DRAFT

SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

MODIFICATIONS TO THE PORT OF HUENEME DEEPENING PROJECT VENTURA COUNTY, CALIFORNIA

Department of the Army
Los Angeles District Corps of Engineers

February 2019

U.S. ARMY CORPS OF ENGINEERS
SOUTH PACIFIC DIVISION
LOS ANGELES DISTRICT

FINDING OF NO SIGNIFICANT IMPACT FOR THE MODIFICATIONS TO THE PORT OF HUENEME DEEPENING PROJECT VENTURA COUNTY, CALIFORNIA

I have reviewed the attached Supplemental Environmental Assessment (SEA) prepared for the project in Ventura County. The primary project purposes include efficient accommodation of larger, deep-draft vessels; increased cargo efficiency of product delivery; and reduced overall transit costs. The project would also provide beneficial uses for most of the dredged sediments as nourishment at Hueneme Beach, either directly onto the beach or into the nearby nearshore area. The plan selected (Alternative 2a with Disposal Option 1) is the National Economic Development Plan (NED Plan). Under this alternative, the Main Approach Channel would be dredged to -44 feet MLLW, and the Entrance Channel and Turning Basin (which includes Channel A) would be dredged to -40 feet mean lower low water (MLLW). Approximately 390 kilo-cubic yards (kcy) of material would be dredged over two months with 363 kcy of sand placed onto Hueneme Beach, 7 kcy place into the nearshore, and 20 kcy disposed of on the existing Confined Aquatic Disposal (CAD) Site located within the harbor. In addition, if determined needed, approximately 14,000 ton of stone would be placed along the toe of the eastern slope of the Entrance Channel to stabilize the slope and prevent slumping into the deepened navigation channel. Construction could begin as early as June 2019 with an estimated 4-month duration.

Environmental resources and attributes addressed in the SEA include: topography and geology, oceanography and water quality, marine resources, air quality, noise, cultural resources, land and water use, ground transportation, vessel transportation, socioeconomic effects, and aesthetics are not expected to result in significant adverse impacts for the Recommended Plan as well as for all action alternatives.

Construction activities would be subject to environmental commitments specified in the original 1999 Environmental Assessment, as modified in Chapter 6 of this SEA. The project is in compliance with all applicable regulations including Section 404 and 401 of the Clean Water Act. A Section 404(b)(l) evaluation has been prepared (Appendix C) and the project received a Section 401 water quality certification, a copy of which can be found in Appendix _ in the final SEA. The total direct and indirect emissions from the federal action are below applicability rates. Therefore, a conformity determination is not required. The project meets the requirements of Section 176(c) of the Clean Air Act. A supplemental Consistency Determination was submitted to the California Coastal Commission (CCC) for project concurrence for compliance with the Coastal Zone Management Act. A copy of the concurrence letter can be found in Appendix _ in the final SEA. No federally-listed species or designated critical habitat would be affected by project implementation. Therefore, formal consultation is not required pursuant to

Section 7 of the Endangered Species Act of 1973, as amended. In accordance with the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act, an assessment of Essential Fish Habitat has been conducted for the proposed project. The USACE has determined that this project would not result in a substantial, adverse impact to EFH. Results of consultation with the National Marine Fisheries Service can be found in Appendix _ in the Final EA, including any conservation recommendations. Consultation has been completed with the State Historic Preservation Officer (SHPO) in accordance with Section 106 of the National Historic Preservation Act with a determination that there would be no adverse effect to historic properties. A copy of SHPO's concurrence letter is included in Appendix F of the final SEA. In the event that previously unknown cultural resources are discovered during the project, all ground disturbing activities shall cease until the USACE has met the requirement of 36 CFR 800.13 regarding post-review discoveries.

Hence, I have considered the available information contained in this SEA and determined that the impacts resulting from the implementation of Alternative 2a with Disposal Option 1 would not have a significant effect on the human environment; therefore, preparation of an Environmental Impact Statement is not required.

_____________________ _DRAFT___________________________

DATE

Aaron C. Barta, PMP
Colonel, US Army
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1.0 INTRODUCTION

1.1 Project Location. The proposed project is located in the Approach Channel, Entrance Channel and Turning Basin (which is defined to include Channel A throughout this document) within the Port of Hueneme, Ventura County, California (Figure 1). The Port of Hueneme is a deep water harbor located in the city of Port Hueneme at the southern edge of the city of Oxnard. The harbor was originally established in 1939 by the Oxnard Harbor District (OHD), but was divided into two jurisdictions after World War II. The U.S. Naval base at the Port of Hueneme has long been the home of the U.S. Navy Construction Battalion, otherwise known as the Seabees. Other naval functions include training in electronic warfare systems and civil engineering. The remainder of the harbor is operated by the OHD, a major facility for the import and export of automobiles, fresh fruit, liquid bulk, and break bulk cargo. Refer to Figure 2 for a map showing the jurisdictional limits of the U.S. Naval Base. The Approach Channel is approximately 787.2 feet in length and 590.4 feet in width, with an authorized depth of -40 feet mean lower low water (MLLW). The Entrance Channel is approximately 1541.6 feet in length and 328 feet in width, with an authorized depth of -36 feet MLLW. The Turning Basin is 1079.1 feet in length and 1020.1 feet in width, with an authorized depth of -35 feet MLLW. Navigation into the Port of Hueneme proceeds between two rubble-mounted jetties through a dredged channel. Pilotage is controlled by the narrowest width of the Entrance Channel, which is 328 feet. The main navigation channel inside the harbor is maintained at -35 feet MLLW.

1.2 Project History. In August 1999, the U.S. Army Corps of Engineers, Los Angeles District (USACE) and the OHD prepared a Feasibility Report for the Port of Hueneme Deep Draft Navigation Study with an associated Final Environmental Assessment (Final EA) and Mitigated Negative Declaration (USACE, 1999a, 1999b). The USACE was the federal National Environmental Policy Act (NEPA) lead agency and the OHD was the California Environmental Quality Act (CEQA) lead agency.

The 1999 Final EA analyzed in detail the no action alternative and five action alternatives (Alternatives 1, 2, 2a, 3, and 4) that assessed various depths that met project needs. Alternative 2a was the "recommended plan" and included, in pertinent part, dredging the main channel to -43.3 feet MLLW and the Entrance Channel and turning basin to -40 feet MLLW. Under all action alternatives, dredged material was to be disposed at Hueneme Beach and approximately 350 wooden pier piles removed and disposed at an approved landfill. Operation and maintenance was anticipated to occur on a 6 to 10 year cycle, with removal of 261,590 cubic yards (cy) of material per event. On August 19, 1999, the District Engineer, Col. John P. Carroll, signed a Finding of No Significant Impact (FONSI). The FONSI concluded that: "[n]o significant impacts to oceanography and water quality, land and water uses, transportation, or aesthetics are anticipated. No impacts to cultural resources are anticipated." And that ". . . no significant impacts to the quality of the environment would result from the proposed action. Preparation of an Environmental Impact Statement, therefore, is not required." The Commander, South Pacific Division, approved the Feasibility Report on September 29, 1999. The recommended plan was the selected plan, and subsequently entered the design phase.

In May 2001, due to the lapse in time between the 1996 sediment quality evaluation and the scheduled construction date, the USACE collected new sediment samples. The USACE conducted a Human Risk Assessment of suitability of sediments for on-shore or near-shore placement (Bechtel Environmental, 2001), a Focused Ecological Risk Assessment (Anchor Environmental 2003), and an ecological risk evaluation for tributyltin (TBT) (Anchor Environmental, 2004) and determined that approximately 117,716 cy of sediments were unsuitable for beach nourishment. The project construction was delayed until disposal options could be developed.

A Draft Supplemental Environmental Assessment (SEA) was prepared in 2004 to supplement the 1999 analysis with new sections describing existing conditions and environmental effects for disposal options for the dredged material that was determined unsuitable for beach nourishment. These options included an alternate disposal site at the Port of Long Beach (see Figure 1) and use of new technology to separate the unsuitable components from the clean sand. These options were determined to be infeasible due primarily to economic considerations. The project was then put on hold pending resolution of the sediment contamination issues.

It was determined in 2006 that maintenance dredging of the federal channels was required to maintain safe navigation. A Final EA was prepared in October 2006 (USACE 2006) to address maintenance dredging at Port of Hueneme and Channel Islands Harbors. Sediment testing conducted in 2007 (USACE 2007) found that sediments in Port of Hueneme contained elevated levels of PCB's (poly-chlorinated biphenyls), TBT, and DDT (dichloro-diphenyl-trichloroethane). The sediments were determined to be unsuitable for unconfined aquatic disposal. Maintenance dredging was delayed until a cleanup plan could be devised and coordinated by the OHD with federal and state agencies, including the U.S. Environmental Protection Agency (USEPA) and California Department of Toxic Substances Control (DTSC).

Once resolution of the contaminated sediments disposal issue had been reached, an SEA was finalized in 2008 (USACE 2008) as a supplement to the 2006 Final EA that addressed the selected solution to cleaning up the sediments that were determined to be unsuitable for unconfined aquatic disposal and to perform needed maintenance dredging. The solution was to dig a Confined Aquatic Disposal (CAD) Site within Port of Hueneme on U.S. Navy property (Figure 3), place the contaminated sediment, and cover them with clean sediments and a rock layer over a portion of the cap. Along with the contaminated sediments from maintenance dredging of the federal channels, contaminated sediments dredged from berths pursuant to separate U.S. Navy cleanup activities under the Installation Restoration Program were also placed in the CAD prior to capping. Sediment from Oxnard Harbor District berths was also placed into the CAD. The CAD site was sized to accommodate future harbor deepening while maintaining its integrity as a confined site. Monitoring of the CAD Site was conducted in accordance with a Memorandum of Understanding (MOU) between the U.S. Navy and the OHD to validate the stability of the cap and its ability to continue to isolate sediments placed into the CAD site from the aquatic environment. Evidence, to date, is that the cap is still intact and functioning as designed.

After the contaminated sediments were addressed through placement in the CAD site in 2009, in 2016, the USACE and OHD executed a Project Partnership Agreement (PPA) for design and construction of the deepening project. The PPA allowed design to continue in accordance with current USACE policy and requires that any additional NEPA documentation and environmental permitting for the proposed project be completed prior to the solicitation for the first construction contract.

This SEA supplements the 1999 Final EA to analyze the effects of project modifications, including disposal options for the dredged material, and updates the proposed schedule and documentation of compliance with the Magnuson-Stevens Fishery Conservation and Management Act, Clean Water Act, Clean Air Act, and other environmental requirements.

The benefits which the federal action is intended to produce often requires similar and related operations by the project sponsor. OHD has received a Department of the Army permit to deepen berths at Berths 1 & 2, and strengthen wharves at Berths 1, 2, & 3 to correspond to the proposed federal project depth. OHD's proposed project was analyzed in a separate EA. The USACE anticipates OHD would seek a Department of the Army permit to undertake similar improvements in the future at Berths 4 & 5. Both the permitted project and reasonably foreseeable future project are considered in the cumulative impacts assessment of this SEA. The Federal navigation project benefits would be fully supported by deepening Berths 1 through 5.

1.3 Previous NEPA Documents

U.S. Army Corps of Engineers, Los Angeles District, 1999a. Finding of No Significant Impact, Final Environmental Assessment and Mitigated Negative Declaration for the Port of Hueneme Deep Draft Navigation Study (USACE, 1999a) addressed the impacts of the proposed improvements to the harbor, including alternatives.

U.S. Army Corps of Engineers, Los Angeles District, 2006. Finding of No Significant Impact and Final Environmental Assessment. Channel Islands/Port Hueneme Harbors Maintenance Dredging Project, Ventura County, California.

U.S. Army Corps of Engineers, Los Angeles District, 2008. Finding of No Significant Impact and Final Supplemental Environmental Assessment. Port Hueneme Harbor Maintenance Dredging Project, Ventura County, California.

1.4 Proposed Revisions to the 1999 Final EA, as it relates to the Federal Action.

Several modifications to the Federal action-related activities included in the recommended plan have occurred since completion of the 1999 Final EA. Revisions addressed in this SEA include minor changes to the Entrance Channel, revisions to project scheduling, and dredged material disposal locations.

1.4.1 Entrance Channel. Subsequent to completion of the Feasibility Report (USACE 1999a), it was recognized that the deepening of the Federal Channel would encroach on the slope adjacent to the Entrance Channel. A static slope stability analysis determined that a dredged cut slope of 3 horizontal (H) to1 vertical (V) would be stable; however, creating a 3H to 1V slope requires that a large quantity of revetment and dredge material be removed and that the channel be widened considerably. Removal of sufficient quantities to create the 3H to 1V slope would increase dredging costs, lengthen construction time, and potentially undermine the entrance channel wharf. The analysis then focused on two different cut slopes for this project: 2H to 1V for the upcoast side of the Entrance Channel, and 1.5H to1V for the downcoast side. In order to maintain the required factor of safety and stabilization for the steeper channel cut, the slopes would be covered with a 3.28-feet thick layer of rock revetment. Approximately 14,000 tons of rock would be required for this work.

1.4.2 Timber Pile Removal. An area within the federal turning basin north of Wharf 1 may contain remnants of timber piles used to support a wharf that was removed in the early 1970's. Based on March 1970 drawings there were approximately 640 piles in a portion of the federal turning basin as shown on Figure 6. When the wharf was removed some, but not all of the piles were removed. An unknown number were entirely removed. The estimate of 640 piles is therefore a maximum number possible. The OHD did not encounter any pile remnants when dredging in the potential piling field during cleanup dredging in 2008. Many of the remaining piles were cut off at the mud line with the lower segment remaining in place. Piles are assumed to be 10-inch diameter piles (based on two piles removed by the OHD in 1997). Tip elevations for the two piles removed in 1997 were -49 and -52.5 feet MLLW. A bent spacing of 15 feet was observed in aerial photographs taken in 1970 during wharf removal. A 4.5 feet pile spacing within each bent was based on the project drawing set from wharf removal from 1970. Sediments in this area are assumed to include an unknown quantity of debris that may have been treated in some way to retard fouling and damage from marine growths.

These sediments would be dredged and placed by clamshell dredge and bottom dump barges. The estimated volume for each action alternative is given in Table 3. Sediments in the area with potential piles (Figure 6) would be dredged by clamshell with a 1 foot x 1 foot screen placed over a barge to catch and remove any piling remnants. Any piling remnants caught on the screen would be removed and properly disposed of in a landfill. These sediments would be placed as described in Section 3. Dredging in this area would be done to a depth of -42 feet MLLW plus a two-foot overdredge allowance to ensure that all pilings are removed and pilings would not affect any future maintenance dredging in the area (Figure 13).

1.4.3 Schedule Revision. The project analyzed in the Final EA (USACE, 1999a) was based upon a three-month construction period to occur between October 1 and March 1 of Fiscal year 2000 (starting in October 1999). Construction would commence as early as June 1, 2019 and take approximately 4 months to complete.

1.5 Purpose and Need

The purpose and need for the project remains unchanged from the 1999 Final EA.

1.6 Determination of Consistency with Coastal Zone Management Act

As a Federal agency USACE is responsible for ensuring project compliance with the Federal Coastal Zone Management Act of 1972 (CZMA). Section 307 of the CZMA (Title 16, U.S. Code Section 1456(c)) states that Federal activities within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs. The California Coastal Act is this state's approved coastal management program applicable to the proposed Federal action. To document the degree of consistency with the state program, the CZMA requires the preparation of a consistency determination (CD) whenever a federal activity affects coastal resources. A CD provides a description of the proposed project, discusses the proposed project's consistency, and where applicable, describes measures, which when implemented, would result in project consistency with state policies to the maximum extent practicable. On May 11, 1999, the CCC concurred with the USACE's CD (CCC reference number CD-030-99). In accordance with 15 CFR 930.46, for proposed Federal agency activities that were previously determined by CCC to be consistent with the management program, but which have not yet begun, the USACE is required to further coordinate with the CCC and prepare a supplemental consistency determination if the proposed activity would affect any coastal use or resource substantially different than originally described.

The determination of continued consistency with the California Coastal Act is based on the analysis performed in this SEA. The USACE has carefully evaluated this proposed Federal Action in accordance with 15 CFR Part 930. A determination of consistency with the relevant policies of the California Coastal Act for the Federal Action has been formulated based on the following items:

- An analysis of project construction and the potential for direct and indirect adverse effects on any coastal use or resource;

- The formulation and implementation of proposed measures to offset project impacts; and

- The policies of the State of California related to the Federal Action as outlined in the findings and declarations of the California Coastal Act of 1976, as amended.

The supplemental CD declares that the actions that comprise the proposed Federal Action are activities that are consistent to the maximum extent practicable with the approved State management program, as specified Section 307(c)(l) of the CZMA. The USACE has determined this project remains consistent to the maximum extent practicable with the California Coastal Act of 1976, Chapter 3, Coastal Resources Planning and Management Policies as amended February 1982, for the reasons stated above and in the supplemental CD. The USACE has sought CCC concurrence.

1.7 Supplemental Environmental Assessment Process

This SEA analyzes changes to the Federal action-related activities of the proposed project that have occurred since completion of the 1999 Final EA. This document complies with the NEPA of 1969, as amended (42 USC 4321-4347); the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 CFR 1500-1508); and the USACE's NEPA Regulations (33 CFR Part 230).

The SEA process follows a series of prescribed steps. The first, scoping, was completed in September 2017 to solicit comments from federal, state, and local agencies, as well as the public. Comments were received concerning the suitability of sediments for beach nourishment and potential effects of dredging on the existing CAD site located within the harbor. This Draft SEA, the second step, is circulated for a 30-day review to concerned agencies, organizations and the interested public, during which interested parties may express their views concerning the proposed project. The next step requires preparation of a Final SEA that incorporates and responds to comments received. The Final SEA will be furnished to all who commented on the draft and will be made available to others upon request. The final step is preparing a FONSI; if it is determined the federal action will not have a significant effect on the human environment. This is a concise summary of the decision made by the USACE from among the alternatives presented in the Final SEA. If it is determined the federal action will have a significant effect on the human environment, an EIS must be prepared.

1.8 Coordination

The principal agencies with which this proposed project has been, and will continue to be coordinated, include the: U.S. Navy, Southern California Dredged Material Management Team (SC-DMMT), USEPA, Los Angeles Regional Water Quality Control Board (LA RWQCB), and California Coastal Commission (CCC).

1.8.1 SC-DMMT. The SC-DMMT is a multi-agency management team set up jointly by the USACE and the USEPA. The SC-DMMT initially consisted of the USACE and USEPA, but has expanded to include participation by the various Regional Water Quality Control Boards and the CCC. The SC-DMMT currently meets monthly. The process used by the SC-DMMT to evaluate placement options, taken from the Contaminated Sediments Task Force (CSTF, 2005) prioritizing for beneficial reuse of dredged sediments is shown on Figure 9.

The Sampling and Analysis Plan was discussed at a joint meeting of the SC-DMMT held on October 26, 2016. Minor adjustments were made to the plan, which was then implemented (USACE, 2016). Additional sampling and testing was conducted to provide additional information on sediment quality needed to make a final determination as to suitability of sediments for beach nourishment. Procedures and results are discussed in the Sampling and Analysis Plan Report (SAPR; USACE 2017, Appendix A). The SAPR was discussed at a meeting of the SC-DMMT held September 27, 2017. The consensus was that the proposed disposal of sediments, as discussed in Section 2.2.1 below, was concurred with by the members of the SC-DMMT.

1.8.2 USEPA. The USACE, in consultation with the USEPA, reviewed initial sediment test results in January 2017. Additional sampling and testing was conducted, evaluated, and repeated until sufficient evidence was available to make a final suitability determination. This process is documented in the Final SAPR)(USACE, 2017). The SAPR was then presented to the SC-DMMT as discussed above.

1.8.3 LA RWQCB. The LA RWQCB concurred with the suitability determination, as part of the SC-DMMT, as discussed above. Prior to initiation of the project, the USACE would obtain water quality certification or deem a waiver, as applicable.

1.8.4 CCC. A copy of the Draft SEA will be provided to the CCC staff concurrently with public review, along with a request that the CCC concur with the Supplemental CD. Please refer to Section 5.1 of this SEA for a discussion of project compliance with the CZMA.

1.8.5 U.S. Navy

The USACE has consulted with the U.S. Navy in their role as property owner for the majority of the harbor (Figure 2). A Memorandum of Understanding would be required to allow the USACE to dispose of sediments on the existing CAD site and to add rock to the slope protection along the east side of the Entrance Channel. The U.S. Navy will adopt this SEA as part of that action.

1.9 Relationship to Environmental Protection Statutes, Plans, and Other Requirements

The USACE is required to comply with all pertinent federal laws and regulations; compliance is summarized in Table 1.

Table 1. Summary of Environmental Compliance

Statute	Status of Compliance
National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. 4321 et seq., as amended Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the NEPA (40 CFR 1500-1508) and USACE NEPA Implementing Regulations at 33 CFR Part 230 and guidance	The SEA will be completed and circulated for public review. Upon review of the Final SEA, the District Engineer will either issue a FONSI or require preparation of an EIS.
Clean Air Act, 42 U.S.C. 7401 et seq	A permit to construct would be obtained by contractor, if necessary. The total direct and indirect emissions from the federal action are below applicability rates. Therefore, a conformity determination is not required.
Section 404 of the Clean Water Act, 33 U.S.C. 1344, USACE regulations at 33 CFR Part 336 , and USEPA 404(b)(1) Guidelines at 40 CFR Part 230 Section 401 of the Clean Water Act, 33 U.S.C. 1341 Section 10 of the Rivers and Harbors Act of 1899, 33 U.S.C. 403	A section 404(b)(1) analysis (Appendix C) was prepared for the recommended placement of dredged or fill material within waters of the U.S. Prior to initiation of the project, the USACE would obtain water quality certification or deem a waiver, as applicable. Not applicable.
Coastal Zone Management Act of 1972, 16 U.S.C. 1451 et seq National Oceanic and Atmospheric Administration Federal Consistency Regulation With Approved Coastal Management Program Regulations at 15 CFR Part 930	A Supplemental CD has been prepared by the USACE for concurrence by the CCC.
Section 7 of the Endangered Species Act of 1973, 16 U.S.C. 1536 and implementing regulations at 50 CFR Part 402 Fish and Wildlife Coordination Act, 16 U.S.C. 661-666c Migratory Bird Treaty Act, 16 U.S.C. 703-711 Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended, 33 U.S.C. 1413 Marine Mammal Protection Act, 16 U.S.C. 1361 et seq Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. 1855(b) and implementing regulations at 50 CFR 600.905-930.	The USACE has determined that there will be no effect to listed species or designated critical habitat; consultation pursuant to Section 7 of the Endangered Species Act is not required. An analysis of potential effects has been conducted and coordination efforts are underway with the U. S. Fish and Wildlife Service. The USACE has determined that no species protected by the Migratory Bird Treaty Act will be impacted. Not applicable. The USACE has determined that no species of marine mammal would be impacted. The USACE has determined that this project would not result in a substantial, adverse impact to Essential Fish Habitat (EFH). The USACE intends to use the NEPA review process to fulfill the EFH consultation requirements.
Section 106 of the National Historic Preservation Act (NHPA54 U.S.C. 3000100 et seq. and implementing regulations at 36 CFR 800) Executive Order 11593: Protection and Enhancement of the Cultural Environment, May 13, 1971 Executive Order 12898, Environmental Justice in Minority and Low-Income Populations	The USACE has determined that the federal action (the undertaking) would have no adverse effect on historic properties; the USACE will seek concurrence from the State Historic Preservation Officer. Not applicable. The minority population in the project area is significantly smaller than the minority population in the County. Therefore, the federal action would not result in disproportionately high and adverse impacts to minority populations.

2.0 ALTERNATIVES

2.1 NO ACTION ALTERNATIVE

This alternative, described in Section 3.1.3 of the Final EA (USACE, 1999a), remains unchanged. Under this alternative, the USACE would not deepen the Federal channels. This alternative would not accommodate deep draft vessels as efficiently. Maintenance dredging of the Federal channels, however, would continue at roughly five-year intervals. The potential impacts of maintenance dredging would be assessed in a separate NEPA document and would be to the current authorized depths of -40 feet MLLW in the Approach Channel, -36 feet MLLW in the Entrance Channel and -35 feet in the Turning Basin.

2.2 ACTION ALTERNATIVES

2.2.1 Depth Configuration

The existing channel dimensions, other than the depth, are all adequate to allow the design vessels to maneuver in the harbor. Originally, a broad array of depths were assessed generally to determine depths that meet project needs. Optimal depths for achieving most efficient and economical vessel transit through the channel fully loaded vary between -46 feet and -38 feet MLLW. Thus, the following five alternatives were developed in Section 3.1.2.1 of the Final EA (USACE, 1999a) and are revised as described below.

Project depths are slightly different due mainly to rounding when converting from the metric units used in 1999 and the English units in use today and the desire to avoid fractional values. For example, the proposed deepening of the Approach Channel for Alternative 2a was to a depth of -13.2 meters (-43.3 feet) MLLW in 1999; the new proposed depth is -44 feet MLLW. The Entrance Channel and Turning Basin were proposed to a depth of -12.2 meters (-40.0 feet) MLLW in 1999; the new proposed depth is -40 feet MLLW. All converted depths were rounded up for purposes of this SEA in order to retain all benefits from each proposed configuration. Proposed dredging volumes have also changed as a result of other dredging projects that have been completed since 1999 as well as the conversion from metric cubic meters to English cubic yards. Dredge volumes are reported in thousands of cubic yards (kcy); 1,000 cubic yards is equal to 1 kcy.

All project volumes include sediments that are considered to be maintenance dredging and that are above the current authorized depths. Those sediments would be removed as part of the deepening project. If the deepening project is delayed, those sediments would be removed in a separate action being evaluated in a separate NEPA document (USACE, 2018a). The estimated volumes for maintenance dredging are: approximately 127 kcy (92 kcy from the Approach Channel, 29 kcy from the Entrance Channel and 6 kcy from the Turning Basin).

Alternative 1. The Approach Channel would be dredged to -41 feet MLLW, and the Entrance Channel and Turning Basin would be dredged to -38 feet MLLW. Approximately 210 kcy of material would be dredged over approximately one month.

Alternative 2. The Approach Channel would be dredged to -43 feet MLLW, and the Entrance Channel and Turning Basin would be dredged to -40 feet MLLW. Approximately 347 kcy of material would be dredged over approximately one and a half months.

Alternative 2a (the Recommended Plan). The Approach Channel would be dredged to -44 feet MLLW, and the Entrance Channel and Turning Basin would be dredged to -40 feet MLLW. Approximately 390 kcy of material would be dredged over approximately 2 months.

Alternative 3. The Approach Channel would be dredged to -45 feet MLLW, and the Entrance Channel and Turning Basin would be dredged to -41 feet MLLW. Approximately 462 kcy of material would be dredged over approximately two and a half months.

Alternative 4. The Approach Channel would be dredged to -46 feet MLLW, and the Entrance Channel and Turning Basin would be dredged to -43 feet MLLW. Approximately613 kcy of material would be dredged over approximately three and a half months.

Table 2 shows project depths and estimated volumes proposed to be dredged from the Approach Channel, Entrance Channel, and Turning Basin for each of the action alternatives, while Table 4 shows estimated durations.

2.2.2 New Work Added to All Action Alternatives

The eastern slope in the Entrance Channel along a length of approximate 1,000 feet, from Station 20+00 to 30+00, is protected from slumping by a rock revetment (Figures 8 and 10). There is no revetment along the western slope of the Entrance Channel. Deepening the adjacent channel from its current design depth of -36 feet MLLW to a new design depth of -38 to -43 feet MLLW may destabilize the eastern slope. Under all action alternatives, approximately 14,000 ton of stone would be placed along the toe of the slope to stabilize the slope and prevent slumping into the deepened navigation channel. This estimate is based on historical design documents. Actual conditions may not warrant additional placement of rock revetment, so that limited or no rocks may need to be placed as part of this project. Need and exact volumes would be determined during construction when obstructions would be used to determine the nature and location of the current rock revetment. Rock would be placed by derrick barge and would take a maximum of approximately 30 days. It is the contractor's responsibility to locate sufficient quantity and quality of stone from among southern California quarries. The USACE cannot direct the contractor in making this selection, but can only specify the size, type and quality of stone. For purposes of this analysis, the Pebbly Beach quarry on Santa Catalina Island is considered to be the most likely source due to known quantities on hand, use of barges to transport stone instead of truck, the need to load stone from other quarries onto barges after trucking to the harbor for use at the Entrance Channel, however the use of other quarries cannot be ruled out.

Table 2. Estimated Dredge Volumes by Channel/Composite Area

Alternative	Channel/ Composite Area	Project Depth (feet, MLLW)	Project Depth + Overdepth (feet, MLLW)	Volume with 2-foot Overdepth (kcy)*
1	Approach	-41	-43	117
	Entrance	-38	-40	63
	Turning Basin	-38	-40	30
			TOTAL	210
2	Approach	-43	-45	177
	Entrance	-40	-42	100
	Turning Basin	-40	-42	70
			TOTAL	347
2a	Approach	-44	-46	220
	Entrance	-40	-42	100
	Turning Basin	-40	-42	70
			TOTAL	390
3	Approach	-45	-47	243
	Entrance	-41	-43	121
	Turning Basin	-41	-43	98
			TOTAL	462
4	Approach	-46	-48	277
	Entrance	-43	-45	169
	Turning Basin	-43	-45	167
			TOTAL	613

Volume Quantities based on Government survey conducted May 2017.

2.2.3 Material Placement Alternatives.

Section 3.1.2.2 of the Final EA (USACE 1999a) is hereby revised as it relates to Material Placement Options for dredged material under all action alternatives. In addition, Section 3.2.1 and 3.2.2 is also being revised concerning construction methods and timing. Staging requirements discussed in Section 3.2.1 remain unchanged. Material testing results from 1996 indicated that all proposed dredge materials were suitable for beach nourishment at Hueneme Beach, therefore, other disposal options were dismissed. Beach nourishment included both onshore and nearshore placement. This option is no longer feasible, as some sediments are no longer considered to be acceptable for beach nourishment for reasons discussed below, and is not carried forward for evaluation.

The USACE recently (USACE 2017) characterized the sediment proposed for dredging from the Federal channels pursuant to the USACE and USEPA's Inland Testing Manual

(USACE/USEPA 1998), which provides the framework for evaluating dredged material proposed for discharge into waters of the United States in order to determine compliance with the 404(b)(1) Guidelines. Conclusions reached utilizing the Inland Testing Manual are used to make factual determinations of the potential effects of a proposed discharge of dredged material on the physical, chemical, and biological components of the aquatic environment. The Inland Testing Manual utilizes both chemical and biological analyses as necessary, to provide effects-based conclusions within a tiered framework with regard to the potential for contaminant-related water column, benthic toxicity, and benthic bioaccumulation impacts. Tier I uses readily available existing information. Tier II is concerned solely with sediment and water chemistry. Tier III is concerned with well-defined nationally accepted toxicity and bioaccumulation procedures. Tier IV allows for case-specific laboratory and field testing, and is intended for use in unusual circumstances. It is necessary to proceed through the tiers only until information sufficient to make factual determinations has been obtained. While it is generally anticipated that the USACE will follow the procedures in the Inland Testing Manual, the agency decision-makers retain the discretion to adopt approaches on a case-by-case basis that differ from the guidance in the Inland Testing Manual where determined to be appropriate.

Sediments from the Approach Channel, Entrance Channel, and Turning Basin are considered physically compatible, as measured by grain size and total organic carbon, to be beneficially reused for beach nourishment. Based on results of the 2016 sediment sampling and analysis (USACE 2017) all sediments were determined to be physically compatible for beach and, in some cases nearshore placement. The Entrance Channel composite was considered to be suitable for nearshore placement, as well as beach placement as were sediments from trench construction. Most sediments are suitable for beach placement only and are not physically compatible with nearshore placement. Harbor sediments are finer than the beach sediments (while remaining compatible), and are considered suitable for placement in the surfzone off Hueneme Beach.

Chemical concentrations in composite sediment samples did not result in acute toxicity or significant bioaccumulation in marine invertebrates. Based on the composite samples, the sediments were considered to be chemically suitable for beneficial use to nourish Hueneme Beach. However, during the agency coordination process, concerns were expressed about the concentrations of PCBs in certain individual core samples. Concentrations of total PCB congeners in composite samples were as follows: Approach Channel 67 µg/kg, Entrance Channel 59 µg/kg, and Turning Basin 44 µg/kg. All individual cores total PCB concentrations were used to determine a 95% Upper Confidence Limit (UCL) for total PCBs of 72.89 ug/kg. An ecological risk assessment performed for the USACE (Anchor Environmental 2003) using Port Hueneme sediments calculated a 95% UCL value of 89.6 µg/kg determined by the USACE to be protective of ecological health for the protection of California least tern egg development.

The Sampling and Analysis Program conducted in 2016 was designed to support the Recommended Plan (Alternative 2a). Deeper alternatives (Alternatives 3 & 4) were not tested for purposes of suitability for beach nourishment for the reasons stated below.

Some areas in the Turning Basin were evaluated to a deeper depth as part of an evaluation for potential trenches. All of these deeper sediments were found to be suitable for beach nourishment, which lends further support to the Tier I assessment provided below. Based on the 1996 Sampling and Analysis Program those deeper sediments were re-evaluated in a Tier I review as part of this SEA's evaluation of environmental impacts and the USACE has determined that they have remained buried and have not been exposed to contaminants and would therefore be suitable for beach nourishment, either on beach or nearshore placement. The deeper sediments were shown to be physically compatible with both the beach and nearshore placement areas.

Although the composite samples were considered to be suitable for placement at Hueneme Beach based on the results of the sediment sampling and analysis program, the USACE, in consultation with the USEPA, has elected to manage sediment from five individual core locations within the harbor. Rationale for the disqualification of individual cores from beach placement was a result of both high PCB concentrations (up to 367 µg/kg) and the presence of excessive fine grained material in the individual cores. Specifically, individual core sediments were deemed unacceptable for beach or nearshore placement if 1) their total PCB concentration exceeded the 95% UCL for total PCBs of 89.6 µg/kg total PCBs; and 2) their weighted average silt content is 30% or greater.

Cores A-8, E-6, T-10, E-9, and T-15 (Figure 11) are deemed to be unacceptable under the above criteria for beach or nearshore placement, but are considered to be suitable for unconfined disposal within the harbor. Estimated volumes for the action alternatives are given in Table 3.

Table 3. Estimated Dredge Volumes by Feature (kcy)

	Alternative				
Project Feature	**1**	**2**	**2a**	**3**	**4**
Five Unacceptable Cores	10	19	20	25	35
Timber Pile Area	2	3	3	4	4
Rock Revetment Area	3	4	4	5	5
Beach Placement	195	321	363	428	569
Trench Construction	11	21	23	29	40
Total (CAD Option)	210	347	390	462	613
Total (Trench Option)	221	368	413	491	653

Sediments from the Federal channel in front of Wharf 1 may contain remnants of old timber piles from an earlier wharf. These sediments would be dredged by clamshell with dredged materials passing through a screen to remove any timber pile remnants of a size to be of concern and the sediments placed into the nearshore to preclude introducing timber pile fragments directly onto the beach. Timber pile fragments would be collected from the screen and disposed of at a landfill in accordance with state and federal regulations. Estimated volumes for the action alternatives are given in Table 3.

Two placement options are under consideration for this project.

2.2.3.1 Disposal Option 1 – CAD Placement of Unacceptable Sediments

Under this option, sediment from the five unacceptable cores would be dredged by clamshell and placed onto the top of the existing CAD area (Figure 12) to serve as additional cap material, due to their similarity to the existing cap material (95% UCL of 94.48 µg/kg for total PCBs), to enhance isolation of contaminated sediments placed within the CAD in 2009. Dredged materials from the area of these five unacceptable cores would be placed in order of decreasing PCB concentration. That order would be Cores A-08, T-10, E-06, T-15, and E-09. This sediment would be dredged and placed by clamshell dredge and bottom dump barges on to the existing CAD site. The estimated volume for each action alternative is given in Table 3 (Five Unacceptable Cores). Sediments in the area with potential piles (Figure 6) would be dredged by clamshell with a 1 foot x 1 foot screen placed over a barge to catch and remove any piling remnants. Any piling remnants caught on the screen would be removed and properly disposed of in a landfill. These sediments would be placed into the nearshore placement zone to minimize the potential for small piling remnants ending up on Hueneme Beach. The OHD did not encounter any pile remnants when dredging in the potential piling field during cleanup dredging in 2008. Dredging in this area would be done to a depth of -42 feet MLLW plus a two-foot overdredge allowance for all action alternatives to ensure that all pilings are removed and pilings would not affect any future maintenance dredging in the area. Figure 13 shows the design depths for these piles that shows that no piles were driven below -44.5 feet MLLW) and that only one row of piles was driven to this depth; clamshell dredging would remove any pile fragments found between -44 and -44.5 feet MLLW. The estimated volume for each action alternative is given in Table 3 (Timber Pile Area). Sediments along the east side of the Entrance Channel would be dredged by clamshell dredge with barge placement into the nearshore placement site. This is being done for structural reasons as there may be rocks present from a rock revetment placed along the slope above the channel. Rocks would be screened from the dredged material for reuse. Hydraulic dredges would not be suitable for this area as any rocks present could damage the cutterhead. Estimated volumes for this feature for each action alternative are given in Table 3 (Rock Revetment Area). The remaining sediments would be dredged by hydraulic dredge with beach placement into the surf zone by pipeline or by hopper dredge placement in the nearshore. The estimated volume for each action alternative is given in Table 3 (Beach Placement). Dredging and placement durations for each action alternative is given in Table 4.

Table 4. Estimated Dredge Durations (days)

		Alternative				
Option	**Dredge Type**	**1**	**2**	**2a**	**3**	**4**
CAD Option						
	Clamshell	7	13	14	17	24
	Hydraulic	20	32	36	43	57
TOTAL		27	45	50	60	81
Trench Option						
	Clamshell	13	23	25	32	43
	Hydraulic	20	32	36	43	57
TOTAL		33	55	61	75	100

2.2.3.2 Disposal Option 2 – Trench Placement of Unacceptable Sediments

Under this alternative, a trench (Figure 14) would be constructed by dredging additional sediment with placement of the dredged sediments into the nearshore placement site. The estimated volume for each action alternative is given in Table 3 (Trench Construction). Sediments from the five unacceptable cores identified above would be placed into the trench. Dredged materials from the area of these five cores would be placed in order of decreasing PCB concentration in the bottom of the trench. That order would be Cores A-08, T-10, E-06, T-15, and E-09. This sediment would be dredged and placed by clamshell dredge and bottom dump barges. The estimated volume for each action alternative is given in Table 3 (Five Unacceptable Cores). Sediments in the area with potential piles (Figure 6) would be dredged by clamshell with a 1 foot x 1 foot screen placed over a barge to catch and remove any piling remnants. Any piling remnants caught on the screen would be removed and properly disposed of in a landfill. These sediments would be placed into the trench on top of the sediments identified above to eliminate any potential for small piling remnants ending up on Hueneme Beach. Dredging in this area would be done to a depth of -42 feet MLLW plus a two-foot overdredge allowance to ensure that all pilings are removed and pilings would not affect any future maintenance dredging in the area. The estimated volume for each action alternative is given in Table 3 (Timber Pile Area). Sediments along the east side of the Entrance Channel would be dredged by clamshell dredge with barge placement into the nearshore placement site. This is being done for structural reasons as there may be rocks present from a rock revetment placed along the slope above the channel. Rocks would be screened from the dredged material for reuse. Hydraulic dredges would not be suitable for this area as any rocks present could damage the cutterhead. The estimated volume for each action alternative is given in Table 3 (Rock Revetment Area). The remaining sediments would be dredged by hydraulic dredge with beach placement into the surf zone by pipeline or by hopper dredge placement in the nearshore. The estimated volume for each action alternative is given in Table 3 (Beach Placement). Dredging and placement durations for each action alternative is given in Table 4.

Environmental commitments specified in the 1999 Final EA, as modified in Chapter 6 of this SEA, are included as project design features under all alternatives.

2.3 RECOMMENDED PLAN DESCRIPTION

Alternative 2a, described in Section 3.1.2.1 of the Final EA (USACE, 1999a), as revised, is the Recommended Plan. Under this alternative, the Approach Channel would be dredged to -44 feet MLLW, and the Entrance Channel and Turning Basin would be dredged to -40 feet MLLW. Approximately 390 kcy of material would be dredged over four months, this estimated duration includes mobilization of equipment to the site, dredging, and demobilization from the site.

Table 2 shows project depths and estimated volumes proposed to be dredged from the Approach Channel, Entrance Channel, and Turning Basin under Alternative 2a.

The eastern slope in the Entrance Channel along a length of approximate 1,000 feet, from Station 20+00 to 30+00, is protected from slumping by a rock revetment (Figure 8). There is no revetment along the western slope of the Entrance Channel. Deepening the adjacent channel from its current design depth of -36 feet MLLW to a new design depth of -40 feet MLLW may destabilize the eastern slope. Under this alternative, approximately 14,000 ton of stone would be placed along the toe of the eastern slope to stabilize the slope and prevent slumping into the deepened navigation channel. This estimate is based on historical design documents. Actual conditions may not warrant additional placement of rock revetment, so that limited or no rocks need to be placed as part of this alternative. Need and exact volumes would be determined during construction when dredging obstructions would be used to determine the nature and location of the current rock revetment. Rock would be placed by derrick barge and would take a maximum of approximately 30 days.

The disposal/placement options recommended is Option 1: disposal of sediments from the area surrounding the five unacceptable five cores as additional cap on the CAD Site located within Port of Hueneme; sediments in the area with potential piles would be dredged by clamshell with a 1 foot x 1 foot screen placed over a barge to catch and remove any piling remnants. Any piling remnants caught on the screen would be removed and properly disposed of in a landfill. Placement of screened sediments from the piling area in the nearshore placement site located off of Hueneme Beach; placement of sediments along the revetment toe in the Entrance Channel into the nearshore placement area located off of Hueneme Beach; and placement of remaining sediments in the surf zone on Hueneme Beach if pipeline placement used or nearshore placement if a hopper dredge is used. This represents a total of 27 kcy that would be dredged by clamshell dredging into barges. The remaining 363 kcy of sediments would be dredged by hydraulic dredge with beach placement by pipeline (breakdown by feature is given in Table 3 for Alternative 2a). Dredging and placement would take approximately 36 days of hydraulic dredging and 14 days of clamshell dredging for a total of 50 days. Mobilization, weather delays, and equipment difficulties could result in a total construction time of four months depending on circumstances.

3.0 AFFECTED ENVIRONMENT

The Affected Environment at Port of Hueneme is generally as described in the Final EA (USACE, 1999a). Water quality and sediment information have been updated. The Marine Resources discussion has been updated to include Essential Fish Habitat (EFH), delisting of the brown pelican in accordance with the Endangered Species Act, and an invasive algal species.

3.1 OCEANOGRAPHY

3.1.1 Port of Hueneme and Hueneme Beach Water Quality.

Water quality in the harbor and placement areas are essentially as described in the Final EA (USACE, 1999a). Conditions have likely improved with implementation of storm water regulations as well as non-point source controls implemented throughout the region. Back basins of Port of Hueneme are listed as impaired on the 2012 Clean Water Act section 303(d) List of Impaired Waters for fish tissue levels for DDT and PCB. Port of Hueneme is a 4b water segment where all its 303(d) listings are being addressed by action(s) other than Total Maximum Daily Load (TMDL), in this case the 2008-2009 cleanup dredging program conducted by the OHD and U.S. Navy, and 2008 maintenance dredging by the USACE. While listed on the most recent 303(d) list, both contaminants listing are due to lines of evidence collected in 2006 and 2007 (LARWQCB 2017), prior to the dredging conducted in 2008-2009 to remove and sequester sediments with high levels of PCB and DDT. The listing is likely out of date.

3.1.2 Port of Hueneme and Hueneme Beach Sediment Quality.

3.1.2.1 Sediment Testing and Analysis. USEPA previously reviewed the results of sediment testing conducted in 1996 and determined that the proposed dredged materials were chemically suitable for aquatic disposal and physically compatible for beneficial reuse for beach nourishment at Hueneme Beach. However, due to the lapse in time between the 1996 sediment quality evaluation and the proposed construction date, USEPA recommended retesting of the proposed dredged materials. New sediment samples were collected in May 2001 to provide updated analyses. Analyses include a Human Risk Assessment of suitability of sediments for on-shore or near-shore placement (Bechtel Environmental, 2001), a Focused Ecological Risk Assessment (Anchor Environmental 2003), and an ecological risk evaluation for tributyltin (TBT) (Anchor Environmental 2004).

Bechtel Environmental (2001) performed a Human Risk Assessment to evaluate the potential impact on human health from chemicals of potential concern (COPCs) in sediments that would be dredged from Port of Hueneme and placed on Hueneme Beach or in the nearshore zone, immediately downcoast of the harbor. Bechtel Environmental performed the Risk Assessment in accordance with guidelines published by USEPA in the Risk Assessment Guidance for Superfund and supporting documents and guidelines published by Cal-EPA. The risk assessment addresses the potential health risk for people who use the beach and open water for recreation, including swimming, surfing, and fishing. Selected COPCs are all 31 of the organic compounds reported in at least one sediment sample. None of the metals were selected as COPCs because concentrations were at or near background levels. Receptors are identified as humans having a potential to contact sediment either onshore or in the water column. Children and adults who live near Hueneme Beach routinely use the beach. Visitors from outside the immediate area also use the beach, but to a lesser extent. Surfers frequently surf in the waters immediately offshore of the beach, and recreational fishing may also take place.

The Risk Assessment (Bechtel Environmental, 2001) concluded that the cumulative cancer risk for children regularly using the beach is 1×10^{-6} or the same as the de minimus risk using USEPA standards. The de minimus risk refers to the risk with no exposure to carcinogenic chemicals. Using CalEPA standards, the risk is slightly higher (2×10^{-6}), but still well within the acceptable range (below 1×10^{-4}). The risk assessment was based on extremely conservative estimates of the level of exposure to the COPCs. Actual exposure would probably be considerably less.

The ecological risk assessment (Anchor Environmental, 2003) revealed that approximately 66,000 to 92,000 cy of sediment from two areas within the harbor (the northwestern corner of the Turning Basin and a portion of the western edge of the Approach Channel) contained elevated levels of potential contaminants of concern. These samples contained concentrations of TBT, PCBs, and DDT and its breakdown products exceeding the screening value levels used elsewhere for indicating the likelihood of material suitability criteria for aquatic disposal.

Based upon the results of further testing and analysis completed in 2007, the USACE, USEPA, and the LA RWQCB identified the need for an alternative disposal site and an alternative disposal method for dredged material containing elevated levels of COPCs. The USACE considered the following options:
(1) Disposal as fill material at the Port of Long Beach's Pier J South expansion project,
(2) Use as daily landfill cover at a Class III landfill located within Ventura County,
(3) Disposal at a Class I landfill as a non-hazardous waste.
(4) Stabilization in cement and use in construction projects such as parking lots or roadbeds
(5) Physical separation of unsuitable components from clean sand.

The USACE, U.S. Navy, and the OHD developed a sixth alternative that was implemented in 2009. That alternative was the construction of a CAD site within Port of Hueneme (OHD 2007). Dredging was conducted to remove sediments above action levels for total PCB, DDT, and TBT. As a result, many areas were dredged beyond authorized depths and some areas remain at or below the new authorized depth, reducing the amount of dredging needed to complete the current deepening project.

A Sampling and Analysis Plan (SAP) was implemented in 2016 to evaluate the suitability of sediments remaining in the federal channels for beach and/or nearshore placement. In addition, the beach and nearshore areas were evaluated for grain size and are typical of sandy beaches found in Southern California. The SAPR is attached as Appendix A. Concerns related to total PCB levels in the composite samples led to additional testing described in the SAPR. Although the composite samples were considered to be suitable for placement at Hueneme Beach, the USACE, in consultation with the USEPA, elected to manage sediment from five individual core locations within the harbor due to high PCB concentrations (up to 367 µg/kg) and the presence of excessive fine grained material in the individual cores. These five cores were deemed to be unacceptable for beach or nearshore placement, but are suitable for unconfined disposal within the harbor. Notes from discussion with the SC-DMMT are included in Appendix B.

The discovery of possible timber pile remnants while preparing construction drawings in the federal channel north of Wharf 1 led to the determination that the sediments in the area are unsuitable for beach nourishment due to potential debris issues associated with dredging in this area, but are considered to be suitable for nearshore placement provided sediments are screened as they are being placed into sediment scows to remove timber pile remnants.

3.2 MARINE RESOURCES

3.2.1 Port of Hueneme and Hueneme Beach.

3.2.1.1 Essential Fish Habitat Assessment. The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act set forth a number of new mandates for the National Marine Fisheries Service (NMFS), regional fishery management councils, and other federal agencies to identify and protect important marine and anadromous fish habitat. The Councils, with assistance from NMFS, are required to delineate essential fish habitat (EFH) for all managed species. The Act defines EFH as "...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Federal action agencies that fund, permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding the potential effects of their actions on EFH, and to respond in writing to their recommendations. Subsequent to completion of the Final EA (USACE 1999a), NMFS provided the USACE with updated information regarding requirements to assess EFH.

In the Pacific region, EFH has been identified for a total of 89 species covered by three fishery management plans (FMPs) under the auspices of the Pacific Fishery Management Council. Port of Hueneme Harbor and surrounding waters provide habitat for several of these species, including the northern anchovy (*Engraulis mordax*), Pacific sanddab (*Citharichthys sordidus*), and several species of rockfishes (*Sebastes* spp.) The harbor and adjacent habitats are not identified as important fish breeding or nursery areas. This section and Section 4.2.2 of this SEA constitute the USACE's EFH Assessment for the proposed federal action.

3.2.1.2 Invasive Marine Alga (*Caulerpa taxifolia*). *Caulerpa taxifolia* ("*Caulerpa*") is an invasive green alga native to tropical waters. *Caulerpa* was a popular salt-water aquarium plant until it was banned in 2001. In the summer of 2000, *Caulerpa* was discovered in two separate southern California coastal embayments: Agua Hedionda Lagoon in northern San Diego County and Huntington Harbor in Orange County. Huntington Harbor is approximately 100 miles south of Port of Hueneme, and Agua Hedionda is an additional 50 miles further south. *Caulerpa* poses a substantial threat to marine ecosystems in California, particularly to eelgrass meadows and other benthic environments. The National Marine Fisheries Service (NMFS) and the California Department of Fish and Wildlife (CDFW) established provisions to eradicate the infestation and to prevent the spread and introduction of this species into other systems along the California coast from Morro Bay to the U.S./Mexican border, including surveys of suitable habitat prior to underwater construction activities, such as dredging. The Approach Channel is considered to be too deep and too rough for *Caulerpa taxifolia*, however, the Entrance Channel and Turning Basin are considered to be suitable habitat. Neither the beach nor the nearshore placement area are considered to be suitable habitat.

3.2.1.3 Threatened and Endangered Species.

California least tern. The federally listed endangered California least tern (Sternula antillarum browni) is a migratory bird. California least terns predominately nest on coastal foredunes and other sites with gravelly or sandy substrate and sparse vegetation. Because terns would abandon nests if disturbed, they require nest areas relatively free of human disturbance and predators. The historical habitat of the California least tern has been significantly reduced and modified by human activities including marine and industrial development and residential development along beaches. This loss of habitat has resulted in small isolated breeding colonies that are vulnerable to local extirpation. Primary threats to California least tern populations include increased predation and recreation-related disturbances. California least terns arrive and move through the harbor area in late April and utilize nest areas in Ventura County from mid-May through August. Although nesting does not occur at the harbor, other areas in the region provide suitable habitat. These areas include Oxnard Beach and McGrath State Beach to the north and Ormond Beach and Naval Base Ventura County Point Mugu to the south. California least terns have been observed foraging at the harbor and can be expected to forage in waters offshore during the breeding season. Beaches within the harbor are not an important resting area for the species due to their limited spatial extent and the presence of human activity.

Western snowy plover. The western snowy plover (Charadrius nivosus nivosus) is federally listed as threatened. The threats associated with the decline in population include lower reproductive success caused by human disturbances, predation, and loss of suitable habitat from non-native plans and human development and disturbance. USFWS has designated critical habitat for this species but none has been designated in the project area. Western snowy plovers forage on open beaches above and below the mean high tide water lines and in salt pannes where they feed on insects and other invertebrates found on the sand, decomposing kelp, marine mammal carcasses, and fore dune vegetation. Western snowy plovers nest on dune-backed beaches, dry salt pannes in lagoons, and barrier beaches in scrapes adorned with shells and other collected debris.

Nesting usually begins by late March and fledging may extend into the end of September. Western snowy plovers are able to have multiple clutches during a nesting season. Western snowy plovers have not been observed to nest within the project area. Due to the disturbed nature of the beach and its narrow width and susceptibility to high tides, Hueneme Beach is not expected to support nesting western snowy plovers. Individuals may use the beach infrequently for foraging or resting during spring or fall migration and during winter. Therefore, it would be unlikely that the western snowy plover would be present in the project area.

Tidewater Goby & Southern California steelhead trout. The federally endangered tidewater goby (*Eucyclogobius newberryi*) and the Southern California Steelhead Trout (*Onchorhynchus mykiss*), Southern California Endangered Evolutionarily Significant Unit (ESU), are known to occur near the project vicinity. These species occur at river mouths and in estuarine areas. Port of Hueneme harbor has no river inlet; therefore, these species are not expected in the project area.

3.2.1.4 California Grunion. The California grunion (*Leuresthes tenuis*) is a member of the New World silversides family, Atheriniopsidae, along with the jacksmelt and topsmelt. They inhabit the nearshore waters from the surf to a depth of 60 feet. Grunion leave the water at night to spawn on beaches during the spring and summer months. For four consecutive nights, beginning on the nights of the full and new moons, spawning occurs after high tides and continues for several hours. As waves break on the beach, grunion swim as far up the slope as possible. The female arches her body and excavates the semi-fluid sand with her tail to create a nest. Twisting her body, she digs into the sand until half-buried with her head sticking out. She then deposits her eggs into the nest. Males curve around the female and release milt. The milt flows down the female's body until it reaches and fertilizes the eggs. As many as eight males may fertilize the eggs in a single nest. After spawning, the males immediately retreat toward the water while the female twists free and returns with the next wave. Spawning occurs from mid-March through late August. Peak spawning occurs from late March to early June. Receiving beaches are likely to be in an unsuitable condition to support grunion prior to beach nourishment.

3.2.1.5 Pismo Clam. Pismo clams (*Tivela stultorum*) are a state-listed sensitive species that were assessed in the Final EA (USACE, 1999b). However, they are no longer considered to be present at the beach and/or nearshore placement site and will not be considered further in this document. Surveys, included in the Environmental Commitments in 1999, would not be conducted.

3.3 LAND AND WATER USES

3.3.1 Port of Hueneme and Hueneme Beach. Land and water uses are as described in the Final EA (USACE, 1999b).

3.3.1.1 Unexploded Ordnance (UXO). Ordnance handling, surveillance, and maintenance are not a part of the U.S. Navy's mission at the Naval Base Ventura County

(NBVC). No historic observations of UXO have been reported at any time (Bechtel, 2001).

3.3.1.2 Installation Restoration (IR). The U.S. Navy is responsible for investigating and remediating contamination that resulted from historical U.S. Navy operations at NBVC - Port of Hueneme. The U.S. Navy portion of Port of Hueneme Harbor has been impacted by contamination from historical operations. The U.S. Navy has identified their portion of the harbor as IR Site 19. IR Site 19 included the U.S. Navy's berths in the northern section of the Turning Basin and the western side of the Approach Channel (outside the federal navigation portion).

The U.S. Navy began investigating IR Site 19 in 1985 with an initial assessment study. Subsequent investigations included a site inspection, risk evaluation, and remedial investigation (RI). The human health risk evaluation identified recreational fishermen who fish in the harbor as potential human receptors of contaminated sediments. However, because fishing is prohibited, the RI later determined that there are no complete exposure pathways to potential human receptors.

An Ecological Risk Assessment (ERA) was conducted during the RI for IR Site 19, and the nature and extent of chemicals in sediment was evaluated for three areas within the harbor. More than 40 samples were collected and analyzed for a variety of chemicals and their potential effect on ecological receptors. No chemicals were identified as COPCs, and the RI determined that the results indicate no unacceptable risk is posed to ecological receptors at Port of Hueneme Harbor. The U.S. Navy has proposed no further action at IRP Site 19 and is awaiting concurrence from the California Department of Toxic Substance Control (DTSC).

3.4 CULTURAL RESOURCES

3.4.1 Port of Hueneme and Hueneme Beach. Cultural resources are as described in the 1999 Final EA (USACE, 1999b) and Feasibility Report (USACE, 1999a). Construction of the harbor was begun in 1939 by local interests. The United States Government requisitioned Port of Hueneme from the OHD for the war effort but control over a portion of the port for commercial use was eventually returned. The cut off pilings from the 1938 wharf that was removed in the 1970s described in the 1999 Final EA were presumably removed by the OHD during the dredging operations conducted with the U.S. Navy in 2008. Past dredging activities precludes any shipwrecks being present within the project area.

The project area has been surveyed over the course of several past routine dredging and harbor improvement projects. Only one historic property is known to have existed near the project area. According to the *Integrated Cultural Resources Management Plan for Point Mugu and Port Hueneme Naval Base Ventura County, California, and Special Areas*, site CA-VEN-663 was first reported by Van Valkenberg in 1933 as a Late Prehistoric shell midden with associated mammal bone. Port of Hueneme Harbor was subsequently constructed in what is apparently the same area where Van Valkenberg indicated the site was located, although no map is known that illustrates exactly where the site was originally identified. At some point in time, Van Valkenberg reportedly suggested that the site had likely been heavily impacted or destroyed by the construction of the harbor channel in 1942. This seems likely, as the area has been inspected by various archaeologists numerous times in the past 35 years, and no clear evidence of the site remains (Pumphrey et al. 2013). If any fragment of the site still exists to either side of the harbor entrance, it would be buried under erosion protection and other U.S. Navy/OHD improvements.

3.5 TRANSPORTATION

3.5.1 Port of Hueneme and Hueneme Beach. Transportation and navigation are as described in the Final EA (USACE, 1999a).

3.6 AIR QUALITY

Port of Hueneme and Hueneme Beach. Air quality is as described in the 1999 Final EA (USACE, 1999a). The project is located within the Ventura County portion of the South Central Coast Air Basin (SCCAB) under the jurisdiction of the Ventura County Air Pollution Control District (VCAPCD). The quarry on Santa Catalina is located in the Los Angeles County portion of the South Coast Air Basin (SCAB) under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). A conformity determination is required for each criteria pollutant or precursor where the total of direct and indirect emissions of the criteria pollutant or precursor in a nonattainment or maintenance area caused by a Federal action would equal or exceed any of the rates specified in 40 CFR 93.153(b)(1). Total of direct and indirect emissions means the sum of direct and indirect emissions increases and decreases caused by the Federal action; i.e., the "net" emissions considering all direct and indirect emissions. The portion of emissions which are exempt or presumed to conform under § 93.153 (c), (d), (e), or (f) are not included in the "total of direct and indirect emissions." The "total of direct and indirect emissions" includes emissions of criteria pollutants and emissions of precursors of criteria pollutants.

Direct emissions include construction emissions. Indirect emissions means those emissions of a criteria pollutant or its precursors:

1. That are caused or initiated by the Federal action and originate in the same nonattainment or maintenance area but occur at a different time or place as the action;
2. That are reasonably foreseeable;
3. That the agency can practically control; and
4. For which the agency has continuing program responsibility.

Operational emissions, including ship emissions and cargo handling emissions, cannot be practically controlled by the USACE and are therefore not considered indirect emissions caused by the Federal action. Thus, this analysis is limited to construction emissions. The following measures are included in the description of each action alternative:

- Maintain equipment in tune per manufacturer's specifications.
- Utilize catalytic converters on gasoline-powered equipment.
- Use reformulated, low-emissions diesel fuel.
- Equipment would not be left idling for prolonged periods.
- Curtail (cease or reduce) construction during periods of high ambient pollutant concentrations (e.g., State 1 smog alerts).
- Reduce the number of pieces of equipment involved, where feasible

The most recent VCAPCD comprehensive publication regarding air quality assessment is the Ventura County Air Quality Assessment Guidelines (Guidelines) (VCAPCD, 2003). The Guidelines recommend significance thresholds for projects proposed in Ventura County. According to the Guidelines, projects that generate more than 25 pounds per day of reactive organic gases (ROG) and NOx may jeopardize attainment of the federal and state ozone standard, resulting in a significant impact on air quality. The 25 pounds per day threshold for ROG and NOx are not intended to be applied to construction emissions since such emissions are temporary.

The potential significance of temporary construction emissions is determined based on federal regulation for criteria pollutant emissions as described in the Final EA (USACE, 1999). The Ventura County portion of the SCCAB is in attainment for all federal criteria pollutants except is in serious nonattainment for the federal 8-hour ozone standard, which has an applicability rate of 50 tons per year. The Los Angeles County portion of the SCAB is in extreme nonattainment for the federal 8-hour ozone, nonattainment for suspended particulate matter (PM) 2.5, and in maintenance for PM10, nitrogen oxides (NOx), and carbon monoxide (CO). Within the SCAB, a federal action would conform to the State Implementation Plan if its annual emissions remain below 100 tons of CO or PM2.5, 70 tons of PM10, or 10 tons of NOx or volatile organic compounds (VOC).

Gases that trap heat in the atmosphere are often called greenhouse gases (GHG). GHGs are emitted by natural processes and human activities. Examples of GHGs that are produced both by natural processes and industry include carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O). Currently, there are no Federal standards for GHG emissions and no Federal regulations have been set at this time.

3.7 NOISE

3.7.1 Port of Hueneme and Hueneme Beach. Noise is as described in the Final EA (USACE, 1999a).

3.8 AESTHETICS

3.8.1 Port of Hueneme and Hueneme Beach. Aesthetic conditions are as described in the Final EA (USACE, 1999a).

4.0 ENVIRONMENTAL EFFECTS

The following analysis evaluates impacts associated with No Action Alternative, Alternative 2a (the Recommended Plan), and Alternatives 1, 2, 3, and 4. The Recommended Plan includes deepening the Approach Channel to -44 feet MLLW, and the Entrance Channel and Turning Basin to -40 feet MLLW, and placing approximately 390 kcy of dredged material at the disposal/placement sites under Option 1 described in Section 2. Channel depths and volumes of dredged material for the other alternatives are found in Section 2.2 of this Draft SEA. Deepening activities can occur with use of a combination of hydraulic cutterhead, hopper, or clamshell dredges. Material placement can be completed with on-shore or nearshore placement methods.

For material that is placed in the nearshore, either a hopper or clamshell dredge can be employed. If a hopper dredge is used, it picks up material by pulling a suction drag head along the bottom, where excavated material is stored on-board in a compartment called the vessel hopper. Once filled, the hopper dredge travels to the placement site where sediment is offloaded. A hopper dredge could not be used in the timber pile or rock revetment areas, but could be used to place sediments into the nearshore instead of on the beach. If a clamshell dredge is used, a barge-mounted crane retrieves excavated material and places it in a scow for transport by tug to the placement site. Following the sediment placement/ disposal, the barge is transported back to the dredge site for re-loading. Pier pilings would be pulled by the clamshell, if encountered. Pier piling materials would be removed prior to sediment placement/disposal.

For material that is placed onto the beach a hydraulic cutterhead would be used to remove sand that would be pumped through a pipeline onto the beach.

All action alternatives and disposal options require the use of a combination of equipment types. The most likely mix is the use of a large hydraulic dredge for dredging all areas with beach placement and the use of a clamshell dredge for all areas with in-harbor disposal or placement into the nearshore placement area. The use of a hopper dredge is unlikely, but the option is retained to allow bidders the maximum flexibility for doing the work. The hopper dredge would likely be paired with a clamshell dredge.

Project implementation is estimated at approximately 3 months, with an additional month required for mobilization and demobilization activities.

Since Alternatives 1 and 2 would involve less dredging and disposal and a shorter construction period than the Recommended Plan (2a), adverse impacts would be similar to but less than impacts for the Recommended Plan, and separate analyses have not been prepared. These alternatives would also provide fewer economic benefits than the Recommended Plan. Impacts of Alternatives 3 and 4 would have impacts similar to, but sometimes greater than the Recommended Plan. The main analysis of this section applies to the Recommended Plan, followed by Impacts of Alternatives, where they differ from the Recommended Plan.

4.1 OCEANOGRAPHY

4.1.1 No Action Alternative. Under the No Action Alternative, no construction activities related to the proposed project would occur. Selection of this alternative would minimize the potential for short- and long-term water quality impacts at the project area. However, since dredging and disposal activities would not occur, the 20,000 cy of unacceptable sediments would remain in the Federal Channels and would have the potential to be resuspended during storm events, resulting in future degradations to water quality. Periodic maintenance dredging of the channels would still occur as needed, but the unacceptable sediments would remain in place as the bulk of it lies below current authorized depths and the rest would be left in place due to a lack of a disposal location associated with the maintenance dredging effort.

4.1.2 Dredging Impacts

Recommended Plan. Impacts to water quality in the harbor during dredging would be essentially the same as described in the Final EA (USACE, 1999a) and would not be significant. Minor resuspension of contaminants in the water column, in addition to turbidity, may occur during the dredging of the unacceptable sediments. Water quality monitoring during dredging would evaluate if contaminants are resuspended during the dredging activities. Total PCB's are the contaminants of concern and are considered to be tightly bound to fine-grained sediments. Significant resuspension is not expected. Any exceedances would be controlled by modifying operations, shifting to a closed bucket, or using turbidity curtains. Impacts would extend over a period of four months. Sediments dredged from the timber pile removal area would necessitate dredging by clamshell with grizzly screens over the barge to separate large pieces of wood which would be properly disposed of as waste by the dredging contractor. Smaller pieces are expected to fall through the screen rendering but is not expected to significantly impact water or sediment quality. Impacts to oceanography would be less than significant.

Alternative 3. Impacts would be similar to the Recommended Plan, except that conditions of turbidity and resuspended sediments, and other water quality effects would occur over a period of approximately an additional two weeks. The difference in the harbor depth of 5 feet in the Approach Channel and one foot in the Entrance Channel and Turning Basin would not be significant.

Alternative 4. Impacts would be similar to the Recommended Plan, except that conditions of turbidity and resuspended sediments would occur over a period of approximately an additional month. The difference in the harbor depth of 5 feet in the Approach Channel and one foot in the Entrance Channel and Turning Basin would not be significant.

4.1.3 Disposal Impacts

4.1.3.1 Option 1, CAD Placement of Unacceptable Sediments.

Recommended Plan. Impacts to water quality during beach nourishment activities would be essentially the same as described in the Final EA (USACE, 1999b) and would not be significant. Minor resuspension of contaminants in the water column, in addition to turbidity, may occur during the disposal of the unacceptable sediments. Water quality monitoring during disposal operations would include monitoring for total PCB, the contaminant of concern, to ensure that water quality standards are not exceeded. Any exceedances would be controlled by modifying operations or using turbidity curtains. Impacts would extend over a period of four months. Impacts to oceanography are not expected to be significant.

Alternative 3. Impacts would be similar to the Recommended Plan, except that conditions of turbidity and resuspended sediments would occur over a period of approximately an additional two weeks

Alternative 4. Impacts would be similar to the Recommended Plan, except that conditions of turbidity and resuspended sediments would occur over a period of approximately an additional month.

4.1.3.2 Option 2, Trench Placement of Unacceptable Sediments.

Recommended Plan. Impacts to water quality during beach nourishment activities would be essentially the same as described in the Final EA (USACE, 1999a) and would not be significant. Additional dredging would be required to construct the trench, but would have the same impacts as the rest of the dredging discussed above. Minor resuspension of contaminants in the water column, in addition to turbidity, may occur during the disposal of the unacceptable sediments. Water quality monitoring during trench dredging and placement operations would include monitoring for total PCB, the contaminant of concern, to ensure that water quality standards are not exceeded. Any exceedances would be controlled by modifying operations, shifting to a closed bucket, or using turbidity curtains. Impacts would extend over a period of four months. In the long term, isolation of contaminated sediments from the harbor ecosystem would improve the quality of the benthic habitat and, to a lesser extent, the water column. Impacts to oceanography are not expected to be significant.

Alternative 3. Impacts would be similar to the Recommended Plan, except that conditions of turbidity and resuspended sediments would occur over a period of approximately an additional two weeks

Alternative 4. Impacts would be similar to the Recommended Plan, except that conditions of turbidity and resuspended sediments would occur over a period of approximately an additional month.

4.1.4 Rock Placement

Recommended Plan. Rock placement would utilize clean, quarry-run rock. Small amounts of localized turbidity may result from rock flour during placement. This is expected to be minor and highly localized and short term in duration. Impacts to oceanography are not expected to be significant.

Alternative 3. Impacts would be similar to the Recommended Plan, except that additional amounts of rock may be needed to accommodate the deeper depth.

Alternative 4. Impacts would be similar to the Recommended Plan, except that additional amounts of rock may be needed to accommodate the deeper depth.

4.2 MARINE RESOURCES

4.2.1 No Action Alternative. Under the No Action Alternative, no construction activities related to the proposed project would occur. However, since dredging and disposal activities would not occur, the 20,000 cy of unacceptable sediments would remain in the Federal Channels and would have the potential to continue to adversely impact benthic habitat and be accumulated in the local food chain, resulting in future degradations to biological resources, particularly benthic organisms. Periodic maintenance dredging of the channels would still occur as needed, but the unacceptable sediments would remain in place as the bulk of it lies below current authorized depths and the rest would be left in place due to a lack of a disposal location associated with the maintenance dredging effort.

4.2.2 Dredging Impacts

Marine Species and Habitats.

Recommended Plan. Impacts to marine resources in the harbor during dredging would be essentially the same as described in the Final EA (USACE 1999a) and would not be significant. Impacts would extend over a period of four months.

Alternative 3. Impacts would be similar to the Recommended Plan, except that impacts to marine resources would occur over a period of approximately an additional two weeks. The difference in the harbor depth of 5 feet in the Approach Channel and one foot in the Entrance Channel and Turning Basin would not be significant.

Alternative 4. Impacts would be similar to the Recommended Plan, except that impacts to marine resources occur over a period of approximately an additional month. The difference in the harbor depth of 5 feet in the Approach Channel and one foot in the Entrance Channel and Turning Basin would not be significant.

Invasive Marine Alga (*Caulerpa taxifolia*). Potential sources of *Caulerpa taxifolia* are more likely to be located in the inner harbor, in the Entrance Channel and the Turning Basin. The USACE would survey in the Entrance Channel and Turning Basin prior to any dredging. This is in accordance with the established *Caulerpa Control Protocol* (NMFS, 2008). The USACE would conduct Surveillance Level surveys for *Caulerpa taxifolia* in accordance with the *Caulerpa Control Protocol.*

Threatened and Endangered Species.

California Least Tern (*Sternula antillarum browni*). The USACE determined in the Final EA (USACE 1999a) that the Recommended Plan would have no effect on this species due to scheduling of all dredging, beach replenishment, and construction activities between October 1 and March 1, when the California least tern would not be present. Under the revised schedule, the anticipated commencement date for project construction may be as early as June 1, 2019 with an estimated construction period of four months. Dredging would occur in the harbor, which does not offer suitable nesting habitat. Dredging would result in short-term increases in noise and human activities and localized, short-term effects to water quality in the dredging area. Because the project area is routinely subject to elevated noise and activity of workers and equipment associated with common commercial and military practices, short-term project-related disturbances are not expected to significantly affect the foraging and resting of least terns. Because the project area is developed and similar resting and foraging habitats occur nearby, least terns would likely move to other nearby similar habitats and return when the project is complete. If dredging takes place during the nesting season and California least tern are present, turbidity associated with dredging would not affect the ability of least terns to feed in the nearshore environment. If dredging takes place outside the California least tern nesting season, the birds would not be present and there would be no affect. The proposed project would have no effect on the least tern for all action alternatives for any time interval.

Essential Fish Habitat Assessment.

Recommended Plan. Temporary displacement of fish, including some species covered under the Pacific Fishery Management Council's fishery management plans (FMPs), would occur during harbor deepening. Turbidity effects would be localized and temporary. No net loss of rocky intertidal, rocky subtidal, or soft-bottom fish habitat would occur. No significant long-term effects to fish foraging or spawning habitat would occur.

Construction activities are expected to have adverse, but not substantial adverse impacts to fish covered under the FMPs. Impacts would include noise, turbidity and mechanical effects of the dredge within the areas to be deepened.

Fish populations in the local area would be affected in several ways. Dredging would disperse benthic fish resting or feeding in the immediate dredge area. In some cases fish may be cut by the cutterhead mechanism or sucked into the dredge. Most fish would avoid the dredge area due to turbidity and noise, resulting in a temporary loss of habitat. Turbidity would limit visibility for sight-feeding fish, and these species would likely avoid the turbidity plume. Other species would be attracted to the site to forage on benthic organisms suspended by the dredging. Noise effects may be indirectly beneficial, causing fish to avoid the direct mechanical effects of the dredge. Noise would affect a relatively small area because short, high-intensity noises that can cause startle responses in fish are not expected to result from the proposed project.

Turbidity would be limited to near the immediate vicinity of the dredge site. The estimated turbidity plume associated with clamshell dredging of littoral materials composed primarily of fine sands in a harbor environment is estimated at about 100 feet from the point of dredging. Under conditions of strong tidal action, the turbidity plume may double or even triple, to a maximum of about 300 feet (Applied Environmental Technologies, Personal communication, 2000 in USACE 2000b). Dredging in the area of the five unacceptable cores involves dredging of sediments with elevated PCB levels. PCBs are generally tightly bound to fine sediments and are not expected to enter the water column during dredging or disposal. Water quality monitoring during dredging and disposal of these sediments would include monitoring for PCB levels to confirm that this is not an issue. To minimize turbidity, or if PCB levels in water become an issue, for the portions of the harbor that require a clamshell dredge, measures may be taken to reduce turbidity or PCB levels. Measures may include use of a closed bucket to reduce the amount of turbidity or a silt curtain to contain the turbidity within a small area around the dredge.

Cutterhead dredging operations normally generate smaller turbidity plumes than clamshell dredges. No significant resuspension of contaminants is expected. Sediment testing results indicate that concentrations of metals and organic chemicals in the sediments are low, and the potential for release from sediments resuspended during dredging would be negligible. Direct toxic effects to fish or bioaccumulation through the food chain are expected to be minimal. Impacts would not be significant because turbidity and other disturbance would be restricted to a small area around the dredge and beach replenishment sites, and recovery would occur within a few days after dredging stops and turbidity dissipates.

The USACE has determined that the proposed federal action would not have a substantial, adverse impact on Essential Fish Habitat (EFH).

Alternative 3. Impacts would be similar to the Recommended Plan, except that conditions of turbidity and resuspended sediments would occur over a period of approximately an additional two weeks. The difference in the harbor depth of 5 feet in the Approach Channel and one foot in the Entrance Channel and Turning Basin would not be significant by deepening the benthic habitat with a resulting diminution of light levels or result in potentially anoxic conditions.

Alternative 4. Impacts would be similar to the Recommended Plan, except that conditions of turbidity and resuspended sediments would occur over a period of approximately an additional month. The final difference in the harbor depth of 5 feet in the Approach Channel and one foot in the Entrance Channel and Turning Basin would not be significant by deepening the benthic habitat with a resulting diminution of light levels or result in potentially anoxic conditions.

4.2.3 Disposal Impacts

4.2.3.1 Option 1, CAD Placement of Unacceptable Sediments.

Marine Species and Habitats.

Recommended Plan. Impacts to marine species and habitats from beach nourishment activities would be essentially the same as described in the Final EA (USACE, 1999a). Placement of unacceptable sediments within the CAD would bury a portion of the existing CAD surface resulting in burial of benthic organisms. Recovery is expected to occur quickly given the large area of adjacent bottom that would not be affected that could recolonize the area. No significant introduction of contaminants into the food chain during disposal is anticipated; whereas, the relocation of the contaminants from their current location would benefit future populations of benthic organisms, including burrowing invertebrates that would recolonize the sites where unacceptable sediments are currently located. Impacts to marine resources and habitats would be less than significant.

Alternative 3. Impacts would be similar to the Recommended Plan, except that conditions of turbidity and resuspended sediments would occur over a period of approximately an additional two weeks. The difference in the volumes of sediments to be dredged would not be significant. Impacts to marine resources and habitats would be less than significant.

Alternative 4. Impacts would be similar to the Recommended Plan, except that conditions of turbidity and resuspended sediments would occur over a period of approximately an additional month. The difference in the volumes of sediments to be dredged would not be significant. Impacts to marine resources and habitats would be less than significant.

Invasive Marine Alga (*Caulerpa taxifolia*). The Surveillance Level surveys conducted in the Turning Basin would include the CAD site. Surveys in the beach nourishment placement sites is not necessary due to a lack of suitable habitat in these areas.

Threatened and Endangered Species.

California Least Tern (*Sternula antillarum browni*). The USACE determined in the Final EA (USACE 1999a) that the Recommended Plan would have no effect on this species due to scheduling of all dredging, beach replenishment, and construction activities between October 1 and March 1, when the California least tern would not be present. Under the revised schedule, the anticipated commencement date for project construction may be as early as June 1, 2019 with an estimated construction period of 3 months. If disposal takes place during the nesting season and California least tern are present, turbidity associated with sand placement in the surf zone or into the nearshore area would not affect the ability of least terns to feed in the nearshore environment. If dredging takes place outside the California least tern nesting season, the birds would not be present and there would be no affect. Disposal at the CAD site would occur in the harbor, which does not offer suitable nesting habitat. Disposal activities would result in short-term increases in noise and human activities and localized, short-term effects to water quality in the disposal area. Because the harbor is routinely subject to elevated noise and activity of workers and equipment associated with common commercial and military practices, short-term project-related disturbances are not expected to significantly affect the foraging and resting of least terns. Because the project area is developed and similar resting and foraging habitats occur nearby, least terns would likely move to other nearby similar habitats and return when the project is complete. The proposed disposal would have no effect on the least tern for all action alternatives for any time interval.

Western Snowy Plover (*Charadrius nivosus nivosus*). Hueneme Beach is highly eroded and exposed to high levels of human presence, making it unsuitable for nesting. Individuals may use the beach infrequently for foraging and nesting during spring or fall migration or during the winter. Because it is unlikely that the western snowy plover would be present in the project area, there would be no effect to this species for all action alternatives.

Pre-construction surveys would be conducted at Hueneme Beach prior to beach placement. Should snowy plovers be found on or adjacent to the beach placement site, monitors would be hired to direct the contractor to avoid affecting this species using proven methods concurred with by the USFWS during beach nourishment activities.

California Grunion. Placement would occur outside the spawning season for California grunion, so there would be no impacts to this species. Additionally, receiving beaches would likely be in an unsuitable condition to support grunion prior to beach nourishment. If placement during spawning season is necessary, a survey would confirm unsuitability or a monitoring and avoidance plan would be implemented if beaches are suitable habitat for spawning. Placement of sand into the surf zone reduces impacts to spawning grunion, which nest at the highest high tide line, which would be taken into consideration during preparation of any monitoring and avoidance plan, if needed. Impacts are expected to be less than significant.

Essential Fish Habitat Assessment.

Recommended Plan. Temporary displacement of fish, including some species covered under the Pacific Fishery Management Council's FMPs, would occur during disposal operations. Turbidity effects would be localized and temporary. No net loss of rocky intertidal, rocky subtidal, or soft-bottom fish habitat would occur. No significant long-term effects to fish foraging or spawning habitat would occur.

Disposal activities are expected to have adverse, but not substantial impacts to fish covered under the FMPs. Impacts would be primarily limited to burial and turbidity. Disposal of the material from the five unacceptable cores at the CAD site involves disposal of sediments with elevated PCB levels. PCBs are generally tightly bound to fine sediments and are not expected to enter the water column during disposal. Water quality monitoring during disposal of these sediments would include monitoring for PCB levels to confirm that this is not an issue.

Turbidity at the beach replenishment sites would be extensive; however, the turbidity level in the surf zone is naturally high, and the additional turbidity would not be significant. No significant resuspension of contaminants is expected. Sediment testing results indicate that concentrations of metals and organic chemicals in the sediments are low, and the potential for release from sediments resuspended during dredging would be negligible. Direct toxic effects to fish or bioaccumulation through the food chain are expected to be minimal. Impacts would not be significant because turbidity and other disturbance would be restricted to a small area around the beach replenishment and CAD sites, and recovery would occur within a few days after disposal stops and turbidity dissipates.

The USACE has determined that the proposed federal action would not have a substantial, adverse impact on EFH.

Alternative 3. Impacts would be similar to the Recommended Plan, except that conditions of turbidity and resuspended sediments would occur over a period of approximately an additional two weeks. The difference in the volumes of sediments to be disposed would not be significant.

Alternative 4. Impacts would be similar to the Recommended Plan, except that conditions of turbidity and resuspended sediments would occur over a period of approximately an additional month. The difference in the volumes of sediments to be disposed would not be significant.

4.2.3.2 Option 2, Trench Placement of Unacceptable Sediments.

Marine Species and Habitats.

Recommended Plan. Impacts to marine species and habitats from dredging, including construction of the trench and beach nourishment, would be essentially the same as described in the Final EA (USACE, 1999a) and would not be significant. Placement of unacceptable sediments within the trench and applying a cap would not result in burial of benthic organisms as they would have been removed during initial deepening of the trench area. Recovery is expected to occur quickly given the large area of adjacent bottom that would not be affected that could recolonize the area. No significant introduction of contaminants into the food chain during trench dredging is anticipated; whereas, the isolation of the contaminants from the ecosystem would benefit future populations of benthic organisms that would recolonize the sites where unacceptable sediments are currently located. Impacts to marine resources and habitats would be less than significant.

Alternative 3. Impacts would be similar to the Recommended Plan, except that conditions of turbidity and resuspended sediments would occur over a period of approximately an additional two weeks. The difference in the volumes of sediments to be disposed would not be significant. Impacts to marine resources and habitats would be less than significant.

Alternative 4. Impacts would be similar to the Recommended Plan, except that conditions of turbidity and resuspended sediments would occur over a period of approximately an additional month. The difference in the volumes of sediments to be disposed would not be significant. Impacts to marine resources and habitats would be less than significant.

Invasive Marine Alga (*Caulerpa taxifolia*). The Surveillance Level surveys conducted in the Turning Basin would include the trench site. Surveys in the beach nourishment placement sites is not necessary due to a lack of suitable habitat in these areas.

Threatened and Endangered Species.

California Least Tern (*Sternula antillarum browni*). The USACE determined in the Final EA (USACE 1999a) that the Recommended Plan would have no effect on this species due to scheduling of all dredging, beach replenishment, and construction activities between October 1 and March 1, when the California least tern would not be present. Under the revised schedule, the anticipated commencement date for project construction may be as early as June 1, 2019 with an estimated construction period of 3 months. If disposal takes place during the nesting season and California least tern are present, turbidity associated with sand placement in the surf zone or into the nearshore area would not affect the ability of least terns to feed in the nearshore environment. If dredging takes place outside the California least tern nesting season, the birds would not be present and there would be no affect. Trench dredging would occur in the harbor, which does not offer suitable nesting habitat. Dredging would result in short-term increases in noise and human activities and localized, short-term effects to water quality in the dredging area. Because the project area is routinely subject to elevated noise and activity of workers and equipment associated with common commercial and military practices, short-term project-related disturbances are not expected to significantly affect the foraging and resting of least terns. Because the project area is developed and similar resting and foraging habitats occur nearby, least terns would likely move to other nearby similar habitats and return when the project is complete. The proposed project would have no effect on the least tern for all action alternatives for any time interval.

Western Snowy Plover (*Charadrius nivosus nivosus*). Hueneme Beach is highly eroded and exposed to high levels of human presence, making it unsuitable for nesting. Individuals may use the beach infrequently for foraging and nesting during spring or fall migration or during the winter. Because it is unlikely that the western snowy plover would be present in the project area, there would be no effect to this species for all action alternatives.

Pre-construction surveys would be conducted at Hueneme Beach prior to beach placement. Should snowy plovers be found on or adjacent to the beach placement site, monitors would be hired to direct the contractor to avoid affecting this species using proven methods concurred with by the USFWS during beach nourishment activities.

California Grunion. Placement would occur outside the spawning season for California grunion, so there would be no impacts to this species. Additionally, receiving beaches would likely be in an unsuitable condition to support grunion prior to beach nourishment. If placement during spawning season is necessary, a survey would confirm unsuitability or a monitoring and avoidance plan would be implemented if beaches are suitable habitat for spawning. Placement of sand into the surf zone reduces impacts to spawning grunion, which nest at the highest high tide line, which would be taken into consideration during preparation of any monitoring and avoidance plan, if needed.

Essential Fish Habitat Assessment.

Recommended Plan. Temporary displacement of fish, including some species covered under the Pacific Fishery Management Council's FMPs, would occur during trench dredging operations and disposal activities. Turbidity effects would be localized and temporary. No net loss of rocky intertidal, rocky subtidal, or soft-bottom fish habitat would occur. No significant long-term effects to fish foraging or spawning habitat would occur.

Disposal activities are expected to have adverse, but not substantial impacts to fish covered under the FMPs. Impacts would be primarily limited to burial and turbidity. Disposal of the material from the five unacceptable cores in the trench involves disposing sediments with elevated PCB levels. PCBs are generally tightly bound to fine sediments and are not expected to enter the water column during disposal. Water quality monitoring during disposal of these sediments would include monitoring for PCB levels to confirm that this is not an issue.

Turbidity at the beach replenishment sites would be extensive; however, the turbidity level in the surf zone is naturally high, and the additional turbidity would not be significant. No significant resuspension of contaminants is expected. Sediment testing results indicate that concentrations of metals and organic chemicals in the sediments are low, and the potential for release from sediments resuspended during dredging would be negligible. Direct toxic effects to fish or bioaccumulation through the food chain are expected to be minimal. Impacts would not be significant because turbidity and other disturbance would be restricted to a small area around the beach replenishment sites, and recovery would occur within a few days after dredging stops and turbidity dissipates.

The USACE has determined that the proposed federal action would not have a substantial, adverse impact on EFH.

Alternative 3. Impacts would be similar to the Recommended Plan, except that conditions of turbidity and resuspended sediments would occur over a period of approximately an additional two weeks. The difference in the volumes of sediments to be disposed would not be significant.

Alternative 4. Impacts would be similar to the Recommended Plan, except that conditions of turbidity and resuspended sediments would occur over a period of approximately an additional month. The difference in the volumes of sediments to be disposed would not be significant.

4.2.4 Rock Placement

Recommended Plan. Rock placement would utilize clean, quarry-run rock. The addition of rock at the toe of the slope would convert soft-bottom habitat to rocky habitat along the 1,000 linear foot placement path. This is considered to be a beneficial impact increasing the diversity of the benthic community. Adjacent slope protection would be unaffected and the resulting increase in rocky habitat would be minor and at or near project depth limiting the introduction of aquatic vegetation to deeper water species that can tolerate low light levels. Lack of circulation and thus warmer waters should preclude kelp recruitment into this area. Impacts to marine resources and habitats would be less than significant.

Alternative 3. Impacts would be similar to the Recommended Plan, except that additional amounts of rock may be needed to accommodate the deeper depth. Impacts to marine resources and habitats would be less than significant.

Alternative 4. Impacts would be similar to the Recommended Plan, except that additional amounts of rock may be needed to accommodate the deeper depth. Impacts to marine resources and habitats would be less than significant.

4.3 LAND AND WATER USES

4.3.1 No Action Alternative. Under the No Action Alternative, no construction activities related to the proposed project would occur. Periodic maintenance dredging of the channels would still occur as needed, but the unacceptable sediments would remain in place as the bulk of it lies below current authorized depths and the rest would be left in place due to a lack of a disposal location associated with the maintenance dredging effort. This action would be on a smaller scale taking considerably less time and is expected to nourish downcoast beaches, improving recreational opportunities.

4.3.2 Dredging Impacts

Recommended Plan. Land and water use impacts would generally be as described for the Recommended Plan in the EA (USACE, 1999a). Impacts to land and water would be less than significant.

Alternative 3. Impacts would be similar to the Recommended Plan, except that the construction period would be extended over approximately additional two weeks.

Impacts to land and water would be less than significant.

Alternative 4. Impacts would be similar to the Recommended Plan, except that the construction period would be extended over approximately an additional one month. Impacts to land and water would be less than significant.

4.3.3 Disposal Impacts

4.3.3.1 Option 1, CAD Placement of Unacceptable Sediments.

Recommended Plan. Land and water use impacts related to beach nourishment would generally be as described for the Recommended Plan in the Final EA (USACE, 1999a). Nourished beaches would be available for recreational uses. Expansion of the current CAD would take place vertically only, approaching the design parameters of the original CAD. The current CAD allows for future deepening of the Port to a depth of -45 feet MLLW. Top of the CAD site would be at approximately -48 feet MLLW, so that future deepening to -45 feet MLLW, if proposed, would not be restricted. There are currently no plans for further deepening. Impacts to land and water would be less than significant.

Alternative 3. Impacts would be similar to the Recommended Plan. Impacts to land and water would be less than significant.

Alternative 4. Impacts would be similar to the Recommended Plan, except that, the top of the CAD site would be at approximately -46 feet MLLW. If the CAD is enlarged future deepening may be restricted to a depth 0f -44 feet MLLW. There are currently no plans for further deepening. Impacts to land and water would be less than significant.

4.3.3.2 Option 2, Trench Placement of Unacceptable Sediments.

Recommended Plan. Land and water use impacts related to beach nourishment would generally be as described for the Recommended Plan in the Final EA (USACE, 1999a). Nourished beaches would be available for recreational uses. If the trench is constructed future deepening may be restricted to -40 feet MLLW. Overdepth allowances in this area may be limited for future maintenance dredging operations if the trench is used as proposed for the deepening project. Limitations would be based on the final surface elevation of the cap with no overdepth allowance allowed to extend into the cap. There are currently no plans for further deepening. Impacts to land and water would be less than significant.

Alternative 3. Impacts would be similar to the Recommended Plan. The trench would be deeper to accommodate the larger volume of sediments to be disposed of in the trench, but the limitations would be the same. There are currently no plans for further deepening. Impacts to land and water would be less than significant.

Alternative 4. Impacts would be similar to the Recommended Plan. The trench would be deeper to accommodate the larger volume of sediments to be disposed of in the trench, but the limitations would be the same. There are currently no plans for further deepening. Impacts to land and water would be less than significant.

4.3.4 Rock Placement

Recommended Plan. Rock placement would utilize clean, quarry-run rock. Rock placement would occur along the toe of the eastern slope of the Entrance Channel and would not be visible. This should have no effect on land/water uses. Impacts to land and water would be less than significant.

Alternative 3. Impacts would be similar to the Recommended Plan. Impacts to land and water would be less than significant.

Alternative 4. Impacts would be similar to the Recommended Plan. Impacts to land and water would be less than significant.

4.4 CULTURAL RESOURCES.

4.4.1 No Action. Under the No Action Alternative, no activities would occur as a result of this proposed federal action. Thus, the No Action Alternative would have no potential to affect historic properties. Periodic maintenance dredging of the channels would still occur as a separate undertaking subject to separate analysis.

4.4.2 All Action Alternatives (1, 2, 2a, 3, 4). Copies of consultation letters are included in Appendix F. Effects to cultural resources were previously evaluated for the five action alternatives in the Final EA (USACE, 1999a). Alternative 2a, the Recommended Plan in this SEA, proposes to dredge to a slightly deeper depth than Alternative 2, which is mainly attributable to rounding the conversion of metric units to English units. Further, Alternative 2a does not extend to the depths considered for Alternatives 3 and 4. A broader range of material disposal options is being considered than was proposed in the 1999 Final EA, but the footprint of the dredging and disposal areas are the same as have been used for previous dredging events.

Consultation between the USACE and the State Historic Preservation Officer (SHPO) in support of the 1999 Final EA considered deepening the harbor to the currently proposed depth. In a letter to the SHPO dated February 22, 1999, the USACE consulted on deepening the harbor to a depth of -14.5 meters MLLW, which is the equivalent of approximately 47.5 feet. The south channel trench currently being considered could be accommodated within the dredge depth of -14.5 meters MLLW previously considered.

In the same letter from 1999, the USACE proposed both directly nourishing Hueneme Beach and placing the sediment in the nearshore placement area for distribution by natural wave action. This letter also specifically referred to a 1994 consultation (COE940926F dated October 5, 1994) in which SHPO concurred that the continuation of the USACE's program of maintenance harbor dredging every 2 years and the use of the nearshore disposal area to indirectly nourish Hueneme Beach would not affect historic properties. This letter also discloses that any remaining cut off timber pilings from the pier that was demolished in the 1970s would be removed by the dredging. The SHPO concurred that no historic properties would be affected by the proposed activities ("will not involve National Register listed or eligible properties") by countersigning the USACE's letter on March 23, 1999.

The USACE conducted additional consultation with the SHPO in 2000 regarding a proposed jetty repair project that would include additional dredging and sediment disposal. In a letter dated February 9, 2000, the USACE determined that both the east and west jetties are ineligible for the National Register of Historic Places (NRHP) and suggested that dredging the harbor, excavating adjacent to the east jetty, and repairing the jetties would have no adverse effect on historic properties. The SHPO replied in a letter dated March 28, 2000 (COE940926F) that the proposed project, specifically including harbor deepening, would have no effect on historic properties.

The U.S. Navy has also consulted on dredging and disposal activities associated with Port of Hueneme. In a letter to the SHPO dated April 3, 2008, the U.S. Navy proposed to conduct maintenance dredging, beach nourishment, and to establish the CAD site for contaminated sediments. (The USACE documented its participation in planning and constructing the CAD in the 2008 Final SEA [USACE, 2008].) In that letter, the U.S. Navy disclosed that site CA-VEN-663 had been previously identified within the boundary of the Harbor but that the site had likely been destroyed by development of the Harbor. Because the proposed project dredging would occur within the constructed harbor, the U.S. Navy concluded that the area of potential effect (APE) was outside the site boundary. In a letter dated May 20, 2008 (USN080414A), the SHPO concurred with the U.S. Navy's determination that their proposed project would have no adverse effect on historic properties. That project was subsequently implemented and the CAD created.

The consultation history documents that all aspects of each action alternative have been considered previously. The jetties have been determined ineligible for inclusion in the NRHP, and the SHPO has concurred that altering them would have no effect on historic properties. The USACE and U.S. Navy have consulted with the SHPO repeatedly regarding dredging, deepening of the harbor, and disposal of material by placing it directly on Hueneme Beach, placing it in the nearshore disposal area, and burying it in the CAD area. Past consultations between the USACE and the SHPO have concluded that no historic properties would be affected by these various activities. However, the USACE was unaware that any portion of site CA-VEN-663 could still be extant near the project area during those past consultations. The U.S. Navy has concluded that no portion of the site could have survived within the constructed harbor, so there are no historic properties within the area of potential effect. However, given the lingering ambiguity regarding the site, the U.S. Navy and the SHPO agreed in 2008 that a final determination of no adverse effect to historic properties was appropriate for dredging, beach nourishment, and creating the CAD. After discussing the consultation history with the U.S. Navy cultural resources staff, the USACE agrees that the determination of no adverse effect to historic properties that resulted from the most recent consultation with the SHPO is appropriate. The determination of no adverse effect to historic properties is applicable to all action alternatives, including 2a.

4.5 TRANSPORTATION

4.5.1 Transportation and navigation are as described in the Final EA (USACE, 1999a).

4.6 AIR QUALITY

4.6.1 No Action Alternative. Under the No Action Alternative, no construction activities related to the proposed project would occur. Periodic maintenance dredging of the channels would still occur as needed, subject to separate analysis.

4.6.2 Dredging Impacts

Recommended Plan. Air quality impacts would generally be as described for the Recommended Plan in the Final EA (USACE, 1999a). Air emissions associated with the federal action would actually be reduced on a daily basis due to the introduction and required use of more advanced emissions controls on all equipment. Emissions associated with the federal action were recalculated due to the use of new air emissions technologies associated with dredging and sediment placement activities. Construction sequencing was done to allow for the use of a single piece of construction equipment at a time to minimize impacts to navigation within the harbor. Tables 5 and 6 includes the total project emissions calculated for dredging, sediment placement/disposal, and rock transport and placement. Table 11 includes the daily emissions levels common to all action alternatives. Calculations and assumptions can be found in Appendix E. Air emissions are below applicability rates for purposes of air quality conformity determination. Therefore, impacts are less than significant.

Table 5. Total Project Construction Emissions Ventura County – Recommended Plan

	Tons/year				
Recommended Plan	**ROG**	**CO**	**NOx**	**SOx**	**PM10**
Trench Option					
Hydraulic dredge (dredging & disposal)[1]	0.1836	0.2052	0.4014	0.1663	0.0104
Clamshell dredge (dredging & disposal)	0.3500	0.2269	1.2431	0.4285	0.2114
Clamshell Dredge (rock placement)	0.2800	0.1815	0.9944	0.3428	0.1691
Tug boat-rock barge (rock transport)	0.0091	0.1033	0.1641	0.0002	0.0048
Total	0.8228	0.7169	2.8030	0.9378	0.3957
CAD Option					
Hydraulic dredge (dredging & disposal)	0.1836	0.2052	0.4014	0.1663	0.1242
Clamshell dredge (dredging & disposal)	0.1960	0.1271	0.6961	0.2400	0.1184
Clamshell Dredge (rock placement)	0.2800	0.1815	0.9944	0.3428	0.1691
Tug boat-rock barge (rock transport)	0.0091	0.1033	0.1641	0.0002	0.0048
Total	0.6687	0.6171	2.2560	0.7493	0.4165
Applicability Rate	**50**		**50**		

Notes: 1 – disposal emissions include bulldozer emission for beach placement of dredged materials.

Table 6. Total Project Construction Emissions Los Angeles County – Recommended Plan						
	Tons/year					
Recommended Plan	**ROG**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**
Tug boat-rock barge (rock transport)	0.0045	0.0517	0.0820	0.0001	0.0024	0.0022
Applicability Rate	**10**	**100**	**10**		**70**	**100**

Alternative 3. Impacts would be similar to the Recommended Plan, except that air quality effects would occur over a period of approximately an additional two weeks. Daily project emissions are the same as for the Recommended Plan; total project emissions are shown in Tables 7 and 8. Calculations and assumptions can be found in Appendix E. Air emissions are below applicability rates for purposes of air quality conformity determination. Therefore, impacts are less than significant.

Table 7. Total Project Construction Emissions Ventura County – Alternative 3					
	Tons/year				
Recommended Plan	**ROG**	**CO**	**NOx**	**SOx**	**PM10**
Trench Option					
Hydraulic dredge (dredging & disposal)[1]	0.2193	0.2451	0.4795	0.1987	0.1484
Clamshell dredge (dredging & disposal)	0.4481	0.2904	1.5911	0.5485	0.2706
Clamshell Dredge (rock placement)	0.2800	0.1815	0.9944	0.3428	0.1691
Tug boat-rock barge (rock transport)	0.0091	0.1033	0.1641	0.0002	0.0048
Total	**0.9565**	**0.8204**	**3.2291**	**1.0901**	**0.5929**
CAD Option					
Hydraulic dredge (dredging & disposal)	0.2193	0.2451	0.4795	0.1987	0.1484
Clamshell dredge (dredging & disposal)	0.2380	0.1543	0.8453	0.2914	0.1438
Clamshell Dredge (rock placement)	0.2800	0.1815	0.9944	0.3428	0.1691
Tug boat-rock barge (rock transport)	0.0091	0.1033	0.1641	0.0002	0.0048
Total	**0.7465**	**0.6842**	**2.4832**	**0.8330**	**0.4660**
Applicability Rate	**50**		**50**		
Notes: 1 – disposal emissions include bulldozer emission for beach placement of dredged materials.					

Table 8. Total Project Construction Emissions Los Angeles County – Alternative 3						
	Tons/year					
Recommended Plan	**ROG**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**
Tug boat-rock barge (rock transport)	0.0045	0.0517	0.0820	0.0001	0.0024	0.0022
Applicability Rate	**10**	**100**	**10**		**70**	**100**

Alternative 4. Impacts would be similar to the Recommended Plan, except that except that air quality effects would occur over a period of approximately an additional month. Daily project emissions are the same as for the Recommended Plan; total project emissions are shown in Tables 9 and 10. Calculations and assumptions can be found in Appendix E. Air emissions are below applicability rates for purposes of air quality conformity determination. Therefore, impacts are less than significant.

Table 9. Total Project Construction Emissions Ventura County – Alternative 4					
	Tons/year				
Recommended Plan	**ROG**	**CO**	**NOx**	**SOx**	**PM10**
Trench Option					
Hydraulic dredge (dredging & disposal)[1]	0.2907	0.3249	0.6356	0.2633	0.1967
Clamshell dredge (dredging & disposal)	0.6021	0.3903	2.1380	0.7370	0.3637
Clamshell Dredge (rock placement)	0.2800	0.1815	0.9944	0.3428	0.1691
Tug boat-rock barge (rock transport)	0.0091	0.1033	0.1641	0.0002	0.0048
Total	**1.1819**	**1.0000**	**3.9321**	**1.3434**	**0.7342**
CAD Option					
Hydraulic dredge (dredging & disposal)	0.2907	0.3249	0.6356	0.2633	0.1967
Clamshell dredge (dredging & disposal)	0.3220	0.2087	1.1436	0.3942	0.1945
Clamshell Dredge (rock placement)	0.2800	0.1815	0.9944	0.3428	0.1691
Tug boat-rock barge (rock transport)	0.0091	0.1033	0.1641	0.0002	0.0048
Total	**0.9019**	**0.8185**	**2.9377**	**1.0006**	**0.5651**
Applicability Rate	**50**		**50**		
Notes: 1 – disposal emissions include bulldozer emission for beach placement of dredged materials.					

Table 10. Total Project Construction Emissions Los Angeles County – Alternative 4						
	Tons/year					
Recommended Plan	**ROG**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**
Tug boat-rock barge (rock transport)	0.0045	0.0517	0.0820	0.0001	0.0024	0.0022
Applicability Rate	**10**	**100**	**10**		**70**	**100**

Table 11. Daily Project Emissions

Equipment Type	**Emissions**				
Daily Project Emissions (pounds per day)	**ROG**	**CO**	**NOx**	**SOx**	**PM10**
Clamshell dredge (dredge, disposal, and rock placement)	28.0	18.2	99.4	34.3	16.9
Hydraulic dredge (dredge & disposal)	10.2	11.4	22.3	9.2	6.9

4.6.3 Disposal Impacts

4.6.3.1 Option 1, CAD Placement of Unacceptable Sediments.

Recommended Plan. Emissions associated with disposal/placement are included in Tables 5 and 6. Total project emissions are below applicability rates for purposes of air quality conformity determination. Therefore, impacts are less than significant.

Alternative 3. Impacts would be similar to the Recommended Plan, except that air quality effects would occur over a period of approximately an additional two weeks. Total project emissions are shown in Tables 7 and 8. Calculations and assumptions can be found in Appendix E. Total project emissions are below applicability rates for purposes of air quality conformity determination. Therefore, impacts are less than significant.

Alternative 4. Impacts would be similar to the Recommended Plan, except that air quality effects would occur over a period of approximately an additional month. Total project emissions are shown in Tables 9 and 10. Calculations and assumptions can be found in Appendix E. Total project emissions are below applicability rates for purposes of air quality conformity determination. Therefore, impacts are less than significant.

4.6.3.2 Option 2, Trench Disposal of Unacceptable Sediments.

Recommended Plan. Emissions associated with disposal/placement are included in Tables 5 and 6. Total project emissions are below applicability rates for purposes of air quality conformity determination. Therefore, impacts are less than significant.

Alternative 3. Impacts would be similar to the Recommended Plan, except that air quality effects would occur over a period of approximately an additional two weeks. Total project emissions are shown in Tables 7 and 8. Calculations and assumptions can be found in Appendix E. Total project emissions are below applicability rates for purposes of air quality conformity determination. Therefore, impacts are less than significant.

Alternative 4. Impacts would be similar to the Recommended Plan, except that air quality effects would occur over a period of approximately an additional month. Total project emissions are shown in Tables 9 and 10. Calculations and assumptions can be found in Appendix E. Total project emissions are below applicability rates for purposes of air quality conformity determination. Therefore, impacts are less than significant.

4.6.4 Rock Placement

Recommended Plan. Emissions associated with transportation and placement are included in Tables 5 and 6. Total project emissions are below applicability rates for purposes of air quality conformity determination. Therefore, impacts are less than significant.

Alternative 3. Impacts would be similar to the Recommended Plan, except that additional amounts of rock may be needed to accommodate the deeper depth. Therefore, impacts are less than significant.

Alternative 4. Impacts would be similar to the Recommended Plan, except that additional amounts of rock may be needed to accommodate the deeper depth. Therefore, impacts are less than significant.

4.6.5 Air Quality Conformity Determination. Under all alternatives, the total direct and indirect emissions associated with the Federal action would not equal or exceed applicability rate as specified at 40 CFR 93.153(b) for 8-hour ozone in Ventura County or the applicability rates for 8-hour ozone, CO, PM 2.5, PM10, or NOx in Los Angeles County. Therefore, a general conformity determination is not required.

4.6.6 Green House Gas Emissions. GHG emissions were estimated for all activities associated with the federal action and are disclosed in Table 12. Calculations are shown in Appendix E.

Table 12. GHG Emissions

Alternative	Total Equivalent CO2 (tons)
Alternative 2a	
Trench Option	1.4
CAD Option	1.1
Alternative 3	
Trench Option	1.6
CAD Option	1.2
Alternative 4	
Trench Option	2.0
CAD Option	1.5

4.7 NOISE

4.7.1 No Action Alternative. Under the No Action Alternative, no construction activities related to the proposed project would occur. Periodic maintenance dredging of the channels would still occur as needed, subject to separate analysis.

4.7.2 Dredging Impacts

Recommended Plan. Noise impacts were previously evaluated in the Final EA (USACE 1999a). The proposed modifications would not disturb any additional area; dredging activities would take place in the same footprint using equipment previously assessed. Impacts would occur over approximately four months. Therefore, no additional impact would occur. Impacts to noise would be less than significant.

Alternative 3. Impacts would be similar to the Recommended Plan, except that noise effects would occur over a period of approximately an additional two weeks. Impacts to noise would be less than significant.

Alternative 4. Impacts would be similar to the Recommended Plan, except that except that noise effects would occur over a period of approximately an additional month. Impacts to noise would be less than significant.

4.7.3 Disposal Impacts.

4.7.3.1 Option 1, CAD Placement of Unacceptable Sediments.

Recommended Plan. Noise impacts were previously evaluated in the Final EA (USACE 1999a) for beach nourishment activities. In-port disposal at the CAD site would be by bottom-dump barges, which would generate no more noise than a transiting barge previously assessed. Impacts would occur over approximately four months. Therefore, no additional impact would occur. Impacts to noise would be less than significant.

Alternative 3. Impacts would be similar to the Recommended Plan, except that noise effects would occur over a period of approximately an additional two weeks. Impacts to noise would be less than significant.

Alternative 4. Impacts would be similar to the Recommended Plan, except that except that noise effects would occur over a period of approximately an additional month. Impacts to noise would be less than significant.

4.7.3.2 Option 2, Trench Disposal of Unacceptable Sediments.

Recommended Plan. Noise impacts were previously evaluated in the Final EA (USACE 1999a) for beach nourishment activities. In-port trench construction and disposal at the trench site would be by bottom-dump barges, which would generate no more noise than a transiting barge previously assessed. Dredging impacts to construct the trench would be the same as dredging in the federal channels and would be indiscernible from those impacts. Impacts would occur over approximately four months. Therefore, no additional impact would occur. Impacts to noise would be less than significant.

Alternative 3. Impacts would be similar to the Recommended Plan, except that noise effects would occur over a period of approximately an additional two weeks. Impacts to noise would be less than significant.

Alternative 4. Impacts would be similar to the Recommended Plan, except that except that noise effects would occur over a period of approximately an additional month. Impacts to noise would be less than significant.

4.7.4 Rock Placement

Recommended Plan. Noises associated with rock placement would be similar to dredging with the clamshell picking up rocks off of a barge and depositing them on the slope as needed. Impacts would occur over approximately one month. Impacts are less than significant.

Alternative 3. Impacts would be similar to the Recommended Plan, except that additional amounts of rock may be needed to accommodate the deeper depth. Therefore, impacts are less than significant.

Alternative 4. Impacts would be similar to the Recommended Plan, except that additional amounts of rock may be needed to accommodate the deeper depth. Therefore, impacts are less than significant.

4.8 AESTHETICS.

4.8.1 No Action Alternative. Under the No Action Alternative, no construction activities related to the proposed project would occur. Periodic maintenance dredging of the channels would still occur as needed, subject to separate analysis.

4.8.2 Recommended Plan. Aesthetics impacts for the dredge area and beach disposal were previously evaluated in the Final EA (USACE, 1999a). Aesthetic impacts would occur in the nearshore area that is used for recreational purposes year-round and has a high level of visible sensitivity. Impacts would be associated with nearshore sediment placement. There would be sporadic disruption to the visual character of the area while placement activities occur. Because disposal equipment would be the dominant element in the viewshed to an observer on the beach or pier adjacent to this work. Disposal equipment would only be visible for approximately 30 minutes per disposal event with roughly 4-6 disposal events per day, many occurring at night; otherwise no equipment would be present at the nearshore placement site. Although the character of the viewshed would be altered periodically by the introduction of such equipment over the project duration, no residual aesthetic impacts would result. Impacts are less than significant.

4.8.3 Alternative 3. Impacts would be similar to the Recommended Plan, except that aesthetic impacts would occur over a period of approximately an additional two weeks.

4.8.4 Alternative 4. Impacts would be similar to the Recommended Plan, except that except that aesthetic impacts would occur over a period of approximately an additional month.

4.8.5 Rock Placement. Rock placement would utilize clean, quarry-run rock. Rock placement would occur along the toe of the slope of the Entrance Channel and would not be visible. This should have no effect on aesthetics outside of construction when the equipment would be visible for a short term. Impacts are less than significant.

5. CUMULATIVE IMPACT ANALYSIS

NEPA requires that cumulative impacts of the proposed action be analyzed and disclosed. Cumulative impacts are impacts on the environment that would result from the incremental effect of the proposed action when combined with other past, present, and reasonably foreseeable planned and proposed actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. Geographic scope of this analysis is the Port of Hueneme Harbor and the beach and nearshore areas.

Subsequent to completion of the Feasibility Report (USACE 1999b), it was recognized that deepening of all five berths along the two wharves would be necessary to fully realize all project benefits. The original, authorized project only included a deepening of Berths 1 and 5. In order to take full advantage of the channel deepening, OHD would dredge Berths 1 & 2 to match the deepened channels allowing deeper draft ships to safely tie up to unload. Deepening the berths would require that the wharves be strengthened at Berths 1, 2 and 3 to be structurally capable of standing adjacent to deepened berths. Similar improvements are anticipated by OHD to be made to Berths 4 and 5 in the future for the same reasons. Improvements to Berths 3, 4, and 5 would occur after the deepening project is completed and would not contribute to the cumulative impacts associated with project construction.

Impacts from berth dredging would be similar to impacts from federal channel dredging and would occur either before or after, but likely not concurrently due to the increased risk to navigation. Those impacts would lengthen the time of construction of the overall project without exceeding significance criteria for any impact areas. Impacts from wharf strengthening would occur prior to berth dredging to ensure that deepened berths would not result in wharf failure and would be minor in overall effect. USACE Regulatory is responsible for preparing NEPA documentation to support its permit decision. No significant impacts are expected (USACE 2018b).

Past activities, such as dredging, placement of fill material, and construction of harbor facilities, have reduced the physical and biological aquatic resource functions present in this area, as compared to natural undisturbed areas. Elevated noise levels and vessel traffic cause ongoing disturbances in the project vicinity. Past impacts within and adjacent to the harbor also include negative impacts to air quality. Thus, the project area has been affected by past activities and continues to be similarly disturbed.

The USACE has concluded that the cumulative impacts of projects, including maintenance, reconstruction, and upgrades, from current project and reasonably foreseeable future actions in the proximity of Port of Hueneme and Hueneme Beach would be highly localized and would not significantly affect the quality of the existing human environments.

6.0 ENVIRONMENTAL COMMITMENTS. All Environmental Commitments specified in the Final EA (USACE 1999a), with the exception of Environmental Commitments 7.9.2.1, 7.9.2.3, 7.9.3, 7.9.7, and 7.9.8, shall remain in effect unless modified in this section. The specified Environmental Commitments have been deleted. All impacts are less than significant, therefore no mitigation measures are proposed.

6.1 OCEANOGRAPHY

6.1.1 Water Quality Monitoring. [Revised Environmental Commitment 7.9.1] Standard water quality monitoring for dredging and placement activities would occur throughout the project. The standard water quality monitoring program for dredging and placement of dredged sediments would be revised to include water sampling for PCB's during dredging and placement of all sediments as this is a contaminant of concern for this harbor. Control measures would be implemented if needed, including modifications to the dredging cycle, use of a closed bucket, or placement of silt curtains.

6.2 MARINE RESOURCES

6.2.1 California Grunion (*Leuresthes tenuis*). [Revised Environmental Commitment 7.9.2.2] For placement activities that occur on Hueneme Beach between March 15 and September 1, the USACE would prepare a monitoring and avoidance plan in consultation with the National Marine Fisheries Service (NMFS) and the California Department of Fish and Wildlife (CDFW). Alternatively, the USACE could monitor the placement site during predicted grunion runs and continue the placement operations unmodified if no grunion spawn at the site or if the site is unsuitable for grunion spawning. Placement of sand into the surf zone reduces impacts to spawning grunion, which nest at the highest high tide line, which would be taken into consideration during preparation of any monitoring and avoidance plan, if needed.

6.2.2 *Caulerpa taxifolia*. [New Environmental Commitment] Prior to dredging the harbor, the USACE would conduct Surveillance Level surveys for *Caulerpa taxifolia,* an invasive species of green seaweed native to tropical waters, that has been identified in two Southern California locations (Orange County and northern San Diego County) in the Entrance Channel and Turning Basin only. Surveys shall be completed not earlier than 90 days prior to the commencement of dredging and not later than 30 days prior to the onset of work. Surveys would systematically sample at least 20% of the bottom of the entire area to be dredged to assure that widespread occurrences of *Caulerpa taxifolia* would be identified if present. Surveys would be accomplished using diver transects, remote cameras, or acoustic surveys with visual ground truthing. The USACE would submit survey results in standard format to NMFS/CDFW within 15 days of completion. If *Caulerpa* is identified during the surveys, the USACE would contact NMFS/CDFW within 24 hours of first noting the occurrence. In the event that *Caulerpa* is detected, maintenance dredging would be delayed until such time as the infestation has been isolated, treated and the risk of spread from the proposed action eliminated. In the event that NMFS/CDFW determines that the risk of *Caulerpa taxifolia* infestation has been eliminated or substantially reduced, the requirement for *Caulerpa taxifolia* surveys may be rescinded, or the frequency or level of detail of surveys may be decreased.

6.2.3 Western snowy plover (*Charadrius nivosus nivosus*). [New Environmental Commitment] Pre-construction surveys would be conducted at Hueneme Beach prior to beach placement into the surf zone. Should snowy plovers be found on or adjacent to the beach placement site, USACE would initiate informal consultation with USFWS and would prepare a monitoring and avoidance plan to include monitors who would be hired to direct the contractor to avoid affecting this species using proven methods concurred with by the USFWS during beach nourishment activities.

6.3 CULTURAL RESOURCES

6.3.1 Inadvertent Discoveries. [Revised Environmental Commitment 7.9.4]In the event that previously unknown cultural resources are discovered during the project, all ground disturbing activities shall immediately cease within 100 feet of the discovery until the USACE has met the requirement of 36 CFR 800.13 regarding post-review discoveries. The USACE shall evaluate the eligibility of such resources for listing on the National Register of Historic Places and propose actions to resolve any anticipated adverse effects. Work shall not resume in the area surrounding the potential historic property until the USACE re-authorizes project construction.

6.3.2 Human Remains. [New Environmental Commitment] In the event of accidental discovery of human remains, all construction activities shall be halted immediately, and the USACE archaeologist and the Ventura County Coroner must be notified. The coroner would determine whether the remains are of forensic interest. If human remains, funerary objects, sacred objects, or items of cultural patrimony are encountered during the proposed project, the treatment and disposition of such remains would be carried out in compliance with the Native American Graves Protection and Repatriation Act (Public Law 101-601; 25 U.S.C. 3001 et seq.) and EP 1130-2-540, Chapter 6.

6.4 AIR QUALITY

The following replaces environmental commitment 7.9.6. These measures would be implemented by the USACE to further reduce air quality impacts:

- Maintain equipment in tune per manufacturer’s specifications.
- Utilize catalytic converters on gasoline-powered equipment.
- Use reformulated, low-emissions diesel fuel.
- Equipment would not be left idling for prolonged periods.
- Curtail (cease or reduce) construction during periods of high ambient pollutant concentrations (e.g., State 1 smog alerts).
- Reduce the number of pieces of equipment involved, where feasible

7.0 ENVIRONMENTAL COMPLIANCE. Updated information regarding compliance with environmental laws, regulations, and statutes is provided in this section. Information for those laws, regulations, and statutes with no change in status from the Final EA (USACE 1999a) is not repeated in this SEA.

7.1 Magnuson-Stevens Fishery Conservation and Management Act. This SEA assesses EFH as required by the Magnuson-Stevens Act. Although construction would occur within EFH, the USACE has determined that this project would not result in a substantial, adverse impact. In compliance with the coordination and consultation requirements of the Magnuson-Stevens Act, this Draft SEA, which includes the USACE's EFH Assessment, will be sent to NMFS for their review and comment and submittal of EFH Conservation Recommendations. The Final SEA will include a written response to any comments or recommendations that may be received from NMFS.

7.2 Clean Water Act (Section 404) and River and Harbor Act of 1899 (Section 10). Section 404 of the CWA (33 U.S.C. 1344) governs the discharge of dredged or fill material into waters of the U.S. Although the USACE does not process and issue permits for its own activities, the USACE authorizes its own discharges of dredged or fill material by applying all applicable substantive legal requirements, including public notice, opportunity for public hearing, and application of the section 404(b)(1) guidelines. Pursuant to 33 CFR 323.2(d)(3)(ii), Section 404 authorization is not required for incidental movement of dredged material occurring during normal dredging operations. The USACE's draft 404(b)(1) evaluation for its proposed disposal of dredged material and placement of rock revetment into waters of the United States is included in Appendix C.

Section 10 of the Rivers and Harbors Act approved March 3, 1899, (33 U.S.C. 403), prohibits the unauthorized obstruction or alteration of any navigable water of the United States. The construction of any structure in or over any navigable water of the United States, the excavating from or depositing of material in such waters, or the accomplishment of any other work affecting the course, location, condition, or capacity of such waters is unlawful unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of the Army. The Final Feasibility Report (USACE 1999b) authorizes the project and serves as the compliance documentation of the project with Section 19 of the Rivers and Harbors Act.

7.3 Clean Water Act (Section 401). Section 401 requires state certification or waiver thereof for discharges affecting waters of the United States prior to construction. The USACE would obtain water quality certification or deem a waiver as applicable.

7.4 Endangered Species Act. Under ESA Section 7(a)(2), each federal agency must ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of the species' designated critical habitat (16 U.S.C. § 1536(a)(2)). If an agency determines that its actions "may affect" a listed species or its critical habitat, the agency must conduct informal or formal consultation, as appropriate, with either the

USFWS or the NMFS, depending on the species at issue (50 C.F.R. §§402.01, 402.14(a)–(b)). If, however, the action agency independently determines that the action would have "no effect" on listed species or critical habitat, the agency has no further obligations under the ESA.

The proposed federal action under Alternative 2a, disposal option 1, as analyzed herein, would not affect any federally listed endangered or threatened species, or their designated critical habitat, and consultation under Section 7 of the ESA is not required.

7.5 Clean Air Act. The project is located within the Ventura County portion of the SCCAB under the jurisdiction of the VCAPCD. Santa Catalina Island is located within the Los Angeles County portion of the SCAB under the jurisdiction of the SCAQMD..A conformity determination is required for each criteria pollutant or precursor where the total of direct and indirect emissions of the criteria pollutant or precursor in a nonattainment or maintenance area caused by a Federal action would equal or exceed any of the applicability rates specified in 40 CFR 93.153(b)(1). Ventura County is only in nonattainment (serious) for 8-hour ozone. The Los Angeles County portion of the SCAB is in extreme nonattainment for the federal 8-hour ozone, nonattainment for PM2.5, and in maintenance for PM10, NOx, and CO. As shown in Tables 5 and 6 above, the total direct and indirect emissions associated with the federal action under the Recommendation Plan are not expected to equal or exceed the applicability rates specified at 40 CFR 93.153(b). A general conformity determination is not required. Therefore, the project is consistent with the SIP and meets the requirements of Section 176(c) of the CAA.

7.6 Coastal Zone Management Act of 1972. Section 307 of the CZMA states that federal activities within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs. The California Coastal Act is this state's approved coastal management program applicable to the federal action. To document the degree of consistency with the state program, the CZMA requires the preparation of a coastal consistency determination (CD) whenever a federal activity affects coastal resources. The CD declares that the actions that comprise the proposed Federal Action are activities that are consistent to the maximum extent practicable with the approved State management program, as specified Section 307(c)(l) of the CZMA. On May 11, 1999, the CCC concurred with the USACE's CD (CCC reference number CD-030-99). In accordance with 15 CFR 930.46, for proposed Federal agency activities that were previously determined by CCC to be consistent with the management program, but which have not yet begun, the USACE is required to further coordinate with the CCC and prepare a supplemental consistency determination if the proposed activity would affect any coastal use or resource substantially different than originally described. The USACE has determined this project remains consistent to the maximum extent practicable with the California Coastal Act of 1976, Chapter 3, Coastal Resources Planning and Management Policies as amended February 1982. The USACE has requested concurrence from the CCC.

7.7 National Historic Preservation Act of 1966. Section 106 of the NHPA requires Federal agencies to take into account the effects of undertakings they carry out, assist, fund, or permit on historic properties and to provide the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. Federal agencies meet this requirement by completing the Section 106 process set forth in the implementing regulations, "Protection of Historic Properties," 36 C.F.R. Part 800. The goal of the Section 106 process is to identify and to consider historic properties that might be affected by an undertaking and to attempt to resolve any adverse effects through consultation.

The consultation history documents that all aspects of each action alternative within the APE have been considered previously. The jetties have been determined ineligible for inclusion in the NRHP, and the SHPO has concurred that altering them would have no effect on historic properties. The USACE and U.S. Navy have consulted with the SHPO repeatedly regarding dredging, deepening of the harbor, and disposal of material by placing it directly on Hueneme Beach, placing it in the nearshore disposal area, and burying it in the CAD area or trench. Past consultations between the USACE and the SHPO have concluded that no historic properties would be affected by these various activities. However, the USACE was unaware that any portion of site CA-VEN-663 could still be extant near the project area during those past consultations. The U.S. Navy has concluded that no portion of the site could have survived within the constructed harbor, so there are no historic properties within the area of potential effect. However, given the lingering ambiguity regarding the site, the U.S. Navy and the SHPO agreed in 2008 that a final determination of no adverse effect to historic properties was appropriate for dredging, beach nourishment, and creating the CAD. After discussing the consultation history with the U.S. Navy cultural resources staff, the USACE agrees that the determination of no adverse effect to historic properties that resulted from the most recent consultation with the SHPO is appropriate. The determination of no adverse effect to historic properties is applicable to all action alternatives, including 2a. SHPO affirmed their concurrence with the USACE determination that alternative 2a would have no adverse effect on historic properties in a letter dated November 6, 2018. If previously unknown cultural resources are identified during project implementation, all activity would cease until requirements of 36 CFR 800.13, Discovery of Properties During Implementation of an Undertaking, are met.

7.8 Executive Order 12898. Environmental Justice. E.O. 12898 focuses Federal attention on the environment and human health conditions of minority and low-income communities and calls on agencies to achieve environmental justice as part of its mission. The order requires the USEPA and all other Federal agencies (as well as state agencies receiving Federal funds) to develop strategies to address this issue as part of the NEPA process. The agencies are required to identify and address, as appropriate, any disproportionately high and adverse human health or environmental impacts of their programs, policies, and activities on minority and low-income populations. The order makes clear that its provisions apply fully to programs involving Native Americans. The CEQ has oversight responsibility for the Federal government's compliance with E.O. 12898 and NEPA. The CEQ, in consultation with the USEPA and other agencies, has developed guidance to assist Federal agencies with their NEPA procedures so that environmental justice concerns are effectively identified and addressed. According to the CEQ's Environmental Justice Guidance Under the National Environmental Policy Act, agencies should consider the composition of the affected area to determine whether minority populations or low-income populations are present in the area affected by the proposed action, and if so whether there may be disproportionately high and adverse human health or environmental impacts (CEQ 1997). The proposed project is in compliance. There would be no impacts resulting from the proposed project that would result in disproportionately high and adverse impacts to minority and low income communities.

8.0 PREPARERS AND REVIEWERS

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Elizabeth Moriarty, Office of Counsel
Tiffany Troxel, Office of Counsel
Travis Bone, Archeologist

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Figures

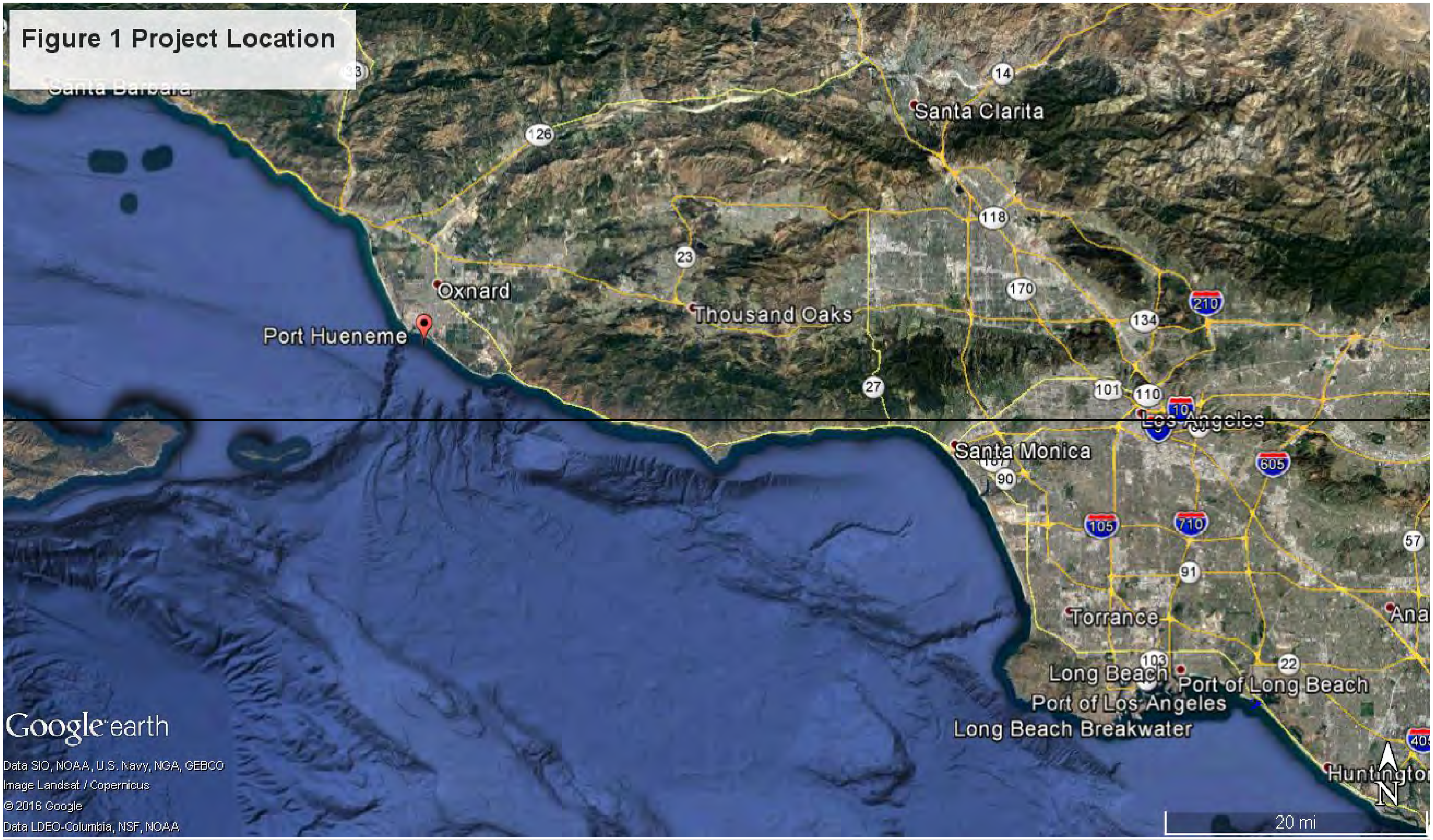
Figure 1 Project Location
Santa Barbara
Santa Clarita
Oxnard
Port Hueneme
Thousand Oaks
Los Angeles
Santa Monica
Torrance
Long Beach
Port of Long Beach
Port of Los Angeles
Long Beach Breakwater
Google earth
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
© 2016 Google
Data LDEO-Columbia, NSF, NOAA
20 mi
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Figure 2 Navy Installation Property Boundary Map

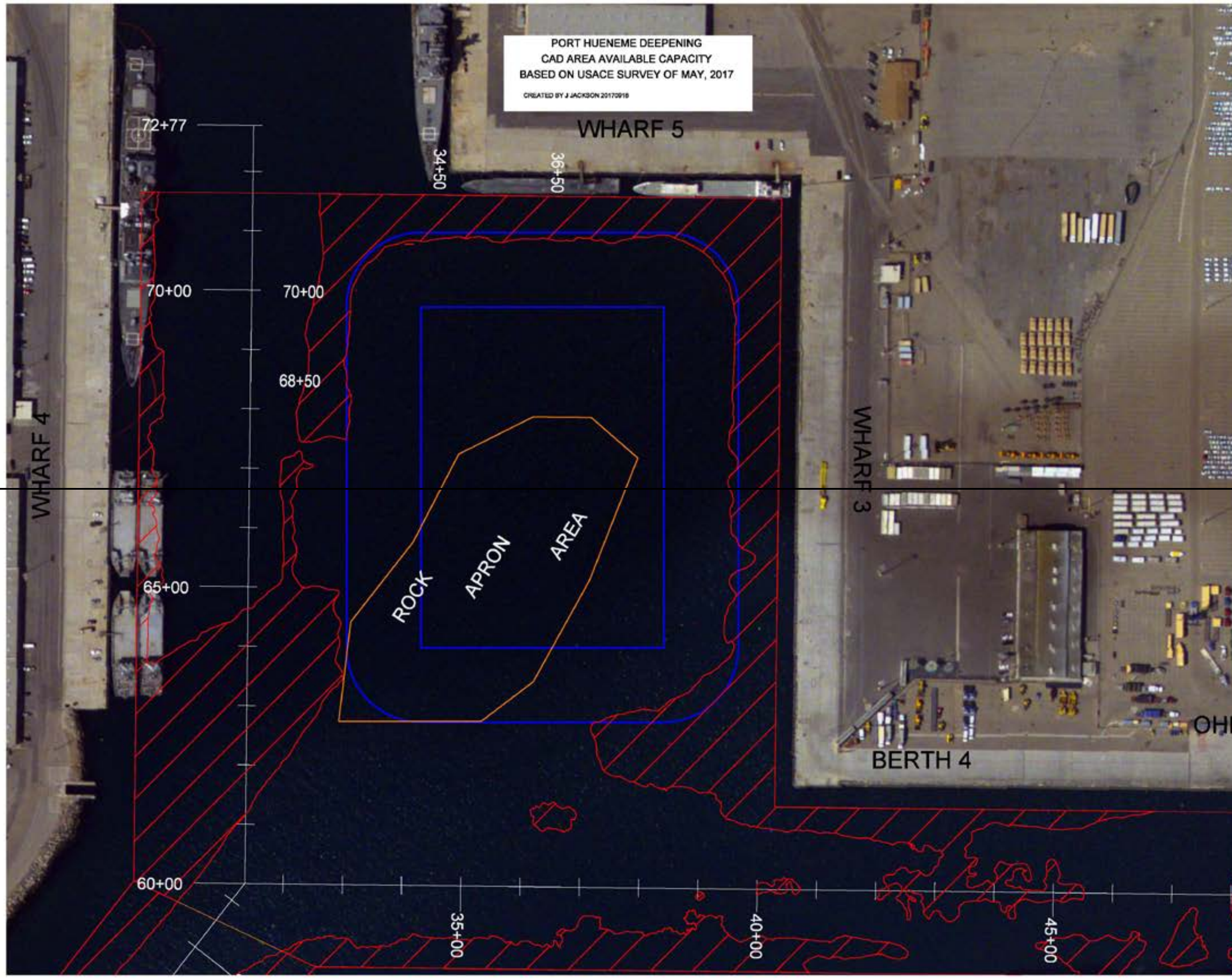


Figure 3. Port Hueneme Confined Aquatic Disposal (CAD) Site.

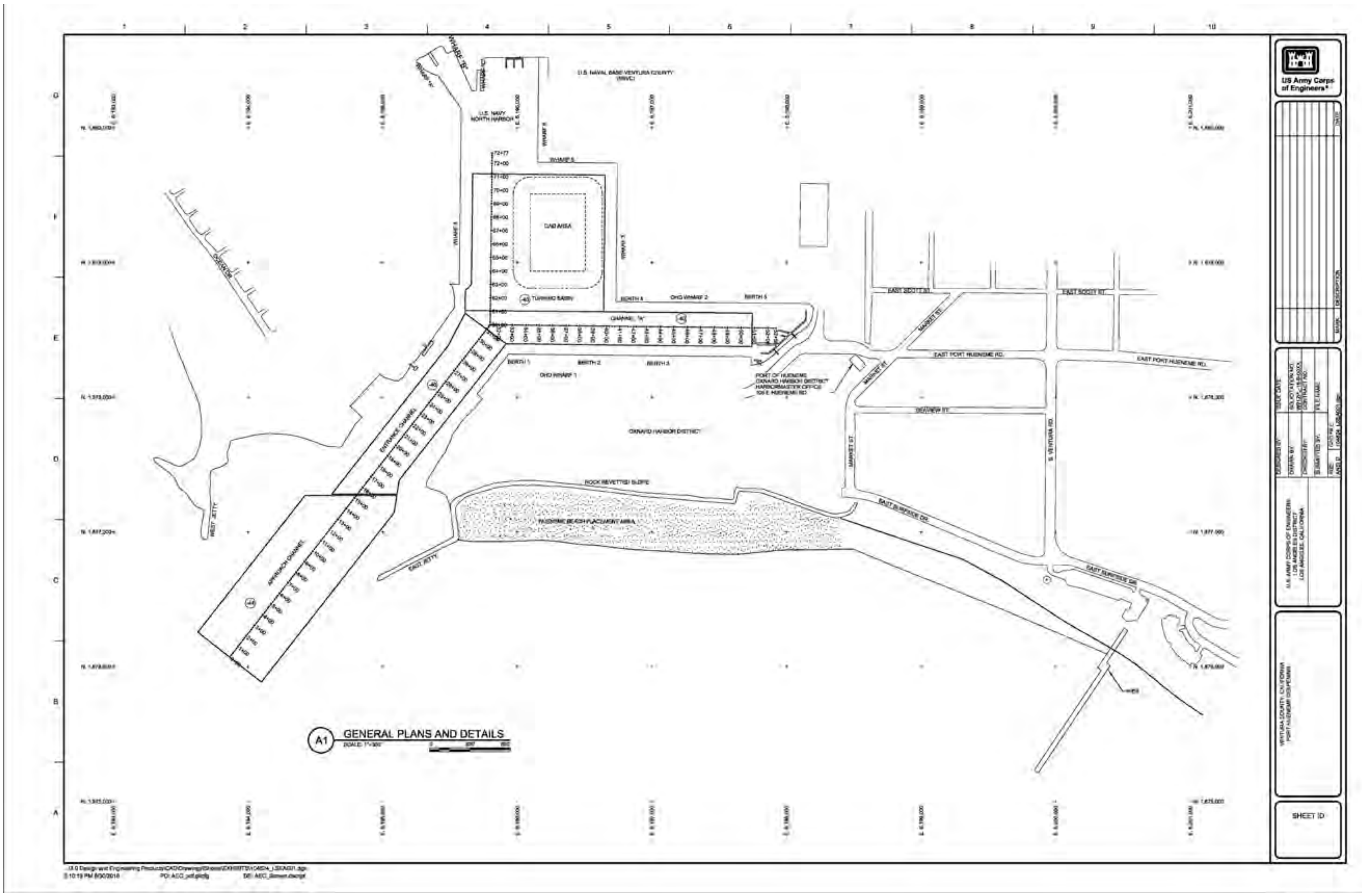


Figure 4. Federal Channels and Oxnard Harbor District Berths

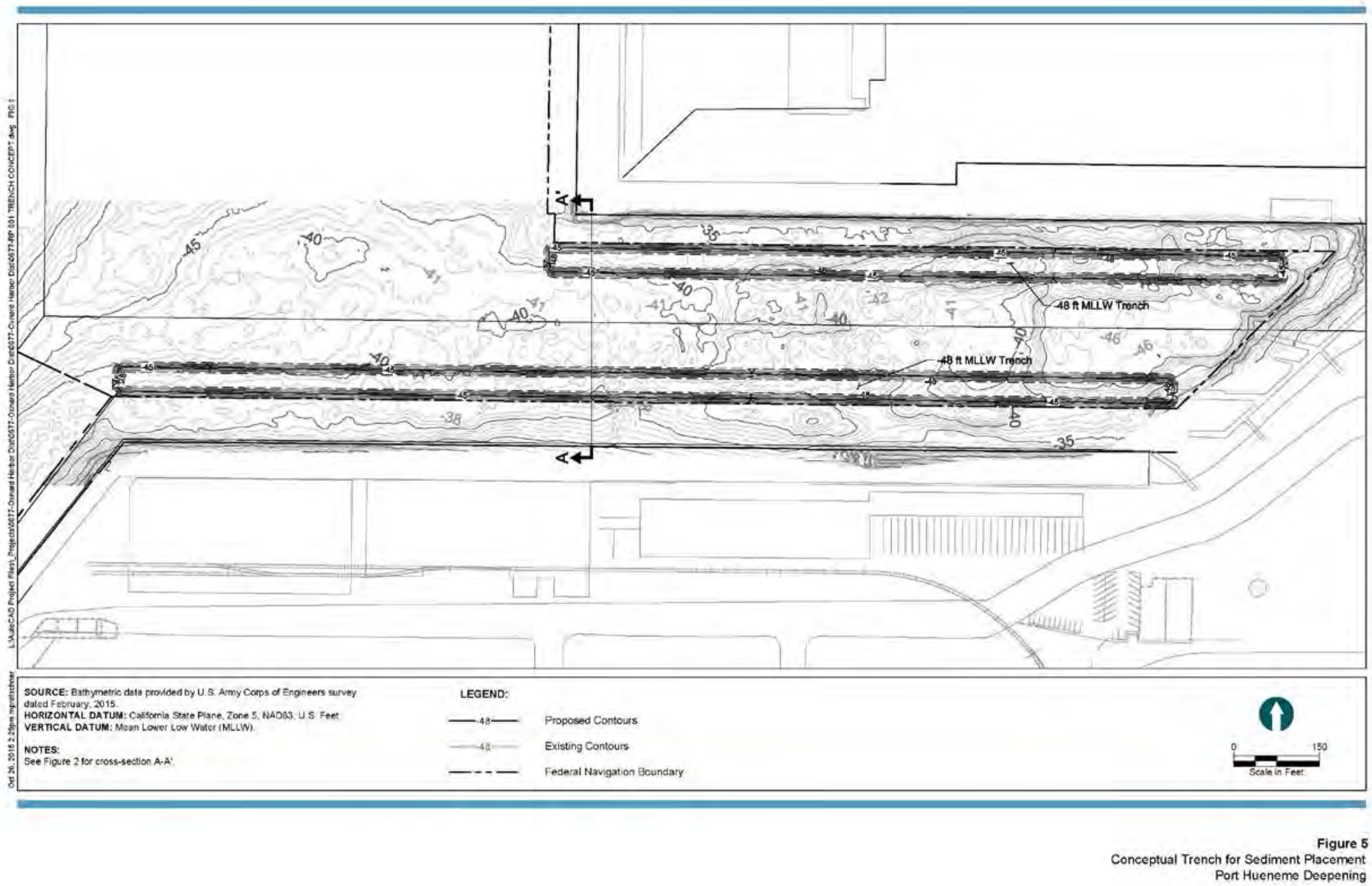


Figure 5. Conceptual Trenches

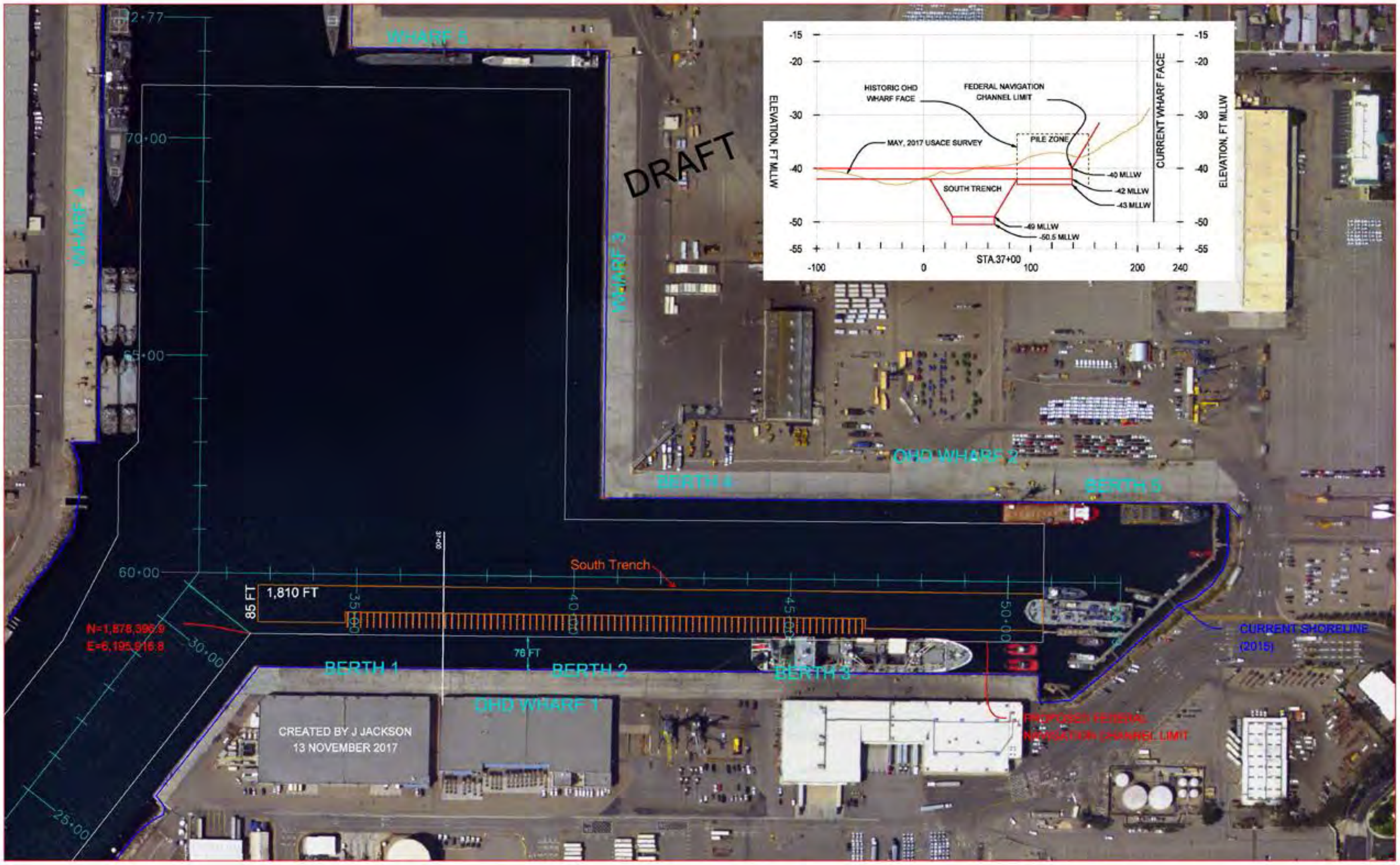


Figure 6. Wharf 1 Pile Area

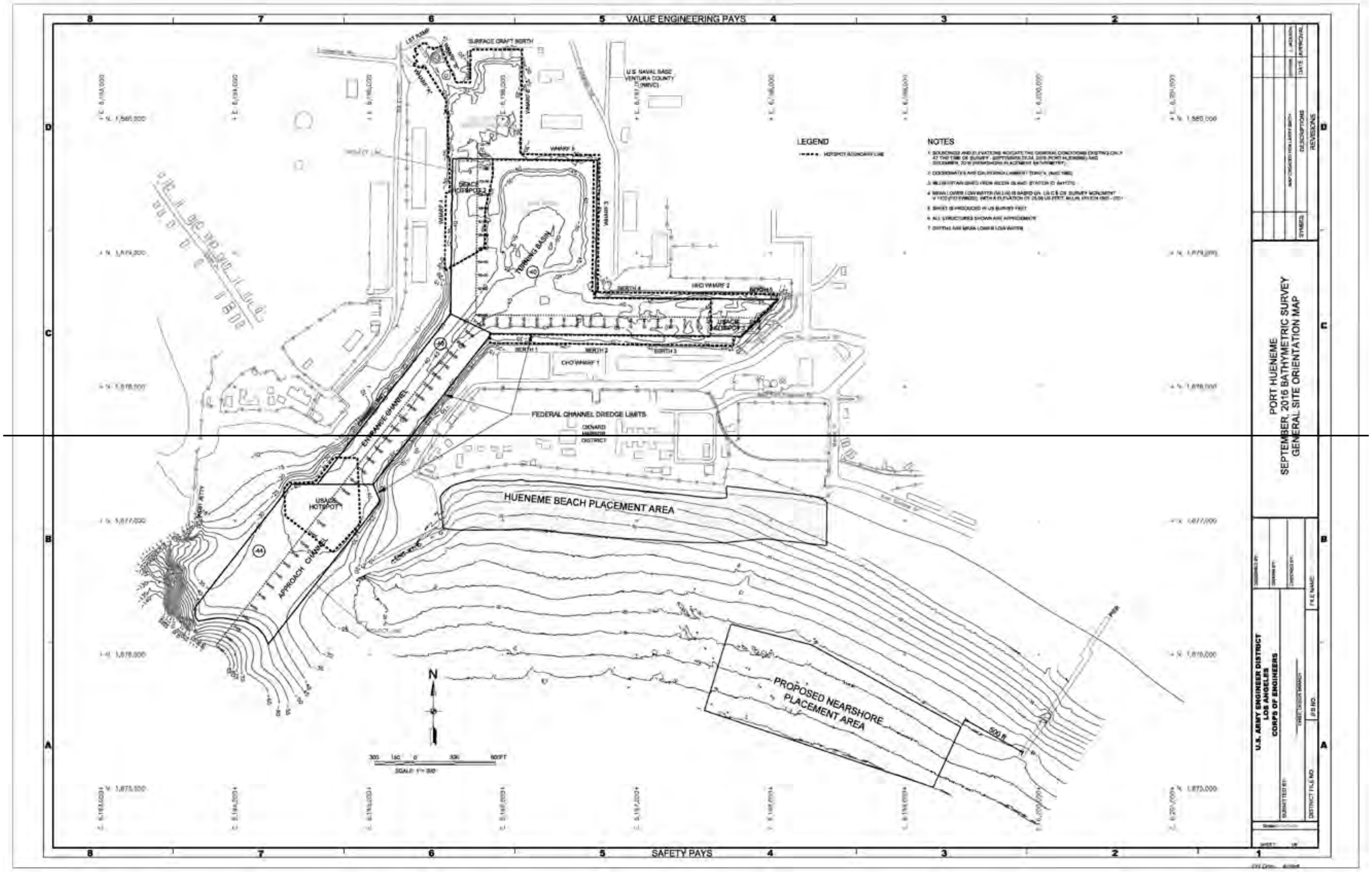
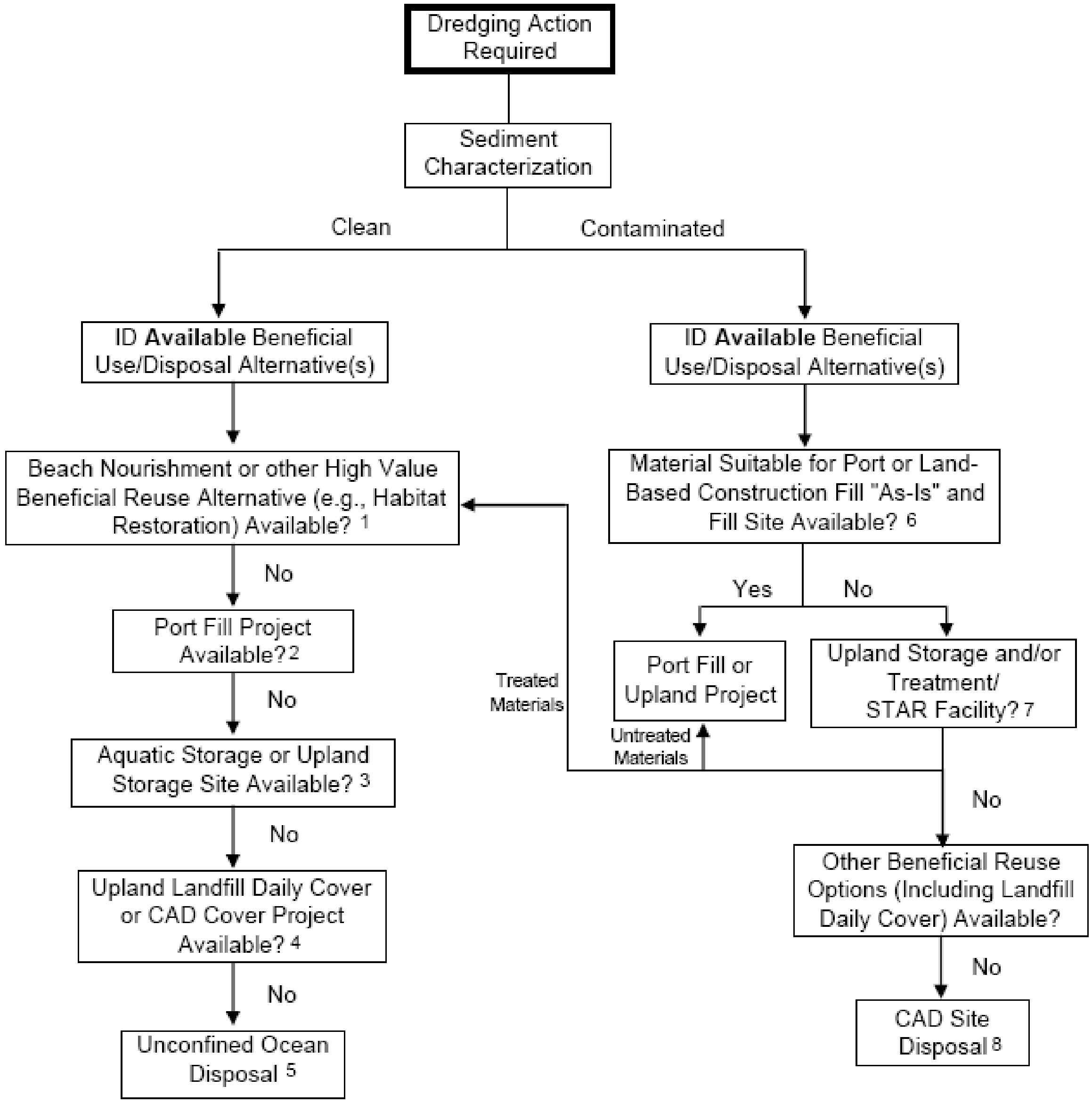


Figure 7. Port Hueneme Federal Channels and Beach and Nearshore Placement Sites

Figure 8. Port Hueneme Federal Channels. Red areas require dredging, remaining areas are at project depth or below and do not require dredging. Slope protection shown as blue line.



Notes:
1. Assumes that materials are chemically suitable and physically compatible for specific beneficial use alternative.
2. Assumes no near term sources of contaminated material (including material stored at Treatment, Storage, and Reuse (TSR) sites suitable for constructed fill which would be precluded from inclusion in the Port fill by these clean materials. Contaminated materials suitable for construction fill have priority over clean material.
3. Storage for future beneficial reuse at a designated unconfined aquatic site or upland site. Storage sites managed to prevent contamination of clean stored material.
4. Use of contaminated materials for upland daily cover has priority over use of clean material.
5. Assumes no less environmentally damaging practicable alternative, including other beneficial uses, are available.
6. Assumes coordination of dredge and fill schedules.
7. TSR site provides storage until constructed fill project becomes available, or treatment to transform material to be suitable for constructed fill.
8. Assumes no documented near term need for fill material (i.e., schedule dredging activity to coincide with fill project); assumes no available TSR capacity; assumes no other practicable beneficial reuse opportunities available.

Figure 9. Los Angeles Contaminated Sediment Task Force (CSTF) Sediment Management Decision Tree

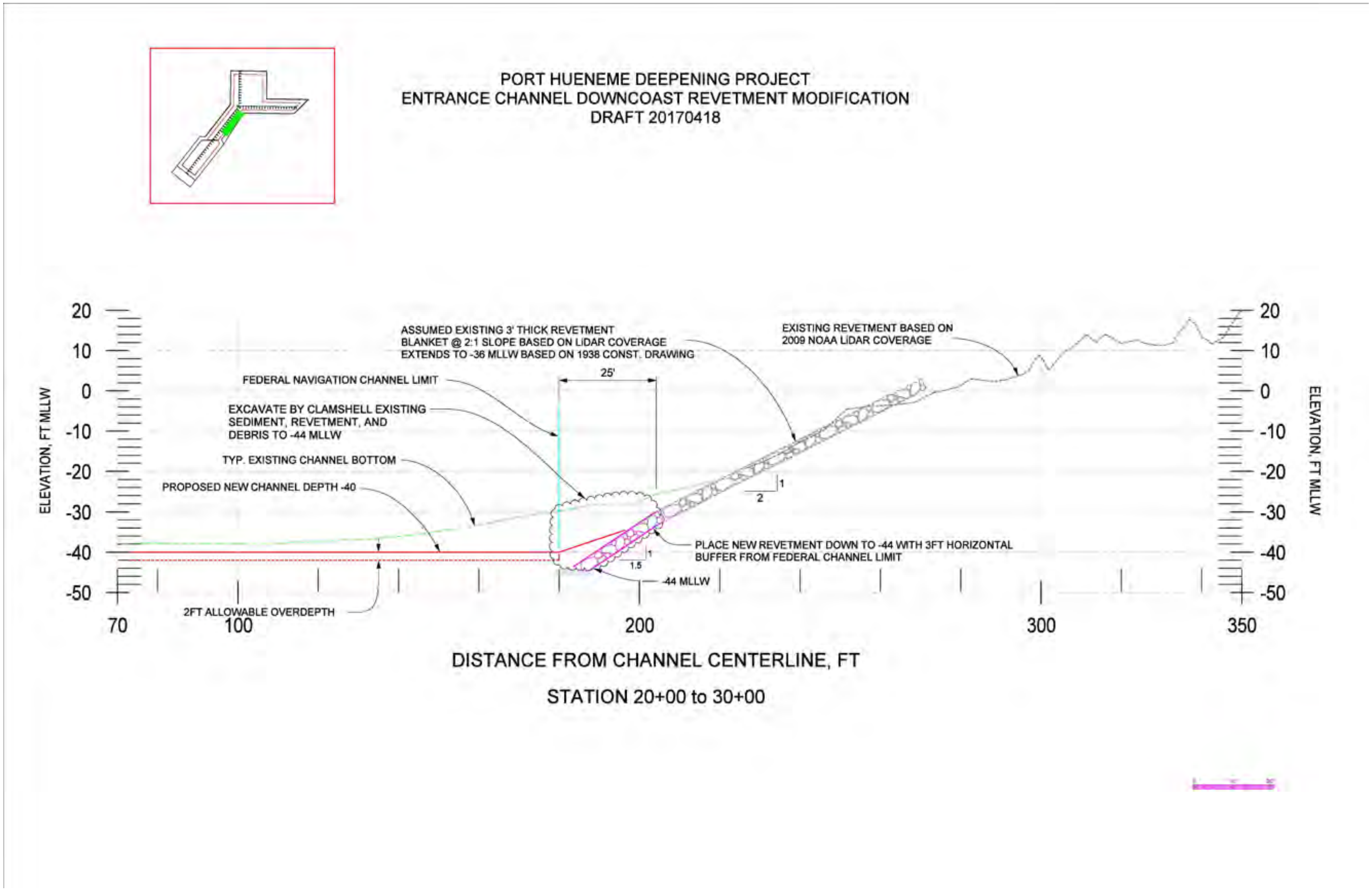
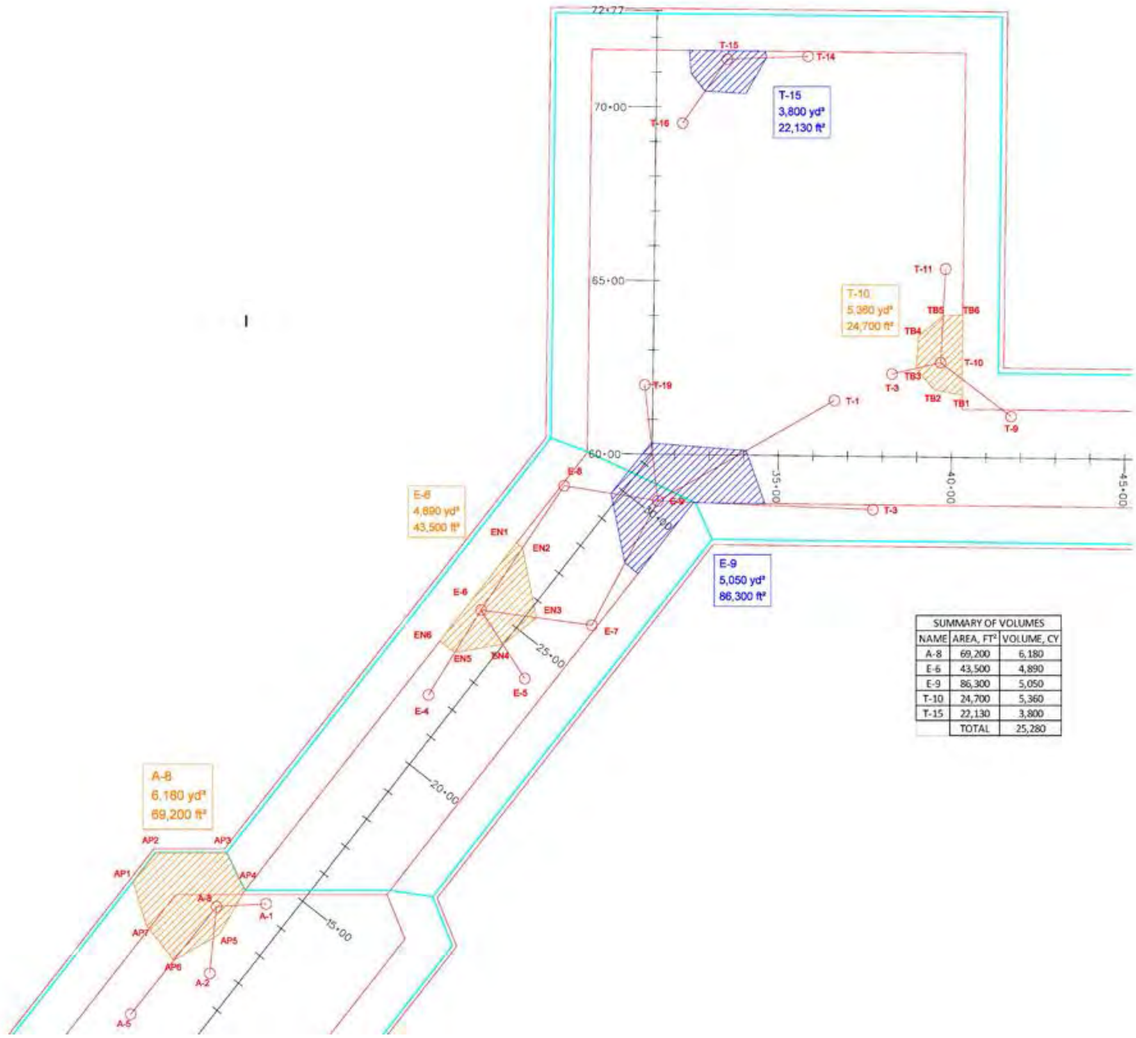


Figure 10. Rock Revetment Cross Section



SUMMARY OF VOLUMES		
NAME	AREA, FT²	VOLUME, CY
A-8	69,200	6,180
E-6	43,500	4,890
E-9	86,300	5,050
T-10	24,700	5,360
T-15	22,130	3,800
	TOTAL	25,280

Figure 11. Plan View of Unacceptable Sediments: Cores A-8, E-6, T-10, E-9, and T-15

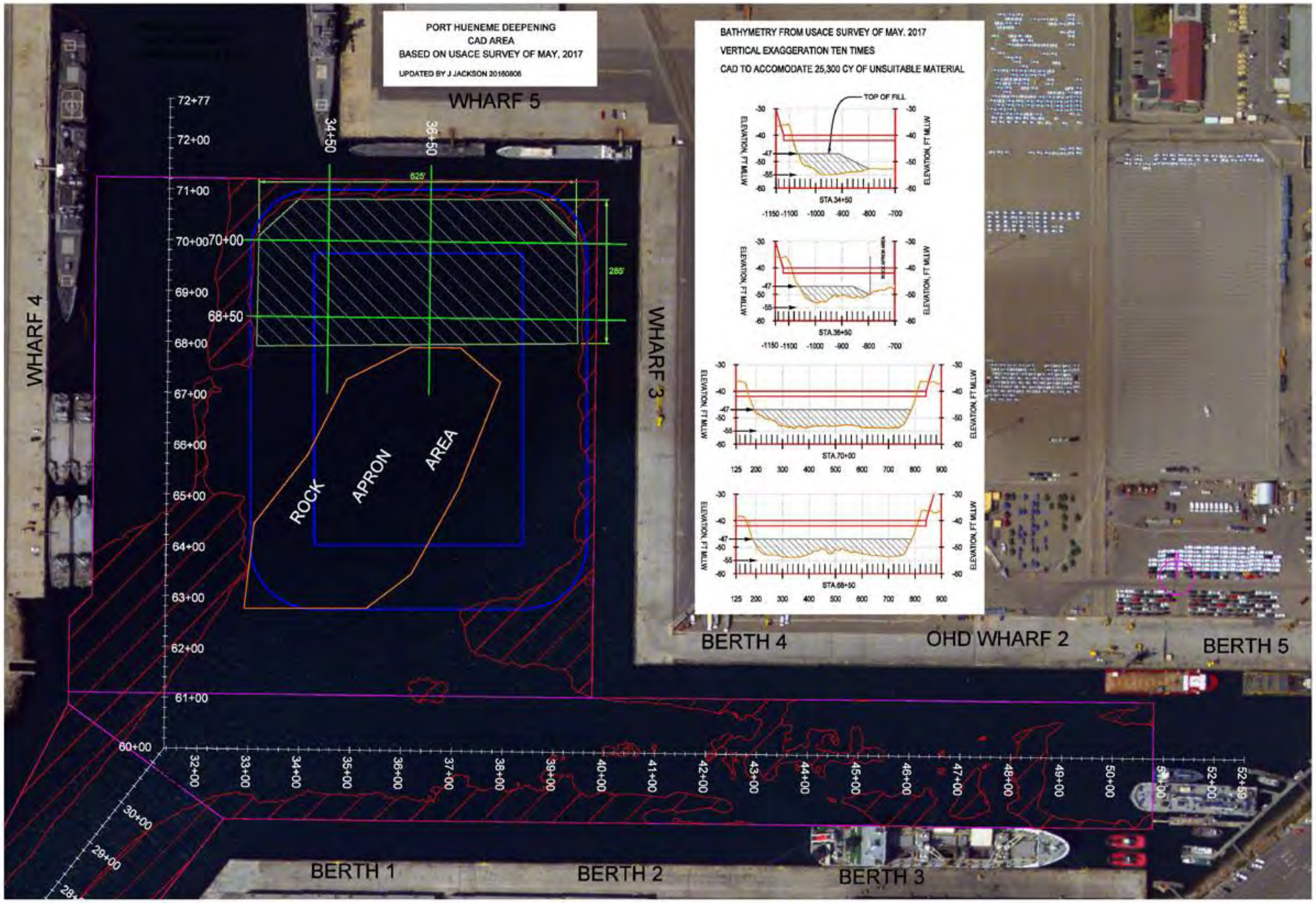


Figure 12. Conceptual Confined Aquatic Disposal Site Placement

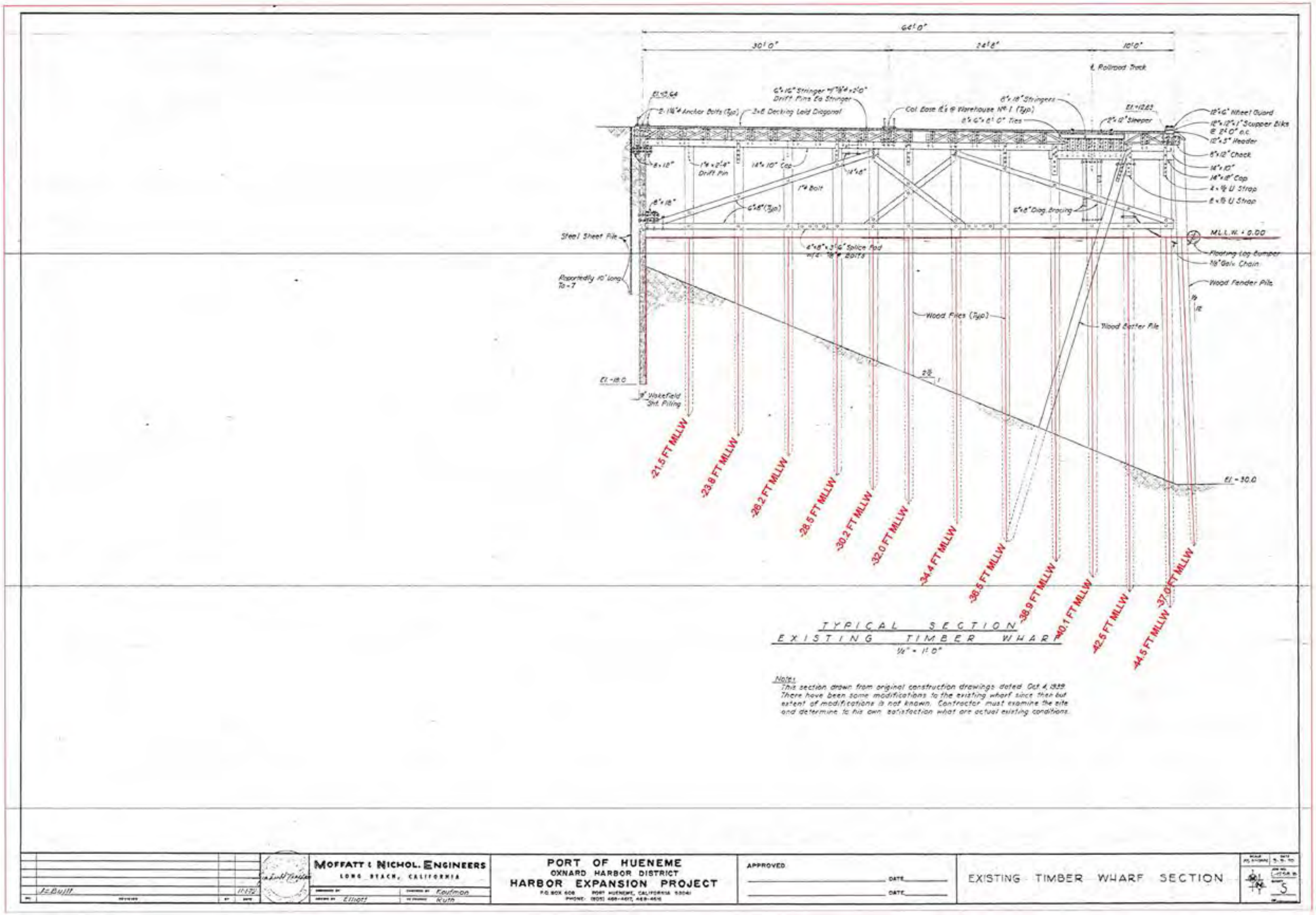


Figure 13. Remnant Pile Tip Elevations

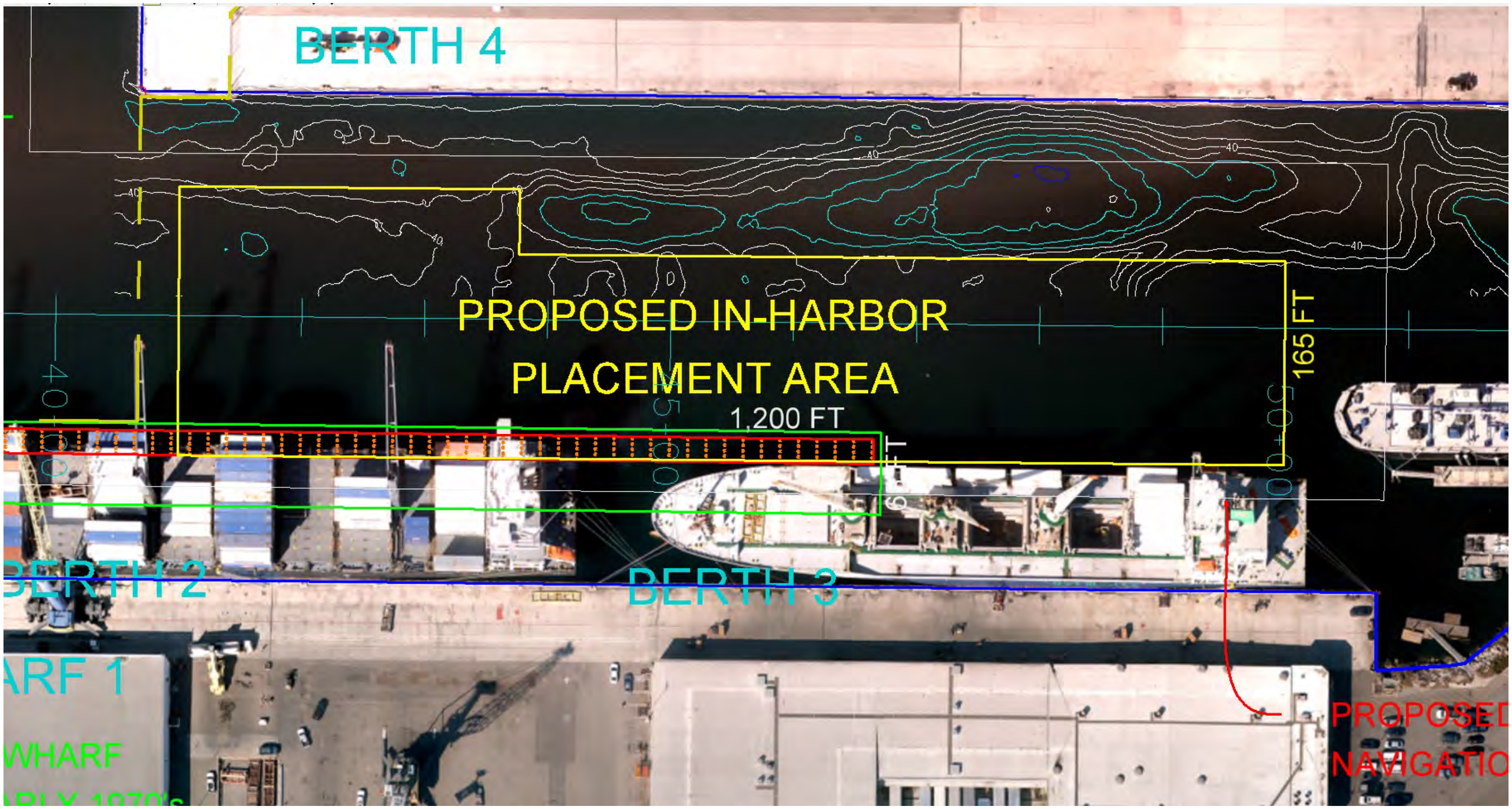


Figure 14. South Trench Disposal Area

Appendix A
2016 Sampling and Analysis Plan Report

SAMPLING AND ANALYSIS PLAN REPORT

Port Hueneme Deep Navigation Project Geotechnical and Environmental Investigation

Task Order No. 0014, USACE Contract No. W912PL-11-D-0015

Volume 1

Prepared for:
U.S. Army Corps of Engineers
Los Angeles District
Los Angeles, California

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SAMPLING AND ANALYSIS PLAN REPORT

Port Hueneme Deep Navigation Project Geotechnical and Environmental Investigation

Task Order No.0014, USACE, Contract No. W912PL-11-D-0015

November 2018

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LIST OF ACRONYMS

ASTM	American Society for Testing and Materials	**MS**	Matrix Spike
BLK	Method or Procedural Blank	**MSD**	Matrix Spike Duplicate
BMP	Best Management Practice	**MSD**	Minimum Significant Difference
BS	Blank Spike	**ND**	Not Detected
BSD	Blank Spike Duplicate	**NOAA**	National Oceanic and Atmospheric Administration
CAD	Confined Aquatic Disposal	**NOED**	No Observable Effects Dose
Cal/EPA	California Environmental Protection Agency	**OEHA**	Office if Environmental Hazard Assessment
CD	Compact Disc	**OHD**	Oxnard Harbor District
CDFG	California Department of Fish and Game	**OTM**	Ocean Testing Manual
CESPD	Corps of Engineers South Pacific Division	**PAH**	Polyaromatic Hydrocarbon
CHHSL	California Human Health screening Level	**PCB**	Polychlorinated Biphenyl
COC	Chain of Custody	**PDS**	Post Digestion Spike
CSLC	California State Lands Commission	**PDSD**	Post Digestion Spike Duplicate
CV	Coefficient of Variation	**PPB**	Parts Per Billion
cy	Cubic Yards	**PPM**	Parts Per Million
CRM	Certified Reference Material	**PRG**	Preliminary Remediation Goals
DBT	Dibutyltin	**PVC**	Polyvinyl Chloride
DDD	Dichlorodiphenyldichloroethane	**QA**	Quality Assurance
DDE	Dichlorodiphenyldichloroethylene	**QC**	Quality Control
DDT	Dichlorodiphenyltrichloroethane	**QUAL**	Qualifier
DGPS	Differential Global Positioning Satellite	**RBC**	Risk-Based Concentration
DTSC	Department of Toxic Substances Control	**RI**	Remedial Investigation
DUP	Laboratory Replicates	**RL**	Reporting Limit
ECD	Electron Capture Detection	**RPD**	Relative Percent Difference
ERA	Ecological Risk Assessment	**RSLs**	Regional Screening Levels for Cleanup of Superfund Sites
ERED	Environmental Residue Effects Database	**SC-DMMT**	Southern California Dredge Material Management Team
ERL	NOAA Effects Range Low	**SIM**	Selective Ion Monitoring
ERM	NOAA Effects Range Medium	**SOPs**	Standard Operating Procedures
GPS	Global Positioning Satellite	**SRM**	Standard Reference Material
HHMSSL	Human Health Medium – Specific Screening Levels	**STLC**	Title 22 Soluble Threshold Limit Concentration
HDPE	High-density Polyethylene	**SURR**	Surrogate Analysis
IRP	Installation Restoration Program	**SWQCB**	State Water Resources Control Board
ITM	Inland Testing Manual	**TBT**	Tributyltin
LCL	Lower Control Limit	**TOC**	Total Organic Carbon
LCS	Laboratory Control Spike	**TRPH**	Total Recoverable Hydrocarbons
LDPE	Low-density Polyethylene	**TRV**	Toxicity Reference Value
LOED	Lowest Observable Effects Dose	**TTLC**	Title 22 Total Threshold Limit Concentration
LPC	Limiting Permissible Concentration	**UCL**	Upper Control Limit
LSD	Least Significant Difference	**USACE**	U.S. Army Corps of Engineers
MDL	Method Detection Limit	**USEPA**	U.S. Environmental Protection Agency
MLLW	Mean Lower Low Water	**USCS**	Unified Soil Classification System

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.SAMPLING AND ANALYSIS PLAN REPORT

Port Hueneme Deep Navigation Project Geotechnical and Environmental Investigation

November 2018

1.0 INTRODUCTION

The Port Hueneme Deep Navigation Project consists of deepening portions of the Port Hueneme federal channels from -35 feet (MLLW) to a new authorized depth of -40 feet MLLW (-44 feet MLLW for the Approach Channel) to accommodate Panama-sized vessels which are currently unable to load to their maximum capacity. Port Hueneme is located 65 miles northwest of Los Angeles in Ventura County (Figure 1). Areas to be deepened are identified on Figure 2. Sediments to be dredged require an environmental evaluation of sediment quality in order to support planning and permitting for dredging and reuse. This project was authorized by the Rivers and Harbor Act of 1958 (House Document 362, 83rd Congress, 2nd Session) and (House Document 356, 90th Congress, 2nd Session), pursuant to Section 404 of the Clean Water Act.

This Sampling and Analysis Plan Report (SAPR) has been prepared on behalf of the U.S. Army Corps of Engineers (USACE), Los Angeles District to detail procedures and results, including quality assurance/quality control (QA/QC) results, from the sampling and testing of sediments from Port Hueneme identified for placement at a potential beach nourishment area. This work was performed under Task Order No. 0014, USACE Contract No. W912PL-11-D-0015. Cone Penetrometer Tests (CPTs) were also performed under this task order. However, CPT data are reported separately. Work performed was conducted according to the approved Sampling and Analysis (SAP) (Diaz Yourman, GeoPentech and Kinnetic Laboratories JV, 2016)

1.1 Project Summary

The purpose of this project was to sample and test sediments down to the new authorized channel depth of -40 feet MLLW (-44 feet MLLW for the Approach Channel) to provide sediment quality data for evaluation of dredging and beach nourishment. This report is to fulfill requirements of Corps of Engineers South Pacific Division Regulation No. 1110-1-8 (CESPD, 2000), the Inland Testing Manual (ITM) (USACE and USEPA, 1998), the Clean Water Act (CWA), and the Southern California Dredge Material Management Team (SC-DMMT) draft guidelines.

The study design for this project was originally based on a September 2016 hydrographic survey. The bathymetry was subsequently updated with a May 2017 survey. Based on this survey, the estimated volume of sediments requiring dredging from the Port Hueneme federal channels is approximately 390,000 cubic yards (cy). The volume estimate includes a two-foot overdepth allowance. Figure 3 shows the 2017 bathymetric data. The sediment infill rate is approximately 15,000 cubic yards per year. Note that a large portion of Turning Basin does not require deepening since the mudline elevation is already below -40 feet MLLW. As shown on Figure 4, A large portion of the Turning Basin also contains a Confined Aquatic Disposal (CAD) site within a rock containment apron constructed in 2008. It is a project desire to beneficially reuse all the Port Hueneme dredged material for beach nourishment by placing the material either on the beach or just offshore of Hueneme Beach (Figure 2) provided that physical and chemical properties of the sediments are suitable for this purpose. Project elevations, sampling elevations and dredge volumes for the Approach Channel, Entrance Channel and Channel A/Turning Basin areas of Port Hueneme (Figure 2) identified for beach replenishment are provided in Table 1.

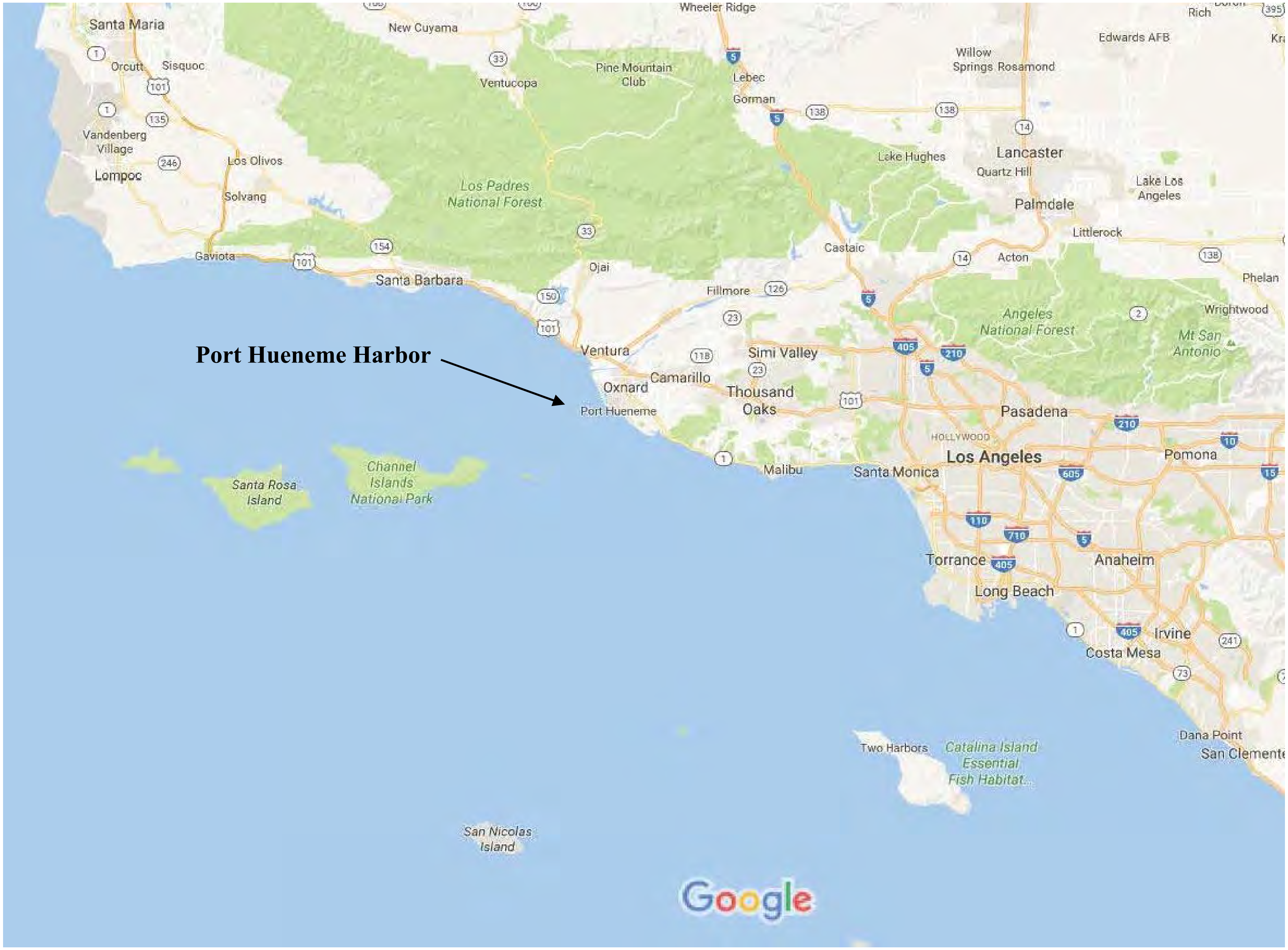

Figure 1. Location of Port Hueneme

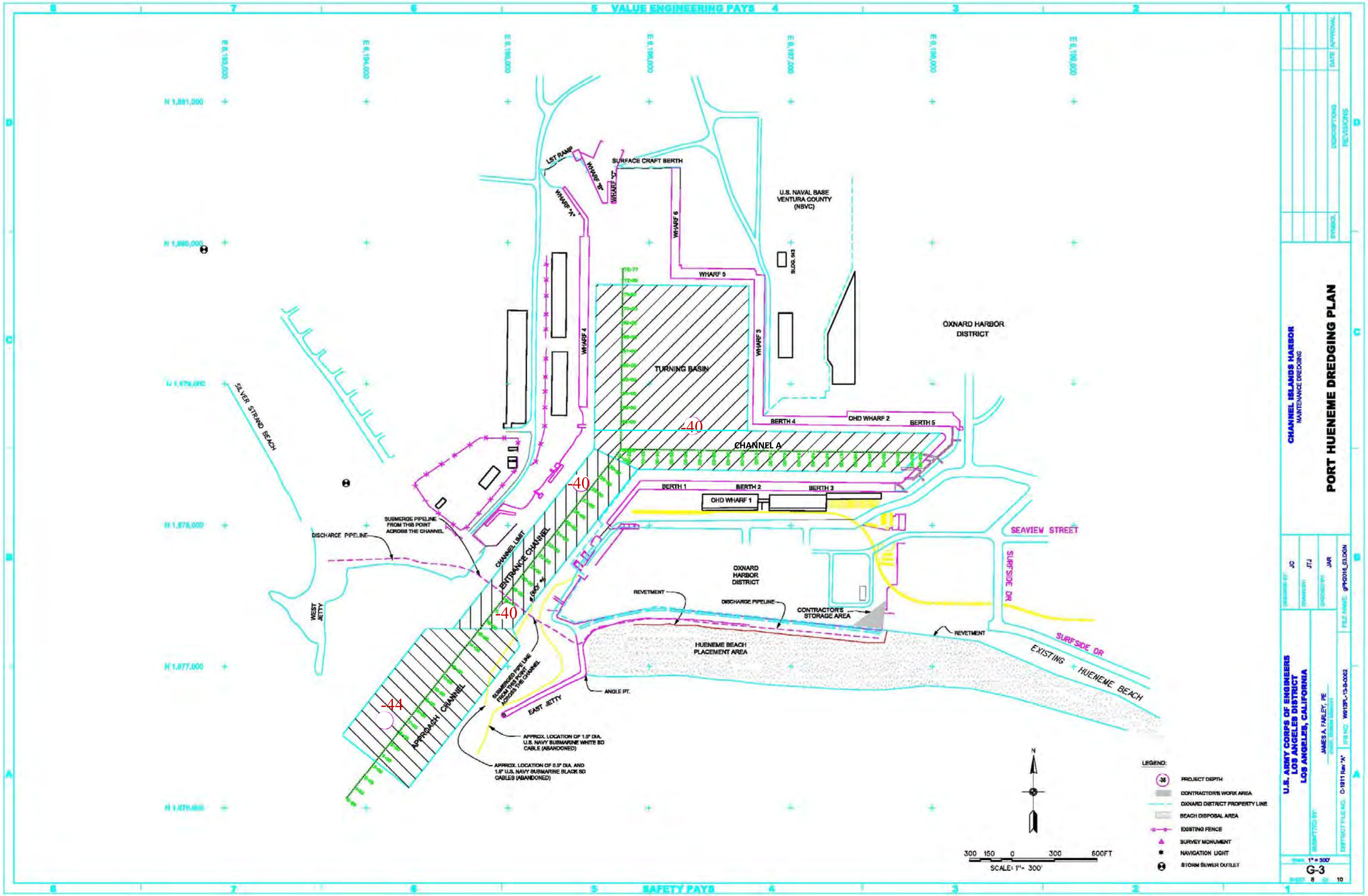

Figure 2. Port Hueneme Channel Areas to be Deepened and the Beach Placement Area.

Figure 3. May 2017 Port Hueneme Bathymetric Data, Actual and Target Sampling Locations.

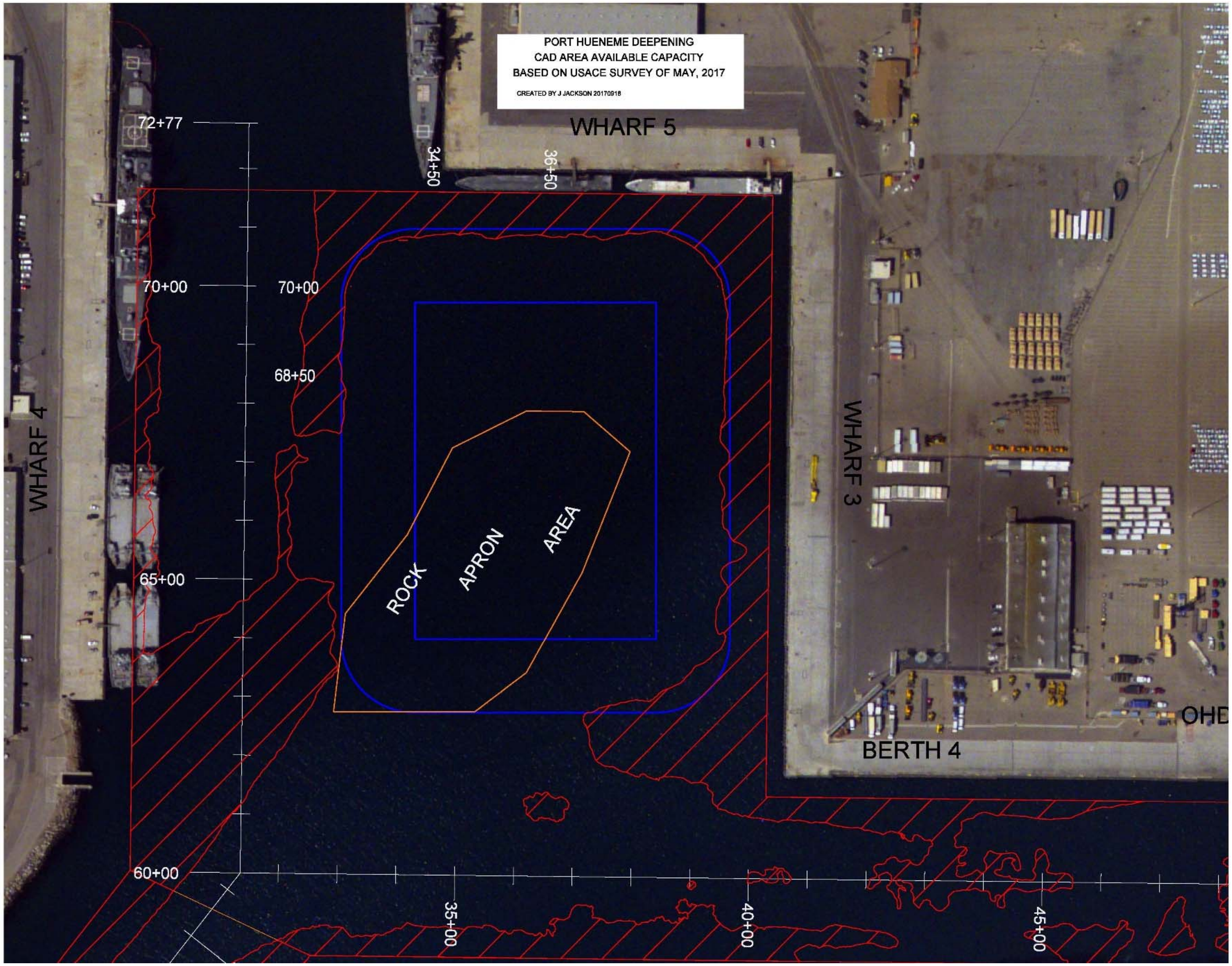

Figure 4. Location of the Port Hueneme Turning Basing CAD Site and Rock Apron.

Table 1. Dredge Area Volume Estimates for the Port Hueneme Federal Channels.

Channel/ Composite Area	Project Elevation (ft, MLLW)	Project Elevation + Overdepth (ft, MLLW)	Sampling Elevation* (ft, MLLW)	Volume (yd^3)**	
				To Design Depth	With 2 ft Overdepth
Approach (A)	-44	-46	-46	160,000	220,000
Entrance (E)	-40	-42	-42	70,000	100,000
Channel A/Turning Basin (T)	-40	-42	-42	40,000	70,000
			TOTALS	270,000	390,000

* Sampling depth includes two feet for overdepth allowance.
**Volume Quantities based on Government survey conducted May 2017. Volumes were refined during engineering design and thus differ from those presented in the Sampling and Analysis Plan

1.2 Site Location

Port Hueneme is located in Ventura County, California (Figure 1). Geographic coordinates (NAD 83) for the entrance to the Port are 34° 8.6' N and 119° 12.84' W. The Hueneme Beach placement area is to the southeast of Port Hueneme, just down coast of the Port. Geographic coordinates of the approximate center of the Hueneme Beach nourishment area are 34° 8.6' N and 119° 12.0' W. Corner coordinates of four potential nearshore placement areas off Hueneme Beach are provided in Table 2. Geographic coordinates of the approximate center of four potential Hueneme Beach nearshore placement areas are as follows:

Alpha - 34º 8.4′ N, 119º 12.0′ W
Bravo - 34º 8.2′ N, 119º 11.5′ W
Charlie - 34º 7.9′ N, 119º 11.1′ W
Delta - 34º 8.5′ N, 119º 12.2′ W

1.3 Roles and Responsibilities

Project responsibilities and key contacts for this sediment characterization program are listed in Tables 2 and 3. Kinnetic Laboratories Inc. provided the sampling and reporting services. Diaz Yourman and Associates were responsible for core logging and geotechnical testing. Analytical chemical testing of sediments for this project was carried out by Eurofins Calscience (Cal-ELAP No. 2944). Optional bioaccumulation was performed by Pacific EcoRisk (NELAP No. 04225CA).

Table 2. Project Team and Responsibilities.

Responsibility	Name	Affiliation
Project Planning and Coordination	Jeffrey Devine Larry Smith Susie Ming Ken Kronschnabl	USACE USACE USACE Kinnetic Laboratories
Sampling and Analysis Plan (SAP) Preparation	Ken Kronschnabl Christopher Diaz	Kinnetic Laboratories Diaz-Yourman
Field Sample Collection and Transport	Spencer Johnson Dale Parent	Kinnetic Laboratories Kinnetic Laboratories
Geotechnical Investigation	Chris Diaz Kelly Shaw	Diaz-Yourman Diaz-Yourman
Health and Safety Officer and Site Safety Plan	Jon Toal	Kinnetic Laboratories
Laboratory Chemical Analyses	Carla Hollowell Katie Scott	Eurofins Kinnetic Laboratories
Biological Testing	Jeffrey Cotsifas	Pacific EcoRisk
QA/QC Management Analytical Laboratory QA/QC	Danielle Gonsman Amy Howk Carla Hollowell	Kinnetic Laboratories Kinnetic Laboratories Eurofins
Technical Review	Pat Kinney Jeffrey Devine Christopher Diaz Larry Smith Joe Ryan	Kinnetic Laboratories USACE Diaz-Yourman USACE USACE
Final Report	Ken Kronschnabl Christopher Diaz	Kinnetic Laboratories Diaz-Yourman
Agency Coordination	Jeffrey Devine Larry Smith	USACE USACE

Table 3. Key Project Contacts

Susie Ming USACE Project Manager PPMD Navigation and Coastal Projects Branch U. S. Army Corps of Engineers, Los Angeles District 915 Wilshire Blvd. Los Angeles, Ca. 90017 Tel. (213) 452-3789 susan.m.ming@usace.army.mil	Jeffrey Devine USACE Project Technical Manager Geology and Investigations Section U. S. Army Corps of Engineers, Los Angeles District 915 Wilshire Blvd. Los Angeles, Ca. 90017 Tel. (213) 452-3579 Jeffrey.D.Devine@usace.army.mil
Larry Smith USACE Project Technical Manager U. S. Army Corps of Engineers, Los Angeles District 915 Wilshire Blvd. Los Angeles, Ca. 90017 Tel. (213) 452-3846 Lawrence.J.Smith@usace.army.mil	Ken Kronschnabl Project Manager - Sampling/Testing Kinnetic Laboratories, Inc. (KLI) 307 Washington St. Santa Cruz, CA 95060 Tel. (831) 457-3950 kkronsch@kinneticlabs.com
Chris Diaz Project Manager - Geotechnical Investigations Diaz Yourman & Associates 1616 East 17th Street Santa Ana, CA 92705-8509 Tel. (714) 245-2920 chris@diazyourman.com	Michele Castro Business Development Manager Eurofins Calscience, Inc. 7440 Lincoln Way Garden Grove, CA 92841-1427 Tel.: (949) 870-8766 MicheleCastro@eurofinsUS.com
Spencer Johnson Field Operations Mgr. Kinnetic Laboratories, Inc. (KLI) 307 Washington St. Santa Cruz, CA 95060 Tel. (831) 457-3950 sjohnson@kinneticlabs.com	Allen Yourman Joint Venture Project Manager Diaz Yourman Associates, Geopentech, and Kinnetic Laboratories Joint Venture 1616 East 17th Street Santa Ana, CA 92705-8509 Tel. (714) 245-2920 Allen@diazyourman.com
Amy Howk QA/QC Management Kinnetic Laboratories, Inc. 307 Washington St. Santa Cruz, CA 95060 Tel. (831) 457-3950 ahowk@kinneticlabs.net	

2.0 SITE HISTORY AND HISTORICAL DATA REVIEW

This section provides a brief history of Port Hueneme, potential sources of contamination, dredging history, and most recent testing and sampling results.

2.1 Port Construction, Site Setting and Potential Sources of Contamination

Port Hueneme is located in the City of Port Hueneme at the southern edge of the City of Oxnard. The harbor was originally established in 1939 by the Oxnard Harbor District (OHD), but was divided into two jurisdictions after World War II. The U.S. Naval base at Port Hueneme has long been the home of the famed Navy Construction Battalion, otherwise known as the Seabees. Other naval functions include training in electronic warfare systems and civil engineering. The other half of the harbor is operated by the OHD, a major facility for the import of cars, fruit and frozen food. There are no public facilities for small boating and leisure craft.

Stormwater discharges are a potential source of sediment contamination in Port Hueneme. The majority of runoff entering the Port is through sheet runoff from adjacent land (Geosyntec, 2013). There is one channel that discharges into the northwest corner of the Port as shown on Figure 5. This channel (IR Site 19A) cuts through the Naval Construction Battalion Center (NCBC) at Port Hueneme and has undergone remedial cleanup in the past for pesticides and PCBs.

Fueling operations occur within the Port. TracTide Marine Corporation provides fuel services via pipelines for all commercial docks within the Port.

2.2 Previous Port Hueneme Dredging and Testing Episodes

The Port Hueneme channels were constructed in 1960 and 1961. Since 1990, the U.S. Army Corps of Engineers has dredged Port Hueneme during four periods. Dredging years and volumes are identified in Table 4. Except for 288,000 cy of contaminated sediments dredged in 2008/2009 from various wharfs and federal channel “hot spots” identified on Figure 6, the dredged sediments have all been placed at Hueneme Beach. The contaminated sediments were placed within a confined aquatic disposal (CAD) facility within the Turning Basin of the Port (Figures 4 and 6). The CAD site was constructed by dredging 687,000 cy of material to an elevation of -85 feet MLLW and placing that material on Hueneme Beach. The contaminated sediments were capped with 131,000 cy of clean material dredged from the Approach and Entrance Channel and portions of the cap were covered with a protective stone armor.

Table 4. Port Hueneme Federal Channels Dredging History.

Date	Areas Dredged	Volume (cubic yards)	Placement Site
1990-1991	Approach and Entrance Channels	200,000	Hueneme Beach
1999	Approach Channel	68,000	Hueneme Beach
2004	Entrance Channel and Turning Basin	27,500	Hueneme Beach
2008-2009	CAD Area and Entrance	818,000	Hueneme Beach
2008-2009	Contaminated Areas	288,000	Port Hueneme CAD area

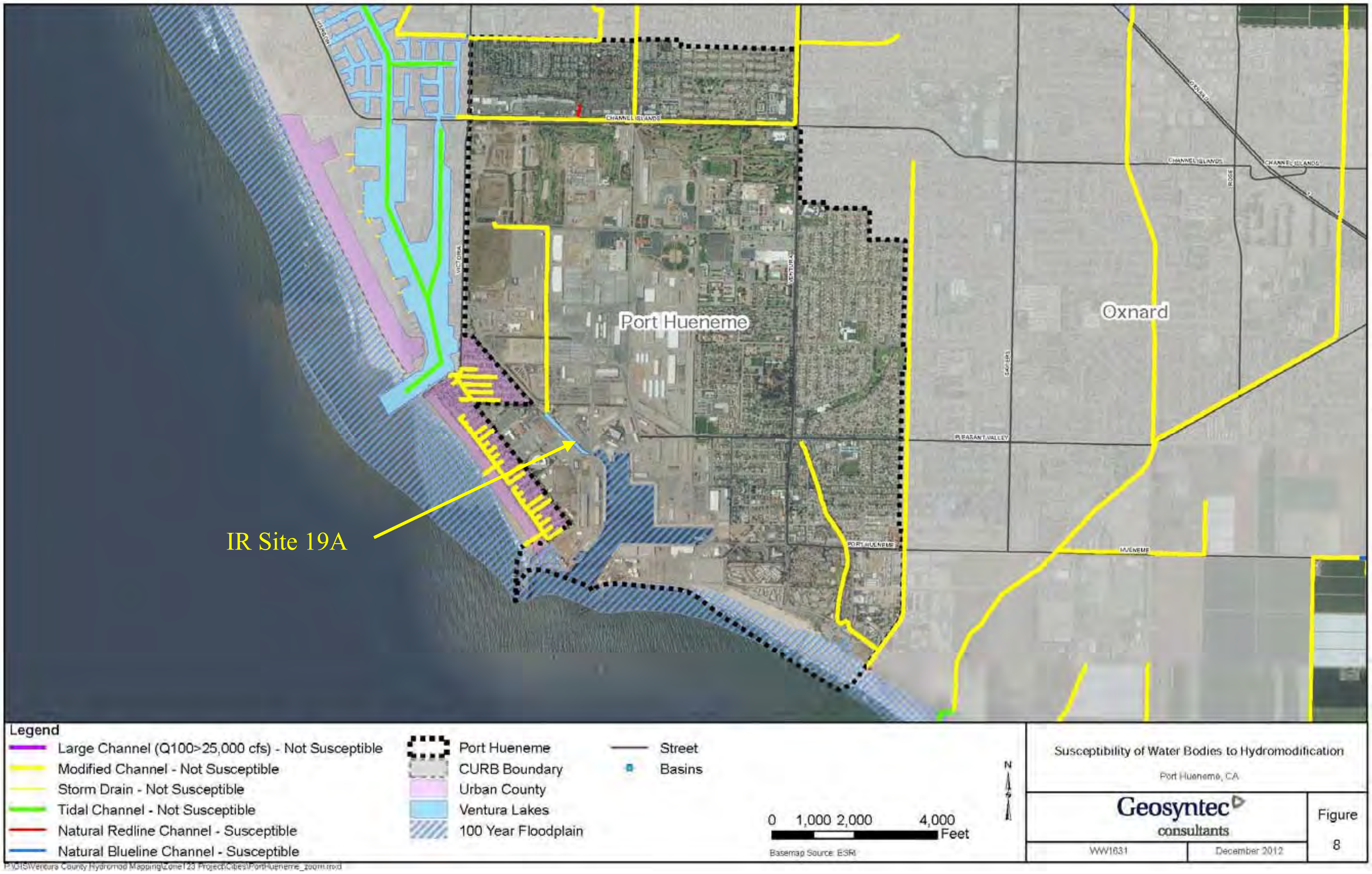

Figure 5. Major Stormwater Drainages into Port Hueneme (Geosyntec, 2013).

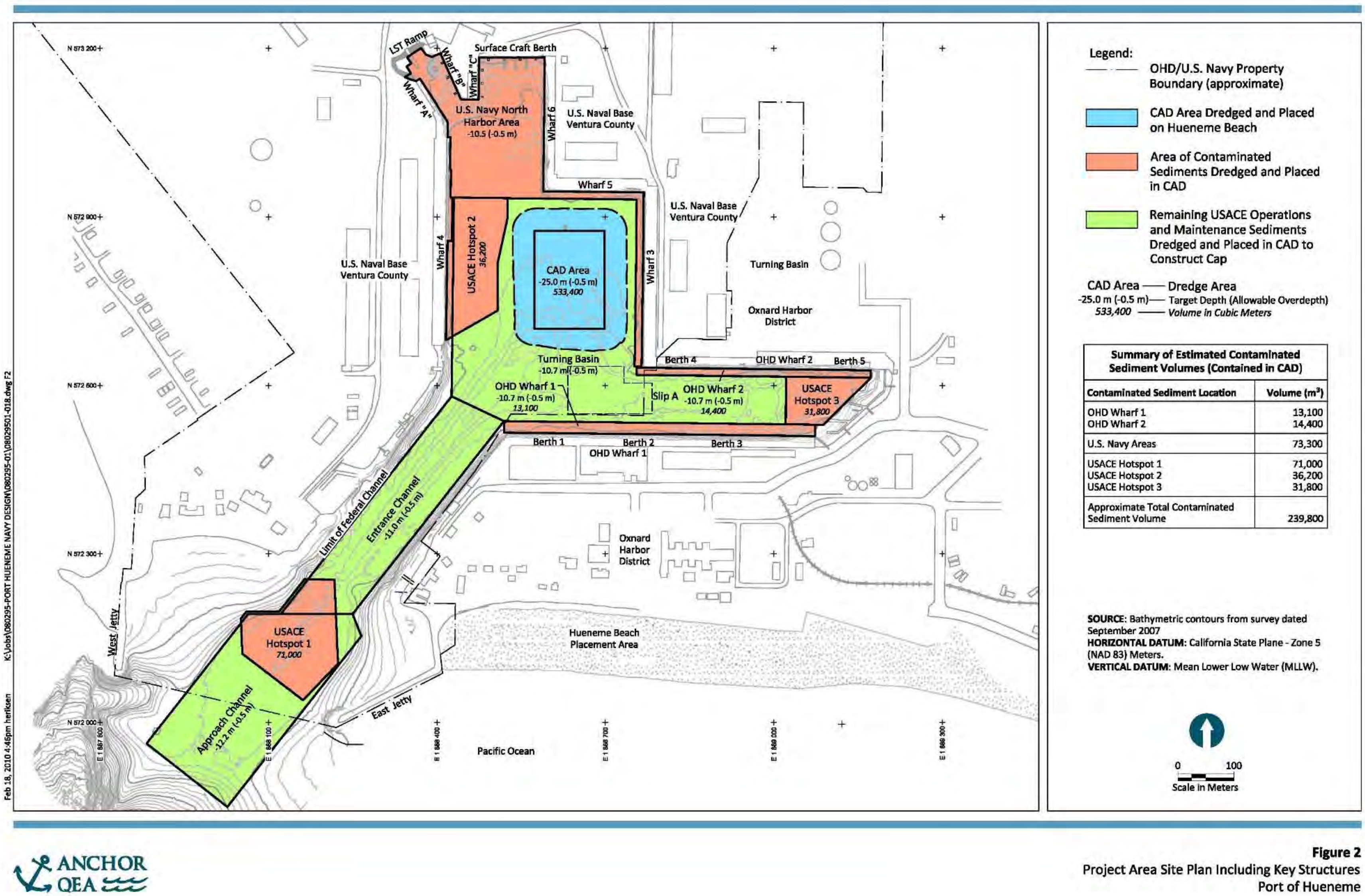

Figure 6. Location of CAD Area and September 2007 Contaminated Areas of the Port (from Anchor QEA, 2015).

The results of the CAD site monitoring as well as a 2003 Biological Risk Assessment and a 2007 maintenance dredging investigation conducted for USACE, Los Angeles District, and a 2011 Navy remedial investigation are discussed separately below.

2.2.1 Long-Term CAD Site Monitoring

Subsequent to construction of the CAD site, long-term monitoring of the CAD site performance was conducted. This monitoring took place from 2010 to 2015 and is summarized in a report by Anchor QEA (2015). As part of the monitoring, chemical data were collected from cap sediments and porewater three months, one year and five years' post-construction to determine if contaminants of concerns were migrating through the cap at an unacceptable rate. Based on the chemistry results, the Anchor QEA report concluded that that chemical containment below the cap has been maintained and the cap was functioning as designed.

2.2.2 2003 Biological Risk Assessment

In support of a 2001 USACE channel deepening project for the Port Hueneme federal channels, a streamlined Ecological Risk Assessment was conducted by Anchor Environmental for contaminants of potential concern (COPCs) measured in the federal channel composite sediments. These contaminants were identified as PCBs, DDT, and the DDT metabolites DDD and DDE. Approximately 560,000 cubic yards (430,000 cubic meters) of sediments were evaluated for placement on the beach or in the nearshore areas of Hueneme Beach. The assessment looked at the minimum, maximum, mean and 95% upper confidence limit (UCL) sediment COPC concentrations and modeled the food web transfer of the COPCs to higher trophic levels using Gobas steadystate uptake model incorporated into the USACE Trophic Trace (Version 3.02) software developed by the Waterways Experiment Station (WES). This model uses sediment and lipids and water and lipids equilibrium partitioning. Sediment and/or water concentrations were modeled up four trophic levels to invertebrates to foraging fish and birds to piscivorous fish to mammals. Several of the species modeled are considered threatened or endangered. The Anchor Environmental report (Anchor Environmental, 2003), attached as Appendix L, summarizes the model inputs and outputs and conclusions based on comparisons to Toxicity Reference Values (TRVs). The modeled 95% UCL tissue burdens in all species evaluated were lower than the lowest relevant TRVs consisting of no observable apparent effects levels (NOAELs) for survival, growth and reproduction. As such, all toxicity quotients were less than one.

The California Department of Toxics Substance Control (DTSC) reviewed the Anchor Environmental Report. In a letter dated March 11, 2014 (Chen, 2014), the DTSC agreed with the findings of the Risk Assessment that concentrations of DDT compounds and PCBs in Port Hueneme sediments, after placement on Hueneme Beach and in the nearshore environment, are unlikely to pose a significant bioaccumulation risk to invertebrates, fishes, birds, or marine mammals.

2.2.3 2007 Federal Channel Maintenance Dredging

The most recent maintenance dredging evaluation was conducted in 2007 (Kinnetic Laboratories and Diaz Yourman and Associates, 2007). Three composite samples were evaluated for this study.

Four vibracores were collected in the Approach Channel and combined into one composite sample, four vibracores were collected in the Entrance Channel and combined into another composite sample, and four vibracores were collected in the Turning Basin and combined into the third composite sample. Each vibracore was advanced to the project elevations plus one meter for overdepth allowance. In addition, surface samples were collected along three transects at Hueneme Beach and analyzed for grain size. These grain size data were used for beach physical compatibility analyses, which was reported separately by the USACE.

Chemical constituent levels in the Port Hueneme sediments collected in 2007 were for the most part low. These data are summarized in Appendix A. Silver, butyltins and phenols were not detected above reporting limits in any sample. All other metal concentrations were below ERL values. ERL and ERM values are defined in Section 3.2.6. Oil and Grease and total recoverable hydrocarbons were detected in most samples, but near or below reporting limits. DDT compounds in all composite samples and total PCB aroclors in three composite samples were the only detected organic contaminants exceeding ERL values. In all cases, 4,4'-DDD and 4,4'-DDE were detected at concentrations above the method detection limits, but below reporting limits. Concentrations of total DDT and total PCB compounds were well below ERM values.

2.2.4 2011 Navy Remedial Investigation

Subsequent to removal of contaminated sediments throughout the Port and placement in the CAD site, sampling was conducted in 2011 as part of a Navy remedial investigation of a large area of the Port known as Installation Restoration Program (IRP) Site 19. Numerous samples were collected throughout IRP Site 19. The subsequent sediment chemistry results are detailed in a report by CH2M Hill/Kleinfelder (KCH) Joint Venture (2015). Data from this investigation are provided in Appendix B. The KCH report concluded that several chemical constituents were reported above ERL levels. However, it was concluded that the nature and extent of the contamination did not adversely impact sediments in the Harbor and further evaluation of risks to ecological receptors was not warranted.

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3.0 METHODS

This section describes the dredging design, study design, and field and analytical methods for this testing program.

3.1 Dredge Design

Bathymetric data from May 2017 in relationship to sampling locations are shown on Figure 3 and Figures 7 through 9. These figures also define the limits of dredging. Design depths and dredge volumes for each area identified for dredging are provided in Table 1.

3.2 Sampling and Testing Design

The sampling and testing design for this project covers data collection tasks for Port Hueneme federal channels sediment collection and testing and Hueneme Beach onshore and nearshore area sampling and testing. Evaluation guidelines are also discussed.

3.2.1 Sampling and Testing Approach

The main approach was to sample dredge sediments to dredge depths plus allowable overdepth, composite them by area, and subject the composite samples to chemical testing and, if necessary, biological testing to determine if sediments were suitable for beach nourishment either by placing sediments directly on Hueneme Beach or in the nearshore areas of this beach. The approach was to determine the physical properties of the sediments at each location and at different depths. Testing followed requirements and procedures detailed in the ITM (USEPA/USACE, 1998) with further guidance from Los Angeles District USACE guidelines (CESPL, undated) and from SC-DMMT draft guidelines. Acceptability guidelines published in these documents was used to evaluate the suitability of Port Hueneme dredged sediments for beach nourishment.

3.2.2 Port Hueneme Sample Identification, Composite Areas, Sediment Collection and Testing

Vibracore sampling, as described in Section 3.3.2 (Vibracore Sampling Methods), was carried out from November 14 through 16, 2016 and March 10 through 12, 2017 to collect subsurface sediment data from the Approach Channel (Area A), Entrance Channel (Area E) and Channel A/Turning Basin (Area T) of the Port. Eight (8) original locations were sampled in Area A, nine (9) locations were sampled in Area E, and 19 locations were sampled in Area T for a total of 36 locations. As described below, six (6) additional cores were sampled in the approach channel bringing the total number of cores to 42. The prefix for all vibracore locations was "HUENEME-VC-16-#-##." Final sampling locations are shown on Figures 7 through 9. Eleven of the sampling locations were located within or on the border of areas identified as former "hot spots" for sediments contaminated with metals and PCBs. The contaminated sediments were removed in 2008/2009 from the areas identified on Figure 6 and the locations of the eleven cores will help confirm this. All cores were advanced past dredge depth plus two feet of overdepth. Up to five feet below overdepth elevations of additional material was sampled for geotechnical and USACE informational purposes only. Date and time of sampling, geographic coordinates, approximate seafloor elevations, sampling intervals and testing performed for each sample location are listed in Table 5. Note that some sample locations changed because of weather conditions, to target more shoaled areas and to avoid obstacles such as moored ships.

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Figure 7. May 2017 Bathymetric Data and Vibracore and CPT Locations for the Port Hueneme Approach Channel.

Figure 8. May 2017 Bathymetric Data and Vibracore and CPT Locations for the Port Hueneme Entrance Channel.

Figure 9. May 2017 Bathymetric Data and Vibracore and CPT Locations for the Port Hueneme Channel A and Turning Basin.

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Table 5. Actual Sample Location Geographic Coordinates, Date and Time of Sampling, Core Depths, Mudline Elevations, Core Intervals Sampled and Tests performed for the Initial Samples Collected for the Port Hueneme Harbor Deepening Project.

Fed. Chan./ Area	Core Designation	Date Sampled	Time Sampled	Geographic Coordinates (NAD 83)		Mudline Elevation (ft., MLLW)	Design Depth + Overdepth (ft., MLLW)	Core Recovery (ft.)	Core Interval Sampled (ft., MLLW)	Individual Core Analyses	Composite Analyses
				Latitude North	Longitude West						
Area A: Approach Channel	Hueneme-VC-16-A-01	11/15/2016	13:52	34.144667º	119.212889º	-44.3	-46	5.6	-44.3 to -46	Grain Size and Chemical Archiving	Bulk Sediment Chemistry and Bioassay Archiving
	Hueneme-VC-16-A-02	11/15/2016	13:25	34.144111º	119.213417º	-43.0	-46	6.8	-43.0 to -46		
	Hueneme-VC-16-A-03	11/15/2016	13:21	34.143583º	119.212889º	-42.6	-46	7.0	-42.6 to -46		
	Hueneme-VC-16-A-04	11/15/2016	12:40	34.143750º	119.213389º	-43.2	-46	8.5	-43.2 to -46		
	Hueneme-VC-16-A-05	11/15/2016	9:27	34.143778º	119.214167º	-39.6	-46	8.0	-39.6 to -46		
	Hueneme-VC-16-A-06	11/15/2016	8:20	34.144045º	119.212280º	-43.2	-46	5.3	-43.2 to -46		
	Hueneme-VC-16-A-07	11/15/2016	8:45	34.144278º	119.212056º	-42.1	-46	7.5	-42.1 to -46		
	Hueneme-VC-16-A-08	11/15/2016	7:50	34.144639º	119.213361º	-42.7	-46	5.3	-42.7 to -46		
Area E: Entrance Channel	Hueneme-VC-16-E-01	11/16/2016	7:35	34.145000º	119.211778º	-37.2	-42	8.5	-37.2 to -42	Grain Size and Chemical Archiving	Bulk Sediment Chemistry and Bioassay Archiving
	Hueneme-VC-16-E-02	11/16/2016	8:04	34.145430º	119.212290º	-38.2	-42	7.0	-38.2 to -42		
	Hueneme-VC-16-E-03	11/16/2016	8:20	34.145583º	119.211222º	-37.2	-42	8.5	-37.2 to -42		
	Hueneme-VC-16-E-04	11/16/2016	8:55	34.146333º	119.211361º	-38.5	-42	7.7	-38.5 to -42		
	Hueneme-VC-16-E-05	11/16/2016	9:20	34.146472º	119.210444º	-38.3	-42	8.1	-38.3 to -42		
	Hueneme-VC-16-E-06	11/16/2016	9:50	34.147010º	119.210870º	-37.8	-42	8.5	-37.8 to -42		
	Hueneme-VC-16-E-07	11/16/2016	10:20	34.146900º	119.209810º	-37.9	-42	8.5	-37.9 to -42		
	Hueneme-VC-16-E-08	11/16/2016	10:45	34.148000º	119.210090º	-36.9	-42	9.0	-36.9 to -42		
	Hueneme-VC-16-E-09	11/16/2016	11:20	34.147889º	119.209194º	-40.6	-42	9.0	-40.6 to -42		

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Table 5. Actual Sample Location Geographic Coordinates, Date and Time of Sampling, Core Depths, Mudline Elevations, Core Intervals Sampled and Tests performed for the Initial Samples Collected for the Port Hueneme Harbor Deepening Project. (Continued).

Fed. Chan./ Area	Core Designation	Date Sampled	Time Sampled	Geographic Coordinates (NAD 83)		Mudline Elevation (ft., MLLW)	Design Depth + Overdepth (ft., MLLW)	Core Recovery (ft.)	Core Interval Sampled (ft., MLLW)	Individual Core Analyses	Composite Analyses
				Latitude North	Longitude West						
Area T: Turning Basin/Channel A	Hueneme-VC-16-T-01	11/14/2016	16:45	34.14870º	119.20751 º	-40.1	-42	7.3	-40.1 to -42	Grain Size and Chemical Archiving	Bulk Sediment Chemistry and Bioassay Archive
	Hueneme-VC-16-T-02	11/14/2016	14:45	34.147784º	119.207140º	-37.5	-42	8.5	-37.5 to -42		
	Hueneme-VC-16-T-03	11/16/2016	13:20	34.148917º	119.206972º	-37.2	-42	8.2	-37.2 to -42		
	Hueneme-VC-16-T-04	11/14/2016	14:35	34.147889º	119.205806º	-38.8	-42	5.2	-38.8 to -42		
	Hueneme-VC-16-T-05	11/14/2016	15:17	34.147960º	119.204380º	-38.6	-42	6.0	-38.6 to -42		
	Hueneme-VC-16-T-06	11/14/2016	13:14	34.147800º	119.202860º	-37.0	-42	9.0	-37.0 to -42		
	Hueneme-VC-16-T-07	11/14/2016	13:53	34.148570º	119.203000º	-40.6	-42	6.0	-40.6 to -42		
	Hueneme-VC-16-T-08	11/14/2016	16:05	34.148270º	119.203660º	-38.9	-42	7.0	-38.9 to -42		
	Hueneme-VC-16-T-09	11/14/2016	14:24	34.148590º	119.205830º	-38.0	-42	8.5	-38.0 to -42		
	Hueneme-VC-16-T-10	11/16/2016	12:50	34.149010º	119.206510º	-37.0	-42	7.0	-37.0 to -42		
	Hueneme-VC-16-T-11	11/17/2016	8:15	34.149750º	119.206472º	-37.0	-42	9.0	-37.0 to -42		
	Hueneme-VC-16-T-12	11/17/2016	7:50	34.150417º	119.206556º	-37.5	-42	7.0	-37.5 to -42		
	Hueneme-VC-16-T-13	11/16/2016	12:00	34.151300º	119.206640º	-37.4	-42	10.0	-37.4 to -42		
	Hueneme-VC-16-T-14	11/15/2016	15:25	34.151417º	119.207806º	-36.0	-42	7.5	-36.0 to -42		
	Hueneme-VC-16-T-15	11/15/2016	15:00	34.151389º	119.208583º	-36.7	-42	7.8	-36.7 to -42		
	Hueneme-VC-16-T-16	11/15/2016	14:25	34.150880º	119.209000º	-37.6	-42	9.0	-37.6 to -42		
	Hueneme-VC-16-T-17	11/15/2016	11:42	34.149917º	119.209028º	-40.2	-42	5.7	-40.2 to -42		
	Hueneme-VC-16-T-18	11/15/2016	10:45	34.149200º	119.209610º	-36.6	-42	7.0	-36.6 to -42		
	Hueneme-VC-16-T-19	11/15/2016	10:15	34.148806º	119.209333º	-36.9	-42	8.5	-36.9 to -42		

Four approach Channel cores (A1, A2, A3 and A4) were moved further inside during the initial sampling effort for safety and technical considerations due to rough sea state conditions. Since this provided a large gap in data coverage, the moved locations were re-sampled at the original SAP locations on July 5 and 6, 2017. These locations are identified on the Figures 3 and 7 and in Table 6 as A2-1 through A2-4. Furthermore, two additional locations were sampled in the Approach Channel for geotechnical purposes. These are identified as GT-01 and GT-02 on the figures and in Table 6. Table 6 includes all the sampling data for these supplemental cores.

Three (3) area composite samples were initially created from each of the three (3) channel areas shown on Figure 2 and analyzed for bulk sediment chemistry. One composite sample was created from each channel area. A fourth composite sample for bulk sediment chemistry analyses was created from the four cores collected on July 5 and 6 described above. Continuous samples from the mudline to project depths plus two feet for overdepth testing were collected from all core locations. These primary core intervals were homogenized and then combined with all primary core intervals in the composite area to form composite samples for bulk sediment chemistry analyses. Additional composite material was archived in case acute solid phase bioassay testing becomes necessary. Sediments below overdepth elevations were collected at most core locations for geotechnical purposes only. No material below the overdepth elevation were included in any sediment composite samples for chemistry.

In addition to the composite samples, at least two archive bulk sediment chemistry samples were collected from each core location during the initial sampling effort. One archive sample from each location represents the entire primary core interval (mudline to overdepth elevations). The second archive sample represents the upper fine sediments (fluff layer). No further archiving was necessary. A single archive sample was also formed from the six cores collected on July 5 and 6.

The USACE (in consultation with the USEPA) requested that the archive samples of primary core intervals be analyzed for PAHs and PCBs. However, the archive samples should have been stored frozen but instead were kept in cold storage at 2-4º C. Subsequently, the hold time for the sediments expired for organic analyses. Therefore, each initial core location was resampled during the period of March 10 through March 12, 2017 and new samples of the primary core intervals from the mudline to the overdepth elevation were formed. Sampling data for the resampling effort are provided in Table 7.

Three samples were formed from each primary core interval collected for the March and July resampling efforts. One sample was sent to the laboratory for PCB and PAH analyses and one sample was archived. In addition, weighted portions of each primary core interval were used to form composite archive analyses in case bioassay testing becomes required plus a composite sediment chemistry sample for the July cores. All new chemistry archive samples are being stored frozen at Kinnetic Laboratories' Santa Cruz facility for at least six months unless directed otherwise by the USACE Technical Manager. The bioassay archives were held in a refrigerator at 4ºC. As described later, bioaccumulation testing was conducted on the three bioassay archive samples collected in March. The bioassay sediment collected in July is still being archived.

Table 6. Actual Sample Location Coordinates, Date and Time of Sampling, Core Depths, Mudline Elevations, Core Intervals Sampled, and Tests performed for the Samples Collected in July 2017.

Fed. Chan./ Area	Core Designation	Date Sampled	Time Sampled	Geographic Coordinates (NAD 83)		Mudline Elevation (ft., MLLW)	Design Depth + Overdepth (ft., MLLW)	Core Recovery (ft.)	Core Interval Sampled (ft., MLLW)	Individual Core Analyses
				Latitude North	Longitude West					
Area A: Approach Channel	Hueneme-VC-16-A2-01	07/05/17	1740	34º 08′ 34.0″	119º 12′ 54.6″	-37.5	-46.0	9.0	-37.5 to -46	Grain, Size PAHs and PCBs
	Hueneme-VC-16-A2-02	07/05/17	1840	34º 08′ 31.8″	119º 12′ 50.1″	-37.5	-46.0	8.7	-37.5 to -46	
	Hueneme-VC-16-A2-03	07/05/17	1915	34º 08′ 34.9″	119º 12′ 51.1″	-38.5	-46.0	8.9	-38.5 to -46	
	Hueneme-VC-16-A2-04	07/05/17	1950	34º 08′ 35.1″	119º 12′ 47.1″	-38.0	-46.0	9.5	-38.0 to -46	
	Hueneme-VC-16-GT-01	07/05/17	2020	34º 08′ 39.3″	119º 12′ 49.5″	-40.4	-46.0	8.5	-40.4 to -46	Grain Size
	Hueneme-VC-16-GT-02	07/06/17	0745	34º 08′ 38.5″	119º 12′ 46.0″	-42.5	-46.0	9.5	-42.5 to -46	

Table 7. Actual Sample Location Coordinates, Date and Time of Sampling, Core Depths, Mudline Elevations, Core Intervals Sampled, and Tests performed for the Samples Collected in March 2017.

Fed. Chan./ Area	Core Designation	Date Sampled	Time Sampled	Geographic Coordinates (NAD 83)		Mudline Elevation (ft., MLLW)	Design Depth + Overdepth (ft., MLLW)	Core Recovery (ft.)	Core Interval Sampled (ft., MLLW)	Individual Core Analyses
				Latitude North	Longitude West					
Area A: Approach Channel	Hueneme-VC-16-A-01b	3/11/17	11:40	34.14469º	119.21294º	-44.0	-46.0	5.2	-44.0 to -46	PAHs and PCBs
	Hueneme-VC-16-A-02b	3/11/17	10:43	34.14413º	119.21339º	-43.8	-46.0	4.5	-43.8 to -46	
	Hueneme-VC-16-A-03b	3/11/17	09:30	34.14359º	119.21288º	-42.3	-46.0	4.7	-42.3 to -46	
	Hueneme-VC-16-A-04b	3/11/17	09:05	34.14380º	119.21339º	-42.5	-46.0	6.2	-42.5 to -46	
	Hueneme-VC-16-A-05b	3/11/17	08:27	34.14376º	119.21417º	-39.4	-46.0	7.0	-39.4 to -46	
	Hueneme-VC-16-A-06b	3/11/17	09:50	34.14406º	119.21227º	-43.2	-46.0	6.4	-43.2 to -46	
	Hueneme-VC-16-A-07b	3/11/17	10:12	34.14426º	119.21207º	-42.1	-46.0	4.5	-42.1 to -46	
	Hueneme-VC-16-A-08b	3/11/17	11:15	34.14467º	119.21334º	-42.3	-46.0	6.3	-42.3 to -46	
Area E: Entrance Channel	Hueneme-VC-16-E-01b	3/11/17	12:07	34.14505º	119.21175º	-36.8	-42.0	5.5	-36.8 to -42	PAHs and PCBs
	Hueneme-VC-16-E-02b	3/11/17	12:55	34.14544º	119.21224º	-38.2	-42.0	4.8	-38.2 to -42	
	Hueneme-VC-16-E-03b	3/11/17	13:17	34.14557º	119.21125º	-37.7	-42.0	6.3	-37.7 to -42	
	Hueneme-VC-16-E-04b	3/11/17	13:40	34.14635º	119.21133º	-37.1	-42.0	5.0	-37.1 to -42	
	Hueneme-VC-16-E-05b	3/11/17	13:55	34.14643º	119.21043º	-37.3	-42.0	6.0	-37.3 to -42	
	Hueneme-VC-16-E-06b	3/11/17	14:35	34.14698º	119.21087º	-38.6	-42.0	6.0	-38.6 to -42	
	Hueneme-VC-16-E-07b	3/11/17	15:00	34.14689º	119.20982º	-37.7	-42.0	5.3	-37.7 to -42	
	Hueneme-VC-16-E-08b	3/11/17	15:40	34.14802º	119.21009º	-37.6	-42.0	5.8	-37.6 to -42	
	Hueneme-VC-16-E-09b	3/11/17	16:05	34.14787º	119.20918º	-38.8	-42.0	6.0	-38.8 to -42	

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Table 7. Actual Sample Location Coordinates, Date and Time of Sampling, Core Depths, Mudline Elevations, Core Intervals Sampled, and Tests performed for the Samples Collected in March 2017 (Continued).

Fed. Chan./ Area	Core Designation	Date Sampled	Time Sampled	Geographic Coordinates (NAD 83)		Mudline Elevation (ft., MLLW)	Design Depth + Overdepth (ft., MLLW)	Core Recovery (ft.)	Core Interval Sampled (ft., MLLW)	Individual Core Analyses
				Latitude North	Longitude West					
Area T: Turning Basin/Channel A	Hueneme-VC-16-T-01b	3/12/17	11:30	34.14862	119.20752	-39.7	-42.0	4.8	-39.7 to -42	PAHs and PCBs
	Hueneme-VC-16-T-02b	3/10/17	15:35	34.14781	119.20710	-36.5	-42.0	5.8	-36.5 to -42	
	Hueneme-VC-16-T-03b	3/12/17	10:45	34.14898	119.20691	-36.8	-42.0	6.0	-36.8 to -42	
	Hueneme-VC-16-T-04b	3/10/17	15:05	34.14780	119.20578	-38.7	-42.0	4.7	-38.7 to -42	
	Hueneme-VC-16-T-05b	3/10/17	09:10	34.14796	119.20438	-38.1	-42.0	4.2	-38.1 to -42	
	Hueneme-VC-16-T-06b	3/11/17	07:45	34.14781	119.20286	-36.5	-42.0	5.5	-36.5 to -42	
	Hueneme-VC-16-T-07b	3/10/17	07:50	34.14860	119.20302	-40.3	-42.0	6.0	-40.3 to -42	
	Hueneme-VC-16-T-08b	3/10/17	08:30	34.14827	119.20368	-39.6	-42.0	6.0	-39.6 to -42	
	Hueneme-VC-16-T-09b	3/10/17	15:55	34.14862	119.20581	-38.7	-42.0	5.5	-38.7 to -42	
	Hueneme-VC-16-T-10b	3/10/17	16:20	34.14898	119.20651	-36.7	-42.0	5.3	-36.7 to -42	
	Hueneme-VC-16-T-11b	3/10/17	16:40	34.14975	119.20650	-37.4	-42.0	5.5	-37.4 to -42	
	Hueneme-VC-16-T-12b	3/10/17	17:20	34.15041	119.20654	-37.0	-42.0	6.0	-37.0 to -42	
	Hueneme-VC-16-T-13b	3/11/17	16:35	34.15128	119.20667	-37.3	-42.0	5.9	-37.3 to -42	
	Hueneme-VC-16-T-14b	3/11/17	17:05	34.15142	119.20782	-36.4	-42.0	5.6	-36.4 to -42	
	Hueneme-VC-16-T-15b	3/12/17	10:00	34.15141	119.20861	-36.6	-42.0	5.4	-36.6 to -42	
	Hueneme-VC-16-T-16b	3/12/17	09:35	34.15089	119.20886	-37.2	-42.0	5.7	-37.2 to -42	
	Hueneme-VC-16-T-17b	3/12/17	09:00	34.14992	119.20898	-38.4	-42.0	4.5	-38.4 to -42	
	Hueneme-VC-16-T-18b	3/12/17	08:15	34.14926	119.20960	-38.1	-42.0	6.0	-38.1 to -42	
	Hueneme-VC-16-T-19b	3/12/17	07:40	34.14887	119.20927	-37.2	-42.0	4.0	-37.2 to -42	

3.2.3 Hueneme Beach and Nearshore Reference Samples

A series of surface grabs were collected along three (3) transects perpendicular to the shore at the receiving beach. The beach transect sampling was conducted over the period of November 9 through 16, 2016 and consisted of collecting surface grab samples at eight elevations (+12, +6, 0, -6, -12, -18, -24 and -30 feet MLLW) along each transect. Locations of these transects are shown on Figure 10. Higher elevations (above – 6 feet MLLW) did not exist for Transects A as no beach exists at this transect location, only cobble. In addition to the transect samples, eleven nearshore grab samples were collected from the nearshore placement area shown on Figure 10 on March 10, 2017. Individual geotechnical grain size testing was performed on all grab samples collected along the transects and from the nearshore area. Table 7 provides a list of the final locations for the beach transect and nearshore samples along with the dates and times of collection.

In addition to individual grain size analyses, the grab samples collected from the fifteen Hueneme Beach nearshore locations (-6 to -30 feet MLLW along all three transects) were composited into a single composite sample and the eleven nearshore samples were composited into a second composite sample. These composite samples were archived as reference material in case acute solid phase bioassay testing was required. The holding times for the offshore transect composite sample has since expired. The holding time for the nearshore area composite sample expired on May 5, 2017 since it was re-collected during the March sampling effort. Bioaccumulation data derived from this composite sample serves as reference data for the bioaccumulation testing that was conducted. Bioaccumulation testing was initiated slightly after the reference sample hold time as described later.

After the grain size results from the initial Hueneme Beach reference areas were examined, USACE, Los Angeles District decided to explore three additional nearshore areas and sample additional locations in the initial nearshore area. Eleven locations were sampled for grain size only in each of the four nearshore areas. This was conducted on June 20, 2017. Figure 10 shows the locations of the June samples collected. Table 9 provides coordinates for each of these nearshore locations along with the dates and times of collection.

3.2.4 Geotechnical Samples and Testing

A sufficient quantity of sediment was collected from each location within the Port Hueneme channel areas so that a representative amount of sediment was included in each geotechnical sample. At least one primary grain size sample was formed and analyzed from each core collected in November 2016. At a minimum, this sample represented the material from the mudline to the project overdepth, though often several discrete intervals were collected within the primary core interval. Grain size analyses were also conducted on each sampling location along the three (3) beach transects and the nearshore placement areas for a total of 76 additional samples.

USACE, Los Angeles District requested that one (1) additional sample from each core that represents the five feet of material below the overdepth elevation be collected and tested for grain size. Data from these samples are for informational and internal purposes only and were not used for beach suitability purposes and are not included in this report.

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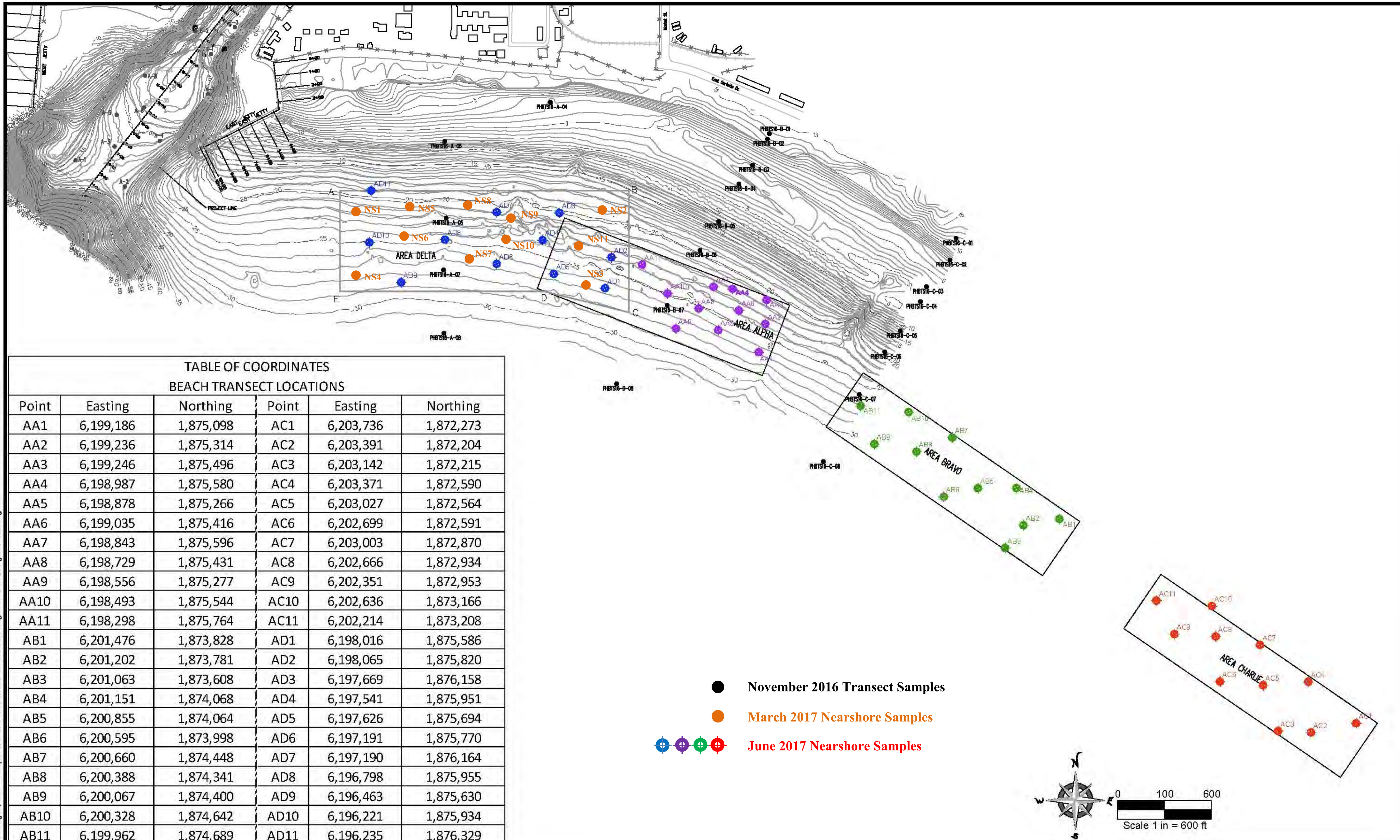

TABLE OF COORDINATES
BEACH TRANSECT LOCATIONS

Point	Easting	Northing	Point	Easting	Northing
AA1	6,199,186	1,875,098	AC1	6,203,736	1,872,273
AA2	6,199,236	1,875,314	AC2	6,203,391	1,872,204
AA3	6,199,246	1,875,496	AC3	6,203,142	1,872,215
AA4	6,198,987	1,875,580	AC4	6,203,371	1,872,590
AA5	6,198,878	1,875,266	AC5	6,203,027	1,872,564
AA6	6,199,035	1,875,416	AC6	6,202,699	1,872,591
AA7	6,198,843	1,875,596	AC7	6,203,003	1,872,870
AA8	6,198,729	1,875,431	AC8	6,202,666	1,872,934
AA9	6,198,556	1,875,277	AC9	6,202,351	1,872,953
AA10	6,198,493	1,875,544	AC10	6,202,636	1,873,166
AA11	6,198,298	1,875,764	AC11	6,202,214	1,873,208
AB1	6,201,476	1,873,828	AD1	6,198,016	1,875,586
AB2	6,201,202	1,873,781	AD2	6,198,065	1,875,820
AB3	6,201,063	1,873,608	AD3	6,197,669	1,876,158
AB4	6,201,151	1,874,068	AD4	6,197,541	1,875,951
AB5	6,200,855	1,874,064	AD5	6,197,626	1,875,694
AB6	6,200,595	1,873,998	AD6	6,197,191	1,875,770
AB7	6,200,660	1,874,448	AD7	6,197,190	1,876,164
AB8	6,200,388	1,874,341	AD8	6,196,798	1,875,955
AB9	6,200,067	1,874,400	AD9	6,196,463	1,875,630
AB10	6,200,328	1,874,642	AD10	6,196,221	1,875,934
AB11	6,199,962	1,874,689	AD11	6,196,235	1,876,329

Figure 10. Hueneme Beach Transect Locations and Nearshore Placement Areas and Locations from June 2016, March 2017 and June 2017.

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Table 8. Dates, Times and Sampling Coordinates for Samples Collected from the Beach Transects and Initial Nearshore Placement Area.

Area	Site Designations	Date	Time	Approx. Sampling Elevations (feet, MLLW)	Latitude North	Longitude West
Beach Transect A (PHBTS16-A)	A+12 (A1)	No Samples Collected - Breakwater Over Site Locations				
	A+6 (A2)					
	A0 (A3)					
	A-6 (A4)	11/16/2016	15:47	-4	34.144100º	119.203233º
	A-12 (A5)	11/17/2016	9:07	-12	34.143250º	119.205880º
	A-18 (A6)	11/10/2016	11:15	-18	34.141649º	119.205822º
	A-24 (A7)	11/10/2016	11:40	-24	34.140562º	119.205874º
	A-30 (A8)	11/10/2016	11:50	-30	34.139239º	119.205845º
Beach Transect B (PHBTS146-B)	B+12 (B1)	11/15/2016	16:52	+12	34.143500º	119.197717º
	B+6 (B2)	11/15/2016	16:45	+6	34.143383º	119.197767º
	B0 (B3)	11/15/2016	16:42	0	34.142833º	119.198133º
	B-6 (B4)	11/16/2016	16:12	-4	34.142433º	119.198467º
	B-12 (B5)	11/17/2016	9:20	-12	34.141646º	119.198967º
	B-18 (B6)	11/10/2016	12:24	-18	34.141036º	119.199425º
	B-24 (B7)	11/10/2016	12:12	-24	34.139876º	119.200237º
	B-30 (B8)	11/10/2016	12:00	-30	34.138226º	119.201485º
Beach Transect C (PHBTS16-C)	C+12 (C1)	11/9/2016	16:04	+12	34.141350º	119.192983º
	C+6 (C2)	11/9/2016	16:00	+6	34.140900º	119.193133º
	C0 (C3)	11/9/2016	15:55	0	34.140333º	119.193717º
	C-6 (C4)	11/16/2016	16:32	-4	34.140017º	119.193867º
	C-12 (C5)	11/17/2016	9:30	-12	34.139401º	119.194362º
	C-18 (C6)	11/10/2016	12:37	-18	34.138959º	119.194753º
	C-24 (C7)	11/10/2016	12:46	-24	34.138060º	119.195378º
	C-30 (C8)	11/10/2016	12:55	-30	34.136648º	119.196260º
Nearshore Placement Area*	NS1	3/10/2017	11:10	-21.9	34.141673º	119.207782º
	NS2	3/10/2017	12:00	-19.1	34.141908º	119.202050º
	NS3	3/10/2017	12:20	-26.4	34.140334º	119.202166º
	NS4	3/10/2017	13:00	-28.1	34.140372º	119.207787º
	NS5	3/10/2017	11:30	-18.2	34.142208º	119.206625º
	NS6	3/10/2017	12:50	-25	34.141169º	119.206760º
	NS7	3/10/2017	12:40	-25.8	34.140862º	119.204886º
	NS8	3/10/2017	11:40	-17.4	34.142198º	119.205073º
	NS9	3/10/2017	11:50	-19.7	34.142003º	119.203947º
	NS10	3/10/2017	12:30	-23.6	34.141377º	119.204055º
	NS11	3/10/2017	12:10	-22.2	34.141173º	119.202649º

* Not sampled in November 2016

Table 9. Dates, Times and Sampling Coordinates for Samples Collected from the June 2017 Supplemental Hueneme Beach Nearshore Placement Areas.

Nearshore Area	Site Designations	Date	Time	Depth of Water (feet)	Latitude North	Longitude West
Alpha	AA1	06/20/17	1033	27	34.1389210º	119.1979199º
	AA2	06/20/17	1039	24	34.1395166º	119.1977639º
	AA3	06/20/17	1044	19	34.1400166º	119.1977394º
	AA4	06/20/17	1048	21	34.1402398º	119.1985956º
	AA5	06/20/17	1054	26	34.1393739º	119.1989456º
	AA6	06/20/17	1058	24	34.1397911º	119.1984308º
	AA7	06/20/17	1102	22	34.1402793º	119.1990748º
	AA8	06/20/17	1106	25	34.1398230º	119.1994429º
	AA9	06/20/17	1110	29	34.1393944º	119.2000106º
	AA10	06/20/17	1112	23	34.1401253º	119.2002296º
	AA11	06/20/17	1118	23	34.1407234º	119.2008808º
Bravo	AB1	06/20/17	0928	26	34.13550845º	119.1903028º
	AB2	06/20/17	0934	30	34.13537049º	119.1912065º
	AB3	06/20/17	0939	31	34.13488995º	119.1916593º
	AB4	06/20/17	0943	27	34.13615705º	119.1913879º
	AB5	06/20/17	0949	26	34.13613425º	119.1923637º
	AB6	06/20/17	0955	30	34.13594557º	119.1932226º
	AB7	06/20/17	1000	25	34.13718383º	119.1930233º
	AB8	06/20/17	1007	28	34.136882º	119.1939185º
	AB9	06/20/17	1013	28	34.13703186º	119.1949817º
	AB10	06/20/17	1020	24	34.13770644º	119.1941278º
	AB11	06/20/17	1025	27	34.13782404º	119.1953391º
Charlie	AC1	06/20/17	0830	25	34.13130837º	119.1827766º
	AC2	06/20/17	0838	30	34.1311067º	119.1839129º
	AC3	06/20/17	0841	33	34.13113017º	119.1847371º
	AC4	06/20/17	0848	26	34.13216642º	119.1839929º
	AC5	06/20/17	0853	30	34.13208344º	119.185128º
	AC6	06/20/17	0857	31	34.13214815º	119.1862151º
	AC7	06/20/17	0901	27	34.13292456º	119.1852199º
	AC8	06/20/17	907	28	34.13309053º	119.1863359º
	AC9	06/20/17	0911	32	34.13313109º	119.1873771º
	AC10	06/20/17	0919	23	34.13372604º	119.1864436º
	AC11	06/20/17	0923	29	34.13382721º	119.18784º
Delta	AD1	06/20/17	1122	26	34.14022394º	119.2018063º
	AD2	06/20/17	1126	22	34.14087019º	119.2016524º
	AD3	06/20/17	1131	19	34.14178491º	119.2029753º
	AD4	06/20/17	1134	22	34.14121276º	119.2033891º
	AD5	06/20/17	1137	27	34.14050876º	119.2030983º
	AD6	06/20/17	1141	27	34.14070356º	119.2045393º
	AD7	06/20/17	1145	19	34.14178608º	119.2045595º
	AD8	06/20/17	1149	24	34.14119876º	119.2058469º
	AD9	06/20/17	1152	26	34.14029427º	119.206938º
	AD10	06/20/17	1156	26	34.14112106º	119.2077515º
	AD11	06/20/17	1200	17	34.14220735º	119.20772º

All mechanical grain size tests were run according to ASTM D 422 (1963). In addition to the mechanical grain size samples, ten (10) hydrometer tests were run according to ASTM D 422 and ten (10) Atterberg Limits tests were run according to ASTM D 4318 (2005). The hydrometer and Atterberg tests were conducted on samples with the highest proportions of fine grained material. All geotechnical data gathered were used to do physical beach compatibility analyses between the dredged sediments and the receiving beach. This task was accomplished by USACE-Los Angeles District and is included as Appendix C to this report.

3.2.5 Summary of Port Hueneme Testing and Evaluation Sequence

The testing and evaluation sequence for the Port Hueneme composite samples is described in detail in the next subsection and is outlined as follows:

1) Bulk sediment chemical analyses were conducted on each composite sample.
2) Grain size physical compatibility analyses was conducted by the Los Angeles District U.S. Army Corps of Engineers Geotechnical Branch.
3) Analytical results were evaluated using the sediment quality guidelines consisting of Effects Range Low (ERL) and Effects Range Medium (ERM) values developed by Long, *et al*. (1995) that correlate concentrations of selected contaminants with likelihood of adverse biological effects. The sediment chemistry summary tables in Section 4 (Results) list available ERL and ERM values. Please note that ERLs and ERMs have not been developed for all analytes.
4) Analytical results were also evaluated using the USEPA's RSL (Regional Screening Levels) (USEPA Region 9, updated 2016) and the State of California's CHHSL (California Human Health Screening Levels) for potential effects to humans (Cal/EPA, updated 2010). The sediment chemical summary table in Section 4 lists the available RSL and CHHSL values.
5) Bioaccumulation Potential tissue results were statistically compared to reference tissue results and relevant action levels and toxicity reference values.

If grain size characteristics are compatible with the receiving beach and/or nearshore areas and contaminant levels are low compared to lower effects based screening levels and human health screening levels, then the sediments should be suitable for beach nourishment and no further testing would be required. However, additional testing consisting of individual core chemistry and bioaccumulation potential testing were required since elevated concentrations of PCBs and PAHs were encountered in the initial composite samples.

3.2.6 Evaluation Guidelines

As mentioned above, to aid in the evaluation of sediment test data, chemical concentrations of contaminants found within the sediments were compared to sediment quality guidelines (Long et. al., 1995) developed by NOAA. These guidelines can be used to screen sediments for contaminant concentrations that might cause biological effects and to identify sediments for further toxicity testing. For any given contaminant, ERL guidelines represent the 10^{th} percentile concentration value in the NOAA database that might be expected to cause adverse biological effects and ERM guidelines reflect the 50^{th} percentile value in the database. Note that ERLs and ERMs were only used as a screening tool. They were not used to determine suitability. The final suitability determination will be made by the USACE in consultation with the SC-DMMT based on the results reported in the SAPR.

As an additional measure of potential toxicity, the mean ERM quotients (ERMq) for the composite samples were calculated according to Long et al. (1998a) and Hyland et al. (1999). ERMq is calculated by dividing each contaminant concentration by its respective ERM value and then summing the results and dividing through by the number of contaminants as shown in the following equation:

$$ERMQuotient = \frac{1}{24}\sum \frac{SampleConcentration}{ERM}$$

In cases where concentrations of measured contaminants are below the method detection limit (MDL), values of ½ the MDL were used for the ERMq calculations. For a general overall indication of toxicity, a quotient less than 0.1 is indicative of a low probability (<12%) of a highly toxic response to marine amphipods (Long and MacDonald, 1998b). If there are no ERL exceedances in a sample, there is less than a 10% probability of a highly toxic response to marine amphipods. The probability of a highly toxic response increases to 71% for quotients greater than 1.0.

The dredge material was assessed to whether or not it is suitable for human contact. To do so, the chemical results were compared to "Regional Screening Levels for Chemical Contaminants at Superfund Sites" (USEPA Region 9, updated 2017), formerly known as Preliminary Remediation Goals (PRGs). These screening levels (RSLs) were developed for Superfund/RCRA programs and are a consortium of USEPA Region 9 PRGs, USEPA Region 3 Risked-Based Concentrations (RBCs) and EPA Region 6 Human Health Medium – Specific Screening Levels (HHMSSLs). RSLs are risk-based concentrations derived from standardized equations combining exposure information assumptions with EPA toxicity data. RSLs used in this report are based on a conservative target hazard quotient of 0.1.

RSLs are considered by the USEPA to be protective for humans (including sensitive groups) over a lifetime. However, RSLs are not always applicable to a particular site and do not address non-human health endpoints, such as ecological impacts. The RSLs in the sediment chemistry summary table were calculated without site-specific information. They are used for site "screening" and as initial cleanup goals. RSLs are not cleanup standards and were not applied as such. The RSL's primary role in site "screening" is to help identify areas, contaminants, and conditions that require further federal attention at a particular site, and they are also useful in determining risks to human exposure at non-superfund sites. RSLs may be lower than the California Title 22 Total Threshold Limit Concentration (TTLC) values, but often are much higher. Material with excessive RSL exceedances should be re-used as buried fill instead of topsoil provided it can be shown that the material will not leach contaminants at detrimental concentrations into groundwater and receiving waters.

Human health risks were also evaluated using CHHSLs. CHHSLs (Cal/EPA, updated 2010) are concentrations of 54 hazardous chemicals in soil or soil gas that are considered to be protective of human health. The CHHSLs were developed by the Office of Environmental Health Hazard Assessment (OEHHA) on behalf of California Environmental Protection Agency (Cal/EPA).

CHHSLs listed in the sediment chemistry summary table (Section 4.0) were developed separately for industrial/commercial settings and for residential settings.

Twenty-eight-day bioaccumulation exposures were performed on the three composite samples collected in March using worms only. There was insufficient sediment volume to do both worms and clams. Species selection for the single-species bioaccumulation test was made by the USACE in consultation with the USEPA. Test sediments were exposed concurrently with reference (nearshore area) and control sediments, and tissues generated from the exposures were analyzed for PCBs. Concentrations in tissues of organisms exposed to reference sediments were compared with concentrations in organisms exposed to test sediments. Constituents that show statistically elevated concentrations in test tissues are considered potentially bioaccumulative and were then evaluated to determine if these levels are biologically important.

3.3 Field Sampling Protocols

Vibracore sampling, grab sampling, decontamination, sample processing and documentation procedures are discussed in this section.

3.3.1 Positioning and Depth Measurements

Positioning at sampling locations was accomplished using a differential GPS (DGPS) navigation system with positioning accuracies of 3 to 10 feet. The locations were recorded in Geographic coordinates (NAD 83) and converted to State Plane Coordinates (CA Zone V, NAD 83). Water depths were measured with a graduated lead line and corrected to mean lower low water (MLLW). Tidal stage was determined using NOAA predicted tide tables checked against a local tide gage or real-time tidal stage data. These tide data were used to calculate the seafloor elevation/mudline for each site.

All sampling sites were located within Federal Channel limits and within 50 feet of target coordinates with the exception of the four initial Approach Channel locations that were moved due to ocean conditions and a couple other locations that were moved due to the presence of a ship or to target a more shoaled area. Actual locations are listed in Tables 5 through 7.

3.3.2 Vibracore Sampling Methods

All sediment samples were collected using an electric vibracore. The cores were advanced beyond the target sampling elevation (project elevation plus two feet for overdepth allowance plus up to five feet for geotechnical purposes only). At the conclusion of a successful vibracore, the core liner was removed and split open for inspection and sampling. Extrusion of the cores was not allowed. Processing took place on onshore.

Vibracore sampling was conducted from the 35-foot vessel ***DW Hood***. This vessel with a Uniflite hull is outfitted with a 14-foot tall A-frame and a winch that is suitable for the coring equipment. This vessel is fully equipped with all necessary navigation, safety, and lifesaving devices per Coast Guard requirements and is capable of three-point anchoring.

Kinnetic Laboratories' vibracore consists of a 4-inch diameter aluminum coring tube, a stainless steel cutting tip, and a stainless-steel core catcher. Food-grade clean polyethylene liners were inserted into the core tubes. The vibrating unit has two counter-rotating motors encased in a waterproof aluminum housing. A three-phase, 240-volt generator powers the motors. The vibracore head and tube were lowered overboard with a boom. The unit was then vibrated until it reached below the target sampling elevation or until the depth of refusal was reached.

When penetration of the vibracore was complete, power was shut off to the vibra-head, and the vibracore was extracted from the sediment and brought aboard the vessel. A check valve located on top of the core tube reduced or prevented sediment loss during pull-out. The length of sediment recovered was noted by measuring down the interior of the core tube to the top of the sediment. The core tube was then detached from the vibra-head, and the core cutting tip and catcher were removed. Afterwards, the core liners were removed and sealed on both ends and transported to the shore-side processing facility.

A stand was used to support the vibracore in waters unprotected from wave action. The vibracore and stand were lowered overboard from the sampling vessel as one unit. Use of a stand allowed the sampling vessel to move off of the sampling location while the coring apparatus penetrates the sediment. Thus one-point anchoring or no anchoring could be utilized. A stand also prevented the coring apparatus from being pulled up from waves while trying to penetrate, thus alleviating multiple penetrations of the same material.

3.3.3 Vibracore Decontamination

All sample contact surfaces were stainless steel or polyethylene. Compositing tools were stainless steel or Teflon® coated stainless steel. Except for the core liners, all contact surfaces of the sampling devices and the coring tubes were cleaned for each sampling location. The cleaning protocol consisted of a site water rinse, a Micro-90® soap wash, and then finished with deionized water rinses. The polyethylene core liners were new and of food grade quality. All rinseate was collected in containers and disposed of properly.

3.3.4 Core Processing

Whole cores were processed on top of tables at a shore side processing facility. The tables were covered in clean plastic for every core. Cores were placed in a PVC core rack that was cleaned between cores. After placement in the core rack, core liners were split lengthwise to expose the recovered sediment. Once exposed, sediments that came in contact with the core liner were removed by scraping with a pre-cleaned stainless steel spoon. Each core was photographed, measured, and lithologically logged in accordance with the Unified Soil Classification System (USCS) as outlined in ASTM Standards D-2488 (2006) and D-2487 (2006). A geologist from Diaz Yourman and Associates did the lithologic logging along with collection of sample splits for geotechnical testing. Only the original cores collected in November 2016 were lithologically logged. Cores collected in March 2017 were photographed but not logged.

Photographs were taken of each core (each photograph covers a maximum two-foot interval). These pictures are included as Appendix D of this report with captions describing the subject and date.

Following logging, vertical composite subsamples were then formed from each core and samples for grain size analyses were formed. The primary vertical composite subsamples were from the mudline to project depth plus two feet below the project depth or depth of refusal. Primary vertical composite subsamples were used to form area composite samples and individual samples for chemical testing. An archived sample was formed from each primary vertical composite subsample. Since there was no distinct geologic stratification greater than two feet nor layers of suspected contamination in the cores, no additional archive samples were collected. Distinct geologic strata greater than eight inches in length were analyzed or archived for grain size.

Vertical composite subsamples were formed by combining and homogenizing a representative sample from each primary core interval, as described above, in a pre-cleaned stainless steel tray. A 0.5-liter portion of each primary vertical composite subsample was placed in a pre-cleaned and certified glass jar with a Teflon®-lined lid for archived material (Ziploc bags for geotechnical samples). The remaining portion of each primary vertical composite subsample within each sampling interval identified for composite sample formation was placed in another pre-cleaned tray for area composing with all other cores from the same channel/composite area. All samples for grain size analyses were transferred to pre-labeled sample containers (sealed plastic bags) and stored appropriately and ultimately transferred to Diaz-Yourman and Associates for analysis.

Except for archival material for chemical analyses, containers were completely filled to minimize air bubbles being trapped in the sample container. A small amount of headspace was allowed for archived chemistry samples to prevent container breakage during freezing. For the preservation of the sediment composite chemistry samples, filled containers were refrigerated or placed on ice immediately following sampling and maintained at 2 to 4°C until analyzed. Resampled archived samples for chemistry were placed on ice initially and then frozen as soon as possible. Archived samples for bioassay testing were maintained at 2 to 4°C. The sample containers, both jars and bags, were sealed to prevent any moisture loss and possible contamination.

3.3.5 Beach Transect and Nearshore Placement Area Grab Samples

November 2017. The three Hueneme Beach transects were performed approximately perpendicular to the existing water line and offshore bathymetry as shown on Figure 10. In addition, Beach transect sampling consisted of collecting surface grab samples of sediment at six foot increments in elevation between +12 and -30 feet MLLW (eight samples per transect). Beach transect locations identified in the project SAP were adjusted in the field to match existing conditions and landmarks. Reference points/coordinates used to maintain position along each transect were included in the Field Logs. Each transect location was individually logged and analyzed for physical properties.

March 2017. Eleven randomly placed grab samples were collected from within the boundaries of the nearshore placement area identified as Area Delta on Figure 10. Each nearshore placement area location was individually logged and analyzed for physical properties.

June 2017. Eleven additional locations were sampled in Area Delta to confirm the initial results and provide additional physical data. In addition, eleven randomly placed grab samples were collected from within the boundaries of three additional nearshore placement areas identified as Areas Alpha, Bravo and Charlie on Figure 10. These areas were added in order to fully characterize the nearshore areas of Hueneme Beach.

Positioning at all transect sampling locations was accomplished using a DGPS navigation system. Water depths at intertidal and subtidal stations were measured with a graduated lead line (or other approved method) and corrected to MLLW. Records were maintained during fieldwork to confirm the accuracy of the navigation systems.

The top three to six inches of sand or sediment was collected at all beach transect and nearshore area sampling locations. The three highest locations along each beach transect on land or in the intertidal area were sampled using a hand held scoop. All other offshore stations were sampled from the ***DW Hood*** and a Boston Whaler using Smith McIntyre and Ponar grab samplers. At each offshore station, the grab sampler was deployed, and upon retrieval, the grab was visually inspected to ensure the sample was acceptable according to SOPs. A subsample of each grab was collected using a sampling scoop.

All samples for grain size analyses were transferred to pre-labeled sample containers (sealed plastic bags) and stored appropriately until they were transferred to Diaz-Yourman and Associates for analysis. An additional subsample was collected from each grab and combined with similar, equally weighted subsamples from all offshore grabs (-6 to -30 MLLW) along all three offshore transects. Similar subsamples were collected from the nearshore placement area and combined. These offshore composite samples were placed in a new, food grade polyethylene bags and stored at 2º to 4º C as archive material at Kinnetic Laboratories. The transect composite archive material has expired. The nearshore area composite archived material was used as reference material should bioaccumulation potential testing on the three Port Hueneme composite samples formed in March 2017.

3.3.6 Detailed Soils Log

A detailed soils log was prepared for each sampling location, including beach transect and nearshore placement area locations. These logs include the project name, hole or transect number or designation, date, time, location, water depth, estimated tide, mudline elevation, type and size of sampling device used, depth of penetration, length of recovery, name of person(s) taking samples, depths below mudline of samples, and a description and condition of the sediment. Descriptions of the sediment were conducted in accordance with ASTM D 2488 (2006), and included as a minimum: grain size, color, maximum particle size, estimation of density (sand) or consistency (silts and clays), odor (if present), and description of amount and types of organics and trash present. In cohesive soils, a pocket penetrometer and miniature vane shear device (torvane) was used to collect estimated strength/consistency data. Copies of the generated soils logs are included as Appendix E of this report.

3.3.7 Documentation and Sample Custody

All samples containers were physically marked as to sample location, date, time and analyses. All samples were handled under Chain of Custody (COC) protocols beginning at the time of collection. Samples were considered to be "in custody" if they were (1) in the custodian's possession or view, (2) in a secured place (locked) with restricted access, or (3) in a secure container. Standard COC procedures were used for all samples collected, transferred, and analyzed as part of this project. COC forms were used to identify the samples, custodians, and dates of transfer. Each person who had custody of the samples signed the COC form and ensured samples were stored properly and not left unattended unless properly secured.

Standard information on Chain of Custody forms includes:

- Sample Identification
- Sample Collection Date and Time
- Sample Matrices (e.g., marine sediment)
- Analyses to be Performed
- Container Types
- Preservation Method
- Sampler Identification
- Dates of Transfer
- Names of Persons with Custody

Completed COC forms (for all samples including archive samples) were placed in a sealable plastic bag that was placed in the cooler with the samples. Copies of the COC forms are included with the analytical laboratory reports attached as Appendix F. Redundant sampling data were also recorded on field data log sheets. Copies of the field data logs are included in this report as Appendix G.

As described in Sections 3.3.6, detailed soil logs were prepared from each sampling location. These soil logs are an integral part of this report.

3.4 Laboratory Testing Methods

Analytical chemical testing of sediments for this project was carried out by Eurofins Calscience; a state certified testing laboratory (Cal-ELAP No. 2944) using USEPA and USACE approved methodologies. Extraction and analysis of the composite samples occurred between the period of November 18, 2016 and December 13, 2016 for the initial three composite samples. Extraction and analysis of the individual core samples occurred on March 20 and 21, 2017. Extraction and analysis of the supplemental individual core samples and composite sample from July 2017 occurred on July 10 to July 24, 2017. Hushmand Associates carried out all geotechnical analyses.

3.4.1 Geotechnical Testing

Sieve analyses and hydrometer testing were performed according to ASTM D 422 (1963), and Atterberg Limits were determined according to ASTM D 4318 (2005). Required U.S. standard sieve sizes included No. 4, 7, 10, 14, 18, 25, 35, 45, 60, 80, 120, 170, 200, and 230 sieves. All sediment samples were classified in accordance with the Unified Soil Classification System (ASTM D 2487-06 and ASTM D 2488-06). Grain size compatibility of the proposed dredge material with the reuse areas was evaluated by the Los Angeles District USACE (Appendix C). Note that ASTM D 422 for grain size is similar to but deviates from the method by Plumb (1981) specified in the draft SC-DMMT SAP guidance document.

3.4.2 Bulk Sediment Chemical Analyses

The four sediment composite samples collected from within Port Hueneme (three in November 2016 and one in June 2017) were analyzed for the parameters, methods and quantification limits specified in Table 10. The same methods and quantification limits were used for the PCB and PAH analyses conducted on the individual cores. The results are reported in dry weight unless noted otherwise. All analyses were conducted in a manner consistent with guidelines for dredge material testing methods in the USEPA/USACE ITM. Samples were extracted and analyzed within specified USEPA holding times, and all analyses were accomplished with appropriate quality control measures.

Discrete chemistry samples from each location are being archived frozen and will be for at least 180 days from collection. Additional direction will be provided for additional analysis, if required.

There are a few method deviations from those listed in the draft SC-DMMT guidelines. These method deviations were detailed in the project SAP. One deviation is that EPA method 8082A ECD for PCB congeners was substituted with EPA method 8270C (SIM). Eurofins Calscience has shown less interferences with this method and they have received prior approval form the San Francisco Bay Region Dredge Material Management Office (DMMO) and EPA Region 9 to use this method after an extensive side-by-side comparison of methods using “blind” standards supplied from an independent, certified laboratory (DMMO, 2012). Furthermore, this method has been used successfully on numerous other LA District USACE maintenance dredging projects. The remaining method deviations are associated with conventional analyses. The following similar methods were submitted:

- Standard Method (SM) 4500-NH3 B/C ammonia (as N) was substituted for EPA method 350.1M
- SM 2540 B for total solids was substituted for EPA 160.3.
- EPA 160.4 (M) for total volatile solids (TVS) was substituted for SM 2540.

Table 10. Sediment Analytical Methods and Target Quantitation Limits.

Analyte	Method	Method Detection Limits (Dry Weight)	Laboratory Reporting Limits (Dry Weight)	SAP Reporting Limits (Wet Weight)
CONVENTIONALS (mg/kg except where noted)				
Ammonia	SM 4500-NH3 B/C (M)	0.15 – 0.16	0.28 – 0.30	0.2
Percent Solids (%)	SM 2540 B	0.10	0.10	0.1
Total Organic Carbon (%)	EPA 9060A	0 024 – 0.026	0.069 – 0.075	0.05
Total Volatile Solids (%)	EPA 160.4M	0.10	0.10	0.1
Total Sulfides	EPA 376.2M	12 - 13	14 - 15	10
Dissolved Sulfides	EPA 376.2M	0.017	0.10	0.1
Oil & Grease	EPA 1664A (M) HEM	11 - 12	14 - 15	10
TRPH	EPA 1664A (M) HEM-SGT	11 - 12	14 - 15	10
METALS (mg/kg)				
Arsenic	EPA 6020	0.121 – 0.130	0.139 – 0.149	0.1
Cadmium	EPA 6020	0.0794 – 0.0853	0.139 - 0.149	0.1
Chromium	EPA 6020	0.0861 – 0.0925	0.139 - 0.149	0.1
Copper	EPA 6020	0.0581 – 0.0625	0.139 - 0.149	0.1
Lead	EPA 6020	0.0914 – 0.0982	0.139 - 0.149	0.1
Mercury	EPA 7471A	0.00776 – 0.00847	0.0264 – 0.0307	0.02
Nickel	EPA 6020	0.0702 – 0.0754	0.139 - 0.149	0.1
Selenium	EPA 6020	0.101 – 0.109	0.139 - 0.149	0.1
Silver	EPA 6020	0.0434 – 0.0466	0.139 - 0.149	0.1
Zinc	EPA 6020	1.10 – 1.18	1.39 – 1.49	1.0
ORGANICS-CHLORINATED PESTICIDES (µg/kg)				
2,4' DDD	EPA 8270C (SIM)	0.11 – 0.11	0.28 – 0.30	0.2
2,4' DDE	EPA 8270C (SIM)	0.049 – 0.052	0.28 – 0.30	0.2
2,4' DDT	EPA 8270C (SIM)	0.086 – 0.092	0.28 – 0.30	0.2
4,4' DDD	EPA 8270C (SIM)	0.055 – 0.059	0.28 – 0.30	0.2
4,4' DDE	EPA 8270C (SIM)	0.056 – 0.060	0.28 – 0.30	0.2
4,4' DDT	EPA 8270C (SIM)	0.073 – 0.078	0.28 – 0.30	0.2
Total DDT	EPA 8270C (SIM)	--	0.28 – 0.30	0.2
Aldrin	EPA 8270C (SIM)	0.052 – 0.056	0.28 – 0.30	0.2
BHC-alpha	EPA 8270C (SIM)	0.079 – 0.085	0.28 – 0.30	0.2
BHC-beta	EPA 8270C (SIM)	0.093 – 0.10	0.28 – 0.30	0.2
BHC-delta	EPA 8270C (SIM)	0.13 – 0.14	0.28 – 0.30	0.2
BHC-gamma (Lindane)	EPA 8270C (SIM)	0.048 – 0.051	0.28 – 0.30	0.2
Chlordane (Technical)	EPA 8270C-GCECD	7.3 – 7.8	14 – 15	10
Chlordane-alpha	EPA 8270C (SIM)	0.092 – 0.099	0.28 – 0.30	0.2
Chlordane-gamma	EPA 8270C (SIM)	0.074 – 0.079	0.28 – 0.30	0.2
Oxychlordane	EPA 8270C (SIM)	0.10 – 0.11	0.28 – 0.30	0.2
Total Chlordane	EPA 8270C (SIM)	--	0.28 – 0.30	0.2
Dieldrin	EPA 8270C (SIM)	0.15 – 0.16	0.28 – 0.30	0.2
Endosulfan sulfate	EPA 8270C (SIM)	0.14 – 0.15	0.28 – 0.30	0.2
Endosulfan I	EPA 8270C (SIM)	0.080 – 0.086	0.28 – 0.30	0.2
Endosulfan II	EPA 8270C (SIM)	0.13 – 0.13	0.28 – 0.30	0.2
Endrin	EPA 8270C (SIM)	0.078 – 0.084	0.28 – 0.30	0.2
Endrin aldehyde	EPA 8270C (SIM)	0.14 – 0.15	0.28 – 0.30	0.2
Endrin ketone	EPA 8270C (SIM)	0.077 – 0.082	0.28 – 0.30	0.2
Heptachlor	EPA 8270C (SIM)	0.071 – 0.076	0.28 – 0.30	0.2
Heptachlor epoxide	EPA 8270C (SIM)	0.061 – 0.066	0.28 – 0.30	0.2
Methoxychlor	EPA 8270C (SIM)	0.093 – 0.10	0.28 – 0.30	0.2
Mirex	EPA 8270C (SIM)	0.054 – 0.058	0.28 – 0.30	0.2
Toxaphene	EPA 8270C-GCECD	12 - 13	28 - 30	10
trans-Nonachlor	EPA 8270C (SIM)	0.059 – 0.064	0.28 – 0.30	0.2

Table 10. Sediment Analytical Methods and Target Quantitation Limits (Continued)

Analyte	Method	Method Detection Limits (Dry Weight)	Laboratory Reporting Limits (Dry Weight)	SAP Reporting Limits (Wet Weight)
ORGANICS-Pyrethroid Pesticides (µg/kg)				
Allethrin (Bioallethrin)	EPA 8270D (M)/TQ/EI	0.35 – 0.37	0.69 – 0.75	0.5
Bifenthrin	EPA 8270D (M)/TQ/EI	0.42 – 0.45	0.69 – 0.75	0.5
Cyfluthrin-beta (Baythroid)	EPA 8270D (M)/TQ/EI	0.35 – 0.37	0.69 – 0.75	0.5
Cyhalothrin-Lamba	EPA 8270D (M)/TQ/EI	0.35 – 0.37	0.69 – 0.75	0.5
Cypermethrin	EPA 8270D (M)/TQ/EI	0.35 – 0.37	0.69 – 0.75	0.5
Deltamethrin (Decamethrin)	EPA 8270D (M)/TQ/EI	0.35 – 0.37	0.69 – 0.75	0.5
Esfenvalerate	EPA 8270D (M)/TQ/EI	0.35 – 0.37	0.69 – 0.75	0.5
Fenpropathrin (Danitol)	EPA 8270D (M)/TQ/EI	0.35 – 0.37	0.69 – 0.75	0.5
Fenvalerate (sanmarton)	EPA 8270D (M)/TQ/EI	0.35 – 0.37	0.69 – 0.75	0.5
Fluvalinate	EPA 8270D (M)/TQ/EI	0.35 – 0.37	0.69 – 0.75	0.5
Permethrin (cis and trans)	EPA 8270D (M)/TQ/EI	0.69 – 0.75	1.4 – 1.5	1.0
Resmethrin/Bioresmethrin	EPA 8270D (M)/TQ/EI	0.59 – 0.64	0.69 – 0.75	0.5
Sumithrin (Phenothrin)	EPA 8270D (M)/TQ/EI	0.35 – 0.37	0.69 – 0.75	0.5
Tetramethrin	EPA 8270D (M)/TQ/EI	0.42 – 0.45	0.69 – 0.75	0.5
Tralomethrin	EPA 8270D (M)/TQ/EI	0.35 – 0.37	0.69 – 0.75	0.5
ORGANICS-BUTYLTINS (µg/kg)				
Monbutyltin	Krone et al., 1989	1.9 – 2.0	4.1 – 4.4	3.0
Dibutyltin	Krone et al., 1989	0.99 – 1.1	4.1 – 4.4	3.0
Tributyltin	Krone et al., 1989	2.0 – 2.2	4.1 – 4.4	3.0
Tetrabutyltin	Krone et al., 1989	1.0 – 1.1	4.1 – 4.4	3.0
ORGANICS-PHTHALATES (µg/kg)				
bis(2-ethylhexyl) phthalate	EPA 8270C (SIM)	2.1 – 2.3	69 – 74	10
Butyl benzyl phthalate	EPA 8270C (SIM)	2.7 – 2.9	69 – 74	10
Diethyl Phthalate	EPA 8270C (SIM)	2.2 – 2.4	69 – 74	10
Dimethyl Phthalate	EPA 8270C (SIM)	2.8 – 3.0	69 – 74	10
Di-n-butyl Phthalate	EPA 8270C (SIM)	2.6 – 2.8	69 - 74	500
Di-n-octyl Phthalate	EPA 8270C (SIM)	2.6 – 2.8	69 - 74	10
ORGANICS-PHENOLS (µg/kg)				
2,3,4,6-Tetrachlorophenol	EPA 8270C (SIM)	5.4 – 5.8	14 - 15	10
2,4,5-Trichlorophenol	EPA 8270C (SIM)	1.7 – 1.8	14 - 15	10
2,4,6-Trichlorophenol	EPA 8270C (SIM)	1.8 – 1.9	14 - 15	10
2,4-Dichlorophenol	EPA 8270C (SIM)	2.4 – 2.5	14 – 15	10
2,4-Dimethylphenol	EPA 8270C (SIM)	3.6 – 3.9	690 – 740	500
2,4-Dinitrophenol	EPA 8270C (SIM)	83 - 89	690 - 740	500
2,6-Dichlorophenol	EPA 8270C (SIM)	2.9 – 3.2	14 – 15	10
2-Chlorophenol	EPA 8270C (SIM)	2.6 – 2.8	14 - 15	10
2-Methyl-4,6-dinitrophenol	EPA 8270C (SIM)	91 - 98	690 - 740	500
2-Methylphenol	EPA 8270C (SIM)	2.7 – 2.9	14 – 15	10
2-Nitrophenol	EPA 8270C (SIM)	2.3 – 2.5	690 – 740	500
3+4-Methylphenol	EPA 8270C (SIM)	5.0 – 5.4	14 - 15	10
4-Chloro-3-methylphenol	EPA 8270C (SIM)	2.8 – 3.1	14 – 15	10
4-Nitrophenol	EPA 8270C (SIM)	110 - 120	690 – 740	500
Bisphenol A	EPA 8270C (SIM)	2.8 – 3.1	14 – 15	10
Pentachlorophenol	EPA 8270C (SIM)	1.8 – 2.0	690 – 740	500
Phenol	EPA 8270C (SIM)	3.2 – 3.4	14 - 15	10

Table 10. Sediment Analytical Methods and Target Quantitation Limits (Continued)

Analyte	Method	Method Detection Limits (Dry Weight)	Laboratory Reporting Limits (Dry Weight)	SAP Reporting Limits (Wet Weight)
ORGANICS-PCBs (µg/kg) PCB congeners of: 018, 028, 037, 044, 049, 052, 066, 070, 074, 077, 081, 087, 099, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138/158, 149, 151, 153, 156, 157, 167, 168, 169, 170, 177, 180, 183, 187, 189, 194, 201, and 206.	EPA 8270C (SIM)	0.039 – 0.57	0.23 – 0.65	0.5
Total PCBs as sum of all individual PCB congeners.	EPA 8270C (SIM)	--	0.23 – 0.65	0.5
ORGANICS-PAHs (µg/kg dry)				
1-Methylnaphthalene	EPA 8270C (SIM)	1.5 – 3.8	12 – 16	10
1-Methylphenanthrene	EPA 8270C (SIM)	2.7 – 4.0	12 – 16	10
1,6,7-Trimethylnaphthalene	EPA 8270C (SIM)	2.2 – 3.1	12 – 16	10
2,6-Dimethylnaphthalene	EPA 8270C (SIM)	2.0 – 3.1	12 – 16	10
2-Methylnaphthalene	EPA 8270C (SIM)	2.3 – 3.8	12 – 16	10
Acenaphthene	EPA 8270C (SIM)	2.1 – 3.8	12 – 16	10
Acenaphthylene	EPA 8270C (SIM)	2.1 – 2.9	12 – 16	10
Anthracene	EPA 8270C (SIM)	2.7 – 5.6	12 – 16	10
Benzo[a]anthracene	EPA 8270C (SIM)	2.0 – 3.5	12 – 16	10
Benzo[a]pyrene	EPA 8270C (SIM)	1.9 – 3.0	12 – 16	10
Benzo[b]fluoranthene	EPA 8270C (SIM)	2.0 – 4.4	12 – 16	10
Benzo[e]pyrene	EPA 8270C (SIM)	2.1 – 3.2	12 – 16	10
Benzo[g,h,i]perylene	EPA 8270C (SIM)	1.8 – 2.5	12 – 16	10
Benzo[k]fluoranthene	EPA 8270C (SIM)	2.0 – 4.5	12 – 16	10
Biphenyl	EPA 8270C (SIM)	2.1 – 3.0	12 – 16	10
Chrysene	EPA 8270C (SIM)	1.9 – 3.6	12 – 16	10
Dibenzo[a,h]anthracene	EPA 8270C (SIM)	2.0 – 3.1	12 – 16	10
Dibenzothiophene	EPA 8270C (SIM)	1.6 – 2.2	12 – 16	10
Fluoranthene	EPA 8270C (SIM)	2.1 – 2.9	12 – 16	10
Fluorene	EPA 8270C (SIM)	2.3 – 5.0	12 – 16	10
Indeno[1,2,3-c,d]pyrene	EPA 8270C (SIM)	1.8 – 2.6	12 – 16	10
Naphthalene	EPA 8270C (SIM)	2.1 – 5.6	12 – 16	10
Perylene	EPA 8270C (SIM)	1.6 – 3.8	12 – 16	10
Phenanthrene	EPA 8270C (SIM)	2.4 – 3.6	12 – 16	10
Pyrene	EPA 8270C (SIM)	2.3 – 3.6	12 – 16	10
Total Low Weight PAHs	EPA 8270C (SIM)	--	12 – 16	10
Total High Weight PAHs	EPA 8270C (SIM)	--	12 – 16	10
Total Detectable PAHs	EPA 8270C (SIM)	--	12 – 16	10

3.4.3 Bioaccumulation Potential Testing

Prior to tissue analyses, the ITM requires a 28-day exposure period of two benthic species to test, reference, and control sediments. However, due to the lack of sediment volume only one test specie was used, which was exposed to five replicates of each sediment composite sample including reference and control samples. Bioaccumulation exposures were conducted according to method ASTM E-1688-00a (2013). The test species used, which conforms to OTM and ITM recommendations and which was selected by the USACE in consultation with the USEPA, was *Nereis virens* (worm).

Water quality parameters (pH, temperature, salinity, dissolved oxygen, and ammonia) were monitored on overlying composite water samples each day of the 28 days of exposures. The animals were added to the test tanks and day zero began approximately 24 hours after the sediments and water were allowed to equilibrate. Water changes in the test aquaria were conducted approximately three times a week. Complete bioaccumulation methods used can be found in the bioassay laboratory report in Appendix H.

Following exposure of the organisms to the test sediments, they were placed in a clean, non-stressful environment to purge their systems of sediment. The purge time was sufficiently long enough to purge sediment, but not long enough to allow them to depurate accumulated toxicants. Generally, 24 hours is deemed to be sufficient. Once purging of the sediment was complete, whole animals were triple wrapped according to composite and replicate IDs and frozen. The frozen animals were delivered overnight to Eurofins Calscience Laboratories on dry ice where they were placed in the freezer until analyzed. These animals were later homogenized in a clean laboratory at Eurofins Calscience Laboratories prior to analysis of PCB congeners and lipids. Methods and reporting limits used for the tissue analyses are provided in Table 11. The tissues were extracted and analyzed between June 14 and June 28, 2017.

Table 11. Analytical Methods and Quantitation Limits Achieved for the Tissue Samples.

Analyte	Method	Target Method Detection Limits	Target Laboratory Reporting Limits
Percent Solids (%)	SM 2540 B	0.1	0.1
Lipids (% wet weight)[2]	$MeCl_2$ Extraction	0.1	0.1
ORGANICS-PCBs (µg/kg) PCB congeners of: 018, 028, 037, 044, 049, 052, 066, 070, 074, 077, 081, 087, 099, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138/158, 149, 151, 153, 156, 157, 167, 168, 169, 170, 177, 180, 183, 187, 189, 194, 201, and 206.	EPA 8270C (SIM)	0.042-0.2	0.2-0.4
Total PCBs as sum of all individual PCB congeners.	EPA 8270C (SIM)	--	0.5

There were no non-detected results (NDs) in the total PCB tissue data for *Nereis*. Therefore, standard statistical analyses were able to be performed. PCB congeners were summed to generate total PCBs. Only the congeners not flagged as NDs were used to calculate the summed totals for each site. No strong relationship was found for *Nereis* between the percentage of lipids and total PCBs in tissues. Therefore, normalizing of the PCB data to lipids was not performed.

Analysis of the bioaccumulation data generally followed the recommendations outlined in the OTM Section 13, Statistical Analysis for the 28-day dredged sediments vs. "reference" scenario. The statistical program NCSS version 11 (http://www.ncss.com) was used to find test site vs. reference differences. The procedure for Two-Sample T-Tests was used. This NCSS module produces both parametric and non-parametric output that include normality and variance homogeneity testing along with the hypothesis testing results in a single report. The null hypothesis in this case assumes that the test sites are not significantly greater than the reference category, so it is a one-way probability layout ($p \leq 0.05$).

The lower one-sided 95% confidence limits (LCLs) of total PCBs were also calculated for each test site and the upper one-sided confidence limits (UCLs) were calculated for the control. This allows the LCLs of the test sites to be statistically compared with the UCL of the control for overlap or to an Action Level (as suggested by the OTM) or historic reference data such as the SF-DODS database as an example.

4.0 RESULTS

Physical and chemical testing results of the Port Hueneme sediments are summarized in Tables 12 through 20 below. The chemical tables do not include analytical quality assurance/quality control (QA/QC) data. Complete analytical results including all associated QA/QC data are provided in Appendix I. A complete set of physical results is included in Appendix J.

4.1 Sediment Physical Results

Grain Size analyses were performed on multiple layers from each of the 42 cores collected. Data for each core and each individual layer for samples collected in November 2016 and July 2017 are provided in Tables 12 and 13, respectively. Sieve analysis data for the three individual beach transect samples collected in November 2016 and nearshore placement area samples collected in March 2017 are provided in Tables 14 and 15, respectively, and sieve analysis data for the nearshore area samples collected in June 2017 are provided in Table 16. Individual grain size distribution curves for each individual grain size sample are provided in Appendix J along with plasticity index plots and hydrometer data for a select number of samples.

4.2 Sediment Chemistry Results

A summary of the chemical testing results is provided in Table 17 for the four composite samples. Results of the PCB and PAH analyses for the 36 individual cores collected in Mach 2017 are provided in Tables 18 through 21. Results of the PCB and PAH analyses for the individual cores collected in July 2017 are provided in Table 22. Included in these tables are biological affects screening values consisting of ERLs and ERMs and human health criteria for residential and industrial settings consisting of RSLs and CHHSLs.

Data contained in Tables 18 through 22 are often coded. Values that were not detected above the method detection limit were assigned a "<" prefix symbol. Values estimated between the MDL and reporting limit were tagged with a "J". No additional qualifiers were necessary for this data set. Definitions of all other symbols are described in the QA/QC report in Appendix I and in Table footnotes.

4.3 Biological Testing Results

As described earlier, the only Tier III biological testing conducted on the federal channel composite samples was for PCB bioaccumulation testing. Additional Tier III testing was conducted, during a separate Sampling and Analysis Plan in the field at the same time, on a single composite sample for the Oxnard Harbor District (OHD) dredge material evaluation for the deepening of Berths 1, 2 and 3. This study was conducted at the same time as the federal channel study and therefore the results of this study summarized in a report by Anchor QEA (2017) are pertinent to the federal channel study.

4.3.1 Oxnard Harbor District Tier III Testing Results

For the Berths 1, 2 and 3 study, five core samples were collected by Kinnetic Laboratories using the same methods described above and in the Berths 1, 2 and 3 project SAP (Anchor QEA, 2016) to form the composite sample for Tier III testing. These core locations are shown on Figures 3 and 9. A composite sample of deeper material (to -48 feet MLLW) was also formed from three cores (T-2, T-4 and T-5) collected for the federal channel testing program. This material was used as a reference sample for the toxicity testing. Tier III testing results are useful for this project because of similarities in sediment chemistry results. The OHD sediment chemistry results are provided in Appendix K.

Tier III testing conducted for the OHD testing program included acute 10-day solid phase (SP) bioassays using an amphipod (*Eohaustorius estuaries*) and a polychaete worm (*Neanthes arenaceodentata*), a chronic and acute 48-hour suspended particulate phase (SPP) bioassay using bivalve larvae (*Mytilus galloprovincialis*), and 28-day bioaccumulation potential assays using a clam (*Macoma nasuta*) and a polychaete worm (*Nereis virens*). Results of the Tier III testing are summarized in the Anchor QEA report prepared for the OHD (Anchor QEA, 2017). Bioassay results from the Anchor QEA report are provided in Table 23 for the SP testing and Table 24 for the SPP testing. Clam and polychaete worm survival data from the QEA report are provided in Table 25.

As directed by the SC-DMMT, Anchor QEA analyzed the tissues generated by the bioaccumulation exposures for butyltin compounds and PCB congeners. Tissue chemistry results for all replicates and all congeners are provided in Appendix K. Mean tissue concentrations for dibutyltin, tributyltin and total PCBs for both the Berths 1-3 composite sample and the reference sample are provided in Table 26.

4.3.2 Federal Channel Bioaccumulation Potential Results

Survival data for the 28-day bioaccumulation exposures to the Area A, E and T composite samples are presented in Table 27. Results of the *Nereis virens* PCB tissue analyses are presented in Tables 28 through 30. Table cells with values greater than the method detection limit (MDL) are shaded green to assist the reader. Mean test tissue concentrations bolded and in cells shaded orange are statistically elevated over mean reference tissue concentrations for the nearshore area refrence site. Tissue qualification codes are the same as those for the sediment samples.

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Table 12. Port Hueneme Harbor Sieve Analysis Data for Individual Cores Collected in November 2016.

Boring ID	Elevation (ft)		Fine Gravel*					Coarse Sand		Medium Sand				Fine Sand						Silt	Atterberg Limits		Soil Classification
			Sieve No./Sieve Size/% Passing																				
			1.5"	1"	3/4"	3/8"	4	7	10	14	18	25	35	45	60	80	120	170	200	230			
	Top	Bottom	38.1 mm	25.4 mm	19 mm	9.5 mm	4.75 mm	2.38 mm	2 mm	1.41 mm	1.0 mm	0.71 mm	0.50 mm	0.35 mm	0.25 mm	0.18 mm	0.125 mm	0.09 mm	0.075 mm	0.063 mm	LL	PL	
Approach Channel																							
Hueneme-VC-16-A-01	-44.3	-46	100	100	100	100	100	100	100	100	99	99	98	97	95	91	69	44	39	34			SILTY SAND (SM)
Hueneme-VC-16-A-02	-43	-46	100	100	100	100	100	100	100	100	100	99	98	96	95	93	84	61	56	45	NP		SANDY SILT (ML)
Hueneme-VC-16-A-03	-42.6	-46	100	100	100	100	100	100	100	99	99	99	99	99	97	95	83	61	56	49	NP		SANDY SILT (ML)
Hueneme-VC-16-A-04	-43.2	-46	100	100	100	100	100	100	100	100	99	99	98	97	96	93	70	47	41	36			SILTY SAND (SM)
Hueneme-VC-16-A-05	-39.6	-41.5	100	100	100	100	100	100	100	100	100	100	100	100	99	98	71	47	39	33			SILTY SAND (SM)
Hueneme-VC-16-A-05	-41.5	-42.6	100	100	100	100	100	100	100	100	100	100	100	100	99	98	85	68	62	57			SANDY SILT (ML)
Hueneme-VC-16-A-05	-42.6	-46	100	100	100	98	94	91	88	84	81	76	69	61	53	45	25	12	10	8			POORLY GRADED SAND WITH SILT (SP-SM)
Hueneme-VC-16-A-06	-43.2	-46	100	100	100	100	100	100	99	99	99	99	98	97	96	94	86	68	63	60			SANDY SILT (ML)
Hueneme-VC-16-A-07	-42.1	-46	100	100	100	100	100	100	99	99	98	95	90	82	71	56	32	17	14	13			SILTY SAND (SM)
Hueneme-VC-16-A-08	-42.7	-46	100	100	100	100	100	100	100	100	100	100	100	99	99	97	89	75	70	65	NP		SILT WITH SAND (ML)
Weighted Average**			100	100	100	100	99	99	98	98	97	96	94	91	87	82	65	47	42	37			
Entrance Channel																							
Hueneme-VC-16-E-01	-37.2	-42	100	100	100	100	100	100	100	100	100	99	99	98	95	79	36	22	19	17			SILTY SAND (SM)
Hueneme-VC-16-E-02	-38.2	-39.7	100	100	100	100	100	100	100	100	100	99	98	97	93	83	52	37	33	30			SILTY SAND (SM)
Hueneme-VC-16-E-02	-39.7	-42	100	100	100	100	100	100	100	99	98	97	94	89	77	53	19	7	6	5			POORLY GRADED SAND WITH SILT (SP-SM)
Hueneme-VC-16-E-03	-37.2	-41.2	100	100	100	100	100	100	100	100	99	99	98	96	91	74	36	24	22	19			SILTY SAND (SM)
Hueneme-VC-16-E-03	-41.2	-42	93	88	81	71	64	60	58	55	52	43	29	17	12	9	6	4	3	3			POORLY GRADED SAND WITH GRAVEL (SP)
Hueneme-VC-16-E-04	-38.5	-39.5	100	100	100	100	100	100	100	99	99	98	97	96	94	90	77	64	61	57	28	20	SANDY LEAN CLAY (CL)
Hueneme-VC-16-E-04	-39.5	-42	100	100	96	94	93	92	92	92	91	88	79	64	51	36	18	11	9	8			POORLY GRADED SAND WITH SILT (SP-SM)
Hueneme-VC-16-E-05	-38.3	-40.3	100	100	100	99	99	99	99	98	97	96	95	92	89	79	53	42	39	36			SILTY SAND (SM)
Hueneme-VC-16-E-05	-40.3	-42	100	100	100	99	99	98	97	96	92	83	62	36	20	12	8	6	6	5			POORLY GRADED SAND WITH SILT (SP-SM)
Hueneme-VC-16-E-06	-37.8	-39.8	100	100	100	100	100	99	99	99	98	96	94	90	87	81	67	58	55	53			SANDY SILT (ML)
Hueneme-VC-16-E-06	-39.8	-42	96	93	90	86	85	85	84	83	82	79	73	63	49	37	24	17	15	14			SILTY SAND (SM)
Hueneme-VC-16-E-07	-37.9	-39.9	100	100	100	100	100	100	100	100	100	99	99	99	98	95	88	77	74	71	33	23	SILTY CLAY WITH SAND (CL-ML)
Hueneme-VC-16-E-07	-39.9	-41.1	100	100	100	99	99	97	96	94	92	86	77	52	44	36	27	21	19	17			SILTY SAND (SM)
Hueneme-VC-16-E-07	-41.1	-42	100	100	100	100	100	100	99	99	99	98	98	96	90	77	32	9	6	5			POORLY GRADED SAND WITH SILT (SP-SM)
Hueneme-VC-16-E-08	-36.9	-39.5	100	100	100	100	100	100	100	100	99	98	97	94	90	85	72	59	56	53	27	20	SANDY SILTY CLAY (CL-ML)
Hueneme-VC-16-E-08	-39.5	-42	100	100	100	99	98	98	97	96	92	84	69	52	45	41	38	37	36	35			SILTY SAND (SM)
Hueneme-VC-16-E-09	-40.6	-42	100	100	100	100	99	98	97	96	94	91	86	80	70	61	45	33	31	30			SILTY SAND (SM)
Weighted Average**			99	98	98	97	96	96	96	95	94	91	87	80	73	62	41	30	28	26			
Channel A/Turning Basin																							
Hueneme-VC-16-T-01	-40.1	-42	100	100	100	99	96	92	87	79	69	55	41	29	22	16	10	4	3	2			WELL-GRADED SAND (SW)
Hueneme-VC-16-T-02	-37.5	-40	100	100	100	99	98	97	97	97	96	93	86	71	48	28	14	8	7	6			POORLY GRADED SAND WITH SILT (SP-SM)
Hueneme-VC-16-T-02	-40	-42	100	100	100	100	100	100	100	99	99	99	99	98	97	96	73	10	5	3			POORLY GRADED SAND (SP)
Hueneme-VC-16-T-03	-37.2	-41.1	100	100	100	100	100	99	99	98	96	90	75	54	42	36	28	21	19	17			SILTY SAND (SM)
Hueneme-VC-16-T-03	-41.1	-42	100	100	100	100	100	100	100	100	100	100	99	99	98	97	93	86	81	73	NP		SILT WITH SAND (ML)

Table 12. Port Hueneme Harbor Sieve Analysis Data for Individual Cores Collected in November 2016 (Continued).

Boring ID	Elevation (ft)		Fine Gravel*					Coarse Sand		Medium Sand				Fine Sand						Silt	Atterberg Limits		Soil Classification
			Sieve No./Sieve Size/% Passing																				
			1.5"	1"	3/4"	3/8"	4	7	10	14	18	25	35	45	60	80	120	170	200	230			
	Top	Bottom	38.1 mm	25.4 mm	19 mm	9.5 mm	4.75 mm	2.38 mm	2 mm	1.41 mm	1.0 mm	0.71 mm	0.50 mm	0.35 mm	0.25 mm	0.18 mm	0.125 mm	0.09 mm	0.075 mm	0.063 mm	LL	PL	
Hueneme-VC-16-T-04	-38.8	-42	100	100	100	100	100	99	99	99	99	99	99	98	98	94	54	8	5	3			POORLY GRADED SAND (SP)
Hueneme-VC-16-T-05	-38.6	-42	100	100	100	100	100	100	100	99	99	99	98	96	93	88	70	39	31	24			SILTY SAND (SM)
Hueneme-VC-16-T-06	-37	-38	100	100	100	100	100	100	100	99	99	98	97	95	92	88	79	65	60	55	27	22	SANDY SILTY CLAY (CL-ML)
Hueneme-VC-16-T-06	-38	-42	100	100	100	100	98	98	97	97	96	94	89	81	73	66	58	50	47	43			SANDY SILTY CLAY (CL-ML)
Hueneme-VC-16-T-07	-40.6	-42	100	100	100	100	97	96	96	94	93	89	84	78	73	69	60	43	38	35			SANDY SILT (ML)
Hueneme-VC-16-T-08	-38.9	-42	100	100	100	100	100	100	100	100	100	99	99	96	92	88	79	64	60	56	29	17	SANDY LEAN CLAY (CL)
Hueneme-VC-16-T-09	-38	-42	100	100	100	99	97	95	94	92	89	84	75	57	42	35	29	22	20	18			SILT WITH SAND (ML)
Hueneme-VC-16-T-10	-37	-39.2	100	100	100	100	99	99	99	98	98	97	93	83	73	63	44	29	26	23			SILTY SAND (SM)
Hueneme-VC-16-T-10	-39.2	-41.2	100	100	100	99	99	99	99	98	98	95	88	66	49	42	27	12	9	7			POORLY GRADED SAND WITH SILT (SP-SM)
Hueneme-VC-16-T-10	-41.2	-42	100	100	100	100	100	100	100	100	100	100	100	100	99	99	97	86	81	75			SILT WITH SAND (ML)
Hueneme-VC-16-T-11	-37	-39.1	100	100	100	100	100	99	99	98	98	96	93	88	79	69	50	36	32	30			CLAYEY SAND (SC)
Hueneme-VC-16-T-11	-39.1	-40	100	100	100	100	100	100	99	99	99	99	98	95	91	86	80	74	72	71			FAT CLAY WITH SAND (CH)
Hueneme-VC-16-T-11	-40	-42	100	100	100	100	100	100	100	100	100	99	97	83	59	40	29	24	23	23			CLAYEY SAND (SC)
Hueneme-VC-16-T-12	-37.5	-38.3	100	100	100	100	99	99	98	97	96	93	87	74	58	45	15	6	4	3			POORLY GRADED SAND (SP)
Hueneme-VC-16-T-12	-38.3	-39.5	100	100	100	100	100	100	100	99	99	98	96	94	91	88	83	78	76	74			LEAN CLAY WITH SAND (CL)
Hueneme-VC-16-T-12	-39.5	-42	100	100	100	100	100	100	100	99	99	99	98	97	95	91	79	65	62	60			SANDY LEAN CLAY (CL)
Hueneme-VC-16-T-13	-37.4	-39.4	100	100	100	98	95	94	92	90	87	80	73	67	61	57	47	41	40	38			SILTY SAND (SM)
Hueneme-VC-16-T-13	-39.4	-40.5	100	100	100	100	100	100	100	99	98	96	93	90	88	87	86	85	84	84	55	24	FAT CLAY WITH SAND (CH)
Hueneme-VC-16-T-13	-40.5	-42	100	100	100	92	88	85	83	79	73	62	49	40	33	30	28	27	27	27			CLAYEY SAND (SC)
Hueneme-VC-16-T-14	-36	-36.9	100	100	100	100	100	100	99	99	99	99	97	94	87	80	67	56	52	50			SANDY LEAN CLAY (CL)
Hueneme-VC-16-T-14	-36.9	-39.2	100	100	100	100	100	99	99	98	95	91	82	67	53	43	34	28	26	25			CLAYEY SAND (SC)
Hueneme-VC-16-T-14	-39.2	-41	100	100	100	100	100	100	99	97	91	69	44	27	18	12	7	5	4	4			POORLY GRADED SAND (SP)
Hueneme-VC-16-T-14	-41	-42	100	100	100	100	100	100	100	100	100	99	99	99	98	98	97	97	96	96			FAT CLAY (CH)
Hueneme-VC-16-T-15	-36.7	-37.7	100	100	100	100	100	100	100	100	100	99	98	95	91	84	69	56	53	50			SANDY SILT (ML)
Hueneme-VC-16-T-15	-37.7	-38.7	100	100	100	100	100	100	100	99	99	97	94	88	77	62	43	32	30	28			SILTY SAND (SM)
Hueneme-VC-16-T-15	-38.7	-41.3	100	100	100	100	100	99	99	98	96	92	84	67	46	29	17	12	12	11			POORLY GRADED SAND WITH CLAY (SP-SC)
Hueneme-VC-16-T-15	-41.3	-42	100	100	100	100	100	100	100	100	100	100	99	99	99	98	98	97	97	97			FAT CLAY (CH)
Hueneme-VC-16-T-16	-37.6	-38.9	100	100	100	100	100	100	99	99	98	96	92	86	79	71	50	41	39	37			CLAYEY SAND (SC)
Hueneme-VC-16-T-16	-38.9	-40.3	100	100	100	97	95	94	92	90	87	85	71	62	51	41	32	28	27	26			CLAYEY SAND (SC)
Hueneme-VC-16-T-16	-40.3	-41.4	100	92	90	82	73	67	62	56	50	40	31	24	21	19	18	17	17	17			CLAYEY SAND WITH GRAVEL (SC)
Hueneme-VC-16-T-16	-41.4	-42	100	100	100	100	100	100	100	100	99	99	98	98	97	97	96	95	94	92			FAT CLAY (CH)
Hueneme-VC-16-T-17	-40.2	-42	100	100	100	99	98	97	96	94	92	87	77	50	39	30	26	24	23	22			SILTY SAND (SM)
Hueneme-VC-16-T-18	-36.6	-42	100	100	100	100	100	100	99	99	98	96	91	78	60	45	30	24	22	21			CLAYEY SAND (SC)
Hueneme-VC-16-T-19	-36.9	-42	100	100	100	100	100	98	97	96	94	89	78	57	49	39	25	15	14	13			CLAYEY SAND (SC)
Weighted Average**			100	100	100	99	99	98	97	96	94	91	85	75	66	57	45	34	31	29			

*All material passed through sieve sizes greater than 38.1 mm.
** Weighted average calculated by factoring in the length of each core interval contributing to the composite sample.

Table 13. Port Hueneme Harbor Approach Channel Sieve Analysis Data for Individual Cores Collected in July 2017.

Boring ID	Elevation (ft)		Fine Gravel*					Coarse Sand		Medium Sand				Fine Sand						Silt	Atterberg Limits		Soil Classification
			Sieve No./Sieve Size/% Passing																				
			1.5"	1"	3/4"	3/8"	4	7	10	14	18	25	35	45	60	80	120	170	200	230			
	Top	Bottom	38.1 mm	25.4 mm	19 mm	9.5 mm	4.75 mm	2.38 mm	2 mm	1.41 mm	1.0 mm	0.71 mm	0.50 mm	0.35 mm	0.25 mm	0.18 mm	0.125 mm	0.09 mm	0.075 mm	0.063 mm	LL	PL	
Hueneme-VC-17-A2-01	-37.5	-46	100	100	100	100	100	100	100	100	100	99	99	99	98	94	59	30	23	20			SILTY SAND (SM)
Hueneme-VC-17-A2-02	-37.5	-46	100	100	100	100	100	100	100	100	100	100	100	99	98	93	52	24	20	17			SILTY SAND (SM)
Hueneme-VC-17-A2-03	-38.5	-46	100	100	100	100	100	100	100	100	100	99	99	99	99	96	52	27	22	19			SILTY SAND (SM)
Hueneme-VC-17-A2-04	-38.0	-46	100	100	100	100	100	100	99	99	99	98	98	97	96	90	52	21	16	12			SILTY SAND (SM)
A2 Weighted Average			100	100	100	100	100	100	88	88	87	87	87	86	85	79	43	22	18	16			
Hueneme-VC-17-GT-01	-40.4	-46	100	100	100	100	100	99	99	99	98	95	92	90	89	87	80	64	59	54			SANDY SILT (ML)
Hueneme-VC-17-GT-02	-42.5	-46	100	100	100	100	100	100	100	100	100	99	99	98	97	95	83	57	49	43			SILTY SAND (SM)

Table C-1. Surface Physical Data for Hueneme Beach Transect Samples Collected in November 2016.

Beach ID	Mudline Elevation (feet MLLW)	Fine Gravel*					Coarse Sand		Medium Sand				Fine Sand					Silt		Atterberg Limits		Soil Classification
		Sieve No./Sieve Size/% Passing																				
		1.5"	1"	3/4"	3/8"	4	7	10	14	18	25	35	45	60	80	120	170	200	230			
		38.1 mm	25.4 mm	19 mm	9.5 mm	4.75 mm	2.38 mm	2 mm	1.41 mm	1.0 mm	0.71 mm	0.50 mm	0.35 mm	0.25 mm	0.18 mm	0.125 mm	0.09 mm	0.075 mm	0.063 mm	LL	PL	
Beach – Transect A																						
PHBTS16-A-04	-6	100	100	100	100	100	100	99	99	98	96	93	86	72	44	8	2	2	2			POORLY GRADED SAND (SP)
PHBTS16-A-05	-12	100	100	100	100	100	100	100	100	100	99	98	96	91	75	37	13	10	7			POORLY GRADED SAND WITH SILT (SP-SM)
PHBTS16-A-06	-18	100	100	100	100	100	100	100	99	99	99	99	98	97	94	57	25	16	10			SILTY SAND (SM)
PHBTS16-A-07	-24	100	100	100	100	100	100	100	100	100	100	99	99	98	94	33	12	9	7			POORLY GRADED SAND WITH SILT (SP-SM)
PHBTS16-A-08	-30	100	100	100	99	99	99	99	99	99	99	99	98	97	91	23	9	7	6			POORLY GRADED SAND WITH SILT (SP-SM)
Beach – Transect B																						
PHBTS16-B-01	12	100	100	100	100	100	100	100	99	97	91	82	71	52	23	4	1	1	1			POORLY GRADED SAND (SP)
PHBTS16-B-02	6	100	100	100	100	100	100	100	100	100	98	96	89	57	17	3	2	1	1			POORLY GRADED SAND (SP)
PHBTS16-B-03	0	100	100	100	100	97	97	97	96	95	93	88	78	56	27	6	3	2	2			POORLY GRADED SAND (SP)
PHBTS16-B-04	-6	100	100	100	100	98	95	90	84	76	64	53	42	31	15	4	2	1	1			POORLY GRADED SAND (SP)
PHBTS16-B-05	-12	100	100	100	99	98	98	97	97	97	97	97	96	93	76	31	7	5	4			POORLY GRADED SAND (SP)
PHBTS16-B-06	-18	100	100	100	100	100	99	99	99	99	99	98	97	96	94	60	29	23	20			SILTY SAND (SM)
PHBTS16-B-07	-24	100	100	100	99	99	99	99	99	99	99	99	98	95	91	64	27	19	14			SILTY SAND (SM)
PHBTS16-B-08	-30	100	100	100	100	100	100	100	100	100	100	99	98	88	81	27	9	8	7			POORLY GRADED SAND WITH SILT (SP-SM)
Beach – Transect C																						
PHBTS16-C-01	12	100	100	100	100	99	97	96	94	92	89	85	72	46	20	7	4	3	3			POORLY GRADED SAND (SP)
PHBTS16-C-02	6	100	100	100	100	100	100	100	100	100	97	87	61	35	12	3	2	2	2			POORLY GRADED SAND (SP)
PHBTS16-C-03	0	100	100	100	100	100	100	100	100	99	98	94	85	67	37	11	3	3	2			POORLY GRADED SAND (SP)
PHBTS16-C-04	-6	100	100	100	100	99	98	95	89	82	70	57	44	32	20	8	3	2	2			POORLY GRADED SAND (SP)
PHBTS16-C-05	-12	100	100	100	100	100	100	99	99	99	99	99	98	97	85	24	5	4	3			POORLY GRADED SAND (SP)
PHBTS16-C-06	-18	100	100	100	99	99	99	99	99	99	99	99	98	98	97	52	10	7	5			POORLY GRADED SAND WITH SILT (SP-SM)
PHBTS16-C-07	-24	100	100	100	100	100	100	100	100	100	100	100	99	97	93	62	18	13	11			SILTY SAND (SM)
Beach Compatibility Comparison																						
PHBTS – Fine Limit	-18	100	100	100	100	100	99	99	99	99	99	98	97	96	94	60	29	23	20			SILTY SAND (SM)
Average		100	100	100	100	100	99	99	98	97	95	91	86	76	60	27	10	7	6			
PHBTS – Coarse Limit	-6	100	100	100	100	98	95	90	84	76	64	53	42	31	15	4	2	1	1			POORLY GRADED SAND (SP)

*All material passed through sieve sizes greater than 38.1 mm.

Table C-1. Hueneme Beach Surface Sieve Analysis Data for the Nearshore Placement Area Collected in March 2017.

Nearshore Sample ID	Water Depth (feet)	Fine Gravel*					Coarse Sand		Medium Sand				Fine Sand						Silt	Soil Classification
		Sieve No./Sieve Size/% Passing																		
		1.5"	1"	3/4"	3/8"	4	7	10	14	18	25	35	45	60	80	120	170	200	230	
		38.1 mm	25.4 mm	19 mm	9.5 mm	4.75 mm	2.38 mm	2 mm	1.41 mm	1.0 mm	0.71 mm	0.50 mm	0.35 mm	0.25 mm	0.18 mm	0.125 mm	0.09 mm	0.075 mm	0.063 mm	
NSPHB16-01	-21.9	100	100	100	100	100	100	100	100	100	100	100	100	99	90	24	7	5	3	POORLY GRADED SAND (SP)
NSPHB16-02	-19.1	100	100	100	100	100	100	100	100	99	99	99	99	97	84	33	11	8	6	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB16-03	-26.4	100	100	100	100	100	100	100	100	100	100	100	99	98	88	34	10	7	4	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB16-04	-28.1	100	100	100	100	100	100	100	100	100	100	100	100	99	94	31	9	6	4	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB16-05	-18.2	100	100	100	100	100	100	100	100	100	100	100	100	100	82	27	8	6	4	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB16-06	-25	100	100	100	100	100	100	100	100	100	100	100	100	99	90	27	8	5	3	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB16-07	-25.8	100	100	100	100	100	100	100	100	100	100	100	100	100	97	43	12	7	5	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB16-08	-17.4	100	100	100	100	100	100	100	100	100	100	100	100	98	78	23	8	6	4	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB16-09	-19.7	100	100	100	100	100	100	100	100	100	100	100	100	98	74	24	8	6	4	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB16-10	-23.6	100	100	100	100	100	100	100	100	100	100	100	100	98	73	21	6	4	2	POORLY GRADED SAND (SP)
NSPHB16-11	-22.2	100	100	100	100	99	98	98	98	98	97	94	88	78	47	13	4	2	2	POORLY GRADED SAND (SP)
Average	-22.5	100	100	100	100	100	100	100	100	100	100	99	99	97	82	27	8	5	4	

*All material passed through sieve sizes greater than 38.1 mm.

** Weighted average calculated by factoring in the length of each core interval contributing to the composite sample.

Table C-2. Hueneme Beach Sieve Analysis Data for the Nearshore Placement Areas Collected in June 2017.

Nearshore Sample ID	Water Depth (feet)	Fine Gravel*					Coarse Sand		Medium Sand				Fine Sand						Silt	Soil Classification
		Sieve No./Sieve Size/% Passing																		
		1.5"	1"	3/4"	3/8"	4	7	10	14	18	25	35	45	60	80	120	170	200	230	
		38.1 mm	25.4 mm	19 mm	9.5 mm	4.75 mm	2.38 mm	2 mm	1.41 mm	1.0 mm	0.71 mm	0.50 mm	0.35 mm	0.25 mm	0.18 mm	0.125 mm	0.09 mm	0.075 mm	0.063 mm	
Alpha Nearshore																				
NSPHB17-AA-01	27	100	100	100	100	100	100	100	100	100	100	100	100	95	87	76	28	16	7	SILTY SAND (SM)
NSPHB17-AA-02	24	100	100	100	100	100	100	100	100	100	100	100	99	97	92	74	20	10	6	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AA-03	19	100	100	100	100	100	99	99	99	99	99	99	99	97	92	77	30	19	9	SILTY SAND (SM)
NSPHB17-AA-04	21	100	100	100	100	100	99	99	98	98	98	98	97	94	88	60	17	11	6	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AA-05	26	100	100	100	100	100	100	100	99	99	99	99	99	93	85	67	19	11	7	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AA-06	24	100	100	100	100	99	99	99	99	99	99	99	98	96	90	66	15	9	5	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AA-07	22	100	100	100	100	100	100	100	100	100	100	99	99	96	91	64	18	10	5	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AA-08	25	100	100	100	100	100	100	99	99	99	99	99	98	93	88	64	17	10	5	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AA-09	29	100	100	100	98	98	98	98	98	98	98	98	95	84	77	59	18	9	4	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AA-10	23	100	100	100	100	100	100	100	100	100	100	100	99	97	91	66	18	9	5	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AA-11	23	100	100	100	99	99	99	99	99	99	99	99	98	95	82	49	12	7	3	POORLY GRADED SAND WITH SILT (SP-SM)
Bravo Nearshore																				
NSPHB17-AB-01	26	100	100	100	100	100	100	100	100	100	100	100	99	99	95	57	13	8	4	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AB-02	30	100	100	100	100	100	100	100	100	100	100	100	99	99	96	64	16	9	5	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AB-03	31	100	100	100	100	100	100	100	100	100	100	100	98	96	84	62	18	10	6	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AB-04	27	100	100	100	100	99	99	99	99	99	99	98	98	98	96	68	15	9	5	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AB-05	26	100	100	100	100	100	100	100	100	99	99	99	99	98	95	81	25	11	6	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AB-06	30	100	100	100	100	100	100	100	100	99	99	99	99	99	96	82	26	13	7	SILTY SAND (SM)
NSPHB17-AB-07	25	100	100	100	100	100	99	99	99	99	99	99	99	98	96	64	13	8	5	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AB-08	28	100	100	100	100	100	100	100	99	99	99	99	99	98	95	75	16	8	5	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AB-09	28	100	100	100	100	100	100	100	100	100	100	99	99	97	92	77	23	12	6	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AB-10	24	100	100	100	100	100	100	100	99	99	99	99	99	98	95	70	16	9	5	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AB-11	27	100	100	100	100	100	100	100	100	100	100	99	99	97	93	76	22	10	6	POORLY GRADED SAND WITH SILT (SP-SM)
Charlie Nearshore																				
NSPHB17-AC-01	25	100	100	100	99	96	96	95	95	94	94	93	92	92	88	70	20	12		POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AC-02	30	100	100	100	100	100	100	100	99	99	99	99	99	98	96	76	18	10	5	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AC-03	33	100	100	100	100	100	100	99	99	99	99	99	98	98	95	76	29	18	9	SILTY SAND (SM)
NSPHB17-AC-04	26	100	100	100	100	100	100	100	99	99	99	99	99	98	95	74	20	11	5	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AC-05	30	100	100	100	100	100	100	100	100	99	99	99	99	98	96	76	23	11	5	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AC-06	31	100	100	100	100	99	99	99	99	99	99	99	99	97	89	58	17	10	6	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AC-07	27	100	100	100	100	99	99	99	99	99	98	98	97	96	89	62	16	9	4	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AC-08	28	100	100	100	99	99	99	99	99	99	99	99	98	96	88	59	15	8	5	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AC-09	32	100	100	100	100	100	100	100	99	99	99	99	99	97	90	67	18	9	5	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AC-10	23	100	100	100	97	97	96	96	96	96	96	96	95	93	84	40	10	5	3	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AC-11	29	100	100	100	100	100	100	100	100	100	99	99	92	69	52	30	7	4	2	POORLY GRADED SAND (SP)

Table C-2. Hueneme Beach Sieve Analysis Data for the Nearshore Placement Areas Collected in June 2017 (Continued).

Nearshore Sample ID	Water Depth (feet)	Fine Gravel*					Coarse Sand		Medium Sand				Fine Sand						Silt	Soil Classification
		Sieve No./Sieve Size/% Passing																		
		1.5"	1"	3/4"	3/8"	4	7	10	14	18	25	35	45	60	80	120	170	200	230	
		38.1 mm	25.4 mm	19 mm	9.5 mm	4.75 mm	2.38 mm	2 mm	1.41 mm	1.0 mm	0.71 mm	0.50 mm	0.35 mm	0.25 mm	0.18 mm	0.125 mm	0.09 mm	0.075 mm	0.063 mm	
Delta Nearshore																				
NSPHB17-AD-01	26	100	100	100	100	100	100	100	100	100	99	99	95	86	79	51	14	8	5	POORLY GRADED SAND WITH SILT(SP-SM)
NSPHB17-AD-02	22	100	100	100	100	99	99	99	99	99	98	98	95	90	76	34	7	4	3	POORLY GRADED SAND (SP)
NSPHB17-AD-03	19	100	100	100	99	99	99	98	98	98	98	98	97	93	69	19	5	3	2	POORLY GRADED SAND (SP)
NSPHB17-AD-04	22	100	100	100	100	100	100	100	100	100	100	100	100	99	92	49	13	7	4	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AD-05	27	100	100	100	100	100	99	99	99	98	98	96	93	89	84	40	9	5	3	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AD-06	27	100	100	100	100	100	100	100	99	99	99	99	98	97	94	69	14	7	3	POORLY GRADED SAND WITH SILT (SP-SM)
NSPHB17-AD-07	19	100	100	100	100	100	100	100	100	100	99	99	99	96	70	27	5	3	2	POORLY GRADED SAND (SP)
NSPHB17-AD-08	24	100	100	100	100	100	100	100	100	100	99	99	98	96	90	50	10	5	2	POORLY GRADED SAND (SP)
NSPHB17-AD-09	26	100	100	100	100	100	100	100	100	100	99	99	99	97	92	50	9	4	2	POORLY GRADED SAND (SP)
NSPHB17-AD-10	26	100	100	100	100	100	100	100	100	100	100	99	99	98	92	34	8	4	3	POORLY GRADED SAND (SP)
NSPHB17-AD-11	17	100	100	100	100	100	100	100	100	100	100	99	99	94	74	20	5	3	2	POORLY GRADED SAND (SP)
Averages																				
Alpha	22	100	100	100	100	99	99	99	99	99	99	99	98	94	87	66	19	11	6	
Bravo	25	100	100	100	100	100	100	100	100	99	99	99	99	98	94	71	18	10	5	
Charlie	25	100	100	100	100	99	99	99	99	98	98	98	97	94	87	62	17	10	5	
Delta	22	100	100	100	100	100	100	99	99	99	99	99	97	94	83	40	9	5	3	

*All material passed through sieve sizes greater than 38.1 mm.

** Weighted average calculated by factoring in the length of each core interval contributing to the composite sample.

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Table 17. 2016 Port Hueneme Composite Bulk Sediment Chemistry Results.

Valid Analyte Name	Units	Port Hueneme Composite Samples (HUENEMEVC16-)				NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		A	A2	E	T	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
SEDIMENT CONVENTIONALS											
Percent Solids	%	67.1	76.7	68.6	72.1						
Total Volatile Solids	%	33	1.4	28	24						
Total Organic Carbon	%	0.93	0.45	<0.025	0.18						
Oil and Grease	mg/kg dry	290	87	210	200						
TRPH	mg/kg dry	200	39	150	120						
Total Ammonia	mg/kg dry	5.4	1.1	2.0	1.9						
Water Soluble Sulfides	mg/kg dry	<0.017	N/A	<0.017	<0.017						
Total Sulfides	mg/kg dry	300	N/A	170	110						
METALS											
Arsenic	mg/kg dry	4.56	3.39	5.12	4.76	8.2	70	0.68	3.0	0.07	0.24
Cadmium	mg/kg dry	0.638	0.415	0.749	0.665	1.2	9.6	7.1	98	1.7	7.5
Chromium	mg/kg dry	15.5	12.3	18.7	14.2	81	370			100,000	100,000
Copper	mg/kg dry	22.1	7.14	21.2	21.1	34	270	310	4,700	3,000	38,000
Lead	mg/kg dry	10	4.46	10.1	9.12	46.7	218	400	800	80	320
Mercury	mg/kg dry	0.0507	0.0164J	0.0314	0.0378	0.15	0.71	1.1	4.6	18	180
Nickel	mg/kg dry	15.7	12.8	19.3	16.8	20.9	51.6	150	2,200	1,600	16,000
Selenium	mg/kg dry	0.529	0.358	0.923	0.598			39	580	380	4,800
Silver	mg/kg dry	0.13J	0.0462J	0.322	0.168	1	3.7	39	580	380	4,800
Zinc	mg/kg dry	64.7	40.8	72.4	56.8	150	410	2,300	35,000	23,000	100,000
BUTYLTINS											
Monobutyltin	µg/kg dry	<2	<1.8	<2	<1.9						
Dibutyltin	µg/kg dry	4J	<0.93	4.2J	11			1,900	25,000		
Tributyltin	µg/kg dry	<2.2	<1.9	3.5J	8			1,900	25,000		
Tetrabutyltin	µg/kg dry	<1.1	<0.95	<1.1	<1						
PAH's											
1-Methylnaphthalene	µg/kg dry	4.3J	5.8J	2.8J	<1.5			18,000	73,000		
1-Methylphenanthrene	µg/kg dry	<2.9	2.9J	<2.8	3.9J						
2,3,5-Trimethylnaphthalene	µg/kg dry	<2.6	<2.3	<2.5	<2.4						
2,6-Dimethylnaphthalene	µg/kg dry	16	4.8J	13J	5.1J						
2-Methylnaphthalene	µg/kg dry	4.9J	8.2J	3.3J	2.3J	70	670	24,000	300,000		
Acenaphthene	µg/kg dry	2.6J	<2	<2.2	2.2J	16	500	360,000	4,500,000		
Acenaphthylene	µg/kg dry	<2.5	<2.2	7.1J	15	44	640				
Anthracene	µg/kg dry	7.1J	<2.5	15	27	85.3	1100	1,800,000	23,000,000		
Benzo (a) Anthracene	µg/kg dry	14J	8.4J	26	38	261	1600	1,100	21,000		

Table 17. 2016 Port Hueneme Composite Bulk Sediment Chemistry Results (Continued).

Valid Analyte Name	Units	Port Hueneme Composite Samples (HUENEMEVC16-)				NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		A	A2	E	T	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
Benzo (a) Pyrene	µg/kg dry	14J	5J	58	180	430	1600	110	2,100	38	130
Benzo (b) Fluoranthene	µg/kg dry	25	9.2J	76	210			160	2,900		
Benzo (e) Pyrene	µg/kg dry	15	7.2J	40	110						
Benzo (g,h,i) Perylene	µg/kg dry	<2.3	<2	19	51						
Benzo (k) Fluoranthene	µg/kg dry	17	6J	72	190			11,000	210,000		
Biphenyl	µg/kg dry	3.7J	5.1J	<2.7	<2.6						
Chrysene	µg/kg dry	18	10J	40	71	384	2800	110,000	2,100,000		
Dibenz (a,h) Anthracene	µg/kg dry	<2.1	<1.9	<2.1	19	63.4	260	110	2,100		
Dibenzothiophene	µg/kg dry	<2	2J	<2	<1.9			78,000	1,200,000		
Fluoranthene	µg/kg dry	27	14	44	39	600	5100	240,000	3,000,000		
Fluorene	µg/kg dry	<2.4	<2.1	<2.4	3.4J	19	540	240,000	3,000,000		
Indeno (1,2,3-c,d) Pyrene	µg/kg dry	8.8J	<1.7	28	73			1,100	21,000		
Naphthalene	µg/kg dry	4.7J	5J	3J	2.6J	160	2100	3,800	17,000		
Perylene	µg/kg dry	26	30	22	31						
Phenanthrene	µg/kg dry	15	13	24	19	240	1500				
Pyrene	µg/kg dry	29	16	50	76	665	2600	180,000	2,300,000		
Total Low Weight PAHs	µg/kg dry	58	47	68	81	552	3160				
Total High Weight PAHs	µg/kg dry	194	106	475	1088	1700	9600				
Total PAHs	µg/kg dry	252	153	543	1169	4022	44792				
PHTHALATES											
Benzyl Butyl Phthalate	µg/kg dry	57J	64U	56J	67J			290,000	1,200,000		
bis-(2-Ethylhexyl) Phthalate	µg/kg dry	15J	64U	26J	27J			39,000	160,000		
Diethyl Phthalate	µg/kg dry	21J	<2.1	25J	17J			5,100,000	66,000,000		
Dimethyl Phthalate	µg/kg dry	<3	<2.6	<2.9	<2.8			780,000	12,000,000		
Di-n-Butyl Phthalate	µg/kg dry	82	64U	77	100			630,000	8,200,000		
Di-n-Octyl Phthalate	µg/kg dry	<2.8	<2.4	<2.7	<2.6			63,000	820,000		
PHENOLS											
2,3,4,6-Tetrachlorophenol	µg/kg dry	<5.8	<5	<5.6	<5.4			190,000	2,500,000		
2,4,5-Trichlorophenol	µg/kg dry	<1.8	<1.6	<1.8	<1.7			630,000	8,200,000		
2,4,6-Trichlorophenol	µg/kg dry	<1.9	<1.7	<1.9	<1.8			6,300	82,000		
2,4-Dichlorophenol	µg/kg dry	<2.5	<2.2	<2.5	<2.4			19,000	250,000		
2,4-Dimethylphenol	µg/kg dry	<3.9	<3.3	<3.8	<3.6			130,000	1,600,000		
2,4-Dinitrophenol	µg/kg dry	<89	<77	<87	<83			13,000	160,000		
2,6-Dichlorophenol	µg/kg dry	<3.2	<2.7	<3.1	<2.9						
2-Chlorophenol	µg/kg dry	<2.8	<2.4	<2.7	<2.6			39,000	580,000		

Table 17. 2016 Port Hueneme Composite Bulk Sediment Chemistry Results (Continued).

Valid Analyte Name	Units	Port Hueneme Composite Samples (HUENEMEVC16-)				NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		A	A2	E	T	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
2-Methylphenol	µg/kg dry	<2.9	<2.5	<2.8	<2.7						
2-Nitrophenol	µg/kg dry	<2.5	<2.2	<2.4	<2.3						
3/4-Methylphenol	µg/kg dry	<5.4	<4.7	<5.2	<5						
4,6-Dinitro-2-Methylphenol	µg/kg dry	<98	<85	<96	<91						
4-Chloro-3-Methylphenol	µg/kg dry	<3.1	<2.6	<3	<2.8						
4-Nitrophenol	µg/kg dry	<120	<100	<120	<110						
Bisphenol A	µg/kg dry	11J	<2.7	8.4J	<2.8			320,000	4,100,000		
Pentachlorophenol	µg/kg dry	<2	<1.7	<1.9	<1.8			1,000	4,000	4,400	13,000
Phenol	µg/kg dry	<3.4	<3	<3.3	<3.2			1,900,000	25,000,000		
CHLORINATED PESTICIDES											
2,4'-DDD	µg/kg dry	<0.11	<0.099	<0.11	<0.11						
2,4'-DDE	µg/kg dry	<0.052	<0.046	<0.051	<0.049						
2,4'-DDT	µg/kg dry	<0.092	<0.081	<0.09	<0.086						
4,4'-DDD	µg/kg dry	**4.9**	**3.7**	**4**	**2.3**	2	20	2,300	9,600	2,300	9,000
4,4'-DDE	µg/kg dry	**6.2**	**3.5**	**3.9**	**1.5**	2.2	27	2,000	9,300	1,600	6,300
4,4'-DDT	µg/kg dry	<0.078	<0.068	<0.076	<0.073	1	7	1,900	8,500	1,600	6,300
Total DDT	µg/kg dry	**11**	**7.2**	**7.9**	**3.8**	1.58	46.1				
Aldrin	µg/kg dry	<0.056	<0.049	<0.055	<0.052			39	180	33	130
BHC-alpha	µg/kg dry	<0.085	<0.075	<0.083	<0.079			86	360		
BHC-beta	µg/kg dry	<0.1	<0.088	<0.097	<0.093			300	1,300		
BHC-delta	µg/kg dry	<0.14	<0.12	<0.13	<0.13						
BHC-gamma (Lindane)	µg/kg dry	<0.051	<0.045	<0.05	<0.048			570	2,500		
Chlordane-alpha	µg/kg dry	<0.099	0.17J	<0.096	<0.092						
Chlordane-gamma	µg/kg dry	<0.079	0.24J	<0.077	<0.074						
Chlordane (Technical)	µg/kg dry	<7.8	<6.8	<7.6	<7.3			1,700	7,700	430	1,700
Dieldrin	µg/kg dry	<0.16	<0.14	<0.15	<0.15	0.02	8	34	140	35	130
Endosulfan Sulfate	µg/kg dry	<0.15	<0.14	<0.15	<0.14						
Endosulfan I	µg/kg dry	<0.086	<0.075	<0.083	<0.08			47,000	700,000		
Endosulfan II	µg/kg dry	<0.13	<0.12	<0.13	<0.13						
Endrin	µg/kg dry	<0.084	<0.073	<0.082	<0.078		45	1,900	25,000	21,000	230,000
Endrin Aldehyde	µg/kg dry	<0.15	<0.13	<0.14	<0.14						
Endrin Ketone	µg/kg dry	<0.082	<0.072	<0.08	<0.077						
Heptachlor	µg/kg dry	<0.076	<0.067	<0.074	<0.071			130	630	130	520
Heptachlor Epoxide	µg/kg dry	<0.066	<0.058	<0.064	<0.061			70	330		
Methoxychlor	µg/kg dry	<0.1	<0.087J-	<0.097	<0.093			32,000	410,000	340,000	3,800,000
Mirex	ug/kg dry	<0.058	<0.051	<0.057	<0.054			36	170	31	120

Table 17. 2016 Port Hueneme Composite Bulk Sediment Chemistry Results (Continued).

Valid Analyte Name	Units	Port Hueneme Composite Samples (HUENEMEVC16-)				NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		A	A2	E	T	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
Oxychlordane	ug/kg dry	<0.11	<0.095	<0.11	<0.1						
Toxaphene	ug/kg dry	<13	<12	<13	<12			490	2,100	460	1,800
Trans-nonachlor	ug/kg dry	<0.064	0.11J	<0.062	<0.059						
Total Chlordane	ug/kg dry	ND	**0.52**	ND	ND	0.5	6	1,700	7,700	430	1,700
PCB CONGENERS											
PCB018	µg/kg dry	1.4	<0.084	<0.1	<0.098						
PCB028	µg/kg dry	<0.049	<0.09	<0.049	<0.046						
PCB037	µg/kg dry	<0.089	<0.078	<0.088	<0.083						
PCB044	µg/kg dry	2.2	<0.2	1.2	0.97						
PCB049	µg/kg dry	2.8	<0.064	1.1	0.62						
PCB052	µg/kg dry	5.6	<0.25	3	1.5						
PCB066	µg/kg dry	2.1	<0.16	1.6	1.1						
PCB070	µg/kg dry	2.8	<0.092	2.2	1.1						
PCB074	µg/kg dry	1	<0.12	0.74	0.48						
PCB077	µg/kg dry	<0.11	<0.15	0.57	0.57			38	160		
PCB081	µg/kg dry	<0.18	<0.12	<0.17	<0.16			12	48		
PCB087	µg/kg dry	2.1	<0.14	2.1	1.4						
PCB099	µg/kg dry	4.5	<0.061	2.9	1.4						
PCB101	µg/kg dry	7	1.1	5.8	3.7						
PCB105	µg/kg dry	2.7	<0.069	2.1	1.8			120	490		
PCB110	µg/kg dry	6.3	1.8	5.4	3.4						
PCB114	µg/kg dry	<0.12	<0.096	<0.12	<0.11			120	500		
PCB118	µg/kg dry	7.8	1.6	5.9	3.1			120	490		
PCB119	µg/kg dry	<0.14	<0.081	<0.14	<0.13						
PCB123	µg/kg dry	<0.15	<0.094	<0.15	<0.14			120	490		
PCB126	µg/kg dry	<0.12	<0.071	<0.12	<0.11			0.036	0.15		
PCB128	µg/kg dry	1.1	<0.15	1.5	0.81						
PCB132/153	µg/kg dry	6.9	1.8	7.1	5.9						
PCB138/158	µg/kg dry	6.3	2.2	8.2	6.3						
PCB149	µg/kg dry	3.2	1.4	3.6	3						
PCB151	µg/kg dry	<0.099	<0.11	1.1	0.74						
PCB156	µg/kg dry	<0.085	<0.1	0.98	0.71			120	500		
PCB157	µg/kg dry	<0.077	<0.11	<0.076	<0.072			120	500		
PCB167	µg/kg dry	<0.091	<0.17	<0.089	<0.085			120	510		
PCB168	µg/kg dry	<0.072	<0.18	<0.071	<0.067						
PCB169	µg/kg dry	<0.09	<0.084	<0.088	<0.084			0.12	0.51		

Table 17. 2016 Port Hueneme Composite Bulk Sediment Chemistry Results (Continued).

Valid Analyte Name	Units	Port Hueneme Composite Samples (HUENEMEVC16-)				NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		A	A2	E	T	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
PCB170	µg/kg dry	<0.094	<0.14	<0.092	1.7						
PCB177	µg/kg dry	<0.13	<0.15	<0.13	0.94						
PCB180	µg/kg dry	1.5	<0.12	2.3	3.1						
PCB183	µg/kg dry	<0.16	<0.12	<0.16	<0.15						
PCB187	µg/kg dry	<0.12	<0.13	<0.12	<0.12						
PCB189	µg/kg dry	<0.09	<0.083	<0.088	<0.084			130	520		
PCB194	µg/kg dry	<0.17	<0.095	<0.16	<0.15						
PCB201	µg/kg dry	<0.14	<0.044	<0.14	<0.13						
PCB206	µg/kg dry	<0.28	<0.15	<0.28	<0.26						
Total PCB Congeners	µg/kg dry	**67**	9.9	**59**	**44**	22.7	180	230	940	89	300
PYRETHROIDS											
Allethrin	µg/kg dry	<0.37	<0.32	<0.36	<0.35						
Bifenthrin	µg/kg dry	<0.45	<0.39	<0.44	<0.42			95,000	1,200,000		
Cyfluthrin	µg/kg dry	<0.37	<0.32	<0.36	<0.35			160,000	2,100,000		
Cyhalothrin-lambda	µg/kg dry	<0.37	<0.32	<0.36	<0.35			6,300	82,000		
Cypermethrin	µg/kg dry	<0.37	<0.32	<0.36	<0.35			380,000	4,900,000		
Deltamethrin:Tralomethrin	µg/kg dry	<0.37	<0.32	<0.36	<0.35			47,000	620,000		
Esfenvalerate:Fenvalerate	µg/kg dry	<0.37	<0.32	<0.36	<0.35			160,000	2,100,000		
Fenpropathrin	µg/kg dry	<0.37	<0.32	<0.36	<0.35			160,000	2,100,000		
Fluvalinate	µg/kg dry	<0.37	<0.32	<0.36	<0.35			63,000	820,000		
Phenothrin (Sumithrin)	µg/kg dry	<0.37	<0.32	<0.36	<0.35						
Permethrin (cis/trans)	µg/kg dry	<0.75	<0.65	<0.73	<0.69			320,000	4,100,000		
Resmethrin:Bioresmethrin	µg/kg dry	<0.64	<0.55	<0.62	<0.59			190,000	2,500,000		
Tetramethrin	µg/kg dry	<0.45	<0.39	<0.44	<0.42						
ERM Quotient		0.06	0.03	0.05	0.05						

1. Effects Range Low (ERL) and Effects Range Median (ERM) sediment quality objectives from Buchman (2008) and Long *et al.* (1995).
2. Regional Screening Levels for Chemical Contaminants at Superfund Sites" (USEPA Region 9, updated 2017).
3. California Human Health Screening Levels for Soil (Cal/EPA, 2005).

Red values exceed ERL values.
Red underlined values exceed ERM values.
Green shaded values exceed one or more of the corresponding human health values.
ND = Not Detected NF= Not found as a Tentatively Identifiable Compound.
< = Not detected at the corresponding Method Detection Limit. J = Estimated between the Reporting Limit and the Method Detection Limit.
J- = Biased low estimated value. U = Sample is ND at the RL due to a method blank detection. N/A = Not Analyzed

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Table 18. Individual Core Chemistry for Area A, Port Hueneme.

Valid Analyte Name	Units	Area A								Area A Composite Sample	NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		A-01*	A-02*	A-03*	A-04*	A-05	A-06*	A-07*	A-08*		Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
SEDIMENT CONVENTIONALS																
Percent Solids	%	70.5	74	65.9	66.3	76.5	61.7	70.8	69.1	67.1						
PAH's																
1-Methylnaphthalene	µg/kg dry	<3.3	<3.1	<3.5	<3.5	<3	<3.8	<3.3	<3.4	4.3J			18,000	73,000		
1-Methylphenanthrene	µg/kg dry	<3.5	<3.3	<3.8	<3.7	<3.2	<4	<3.5	<3.6	<2.9						
2,3,5-Trimethylnaphthalene	µg/kg dry	<2.7	<2.6	<2.9	<2.9	<2.5	<3.1	<2.7	<2.8	<2.6						
2,6-Dimethylnaphthalene	µg/kg dry	7.5J	<2.3	8J	3.9J	7.1J	16J	3J	5.9J	16						
2-Methylnaphthalene	µg/kg dry	<3.3	<3.1	<3.5	3.9J	<3	<3.8	<3.3	3.5J	4.9J	70	670	24,000	300,000		
Acenaphthene	µg/kg dry	<3.3	<3.1	<3.6	<3.5	<3.1	<3.8	<3.3	<3.4	2.6J	16	500	360,000	4,500,000		
Acenaphthylene	µg/kg dry	<2.5	<2.4	<2.7	<2.7	<2.3	<2.9	<2.5	<2.6	<2.5	44	640				
Anthracene	µg/kg dry	14J	5.1J+	<5.3	8.4J+	5.2J+	12J+	<4.9	16J+	7.1J	85.3	1100	1,800,000	23,000,000		
Benzo (a) Anthracene	µg/kg dry	20	7.3J+	14J+	13J+	14J+	20J+	7.2J+	15J+	14J	261	1600	1,100	21,000		
Benzo (a) Pyrene	µg/kg dry	9.7J	2.8J	13J	8.6J	12J	18	6.2J	8.7J	14J	430	1600	110	2,100	38	130
Benzo (b) Fluoranthene	µg/kg dry	12J	4.1J	18	11J	15	21	8.2J	11J	25			1,100	21,000		
Benzo (e) Pyrene	µg/kg dry	7.2J	<2.6	9.6J	8.4J	10J	14J	5.3J	6.5J	15						
Benzo (g,h,i) Perylene	µg/kg dry	<2.2	<2.1	6.3J+	<2.3	6.5J+	3.9J+	3.3J+	<2.2	<2.3						
Benzo (k) Fluoranthene	µg/kg dry	11J	<3.7	13J	8.4J	13J	15J	7.6J	8.8J	17			11,000	210,000		
Biphenyl	µg/kg dry	<2.6	<2.5	<2.8	<2.8	<2.4	<3	<2.6	<2.7	3.7J						
Chrysene	µg/kg dry	28	9.8J+	18J+	J+	19J+	27J+	8.2J+	28J+	18	384	2800	110,000	2,100,000		
Dibenz (a,h) Anthracene	µg/kg dry	<2.7	<2.6	<2.9	<2.9	<2.5	<3.1	<2.8	<2.8	<2.1	63.4	260	110	2,100		
Dibenzothiophene	µg/kg dry	<1.9	<1.8	<2	<2	<1.8	<2.2	<1.9	<1.9	<2			78,000	1,200,000		
Fluoranthene	µg/kg dry	53	27J+	26J+	28J+	30J+	47J+	11J+	36J+	27	600	5100	240,000	3,000,000		
Fluorene	µg/kg dry	<4.4	<4.2	<4.7	<4.7	<4.1	<5	<4.4	<4.5	<2.4	19	540	240,000	3,000,000		
Indeno (1,2,3-c,d) Pyrene	µg/kg dry	<2.2	<2.1	6.1J+	2.6J+	5.9J+	5.1J+	3.3J+	<2.3	8.8J			1,100	21,000		
Naphthalene	µg/kg dry	<4.9	<4.6	<5.2	<5.2	<4.5	<5.6	<4.9	<5	4.7J	160	2100	3,800	17,000		
Perylene	µg/kg dry	7.5J	<3.2	<3.6	11J	23	<3.8	9.4J	6.4J	26						
Phenanthrene	µg/kg dry	21	17J+	14J+	15J+	15J+	23J+	4.8J+	17J+	15	240	1500				
Pyrene	µg/kg dry	49	25	30	27	30	44	13J	36	29	665	2600	180,000	2,300,000		
Total Low Weight PAHs	µg/kg dry	43	22	22	31	27.3	51	7.8	42	58	552	3160				
Total High Weight PAHs	µg/kg dry	197	76	154	136	178	215	83	156	194	1700	9600				
Total PAHs	µg/kg dry	240	98.1	176	167	206	266	91	199	252	4022	44792				
PCB CONGENERS																
PCB018	µg/kg dry	<0.091	<0.087	<0.098	<0.097	<0.085	<0.1	<0.092	4.5	1.4						
PCB028	µg/kg dry	<0.097	<0.093	<0.1	<0.1	<0.091	<0.11	<0.098	<0.1	<0.049						
PCB037	µg/kg dry	<0.085	<0.081	<0.092	<0.091	<0.079	<0.098	<0.086	<0.087	<0.089						
PCB044	µg/kg dry	3	1.5	<0.23	2.1	0.99	<0.25	<0.21	4.9	2.2						
PCB049	µg/kg dry	1.2	1.4	0.59	1.6	0.49	<0.08	<0.07	8.9	2.8						
PCB052	µg/kg dry	3.6	2.9	1.9	4.3	1.4	2.4	<0.27	14	5.6						
PCB066	µg/kg dry	1.3	1.3	0.97	1.7	0.64	0.74	<0.17	6.4	2.1						
PCB070	µg/kg dry	2.8	2.2	2	2.5	1.4	1.5	0.61	9.4	2.8						
PCB074	µg/kg dry	0.93	0.97	0.44	1	<0.12	0.88	<0.13	3.2	1						
PCB077	µg/kg dry	<0.16	0.43	<0.17	<0.17	<0.15	<0.19	<0.16	2.8	<0.11			38	160		
PCB081	µg/kg dry	<0.13	<0.12	<0.14	<0.14	<0.12	<0.15	<0.13	<0.13	<0.18			12	48		
PCB087	µg/kg dry	3.3	2.3	2.1	3.1	1.5	<0.18	<0.16	11	2.1						
PCB099	µg/kg dry	4	3.3	2.6	4.2	2.2	2.7	1	22	4.5						
PCB101	µg/kg dry	8.1	6.6	5.6	9	4	4.3	1.8	36	7						
PCB105	µg/kg dry	4.2	3	2.2	2.3	1.8	<0.086	<0.075	17	2.7			120	490		

Table 18. Individual Core Chemistry for Area A, Port Hueneme (Continued).

Valid Analyte Name	Units	Area A								Area A Composite Sample	NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		A-01*	A-02*	A-03*	A-04*	A-05	A-06*	A-07*	A-08*		Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
PCB110	µg/kg dry	7.6	6.3	4	7.4	3.7	4.1	2.1	32	6.3						
PCB114	µg/kg dry	<0.1	<0.099	<0.11	<0.11	<0.097	<0.12	<0.1	<0.11	<0.12			120	500		
PCB118	µg/kg dry	7.2	6.9	4.5	7.9	3.2	3.8	1.8	44	7.8			120	490		
PCB119	µg/kg dry	<0.088	<0.084	<0.094	<0.094	<0.082	<0.1	<0.088	<0.09	<0.14						
PCB123	µg/kg dry	<0.1	<0.098	<0.11	<0.11	<0.095	<0.12	<0.1	<0.1	<0.15			120	490		
PCB126	µg/kg dry	<0.077	<0.073	<0.083	<0.082	<0.072	<0.089	<0.078	<0.079	<0.12			0.036	0.15		
PCB128	µg/kg dry	<0.17	1.5	<0.18	1.9	<0.16	<0.19	<0.17	10	1.1						
PCB132/153	µg/kg dry	6.9	5.9	4.6	7.3	4	3.7	2.1	41	6.9						
PCB138/158	µg/kg dry	8	6.5	4.8	7.2	4.5	4.2	1.7	44	6.3						
PCB149	µg/kg dry	4.1	3.8	2.8	4.2	2.3	2.2	1.3	21	3.2						
PCB151	µg/kg dry	<0.12	0.81	<0.13	<0.13	<0.11	<0.14	<0.12	4	<0.099						
PCB156	µg/kg dry	1.2	1.4	<0.12	0.73	<0.1	<0.12	<0.11	6.6	<0.085			120	500		
PCB157	µg/kg dry	<0.12	<0.11	<0.13	<0.13	<0.11	<0.14	<0.12	1.7	<0.077			120	500		
PCB167	µg/kg dry	<0.19	0.31	<0.2	<0.2	<0.17	<0.21	<0.19	2.4	<0.091			120	510		
PCB168	µg/kg dry	<0.2	<0.19	<0.22	<0.21	<0.19	<0.23	<0.2	<0.21	<0.072						
PCB169	µg/kg dry	<0.091	<0.087	<0.098	<0.098	<0.085	<0.11	<0.092	<0.094	<0.09			0.12	0.51		
PCB170	µg/kg dry	<0.16	0.91	<0.17	1.3	<0.15	<0.18	<0.16	5.4	<0.094						
PCB177	µg/kg dry	<0.16	<0.16	<0.18	<0.18	<0.15	<0.19	<0.17	1.9	<0.13						
PCB180	µg/kg dry	1.8	1.5J+	<0.14	1.4J+	1J+	<0.15	<0.13	8.3J+	1.5						
PCB183	µg/kg dry	0.6	<0.13	<0.14	<0.14	<0.12	<0.15	<0.13	2.2	<0.16						
PCB187	µg/kg dry	1.1	0.8	<0.15	0.6	0.73	<0.17	<0.14	2.6	<0.12						
PCB189	µg/kg dry	<0.09	<0.086	<0.097	<0.096	<0.084	<0.1	<0.091	<0.092	<0.09			130	520		
PCB194	µg/kg dry	<0.1	<0.099	<0.11	<0.11	<0.097	<0.12	<0.1	<0.11	<0.17						
PCB201	µg/kg dry	<0.048	<0.046	<0.051	<0.051	<0.044	<0.055	<0.048	<0.049	<0.14						
PCB206	µg/kg dry	<0.16	<0.15	<0.17	<0.17	<0.15	<0.19	<0.16	<0.17	<0.28						
Total PCB Congeners	µg/kg dry	**71**	**63**	**39**	**72**	**34**	**31**	12	**367**	**67**	22.7	180	230	940	89	300

*Located within or on the boundaries of former USACE "Hot Spots" for PCBs and metals.

1. Effects Range Low (ERL) and Effects Range Median (ERM) sediment quality objectives from Buchman (2008) and Long *et al.* (1995).
2. Regional Screening Levels for Chemical Contaminants at Superfund Sites" (USEPA Region 9, updated 2017).
3. California Human Health Screening Levels for Soil (Cal/EPA, 2005).

Red values exceed ERL values.
Red underlined values exceed ERM values.
Green shaded values exceed one or more of the corresponding human health values.
ND = Not Detected
< = Not detected at the corresponding Method Detection Limit.
J = Estimated between the Reporting Limit and the Method Detection Limit or an estimated value due to QC data outside QC objectives.
J+ = Biased high estimated value.

Table 19. Individual Core Chemistry for Area E, Port Hueneme.

Valid Analyte Name	Units	Area E									Area E Composite Sample	NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		E-01	E-02	E-03	E-04	E-05	E-06	E-07	E-08	E-09		Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
SEDIMENT CONVENTIONALS																	
Percent Solids	%	76.9	71.6	80	86.8	75.9	74.6	69.5	76.3	70.7	68.6						
PAH's																	
1-Methylnaphthalene	µg/kg dry	<3	<3.2	<2.9	<2.7	<3	<3.1	<3.3	<3	<3.3	2.8J			18,000	73,000		
1-Methylphenanthrene	µg/kg dry	<3.2	<3.4	<3.1	<2.9	<3.2	<3.3	9.7J	17	<3.5	<2.8						
2,3,5-Trimethylnaphthalene	µg/kg dry	<2.5	<2.7	<2.4	<2.2	<2.5	<2.6	<2.8	<2.5	<2.7	<2.5						
2,6-Dimethylnaphthalene	µg/kg dry	<2.2	<2.4	<2.1	<2	17	13J	<2.4	7.3J	6.3J	13J						
2-Methylnaphthalene	µg/kg dry	<3	<3.2	<2.9	<2.7	<3	<3.1	<3.3	<3	<3.3	3.3J	70	670	24,000	300,000		
Acenaphthene	µg/kg dry	<3	<3.3	<2.9	<2.7	<3.1	<3.1	4.8J	16	<3.3	<2.2	16	500	360,000	4,500,000		
Acenaphthylene	µg/kg dry	<2.3	<2.5	<2.2	<2.1	7.2J	15	4.8J	18	17	7.1J	44	640				
Anthracene	µg/kg dry	7.1J+	<4.8	13J+	<4	25J+	40J+	29J+	81J+	37J+	15	85.3	1100	1,800,000	23,000,000		
Benzo (a) Anthracene	µg/kg dry	11J+	8.8J+	10J+	<2.5	50J+	41J+	110J+	160J+	41J+	26	261	1600	1,100	21,000		
Benzo (a) Pyrene	µg/kg dry	5.5J	6.1J	4.3J	6.7J	78	130	57	320	140	58	430	1600	110	2,100	38	130
Benzo (b) Fluoranthene	µg/kg dry	8.2J	9J	6.1J	10J	100	180	96	390	170	76			1,100	21,000		
Benzo (e) Pyrene	µg/kg dry	5.3J	5.4J	2.8J	3.7J	48	76	42	160	58	40						
Benzo (g,h,i) Perylene	µg/kg dry	<2	<2.1	<1.9	<1.8	25J+	46J+	7.7J+	92J+	49J+	19						
Benzo (k) Fluoranthene	µg/kg dry	5.8J	7.5J	5.5J	8.8J	91	150	77	300	180	72			11,000	210,000		
Biphenyl	µg/kg dry	<2.4	<2.6	<2.3	<2.1	<2.4	<2.5	<2.7	<2.4	<2.6	<2.7						
Chrysene	µg/kg dry	14J+	11J+	15J+	4.6J+	77J+	66J+	180J+	240J+	65J+	40	384	2800	110,000	2,100,000		
Dibenz (a,h) Anthracene	µg/kg dry	<2.5	<2.7	<2.4	<2.2	11J	24	5.2J	50	23	<2.1	63.4	260	110	2,100		
Dibenzothiophene	µg/kg dry	<1.7	<1.9	<1.7	<1.6	<1.8	<1.8	<1.9	12J	<1.9	<2			78,000	1,200,000		
Fluoranthene	µg/kg dry	36J+	16J+	36J+	3.2J+	130J+	54J+	360J+	370J+	50J+	44	600	5100	240,000	3,000,000		
Fluorene	µg/kg dry	<4	<4.3	<3.9	<3.6	<4.1	<4.2	<4.5	23	<4.4	<2.4	19	540	240,000	3,000,000		
Indeno (1,2,3-c,d) Pyrene	µg/kg dry	<2	<2.2	<2	<1.8	31J+	55J+	9.2J+	110J+	52J+	28			1,100	21,000		
Naphthalene	µg/kg dry	<4.5	<4.8	<4.3	<4	<4.5	<4.6	<4.9	<4.5	<4.9	3J	160	2100	3,800	17,000		
Perylene	µg/kg dry	5J	<3.3	<3	<2.7	30	28	7.8J	57	19	22						
Phenanthrene	µg/kg dry	25J+	6J+	33J+	<2.6	40J+	26J+	57J+	310J+	28J+	24	240	1500				
Pyrene	µg/kg dry	31J+	18J+	35J+	4.2J+	130J+	67J+	340J+	300J+	69J+	50	665	2600	180,000	2,300,000		
Total Low Weight PAHs	µg/kg dry	32	6	46	ND	89	94	105	484	88	68.2	552	3160				
Total High Weight PAHs	µg/kg dry	122	82	115	41	801	917	1292	2549	916	475	1700	9600				
Total PAHs	µg/kg dry	154	88	161	41	890	1011	1397	3033	1004	543	4022	44792				
PCB CONGENERS																	
PCB018	µg/kg dry	<0.084	<0.09	1.2	<0.075	<0.085	<0.087	<0.093	<0.085	<0.091	<0.1						
PCB028	µg/kg dry	<0.089	<0.096	<0.087	<0.08	<0.091	<0.093	<0.099	<0.091	<0.098	<0.049						
PCB037	µg/kg dry	<0.078	<0.084	<0.076	<0.07	<0.079	<0.081	<0.086	<0.079	<0.085	<0.088						
PCB044	µg/kg dry	<0.2	0.79	1.5	0.48	1.2	2.4	0.97	<0.2	1.6	1.2						
PCB049	µg/kg dry	0.5	0.48	1.5	0.62	0.78	1.8	0.49	<0.065	0.73	1.1						
PCB052	µg/kg dry	0.86	1.2	3.6	1	1.8	3	1.7	1.3	1.7	3						
PCB066	µg/kg dry	0.39	0.57	1.4	0.75	1.6	2.3	1.2	1.2	1.6	1.6						
PCB070	µg/kg dry	0.67	0.89	2.1	1	1.8	3.9	1.8	1.1	1.2	2.2						
PCB074	µg/kg dry	<0.12	0.35	0.74	<0.1	0.93	1.1	0.49	0.65	0.7	0.74						
PCB077	µg/kg dry	<0.15	<0.16	0.35	<0.13	<0.15	0.98	<0.16	<0.15	<0.16	0.57			38	160		
PCB081	µg/kg dry	<0.12	<0.12	<0.11	<0.1	<0.12	<0.12	<0.13	<0.12	<0.13	<0.17			12	48		
PCB087	µg/kg dry	<0.14	0.8	2.2	1	2.6	4.6	2.1	1.4	2.6	2.1						
PCB099	µg/kg dry	1.3	1.7	3.8	1.3	3.2	7.5	3.4	2.1	3.7	2.9						
PCB101	µg/kg dry	1.8	2.4	7.3	3.3	6.4	13	4.6	5.1	6.8	5.8						
PCB105	µg/kg dry	1.3	<0.074	2.4	0.83	2.1	5	2	2.2	2.5	2.1			120	490		

Table 19. Individual Core Chemistry for Area E, Port Hueneme (Continued).

Valid Analyte Name	Units	Area E									Area E Composite Sample	NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		E-01	E-02	E-03	E-04	E-05	E-06	E-07	E-08	E-09		Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
PCB110	µg/kg dry	1.5	2.5	5.8	3.1	5.7	12	5.8	4.7	6.2	5.4						
PCB114	µg/kg dry	<0.095	<0.1	<0.093	<0.085	<0.097	<0.099	<0.11	<0.097	<0.1	<0.12			120	500		
PCB118	µg/kg dry	1.7	2.4	6.4	2	6.4	12	5.1	4.3	6	5.9			120	490		
PCB119	µg/kg dry	<0.08	<0.086	<0.078	<0.072	<0.082	<0.083	<0.089	<0.082	<0.088	<0.14						
PCB123	µg/kg dry	<0.094	<0.1	<0.091	<0.084	<0.095	<0.097	<0.1	<0.095	<0.1	<0.15			120	490		
PCB126	µg/kg dry	<0.071	<0.076	<0.069	<0.063	<0.072	<0.073	<0.078	<0.072	<0.077	<0.12			0.036	0.15		
PCB128	µg/kg dry	<0.15	<0.17	1.2	<0.14	1.3	2.9	1.4	1.3	2.2	1.5						
PCB132/153	µg/kg dry	2.4	2.6	7.1	2.7	6.3	15	6.9	9.7	13	7.1						
PCB138/158	µg/kg dry	2.1	2.6	5.8	2.2	6.9	14	6.6	8	12	8.2						
PCB149	µg/kg dry	0.83	1.4	3.4	1.4	3.6	7.8	3.3	5.7	8	3.6						
PCB151	µg/kg dry	<0.11	<0.12	0.88	0.62	1.1	1.6	<0.12	2.2	1.8	1.1						
PCB156	µg/kg dry	<0.1	<0.11	0.74	<0.089	0.85	1.8	0.96	0.87	1.1	0.98			120	500		
PCB157	µg/kg dry	<0.11	<0.12	<0.11	<0.098	<0.11	<0.11	<0.12	<0.11	<0.12	<0.076			120	500		
PCB167	µg/kg dry	<0.17	<0.18	<0.17	<0.15	<0.17	0.59	<0.19	<0.17	<0.19	<0.089			120	510		
PCB168	µg/kg dry	<0.18	<0.2	<0.18	<0.16	<0.19	<0.19	<0.2	<0.19	<0.2	<0.071						
PCB169	µg/kg dry	<0.084	<0.09	<0.081	<0.075	<0.085	<0.087	<0.093	<0.085	<0.092	<0.088			0.12	0.51		
PCB170	µg/kg dry	<0.14	<0.15	1.1	0.71	<0.14	1.4	0.93	2.9	3.2	<0.092						
PCB177	µg/kg dry	<0.15	<0.16	0.65	<0.14	0.78	1.3	<0.17	1.3	1.8	<0.13						
PCB180	µg/kg dry	<0.12	<0.13	1.6J+	1.4J+	2J+	5.1J+	2J+	4.9J+	7.5J+	2.3						
PCB183	µg/kg dry	<0.12	<0.13	<0.12	<0.11	0.58	1.7	0.95	1.2	1.7	<0.16						
PCB187	µg/kg dry	<0.13	<0.14	<0.13	0.52	0.97	2.1	1.5	2.2	3.3	<0.12						
PCB189	µg/kg dry	<0.083	<0.089	<0.08	<0.074	<0.084	<0.086	<0.091	<0.084	<0.09	<0.088			130	520		
PCB194	µg/kg dry	<0.095	<0.1	<0.092	<0.085	<0.096	<0.099	<0.11	<0.096	1.3	<0.16						
PCB201	µg/kg dry	<0.044	<0.047	<0.043	<0.039	<0.044	<0.045	<0.048	<0.044	<0.048	<0.14						
PCB206	µg/kg dry	<0.15	<0.16	<0.14	<0.13	<0.15	<0.15	<0.17	<0.15	<0.16	<0.28						
Total PCB Congeners	µg/kg dry	15	21	**63**	**25**	**59**	**125**	**54**	**64**	**92**	**59**	22.7	180	230	940	89	300

1. Effects Range Low (ERL) and Effects Range Median (ERM) sediment quality objectives from Buchman (2008) and Long *et al.* (1995).
2. Regional Screening Levels for Chemical Contaminants at Superfund Sites" (USEPA Region 9, updated 2017).
3. California Human Health Screening Levels for Soil (Cal/EPA, 2005).

Red values exceed ERL values.
Red underlined values exceed ERM values.
Green shaded values exceed one or more of the corresponding human health values.
ND = Not Detected
< = Not detected at the corresponding Method Detection Limit.
J = Estimated between the Reporting Limit and the Method Detection Limit or an estimated value due to QC data outside QC objectives.
J+ = Biased high estimated value

Table 20. Individual Core Chemistry for Area T Cores 1 through 10, Port Hueneme.

Valid Analyte Name	Units	Area T Individual Cores										Area T Composite Sample	NOAA Screening		Human RSLs[2] HQ = 0.1		Human CHHSLs[3]	
		T-01	T-02	T-03	T-04	T-05	T-06*	T-07*	T-08	T-09	T-10		Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
SEDIMENT CONVENTIONALS																		
Percent Solids	%	84.6	77.2	77.8	77.2	75.1	75	72.6	73.1	77.4	78	72.1						
PAH's																		
1-Methylnaphthalene	µg/kg dry	<2.7	<3	<3	<3	<3.1	<3.1	<3.2	<3.2	<3	<3	<1.5			18,000	73,000		
1-Methylphenanthrene	µg/kg dry	<2.9	<3.2	<3.2	<3.2	9.7J	<3.3	<3.4	<3.4	<3.2	<3.2	3.9J						
2,3,5-Trimethylnaphthalene	µg/kg dry	<2.3	<2.5	<2.5	<2.5	2.7J	<2.6	<2.7	<2.6	<2.5	<2.5	<2.4						
2,6-Dimethylnaphthalene	µg/kg dry	<2	<2.2	<2.2	<2.2	<2.3	<2.3	3.5J	16	<2.2	<2.2	5.1J						
2-Methylnaphthalene	µg/kg dry	<2.7	<3	<3	<3	<3.1	<3.1	<3.2	<3.2	<3	<3	2.3J	70	670	24,000	300,000		
Acenaphthene	µg/kg dry	<2.8	<3	<3	<3	8.1J	<3.1	3.9J	4.9J	<3	<3	2.2J	16	500	360,000	4,500,000		
Acenaphthylene	µg/kg dry	<2.1	2.9J	2.6J	<2.3	7.7J	4.2J	17	45	<2.3	8J	15	44	640				
Anthracene	µg/kg dry	<4.1	10J	8.3J	<4.5	44	10J	47	110	<4.5	23	27	85.3	1100	1,800,000	23,000,000		
Benzo (a) Anthracene	µg/kg dry	<2.5	22	7.4J	<2.8	54	19	47	170	<2.8	19	38	261	1600	1,100	21,000		
Benzo (a) Pyrene	µg/kg dry	5J	24	7.3J	3.9J	70	39	38	400	<2.4	23	180	430	1600	110	2,100	38	130
Benzo (b) Fluoranthene	µg/kg dry	6.7J	34	14	5.1J	130	58	73	590	<3.5	40	210			1,100	21,000		
Benzo (e) Pyrene	µg/kg dry	3.1J	16	3.5J	2.6J	43	27	34	260	<2.5	17	110						
Benzo (g,h,i) Perylene	µg/kg dry	2.2J	4.4J	<2	<2	7J	3.6J	6.3J	120	<2	2.3J	51						
Benzo (k) Fluoranthene	µg/kg dry	6.3J	32	9.5J	5.4J	93	51	59	510	<3.6	28	190			11,000	210,000		
Biphenyl	µg/kg dry	<2.2	<2.4	<2.4	<2.4	<2.5	<2.5	<2.6	<2.5	<2.4	<2.4	<2.6						
Chrysene	µg/kg dry	<2.6	33	12J	3.3J	73	25	97	390	<2.9	33	71	384	2800	110,000	2,100,000		
Dibenz (a,h) Anthracene	µg/kg dry	<2.3	<2.5	<2.5	<2.5	6.1J	2.9J	3.2J	66	<2.5	<2.5	19	63.4	260	110	2,100		
Dibenzothiophene	µg/kg dry	<1.6	<1.7	<1.7	<1.7	7.8J	<1.8	2J	2.3J	<1.7	<1.7	<1.9			78,000	1,200,000		
Fluoranthene	µg/kg dry	3.1J	41	14	5.1J	140	23	92	330	<2.4	44	39	600	5100	240,000	3,000,000		
Fluorene	µg/kg dry	<3.7	<4	<4	<4	19	<4.1	5.4J	9.1J	<4	<4	3.4J	19	540	240,000	3,000,000		
Indeno (1,2,3-c,d) Pyrene	µg/kg dry	2.2J	4.8J	<2	<2.1	9.8J	5.1J	5.9J	150	<2.1	2.8J	73			1,100	21,000		
Naphthalene	µg/kg dry	<4.1	<4.5	<4.4	<4.5	8J	<4.6	<4.8	<4.7	<4.5	<4.4	2.6J	160	2100	3,800	17,000		
Perylene	µg/kg dry	<2.8	5.7J	<3	5.6J	15	11J	8.3J	76	<3.1	4J	31						
Phenanthrene	µg/kg dry	<2.6	10J	5.8J	3.8J	94	12J	37	60	<2.9	14	19	240	1500				
Pyrene	µg/kg dry	5J	52	17	8.1J	690	150	310	460	<2.9	84	76	665	2600	180,000	2,300,000		
Total Low Weight PAHs	µg/kg dry	0	23	17	3.8	201	26.2	116	247	0	45	80.5	552	3160				
Total High Weight PAHs	µg/kg dry	34	269	85	39	1331	415	774	**3522**	0	297	1088	1700	9600				
Total PAHs	µg/kg dry	34	292	101	43	1532	441	890	3769	0	342	1169	4022	44792				
PCB CONGENERS																		
PCB018	µg/kg dry	<0.076	0.37	<0.083	<0.084	<0.086	<0.086	<0.089	<0.088	<0.084	14	<0.098						
PCB028	µg/kg dry	<0.082	<0.089	<0.088	<0.09	<0.092	<0.092	<0.096	<0.094	<0.09	9.8	<0.046						
PCB037	µg/kg dry	<0.071	<0.078	0.39	<0.079	<0.08	<0.08	<0.083	<0.082	<0.078	3	<0.083						
PCB044	µg/kg dry	<0.18	<0.2	1.2	<0.2	<0.2	0.74	1.6	1.2	<0.2	11	0.97						
PCB049	µg/kg dry	<0.058	<0.064	0.59	<0.064	<0.066	0.35	0.97	0.74	<0.064	7.5	0.62						
PCB052	µg/kg dry	<0.22	0.49	1.6	<0.25	0.51	1.2	1.7	1.9	<0.25	12	1.5						
PCB066	µg/kg dry	<0.15	0.35	0.59	<0.16	0.37	0.48	1.2	1.5	<0.16	9.2	1.1						
PCB070	µg/kg dry	<0.084	0.4	1.3	<0.093	0.54	0.67	1.5	1.9	<0.092	12	1.1						
PCB074	µg/kg dry	<0.11	<0.12	0.41	<0.12	<0.12	<0.12	0.64	0.92	<0.12	5.8	0.48						
PCB077	µg/kg dry	<0.14	<0.15	0.4	<0.15	<0.15	<0.15	<0.16	<0.16	<0.15	1	0.57			38	160		
PCB081	µg/kg dry	<0.11	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.16			12	48		
PCB087	µg/kg dry	<0.13	0.43	1.8	<0.14	0.65	0.78	1.6	2.6	<0.14	2	1.4						
PCB099	µg/kg dry	<0.056	<0.061	1.8	<0.061	0.77	0.88	2.5	3.4	<0.061	3.8	1.4						
PCB101	µg/kg dry	<0.052	0.92	4.5	<0.057	1.3	2.3	5.4	6.3	<0.057	6.3	3.7						
PCB105	µg/kg dry	<0.063	0.67	1.9	<0.069	<0.071	<0.071	2.3	2.1	<0.069	2	1.8			120	490		

Table 20. Individual Core Chemistry for Area T Cores 1 through 10, Port Hueneme (Continued).

Valid Analyte Name	Units	Area T Individual Cores										Area T Composite Sample	NOAA Screening		Human RSLs[2] HQ = 0.1		Human CHHSLs[3]	
		T-01	T-02	T-03	T-04	T-05	T-06*	T-07*	T-08	T-09	T-10		Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
PCB110	µg/kg dry	<0.04	0.76	4.1	<0.044	1.3	1.8	4.3	6.8	<0.044	5.7	<0.11						
PCB114	µg/kg dry	<0.087	<0.095	<0.094	<0.096	<0.098	<0.098	<0.1	<0.1	<0.096	<0.095	3.1			120	500		
PCB118	µg/kg dry	<0.041	1.2	3.7	<0.045	1.2	1.8	4.9	6.4	<0.045	6.2	<0.13			120	490		
PCB119	µg/kg dry	<0.074	<0.08	<0.08	<0.081	<0.083	<0.083	<0.086	<0.085	<0.081	<0.08	<0.14						
PCB123	µg/kg dry	<0.086	<0.094	<0.093	<0.094	<0.097	<0.096	<0.1	<0.099	<0.094	<0.093	<0.11			120	490		
PCB126	µg/kg dry	<0.065	<0.07	<0.07	<0.071	<0.073	<0.073	<0.076	<0.074	<0.071	<0.07	0.81			0.036	0.15		
PCB128	µg/kg dry	<0.14	<0.15	1.1	<0.16	<0.16	<0.16	<0.17	1.9	<0.16	<0.15	5.9						
PCB132/153	µg/kg dry	<0.19	0.98	5.2	<0.21	1.8	2.6	6	9.2	<0.21	4.8	6.3						
PCB138/158	µg/kg dry	<0.41	1.8	5.2	<0.46	1.8	2.4	5.8	9.9	<0.46	4.5	3						
PCB149	µg/kg dry	<0.14	0.7	3.3	<0.15	1.3	1.5	3.4	5.3	<0.15	2.8	0.74						
PCB151	µg/kg dry	<0.1	<0.11	0.68	<0.11	<0.12	<0.12	0.9	1.6	<0.11	0.83	0.71						
PCB156	µg/kg dry	<0.091	<0.099	0.82	<0.1	<0.1	<0.1	<0.11	1.2	<0.1	0.52	<0.072			120	500		
PCB157	µg/kg dry	<0.1	<0.11	<0.11	<0.11	<0.11	<0.11	<0.12	<0.11	<0.11	<0.11	<0.085			120	500		
PCB167	µg/kg dry	<0.16	<0.17	<0.17	<0.17	<0.18	<0.18	<0.18	0.46	<0.17	<0.17	<0.11			120	510		
PCB168	µg/kg dry	<0.17	<0.18	<0.18	<0.18	<0.19	<0.19	<0.2	<0.19	<0.18	<0.18	<0.067						
PCB169	µg/kg dry	<0.077	<0.084	<0.083	<0.084	<0.086	<0.086	<0.09	<0.088	<0.084	<0.083	<0.084			0.12	0.51		
PCB170	µg/kg dry	<0.13	<0.14	1.3	<0.14	0.66	<0.15	1.9	3.3	<0.14	0.96	1.7						
PCB177	µg/kg dry	<0.14	<0.15	0.56	<0.15	<0.16	<0.15	<0.16	1.1	<0.15	0.74	0.94						
PCB180	µg/kg dry	<0.11	<0.12	2.2	<0.12	1.2	1.4	3.1	4.7	<0.12	2.5	3.1						
PCB183	µg/kg dry	<0.11	<0.12	0.42	<0.12	0.39	<0.12	<0.13	1.3	<0.12	0.77	<0.15						
PCB187	µg/kg dry	<0.12	<0.13	0.99	<0.13	0.5	0.86	1.4	2.6	<0.13	1	<0.12						
PCB189	µg/kg dry	<0.075	<0.082	<0.082	<0.083	<0.085	<0.085	<0.088	<0.087	<0.083	<0.082	<0.084			130	520		
PCB194	µg/kg dry	<0.087	<0.095	<0.094	<0.096	<0.098	<0.098	<0.1	<0.1	<0.096	<0.094	<0.15						
PCB201	µg/kg dry	<0.04	<0.044	<0.043	<0.044	<0.045	<0.045	<0.047	<0.046	<0.044	<0.043	<0.13						
PCB206	µg/kg dry	<0.14	<0.15	<0.15	<0.15	<0.15	<0.15	<0.16	<0.16	<0.15	<0.15	<0.26						
Total PCB Congeners	µg/kg dry	ND	9.1	**46**	ND	14.3	19.8	**51**	**78**	ND	**131**	**44**	22.7	180	230	940	89	300

*Located within or on the boundaries of former USACE "Hot Spots" for PCBs and metals.

1. cts Range Low (ERL) and Effects Range Median (ERM) sediment quality objectives from Buchman (2008) and Long *et al.* (1995).
2. Regional Screening Levels for Chemical Contaminants at Superfund Sites" (USEPA Region 9, updated 2017).
3. California Human Health Screening Levels for Soil (Cal/EPA, 2005).

Red values exceed ERL values.
Red underlined values exceed ERM values.
Green shaded values exceed one or more of the corresponding human health values.
ND = Not Detected
< = Not detected at the corresponding Method Detection Limit.
J = Estimated between the Reporting Limit and the Method Detection Limit or an estimated value due to QC data outside QC objectives.
J+ = Biased high estimated value.

Table 21. Individual Core Chemistry for Area T Cores 11 through 19, Port Hueneme.

Valid Analyte Name	Units	Area T Individual Cores									Area T Composite Sample	NOAA Screening		Human RSLs[2] HQ = 0.1		Human CHHSLs[3]	
		T-11	T-12	T-13	T-14	T-15	T-16*	T-17*	T-18	T-19		Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
SEDIMENT CONVENTIONALS																	
Percent Solids	%	75	74	78.5	78.1	75.1	80.7	77.5	78.5	75.5	72.1						
PAH's																	
1-Methylnaphthalene	µg/kg dry	<3.1	<3.1	<2.9	<3	<3.1	<2.9	<3	<2.9	<3.1	<1.5			18,000	73,000		
1-Methylphenanthrene	µg/kg dry	<3.3	<3.3	5.1J	<3.2	5.2J	<3.1	<3.2	<3.1	<3.3	3.9J						
2,3,5-Trimethylnaphthalene	µg/kg dry	<2.6	<2.6	<2.5	<2.5	<2.6	<2.4	<2.5	<2.5	<2.6	<2.4						
2,6-Dimethylnaphthalene	µg/kg dry	<2.3	3J	<2.2	3.2J	2.9J	<2.1	<2.2	<2.2	<2.3	5.1J						
2-Methylnaphthalene	µg/kg dry	<3.1	<3.1	<2.9	<3	<3.1	<2.9	<3	<2.9	<3.1	2.3J	70	670	24,000	300,000		
Acenaphthene	µg/kg dry	<3.1	<3.1	<3	<3	<3.1	<2.9	<3	<3	<3.1	2.2J	16	500	360,000	4,500,000		
Acenaphthylene	µg/kg dry	<2.4	4.9J	9.8J	15	13	4J	<2.3	5.1J	2.7J	15	44	640				
Anthracene	µg/kg dry	<4.6	11J	23	29	35	15	<4.4	13	12J	27	85.3	1100	1,800,000	23,000,000		
Benzo (a) Anthracene	µg/kg dry	4.6J	24	27	37	43	11J	<2.8	16	18	38	261	1600	1,100	21,000		
Benzo (a) Pyrene	µg/kg dry	8.2J	74	110	180	190	8.6J	<2.3	22	19	180	430	1600	110	2,100	38	130
Benzo (b) Fluoranthene	µg/kg dry	11J	95	150	280	240	14	<3.5	40	30	210			1,100	21,000		
Benzo (e) Pyrene	µg/kg dry	6.5J	37	51	110	89	6.3J	<2.5	14	13J	110						
Benzo (g,h,i) Perylene	µg/kg dry	2.3J	32	27	48	60	4.2J	2.6J	3J	3.2J	51						
Benzo (k) Fluoranthene	µg/kg dry	9.6J	85	140	180	220	9.4J	<3.6	31	26	190			11,000	210,000		
Biphenyl	µg/kg dry	<2.5	<2.5	<2.4	<2.4	<2.5	<2.3	<2.4	<2.4	<2.5	<2.6						
Chrysene	µg/kg dry	8.6J	39	51	77	97	19	<2.9	34	30	71	384	2800	110,000	2,100,000		
Dibenz (a,h) Anthracene	µg/kg dry	<2.6	14	17	27	33	<2.4	<2.5	<2.5	<2.6	19	63.4	260	110	2,100		
Dibenzothiophene	µg/kg dry	<1.8	<1.8	55	<1.7	<1.8	<1.7	<1.7	<1.7	<1.8	<1.9			78,000	1,200,000		
Fluoranthene	µg/kg dry	5.7J	22	29	43	40	22	<2.3	34	32	39	600	5100	240,000	3,000,000		
Fluorene	µg/kg dry	<4.1	<4.2	<3.9	<4	<4.2	<3.9	<4	<3.9	<4.1	3.4J	19	540	240,000	3,000,000		
Indeno (1,2,3-c,d) Pyrene	µg/kg dry	2.9J	32	35	57	72	3.4J	<2	3.9J	4.3J	73			1,100	21,000		
Naphthalene	µg/kg dry	<4.6	<4.6	<4.4	<4.4	<4.6	<4.3	<4.4	<4.4	<4.6	2.6J	160	2100	3,800	17,000		
Perylene	µg/kg dry	19	27	16	37	43	<2.9	3.9J	3.5J	4.8J	31						
Phenanthrene	µg/kg dry	4.4J	10J	13	19	24	13	<2.8	14	10J	19	240	1500				
Pyrene	µg/kg dry	9.3J	46	40	75	63	29	<2.9	56	34	76	665	2600	180,000	2,300,000		
Total Low Weight PAHs	µg/kg dry	4.4	29	106	66	80	32	0	32	25	80.5	552	3160				
Total High Weight PAHs	µg/kg dry	88	527	693	1151	1190	127	6.5	257	214	1088	1700	9600				
Total PAHs	µg/kg dry	92	556	799	1217	1270	159	6.5	290	239	1169	4022	44792				
PCB CONGENERS																	
PCB018	µg/kg dry	<0.086	<0.087	<0.082	<0.083	<0.086	<0.08	<0.083	<0.082	<0.086	<0.098						
PCB028	µg/kg dry	<0.092	<0.093	<0.088	<0.088	<0.092	<0.086	<0.089	<0.088	<0.092	<0.046						
PCB037	µg/kg dry	<0.08	<0.081	<0.076	<0.077	<0.081	<0.075	<0.077	<0.076	<0.08	<0.083						
PCB044	µg/kg dry	<0.2	<0.2	0.37	0.99	1.4	<0.19	<0.19	<0.19	<0.2	0.97						
PCB049	µg/kg dry	<0.066	<0.066	0.31	0.52	0.58	0.46	<0.063	0.52	<0.066	0.62						
PCB052	µg/kg dry	<0.25	<0.25	0.76	1.4	1.4	1.1	<0.24	0.86	0.69	1.5						
PCB066	µg/kg dry	<0.16	0.56	0.42	0.62	1.3	0.85	<0.16	0.93	0.42	1.1						
PCB070	µg/kg dry	<0.095	0.7	0.69	1	1.8	1.2	<0.091	1.1	0.83	1.1						
PCB074	µg/kg dry	<0.12	<0.12	<0.11	<0.11	0.66	<0.11	<0.12	0.34	<0.12	0.48						
PCB077	µg/kg dry	<0.15	<0.15	<0.15	<0.15	<0.15	0.45	<0.15	<0.15	0.26J	0.57			38	160		
PCB081	µg/kg dry	<0.12	<0.12	<0.11	<0.12	<0.12	<0.11	<0.12	<0.11	<0.12	<0.16			12	48		
PCB087	µg/kg dry	<0.15	<0.15	1.4	1.2	2.6	1.7	<0.14	1.2	0.73	1.4						
PCB099	µg/kg dry	<0.063	1.4	1.1	1.8	2.8	2.1	<0.061	1.7	1.6	1.4						
PCB101	µg/kg dry	<0.059	3.4	2.6	3.3	6.6	4.4	<0.057	3.9	2.7	3.7						
PCB105	µg/kg dry	<0.071	<0.072	0.99	<0.068	2.8	2.3	<0.068	1.8	0.67	1.8			120	490		

Table 21. Individual Core Chemistry Area T Cores 11 through 19 Port Hueneme (Continued).

Valid Analyte Name	Units	Area T Individual Cores									Area T Composite Sample	NOAA Screening		Human RSLs[2] HQ = 0.1		Human CHHSLs[3]	
		T-11	T-12	T-13	T-14	T-15	T-16*	T-17*	T-18	T-19		Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
PCB110	µg/kg dry	0.83	2.5	2.6	2.7	6.8	3.9	<0.043	3.4	2.2	<0.11						
PCB114	µg/kg dry	<0.098	<0.099	<0.093	<0.094	<0.099	<0.092	<0.095	<0.093	<0.098	3.1			120	500		
PCB118	µg/kg dry	<0.046	2.6	2.5	2.4	6.1	4	<0.044	3.4	2	<0.13			120	490		
PCB119	µg/kg dry	<0.083	<0.084	<0.079	<0.08	<0.083	<0.077	<0.08	<0.079	0.3	<0.14						
PCB123	µg/kg dry	<0.097	<0.098	<0.092	<0.093	<0.097	<0.09	<0.093	<0.092	<0.097	<0.11			120	490		
PCB126	µg/kg dry	<0.073	<0.073	<0.069	<0.07	<0.073	<0.068	<0.07	<0.069	<0.073	0.81			0.036	0.15		
PCB128	µg/kg dry	<0.16	<0.16	0.73	<0.15	1.8	1.3	<0.15	1.1	0.67	5.9						
PCB132/153	µg/kg dry	0.85	4.8	4.9	3.5	13	8	<0.21	6.4	3.7	6.3						
PCB138/158	µg/kg dry	0.1.1	4.4	4.5	3.1	13	7.6	<0.45	6.9	3	3						
PCB149	µg/kg dry	0.39J	2.8	3	1.9	7.7	5.1	<0.15	3.6	1.7	0.74						
PCB151	µg/kg dry	<0.12	<0.12	1.2	0.4	2.8	1.2	<0.11	1	0.47	0.71						
PCB156	µg/kg dry	<0.1	<0.1	<0.097	<0.098	1.2	0.99	<0.099	0.69	<0.1	<0.072			120	500		
PCB157	µg/kg dry	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.085			120	500		
PCB167	µg/kg dry	<0.18	<0.18	<0.17	<0.17	<0.18	<0.16	<0.17	<0.17	<0.18	<0.11			120	510		
PCB168	µg/kg dry	<0.19	<0.19	<0.18	<0.18	<0.19	<0.18	<0.18	<0.18	<0.19	<0.067						
PCB169	µg/kg dry	<0.086	<0.087	<0.082	<0.083	<0.087	<0.081	<0.083	<0.082	<0.086	<0.084			0.12	0.51		
PCB170	µg/kg dry	<0.15	0.75	1.4	<0.14	4.5	2.8	<0.14	2.4	<0.15	1.7						
PCB177	µg/kg dry	<0.16	<0.16	0.73	<0.15	2.5	1.5	<0.15	0.95	<0.16	0.94						
PCB180	µg/kg dry	<0.12	2.4	3.1	2	9.2	5	<0.12	3.8	1.4	3.1						
PCB183	µg/kg dry	<0.12	<0.13	0.98	<0.12	2.3	1.7	<0.12	0.89	<0.12	<0.15						
PCB187	µg/kg dry	<0.14	1.2	1.4	<0.13	3.6	2.2	<0.13	1.6	0.82	<0.12						
PCB189	µg/kg dry	<0.085	<0.086	<0.081	<0.082	<0.085	<0.079	<0.082	<0.081	<0.085	<0.084			130	520		
PCB194	µg/kg dry	<0.098	<0.099	<0.093	<0.094	1.3	1	<0.094	<0.093	<0.098	<0.15						
PCB201	µg/kg dry	<0.045	<0.046	<0.043	<0.043	<0.045	<0.042	<0.043	<0.043	<0.045	<0.13						
PCB206	µg/kg dry	<0.15	<0.15	<0.15	<0.15	<0.15	<0.14	<0.15	<0.15	<0.15	<0.26						
Total PCB Congeners	µg/kg dry	3.17	**28**	**36**	**27**	**98**	**61**	ND	**49**	**24**	**44**	22.7	180	230	940	89	300

*Located within or on the boundaries of former USACE "Hot Spots" for PCBs and metals.

1. Effects Range Low (ERL) and Effects Range Median (ERM) sediment quality objectives from Buchman (2008) and Long *et al.* (1995).
2. Regional Screening Levels for Chemical Contaminants at Superfund Sites" (USEPA Region 9, updated 2016).
3. California Human Health Screening Levels for Soil (Cal/EPA, 2005).

Red values exceed ERL values.
Red underlined values exceed ERM values.
Green shaded values exceed one or more of the corresponding human health values.
ND = Not Detected
< = Not detected at the corresponding Method Detection Limit.
J = Estimated between the Reporting Limit and the Method Detection Limit or an estimated value due to QC data outside QC objectives.
J+ = Biased high estimated value

Table 22. Individual Core Chemistry for Approach Channel Cores (Area A2) Collected in July 2017.

Valid Analyte Name	Units	Area A2 Individual Cores				Area A2 Composite Sample	NOAA Screening		Human RSLs[2] HQ = 0.1		Human CHHSLs[3]	
		A2-1	A2-2	A2-3	A2-4		Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
SEDIMENT CONVENTIONALS												
Percent Solids	%	77.7	76	76.7	71	76.7						
PAH's												
1-Methylnaphthalene	µg/kg dry	<3	3.8J	<3	5.9J	5.8J			18,000	73,000		
1-Methylphenanthrene	µg/kg dry	<3.2	<3.2	<3.2	7.7J	2.9J						
2,3,5-Trimethylnaphthalene	µg/kg dry	<2.5	2.9J	<2.5	9.9J	<2.3						
2,6-Dimethylnaphthalene	µg/kg dry	2.4J	4.2J	2.5J	10J	4.8J						
2-Methylnaphthalene	µg/kg dry	<3	4J	<3	7.5J	8.2J	70	670	24,000	300,000		
Acenaphthene	µg/kg dry	<3	<3.1	<3	17	<2	16	500	360,000	4,500,000		
Acenaphthylene	µg/kg dry	<2.3	<2.3	<2.3	<2.5	<2.2	44	640				
Anthracene	µg/kg dry	<4.4	<4.5	<4.5	31	<2.5	85.3	1100	1,800,000	23,000,000		
Benzo (a) Anthracene	µg/kg dry	6.6J	11J	11J	56	8.4J	261	1600	1,100	21,000		
Benzo (a) Pyrene	µg/kg dry	4.5J	8.5J	10J	39	5J	430	1600	110	2,100	38	130
Benzo (b) Fluoranthene	µg/kg dry	6.4J	12J	13	45	9.2J			1,100	21,000		
Benzo (e) Pyrene	µg/kg dry	6J	12J	9.9J	34	7.2J						
Benzo (g,h,i) Perylene	µg/kg dry	4.8J	6.8J	7.2J	17	<2						
Benzo (k) Fluoranthene	µg/kg dry	4.3J	8.7J	8.8J	33	6J			11,000	210,000		
Biphenyl	µg/kg dry	<2.4	3.7J	<2.4	<2.6	5.1J						
Chrysene	µg/kg dry	8.1J	17	14	63	10J	384	2800	110,000	2,100,000		
Dibenz (a,h) Anthracene	µg/kg dry	2.5J	2.8J	2.6J	7.9J	<1.9	63.4	260	110	2,100		
Dibenzothiophene	µg/kg dry	<1.7	<1.7	<1.7	7.9J	2J			78,000	1,200,000		
Fluoranthene	µg/kg dry	9.7J	23	17	160	14	600	5100	240,000	3,000,000		
Fluorene	µg/kg dry	<4	<4.1	<4	16	<2.1	19	540	240,000	3,000,000		
Indeno (1,2,3-c,d) Pyrene	µg/kg dry	2.9J	5.1J	6.3J	16	<1.7			1,100	21,000		
Naphthalene	µg/kg dry	<4.4	5.7J	<4.5	7.8J	5J	160	2100	3,800	17,000		
Perylene	µg/kg dry	27	35	21	46	30						
Phenanthrene	µg/kg dry	7.9J	14	11J	120	13	240	1500				
Pyrene	µg/kg dry	10J	24	19	170	16	665	2600	180,000	2,300,000		
Total Low Weight PAHs	µg/kg dry	10	38	14.0	241	47	552	3160				
Total High Weight PAHs	µg/kg dry	93	166	140	687	106	1700	9600				
Total PAHs	µg/kg dry	103	204	154	928	153	4022	44792				

Table 22. Individual Core Chemistry for Approach Channel Cores (Area A2) Collected in July 2017 (Continued).

Valid Analyte Name	Units	Area A2 Individual Cores				Area A-2 Composite Sample	NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		A2-1	A2-2	A2-3	A2-4		Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
PCB CONGENERS												
PCB018	µg/kg dry	<0.083	<0.084	<0.084	<0.091	<0.084						
PCB028	µg/kg dry	<0.088	<0.09	<0.09	<0.097	<0.09						
PCB037	µg/kg dry	<0.077	<0.079	<0.078	<0.085	<0.078						
PCB044	µg/kg dry	<0.19	<0.2	<0.2	<0.21	<0.2						
PCB049	µg/kg dry	<0.063	<0.064	0.26J	<0.069	<0.064						
PCB052	µg/kg dry	<0.24	<0.25	0.52	<0.27	<0.25						
PCB066	µg/kg dry	<0.16	<0.16	<0.16	<0.17	<0.16						
PCB070	µg/kg dry	0.29	<0.093	<0.092	0.75	<0.092						
PCB074	µg/kg dry	<0.11	<0.12	<0.12	<0.13	<0.12						
PCB077	µg/kg dry	<0.15	<0.15	<0.15	<0.16	<0.15			38	160		
PCB081	µg/kg dry	<0.12	<0.12	<0.12	<0.13	<0.12			12	48		
PCB087	µg/kg dry	<0.14	<0.14	<0.14	<0.16	<0.14						
PCB099	µg/kg dry	<0.06	<0.061	<0.061	1.1	<0.061						
PCB101	µg/kg dry	0.6	<0.057	1.2	1.1	1.1						
PCB105	µg/kg dry	<0.068	<0.069	<0.069	<0.075	<0.069			120	490		
PCB110	µg/kg dry	0.99	0.54	1.3	2.1	1.8						
PCB114	µg/kg dry	<0.094	<0.096	<0.096	<0.1	<0.096			120	500		
PCB118	µg/kg dry	0.61	1.2	1	2.1	1.6			120	490		
PCB119	µg/kg dry	<0.08	<0.081	<0.081	<0.087	<0.081						
PCB123	µg/kg dry	<0.093	<0.095	<0.094	<0.1	<0.094			120	490		
PCB126	µg/kg dry	<0.07	<0.071	<0.071	<0.077	<0.071			0.036	0.15		
PCB128	µg/kg dry	<0.15	<0.16	<0.15	<0.17	<0.15						
PCB132/153	µg/kg dry	0.64	1.1	<0.21	1.8	1.8						
PCB138/158	µg/kg dry	<0.45	<0.46	0.95	1.5	2.2						
PCB149	µg/kg dry	<0.15	<0.15	<0.15	0.91	1.4						
PCB151	µg/kg dry	<0.11	<0.11	<0.11	<0.12	<0.11						
PCB156	µg/kg dry	<0.098	<0.1	<0.1	<0.11	<0.1			120	500		
PCB157	µg/kg dry	<0.11	<0.11	<0.11	<0.12	<0.11			120	500		
PCB167	µg/kg dry	<0.17	<0.17	<0.17	<0.19	<0.17			120	510		
PCB168	µg/kg dry	<0.18	<0.19	<0.18	<0.2	<0.18						
PCB169	µg/kg dry	<0.083	<0.084	<0.084	<0.091	<0.084			0.12	0.51		

Table 22. Individual Core Chemistry for Approach Channel Cores (Area A2) Collected in July 2017 (Continued).

Valid Analyte Name	Units	Area A2 Individual Cores				Area A-2 Composite Sample	NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		A2-1	A2-2	A2-3	A2-4		Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
PCB170	µg/kg dry	<0.14	<0.14	<0.14	<0.15	<0.14						
PCB177	µg/kg dry	<0.15	<0.15	<0.15	<0.16	<0.15						
PCB180	µg/kg dry	<0.12	<0.12	<0.12	<0.13	<0.12						
PCB183	µg/kg dry	<0.12	<0.12	<0.12	<0.13	<0.12						
PCB187	µg/kg dry	<0.13	<0.13	<0.13	<0.14	<0.13						
PCB189	µg/kg dry	<0.082	<0.083	<0.083	<0.089	<0.083			130	520		
PCB194	µg/kg dry	<0.094	<0.096	<0.095	<0.1	<0.095						
PCB201	µg/kg dry	<0.043	<0.044	<0.044	<0.047	<0.044						
PCB206	µg/kg dry	<0.15	<0.15	<0.15	<0.16	<0.15						
Total PCB Congeners	µg/kg dry	3.13	2.84	5.23	11.4	9.9	22.7	180	230	940	89	300

*Located within or on the boundaries of former USACE "Hot Spots" for PCBs and metals.

4. Effects Range Low (ERL) and Effects Range Median (ERM) sediment quality objectives from Buchman (2008) and Long *et al.* (1995).
5. Regional Screening Levels for Chemical Contaminants at Superfund Sites" (USEPA Region 9, updated 2017).
6. California Human Health Screening Levels for Soil (Cal/EPA, 2005).

Red values exceed ERL values.
Red underlined values exceed ERM values.
Green shaded values exceed one or more of the corresponding human health values.
ND = Not Detected
< = Not detected at the corresponding Method Detection Limit.
J = Estimated between the Reporting Limit and the Method Detection Limit or an estimated value due to QC data outside QC objectives.
J+ = Biased high estimated value

Table 23. Solid Phase Toxicity Testing Results for OHD Berths 1, 2 and 3 (Anchor QEA, 2017).

Sample	Mean Survival (%)	Standard Deviation (%)	Acute Toxicity
Solid Phase Bioassays: Amphipod (*Eohaustorius estuaries)*			
Control	99	2.2	N/A
Reference	99	2.2	N/A
OHD-COMP	100	0.0	No
Solid Phase Bioassays: Polychaete worm (*Neanthes arenaceodentata)*			
Control	100	0.0	N/A
Reference	96	8.9	N/A
OHD-COMP	100	0.0	No

N/A = Not Applicable

Table 24. Suspended Particulate Phase Toxicity Testing Results for OHD Berths 1, 2 and 3 using *Mytilus galloprovincialis* (Anchor QEA, 2017).

Sample	Concentration (%)	Mean Normal Development (%)	Standard Deviation (%)	EC50 (%)	Mean Survival (%)	Standard Deviation (%)	LC50 (%)	Acute Toxicity
Control	N/A	96.9	1.2	N/A	93.4	6.9	N/A	N/A
Site Water Control	N/A	97.5	2.2	N/A	96.1	5.5	N/A	N/A
OHD-COMP	1	**93.7**	1.4	>100	92.3	4.4	>100	No
	10	95.3	2.4		96.5	4.3		
	50	96.0	2.4		91.7	7.5		
	100	97.1	0.8		91.5	4.4		

Bold = Value is significantly less than the control ($p<0.05$)
EC50 = median effective concentration
LC50 = median lethal concentration
N/A = not applicable

Table 25. Mean Survival of Clams and Polychaetes after the 28-day Bioaccumulation Exposures to Berths 1, 2 and 3 (Anchor QEA, 2017).

Sample	*Macoma nasuta*		*Nereis virens*	
	Mean Survival (%)	Standard Deviation	Mean Survival (%)	Standard Deviation
Control	98.4	2.2	98.0	4.5
OHD Comp	92.0	4.0	96.0	5.5
Reference Comp	95.2	3.3	96.0	8.9

Table 26. Mean Polychaete and Clam Tissue Concentrations and Statistical Results (Anchor QEA, 2017).

Analyte	Mean Tissue Concentrations (µg/kg)			p Value	Ratio of OHD-Comp to Reference
	T0	Reference	OHD Comp		
Macoma nasuta					
Dibutyltin	1.69	2.00	**11.3**	0.008	5.63
Tributyltin	0.75U	2.22	**29.1**	0.005	13.1
Total PCBs	0.0046U	8.71	**27.7**	<0.0001	3.19
Nereis virens					
Dibutyltin	0.363U	2.89	**15.0**	0.013	5.18
Tributyltin	0.75U	2.60	**8.00**	0.018	3.08
Total PCBs	5.11	12.5	**41.1**	<0.0001	3.29

U= Not Detected with half the MDL shown.
Bolded concentrations are statistically elevated over reference concentrations.

Table 27. Survival of *Nereis Virens* after the 28-day Bioaccumulation Exposures to the Federal Channel Composite Samples.

Composite Sample	Percent Polychaetes the Survived					Mean Survival (%)
	Rep A	Rep B	Rep C	Rep D	Rep E	
Lab Control	90	90	90	60	90	84
Approach Channel (A)	60	80	30	70	80	64
Entrance Channel (E)	90	80	70	60	60	72
Channel A/Turning Basin (T)	90	80	90	100	80	88
Nearshore Area Reference	60	50	40	60	60	54

Table 28. *Nereis Virens* Bioaccumulation Results for the Approach Channel (Area A).

Analyte	Composite Replicate Data, Mean and Standard Deviation for *Neries virens* Tissues														
	Approach Channel							CONTROL							T0
	A	B	C	D	E	Mean	SD	A	B	C	D	E	Mean	SD	
% Moisture	84	85	84	86	86	85	1	85	85	85	85	85	85	0.000	86
% Lipids	1.6	0.97	2	1.1	1.1	1.4	0.434	1.1	1.1	1.1	1.3	1.3	1.2	0.110	0.88
PCB Congeners (µg/Kg, wet)															
PCB018	<0.07	0.33	<0.07	<0.069	<0.07			<0.07	<0.071	<0.071	<0.071	<0.071			<0.069
PCB028	<0.033	0.29	<0.033	<0.033	<0.033			<0.033	<0.034	<0.034	<0.034	<0.034			<0.033
PCB037	<0.059	<0.059	<0.06	<0.059	<0.06			<0.06	<0.06	<0.06	<0.06	<0.06			<0.059
PCB044	<0.085	0.55	<0.086	<0.084	<0.086			<0.086	<0.087	<0.087	<0.087	<0.087			<0.084
PCB049	<0.11	<0.11	0.25	<0.11	<0.11			<0.11	<0.11	<0.11	<0.11	<0.11			<0.11
PCB052	0.64	0.73	0.79	0.32	0.46			<0.062	<0.063	<0.063	<0.063	<0.063			<0.061
PCB066	<0.1	0.47	0.31	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1			<0.1
PCB070	<0.058	<0.058	<0.059	<0.058	<0.059			<0.059	<0.06	<0.06	<0.06	<0.06			<0.058
PCB074	<0.085	<0.085	<0.086	<0.084	<0.086			<0.086	<0.087	<0.087	<0.087	<0.087			<0.084
PCB077	<0.076	0.43	<0.077	<0.075	<0.077			<0.077	<0.078	<0.078	<0.078	<0.078			<0.075
PCB081	<0.12	<0.12	<0.12	<0.12	<0.12			<0.12	<0.12	<0.12	<0.12	<0.12			<0.12
PCB087	<0.11	<0.11	<0.11	<0.1	<0.11			<0.11	<0.11	<0.11	<0.11	<0.11			<0.1
PCB099	0.81	0.38	0.69	0.46	0.32			<0.06	0.25	<0.061	<0.061	0.25			<0.059
PCB101	1.1	0.77	1.1	0.42	0.94			<0.097	0.34	<0.098	0.24	0.28			0.39
PCB105	<0.054	0.48	0.28	0.23	0.37			<0.054	<0.055	<0.055	<0.055	<0.055			<0.053
PCB110	0.81	0.51	0.93	0.62	0.78			<0.045	<0.046	<0.046	<0.046	<0.046			<0.045
PCB114	<0.08	<0.08	<0.081	<0.08	<0.081			<0.081	<0.082	<0.082	<0.082	<0.082			<0.08
PCB118	0.75	0.73	0.78	0.38	0.46			<0.083	0.3	<0.084	<0.084	0.2J			0.26
PCB119	<0.093	<0.093	<0.094	<0.092	<0.094			<0.094	<0.094	<0.094	<0.094	<0.094			<0.092
PCB123	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1			<0.1
PCB126	<0.078	0.37	<0.079	<0.078	<0.079			<0.079	<0.08	<0.08	<0.08	<0.08			<0.078
PCB128	<0.1	0.61	<0.1	<0.099	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1			<0.099
PCB132/153	3.2	1.6	2.7	2	1.9			0.94	1.5	1.3	1.7	1.9			1.4
PCB138/158	1.8	1.1	2	1	1.4			0.56	1	0.81	0.96	1			0.71
PCB149	1.1	0.43	1.3	0.75	0.87			0.43	0.77	0.5	0.67	0.81			0.48
PCB151	0.46	<0.066	0.58	<0.065	0.32			<0.067	<0.067	<0.067	<0.067	<0.067			<0.065
PCB156	<0.056	<0.056	<0.057	<0.056	<0.057			<0.057	<0.058	<0.058	<0.058	<0.058			<0.056
PCB157	<0.051	<0.051	<0.052	<0.051	<0.052			<0.052	<0.052	<0.052	<0.052	<0.052			<0.051
PCB167	<0.06	<0.06	<0.061	<0.06	<0.061			<0.061	<0.062	<0.062	<0.062	<0.062			<0.06
PCB168	<0.048	<0.048	<0.048	<0.047	<0.048			<0.048	<0.049	<0.049	<0.049	<0.049			<0.047
PCB169	<0.06	<0.06	<0.06	<0.059	<0.06			<0.06	<0.061	<0.061	<0.061	<0.061			<0.059
PCB170	0.46	0.54	0.59	<0.062	0.57			<0.063	<0.063	<0.063	0.35	<0.063			<0.062
PCB177	<0.085	<0.085	0.33	<0.085	<0.086			<0.086	<0.087	<0.087	<0.087	<0.087			<0.085
PCB180	1	0.58	0.77	0.59	0.51			0.55	0.57	0.58	0.53	0.58			<0.041
PCB183	0.46	<0.11	0.46	<0.11	0.28			0.2	0.21	0.2J	0.2J	0.34			0.23
PCB187	1	0.66	0.66	0.64	0.58			0.49	0.67	0.65	0.62	0.5			0.4
PCB189	<0.06	<0.06	<0.06	<0.059	<0.06			<0.06	<0.061	<0.061	<0.061	<0.061			<0.059
PCB194	<0.11	<0.11	<0.11	<0.11	<0.11			<0.11	<0.11	<0.11	<0.11	<0.11			<0.11
PCB201	<0.095	0.32	<0.096	<0.094	<0.096			<0.096	<0.097	<0.097	<0.097	<0.097			<0.094
PCB206	0.37	0.49	<0.19	<0.19	<0.19			<0.19	<0.19	<0.19	0.3	<0.19			<0.19
Total PCBs	14	12	15	7.4	9.8	**12**	2.985	3.2	5.6	4.0	5.6	5.9	4.9	1.183	3.9

NOTES:
Values in green shaded cells are detected concentrations greater than the MDL.
J = Estimated value between the method detection limit and reporting limit.
Bolded Values and Orange shaded cells indicate statistically significant differences in mean concentrations between test and nearshore reference tissues and test and control tissues ($p \leq 0.05$).

Table 29. *Nereis Virens* Bioaccumulation Results for the Entrance Channel (Area E).

Analyte	Composite Replicate Data, Mean and Standard Deviation for *Neries virens* Tissues														
	Entrance Channel							CONTROL							T0
	A	B	C	D	E	Mean	SD	A	B	C	D	E	Mean	SD	
% Moisture	84	85	85	85	85	85	0.447	85	85	85	85	85	85	0.000	86
% Lipids	1.4	0.97	0.99	1.2	1.2	1.2	0.177	1.1	1.1	1.1	1.3	1.3	1.2	0.110	0.88
PCB Congeners (µg/Kg, wet)															
PCB018	<0.07	<0.07	<0.071	<0.07	<0.071			<0.07	<0.071	<0.071	<0.071	<0.071			<0.069
PCB028	<0.033	<0.033	<0.034	<0.033	<0.034			<0.033	<0.034	<0.034	<0.034	<0.034			<0.033
PCB037	<0.059	<0.059	<0.06	<0.06	<0.06			<0.06	<0.06	<0.06	<0.06	<0.06			<0.059
PCB044	<0.085	<0.085	<0.087	<0.086	<0.087			<0.086	<0.087	<0.087	<0.087	<0.087			<0.084
PCB049	<0.11	<0.11	<0.11	<0.11	<0.11			<0.11	<0.11	<0.11	<0.11	<0.11			<0.11
PCB052	0.67	0.53	0.39	0.35	0.48			<0.062	<0.063	<0.063	<0.063	<0.063			<0.061
PCB066	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1			<0.1
PCB070	<0.058	<0.058	<0.06	<0.059	<0.06			<0.059	<0.06	<0.06	<0.06	<0.06			<0.058
PCB074	<0.085	<0.085	<0.087	<0.086	<0.087			<0.086	<0.087	<0.087	<0.087	<0.087			<0.084
PCB077	<0.076	<0.076	<0.078	<0.077	<0.078			<0.077	<0.078	<0.078	<0.078	<0.078			<0.075
PCB081	<0.12	<0.12	<0.12	<0.12	<0.12			<0.12	<0.12	<0.12	<0.12	<0.12			<0.12
PCB087	<0.11	0.29	<0.11	<0.11	<0.11			<0.11	<0.11	<0.11	<0.11	<0.11			<0.1
PCB099	0.63	0.49	0.46	0.33	0.53			<0.06	0.25	<0.061	<0.061	0.25			<0.059
PCB101	1.3	0.81	0.85	0.81	0.85			<0.097	0.34	<0.098	0.24	0.28			0.39
PCB105	0.54	<0.054	<0.055	<0.054	0.32			<0.054	<0.055	<0.055	<0.055	<0.055			<0.053
PCB110	0.77	0.44	0.65	0.58	0.59			<0.045	<0.046	<0.046	<0.046	<0.046			<0.045
PCB114	<0.08	<0.08	<0.082	<0.081	<0.082			<0.081	<0.082	<0.082	<0.082	<0.082			<0.08
PCB118	0.58	0.41	0.57	0.43	0.54			<0.083	0.3	<0.084	<0.084	0.2J			0.26
PCB119	<0.093	<0.093	<0.094	<0.094	<0.094			<0.094	<0.094	<0.094	<0.094	<0.094			<0.092
PCB123	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1			<0.1
PCB126	<0.078	<0.078	<0.08	<0.079	<0.08			<0.079	<0.08	<0.08	<0.08	<0.08			<0.078
PCB128	0.32	<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1			<0.099
PCB132/153	3.4	2	1.7	1.6	2.2			0.94	1.5	1.3	1.7	1.9			1.4
PCB138/158	2.1	1.1	1.3	1.2	1.6			0.56	1	0.81	0.96	1			0.71
PCB149	1.4	0.78	0.72	0.9	1			0.43	0.77	0.5	0.67	0.81			0.48
PCB151	0.48	0.39	<0.067	0.35	<0.067			<0.067	<0.067	<0.067	<0.067	<0.067			<0.065
PCB156	<0.056	<0.056	<0.058	<0.057	<0.058			<0.057	<0.058	<0.058	<0.058	<0.058			<0.056
PCB157	<0.051	<0.051	<0.052	<0.052	<0.052			<0.052	<0.052	<0.052	<0.052	<0.052			<0.051
PCB167	<0.06	<0.06	<0.062	<0.061	<0.062			<0.061	<0.062	<0.062	<0.062	<0.062			<0.06
PCB168	<0.048	<0.048	<0.049	<0.048	<0.049			<0.048	<0.049	<0.049	<0.049	<0.049			<0.047
PCB169	<0.06	<0.06	<0.061	<0.06	<0.061			<0.06	<0.061	<0.061	<0.061	<0.061			<0.059
PCB170	0.79	<0.062	<0.063	<0.063	0.41			<0.063	<0.063	<0.063	0.35	<0.063			<0.062
PCB177	<0.085	<0.085	<0.087	<0.086	<0.087			<0.086	<0.087	<0.087	<0.087	<0.087			<0.085
PCB180	0.89	0.57	0.47	0.37	0.95			0.55	0.57	0.58	0.53	0.58			<0.041
PCB183	<0.11	0.38	0.21	0.27	0.39			0.2	0.21	0.2J	0.2J	0.34			0.23
PCB187	1	0.7	0.57	0.5	0.86			0.49	0.67	0.65	0.62	0.5			0.4
PCB189	<0.06	<0.06	<0.061	<0.06	<0.061			<0.06	<0.061	<0.061	<0.061	<0.061			<0.059
PCB194	<0.11	<0.11	<0.11	<0.11	<0.11			<0.11	<0.11	<0.11	<0.11	<0.11			<0.11
PCB201	<0.095	<0.095	<0.097	<0.096	<0.097			<0.096	<0.097	<0.097	<0.097	<0.097			<0.094
PCB206	<0.19	<0.19	<0.19	<0.19	0.4			<0.19	<0.19	<0.19	0.3	<0.19			<0.19
Total PCBs	15	8.9	7.9	7.7	11	**10**	2.998	3.2	5.6	4.0	5.6	5.9	4.9	1.183	3.9

NOTES:
Values in green shaded cells are detected concentrations greater than the MDL.
J = Estimated value between the method detection limit and reporting limit.
Bolded Values and Orange shaded cells indicate statistically significant differences in mean concentrations between test and nearshore reference tissues ($p \leq 0.05$).

Table 30. *Nereis Virens* Bioaccumulation Results for the Channel A/Turning Basin (Area T).

Analyte	Composite Replicate Data, Mean and Standard Deviation for *Neries virens* Tissues														
	Turning Basin							CONTROL							T0
	A	B	C	D	E	Mean	SD	A	B	C	D	E	Mean	SD	
% Moisture	85	86	84	87	86	86	1.14	85	85	85	85	85	85	0.000	86
% Lipids	1.2	1.1	1.2	0.89	1.3	1.1	0.156	1.1	1.1	1.1	1.3	1.3	1.2	0.110	0.88
PCB Congeners (µg/Kg, wet)															
PCB018	<0.14	<0.071	<0.071	<0.071	<0.07			<0.07	<0.071	<0.071	<0.071	<0.071			<0.069
PCB028	<0.067	<0.034	<0.034	<0.034	<0.033			<0.033	<0.034	<0.034	<0.034	<0.034			<0.033
PCB037	<0.12	<0.06	<0.06	<0.06	<0.06			<0.06	<0.06	<0.06	<0.06	<0.06			<0.059
PCB044	<0.17	<0.087	<0.087	<0.087	<0.086			<0.086	<0.087	<0.087	<0.087	<0.087			<0.084
PCB049	<0.22	<0.11	<0.11	<0.11	<0.11			<0.11	<0.11	<0.11	<0.11	<0.11			<0.11
PCB052	<0.13	0.36	0.42	0.46	0.31			<0.062	<0.063	<0.063	<0.063	<0.063			<0.061
PCB066	<0.21	<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1			<0.1
PCB070	<0.12	<0.06	<0.06	<0.06	<0.059			<0.059	<0.06	<0.06	<0.06	<0.06			<0.058
PCB074	<0.17	<0.087	<0.087	<0.087	<0.086			<0.086	<0.087	<0.087	<0.087	<0.087			<0.084
PCB077	<0.16	<0.078	<0.078	<0.078	<0.077			<0.077	<0.078	<0.078	<0.078	<0.078			<0.075
PCB081	<0.24	<0.12	<0.12	<0.12	<0.12			<0.12	<0.12	<0.12	<0.12	<0.12			<0.12
PCB087	<0.21	<0.11	<0.11	<0.11	<0.11			<0.11	<0.11	<0.11	<0.11	<0.11			<0.1
PCB099	<0.12	0.46	0.52	0.48	0.43			<0.06	0.25	<0.061	<0.061	0.25			<0.059
PCB101	0.61	0.96	0.95	1	0.96			<0.097	0.34	<0.098	0.24	0.28			0.39
PCB105	<0.11	0.34	<0.055	0.37	0.22			<0.054	<0.055	<0.055	<0.055	<0.055			<0.053
PCB110	0.47	0.6	0.73	0.56	0.77			<0.045	<0.046	<0.046	<0.046	<0.046			<0.045
PCB114	<0.16	<0.082	<0.082	<0.082	<0.081			<0.081	<0.082	<0.082	<0.082	<0.082			<0.08
PCB118	0.54	0.5	0.49	0.74	0.58			<0.083	0.3	<0.084	<0.084	0.2J			0.26
PCB119	<0.19	<0.094	<0.094	<0.094	<0.094			<0.094	<0.094	<0.094	<0.094	<0.094			<0.092
PCB123	<0.21	<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1			<0.1
PCB126	<0.16	<0.08	<0.08	<0.08	<0.079			<0.079	<0.08	<0.08	<0.08	<0.08			<0.078
PCB128	<0.2	<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1			<0.099
PCB132/153	2.5	2.8	2.5	2.5	2.1			0.94	1.5	1.3	1.7	1.9			1.4
PCB138/158	1.5	1.7	1.5	1.7	1.5			0.56	1	0.81	0.96	1			0.71
PCB149	1.1	1.3	1.2	1.2	1.1			0.43	0.77	0.5	0.67	0.81			0.48
PCB151	<0.13	0.27	0.33	<0.067	<0.067			<0.067	<0.067	<0.067	<0.067	<0.067			<0.065
PCB156	<0.12	<0.058	<0.058	<0.058	<0.057			<0.057	<0.058	<0.058	<0.058	<0.058			<0.056
PCB157	<0.1	<0.052	<0.052	<0.052	<0.052			<0.052	<0.052	<0.052	<0.052	<0.052			<0.051
PCB167	<0.12	<0.062	<0.062	<0.062	<0.061			<0.061	<0.062	<0.062	<0.062	<0.062			<0.06
PCB168	<0.097	<0.049	<0.049	<0.049	<0.048			<0.048	<0.049	<0.049	<0.049	<0.049			<0.047
PCB169	<0.12	<0.061	<0.061	<0.061	<0.06			<0.06	<0.061	<0.061	<0.061	<0.061			<0.059
PCB170	<0.13	0.5	0.31	0.39	0.47			<0.063	<0.063	<0.063	0.35	<0.063			<0.062
PCB177	<0.17	<0.087	<0.087	<0.087	<0.086			<0.086	<0.087	<0.087	<0.087	<0.087			<0.085
PCB180	0.78	0.87	0.74	0.73	0.7			0.55	0.57	0.58	0.53	0.58			<0.041
PCB183	0.39J	0.45	0.29	0.27	0.24			0.2	0.21	0.2J	0.2J	0.34			0.23
PCB187	0.75	0.84	0.58	0.74	0.61			0.49	0.67	0.65	0.62	0.5			0.4
PCB189	<0.12	<0.061	<0.061	<0.061	<0.06			<0.06	<0.061	<0.061	<0.061	<0.061			<0.059
PCB194	<0.22	<0.11	<0.11	<0.11	<0.11			<0.11	<0.11	<0.11	<0.11	<0.11			<0.11
PCB201	<0.19	<0.097	<0.097	<0.097	<0.096			<0.096	<0.097	<0.097	<0.097	<0.097			<0.094
PCB206	<0.39	<0.19	<0.19	<0.19	<0.19			<0.19	<0.19	<0.19	0.3	<0.19			<0.19
Total PCBs	8.6	12	11	11	10	**11**	1.248	3.2	5.6	4.0	5.6	5.9	4.9	1.183	3.9

NOTES:
Values in green shaded cells are detected concentrations greater than the MDL.
J = Estimated value between the method detection limit and reporting limit.
Bolded Values and Orange shaded cells indicate statistically significant differences in mean concentrations between test and nearshore reference tissues ($p \leq 0.05$).

Table 31. *Nereis Virens* Bioaccumulation Results for the Nearshore Reference Sample.

Analyte	Composite Replicate Data, Mean and Standard Deviation for *Neries virens* Tissues														
	Nearshore Reference							CONTROL							T0
	A	B	C	D	E	Mean	SD	A	B	C	D	E	Mean	SD	
% Moisture	86	84	84	86	87	85	1.342	85	85	85	85	85	85	0.000	86
% Lipids	1	1.2	0.99	0.82	0.61	0.92	0.221	1.1	1.1	1.1	1.3	1.3	1.2	0.110	0.88
PCB Congeners (µg/Kg, wet)															
PCB018	<0.071	<0.071	<0.07	<0.07	0.37			<0.07	<0.071	<0.071	<0.071	<0.071			<0.069
PCB028	<0.034	<0.034	<0.033	<0.033	<0.033			<0.033	<0.034	<0.034	<0.034	<0.034			<0.033
PCB037	<0.06	<0.06	<0.06	<0.06	<0.06			<0.06	<0.06	<0.06	<0.06	<0.06			<0.059
PCB044	<0.087	<0.087	<0.086	<0.086	<0.086			<0.086	<0.087	<0.087	<0.087	<0.087			<0.084
PCB049	<0.11	<0.11	<0.11	<0.11	<0.11			<0.11	<0.11	<0.11	<0.11	<0.11			<0.11
PCB052	<0.063	<0.063	<0.062	<0.062	0.5			<0.062	<0.063	<0.063	<0.063	<0.063			<0.061
PCB066	<0.1	<0.1	<0.1	<0.1	0.56			<0.1	<0.1	<0.1	<0.1	<0.1			<0.1
PCB070	<0.06	<0.06	<0.059	<0.059	<0.059			<0.059	<0.06	<0.06	<0.06	<0.06			<0.058
PCB074	<0.087	<0.087	<0.086	<0.086	<0.086			<0.086	<0.087	<0.087	<0.087	<0.087			<0.084
PCB077	<0.078	<0.078	<0.077	<0.077	<0.077			<0.077	<0.078	<0.078	<0.078	<0.078			<0.075
PCB081	<0.12	<0.12	<0.12	<0.12	<0.12			<0.12	<0.12	<0.12	<0.12	<0.12			<0.12
PCB087	<0.11	<0.11	<0.11	<0.11	<0.11			<0.11	<0.11	<0.11	<0.11	<0.11			<0.1
PCB099	<0.061	0.27	<0.06	<0.06	<0.06			<0.06	0.25	<0.061	<0.061	0.25			<0.059
PCB101	0.29	0.33	<0.097	<0.097	0.36			<0.097	0.34	<0.098	0.24	0.28			0.39
PCB105	<0.055	<0.055	<0.054	<0.054	<0.054			<0.054	<0.055	<0.055	<0.055	<0.055			<0.053
PCB110	<0.046	<0.046	<0.045	<0.045	<0.045			<0.045	<0.046	<0.046	<0.046	<0.046			<0.045
PCB114	<0.082	<0.082	<0.081	<0.081	<0.081			<0.081	<0.082	<0.082	<0.082	<0.082			<0.08
PCB118	<0.084	<0.084	<0.083	<0.083	<0.083			<0.083	0.3	<0.084	<0.084	0.2J			0.26
PCB119	<0.094	<0.094	<0.094	<0.094	<0.094			<0.094	<0.094	<0.094	<0.094	<0.094			<0.092
PCB123	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1			<0.1
PCB126	<0.08	<0.08	<0.079	<0.079	<0.079			<0.079	<0.08	<0.08	<0.08	<0.08			<0.078
PCB128	<0.1	<0.1	<0.1	<0.1	0.41			<0.1	<0.1	<0.1	<0.1	<0.1			<0.099
PCB132/153	1.4	1.7	0.71	0.95	1.1			0.94	1.5	1.3	1.7	1.9			1.4
PCB138/158	0.99	0.97	0.44	0.67	0.49			0.56	1	0.81	0.96	1			0.71
PCB149	0.58	0.65	<0.097	<0.097	<0.097			0.43	0.77	0.5	0.67	0.81			0.48
PCB151	<0.067	<0.067	<0.067	<0.067	<0.067			<0.067	<0.067	<0.067	<0.067	<0.067			<0.065
PCB156	<0.058	<0.058	<0.057	<0.057	<0.057			<0.057	<0.058	<0.058	<0.058	<0.058			<0.056
PCB157	<0.052	<0.052	<0.052	<0.052	<0.052			<0.052	<0.052	<0.052	<0.052	<0.052			<0.051
PCB167	<0.062	<0.062	<0.061	<0.061	<0.061			<0.061	<0.062	<0.062	<0.062	<0.062			<0.06
PCB168	<0.049	<0.049	<0.048	<0.048	<0.048			<0.048	<0.049	<0.049	<0.049	<0.049			<0.047
PCB169	<0.061	<0.061	<0.06	<0.06	<0.06			<0.06	<0.061	<0.061	<0.061	<0.061			<0.059
PCB170	<0.063	0.29	<0.063	<0.063	0.29			<0.063	<0.063	<0.063	0.35	<0.063			<0.062
PCB177	<0.087	<0.087	<0.086	<0.086	<0.086			<0.086	<0.087	<0.087	<0.087	<0.087			<0.085
PCB180	0.53	0.58	<0.042	0.39	0.54			0.55	0.57	0.58	0.53	0.58			<0.041
PCB183	0.27	<0.11	<0.11	<0.11	<0.11			0.2	0.21	0.2J	0.2J	0.34			0.23
PCB187	0.59	0.59	0.24	0.37	0.53			0.49	0.67	0.65	0.62	0.5			0.4
PCB189	<0.061	<0.061	<0.06	<0.06	<0.06			<0.06	<0.061	<0.061	<0.061	<0.061			<0.059
PCB194	<0.11	<0.11	<0.11	<0.11	<0.11			<0.11	<0.11	<0.11	<0.11	<0.11			<0.11
PCB201	<0.097	<0.097	<0.096	<0.096	0.47			<0.096	<0.097	<0.097	<0.097	<0.097			<0.094
PCB206	<0.19	<0.19	<0.19	<0.19	0.47			<0.19	<0.19	<0.19	0.3	<0.19			<0.19
Total PCBs	4.7	5.4	1.4	2.4	6.1	4.0	2.008	3.2	5.6	4.0	5.6	5.9	4.9	1.183	3.9

NOTES:

Values in green shaded cells are detected concentrations greater than the MDL.

J = Estimated value between the method detection limit and reporting limit.

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5.0 DISCUSSION

Subsections that follow describe physical and chemical testing results, as summarized in Tables 12 through 22, in terms of sediment screening levels and objectives for beach nourishment. An additional brief discussion is given for the results of the OHD composite sample Tier III testing, as summarized in Tables 23 through 26, as well as the differences between the federal channel composite sample chemical results and the OHD composite sample chemical results (Appendix K). Next, a discussion is provided for the *Nereis Virens* bioaccumulation results, as summarized in Tables 27 through 31, after exposures to the federal channel sediments.

5.1 Sediment Observations

Most observed sediment characteristics were somewhat similar among cores. According to soils logs (Appendix E), sediments were predominately described as silty sand (SM) or sandy silt (ML) down to the project overdepth elevations from Areas A and E. Cores from Area T were highly variable with descriptions ranged from poorly graded sand (SP) to fat clay (CH). In comparison, sediments along the beach transects were described as poorly graded sand (SP) from the top of the beach down to an elevation of about -18 feet MLLW. Sediments deeper than the -18 feet MLLW contour were described predominately as either silty sand (SM) or sandy silt (ML). Sediments in the nearshore areas were described mainly as poorly graded sand (SP) or poorly graded sand with silt (SP-SM).

There were no obvious visual layers of elevated contamination and there was no observed trash in any of the cores. Most cores contained at least a trace amount of organic material in the upper sediments along with a slight organic odor. Aside from Area A, most cores contained trace amounts of shell debris. Sediments below the -18 feet MLLW elevation along the beach transects also exhibited organic material along with occasional trace organic odors. Transect B contained shell debris in the 0.0 foot MLLW sample and below.

5.2 Sediment Grain Size

As summarized in Tables 9 through 11, results indicate that all composite areas have weighted averages greater than 58% overall sand and gravel content (58% to 82%) with Area A2 having the greatest sand content among the four channel areas (82%) followed by Area E (72%). Beach transect data shows the average sand content to be 92.8% with the lowest individual transect sample containing 77% sand and the highest transect sample containing 99% sand. The nearshore placement area sampled in March 2017 had an average sand content of 95%. The average sand content among the four nearshore areas sampled in June 2017 ranged from 89% to 95% sand.

5.3 Bulk Sediment Chemistry

Chemical characteristics of the federal channel composite samples are discussed first followed by a comparison of the federal channel composite samples to the OHD composite sample.

5.3.1 Federal Channel Composite Samples

With a few exceptions, analyte concentrations in the Port Hueneme area composite samples, as summarized in Table 12, were below detection limits or low compared to effects based screening levels. Several DDTs and also total DDTs were elevated above NOAA ERL screening values in all four composite samples. Total PCB congeners also exceeded the NOAA ERL in all the area composite samples except for Area A2. Except for a slight exceedance of total chlordane in the Area A2 composite sample, there were no other chemical constituents that exceeded an ERL value and no constituent exceeded an ERM value.

As a general overall indicator of potential toxicity, mean ERM quotients were calculated for the composite samples. These ranged from 0.03 in the Area A2 composite sample to 0.06 in the Area A composite. A mean quotient less than 0.1 is indicative of a low probability (<12%) of a highly toxic response to marine amphipods (Long and MacDonald, 1998).

There were only a couple of organic constituents that slightly exceeded one or more human health screening levels. Benzo (a) Pyrene was above both the residential RSL and the residential CHSSL value in the Area T composite sample and just the residential CHSSL in the Area E composite sample. Neither sample exceeded an RSL or CHSSL commercial/industrial screening value. The residential RSL value for benzo (b) fluoranthene was exceeded in the Area T composite sample but was a magnitude lower than the industrial RSL value. Benzo (a) Pyrene and benzo (b) fluoranthene result from incomplete combustion and have been positively linked to numerous cancers.

Arsenic, as usual, was the only other constituent to exceed human health screening values. Arsenic values in all four composite samples exceeded both the RSL and CHHSL residential and industrial/commercial screening values. Elevated arsenic concentrations occur commonly from natural as well as from anthropogenic sources in California dredge sediments and in soils, and the concentrations of arsenic in the Port Hueneme Harbor composite samples were similar to the estimated background concentration (3.5 mg/kg) for soils throughout California (Bradford et al., 1996), and less than the concentration (12 mg/kg) that the Department of Toxic Substance Control (DTSC) considers dangerous to human health (Dr. William Bosan, Personnel Communication). The arsenic concentrations in the composite samples only slightly exceeded the background concentration determined for Hueneme Beach back in 2011. The calculated upper bound (95th percentile) background concentration in the fine grained (sieved) fraction from this beach was 3.62 mg/kg (Diaz-Yourman, GeoPentech and Kinnetic Laboratories Joint Venture, 2012 and 2013).

5.3.2 Federal Channel Individual Core Analyses for PCBs and PAHs

Per a request by the USACE, PCB and PAH analyses were conducted on the individual core samples from all four composite areas. Historical contamination of PCBs and PAHs was mitigated by dredging and then placing and capping the material in CAD site located in the Turning Basin of Port Hueneme Harbor. The individual core analysis was requested to locate any residual locations with high amounts of these compounds.

Total PCBs in the composite samples ranged from 9.9 (Area A2) to 67 (Area A) µg/kg. There were several core samples where total PCB values exceeded their corresponding PCB value in the composite sample. There were three locations in Area A, four locations in Area E and seven locations in Area T that had total PCB values higher than total PCB concentrations in the corresponding composite samples. There was also one location in Area A2 that had a total PCB concentration that also exceeded the composite sample concentration, but this value was well below the ERL value. All but four of the locations with higher values had total PCB concentrations less than two times the corresponding composite concentrations. The total PCB concentration in Location A-08 (367 µg/kg) was roughly 5.5 times higher than the concentration in the Area A composite sample (67 µg/kg). The total PCB concentration in Location E-06 (125 µg/kg) was 2.1 times higher than the concentration in the Area E composite sample (59 µg/kg). Total PCB concentrations in Locations T-10 (131 µg/kg) and T-15 (98 µg/kg) were roughly 3.0 and 2.2 times higher than the concentration in the Area E composite sample (59 µg/kg), respectively.

Total PAHs in the composite samples ranged from 153 (Area A2) to 1,169 (Area T) µg/kg. There were no individual core samples in Area A with total PAH concentrations that exceeded the total PAH concentration in the Area A composite sample (252 µg/kg). Total PAHs in half of the Area A2 individual core samples exceeded the total PAH concertation in the Area A2 composite sample (153 µg/kg). Area A2-04 had the highest total PAH concentration (928 µg/kg) among the Area A2 individual cores and was roughly 7.5 times higher than the composite concentration. Total PAHs in roughly half of the Area E individual core samples (5 out of 9 samples) exceeded the total PAH concertation in the Area E composite sample (542 µg/kg). Location E-08 had the highest total PAH concentration (3,033 µg/kg) among the Area E individual cores and it was roughly 5.5 times higher than the composite sample concentration. Four out of the 19 Area T individual core samples had concentrations of total PAHs that exceeded the Area T composite sample concentration. Three of these locations exceeded the composite sample concertation by less than 1.5 times. The fourth location, T-08, had a total PAH concentration of 3,769 µg/kg and was roughly 3.2 times higher than the composite sample concertation. Note that PAH totals in the Area A and Area E individual cores may be biased high due to strong matrix interferences that lead to high spike recoveries for some of the individual PAH compounds (see Appendix I).

5.3.3 Comparison of the Federal Channel Composite Samples to the OHD (Berths 1, 2 and 3) Composite Sample

The Anchor QEA team formed the OHD composite sample from five cores collected in front of Berths 1, 2 and 3. Locations of these cores are shown on Figures 3 and 9. Use of the Tier III data from the OHD composite sample (Anchor QEA, 2017) is based on the assumption that the OHD composite sample is similar in chemical concentrations with the federal channel composite samples. The following is a synopsis of the chemical results between the OHD composite sample and the federal channel composite samples:

- Except for Area A2, the OHD composite sample was slightly coarser than the federal channel composite samples and consisted of 78% sand and gravel compared to weighted average sand and gravel contents of 58% for Area A, 82% for Area A2, 72% for Area E and 69% for Area T.
- TOC in the federal channel composite samples ranged from not detected to 0.93% compared to 0.3% on the OHD composite sample.

- Total recoverable metals concentrations were slightly lower overall in the OHD composite but the federal channel composite sample concentrations, like the OHD composite sample concentrations, were all less than ERL values.
- Dibutyltin and tributyltin concentrations in the OHD composite sample were much higher than in the federal channel composite samples. The highest concentration of dibutyltin in the federal channel composite samples was 11 µg/kg (Area T) compared to 57 µg/kg in the OHD composite sample. The highest concentration of Tributyltin in the federal channel composite samples was 8.0 µg/kg (Area T) compared to 160 µg/kg in the OHD composite sample.
- The highest concentration of total PAHs among the federal channel composite samples was 1,169 µg/kg compared to 1,734 µg/kg in the OHD composite sample.
- With few exceptions (concentrations of chlordane compounds in the Area A2 composite sample below the reporting limit), DDTs were the only chlorinated pesticides detected in both the federal channel composite samples and the OHD composite sample. Total DDTs in the federal channel composite sample ranged from 3.8 to 11 µg/kg compared to 10 µg/kg in the OHD composite sample. All total DDT concentrations exceeded the ERL value.
- Total PCBs ranged from 9.9 to 67 µg/kg in the federal channel composite samples compared to 43 µg/kg in the OHD composite sample. Except for the Area A2 sample, all total PCB concentrations exceeded the ERL value.
- Pyrethroid pesticides were not detected in the federal channel composite samples, nor were they in the OHD composite sample.

In summary, the federal channel composite samples contained slightly less sand, had similar to slightly higher concentrations of metals, had much lower concentrations of butyltins, had somewhat less concentrations of total PAHs, and had slightly higher concentrations of total PCBs. All other chlorinated and organophosphate pesticides were not detected in federal channel composite samples nor in the OHD composite sample. Differences in the physical and chemical makeup of the federal channel and OHD composite sample are not sufficiently different to preclude applying the OHD toxicity results to the federal channel composite samples and supplementing bioaccumulation findings.

5.4 Berths 1, 2 and 3 Tier III Testing

Results of the Tier III testing on the OHD composite sample reported by Anchor QEA (2017) are discussed below. The solid phase OHD composite sample and bioassays and tissue residues were evaluated against a reference sample of sediment collected below -40 feet MLLW from trench to be excavated from Channel A in Area T to receive sediments from Berths 1, 2, and 3. More specifically, reference sediments were collected from federal channel Area T Locations T-2, T-4, and T-5 plus two additional locations.

5.4.1 OHD Solid Phase Bioassays

No solid phase toxicity was observed in the OHD composite sample with mean survival for both *E. estuaries* and *N. arenaceodentata* at 100%.

5.4.2 OHD Suspended Particulate Phase Bioassays

The SPP test using *M. galloprovincialis* resulted in EC_{50} and LC_{50} values of greater than 100% elutriate. Mean normal development in the 100% test elutriate was 97.1% and mean survival in the 100% test elutriate was 91.5% compared to 96.9% and 93.4%, respectively, in the control exposures.

5.4.3 OHD Bioaccumulation Exposure Survival

Toxicity was also not evident from the OHD sediments after the 28-day bioaccumulation exposures. Mean survival was 92% for *Macoma nasuta* and 96% for *Nereis virens*.

5.4.4 OHD Assessment of Bioaccumulation Potential

Dibutyltin (DBT), tributyltin (TBT) and total PCBs along with numerous PCB congeners were statistically higher in the clam and worm tissues for the OHD composite sample. Mean dibutyltin concentrations in the OHD composite clam and worm tissues were elevated 5.6 times and 5.2 times, receptively, over the mean reference tissue concentrations. Mean tributyltin concentrations in the OHD composite clam and worm tissues were elevated 13.1 times and 3.1 times, receptively, over mean reference tissue concentrations. Mean total PCB concentrations in the OHD composite clam and worm tissues were elevated by factors of 3.2 times and 3.3 times, receptively, over mean reference tissue concentrations.

Anchor QEA evaluated the tissue concentrations against FDA action levels and the lowest relevant ecological effects data among invertebrates. There are no FDA action levels for organotins. Total PCB tissue concentrations were well below the FDA Acton Level of 2,000 µg/kg for total PCBs. The ecological effects data used were toxicity reverence values (TRVs) in USACE's online Environmental Residue Effects Database (ERED)(https://ered.el.erdc.dren.mil/). Only no effects (NOED) and lowest effects (LOED) end points were queried with the preference being the use of a LOED endpoint. TRVs chosen were only for measurable biological effects such as mortality, reproduction and growth. The lowest relevant TRV in ERED chosen for dibutyltin is a LOED of 18 µg/kg for reproductive impairment to the gastropod *Hexaplex trunculus*. However, the Anchor report pointed out that this effect was from a mixture of organotin compounds rather than strictly dibutyltin. As such, the Anchor report proposed an alternative TRV consisting of a NOED of 330 µg/kg for the Atlantic Dogwinkle. The mean *Macoma* and *Nereis* DBT tissue concentrations (11.3 and 15.0 µg/kg, respectively) were below both dibutyltin TRVs. The lowest relevant TRV in ERED chosen for tributyltin was a reproductive (imposex) NOED of 80 µg/kg for the gastropod *Hexaplex trunculus*. Mean *Macoma* and *Nereis* TBT tissue concentrations in the OHD composite tissues (29.2 and 8.0, respectively) were less the TBT TRV. The Anchor QEA report listed a growth LOED of 146 µg/kg for the Common Sea Star (*Asterias rubens*) as the lowest relevant TRV for total PCBs. Mean total PCBs in the test tissues (27.7 µg/kg for Macoma and 41.1 µg/kg) were several time less than the total PCB TRV. The Anchor report concluded that bioaccumulation observed coupled with no measurable toxicity would unlikely cause impairment to marine organisms after placing the Berths 1, 2 and 3 sediments in an in-harbor trench.

5.5 Federal Channels Bioaccumulation Potential Testing

Bioaccumulation potential testing with *Nereis virens* was conducted on the Area A, E and T composite samples. Mean *Nereis virens* tissue concentrations from the exposures to the composite samples, when possible, were statistically compared to mean concentrations from exposures to the reference sediments. As indicated in the OTM, the statistical comparison of tissue residues in the treatments to the reference provides a starting point to the tiered evaluation. Because variability between replicates in the reference tissues is typically low, a statistical significance may be observed without biological relevance. In this case, other points of comparison and interpretation are used, including: an evaluation of the magnitude of difference, a comparison of observed tissue residues with critical body residue levels, and site specific factors that help to predict effects at the placement sites. Relative points of evaluation are discussed separately.

Uptake of PCBs was evaluated in terms of total PCBs. The distribution of mean and 95% confidence limits for total PCBs among *Nereis* tissue samples is illustrated in Figure 11. Statistical results for total PCBs are provided in Table 32. Table 32 bolded mean concentrations in shaded cells indicate statistically significant differences with mean reference tissue concentrations. There was not a positive correlation between total PCB and lipid concentrations in the *Nereis* tissues. Therefore, total PCB concentrations for these tissues were not normalized to lipids. Most PCB congeners in polychaetes reach 80% steady state after 28 days of exposure (Kennedy et al, 2010). Therefore, total PCBs concentrations in the test tissues were not adjusted to steady state before comparisons to action levels or TRVs.

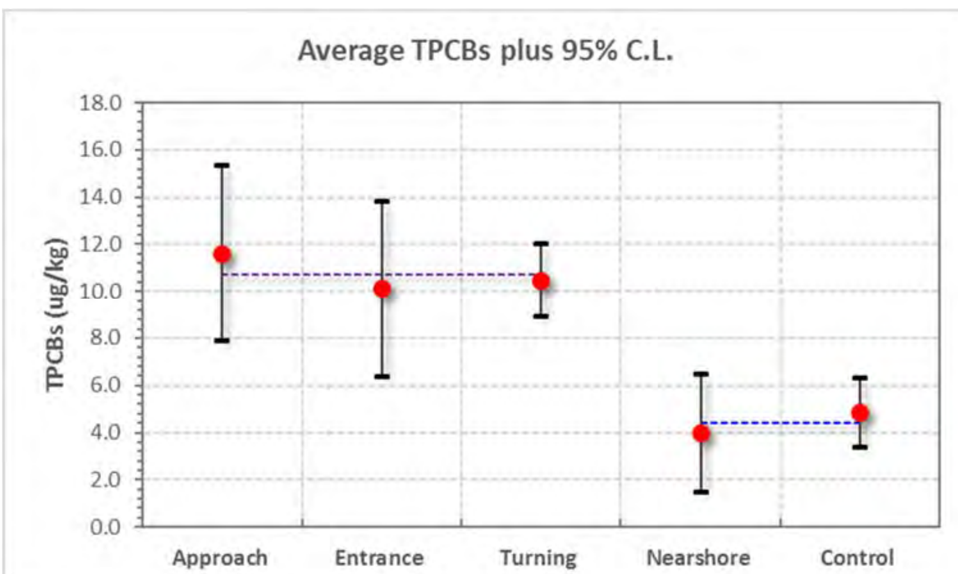

Figure 11. Distribution of Total PCBs in Tissues of *Nereis Virens*.

Table 32. Total PCB Statistical Results for the Port Hueneme Federal Channels *Nereis virens* Tissue Concentrations Compared to Reference and Control Tissue Concentrations.

Sample	Total PCBs (µg/kg)					
	n	Mean	Standard Deviation (n-1)	Lower Bound on Mean (95%)	Upper Bound on Mean (95%)	FDA Action Level
Approach Channel (Area A)	5	**11.6**	2.985	7.90	15.3	2,000
Entrance Channel (Area E)	5	**10.1**	2.998	6.37	13.8	
Channel A/Turning Basin (Area T)	5	**10.5**	1.248	8.91	12.0	
Nearshore Reference	5	3.98	2.008	1.48	6.47	
Control	5	4.85	1.183	3.81	6.32	
T0	1	3.9	NA	NA	NA	

Bolded Values and Orange shaded cells indicate statistically significant differences ($p \leq 0.05$) in mean concentrations between test and nearshore area reference tissues.

There was statistically significant ($p \leq 0.05$) mean uptake of total PCBs in the polychaetes exposed to all three federal channel sediment composite samples compared to the average uptake of total PCBs in the tissues of worms exposed to both the nearshore reference and control sediments. Average uptake of total PCBs in worms exposed to the Area A, Area E and Area T sediments was 11.6, 10.1, and 10.5 µg/kg, respectively, compared to 4.0 and 4.8 µg/kg for worms exposed to the nearshore reference and control sediments, respectively. Therefore, the mean concentrations of total PCBs in the composite sample worm tissues were only three or less times higher than the mean nearshore area reference concentration and only 2.5 or less times higher than the mean control concentration. Furthermore, total PCBs in the baseline (TO) worm tissue sample was 3.9 µg/kg, thus PCB concentrations in the test tissues are biased high and can be considered conservative. Since only one time zero tissue sample was analyzed, composite, reference and control tissue concentrations were not time zero corrected.

The mean and 95% UCL total PCB concentrations in the *Nereis* tissues were further evaluated against the FDA Action Level and to relevant TRVs for total PCBs in the ERED database. The 95% UCL tissue concentrations were magnitudes less than the FDA Action Level (2,000 µg/kg). The ERED database queries were limited to LOED endpoints with measurable biological effects (survival/mortality, development, reproduction, etc.) to marine invertebrates. Although there are numerous endpoints in the ERED that are relevant to invertebrates, one value was selected by USEPA as part of the recently completed dredged material characterization of OHD's Berths 1, 2 and 3. Specifically, USEPA identified a LOED of 146 µg/kg (Total PCBs), associated with growth impairment of the sea star *Asterias rubens*, as the most appropriate TRV from the ERED. Consequently, *Nereis* tissue total PCBs from all project areas (A, E, and T) were compared to USEPA's selected TRV and were found to be more than 10-fold lower than this value.

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6.0 QUALITY CONTROL REQUIREMENTS

Kinnetic Laboratories conducts its sampling, testing and evaluation activities in accordance with formal QA/QC procedures. The objectives of the QA/QC Program are to fully document the field and laboratory data collected, to maintain data integrity from the time of field collection through storage and archiving, and to produce the highest quality data possible. Quality assurance involves all of the planned and systematic actions necessary to provide confidence that work performed by Kinnetic Laboratories conforms to contract requirements, laboratory methodologies, State and federal regulation requirements, and corporate Standard Operating Procedures (SOPs). The program is designed to allow the data to be assessed by the following parameters: Precision, Accuracy, Comparability, Representativeness, and Completeness. These parameters are controlled by adhering to documented methods and procedures (SOPs), and by the analysis of quality control (QC) samples on a routine basis.

6.1 Field Sampling Quality Management

Field Quality Control procedures are summarized in Table 33 and includes adherence to SOPs and formal sample documentation and tracking.

Table 33. Quality Control Summary for Field Sediment Sampling.

Sediment Sampling Field Activity
• Vibracore Sampling SOP • Grab Sampling SOP • Protocol Cleaning/Low Detection Limits • Certified Clean Laboratory Containers • Horizontal and Vertical Controls • Core Logging & Subsampling Protocols • Sample Control/ Chain of Custody Procedures • Field Logs and Core Logs • Sample Preservation & Shipping Procedures

6.2 Analytical Chemistry QA/QC

Analytical chemistry Quality Control is formalized by EPA and State certification agencies, and involves internal quality control checks for precision and accuracy. Any issues associated with the quality control check are summarized in Appendix I.

QA/QC findings presented are based on the validation of the data according to the quality assurance objectives detailed in the SAP (Diaz-Yourman, GeoPentech and Kinnetic Laboratories/ Joint Venture, 2015) and in Appendix I, and using guidance from EPA National Functional Guidelines for inorganic and organic data review (USEPA, 2014a and 2014b).

As the first step in the validation process, all results were carefully reviewed to check that the laboratories met project reporting limits and that chemical analyses were completed within holding times. Most detection limits and reporting limits for this project, as specified in the SC-DMMT SAP guidance document, were met. Target reporting limits were not met for toxaphene, bis(2-

ethylhexyl) phthalate, butyl benzyl phthalate, di-n-octyl phthalate, diethyl phthalate and dimethyl phthalate. However, reporting limits for these compounds did not exceed any screening values in Table 17. All analyses were completed within EPA and Surface Water Ambient Monitoring Program (SWAMP) specified holding times. Archive samples from the November sampling were improperly stored in refrigeration rather than being frozen. Holding times would have been exceeded in the individual cores making it necessary to resample all core locations for the individual core analyses.

QA/QC records (1,943 total) for the sediment analyses included method blanks, laboratory duplicates, laboratory control samples and their duplicates (LCS/LCSDs), matrix spikes and matrix spike duplicates (MS/MSDs), post digestion spikes (PDS) and surrogates. Total numbers of QC records by type are summarized in Table 34. Generally, the QC data were within limits with the exceptions noted in Table 35. A total of 124 sample results (3.8%) were qualified as a result of the QC review. All of these qualifications were a result of high matrix spike recoveries due to some sort of matrix interference in the sediments. There were no qualifications applied to tissue samples. Concentrations for those compounds with high spike recoveries may be overestimated. A complete QA/QC discussion of the data can be found in Appendix I.

Table 34. Counts of QC records per Chemical Category.

Analyte Group	BLK	DUP	LCS / LCSD	MS / MSD	PDS	SURR	Total
Sediment							
Conventionals							
Percent Solids	4	4					8
Ammonia	2		4	4			10
Total Sulfides	1	1	2				4
Dissolved Sulfides	1	1	2				4
Total Organic Carbon	2		4	4			10
Total Volatile Solids	2	2					4
O&G	2		4	4			10
TRPH	2		4	4			10
Total Metals	20		30	40	19		109
PAH's, Phthalates & Phenols	171		124	176		168	639
Chlorinated Pesticides	56		64	88		24	232
PCB Congeners	160		115	132		96	503
Butyltins	8		8	8		6	30
Pyrethroids	26		52	52		6	136
Sediment Totals	457	8	413	512	19	300	1709
Tissue							
Percent Solids	2	2					4
Percent Lipids	2	2					4
PCB Congeners	80		30	60		56	226
Tissue Totals	84	4	30	60	0	56	234

Table 35. Final QC Qualification Applied to Sample Results.

Analyte	# Samples Qualified	Final Qualifier	BLK	DUP	LCS	MS	PDS	SURR
OC Pesticides – Sediment								
Methoxychlor	1	J-				J-		
Phthalates – Sediment								
Benzyl Butyl Phthalate	1	U	U					
Bis(2-Ethylhexyl) Phthalate	1	U	U					
Di-n-Butyl Phthalate	1	U	U					
PAHs - Sediment								
Anthracene	12	J+				J+		
Benzo (a) Anthracene	15	J+				J+		
Benzo (g,h,i) Perylene	9	J+				J+		
Chrysene	16	J+				J+		
Fluoranthene	16	J+				J+		
Indeno (1,2,3-c,d) Pyrene	10	J+				J+		
Phenanthrene	15	J+				J+		
Pyrene	16	J+				J+		
PCBs - Sediment								
PCB 180	11	J+				J+		
Total number of affected samples	124							
Percentage of all samples	3.8%							

6.3 Biological Testing Quality Management

Quality assurance procedures employed for this project were consistent with the procedures detailed in the ITM and OTM. Sediments used for bioaccumulation testing were stored in the dark at ≤4° C until used. Bioaccumulation exposures were initiated slightly beyond the eight week holding time specified in the ITM. Specifically, the sediments for bioaccumulation were collected March 10 – 12, 2017. They were delivered to Pacific EcoRisk on May 8, 2017 (3 to 5 days past) and tests were initiated on May 10 (5 to 7 days) past. Since testing was conducted to measure the uptake of PCBs and PCBs are persistent in sediments, these minor holding time excursions should not affect the results of the study.

Summary bioaccumulation testing and quality assurance information is provided toxicity lab report (Appendices H). This report includes documentation of test animal collection, shipping, holding/acclimation, water quality parameters monitored during the test, and negative control performance.

As indicated by Table 27, there was reduced survival of Nereis in the test and control exposures. Based on the observation of spawning activity in a subsequent batch of *Nereis* and communication with the organism supplier, it appears that the organisms used for testing were going through their reproductive cycle. The spawning season typically lasts around a month and it is not uncommon to see some mortality during the spawning period. Due to the size of the polychaetes used (5-7 grams/worm), there was sufficient biomass in all samples for PCB analyses.

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7.0 CONCLUSIONS AND RECOMMENDATIONS

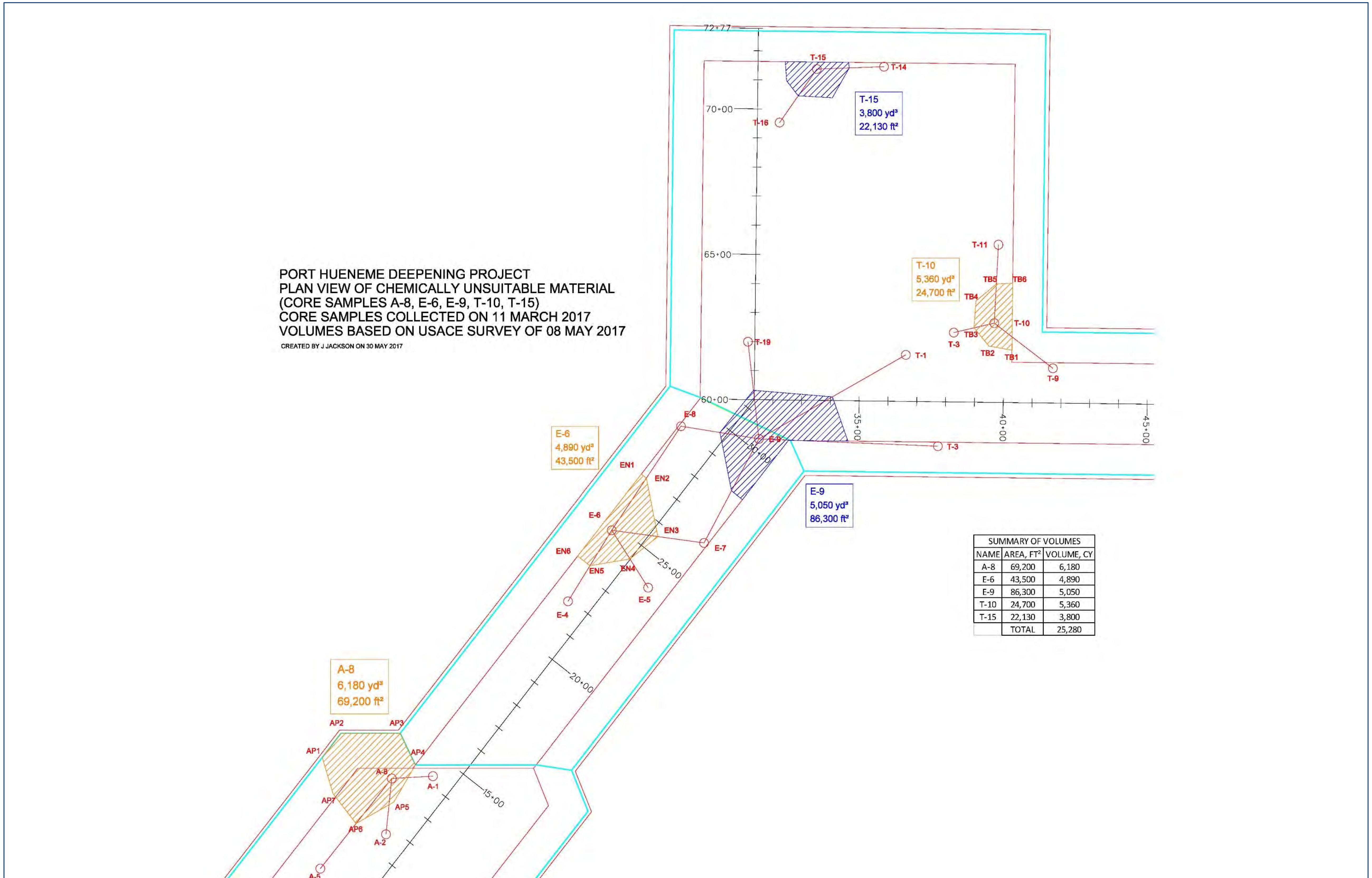
The Port Hueneme Federal Channel sediments were evaluated using Tier I through III analyses for their suitability to be placed on Hueneme Beach or in the nearshore areas of Hueneme Beach. Sediment grain size and chemistry data were used to directly assess physical and environmental suitability as well as the suitability for human contact. Bioaccumulation data were also used to assess environmental suitability. Bioassay data from a study by the Oxnard Harbor District for deepening of Berths 1, 2, and 3 were used to indirectly assess sediment toxicity.

According to the USACE physical beach compatibility analysis (Appendix C), the composite weighted average grain size curves of all three dredge footprint areas for the Entrance Channel, Approach Channel, and Turning Basin fits within the onshore Hueneme Beach placement area beach compatibility envelope. Since there are relatively high amounts of fines present in the composite mixture of sediments to be dredged from all three footprints, it is recommended to place all the material in the surf zone only in order to allow fines to flush from the placement area.

On a composite sample basis, most chemical concentrations were below levels that would be expected to contribute to invertebrate toxicity and pose a human health risk. In terms of NOAA effects based screening values, the exceptions to this were for 4,4'-DDD, 4,4'-DDE, total DDT and total PCB congeners. Except for total PCB congeners in the Area A2 sediments, these compounds were elevated above ERL values but were well below ERM values. Total PCB congeners in the Area A2 sediments were below the ERL value. In terms of human health, the exceptions to this were for benzo (a) pyrene in two samples and benzo (b) fluoranthene in one sample. Arsenic also exceeded human health objectives but were at concentrations similar to background concentrations. Since similar levels of DDTs and PCBs in the OHD composite sample did not lead to benthic or water column toxicity and observed bioaccumulation of PCB residues in the in the OHD and federal channel composite samples were below levels expected to cause chronic toxicity to marine invertebrates, it is unlikely, based on composite results, that the placement of Port Hueneme sediments on or in the nearshore areas of Hueneme Beach would impact the benthic community recolonizing the dredged sediments. Since more than 50% of the sediments to be dredged do not have any individual PAH compounds that exceed a human health objective, dilution from the cleaner sediments would be expected to mitigate any human health concerns. Therefore, based on the composite results, it is recommended that Port Hueneme sediments be environmentally suitable for beach nourishment.

It is recognized that some of the regulatory agencies do have concerns about the level of PCBs in the Port Hueneme sediments. PCBs are a concern because of their preponderance to biomagnify up the food chain. As such, the suitability of some of the sediments for placement in the marine environment was evaluated. As described in Section 2.2.2, the USACE funded a limited Ecological Risk Assessment (ERA) for samples collected in 2001 for the Port Hueneme Deepening Project. This ERA evaluated PCB sediment concentrations and modeled the food web transfer of PCBs to higher trophic levels. Model inputs, outputs and conclusions of the ERA are summarized in a report by Anchor QEA (2003) which is attached as Appendix L and was approved by the DTSC. Anchor QEA used the modeling results from this report to back-calculate the highest sediment total PCB concentration that would be protective of aquatic life and not cause harm to invertebrates, fish, birds, and mammals (sediment concentrations with hazard quotients less than one using no observable effects data). These calculations are attached as Appendix M. A sediment concentration determined by the USACE to be protective of all ecological receptors by this exercise was a 95% UCL of 89.6 µg/kg total PCBs for the protection of Least Tern egg development. Therefore, it is reasonable to use this concentration as a site-specific sediment quality objective for the suitability of reusing the Port Hueneme sediments for beach nourishment.

Using a sediment concentration of 89.6 µg/kg total PCBs, it is still recommended that sediments from most areas of Port Hueneme Harbor be environmentally suitable for placement in the marine environment. Total PCB concentrations in the sediments from locations A-8, E-6, E-9, T-10 and T-15 exceeded the 89.6 µg/kg value (Tables 18 through 20). Boundaries delineating sediments around these locations were placed midway between those locations and adjacent locations with total PCBs concentrations less than the 89.6 µg/kg value. Resulting areas with sediments unacceptable for placement in the marine environment are shown on Figure 12. The combined volume of sediments within these areas is approximately 20,000 cy.



SUMMARY OF VOLUMES		
NAME	AREA, FT²	VOLUME, CY
A-8	69,200	6,180
E-6	43,500	4,890
E-9	86,300	5,050
T-10	24,700	5,360
T-15	22,130	3,800
	TOTAL	25,280

Figure 12. Distribution of Sediments Unacceptable for Nearshore Placement.

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Appendices available upon request

Appendix B
Southern California Dredged Material Management Team Meeting Notes

Draft Notes for Wednesday September 28, 2016

Southern California Dredged Material Management Team (SC-DMMT) Meeting

US Army Corps of Engineers - Los Angeles District

Announcements: 10:00 – 10:05

Announcements. Update the pilot DMMT Tracking Sheet.

Attendees:

Melissa Scianni (USEPA)
Bonnie Rogers (Corps)
Jessica Vargas (Corps)
Kevin Yu (Corps)
Chris Osuch (Anchor QEA)
KJ May (Port of Hueneme)
Jack Malone (Anchor QEA)
Pam Kostka (Corps)
Jon Moore (Noble Consultants)
Harry Finney (AET)
Eric Storey (AET)
Janna Watanabe (POLB)
Dylan Porter (POLB)
James Vernon (POLB)

†Michael Lyons (RWQCB-LA)
†Allan Ota (EPA)
†Allan Monji (RWQCB-SD)
†Lisa Mangione (Corps)
†Eric Wilkins (CDFW)
†Larry Simon (CCC)
†Antal Szijj (Corps)

†Participating by telephone.

Project #1: 10:05 – 10:30

1) Project name: Port Hueneme Deepening
2) Applicant NAME & Applicant affiliation: Corps
3) Project type (Regulatory/Navigation): Navigation
4) Corps Project Manager name: Larry Smith
5) Meeting type (DMMT/CSTF): SC-DMMT
6) Purpose/topic (e.g., SAP, SAPR and/or suitability determination): Review SAP

7) Presentation? (y/n): no
8) Documents provided (emailed or a link): SAP to be provided for dissemination
9) Time needed (15, 30, 45 min?): 30 minutes

Notes: USEPA expressed concerns over the maps in the SAP and their inability to read contour lines. They were concerned over the current state of the CAD, what its current elevation is, and possible damage during dredging. They suggested addressing measures in the SAPR on how to avoid damage. The Corps responded that such measures would be addressed in the SEA that will be prepared and distributed for public and agency review and that the SAPR would focus on sediment test results. Corps and Port staff indicated that the top of the CAD was at -50 ft MLLW or deeper and the cap was intact. A new bathymetric survey is being conducted and that survey will be used in the Final SAP with clearer definition of the bottom contour lines, including a highlighted -40 ft MLLW contour to more clearly show dredge areas. Optional bioassay testing was described as limited to solid phase testing to determine toxicity if sediment chemistry was not definitive. Complete bioassay testing is not required as test results generally do not require such testing for beach placement. There are no alternatives to beach or nearshore placement is sediments are not suitable; ocean disposal is not feasible due to distance from the Port to LA-2 (the nearest ocean disposal site). The SAP was not accepted as final pending submittal of a SAP with new maps. Maps should be available within a month and may be distributed for out of cycle review if completed early, or discussed at the next SC-DMMT meeting if not.

Project #2: 10:30 – 11:15
1) Project name: Port of Hueneme Berth Deepening
2) Applicant NAME & Applicant affiliation: Mr. KJ May, Project Engineer, Port of Hueneme
3) Project type (Regulatory/Navigation): Regulatory
4) Corps Project Manager name: Mr. Antal Szijj
5) Meeting type (DMMT/CSTF): DMMT
6) Purpose/topic (e.g., SAP, SAPR and/or suitability determination): Draft SAP
7) Presentation? (y/n): Yes
8) Documents provided (emailed or a link): The Draft SAP and presentation will be provided electronically either by email or an FTP site depending on file size.
9) Time needed (15, 30, 45 min?): 45 minutes

Notes: USEPA expressed doubt that full tier III ocean testing was needed for this project because ocean placement was not under consideration and proposed a phased testing approach. An email outlining the phased approach to testing was going to be circulated before the agencies approved the SAP.

A new phased testing approach was circulated to agency staff by Chris Osuch via email on 10/13/2016.

Pursuant to discussion at the September 28, 2016 DMMT meeting, the Oxnard Harbor District is planning to modify the biological testing approach for sediment from Berths 1, 2, and 3 described in Section 5 of the SAP. Because the sediment is not being proposed for disposal at a designated offshore disposal site falling under the requirements of the Marine Protection, Research, and Sanctuaries Act, a phased testing approach will be employed to evaluate sediment for unconfined open water placement within the trenches excavated in the harbor.

Phase I testing will include physical and chemical analyses (as described in Section 4 of the SAP), solid phase testing using an amphipod (*Eohaustorius estuarius*) and a polychaete (*Neanthes arenaceodentata*), and suspended particulate phase testing using bivalve larvae (*Mytilus galloprovincialis*). Results of physical and chemical analyses and the first phase of biological tests will be provided to the DMMT via email to solicit guidance on whether additional biological testing should be performed. If required, Phase II testing will include bioaccumulation potential testing and tissue chemistry. Sufficient sediment will be collected to perform all biological testing proposed in Phases I and II and sediment will be held in compliance with requirements of the OTM and ITM to facilitate this phased approach.

EPA concurred with the proposed phased testing approach. If the phase 1 results will not be available before the bioaccumulation holding times expire, please begin those tests prior to getting DMMT guidance. If DMMT determines they are not needed, they can be terminated at that time.

Project #3: 11:15 – 11:45
1) Project name: Seaside Lagoon Enhancement Project
2) Applicant NAME & Applicant affiliation: Stephen Proud; City of Redondo Beach
3) Project type (Regulatory/Navigation): Regulatory
4) Corps Project Manager name: Pam Kostka
5) Meeting type (DMMT/CSTF): DMMT
6) Purpose/topic (e.g., SAP, SAPR and/or suitability determination): SAPR and suitability concurrence
7) Presentation? (y/n): N
8) Documents provided (emailed or a link): emailed
9) Time needed (15, 30, 45 min?): 30 minutes

Notes: SAP results found 100% sand. No issues with chemistry.
USEPA was concerned that no PAH results were found in the chemistry tables. Also, the tables depicting the sediment core testing is confusing. An email was requested to clarify what the numbers in the core depth table mean.
Agencies need clarification through emails on the core sampling and PAH results before they can provide a suitability concurrence.

In Emails dated October 10th and October 24th, Jon Moore provided the Core Logs and the following clarification: In summary, the existing revetment stone obstructed some of the vibracore drilling as indicated. As a result, two of the proposed drilling locations had to be moved a bit. Vibracore KH16-1A was moved the furthest seaward in order to avoid the surficial stone and obtain representative sediment for testing. The field work also indicated that existing bottom depths near the end of the breakwater are about 2 feet deeper than shown by the 2012 bathymetric data that was used to prepare the preliminary grading plan. The implication of this finding is that less material will need to be excavated and a greater percentage of the material to be removed will be the existing revetment quarry stone. A pre-construction bathymetric survey will be taken within the confines of the proposed excavation area to confirm final quantities.
Please note that all of the vibracores are very closely spaced because the proposed excavation footprint is so small. Not surprisingly, and as indicated by AET, all of the sediment that was collected was similar in appearance and grain size. Consequently, we are confident that we have sampled, tested, and reported on the representative material that will make up the small prism that this project's scope.

EPA Email November 2nd: EPA has reviewed the Seaside Lagoon Enhancement Project September 2016 SAPR, core logs, and October 11 clarification memo. From these documents it appears that material was sampled and tested from below the stated project depth. This makes determining placement site suitability difficult because the results include material that will not be dredged. However, since the core logs did not indicate any visual differences with depth, the material was very sandy, and there were no concerns with the chemistry results, we find the project material suitable for reuse onsite as beach sand. We would like to note that we did not feel resampling was necessary for this project due to the specific facts stated above, and that for other projects with similar sampling issues we may recommend resampling.

Project #4: 1:00 – 2:00
1) Project name: Middle Harbor Terminal Redevelopment - Project Update and Pier F Cut SAP
2) Applicant NAME & Applicant affiliation: Port of Long Beach
3) Project type (Regulatory/Navigation): Regulatory
4) Corps Project Manager name: Lisa Mangione
5) Meeting type (DMMT/CSTF): CSTF
6) Purpose/topic (e.g., SAP, SAPR and/or suitability determination): We will be presenting an update on the Port's Middle Harbor Redevelopment Project and presenting the Pier F Cut SAP for approval
7) Presentation? (y/n): Yes
8) Documents provided (emailed or a link): The Pier F Cut SAP will be provided by 9/21 and the PowerPoint slides for the presentation will be provided prior to the 9/28 meeting.
9) Time needed (15, 30, 45 min?): 1 hour

Notes: Pre-SAP presentation for Middle Harbor phase 4.

Melissa Scianni (EPA) – At the end of Middle Harbor Phase 4, how much surcharge may be placed in the Western Anchorage Sediment Storage Site?

POLB – Approximately 300,000 to 400,000 cubic yards

Pier F SAP:

Melissa Scianni (EPA) – Why were sampling locations not placed in the water?

POLB – Sampling locations were not located on the slopes in the water because the slopes are covered with rip rap and are underneath the wharf.

All agencies approved the SAP as presented.

- Agenda POC: Jessica Vargas,
- SC-DMMT materials are available at: http://www.spl.usace.army.mil/Missions/Regulatory/ProjectsPrograms.aspx.
- Please arrive no more than 10 minutes prior to your scheduled meeting start time.
- Check in with our security office on the 11th floor. Once there, security will call the following person(s) to escort you to the meeting room. Tom Janey; Liz Thomas; Irma Nevarez

Final Notes for Wednesday October 26, 2016

Southern California Dredged Material Management Team (SC-DMMT) Meeting

US Army Corps of Engineers - Los Angeles District

Announcements: 10:00 – 10:05

Announcements. Update the pilot DMMT Tracking Sheet. Proposed out of cycle meeting to cover the November and December meetings. The proposed meeting is to be held on December 7th at 10:00 AM.

Attendees:

Melissa Scianni (USEPA)
Jessica Vargas (Corps)
James Vernon (POLB)
Shelly Anghera (Anchor QEA)
Erin Jones (Corps)
Tonia McMahon (Moffatt & Nichol)
Conor Ofsthun (Moffatt & Nichol)

†Michael Lyons (RWQCB-LA)
† Carol Roberts (USFWS)
†Allan Monji (RWQCB-SD)
†Chris Osuch (Anchor QEA)
†Larry Smith (Corps)
†Larry Simon (CCC)
† Ken Kronschnabl (Kinnetic Laboratories)

†Participating by telephone.

Project #1: 10:05 – 10:30

1) Project name: Port of Long Beach Proposed Outer Harbor CAD Site Feasibility Study
2) Applicant NAME & Applicant affiliation: Port of Long Beach
3) Project type (Regulatory/Navigation): Regulatory
4) Corps Project Manager name: Lisa Mangione
5) Meeting type (DMMT/CSTF): CSTF
6) Purpose/topic (e.g., SAP, SAPR and/or suitability determination): Feasibility Study Presentation
7) Presentation? (y/n): Y
8) Documents provided (emailed or a link): To be provided by Oct. 19th.
9) Time needed (15, 30, 45 min?): 30 min

Notes: James and Shelly presented the PowerPoint. The following questions, answers, and discussions occurred:
Larry Simone – CCC
* Where did the Port's future sediment management volume number come from? James gave a description of the type of capital and maintenance programs that are being evaluated at the Port.
* Will the Port need a master plan amendment for this project? James agreed that use of a CAD would require either an amendment to the PMP or it would be part of an upcoming PMP update. Timing of projects would likely determine the approach.
* How long will it take to fill the cells? James commented that it would be dependent on the size of the projects that would use the facility. Several very large projects are currently being evaluated.
* How long could the interim caps be in place before another event occurred? Could it be as long as 2-3 years between events? James said it could be an extended period of time.
* Were potential impacts associated with seismic events considered during the FS technical evaluations? This feasibility evaluation did not discuss seismic events, but the long term monitoring program (to be described in the future Operation Maintenance and Management Plan, OMMP) will likely include a survey to be conducted after the earthquake to examine fissures in the cap, similar to approach applied for the Hueneme CAD.

Michael Lyons – LARWQCB
* Remembered that during the NEIBP development program the Corps looked at potential for scour associated with wind/storm driven events – was that evaluated for this project? Shelly discussed the use of the WRAP model that has been calibrated for the Port and the data do not suggest there is potential for a storm related current. James added, due to the site location in the center of the Middle Breakwater, over a nautical mile from either Queen's or Angel's Gate, storm generated wave action is expected to be minimal.
* What if the cap fails? Will it be replaced? The O&M Plan will include cap performance monitoring and recommended cap improvement methods is needed.
* Is 1 meter thick enough for the cap? Is it possible that prop wash scour and anchor scour could present cumulative impacts that could result in greater than 1 meter of disturbance? If not an issue make sure to discuss in report. Shelly discussed the consideration of scars from anchors and prop wash. The literature and the frequent transiting of ships crossing the area would disturb sediments but they would settle back into the space that was disturbed. They effects are not necessarily additive. Bathymetric surveys can be used to examine scour to confirm depressions are not left for extended periods of time. This discussion will be brought out of the appendix and into the main body of the feasibility study for clarity.
* When will the OMMP be developed and can you make sure it covers these types of issues? The next phase of effort on this project is to develop the OMMP and provide this type of detail.
* Is a 1-foot interim cap protective enough given the prop wash and anchor scour that may occur? The interim caps would be placed at depths deeper than the final elevation that was

evaluated, therefore, the prop wash will penetrate less. James evaluated the size of ships and anchors that were included in the feasibility and they are larger than those that are currently used or transit this part of the harbor. It was acknowledged that anchor scour may be an issue and we can look into including a thicker cap in the anchor placement zone.

Carol Roberts - USFWS
* Will the potential San Pedro Bay Restoration Project impact this site? James described the section of breakwater being evaluated is the Long Beach Breakwater to the east of the Middle Breakwater near the site. It is not believed the restoration project would have any impact on the OHSPER.
* For the chemical containment evaluation, the potential for chemicals to migrate through the cap into the surface. The surface was defined as the top 15 cm of the bioturbation zone. Why is the bioturbation zone limited to the top 15 cm? What about ghost shrimp? Shelly acknowledged that to establish cap thickness due to burrowers, the penetration is described in the report as being as deep at 0.9 m. However this is rare in the deeper outer harbor areas. For the chemical containment modeling, the goal was to evaluate the potential flux of contaminants from the capped sediments, through the cap into the "bioturbation zone". This zone is expected to be highly mixed and homogenous because of the abundance of organisms at this depth that penetrate the top 10 cm of sediment. This particular evaluation was to estimate the total contribution to that surface layer using a very conservative steady state model. It did not analyze impact of deep ghost shrimp burrows which are expected to be rare.
Melissa – EPA
* The modeling assumes specific sediment concentrations, what is the process if future sediments are higher than those that were modeled? The OMMP will define the process for approval for each project placed at OHSPER (it was briefly summarized in the presentation). Each project would be brought forward to the CSTF. If a project has higher chemical concentrations than were evaluated, additional modeling can be performed. It should be noted that hazardous material is not proposed for placement at the OHSPER site.
* What are the next steps? Develop the OMMP, start the permitting process and PMP update or amendment.
Larry Smith – USACE
* Clarified for the group that the deep draft standby area being evaluated to the east of the OHSPER is not a true anchorage area – just a holding area.

Project #2: 10:30 – 11:15
1) Project name: Santa Ana River Marsh, Newport Beach, CA
2) Applicant NAME & Applicant affiliation: Corps, Erin Jones, Project Biologist
3) Project type (Regulatory/Navigation): Restoration (Corps Planning Division)
4) Corps Project Manager name: Erin Jones, Biologist; Damien Lariviere, PM
5) Meeting type (DMMT/CSTF): DMMT

6) Purpose/topic (e.g., SAP, SAPR and/or suitability determination): Draft SAP
7) Presentation? (y/n): Y
8) Documents provided (emailed or a link): To be provided by COB 10/21
9) Time needed (15, 30, 45 min?): 45 min

Notes: 1) EPA confirmed overdepth characterization at 1 foot overdepth
2) DMMT requested that we split project area into 2 sub-areas based on design depths, as opposed to 3 current designations of Areas A, B, and C
3) DMMT requested a figure showing both borings and bathymetry, and will comment on/approve boring locations based on this re-submitted map
4) DMMT requested that legends of figures be changed to identify "sub-areas" as opposed to current "composite areas" - "composite areas" was found to be mid-leading as we proposed only 1 chemistry composite
5) Discussion on composites for chemistry based on grain size - final decision is to make a determination in the field on adding a 2nd composite if visual inspections of borings find a significant layer of fines
6) it is assumed that volume of archived material would be sufficient to do bioassay testing if necessary
7) SC-DMMT requested full report from 2012 as an appendix. The Draft SAP only had grain size, the SC-DMMT also wanted to see sediment chemistry.
8) schedule for agency coordination and SEA will be revisited at the early Dec DMMT.
9) The DMMT members indicated they would be willing to review the draft SAPR out of standard meeting cycle.

Project #3: 11:15– 11:30
1) Project name: Port Hueneme Deepening SAP
2) Applicant NAME & Applicant affiliation: Civil Works
3) Project type (Regulatory/Navigation): Navigation
4) Corps Project Manager name: Joseph Johnson
5) Meeting type (DMMT/CSTF): SC-DMMT
6) Purpose/topic (e.g., SAP, SAPR and/or suitability determination): SAP approval
7) Presentation? (y/n): No
8) Documents provided (emailed or a link): To be provided
9) Time needed (15, 30, 45 min?): 15 minutes

Notes: The revised graphics were included in the SAP. The new graphics were acceptable to USEPA and that RWQCB concerns regarding potential hot spots left over from cleanup dredging were resolved in separate telephone conversations held prior to the monthly meeting, The SAP was approved by USEPA, CCC, and LA RWQCB.

- Agenda POC: Jessica Vargas
- SC-DMMT materials are available at: http://www.spl.usace.army.mil/Missions/Regulatory/ProjectsPrograms.aspx.
- Please arrive no more than 10 minutes prior to your scheduled meeting start time.
- Check in with our security office on the 11th floor.

Notes for Wednesday March 22, 2017

Southern California Dredged Material Management Team (SC-DMMT) Meeting

US Army Corps of Engineers - Los Angeles District

Attendees:

Jessica Vargas (Corps)
Jeff Cole (Corps)
Susan Ming (Corps)
Chris Osuch (Anchor QEA)
Jack Malone (Anchor QEA)
KJ May (Anchor QEA)
Melissa Scianni (EPA)
Joe Ryan (Corps)

Phone:
Antal Szijj (Corps)
Robert Smith (Corps)
Larry Simon (CCC)
Michael Lyons (RWQCB – LA)
Shelley Anghera (Anchor QEA)
Larry Smith (Corps)
Allan Ota (EPA)

Announcements: 10:00 – 10:05

Announcements.

Project #1: 10:05 – 10:30

1) Project name: Oxnard Harbor District, Port Hueneme Berth Deepening
2) Applicant NAME & Applicant affiliation: **Oxnard Harbor District**
3) Project type (Regulatory/Navigation): Regulatory
4) Corps Project Manager name: Antal Szijj (Regulatory)
5) Meeting type (DMMT/CSTF): DMMT
6) Purpose/topic (e.g., SAP, SAPR and/or suitability determination): SAR and suitability determination
7) Presentation? (y/n): Yes
8) Documents provided (emailed or a link): SAR will be provided by March 15
9) Time needed (15, 30, 45 min?): 30 minutes

Notes: slide presentation.
Anchor QEA Notes:
* EPA and RWQCB agreed that the trench material is suitable for beach or nearshore placement.

* EPA noted that they found values in the ERED database for PCBs and organotins that were lower than the values in Tables 20 and 21 of the SAR. EPA will send the ERED database information for the specific values to the Port and USACE.

o PCBs 146 ppb for a seastar (Port's observed tissue concentrations are still below this value)

o Dibutyltin 10 ppb for a whelk

o Tributyltin 80 ppb for a different marine snail

* The column heading on Table 20 called "Tissue Concentration" should say "Reference Mean Tissue Concentration".

* EPA requested that the Port evaluate the bioaccumulation data in light of the ERED values they found and provide additional analysis to address them. EPA suggested that it might be appropriate to look at the "Time 0" tissue concentrations, particularly for dibutyltin to account for pre-exposure tissue concentrations. An additional potential step after evaluating the data and EREDA values would be to review the sediment chemical concentrations for the individual cores and if isolated areas have elevated concentrations, those areas could potentially be managed by dredging them first and placing them in the bottom of the trench.

PM notes:
* EPA and Anchor QEA discussed the value of examining individual cores to examine PCB patterns that may explain the bioaccumulation tissue results.

* EPA will provide the referenced item in the ERED database.

* LARWCB and CCC concurred with EPAs recommendations

* Port affirmed they would like to keep both disposal options available at this time (trench placement or beach/nearshore placement)

* Material excavated to form the trenches would be combined with material from Corps dredging for disposal
CCC – trench material is suitable for beach or near shore.
Waterboard – trench material is suitable for beach or near shore.
EPA – trench material is suitable for beach or near shore.

EPA email sending the ERED values described above, dated 3/22/2017: EPA stated "Attached are the PCB and organotin tables we've pulled from ERED. On the PCB table, please see row 16. On the tin table, please rows 37 (DBT) and 109 (TBT). When selecting appropriate TRVs, we normally looking for values that are LOED, whole body responses, and marine invertebrates."

Project #2: 10:30 – 11:00
1) Project name: Port Hueneme Deepening
2) Applicant NAME & Applicant affiliation: **Corps**
3) Project type (Regulatory/Navigation): Navigation
4) Corps Project Manager name: Susie Ming
5) Meeting type (DMMT/CSTF): SC-DMMT
6) Purpose/topic (e.g., SAP, SAPR and/or suitability determination): Discuss preliminary sediment chemistry and grain size analyses results.
7) Presentation? (y/n): N
8) Documents provided (emailed or a link): TBP
9) Time needed (15, 30, 45 min?): 30 minutes

Notes: Sediment chemistry data were presented and discussed, including similarities and differences with the Port Hueneme Berth Deepening data. Indications are that some of the sediments may not be suitable for beach placement, but could be suitable for placement in the nearshore. USEPA expressed concerns for the PCB levels in the composite samples, but are waiting for the individual core samples to complete their evaluation. Additional sampling is currently being conducted as a result of the failure of the contractor to properly freeze the individual core samples resulting in exceedance of holding times. Those additional samples will include fresh composite samples for toxicity testing, if needed. USEPA expressed the opinion that bioaccumulation testing may be warranted, using those samples.

The results of the additional sampling and testing will be shared with the SC-DMMT, but may require an out-of-cycle review by the USEPA, RWQCB, and CCC via conference call. Initial results are expected end of next week.

USEPA also requested that average sediment grain size be calculated for each core and for each composite area as a means for assessing the mixed sediments that would be created by the dredging process for placement.

- Agenda POC: Jessica Vargas
- SC-DMMT materials are available at: http://www.spl.usace.army.mil/Missions/Regulatory/ProjectsPrograms.aspx.
- Please arrive no more than 10 minutes prior to your scheduled meeting start time.
- Check in with our security office on the 11th floor. Once there, security will call the following person(s) to escort you to the meeting room. Liz Thomas; Debra Howell.

Notes for Wednesday May 24, 2017

Southern California Dredged Material Management Team (SC-DMMT) Meeting

US Army Corps of Engineers - Los Angeles District

Announcements: 10:00 – 10:05

Announcements.

Attendees:

Larry Smith (Corps)
Joe Ryan (Corps)
Jessica Vargas (Corps)
Antal Szijj (Corps)
Jeremy Jackson (Corps)
Jeffrey Devine (Corps)
Susie Ming (Corps)
KJ May (Port of Hueneme)
Jack Malone (Anchor QEA)

On the Phone:
Allan Ota (EPA)
Melissa Scianni (EPA)
Chris Osuch (Anchor QEA)
Shelly Anghera (Anchor QEA)
Steve Capilino (Anchor QEA)
Theresa Stevens (Corps)
Jeff Cole (Corps)
Katherine Curtis (POLA)
Michael Lyons (LA-RWQCB)

Project #1: 10:00 – 10:30

1) Project name: Oxnard Harbor District Port of Hueneme Deepening
2) Applicant NAME & Applicant affiliation: Oxnard Harbor District
3) Project type (Regulatory/Navigation): Regulatory
4) Corps Project Manager name: Antal Szijj
5) Meeting type (DMMT/CSTF): DMMT
6) Purpose/topic (e.g., SAP, SAPR and/or suitability determination): Updated SAPR and suitability determination
7) Presentation? (y/n): Y
8) Documents provided (emailed or a link): To be provided by 5/17
9) Time needed (15, 30, 45 min?): 30 minutes

Notes: SAPR was originally presented at March DMMT meeting. Updated SAPR reflects discussion with EPA. Including updated tables.

EPA: Is the harbor district still looking for suitability for beach placement?
OHD: Verified they would still want the option for near-shore placement as well as trench.
EPA: suitable to go back into harbor and in the trench. Unsure about beach nourishment? What does agency staff think of the PCB levels and beach nourishment?
Larry Smith – Navy 2008 study show ecological risk 253 ppb for beach nourishment.
EPA- material in 2008 with those levels actually taken to beach or near shore?
Larry Smith: that was a threshold established but not sure anything with that level was sent to beach.
EPA: any additional information needed to determine risk to human health needed by Waterboard to make decision?
Michael Lyons: no, not thinking that risk to human health is high, ecological risk is more likely.
EPA: the question is whether we accept the 2008 data and applicability of the previous ecological risk assessment or need a newer study.
Allan Ota: maybe resend the study to agency staff so we can review and come to a decision on the use of the data.
Larry Smith will send report to Allan Ota, Melissa Scianni and Michael Lyons, and Larry Simon.
EPA: volume for OHB – 23000 cy.
Jack Malone. The PCBs for this sediment is 43 ppb. Residential level is around 100
Allan: PCBs not a big problem, it was more the organotins at 160 which caught their eye.
The residential level for tributyltin 10 is 2300.
Shelly A: PCB concentrations are much lower than report by Larry Smith, RSLs
EPA: There is a risk assessment that covers this area. And beach nourishment is a significant decision. Would like to hear Coastal Commissions thoughts.
Larry Smith: Correction on the risk assessment, it is 158 ppb not the 253 which was stated earlier.
EPA and other agency staff will need time to review the PCB risk assessment study from 2008 to determine if still applicable. Also, EPA would like input from Coastal Commission before making a recommendation for beach nourishment suitability.
EPA and other agency staff found the material suitable to be placed in the trench locations.

Project #2: 10:30 – 11:30
1) Project name: Port Hueneme Deepening
2) Applicant NAME & Applicant affiliation: Corps and Oxnard Harbor District
3) Project type (Regulatory/Navigation): Civil Works
4) Corps Project Manager name: Larry Smith, Antal Szijj
5) Meeting type (DMMT/CSTF): SC-DMMT
6) Purpose/topic (e.g., SAP, SAPR and/or suitability determination): Suitability discussion
7) Presentation? (y/n): No
8) Documents provided (emailed or a link): To be provided
9) Time needed (15, 30, 45 min?): 60 min

Notes: corps Sampling project update:
Resampled individual cores.
Bioaccumulation exposure started May 10^{th}.
Sampling contractor moved some of the cores for the approach area into the harbor. We will be going out to resample the approach area. One composite of 4 cores.

One core A-8, had high PCBs – looking at that area to be placed in trench. 7000 cubic yards.
EPA: how much material is being removed from the approach channel and can it be placed in the trench?
Larry – approach channel is 200k cy and is too large for the trench. The only back up is to take it to LA-2 and green book testing would need to be done.
Are there any thought on making a larger trench?
Larry: we could widen the trench and have it evaluated through existing sampling
Jack – Will some additional near shore sites would be sampled for possible disposal sites?
Jeff Devine: yes
Larry: yes, additional sites would be sampled as possible disposal sites.
EPA: there are a few cores with PCB over 100 so we would need to look at the data and risk assessment to determine if material is suitable for beach nourishment with those PCB levels.
EPA: Has the Corps thought about future dredging projects and disposal sites? It appears the PCB levels are not going down through each sampling and the material will no longer be suitable for beach or nearshore placement.
Larry Smith: It would come down to cost of disposal. The closest ocean disposal site is LA-2 and it would greatly increase the cost to take the material there.

- Agenda POC: Jessica Vargas, 213-452-3409
- SC-DMMT materials are available at: http://www.spl.usace.army.mil/Missions/Regulatory/ProjectsPrograms.aspx.
- Please arrive no more than 10 minutes prior to your scheduled meeting start time.
- Check in with our security office on the 11th floor. Once there, security will call the following person(s) to escort you to the meeting room. Liz Thomas; Debra Howell.

Final Notes for Wednesday September 27, 2017
Southern California Dredged Material Management Team (SC-DMMT) Meeting
US Army Corps of Engineers - Los Angeles District

Announcements: 10:00 – 10:05
The tracking sheet is back in circulation and will be emailed out to DMMT for project managers to update their project specific information.
DMMT agenda POC is changing. Please contact Bonnie Rogers for the October DMMT meeting.

Attendees:
Melissa Scianni (EPA)
Larry Smith (Corps)
Jessica Vargas (Corps)
Joe Ryan (Corps)
Jeremy Jackson (Corps)
Susie Ming (Corps)

On the Phone:
Larry Simon (CCC)
Peter von Langen (RWQCB-Centralcoast)
Ken Kronschnabl (Kinnetic Laboratories)
Antal Szijj (Corps)
Crystal Huerta (Corps)
Jason Freshwater (Santa Ana RWQCB)
Karl Treiberg, (City of Santa Barbara Waterfront Department)
Maureen Spencer (Santa Barbara County Flood Control)
Andrew Raff (Santa Barbara County Flood Control)
Jack Malone (Anchor QEA)
Chris Osuch (Anchor QEA)
Glenn Marshall (NBVC Port Operation Director)
Steve Granade (NBVC Environmental Division)
Daniel Herrera (NBVC Port Operations)
Augustine Anijielo (LARWQCB)

Project #1: 10:00 – 10:15
1) Project name: Maintenance Activities in the Goleta Slough
2) Applicant NAME & Applicant affiliation: Santa Barbara County Flood Control and Water Conservation District
3) Project type (Regulatory/Navigation): Regulatory
4) Corps Project Manager name: Crystal Huerta
5) Meeting type (DMMT/CSTF): DMMT
6) Purpose/topic (e.g., SAP, SAPR and/or suitability determination): SAP
7) Presentation? (y/n): N

8) Documents provided (emailed or a link): Desilted Materials Sampling and Analyses Program to be emailed.
9) Time needed (15, 30, 45 min?): 15 minutes

Notes: District would like to do beach nourishment near Goleta beach. Desilting authorized under the existing Corps permit.
Looking for comments on proposal to dragline desilt at San Pedro and San Jose Creek for beach nourishment. The current permit states "No more than 25% fines" all but one of the samples exceed 25% fines with one at 37% fines at San Pedro and San Jose Creeks.
Waterboards – under 401, for beach nourishment nothing can exceed 25% fines.
CCC – Low % for sand. Has similar conditions as the 401. 25% is a generous expansion and that testing is likely to be less than 25%.
District – This is the first time of high fines because of the recent drought causing no flushing flows. They are not proposing to change the profile of the beach. They are planning to push the sediment into the surfzone.
EPA – If you are doing beach nourishment when it is covered by CWA and Ocean Dumping Act, a decision needs to be made which act covers the placement. In the case of material with more than 50% fines, its EPA's policy to cover that under Ocean Dumping because that fine material will not stay on the beach it is going to drift out to sea. In this case it seems like it would be permitted under the CWA since the composites come back with greater than 50% sand.
Corps – Would like to know where the 25% requirement came from.
EPA – Would like to see receiver beach analysis and reminded the group concerning Santa Cruz demonstration studies. Recommended additional testing in San Pedro Channel, specifically toxicity testing due to elevated chlordane levels before beach nourishment occurs.
Corps – Recommended comments to be received by COB today unless there are requests for additional time.

Project #2: 10:15 – 10:45
1) Project name: Santa Barbara Interior Harbor Dredge Material Investigation
2) Applicant: Karl Treiberg, City of Santa Barbara Waterfront Department
3) Project type (Regulatory/Navigation): Regulatory
4) Corps Project Manager name: Crystal Huerta
5) Meeting type (DMMT/CSTF): DMMT
6) Purpose/topic (e.g., SAP, SAPR and/or suitability determination): SAP Approval
7) Presentation? (y/n): Y
8) Documents provided (emailed or a link): Will Email SAP
9) Time needed (15, 30, 45 min?): 30

Notes: SAP Approval. City of Santa Barbara. Powerpoint presentation.
Peter: What are the biological communities or organisms found in the cobble?
Karl- not much but will do a biological survey for permitting purposes.
EPA: Was the west beach dredged in 15?
Carl: 6k cubic yards was taken to Goleta beach
EPA: When are you proposing to complete this project?
Karl: we usually dredge in the fall – hopefully December and March.

EPA: Why are you proposing testing in Area 1 – West Beach if you tested in 2015? We usually only require testing for every 3 years.
Karl: If agencies are ok with not testing at this time then we are ok with not testing in the west beach and just testing in the outer breakwater.
CCC: Does your CDP require testing this year?
Karl: I would have to check on that.
EPA: No comments on SAP otherwise but suggest you check with other agencies to see if testing is really necessary in the west beach.
Larry; could they only do one Composite if they had to test in area 1?
EPA: No problem with one composite.
CCC: You may want to contact Ventura office and see if they believe you still need to do testing if the Feds don't believe it was required.
Regional Board: 401 requirements similar – you may be ok with 2015 data. 401 references Coastal Commission requirements.

Project #3: 10:45 – 11:30
1) Project name: Port of Hueneme Harbor (POHH) Deep Draft Navigation Project
2) Applicant NAME & Applicant affiliation: Civil Works
3) Project type (Regulatory/Navigation): Navigation
4) Corps Project Manager name: Larry Smith
5) Meeting type (DMMT/CSTF): SC-DMMT
6) Purpose/topic (e.g., SAP, SAPR and/or suitability determination): SAPR and suitability determination
7) Presentation? (y/n): n
8) Documents provided (emailed or a link): to be provided
9) Time needed (15, 30, 45 min?): 45 min

Notes: Some issues with getting the testing completed.
Composite level – chemistry testing show no toxicity issues, as supported by OHD toxicity testing. Based on the bioaccumulation testing – not a bioaccumulation risk. Grain size – suitable for beach nourishment.
The five cores that exceed PCBs sediment concentration 89ppb are going to be segregated out and not be acceptable for beach placement. And those areas will be placed in the harbor in a confined disposal location.
Since it is fairly high in fines, we propose to place the remaining material into the surf zone so the fines can be separated out.
The trenches which were previously proposed are probably not going to be dredged. The Harbor District material is all suitable for beach nourishment.
Instead, we are evaluating a CAD site shown in Figure 4, page 5 of the report. Material from those 5 core sample areas would be placed in CAD site and capped with clean material.
The federal channel north of Wharf 1 (in the area of cores T-2, T-4, and T-5) have had a lot of wood piles placed in the past. The sediments would be screened as it is being dredged and placed into barges. Large pieces of wood piles would be removed and appropriately disposed of by the dredge contractor. However, the smaller pieces may pass through the screen and remain in the

sediments in the barge. So the material would not be suitable for beach placement, but it is clean material which can be utilized as a cap for the CAD site.
EPA: what is proposed for the 5 cores sounds suitable to the EPA. The other material looks suitable for beach placement from a grain size and biologically available stand point.
CCC: are you asking for approval CAD?
Larry: No just suitability of the other areas – minus the 5 cores - for beach placement.
CCC: concur as it is proposed, leaving out the 5 cores sample areas,
Steve Granade: share concerns about the one sample ~360 for PCBs. Since the composites are lower and suitable for beach placement under this analysis, wouldn't they all be suitable for beach placement?
The CAD site is in area operated by Navy and Harbor District. So the Navy would need to agree to the CAD location.
Would like to hear from EPA on why the other core samples, based on composite results, are not suitable for beach placement.
Waterboards: No issues with the suitability as it is proposed today.
EPA: On figure 3: Is the legend wrong. The red triangles should be November 2016 actual sampling and black circles are SAP locations? Legend is incorrect and will be corrected.
EPA: noticed some of the cores were split:
Ken: required to take so many samples from the cores. Take samples where they notice supple differences. Corps requirements asked for x number of samples per Corps.
EPA: grain size wasn't done on March 2017 samples. But it was done in November 2016.
EPA: it would be helpful to have the 2003 data added as an appendix
Glenn Marshall: timetable question. Are we going to have a timetable published to be able to get a lead on when the project would be completed?
Corps – we will work with the Navy on a project timeline.
NOTE: in a brief discussion following the meeting between Corps and EPA the two cores with total PCBs in the 90s were discussed. These are cores E-9 (92 ppb PCB) and T-15 (98 ppb PCB). Sediments from these two cores are considered to be suitable as capping material for the other three cores and could remain exposed on the harbor bottom, if necessary. Comments from SC-DMMT agencies are welcome.
DETERMINATION: All sediments are considered to be suitable for beach placement into the surf zone with the exception of sediments north of Wharf 1 that are considered to be unsuitable for beach placement due to the presence of wood piles and the possibility of wood debris remaining in the dredged sediments. These unsuitable sediments will be used as capping material for the Confined Aquatic Disposal (CAD) Site to be created in harbor. Sediments from cores A-8, E-6, E-9, T-10 and T-15 are considered to be unacceptable for beach nourishment and are to be placed in the CAD site. Cores A-8, E-6, and T-10 are to be placed within the CAD and capped with core A-8 placed first; cores E-9 and T-15 are to be placed in the CAD, but may be used as capping material. Remaining sediments may also be used as capping material.

- Agenda POC: Jessica Vargas,
- SC-DMMT materials are available at: http://www.spl.usace.army.mil/Missions/Regulatory/ProjectsPrograms.aspx.
- Please arrive no more than 10 minutes prior to your scheduled meeting start time.

Appendix C
404(b)(1) Evaluation

**THE EVALUATION OF THE EFFECTS
OF THE DISCHARGE OF DREDGED OR FILL MATERIAL
INTO THE WATERS OF THE UNITED STATES
IN SUPPORT OF THE SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT FOR
PORT OF HUENEME DEEPENING PROJECT
VENTURA, CALIFORNIA**

INTRODUCTION. The following evaluation is provided in accordance with Section 404(b)(1) of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500) as amended by the Clean Water Act of 1977 (Public Law 95-217). Its intent is to succinctly state and evaluate information regarding the effects of discharge of dredged or fill material into the waters of the U.S. As such, it is not meant to stand-alone and relies heavily upon information provided in the environmental document to which it is attached. Citation in brackets [] refer to expanded discussion found in the Supplemental Environmental Assessment (SEA), to which the reader should refer for details.

I. Project Description [1.1]

a. Location: [1.1.1] The Port of Hueneme is located in the city of Port Hueneme at the southern edge of the city of Oxnard.

b. General Description: [1.2] The proposed project is, generally, as described in the Final EA (USACE 1999a) and Feasibility Report (USACE 1999b). Several modifications to the proposed federal action have occurred since completion of the Final EA and Finding of No Significant Impact (FONSI). These revisions include minor changes to the Entrance Channel, revisions to project scheduling, and disposal locations.

Under the Recommended Plan (using Disposal Option 1), the USACE proposes to dredge approximately 390,000 cubic yards (cy) of sediments to deepen the Entrance Channel and Turning Basin (which includes Channel A) to -40 feet mean lower low water (MLLW) and the Approach Channel to -44 feet MLLW. The eastern slope in the Entrance Channel along a length of approximate 1,000 feet, from Station 20+00 to 30+00, is protected from slumping by a rock revetment (Figure 8). There is no revetment along the western slope of the Entrance Channel. Deepening the adjacent channel from its current design depth of -36 feet MLLW to a new design depth of -40 feet MLLW may destabilize this slope. The USACE proposes to place approximately 14,000 ton of stone along the toe of the new slope to stabilize the slope and prevent slumping into the deepened navigation channel. Approximately 363,000 cy of dredged material deemed suitable for beach replenishment would be disposed in the surf zone of Hueneme Beach or nearshore area off Hueneme Beach. Approximately 20,000 cy of dredged material is considered unacceptable for beach or nearshore placement. This unacceptable material would be placed as additional cap on to the existing CAD site. Approximately 3,000 cy of sediment that may include debris from the timber pile removal area is proposed to be screened and disposed of in the nearshore area. Any large pieces of wood captured by the screening would be properly disposed of in a landfill.

c. Basic and Overall <u>Purpose.</u> [1.3] The basic purpose is navigation. The overall project purpose is to more effectively accommodate larger, deep-draft vessels, increase cargo efficiency of product delivery, and reduce overall transportation costs.

d. General Description of Dredged or Fill Material: [3.2.1, Appendix B]

(1) General Characteristics of Material (grain size, soil type): The areas to be dredged contain mainly silty sands that have been determined to be physically and chemically compatible with the surf zone of Hueneme Beach. However, an area within the Turning Basin north of Wharf 1 may contain remnants of timber piles used to support an old wharf that was removed in the early 1970s. Approximately 3,000 cy of dredged material from this area would be dredged by clamshell and screened as it is placed into barges to remove any timber pile remnants. This screened material would be disposed of in the nearshore placement area, with any timber remnants disposed in a landfill. Approximately 20,000 cy of sediments were deemed unacceptable for beach or nearshore placement because they 1) had total PCB concentration exceeded the 95% UCL for total PCBs of 89.6 µg/kg; and/or 2) their weighted average silt content is 30% or greater and is proposed to be placed on top of an existing CAD site as added cap for the existing CAD site (see Section 2.3.3 of this Draft SEA for details). The slopes in the Entrance Channel would be covered with up to 14,000 tons quarry rock as needed to protect the slope from the deepened channel. Placement of stone is expected to take approximately 30 days.

(2) Quantity of Material: Approximately 390,000 cy of sediments dredged from the project area would be disposed in a combination of the surf zone of Hueneme Beach, nearshore placement area, and CAD. Approximately 14,000 tons of rock may be discharged to stabilize the eastern entrance channel slope.

(3) Source Material: It will be the contractor's responsibility to locate sufficient quantity and quality of stone from among southern California quarries. The USACE cannot direct the contractor in making this selection, but can only specify size, type, and quality of stone. The Santa Catalina Island is considered to be the most likely source due to known quantities on hand to start work with and the use of barges to transport stone to the placement site. However the use of other quarries cannot be ruled out.

e. Description of the Proposed Discharge Site:

(1) Suitable dredged material would be placed in the surf zone or nearshore area of Hueneme Beach (Figure 7). The characteristic habitat type subject to impact by dredge material discharge is open-coast sandy beach. Unsuitable material would be disposed onto the existing CAD site. The location of the surfzone and nearshore placement areas is shown on Figure 7; CAD site is shown on Figure 12. Rock may be placed along the toe of the slope shown on Figures 8 & 10.

(2) Size (acres): Suitable dredged material would occur along approximately 3,000 feet of the surf zone of Hueneme Beach or in the nearshore, approximately 2,000 feet in length x 1,200 feet in width. Unsuitable material would be placed onto the existing CAD site as additional cap material and would cover an area measuring approximately 625 feet x 285 feet or approximately 4.1 acres. The proposed rock revetment area measures 1,000 linear feet.

(3) Type of Site (confined, unconfined, open water): A combination of unconfined and managed aquatic disposal.

(4) Types of Habitat: beach placement is on a typical southern California sandy beach as described in Section 3.2 of the SEA. Harbor placement sites, including proposed CAD and rock placement site, are soft-bottom bay habitats as described in Section 3.2 of the SEA.

f. Description of Disposal Method: [2.5] Material would be dredged and transported via a hydraulic pipeline or by hopper dredge with pumpout capability for all sediments placed on Hueneme Beach, or clamshell dredge transported via scow for all sediments placed on the CAD or into the nearshore placement area. A barge mounted crane would be used to place rock, picking up rock from a barge.

II. Factual Determinations**.**

a. Physical Substrate Determinations:

(1) Substrate Elevation and Slope:

The eastern slope of the Entrance Channel is protected by rock revetment. Any failure of the existing rock revetment during deepening would be repaired with new or reused rock depending on the severity of the failure. This would ensure stability of the slope. Material placed as additional cap material at the CAD site would slightly raise the surface elevation of the CAD site. Material used for beach nourishment would widen the beach to provide enhanced shoreline protection. Elevation and slope would match existing beach values. The proposed project is not expected to result in significant impacts to substrate elevation or slope.

(2) Sediment Type.

Geotechnical studies indicate that the sediment consist primarily of silty sands. Suitable sediments are compatible with existing beach materials. Unacceptable sediments are compatible with proposed CAD site.

(3) Dredged Material Movement.

Suitable dredged material would be placed onshore in the surf zone or nearshore. Sands are expected to move downcoast nourishing those beaches as well mimicking the natural process that was interrupted by Port of Hueneme harbor development. Unacceptable sediments would be disposed of on the existing CAD. These sediments are not expected to move. Based on annual monitoring, the existing CAD has been shown to be stable with maintenance of a clean, stable cap and protective layer of coarse (“armor”) stone since its original placement in 2009. Rock placed on the slope is for stability purposes and will be designed and placed to not move.

(4) Physical Effects on Benthos (burial, changes in sediment type, etc.).

Temporary, short-term impacts would occur. Beach nourishment placement areas would bury benthic organisms. Each placement into the surf zone or nearshore would be gradual buildup of sediments from which the majority of benthic organisms could survive. Recolonization would be expected to occur quickly. However, no long-term, adverse significant impacts are expected. The in-harbor CAD site and rock at the revetment would also bury benthic organisms. Recolonization is expected to occur quickly. No long-term adverse effects are expected.

(5) Other Effects. None.

(6) Actions Taken to Minimize Impacts (Subpart H).

Needed: __X__ YES___ NO

Monitoring of water quality to control turbidity and to monitor for possible resuspension of contaminants during disposal would occur. If turbidity exceeds set standards and/or PCB exceeds water quality criteria, disposal would be evaluated and modifications made to get back into compliance.

If needed, Taken:__X__ YES____ NO

A water quality monitoring plan will be part of the construction contract and will be coordinated with the Regional Water Quality Control Board, Los Angeles Region.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water (refer to sections 230.11(b), 230.22 Water, and 230.25 Salinity Gradients; test specified in Subpart G may be required). Consider effects on salinity, water chemistry, clarity, odor, taste, dissolved gas levels, nutrients, eutrophication, others.

The proposed federal action is not expected to significantly affect water circulation, fluctuation, and/or salinity. Only clean, beach-compatible sands from the project will be used for the surf zone and nearshore placement. These sands are not a source of contaminants. Minor turbidity levels may exist in the immediate vicinity of the placement operations that may result in minor, temporary reductions in dissolved oxygen. Sands will not be a source of nutrients, thus eutrophication is not expected to result. Water used to entrain sands will be sea water as is water adjacent to nearshore placement, thus there will be no effect on salinity levels. Disposal of unacceptable material as additional cap material at the CAD site would not significantly impact general water quality for several reasons. The CAD site is a contained area that is not subject to high wave energy or currents, and any turbidity that is generated is likely to undergo dispersion or spreading. Water depths at the surface of the CAD are relatively shallow (approximately -10 meters MLLW), so that the dredged material's transit time through the water column would be very brief, thus, turbidity would temporarily affect water quality in the harbor in the vicinity of the CAD site. The presence of elevated PCB concentrations would be very short-lived as the turbidity and porewater mixes into surrounding waters. These combined effects would lessen the likely chemical impacts of disposal by a considerable margin. Water quality monitoring during disposal at the CAD and beach nourishment operations will allow USACE to modify operations (such as by slowing rate of discharge) until any water quality problems abate.

Clean, quarry-run rocks will be used to reinforce revetment toe protection and are not expected to significantly affect water for similar reasons.

(2) Current Patterns and Circulation (consider items in sections 230.11(b), and 230.23), Current Flow, and Water Circulation.

The proposed federal action is not expected to significantly affect current patterns or circulation. Circulation and current patterns in the harbor are determined by a combination of tide, wind, thermal structure, and local bathymetry. Placement of material at the CAD site result in minor, localized changes to circulation patterns within the Turning Basin. However, long-term effects to current patterns or circulation are anticipated to be negligible after disposal operation cease and the cap material settles in place.

Beach width increases associated with the project would fall within historical ranges. The redistribution of sand following the initial placement might result in modification of the cross-shore currents (e.g., rip currents) in the immediate vicinity of the project activities. These modifications are not expected to result in adverse impacts because the nearshore currents are primarily a function of the nearshore waves, which would not be directly affected by the project.

Due to placement of the rock below the toe of the revetment within the entrance channel, no substantial adverse effects are expected on sediment transport, wave characteristics, or nearshore currents.

(3) Normal Water Level Fluctuations (tides, river stage, etc.) (consider items in sections 230.11(b) and 230.24)

The proposed federal action is not expected to have a significant impact on normal water level fluctuations. There would no change to tidal elevations, which is determined by access to the open ocean, which would not be changed.

Due to placement of the rock below the toe of the revetment within the entrance channel, no substantial adverse effects are expected from the rock placement to tidal elevations.

(4) Salinity Gradients (consider items in sections 230.11(b) and 230.25)

The proposed federal action is not expected to have any impact on normal water salinity nor is it expected to create salinity gradients. Sands and water used to entrain sands will be sea water as is water adjacent to widened beaches, thus there will be no creation of salinity gradients. Placement of rock below the toe of the revetment within the entrance channel would have no effect on salinity, nor would it create any salinity gradients.

(5) Actions That Will Be Taken to Minimize Impacts (refer to Subpart H)

Needed:	__X__ YES	___ NO
If needed, Taken:	__X__ YES	___ NO

All disposal and placement operations would be monitored for effects on water quality, including turbidity, temperature, salinity, dissolved oxygen, and pH; monthly water samples will be taken and analyzed for total dissolved solids. Best management practices would be implemented if turbidity and/or dissolved oxygen exceeds water quality criteria.

c. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site (consider items in sections 230.11(c) and 230.21)

Disposal of sediments generally results in minor impacts to water quality from turbidity. Impacts will be temporary and adverse, but not significant. Disposal of dredged material at the CAD site and beach nourishment activities would increase turbidity levels during placement activities. This is expected to be highly localized and visually indistinguishable from normal turbidity levels. The areas are expected to return to background after disposal/placement ceases. Water quality monitoring during disposal at the CAD and beach nourishment operations will allow USACE to modify operations (such as by slowing rate of discharge) until any water quality problems abate. Turbidity from the placement of rock associated with revetment toe construction is expected to be minimal and restricted to the immediate placement area.

(2) Effects (degree and duration) on Chemical and Physical Properties of the Water Column (consider environmental values in section 230.21, as appropriate)

Disposal of clean sandy sediments generally results in minor impacts to water quality due to resuspension of chemical contaminants in the sediments. Disposal of unacceptable sediments due to PCB levels is not expected to impact water quality as the PCBs appear to be chemically bound to the sediments. Impacts will be temporary and adverse, but not significant.

Only clean, quarry-run rocks for toe of the revetment within the entrance channel will be used to construct the project. These rocks are not a source of contaminants. Minor turbidity levels may exist in the immediate vicinity of the placement operations that may result in minor, temporary reductions in dissolved oxygen.

(3) Effects on Biota (consider environmental values in sections 230.21, as appropriate).

Biota buried during disposal and rock placement are expected to recolonize over the short term. Impacts will be temporary and adverse, but not significant.

(4) Actions taken to Minimize Impacts (Subpart H)

Needed:	__X__ YES	___ NO
If needed, Taken:	__X__ YES	___ NO

Monitoring of water quality to control turbidity and to monitor for possible resuspension of contaminants during disposal will occur. If turbidity exceeds set standards and/or PCB exceeds water quality criteria, disposal would be evaluated and modifications made to get back into compliance.

A water quality monitoring plan will be part of the construction contract and will be coordinated with the Regional Water Quality Control Board, Los Angeles Region.

d. Contaminant Determinations (consider requirements in section 230.11(d)): The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material. (Check only those appropriate.)

(1) Physical characteristics _X_

(2) Hydrography in relation to known or anticipated sources of contaminants _X_

(3) Results from previous testing of the material or similar material in the vicinity of the proposed project _X_

(4) Known, significant sources of contaminants (e.g. pesticides) from land runoff or percolation ___

(5) Spill records for petroleum products or designated (Section 311 of the CWA) hazardous substances___

(6) Other public records of significant introduction of contaminants from industries, municipalities, or other sources ___

(7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge activities ___

(8) Other sources (specify) ___

An evaluation of the Geotechnical Report indicates that the proposed dredged material is not a carrier of contaminants and that levels of contaminants are substantively similar in the extraction and placement sites and is not likely to be constraints. Sediments in the area of the five unacceptable cores are considered to be unacceptable for beach nourishment purposes due to exceedances of a 95% UCL value of 89.6 µg/kg determined by the USACE to be protective of ecological health for the protection of California least tern egg development (see Section 2.3.3 of this Draft SEA for details). Those sediments are considered to be acceptable for in-harbor disposal to enhance the cap on the existing CAD site. Sediments in the timber pile area may contain timber pile remnants. Screening those sediments as they are dredged will remove large pieces of timber pile. Possible fragments make this sediment unacceptable for beach placement, but not for nearshore placement. Only clean, quarry-run rocks for the toe of the revetment within the entrance channel will be used to construct the project. The presence of contaminants are not likely to place any limitations on sand placement or rock placement activities.

e. Aquatic Ecosystem and Organism Determinations (use evaluation and testing Procedures in Subpart G, as appropriate)

(1) Plankton, Benthos and Nekton

Disposal operations would result in short-term turbidity impacts that would affect plankton in the area. Organisms could stifle in the immediate vicinity as these small organisms are impacted by turbidity. However, these effects would be small in both area and time and the plankton would be expected to recover quickly once disposal is completed. Benthic organisms would be buried by disposal, but the areas would be minor in area and would quickly recolonize. Larger organisms in the nekton would be expected to avoid disposal operations and would not be impacted.

Construction of rock below the toe of the revetment within the entrance channel would result in direct mortality to sessile benthic organisms in the toe footprint. The use of clean, quarry-run rocks would reduce the impacts to plankton and nekton to those shore time durations during which rock placement actually occurs as the rock passes through the water column to the bottom. Most of this area is already under a rock apron that would be repaired as needed to replace rocks that move down the new slope, so there would be no overall change to the benthic environment. New rocks would quickly colonize from nearby rocks, restoring the current habitat values.

(2) Food Web

Impacts to the bottom of the food chain (plankton and nekton) would be short term and occur in a small area. Recovery would be quick once disposal operations are concluded.

Construction of rock below the toe of the revetment within the entrance channel would similarly result in short-term, impacts over a small area to the benthic environment. New rocks would quickly colonize from nearby rocks, once rock placement activities are concluded.

(3) Special Aquatic Sites

There are no special aquatic sites in the project area.

(4) Threatened & Endangered Species

There would be no affect to any listed threatened or endangered species or to their designated critical habitat. The federally listed endangered California least tern (*Sternula antillarum browni*) is a migratory bird. California least terns predominately nest on coastal foredunes and other sites with gravelly or sandy substrate and sparse vegetation. Because terns would abandon nests if disturbed, they require nest areas relatively free of human disturbance and predators. The historical habitat of the California least tern has been significantly reduced and modified by human activities including marine and industrial development and residential development along beaches. This loss of habitat has resulted in small isolated breeding colonies that are vulnerable to local extirpation. Primary threats to California least tern populations include increased predation and recreation-related disturbances. California least terns arrive and move through the harbor area in late April and utilize nest areas in Ventura County from mid-May through August. Although nesting does not occur at the harbor, other areas in the region provide suitable habitat. These areas include Oxnard Beach and McGrath State Beach to the north and Ormond Beach and Naval Base Ventura County Point Mugu to the south. California least terns have been observed foraging at the harbor and can be expected to forage in waters offshore during the breeding season. Beaches within the harbor are not an important resting area for the species due to their limited spatial extent and the presence of human activity. In harbor disposal and rock placement would result in short-term increases in noise and human activities and localized, short-term effects to water quality in the disposal/placement area. Because the project area is routinely subject to elevated noise and activity of workers and equipment associated with common commercial and military practices, short-term project-related disturbances are not expected to affect the foraging and resting of least terns. Because the project area is developed and similar resting and foraging habitats occur nearby, least terns would likely move to other nearby similar habitats and return when the project is complete.

The western snowy plover (*Charadrius nivosus nivosus*) is federally listed as threatened. The threats associated with the decline in population include lower reproductive success caused by human disturbances, predation, and loss of suitable habitat from non-native plans and human development and disturbance. USFWS has designated critical habitat for this species but none has been designated in the project area. Western snowy plovers forage on open beaches above and below the mean high tide water lines and in salt pannes where they feed on insects and other invertebrates found on the sand, decomposing kelp, marine mammal carcasses, and fore dune vegetation. Western snowy plovers nest on dune-backed beaches, dry salt pannes in lagoons, and barrier beaches in scrapes adorned with shells and other collected debris. Nesting usually begins by late March and fledging may extend into the end of September. Western snowy plovers are able to have multiple clutches during a nesting season. Western snowy plovers have not been observed to nest within the project area. Due to the disturbed nature of the beach and its narrow width and susceptibility to high tides, Hueneme Beach is not expected to support nesting western snowy plovers. Individuals may use the beach infrequently for foraging or resting during spring or fall migration and during winter. Therefore, it would be unlikely that the western snowy plover would be present in the project area.

(5) Other fish and wildlife:

Marine mammals would not be affected by disposal activities. Birds would generally avoid the disposal sites, although surf zone placement could attract birds to the benthic organisms coming out of the dredge pipe as an alternate food source.

Rock revetment construction would result in direct mortality to sessile benthic organisms in the toe footprint; however, sandy habitat does not support sensitive marine biological resources.

The California grunion (*Leuresthes tenuis*) is a member of the New World silversides family, Atheriniopsidae, along with the jacksmelt and topsmelt. They inhabit the nearshore waters from the surf to a depth of 60 feet. Grunion leave the water at night to spawn on beaches during the spring and summer months. For four consecutive nights, beginning on the nights of the full and new moons, spawning occurs after high tides and continues for several hours. As waves break on the beach, grunion swim as far up the slope as possible. The female arches her body and excavates the semi-fluid sand with her tail to create a nest. Twisting her body, she digs into the sand until half-buried with her head sticking out. She then deposits her eggs into the nest. Males curve around the female and release milt. The milt flows down the female's body until it reaches and fertilizes the eggs. As many as eight males may fertilize the eggs in a single nest. After spawning, the males immediately retreat toward the water while the female twists free and returns with the next wave. Spawning occurs from mid-March through late August. Peak spawning occurs from late March to early June. Currently, construction is scheduled to start in June 2019, during the grunion spawning season. However, receiving beaches are likely to be in an unsuitable condition to support grunion prior to beach nourishment.

(6) Actions to Minimize Impacts (refer to Subpart H)

Needed:__X__ YES___ NO

Monitor and control turbidity to minimize impacts to plankton and nekton.

A survey would confirm unsuitability for grunion spawning or a monitoring and avoidance plan would be implemented if beaches are suitable habitat for spawning. Placement of sand into the surf zone reduces impacts to spawning grunion, which nest at the highest high tide line, which will be taken into consideration during preparation of any monitoring and avoidance plan, if needed.

Western snowy plover. Pre-construction surveys will be conducted at Hueneme Beach prior to beach placement. Should snowy plovers be found on or adjacent to the beach placement site, USACE will initiate informal consultation with USFWS and will prepare a monitoring and avoidance plan to include monitors who will be hired to direct the contractor to avoid affecting this species during beach nourishment activities using proven methods concurred with by the USFWS.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determination (consider factors in section 230.11(f)(2))

Is the mixing zone for each disposal site confined to the smallest practicable zone?
__X_ YES ____ NO

Sediments do not require a mixing zone in order to remain in compliance with water quality standards. As such, the mixing zone is considered to be the smallest practicable.

(2) Determination of Compliance with Applicable Water Quality Standards (present the standards and rationale for compliance or non-compliance with each standard)

The project will be in compliance with state water quality standards. Placement of material at the receiver sites would result in short-term elevated turbidity levels and suspended sediment concentrations, but no appreciable long-term changes in other water quality parameters, including dissolved oxygen, pH, nutrients, or chemical contaminants. Factors considered in this assessment include the relatively localized nature of the expected turbidity plumes for the majority of the disposal/placement period and rapid diluting capacity of the receiving environment. Water quality monitoring would be required as part of the overall project. If monitoring indicated that suspended particulate concentrations outside the zone of initial dilution exceeded permissible limits, disposal/placement operations would be modified to reduce turbidity to permissible levels. Therefore, impacts to water quality from disposal/placement of material at the receiver sites would not violate water quality objectives or compromise beneficial uses listed in the Basin Plan. USACE will continue to coordinate with the Regional Water Quality Control Board during construction to minimize impacts to water quality.

(3) Potential Effects on Human Use Characteristic

(a) Municipal and Private Water Supply (refer to section 230.50)

There are no municipal or private water supply resources (i.e. aquifers, pipelines) in the project area. The proposed project would have no effect on municipal or private water supplies or water conservation.

(b) Recreational and Commercial Fisheries (refer to section 230.51)

The harbor and nearshore areas are not subject to commercial fishing. Recreational fishing would move to avoid the disposal activities and to follow fish out of these areas.

(c) Water Related Recreation (refer to section 230.52)

Construction equipment would be required to maintain ocean access for all uses. During the nearshore placement, portions of the beach in the immediate placement area would be closed to public use. Impacts would be temporary (up to four months). During nourishment activities, proper advanced notice to mariners would occur and navigational traffic would not be allowed within the nearshore placement discharge area. In addition, signage would be provided to inform swimmers of potential hazards. Recreational users would be required to visit a different portion of the beach during the closure periods. The displacement of recreational users would be temporary and short-term. However, the proposed project would not significantly impact surfing conditions or other water sports once completed. These currents are not expected to change in magnitude or direction, but only relocate seaward. Therefore, the federal action is not expected to measurably change currents or change surfing in any discernible way through changes to currents. To minimize navigation impacts and threats to vessel safety, all floating equipment would be equipped with markings and lightings in accordance with the U.S. Coast Guard regulations. The location and schedule of the work would be published in the U.S. Coast Guard Local Notice to Mariners

In the long term, the nearshore nourishment would create a wider beach area and greater opportunities for beach activities, enhancing the beach available for recreation users. The wider beach would be a benefit to beach recreation users.

(d) Aesthetics (refer to section 230.53)

Minor, short term effects during disposal and rock placement are anticipated. The federal action would result in a wider beach, which would be a beneficial alteration of the visual character of the existing environment. During the construction phase, the visual character of the site would be affected by construction activities and the presence of construction equipment and materials; however, the construction phase is temporary, and as such, would not result in permanent effects to the visual character of the site. In the long term, the resulting wider beach would enhance the view of the beach and result in a visual benefit. Rocks placed would be entirely underwater and would not be visible.

(e) Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves (refer to section 230.54)

The federal action would not have any effect on national and historic monuments, national seashores, wild and scenic rivers, wilderness areas or research sites.

g. Determination of Cumulative Effects on the Aquatic Ecosystem (consider requirements in section 230.11 (g))

Cumulative effects were determined to be insignificant, refer to section 5 of the SEA.

h. Determination of Secondary Effects on the Aquatic Ecosystem (consider requirements in section 230.11(h))

Secondary effects of the discharge of dredged or fill would be negligible. Areas outside the direct impact would have only negligible turbidity effects either from disposal or rock placement. Turbidity levels would be low and in the immediate vicinity of the disposal operations or rock placement. Impacts of the federal action are all temporary construction impacts. Movement of sand downcoast would be indistinguishable from natural sand movement resulting in lowered erosion rates due to the increased volume of sand.

III. Findings of Compliance or Non-Compliance with the Restrictions on Discharge

a. Adaptation of the Section 404(b)(l) Guidelines to this Evaluation

No significant adaptations of the guidelines were made relative to this evaluation.

b. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem:

All practicable alternatives for dredging/placement were evaluated. This included disposal option 2 in the SEA, which addressed construction of a trench for disposal of the unacceptable sediment. Disposal option 2 includes considerably more discharges of dredged material that would result in increased costs and adverse impacts to the aquatic ecosystem.

c. Compliance with Applicable State Water Quality Standards.

The proposed project meets State of California water quality standards.

d. Compliance with Applicable Toxic Effluent Standard or Prohibition Under Section 307 Of the Clean Water Act.

No toxic materials/wastes are expected to be produced or introduced into the environment by this project.

e. Compliance with Endangered Species Act of 1973.

As discussed in the attached SEA, the USACE has determined the disposal of dredged/fill material will not have an effect on any species Federally-listed as threatened or endangered nor any designated critical habitat. Consultation pursuant to Section 7 of this Act is not required for this project. However, pre-construction surveys will be conducted at Hueneme Beach prior to beach placement. Should snowy plovers be found on or adjacent to the beach placement site, USACE will initiate informal consultation with USFWS and will prepare a monitoring and avoidance plan to include monitors who will be hired to direct the contractor to avoid affecting this species during beach nourishment activities using proven methods concurred with by the USFWS.

f. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972.

No sanctuaries as designated by the Marine Protection, Research and Sanctuaries Act of 1972 will be affected by the proposed project. No sediments will be disposed of at designated ocean dredged material disposal sites.

g. Evaluation of Extent of Degradation of the Waters of the United States

(1) Significant Adverse Effects on Human Health and Welfare

(a) Municipal and Private Water Supplies

The proposed project will have no significant adverse effects on municipal and private water supplies.

(b) Recreation and Commercial Fisheries

The proposed project will have minor, short-term impacts, but no significant adverse effects on recreation fisheries. The harbor and nearshore areas are not subject to commercial fishing. Recreational fishing would move to avoid the disposal activities and to follow fish out of these areas. To minimize navigation impacts and threats to vessel safety, all floating equipment would be equipped with markings and lightings in accordance with the U.S. Coast Guard regulations. The location and schedule of the work would be published in the U.S. Coast Guard Local Notice to Mariners.

(c) Plankton

Disposal and rock placement operations would result in short-term turbidity impacts that would affect plankton in the area. Organisms could stifle in the immediate vicinity as these small organisms are impacted by turbidity. However, these effects would be small in both area and time and the plankton would be expected to recover quickly once disposal is completed.

(d) Fish

Larger organisms in the nekton would be expected to avoid disposal and rock placement operations and would not be impacted. If placement occurs during grunion spawning, a survey would confirm unsuitability for grunion spawning or a monitoring and avoidance plan would be implemented if beaches are suitable habitat for spawning. Placement of sand into the surf zone reduces impacts to spawning grunion, which nest at the highest high tide line, which will be taken into consideration during preparation of any monitoring and avoidance plan, if needed.

(e) Shellfish

Benthic organisms, including shellfish, would be buried by disposal/rock placement, but the areas would be minor in area and would quickly recolonize.

(f) Wildlife

Marine mammals would not be affected by disposal or rock placement activities. Birds would generally avoid the disposal/rock placement sites, although surf zone placement could attract birds to the benthic organisms coming out of the dredge pipe as an alternate food source.

(g) Special Aquatic Sites

There are no special aquatic sites in the project area.

(2) Significant Adverse Effects on Life Stages of Aquatic Life and Other Wildlife Dependent on Aquatic Ecosystems

Any adverse effects would be short-term and insignificant. Refer to section 4 of this SEA.

(3) Significant Adverse Effects on Aquatic Ecosystem Diversity, Productivity and Stability

Any adverse effects would be short-term and insignificant. Refer to section 4 of this SEA.

(4) Significant Adverse Effects on Recreational, Aesthetic, and Economic Values

Any adverse effects would be short-term and insignificant. Refer to section 4 of this SEA.

h. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem

Specific environmental commitments are outlined in the analysis above and in the attached SEA. All appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem.

i. On the Basis of the Guidelines, the Proposed Disposal Site(s) for the Discharge of Dredged or Fill Material (specify which) is:

The final 404(b)(1) evaluation and Findings of Compliance will be included with the final SEA.

Prepared by: Larry Smith Date: 22 February 2019

Appendix D
Mailing List

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U.S. Environmental Protection Agency
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Jun Zhu
Regional Water Quality Control Board
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John Laird, Secretary
California Natural Resources Agency
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Michael J. Villegas,
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Appendix E
Air Quality Emissions Calculations

Dredging

Emission Source Data for Dredging

Construction Activity/Equipment Type	Power Rating	Load Factor	# Active	Hourly Hp-Hrs	Fuel Use GPH	Hrs per Day (1)	Total Work Days (2)	DailyTotal Hp-Hrs (1)
Clamshell dredge	N/A	N/A	N/A	N/A	N/A	22		N/A
Tug boat-clamshell dredge	800	0.20	1	160	8.0	22		176
Hydraulic dredge	2,600	N/A	N/A	N/A	N/A	22		N/A
Bulldozer-D8 (3)	335	0.50	2	335	18.8	8	2	2,680
Tug boat-rock barge (power in kw)	1,790	0.68	1			1.1	7	1,339

Estimated Dredge Duration		Alternative				
Disposal Option	Dredge Type	1	2	2a	3	4
Trench Option						
	Clamshell	13	23	25	32	43
	Hydraulic	20	32	36	43	57
CAD Option						
	Clamshell	7	13	14	17	23
	Hydraulic	20	32	36	43	57

Alternative 2a is the Recommended Plan

Basic assumption was dredging of 10,000 cy per day for the hydraulkic dredge and 2,000 cubic yards per day for the clamshell dredge

Emission Factors for Construction Equipment

Equipment Type	**ROG**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**
Clamshell dredge (lb/hr)	1.1	0.3	1.1	1.0	0.7	
Tugboat (lbs/1,000 Gal)	18.2	57.0	419.0	75.0	9.0	
Hydraulic dredge (lb/hr)	0.2	0.1	0.5	0.3	0.2	
Hooper dredge (lb/hp-hr)	0.0001	0.0055	0.0130	0.0081	0.0007	
Bulldozer (grms/HP-HR)	1.7	4.8	10.3	0.9	1.1	
Tug boat-rock barge (g/hw-hr)	0.44	5.00	7.94	0.01	0.23	0.21

Daily Emissions from Construction Activities Clamshell Dredge and Rock Placement Operations

			Pounds per day		
Construction Activity/Equipment Type	**ROG**	**CO**	**NOx**	**SOx**	**PM10**
Clamshell dredge	23.8	6.6	24.0	20.9	15.2
Tug boat-clamshell dredge	3.2	10.0	73.7	13.2	1.6
Crew boat (4)	0.9	0.4	0.8	0.1	0.1
Worker Vehicles (4)	0.1	1.2	0.9	0.1	0.1
Peak Daily Emissions	**28.0**	**18.2**	**99.4**	**34.3**	**16.9**

Daily Emissions from Construction Activities Hydraulic Dredge

			Pounds per day		
Construction Activity/Equipment Type	**ROG**	**CO**	**NOx**	**SOx**	**PM10**
Hydraulic dredge	4.4	2.2	11.0	6.6	4.4
Tug boat-hydraulic dredge	5.2	6.8	9.5	2.4	2.2
Crew boat (4)	0.4	0.3	0.8	0.1	0.1
Worker Vehicles (4)	0.2	2.1	1.0	0.1	0.2
Bulldozer-D8(3)	10.0	28.4	60.9	5.3	6.5
Peak Daily Emissions	**10.2**	**11.4**	**22.3**	**9.2**	**6.9**

Daily Emissions from Tugs transiting to/from Catalina Rock Quarry

				Pounds per day		
Construction Activity/Equipment Type	**ROG**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**
South Coast Air Basin(5)	1.30	14.76	23.44	0.03	0.68	0.62
South Central Coast Air Basin(6)	2.60	29.52	46.88	0.06	1.36	

(1) Assumes 2-hour down time per day for shift change, maintenance, fueling. Three shifts per day.

(2) Assumes average duration of 36 days for hydraulic and 25 days for clamshell for the recommended plan for the trench alternative.

(2) Assumes average duration of 36 days for hydraulic and 14 days for clamshell for recommended plan for the CAD alternative.

(3) Bulldozer would only be used to place and then remove the pipeline before and after dredging, surf zone placement that means that a bulldozer would not be required on the beach to smooth sand placed for the project.

(4) See following pages for source date, emissions factors, and emissions calculations.

(5) Air emissions in SCAB limited to quarry out to 3 nm limit

(6) Air emissions in SSCAB limited to 3 nm limit to the project site, a distance of 6 nm

Assume dredge volume of 390,000 cy, maximum expected based volume in the dredge areas, plus 23,000 cy for trench construction for trench alternative.
Emissions factors for Dredging for tugboat and bulldozer taken from the Port of Los Angeles Channel Deepening Project Final Supplemental Environmental Impact Statement/Environmental Impact Report, September 2000.
Emissions factors for Dredging for the Clamshell Dredge provided by Justice and Associates for a Manson clamshell dredge.
CAD Alternative: 350,000 cy dredging with beach placement using hydraulic dredge taking 30 days; 63,000 cy in CAD placement taking 32 days.
Trench Alternative: 367,000 cy dredging with beach placement using hydraulic dredge taking 31 days; 46,000 cy in CAD placement taking 26 days (clamshell); 52,000 cy from trench construction into nearshore taking 13 days (clamshell); total of 39 days clamshell operations.
Emission factors for hopper dredge taken from AP-42 for diesel engines.
Rock placement operations would utilize a barge-mounted crane equivalent to the clamshell dredge. Support equipment is the same as well. Duration: 10-20 days, 20 days used for worst case..
Speed of tug towing rock barge to/from Catalina rock quarry: 5 knots loaded, 6 knots light
Rock barge capacity 2,000 tons, 14,000 tons total needed, requiring 7 bargeloads total. One barge load per day spread out over the one month construction period
PM2.5 estimated for rock barge transit only for SCAB, which is nonattainment for PM2.5; SCCAB is attainment for PM2.5.

Total Project Construction Emissions
TotalEmissions from Tugs transiting to/from Catalina Rock Quarry

	Tons per Year					
Construction Activity/Equipment Type	**ROG**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**
South Coast Air Basin[(5)]	0.0045	0.0517	0.0820	0.0001	0.0024	0.0022
South Central Coast Air Basin[(6)]	0.0091	0.1033	0.1641	0.0002	0.0048	
Applicability Rate	**10**	**100**	**10**		**70**	**100**

SCAB nonattainment for ozone (ROG and NOx), attainment (maintenance) for CO and PM10
SCCAB nonattainment for ozone (ROG and Nox)

	Tons/year				
Recommended Plan	**ROG**	**CO**	**NOx**	**SOx**	**PM10**
Trench Option					
Hydraulic dredge (dredging & disposal)[1]	0.1836	0.2052	0.4014	0.1663	0.0104
Clamshell dredge (dredging & disposal)	0.3500	0.2269	1.2431	0.4285	0.2114
Clamshell Dredge (rock placement)	0.2800	0.1815	0.9944	0.3428	0.1691
Tug boat-rock barge (rock transport)	0.0091	0.1033	0.1641	0.0002	0.0048
Total	**0.8228**	**0.7169**	**2.8030**	**0.9378**	**0.3957**
CAD Option					
Hydraulic dredge (dredging & disposal)	0.1836	0.2052	0.4014	0.1663	0.1242
Clamshell dredge (dredging & disposal)	0.1960	0.1271	0.6961	0.2400	0.1184
Clamshell Dredge (rock placement)	0.2800	0.1815	0.9944	0.3428	0.1691
Tug boat-rock barge (rock transport)	0.0091	0.1033	0.1641	0.0002	0.0048
Total	**0.6687**	**0.6171**	**2.2560**	**0.7493**	**0.4165**
Applicability Rate	**50**		**50**		

Notes: 1 – disposal emissions include bulldozer emission for beach placement of dredged materials.

	Tons/year				
Alternative 3	**ROG**	**CO**	**NOx**	**SOx**	**PM10**
Trench Option					
Hydraulic dredge (dredging & disposal)[1]	0.2193	0.2451	0.4795	0.1987	0.1484
Clamshell dredge (dredging & disposal)	0.4481	0.2904	1.5911	0.5485	0.2706
Clamshell Dredge (rock placement)	0.2800	0.1815	0.9944	0.3428	0.1691
Tug boat-rock barge (rock transport)	0.0091	0.1033	0.1641	0.0002	0.0048
Total	**0.9565**	**0.8204**	**3.2291**	**1.0901**	**0.5929**
CAD Option					
Hydraulic dredge (dredging & disposal)	0.2193	0.2451	0.4795	0.1987	0.1484
Clamshell dredge (dredging & disposal)	0.2380	0.1543	0.8453	0.2914	0.1438
Clamshell Dredge (rock placement)	0.2800	0.1815	0.9944	0.3428	0.1691
Tug boat-rock barge (rock transport)	0.0091	0.1033	0.1641	0.0002	0.0048
Total	**0.7465**	**0.6842**	**2.4832**	**0.8330**	**0.4660**
Applicability Rate	**50**		**50**		

Notes: 1 – disposal emissions include bulldozer emission for beach placement of dredged materials.

	Tons/year				
Alternative 4	**ROG**	**CO**	**NOx**	**SOx**	**PM10**
Trench Option					

Hydraulic dredge (dredging & disposal)[1]	0.2907	0.3249	0.6356	0.2633	0.1967
Clamshell dredge (dredging & disposal)	0.6021	0.3903	2.1380	0.7370	0.3637
Clamshell Dredge (rock placement)	0.2800	0.1815	0.9944	0.3428	0.1691
Tug boat-rock barge (rock transport)	0.0091	0.1033	0.1641	0.0002	0.0048
Total	**1.1819**	**1.0000**	**3.9321**	**1.3434**	**0.7342**
CAD Option					
Hydraulic dredge (dredging & disposal)	0.2907	0.3249	0.6356	0.2633	0.1967
Clamshell dredge (dredging & disposal)	0.3220	0.2087	1.1436	0.3942	0.1945
Clamshell Dredge (rock placement)	0.2800	0.1815	0.9944	0.3428	0.1691
Tug boat-rock barge (rock transport)	0.0091	0.1033	0.1641	0.0002	0.0048
Total	**0.9019**	**0.8185**	**2.9377**	**1.0006**	**0.5651**
Applicability Rate	**50**		**50**		
Notes: 1 – disposal emissions include bulldozer emission for beach placement of dredged materials.					

GHG Emissions

Dredging

Emission Source Data for Dredging

Construction Activity/Equipment Type	Power Rating	Load Factor	# Active	Hourly Hp-Hrs	Fuel Use GPH	Hrs per Day	Total Work Days(3)	DailyTotal Hp-Hrs (1)
Clamshell dredge	1,890	1.0	1	1,890	N/A	22		41,580
Tug boat-clamshell dredge	800	0.20	1	160	8.0	22		176
Hydraulic dredge	2,600	NA	1	NA	NA	22		NA
Crew boat	50	NA	1	NA	NA	4		NA
Tug boat-hydraulic dredge	1,600	NA	1	NA	NA	2		NA
Worker vehicles	NA	NA	18	NA	NA	12.5		NA
Hopper dredge	2,000					22		22,000
Bulldozer-D8	335	0.50	2	335	18.8	8	2	2,680
Tug boat-rock barge (power in kw)	1,790	0.68	1			1.1	7	1,339

Emission Factors for Construction Equipment

	Grams per HP-HR
Equipment Type	**CO2**
Clamshell dredge	568
Tugboat	509
Hydraulic dredge	183
Crew boat	75
Tug boat-hydraulic dredge	93.9
Worker vehicles	1.1
Bulldozer	390
Tug boat-rock barge g/kw-hr)	652

Estimated Emissions from Construction Equipment

	CO2						
		Alternative 2a		**Alternative 3**		**Alternative 4**	
	lbs/day	**tons total**		**tons total**		**tons total**	
Equipment Type		**Trench**	**CAD**	**Trench**	**CAD**	**Trench**	**CAD**
Clamshell dredge	27.6	0.3444	0.1929	0.4409	0.2342	0.5924	0.3169
Tugboat	24.7	0.3086	0.1728	0.3951	0.2099	0.5309	0.2840
Hydraulic dredge	8.9	0.1598	0.1598	0.1909	0.1909	0.2530	0.2530
Crew boat	0.7	0.0202	0.0165	0.0248	0.0198	0.0331	0.0268
Tug boat-hydraulic dredge	0.4	0.0075	0.0075	0.0089	0.0089	0.0118	0.0118
Worker vehicles	0.5	0.0166	0.0136	0.0205	0.0164	0.0273	0.0221
Bulldozer[(3)]	6.9	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069
Operation Type							
Hydraulic dredge	10.5	0.1890	0.1890	0.2257	0.2257	0.2992	0.2992
Clamshell dredge	53.5	0.6682	0.3742	0.8552	0.4543	1.1492	0.6147
Rock placement	53.5	0.5345	0.5345	0.5345	0.5345	0.5345	0.5345
Bulldozer[(3)]	6.9	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069
Tug boat-rock barge	1.6	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055
Total		1.4041	1.1101	1.6224	1.2215	1.9898	1.4553
Total Equivalent CO2		**1.4153**	**1.1190**	**1.6353**	**1.2312**	**2.0058**	**1.4670**

CO2 Equivalent = CO2*1.008

Emission Factors for Dredges

Source	CO	NOx	VOC/ROG[7]	PM_{10}/ SOx [6]
Traditional AP-42 Large-Bore Diesel Emission Factors				
Uncontrolled diesel emission factors (Lb/hp-hr)[1]	0.0055	0.024	0.0006	0.0007/ .00809
Controlled diesel emission factors (Lb/hp-hr)[2]	0.0055	0.013	0.0006	0.0007/ 0.00809
Caterpillar 3516B Emission Factors[3]				
Lb/hp-hr	0.0008	0.18	0.0003	0.0002/ 0.0004
H.R. Morris Emission Factors				
Lb/hp-hr	0.0001	0.0004	0.0002[4]	0.0002[3]/ 0.0002
Traditional AP-42 Emissions for a 2,600 Horsepower Diesel[5]				
Uncontrolled diesel emission factors (Lb/hr)	7.2	31.2	0.8	0.9/ 10.5
Controlled diesel emission factors (Lb/hr)[2]	7.2	16.9	0.8	0.9/ 10.5
Caterpillar 3516B Emissions for a 2,600 Horsepower Diesel[5]				
Lb/hr	1.0	23.8	0.4	0.2/ 0.5
H.R. Morris Emission Factors[5]				
Lb/hr	0.1	0.5	0.2	0.2/ 0.3

[1] Based on Table 3.4-1 of USEPA AP-42, A Compilation of Air Pollutant Emission Factors.
[2] NOx controlled by injection timing retard.
[3] Based on data provided by Caterpillar for this engine.
[4] Assumes 50 percent control efficiency for use of selective catalytic reduction (SCR).
[5] A 50 percent load factor used for this engine per discussion with Caterpillar Diesel.
[6] SOx values are separate emission factors from PM10.
[7] VOC and ROG are used interchangeably.

Ancillary Equipment Operations and Horsepower Ratings			
Emission Source	**Number**	**Horsepower**	**Total Hours per Day**
Tugboat	1	1,600	2
Crew Boats	2	50	4

Tug Boat Fuel Data	
Fuel Type	Diesel
Fuel Density, lb/gal	7.12
Specific Fuel Consumption, lb/hp/hr	0.40
Idle Load Factor	0.20
Maneuver Load Factor	0.50
Cruise Load Factor	0.80

Estimating Fugitive emissions for Vehicle Miles Traveled (VMT) for construction laborers (SCAQMD CEQA Quality Handbook Table A9-9-A with updates through 2010). It is assumed that 18 personnel would work and 18 Vehicles used. Personnel would commute from approximately 6.25 miles one-way on-road. Note: No off-road work.

V=W x (X/Y) x Z; Where V=VMT, W=Distance, X=number of vehicles, Y=1 hour, Z= estimated travel time

VMT= 12.5 miles/day x (18 vehicles/hr) x 0.5 hr = 112.5 miles per day

Estimating fugitive emissions from passenger (commuter) Vehicle Travel on Paved Roads (SCAQMD CEQA Quality Handbook Table A9-9-B with updates through 2010).

E = V x G (with street cleaning and is dependent on type of road); where E= emissions for passenger vehicles; V= VMT; **and** G = 0.00065 for freeways **(SCAQMD CEQA Quality Handbook Table A9-9-B-1 with updates through 2010).**

E = 112.5 miles/day x 0.00065 lbs/mile = 0.08 lbs/day
Note: No off-road work = no off-road fugitive emissions/day.

Total Fugitive Emissions (Vehicles) = 0.15 lb/day

TYPE OF VEHICLE	NUMBER OF VEHICLES	VMT/DAY (on-road)	VMT/DAY (off-road)	EMISSIONS (on-road) (lbs/day)	EMISSIONS (off-road) (lbs/day)
Passenger (commuter)	18	112.5	0	0.08	0
Total on-road fugitive emissions	Na	na	Na	0.08	na

"na" means "Not Applicable"

<u>On-Road Emission (lb/day): 40 mph</u>

<u>Travel emission formula</u>= [(emission factors (Exhaust+Tire wear)) x (Distance traveled(VMT))]/(454 grams/lbs)

PM10 = [0.195 grams/mile x 112.5 miles/day]/454 grams/lb = [21.94 grams/day]/454 grams/lb = 0.05 lbs/day PM10

CO = [4.72 grams/mile x 112.5 miles/day]/454 grams/lb = [531 grams/day]/454 grams/lb = 1.17 lbs/day CO

ROC = [0.55 grams/mile x 112.5 miles/day]/454 grams/lb = [61.88 grams/day]/454 grams/lb = 0..14 lbs/day ROC

NOx = [3.73 grams/mile x 112.5 miles/day]/454 grams/lb = [419.63 grams/day]/454 grams/lb = 0.92 lbs/day NOx

SOx = [0.29 grams/mile x 112.5 miles/day]/454 grams/lb = [32.63 grams/day]/454 grams/lb = 0.07 lbs/day SOx

Appendix F
Cultural Resources Correspondence

Previous Consultations Conducted

By The Corps of Engineers

and The Navy

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2711
LOS ANGELES, CALIFORNIA 90053-2325

September 22, 1994

REPLY TO
ATTENTION OF
Office of the Chief
Environmental Resources Branch

Ms. Cherylin Widell
Acting State Historic Preservation Officer
Office of Historic Preservation
P.O. Box 942896
Sacramento, California 94296-0001

Dear Ms. Widell:

The Los Angeles District Corps of Engineers (COE), is proposing to engage in routine maintenance dredging and sediment disposal of Channel Islands and Port Hueneme Harbors in Ventura County. Channel Islands Harbor has been dredged every two years beginning in 1969, and Port Hueneme Harbor every fours years since 1975. All undertakings have been coordinated for compliance with Section 106 through your office. Coordination with your office most recently occurred in 1988 (COE 860715A: enclosure 1)) and again in 1990 (CoE 900320A: enclosure 2). In both cases you concurred that there were either no historic properties, or effects occurring in the area of potential effects (APE). The current project area overlaps substantially with these previously tested areas. The only area which has not been subjected to Section 106 evaluation, and which is the subject of this letter, is a portion of the sediment disposal area which lies nearshore off Hueneme Beach between the old Port Hueneme Lighthouse adjacent to the jetty, and the northwest boundary of Ormand Beach in Oxnard (enclosure 3). The proposed nearshore disposal area is located between the -10ft and -30ft MLLW depths. Some dredged material may also be disposed of at Silver Strand Beach, another routinely utilized area, which has been in use since 1984.

The proposed project is a six-year harbor maintenance program requiring the bi-annual removal of about 258,500 cubic yards of sediment per episode. Due to ecological restrictions, dredging must occur between October 1 and April 15 for each episode. The sediment will be deposited nearshore to enable wave action to distribute it on the beach, thereby renourishing Hueneme Beach.

The COE contracted Macfarlane Archaeological Consulting (MAC) to conduct a records and literature search and an updated remote sensing survey of the Hueneme Beach nearshore disposal area. The letter report prepared by MAC listed the remains of the Hueneme Pier, and a variety of shipwrecks originally reported to have gone down in the vicinity of the APE prior to 1938 (enclosure 4). MAC's survey detected a debris field in the

nearshore disposal area. MAC equated the debris with the pilings and remnants of the old Hueneme Pier which collapsed in 1938, and suggested that the debris field might require further archeological testing.

The COE, however, disagrees with MAC's recommendation. Our research shows that major storms hit the Southern California coastline in 1938 and 1939 (enclosures 5 and 6). These storms caused the collapse of the pier and created a great deal of seafloor turbulence. The beach profile (enclosure 7) shows that the seafloor level was very high in 1938 and then much lower in successive years, indicating the storms of 1938 and 1939 removed an extremely large amount of sediment from the ocean bottom. Undoubtedly with the amount of nearshore turbulence and disturbance, the location and integrity of pre-1939 shipwrecks and the historic pier would be heavily impaired. In fact, the MAC report documents their findings as a "debris field" rather than as any distinct entity; the debris field is a likely result of storm activity and subsequent ocean bottom movement. The COE believes that there is ample historical information on the Port Hueneme Pier that would far surpass the value of underwater investigations of its disturbed and maybe nonexistent remains.

Furthermore, in the unlikely event that any remains are still in place, the COE does not consider the temporary placement of sediment a significant impact. The sediment is placed so as to migrate shoreward and would not constitute a permanent burial of the area. In addition, the MAC report states that magnetic anomalies were the identifying factor for much of this debris field, a fact which indicates that some of the debris is already buried under a protective layer of sediment.

After considering all of the information available -- clearance of similar projects in the same location on two recent occasions, knowledge of two major destructive storms in 1938 and 1939, the fact that the reported anomalies constitute unidentifiable debris rather than a distinct entity, and the conclusion that the deposition of sediment would not constitute a significant impact in the event of any potential sites -- the COE has determined that the Channel Islands/Port Hueneme Harbors Maintenance Dredging project as planned will not involve National Register listed or eligible properties.

We request that you review the enclosed information. If you agree with this determination, we would appreciate your concurrence within thirty days, otherwise we will assume your concurrence. If you have any questions concerning this project or the determination, please contact Mr. Richard Perry, Project Archeologist, at (213) 894-6087.

Sincerely,

Charles S. Dwyer

for Carl F. Enson, P.E.
Chief, Construction-
Operations Division

Enclosures

MACFARLANE ARCHAEOLOGICAL CONSULTANTS
7290 Marmota Street
Ventura, California 93003
(805) 659-2657

August 31, 1994

STATISTICAL RESEARCH INC.
2500 N. Pantano, Suite 218
Tucson, Arizona 85751

Attn: Jeff

Letter Report of Cultural Resource Investigations
Underwater Remote Sensing Survey
For the US Army Corps of Engineers, LA District
Environmental Planning Division
Contract No. DACW09-94-D-0014

(1) Dredged Materials Redistribution Area
Channel Islands/Port Hueneme Harbors
Ventura County, California
Service Request No. 94-4407 [ER] dated 14 June 1994

(2) Dredged Materials Redistribution Area
Offshore near Ventura Harbor
Ventura County, California
Service Request No. 94-4407 [ER] dated 14 June 1994

Ladies & Gentlemen:

This letter constitutes a preliminary letter report of the results of the field survey and literature research conducted for the abovereferenced dredge materials redistribution areas. A hard copy of this report is being sent which will include the data reduction/shiptrack map of the individual project areas. A fax copy of this report is being sent directly to the COE to meet their dredge contractual deadlines.

(1) Dredged Materials Redistribution Area, Offshore Channel Islands/Port Hueneme Harbor

Field surveys, literature research and data reduction for the above referenced project is complete.

UCLA indicates that one prehistoric site, CA-VEn-663 has been identified within a one-half mile radius of the project area. This location is the prehistoric site of *Weneme*, the majority of which was removed when the Port was constructed in the late 1930's. One historic site, CA-VEn-975H is located within a one-half mile radius of the project area. Inspection of historic maps on file at UCLA (Hueneme, 1904 15 minute series) indicates that there were very few roads and structures located in the area at that time. UCLA also reports that three surveys and/or excavations have been conducted within a one-half mile radius of the project area (Horne and Macfarlane, 1980; Bissel, 1990; Maxwell, 1976).

The Ventura County Historic Society Library files show one historic structure, the Hueneme lighthouse located north of the project area. The historic lighthouse was removed and placed on a barge at Hueneme in 1938. It is reported as having been dismantled at a later date. Files also confirm that the historic Hueneme Pier (c. 1857-1938) was located within the nearshore portion of the survey area.

One outfall pipeline is located in the easternmost portion of the survey area, just west of the Ormond Beach Pier. No oil industry related facilities (wells/flowlines) occur in the Port Hueneme area. The eastern Port Hueneme jetty is located just west of the survey area. A disposal area is documented in the shallow intertidal zone just east of the eastern Port Hueneme jetty and just northwest of the survey area.

Shipwrecks reportedly lost in the project vicinity are presented in Table 1 (Attachment 1). Shipwrecks report as "wrecked" or "stranded" at Hueneme prior to 1938 most likely refer to the area offshore of the historic Hueneme Pier rather than offshore of Port Hueneme. Coordinates for these early wrecks are approximate but place them in the project vicinity. Shipwrecks include the Caesar Brun, a 2-masted schooner lost off Hueneme in 1889; California, lost off Hueneme in 1883; Caroline Foote, lost off Hueneme in 1871; Chris C., lost off Hueneme in 1937; James Higgins, lost off Hueneme in 1916; Kea, stranded at Hueneme in 1920; Portland, wrecked off Hueneme in 1906; Sitka, lost at Huememe in 1934; and the Yaquina, lost at Hueneme in 1897. Of these vessels, only the California is evaluated as significant, although it is reported to have been salvaged or removed. The remaining vessels are evaluated as moderately significant. Of these moderately significant vessels, only the Portland is reported as having been salvaged or removed.

A significant cluster of seafloor features and magnetic anomalies associated were found to be located within the survey area as well an area of pilings. The pilings are the remains of the historic Hueneme Pier (c. 1857-1938). Seafloor features and magnetic anomalies and zones of anomalies are interpreted as a debris field associated with the historic pier. These features and anomalies are listed in Table 2 (Attachment 2). Further work will be needed to document the identity and origin of this debris.

Resident Dick Cunningham (Ventura Maritime Museum), has indicated that the Navy's civil engineering lab was located onshore at this location and that "all manner of things" may have been dumped in the ocean during the war and post-war periods. As the shallow zone just northwest of the survey area is documented as a disposal area, this is very likely to have been the case. There is no documentation, however, presently available to confirm this observation in the Navy Base Command Historian's files. The Navy Command Historian indicates that they have no records of offshore facilities (cables, etc.) in the project area other than a radio directional facility which was once located onshore during World War II.

Given the association of the historic pier and the number of shipwrecks lost in the project vicinity which would have referred to the Hueneme Pier location rather than the later Port location in their logs, there is a high probability that the debris field documented in the survey represents (1) remains of the pier and the railway which traversed its 900 ft. length; and/or (2) remains of a historic vessel or vessels lost at anchor or having foundered near the pier and listed as lost at Hueneme.

Dredged materials redeposited or redistributed at this location may result in (1) adverse impacts to potentially significant historic archaeological site or sites, in that burial under dredged materials may remove materials from direct examination and study by archaeologists; and/or (2) adverse impacts to a potentially significant historic archaeological site or sites due to the scouring action of newly deposits sands which would abrade the surface of a degraded shipwreck or other historic remains. Once such a site has been documented, burial of the site could result in a short-term beneficial impact to the site in that burial under sediments could result in protection of the resource from further degradation as the result of predation by boring clams (shipworm), wind and wave action and chemical reaction (oxidation).

It is in the best interests of historic preservation, therefore, that prior to any disposal of dredged materials in the survey area, additional visual identification of the potentially significant debris field in the Port Hueneme area via diver or ROV survey should be required and that any historic locations identified be evaluated for eligibility for inclusion in the National Register of Historic Places.

(2) Dredged Materials Redistribution Area, Offshore near Ventura Harbor

Field survey, literature research and data reduction for the Ventura Harbor dredged materials redistribution area is complete.

UCLA literature research indicates that no prehistoric or historic sites are located within a one-half mile radius of the project area. Information on the cultural history of the area will be presented in the draft report.

The California Division of Oil and Gas has confirmed that two wells (Shell Oil Company 54-8036 1 "State PRC 3314" and EXXON 64-5500 27 H8R) are located just outside the Ventura survey area and flowlines to shore may be present. While directional drilling from onshore wells in the Ventura survey area (Chevron, State Lands Parcel 735) is documented, this drilling is expected to be located at too great a depth (1200 ft.) to be within active sensor range of the magnetometer. As is always the case in areas of previous oil exploration and development, some small debris may be accidentally lost in transit between shore and offshore facilities. This debris is identified as possible jetsam, that is, man-made materials which have been accidentally jettisoned from transitting vessels.

Vessels reported lost in the vicinity of the project area are presented in Table 3 (Attachment 3). Of the vessels reported lost off San Buenaventura, only one shipwreck, the Moonshiner is documented within or near the project area. This wreck, lost south of the Ventura Marina breakwater in 1977, is evaluated as insignificant. Two shipwrecks evaluated as moderately significant are also reported, the WL Hardison and G. Marconi. The WL Hardison, a steamship reportedly lost in 1889 "off Ventura" is assumed to be located somewhere in the vicinity of the San Buenaventura Pier to the west of the survey area. The G. Marconi lost in the "Santa Barbara

Channel off Ventura" in 1931 may be anywhere from Ventura northwest to Santa Barbara and is considered unlikely to be within the survey area.

Data reduction and interpretation resulted in a list of seafloor features and magnetic anomalies identified in the survey area which are presented in Table 4 (Attachment 4). No significant cultural features were identified as the result of the remote sensing archaeological survey. As no culturally significant sites or artifacts are located within or directly adjacent to the survey area, no impacts are expected to occur to documented cultural resources as the result of the redistribution of dredged materials in this area. No further archaeological research is recommended.

Yours truly,

Heather Macfarlane
Archaeologist

Enclosure(s)

cc: Richard Perry, LADCOE

Attachment 1

Table 1. Shipwrecks Reported in the Vicinity of Huemene/Channel Islands Dredged Materials Redistribution Area

Lloyds/ Merchant Vessel Registry No.	MMS No.	Salv-age	CR	L	Vessel Name	Year Built	Year Lost	Month/ Day	Rig/ Service	Tons	Latitude	Longitude	Location/Situation
	16		2	E	Aloah		1952				34 08'	119 13'	Off Pt. Hueneme
	594		2	E	Caesar Bruns		1889	11/16	Schr, 2-Mstd				Hueneme
	60	R/R	1	E	California		1883				34 09'	119 13'	Hueneme
	597		2	E	Caroline Foote		1871	5/30					Hueneme
226589	70		2	E	Chris C.	1927	1937	2/04	Ol.S.		34 08'	119 13'	Hueneme
222032					Congress	1919	1938	912	Ol.s.	42			Stranded at Huemene
234310					Dina Lee	1917	1974	613	Ol.s.	13			Foundered 5 miles SW of Oxnard
259837					Friendship	1907	1951	223	Ga.s.	14			Foundered on reef in Santa Barbara Channel
	158		2	E	James Higgins		1916				34 08'	119 15'	Hueneme
203789					Kea	1906	1920	102	Ga.s.	14			Stranded, Huemene
264653	174		3	E	Kopco Star	1952	1963	10/01	Ol.S.	60	34 02'	119 12'	Stranded, 8mi S of Pt. Hueneme
	177	E	3	A	La Jenelle [Arosa Star]	1931	1970	4/14	St.S.	7000	34 08'	119 10'	Wrecked at Pt. Hueneme, partial salvage; Wreckage dumped OCS P-0479
256332					Liberty	1948	1973	1111	Ol.s.	197			Foundered, SB Channel
237438	188		3	C	Linde	1928	1951	10/05	Ol.S.	73			1.5mi off Pt. Hueneme Bkwtr
	730		2	E	Liverpool		1902	2/23	British Ship				Wrecked at Channel Islands Hbr; enroute Antwerp for SF
253044					Molly	1919	1969	1212	Ol.s.	36			Foundered at Oxnard; 600 ft. S of S Jetty at the entrance to Channel Islands Harbor.
506643					Olympia	1913	1973	1024	Drg.	642			Burned in Channel Islands Hbr, Oxnard
226036	245		2	D	Pal	1926	1937	11/27	Ol.S.	71	34 10'	119 15'	Foundered 6mi N of Pt. Hueneme Lighthouse
20457	257	R/R	1/2	E	Portland	1873	1906	6/19	Brk./1dk	493.61	34 09'	119 14'	Wrecked of Hueneme; built Coos Bay Oregon; SF Homeport; Lloyds Sailing Vessels, 1899-1900, 414; T.Cook Mss., p.26
245967					Prowler	1944	1967	1016	Ol.s.	42	34 20'	120 20'	Foundered in the Santa Barbara Channel
171672	533			E	R.C. Co. No. 2	1934	1939	4/13	Scow	402	34 08'	119 12'	Stranded 3 miles S of Point Hueneme

Attachment 2

Table 1. Shipwrecks Report in the Vicinity of Huemene/Channel Islands Dredged Materiald Redistribution Area

Lloyds/ Merchant Vessel Registry No.	MMS No.	Salv-age	CR	L	Vessel Name	Year Built	Year Lost	Month/ Day	Rig/ Service	Tons	Latitude	Longitude	Location/Situation
212722					Scout	1914	1953	710		14			Stranded and washed ashore 2.5 miles S Port Hueneme Harbor, broke-up on beach
252321					Sea Bee	1947	1967	211	Ol.s.	14			Foundered about 200 yds bear 243 deg. true from West Jetty Light Channel Islands
237168					Sierra	1917	1966	716	Ol.s.	23			Foundered about 1/4 miles from Channel Islands Bkwtr, Oxnard
	312		2	E	Sitka		1934				34 08'	119 13'	Hueneme
	315		2	E	South Coast						34 07'	119 13'	Hueneme
	328		2	E	Stratus		1952				34 06'	119 13'	Off Pt. Hueneme
	399		1	E	Yaquina		1897				34 07'	119 14'	Hueneme

Attachment 2

Table 2. Seafloor Feature and Magnetic Anomalies in the Hueneme/Channel Islands Dredged Materials Redistribution Area Page 1 of 4

Feature No.	Line No.	Fix Point	Starboard/ Port (Meters)	Magnetic Anomaly	Duration (Meters)	Water Depth	Description	Cultural Resource Significance
CI-1	1	22.5-20	Center	100+	400		Pipeline	Insignificant
CI-14	21	7-5.5	CL	100+	300		Pipeline	Insignificant
CI-20	2	17.1		100+	300		Pipeline	Insignificant
CI-22	20	19.51	Center	100+	300		Pipeline	Insignificant
CI-26	3	19	Center	100+	400		Pipeline	Insignificant
CI-27	4	18.3	Center	100+	300		Pipeline	Insignificant
CI-30	5	19.5	Center	100+	300		Pipeline	Insignificant
CI-31	6	20	Center	100+	400		Pipeline	Insignificant
CI-36	6	19.5	Center	100+			Pipeline	Insignificant
CI-37	10	21	Center	100+	300		Pipeline	Insignificant
CI-40	7	20.5	Center	100+	400		Pipeline	Insignificant
CI-43	9	21	15 stbd	100+	400		Pipeline	Insignificant
CI-2	1	23.8-22	4.5 Pt				24 ft narrow linear feature 1.64 x 3.3 ft.; possible small debris associated with pipeline construction (jetsam)	Insignificant
CI-3 CI-7	1	12.12	17 Pt	100	400		Dense linear feature within depression 3 x 5 ft.; confirmed on line 16 CI-7 located 65 ft. prior to SOL; debris field	Significant
CI-4	1	10.05	30 Stbd.				<1.5 ft. square area of density; 100 ft. W of 100 gamma anomaly associated with CI-3/7; no correlation on adjacent lines	Insignificant
CI-5	1	9.15	20 Stbd.				3 x 1.5 ft. sinuous linear feature within depression; no correlation on adjacent lines	Insignificant
CI-6	1	9.9	15 Pt.				Linear area of density <1.5 ft. square in depression; no correlation on adjacent lines	Insignificant

Table 2. Seafloor Feature and Magnetic Anomalies in the Hueneme/Channel Islands Dredged Materials Redistribution Area

Feature No.	Line No.	Fix Point	Starboard/ Port (Meters)	Magnetic Anomaly	Duration (Meters)	Water Depth	Description	Cultural Resource Significance
CI-8 CI-9	16	6.0-6.3 6.5	20 Stbd. 15-40 stbd	30 27	100 500		Linear sinuous feature, dense 7 ft. feature with 3 to 4 ft. ht above seafloor; lying perpendicular to seafloor structure; debris field	Significant
CI-10	16	7	5 Pt.				Triangular feature with <3 ft. ht; debris field	Significant
CI-11	16	7.5	15 Stbd.	100+ Magnetic zone			Sinuous linear feature with 3 ft. ht. above seafloor; cables; debris field	Significant
CI-12	16	9	CL	Magnetic zone			< 3 ft. square feature with <1.5 ft. height above seafloor; debris field	Significant
CI-13	16	9.1	22 Pt.				Small linear feature within drpession <1.5 x 7 ft.; no correlation on adjacent lines	Insignificant
CI-15	21	3	25 Pt.				3 ft diameter feature in depression; no correlation on adjacent lines	Insignificant
CI-16	17		25 stbd.				Piling structures; also seen on lines 13, 13a	Significant
CI-17 CI-49	17 11	9.1 9.6	5 stbd. 15 stbd				10 ft. x <0.5 m. sinuous linear feature; dense sinuous feature 40 ft. in length with no visible seafloor height, interior shadow; debris field	Significant
CI-18	18	6.7	25 m. Pt.	Magnetic zone			Sinous linear feature in area of water column anomalies (kelp); debris field	Significant
CI-19 CI-39	18 10	6.9 13.8	23 Port 10 stbd	Magnetic zone			Complex feature, dense with interior shadow 7 ft. diameter; small dense feature 3 ft diameter with 3 to 7 ft. seafloor height; debris field	Significant
CI-21 CI-25 CI-24	2 3 2	5.9 6.1 5.8	10 pt 10 pt 10 pt	5/45 4 5/45	200 200 200		13x10 ft. dense rectangular feature with interior shadow; dense and varies from 3 to 7 ft. thickness; Strangely shaped feature may represent kelp? WC's consistent with kelp anomalies; debris field	Significant
CI-23	EOL		15 pt				Feature similar to piling anomaly but too far offshore; unknown, possible association with debris field	Significant
CI-25	3	6.1	10 pt				3 ft. diameter feature in depression; no correlation on adjacent lines	Insignificant

Table 2. Seafloor Feature and Magnetic Anomalies in the Hueneme/Channel Islands Dredged Materials Redistribution Area

Feature No.	Line No.	Fix Point	Starboard/ Port (Meters)	Magnetic Anomaly	Duration (Meters)	Water Depth	Description	Cultural Resource Significance
CI-28	4	5.1 5.1	30 stbd 5 pt	4	100		20 ft. long dense sinuous feature with possible 3 to 6 ft. height above sefloor associated with a circular area of seafloor density with interior shadows; debris field	Significant
CI-29	4	25.1	10 pt	4	200		3 ft. diameter feature within depression; no visible height above seafloor; debris field	Significant
CI-32	6	12.5	Center				Area of seafloor density change with 3 ft. height above seafloor; debris field	Significant
CI-33 CI-34	6	11.5 11.0	20 pt Center	 9	 100		Sinuous linear feature in depression, 20 x 3 ft. with 3 ft. above seafloor height and rectangular feature, 20 x 7 x 6 ft.; debris field	Significant
CI-35	6	4.5	5 pt	150	500		Dense cluster of features all of which are less than 1.5 ft. in diameter with no visible seafloor height; debris field	Significant
CI-38	10	12.3	5 pt	Magnetic zone			Small feature 10 ft. in diameter with 3 ft. height above seafloor; debris field	Significant
CI-41	7	10.2	6 stbd	9	200		<1.5 diameter feature with 3 ft. above seafloor height; debris field	Significant
CI-42	7	7	15 stbd	55	200		Long dense sinuous feature with 3 ft. seafloor height; debris field	Significant
CI-44	9	8.1	6 stbd				Two <1.5 diameter features with 3 ft. above seafloor height; debris field	Significant
CI-45	15	7.3	5 pt				Squared crescent shaped feature 20 x 7 ft. with 7 ft. above seafloor expression; debris field	Significant
CI-46	12	8.5	Center	Magnetic zone			50 ft. long sinuous linear feature; debris field	Significant
CI-47	12	12.5	5 stbd				Small debris feature displaying seafloor height and perpendicular area of shadow indicative of height above seafloor; debris field	Significant

Table 2. Seafloor Feature and Magnetic Anomalies in the Hueneme/Channel Islands Dredged Materials Redistribution Area

Feature No.	Line No.	Fix Point	Starboard/ Port (Meters)	Magnetic Anomaly	Duration (Meters)	Water Depth	Description	Cultural Resource Significance
CI-48	12	12.9	5 stbd				Small features less than 3 ft. diameter; no correlation on adjacent lines	Insignificant
CI-50 (see CI-48)	11	13.7	15 stbd	Magnetic zone			Dense linear feature 12 x 7 ft. with possible 7 ft. above seafloor height; debris field	Significant

Attachment 3

Table 3. Shipwrecks in the Vicinity of the Ventura Dredged Materials Redistribution Area

Registration Lloyds/ Merchant Vesssel	MMS No.	Salv-age	C R	L	Vessel	Year Built	Year Lost	Month / Day	Rig/ Services	Tons	Latitude	Longitude	Loss Depth	Loss Location/Situation
	583		1	E	Advance		1870	1113	Brig	210				Ventura
231652					Arrow	1932	1954	307	Ol.s.	14				Stranded 1/2 mile W of Ventura river, Ventura
126223	78	R/R	2	B	Coos Bay	1884	1914	1219	Am St.S. (Wood)	544	34 14	119 16		Stranded, driven into and grounded under wharf at Ventura Pier (12/16 and 12/19)
	603		1	E	Crimea		1876	329	Brig					Ashore at Buenaventura
232218					Flying A	1932	1957	312	Ol.s.	18	34 15	119 17		Collided with Flying "A" off Ventura
232622					Garey	1917	1969	225	Ol.s.	12				Foundered at Ventura Marina, Santa Clara River
	625		2	E	Gualala		1888	208	Schr					Ashore at San Buenaventura
228446	125	None	4	E	G. Marconi	1928	1931	9/23	Ol.S.	106	34 20'	120 40'		Burned in SB Channel off Ventura
	633		2	E	Kalorama		1876	225	St.S./Schr					Lost at San Buenaventura wharf
	640		1	E	Lucy Ann		1875	1201	Brig					Stranded 1/4mi below San Buenaventura wharf
253652					Marie	1943	1960	609	Ol.s.	13	34 12	119 35		Foundered
518433					Moonshiner	1969	1977	116	Ol.s.	17				Foundered south of Ventura Marina Bkwtr
	314		2	E	Sonoma	1914	1949	521	Ol.S.	196	34 09	119 18		Off Ventura
	724		2	E	Tritonia		1929	301	Br. Stmr					Exploded, Buenaventura, total loss
					Unknown				Wreckage		34 06	119 05		
	505		4	A	Unknown						34 14	119 16		
	503		4	A	Unknown						34 14	119 16		
	506		4	A	Unknown						34 14	119 16		
					Unknown				Wreckage		34 14	122 16		
	504		4	A	Unknown						34 14	119 16		Ventura Hbr entrance
	677		2	E	W.L. Hardison		1889	625	Stm shp					Off Ventura

Attachment 4

Table 4. Seafloor Feature and Magnetic Anomalies in the Ventura Dredged Materials Redistribution Area

Feature No.	Line No.	Fix Point	Starboard/ Port (Meters)	Magnetic Anomaly	Duration (Meters)	Water Depth	Description	Cultural Resource Significance
V-1	14	15.0	Center				Depressions on seafloor similar in configuration to impressions left by a jack-up drilling rig	Insignificant
V-2	4	22.5 22.9	23 stbd 3 prt				Small 3 ft. diameter feature in depression with association 10 x < 1.0 ft. linear feature; second associated linear feature 16 x <1.0 ft.; interpreted as anchor and chain.	Insignificant
V-3	4 5	9.6 8.9	15 stbd	 67	 66		3 ft. diameter dense feature within depression and expressing >1.5 ft. height above seafloor; interpreted as ferromagnetic debris (jetsam) or anchor	Insignificant
V-4	2	12.5	15 pt				Feint 20 x 7 ft. area of seafloor density change lacking visible height above the seafloor; not visible on adjacent lines	Insignificant
V-5	2	10.5	40 stbd				Three feint rectangular areas of seafloor density change 10 to 15 ft. in length and 7 ft. wide lacking visible height above the seafloor; not visible on adjacent lines	Insignificant
V-6 V-7	3	20.1 21.1	45 stbd 15 stbd				Two dense linear features 20 x <1.5, one of which has <1.5 ft. height above seafloor in area of visible sand ripples; not visible on adjacent lines	Insignificant
V-8	5	4.8	25 pt				Dense complex feature 7 x 1 x 1.5 ft. within depression; possible small debris (jetsam)	Insignificant
V-9	6 7	1.5 2.0	10 stbd	 65	 66		Small 1 m. square feature; possible anchor or small debris	Insignificant
V-10	15	9.8	25 pt				24 ft. parallel linear features in area of sand ripples; no corresponding feature on adjacent lines	Insignificant

Table 4. Seafloor Feature and Magnetic Anomalies in the Ventura Dredged Materials Redistribution Area

Feature No.	Line No.	Fix Point	Starboard/ Port (Meters)	Magnetic Anomaly	Duration (Meters)	Water Depth	Description	Cultural Resource Significance
V-11	12 13 13	12.95 13.0 12.0 11.5	10 stbd	 15/45 5	 33 33		Dense linear feature 33 ft. x < 3 x 10 ft. Lost tracking on water column anomaly (fish)	Insignificant
V-12	5 6	7.6 7.5	20 stbd	 10	 33		Dense linear feature in area of sand ripples 10 x <1.5 ft. with no visible height above seafloor; feature visible on adjacent lines. Small ferromagnetic debris (jetsam) or flotsam (remains of a recent vessel)	Insignificant
	6	5.4	20 pt				Small complex feature, 7 x 4 x 3 ft. Interpreted as possible small non-ferromagnetic debris.	Insignificant
V-13	8 6	1.5 1.5	Center	 20	 66		Small linear feature within depression 17 x <1.5 ft. within area of sand ripples. Interpreted as small ferromagnetic debris (jetsam) or flotsam (remains of recent vessel).	Insignificant
V-14 V-15	10 9 8	4.5 4.1 4.1	25 stbd 25 stbd Center				Dense 10 x 1.5 ft. feature; 3 ft. diameter feature with 1.5 ft seafloor height in area of sand ripples and water column anomalies. Interpreted as possible non-ferromagnetic debris (jetsam) or flotsam (remains of a recent vessel).	Insignificant
V-16 V-17	8	10.8 10.9 8.5	25 stbd 5 pt	 15	 30		Dense 15 x <1.5 ft. linear feature expression no visible height above seafloor and small 15 ft. diameter feature within derpession. Interpreted as small ferro-magnetic debris (jetsam) or flotsam (remains of a small recent vessel)	Insignificant
V-18	9	5.7	15 stbd				Small dense 3 ft. diameter feature in area of sand ripples	Insignificant
	8	18		40	33		No visible feature on seafloor	Unknown
	12	22.5		10/75	66		No visible feature on seafloor	Unknown
	13	6.5		70	66		Lost tracking at 6.3; no visible seafloor features	Unknown
	14	1		5/20	33		No visible seafloor features; Unknown, possible buried ferromagnetic debris	Unknown

Table 4. Seafloor Feature and Magnetic Anomalies in the Ventura Dredged Materials Redistribution Area

Feature No.	Line No.	Fix Point	Starboard/ Port (Meters)	Magnetic Anomaly	Duration (Meters)	Water Depth	Description	Cultural Resource Significance
	14	6		15	33		No visible seafloor features; Unknown, possible buried ferromagnetic debris	Unknown
	15	3.0		5	33		No visible seafloor features; unknown, possible buried ferromagnetic debris	Unknown

CALIFORNIA — THE RESOURCES AGE...Y

PETE WILSON, *Governor*

.-ICE OF HISTORIC PRESERVATION
.EPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO 94296-0001
(916) 653-6624
FAX: (916) 653-9824

5 October 1994

Reply to: COE940926F

Col. R.L. Van Antwerp, District Engineer
US Army Corps of Engineers
ATTN: Carl Enson
Post Office Box 2711
LOS ANGELES CA 90053-2325

Subject: 13TH BIANNUAL HARBOR DREDGING, CHANNEL ISLANDS AND PORT HUENEME

Dear Col. Van Antwerp:

Thank you for requesting my review of the undertaking noted above and for including the documentation which justifies your determination.

I do not object to your determination that this undertaking will not affect historic properties. Accordingly, you have fulfilled federal agency responsibilities pursuant to 36 CFR 800, regulations implementing Section 106 of the National Historic Preservation Act. Please note that your agency may have additional responsibilities under 36 CFR 800 under any of the following circumstances;

1. If any person requests that the Advisory Council on Historic Preservation review your findings in accordance with 36 CFR 800.6(e);
2. If this undertaking changes in ways that could affect historic properties [36 CFR 800.5(c)];
3. If previously undocumented properties are discovered during the implementation of this undertaking or if a known historic property will be affected in an unanticipated manner [36 CFR 800.11];
4. If a property that was to be avoided has been inadvertently or otherwise affected [36 CFR 800.4(c);800.5];
5. If any condition of the undertaking, such as a delay in implementation or implementation in phases over time, may justify reconsideration of the current National Register status of properties within the undertaking's Area of

Thank you for considering historic properties during project planning. If you have any questions, please call staff archaeologist Nicholas Del Cioppo at (916) 653-9696.

Sincerely,

Ms. Cherilyn Widell
State Historic Preservation Officer

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

February 22, 1999

Office of the Chief
Environmental Resources Branch

Mr. Daniel Abeyta
Acting State Historic Preservation Officer
Office of Historic Preservation
P.O. Box 942896
Sacramento, California 94296-0001

Dear Mr. Abeyta:

The Los Angeles District Corps of Engineers (COE), is preparing an Environmental Assessment (EA) for the proposed Port of Hueneme Harbor (PoHH) deepening project in Port Hueneme, Ventura County (Enclosure 1). The PoHH is the only deep water port between Los Angeles and San Francisco. The purpose of the undertaking is to deepen the harbor to an optimal depth from –14.5 m and 1-11.5 m MLLW. The preferred depth will probably be between –12 m and –12.5 m MLLW. The newly deepened PoHH berthing areas will be used to provide anchorage for deeper draft vessels than currently allowed. The dredged material will be disposed of on Hueneme Beach for beach nourishment. Port Hueneme Harbor has been routinely dredged every fours years since 1975. An EA approved in 1994 changed the dredging schedule to a two-year cycle over a six-year period. Additional project elements include removal of the existing fender system, reinforcement of the sheet pile toe wall, and installation of a new timber fender system. The area of potential effects (APE) for this project is the approach and entrance channels, the Turn Basin and Channel A within the harbor, and Hueneme Beach (Enclosure 2).

All undertakings have been coordinated for compliance with Section 106 through your office. Consultation occurred most recently in 1994 (COE 940926F) with Mr. Nicholas Del Cioppo of your staff (Enclosure 3, attachments 1 and 2). Compliance was completed for an EA to authorize a six-year dredging program. Use of Hueneme Beach as a disposal site was part of the six-year project. In all earlier cases you concurred that there were either no historic properties, or effects occurring in the APE.

The PoHH is man-made. Accordingly, expectations for archeological resources and shipwrecks to be located within the APE are non-existent. In a telephone conversation on April 29, 1997 Mr. Robert Harmith, PoHH, Director of Marine Operations, told us that there is no written policy towards shipwrecks. He also said that they strive to prevent ships from sinking and if one does, it is removed immediately. No cultural resources have been involved in any of the dredging operations.

The APE is also the site of a former wharf which extended the length of the present Wharf 1 along the southern side of Channel A (Enclosure 2, in diagonal lines). The wooden wharf was built around 1938 and was removed in the early 1970s because of its loss of integrity. The pilings were cut off .5 m above the mud line and current estimates suggest that approximately 350 piles remain. The piles will be removed for safety purposes before the deepening process begins. Disposal of the piles will be in an approved location. The sediment disposal area lies nearshore off Hueneme Beach between the old Port Hueneme Lighthouse adjacent to the jetty, and the northwest boundary of Ormand Beach in Oxnard (enclosure 2). The proposed nearshore disposal area is located between the -10ft and -30ft MLLW depths. Sediment will be deposited nearshore to enable wave action to distribute it on the beach, thereby renourishing Hueneme Beach.

Before requesting your concurrence with our determination of eligibility, we have carefully reviewed all existing documentation: (1) clearance of similar projects in the same location on three recent occasions; (2) the dredging aspect is occurring in areas that have been routinely dredged on a regular, scheduled basis; (3) sediment disposal will be in an approved beach location; and (4) there are no historic properties or shipwrecks in the APE. After considering all of the information available, the COE has determined that the PoHH deepening project as planned will not involve National Register listed or eligible properties.

Correspondence may be sent to:

Mr. Robert E. Koplin, P.E.
Chief, Planning Division
Attn: Mr. Richard Perry (CESPL-PD-RN)
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

We request that you review the enclosed information. If you agree with this determination, we would appreciate your concurrence. We understand that you have 30 days in which to respond to this request, otherwise we will proceed according to the provisions stated in 36 CFR 800.4(d) and consider that we have discharged our obligations under Section 106. If you have any questions concerning this project or the determination, please contact project archeologist, Mr. Richard Perry, at (213) 452-3855.

Sincerely,

Robert E. Koplin, P.E.
Chief, Planning Division

Enclosures

CONCUR: 3/23/99
Daniel Abeyta, Acting
State Historic Preservation Officer

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

February 9, 2000

Office of the Chief
Environmental Resources Branch

Mr. Daniel Abeyta
Acting State Historic Preservation Officer
Office of Historic Preservation
P.O. Box 942896
Sacramento, California 94296-0001

Dear Mr. Abeyta:

The Los Angeles District Corps of Engineers (COE), is preparing an Environmental Assessment (EA) for the proposed east and west jettie repair project (EWJR) at the entrance to the Port of Hueneme Harbor (PoHH) Port Hueneme, Ventura County (Enclosure 1). The project's purpose is to restore the severely damaged 61 year-old jetties to their original configuration. We have routinely conducted Section 106 compliance for biannual dredging EA's and last year's harbor deepening environmental impact statement. The area of potential effects (APE) for the proposed project is the two jetties and an area directly adjacent to the harbor side of the east jetty that may be excavated to allow construction access by sea (Enclosure 2). Approximately 5,000 m^3 of excavated material would be moved aside within the entrance channel.

All undertakings have been coordinated for compliance with Section 106 through your office. Consultation occurred most recently in March 1999 with our letter returned to us with your signature (Enclosure 3). Earlier compliance for dredging was coordinated with Mr. Nicholas Del Cioppo, formerly of your staff (COE 940926). Compliance was completed for an EA to authorize a six-year dredging program. In all earlier cases you concurred that there were either no historic properties, or effects occurring in the APE. This project was recently brought up during a telephone conversation over a similar project with Mr. Steve Grantham of your staff.

The two jetties, known as rock mound jetties, were built in 1939 using standard quarrystone, rubblemound construction techniques. They were designed in a typical trapezoidal configuration. Three types and sizes of stone were used in the construction: (1) inner core of graded quarry-run material; (2) an intermediate shell of a graded mix of quarry run, chips, spalls, and single pieces; and (3) a 2.44 meter-thick outer armor layer. Sixty years of storm surf and hydraulic pressure have caused serious damage to the jetties. A description of the project and jetty damage is enclosed (Enclosure 4). Overall, the cumulative years of damage have severely compromised the integrity of the jetties.

The PoHH is man-made. Accordingly, expectations for archeological resources and shipwrecks to be located within the APE are non-existent. In a telephone conversation on April 29, 1997, Mr. Robert Harmith, PoHH, Director of Marine Operations, told us that there is no written policy towards shipwrecks. He also said that they strive to prevent ships from sinking and if one does, it is removed immediately. No cultural resources have been involved in any of the dredging operations.

Before requesting your concurrence with our determination of eligibility, we have carefully reviewed all existing documentation: (1) the jetties were built using standard construction and design; (2) now have greatly diminished structural integrity; (3) sediment excavation and disposal will be in an approved location in the entrance channel; and (4) there are no historic properties or shipwrecks in the APE. After considering all of the information available, the COE has determined that the east and west jetties are not eligible for inclusion in the National Register of Historic Places. Therefore, we have also determined that the proposed EWJR project as planned will not have an adverse effect on National Register listed or eligible properties.

Correspondence may be sent to:

Mr. Robert E. Koplin, P.E.
Chief, Planning Division
Attn: Mr. Richard Perry (CESPL-PD-RN)
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

We request that you review the enclosed information. If you concur with our determination of the APE pursuant to 36 CFR 800.4(a)(1), determination of non-eligibility pursuant to 36 CFR 800.4(2)(c), and our determination that no historic properties will be affected pursuant to 36 CFR 800.(d)(1), we would appreciate your concurrence. If you have any questions concerning this project or the determinations, please contact the project archeologist, Mr. Richard Perry, at (213) 452-3855, or by Email at rperry@spl.usace.army.mil.

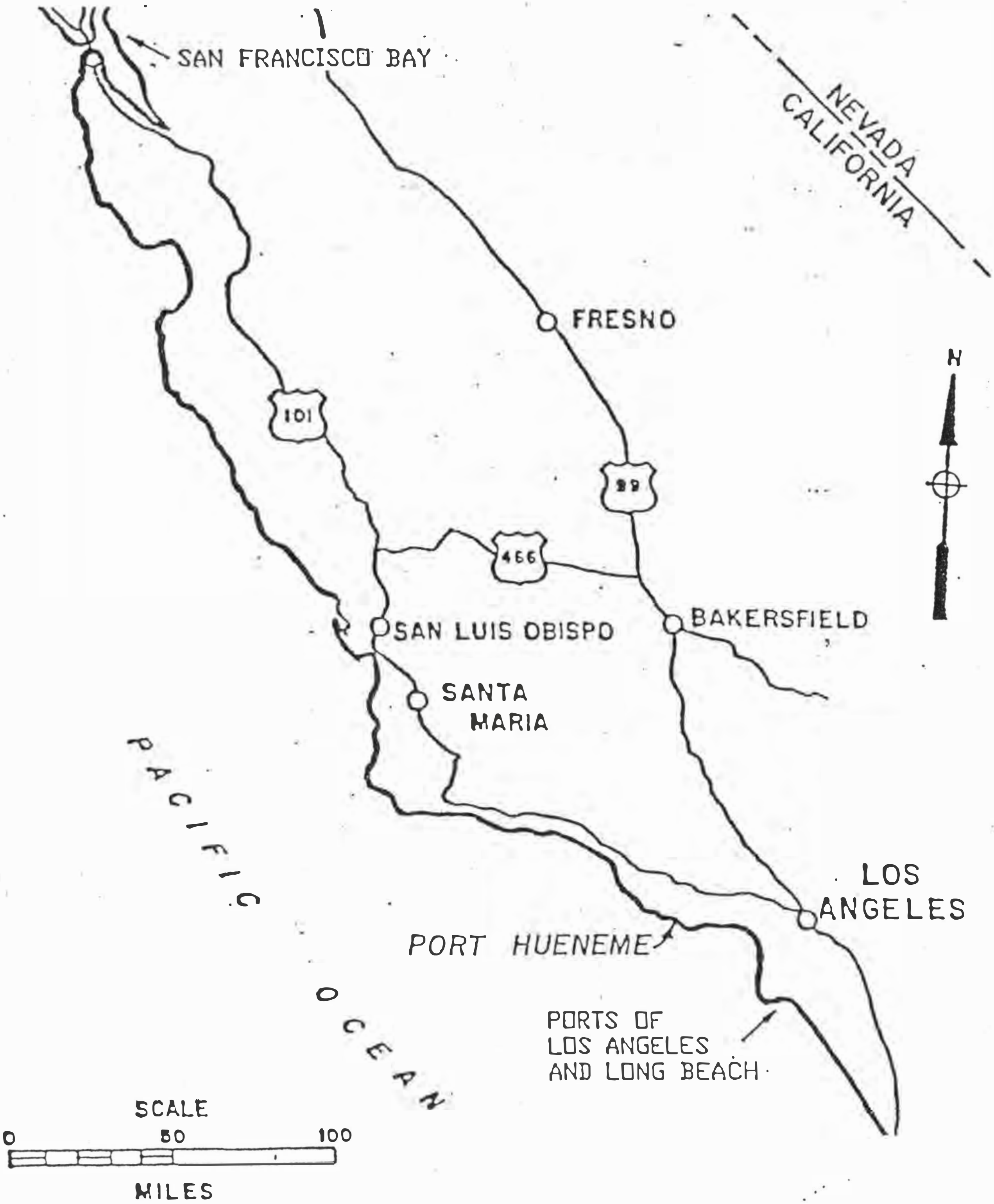
Sincerely,

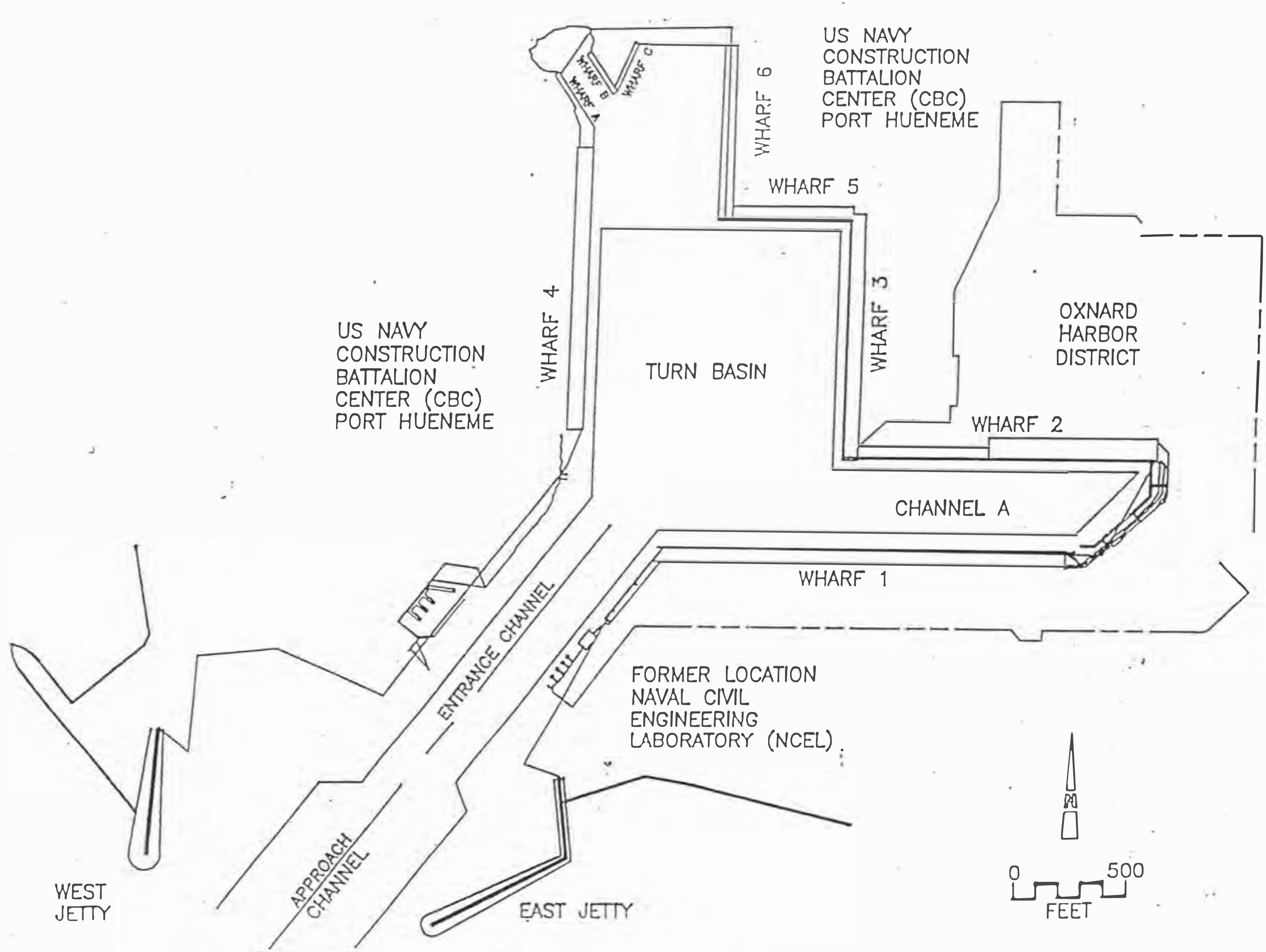
for Robert E. Koplin, P.E.
Chief, Planning Division

Enclosures

ENCLOSURE 1

Vicinity Map





Existing Harbor Plan

ENCLOSURE 2

ENCLOSURE 3

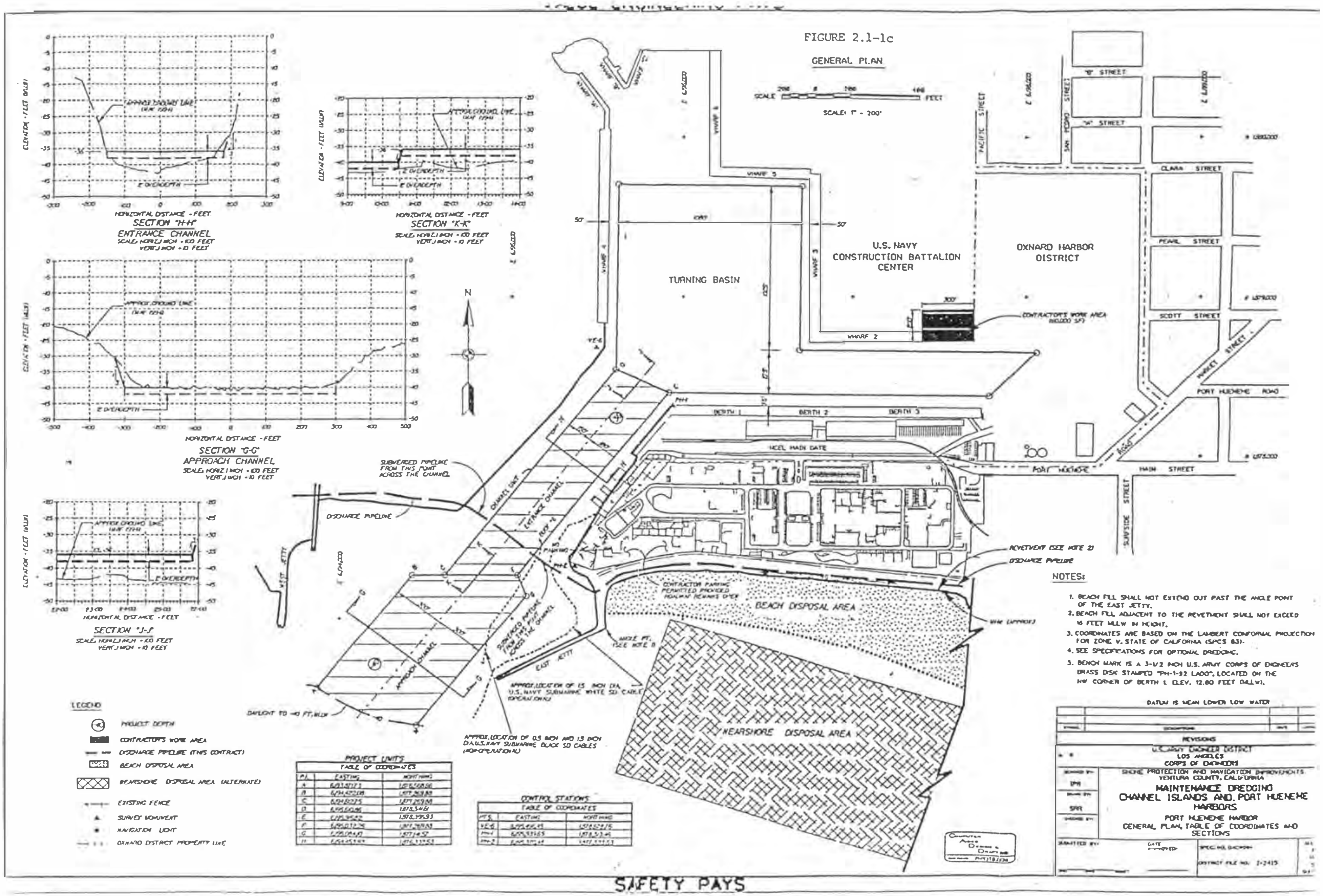
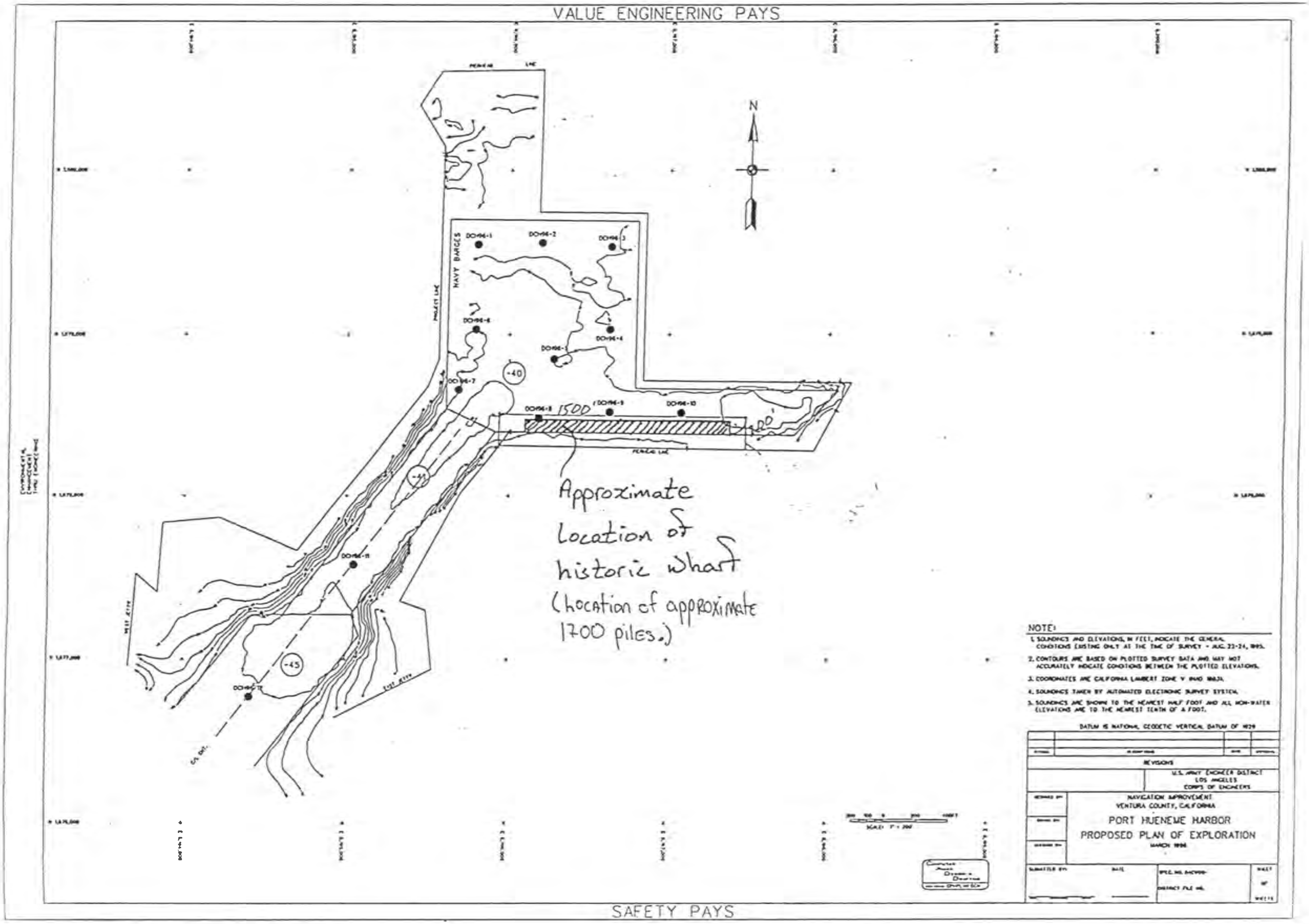


FIGURE 2.1-1c
GENERAL PLAN
SCALE: 1" = 200'
SECTION "H-H"
ENTRANCE CHANNEL
SECTION "K-K"
SECTION "G-G"
APPROACH CHANNEL
SECTION "J-J"
TURNING BASIN
U.S. NAVY CONSTRUCTION BATTALION CENTER
OXNARD HARBOR DISTRICT
WHARF 2
WHARF 3
WHARF 4
WHARF 5
BERTH 1
BERTH 2
BERTH 3
CLARA STREET
PEARL STREET
SCOTT STREET
MAIN STREET
PORT HUENEME ROAD
PACIFIC STREET
SAN PEDRO STREET
SURFSIDE STREET
EAST JETTY
WEST JETTY
BEACH DISPOSAL AREA
NEARSHORE DISPOSAL AREA
DISCHARGE PIPELINE
CONTRACTOR'S WORK AREA
LEGEND
PROJECT DEPTH
CONTRACTOR'S WORK AREA
BEACH DISPOSAL AREA
EXISTING FENCE
SURVEY MONUMENT
NAVIGATION LIGHT
PROJECT LIMITS
CONTROL STATIONS
NOTES:
1. BEACH FILL SHALL NOT EXTEND OUT PAST THE ANGLE POINT OF THE EAST JETTY.
2. BEACH FILL ADJACENT TO THE REVETMENT SHALL NOT EXCEED 16 FEET MLLW IN HEIGHT.
3. COORDINATES ARE BASED ON THE LAMBERT CONFORMAL PROJECTION FOR ZONE V, STATE OF CALIFORNIA (SPCS 83).
4. SEE SPECIFICATIONS FOR OPTIONAL DREDGING.
DATUM IS MEAN LOWER LOW WATER
REVISIONS
U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS
MAINTENANCE DREDGING
CHANNEL ISLANDS AND PORT HUENEME HARBORS
PORT HUENEME HARBOR
GENERAL PLAN, TABLE OF COORDINATES AND SECTIONS
SAFETY PAYS

ENCLOSURE 4



VALUE ENGINEERING PAYS
N
NAVY BARGES
PROJECT LINE
DCH96-1
DCH96-2
DCH96-3
DCH96-4
DCH96-6
DCH96-7
DCH96-8
DCH96-9
DCH96-10
DCH96-11
-40
-45
1500
Approximate location of historic wharf
(Location of approximate 1700 piles.)
NOTE:
1. SOUNDINGS AND ELEVATIONS, IN FEET, INDICATE THE GENERAL CONDITIONS EXISTING ONLY AT THE TIME OF SURVEY
2. CONTOURS ARE BASED ON PLOTTED SURVEY DATA AND MAY NOT ACCURATELY INDICATE CONDITIONS BETWEEN THE PLOTTED ELEVATIONS.
3. COORDINATES ARE CALIFORNIA LAMBERT ZONE V
4. SOUNDINGS TAKEN BY AUTOMATED ELECTRONIC SURVEY SYSTEM.
5. SOUNDINGS ARE SHOWN TO THE NEAREST HALF FOOT AND ALL NON-WATER ELEVATIONS ARE TO THE NEAREST TENTH OF A FOOT.
DATUM IS NATIONAL GEODETIC VERTICAL DATUM
REVISIONS
U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS
NAVIGATION IMPROVEMENT
VENTURA COUNTY, CALIFORNIA
PORT HUENEME HARBOR
PROPOSED PLAN OF EXPLORATION
SUBMITTED BY:
DATE
DISTRICT FILE NO.
SAFETY PAYS

STATE OF CALIFORNIA – THE RESOURCES AGENCY GRAY DAVIS, *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
BOX 942896
AMENTO, CA 94296-0001
653-6624 Fax: (916) 653-9824
calshpo@mail2.quiknet.com

March 28, 2000

REPLY TO: COE940926F

Mr. Robert E. Koplin, P.E.
Chief Planning Division
Attn: Mr. Richard Perry (CESPL-PD-RN)
U.S. Army Corps of Engineers
P.O. Box 532711
LOS ANGELES CA 90355-2325

Re: East and West Jetty Repair Project and Harbor Deepening Project, Port of Hueneme Harbor, Port Hueneme, Ventura County.

Dear Mr. Koplin:

Thank you for submitting to our office your letters dated February 9, 2000 and February 22, 2000 and supporting documentation regarding a proposed project involving the repair of the east and west jetties at the entrance to the Port of Hueneme Harbor (PoHH) and the deepening of the harbor to provide anchorage for deeper draft vehicles. PoHH is located in the City of Port Hueneme, Ventura County. The proposed jetty repair project is designed to restore the 61-year old structures to their original configuration. Details of the proposed jetty repair project are contained in Enclosure 4 of the supporting documentation.

The Army Corps of Engineers (Corps) is seeking our comments on its determination of the eligibility of the east and west jetties at the entrance to the PoHH for inclusion on the National Register of Historic Places (NRHP) in accordance with 36 CFR 800, regulations effective June 17, 1999 implementing Section 106 of the National Historic Preservation Act. The Corps is also seeking our comments on its determination of the effects the proposed project will have on historic properties in accordance with 36 CFR 800. Our review of the submitted documentation leads to concur with the Corp's determination that the east and west jetties are not eligible for inclusion on the NRHP under any of the criteria established by 36 CFR 800. The jetties have no strong associations with significant historical events or persons, and are not examples of outstanding engineering design or function. We also concur with the Corp's determination that the aforementioned jetty repair and harbor deepening projects, as described, will have no effect on historic properties.

Thank you again for seeking our comments on your project. If you have any questions, please contact staff historian Clarence Caesar at (916) 653-8902.

Sincerely,

Daniel Abeyta, Acting
State Historic Preservation Officer

Previous Consultation Conducted By

The Department of the Navy

DEPARTMENT OF THE NAVY
NAVAL BASE VENTURA COUNTY
311 MAIN ROAD, SUITE 1
POINT MUGU, CA 93042-5033

IN REPLY REFER TO:
5090
Ser N45VCS/0102
April 3, 2008

Milford Wayne Donaldson
State Historic Preservation Officer
Department of Parks and Recreation
1416 Ninth Street, Rm. 1442
Sacramento, CA 94296-0001

Dear Mr. Donaldson:

The Navy plans to conduct maintenance dredging, beach replenishment, and a Confined Aquatic Disposal (CAD) project, in partnership with the Oxnard Harbor District, at the Army Corps of Engineers maintained Turning Basin adjacent to Naval Base Ventura County. This letter initiates Section 106 consultation in accordance with 36 CFR 800.3(a), regulations implementing the National Historic Preservation Act of 1966, as amended.

Included in this letter are definition of the Area of Potential Effects (APE) and information to support the Navy's determination that the undertaking will not adversely affect historic properties. The remainder of this letter is organized to present an overview of the undertaking and associated APE and discussion of the proposed project's potential to affect historic architectural and archaeological properties.

Sediment investigations have identified three areas of contaminated sediment at Port Hueneme. Contaminants include polychlorinated biphenyl (PCB's) and pesticides, mostly dichlorodiphenyltrichloroethane (DDT). The dredging project would remove three to 12 feet of sediment in the harbor, depending on location, and create a depression, called a CAD facility, in the Port Hueneme Turning Basin. The depression would be of sufficient size and depth to accommodate the total volume of contaminated harbor sediment. Clean sand that is excavated from the cell would be pumped onto Hueneme Beach, located immediately south of the entrance channel. Contaminated harbor sediments would be dredged using mechanical equipment and placed within the cell by using a bottom dump barge. These contaminated sediments would then be covered with clean sediments dredged from the remainder of the channel.

Maps in enclosure (1) include a general vicinity map and APE map. The APE is the area to be dredged within the harbor and the Port Hueneme beach area to receive clean dredged material.

Previously completed professional cultural resources investigations provide a basis for identifying historic properties potentially affected by the proposed undertaking. Port Hueneme has been the subject of several cultural resources studies. William Self Associates inventoried properties at Port Hueneme in 1995 (U.S. Navy 1995). The report, entitled

Cultural Resources Overview, Naval Construction Battalion Center, Port Hueneme, Ventura County, California (overview), applied archival research and fieldwork to identify areas of archaeological sensitivity and pre-1946 buildings and structures meeting the criteria for eligibility for listing in the National Register of Historic Places. A copy of the overview was provided to the Office of Historic Preservation in 2004. The findings of the study were incorporated into the 1998 Historic and Archaeological Resources Protection Plan for the Naval Construction Battalion Center, Port Hueneme, Ventura County, California (U.S. Navy 1998). Enclosure (2) provides a listing of previously completed archaeological investigations at Port Hueneme.

There are no buildings or structures within the APE. The proposed undertaking has no potential to affect historic architectural properties.

The potential for ground-disturbing aspects of the proposed dredging project to affect archaeological resources is precluded by the development history of Port Hueneme. More than half of the area of Port Hueneme represents reclaimed coastal wetlands subject to extensive modification beginning in the early 1900s from agriculture and the 1940s and 1950s during the primary periods of development as a military facility. These activities deeply buried or significantly modified all original terrains.

At the time of its establishment in 1943, the seaward half of Port Hueneme was either active salt marsh or former tidal wetlands recently reclaimed for agriculture. The inland portion of the base encompassed low-lying, farmed floodplain. The establishment of Port Hueneme as the principal west coast base for Navy Seabee World War II operations fully developed all portions of the base, filling the former wetlands with the spoils from dredging the new harbor and significantly altering most of the inland portion of the base. Over time, only one archaeological site, CA-Ven-663, has been documented within the boundary of Port Hueneme as shown in enclosure (3). However, this shell midden site was last reported in 1933 and was probably destroyed during development of the Port Hueneme Harbor in the late 1930s and early 1940s. Another midden site (CA-Ven-662), lies approximately 0.6 mile (0.97 km) east-southeast of the harbor (U.S. Navy 1995) and north of the beach disposal area. CA-Ven-663 and CA-Ven-662 are not within the APE for the harbor or the beach disposal area. The proposed undertaking has no potential to affect prehistoric archaeological properties.

There are a number of shipwrecks along the Hueneme Harbor and its approach channel, as shown in enclosure (4). The majority of these shipwrecks are in Hueneme Canyon. These ships include schooners, steamships, gas-powered shims, brigs, scows, barges, fishing boats, and oil-powered ships (Northern Maritime Research 2002). Shipwreck locations are influenced by tides and storms and can shift up to one mile (1.6 km) in any direction. Four additional shipwrecks are not shown in Figure 2 due to their approximate location being unknown: Kea, Kipco Star, RC Co#2, and Scout. Records show that these ships went down in this area; however, concrete data does not exist on their final underwater destination (Northern Maritime Research 2002).

Of the shipwrecks shown as located in the Hueneme Harbor all but two predate the construction of the harbor. The Aloha wreck is dated 1952 and the South Coast is undated. The harbor has been dredged seven times from 1971 to 2005 and deepened from 32 to 35 feet in 1975 (Bechtel Environmental Inc., September 2001). A side-scan-sonar and magnetometer survey of the harbor was performed in October 2000. Identified in the survey are piles, a pipeline, and widely dispersed small unidentified targets. No shipwrecks or potential shipwrecks were identified in the survey (Anchor Environmental, November 2007). The proposed undertaking has no potential to affect historic archaeological properties.

Consistent with the above considerations, and in accordance with 36 CFR 800.4(d)(1), the Navy has determined that a no adverse effect finding is appropriate for the proposed maintenance dredging, beach replenishment, and confined aquatic disposal project. Commander, Navy Region Southwest, Cultural Resources Office has reviewed the proposed project and concurs with the no adverse effect finding.

The Navy respectfully requests your comment on this proposed determination finding.

Should you have any questions, please contact Allen Adams at (805) 989-9247.

Sincerely,

C. B. CONNERS
Captain, U.S. Navy
Commanding Officer

Enclosures:
1. General Vicinity Map and APE Map
2. Listing of Previously Completed Archaeological Investigations at Port Hueneme
3. Cultural Resources Overview, Naval Construction Battalion Center, Port Hueneme, Ventura County, California, Figure 3
4. List: Shipwrecks in the Vicinity of the Project Area and Locations: Shipwrecks within Alternative Project Areas

5090
Ser N45VCS/0102
April 3, 2008

Copy to: Commander, Navy Region Southwest, Environmental Department
Cultural Resources Management Program
San Diego, CA 92147

Friends of the Bard Mansion
P.O. Box 113, Port Hueneme, CA 93003

Port Hueneme Historical Society
220 Market Street, Port Hueneme, CA 93041

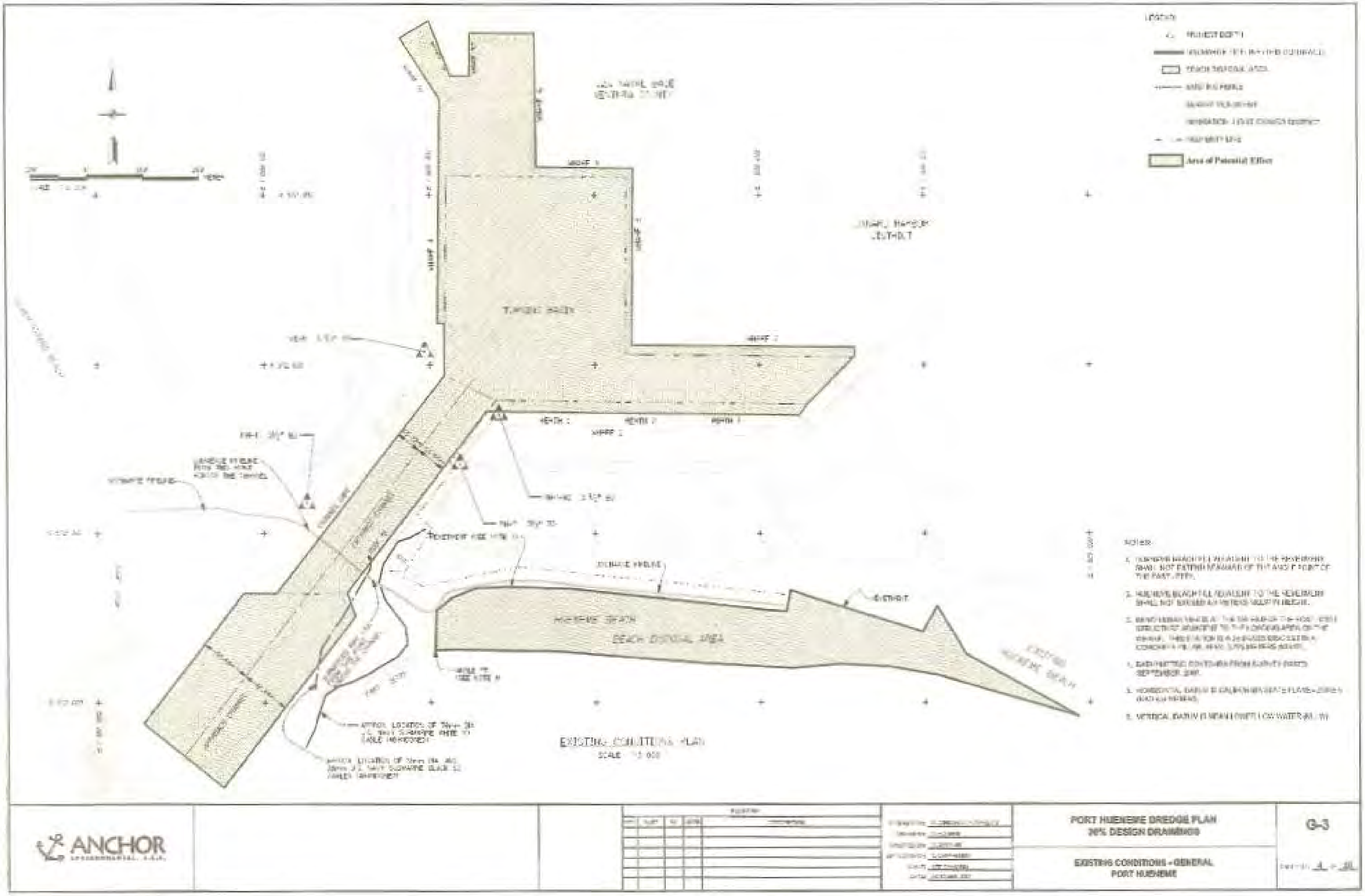
Ventura County Heritage Board
800 South Victoria Avenue, Ventura, CA 93009

Heritage Trust of Oxnard
125 North F Street, Oxnard, CA 93030

Santa Ynez Band of Mission Indians
Attn: Vincent Armenta - Chairman
P.O. Box 517, Santa Ynez, CA 93460

GENERAL VICINITY MAP
AND APE MAP


Naval Base
Ventura County Properties
Location Map
Port Hueneme Related Properties
Point Mugu Related Properties
Miles
0
1
2
NBVC_Properties.mxd
Catalina
Heights
Housing
101
Camarillo
Airport
34
NBVC
Port Hueneme
1
NBVC
Point Mugu
Laguna
Peak


Area of Potential Effect
TURNING BASIN
HUENEME BEACH
BEACH DISPOSAL AREA
EXISTING HUENEME BEACH
EXISTING CONDITIONS PLAN
NOTES:
ANCHOR
PORT HUENEME DREDGE PLAN
30% DESIGN DRAWINGS
EXISTING CONDITIONS - GENERAL
PORT HUENEME
G-3

LISTING OF PREVIOUSLY COMPLETED ARCHAEOLOGICAL INVESTIGATIONS AT PORT HUENEME

Table 1. Recorded Archeological Sites Within 1 Mile of CBC Port Hueneme			
SITE NO.	**LOCATION**	**AUTHOR**	**DESCRIPTION**
CA-Ven-662	Site is situated approximately 0.6 miles east-southeast of CBC Port Hueneme.	Van Valkenburg 1933; Horne and Craig 1979.	Poorly developed midden deposit with chert cores, flakes and hammerstones. Also present were clusters of burned rock, deer bone and shell. Site may be *Weneme-me*, a temporary camp of the Chumash.
CA-Ven-663	At the harbor entrance to CBC Port Hueneme, on a vanished landform.	Van Valkenburg 1933; Horne 1979; Schwartz 1983; Mitech 1988 (V-715).	Reported in 1933 as a shell midden 1 m deep, site was probably destroyed when the channel entrance was widened; 1939-1941.
CA-Ven-664H	Located on the east side of Perkins Avenue .8 of a mile outside CBC Port Hueneme.	Horne and Craig 1979.	Historic site consisting of the remains of 20th century farm buildings. Artifacts and features include a cistern, 1903 glass, crockery, stoneware, bricks, and a shell button.
CA-Ven-975H	Located at the west entrance to CBC Port Hueneme harbor.	Schwartz 1988 (site form).	Shipwreck site of *La Janelle*, a 1929 cruise ship originally called *Bahama Star*. Utilized during World War II to transport troops, the *Bahama Star* returned to civilian service. After undergoing a name change in 1968, *La Janelle* sank during a storm on April 14, 1970.
James Higgins Shipwreck	Channel Island Harbor sand trap; exact location unknown.	Mitech 1988 (V-715)	1916 ship *James Higgins* reported wrecked in the vicinity of the Channel Island Harbor sand trap.

Table 2. Archeological Investigations Within 1 Mile of CBC Port Hueneme		
AUTHOR	**LOCATION**	**REMARKS**
Bissell, Ronald M. 1991a (V-959)	Survey consists of 5 small areas within the boundaries of CBC Port Hueneme Naval Reserve.	No prehistoric or historic cultural resources observed.
Bissell, Ronald M. 1991 (V-1004)	Located within CBC Port Hueneme Naval Reserve.	No prehistoric or historic cultural resources observed.
Browne, Robert O. 1973 (V-9)	Segments of Channel Island Road and McGrath Road, beginning 0.55 miles west-northwest of CBC Port Hueneme.	No prehistoric or historic cultural resources observed.
Callison, Sheila 1979 (V-567)	Located 0.7 miles west of CBC Port Hueneme.	No prehistoric or historic cultural resources observed.
Cottrell, Marie G. 1977 (V-431)	Located 0.6 miles due east of CBC Port Hueneme.	No prehistoric or historic cultural resources were observed.
Desautels, Roger 1980 (V-379)	Located .8 of a mile southeast of CBC Port Hueneme.	No prehistoric or historic cultural resources observed.
Horne, Stephen 1980 (V-236)	Located within and adjacent to CBC Port Hueneme.	Sites noted include: CA-Ven-662, a midden deposit with shell, ground stone artifacts, chert waste flakes and fire-altered rock; CA-Ven-663, a prehistoric camp with end-battered cobble and fire-altered rock; CA-Ven-664H, remains of 20th century farm buildings; CA-Ven-665, three discontinous clusters of shell and/or aritfacts; CA-Ven-666, low density scatter of shell and artifacts; CA-Ven-667, buried site, extent unknown.

Howard, William J. 1991 (V-1067)	Located 0.8 miles southeast of CBC Port Hueneme.	No prehistoric or historic cultural resources observed.
Lopez, Robert 1982 (V-614)	Located 0.7 miles northwest of CBC Port Hueneme.	No prehistoric or historic cultural resources observed.
Maxwell, T.J. 1976 (V-859)	Location is 0.75 miles northwest of CBC Port Hueneme.	No prehistoric or historic cultural resources observed.
Maxwell, T.J. 1976b (V-1263)	Survey area is located within CBC Port Hueneme.	Reports site CA-Ven-663, a prehistoric camp with end-battered cobble and fire-altered rock.
Mitech 1988 (V-715)	Survey area is located <0.5 miles west of CBC Port Hueneme Naval Reserve.	No prehistoric or historic cultural resources observed.
Peak, Ann 1989 (V-825)	Extensive linear survey. A portion of the survey area is .8 of a mile due east of CBC Port Hueneme.	38 sites observed/recorded, none of which are located within a one mile radius of CBC Port Hueneme.
Singer, Clay A. 1977 (V-299)	Survey area extends to northeast boundary of CBC Port Hueneme Naval Reserve and follows Ventura Road to the southern boundary.	One archaeological site noted, CA-Ven-506, located outside the one mile radius boundary of this report.
Whitney-Desautels, Nancy 1978 (V-380)	Survey area lies .5 mile east-southeast of CBC Port Hueneme.	No prehistoric or historic cultural resources observed.
Whitley, David &Joseph Simon 1991 (V-1081)	Survey area is .5 mile east of CBC Port Hueneme.	No prehistoric or historic cultural resources observed.
Wlodarski, Robert 1992 (V-1192)	Survey area is located 0.7 miles northwest of CBC Port Hueneme.	No prehistoric or historic cultural resources observed.

**CULTURAL RESOURCES OVERVIEW,
NAVAL CONSTRUCTION BATTALION CENTER,
PORT HUENEME, VENTURA COUNTY, CALIFORNIA,
FIGURE 3**

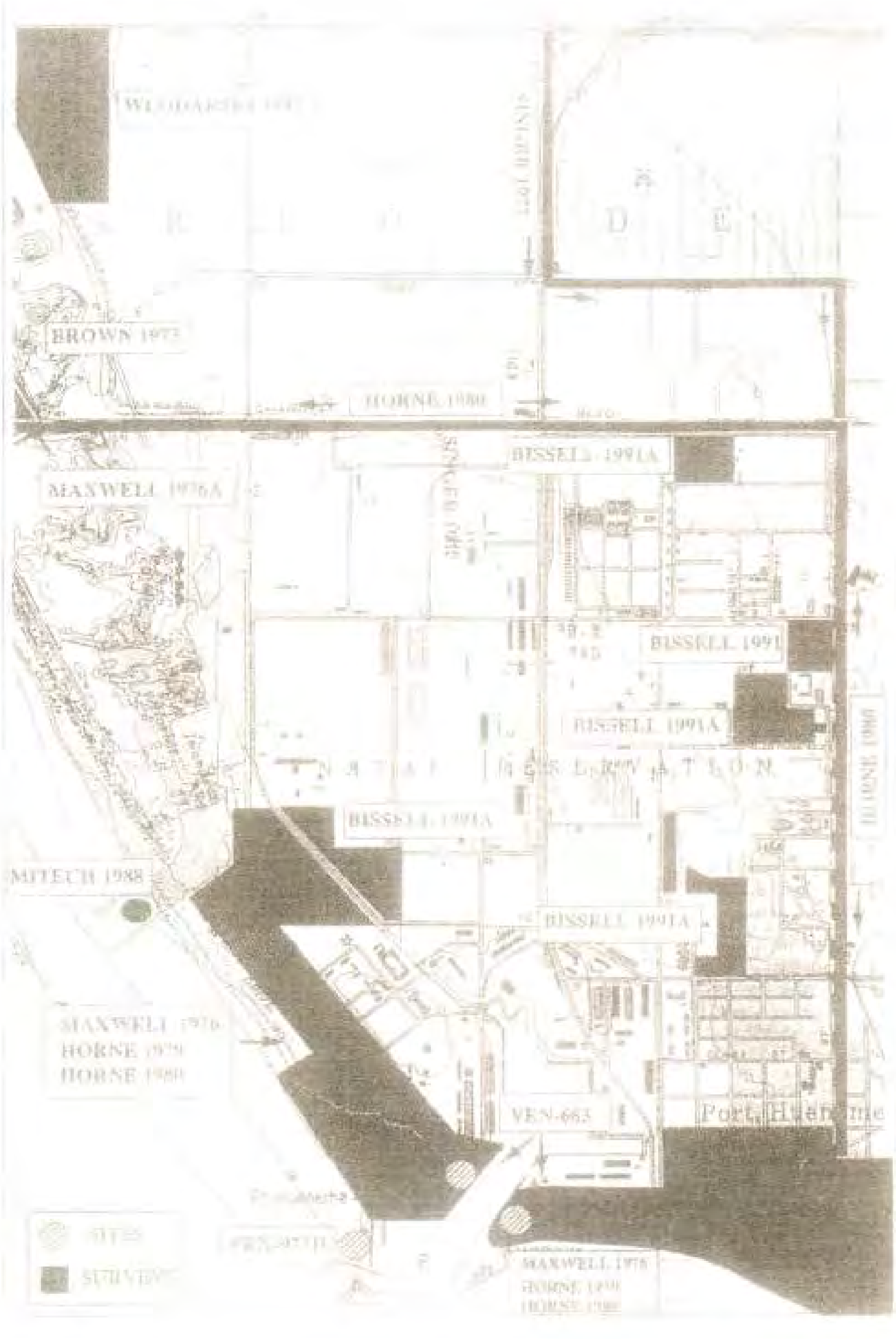


Figure 3 PREVIOUS ARCHEOLOGICAL SURVEYS AND RECORDED SITES

LIST: SHIPWRECKS IN THE VICINITY
OF THE PROJECT
AREA AND LOCATIONS: SHIPWRECKS WITHIN
ALTERNATIVE PROJECT AREAS

Enclosure (4)

Table 1. Shipwrecks in the Vicinity of the Project Area

Ship Name	Type of Vessel	Date of Loss	Cause
Aloha	*	1952	*
Caesar Burns	Schooner	*	*
California	Steamship Side-wheeler	1883	*
Caroline E. Foote	*	1871	*
Chris C	Oil Screw	1937	Foundered
Congress	*	1938	Stranded
Kea	Gas	1920	Stranded
Kipco Star	Oil Screw	1963	*
La Jenelle	Steam Screw	1970	*
Linde	Oil Screw	1951	Stranded
Molly	Oil Screw	1969	Foundered
Portland	Barkentine	1906	*
RC Co#2	Scow	1939	Stranded
Scout	*	1953	Stranded
Sierra	Oil Screw	1966	Foundered
Sitka	*	1934	*
South Coast	*	*	*
Stratus	*	1952	*
Yaquina	Screw	1897	Wrecked

Source: Northern Maritime Research 2002
* data not available

STATE OF CALIFORNIA - THE RESOURCES AGENCY ARNOLD SCHWARZENEGGER, *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov
www.ohp.parks.ca.gov

May 20, 2008 In reply refer to: USN080414A

Captain C. B. Conners
Commanding Officer
U.S. Department of the Navy
Naval Base Ventura County
311 Main Road, Suite 1
Point Mugu, CA 93042-5033

Re: Confined Aquatic Disposal Project, Port Hueneme, California.

Dear Captain Conners:

Thank you for your letter dated 3 April 2008 requesting my review and comment in regard to the referenced undertaking. You are consulting with me pursuant to 36 CFR Part 800, the regulation that implements Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f), as amended.

The Navy is proposing to conduct maintenance dredging, beach replenishment, and a Confined Aquatic Disposal project at the Turning Basin at NBVC Port Hueneme. The Navy has determined that the undertaking, as proposed, will not adversely affect historic properties. Based on a review of the materials you submitted with your letter, I can agree that, per 36 CFR § 800.5(b), a finding of no adverse effect is appropriate for the undertaking, as proposed.

Thank you for seeking my comments and considering historic properties as part of your project planning. If you have any questions or concerns, please contact David Byrd, Project Review Unit historian, at (916) 653-9019 or at dbyrd@parks.ca.gov.

Sincerely,

Susan K Stratton for

Milford Wayne Donaldson, FAIA
State Historic Preservation Officer

MWD:db

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, U.S. ARMY CORPS OF ENGINEERS
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017-3849

October 19, 2018

Planning Division

Ms. Julianne Polanco
State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, California 95816

SUBJECT: Section 106 of the National Historic Preservation Act consultation for the Port of Hueneme Harbor Deepening

Dear Ms. Polanco:

The U.S. Army Corps of Engineers, Los Angeles District (Corps) proposes to deepen the Port of Hueneme Harbor, located near the City of Oxnard, Ventura County, California. We are consulting with you in accordance with Title 36 Code of Federal Regulation Part 800 (36 C.F.R. 800), implementing Section 106 of the National Historic Preservation Act. We are renewing consultation (COE940926F) to consider alterations in the proposed project and modifying our previous determination that no historic properties would be affected to a finding that there would be no adverse effect to historic properties.

Description of the Undertaking

The Port of Hueneme is the only deep-water harbor between Los Angeles and the San Francisco Bay area. The primary purposes of the proposed harbor improvement project are efficient accommodation of larger deep-draft vessels, increased cargo efficiency, and reduced overall transit costs. The project would also benefit Hueneme Beach, which has been subject to erosion since the harbor jetties were constructed in 1939-1940. Most of the dredged sediment would be used to nourish Hueneme Beach, either by placing it directly onto the beach or into the nearshore disposal area.

The current authorized depths of the harbor are -40 feet mean lower low water (MLLW) in the Approach Channel, -36 feet MLLW in the Entrance Channel, and -35 feet in the Turning Basin. The Recommended Plan (2a) proposes to deepen the Approach Channel to -44 feet MLLW, and the Entrance Channel, Turning Basin, and Channel A would be dredged to -40 feet MLLW. Due to the nature of imprecise nature of dredging, two additional feet of overdepth allowance are planned to ensure that the final functional depth meets the target. Thus, the total depth of ground disturbance under the Recommended Plan would be -46/-42 feet respectively. Approximately 390 kilo-cubic yards (kcy) of material would be dredged, with an estimated 363 kcy of sand placed onto Hueneme Beach, 7 kcy place into the nearshore disposal area, and 20 kcy disposed of on the existing Confined Aquatic Disposal (CAD) site located within the harbor. Some sediment may also be placed in a newly created trench within Channel A. The entire project would take approximately 4 months to complete and could begin as early as June 2019.

The other alternatives analyzed for this project vary only in the depth to which dredging would occur. Alternative 4 would dredge the deepest, with the Approach Channel being -46 feet MLLW, and the Entrance Channel and Turning Basin would be dredged to -43 feet MLLW. Considering a 2-foot overdepth allowance, the deepest depth would be -48 feet MLLW in the Approach Channel in Alternative 4. The area of potential effects (APE) for this project is the Approach and Entrance Channels, the Turn Basin and Channel A within the harbor, the CAD Hueneme Beach, and the existing nearshore disposal area. The horizontal area of the APE would be the same for all alternatives, since they vary only in the vertical depth of dredging.

Previous Consultation

The Port of Hueneme is a man-made harbor that was initially constructed by local interests in 1939-1940. It was expanded after the U.S. military took control of the harbor in 1942. The harbor has been maintained and modified over the past decades to meet the needs of the Navy and the commercial Oxnard Harbor District. The Corps has conducted routine dredging of the harbor every four years since 1975. The Corps consulted on previous dredging in 1988 (COR860715A) and again in 1990 (COR900320A).

The Corps approved an Environmental Assessment (EA) in 1994 that added the nearshore disposal area to the available disposal options (e.g. placement on Silver Strand and Hueneme Beaches) and changed the dredging schedule to a two-year cycle. The Corps consulted with the State Historic Preservation Officer (SHPO) on this undertaking in a letter dated September 22, 1994 and proposed the undertaking would have no effect on historic properties. The SHPO did not object in her reply letter (COE940926F) dated October 5, 1994.

The Corps originally initiated consultation on the proposed Port of Hueneme Harbor deepening project in a letter to the SHPO dated February 22, 1999. In this letter, the Corps proposed to deepen the harbor to -14.5 meters MLLW. Other components of the proposed project included removal of the existing fender system, reinforcement of the sheet pile toe wall, and installation of a new timber fender system. This consultation also included removing an estimated 350 cut off pilings from the 1938 wharf that may have been left in below the mud line when the wharf was removed in the early 1970s. The APE defined for that project included the Approach and Entrance Channels, the Turn Basin and Channel A within the harbor, Hueneme Beach, and the nearshore disposal area. The SHPO agreed with the Corps' determination that the project would not affect any historic properties by countersigning the letter on March 23, 1999.

The Corps sent another letter to the SHPO on February 9, 2000 regarding proposed repairs to the east and west jetties. The Corps proposed to repair the jetties to their original design standards. The APE included the jetties and an area along the east jetty that might require dredging to allow barge access to the east jetty. The Corps determined that the east and west jetties were not eligible for the National Register of Historic Places (NRHP) and that the project would not have an adverse effect on historic properties. The SHPO concurred with the determination that the jetties were not eligible and concurred that the proposed project would have no effect on historic properties in a letter dated March 28, 2000 (again, COE940926F). The discrepancy in effect determinations is because the Corps had made an inappropriate determination of effect in the consultation letter. Since the jetties were determined not eligible for the NRHP and no other historic properties were present, no historic properties were present to be adversely affected. The SHPO's language that the project "will have no effect on historic properties" was correct in that situation.

Subsequent sediment sampling indicated that some of the sediment in the harbor contained contaminants that made it unsuitable for onshore or nearshore placement. Maintenance dredging was suspended in the contaminated area while the Corps and the Navy cooperated to establish a Confined Aquatic Disposal (CAD) site within the harbor on Navy property to dispose of the contaminated sediments. The CAD was designed as an area of deeper excavation where the contaminated sediment would be placed, covered with clean sediment, and capped with rock.

In a letter to the SHPO dated April 3, 2008, the Navy introduced a project to conduct maintenance dredging, beach nourishment, and to establish the CAD site. The Navy defined the APE for this project as the area to be dredged within the harbor, including the CAD site, and the Hueneme Beach disposal area. The Navy disclosed in the letter that site CA-VEN-663, the location of which had previously been unknown to the Corps, may be present in the project area. Site CA-VEN-663 was reported in 1933 as a Late Prehistoric shell midden located in the area where the harbor was subsequently constructed. More recent examinations have failed to relocate the site, so the Navy concluded that it was likely destroyed by the development of the Harbor. Because the proposed dredging would occur within the previously constructed and dredged harbor, the Navy further concluded that the area of potential effect (APE) was outside the site boundary, should any portion of it still exist, and determined that the proposed project would have no adverse effect on historic properties. In a letter dated May 20, 2008 (USN080414A), the SHPO concurred with the Navy's determination that the proposed dredging and CAD project would have no adverse effect on historic properties. That project was subsequently implemented and the CAD site created.

Revisions and Clarification of Proposed Action

The alternatives currently being considered, particularly the Recommended Plan (2a), differ slightly from the activities previously consulted on. Other points of ambiguity in the consultation history have also come to light. Those changes are discussed below and any ambiguities clarified.

Project Effect- The previous Corps' consultations with the SHPO have concluded that the proposed project would have no effect on historic properties (i.e. no historic properties affected). However, the Navy consultation in 2008 resulted in a determination that there would be no adverse effect to historic properties due to the unresolved location and condition of site CA-VEN-663. Now that the Corps is aware of the site, a finding of no adverse effect is deemed appropriate for the proposed harbor deepening project.

Use of the CAD site- As discussed previously, the Navy consulted with the SHPO in 2008 regarding creation and use of the CAD site. The Corps was not explicitly named in the correspondence between the Navy and the SHPO. However, the Corps and the Navy cooperated on that previous project, and the Corps agrees with the determination that there would be no adverse effect to historic properties reached in that previous consultation. The Corps proposes to use the existing CAD site to dispose of contaminated sediment as part of the currently proposed project. The existing CAD site has adequate remaining capacity to accommodate the proposed project without being expanded.

Creation of a disposal trench in Channel A- Based upon the results of additional sediment analysis, the Corps has elected to manage sediments from five individual core locations within the harbor separate from the other dredged material. These sediments would not be placed onshore or in the nearshore disposal area. These sediments are suitable for unconfined disposal within the harbor, so they do not necessarily need to be placed in the CAD site. Instead, a trench 900 feet long and up to 220 feet wide may be excavated to a depth of -47 feet MLLW adjacent to Wharf 1 within Channel A. The clean sediment dredged from the trench would be used to nourish Hueneme Beach, and the unacceptable sediment placed in the trench. The "trench" would be created because only a limited area within Channel A would be excavated to a depth of -47 feet MLLW, resulting in less than the total amount of dredged area described in the previous consultation. The Corps has designed the trench so that it would fit within the -47.5 feet MLLW dredge depth described in the 1999 consultation. However, an additional 2-foot overdepth allowance should be considered for to account for the imprecision of dredging operations. Thus, the maximum depth of disturbance could extend to -49 feet MLLW within the trench. A portion of the trench area has already been scoured to a depth over -48 feet MLLW, presumably by prop wash from ships being moved from their berths. Considering that the trench has been designed with a target depth of -47 feet MLLW and that a portion of the trench area has already been scoured to a depth greater than that, it is unlikely that the trench, if implemented, would disturb a substantial amount of sediment beyond what was discussed in the previous consultations.

Conversion from metric to English measurements- The Corps consulted on deepening the harbor to a depth of -14.5 m MLLW in the 1999 letter to the SHPO. The current project is being designed in feet. The original -14.5 m MLLW is the equivalent of approximately -47.5 feet MLLW, which is adequate to fully accommodate the Recommended Plan (2a). Alternative 4, which is the alternative with the deepest dredging, would dredge to a depth of -46 feet MLLW. However, adding the additional 2 feet of overdepth allowance means that ground disturbance could extend to -48 feet MLLW. If Alternative 4 were selected instead of the Recommended Plan, dredging could extend an additional 0.5 foot within the Approach Channel beyond the -47.5 feet MLLW (converted from metric) considered in the 1999 consultation but would not result in any adverse effects to historic properties.

Entrance Channel slope protection- The eastern slope of the Entrance Channel along a length of approximate 1,000 feet, from Station 20+00 to 30+00, is protected from slumping by a rock revetment. Deepening the channel from its current design depth of -36 feet MLLW to a new design depth of -40 feet MLLW may destabilize the base of the slope. In order to maintain the required factor of safety and stabilize the existing revetment, the deepened slope would be covered with an approximately 3.5 foot thick layer of rock revetment to match the design of the existing revetment. Approximately 14,000 ton of stone would be placed along the toe of the eastern slope to stabilize the slope and prevent the existing rock revetment from slumping into the deepened navigation channel. This estimate is based on historical design documents. Actual conditions may not warrant the placement of additional rock revetment, so that limited or no rocks may need to be placed as part of this project. The need and exact volumes would be determined during construction when dredging obstructions would be used to determine the nature and location of the current rock revetment. Any necessary rock would be placed by derrick barge. The additional rock would be placed below the existing rock revetment to support it and would not disturb or displace any of the existing stone.

Sediment disposal areas- A pipeline would be placed on top of the ground surface to convey dredged sediments from the harbor to Hueneme Beach. Setting up temporary pipelines to transport the sediment to the beach has been the standard method used for all past maintenance dredging and was presumably covered in previous consultations. All other sediments would be placed directly into the various disposal areas by dredge or barge.

Timber pile removal- A maximum of six hundred and forty cut off pile bases could still be present below the mud line. The 1990 consultation considered removing the remaining piles. Past investigations did not locate any piles, and previous dredging make it unlikely that any remain. However, the currently proposed project would screen any remaining piles out of the dredged sediment and dispose of them separately from the sediment.

Finding

The Corps has carefully reviewed all the previous consultation documentation prior to requesting your concurrence to ensure: (1) numerous similar projects have been cleared previously within the APE; (2) the dredging would occur in areas that have been routinely dredged; and (3) sediment would be placed in disposal areas that have been previously approved and used. The proposed project would not change the character or use of any historic property, nor diminish the integrity of the location, design, setting, materials, workmanship, feeling, or association of such. The Corps concludes that there would be no adverse effect to historic properties as a result of the proposed project.

At this time, the Corps is requesting your concurrence with our determination that no historic properties would be adversely affected by the proposed project. We appreciate your consideration of our request. If you have specific questions or if we can provide any clarification about this request, please contact Mr. Travis Bone at (602) 230-6969 or via e-mail at Travis.S.Bone@usace.army.mil.

Sincerely,

Eduardo T. De Mesa
Chief, Planning Division

Enclosure

State of California • Natural Resources Agency
Edmund G. Brown Jr., *Governor*

DEPARTMENT OF PARKS AND RECREATION
OFFICE OF HISTORIC PRESERVATION
Lisa Ann L. Mangat, *Director*

Julianne Polanco, State Historic Preservation Officer
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November 06, 2018

In reply refer to: COE940926F

Mr. Eduardo T. De Mesa
Chief, Planning Division
U.S. Army Corps of Engineers
Los Angeles District
915 Wilshire Boulevard, Suite 930
Los Angeles, CA 90017

Subject: Section 106 Consultation for the Port of Hueneme Harbor Deepening Project, Ventura County, California

Dear Mr. De Mesa:

The California State Historic Preservation Officer (SHPO) received a letter from the U.S. Army Corps of Engineers (COE) re-initiating consultation on the above referenced project in order to comply with Section 106 of the National Historic Preservation Act of 1966 (as amended) and its implementing regulations at 36 CFR Part 800. The COE is requesting comments on their revised finding of effect for the undertaking and have provided the following documents for review:

- APE map and project plans (5 pages)
- *Letter Report for Cultural Resource Investigations Underwater Remote Sensing Survey for the US Army Corps of Engineers, LA District Environmental Planning Division* (Statistical Research Inc. August 31, 1994).

The COE is proposing to deepen the Port of Hueneme Harbor. The recommended project plan (Plan 2a) would deepen the harbor Approach Channel from the authorized depth of -40 feet mean lower low water (MLLW) to -44 feet MLLW, the deep the Entrance Channel, Turning Basin, and Channel A to -40 feet MLLW. In other potential alternatives, the deepest depth would extend to -48 feet MLLW. The project will also include: disposal of contaminated sediment at a Confined Aquatic Disposal (CAD) site; creation of a disposal trench in Channel A; addition of additional rock revetment to the eastern slope of the Entrance Channel; placing a pipeline on top of the ground surface to convey dredged sediments from the harbor to Huemene Beach; and removing any remaining cut piles by screening them out of dredged sediment. The COE has defined the Area of Potential Effects (APE) as the Approach and Entrance Channels, the Turn Basin and Channel A within the harbor, the Confined Aquatic Disposal (CAD) site, Hueneme Beach, and the existing nearshore disposal area.

The Port of Huemene was originally constructed in 1939-1940 and expanded in 1942. The COE has conducted routine dredging on the harbor every four years since 1975. The COE previously consulted on dredging activities in 1988 (COR860715A) and 1990 (COR900320A), consulted on changing to a two-year dredging cycle and the addition of a nearshore disposal area in 1994, consulted on deepening the harbor to -14.5 meters MLLW and other harbor improvements in 1999, and consulted on repairing the east and west jetties in 2000 (COE940926F). All of these consultations resulted in the SHPO concurring with the COE's findings of *no historic properties affected*. The Navy also separately consulted on a project (USN080414A) to conduct maintenance dredging, beach nourishment, and to establish the CAD site in 2008. Although the COE cooperated with the Navy on this project, the COE was not mentioned in the Section 106 correspondence with the SHPO.

The COE is re-initiating consultation with the SHPO on this undertaking because the plans currently being considered differ slightly from those the COE already consulted on with the SHPO. In addition, the Navy's 2008 consultation concluded with a finding of no adverse effect because of the unresolved location of archaeological site CA-VEN-663, a shell midden site recorded in 1933 in the location where the harbor was subsequently constructed. The Navy concluded that the site was likely destroyed during construction of the harbor, but that the previous location appeared to be outside the APE and so the undertaking would have no adverse effect on the site. The COE was unaware of this site during their previous consultations with the SHPO, but is considering the potential effects to this site in their revised finding of effect.

The COE's analysis has concluded that similar undertakings have not affected historic properties, that dredging would occur in areas that have been routinely dredged for decades, that sediment would be placed in previously used disposal areas, and that despite the unknown location of CA-VEN-663, the undertaking will not result in an adverse effect to any historic properties. Pursuant to 36 CFR 800.5(b), **I concur** with the COE's finding of *no adverse effect* for this undertaking.

Be advised that under certain circumstances, such as unanticipated discovery or a change in project description, the COE may have additional future responsibilities for this undertaking under 36 CFR Part 800. For more information or if you have any questions, please contact Koren Tippett, Archaeologist, at (916) 445-7017 or koren.tippett@parks.ca.gov.

Sincerely,

Julianne Polanco
State Historic Preservation Officer