND | ND | ND |
| Silver | 0.1 | mg/kg | 0.168 | 0.893 | 0.339 | 0.32 | 0.498 | 0.359 |
| Zinc | 0.1 | mg/kg | 34.6 | 83.2 | 64.4 | 118 | 71.2 | 53.8 |
| Ammonia | | mg/kg | 24 | 10.7 | 3.9 | 6.7 | 7.7 | 5.5 |
| Total Sulfides | 0.1 | mg/kg | 0.3 | 0.3 | 0.8 | 0.4 | 0.5 | 0.6 |
| Soluble Sulfides | 0.1 | mg/kg | ND | ND | ND | ND | ND | ND |

TDL = target detection limit for the laboratory to achieve
mg/kg = milligrams per kilogram (parts per million)
ND = nondetect

## Table 15

## ORGANIC CHEMISTRY RESULTS
## P-326 PROJECT

| Analyte | TDL | Units | Reference Site | Site 1 | Site 2 | Site 3 | Site 4 | Site 5 |
|---|---|---|---|---|---|---|---|---|
| TRPH | 5.0 | mg/kg | ND | 21 | 8.1 | ND | 6.4 | 17 |
| Organotins | 1.0 | µg/kg | ND | ND | ND | ND | ND | ND |
| Total Pesticides | 2.0 – 25.0 | µg/kg | ND | ND | ND | ND | ND | ND |
| Total PCBs | 20.0 | µg/kg | ND | ND | ND | ND | ND | ND |
| Total Phenols | 20 – 120 | µg/kg | ND | ND | ND | ND | ND | ND |
| Total Phthalates | 10 | µg/kg | 47 | 128 | 18 | ND | 13 | 52 |

| Analyte | TDL | Units | Reference Site | Site 6 | Site 7 | Site 8 | Site 9 | Site 10 |
|---|---|---|---|---|---|---|---|---|
| TRPH | 5.0 | mg/kg | ND | 15 | 16 | 11 | 11 | 11 |
| Organotins | 1.0 | µg/kg | ND | ND | ND | ND | ND | ND |
| Total Pesticides | 2.0 – 25.0 | µg/kg | ND | ND | ND | ND | ND | ND |
| Total PCBs | 20.0 | µg/kg | ND | ND | ND | ND | ND | ND |
| Total Phenols | 20 – 120 | µg/kg | ND | ND | ND | ND | ND | ND |
| Total Phthalates | 10 | µg/kg | 47 | ND | ND | ND | 25 | 31 |

TDL = target detection limit for the laboratory to achieve
mg/kg = milligrams per kilogram (parts per million)
µg/kg = micrograms per kilogram (parts per billion)
ND = nondetect
PCB = polychlorinated biphenyl
TRPH = total recoverable petroleum hydrocarbons
Total = sum of detected compounds

## Table 16

## POLYCYCLIC AROMATIC HYDROCARBON RESULTS
## P-326 PROJECT

| Analyte | TDL | Units | Reference Site | Site 1 | Site 2 | Site 3 | Site 4 | Site 5 |
|---|---|---|---|---|---|---|---|---|
| Naphthalene | 0.020 | mg/kg | ND | ND | ND | ND | ND | ND |
| Acenaphthylene | 0.020 | mg/kg | ND | ND | ND | ND | ND | ND |
| Acenapthene | 0.020 | mg/kg | ND | ND | ND | ND | ND | ND |
| Fluorene | 0.020 | mg/kg | ND | ND | ND | ND | ND | ND |
| Phenanthrene | 0.020 | mg/kg | ND | ND | ND | ND | ND | ND |
| Anthracene | 0.020 | mg/kg | ND | 0.033 | ND | ND | ND | ND |
| Fluoranthene | 0.020 | mg/kg | ND | 0.065 | 0.053 | ND | 0.026 | ND |
| Pyrene | 0.020 | mg/kg | ND | 0.26 | 0.13 | 0.042 | 0.034 | 0.033 |
| Benzo(a) anthracene | 0.020 | mg/kg | ND | 0.054 | 0.046 | ND | ND | ND |
| Chrysene | 0.020 | mg/kg | ND | 0.11 | 0.11 | 0.034 | 0.035 | 0.038 |
| Benzo(b) fluoranthene | 0.020 | mg/kg | ND | 0.26 | 0.15 | 0.05 | 0.076 | 0.069 |
| Benzo(k) fluoranthene | 0.020 | mg/kg | ND | 0.25 | 0.14 | 0.037 | 0.069 | 0.063 |
| Benzo(a)pyrene | 0.020 | mg/kg | ND | 0.24 | 0.13 | 0.039 | 0.067 | 0.066 |
| Indeno(1,2,3-cd) pyrene | 0.020 | mg/kg | ND | 0.061 | 0.041 | ND | ND | ND |
| Dibenzo(a,h) anthracene | 0.020 | mg/kg | ND | 0.032 | ND | ND | ND | ND |
| Benzo(g,h,i) perylene | 0.020 | mg/kg | ND | 0.058 | 0.033 | ND | ND | ND |
| Total PAHs | 0.020 | mg/kg | ND | 1.423 | 0.833 | 0.202 | 0.307 | 0.269 |

TDL = target detection limit for the laboratory to achieve
mg/kg = milligrams per kilogram (parts per million)
ND = nondetect
PAH = polycyclic aromatic hydrocarbon
Total = sum of detected compounds

## Table 16 (Continued)

## POLYCYCLIC AROMATIC HYDROCARBON RESULTS
## P-326 PROJECT

| Analyte | TDL | Units | Reference Site | Site 6 | Site 7 | Site 8 | Site 9 | Site 10 |
|---|---|---|---|---|---|---|---|---|
| Naphthalene | 0.020 | mg/kg | ND | ND | ND | ND | ND | ND |
| Acenaphthylene | 0.020 | mg/kg | ND | ND | ND | ND | ND | ND |
| Acenapthene | 0.020 | mg/kg | ND | ND | ND | ND | ND | ND |
| Fluorene | 0.020 | mg/kg | ND | ND | ND | ND | ND | ND |
| Phenanthrene | 0.020 | mg/kg | ND | ND | ND | ND | ND | ND |
| Anthracene | 0.020 | mg/kg | ND | ND | ND | ND | ND | ND |
| Fluoranthene | 0.020 | mg/kg | ND | ND | ND | ND | ND | ND |
| Pyrene | 0.020 | mg/kg | ND | ND | 0.087 | 0.061 | 0.07 | ND |
| Benzo(a) anthracene | 0.020 | mg/kg | ND | ND | 0.029 | ND | ND | ND |
| Chrysene | 0.020 | mg/kg | ND | ND | 0.068 | 0.028 | 0.042 | 0.03 |
| Benzo(b) fluoranthene | 0.020 | mg/kg | ND | 0.043 | 0.16 | 0.054 | 0.076 | 0.046 |
| Benzo(k) fluoranthene | 0.020 | mg/kg | ND | 0.042 | 0.14 | 0.056 | 0.082 | 0.045 |
| Benzo(a)pyrene | 0.020 | mg/kg | ND | 0.044 | 0.13 | 0.05 | 0.068 | 0.04 |
| Indeno(1,2,3-cd) pyrene | 0.020 | mg/kg | ND | ND | 0.036 | ND | ND | ND |
| Dibenzo(a,h) anthracene | 0.020 | mg/kg | ND | ND | ND | ND | ND | ND |
| Benzo(g,h,i) perylene | 0.020 | mg/kg | ND | ND | 0.032 | ND | ND | ND |
| Total PAHs | 0.020 | mg/kg | ND | 0.129 | 0.682 | 0.249 | 0.338 | 0.161 |

TDL = target detection limit for the laboratory to achieve
mg/kg = milligrams per kilogram (parts per million)
ND = nondetect
PAH = polycyclic aromatic hydrocarbon
Total = sum of detected compounds

## 3.4 BIOASSAY RESULTS

### 3.4.1 Solid Phase Toxicity Results

Amphipod and mysid shrimp solid phase bioassay results and suspended particulate (Table 17) are summarized in this section and presented in full in Appendix E. Solid phase results were analyzed by comparing the survival in the test sediment exposures to the level attained in the reference site. This was done to determine potential benthic impacts of placing sediment at the LA-5 disposal site.

Statistically significant toxicity was observed only in the Site 1 amphipod bioassay. Survival averaged 69 percent compared to an average of 90 percent in the reference sediment exposure.

No statistically significant solid phase toxicity was observed for any of the other nine test sites. Amphipod survival ranged from 87 (Site 6) to 92 (Sites 2, 3, 5, 7) while mysid shrimp survival for all test sites was greater than 90 percent.

### 3.4.2 Suspended Particulate Phase Toxicity Results

Suspended particulate phase results are expressed as percent survival (silverside and mysid shrimp) or percent normal (bivalve larvae) (Table 18). These data are used to calculate either an $LC_{50}$ or $EC_{50}$. The suspended particulate phase bioassays were conducted to determine potential significant impacts in the water column at the LA-5 disposal site, and the persistence of these impacts beyond a 4-hour initial mixing period.

The silverside and mysid shrimp $LC_{50}$s for all suspended particulate phase bioassays were >100 percent elutriate. For the bivalve larvae test, Sites 2, 4, 5, 7, 8, and 10 had $EC_{50}$s >100 percent elutriate. The remaining sites 1, 3, 6, and 9, had $EC_{50}$s of 71.8 percent, 75.5 percent, 73.9 percent, and 71.2 percent, respectively.

## Table 17

## SOLID PHASE TOXICITY RESULTS
## P-326 PROJECT

| Test Organism | Amphipod | Mysid Shrimp |
|---|---|---|
| **Site** | **Average Survival (%)** | **Average Survival (%)** |
| Control | 92 | 90 |
| Reference | 90 | 96 |
| Site 1 | 69* | 98 |
| Site 2 | 92 | 96 |
| Site 3 | 92 | 98 |
| Site 4 | 89 | 94 |
| Site 5 | 92 | 96 |
| Site 6 | 87 | 94 |
| Site 7 | 92 | 94 |
| Site 8 | 90 | 92 |
| Site 9 | 91 | 98 |
| Site 10 | 91 | 92 |

*statistically significant

## Table 18

## SUSPENDED PARTICULATE PHASE TOXICITY RESULTS
## P-326 PROJECT

| Test Organism | | Silversides | Mysid Shrimp | Bivalve Larvae |
|---|---|---|---|---|
| Site | Conc (%) | Average Survival (%) | Average Survival (%) | Average Normal (%) |
| Control | 0 | 98 | 94 | 92 |
| Site 1 | 10 | 98 | 92 | 92 |
| | 50 | 92 | 96 | 91 |
| | 100 | 88 | 100 | 3* |
| Control | 0 | 98 | 94 | 96 |
| Site 2 | 10 | 94 | 96 | 97 |
| | 50 | 94 | 96 | 98 |
| | 100 | 100 | 98 | 97 |
| Control | 0 | 92 | 92 | 96 |
| Site 3 | 10 | 100 | 92 | 95 |
| | 50 | 98 | 90 | 97 |
| | 100 | 96 | 90 | 16* |
| Control | 0 | 92 | 92 | 98 |
| Site 4 | 10 | 92 | 88 | 97 |
| | 50 | 92 | 98 | 96 |
| | 100 | 96 | 98 | 73* |
| Control | 0 | 92 | 92 | 98 |
| Site 5 | 10 | 98 | 96 | 98 |
| | 50 | 96 | 96 | 98 |
| | 100 | 96 | 92 | 99 |
| Control | 0 | 100 | 96 | 98 |
| Site 6 | 10 | 98 | 94 | 97 |
| | 50 | 92 | 94 | 97 |
| | 100 | 86 | 92 | 7* |
| Control | 0 | 100 | 96 | 97 |
| Site 7 | 10 | 98 | 92 | 96 |
| | 50 | 98 | 94 | 98 |
| | 100 | 98 | 94 | 98 |
| Control | 0 | 100 | 96 | 97 |
| Site 8 | 10 | 94 | 100 | 98 |
| | 50 | 96 | 94 | 98 |
| | 100 | 100 | 96 | 97 |
| Control | 0 | 94 | 94 | 97 |
| Site 9 | 10 | 98 | 98 | 98 |
| | 50 | 84 | 84 | 98 |
| | 100 | 80 | 80 | 2* |
| Control | 0 | 94 | 94 | 96 |
| Site 10 | 10 | 96 | 92 | 97 |
| | 50 | 96 | 94 | 97 |
| | 100 | 84 | 92 | 98 |

*statistically significant

### 3.4.3 Bioaccumulation

Bioaccumulation test results are contained in Tables 19 and 20 for clams and worms, respectively, and in Appendix F. Organic results (i.e., PAHs, pesticides, and PCBs) are summarized in Tables 21 and 22.

The results are presented as the mean of the five replicates analyzed ± one standard deviation. An asterisk (*) next to the mean indicates that the value was found to be statistically significant ($p \leq 0.05$) compared to the reference mean using a one-tail t-test. All values are dry weight numbers with the exception of PCBs. PCBs are presented as wet weight results, which can be easily compared to the Food and Drug Administration (FDA) action levels, which are also presented in wet weight units (Green Book, page 6-5).

In general, metals with the exception of cadmium and silver were detected in all tissue samples analyzed. Metals are essential nutrients for living organisms so measuring copper, nickel, and zinc is not unusual. Several metals were found to be statistically elevated compared to reference levels. These results are discussed in the following section.

No pesticides were detected in any of the samples analyzed. The observed PCB levels are minimal compared to federal criteria. Statistically significant PAH bioaccumulation was detected in clams for Sites 1, 2, 3 and 8, and worms for Site 1. Organic bioaccumulation is discussed in detail in the following section.

## Table 19

## CLAM BIOACCUMULATION RESULTS – METALS
## P-326 PROJECT

| Analyte | Units (dry wt) | Reference Mean (st dev) | Site 1 Mean (st dev) | Site 2 Mean (st dev) | Site 3 Mean (st dev) | Site 4 Mean (st dev) | Site 5 Mean (st dev) |
|---|---|---|---|---|---|---|---|
| Arsenic | mg/kg | 16.2 (±3.42) | 20.9 (±3.87) | 18.2 (±1.77) | 18.4 (±1.25) | 20.6 (±3.32)* | 25.7 (±4.51)* |
| Cadmium | mg/kg | ND | ND | ND | ND | ND | ND |
| Chromium | mg/kg | 2.20 (±0.35) | 2.82 (±0.31)* | 2.80 (±0.70) | 2.62 (±0.69) | 2.36 (±0.29) | 2.70 (±0.39) |
| Copper | mg/kg | 19.3 (±6.30) | 18.3 (±5.45) | 24.9 (±5.99) | 20.7 (±4.82) | 19.2 (±3.14) | 24.3 (±6.27) |
| Lead | mg/kg | 1.78 (±0.53) | 3.28 (±0.77)* | 2.92 (±0.49)* | 2.16 (±0.46) | 2.68 (±0.29)* | 3.22 (±0.55)* |
| Mercury | mg/kg | 0.11 (±0.04) | 0.13 (±0.03) | 0.13 (±0.03) | 0.18 (±0.06) | 0.13 (±0.01) | 0.16 (±0.05) |
| Nickel | mg/kg | 3.40 (±0.48) | 3.18 (±0.43) | 3.38 (±0.34) | 3.24 (±0.23) | 3.18 (±0.46) | 3.90 (±0.69) |
| Selenium | mg/kg | 1.66 (±0.61) | 1.80 (±0.72) | 1.92 (±2.04) | 2.04 (±0.67) | 2.12 (±0.59) | 2.16 (±0.67) |
| Silver | mg/kg | ND | ND | ND | ND | ND | ND |
| Zinc | mg/kg | 112 (±37.4) | 139 (±30.5) | 112 (±5.45) | 106 (±5.3) | 121 (±25.7) | 155 (±43.8) |

| Analyte | Units (dry wt) | Reference Mean (st dev) | Site 6 Mean (st dev) | Site 7 Mean (st dev) | Site 8 Mean (st dev) | Site 9 Mean (st dev) | Site 10 Mean (st dev) |
|---|---|---|---|---|---|---|---|
| Arsenic | mg/kg | 16.2 (±3.42) | 25.9 (±0.99)* | 28.1 (±3.57)* | 26.3 (±5.15)* | 27.5 (±2.37) | 19.3 (±2.16) |
| Cadmium | mg/kg | ND | ND | ND | ND | ND | ND |
| Chromium | mg/kg | 2.20 (±0.35) | 2.74 (±0.50) | 2.58 (±0.30) | 9.00 (±0.41)* | 2.82 (±0.45)* | 2.58 (±0.34) |
| Copper | mg/kg | 19.3 (±6.30) | 22.2 (±7.13) | 19.6 (±2.09) | 19.9 (±6.00) | 48.8 (±74.5) | 19.1 (±2.23) |
| Lead | mg/kg | 1.78 (±0.53) | 3.02 (±0.76)* | 2.72 (±0.48)* | 2.74 (±0.34)* | 5.66 (±7.69) | 2.44 (±0.22)* |
| Mercury | mg/kg | 0.11 (±0.04) | 0.18 (±0.03)* | 0.16 (±0.03)* | 0.13 (±0.03) | 0.18 (±0.04)* | 0.12 (±0.03) |
| Nickel | mg/kg | 3.40 (±0.48) | 3.50 (±0.30) | 3.70 (±0.49) | 3.70 (±0.34) | 3.80 (±0.53) | 3.56 (±0.38) |
| Selenium | mg/kg | 1.66 (±0.61) | 1.88 (±0.43) | 2.46 (±0.75) | 2.16 (±0.84) | 2.12 (±0.73) | 2.12 (±0.97) |
| Silver | mg/kg | ND | ND | ND | ND | ND | ND |
| Zinc | mg/kg | 112 (±37.4) | 159 (±7.3)* | 166 (±24.2)* | 176 (±10.5)* | 144 (±12.6) | 125 (±24.9) |

*statistically significant
mg/kg = milligrams per kilogram (parts per million)
ND = nondetect

## Table 20

## WORM BIOACCUMULATION RESULTS – METALS
## P-326 PROJECT

| Analyte | Units (dry wt) | Reference Mean (st dev) | Site 1 Mean (st dev) | Site 2 Mean (st dev) | Site 3 Mean (st dev) | Site 4 Mean (st dev) | Site 5 Mean (st dev) |
|---|---|---|---|---|---|---|---|
| Arsenic | mg/kg | 16.8 (±0.78) | 17.4 (±1.40) | 16.9 (±2.91) | 15.8 (±1.90) | 14.1 (±1.74) | 16.7 (±1.65) |
| Cadmium | mg/kg | ND | ND | ND | ND | ND | ND |
| Chromium | mg/kg | 1.86 (±0.25) | 2.16 (±0.52) | 1.70 (±0.26) | 1.74 (±0.27) | 1.86 (±0.61) | 1.70 (±0.31) |
| Copper | mg/kg | 9.70 (±2.40) | 15.9 (±3.32)* | 13.1 (±3.77) | 10.6 (±4.31) | 13.4 (±2.68)* | 13.1 (±2.12)* |
| Lead | mg/kg | 3.06 (±0.35) | 3.98 (±0.49)* | 4.52 (±1.58)* | 4.16 (±1.85) | 4.30 (±1.22)* | 4.18 (±1.87) |
| Mercury | mg/kg | 0.096 (±0.031) | 0.080 (±0.029) | 0.098 (±0.043) | 0.085 (±0.034) | 0.069 (±0.028) | 0.089 (±0.038) |
| Nickel | mg/kg | 2.04 (±0.27) | 2.00 (±0.46) | 1.72 (±0.30) | 1.60 (±0.07) | 2.28 (±0.95) | 1.58 (±0.30) |
| Selenium | mg/kg | 2.04 (±0.59) | 1.92 (±0.72) | 2.14 (±0.58) | 2.58 (±0.76) | 2.08 (±2.35) | 2.10 (±0.85) |
| Silver | mg/kg | ND | ND | ND | ND | ND | ND |
| Zinc | mg/kg | 60.1 (±7.74) | 63.5 (±6.91) | 58.3 (±4.62) | 124 (±141) | 60.4 (±4.7) | 118 (±130) |

| Analyte | Units (dry wt) | Reference Mean (st dev) | Site 6 Mean (st dev) | Site 7 Mean (st dev) | Site 8 Mean (st dev) | Site 9 Mean (st dev) | Site 10 Mean (st dev) |
|---|---|---|---|---|---|---|---|
| Arsenic | mg/kg | 16.8 (±0.78) | 15.8 (±1.18) | 15.7 (±1.88) | 16.7 (±5.52) | 15.1 (±2.34) | 15.2 (±0.99) |
| Cadmium | mg/kg | ND | ND | ND | ND | ND | ND |
| Chromium | mg/kg | 1.86 (±0.25) | 2.10 (±0.29) | 1.76 (±0.33) | 3.70 (±1.34)* | 1.56 (±0.27) | 1.54 (±0.15) |
| Copper | mg/kg | 9.70 (±2.40) | 17.8 (±12.6) | 12.8 (±1.02)* | 14.6 (±1.05)* | 10.3 (±1.72) | 12.2 (±4.39) |
| Lead | mg/kg | 3.06 (±0.35) | 3.56 (±0.90) | 4.68 (±2.31) | 5.02 (±1.97)* | 3.84 (±1.55) | 2.98 (±0.40) |
| Mercury | mg/kg | 0.096 (±0.031) | 0.091 (±0.033) | 0.078 (±0.016) | 0.061 (±0.024) | 0.121 (±0.068) | 0.098 (±0.046) |
| Nickel | mg/kg | 2.04 (±0.27) | 1.90 (±0.47) | 1.70 (±0.37) | 1.92 (±0.50) | 1.94 (±1.08) | 1.72 (±0.56) |
| Selenium | mg/kg | 2.04 (±0.59) | 2.08 (±0.61) | 2.28 (±0.31) | 1.96 (±0.77) | 1.88 (±0.45) | 1.86 (±0.48) |
| Silver | mg/kg | ND | ND | ND | ND | ND | ND |
| Zinc | mg/kg | 60.1 (±7.74) | 59.8 (±7.91) | 57.5 (±5.59) | 71.2 (±18.1) | 60.0 (±15.0) | 82.0 (±41.9) |

*statistically significant
mg/kg = milligrams per kilogram (parts per million)
ND = nondetect

## Table 21

## CLAM BIOACCUMULATION RESULTS – ORGANICS
## P-326 PROJECT

| Analyte | Units (dry wt) | Reference Mean (st dev) | Site 1 Mean (st dev) | Site 2 Mean (st dev) | Site 3 Mean (st dev) | Site 4 Mean (st dev) | Site 5 Mean (st dev) |
|---|---|---|---|---|---|---|---|
| Total PAHs | µg/kg | <2,891 (±398) | 7,988* (±3,615) | 5,892* (±2,521) | 3,932* (±818) | 3,469 (±618) | 6,335 (±4,548) |
| Total Pesticides | µg/kg | ND | ND | ND | ND | ND | ND |
| Total PCBs | µg/kg+ | <140 (±0) | 143 (±2.6) | 148 (±14.3) | 140 (±0) | 148 (±7.8) | 142 (±5.4) |

| Analyte | Units (dry wt) | Reference Mean (st dev) | Site 6 Mean (st dev) | Site 7 Mean (st dev) | Site 8 Mean (st dev) | Site 9 Mean (st dev) | Site 10 Mean (st dev) |
|---|---|---|---|---|---|---|---|
| Total PAHs | µg/kg | <2,891 (±398) | 3,047 (±468) | 5,293 (±3,771) | 4,325* (±1,135) | 3,919 (±1,338) | 3,402 (±864) |
| Total Pesticides | µg/kg | ND | ND | ND | ND | ND | ND |
| Total PCBs | µg/kg+ | <140 (±0) | 147 (±6.1) | 147 (±10.2) | 140 (±1.3) | 141 (±1.3) | 142 (±4.5) |

* = Statistically significant
+ = units are wet weight to compare to FDA action levels
µg/kg = micrograms per kilogram (parts per billion)
ND = nondetect
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
Total = sum of individual compounds

## Table 22

## WORM BIOACCUMULATION RESULTS – ORGANICS
## P-326 PROJECT

| Analyte | Units (dry wt) | Reference Mean (st dev) | Site 1 Mean (st dev) | Site 2 Mean (st dev) | Site 3 Mean (st dev) | Site 4 Mean (st dev) | Site 5 Mean (st dev) |
|---|---|---|---|---|---|---|---|
| Total PAHs | µg/kg | <2,192 (±80) | 2,413 (±126)* | 2,157 (±74) | 2,236 (±130) | 2,167 (±214) | 2,214 (±94) |
| Total Pesticides | µg/kg | ND | ND | ND | ND | ND | ND |
| Total PCBs | µg/kg+ | 143 (±6.3) | 157 (±10.5) | 176 (±18.1) | 161 (±14.1) | 173 (±22.8) | 155 (±12.9) |

| Analyte | Units (dry wt) | Reference Mean (st dev) | Site 6 Mean (st dev) | Site 7 Mean (st dev) | Site 8 Mean (st dev) | Site 9 Mean (st dev) | Site 10 Mean (st dev) |
|---|---|---|---|---|---|---|---|
| Total PAHs | µg/kg | <2,192 (±80) | 2,262 (±130) | 2,485 (±347) | 2,143 (±112) | 2,720 (±725) | 2,176 (±44) |
| Total Pesticides | µg/kg | ND | ND | ND | ND | ND | ND |
| Total PCBs | µg/kg+ | 143 (±6.3) | 157 (±17.3) | 190 (±38.1) | 166 (±10.9) | 161 (±19.2) | 179 (±11.0) |

* = Statistically significant
+ = units are wet weight to compare to FDA action levels
µg/kg = micrograms per kilogram (parts per billion)
ND = nondetect
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
Total = sum of individual compounds

# SECTION 4
# DISCUSSION

## 4.1 SEDIMENT CHEMISTRY

The sediment chemistry results for this study are fairly typical for sediment of coastal industrialized harbors. The concentrations for several metals and PAHs were elevated in comparison to the reference site. This occurrence indicated that Tier III testing was appropriate. A useful measure of sediment quality is the Effects Range-Low (ER-L) and Effects Range-Median (ER-M) approach developed by Long et al. (1995). In this approach, the ER-L is calculated as the lower 10th percentile concentration of the available sediment toxicity data that has been screened for only those samples identified as toxic by original investigators. The ER-L represents a concentration at which effects may begin to be observed in sensitive species. The ER-M is the median concentration of the compilation of only samples labeled as toxic by the original investigators. These do not represent sediment quality criteria, but are useful in providing a general overview of the sediment quality in a given area. Table 23 presents the sediment chemistry results for this study compared to the ER-L and ER-M.

Site 1 was the only site in which significant solid phase toxicity was observed. Copper, mercury, and silver were above the ER-L. Site 1 also had the highest concentrations of PAHs and phthalates of any of the sites. The combination of these factors may have been responsible for the toxicity observed in the amphipod bioassay, as well as the abnormal mussel larvae development in the 100 percent suspended particulate phase concentration.

For the remainder of the sites, copper and mercury were detected above the ER-L. Site 5 had a mercury concentration (1.55 milligrams per kilogram [mg/kg]) above the ER-M (0.71 mg/kg). This level of mercury, however, did not result in toxicity in any of the bioassay tests; hence, it was not bioavailable.

## Table 23

## STUDY RESULTS COMPARED TO ER-L AND ER-M
## P-326 PROJECT

| Analyte | Units | ER-L | ER-M | Site 1 | Site 2 | Site 3 | Site 4 | Site 5 |
|---|---|---|---|---|---|---|---|---|
| Arsenic | mg/kg | 8.2 | 70 | 2.97 | 2.61 | 3.42 | 1.43 | 2.36 |
| Cadmium | mg/kg | 1.2 | 9.6 | 0.695 | 0.48 | 0.32 | 0.219 | 0.59 |
| Chromium | mg/kg | 81 | 370 | 30.6 | 26.7 | 28.2 | 17.7 | 26.0 |
| Copper | mg/kg | 34 | 270 | **87.5** | **43.7** | 32 | 26.4 | **39.1** |
| Lead | mg/kg | 46.7 | 218 | 27.5 | 18.4 | 14.9 | 8.24 | 15.0 |
| Mercury | mg/kg | 0.15 | 0.71 | **0.318** | **0.223** | **0.304** | 0.109 | ***1.55*** |
| Nickel | mg/kg | 20.9 | 51.6 | 7.83 | 8.86 | 9.69 | 5.35 | 8.0 |
| Selenium | mg/kg | NA | NA | <0.714 | <0.698 | <0.779 | <0.635 | <0.850 |
| Silver | mg/kg | 1.0 | 3.7 | **1.44** | 0.727 | 0.457 | 0.315 | 0.893 |
| Zinc | mg/kg | 150 | 410 | 107 | 87.2 | 64.8 | 46.3 | 83.2 |
| Total Phthalates | µg/kg | NA | NA | 128 | 18 | <16 | 13 | 52 |
| Total PAHs | µg/kg | 4,022 | 44,792 | 1,423 | 833 | 202 | 307 | 269 |

| Analyte | Units | ER-L | ER-M | Site 6 | Site 7 | Site 8 | Site 9 | Site 10 |
|---|---|---|---|---|---|---|---|---|
| Arsenic | mg/kg | 8.2 | 70 | 4.07 | 1.73 | 2.23 | 3.0 | 2.73 |
| Cadmium | mg/kg | 1.2 | 9.6 | 1.12 | **0.278** | 0.268 | 0.456 | 0.173 |
| Chromium | mg/kg | 81 | 370 | 41.1 | 19.0 | 47.2 | 33.0 | 21.2 |
| Copper | mg/kg | 34 | 270 | **40.1** | **41.2** | 32.2 | 32.2 | **37.5** |
| Lead | mg/kg | 46.7 | 218 | 25.2 | 15.6 | 11.0 | 19.0 | 11.7 |
| Mercury | mg/kg | 0.15 | 0.71 | **0.499** | 0.132 | 0.115 | **0.338** | **0.180** |
| Nickel | mg/kg | 20.9 | 51.6 | 13.0 | 5.57 | 6.33 | 11.6 | 7.32 |
| Selenium | mg/kg | NA | NA | <0.850 | <0.648 | <0.645 | <0.784 | <0.700 |
| Silver | mg/kg | 1.0 | 3.7 | 0.893 | 0.339 | 0.32 | 0.498 | 0.359 |
| Zinc | mg/kg | 150 | 410 | 83.2 | 64.4 | 118 | 71.2 | 53.8 |
| Total Phthalates | µg/kg | NA | NA | <17 | <13 | <13 | 25 | 31 |
| Total PAHs | µg/kg | 4,022 | 44,792 | 129 | **682** | 249 | 338 | 161 |

**Bold** exceeds ER-L; ***Bold italics*** exceeds ER-M
ER-L = Effects Range-Low
ER-M = Effects Range-Median
mg/kg = milligrams per kilogram (parts per million)
µg/kg = micrograms per kilogram (parts per billion)
ND = nondetect
NA = none available
PAH = polycyclic aromatic hydrocarbon

## 4.2 Toxicity Tests

The Green Book states: "As specified in paragraph 227.13(c), the evaluation process emphasizes potential biological effects, rather than chemical presence, of the possible contaminants. Although bioassays are not precise indicators of environmental effects, they are regarded as the best methods available for integrating the effects of multiple contaminants." To determine the suitability of the proposed dredged material for disposal at LA-5, bioassays were conducted as directed by the Ocean Dumping Law.

Exposure to Site 1 sediment resulted in statistically significant toxicity in the amphipod bioassay. Site 1, therefore, does not meet the benthic effects LPCs for LA-5 disposal.

No significant toxicity was observed in any of the other solid phase exposures with amphipods or mysid shrimp. Exposure to the 100 percent elutriate concentration for Sites 3, 4, 6, and 9 did cause significant abnormality in biovalve larvae with $EC_{50}$s ranging from 71.2 (Site 9) to >100 percent (Site 4). No toxicity was observed in any of the fish or mysid shrimp suspended particulate phase bioassays.

Sites 2 through 10 meet both the benthic effects and water column effects LPCs for LA-5 disposal. The requirement for meeting the water column LPC is that the concentration of suspended particulate phase material in the water column following a 4-hour initial mixing period must be 0.01 of the lowest $LC_{50}$ or $EC_{50}$.

## 4.3 Bioaccumulation Tests

### 4.3.1 Metal Bioaccumulation

#### 4.3.1.1 Clams

Table 19 in the Results section indicates that statistically significant metal bioaccumulation was observed in 22 of the 100 replicates tested. No significant bioaccumulation of cadmium, copper, nickel, selenium, or silver was observed. With the exception of Site 8 chromium (4.1 times), none of the statistically significant means exceeded their corresponding reference tissue level by more than 2 times. The average concentration of chromium in Site 8 clam tissue was determined to be 9.0 (±0.41) mg/kg versus the reference tissue level of 2.2 (±0.35) mg/kg. The bulk sediment concentration

for Site 8 was measured to be 47.2 mg/kg. This translates to a sediment:biota ratio of 5.2:1. The bioconcentration factor (BCF) for chromium from the Green Book (p. 9-20) is 2.1. According to the Green Book (p. 9-17), "Dredged material contaminants with BCFs greater than 1,000 (log BCF>3) should be further evaluated for bioaccumulation potential." Based on chromium's BCF of 2.1, no further analyses are necessary.

The Green Book indicates that when metal contamination is the primary concern, bioaccumulation tests should be conducted for 10 days. Since this test was conducted for 28 days, the chromium concentration can be described as in steady-state. These results indicate that while chromium bioaccumulation was statistically significant, impacts at the LA-5 dump site should be minor.

#### 4.3.1.2 Worms

Table 20 in the Results section highlights the metal bioaccumulation in worm tissue. Ten of the 100 analyses were determined to be significant using a one-tailed t-test. No arsenic, cadmium, mercury, nickel, selenium, silver, or zinc was found to be significant. None of the statistically significant means exceeded their corresponding reference tissue level by more than 2 times.

### 4.3.2 Organic Bioaccumulation

#### 4.3.2.1 Clams

Table 21 contains the results of the clam tissue analyses conducted for PAHs, pesticides, and PCBs. No detectable levels of pesticides were found in clam tissue. Statistical analyses conducted on PAH average concentrations indicated that Sites 1, 2, 3, and 8 had significant bioaccumulation versus the reference level. Only Sites 1 and 2 had levels more than twice the reference concentration (2.8 times and 2.04 times, respectively). The PCB results can be compared to "FDA Tolerance Levels for Unavoidable Poisonous and Deleterious Substances in Fish and Shellfish (edible portion)" (21 CFR 100.30). The FDA action level for total PCBs is 2 mg/kg (wet weight). The results of this study found the highest level to be 0.148 mg/kg (wet weight) or 13.5 times below the action level.

#### 4.3.2.2 Worms

Table 22 contains the results of the worm tissue analyses conducted for organics. No detectable levels of pesticides were found in worm tissue. Statistical analyses conducted on PAH average concentrations indicated that only Site 1 had significant bioaccumulation versus the reference level. The Site 1 level was 1.1 times greater than the reference concentration. The PCB results of this study found the highest level in worm tissue to be 0.190 mg/kg (wet weight) or 10.5 times below the FDA action level.

### 4.4 SUB-BOTTOM PROFILING

Sub-bottom profiling was used to delineate the interface between the Bay Point Formation and the overlying sediments. The distinction between these layers is important because the Bay Point Formation has been documented to have no anthropogenic contamination because it is native to the area, while overlying sediments have been more recently deposited and therefore contain the majority of contaminants. The survey has the additional benefit of providing current bathymetry at the site. Racal-Pelagos conducted the survey in February 2000 and the report is included in Appendix G. Note that the presentation of Sites 4 and 6 do not conform to Figure 2 of this document. The presentation of these sites in the Racal-Pelagos report are reversed and match the presentation of the SAP.

### 4.5 COMPARISON WITH 1997 DATA

The 1997 survey sampled the surface layer of the alternative project sites to determine a conservative baseline datum for planning purposes. This report includes an evaluation of sediment quality in the context of sediment disposal options, and therefore includes the entire vertical profile to project depth. Based on the different sampling methodologies, one might expect a reduction in chemical concentrations in the 2000 data versus the 1997 data based on the assumption that contaminants would be concentrated in the recently deposited surface layers.

This expectation was largely confirmed by sediment chemistry data. In general, there were lower levels of both metal and organic constituents in the 2000 data. In addition, there were fewer ER-M exceedances in 2000. Mercury exceeded the ER-M at Site 5 (1.55 mg/kg) (Table 23), but only 1 exceedance was observed in the current study.

The degree to which 1997 chemical levels exceeded 2000 levels is illustrated by the Site 1 data. In Table 24, 1997 stations located in the vicinity of Site 1 (Stations 1 and 12) were averaged and compared to the 2000 Site 1 composite chemistry data. Sediment chemistry levels were always less for the 2000 data. This is reflective of the sampling methodology, which characterizes material to be disposed of as a composite whole. The 1997 data, alternatively, represents a worst-case scenario of a limited amount of surficial sediment.

**Table 24**

**COMPARISON OF SEDIMENT CHEMISTRY LEVELS AT SITE 1 WITH 1997 DATA**

| Analyte | Units | 1997 Average | 2000 Composite |
|---|---|---|---|
| Chromium | mg/kg | 67 | 30.6 |
| Copper | mg/kg | 200 | 87.5 |
| Lead | mg/kg | 56 | 27.5 |
| Mercury | mg/kg | 1.65 | 0.318 |
| Nickel | mg/kg | 16 | 7.83 |
| Silver | mg/kg | 2.57 | 1.44 |
| Zinc | mg/kg | 260 | 107 |
| PAHs | µg/kg | 13,785 | 1,423 |

## 4.6 CONCLUSION

The Ocean Dumping Law requires evaluation of sediment proposed for ocean disposal using a tiered approach. Based on the toxicity test results, only Site 1 fails to meet the benthic or water column LPCs. Bioaccumulation was minor (for the most part less than twice the reference concentration).

The conclusion of this study is that all test sites, with the exception of Site 1 (due to solid phase toxicity), are suitable for unconfined aquatic disposal.

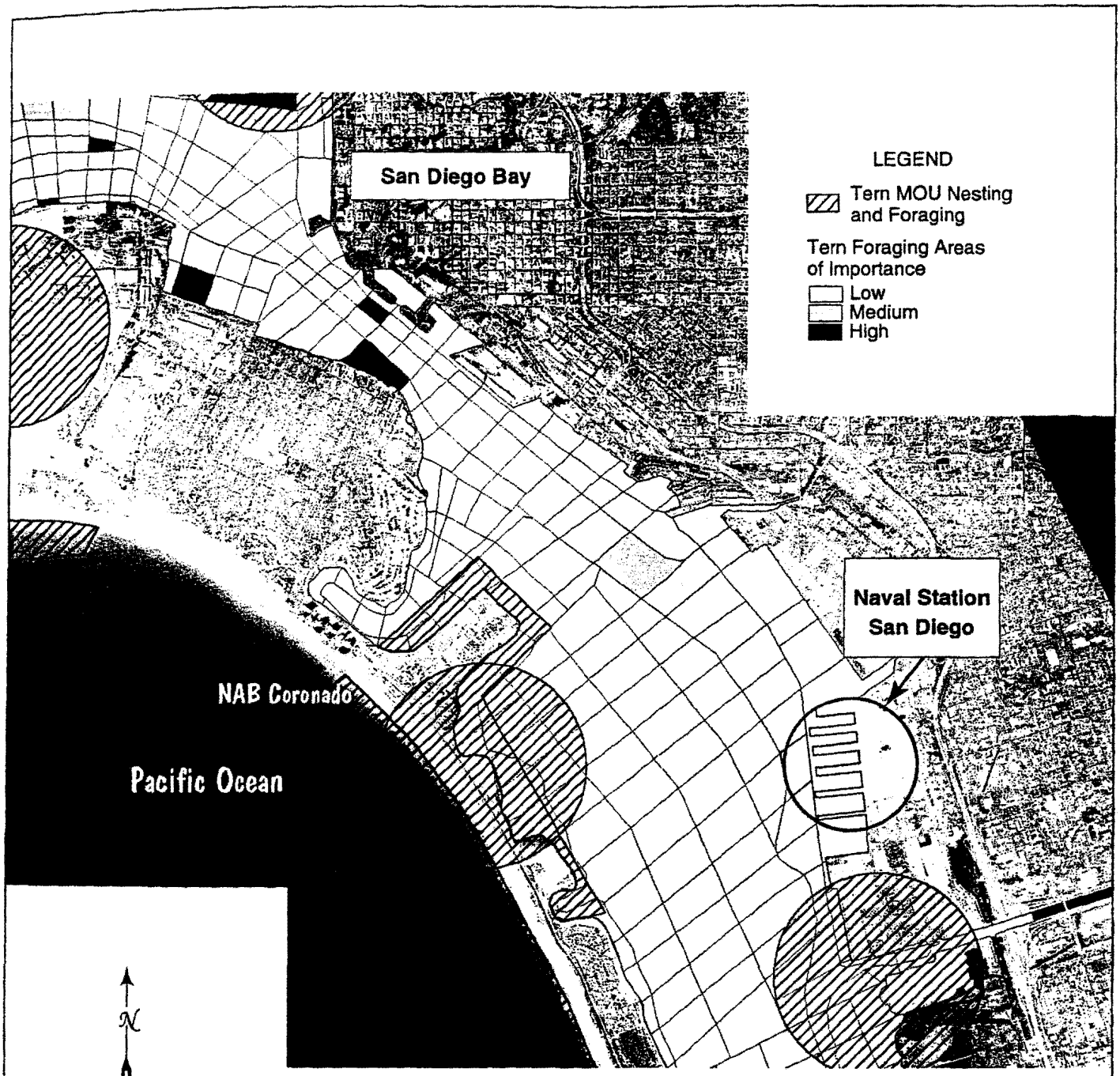
## TABLE 1 – BEST MANAGEMENT PRACTICES

| BMP TITLE | BMP IMPLEMENTATION |
|---|---|
| Label all drums, cans, containers, tanks, and valves | Containers/tanks used to store materials and waste are properly labeled. |
| Restrict access to area and equipment | Access onto the piers is restricted. Guards are posted at the head of each pier. |
| Control Spills | Personnel (including contractors) on the pier are required to maintain spill kits. Federal Fire, Navy Public Works Center, and Navy Port Operations are trained and equipped to respond to and control spills at Naval Station, San Diego. |
| Train employees to properly dispose of waste | Navy ship and shore personnel receive training on waste disposal procedures. |
| Construct dike or berm around critical areas | Containment berms are installed around the oily waste (bilge water) connections on the pier. Temporary berms are installed around |

| BMP TITLE | BMP IMPLEMENTATION |
|---|---|
| | materials/waste that are temporarily stored on the pier (i.e. baker tanks). Pier piping used to transfer oily waste water from the pier to the Base treatment plant will be double-walled. |
| Check vehicles and equipment for leaks | Vehicles are inspected by Port Operations and the Base Environmental Compliance Office for leaks. |
| Use drip pans under leaking equipment | Navy policy requires drip pans under leaking vehicles. Policy is enforced by Port Operations and Environmental Departments. |
| Employ proper handling procedures to transport materials and waste | Personnel are trained on proper procedures to transport waste and materials. |
| Keep tanks, piping, and valves in good condition | The systems on the piers (piping, valves) are maintained by the Navy Public Works Center to ensure they are in good operating condition. |
| Regulary inspect and maintain storm water conveyance systems | The piers are inspected on a regular basis by Port Operations and the Environmental Compliance Office. Drains on the piers are included in the inspections. |
| Regularly inspect and test equipment | The Navy Public Works Center has a preventative maintenance program that includes inspections and testing of equipment on the piers. |
| Do not store used parts or containers directly on the ground | Equipment and containers are stored on pallets. |
| Use oil containment booms | Permanent oil booms are installed on all operational piers at Naval Station. |
| Store wastes and recycling materials in proper containers | Solid waste and recyclable material dumpsters are located on each pier. |
| Perform regular cleaning | Contractors are required to keep their areas clean. Ship personnel perform regular broom sweeping on the piers. Mechanical sweepers and wet scrubbers are utilized on piers on a regular basis. |
| Prepare and spill prevention and response plan | The following response plans have been prepared for Naval Station activities: Spill Prevention, Control, and Countermeasures Plan, Facility Response Plan, Hazardous Materials Response Plans. |
| Conduct personnel training regarding the SWPPP | Navy ship and shore personnel receive training on storm water pollution prevention measures. |
| Do not pour or deposit waste into storm drains | The discharge of waste into a drain or the bay is prohibited. |
| Routinely report any non-storm water discharges | Navy personnel are trained to report discharges/spills. |
| Place trash receptacles at appropriate locations | Trash dumpsters are placed on every pier. |

| | |
|---|---|
| Perform equipment maintenance at designated areas | Pier equipment is maintained on the pier by the Navy Public Works Center. Equipment that is not part of the pier is sent off the pier to a maintenance facility. |
| Substitute non-toxic or less-toxic cleaning solutions | The Navy has a comprehensive Pollution Prevention Program that implements product substitution to reduce the use of toxic cleaning solutions. |
| Maintain equipment in good condition | Pier equipment is maintained by the Navy Public Works Center in accordance with the preventative maintenanace program. |
| Install oil/water separator | A storm water separator/filtration system will be installed for the new pier to remove oil and grease and suspended solids. |
| Avoid hosing down the site | Navy personnel are prohibited from hosing down the pier and allowing the waste water to discharge to the bay. If necessary to wash pier, because of health and safety issues with bird droppings, a minimal amount of water and no soap will be used. Prior to wash, all loose debris will be picked up, oil/grease cleaned up and the area swept down. |
| Wash vehicles and equipment in designated areas | Vehicle and equipment washing is not allowed on the pier. |
| Protect water during ship surface work | Painting using camels, floating platforms, man-lifts requires placement of drop cloths or drip pans to capture paint. Vacuum equipment will be used when performing surface preparation. |

CONTINUED




*Source: USDN SWDIV 1999*

**Figure 3.2-3**

**TERN FORAGING LOCATIONS IN SAN DIEGO BAY**

# P-326 Enhancement #2: Fish Habitat Structures

***Scope***: Concrete demolition debris from Piers 11 and 10 or 12 will be recycled to create two fish habitat structures beside the existing revetment.

***Purpose***: To increase the amount of fish habitat in the region by enhancing environmental diversity and abundance of prey species for foraging birds.

***Schedule***: Initiate and complete mid-2003.

**NAB Enhancement Site. Plan view.**