Appendix B

Channel Islands Jetty Repair Preconstruction Seagrass Survey

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September 21, 2020
M&A #20-075-01

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Pre-construction Seagrass and Canopy Kelp Surveys Report
In Support of the Channel Islands Harbor Breakwater and Jetty Repairs Project

Dear Ms. Martinez-Takeshita and Mr. Shen:

PURPOSE AND INTRODUCTION

The Army Corps of Engineers is completing repairs of the north and south ocean inlet jetties and detached breakwater at Channel Islands Harbor, Ventura County, California under the Channel Islands Harbor Breakwater and Jetty Repairs Project (Project). The Corps has retained Connolly-Pacific Company (C-P) to complete the repairs under Contract No. W912PL-20-C-0011. Merkel & Associates Inc. (M&A) has been retained by C-P to complete environmental surveys in support of the planned work.

Under the Magnuson–Stevens Fishery Conservation and Management Act, the National Marine Fisheries Service (NMFS) is charged with providing for the development and implementation of Fishery Management Plans (FMPs) that include designation of Essential Fish Habitat (EFH). Under EFH, a special category of habitats have been identified as Habitat Areas of Particular Concern (HAPC). Seagrass communities and canopy kelp communities fall within this defined HAPC for the Pacific Coast Groundfish Fishery Management Plan (FMP). As a result, the Corps has requested surveys focusing on these resources as follows:

- **Eelgrass Survey**: A focused pre-construction eelgrass survey and mapping is to occur within the Area of Potential Effects (APE) within the Channel Islands Harbor and immediate vicinity as illustrated in Figure 1;

- **Canopy Kelp Survey**: A pre-construction canopy kelp survey, mapping, and characterization is to be completed within the APE as shown in Figure 1;

- **Surfgrass Survey**: A focused pre-construction surfgrass survey and mapping of the intertidal and subtidal areas of the detached breakwater, north and south jetties in the following areas: Detached Breakwater (leeward, seaward, radius of North and South heads: Station

Pre-construction Eelgrass, Canopy Kelp, and Surfgrass Survey Areas

Channel Islands Harbor Breakwater and Jetty Repairs
Ventura County, CA

Figure 1

0+00 to Station 23+00) North Jetty Head Section (channel, seaward, radius of head: Station 9+50 to Station 12+70) South Jetty Head and Trunk Section (channel, seaward, radius of head: Station 2+75 to Station 13+00). All surfgrass survey areas have been expanded to include buffers beyond the defined survey requirements. The surveyed areas are illustrated in Figure 1.

PROJECT LOCATION AND SURVEY AREA

Surveys were completed within the outer federal channel areas, channel jetties and detached breakwater of Channel Islands Harbor, Ventura County, California (Figure 1).

Eelgrass and kelp habitat surveys were conducted within a 180-acre survey area. This is smaller than the estimated 205 acres outlined in the RPF due to limiting the survey area to areas within water at the time of the survey. The primary reduction in footprint from the RFP is located on Hollywood Beach north of the North Jetty.

Surfgrass surveys were completed in more discrete areas located around the individual repair areas identified within the Project. The survey areas were located at the north jetty head, the south jetty head and trunk, and over the entirety of the detached breakwater (Figure 1).

SURVEY METHODOLOGY

M&A conducted the eelgrass and surfgrass surveys from September 8 - 11, 2020. Spatial extent data were collected using three different survey tools, interferometric sidescan sonar (ISS), remotely operated vehicle (ROV), and unmanned aerial vehicle (UAV).

INTERFEROMETRIC SIDESCAN SONAR (ISS)

The interferometric sidescan sonar provided an acoustic backscatter image of the seafloor within the project area concurrent with collecting high-density swath bathymetric data. Interpretation of the backscatter data allowed for an assessment of the distribution of eelgrass, mapping of rocky and sandy habitats, identification of debris and structures on the bottom, and identification of bottom disturbance and hydrodynamic energy patterns on the bayfloor. Sidescan backscatter data were acquired at a frequency of 468 kHz scanning out 31 meters on both the starboard and port channels for a 62-m wide swath. ISS surveys covered the entirety of the eelgrass survey area (Figure 1).

The rigid hull mounted ISS system integrates motion sensors to control for heave pitch and roll, a sound velocity sensor for speed of sound correction, and a dual antenna real time kinematic global positioning system (RTK GPS) and electronic compass to control for vessel position and yaw. This rigid integration of the ISS transducers within the positioning sensors provides significantly increased precision and accuracy over conventional sidescan sonar equipment. The hull mounted system also allows for maneuvering the vessel in tight environments while collecting good quality data and avoiding potential impact of the transducer with the bottom. This was beneficial for surveying well up onto the shoulders of the jetties.

The survey was conducted by running parallel transects that were spaced to allow for overlap between adjoining sidescan swaths. Survey swaths were navigated until the entirety of the survey area was captured in the survey report. All data were collected in latitude and longitude using the

North American Datum of 1983 (NAD 83), converted to the Universal Transverse Mercator system in meters (UTM), and plotted on a geo-rectified aerial image of the study area.

REMOTELY OPERATED VEHICLE (ROV)

Following the sidescan survey, the survey team deployed an ROV. The ROV was operated from the surface using an operator-held control unit. An acoustic ultra-short baseline (USBL) positioning system allowed the position of the ROV to be tracked on a chart plotter. A color camera on board the ROV sent video images to the computer where the video was routed to large format computer monitors showing the video output and associated position on a live chart. This allowed the operators to annotate the chart while collecting video, aiding in mapping and ground-truthing.

For surfgrass surveys, the ROV was run within the surfgrass survey areas (Figure 1). Surveys were conducted by navigating the ROV in contour parallel paths along the rock starting at the jetty toe and working up the jetty face with the vessel tracking along with the ROV. Horizontal visibility during surveys was approximately 4-9 feet ahead of the ROV being visible during the transect runs. On the outside of the detached breakwater horizontal visibility was as high as 12 feet.

For eelgrass surveys, the ROV focused on ground-truthing eelgrass surveys. Data were collected by lowering the ROV to the seafloor in areas where eelgrass had previously occurred and navigating the ROV across the bottom. As no eelgrass was encountered, eelgrass density data were not collected.

UNMANNED AERIAL VEHICLE (UAV)

The third piece of equipment applied in the survey effort was an UAV. The UAV was flown by a licensed drone pilot operating within authorized airspace requirements. The UAV was fitted with a 20-megapixel RGB true color camera. Photography was completed at multiple altitudes, including 200 feet and 100 feet above ground level (AGL). Surveys were conducted using pre-programmed flight plans with camera orientations and image sidelap and frontlap suitable to produce high-resolution orthomosaic imagery by processing the photographs using Structure from Motion (SfM) technology. The imagery was processed using Agisoft Photoscan software.

DATA ANALYSIS

Following completion of the surveys, data sources were geographically registered, and eelgrass and surfgrass were digitized as spatial themes from the multiple data sources in ESRI ArcGIS. ISS survey mosaics, and ROV video transects were used to investigate the potential for eelgrass. During this survey, coves that had historically supported eelgrass were intensively explored with the ROV. Kelp was mapped using ISS and UAV data. For surfgrass mapping, multiple data sources were available to support spatial mapping, with most of the surfgrass being detectible in a combination of UAV, ROV data, and sometimes in the ISS data streams. Dynamic range spectral stretch tools were used to assist in illuminating the spectral signature of surfgrass from the collected UAV imagery.

SURVEY RESULTS AND DISCUSSION

EELGRASS

No eelgrass (*Zostera marina* or *Zostera pacifica*) was found within the eelgrass survey area. These results follow those noted during April 2020 surveys for U.S. Coast Guard Station Channel Islands Harbor (Merkel & Associates 2020). However, the results in the 2020 surveys differ from a prior harborwide survey completed in 2005 which found scattered eelgrass in the harbor, including eelgrass within the coves occupied by Hobie Beach and Kiddie Beach (Figure 2).

The 2005 survey was a comprehensive survey that detected a minor 1.2 acres of eelgrass within the entirety of the harbor (Merkel & Associates 2008). The majority of this was located off Hobie Beach (Figure 2). Surveys completed in 2005 were conducted using sidescan sonar in association with extensive diving ground-truthing conducted in association with saturation surveys for *Caulerpa taxifolia*.

While no eelgrass or signs of eelgrass were detected during the present surveys, it is notable that in April 2020, a few blades of Pacific eelgrass (*Zostera pacifica*) were observed within algal wrack located on the bottom of the cove supporting Hobie Beach. This suggests the presence of Pacific eelgrass in the area, although no live eelgrass of any species was detected during either of the overlapping April or September 2020 surveys.

SURFGRASS

No surfgrass (*Phyllospadix*) was located within the surveyed areas (Figure 1) and no surfgrass was noted anecdotally outside of the surveyed areas. The survey area ranged as deep as -33 feet up to middle intertidal elevations. The survey area generally supported typical intertidal zonation patterns with a mussel and barnacle zone. At the lower intertidal zones, rock supports a combination of turf, foliose, and coralline algae. Within the more protected portions of the survey zone are monotypic beds of feather boa kelp (*Egregia menziesii*).

The habitat suitability for surfgrass within the surveyed areas is not considered to be good due to the general steepness of the breakwater and the low scour levels on the jetties and breakwater as well as the low physical energy allowing macroalgae to dominate over surfgrass. Dense beds of feather boa kelp preclude suitability for eelgrass on the most protected areas of the survey locations.

*Low altitude photo of the detatched breakwater showing a dense monotypic bed of feather boa kelp (*Egregia menziesii)

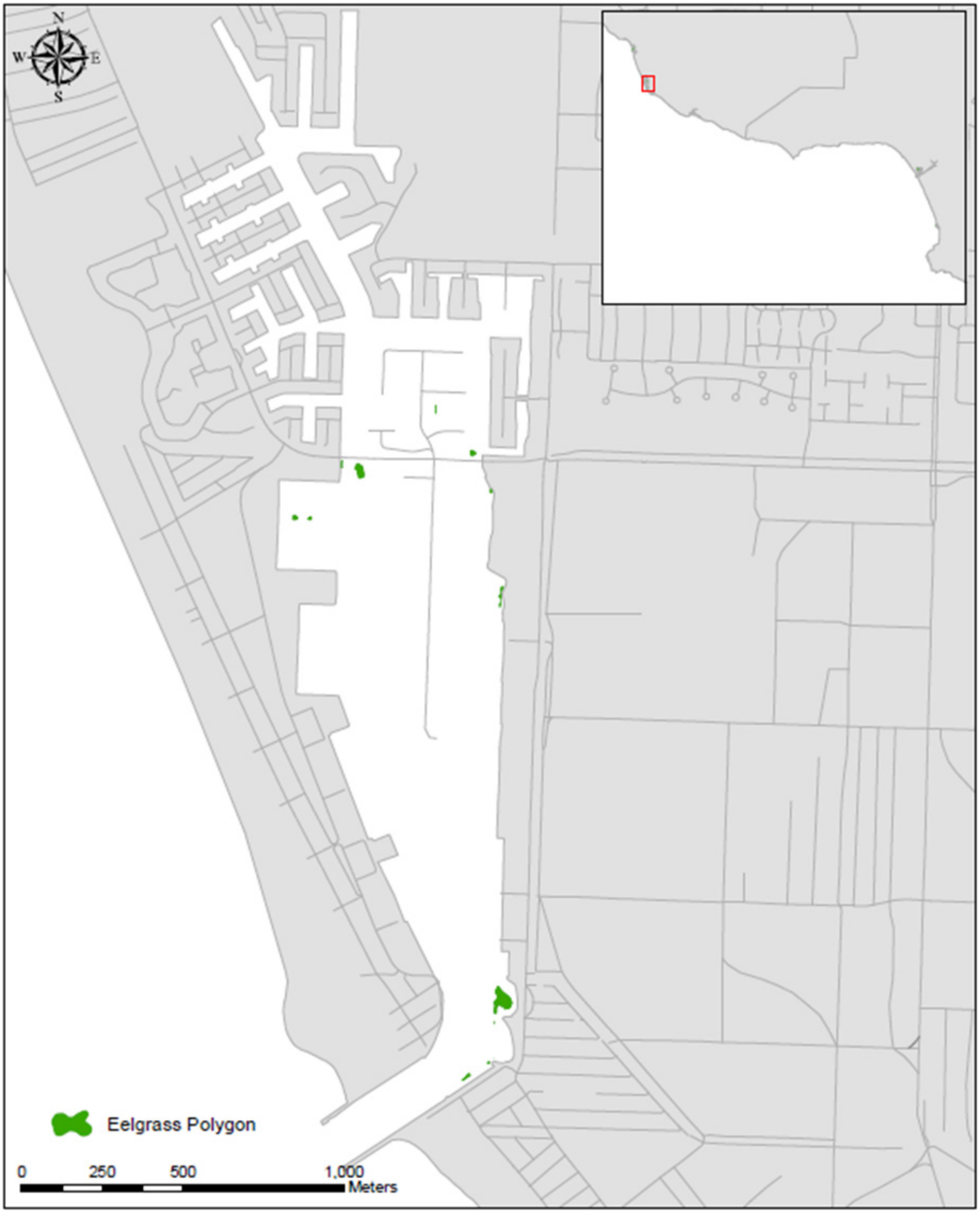

Figure 2. Maximum known extent of eelgrass in Channel Islands Harbor 2005

Canopy Kelp

Dense bands of feather boa kelp occurs throughout the more protected leeward margins of all of both jetties and the detached breakwater (Figure 3). The area of this kelp totals 3.0 acres (11,984 m^2).

Feather boa kelp is a brown algae with a broad representation within intertidal and subtidal rocky habitats. The species is often found within low intertidal and shallow subtidal areas where it forms dense beds. Feather boa under these conditions sweeps surrounding areas of other algae and invertebrates and tends to expand into the available space generated. Conversely, *Egregia* also occurs as an understory alga within more complex canopy kelp communities that are often dominated by giant kelp (*Macrocystis pyrifera*) or bull kelp (*Nereocystis luetkeana*).

Canopy kelp is defined by NMFS as *"The canopy kelp HAPC includes those waters, substrate, and other biogenic habitat associated with canopy-forming kelp species (e.g.,* Macrocystis *spp. and* Nereocystis *spp.)."* Under the present circumstances, it is not believed that the monitypic, intertidal and extreme shallow (less than -10 feet MLLW) beds of *Egregia* constitute canopy kelp HAPC as defined. As such, no canopy kelp HAPC has been found within the surveyed area. This is not to suggest that the presence of *Egregia* is counter to a determination of the presence of canopy kelp HAPC. Feather boa is a recognized constituent element of canopy kelp HAPC, but is not considered to be canopy kelp HAPC when present in the shallow waters and monotypic beds found within the study area. Rather it is a common subcanopy element within more diverse and structured canopy kelp habitats.

While the feather boa kelp beds found on the breakwater and jetties is not considered canopy kelp HAPC, impacts to this habitat should be minimized to the extent practicable. However, it is not essential to avoid impacts. This habitat is expected to be resilient to minor disturbances and is anticipated to recover within one to three years following disturbance when more substantially damaged and residual beds remain adjacent to the disturbed areas.

In the absence of detection of canopy kelp HAPC, a more expansive investigation was undertaken to determine the distribution of kelp habitat in the vicinity of the Project area. This was done by completing a search of the regional kelp mapping data prepared by the CDFW to determine the distribution of any offshore kelp beds located within the vicinity of Channel Islands Harbor. Data were acquired for this effort through queries of ftp://ftp.dfg.ca.gov/R7_MR/BIOLOGICAL/Kelp/, the Department's data server. Regional kelp data layers within the Department's system have been updated through 2016 surveys with new surveys not yet available. Kelp communities in the vicinity of the harbor are very limited. As such the survey area was extended outward beyond 20 miles from the mouth of the harbor (Figure 4). This kelp canopy is mapped by CDFW and its contractors using aerial overflight surveys that are subsequently digitally interpreted to plot kelp canopy. The beds identified are typically dominated by *Macrocystis pyrifera*. The lack of proximate natural rock habitat in proximity to the mouth of Channel Islands Harbor explains the lack of kelp in proximity.

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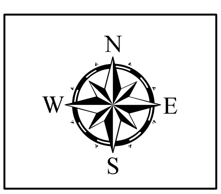


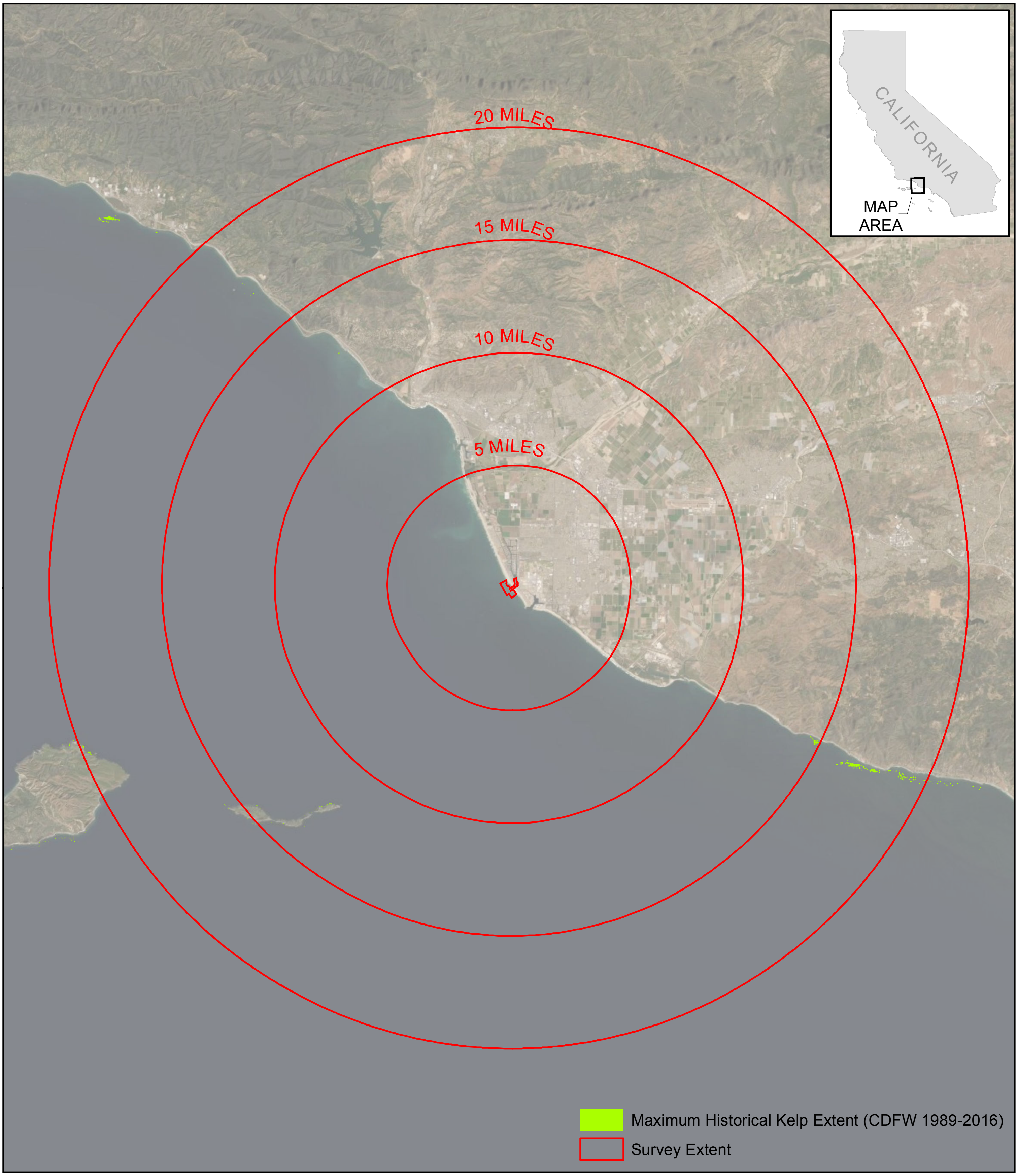
Pre-construction Canopy Kelp - September 2020

Channel Islands Harbor Breakwater and Jetty Repairs

Ventura County, CA

Figure 3

Merkel & Associates, Inc.



Project Vicinity Map with Regional Kelp Distribution

Channel Islands Harbor Breakwater and Jetties Repair Project

Figure 4

The results of the surveys for seagrasses and canopy kelp revealed an absence of either eelgrass or surfgrass and an absence of canopy kelp HAPC, although *Egregia* dominated kelp beds were present.

It has been a pleasure working with you on this project. If you have any questions regarding the results of this investigation, please contact me.

Sincerely,

Keith W. Merkel
Principal Consultant

REFERENCES

National Oceanic and Atmospheric Administration (NOAA). 2014. California Eelgrass Mitigation Policy and Implementing Guidelines.

Merkel & Associates. 2008. Southern California Caulerpa Surveillance Program - Final Status Report: Appendix A. Eelgrass Maps. Prepared for Southern California Caulerpa Action Team.

Merkel & Associates. 2020. U.S. Coast Guard Station Channel Islands Harbor - Baseline Eelgrass Survey. May 27, 2020.

Appendix C

Channel Islands Harbor Sediment Analysis Plan Report

SAMPLING AND ANALYSIS PLAN REPORT

2017-2018 CHANNEL ISLANDS HARBOR GEOTECHNICAL AND ENVIRONMENTAL INVESTIGATION PROJECT

USACE Contract No. W912PL-17-D-0003, Task Order No. 006

Prepared for:

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SAMPLING AND ANALYSIS PLAN REPORT
2017-2018 Channel Islands Harbor Geotechnical and Environmental Investigation Project
AECOM Project No. 60564349

USACE Contract No. W912PL-17-D-0003, Task Order No. 006

May 2018

TABLE OF CONTENTS

Page No.

1.0 INTRODUCTION 1

1.1 Project Summary 1
1.2 Site Location 7
1.3 Roles and Responsibilities 7

2.0 SITE HISTORY AND HISTORICAL DATA REVIEW 10

2.1 Harbor Construction, Site Setting and Potential Sources of Contamination 10
2.2 Site Description 10
2.3 Previous Channel Islands Harbor Dredging and Testing Episodes 10
2.3.1 2012 Testing Episode 10
2.3.2 2006 Testing Episode 12

3.0 METHODS 13

3.1 Dredge Design 13
3.2 Sampling and Testing Design 13
3.2.1 Channel Islands Harbor Sample Identification, Composite Areas, Sediment Collection and Testing 13
3.2.2 Beach Transect and Nearshore Reference Samples 14
3.2.3 Geotechnical Samples and Testing 17
3.3 Field Sampling Protocols 18
3.3.1 Positioning and Depth Measurements 18
3.3.2 Vibracore Sampling Methods 18
3.3.3 Vibracore Decontamination 19
3.3.4 Core Processing 19
3.3.5 Beach Transect and Nearshore Area Grab Samples 20
3.3.6 Detailed Sediment Log 20
3.3.7 Documentation and Sample Custody 20

4.0 RESULTS AND DISCUSSION 21

4.1 Sediment Observations 21
4.2 Sediment Physical Results 22
4.3 Sediment Chemistry Results 22
4.4 Conclusions and Recommendations 25

5.0 QUALITY CONTROL REQUIREMENTS 25

6.0 REFERENCES CITED 26

APPENDICES

Appendix A – Sampling, Physical and Analytical Data. Channel Islands Harbor 2012 Environmental and Geotechnical Investigation Project (Diaz Yourman, GeoPentech and Kinnetic Laboratories JV, 2012)
Appendix B – Sampling, Physical and Analytical Data. Channel Islands Harbor 2006 Dredge Material Investigation (Diaz Yourman and Kinnetic Laboratories 2007)
Appendix C – Summary of 2016 Hueneme Beach Physical Data.
Appendix D – Field Logs Including Core Photographs
Appendix E – Sediment Logs
Appendix F – Grain Size Distribution Plots
Appendix G – USACE Beach Physical Compatibility Report

LIST OF TABLES

Page No.

Table 1. September 2017 Dredge Area Volume Estimates for the Channel Islands Federal Channels ... 3
Table 2. Project Team and Responsibilities ... 8
Table 3. Key Project Contacts. ... 9
Table 4. Actual Sampling Location Coordinates, Date and Time of Sampling, Core Depths, Mudline Elevations, and Sampling Elevations for the 2017 Channel Islands Harbor Sampling and Testing Program. ... 15
Table 5. Date, Times and Sampling Coordinates for Samples Collected from the Silver Strand Beach Transects. ... 17
Table 6. Channel Islands Harbor Sieve Analysis Data ... 23
Table 7. Silver Strand Beach Transect Sieve Analysis Data. ... 24

LIST OF FIGURES

Page No.

Figure 1. Location of Channel Islands Harbor and Silver Strand Beach. ... 2
Figure 2. Overview of Channel Islands Harbor 2018 Dredge Area and SAP and Actual Sampling Locations. ... 4
Figure 3. Close-up of Channel Islands Harbor 2018 Bathymetry and SAP and Actual Sampling Locations for Areas A, B, C and G ... 5
Figure 4. Close-up of Channel Islands Harbor 2018 Bathymetry and SAP and Actual Sampling Locations for Areas A and E. ... 6
Figure 5. Map Showing Channel Islands Harbor Facilities. ... 11
Figure 6. Location of Silver Strand Beach Sampling Transects and the 2016 Hueneme Beach Sampling Transects and Nearshore Sampling Locations. ... 16

LIST OF ACRONYMS

ASTM	American Society for Testing and Materials	**MSD**	Matrix Spike Duplicate
BLK	Method or Procedural Blank	**MSD**	Minimum Significant Difference
BMP	Best Management Practice	**ND**	Not Detected
BS	Blank Spike	**NOAA**	National Oceanic and Atmospheric Administration
BSD	Blank Spike Duplicate	**OEHA**	Office of Environmental Hazard Assessment
Cal/EPA	California Environmental Protection Agency	**OTM**	Ocean Testing Manual
CD	Compact Disc	**PAH**	Polyaromatic Hydrocarbon
CDFG	California Department of Fish and Game	**PCB**	Polychlorinated Biphenyl
CESPD	Corps of Engineers South Pacific Division	**PDS**	Post Digestion Spike
CHHSL	California Human Health screening Level	**PDSD**	Post Digestion Spike Duplicate
COC	Chain of Custody	**PPB**	Parts Per Billion
CSLC	California State Lands Commission	**PPM**	Parts Per Million
CV	Coefficient of Variation	**PRG**	Preliminary Remediation Goals
cy	Cubic Yards	**PVC**	Polyvinyl Chloride
CRM	Certified Reference Material	**QA**	Quality Assurance
DDD	Dichlorodiphenyldichloroethane	**QC**	Quality Control
DDE	Dichlorodiphenyldichloroethylene	**QUAL**	Qualifier
DDT	Dichlorodiphenyltrichloroethane	**RBC**	Risk-Based Concentration
DGPS	Differential Global Positioning Satellite	**RL**	Reporting Limit
DTSC	Department of Toxic Substances Control	**RPD**	Relative Percent Difference
DUP	Laboratory Replicates	**RSLs**	Regional Screening Levels for Cleanup of Superfund Sites
EDD	Electronic data deliverable	**SAP**	Sampling and Analysis Plan
ERL	NOAA Effects Range Low	**SC-DMMT**	Southern California Dredge Material Management Team
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
ITM	Inland Testing Manual	**SWQCB**	State Water Resources Control Board
LCL	Lower Control Limit	**TOC**	Total Organic Carbon
LCS	Laboratory Control Spike	**TRPH**	Total Recoverable Hydrocarbons
LDPE	Low-density Polyethylene	**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
MLLW	Mean Lower Low Water	**USEPA**	U.S. Environmental Protection Agency
MS	Matrix Spike	**USCS**	Unified Soil Classification System

SAMPLING AND ANALYSIS PLAN REPORT
2017-2018 Channel Islands Harbor Geotechnical and Environmental Investigation Project
AECOM Project No. 60564349

USACE Contract No. W912PL-17-D-0003, Task Order No. 006

May 2018

1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE) conducts maintenance dredging of the Channel Islands Harbor (Figure 1) sand traps and channels once every two years. The project serves the following two purposes:

- Remove accumulated sand from the sand traps to nourish Hueneme Beach and Silver Strand Beach down coast.
- Maintain the federal navigation channels of Channel Islands Harbor.

Sediments to be dredged require a physical and environmental evaluation every five years in accordance to a testing plan agreed upon by USACE and the Southern California Dredge Material Management Team (SC-DMMT). The last two testing episodes conducted in 2012 and 2006 indicated that the Channel Islands Harbor Sediments were predominantly sand and contained no substantially elevated sediment concentrations. The Inland Testing Manual (ITM) (USACE and USEPA, 1998) provides an allowance for predominantly sandy soils with low organic carbon content to be exempt from Tier II (chemical) and Tier III (biological) testing since sandy sediments are not known to be carriers of elevated contaminants. As such, a Tier I exclusion from additional environmental testing is being sought for the Channel Island sediments based on previous analytical and physical data and the fact that there are no known spills or anthropogenic events that have occurred that could potentially affect the quality of the sediment in the Harbor. For a Tier I exclusion to take effect, it must be shown that the Channel Island sediments are still predominantly sand.

The purpose of this project was to sample and test sediments from shoaled areas within the Channel Islands Harbor federal channels and sand traps, and from the beach nourishment sites at Hueneme Beach and Silver Strand Beach to evaluate beach nourishment reuse and to confirm that sediments are low in fine particles and that Tier II and III testing are not necessary. This work was performed under AECOM's USACE Contract No. W912PL-17-D-0003 and is authorized by the 1958 Rivers and Harbors Act (H. DOC. 356, 90TH CONG. 2nd SESS).

1.1 Project Summary

The Channel Islands detached breakwater was constructed in the early 1960s prior to the development of Channel Islands Harbor. The intent of the detached breakwater was to create an area in the lee of the breakwater that would shoal, and then the shoaled sands were to be "backpassed" to Hueneme Beach once every two years. Approximately 1.2 million cubic yards of sand shoals behind the detached breakwater (in the sand traps) on an annual basis.

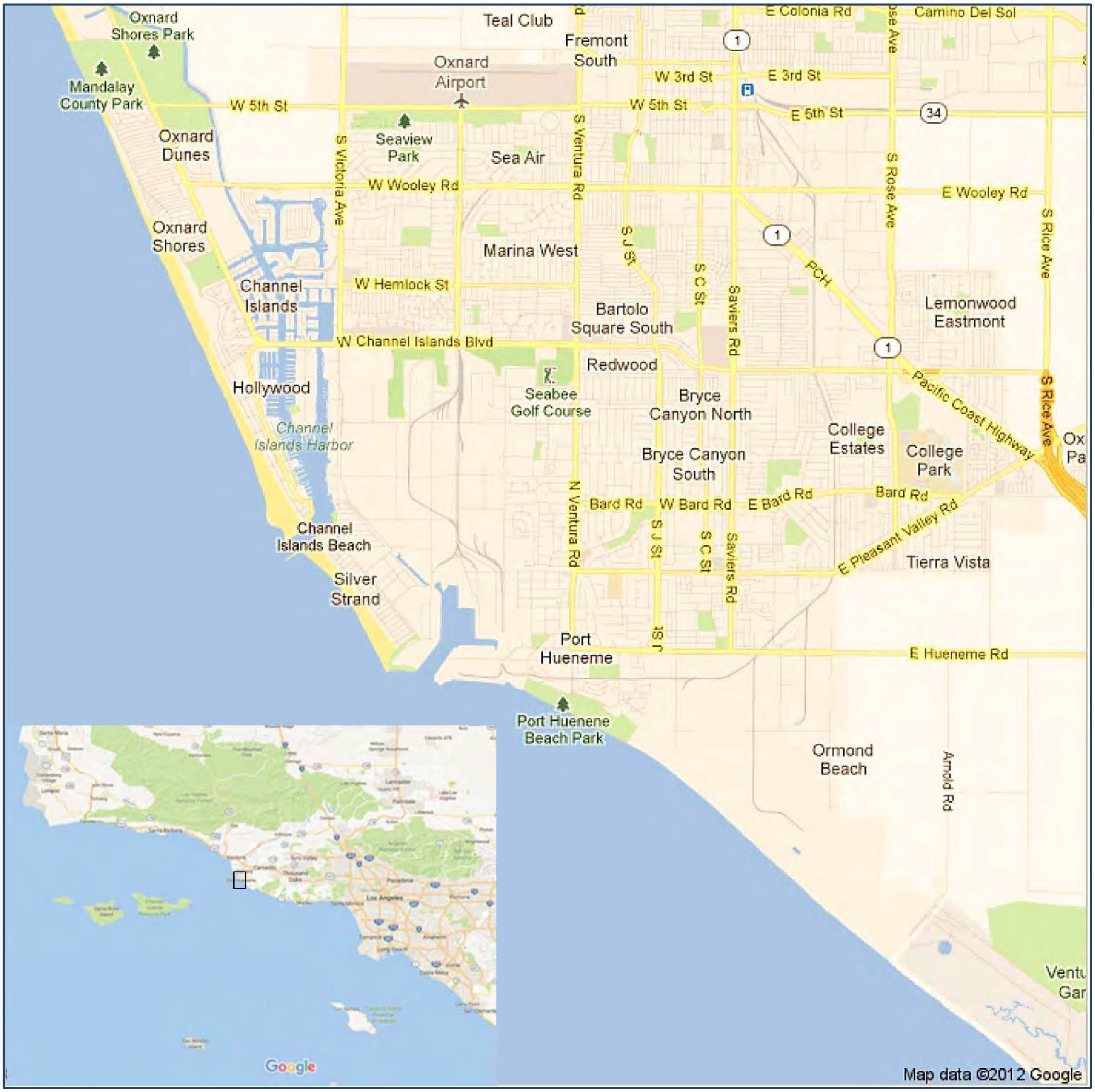


Figure 1. Location of Channel Islands Harbor and Silver Strand Beach.

Channel Islands Harbor was constructed a few years after the detached breakwater construction, and the Entrance Channel and Interior Channel were deemed as federal channels. Proper maintenance dredging would remove 2.4 million cubic yards for each 2-year dredge cycle event. However, due to funding constraints, the dredge quantity for any given year is typically below the required amount. Since 1992, the average dredge quantity per every 2-year dredge cycle has been 1,600,000 cubic yards.

The sand traps and Channel Islands Harbor federal navigation channels were divided into seven dredge units according to location and design depths. Figure 2 shows an overview of the entire dredge area and Figures 3 and 4 are close-ups showing the 2017 bathymetric data with sampling locations. The Entrance Channel (Area A), Inner Channel (Area E), and South Approach Channel (Area G) have an authorized depth of -20 ft Mean Lower Low Water (MLLW) while the Sand Traps (Areas B, C and D) have an authorized depth of -35 ft MLLW. The inner-most channel, Area F, which has an authorized depth of -10 ft MLLW, is not being evaluated as part of this project. Based on the September 2017 bathymetric survey, there are about 2,300,000 cubic yards (cy) of sediments, with a two foot overdepth allowance, that would be available for dredging in order to completely restore the sand traps and federal navigation channels back to their design depths. The quantity of shoaled material is not necessarily indicative of what will be dredged from year to year. The last dredge cycle (December 2016 to February 2017) removed 1,623,000 cy of material. Project elevations, sampling elevations, and September 2017 dredge volumes for each dredge unit in Channel Islands Harbor are provided in Table 1.

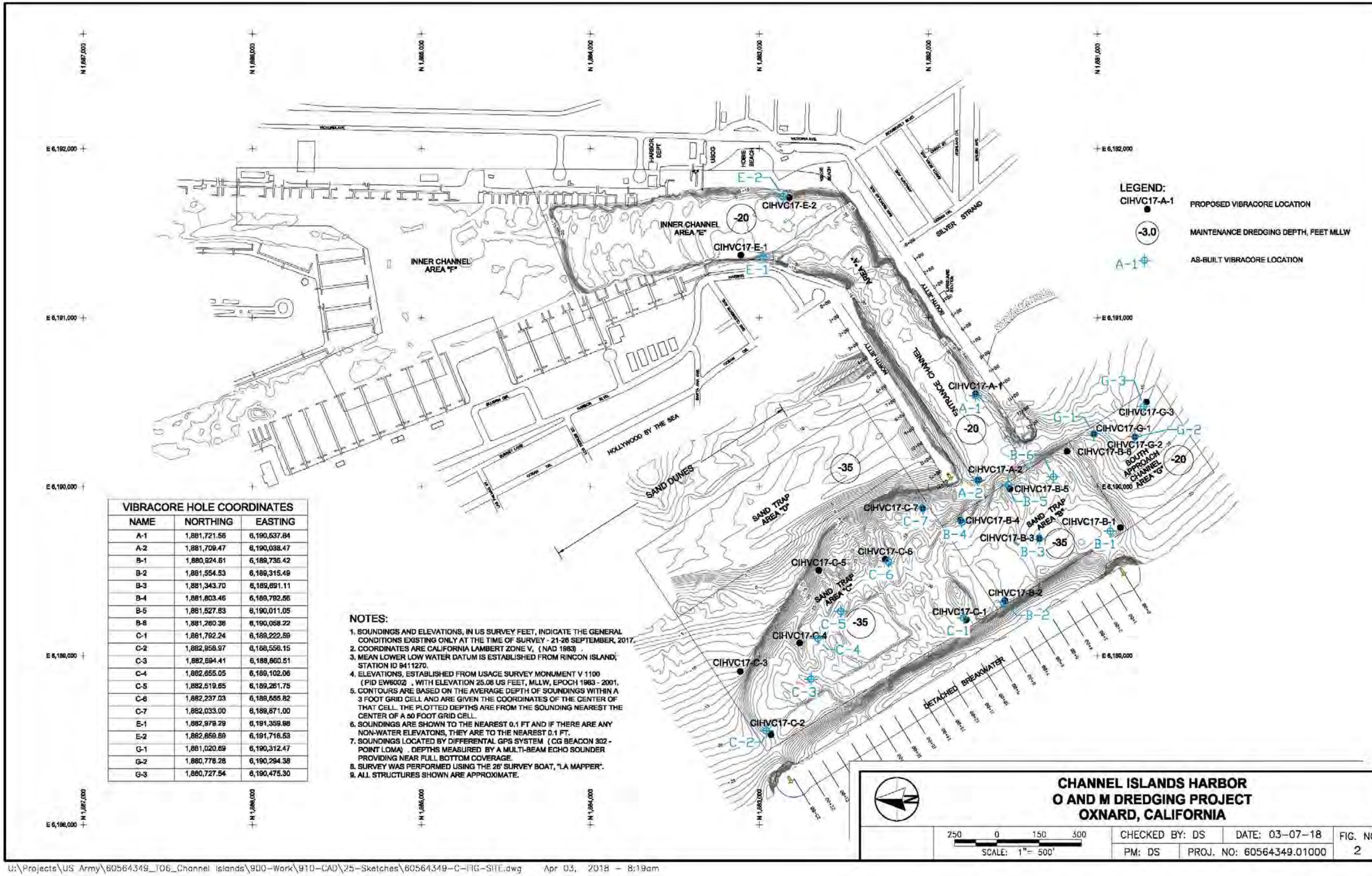
The project intent is to place the vast majority of dredge material form each dredge cycle over the next six years on Hueneme Beach, and approximately 150,000 to 200,000 cubic yards onto Silver Strand Beach each cycle. These beaches are indicated on Figure 1.

Channel Islands Harbor is dredged with a hydraulic cutterhead dredge and the dredged sediments are delivered by pipeline to the receiving beaches. This same method is expected for future dredging episodes.

Table 1. September 2017 Dredge Area Volume Estimates for the Channel Islands Federal Channels

Dredge/ Composite Area	Project Elevation (ft, MLLW)	Project Elevation + Overdepth (ft, MLLW)	Sampling Elevation* (ft, MLLW)	Estimated Dredge Quantities with Overdepth (CY)
A	-20	-22	-22	24,230
B	-35	-37	-37	66,890
C	-35	-37	-37	771,710
D	-35	-37	NA	1,368,060
E	-20	-22	-22	65,850
F	-10	-12	NA	0
G	-20	-22	-22	40,000
TOTAL SEPTEMBER 2017 DREDGE QUANTITIES				**2,336,740**

* Sampling depth includes two feet for overdepth allowance for all areas
NA = Not Applicable



NAME	NORTHING	EASTING
A-1	1,881,721.56	6,190,537.84
A-2	1,881,709.47	6,190,038.47
B-1	1,880,924.61	6,189,736.42
B-2	1,881,554.53	6,189,315.49
B-3	1,881,343.70	6,189,691.11
B-4	1,881,803.46	6,189,792.56
B-5	1,881,527.83	6,190,011.05
B-6	1,881,260.36	6,190,058.22
C-1	1,881,792.24	6,189,222.59
C-2	1,882,958.97	6,188,556.15
C-3	1,882,694.41	6,188,860.51
C-4	1,882,655.05	6,189,102.06
C-5	1,882,519.65	6,189,261.75
C-6	1,882,237.03	6,189,555.82
C-7	1,882,033.00	6,189,871.00
E-1	1,882,979.29	6,191,359.98
E-2	1,882,859.69	6,191,716.53
G-1	1,881,020.69	6,190,312.47
G-2	1,880,776.28	6,190,294.38
G-3	1,880,727.54	6,190,475.30

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Figure 2. Overview of Channel Islands Harbor 2018 Dredge Area and SAP and Actual Sampling Locations.

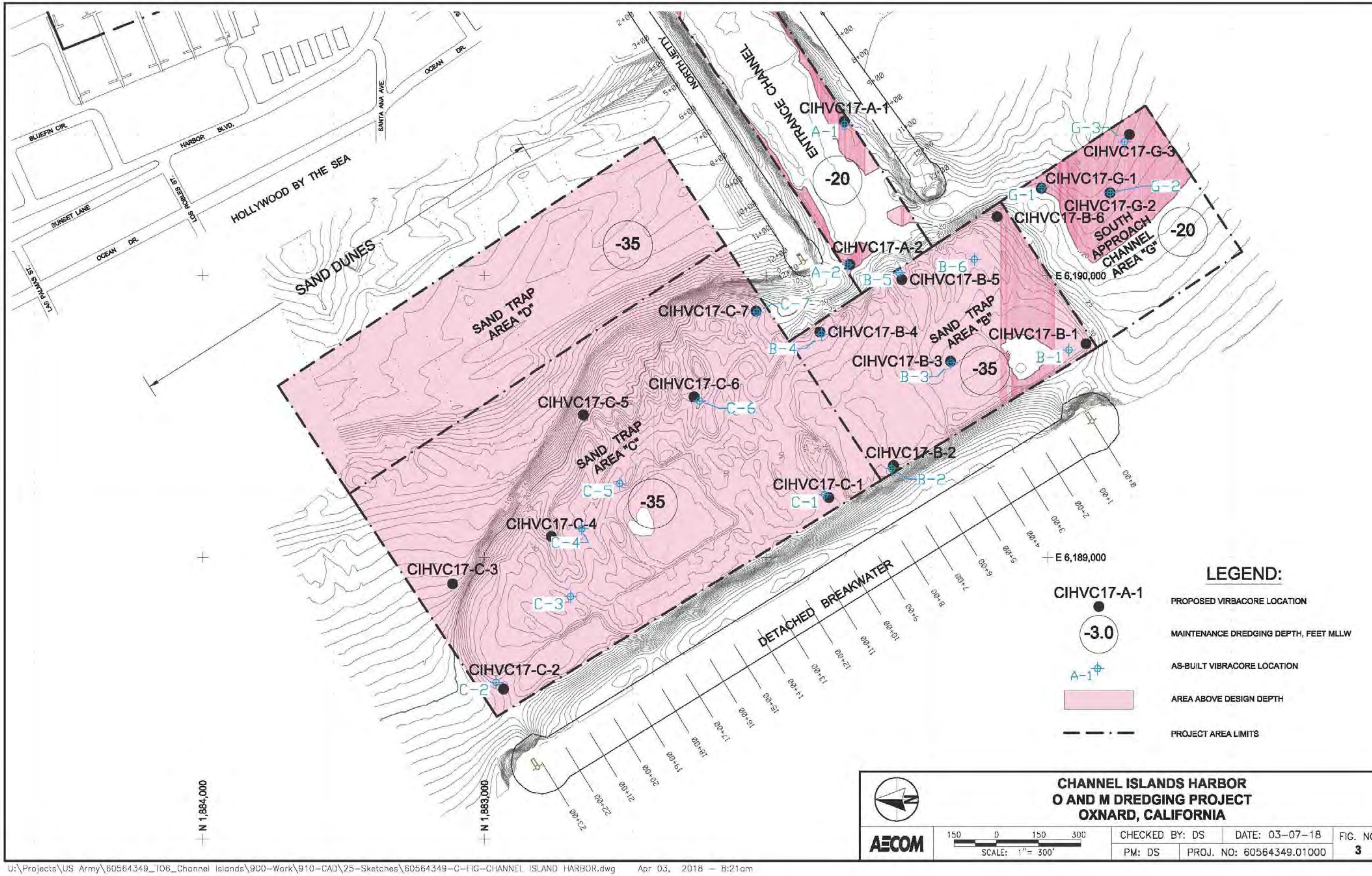

Figure 3. Close-up of Channel Islands Harbor 2018 Bathymetry and SAP and Actual Sampling Locations for Areas A, B, C and G

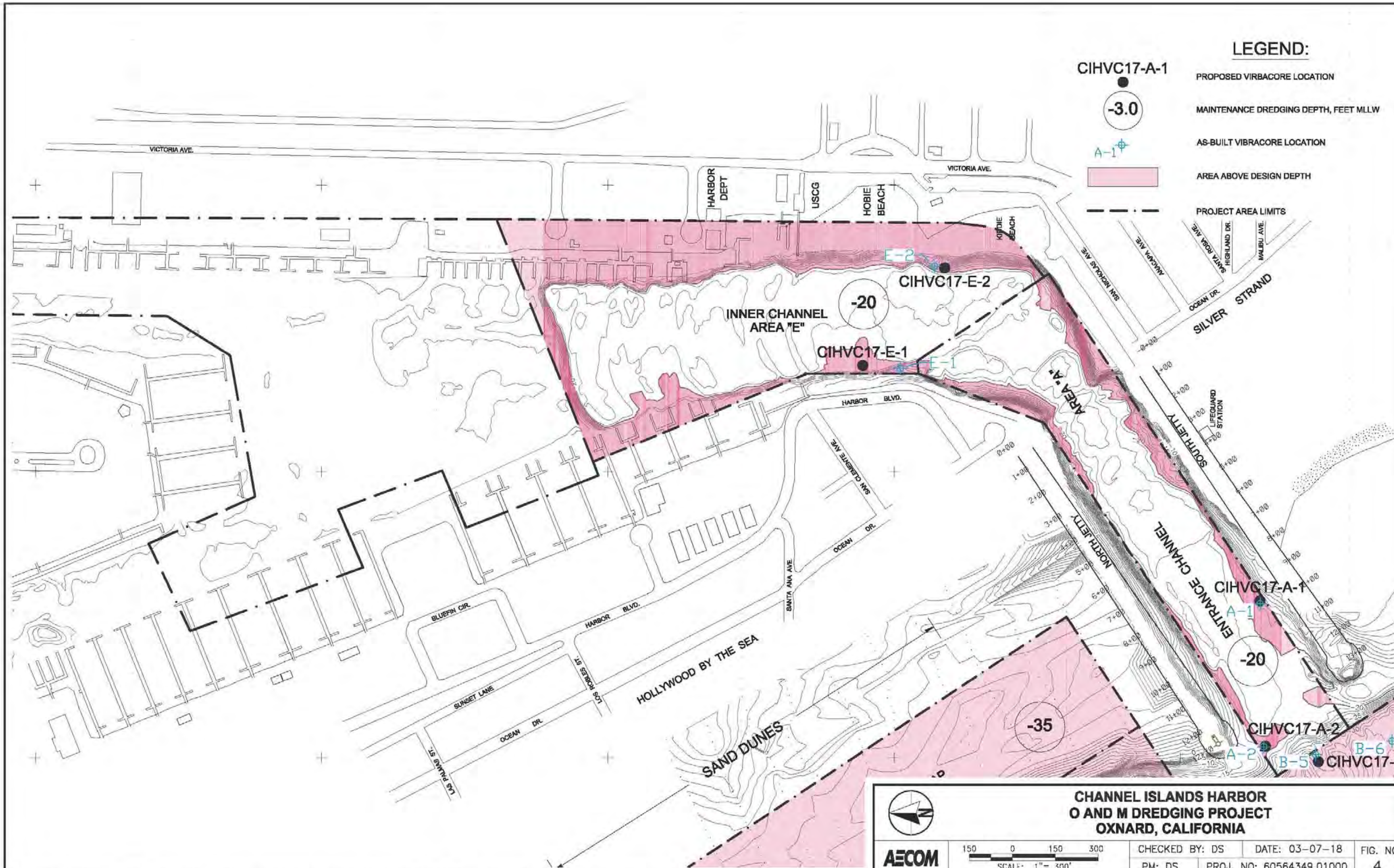

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Figure 4. Close-up of Channel Islands Harbor 2018 Bathymetry and SAP and Actual Sampling Locations for Areas A and E.

1.2 Site Location

Channel Islands Harbor is located in Ventura County, California (Figure 1). Geographic coordinates (NAD 83) for the north side of the Entrance to the Harbor are 34° 09' 24" N and 119° 13' 50" W. Majority of the dredged sand is placed at Hueneme Beach, located 1.6 miles south of the Channel Islands Harbor entrance, and just to the south of the Port Hueneme entrance, at approximately 34° 09' 07" and 119° 13' 10" W. A lesser quantity of material is placed at Silver Strand Beach is between Channel Islands Harbor and Port Hueneme between the following geographic coordinates: 34° 9' 25" N, 119°13' 33" W; 34° 8' 45" N, 119°12' 59" 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. (KLI) provided sampling services. AECOM was responsible for core logging and geotechnical testing.

The principal users of the data produced by this project are the following Southern California Dredge Material Management Team (SC-DMMT) regulatory agencies:

1. Los Angeles District, U.S. Army Corps of Engineers (USACE);
2. Los Angeles Regional Water Quality Control Board (LARWQCB)—Region 4;
3. U.S. Environmental Protection Agency (USEPA) - Region IX; and
4. California Coastal Commission.

Other users of the data may include the following agencies:

1. California Department of Fish and Wildlife (CDFW);
2. U.S. Fish and Wildlife Service (USFWS);
3. U.S. National Marine Fisheries Service (USNMFS); and
4. California State Lands Commission (CSLC).

Table 2. Project Team and Responsibilities.

Responsibility	Name	Affiliation
Project Planning and Coordination	Mark Cooke Jeffrey Devine Larry Smith David Schug Ken Kronschnabl	USACE USACE USACE AECOM Kinnetic Laboratories
SAP Preparation	Ken Kronschnabl David Schug	Kinnetic Laboratories AECOM
Field Sample Collection and Transport	Spencer Johnson Dale Parent	Kinnetic Laboratories Kinnetic Laboratories
Geotechnical Investigation	David Schug Sabah Fanaiyan Jeffrey Devine	AECOM AECOM USACE
Health and Safety Officer and Site Safety Plan	Derek Rector[1] Jon Toal	AECOM Kinnetic Laboratories
Laboratory Chemical Analyses and Laboratory Coordination	Carla Hollowell Amy Howk	Eurofins Kinnetic Laboratories
QA/QC Management Analytical Laboratory QA/QC	Danielle Gonsman Amy Howk Carla Hollowell Amy Dahl	Kinnetic Laboratories Kinnetic Laboratories Eurofins AECOM
Technical Review	Pat Kinney Larry Smith Joe Ryan	Kinnetic Laboratories USACE USACE
Final Report	Ken Kronschnabl David Schug Michael Smith	Kinnetic Laboratories AECOM AECOM
Agency Coordination	Jeffrey Devine Larry Smith	USACE USCAE

[1] Other AECOM staff may be SSHO's depending on availability.

Table 3. Key Project Contacts.

Mark Cooke 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) 452-3704 Mark.D.Cooke@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
David Schug, CEG, CHG Senior Principal Geologist, GeoEngineering AECOM 401 West A Street, Suite 1200 San Diego, CA 92101 Tel. (619) 610-7600 david.schug@aecom.com	Ken Kronschnabl Project Manager - Sampling/Testing Kinnetic Laboratories, Inc. (KLI) 307 Washington St. Santa Cruz, CA 95060 Tel. (831) 457-3950 kkronsch@kinneticlabs.net
Spencer Johnson Field Operations Mgr. Kinnetic Laboratories, Inc. (KLI) 307 Washington St. Santa Cruz, CA 95060 Tel. (831) 457-3950 sjohnson@kinneticlabs.net	Michele Castro Business Development Manager Eurofins Calscience, Inc. 7440 Lincoln Way Garden Grove, CA 92841-1427 Tel.: (949) 870-8766 MicheleCastro@eurofinsUS.com
Amy Howk KLI QA/QC Management Kinnetic Laboratories, Inc. 307 Washington St. Santa Cruz, CA 95060 Tel. (831) 457-3950 ahowk@kinneticlabs.net	Michael Smith, PE, GE, Principal Geotechnical Engineer AECOM 999 Town and Country Road Orange, CA 92868 D 1-714-567-2791 C 1-714-697-5239 michael.g.smith@aecom.com
Larry Smith USACE Environmental Coordinator 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	

2.0 SITE HISTORY AND HISTORICAL DATA REVIEW

This section provides a brief history of Channel Islands Harbor, potential sources of contamination, dredging history, and most recent testing and sampling results.

2.1 Harbor Construction, Site Setting and Potential Sources of Contamination

Channel Islands Harbor is located 68 miles north of the City of Los Angeles in the City of Oxnard, just north of Naval Base Ventura County in Port Hueneme. The Harbor is owned and operated by the County of Ventura.

2.2 Site Description

The US Army Corps of Engineers formed the Harbor in 1960 by removing sand dune and wetland sediment and depositing the material on beaches near Port Hueneme. The Harbor is divided into three areas (West, East, and Peninsula) and contains 166 acres of water with multiple marinas and approximately 2,150 boat slips. Marina facilities, restaurants, hotels, sport fishing facilities, chandleries and shops are scattered throughout the Harbor. Marina facilities include launch ramps, a fuel dock, sewage pump out facilities and public restrooms. Figure 5 shows a map of Harbor facilities.

According to the County of Ventura GIS mapping system, there are no major storm water outfalls that enter the Harbor. There are, however, numerous minor outfalls from localized runoff.

2.3 Previous Channel Islands Harbor Dredging and Testing Episodes

The US Army Corps of Engineers performs maintenance dredging at Channel Islands Harbor every one or two years. Most of the material dredged throughout the years has been pumped to Hueneme Beach. In addition, 150,000 to 200,000 cy is typically pumped directly on Silver Strand Beach during most dredging episodes.

2.3.1 2012 Testing Episode

Channel Islands Harbor sediments were last sampled in April 2012 and tested for beach nourishment. Twenty-six (26) sediment core samples were collected from five (5) designated composite areas and submitted to laboratories for chemical and geotechnical testing. Beach transect grab samples were collected from two (2) perpendicular transects at Silver Strand Beach and three (3) perpendicular transects at Hueneme Beach. Data generated in this investigation are summarized in a report by Diaz Yourman, GeoPentech and Kinnetic Laboratories JV (2012) and were used to complete chemical and grain size compatibility analyses. Summary tables from this report are also provided in Appendix A.

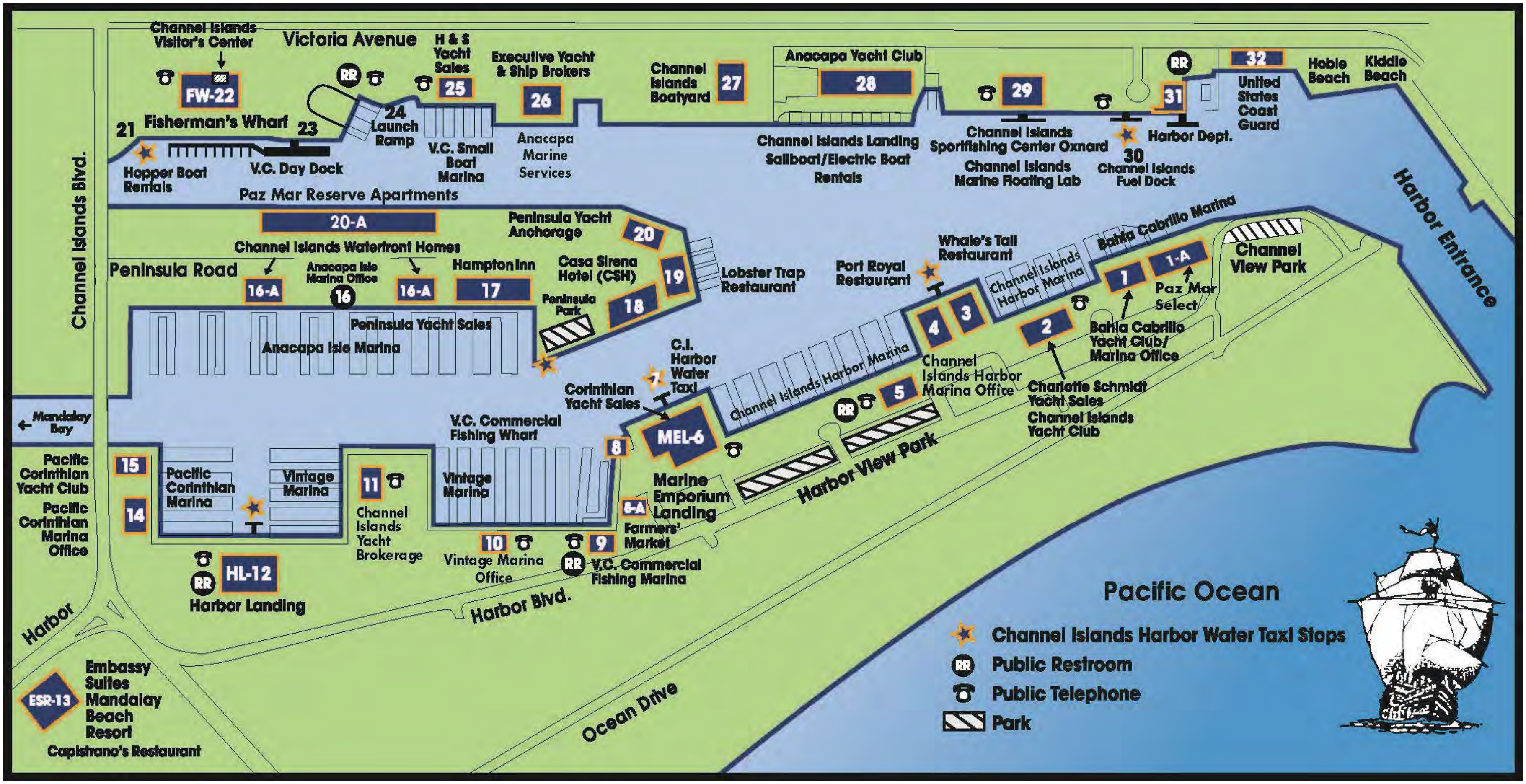

Figure 5. Map Showing Channel Islands Harbor Facilities. **(http://www.mappery.com/Channel-Islands-Harbor-California-Map)**

USACE, Los Angeles District conducted the beach physical compatibility analysis using the 2012 grain size data. Their report (USACE, 2012), which is attached to the main report, concluded that sediments from all five composite areas tested were physically compatible with Silver Strand and Hueneme beaches based on both the weighted average individual and composite sediment grain size curves for each area.

The results of the chemical analysis of composite sediment samples from 2012 found overall contaminant concentrations were below detection or small compared to effects based screening values. Only DDT was detected above a NOAA Effects Range Low (ERL) screening value (Long et. al., 1995) in three of the five areas (Area A, Area C and Area E), with Area E (Inner Channel) having the highest value. The total DDT concentration in Area E was 9.9 µg/kg, which was about six times higher than the ERL value of 1.58 µg/kg and about five times lower than the NOAA Effects Range Median (ERM) value of 46.1 µg/kg.

Except for arsenic, all contaminants detected in the Channel Islands Harbor sediments from 2012 were well below updated Regional Screening Levels for Chemical Contaminants at Superfund Sites (RSLs) (USEPA Region 9, updated 2017) and the most recent California Human Health Screening Levels (CHHSLs) for residential soils (Cal/EPA, 2005, updated 2010) developed for human protection. As part of the 2012 study, the California Coastal Commission requested that an arsenic background concentration be determined for beaches near Channel Islands Harbor. This study, which was incorporated into the report, determined an upper bound beach background concentration of 2.14 mg/kg. The 2012 sediment arsenic concentrations were similar to or only slightly higher than the calculated background concentration.

The 2012 report concluded that excursions above screening levels appeared to be minor and the data indicated that there was little chance of adverse biological or human health effects from the placement of Channel Islands Harbor Sediments at Silver Strand and Port Hueneme Beaches.

2.3.2 2006 Testing Episode

Previous analytical testing data are also available for a prior study conducted in 2006. This study involved the collection of six composite samples in October 2006 (Diaz-Yourman and Associates and Kinnetic Laboratories, 2007). Data generated from this study are provided in Appendix B. For the most part, only low levels of contaminants were evident in the predominantly sandy Channel Islands Harbor sediments. Silver, butyltins, phenols, PCB aroclors, oil and grease and total recoverable hydrocarbons were not detected above reporting limits in any samples. All other metal concentrations were below NOAA ERL values. Low levels (at or below the reporting limit) of numerous PCB congeners were detected in all but two composite samples. DDT compounds in two samples and total PAH compounds in a single sample are the only detected organic contaminants exceeding ERL values. In all cases, contaminant concentrations were below NOAA ERM values. Only arsenic exceeded human health objectives.

3.0 METHODS

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

3.1 Dredge Design

Bathymetric data from September 2017 in relationship to target sampling locations are shown on Figures 2 through 4. These figures also define the limits of dredging, as well as design depths for each area identified for future dredging.

3.2 Sampling and Testing Design

The sampling and testing design detailed in the SAP for this project and summarized below covered data collection tasks for Channel Islands Harbor sediment collection and testing and Silver Strand Beach sampling and testing. Evaluation guidelines are also discussed below.

The main approach for the Channel Islands Harbor sediments was to sample the sediments to dredge depths plus allowable overdepth, log the physical characteristics of each boring, and submit a sample of each major stratigraphic layer for geotechnical testing. This data was used to determine if the Channel Islands Harbor sediments were physically suitable for placement on Silver Strand and Hueneme Beaches. Sampling and testing followed guidance in the Inland Testing Manual (ITM) (USEPA/USACE, 1998) and from USACE, Los Angeles District guidelines (CESPL, undated). Acceptability guidelines published in these documents was used to evaluate the suitability of Channel Islands Harbor maintenance-dredged sediments for beach nourishment.

In addition to collecting samples for physical testing, samples were collected and archived from each boring (mudline to overdepth elevation) for possible chemical testing, and composited sediments from each channel area were archived for possible chemical and biological testing. An archived area composite sample may be chemically tested if the physical testing determines that a large proportion of that composite sample contains fined grained material. Individual boring archives and/or a bioassay archive may be tested if a particular composite sample has elevated contaminant concentrations.

3.2.1 Channel Islands Harbor Sample Identification, Composite Areas, Sediment Collection and Testing

Vibracore sampling, as described in Section 3.3.2 (Vibracore Sampling Methods), was carried out to collect subsurface sediment data at two (2) locations within Area A, six (6) locations in Areas B, seven (7) locations in Area C, two (2) locations in Area E, and three (3) locations in Area G. This equates to 20 separate vibracore sampling locations. The prefix for all vibracore locations was “CIHVC-18-#-##.” Sampling occurred February 26 – 28, 2018. Final as well as the SAP sampling locations are shown on Figures 2 through 4. Due to extreme shoaling, limited access and safety concerns, no samples were taken from the Area D Sand Trap. During the last sampling effort in 2012 for Area D, heavy shoaling in this area limited access by traditional boat mounted vibracore methods. As such, this necessitated conducting coring instead by use of specialized truck mounted sampling unit. Due to these difficulties, the samples were collected short of the dredge depth. However, physical and bulk sediment chemistry test results for this area showed that the sediment was approximately 98% sand with no contamination. Sediment samples were collected to the project dredge depth from the Area C sand trap adjacent to Area D. Since this area is adjacent to Area D, it is assumed that the sediment in both areas is the same and that samples collected in 2018 from Area C will reasonably represent the sediment present in Area D.

Geographic coordinates, time of sampling, seafloor elevations, target elevations and sampling intervals for the finals sample locations are listed in Table 4. Note that a few sample locations changed slightly from the proposed locations to target more shoaled areas. California Lambert coordinates are shown on Figure 2.

A total of five (5) area composite samples were created from the five (5) dredge units being sampled and were archived for possible chemical (Tier II) and biological (Tier III) testing. One composite sample was created from each channel area. 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 a composite area to the form composite samples. Sediments below overdepth elevations were not included in any sediment composite sample.

Individual core archive samples for possible Tier II testing from each core were collected and represent the mudline to the area overdepth elevation or to the depth of refusal. Core subsamples for geotechnical testing included any geo-physically different layers of material in each core and were analyzed for grain size distribution as described later in Section 3.2.3.

3.2.2 Beach Transect and Nearshore Reference Samples

A series of surface grabs were collected along two (2) transects perpendicular to the shore at the Silver Strand Beach identified on Figure 6. The beach transect sampling consisted of collecting surface grab samples at eight elevations (+12, +6, 0, -6, -12, -18, -24 and -30 feet MLLW) along each transect. Individual geotechnical grain size testing was performed on all grab samples collected from the beach and nearshore sites. Table 5 lists the final locations of the beach transect samples.

Since beach transect and nearshore grain size data were collected at Hueneme Beach as part of the 2016 Port Hueneme Harbor dredge material investigation (Diaz Yourman, GeoPentech and Kinnetic Laboratories JV, 2017), no additional sampling was conducted. A summary of these data are provided in Appendix C. The 2016 Hueneme Beach physical data was used as part of USACE's beach compatibility analysis. Figure 6 shows the locations of the 2016 Hueneme Beach sampling transects and nearshore area sample locations.

Table 4. Actual Sampling Location Coordinates, Date and Time of Sampling, Core Depths, Mudline Elevations, and Sampling Elevations for the 2017 Channel Islands Harbor Sampling and Testing Program.

Fed. Chan./ Area	Core Designation	Date Sampled	Time Sampled	California Lambert Zone 5 (NAD 83)		Geographic Coordinates (NAD 83)		Mudline Elevation (ft., MLLW)	Design Depth + Overdepth (ft., MLLW)	Core Recovery (ft.)	Core Interval Sampled (ft., MLLW)
				Northing (feet)	Easting (feet)	Latitude North	Longitude West				
Area A Entrance Channel	CIHVC-18-A-01	02/27/18	08:15	1881721	6190537	34° 09.410'	119° 13.606'	-18.7	-22	6.8	3.3
	CIHVC-18-A-02	02/27/18	08:50	1881709	6190038	34° 09.407'	119° 13.705'	-17.4	-22	6.3	4.6
Area B Sand Trap	CIHVC-18-B-01	02/27/18	10:30	1880924	6189736	34° 09.277'	119° 13.763'	-33.7	-37	6.3	3.3
	CIHVC-18-B-02	02/27/18	11:30	1881554	6189315	34° 09.380'	119° 13.848'	-32.7	-37	6.5	4.3
	CIHVC-18-B-03	02/27/18	09:45	1881343	6189691	34° 09.346'	119° 13.773'	-32.8	-37	6.5	4.2
	CIHVC-18-B-04	02/27/18	15:30	1881803	6189792	34° 09.422'	119° 13.754'	-26.0	-37	12.9	11.0
	CIHVC-18-B-05	02/27/18	13:30	1881527	6190011	34° 09.377'	119° 13.710'	-29.7	-37	10.2	7.3
	CIHVC-18-B-06	02/27/18	12:45	1881260	6190058	34° 09.333'	119° 13.700'	-28.7	-37	10.7	8.3
Area C Sand Trap	CIHVC-18-C-01	02/28/18	12:27	1881792	6189222	34° 09.419'	119° 13.867'	-29.5	-37	8.9	7.5
	CIHVC-18-C-02	02/28/18	12:00	1882958	6188556	34° 09.610'	119° 14.002'	-30.2	-37	8.7	6.8
	CIHVC-18-C-03	02/28/18	11:05	1882694	6188860	34° 09.567'	119° 13.941'	-30.2	-37	8.6	6.8
	CIHVC-18-C-04	02/27/18	17:05	1882655	6189102	34° 09.561'	119° 13.893'	-24.8	-37	13.3	12.2
	CIHVC-18-C-05	02/28/18	09:04	1882519	6189261	34° 09.539'	119° 13.861'	-21.2	-37	18.0	15.8
	CIHVC-18-C-06	02/27/18	16:20	1882237	6189555	34° 09.493'	119° 13.802'	-23.0	-37	14.0	14.0
	CIHVC-18-C-07	02/28/18	07:55	1882032	6189870	34° 09.460'	119° 13.739'	-16.8	-37	15.0	15.0
Area E Inner Channel	CIHVC-18-E-01	02/28/18	17:25	1882979	6191359	34° 09.619'	119° 13.446'	-19.8	-22	5.5	2.2
	CIHVC-18-E-02	02/27/18	07:45	1882859	6191716	34° 09.600'	119° 13.375'	-17.3	-22	6.5	4.7
Area G South Approach Channel	CIHVC-18-G-01	03/01/18	09:30	1881020	6190312	34° 09.294'	119° 13.649'	-16.1	-22	8.9	5.9
	CIHVC-18-G-02	03/01/18	09:05	1880778	6190294	34° 09.254'	119° 13.652'	-17.3	-22	7.5	4.7
	CIHVC-18-G-03	03/01/18	08:35	1880727	6190475	34° 09.246'	119° 13.616'	-16.2	-22	6.0	5.8

Figure 6. Location of Silver Strand Beach Sampling Transects and the 2016 Hueneme Beach Sampling Transects and Nearshore Sampling Locations.

Table 5. Date, Times and Sampling Coordinates for Samples Collected from the Silver Strand Beach Transects.

Area	Site Designations	Date	Time	Approx. Sampling Elevations (feet, MLLW)	Geographic Coordinates (NAD 83)	
					Latitude North	Longitude West
Silver Stand Beach Transect A	SSB18-A-1	2/28/18	14:36	+12	34° 09.238′	119° 13.288′
	SSB18-A-2	2/28/18	14:33	+6	34° 09.234′	119° 13.294′
	SSB18-A-3	2/28/18	14:27	0	34° 09.229′	119° 13.301′
	SSB18-A-4	2/28/18	14:24	-6	34° 09.217′	119° 13.315′
	SSB18-A-5	3/1/18	07:50	-12	34° 09.172′	119° 13.413′
	SSB18-A-6	3/1/18	09:58	-18	34° 09.157′	119° 13.433′
	SSB18-A-7	3/1/18	10:05	-24	34° 09.095′	119° 13.524′
	SSB18-A-8	3/1/18	10:12	-30	34° 09.039′	119° 13.613′
Silver Stand Beach Transect B	SSB18-B-1	2/28/18	14:57	+12*	34° 09.070′	119° 13.147′
	SSB18-B-2	2/28/18	14:53	+6	34° 09.067′	119° 13.155′
	SSB18-B-3	2/28/18	14:51	0	34° 09.065′	119° 13.161′
	SSB18-B-4	2/28/18	14:46	-6	34° 09.053′	119° 13.188′
	SSB18-B-5	3/1/18	08:02	-12	34° 09.003′	119° 13.249′
	SSB18-B-6	3/1/18	10:20	-18	34° 08.979′	119° 13.284′
	SSB18-B-7	3/1/18	10:28	-24	34° 08.940′	119° 13.345′
	SSB18-B-8	3/1/18	10:33	-30	34° 08.882′	119° 13.439′

* The +12 location in Transect B was sampled at an elevation of +15.5' from the top of the berm.

3.2.3 Geotechnical Samples and Testing

A sufficient quantity of sediment was collected from each location within the Channel Islands Harbor federal channels 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 between the mudline and the overdepth elevations. Additional grain size samples representing layers of physically different material greater than six (6) inches were also collected. The field geologist coordinated with the Project Technical Manager on the selection of samples and any samples to be archived. Grain size analyses were also run on each sampling location along the two (2) Silver Strand Beach transects. All mechanical grain size tests were run according to ASTM D 422 (1963) and was conducted by an AECOM laboratory.

In addition to the mechanical grain size samples, five (5) hydrometer tests were run according to ASTM D 422 and five (5) Atterberg Limits tests were run according to ASTM D 4318 (2005). The hydrometer and Atterberg tests were run on representative samples of relatively fine grained material collected from the sediment cores.

All geotechnical data gathered was 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 G to this report.

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 referenced to a local geodetic benchmark with positioning accuracies of 3 to 10 feet. The locations were recorded in both Geographic coordinates (NAD 83) and later 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 as close as possible to target locations. If the target location was not reached (due to shoaling, obstructions, etc.), a location as close as practical that is within the area and project limits and that is shoaled above the project elevation was sampled. Locations B-01, B-06, C-03 and C-05 were moved to another spot in the general area because the shoaling was so much that we were unable to safely get the boat over the proposed location with the swells that were coming in. E-01 was moved slightly to target a more shoaled area.

3.3.2 Vibracore Sampling Methods

All sediment samples were collected using an electric vibracore that was able to penetrate and obtain samples to the project sample elevations. Cores were advanced to the target sampling elevations or beyond (project elevations plus two feet for overdepth allowance plus additional depth for geotechnical pusposes only). Core refusal was not encountered for any location though the core recovery fell short for one of the deeper Sand Trap cores at location C-07. At the conclusion of a successful vibracore, the core liner was removed and split open for inspection and sampling. Extrusion of the core was not allowed. Processing took place onboard the sampling vessel.

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. Inserted into the core tubes were food-grade clean polyethylene liners. 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 an A-frame and winch. The unit was then vibrated until it reaches target sampling elevation.

When penetration of the vibracore was complete, power was shut off to the vibra-head and the vibracore was brought aboard the vessel. A check valve located on top of the core tube, that reduced or prevented sediment loss during pull-out, was removed. The length of sediment recovered was confirmed by measuring down the interior of the core tube to the top of the sediment. The core cutting tip and catcher were then removed and the core liners were sealed on both ends until processed.

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 penetrated the sediment. Thus one-point anchoring or no anchoring was utilized. A stand also prevented the coring apparatus from being pulled up from waves during penetration, thus alleviating multiple penetrations of the same material.

3.3.3 Vibracore Decontamination

All sample contact surfaces were stainless steel, polyethylene or Teflon® coated. 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 between 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 placed in a PVC core rack that was cleaned between cores. All cores were processed on board the ***DW Hood*** with clean plastic sheeting covering the deck. After placement in the core rack, core liners were split lengthwise to expose the recovered sediment. Once exposed, sediment that came in contact with the core liner was 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). Additional sediment characteristics including likely sediment origin and other observations was also recorded. A geologist from AECOM did the lithologic logging along with collection of sample splits for geotechnical testing.

Photographs were taken of each core (each photograph covers a maximum two-foot interval), prior to sample processing and of sampling equipment and procedures. These pictures are provided in Appendix D 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 two feet below the project depth for the area. Primary vertical composite subsamples were archived for chemical testing and used to form area composite samples to be archived for possible chemical and biological testing.

Vertical composite subsamples were formed by combining and homogenizing a representative sample from each sampling interval and from each core stratum, as described in Section 3.2.1, in a pre-cleaned stainless steel or Teflon®-coated tray. A 0.5-liter portion of each primary vertical composite subsample and core stratum was placed in a pre-cleaned and certified glass jar with a Teflon®-lined lid for archived material (Ziploc bags for geotechnical samples). The representative portion of each primary vertical composite subsample within each sampling interval identified for composite sample formation were placed in a large pre-cleaned mixing bowl for area compositing with other cores from the same sampling interval in the same composite area. The composited sediment was placed in 1-liter pre-cleaned and certified glass jars with a Teflon®-lined lids and archived for chemistry. Another representative portion of each core from a composite area were placed in a food-grade clean 5-gallon LPDE bucket liner as archive material for potential Tier III testing. All samples for grain size analyses were transferred to pre-labeled sample containers (sealed plastic bags) and stored appropriately, until they were transferred to AECOM for analysis.

All chemistry archive samples were placed on ice initially and then frozen as soon as possible. A small amount of headspace as allowed for archived chemistry samples to prevent container breakage during freezing. Archived samples for Tier III testing are being kept refrigerated and maintained at 2 to 4° C. The sample containers, jars and bags, were sealed to prevent any moisture loss and possible contamination.

3.3.5 Beach Transect and Nearshore Area Grab Samples

The top six inches of sand or sediment was collected at all beach transect sampling locations. The four highest locations along each beach transect were sampled on land using a hand held scoop. All other offshore stations were sampled from the ***DW Hood*** using Smith-McIntyre Grab. The grab sampler was deployed at each offshore location, and upon retrieval, the grab was visually inspected to ensure the sample was acceptable according to SOPs. Contents of each grab were placed in pre-labeled sample containers (sealed plastic bags) and stored appropriately for transfer to AECOM for grain size analyses.

3.3.6 Detailed Sediment Log

A detailed sediment log was prepared for each vibracore sampling location. 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. Description of the sediment were made in accordance with ASTM D 2488 (2006), and include 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. Completed sediment logs are provided in Appendix E.

3.3.7 Documentation and Sample Custody

All samples had their containers 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. Redundant sampling data was also recorded on field data log sheets. Copies of these logs are included in this report as Appendix D.

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 followed 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 forms and ensured samples are stored properly and not left unattended unless properly secured. The completed COC forms were placed in a sealable plastic bags that were taped to the lid of coolers containing the samples.

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

A daily field activity log was maintained listing the beginning and ending time for every and all phases of operation, the names and responsibilities of all field personnel present, description and length of any delays, and weather and sea conditions.

As described in Sections 3.3.6, detailed sediment logs were prepared from each sampling location, including beach transect locations.

4.0 RESULTS AND DISCUSSION

Physical testing results of the Channel Islands Harbor sediments are summarized in Tables 6 and grain size analysis of Silver Strand Beach are presented in Table 7 below. Results from the 2016 grain size analysis of Port Hueneme Beach can be found in Appendix C. Subsections that follow describe the physical testing results, as summarized in Tables 6 and 7 in terms of objectives for beach nourishment and ODMDS placement.

4.1 Sediment Observations

Sediment characteristics were generally similar among the cores. According to sediment logs (Appendix F), sediments were described as poorly graded sand (SP) or poorly graded sand with silt (SP-SM) down to the project overdepth elevations. Minor thin layers of silt with shells (less than about 0.5 feet thick) were logged in the cores. B-2 encountered a 1-foot thick silty sand (SM) layer at the top of the core. B-3 also encountered a 1-foot thick silty sand (SM) layer at the top of the core as well as a 1-foot thick silty sand (SM) interbed at the project overdepth elevation. One core (18-E-1) encountered silt (ML) to the project overdepth elevation.

The beach transect samples consisted of poorly graded sand (SP). Several samples were described as poorly graded sand with silt (SP-SM).

4.2 Sediment Physical Results

Grain size analyses were performed on multiple layers from each of the 20 cores collected. Data for each core and each individual layer are provided in Table 6. Sieve analysis data for Silver Strand Beach is provided in Table 7. Individual grain size distribution curves for each individual grain size sample are provided in Appendix F along with plasticity index plots and hydrometer data for a select number of samples. Results from the 2016 prior testing of Port Hueneme Beach can be found in Appendix C of this report.

The weighted average composite grain size gradation was calculated for all five dredge areas based on the grain size test results from the vibracore borehole samples (Table 6). The weighted average sand content is 97.8% for Area A, 93.3 % for Area B, 92.9 % for Area C, 70.6 % for Area E and 98.4 % for Area G. In comparison, the average sand content for Silver Strand Beach was 97.8 % (Table 7) and the previous testing of Port Hueneme Beach in 2016 was 92.8%.

Results of the physical compatibility analysis are provided in Appendix G as a separate report prepared by the Los Angeles District USACE. This report concluded that the grain size distribution for Areas A, B, C and G are compatible for placement at Silver Stand Beach, Port Hueneme Beach as well as the four nearshore sites (Alpha, Bravo, Charlie and Delta) located south of Port Hueneme Harbor. Sediments from Area E do not fit within the compatibility envelope of Silver Stand Beach or three of the nearshore disposal areas (Bravo, Charlie and Delta). However, they are compatible with both the Port Hueneme Beach sediments and the Alpha nearshore location.

4.3 Sediment Chemistry Results

Composited sediments from each channel area were archived for both chemical and biological testing. Physical testing of these sediments confirmed primarily sandy sediments with little to no fine grain material. As such, chemical and biological analyses were not performed.

As previously mentioned, grain size analysis was not conducted on Port Hueneme Beach or the nearshore locations Alpha, Bravo, Charlie and Delta. These sediments were collected for Port Hueneme Deep Navigation Project. Those results can be found in Appendix C of this report. Sampling for Port Hueneme Beach occurred in November of 2016 and showed an average sand content of 92.8%, the nearshore Delta location was sampled in March of 2017 and had an average sand content of 95%. Additional confirmation testing of the Delta nearshore location occurred again in June of 2017 along with testing of the Alpha, Bravo and Charlie locations with the average sand content ranging from 89% to 95%.

Table 6. Channel Islands Harbor Sieve Analysis Data

Core Designation	Sampling Depth (ft, MLLW)	Gravel			Coarse Sand		Medium Sand				Fine Sand					Silt		Atterberg Limits		Classification
		Sieve No./Sieve Size/% Passing																		
		1/2"	3/8"	4	7	10	14	18	25	35	45	60	80	120	170	200	230	LL	PI	
		12.5mm	9.5mm	4.750mm	2.800mm	2.000mm	1.400mm	1.000mm	0.710mm	0.500mm	0.355mm	0.250mm	0.180mm	0.125mm	0.090mm	0.075mm	0.063mm			
Area A																				
CIHVC-18-A-01	-22	100.0	100.0	99.7	99.0	98.3	97.4	96.1	94.4	91.6	83.2	58.7	32.2	9.0	3.0	2.1	1.9			POORLY GRADED SAND (SP)
CIHVC-18-A-01	-22	100.0	100.0	93.9	92.8	92.0	90.9	89.6	87.8	84.9	78.4	59.3	35.7	11.0	3.5	2.2	1.9			POORLY GRADED SAND (SP)
CIHVC-18-A-02	-22	100.0	100.0	100.0	100.0	99.9	99.7	99.2	97.3	92.0	81.1	60.7	37.7	11.2	3.5	2.3	2.0			POORLY GRADED SAND (SP)
Area A Weighted Avg.		100	100	98.2	97.8	97.4	96.8	96.0	94.2	89.9	80.6	60.0	36.4	10.9	3.4	2.2	2.0			
Area B																				
CIHVC-18-B-01	-37	100.0	100.0	100.0	100.0	100.0	99.9	99.9	99.8	99.6	98.9	94.2	71.3	22.5	6.7	4.0	3.2			POORLY GRADED SAND (SP)
CIHVC-18-B-02	-37	100.0	100.0	100.0	100.0	100.0	99.9	99.9	99.7	99.5	99.2	98.3	95.3	64.3	41.9	33.6	29.7			SILTY SAND (SM)
CIHVC-18-B-02	-37	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.8	99.4	97.4	81.6	26.4	7.7	4.3	3.3			POORLY GRADED SAND (SP)
CIHVC-18-B-03	-37	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.9	99.8	99.5	97.8	88.1	47.2	27.3	22.0	19.6			SILTY SAND (SM)
CIHVC-18-B-03	-37	100.0	100.0	100.0	99.9	99.8	99.7	99.6	99.5	99.1	98.0	91.3	67.4	19.3	5.4	3.4	2.9			POORLY GRADED SAND (SP)
CIHVC-18-B-03	-37	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.8	99.7	99.3	97.1	77.6	55.6	47.2	42.9			SILTY SAND (SM)
CIHVC-18-B-04	-37	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.7	94.6	64.8	19.3	8.0	6.0	5.3			POORLY GRADED SAND WITH SILT (SP-SM)
CIHVC-18-B-04	-37	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.9	99.5	92.2	62.2	16.4	6.1	4.5	4.0			POORLY GRADED SAND (SP)
CIHVC-18-B-05	-37	100.0	100.0	100.0	100.0	100.0	99.9	99.9	99.8	99.6	98.5	87.3	43.6	12.4	4.0	2.5	2.1			POORLY GRADED SAND (SP)
CIHVC-18-B-06	-37	100.0	100.0	99.9	99.6	99.4	98.9	98.2	96.9	94.7	90.4	76.3	54.5	14.6	6.9	5.1	4.6			POORLY GRADED SAND WITH SILT (SP-SM)
Area B Weighted Avg.		100	100	100	99.9	99.9	99.7	99.6	99.2	98.6	97.2	89.3	62.6	20.9	9.1	6.7	5.9			
Area C																				
CIHVC-18-C-01	-37	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.9	95.8	87.1	66.5	42.4	17.9	12.1	11.4	11.3			POORLY GRADED SAND WITH SILT (SP-SM)
CIHVC-18-C-01	-37	100.0	100.0	100.0	100.0	100.0	99.9	99.9	99.9	99.6	99.3	96.8	81.8	27.3	13.1	9.1	7.4			POORLY GRADED SAND WITH SILT (SP-SM)
CIHVC-18-C-01	-37	100.0	100.0	100.0	100.0	99.9	99.8	99.7	99.4	98.9	97.7	89.0	43.6	10.6	3.8	2.7	2.4			POORLY GRADED SAND (SP)
CIHVC-18-C-02	-37	100.0	100.0	100.0	99.9	99.9	99.8	99.7	99.5	99.2	98.5	95.6	81.0	30.3	14.1	9.1	6.9			POORLY GRADED SAND WITH SILT (SP-SM)
CIHVC-18-C-03	-37	100.0	100.0	100.0	100.0	99.9	99.8	99.7	99.5	99.3	98.9	96.7	76.3	26.2	15.0	11.1	9.4			POORLY GRADED SAND WITH SILT (SP-SM)
CIHVC-18-C-03	-37	100.0	100.0	100.0	100.0	99.9	99.9	99.7	99.4	98.8	97.4	91.6	66.9	24.5	14.5	11.3	9.7			POORLY GRADED SAND WITH SILT (SP-SM)
CIHVC-18-C-04	-37	100.0	100.0	100.0	100.0	99.9	99.9	99.9	99.8	99.6	99.2	95.1	56.1	18.5	10.1	7.6	6.7			POORLY GRADED SAND WITH SILT (SP-SM)
CIHVC-18-C-04	-37	100.0	100.0	99.9	99.9	99.7	99.5	99.4	99.1	98.9	98.1	91.6	57.0	16.6	8.0	5.2	4.2			POORLY GRADED SAND WITH SILT (SP-SM)
CIHVC-18-C-05	-37	100.0	100.0	100.0	99.9	99.9	99.8	99.8	99.6	99.0	98.4	92.2	44.3	9.9	3.3	2.4	2.0			POORLY GRADED SAND (SP)
CIHVC-18-C-05	-37	100.0	100.0	99.6	99.5	99.4	99.3	99.2	99.0	98.6	97.5	90.6	47.2	11.5	4.4	3.1	2.8			POORLY GRADED SAND (SP)
CIHVC-18-C-05	-37	100.0	100.0	100.0	100.0	99.9	99.8	99.7	98.4	96.1	90.2	66.1	39.1	16.9	10.3	8.7	7.8			POORLY GRADED SAND WITH SILT (SP-SM)
CIHVC-18-C-06	-37	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.8	99.4	94.4	56.4	17.8	9.7	7.7	6.8			POORLY GRADED SAND WITH SILT (SP-SM)
CIHVC-18-C-06	-37	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.4	93.8	68.5	16.8	7.1	4.8	4.1			POORLY GRADED SAND (SP)
CIHVC-18-C-07	-37	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.8	99.5	97.9	79.5	43.4	14.6	8.0	6.4	5.7			POORLY GRADED SAND WITH SILT (SP-SM)
CIHVC-18-C-07	-37	100.0	100.0	99.9	99.7	99.6	99.4	99.2	98.8	98.3	97.4	94.0	84.2	59.1	45.0	39.3	36.2			SILTY SAND (SM)
CIHVC-18-C-07	-37	100.0	100.0	99.9	99.9	99.9	99.9	99.8	99.7	99.3	97.9	84.5	44.5	11.3	3.8	2.4	2.0			POORLY GRADED SAND (SP)
Area C Weighted Avg.		100	100	100	99.9	99.9	99.8	99.8	99.5	99.0	97.7	88.6	56.9	18.5	9.5	7.1	6.1			
Area E																				
CIHVC-18-E-01	-22	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.6	98.8	97.5	93.5	84.4	79.2	76.1	29	2	SILT WITH SAND (ML)
CIHVC-18-E-01	-22	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.8	99.5	98.1	95.6	90.3	81.0	76.6	74.2	34	8	SILT WITH SAND (ML)
CIHVC-18-E-02	-22	100.0	100.0	100.0	99.7	99.5	99.2	97.8	91.2	72.3	41.1	14.4	7.7	6.4	5.7	5.4	5.3			POORLY GRADED SAND WITH SILT (SP-SM)
CIHVC-18-E-02	-22	100.0	100.0	99.0	98.2	97.8	96.9	94.9	87.4	69.7	43.0	18.2	10.3	8.4	7.5	7.1	7.0			POORLY GRADED SAND WITH SILT (SP-SM)
Area E Weighted Avg.		100	100	99.5	99.0	98.7	98.2	96.9	92.0	79.7	60.8	43.2	37.4	34.7	31.2	29.4	28.5			
Area G																				
CIHVC-18-G-01	-22	100.0	100.0	99.9	99.9	99.8	99.7	99.4	99.0	97.9	94.6	81.1	50.1	10.1	1.7	1.0	0.9			POORLY GRADED SAND (SP)
CIHVC-18-G-01	-22	100.0	98.7	98.0	97.7	97.5	97.2	96.7	95.4	93.4	91.0	85.0	64.6	17.2	4.9	2.7	2.2			POORLY GRADED SAND (SP)
CIHVC-18-G-02	-22	100.0	100.0	99.9	99.7	99.7	99.4	99.2	98.8	98.3	96.5	85.5	52.8	10.7	2.2	1.1	1.0			POORLY GRADED SAND (SP)
CIHVC-18-G-02	-22	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.8	99.4	94.3	69.0	13.6	3.0	1.5	1.3			POORLY GRADED SAND (SP)
CIHVC-18-G-03	-22	100.0	100.0	100.0	99.9	99.9	99.8	99.7	99.5	99.1	97.7	87.4	50.3	9.5	2.5	1.4	1.2			POORLY GRADED SAND (SP)
CIHVC-18-G-03	-22	100.0	100.0	100.0	100.0	99.9	99.8	99.7	99.4	98.8	96.8	83.3	52.0	12.3	3.1	1.9	1.4			POORLY GRADED SAND (SP)
Area G Weighted Avg.		100	99.8	99.6	99.5	99.4	99.3	99.1	98.6	97.8	95.9	86.0	56.5	12.3	2.9	1.6	1.3			

Table 7. Silver Strand Beach Transect Sieve Analysis Data.

Location	Elevation (feet)	Fine Gravel			Coarse Sand		Medium Sand				Fine Sand					Silt/Clay		Classification
		Sieve No./Sieve Size/% Passing																
		1/2"	3/8"	4	7	10	14	18	25	35	45	60	80	120	170	200	230	
		12.5mm	9.5mm	4.750mm	2.800mm	2.000mm	1.400mm	1.000mm	0.710mm	0.500mm	0.355mm	0.250mm	0.180mm	0.125mm	0.090mm	0.075mm	0.063mm	
SSB18-A-1	+12	100.0	100.0	100.0	100.0	99.9	99.5	97.9	88.5	61.6	23.8	3.0	0.7	0.3	0.2	0.1	0.1	POORLY GRADED SAND (SP)
SSB18-A-2	+6	100.0	100.0	99.9	99.6	98.8	96.1	88.1	70.5	47.9	24.5	4.2	0.6	0.2	0.2	0.2	0.2	POORLY GRADED SAND (SP)
SSB18-A-3	0	100.0	99.8	99.0	98.3	97.9	97.5	97.2	96.6	94.7	83.0	24.3	6.5	1.3	0.9	0.9	0.9	POORLY GRADED SAND (SP)
SSB18-A-4	-6	100.0	100.0	99.9	99.4	98.9	98.0	96.4	92.9	85.9	70.2	35.7	12.1	2.2	0.9	0.9	0.8	POORLY GRADED SAND (SP)
SSB18-A-5	-12	100.0	100.0	100.0	99.8	99.8	99.7	99.5	99.3	99.1	98.1	91.0	62.7	11.4	2.1	1.2	1.0	POORLY GRADED SAND (SP)
SSB18-A-6	-18	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.9	99.7	99.2	95.4	60.6	11.2	2.5	1.3	1.1	POORLY GRADED SAND (SP)
SSB18-A-7	-24	100.0	100.0	100.0	100.0	100.0	99.9	99.9	99.9	99.9	99.9	99.6	96.1	22.0	5.5	2.4	1.8	POORLY GRADED SAND (SP)
SSB18-A-8	-30	100.0	100.0	99.5	99.4	99.4	99.4	99.3	99.3	99.2	99.1	98.4	95.0	39.7	13.5	6.5	4.4	POORLY GRADED SAND WITH SILT (SP-SM)
SSB18-B-1	+12	100.0	98.6	96.7	92.2	87.7	81.2	72.5	61.1	47.4	34.3	18.2	7.8	2.3	1.3	1.1	1.0	POORLY GRADED SAND (SP)
SSB18-B-2	+6	100.0	100.0	100.0	99.9	99.6	98.7	96.1	87.1	58.0	18.9	1.2	0.1	0.1	0.1	0.1	0.1	POORLY GRADED SAND (SP)
SSB18-B-3	0	100.0	100.0	99.6	98.1	95.3	88.9	78.9	65.0	46.5	24.2	4.4	0.9	0.6	0.5	0.5	0.5	POORLY GRADED SAND (SP)
SSB18-B-4	-6	100.0	100.0	99.9	99.5	99.1	98.5	97.4	95.1	89.5	72.5	30.1	10.4	2.2	1.4	1.3	1.3	POORLY GRADED SAND (SP)
SSB18-B-5	-12	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.7	98.5	93.3	75.6	55.3	15.5	4.0	1.8	1.1	POORLY GRADED SAND (SP)
SSB18-B-6	-18	100.0	100.0	99.9	99.9	99.9	99.9	99.8	99.8	99.7	99.6	98.9	94.5	25.8	6.7	2.4	1.7	POORLY GRADED SAND (SP)
SSB18-B-7	-24	100.0	100.0	100.0	100.0	99.9	99.9	99.9	99.9	99.9	99.8	99.3	96.5	39.4	12.6	5.9	4.0	POORLY GRADED SAND WITH SILT (SP-SM)
SSB18-B-8	-30	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.9	99.9	99.8	98.5	47.8	16.6	9.1	5.6	POORLY GRADED SAND WITH SILT (SP-SM)
A & B Weighted Avg.		100.0	99.9	99.7	99.1	98.5	97.3	95.2	90.9	83.0	71.3	54.9	43.6	13.9	4.3	2.2	1.6	

4.4 Conclusions and Recommendations

Sediment grain size results along with the chemical results from the 2012 Channel Islands sampling were compatible for beach nourishment. Grain size results were similar to the grain size results in the current testing program, it is therefore expected that the chemical concentrations will be similar and as such should be suitable for beach nourishment or nearshore placement.

The beach physical compatibility analysis, as described in Appendix G of this report, concluded that the Channel Islands Harbor sediments are compatible for beach nourishment reuse or nearshore placement. Compatibility was based on the weighted average grain size distribution as a composite of all vibracores in a composite area combined as well as the weighted average distributions for each individual core. Based on this, all sediments from Areas A, B, C and G were determined to be compatible with Silver Strand Beach and Port Hueneme Beach as well as all nearshore locations. Area E showed finer grained material especially within vibracore E-01. Based on the composite weighted average calculations for locations E-01 and E-02 collected in this area, all of the sediment in Area E was determined to be suitable for placement at Hueneme Beach or offshore within the Alpha nearshore area (Figure 6).

5.0 QUALITY CONTROL REQUIREMENTS

Formal QA/QC procedures were followed for this project. The objectives of the QA/QC Program were 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 the project team 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.

Field quality control procedures were followed and included adherence to SOPs, field documentation, formal sample documentation and tracking, use of certified clean laboratory containers, protocol cleaning, and sample preservation.

Composited sediments from each channel area were archived for both chemical and biological testing. Testing was not performed. Formal analytical quality control procedures will be followed, if required.

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Appendix A

Sampling, Physical and Analytical Data
Channel Islands Harbor 2012 Environmental and Geotechnical Investigation Project
(Diaz Yourman, GeoPentech and Kinnetic Laboratories, JV, 2012)

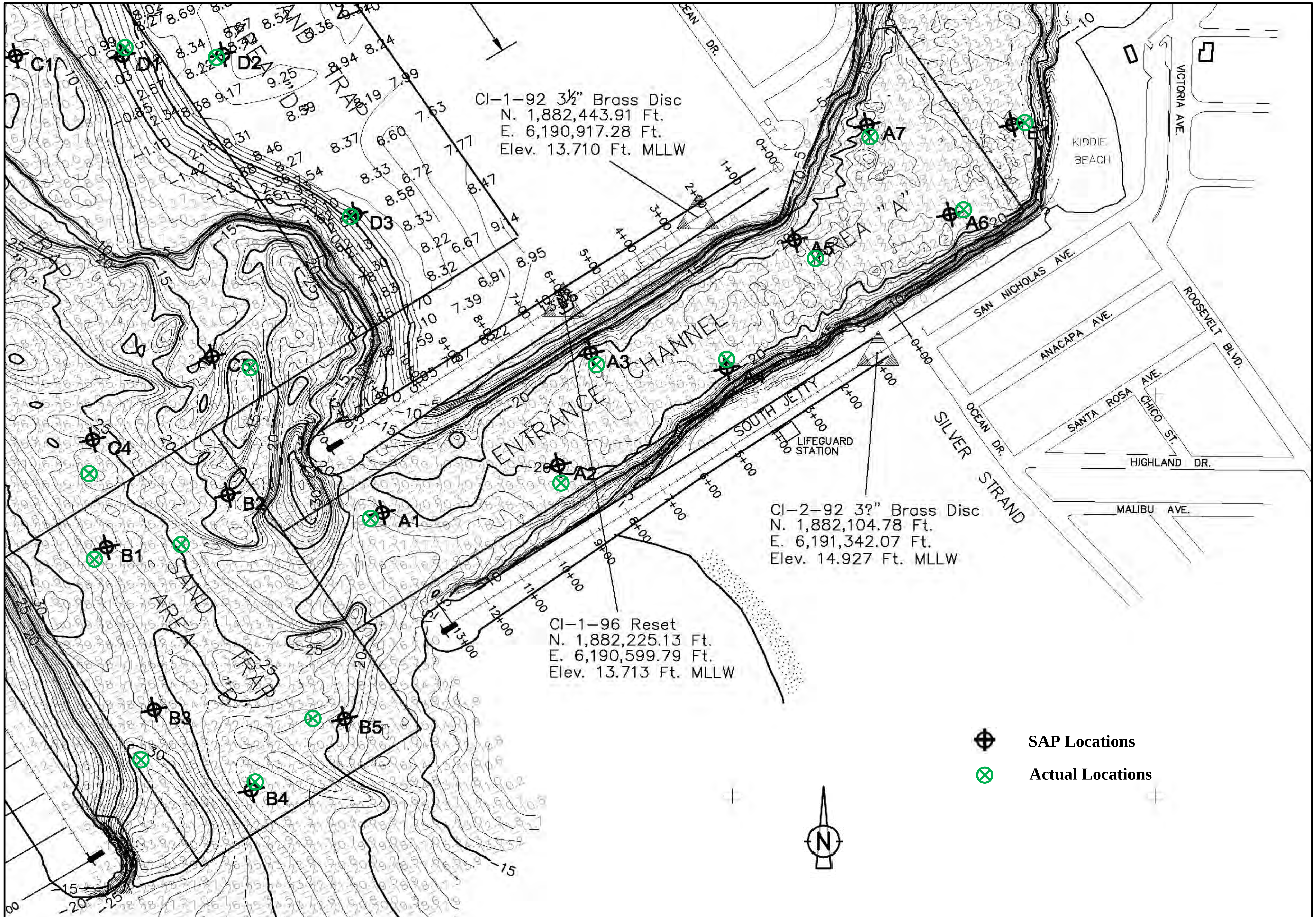

Figure 4. Channel Islands Harbor Areas A and B with Actual and Proposed 2012 Sampling Locations, and September 2011 Bathymetric Data.

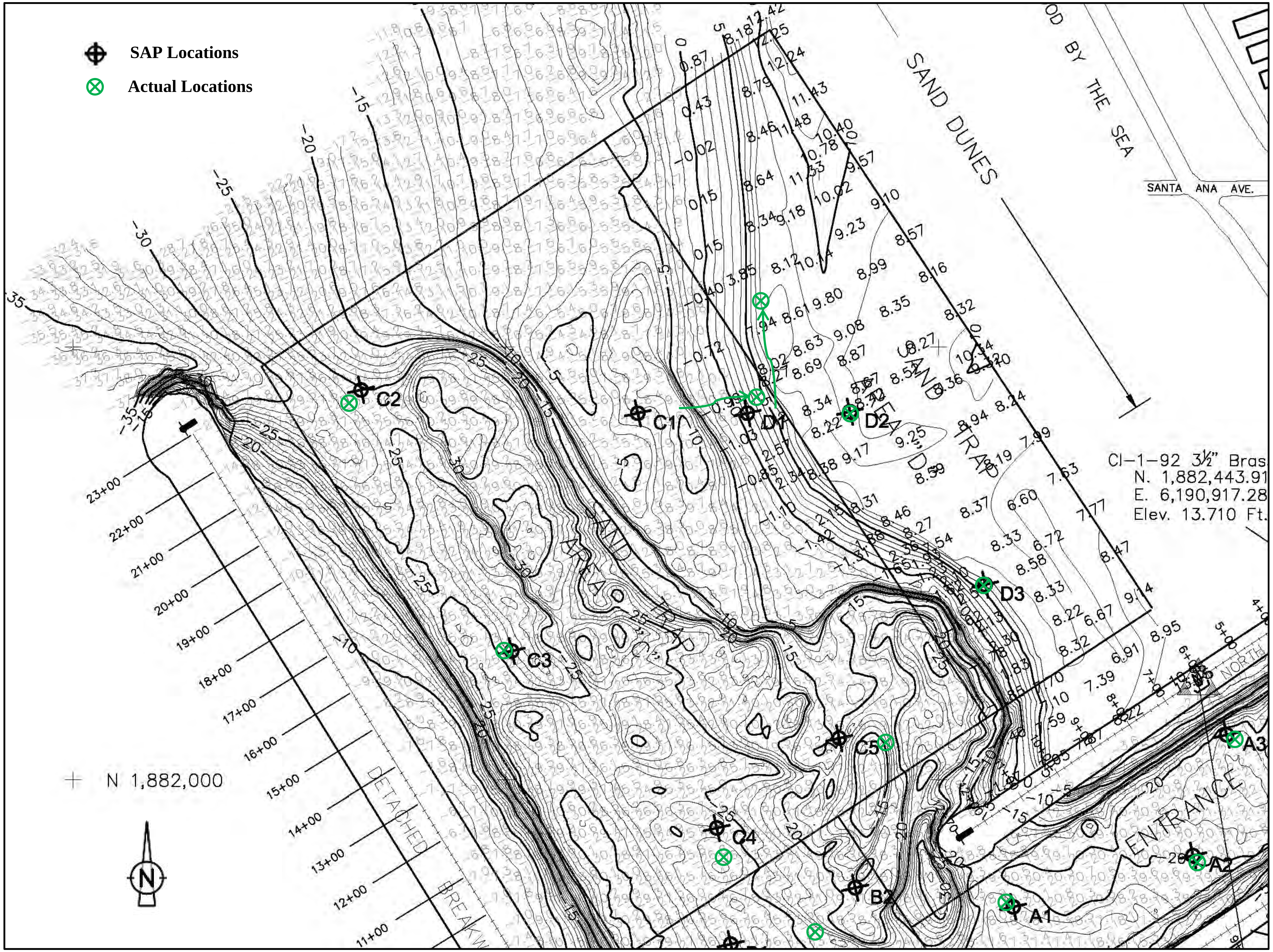

Figure 5. Channel Islands Harbor Areas C and D with and Actual and Proposed 2012 Sampling Locations, and September 2011 Bathymetric Data.

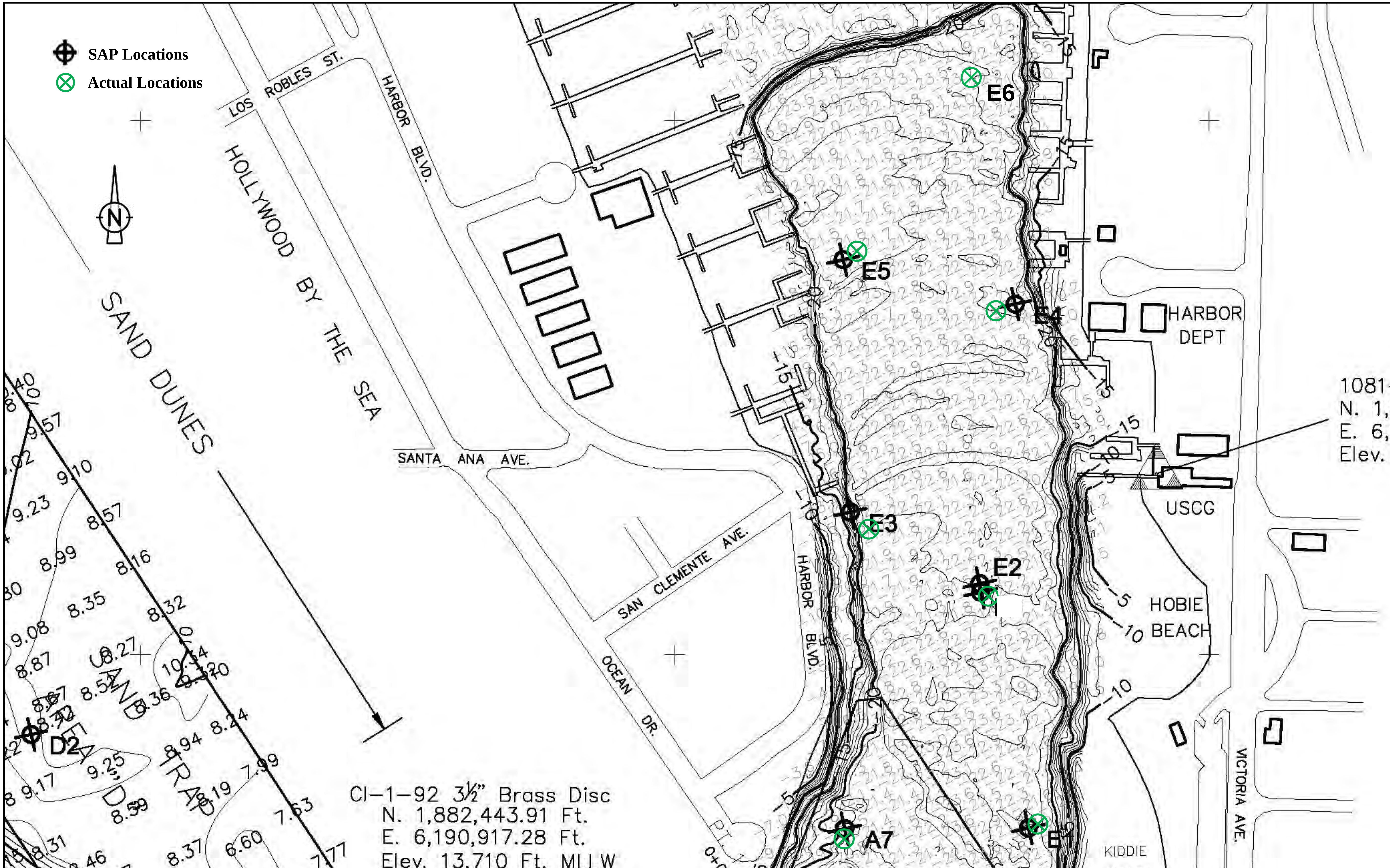

Figure 6. Channel Islands Harbor Area E with Actual and Proposed 2012 Sampling Locations, and September 2011 Bathymetric Data.

Table 3. Core Sampling Locations and Depths, Existing Mudline Elevations, and Project and Sampling Elevations, Channel Islands Harbor.

Composite Area	Core Designation	Sampling Date	Sampling Time	Latitude North	Longitude West	Mudline (ft, MLLW)	Project Elevation (ft, MLLW)	Core Length Recovery (feet)	Target Sampling Elevation (ft, MLLW)	Core Length Sampled** (ft)
Entrance Channel										
A	CIHVC12-A-1	4/11/12	1745	34° 09’ 24.1”	119° 13’ 40.3”	-16.0	-20	12.6	-22	6.0
A	CIHVC12-A-2	4/11/12	0932	34° 09’ 25.3”	119° 13’ 35.6”	-18.1	-20	12.3	-22	3.9
A	CIHVC12-A-3	4/11/12	1021	34° 09’ 28.2”	119° 13’ 34.5”	-19.6	-20	11.8	-22	2.4
A	CIHVC12-A-4	4/11/12	1104	34° 09’ 28.5”	119° 13’ 31.0”	-20.5	-20	10.5	-22	1.5
A	CIHVC12-A-5	4/11/12	1140	34° 09’ 30.9”	119° 13’ 28.7”	-20.5	-20	10.3	-22	1.5
A	CIHVC12-A-6	4/11/12	1227	34° 09’ 32.2”	119° 13’ 24.6”	-20.9	-20	11.2	-22	1.1
A	CIHVC12-A-7	4/11/12	1340	34° 09’ 34.0”	119° 13’ 27.3”	-20.5	-20	11.5	-22	1.5
Sand Trap										
B	CIHVC12-B-1	4/10/12	0914	34° 09’ 23.5”	119° 13’ 48.5”	-23.3	-35	18.8	-37	11.7
B	CIHVC12-B-2	4/12/12	1535	34° 09’ 23.8”	119° 13’ 46.5”	-18.4	-35	23.5	-37	18.6
B	CIHVC12-B-3	4/10/12	1750	34° 09’ 18.7”	119° 13’ 47.3”	-28.4	-35	17.4	-37	8.6
B	CIHVC12-B-4	4/10/12	1843	34° 09’ 17.0”	119° 13’ 44.5”	-25.1	-35	18.6	-37	11.9
B	CIHVC12-B-5	4/10/12	1922	34° 09’ 20.1”	119° 13’ 42.8”	-17.1	-35	23.2	-37	19.9
Sand Trap										
C	CIHVC12-C-1*	4/17/12	1448	34° 09’ 36.0”	119° 13’ 47.5”	+2.5	-35	39.5	-37	39.5
C	CIHVC12-C-2	4/10/12	1225	34° 09’ 35.6”	119° 13’ 59.1”	-28.0	-35	13.9	-37	9.0
C	CIHVC12-C-3	4/10/12	1353	34° 09’ 30.2”	119° 13’ 54.8”	-24	-35	19.5	-37	13.0
C	CIHVC12-C-4	4/10/12	1646	34° 09’ 25.1”	119° 13’ 48.5”	-24.7	-35	16.8	-37	12.3
C	CIHVC12-C-5	4/10/12	1514	34° 09’ 28.1”	119° 13’ 43.7”	-19.4	-35	20.0	-37	17.6
Sand Trap										
D	CIHVC12-D-1*	4/18/12	1100	34° 09’ 40.5”	119° 13’ 47.2”	+4.25	-35	48.25	-37	41.25
D	CIHVC12-D-2*	4/17/12	1245	34° 09’ 35.7”	119° 13’ 45.4”	+8.0	-35	45.0	-37	45.0
D	CIHVC12-D-3*	4/18/12	1450	34° 09’ 31.8”	119° 13’ 41.6”	+1.25	-35	38.0	-37	38.0

Table 3. Core Sampling Locations and Depths, Existing Mudline Elevations, and Project and Sampling Elevations, Channel Islands Harbor.

Composite Area	Core Designation	Sampling Date	Sampling Time	Latitude North	Longitude West	Mudline (ft, MLLW)	Project Elevation (ft, MLLW)	Core Length Recovery (feet)	Target Sampling Elevation (ft, MLLW)	Core Length Sampled** (ft)
Inner Channel										
E	CIHVC12-E-1	4/11/12	1430	34° 09’ 34.3”	119° 13’ 22.9”	-21.5	-20	12.3	-22	0.5
E	CIHVC12-E-2	4/11/12	1516	34° 09’ 38.4”	119° 13’ 24.0”	-21.8	-20	13.0	-22	0.2
E	CIHVC12-E-3	4/11/12	1610	34° 09’ 39.5”	119° 13’ 26.8”	-21.4	-20	12.8	-22	0.6
E	CIHVC12-E-4	4/12/12	1830	34° 09’ 43.8”	119° 13’ 24.0”	-22.9	-20	7.0	-22	NS
E	CIHVC12-E-5	4/12/12	1740	34° 09’ 44.8”	119° 13’ 27.2”	-22.1	-20	9.0	-22	NS
E	CIHVC12-E-6	4/12/12	1710	34° 09’ 48.1”	119° 13’ 24.7”	-23.6	-20	6.9	-22	NS

* Denotes samples taken with the rotosonic drill.

** Only covers the length of core down to the project overdredge depth sampled for chemistry.

NS = Geotechnical samples only.

Table 4. Dates, Times and Locations for Each Sample Collected from Silver Strand Beach and Hueneme Beach.

Area	Site Designations	Date	Time	Sampling Elevations (feet, MLLW)	Latitude North	Longitude West
Silver Strand Beach Transect A (Ventura Ave)	A+12	4/12/2012	10:14:35AM	+12	34 09 04.2	119 13 09.0
	A+6	4/12/2012	10:11:47AM	+6	34 09 03.8	119 13 09.8
	A0	4/12/2012	10:12:25AM	0	34 09 03.3	119 13 10.6
	A-6	4/12/2012	10:17:20AM	-6	34 09 02.0	119 13 12.6
	A-12	4/12/2012	11:29:26AM	-12	34 09 00.4	119 13 15.7
	A-18	4/12/2012	11:39:20AM	-18	34 08 59.3	119 13 17.0
	A-24	4/12/2012	11:46:09AM	-24	34 08 56.6	119 13 21.0
	A-30	4/12/2012	12:01:39PM	-30	34 08 54.2	119 13 25.1
Silver Strand Beach Transect B (Hueneme Ave)	B+12	4/12/2012	10:29:28AM	+12	34 09 14.6	119 13 18.0
	B+6	4/12/2012	10:27:08AM	+6	34 09 14.2	119 13 18.6
	B0	4/12/2012	10:25:31AM	0	34 09 13.4	119 13 19.7
	B-6	4/12/2012	10:30:11AM	-6	34 09 12.4	119 13 21.3
	B-12	4/12/2012	12:18:28PM	-12	34 09 11.3	119 13 23.7
	B-18	4/12/2012	12:24:49PM	-18	34 09 08.2	119 13 26.7
	B-24	4/12/2012	12:40:22PM	-24	34 09 06.1	119 13 30.3
	B-30	4/12/2012	12:51:58PM	-30	34 09 02.5	119 13 35.0
Hueneme Beach Transect A	A+12	4/12/2012	8:06:36AM	+12	34 08 33.2	119 11 46.2
	A+6	4/12/2012	8:01:43AM	+6	34 08 32.2	119 11 47.0
	A0	4/12/2012	7:57:38AM	0	34 08 31.0	119 11 48.1
	A-6	4/12/2012	8:10:24AM	-6	34 08 29.7	119 11 49.3
	A-12	4/25/2012	2:00:03PM	-12	34 08 25.9	119 11 48.5
	A-18	4/12/2012	9:06:01AM	-18	34 08 26.1	119 11 53.1
	A-24	4/12/2012	11:09:32AM	-24	34 08 22.5	119 11 55.4
	A-30	4/12/2012	9:29:17AM	-30	34 08 18.5	119 11 59.4
Hueneme Beach Transect B	B+12	4/12/2012	8:27:01AM	+12	34 08 40.0	119 12 00.7
	B+6	4/12/2012	8:20:07AM	+6	34 08 39.1	119 12 01.2
	B0	4/12/2012	8:18:25AM	0	34 08 38.0	119 12 02.1
	B-6	4/12/2012	8:28:48AM	-6	34 08 36.3	119 12 02.8
	B-12	4/25/2012	2:34:35PM	-12	34 08 34.6	119 12 05.8
	B-18	4/12/2012	10:55:34AM	-18	34 08 31.0	119 12 05.5
	B-24	4/12/2012	10:00:37AM	-24	34 08 25.8	119 12 08.8
	B-30	4/12/2012	9:44:16AM	-30	34 08 20.2	119 12 10.8
Hueneme Beach Transect C	C+12	NA	NA	NA	NA	NA
	C+6	NA	NA	NA	NA	NA
	C0	NA	NA	NA	NA	NA
	C-6	4/12/2012	9:32:18AM	-6	34 08 40.0	119 12 10.7
	C-12	4/25/2012	2:54:08PM	-12	34 08 38.3	119 12 22.5
	C-18	4/12/2012	10:13:01AM	-18	34 08 32.4	119 12 22.6
	C-24	4/12/2012	10:23:56AM	-24	34 08 27.5	119 12 22.3
	C-30	4/12/2012	10:40:07AM	-30	34 08 23.1	119 12 21.5

Table 9. 2012 Channel Islands Harbor Physical Data Above Overdredge Depth for Each Individual Core.

Location	Sample Number	Mudline	Elevation (ft, MLLW)		Gravel			Coarse Sand		Medium Sand				Fine Sand						Silt	Classification
					Sieve No./Seive Size/% Passing																
						3/8	4	7	10	14	18	25	35	45	60	80	120	170	200	230	
			Top	Bottom	19 mm	9.5 mm	4.75 mm	2.8 mm	2 mm	1.4 mm	1.0 mm	0.71 mm	0.50 mm	0.355 mm	0.250 mm	0.18 mm	0.125 mm	0.09 mm	0.075 mm	0.063 mm	
Area A - Entrance Channel																					
CIHVC12-A-1	2	-16	-16	-22.0	100	100	100	100	100	100	100	99	98	97	93	79	28	4	1	0	POORLY GRADED SAND (SP)
CIHVC12-A-2	2	-18.1	-18.1	-22.0	100	100	100	100	100	99	99	98	97	96	92	79	32	8	5	3	POORLY GRADED SAND WITH SILT (SP-SM)
CIHVC12-A-3	2	-19.6	-19.6	-22.0	100	100	100	100	100	100	99	98	97	96	94	87	52	22	15	12	SILTY SAND (SM)
CIHVC12-A-4	2	-20.6	-20.6	-22.0	100	100	100	100	100	100	99	99	98	97	92	78	44	19	13	10	SILTY SAND (SM)
CIHVC12-A-5	2	-20.5	-20.5	-22.0	100	100	100	100	100	100	99	99	97	91	72	52	32	16	11	8	POORLY GRADED SAND WITH SILT (SP-SM)
CIHVC12-A-6	1	-20.9	-20.9	-22.0	100	100	100	100	100	99	99	98	94	83	65	48	29	20	16	14	SILTY SAND (SM)
CIHVC12-A-7	1	-20.5	-20.5	-22.0	100	100	100	100	100	99	99	98	94	83	58	35	23	15	12	10	POORLY GRADED SAND WITH SILT (SP-SM)
Area B - Sand Trap																					
CIHVC12-B-1	2	-23.3	-23.3	-35.0	100	100	100	100	100	99	99	99	98	98	95	85	41	16	11	9	POORLY GRADED SAND WITH SILT (SP-SM)
CIHVC12-B-1	3	-23.3	-35	-37.0	100	100	100	100	100	100	99	99	98	98	96	91	64	37	28	22	SILTY SAND (SM)
CIHVC12-B-2	2	-18.4	-18.4	-37.0	100	100	100	100	100	100	99	99	98	96	91	71	22	4	2	1	POORLY GRADED SAND (SP)
CIHVC12-B-3	2	-28.4	-28.4	-37.0	100	100	100	100	100	99	99	98	97	96	92	80	38	14	9	3	POORLY GRADED SAND WITH SILT (SP-SM)
CIHVC12-B-4	2	-25.1	-25.1	-37.0	100	100	100	100	100	100	99	99	98	95	84	61	15	2	0	0	POORLY GRADED SAND (SP)
CIHVC12-B-5	2	-17.1	-17.1	-37.0	100	100	100	99	98	98	97	95	93	88	75	52	12	1	0	0	POORLY GRADED SAND (SP)
Area C - Sand Trap																					
CIHVC12-C-1	2	2.5	2.5	-37.0	100	100	100	98	97	95	93	90	85	79	61	36	9	3	2	1	POORLY GRADED SAND (SP)
CIHVC12-C-2	2	-28	-28	-37.0	100	100	100	99	98	98	97	96	94	93	91	83	44	19	12	9	POORLY GRADED SAND WITH SILT (SP-SM)
CIHVC12-C-3	2	-24	-24.0	-37.0	100	100	100	100	100	99	99	99	99	98	95	81	34	11	6	4	POORLY GRADED SAND WITH SILT (SP-SM)
CIHVC12-C-4	2	-24.7	-24.7	-37.0	100	100	100	100	100	100	100	99	99	98	94	82	29	6	3	2	POORLY GRADED SAND (SP)
CIHVC12-C-5	1	-19.4	-19.4	-20.7	No Test - all organic material																
CIHVC12-C-5	2	-19.4	-20.7	-37.0	100	100	100	99	99	99	99	98	98	97	91	71	27	8	4	3	POORLY GRADED SAND (SP)
Area D - Sand Trap																					
CIHVC12-D-1	2	4.2	4.2	-37.0	100	100	99	96	94	92	89	84	74	59	36	17	6	3	2	2	POORLY GRADED SAND (SP)
CIHVC12-D-2	2	8.0	8.0	-37.0	100	100	100	100	100	100	99	98	93	83	56	27	7	3	2	2	POORLY GRADED SAND (SP)
CIHVC12-D-3	1	1.2	1.2	-0.8	100	100	100	100	100	100	100	99	98	93	59	19	2	1	0	0	POORLY GRADED SAND (SP)
CIHVC12-D-3	2	1.2	1.2	-37.3	100	100	100	100	100	100	99	98	96	93	82	59	20	7	5	4	POORLY GRADED SAND WITH SILT (SP-SM)
Area E - Inner Channel																					
CIHVC12-E-1	1	-21.5	-21.5	-22.0	100	100	100	100	100	99	98	96	93	87	79	69	50	33	26	21	SILTY SAND (SM)
CIHVC12-E-2	1	-21.8	-21.8	-22.0	100	100	100	100	100	99	98	97	95	93	87	81	67	48	38	32	SILTY SAND (SM)
CIHVC12-E-3	1	-21.4	-21.4	-22.0	100	100	100	100	100	99	99	98	96	87	65	40	21	13	10	8	POORLY GRADED SAND WITH SILT (SP-SM)

Table 10. Surface Physical Data for Silver Strand Beach and Hueneme Beach Collected in 2012.

Location	Mudline	Gravel			Coarse Sand		Medium Sand				Fine Sand						Silt	Classification
		Sieve No./Seive Size/% Passing																
			3/8	4	7	10	14	18	25	35	45	60	80	120	170	200	230	
		19 mm	9.5 mm	4.75 mm	2.8 mm	2 mm	1.4 mm	1.0 mm	0.71 mm	0.50 mm	0.355 mm	0.250 mm	0.18 mm	0.125 mm	0.09 mm	0.075 mm	0.063 mm	
Hueneme Beach - Transect A																		
HBGS12-A-1	12	100	100	99	99	98	98	97	97	96	93	73	37	7	2	1	0	POORLY GRADED SAND (SP)
HBGS12-A-2	6	100	100	100	100	100	100	100	99	97	85	55	23	2	0	0	0	POORLY GRADED SAND (SP)
HBGS12-A-3	0	100	100	99	96	92	85	75	64	53	46	34	18	3	1	1	1	POORLY GRADED SAND (SP)
HBGS12-A-4	-6	100	100	97	93	87	77	65	55	45	35	22	10	2	1	1	1	POORLY GRADED SAND (SP)
HBGS12-A-5	-12	100	100	99	98	98	98	97	96	95	94	87	66	20	4	1	0	POORLY GRADED SAND (SP)
HBGS12-A-6	-18	100	100	100	99	99	99	99	99	98	98	97	96	86	43	13	7	SILTY SAND (SM)
HBGS12-A-7	-24	100	100	100	100	100	100	99	99	98	98	96	94	86	55	32	19	SILTY SAND (SM)
HBGS12-A-8	-30	100	100	100	100	100	100	99	99	98	96	83	70	56	28	12	7	POORLY GRADED SAND WITH SILT (SP-SM)
Hueneme Beach - Transect B																		
HBGS12-B-1	15	100	100	98	96	93	89	83	77	68	59	42	25	8	3	2	2	POORLY GRADED SAND (SP)
HBGS12-B-2	6	100	100	100	100	100	100	100	99	95	79	46	14	1	0	0	0	POORLY GRADED SAND (SP)
HBGS12-B-3	0	100	100	99	97	96	93	89	82	71	61	45	25	5	1	1	1	POORLY GRADED SAND (SP)
HBGS12-B-4	-6	100	100	100	100	100	99	98	97	95	91	80	59	21	6	1	0	POORLY GRADED SAND (SP)
HBGS12-B-5	-12	100	100	100	100	100	100	99	97	89	68	31	12	5	2	1	1	POORLY GRADED SAND (SP)
HBGS12-B-6	-18	100	100	100	99	99	99	98	97	97	95	93	89	76	55	34	21	SILTY SAND (SM)
HBGS12-B-7	-24	100	100	100	100	100	100	99	99	99	97	94	91	79	55	41	25	SILTY SAND (SM)
HBGS12-B-8	-30	100	100	100	100	100	100	100	99	97	81	52	49	40	13	5	3	POORLY GRADED SAND WITH SILT (SP-SM)
Hueneme Beach - Transect C																		
HBGS12-C-4a**	-6	100	100	100	100	100	99	99	99	97	95	86	64	25	7	2	1	POORLY GRADED SAND (SP)
HBGS12-C-5	-12	100	100	100	100	100	100	99	98	97	96	93	87	62	38	23	9	SILTY SAND (SM)
HBGS12-C-6	-18	100	100	100	100	100	100	99	99	98	98	97	95	85	65	44	26	SILTY SAND (SM)
HBGS12-C-7	-24	100	100	100	100	100	100	99	99	99	98	97	94	67	28	17	9	SILTY SAND (SM)
HBGS12-C-8	-30	100	100	100	100	100	100	100	99	99	98	96	93	56	11	3	1	POORLY GRADED SAND (SP)
Silver Strand Beach - Transect A																		
SSBGS12-A-1	6	100	100	100	100	100	100	99	94	73	43	12	2	0	0	0	0	POORLY GRADED SAND (SP)
SSBGS12-A-2	12	100	100	100	100	100	100	99	94	71	30	4	1	0	0	0	0	POORLY GRADED SAND (SP)
SSBGS12-A-3	0	100	100	100	99	98	96	90	79	41	18	5	2	0	0	0	0	POORLY GRADED SAND (SP)
SSBGS12-A-4	-6	100	100	100	100	100	99	98	96	87	64	23	7	1	0	0	0	POORLY GRADED SAND (SP)
SSBGS12-A-5	-12	100	100	100	100	100	100	99	98	96	89	65	40	9	1	0	0	POORLY GRADED SAND (SP)
SSBGS12-A-6	-18	100	100	100	100	100	100	100	99	99	97	92	77	19	2	1	0	POORLY GRADED SAND (SP)
SSBGS12-A-7	-24	100	100	99	99	99	99	98	98	97	96	94	88	42	11	3	1	POORLY GRADED SAND (SP)
SSBGS12-A-8	-30	100	100	100	100	100	100	99	99	98	97	96	93	56	15	5	2	POORLY GRADED SAND WITH SILT (SP-SM)
Silver Strand Beach - Transect B																		
SSBGS12-B-1	12	100	100	100	100	100	100	100	98	85	50	10	1	0	0	0	0	POORLY GRADED SAND (SP)
SSBGS12-B-2	6	100	100	100	98	93	83	68	54	44	34	19	6	1	0	0	0	POORLY GRADED SAND (SP)
SSBGS12-B-3	0	100	100	100	100	100	99	98	96	88	67	31	10	1	0	0	0	POORLY GRADED SAND (SP)
SSBGS12-B-4	-6	100	100	100	100	100	99	98	96	88	73	45	24	4	0	0	0	POORLY GRADED SAND (SP)
SSBGS12-B-5	-12	100	100	100	100	99	99	97	95	92	86	66	40	8	1	0	0	POORLY GRADED SAND (SP)

Table 10. Surface Physical Data for Silver Strand Beach and Hueneme Beach Collected in 2012.

Location	Mudline	Gravel			Coarse Sand		Medium Sand				Fine Sand						Silt	Classification
		Sieve No./Seive Size/% Passing																
			3/8	4	7	10	14	18	25	35	45	60	80	120	170	200	230	
		19 mm	9.5 mm	4.75 mm	2.8 mm	2 mm	1.4 mm	1.0 mm	0.71 mm	0.50 mm	0.355 mm	0.250 mm	0.18 mm	0.125 mm	0.09 mm	0.075 mm	0.063 mm	
SSBGS12-B-6	-18	100	100	100	100	100	100	99	98	97	96	92	81	29	4	1	1	POORLY GRADED SAND (SP)
SSBGS12-B-7	-24	100	100	100	100	99	99	98	98	97	96	95	90	42	7	2	1	POORLY GRADED SAND (SP)
SSBGS12-B-8	-30	100	100	100	100	100	100	99	98	97	97	96	91	45	13	7	5	POORLY GRADED SAND WITH SILT (SP-SM)

**Site was moved for safety.

Table 11. 2012 Channel Islands Harbor Bulk Sediment Chemistry Results.

Valid Analyte Name	Units	Channel Islands Harbor Composite Samples					NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		CIHVC12-A Area A	CIHVC12-B Area B	CIHVC12-C Area C	CIHVC12-D Area D	CIHVC12-E Area E	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
SEDIMENT CONVENTIONALS												
Percent Solids	%	73.3	79.1	81	86.4	64.3						
Total Volatile Solids	%	1.3	0.63	1.2	0.35	0.91						
pH	pH Units	7.76	7.99	8.18	9.72	7.99						
Total Organic Carbon	%	0.4	0.25	0.46	0.1	0.9						
Oil and Grease	mg/kg dry	97	77	94	36	140						
TRPH	mg/kg dry	58	47	73	26	55						
Total Ammonia	mg/kg dry	1.9	1.9	0.43	2.3	2.2						
Water Soluble Sulfides	mg/L	0.1U	0.1U	0.1U	0.1U	0.1U						
Total Sulfides	mg/kg dry	140	0.63	9.9	0.12U	560						
METALS												
Arsenic	mg/kg dry	3.3	3.49	4.18	2.45	4.67	8.2	70	0.39	1.6	0.07	0.24
Cadmium	mg/kg dry	0.314	0.297	0.209	0.127	0.544	1.2	9.6	70	800	1.7	7.5
Chromium	mg/kg dry	13	13	7.95	5.75	22.9	81	370			100,000	1,000,000
Copper	mg/kg dry	8.56	7.1	5.34	3.1	21.8	34	270	3,100	41,000	3,000	38,000
Lead	mg/kg dry	3.88	3.67	2.92	2.15	7.44	46.7	218	400	800	150	3,500
Mercury	mg/kg dry	0.0273U	0.0253U	0.00893J	0.0174J	0.0101J	0.15	0.71	10	43	18	180
Nickel	mg/kg dry	12.3	11.3	8.79	5.31	19.1	20.9	51.6	1,500	20,000	1,600	16,000
Selenium	mg/kg dry	0.323	0.281	0.123U	0.116U	0.544			390	5,100	380	4,800
Silver	mg/kg dry	0.0376J	0.0387J	0.0248J	0.0125J	0.0864J	1	3.7	390	5,100	380	4,800
Zinc	mg/kg dry	33.4	31.9	23.4	15.4	65.5	150	410	23,000	310,000	23,000	100,000
BUTYLTINS												
Dibutyltin	µg/kg dry	4.1U	3.8U	3.7U	3.5U	4.7U			18,000	180,000		
Monobutyltin	µg/kg dry	4.1U	3.8U	3.7U	3.5U	4.7U						
Tetrabutyltin	µg/kg dry	4.1U	3.8U	3.7U	3.5U	4.7U						
Tributyltin	µg/kg dry	4.1U	3.8U	3.7U	3.5U	4.7U			18,000	180,000		
POLYAROMATIC HYDROCARBONS												
1-Methylnaphthalene	µg/kg dry	2.9J	13U	2.4J	12U	5.4J			22,000	99,000		
1-Methylphenanthrene	µg/kg dry	14U	13U	12U	12U	16U						
2,3,5-Trimethylnaphthalene	µg/kg dry	14U	13U	12U	12U	16U						
2,6-Dimethylnaphthalene	µg/kg dry	11J	3.2J	4.4J	12U	38						
2-Methylnaphthalene	µg/kg dry	3.3J	2.6J	2.8J	12U	5.5J	70	670	310,000	4,100,000		
Acenaphthene	µg/kg dry	14U	13U	12U	12U	3.5J	16	500	3,400,000	33,000,000		
Acenaphthylene	µg/kg dry	14U	13U	12U	12U	3.5J	44	640				
Anthracene	µg/kg dry	14U	13U	3.8J	12U	16U	85.3	1100	17,000,000	170,000,000		
Benzo (a) Anthracene	µg/kg dry	3.1J	13U	15	12U	7.5J	261	1600	150	2100		
Benzo (a) Pyrene	µg/kg dry	4.2J	13U	17	12U	7.9J	430	1600	15	210	38	130
Benzo (b) Fluoranthene	µg/kg dry	14U	13U	12	12U	9.7J			150	2100		
Benzo (e) Pyrene	µg/kg dry	5J	2.7J	12J	12U	10J						

Table 11. 2012 Channel Islands Harbor Bulk Sediment Chemistry Results.

Valid Analyte Name	Units	Channel Islands Harbor Composite Samples					NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		CIHVC12-A Area A	CIHVC12-B Area B	CIHVC12-C Area C	CIHVC12-D Area D	CIHVC12-E Area E	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
Benzo (g,h,i) Perylene	µg/kg dry	4.2J	13U	9.2J	12U	7.8J						
Benzo (k) Fluoranthene	µg/kg dry	14U	13U	13	12U	7J			1500	21,000		
Biphenyl	µg/kg dry	2.2J	13U	1.7J	12U	4.3J						
Chrysene	µg/kg dry	7.2J	3.1J	19	2.5J	13J	384	2800	15,000	210,000		
Dibenz (a,h) Anthracene	µg/kg dry	14U	13U	12U	12U	16U	63.4	260	15	210		
Dibenzothiophene	µg/kg dry	14U	13U	12U	12U	16U						
Fluoranthene	µg/kg dry	6.4J	3.4J	30	2.6J	12J	600	5100	2,300,000	22,000,000		
Fluorene	µg/kg dry	14U	13U	12U	12U	3.5J	19	540	2,300,000	22,000,000		
Indeno (1,2,3-c,d) Pyrene	µg/kg dry	14U	13U	6.5J	12U	4.6J			150	2100		
Naphthalene	µg/kg dry	3.5J	3J	3.9J	12U	14J	160	2100	3600	18,000		
Perylene	µg/kg dry	19	12J	19	5.5J	34						
Phenanthrene	µg/kg dry	8J	5.6J	18	3.3J	16	240	1500				
Pyrene	µg/kg dry	7.4J	3.8J	30	12U	16J	665	2600	1,700,000	17,000,000		
Total Low Weight PAHs	µg/kg dry	30.9	14.4	37	3.3J	93.7	552	3160				
Total High Weight PAHs	µg/kg dry	56.5	25	182.7	10.6J	129.5	1700	9600				
Total PAHs	µg/kg dry	87.4	39.4	220	13.9	223	4022	44792				
PHTHALATES												
Benzyl butyl phthalate	µg/kg dry	19	22	9.2J	20	29			260,000	910,000		
bis-(2-Ethylhexyl)phthalate	µg/kg dry	33	22	16	17	66			35,000	120,000		
Diethyl phthalate	µg/kg dry	11J	7.7J	4.6J	5.9J	7.3J			49,000,000	490,000,000		
Dimethyl phthalate	µg/kg dry	97	85	120	130	110						
Di-n-butyl phthalate	µg/kg dry	8.9J	9.7J	5.5J	10J	5.9J			6,100,000	62,000,000		
Di-n-octyl phthalate	µg/kg dry	14U	13U	12U	12U	4.6J						
PHENOLS												
2,3,4,6-Tetrachlorophenol	µg/kg dry	14U	13U	12U	12U	16U						
2,4,5-Trichlorophenol	µg/kg dry	14U	13U	12U	12U	16U						
2,4,6-Trichlorophenol	µg/kg dry	0.93J	0.98J	12U	0.8J	16U			44,000	160,000		
2,4-Dichlorophenol	µg/kg dry	14U	13U	12U	12U	16U			180,000	1,800,000		
2,4-Dimethylphenol	µg/kg dry	14U	13U	12U	12U	16U			1,200,000	12,000,000		
2,4-Dinitrophenol	µg/kg dry	81U	76U	74U	69U	93U			120,000	1,200,000		
2,6-Dichlorophenol	µg/kg dry	14U	13U	12U	12U	16U						
2-Chlorophenol	µg/kg dry	14U	13U	12U	12U	16U			390,000	5,100,000		
2-Methylphenol	µg/kg dry	1.7J	1.5J	12U	1.6J	2J						
2-Nitrophenol	µg/kg dry	2.9J	2.5J	12U	2.4J	1.4J						
3/4-Methylphenol	µg/kg dry	15	4.1J	12U	3.2J	18						
4,6-Dinitro-2-Methylphenol	µg/kg dry	81U	76U	74U	69U	93U						
4-Chloro-3-Methylphenol	µg/kg dry	1.5J	1.3J	12U	2.8J	1.9J						
4-Nitrophenol	µg/kg dry	36J	28J	74U	18J	33J						
Benzoic Acid	µg/kg dry	51J	33J	36J	120U	72J						

Table 11. 2012 Channel Islands Harbor Bulk Sediment Chemistry Results.

Valid Analyte Name	Units	Channel Islands Harbor Composite Samples					NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		CIHVC12-A Area A	CIHVC12-B Area B	CIHVC12-C Area C	CIHVC12-D Area D	CIHVC12-E Area E	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
Pentachlorophenol	µg/kg dry	14U	13U	12U	12U	16U			890	2,700	4,400	13,000
Phenol	µg/kg dry	52	44	38	50	62			18,000,000	180,000,000		
CHLORINATED PESTICIDES												
2,4'-DDD	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U						
2,4'-DDE	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U						
2,4'-DDT	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U						
4,4'-DDD	µg/kg dry	0.88J	0.74J	1.6	0.37J	**3**	2	20	2,000	7,200	2,300	9,000
4,4'-DDE	µg/kg dry	**2.3**	1.4	**2.3**	0.66J	**6.9**	2.2	27	1,400	5,100	1,600	6,300
4,4'-DDT	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U	1	7	1,700	7,000	1,600	6,300
Total DDT	µg/kg dry	**3.18**	**2.14**	**3.9**	1.03J	**9.9**	1.58	46.1				
Aldrin	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U			29	100	33	130
BHC-alpha	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U						
BHC-beta	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U						
BHC-delta	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U						
BHC-gamma	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U						
Chlordane-alpha	µg/kg dry	1.4U	1.3U	1.2U	1.2U	0.72J						
Chlordane-gamma	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U						
Chlordane (Technical)	µg/kg dry	14U	13U	12U	12U	16U			1,600	6,500	430	1,700
Cis-nonachlor	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U						
DCPA (Dacthal)	µg/kg dry	14U	13U	12U	12U	16U	0.02	8	610,000	6,200,000		
Dieldrin	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U			30	110	35	130
Endosulfan Sulfate	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U						
Endosulfan I	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U			370,000	3,700,000		
Endosulfan II	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U						
Endrin	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U			180,000	1,800,000	21,000	230,000
Endrin Aldehyde	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U						
Endrin Ketone	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U						
Heptachlor	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U			110	380	130	520
Heptachlor Epoxide	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U			53	190		
Methoxychlor	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U			310,000	3,100,000	340,000	3,800,000
Mirex	µg/kg dry	6.8U	6.3U	6.2U	5.8U	7.8U			27	96	31	120
Oxychlordane	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U						
Perthane	µg/kg dry	14U	13U	12U	12U	16U						
Toxaphene	µg/kg dry	27U	25U	25U	23U	31U			440	1600	460	1,800
Trans-nonachlor	µg/kg dry	1.4U	1.3U	1.2U	1.2U	0.57J						
4,4'-Dichlorobenzophenone	µg/kg dry	34U	32U	31U	29U	39U						
Total Chlordane	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.29J						

Table 11. 2012 Channel Islands Harbor Bulk Sediment Chemistry Results.

Valid Analyte Name	Units	Channel Islands Harbor Composite Samples					NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		CIHVC12-A Area A	CIHVC12-B Area B	CIHVC12-C Area C	CIHVC12-D Area D	CIHVC12-E Area E	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
PCB Aroclors												
Aroclor 1016	µg/kg dry	14U	13U	12U	12U	16U						
Aroclor 1221	µg/kg dry	14U	13U	12U	12U	16U						
Aroclor 1232	µg/kg dry	14U	13U	12U	12U	16U						
Aroclor 1242	µg/kg dry	14U	13U	12U	12U	16U						
Aroclor 1248	µg/kg dry	14U	13U	12U	12U	16U						
Aroclor 1254	µg/kg dry	14U	13U	12U	12U	16U						
Aroclor 1260	µg/kg dry	14U	13U	12U	12U	16U						
Aroclor 1262	µg/kg dry	14U	13U	12U	12U	16U						
Total Aroclors	µg/kg dry	14U	13U	12U	12U	16U						
PCB CONGENERS												
PCB003	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB008	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB018	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB028	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB031	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB033	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB037	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.26J						
PCB044	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB049	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB052	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB056	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB066	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB070	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB074	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB077	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U			34	110		
PCB081	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U			11	38		
PCB087	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB095	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB097	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB099	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.36J						
PCB101	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB105	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U			110	380		
PCB110	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.39J						
PCB114	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.35J			110	380		
PCB118	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U			110	380		
PCB119	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB123	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U			110	380		
PCB126	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U			0.034	0.11		

Table 11. 2012 Channel Islands Harbor Bulk Sediment Chemistry Results.

Valid Analyte Name	Units	Channel Islands Harbor Composite Samples					NOAA Screening		Human RSLs[2]		Human CHHSLs[3]	
		CIHVC12-A Area A	CIHVC12-B Area B	CIHVC12-C Area C	CIHVC12-D Area D	CIHVC12-E Area E	Salt ERL[1]	Salt ERM[1]	Residential	Industrial	Residential	Commercial Industrial
PCB128	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB132	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB138	µg/kg dry	1.4U	1.3U	1.2U	1.2U	1.6U						
PCB141	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB149	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB151	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB153	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB156	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U			110	380		
PCB157	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U			110	380		
PCB167	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U			110	380		
PCB168	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB169	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U			0.11	0.38		
PCB170	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U			30	99		
PCB174	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB177	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB180	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U			300	990		
PCB183	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB184	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB187	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB189	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U			110	380		
PCB194	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB195	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB200	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB201	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB203	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB206	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
PCB209	µg/kg dry	0.68U	0.63U	0.62U	0.58U	0.78U						
Total PCB Congeners	µg/kg dry	0.68U	0.63U	0.62U	0.58U	1.3	22.7	180			89	300
ERM Quotient		0.015	0.013	0.015	0.007	0.034						

1. Effects Range Low (ERL) and Effects Range Median (ERM) sediment quality objectives from Long *et al.* (1995).
2. Regional Screening Levels for Chemical Contaminants at Superfund Sites" (USEPA Region 9, 2010).
3. California Human Health Screening Levels for Soil (Cal/EPA, 2005).

Bolded values exceed ERL values.
<u>Bolded and underlined</u> values exceed ERM values.
Green shaded values exceed one or more of the corresponding human health values.
U = Not detected at the corresponding reporting limit.
J = Estimated between the Reporting Limit and the Method Detection Limit.

Appendix B

Sampling, Physical and Analytical Data
Channel Islands Harbor 2006 Dredge Material Investigation
(Diaz Yourman and Kinnetic Laboratories, 2007)

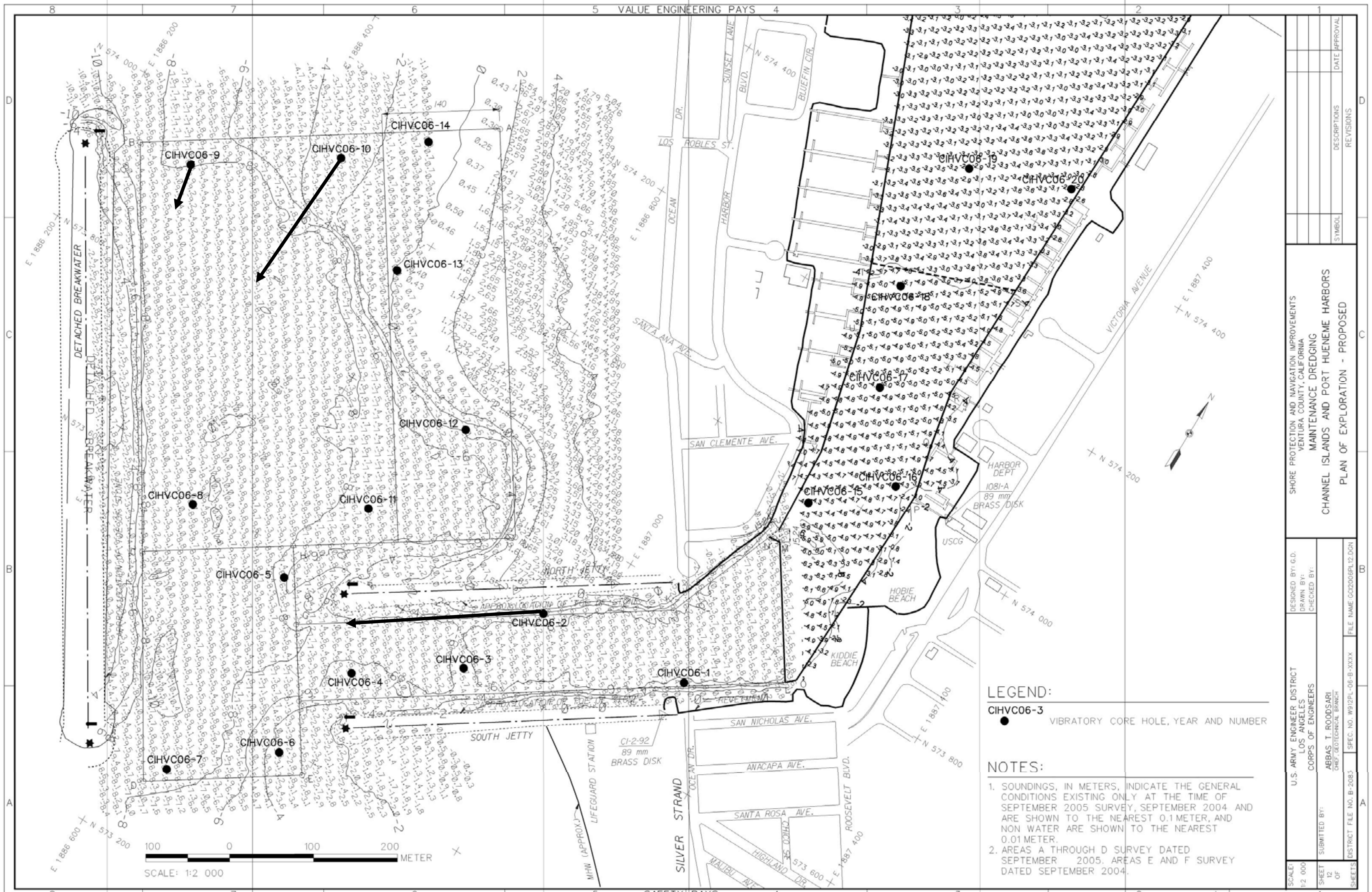

Figure A-1. Sampling Locations and Bathymetry Outside and Lower Channel Islands Harbor. Arrows denote instances where core locations were relocated from target locations.

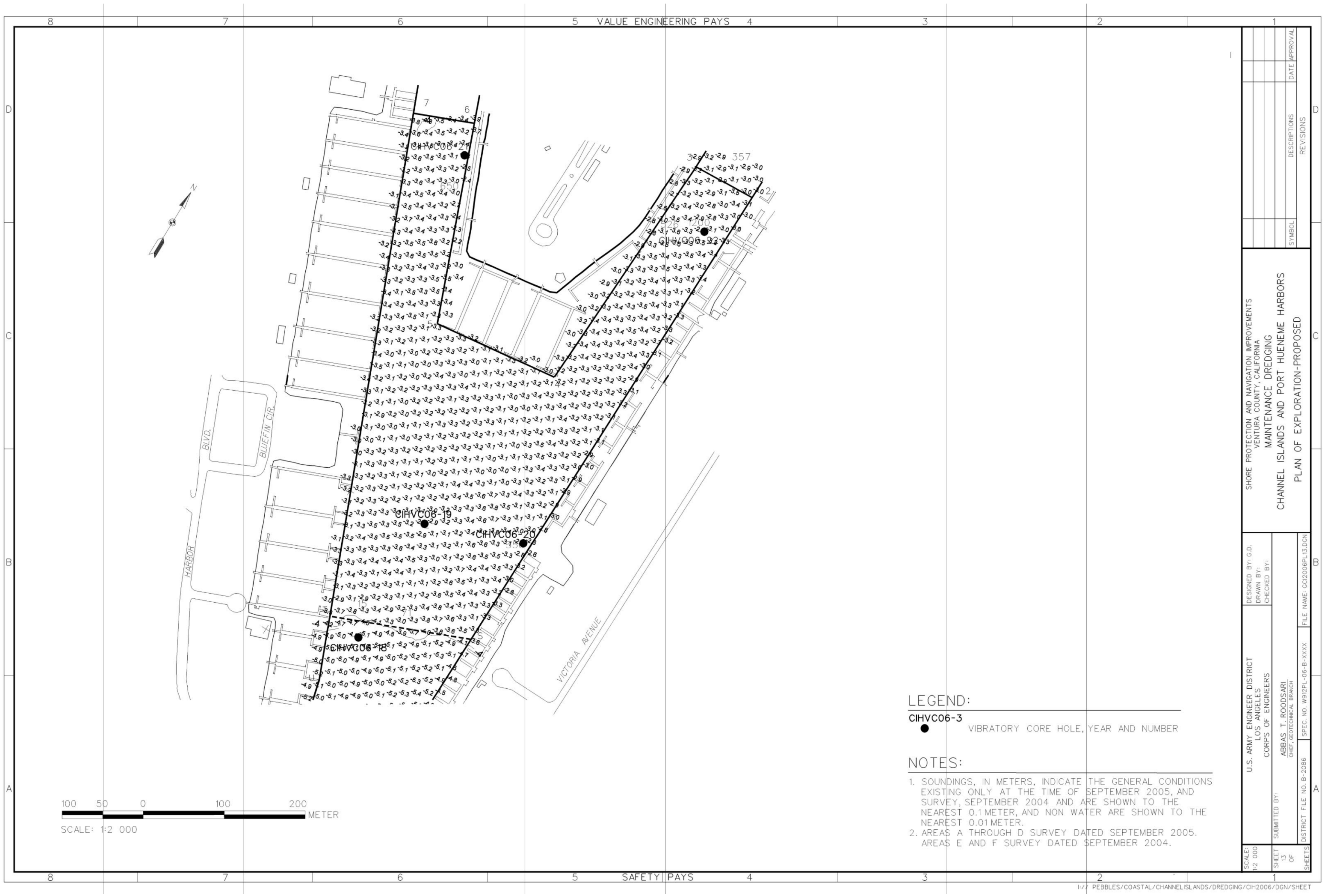

Figure A-2. Vibracore Sampling Locations and Bathymetry for Upper Channel Islands Harbor.

Table A-1. Channel Islands Vibracore Locations and Intervals Sampled

Area	Composite IDs	Core ID	Sampling Date	Sampling Time	Latitude	Longitude	Seafloor Level (m MLLW)	Target Sampling Depth (m bgs)	Core Lengt h (m)	Core Intervals Sampled (m)
A	CI-A-U and CI-A-L	CIHVC06-01	5-Oct-06	1050	34 09 29.8	119 13 27.1	-5.24	-8.10	2.38	-5.24 to -6.10 -6.10 to -7.62
		CIHVC06-02	5-Oct-06	0836	34 09 25.1	119 13 42.4	-5.78	-8.10	2.32	-5.78 to -6.10 -6.10 to -8.10
		CIHVC06-03	5-Oct-06	0940	34 09 26.0	119 13 36.2	-5.40	-8.10	2.83	-5.40 to -6.10 -6.10 to -8.10
		CIHVC06-04	5-Oct-06	0740	34 09 23.6	119 13 40.2	-5.46	-8.10	2.64	-5.46 to -6.10 -6.10 to -8.10
B	CI-B-U and CI-B-L	CIHVC06-05	4-Oct-06	1024	34 09 24.8	119 13 44.7	-4.70	-12.70	5.24	-4.70 to -9.94 No Bottom
		CIHVC06-06	4-Oct-06	0908	34 09 19.5	119 13 40.8	-6.70	-12.70	5.70	-6.70 to -10.70 -10.70 to -12.4
		CIHVC06-07	4-Oct-06	0815	34 09 17.1	119 13 45.9	-9.10	-12.70	4.40	-9.10 to -10.70 -10.70 to -12.70
C	CI-C-U and CI-C-L	CIHVC06-08	4-Oct-06	1630	34 09 24.9	119 13 49.9	-8.73	-12.70	4.60	-8.73 to -10.70 -10.70 to -12.70
		CIHVC06-09	4-Oct-06	1350	34 09 34.5	119 13 58.5	-9.61	-12.70	4.70	-9.61 to -10.71 -10.71 to -12.71
		CIHVC06-10	4-Oct-06	1530	34 09 32.7	119 13 53.0	-6.90	-12.70	4.41	-6.90 to -10.70 -10.70 to -11.30
		CIHVC06-11	4-Oct-06	1250	34 09 29.1	119 13 43.6	-3.97	-12.70	4.37	-3.97 to -8.34 No Bottom
D	CI-D-U	CIHVC06-12	5-Oct-06	1710	34 09 32.9	119 13 41.5	+1.32	-12.70	3.80	+1.32 to -2.48 No Bottom
		CIHVC06-13	6-Oct-06	1600	34 09 37.7	119 13 48.2	+1.50	-12.70	3.50	+1.50 to -2.50 No Bottom
		CIHVC06-14	6-Oct-06	1640	34 09 29.8	119 13 27.1	+0.30	-12.70	4.00	+0.30 to -3.70 No Bottom

Table A-1. Channel Islands Vibracore Locations and Intervals Sampled

Area	Composite IDs	Core ID	Sampling Date	Sampling Time	Latitude	Longitude	Seafloor Level (m MLLW)	Target Sampling Depth (m bgs)	Core Length (m)	Core Intervals Sampled (m)
E	CI-E-U	CIHVC06-15	3-Oct-06	0950	34 09 38.3	119 13 26.3	-4.40	-7.10	2.70	-4.40 to -7.10
		CIHVC06-16	3-Oct-06	1310	34 09 38.1	119 13 22.8	-5.10	-7.10	2.10	-5.10 to -7.10
		CIHVC06-17	3-Oct-06	1400	34 09 43.8	119 13 26.2	-5.10	-7.10	2.50	-5.10 to -7.10
		CIHVC06-18	3-Oct-06	1500	34 09 47.4	119 13 27.9	-5.20	-7.10	2.30	-5.20 to -7.10
F	CI-F-L	CIHVC06-19	3-Oct-06	1552	34 09 52.9	119 13 28.1	-3.40	-4.00	0.75	-3.40 to -4.00
		CIHVC06-20	3-Oct-06	1628	34 09 54.2	119 13 23.6	-3.10	-4.00	1.00	-3.10 to -4.00
		CIHVC06-21	3-Oct-06	1715	34 10 06.2	119 13 36.2	-3.34	-4.00	0.97	-3.34 to -4.00
		CIHVC06-22	3-Oct-06	1755	34 10 08.6	119 13 24.2	-2.92	-4.00	1.61	-2.92 to -4.00

Table A-2. Bulk Sediment Chemistry Summary for Composite Samples Collected in Channel Islands Harbor, October 2006.

Analytical Parameter	CI-A-U	CI-A-L	CI-B-U	CI-B-L	CI-C-U	CI-C-L	CI-D-U	CI-E-U	CI-E-U Dup	CI-F-L	Screening Values ERL	Screening Values ERM	Screening Values TTLC
SEDIMENT CONVENTIONALS													
pH	8.0J	7.7J	8.2J	8.3J	8.1J	7.9J	8.4J	8.1J	8.2J	7.7J			
Percent Solids (% by wt., wet)	72.5	72.7	77.9	79.9	71.4	72.3	83.9	69.3	68	75			
Total Volatile Solids (% by wt., dry)	0.9	0.8	0.8	1.2	1.1	0.5	1.9	1.6	2.1	2.1			
Total Ammonia (as N) (mg/kg, dry)	3.55	4.02	0.64	0.65	1.89	2.06	0.05U	1.35	2.06	0.05U			
Oil and Grease (%, dry)	0.01J	0.01J	0.02U	0.02U	0.02U	0.01J	0.02U	0.02U	0.01J	0.02U			
TRPH (%, dry)	0.01J	0.01J	0.02U	0.02U	0.02U	0.01J	0.02U	0.02U	0.02U	0.01J			
Total Sulfides (mg/kg, dry)	4.13J-	47.2J-	0.6J-	0.3J-	2.8J-	18.1J-	0.76J-	68.9J-	74.8J-	82.1J-			
Water Soluble Sulfides (mg/kg, dry)	0.04	0.08J	0.08J	0.06J	0.03J	0.08J	0.04J	0.89	0.12	0.15			
Total Organic Carbon (% by wt., dry)	0.2	0.32	0.13	0.16	0.37	0.34	0.1	0.54	0.5	0.37			
METALS (mg/kg, dry wt)													
Arsenic	2.32	2.44	2.41	2.43	2.87	3.24	1.91	4.19	4.53	3.56	8.2	70	500
Cadmium	0.188	0.172	0.274	0.148	0.246	0.248	0.117	0.532	0.514	0.348	1.2	9.6	100
Chromium	7.26	7.79	7.08	7.7	10.4	9.59	5.56	18.3	19.4	17.6	81	370	2500
Copper	4.21	4.66	3.39	3.29	5.26	5.43	2.34	17	18.6	17.8	34	270	2500
Lead	2.27	2.3	2.2	2.25	2.88	2.95	1.58	7.56	8.14	12.8	46.7	218	1000
Mercury	0.011J	0.013J	0.01J	0.01J	0.015J	0.017J	0.014J	0.045	0.044	0.057	0.15	0.71	20
Nickel	7.31	7.42	7.16	7.37	9.58	9.32	5.47	17	18.2	15.8	20.9	51.6	2000
Selenium	0.245	0.395	0.185	0.17	0.44	0.421	0.05U	0.812	0.725	0.549			100
Silver	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	1.0	3.7	500
Zinc	19.4	19.4	18.1	21.5	25.1	25.1	13	53.5	58.1	58.4	150	410	5000
ORGANOTINS (ug/kg, dry wt)													
Dibutyltin	3UJ	3UJ	3UJ	3UJ	3UJ	3UJ	3UJ	3UJ	3UJ	3UJ			
Tributyltin	3U	3U	3U	3U	3U	3U	3U	3U	3U	3U			
Tetrabutyltin	3U	3U	3U	3U	3U	3U	3U	3U	3U	3U			
CHLORINATED PESTICIDES (ug/kg, dry wt)													
2,4'-DDT	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
2,4'-DDE	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
2,4'-DDD	5U	5U	5U	5U	5U	5U	5U	6.9	4.9J	5U			
4,4'-DDT	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	1.0	7	1000
4,4'-DDE	5U	5U	5U	5U	5U	5U	5U	**10.7**	**9.8**	**5.1**	2.2	27	1000
4,4'-DDD	5U	5U	5U	5U	5U	5U	5U	**8.6**	**8.6**	**3.1J**	2.0	20	1000
Total DDT	0	0	0	0	0	0	0	**26.2**	**23.3**	**8.2**	1.58	46.1	1000

Table A-2. Bulk Sediment Chemistry Summary for Composite Samples Collected in Channel Islands Harbor, October 2006.

Analytical Parameter	CI-A-U	CI-A-L	CI-B-U	CI-B-L	CI-C-U	CI-C-L	CI-D-U	CI-E-U	CI-E-U Dup	CI-F-L	Screening Values ERL	ERM	TTLC
Aldrin	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			1400
Dieldrin	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	0.02	8	8000
Endrin	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			200
Endrin ketone	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
Endrin aldehyde	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
Endosulfan II	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
Endosulfan I	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
Endosulfan sulfate	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
alpha-BHC	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
beta-BHC	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
delta-BHC	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
gamma-BHC (Lindane)	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
Methoxychlor	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
Mirex	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
Toxaphene	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U			
Heptachlor epoxide	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
Heptachlor	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
alpha-Chlordane	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
gamma-Chlordane	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
Oxychlordane	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
cis-Nonachlor	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
trans-Nonachlor	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U			
Total Chlordane	0	0	0	0	0	0	0	0	0	0	0.5	6	
PCBs (ug/kg, dry weight)													
Aroclor 1016	20U	20U	20U	20U	20U	20U	20U	20U	20U	20U			500000
Aroclor 1221	20U	20U	20U	20U	20U	20U	20U	20U	20U	20U			500000
Aroclor 1232	20U	20U	20U	20U	20U	20U	20U	20U	20U	20U			500000
Aroclor 1242	20U	20U	20U	20U	20U	20U	20U	20U	20U	20U			500000
Aroclor 1248	20U	20U	20U	20U	20U	20U	20U	20U	20U	20U			500000
Aroclor 1254	20U	20U	20U	20U	20U	20U	20U	20U	20U	20U			500000
Aroclor 1260	20U	20U	20U	20U	20U	20U	20U	20U	20U	20U			500000
Total Aroclor PCBs	0	0	0	0	0	0	0	0	0	0	22.7	180	500000

Table A-2. Bulk Sediment Chemistry Summary for Composite Samples Collected in Channel Islands Harbor, October 2006.

Analytical Parameter	CI-A-U	CI-A-L	CI-B-U	CI-B-L	CI-C-U	CI-C-L	CI-D-U	CI-E-U	CI-E-U Dup	CI-F-L	Screening Values ERL	ERM	TTLC
PCB008	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB018	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB028	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB031	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB033	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB037	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB044	5.0U	5.0U	1.6J	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB049	5.0U	5.0U	1.5J	1.1J	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB052	5.0U	5.0U	1.2J	1.5J	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB066	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB070	5.0U	1.3J	1.3J	1.7J	5U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB074	5.0U	5.0U	1.1J	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB077	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB081	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB087	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB095	1.2J	1.4J	2.5J	3J	2.3J	5.0U	5.0U	5.0U	5.0U	1.8J			
PCB097	5.0U	5.0U	5.0U	2J	3.2J	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB099	5.0U	1.4J	2.4J	2.7J	1.8J	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB101	5.0U	2.1J	4.1J	4.9J	3.8J	5.0U	5.0U	1.2J	5.0U	1.3J			
PCB105	5.0U	5.0U	2J	1.9J	5U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB110	1.4J	2.9J	3.9J	4.4J	3.2J	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB114	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB118	5.0U	3.1J	4J	4.7J	2.9J	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB119	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB123	5.0U	5.0U	5.0U	5.0U	2.7J	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB126	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB128+167	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB138	1.4J	2.7J	4.3J	5.1	7.8	5.0U	5.0U	5.0U	5.0U	3.0J			
PCB141	5.0U	5.0U	5.0U	1.6J	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB149	5.0U	5.0U	2.1J	3J	3.4J	5.0U	5.0U	1.1J	5.0U	4.6J			
PCB151	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	1.5J			
PCB153	1.3J	2J	3J	4.4J	5.2	5.0U	5.0U	5.0U	1.5J	5.1			
PCB156	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB157	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			

Table A-2. Bulk Sediment Chemistry Summary for Composite Samples Collected in Channel Islands Harbor, October 2006.

Analytical Parameter	CI-A-U	CI-A-L	CI-B-U	CI-B-L	CI-C-U	CI-C-L	CI-D-U	CI-E-U	CI-E-U Dup	CI-F-L	Screening Values ERL	ERM	TTLC
PCB158	5.0U	5.0U	1.6J	5.0U	1.8J	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB168+132	5.0U	5.0U	1.3J	1.5J	2.1J	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB169	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB170	5.0U	5.0U	1.9J	1.1J	3.3J	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB177	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	1.7J			
PCB180	5.0U	5.0U	1.5J	1.9J	3.7J	5.0U	5.0U	5.0U	5.0U	4J			
PCB183	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	1.3J			
PCB187	5.0U	5.0U	5.0U	5.0U	1.8J	5.0U	5.0U	5.0U	5.0U	2.1J			
PCB189	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB194	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB195	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB200	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB201	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB206	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
PCB209	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U			
Total PCB Congeners	5.3J	16.9J	41.3J	46.5J	49J	0	0	2.3J	1.5J	26.4J			
SEMI_VOLAITILE COMPOUNDS (ug/kg, dry wt.)													
2,4,6-Trichlorophenol	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U			
2,4-Dichlorophenol	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U			
2,4-Dimethylphenol	200U	200U	200U	200U	200U	200U	200U	200U	200U	200U			
2,4-Dinitrophenol	200U	200U	200U	200U	200U	200U	200U	200U	200U	200U			
2-Chlorophenol	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U			
2-Methyl-4,6-dinitrophenol	200U	200U	200U	200U	200U	200U	200U	200U	200U	200U			
2-Nitrophenol	200U	200U	200U	200U	200U	200U	200U	200U	200U	200U			
3+4-Methylphenol	134J	200U	200U	200U	200U	200U	200U	200U	200U	200U			
4-Chloro-3-methylphenol	200U	200U	200U	200U	200U	200U	200U	200U	200U	200U			
4-Nitrophenol	200U	200U	200U	200U	200U	200U	200U	200U	200U	200U			
Pentachlorophenol	100U	100U	100U	100U	100U	100U	100U	100U	100U	100U			
Total Phenolic Compounds	137J	0	0	0	0	0	0	0	0	0			
bis-(2-Ethylhexyl)phthalate	53.6J+	57.6J+	40U	69.3J+	78J+	31.4U	41U	78.5J+	152.8J+	110.9J+			
Di-n-octyl phthalate	10U	10U	10U	10U	10U	10U	10U	10U	10U	10U			
Diethyl phthalate	7.4J	7.6J	6J	15.7U	8.2J	5.2J	6.1J	10U	12.2U	10			
Di-n-butyl phthalate	860J+	928J+	717J+	120J+	924J+	245J+	756J+	291J+	1600J+	836J+			
Benzyl butyl phthalate	10U	10U	7.2J	7.7J	10.6	629	8.7J	10U	32.6	10U			

Table A-2. Bulk Sediment Chemistry Summary for Composite Samples Collected in Channel Islands Harbor, October 2006.

Analytical Parameter	CI-A-U	CI-A-L	CI-B-U	CI-B-L	CI-C-U	CI-C-L	CI-D-U	CI-E-U	CI-E-U Dup	CI-F-L	Screening Values ERL	ERM	TTLC
Dimethyl phthalate	10U	10U	10U	10U	10U	10U	10U	10U	10U	10U			
Phenanthrene	10.8	3.4J	3.6J	4.8J	10.1	517	2.8J	10.3	8.5	4.7J	240	1500	
Naphthalene	1.9J	1.4J	2.3J	1.2J	2.2J	55.5	5U	3.8J	2.9J	1.9J	160	2100	
Fluorene	1.2J	5U	5U	5U	1.3J	108	5U	1.3J	1.1J	5U	19	540	
Dibenzothiophene	5U	5U	5U	5U	1.9J	34.2	5U	1.7J	1.4J	5U			
Biphenyl	1.9J	1.2J	1.3J	1.1J	2.6J	13.6	5U	2.8J	2.4J	1.1J			
Anthracene	2J	5U	5U	5U	5U	49.4	5U	2.5J	2.4J	2.1J	85.3	1100	
Acenaphthylene	5U	5U	5U	5U	5U	1.1J	5U	5U	5U	5U	44	640	
Acenaphthene	1.1J	5U	5U	5U	5U	49.2	5U	1.1J	5U	5U	16	500	
2-Methylnaphthalene	6.3	5.5	6.9	3.6J	7.2	44.1	4.3J	8.1	7.4	6.5	70	670	
2,6-Dimethylnaphthalene	3.2J	2.2J	2.7J	1.8J	3.2J	16.8	1.9J	4.2J	3.6J	2.9J			
2,3,5-Trimethylnaphthalene	1.6J	5U	5U	5U	2.4J	4.6J	5U	2.3J	5U	5U			
1-Methylphenanthrene	3.3J	1.5J	1.4J	2.2J	20.7	30.2	1.3J	4.2J	2.4J	5U			
1-Methylnaphthalene	2.7J	2.3J	2.7J	1.8J	3.6J	24	1.7J	4.9J	4J	2.5J			
Pyrene	19.8	3.2J	3.3J	6.6	9.5	402	2J	18.6	14.2	12.6	665	2600	
Perylene	18.9	15.4	11.4	21.6	43.7	89.9	12	40.1	29.7	14.4			
Indeno(1,2,3-cd)pyrene	5U	5U	5U	5U	5U	367	5U	15.6	14.8	5U			
Fluoranthene	20.9	3J	3.2J	6	7.9	592	1.6J	13.6	9.5	6.4	600	5100	
Dibenzo(a,h)anthracene	5U	5U	5U	5U	5U	56.2	5U	5U	5U	5U	63.4	260	
Chrysene	12.2	2.5J	2.4J	3.9J	20.1	223	2J	12.2	12.5	4.7J	384	2800	
Benzo(k)fluoranthene	11.4	5U	5U	1.6J	12.1	321	5U	16.2	14.3	11.6			
Benzo(g,h,i)perylene	6.7	5U	5U	5U	8.9	185	5U	12.8	11.2	8.4			
Benzo(e)pyrene	8.5	2.3J	2.8J	4J	15.1	206	1.6J	16.1	14.6	10			
Benzo(b)fluoranthene	10.1	2.3J	5U	5.6	26.8	360	5U	19.5	19.4	18.9			
Benzo(a)pyrene	10.1	5U	5U	1.7J	9.7	357	5U	17.7	12.6	13.5	430	1600	
Benzo(a)anthracene	12.2	5U	5U	4.3J	9.6	269	5U	8.8	10.4	6.6	261	1600	
Total PAHs	167	46.2	44	71.8	219	**4380**	31.2	238	199	129	4022	44792	

Bold values equal or exceed ERL.
Bold and underlined values equal or exceed ERL and ERM.
U= Not measured above reported sample reporting limit.
J= The result is an estimated quantity.
J+= The result is an estimated quantity but result may be biased high.

Appendix C

Summary of 2016 Hueneme Beach Physical Data

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.

Appendix D

Agency Correspondence & Coordination

From:	Duncan, Emily@Waterboards
To:	Howo, Kymberly L CIV USARMY CESPL (USA); "Ota, Allan"; Scianni, Melissa; R9cwa401@epa.gov
Cc:	Troxel, Tiffany A CIV USARMY CESPL (USA); Lovan, Hayley J CIV (USA); Martinez-Takeshita, Natalie M CIV USARMY CESPL (USA); Stumpf, Serena@Waterboards; Sexton, Hope@Waterboards; WB-RB4-401Certification
Subject:	[Non-DoD Source] RE: Channel Islands Breakwater Repair
Date:	Friday, April 23, 2021 3:14:12 PM

Hi Kym,
Thank you for the notification, we have added this to our records.

Emily

Emily Duncan, Ph.D. (She/her/hers)

Senior Environmental Scientist, Regional Programs Section

Los Angeles Regional Water Quality Control Board (Region 4)

320 West 4th Street, Suite 200

Los Angeles, CA 90013

Emily.Duncan@waterboards.ca.gov

(213) 576-6679

Cell: 530-304-6217

From: Howo, Kymberly L CIV USARMY CESPL (USA) <Kymberly.L.Howo@usace.army.mil>
Sent: Thursday, April 22, 2021 3:56 PM
To: Duncan, Emily@Waterboards <Emily.Duncan@Waterboards.ca.gov>; WB-RB3-401Application <RB3-401Application@Waterboards.ca.gov>; 'Ota, Allan' <Ota.Allan@epamail.epa.gov>; Scianni, Melissa <Scianni.Melissa@epa.gov>; R9cwa401@epa.gov
Cc: Troxel, Tiffany A CIV USARMY CESPL (USA) <Tiffany.A.Troxel@usace.army.mil>; Lovan, Hayley J CIV (USA) <Hayley.J.Lovan@usace.army.mil>; Martinez-Takeshita, Natalie M CIV USARMY CESPL (USA) <Natalie.M.Martinez-Takeshita@usace.army.mil>
Subject: Channel Islands Breakwater Repair

EXTERNAL:

Good afternoon,

On November 23, 2020, we communicated the Reasonable Period of Time (RPT) to Emily Duncan at the Regional Water Quality Control Board (Water Board), set at 21 days from the receipt of the draft Supplemental Environmental Assessment (SEA). A copy of the RPT notice is attached to this email.

The draft SEA was emailed to the Water Board on February 5, 2021, a copy of which is attached to this email. The RPT expired on April 6, 2021, and we did not receive a 401 water quality certification or denial from the Water Board. Therefore, the 401 certification requirement for this project is waived.

Please let me know if you have any questions.

Thank You,

Kym Howo
Biologist
Environmental Resources Branch | Los Angeles District | U.S. Army Corps of Engineers
kymberly.l.howo@usace.army.mil
Office: 213-452-3811
Govt. cell: 213-800-1024

From:	Laura Casali - NOAA Affiliate
To:	Howo, Kymberly L CIV USARMY CESPL (USA)
Cc:	Bryant Chesney; Martinez-Takeshita, Natalie M CIV USARMY CESPL (USA); Lovan, Hayley J CIV (USA); Chris; Lena
Subject:	[Non-DoD Source] Channel Islands Breakwater and Jetty Repair EFH (WCRO-2021-00354)
Date:	Tuesday, March 9, 2021 8:31:11 AM

Hello Ms. Howo,

Thank you for submitting the Draft Supplemental Environmental Assessment (SEA) and the re-initiation of Essential Fish Habitat (EFH) as required by Magnuson-Stevens Fishery Conservation and Management Act, as amended. NMFS has reviewed the SEA and the proposed action of maintenance and repair work located at the Channel Island Harbor (CIH), on and adjacent to the offshore breakwater, in the city of Oxnard, Ventura County, California, with an approximate total project area of 17 acres. An environmental assessment was completed in June 2019, with a Supplemental EA completed in February 2021. The proposed project work is expected to start in Spring/Summer of 2021 and last approximately three months.

The U.S. Army Corps of Engineers Los Angeles District (Corps) is proposing to perform the action that includes construction and installation of concrete stairs on the breakwater, replacement of the navigational aid pad, and in-water dredging to remove shoaling that has occurred shoreward of the breakwater. This new construction of three sets of concrete stairs (3 ft by 13 ft) atop the breakwater between 0.0 to +13ft MLLW, and the replacement of an existing concrete navigational aid pad would require a concrete mixer, and or concrete truck, concrete forms, and other tools. Removal of the shoaling will require in-water excavation with a clamshell dredge that would take place over a one to two week period using a crane-equipped barge, scow with grizzly, and support vessels. Dredging will excavate approximately 25,000 cubic yards, to a depth of -15 ft MLLW with two feet allowable over-depth, and side cast to Areas B and C of the CIH Operations and Maintenance dredge template (Figure 4) in the SEA 2021.

NMFS believes the proposed action would adversely affect EFH via benthic disturbance and increased turbidity. However, NMFS concurs with the Corps that adverse impacts would be temporary, and does not believe conservation recommendations are necessary for the proposed action.

Thank you for consulting with NMFS regarding the effects of the proposed action on EFH. Please let me know if you have any questions.

Laura Casali

--
Laura Casali

Aquaculture, ESA and EFH Coordination and Consultation,
Contractor with Saltwater Inc. in support of
NOAA Fisheries Office of Protected Resources Division | U.S. Department of Commerce
Mobile: (562)522-9098
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State of California • Natural Resources Agency
Gavin Newsom, *Governor*

DEPARTMENT OF PARKS AND RECREATION
OFFICE OF HISTORIC PRESERVATION
Armando Quintero, *Director*

Julianne Polanco, State Historic Preservation Officer

1725 23rd Street, Suite 100, Sacramento, CA 95816-7100
Telephone: (916) 445-7000 FAX: (916) 445-7053
calshpo.ohp@parks.ca.gov www.ohp.parks.ca.gov

December 15, 2020 In reply refer to: COE_2018_0705_003

VIA ELECTRONIC MAIL

Eduardo T. DeMesa
Chief
Planning Division
U.S. Army Corps of Engineers, Los Angeles District
915 Wilshire Blvd., Suite 930
Los Angeles, CA 90017-3489

RE: Reinitiation of section 106 consultation for the Channel Islands Harbor Breakwater and jetty Repair Project, Ventura County

Dear Eduardo DeMesa:

The U.S. Army Corps of Engineers (COE) is reinitiating consultation with the State Historic Preservation Officer (SHPO) to comply with Section 106 of the National Historic Preservation Act of 1966 (as amended) and its implementing regulation at 36 CFR Part 800. By letter received on November 24, 2020, the COE is seeking comments on their modified undertaking and continued finding of effect for the above-referenced undertaking.

The COE is conducting breakwater repairs and resetting armor stones within the Channel Islands Harbor in Ventura County. Project activities include replacement of an existing navigation aid pad, the addition of four concrete steps to the breakwater, and the dredging of 7’ feet of accumulated sediment. The Area of Potential Effects (APE) remains unchanged from the previous consultations.

Previous efforts to identify historic properties resulted in the COE determining the Channel Islands Harbor breakwater and jetties were not eligible for the National Register with SHPO concurrence and agreement with the COE’s finding of *no historic properties affected* issued on October 30, 2018.

The COE has concluded that the modification to the undertaking would have no effect on historic properties and has requested my review and comment on their continued finding of effect for the proposed undertaking. After reviewing your letter and supporting documentation, **I do not object** to a continued finding of *no historic properties affected* for this undertaking pursuant to 36 CFR 800.4(d)(1).

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. If you require further information, contact Elizabeth Hodges of my staff at (916) 445-7017 or Elizabeth.Hodges@parks.ca.gov.

Sincerely,

Julianne Polanco
State Historic Preservation Officer

Appendix E

Air Quality Calculations

Channel Islands Breakwater/Jetty Repair - AQ Calculations for Construction

CRANE

			Emission Factors in lb/hr							Notes
	Total Days	hrs/day	**ROG**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO2**	
	105	8	0.0954	0.3982	0.7236	0.0014	0.0286	0.0255	128.63	1, 2, 3
total emissions (tons/year)			**0.0401**	**0.1672**	**0.3039**	**0.0006**	**0.012**	**0.0107**	**54.024**	

TUG

power rating (kw)	1790									
load factor	0.68			**ROG**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO2**
Qty.	2	**EF's in g/kw-hr**		0.44	5.00	7.94	0.01	0.23	0.21	652.00
hrs/day	8	**total emission (tons/year)**		**0.98973**	**11.2469**	**17.8601**	**0.02249**	**0.51736**	**0.47237**	**1466.6**
total days	105									
total kw-hr.	2044896									

SKIFF

			Emission Factors in lb/hr							Notes
	Total Days	hrs/day	**ROG**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO2**	
	105	8	0.0228	0.0778	0.1428	0.0002	0.0067	0.006	17.631	1, 2, 3, 4
total emissions (tons/year)			**0.0096**	**0.0327**	**0.06**	**9E-05**	**0.0028**	**0.0025**	**7.4052**	

(1) SCAQMD Off Road Emission Factors using composite emissions for cranes for emission year 2019
(2) Values for PM 2.5 were calculated for off-road emissions by multiplying PM10 emissions by 0.89 per SCAQMD
(3) 6 months of construction ~ 105 work days.
(4) skiff motor ~ to 25 hp generator from SCAQMD Off Road Emission Factors

Appendix F

404(b)(1) Evaluation

THE EVALUATION OF THE EFFECTS OF THE DISCHARGE OF DREDGE OR FILL MATERIAL INTO THE WATERS OF THE UNITED STATES IN SUPPORT OF THE SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT FOR THE MODIFICATIONS TO THE CHANNEL ISLANDS HARBOR BREAKWATER AND JETTY REPAIR PROJECT VENTURA COUNTY, 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 excavated 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: The proposed project area is the Channel Islands Harbor Detached Breakwater, located adjacent to the Channel Islands Harbor Jetty and Federal Entrance Channel.

b. General Description: The Los Angeles District of the U. S. Army Corps of Engineers, as part of its Operations and Maintenance Program, is proposing modifications to an upcoming and previously approved Channel Islands Detached Breakwater repair project. Proposed modifications include the installation of three staircases on the breakwater to facilitate future inspections, replacement of a navigational aid pad, and excavation of shoaled sediments in the lee of the breakwater to provide necessary access for conducting the repairs. Approximately 25,000 cubic yards will be excavated to a depth of -15 feet mean lower low water (MLLW) with a 2 feet allowable over-depth. The material will be side-cast.

Replacement of the navigational aid pad is taking place above the high tide line elevation and will not affect waters of the U.S., and therefore is not discussed further in this evaluation. This evaluation addresses the proposed excavation and side-casting of material as well as the installation of the staircases below the high tide line.

Excavation of the shoal in the lee of the detached breakwater would be performed by a clamshell dredge, over a period of approximately 1 – 2 weeks. The excavated material will be side cast into Areas B and C of the existing Channel Islands Harbor Operations and Maintenance (O&M) dredging template.

Staircase installation involves placement of a lower precast concrete portion extending from +0 feet MLLW to +6 feet MLLW, and an upper portion extending to +13 feet MLLW of cast in place concrete.

c. Basic and Overall Project Purpose: The basic project purpose is maintenance. The overall project purpose is to maintain the detached breakwater to support safe commercial, recreational, and military navigation operations in this harbor.

d. General Description of Dredged or Fill Material: [Appendix C]

(1) General Characteristics of Material (grain size, soil type): A sediment sampling program was conducted 2017-2018 in support of maintenance dredging in the Channel Islands Harbor. The resultant Channel Islands Harbor Sediment and Analysis Plan Report (SAPR) characterized the shoaled sediments as >90% sand compatible with Area B and Area C of the sand trap. The sediments sampled from adjacent locations to the breakwater revealed no physical or chemical contamination. The staircases will be a combination of precast concrete and poured in place concrete.

(2) Quantity of Material: Approximately 25,000 cy of sediments would be excavated from the project area and placed in Areas B and C of the of the existing Channel Islands Harbor O&M dredging template. The quantity of material relating directly to the three staircases is approximately 25 cubic yards.

(3) Source Material: Accumulated sediments of the leeward shoal. Concrete would be purchased by the Contractor.

e. Description of the Proposed Discharge Site:

(4) Shoal area: The area is sandy nearshore environment.

Areas B and C of the existing Channel Islands Harbor O&M dredge template, approximately 1,300 to 2,300 feet offshore in waters -20 to -30 feet MLLW. The area is sandy bottom nearshore environment.

Staircases will be placed at the approximate center and on each end of the quarry rock detached breakwater, respectively 11+50, 22+40 and 00+70, +/- 15 feet. The stairs will be placed from +0 feet MLLW to +13 feet MLLW (See attached Figure 1).

(5) Size (acres): The excavation and placement areas total approximately 17 acres. Staircases by area will cover approximately 117 square feet.

(6) Type of Site (confined, unconfined, open water): Excavation and placement activities will take place in unconfined, open water. The concrete staircases will be placed at the +0 feet MLLW and extending to +13 feet MLLW on the breakwater.

f. Description of Disposal Method: Shoal removal and disposal would require the use of a crane-equipped barge and support vessels. The capabilities and compliment of such equipment are as follows:

Crane-equipped Barge. Typically, a barge with an attached crane that uses a clamshell bucket would be used to excavate the shoaled material in the lee of the detached breakwater. The material would be deposited directly from the clamshell bucket into Area B and Area C of the Channel Islands Harbor O&M dredge template. A scow with an attached grizzly may be used in tandem with the crane-equipped barge if the excavated material warrants filtering. If boulders, refuse or other undesirable material is encountered during excavation of the shoal that is considered unsuitable for deposit into Area B and Area C, the clamshell bucket would deposit shoaled material on top of the grizzly with the scow bottom open below. The same crane-equipped barge or an additional crane-equipped barge could also facilitate movement of staircases and the replacement of the navigation aid concrete pad from the barge to the detached breakwater.

Support Vessels. Self-propelled boats that serve as tenders, tugs, and spotting craft. The main purpose of a support vessel is to assist the crane operator as well as to ferry equipment and crew back and forth from the shore, detached breakwater, staging areas, and the crane and scow. The compliment of these vessels is usually just one operator unless ferrying other crew.

Construction of the concrete staircases would likely require the use a concrete mixer, concrete forms and tools. A concrete truck may be utilized to deliver concrete for staircases.

II. Factual Determinations**.**

a. Physical Substrate Determinations:

(1) Substrate Elevation and Slope.

Current bottom elevations in the lee of the detached breakwater range from -9’ to -15’ MLLW. The shoal has a steep gradient. Areas B and C of the Channel Islands Harbor O&M dredge template range from -20 to -30 MLLW.

(2) Sediment Type.

Geotechnical studies indicate that the sediment consists primarily of sand, compatible with Area B and Area C of the Channel Islands Harbor O&M dredge template. The staircase installation locations are on quarry rock used to construct the breakwater.

(3) Excavated Material Movement.

Excavated material would be placed into the adjacent Areas B and C of the Channel Islands O&M dredge template. Sands are expected to remain in the sand trap. Dust and dirt runoff during staircase placement is expected to initially disperse and settle. The staircases themselves are fixed concrete structures with no movement associated.

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

Temporary, short-term adverse impacts would occur. Excavation and sediment placement (side-casting) into the disposal area would bury benthic organisms. Minor turbidity levels may exist in the immediate vicinity of the excavation and placement operations that may result in minor, localized and temporary reductions in dissolved oxygen Recolonization would be expected to occur once placement activities cease, species abundance and productivity would be expected to fully recover within one to three years. No long-term adverse effects are expected. Staircase placement would have no effect on benthos, nor the staircases themselves, but would permanently cover 117 square feet of quarry rock with concrete.

(5) Other Effects. N/A

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

Needed: YES __X___NO

Water quality monitoring would be performed to ensure impacts are minimal, short-term and localized to the immediate vicinity of the excavation and placement. Water quality monitoring would be conducted every day during the first week of construction, and weekly thereafter. Monitoring would consist of testing for pH, salinity, temperature, dissolved oxygen and turbidity. Negligible impacts to water quality or benthos or substrate are anticipated during placement of stairs.

If needed, Taken: _X_YES__NO

Water quality monitoring shall be performed every day for the first week of construction and weekly thereafter. Parameters to be monitored include dissolved oxygen (DO), salinity, temperature and turbidity.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water (refer to 40 CFR sections 230.11(b), 230.22 Water, and 230.25 Salinity Gradients; testing specified in Subpart G may be required). Consider effects on salinity, water chemistry, clarity, odor, taste, dissolved gas levels, nutrients, eutrophication, others.

Excavation and placement of excavated material in sand trap Areas B and C is not expected to significantly affect water circulation, fluctuation, and/or salinity. The Channel Islands Harbor Sampling and Analysis Plan Report from 2017-18 confirms the compatibility of shoaled materials to the sands within Areas B and C. Minor turbidity levels may exist in the immediate vicinity of the excavation and placement operations that may result in minor, temporary reductions in dissolved oxygen. Sands would not be a source of nutrients, thus eutrophication is not expected to result. Water used to entrain sands would be sea water as is water adjacent to nearshore placement, thus there would be no effect on salinity levels. Staircase installation effects on water quality parameters would be negligible. Staircases would have no effect on water quality parameters.

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

Excavation and placement of excavated material in the Channel Islands Harbor O&M dredge template is not expected to significantly affect circulation. Sands are expected to remain in the disposal site. Staircase installations will not affect current flows or water circulation.

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

Excavation and placement of excavated material in the disposal site 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. Staircase installations will not affect water level fluctuations, nor staircases themselves.

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

Excavation and placement of excavated material in the disposal site 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 would be sea water as is water adjacent to the Areas B and C, thus there would be no creation of salinity gradients. Staircase installations will not affect salinity gradients, nor staircases themselves.

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

Needed: ______YES X_ NO

No impacts to water circulation, fluctuations or salinity are anticipated.

If needed, Taken: ____YES___ NO

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)

Excavation and placement of sediments generally results in impacts to water quality from turbidity. Impacts would be adverse, but temporary and not significant. The impact is expected to be highly localized within the immediate vicinity of the excavation and in Areas B and C of the disposal site. Work areas are expected to return to background levels within one to twenty-four hours after placement ceases. Staircase installations will not affect turbidity levels, nor staircases themselves.

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

Only clean, sandy sediment would be excavated and placed in the disposal site. Minor turbidity levels may exist in the immediate vicinity of the excavation and placement operations that may result in minor, temporary reductions in dissolved oxygen. Staircase installations will not affect chemical or physical properties of the water column, nor staircases themselves.

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

Biota may be displaced and/or crushed during excavation activities. Example species potentially affected include polychaetes, annelids and other benthic organisms. Biota would recolonize and reestablish after excavation. Biota buried during disposal are expected to recolonize and reestablish productivity rates within one to three years. Staircase installation will not affect water circulation for biota, nor staircases themselves. Installation of staircases may crush or displace sessile invertebrates such as mussels and chitons but are expected to recolonize and reestablish quickly. Impacts will be adverse, but temporary and not significant.

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

Needed: X YES _ NO
If needed, Taken: X YES__ NO

Impacts to turbidity, chemical and physical properties of the water column and biota are localized and temporary. Placement of concrete precast stairs will utilize forms, plugs and other appropriate constraints to minimize potential runoff during installation.

Water quality monitoring shall be performed every day for the first week of construction and weekly thereafter. Parameters to be monitored include dissolved oxygen (DO), salinity, temperature and turbidity.

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 excavated 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) _____

Based on the analysis of the 2017-2018 Channel Islands Harbor Sediment Analysis Plan Report, and because dredged material is most likely to be free of contaminants if the material is composed primarily of sand, gravel or other inert material and is found in areas of high current or wave energy (40 CFR 230.60(a)), there is no reason to believe the material is a carrier of contaminants. Therefore, the shoal material is considered suitable for side-cast placement without additional testing.

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

(1) Plankton, Benthos and Nekton

Excavation and 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 side casting is completed. Benthic organisms would be buried by placement, but the areas would be minor in area and would recolonize and reestablish productivity rates within one to three years. Larger organisms in the nekton would be expected to avoid disposal operations and would not be impacted. Staircase installation would not affect plankton, benthos or nekton, nor staircases themselves.

(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 side casting operations are concluded. Staircase installation would not affect the food web, nor staircases themselves.

(3) Special Aquatic Sites

There are no special aquatic sites within the excavation area or in the disposal area. There are no special aquatic sites within staircase installation locations or staircases themselves.

(4) Threatened & Endangered Species [4.2.1 and 4.2.2]

Four Federally listed species utilize the nearshore environment, but would not be affected by the excavation, side-casting placement, or stair construction activities: federally threatened Western snowy plover (*Charadrius nivosus nivosus*) and its designated critical habitat,f ederally endangered California least tern (*Sterna antillarum browni*),endangered black abalone (*Haliotis cracherodii*), and endangered white abalone (*Haliotis sorenseni*).

Western snowy plover. All activities will be done seaside or on the breakwater, no equipment or personnel will access the beach.

California least tern. Excavation, side casting and staircase activities will be conducted on the sea and approximately 1,300 to 2,300 feet from the nearest California least tern nesting site. Potential turbidity plume resulting from side casting activity is expected to be localized and short in duration, with an indistinguishable effect on overall foraging area. In addition, the following minimization measures will be implemented to avoid potential effects:

- The limits of construction and excavation and placement activities shall be clearly marked or maintained with GPS coordinates per Figure 5 to prevent heavy equipment from entering areas beyond the smallest footprint needed to complete the project.
- The work area shall be kept clean to avoid attracting predators. All food and trash shall be disposed of in closed containers and removed from the project area.
- When not in operation, the crane performing work on the detached breakwater will be lowered and stowed in its boom to discourage predator perching.
- Weekly reporting of twice a week Hollywood Beach western snowy plover and California least tern nesting surveys, commencing 2 weeks prior to construction to be performed through the end of the western snowy plover and California least tern nesting seasons (September 15th).

Black and white abalone. Coordination with NMFS has deemed there is a low likelihood that black abalone are present.

(5) Other fish and wildlife:

Marine mammals would not be affected by placement activities. Birds may avoid the placement site while work is occurring (due to the presence of humans and machinery), although placement activities could attract birds to the benthic organisms coming out of the clamshell as an alternate food source. Roosting sea birds would be flushed from the staircase installation locations due to human and machine presence but are expected to reoccupy quickly.

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

Needed: _X_ YES __ NO

Measures included in discussion above.

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. Staircase installations and excavation and placement of material at Areas B and C in the sand trap 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 side casting/placement period and rapid diluting capacity of the receiving environment. Therefore, impacts to water quality from disposal/placement of material at the receiver site would not violate water quality objectives or compromise beneficial uses listed in the Basin Plan.

(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 excavation or sand trap area, or at the breakwater. The proposed actions would have no effect on municipal or private water supplies or water conservation.

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

The excavation and disposal site are not subject to commercial fishing. Recreational fishing would move to avoid the excavation and placement activities and to follow fish out of these areas. Staircase installation would have no affect on recreational and commercial fisheries.

c) Water Related Recreation (refer to section 230.52)

Construction equipment would be required to maintain ocean access for all uses. During excavation and side casting activities, proper advanced notice to mariners would occur and navigational traffic would not be allowed within the excavation and disposal areas. The displacement of recreational boating would be temporary and short-term. However, the nearshore placement activities would not significantly impact surfing conditions or other water sports once completed. The currents are not expected to change in magnitude or direction. Therefore, placement activities are not expected to measurably change currents or change surfing in any discernible way. To minimize navigation impacts and threats to vessel safety, all scows and tugboats 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. Staircase installation activities would have no effect on water related recreation, nor staircases themselves.

d) Aesthetics (refer to section 230.53)

Minor, short term effects during stair construction, excavation and side-casting are anticipated. The visual character of the site would be affected by presence of the scow and tugboats; however, the proposed activities would be temporary, and as such, would not result in permanent effects to the visual character of the site. The staircases and their installation would not fundamentally change the aesthetic character of the breakwater, due to its distance from shore.

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

Stair construction, excavation and side-casting placement activities would not have any effect on national and historic monuments, national seashores, wild and scenic rivers, wilderness areas or research sites.

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

The proposed breakwater and jetty repair, as well as ongoing biennial maintenance dredging are not expected to result in significant impacts. Because all of this work is being conducted within the same general footprint/disturbance area and within the same general timeframe, no additional cumulative impacts are anticipated.

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

Secondary effects of the discharge of excavated or fill would be negligible. Areas outside the direct impact would have only negligible turbidity effects from disposal. Turbidity levels would be low and in the immediate vicinity of the disposal operations. Impacts of the stair construction, excavation and placement activities are all temporary construction impacts. Movement of sand within the littoral cell would be indistinguishable from natural sand movement.

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: Disposing of the material in a different location, rather than side-casting, would expand the project's footprint and area of impact, and therefore would not have less adverse impact on the aquatic ecosystem. For stairs to be functional and meet the project purpose of facilitating safer inspections, they have to be installed below the high tide line. No alternative placement locations or methodologies were identified that would avoid or further minimize impacts to waters of the U.S.

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 nearshore disposal.

e. Compliance with Endangered Species Act of 1973.

The proposed discharges would have no effect on any species Federally listed as threatened or endangered nor on any designated critical habitat.

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 are in the project area..

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 discharges will have no effect on municipal and private water supplies.

(b) Recreation and Commercial Fisheries

The proposed discharges would have minor, short-term impacts, but no significant adverse effects on recreational fisheries. The sand trap area is 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 scows and tug vessels 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. Staircase installation would have no effect on recreational and commercial fisheries.

(c) Plankton

Excavation and 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. Staircase installation would not affect plankton.

(d) Fish

Larger organisms in the nekton would be expected to avoid excavation and side casting operations and would not be impacted. Staircase installation would not affect nekton.

(e) Shellfish

Benthic organisms, including shellfish, would be buried by excavation and side casting, but the areas would be minor in area and would recolonize once placement activities are complete, re-establishing productivity rates within one to three years. Staircase installation would not affect benthos.

(f) Wildlife

Marine mammals would not be affected by excavation or disposal. Birds would generally avoid the excavation and disposal areas, although placement could attract birds to the benthic organisms coming out of the scow as an alternate food source. Staircase installation would not affect wildlife.

(g) Special Aquatic Sites

There are no special aquatic sites in the nearshore 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 4.2 of the SEA.

(3) Significant Adverse Effects on Aquatic Ecosystem Diversity, Productivity and Stability: Any adverse effects would be short-term and less than significant. Refer to section 4.2 of the SEA.

(4) Significant Adverse Effects on Recreational, Aesthetic, and Economic Values: Any adverse effects would be short-term and less than significant. Refer to sections 4.7 and 4.8 of the 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 Section 5.2 of the 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 Excavated or Fill Material (specify which) is:

____ (1) Specified as complying with the requirements of these guidelines; or,

_X_ (2) Specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem; or,

____ (3) Specified as failing to comply with the requirements of these guidelines.

Prepared by: Kymberly Howo Date: 15APR2021

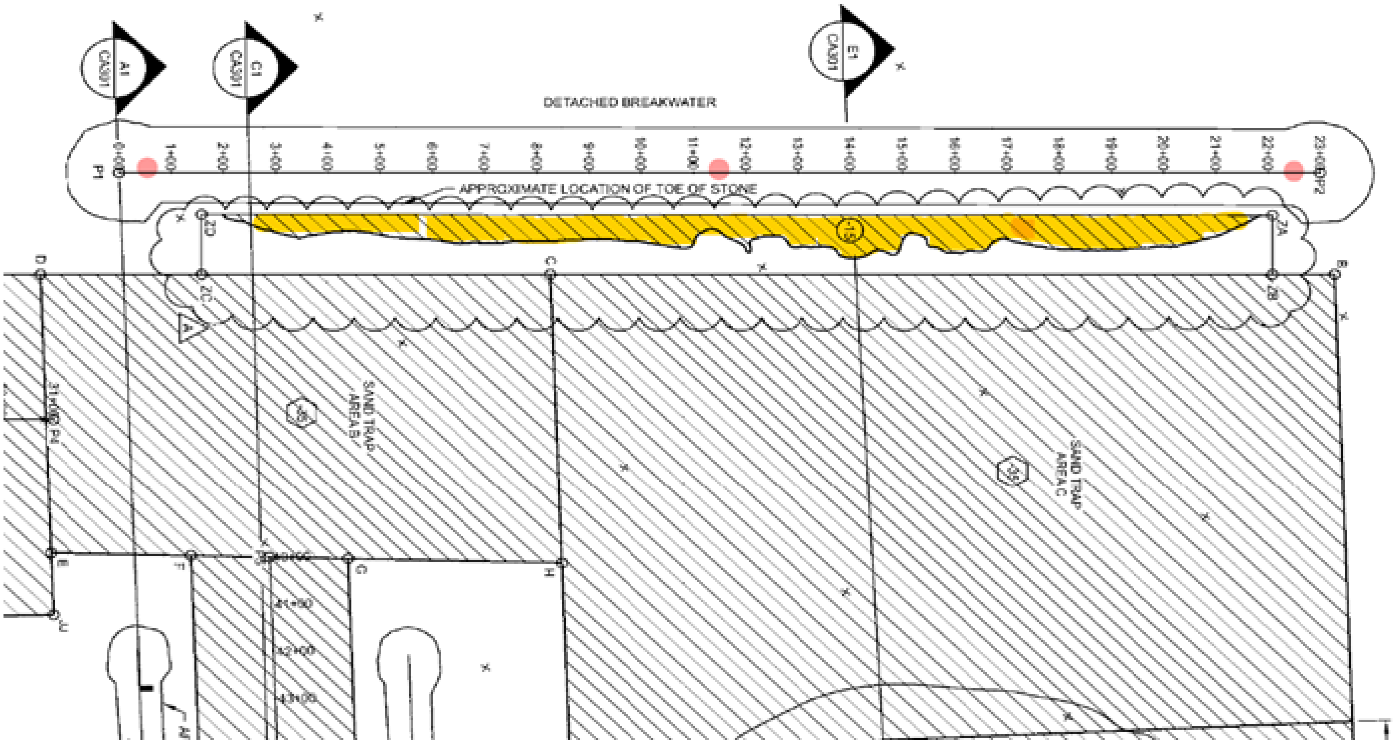


Figure 1. Channel Islands Detached Breakwater figure detailing location of shoal excavation (yellow) and approximate staircase installation locations (red).

Appendix G

Comments and Response to Comments

Copies of all correspondence are included in full in this appendix. The following table provides a summary of the comment and the response.

Agency	Letter Dated	Nature of Comments	Response to Comments/ Changes to SEA/Status
US Fish and Wildlife Service	Letter received on 03/11/2021	The proposed project would occur during a part of the year when both California least terns and western snowy plovers are present and nesting. The Corps proposes to remove the shoal using a crane-equipped barge and support vessels. Corvids (ravens and crows) and gulls are predators of California least tern and western snowy plover nests; a crane may serve as a roost for these predators, which may increase predation. The activity of the barge and support vessels may also interfere with foraging California least terns. Noise or other disturbance from project-related activities could interrupt courtship or breeding activities or elicit a startle response that causes adult California least terns or western snowy plovers to flush from the nest, leaving nests vulnerable to exposure and predation. We therefore recommend that the Corps assess these potential effects and make a new determination for California least tern and western snowy plover.	Coordination call took place March 16, 2021 with David Sherer of USFWS Ventura office. Further clarification of proposed action and discussion of current condition of habitat on Hollywood Beach was communicated in light of changes due to the 2020 Channel Islands Harbor dredge cycle. Several approaches to avoid effects to California least tern and western snowy plover were developed, with the final environmental commitments agreed to as follows, and as documented in Section 4.2.2, Section 5.1.3 and Section 5.2 of the Final EA: • When not in operation, the crane performing work on the detached breakwater will be lowered and stowed in its boom to discourage predator perching. • Weekly reporting of twice a week Hollywood Beach Western Snowy Plover and California Least Tern nesting surveys, commencing 2 weeks prior to construction to be performed through the end of the Western Snowy Plover and California Least Tern nesting seasons (September 15th). • In the event California least tern's nest on Hollywood Beach, perform California least tern monitoring during all excavation and side casting activities. California least tern monitoring must be conducted by a qualified biologist, with a minimum of 40 hours of experience in the field locating, observing, and monitoring

			adult, nesting, and chick/fledgling California least tern.

United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE
Ecological Services
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
08EVEN-2021-E-00528

March 11, 2021

Eduardo T. De Mesa
U.S. Army Corps of Engineers
Los Angeles District
915 Wilshire Boulevard, Suite 930
Los Angeles, California 90017

Subject: Comments on the Draft Supplemental Environmental Assessment for the Channel Islands Harbor Breakwater and Jetty Repair Project, Ventura County, California

Dear Eduardo De Mesa:

We are writing in response to the U.S. Army Corps of Engineers' (Corps) request for comments on the Draft Supplemental Environmental Assessment (SEA) (Corps 2021) for the Channel Islands Harbor Breakwater and Jetty Repair Project (project). The proposed project consists of removing a shoal in offshore waters on the leeward side of the breakwater, the installation of three sets of concrete steps on the surface of the breakwater, and replacement of a navigational aid pad, conducted on approximately 17 acres on and surrounding the offshore breakwater near the entrance to the Channel Islands Harbor (harbor) in the city of Oxnard, Ventura County, California. The Corps expects project activities would take place in the Spring and Summer of 2021.

The Draft SEA does not identify any federally listed species which may occur or have the potential to occur within the project area; however, we have ample data that show the federally endangered California least tern (*Sterna antillarum browni*) and the federally threatened western snowy plover (*Charadrius nivosus nivosus*) breed on the adjacent Hollywood Beach, and California least terns forage in the waters between the breakwater and the shore. California least terns are migratory colonial nesters and are present during their breeding season between April and August; western snowy plovers are present year-round and generally breed between March 1 and September 31.

The U.S. Fish and Wildlife Service's (Service) responsibilities include administering the Endangered Species Act of 1973, as amended (Act), including sections 7, 9, and 10. Section 9 of the Act prohibits the taking of any endangered or threatened species. Section 3(18) of the Act defines take to mean to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Service regulations (50 CFR 17.3) define harm to include significant habitat modification or degradation which actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harassment is defined by the Service as an intentional or negligent action that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. The Act provides for civil and criminal penalties for the unlawful taking of listed species.

Exemptions to the prohibitions against take may be obtained through coordination with the Service in two ways. If the subject project is to be funded, authorized, or carried out by a Federal agency and may affect a listed species, the Federal agency must consult with the Service, pursuant to section 7(a)(2) of the Act. If a proposed project does not involve a Federal agency but may result in take of a listed animal species, the project proponent should apply for an incidental take permit, pursuant to section 10(a)(1)(B) of the Act. To date, the Corps has not requested that we initiate consultation for the proposed project, pursuant to section 7 of the Act. Furthermore, the draft SEA states that the proposed project would have "no effect on any threatened or endangered species," and that "no consultation is required with [the Service]."

The proposed project would occur during a part of the year when both California least terns and western snowy plovers are present and nesting. The Corps proposes to remove the shoal using a crane-equipped barge and support vessels. Corvids (ravens and crows) and gulls are predators of California least tern and western snowy plover nests; a crane may serve as a roost for these predators, which may increase predation. The activity of the barge and support vessels may also interfere with foraging California least terns. Noise or other disturbance from project-related activities could interrupt courtship or breeding activities or elicit a startle response that causes adult California least terns or western snowy plovers to flush from the nest, leaving nests vulnerable to exposure and predation. We therefore recommend that the Corps assess these potential effects and make a new determination for California least tern and western snowy plover.

Due to the scope and complexity of the draft SEA, this letter does not reflect a comprehensive review of the document on our part. We are providing our comments based upon a review of sections addressing biological resources, those that may be associated with biological resources, project activities that have potential to affect federally listed species, other special status species, and our concerns for listed species within our jurisdiction related to our mandates under the Act.

We appreciate the opportunity to provide comments on the proposed project and look forward to working with the Corps to address and minimize the project's potential effects on federally listed species and sensitive habitats. If you have any questions regarding these comments and how they can be efficiently addressed and incorporated into the final SEA, please contact David Sherer at david_sherer@fws.gov.

Sincerely,

Stephen P. Henry
Field Supervisor

cc:
Hans Sins, California Department of Fish and Wildlife
Steve Gibson, California Department of Fish and Wildlife.

LITERATURE CITED

[Corps] U.S. Army Corps of Engineers. 2021. Draft supplemental environmental assessment for the Channel Islands Harbor breakwater and jetty repair project. Prepared by the U.S. Army Corps of Engineers, South Pacific Division, Los Angeles District. February. iii + 26 pp., appendices.

Appendix H

CZMA Amended Negative Determination

From:	Weber, John@Coastal
To:	Howo, Kymberly L CIV USARMY CESPL (USA)
Cc:	Martinez-Takeshita, Natalie M CIV USARMY CESPL (USA)
Subject:	[Non-DoD Source] Re: Channel Islands Breakwater Draft SEA
Date:	Tuesday, March 23, 2021 8:03:04 AM

Thanks, Kym - no, we have no further questions, and no further review for this project is necessary. We'll put a note to our file here, and thanks for coordinating with us.

-John

From: Howo, Kymberly L CIV USARMY CESPL (USA) <Kymberly.L.Howo@usace.army.mil>
Sent: Monday, March 22, 2021 1:16 PM
To: Weber, John@Coastal <john.weber@coastal.ca.gov>
Cc: Martinez-Takeshita, Natalie M CIV USARMY CESPL (USA) <Natalie.M.Martinez-Takeshita@usace.army.mil>
Subject: RE: Channel Islands Breakwater Draft SEA

Hi John,

Nothing new to add on our end.

I emailed Larry Simon last week to follow up on any questions on the Supplemental EA the Commission might have – any news there?

Thanks,
Kym

From: Weber, John@Coastal <john.weber@coastal.ca.gov>
Sent: Monday, March 22, 2021 12:32 PM
To: Howo, Kymberly L CIV USARMY CESPL (USA) <Kymberly.L.Howo@usace.army.mil>
Cc: Martinez-Takeshita, Natalie M CIV USARMY CESPL (USA) <Natalie.M.Martinez-Takeshita@usace.army.mil>
Subject: [Non-DoD Source] Re: Channel Islands Breakwater Draft SEA

....and following up on this, Kym- anything new to report on your end?

From: Weber, John@Coastal
Sent: Friday, February 26, 2021 12:52 PM
To: Howo, Kymberly L CIV USARMY CESPL (USA) <Kymberly.L.Howo@usace.army.mil>
Cc: Simon, Larry@Coastal <Larry.Simon@coastal.ca.gov>; Martinez-Takeshita, Natalie M CIV USARMY CESPL (USA) <Natalie.M.Martinez-Takeshita@usace.army.mil>
Subject: RE: Channel Islands Breakwater Draft SEA

Thanks….can you let me know if any do, as unlikely as that may be?

Thanks, and have a good weekend –

John

From: Howo, Kymberly L CIV USARMY CESPL (USA) [mailto:Kymberly.L.Howo@usace.army.mil]
Sent: Tuesday, February 23, 2021 7:53 AM
To: Weber, John@Coastal
Cc: Simon, Larry@Coastal; Martinez-Takeshita, Natalie M CIV USARMY CESPL (USA)
Subject: RE: Channel Islands Breakwater Draft SEA

Hi John,

No comments received yet on this Supplemental EA.

Thanks,
Kym

From: Martinez-Takeshita, Natalie M CIV USARMY CESPL (USA) <Natalie.M.Martinez-Takeshita@usace.army.mil>
Sent: Monday, February 22, 2021 3:35 PM
To: Weber, John@Coastal <john.weber@coastal.ca.gov>; Howo, Kymberly L CIV USARMY CESPL (USA) <Kymberly.L.Howo@usace.army.mil>
Cc: Simon, Larry@Coastal <Larry.Simon@coastal.ca.gov>
Subject: RE: Channel Islands Breakwater Draft SEA

Hi John,

Kym is out in the field today, but we are both working on this project so you can feel free to reach out to both of us anytime. I will try to answer as much as I know!

The SEA is out for public review right now, the review period ends March 7th. I do not believe we have received any comments yet but Kym will be able to better answer that when she gets back in tomorrow.

Here is the link to the SEA on our website.

https://www.spl.usace.army.mil/Media/Public-Notices/Article/2499793/spl-2021-0210-nlh-channel-islands-breakwater-jetty-repair-sea/

Natalie Martinez-Takeshita
Biologist
Ecosystems Planning Section, Planning Division

Islands Breakwater and Jetty Repair Supplemental EA. The project has a reduced footprint, using a clam shell to opportunistically excavate the leeward shoal for rock work access. In our last discussion we talked about amending the ND - please let us know if you have any questions.

Thanks,
Kym

Kym Howo
Biologist
Environmental Resources Branch | Los Angeles District | U.S. Army Corps of Engineers
kymberly.l.howo@usace.army.mil
Office: 213-452-3811
Govt. cell: 213-800-1024

Los Angeles District US Army Corps of Engineers
Office: (213) 452-3306
Gov. Cell: (213) 703-8894
Natalie.M.Martinez-Takeshita@usace.army.mil

From: Weber, John@Coastal <john.weber@coastal.ca.gov>
Sent: Monday, February 22, 2021 3:21 PM
To: Howo, Kymberly L CIV USARMY CESPL (USA) <Kymberly.L.Howo@usace.army.mil>
Cc: Simon, Larry@Coastal <Larry.Simon@coastal.ca.gov>; Martinez-Takeshita, Natalie M CIV USARMY CESPL (USA) <Natalie.M.Martinez-Takeshita@usace.army.mil>
Subject: [Non-DoD Source] Fw: Channel Islands Breakwater Draft SEA

Hi Kym - Larry forwarded me this information, and one question for you - there's a reference in the draft SEA of providing for a 15-day public comment period. Has that happened as of yet (and if so, any comments received)?

Thanks very much-

John

John Weber
CA Coastal Commission
Energy, Ocean Resources, and Federal Consistency unit

Ph: 415.904.5245

From: Howo, Kymberly L CIV USARMY CESPL (USA) <Kymberly.L.Howo@usace.army.mil>
Sent: Friday, February 19, 2021 4:34 PM
To: Simon, Larry@Coastal <Larry.Simon@coastal.ca.gov>
Cc: Martinez-Takeshita, Natalie M CIV USARMY CESPL (USA) <Natalie.M.Martinez-Takeshita@usace.army.mil>
Subject: Channel Islands Breakwater Draft SEA

Hi Larry,

Following up on our conversation from last November, please find attached the draft Channel

Appendix I

EJScreen report

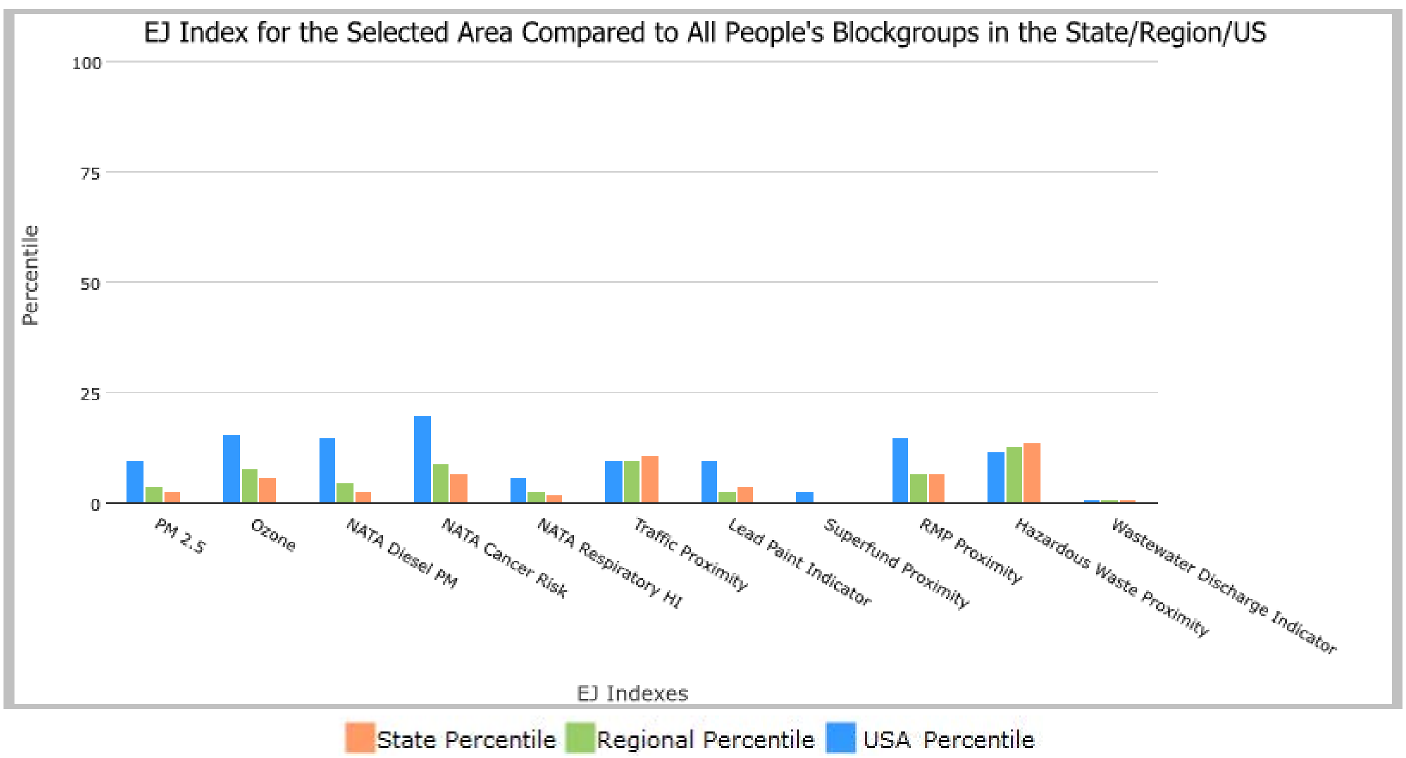
EJSCREEN Report (Version 2020)

the User Specified Area, CALIFORNIA, EPA Region 9

Approximate Population: 1,575

Input Area (sq. miles): 0.93

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	3	4	10
EJ Index for Ozone	6	8	16
EJ Index for NATA* Diesel PM	3	5	15
EJ Index for NATA* Air Toxics Cancer Risk	7	9	20
EJ Index for NATA* Respiratory Hazard Index	2	3	6
EJ Index for Traffic Proximity and Volume	11	10	10
EJ Index for Lead Paint Indicator	4	3	10
EJ Index for Superfund Proximity	0	0	3
EJ Index for RMP Proximity	7	7	15
EJ Index for Hazardous Waste Proximity	14	13	12
EJ Index for Wastewater Discharge Indicator	1	1	1



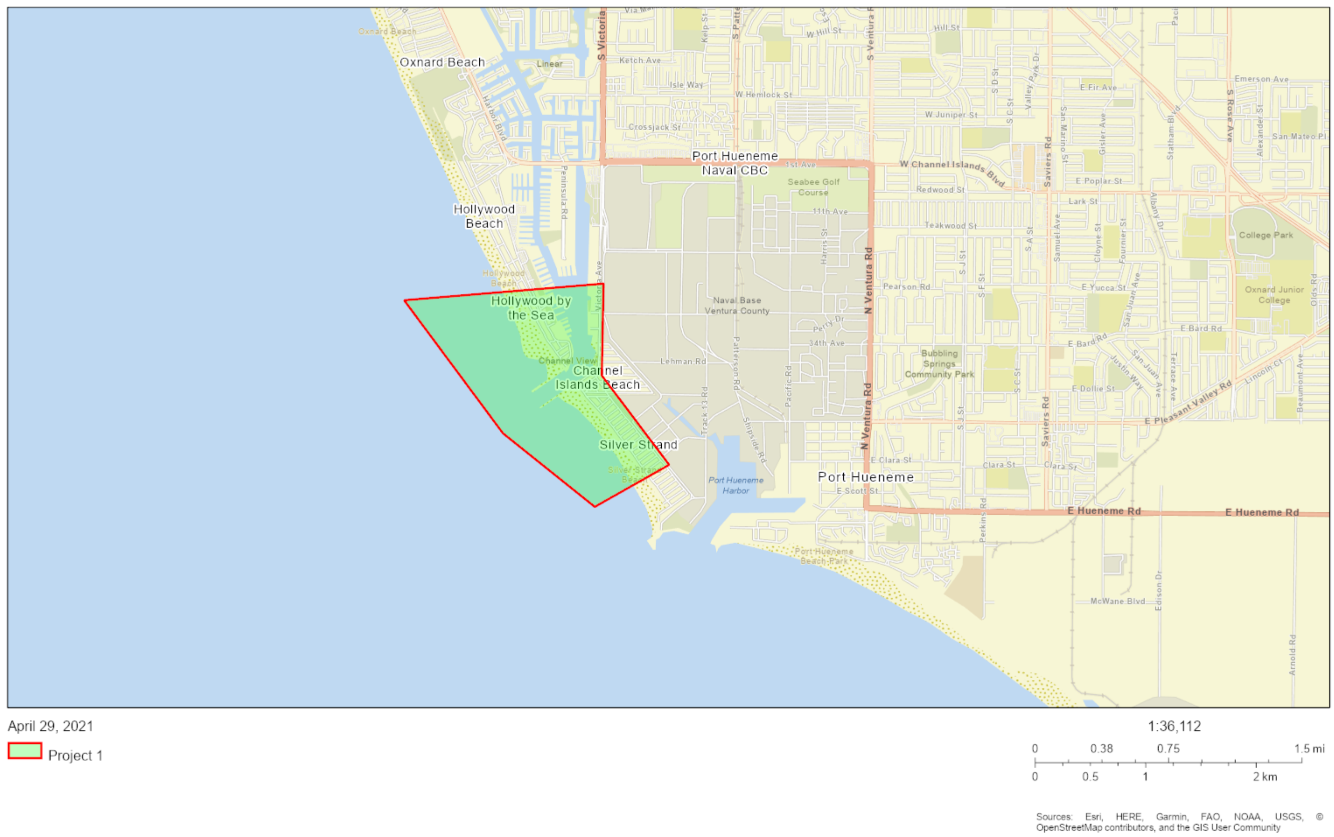
This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJSCREEN Report (Version 2020)

the User Specified Area, CALIFORNIA, EPA Region 9

Approximate Population: 1,575

Input Area (sq. miles): 0.93



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJSCREEN Report (Version 2020)

the User Specified Area, CALIFORNIA, EPA Region 9

Approximate Population: 1,575

Input Area (sq. miles): 0.93

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in $\mu g/m^3$)	9.31	10.6	24	9.99	39	8.55	75
Ozone (ppb)	37.7	49.2	16	50.1	12	42.9	18
NATA* Diesel PM ($\mu g/m^3$)	0.345	0.467	39	0.479	<50th	0.478	<50th
NATA* Cancer Risk (lifetime risk per million)	23	36	3	35	<50th	32	<50th
NATA* Respiratory Hazard Index	0.57	0.55	57	0.53	50-60th	0.44	80-90th
Traffic Proximity and Volume (daily traffic count/distance to road)	330	2000	26	1700	34	750	59
Lead Paint Indicator (% Pre-1960 Housing)	0.25	0.29	54	0.24	62	0.28	58
Superfund Proximity (site count/km distance)	0.23	0.17	85	0.15	88	0.13	88
RMP Proximity (facility count/km distance)	0.32	1.1	35	0.99	41	0.74	50
Hazardous Waste Proximity (facility count/km distance)	1.2	6.2	18	5.3	23	5	54
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	1.3	18	90	18	91	9.4	95
Demographic Indicators							
Demographic Index	17%	47%	6	46%	7	36%	24
People of Color Population	24%	62%	9	60%	11	39%	42
Low Income Population	11%	33%	16	33%	16	33%	16
Linguistically Isolated Population	0%	9%	17	8%	20	4%	45
Population With Less Than High School Education	4%	17%	21	16%	22	13%	25
Population Under 5 years of age	3%	6%	14	6%	15	6%	16
Population over 64 years of age	14%	14%	59	14%	58	15%	49

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

For additional information, see: www.epa.gov/environmentaljustice