APPENDIX E

Shoreline PER

Preliminary Engineering Report
Mission Bay PEIR
Restoration of Shoreline

December 2020

Presented To

City of San Diego Public Works Department
525 B Street, Suite 750, MS 908A
San Diego, CA 92101

Presented By

Moffatt & Nichol
1660 Hotel Circle N, Suite 500
San Diego, CA 92108

P +1-619-220-6050
F +1-619-220-6055
moffattnichol.com

Prepared by:

Conor Ofsthun	**November 2020**
Name	Date
Title	

Reviewed by:

Michael J. McCarthy	**November 2020**
Name	Date
Title	

Authorized by:

Christopher Webb	**December 4, 2020**
Name	Date
Title	

Contents

1.0 INTRODUCTION 1
1.1 Project Overview 1
1.2 Project Location 4
1.3 Project Goals and Objectives 6
2.0 DATA COLLECTION AND EXISTING CHARACTERISTICS 7
2.1 Topography/Bathymetry 7
2.2 Available GIS Data 7
2.3 As-Built Drawings 8
3.0 EXISTING CONDITIONS 9
3.1 Hydrology 9
3.2 Measured Tides 10
3.3 Astronomical Tides 10
3.4 Sea Level Rise 11
3.4.1 What is Sea Level Rise? 11
3.4.2 Selected Sea Level Rise Scenarios 12
3.5 FEMA Flood Maps 13
3.6 Design Wave Analysis 14
3.6.1 Wind Waves 14
3.6.2 Passing Vessel Waves 15
3.6.3 Swell Waves 17
3.6.4 Design Wave by Site 19
4.0 PRELIMINARY DESIGN 20
4.1 Project Sites 20
4.1.1 Bonita Cove 20
4.1.2 Ventura Cove Park 22
4.1.3 Vacation Island Southwest 24
4.1.4 West Sail Bay 25
4.1.5 Crown Point 27
4.1.6 Vacation Island Northwest 29
4.1.7 Vacation Island Northeast (West of Ingraham St & Ski Beach) 31
4.1.8 De Anza Point and Cove 34
4.1.9 Selected Restoration of Shoreline Concept 36
4.2 Hydraulic Analysis 38
4.3 Preliminary Drawings 38
4.4 Preliminary Opinion of Probable Construction Cost 39
4.4.1 Bonita Cove 40
4.4.2 Ventura Cove Park 40
4.4.3 Vacation Island Southwest 41
4.4.4 West Sail Bay 41

4.4.5 Crown Point 42
4.4.6 Vacation Island Northwest 42
4.4.7 Vacation Island Northeast (West of Ingraham St & Ski Beach) 42
4.4.8 De Anza Point and Cove 44
4.4.9 Storm Drain Improvements 45
4.5 Preliminary Project Schedule 45
5.0 OTHER CONSIDERATIONS AS APPROPRIATE 47
5.1 Feasibility Analysis of Constructability 47
5.1.1 Landside Construction 47
5.1.2 Waterside Construction 49
5.1.3 Project Specific Construction Approach 52
5.2 Risk Assessment 55
5.2.1 Land Ownership 55
5.2.2 Utilities 55
5.2.3 Existing Soil Data 55
5.2.4 Proximity to Neighbors 57
5.2.5 Environmental Windows 58
5.2.6 Water Quality Concerns 58
5.2.7 Competing Interests 59
5.2.8 Sensitive Habitat 59
5.2.9 Sea Level Rise 61
5.2.10 Permitting 64
5.3 Project Conflict Coordination and Evaluation 65
5.3.1 Bonita Cove 65
5.3.2 Ventura Cove Park 65
5.3.3 Vacation Island Southwest 65
5.3.4 West Sail Bay 65
5.3.5 Crown Point 66
5.3.6 Vacation Island Northwest 66
5.3.7 Vacation Island Northeast (West of Ingraham St & Ski Beach) 66
5.3.8 De Anza Point and Cove 66
5.4 Environmental Considerations and Permits 68
5.4.1 Noise Control 70
5.5 Design Considerations 71
5.5.1 Beach Nourishment 71
5.5.2 Rip Rap Armor Sizing 72
5.5.3 Cobble Berm 72
5.5.4 Oyster Restoration 75
5.5.5 Vegetated Dune Restoration 79
5.5.6 Wetland Restoration 79
5.6 History of Project Considerations 80
5.6.1 Bonita Cove 81

5.6.2 Ventura Cove Park 81
5.6.3 Vacation Island Southwest 81
5.6.4 West Sail Bay 81
5.6.5 Crown Point 82
5.6.6 Vacation Island Northwest 82
5.6.7 Vacation Island Northeast (West of Ingraham St & Ski Beach) 82
5.6.8 De Anza Point and Cove 83
5.7 City Professional Standards and Mission Bay Masterplan Consistency 83
5.8 ADA and Title 24 88
6.0 REFERENCES 89

Tables

Table 2-1. Data Inventory 7
Table 2-2. Summary of City of San Diego As-Built Drawings Reviewed 8
Table 3-1. Key Rational Method Parameters Summary 9
Table 3-2. Existing Still Water Levels in Mission Bay (NOAA Station 9410230) 11
Table 3-3. Sea Level Rise Projections – San Diego, CA 12
Table 3-4. 100-Year Wind Wave Analysis Results 14
Table 3-5. Passing Vessel Wave Analysis Results 17
Table 3-6. 100-Yr Swell Wave Height by Concept Site 18
Table 3-7. Design Wave by Site 19
Table 4-1. Restoration of Shoreline – 30% Design Concept Summary 37
Table 4-2. Hydraulic Analyses Results 38
Table 4-3. Restoration of Shoreline – 30% Design Construction Cost Estimate 39
Table 4-4. Bonita Cove – 30% Design Quantity and Cost Estimate 40
Table 4-5. Ventura Cove Park – 30% Design Quantity and Cost Estimate 40
Table 4-6. Vacation Island SW – 30% Design Quantity and Cost Estimate 41
Table 4-7. West Sail Bay – 30% Design Quantity and Cost Estimate 41
Table 4-8. Crown Point – 30% Design Quantity and Cost Estimate 42
Table 4-9. Vacation Island NW – 30% Design Quantity and Cost Estimate 42
Table 4-10. Vacation Island NE (W of Ingraham St) – 30% Design Quantity and Cost Estimate 42
Table 4-11. Vacation Island NE (Ski Beach) – 30% Design Quantity and Cost Estimate 43
Table 4-12. De Anza Point – 30% Design Quantity and Cost Estimate 44
Table 4-13. De Anza Cove – 30% Design Quantity and Cost Estimate 44
Table 4-14. De Anza Cove Storm Drain Improvements Quantity and Cost Estimate 45
Table 4-15. Crown Point Storm Drain Improvements Quantity and Cost Estimate 45
Table 5-1. Beach Sample Size Analyses (Tetra Tech 1984) 56
Table 5-2. Approximate Potential Eelgrass Impact 60
Table 5-3. Sea Level Rise Projected Still Water Levels 62
Table 5-4. Observed Species – August 14/15, 2019 Survey 67
Table 5-5. Environmental Permit Considerations 69
Table 5-6. Typical Construction Equipment Noise Levels 70
Table 5-7. Habitat Design Elevations – De Anza Point 80
Table 5-8. Inventory of Relevant Standards 84

Figures

Figure 1-1. Vicinity Map 2
Figure 1-2. Overview of Restoration of Shoreline Sites 3
Figure 1-3. Aerial View of Mission Beach and False Bay – 1930 (www.sandiego.gov) 5
Figure 1-4. Mission Bay Park Dredging, circa 1940s (www.sandiego.gov) 5
Figure 3-1. Measured Tides at Mission Bay and the Open Ocean 10
Figure 3-2. Sea Level Rise Projections – San Diego, CA 13
Figure 3-3. Fetch Length by Site 15
Figure 3-4. Mission Bay Park Boating Regulations (www.sandiego.gov) 16

Figure 3-5. CoSMoS Wave Height and Data Extraction Points 19
Figure 4-1. Bonita Cove Historic Aerial – April 7, 1964 and December 7, 2017....21
Figure 4-2. Bonita Cove Existing Conditions – September 20, 2018....22
Figure 4-3. Bonita Cove – Preliminary Concept....22
Figure 4-4. Ventura Cove Park Existing Conditions – September 20, 2018....23
Figure 4-5. Ventura Cove Park – Preliminary Concept....23
Figure 4-6. Vacation Island Southwest Existing Conditions – September 20, 2018....24
Figure 4-7. Shoreline Restoration – Vacation Island South Cove (Pountney Associates 1998)....25
Figure 4-8. Vacation Island SW – Preliminary Concept....25
Figure 4-9. West Sail Bay Historic Aerial – April 7, 1964....26
Figure 4-10. West Sail Bay Existing Conditions – September 20, 2018....27
Figure 4-11. West Sail Bay – Preliminary Concept....27
Figure 4-12. Crown Point Existing Conditions – September 20, 2018....28
Figure 4-13. Seawall Section and Crown Point (Pountney Associates 1994)....28
Figure 4-14. Crown Point – Preliminary Concept....29
Figure 4-15. Observed Sediment Transport Patterns – Vacation Island NW....30
Figure 4-16. Vacation Island NW – Preliminary Concept....31
Figure 4-17. West of Ingraham Street Existing Conditions – September 20, 2018....32
Figure 4-18. Revetment Section at Vacation Island North Cove (Pountney Associates 1994)....32
Figure 4-19. Ski Beach Existing Conditions – September 20, 2018....33
Figure 4-20. Vacation Island NE – Preliminary Concept....33
Figure 4-21. De Anza Point "Heel" Existing Conditions – September 20, 2018....35
Figure 4-22. De Anza Point – Preliminary Concept....35
Figure 4-23. De Anza Cove Existing Conditions – September 20, 2018....36
Figure 4-24. De Anza Cove – Preliminary Concept....36
Figure 5-1. Maintenance Dredging Locations – Mission Bay (City of San Diego 2002)....51
Figure 5-2. 2018 Dredging Boundaries and Proposed Restoration of Shoreline Footprint....52
Figure 5-3. Soil Behavior Type – De Anza Point (The Bodhi Group 2019)....57
Figure 5-4. Potential Eelgrass Impact....61
Figure 5-5. Reef Ball Project in San Francisco Bay (www.thewatershedproject.org)....76
Figure 5-6. Caged Cultch – Solent Oyster Restoration Project (www.solentforum.org)....77
Figure 5-7. Bagged Cultch – Upper Newport Bay Living Shorelines Project (www.coastkeeper.org)....77
Figure 5-8. Loose Cultch – Alamitos Bay Oyster Restoration Project (www.scwrp.org)....78
Figure 5-9. Oyster Recruitment on Rip Rap – San Diego Bay, CA (Merkel & Associates et al. 2015)....79

Appendices

A. FEMA PRELIMINARY FLOOD MAPS
B. PRELIMINARY DRAWINGS
C. PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COST ESTIMATE
D. ESTIMATED PROJECT SCHEDULE
E. PASSING VESSEL WAVE ANALYSIS
F. RISK ASSESSMENT
G. HYDROLOGIC SUPPORT MATIERAL

Acronyms/Abbreviations

APCD	Air Pollution Control District
AR4	Fourth Assessment Report
AR5	Fifth Assessment Report
BA	Biological Assessment
BFE	base flood elevation
bgs	below ground surface
BMP	best management practice
BTR	Biological Technical Report
CADD	Computer aided drafting and design
CCC	California Coastal Commission
CCS 83	California Coordinate System of 1983
CDFW	California Department of Fish and Wildlife
CDP	Coastal Development Permit
CEM	Coastal Engineering Manual
City	City of San Diego
CoSMoS	Coastal Storm Modelling System
CWA	Clean Water Act
dBA	decibals
DSD	City of San Diego Development Services Department
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
fps	feet per second
EFH	essential fish habitat
ESA	environmentally sensitive area
ft	foot, feet
gcb	gravel, cobble, and/or boulder
GHG	Greenhouse Gas
HOT	Highest Observed Tide
Hs	significant wave height
IPCC	Intergovernmental Panel on Climate Change
KSAN	San Diego International Airport wind station
LiDAR	Light Detection and Ranging
M&N	Moffatt & Nichol
MHHW	Mean Higher-High Water
NHPA	National Historic Preservation Act

MHW	Mean High Water
MLLW	Mean Lower-Low Water
MLW	Mean Low Water
mph	miles per hour
MSL	Mean Sea Level (0 Feet. elevation on NGVD 1929)
NAD 83	North American Datum of 1983
NAVD 88	North American Vertical Datum of 1988
NE	Northeast
NGVD 29	National Geodetic Vertical Datum of 1929
NMFS	National Marine Fisheries Services
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NW	Northwest
OPC	Ocean Protection Council
PEIR	Program Environmental Impact Report
PER	Project Engineering Report
ppt	parts per thousand
RCP	Representative Concentration Pathways
RGP	Regional General Permit
ROD	Record of Decision
RWQCB	Regional Water Quality Control Board
SANDAG	San Diego Association of Governments
SanGIS	San Diego Geographic Information Source
SDMC	San Diego Municipal Code
SHPO/THPO	State Historic Preservation Officer/Tribal Historic Preservation Office
SLR	sea level rise
SSA	Special Study Area
SSRP	Shoreline Stabilization and Restoration Plan
SW	Southwest
SWL	still water level
SWPPP	Stomwater Pollution Prevention Plan
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Services
USGS	U.S. Geological Survey
WDR	Waste Discharge Requirements

1.0 Introduction

The City of San Diego Public Works Department has engaged a consultant team to assist in the preparation of a Program Environmental Impact Report (PEIR) for multiple prioritized improvement projects within the Mission Bay Park Improvement Zone (Improvement Zone). The Improvement Zone includes "those areas encompassed within the boundaries of Mission Bay Park, Oceanfront Walk from the Mission Bay Jetty to Crystal Pier and the adjoining coastal parks…" It also includes portions of Rose Creek, Tecolote Creek, and the San Diego River. The ultimate goal is to improve the conditions of the Improvement Zone for the enjoyment of residents and visitors. As part of the PEIR, Preliminary Engineering Reports (PER) are being prepared for the prioritized improvement projects. The prioritized improvement projects include: Rose Creek, North Fiesta Island, Tecolote Creek & Fiesta Island Causeway, Leisure Lagoon Marsh (Cudahy Creek), Restoration of Shoreline, Habitat Preservation, Bike/Pedestrian Paths, Seawall Restoration, and Deferred Maintenance. This PER is prepared in support of the Restoration of Shoreline project.

1.1 Project Overview

As a part of the Mission Bay Park PEIR, this Restoration of Shoreline PER provides environmental, design, and construction details for ten sites within Mission Bay, San Diego, California (Figure 1-1). This PER is prepared for the City of San Diego (City) by Moffatt & Nichol (M&N) as a subconsultant to Dudek. M&N developed concept shoreline restoration alternatives to be utilized in Mission Bay for various shoreline conditions. Shoreline restoration options include traditional shoreline protection (e.g., revetments, rip rap, and seawalls), soft forms of protection (beach nourishment), living shorelines (e.g., oyster reefs), and hybrid solutions.

Mission Bay has a history of shoreline restoration including investigations of erosion issues (Tetra Tech 1984; Pountney Associates 1988; Pountney Associates and ERC Environmental and Energy Services Co. 1990; Group Delta Consultants et al. 1992). Erosion issues were found to be primarily caused by boat and wind waves, tidal currents, storm waves entering Mission Bay Channel, and storm flows from Rose and Tecolote Creeks. Past restoration solutions were identified primarily in the form of shoreline armoring with rock material at high energy shorelines, and beach nourishment with sand fill at lower energy shorelines at a total of 42 sites. These concepts were then engineered and constructed at several sites in the mid-1990's by the City (Pountney Associates 1994 and 1998). Since the construction of such restoration projects, regular maintenance activities have attempted to sustain the integrity of the shoreline through beach combing, winter berm construction, and excavation of accreting and filling of eroded areas. Despite this past work, erosion has persisted. With the additional threat of sea level rise (SLR) which would exacerbate flooding and erosion (City of San Diego 2019), further shoreline restoration is desired by the City. Ten sites were identified for shoreline restoration in coordination with Dudek and the City. These sites are listed below under their respective region:

1. Bonita Cove
2. Ventura Cove Park
3. Vacation Island Southwest (SW)
4. West Sail Bay
5. Crown Point
6. Vacation Island Northwest (NW)
7. Vacation Island Northeast (NE) - West of Ingraham St
8. Vacation Island Northeast (NE) - Ski Beach

9. De Anza Point (i.e., De Anza Boot)
10. De Anza Cove

Figure 1-2 provides an aerial view of the project location and an overview of the restoration of shoreline sites.



Figure 1-1. Vicinity Map



Figure 1-2. Overview of Restoration of Shoreline Sites

1.2 Project Location

Mission Bay is located within the City of San Diego, California. This coastal inlet was created over the last 18,000 years, after the last glacial period, as sea level rose to present level and riverine drainage incised the inlet. As sea level rose, the San Diego River deposited large volumes of alluvial sediment to create the delta that became the landmass for Mission Bay, named False Bay at the time (Figure 1-3). During the 1820s, the San Diego River was redirected from False Bay into the San Diego Bay. This left False Bay as a low-flow marshland. False Bay was made up of fluvial and estuarine fine sands, silts, and clays from the surface to approximately 60 ft below ground surface (bgs), which were underlain by Quaternary-age dense clayey sands, hard clays, and gravel/cobble from approximately 50-70 ft bgs south of North Mission Bay Drive, and approximately 10-30 ft bgs north of North Mission Bay Drive.

False Bay was historically unnavigable as the channels were narrow and shallow. The City began dredging in 1946 to create Mission Bay Park. Dredging operations, and subsequent land creation with dredged and upland material, occurred between 1946 to 1956, 1959 to 1961, and 1963 to 1964 to create the current configuration of Mission Bay (Figure 1-4). Landforms, such as De Anza, were formed with what is geologically described as Artificial Fill. This Artificial Fill consists primarily of loose to medium dense silty sands, with intermittent layers of soft clay.

The final topography of the Project area is made up of three component land types: wetland habitat, low-lying fill, and upland areas. Currently, wetland habitat occupies elevations ranging from approximately -2 to 3 feet NGVD 29. Low-lying fill areas occupy elevations ranging from 3-8 feet NGVD 29. Upland developed areas range in elevation from +8 feet NGVD 29.

Existing sand grain sizes in Mission Bay vary from 0.16 mm to 0.4 mm, with an average grain size of approximately 0.2 mm (City of San Diego 1990). Since the redirection of the San Diego River away from Mission Bay, the primary sand sources now originate from occasional Rose Creek and Tecolote Creek stormflow discharges, as well as from erosion of parklands within the Bay.



Figure 1-3. Aerial View of Mission Beach and False Bay – 1930 (www.sandiego.gov)



Figure 1-4. Mission Bay Park Dredging, circa 1940s (www.sandiego.gov)

1.3 Project Goals and Objectives

The Restoration of Shoreline project intends to improve shorelines throughout Mission Bay, following City Charter section 55.2, which prioritizes, "Restoration of shoreline treatments within the Mission Bay Park Improvement Zone including restoration of beach sand and stabilization of erosion control features." This project is led by the City of San Diego, with input from local stakeholders such as the San Diego Audubon Society and resource agencies.

Since its construction between the 1940s and 1960s, Mission Bay has experienced coastal erosion and increased vulnerability of upland assets. This has led to an extensive beach maintenance program throughout the Bay, as identified in the Mission Bay Park Natural Resource Management Plan (City of San Diego 1990). Some of the objectives of the Natural Resource Management Plan are:

- The City of San Diego needs to maintain Mission Bay Park shoreline areas for safety, sanitation, and shoreline stabilization reasons.
- The City implements three ongoing beach maintenance activities: grooming and cleaning of dry sand areas, removal of intertidal debris, and smoothing of intertidal sand. After storm events, beaches often experience erosion and require sand replenishment to accommodate summer visitor activity. Currently, maintenance dredging locations are found throughout the shoreline and open water areas of Mission Bay. Maintenance dredging provides the two-fold benefit of reducing navigational problems within the bay due to sediment accretion, as well as supplying material for sand replenishment events necessary along the shoreline of the bay.

The Restoration of Shoreline project objectives include, but are not limited to, repairing previous erosion, preventing future erosion, reduce beach maintenance and replenishment, protecting City assets, improving public access, and enhancing habitat value and water quality. Furthermore, the Mission Bay Park Shoreline Stabilization and Restoration Project Plan recommends "softscape methods" of shoreline restoration to reduce the need for regular beach replenishment (Pountney Associates et. al. 1990).

2.0 Data Collection and Existing Characteristics

2.1 Topography/Bathymetry

Topographic data was obtained from the U.S. Geological Survey (USGS) 2014 Light Detection and Ranging (LiDAR) survey. Bathymetry data was obtained from the Mission Bay Park, 2013 Bathymetry and Eelgrass Inventory (Merkel & Associates 2013). These were incorporated into computer aided drafting and design (CADD) files and compiled with aerial data to provide ground surface elevations of the open water and ground surface areas of the project. It should be noted that topography and bathymetry data were obtained in the North American Vertical datum of 1988 (NAVD 88). A conversion between the NAVD 88 and National Geodetic Vertical Datum (NGVD 29) was performed, ensuring all analyses have been referenced to the NGVD 29 datum. The horizontal basis of coordinates for this survey is referenced to the California Coordinate System of 1983 (CCS 83) Zone 6, North American Datum of 1983 (NAD 83), and elevations are referenced to NGVD 29.

2.2 Available GIS Data

San Diego Geographic Information Source (SanGIS) data was reviewed for information regarding land use (i.e. parcels) and existing utilities in the area (i.e. water and sewer alignments). The parcel data was used for site layout. It should be noted that the location of property lines shown in the preliminary design concept is not exact, but provides an approximation for conceptual design. In some cases the parcel lines did not align well with the georeferenced 2014 aerial image and contours, therefore, adjustments were made to align specific parcel lines to existing fence lines and road alignments, when applicable. The existing utility data from SanGIS was used for preliminary layout and identification of the wet utilities that may exist in the project area. Specific items of importance including culvert crossings, existing storm drains, and utility crossings were reviewed further through available as-built plans and/or site visits when necessary. A detailed survey of existing utilities is nonetheless recommended prior to any final engineering design for the project area. The data layers used are shown in Table 2-1.

Table 2-1. Data Inventory

Data Layer	Version Date	Source (Agency)
LiDAR	2014	SanGIS, San Diego Association of Governments (SANDAG), National Geospatial-Intelligence Agency, Law Enforcement Coordinating Council, Regional Public Safety GIS, 18 Incorporated Cities
Aerial Imagery	September 14, 2011	City of San Diego
Storm Drain Network Files (Drain Conveyance, Drain Structures)	October 17, 2018	City of San Diego, SanGIS, SANDAG
Land Use	January 1, 2017	SanGIS, SANDAG
Soil Survey Geographic Database	November 11, 2013	National Resources Conservation Service
Parcel Layer	February 15, 2018	SanGIS, SANDAG, Assessor/Recorder/County Clerk
Floodplain Layers	April 7, 2016	Federal Emergency Management Agency (FEMA)
Utility Layers (Sewer Main, Water Main, Storm Drainage)	March 5, 2018	SanGIS, City of San Diego Public Utilities Department, SANDAG
Census Block District Groups	April 25, 2016	City of San Diego
Municipal Boundaries	July 25, 2011	SanGIS, SANDAG
National Hydrography Dataset Flowline	April 12, 2016	U.S. Geological Survey

2.3 As-Built Drawings

As-built drawings for the project were obtained from the City of San Diego Development Services Department (DSD). A summary of the as-built plans reviewed is provided in Table 2-2.

Table 2-2. Summary of City of San Diego As-Built Drawings Reviewed

Author	Completion Date	Data Obtained
Pountney Associates	1994	As-Built, Mission Bay Shoreline Protection Phase I, Mission Bay Park, San Diego, California. Prepared for the City of San Diego.
Pountney Associates	1998	As-Built, Mission Bay Shoreline Protection Phase II and Phase III, Mission Bay Park, San Diego, California. Prepared for the City of San Diego.

3.0 Existing Conditions

This section presents existing hydrologic and oceanographic conditions that affect project design. Additionally, project water level conditions are assessed with respect to sea level rise (SLR).

3.1 Hydrology

Hydrologic analysis was performed for the drainage areas that are associated with the storm drain outfalls within the limits of proposed shoreline restoration. Based on review of the existing storm drain inventory, there are 15 existing storm drain outfalls within the proposed areas of shoreline restoration. However eight of these existing storm drain outfalls, within the south mission beach area, are being improved as part of a separate effort by the City of San Diego. Therefore, those eight storm drains were excluded from the hydrologic and hydraulic analyses as part of this preliminary engineering report. The hydrologic analyses included delineating the drainage areas, determining the hydrologic parameters for the watersheds, and performing hydrologic calculations to determine the peak flow rates for the nine existing storm drain outfalls within the shoreline. Watersheds were delineated using the 2014 SanGIS LiDAR data. The watersheds to the outfalls are less than one square mile, and thus in accordance with The *City of San Diego, Transportation & Storm Water Design Manual, Drainage Design Manual* (Drainage Design Manual), dated January, 2017 (City of San Diego 2017), rational method calculations were used determine existing condition peak flow rates for the 100-year frequency storm events. For the locations of the existing storm drain outfalls, their tributary watersheds, and other hydrologic parameters see the hydrologic Workmaps located in Appendix G.

The current land uses within the watersheds were used to determine the overall runoff coefficient (C) for each watershed. The current land uses for each watershed were based on the 2017 SanGIS land use data. To find the intensity (I), time of concentration (Tc) was calculated, and this value is based on considering the drainage area geometry (i.e., size), flow length, topography, and best professional judgement. Using the Intensity-Duration-Frequency Curves for the City of San Diego, provided in Appendix A of the Drainage Design Manual, intensities for each watershed were obtained. See Table 3-1 for a summary of the parameters for Cudahy Creek Outfalls and see Appendix A for backup exhibits and calculations of the peak flowrates:

Table 3-1. Key Rational Method Parameters Summary

Basin ID	Basin Area	Runoff Coefficient	Time of Concentration	100-year Storm Event Peak Flow Rate (cfs)
100	254.5	Varies	25.7 min	385.8
200	11.5	Varies	9.0 min	42.8
300	73.6	Varies	14.1 min	159.2
400	4.9	Varies	5 min*	20.5
500	26	Varies	9.8 min	72.3
600	5.43	Varies	14 min	11.67
700	11	Varies	9.8 min	28.5
800	1.32	Varies	5 min*	4.8
900	0.56	Varies	5 min*	2.3

*Due to the watershed size of basins 400, 800, and 900, a minimum time of concentration of 5 minutes was assumed.

3.2 Measured Tides

As a part of the Mission Bay PEIR Hydrology Study (M&N 2019), four pressure gauges were placed at sub-tidal locations collecting tide measurements to assess the tidal behavior of Mission Bay. No anomalous behavior of Mission Bay tides was identified in comparison with tidal measurements from the La Jolla, CA Station 9410230 (NOAA 2019). Figure 3-1 shows existing tides as measured near south Fiesta Island as compared to ocean tides. There is virtually no measurable difference between bay tides and those of the ocean.

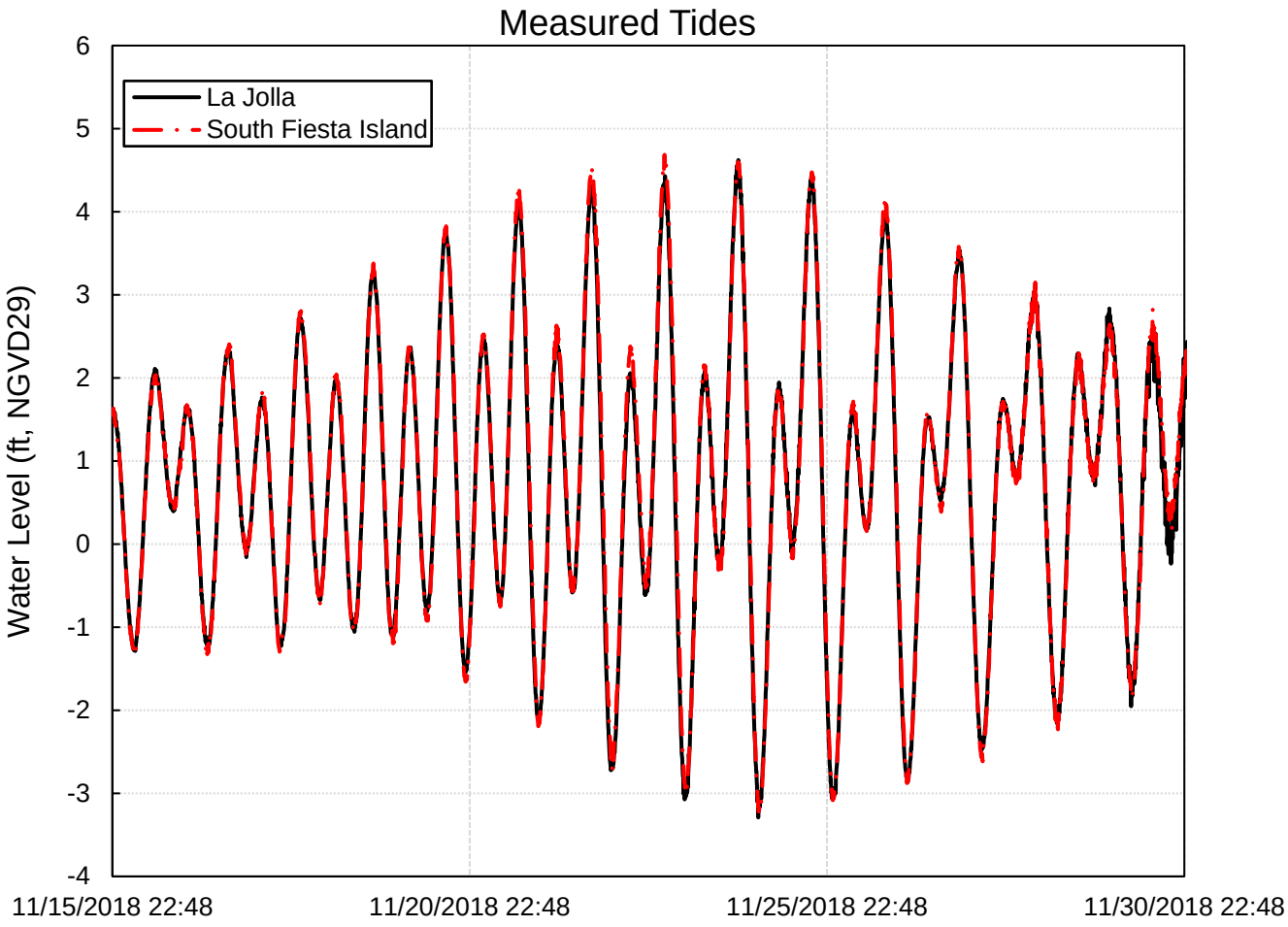


Figure 3-1. Measured Tides at Mission Bay and the Open Ocean

3.3 Astronomical Tides

Astronomical tides are crucial to understanding daily inundation potential in Mission Bay and ramifications to habitat establishment. Still water level (SWL) is defined as average water surface elevations at any instant, excluding local variation due to waves, wave run-up, and wave setup, but including the contributions of tide, storm surge, and SLR. SWL for various tidal levels are presented in Table 3-2. The Mean Lower-Low Water (MLLW) elevation of -2.32 feet NGVD 29 represents the change from sub-tidal to intertidal zones. Mean High Water (MHW) elevation of 2.28 feet NGVD 29 represents the change from daily tidal wetting and drying to supra-tidal areas. The Highest Observed Tide represents the extreme SWL scenario.

Table 3-2. Existing Still Water Levels in Mission Bay (NOAA Station 9410230)

Datum	Abbreviation	Existing SWL (ft, NGVD29)
Highest Observed Tide (11/25/2015)	HOT	5.49
Mean Higher-High Water	MHHW	3.00
Mean High Water	MHW	2.28
Mean Tide Level	MTL	0.43
Mean Sea Level	MSL	0.41
National Geodetic Vertical Datum of 1929	NGVD29	0.00
Mean Low Water	MLW	-1.42
North American Vertical Datum of 1988	NAVD88	-2.13
Mean Lower-Low Water	MLLW	-2.32
Lowest Observed Tide (12/17/1937)	LOT	-5.19
Mean Range of Tide (ft)	4.05	
Greenwich High Water Interval (hrs)	5.01	
Greenwich Low Water Interval (hrs)	11.07	

3.4 Sea Level Rise

3.4.1 What is Sea Level Rise?

Anticipated changes in climate and sea level are a result of increasing "greenhouse" gases in the atmosphere over time due to emissions from burning of fossil fuels and natural sources. Greenhouse gases trap long-wave thermal radiation within the atmosphere. This causes warming of the Earth's atmosphere, lands, and oceans, resulting in climate changes and SLR (IPCC 2013). SLR science involves both global and local physical processes. Models are created based on science's best understanding of atmospheric, oceanographic, and geological processes on global and local scales; therefore, models are dynamic and periodically updated to reflect changes. On a global level, the most recent predictions come from the International Panel on Climate Change's Fifth Assessment Report (AR5) released in 2013. The AR5 projections for SLR were 50% higher than the International Panel on Climate Change's Fourth Assessment Report (AR4) (released 2007) due to the addition of ice sheet dynamics on SLR.

The State of California Ocean Protection Council (OPC) Science Advisory Taskforce updated the best available science through the "Rising Seas in California: An Update on Sea Level Rise Science" report, released in April 2017, which added polar ice sheet melting into future SLR projections (OPC 2017). This report was then used to update the OPC's California State Guidance in 2018 (OPC 2018). The 2018 Guidance projects SLR for multiple emissions scenarios and uses a probabilistic approach based on Kopp et al. (2014).

For both low- and high-emission scenarios, a likely range was determined based on Kopp et al. 2014 that estimates a 66% probability that SLR will be within that range. For the low emissions scenario, the likely range of SLR for 2100 is 1.1 ft to 2.5 ft and for the high emissions scenario, the likely range for 2100 is 1.8 ft to 3.6 ft. The OPC's 2017 report and 2018 guidance include a specific singular scenario called H++, which represents recent scientific findings of faster rates of SLR due to previously unknown glacial dynamics by Sweet et al. (2017), which predicts 10.2 ft by Year 2100. The likelihood of this scenario is unknown and is recommended by the OPC to be considered for long-term, high-stakes decisions (OPC 2018).

Climate science is a constantly changing field, often with high degrees of uncertainty about Representative Concentration Pathways (RCP), which are four greenhouse gas (GHG) concentration trajectories adopted by the IPCC for its Fifth Assessment Report in 2014. The four RCP scenarios are 2.6, 4.5, 6.0, and 8.5. RCP 2.6 is the low emissions trajectory and RCP 8.5 is the "business-as-usual" fossil-fuel-intensive emission trajectory. The intermediate scenarios represent mid-range levels of emissions reductions. RCP 8.5 represents high emissions and is the upper bound of SLR projections. RCP 8.5 represents the worst case scenario and is most commonly used for conservative predictions of SLR. Per OPC guidance, this report includes the RCP 8.5 trajectory because, to date, GHG emissions worldwide have followed the business-as-usual trajectory (OPC 2018). This study refers to "emissions scenarios" rather than "GHG concentration scenarios" when addressing SLR scenarios. Planning for a varying degree of SLR can be challenging and requires continual or periodic updates based on the most recent predictions.

3.4.2 Selected Sea Level Rise Scenarios

The current best available SLR science is the State of California OPC Science Advisory Taskforce April 2017 report and corresponding 2018 California State Guidance (OPC 2018) and CCC guidance (CCC 2018). Projections for San Diego, CA, and by association Mission Bay, range widely with respect to greenhouse gas emission scenarios and probability. Projected SLR scenarios under the high emissions (i.e., worst case) scenario and varying probabilities are presented in Table 3-3 and Figure 3-2.

Table 3-3. Sea Level Rise Projections – San Diego, CA

Year	50% Probability SLR Scenario	17% Probability SLR Scenario	5% Probability SLR Scenario	0.5% Probability SLR Scenario	Extreme (H++) SLR Scenario
2030	0.5 ft	0.6 ft	0.7 ft	0.9 ft	1.1 ft
2050	0.9 ft	1.2 ft	1.4 ft	2.0 ft	2.8 ft
2100	2.6 ft	3.6 ft	4.5 ft	7.0 ft	10.2 ft

(Adopted from OPC 2018, Table 34)

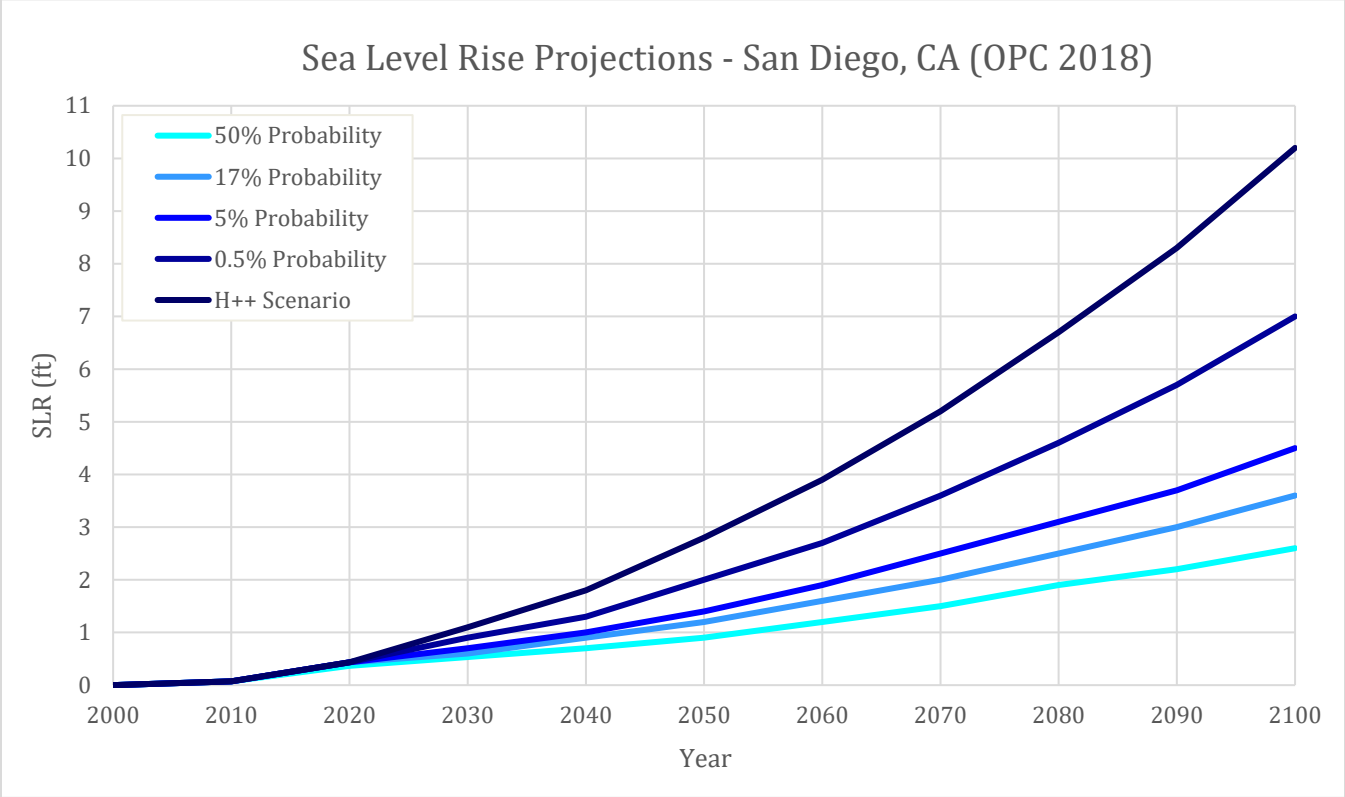


Figure 3-2. Sea Level Rise Projections – San Diego, CA

Due to the high degree of uncertainty associated with predicting when and at what rate SLR will occur, this study looks at a range of two scenarios that capture the range of predicted SLR rates and critical points for the study area. For the purposes of this study, the following two SLR scenarios are considered:

- Low Scenario: 3.6 feet (1.1 meters) and
- High Scenario: 7.0 feet (2.1 meters).

These two scenarios correspond approximately with the Year 2100's 17% and 0.5% probabilities, respectively, and are in line with the ongoing City of San Diego Sea Level Rise Vulnerability Assessment (City of San Diego 2019).

3.5 FEMA Flood Maps

The Federal Emergency Management Agency (FEMA) flood insurance rate maps (FIRMs) are considered for existing vulnerabilities at the project sites. In Mission Bay, the effective base flood elevation (BFE) is approximately 8 feet NAVD 88 or 6 feet NGVD 29. The freeboard of coastal levees should be 1 ft above the height of the BFE in this zone. FEMA flood maps are provided in Appendix A.

According to FEMA flood maps, the following project sites are currently vulnerable to flooding:

- West Sail Bay
  - Vulnerable to extensive flooding, with water estimated to overtop the beach and enter into City roadways and residential parcels.
- De Anza Cove
  - Vulnerable to minor flooding, with water estimated to submerge the majority of existing beach width.

All other project sites experience raised water elevations that encroach upon existing infrastructure and reduced beach widths. However, FEMA flood maps do not predict significant site flooding.

3.6 Design Wave Analysis

Waves generated by passing vessels, wind, and ocean swell all hold the potential to act on the shoreline sites of interest. A design wave is identified at each shoreline location in order to better assess design elevations of the restoration of shoreline concepts. The following design wave analysis investigates which wave dominates the sea state and, as such, is most important to consider in designing the restoration of shoreline concepts. The three most significant waves sources (wind waves, passing vessel waves, and swell waves) are presented below, followed by the selection of a design wave for each restoration of shoreline concept.

3.6.1 Wind Waves

Wind waves are generated as wind transfers energy to the surface of the ocean, with the greatest wave generation propagating parallel to the direction of the wind direction. This section identifies the maximum wind wave height under 100-year wind conditions. Typical wind speeds average about 7 mph, with a prevailent wind direction from the west-northwest. Strong winds can exceed 30 mph on rare occasions. Fetch length, the distance of surface water over which wind wave generation occurs, is measured at each relevant 45-degree angle for all project sites (see Figure 3-3). Wind data are sourced from the San Diego International Airport wind station (KSAN). The maximum 100-year wind wave height at each site is summarized in Table 3-4.

Table 3-4. 100-Year Wind Wave Analysis Results

Site No.	Site Name	100-Yr Wind Wave	
		Significant Wave Height (ft)	Peak Wave Period (s)
1	Bonita Cove	0.7	1.5
2	Ventura Cove Park	0.8	1.7
3	Vacation Island SW	0.7	1.5
4	West Sail Bay	0.7	1.5
5	Crown Point	0.9	1.8
6	Vacation Island NW	0.8	1.7
7	Vacation Island NE – West of Ingraham St	1.0	1.9
8	Vacation Island NE – Ski Beach	0.8	1.8
9	De Anza Point	1.2	2.2
10	De Anza Cove	0.5	1.3

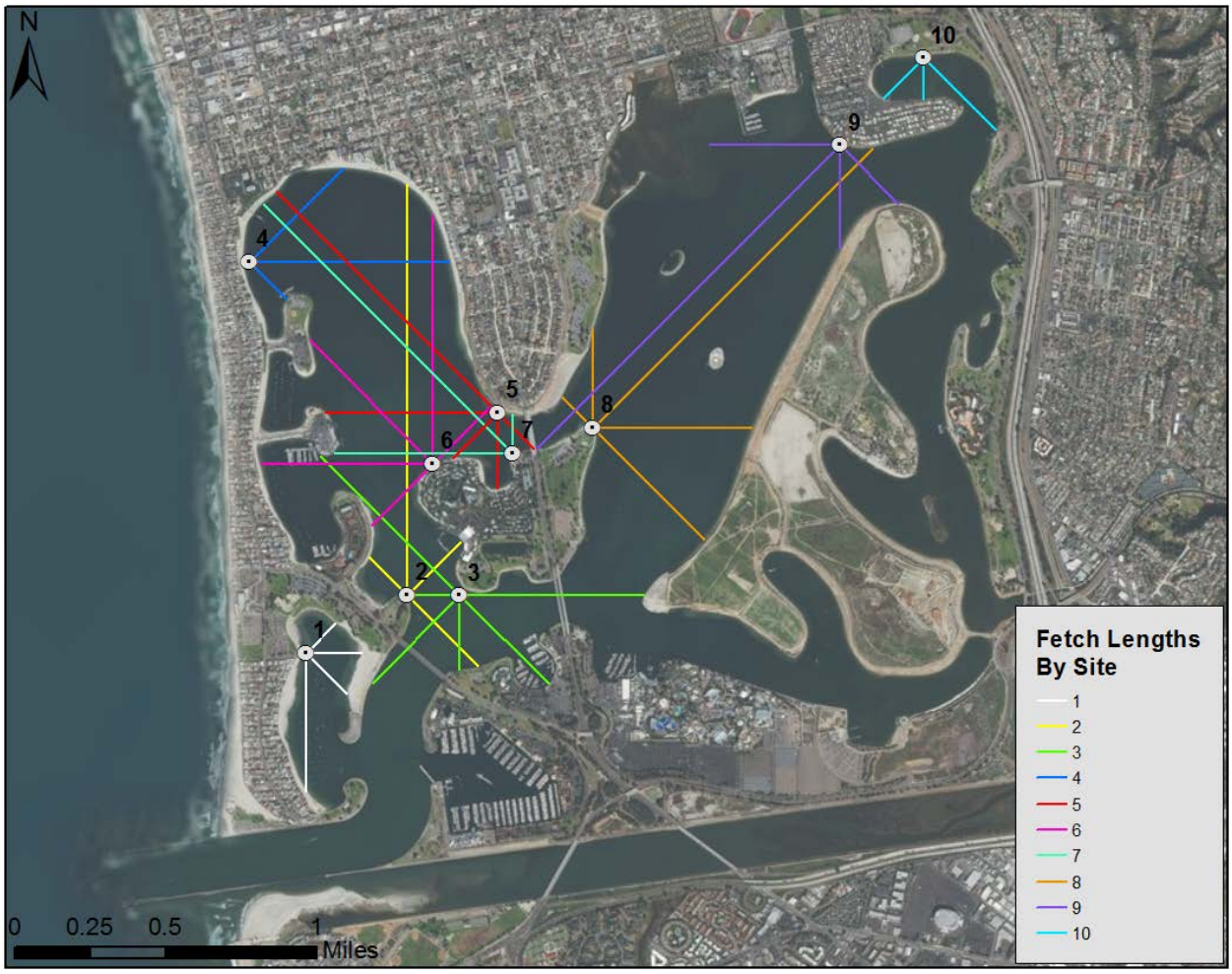


Figure 3-3. Fetch Length by Site

3.6.2 Passing Vessel Waves

Mission Bay is popular for recreational and commercial boating. Passing vessel wakes will interact with the shoreline, potentially causing erosion. Maximum passing vessel wave heights are considered to identify the design wave at each shoreline restoration site.

Within Mission Bay, vessels may not exceed 5 miles per hour (mph) wherever buoys are posted, near bridges, within 100 feet of shore, or within 100 feet of another vessel. Certain areas are identified as open speed in Sail Bay and Fiesta Bay (Figure 3-4).

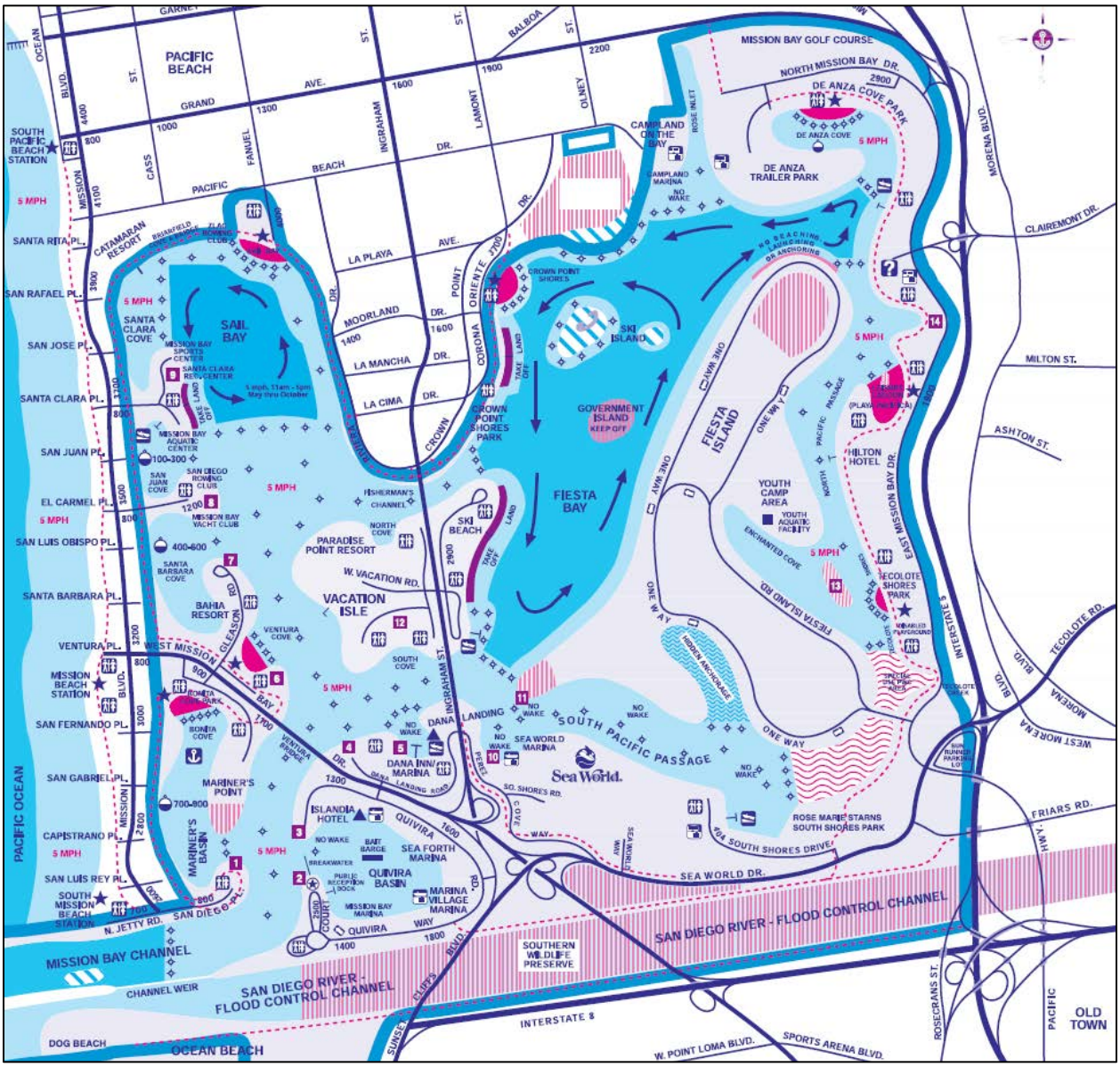


Figure 3-4. Mission Bay Park Boating Regulations (www.sandiego.gov)

Typical boats used within Mission Bay include, but are not limited to:

- Recreational and Commercial Fishing Vessels
- Wake Surfing Vessels
- Jet Skis Vessels
- Bahia Belle Ferry at Bahia Resort Hotel
- Thunder Boats (annually)

In open speed regions of Mission Bay, this analysis uses a typical wake surfing vessel to identify design wave due to its intentionally deep draft and high speed. Sites affected by open speed regions include: West Sail Bay, Crown Point, Vacation Island NW, Vacation Island NE, and De Anza Point and Cove. Specifications of the wake surfing vessel

were obtained for a MasterCraft X26 (https://www.mastercraft.com/). Characteristics that determined the estimated wake height include:

Boat Length	26′0″
Beam	102″
Draft	29″
Wake Surfing Boat Speed	12 mph in Open Speed Regions 5 mph in Restricted Speed Regions

At restricted 5 mph zones, passing vessel wave analysis uses a typical wake surfing vessel at 5 mph and the Bahia Belle due to its large size and low speed, where appropriate. Sites affected by restricted speed regions include: Bonita Cove, Ventura Cove Park, Vacation Island SW. Specifications of the Bahia Belle are estimated at:

Boat Length	75′0″
Beam	25′0″
Draft	6′6″
Bahia Belle Boat Speed	5 mph

Table 3-5 summarizes the maximum estimated passing vessel wave height at each site, calculated using the methods and references of Kriebel and Seelig (2005), Verhey and Bogaerts (1989), Sorensen (1973), and USACE (2002). Calculations have been included in Appendix E.

Table 3-5. Passing Vessel Wave Analysis Results

Site No.	Site Name	Vessel Type & Speed	Wake Wave Height at Shoreline
1	Bonita Cove	Wake Surfing Vessel @ 5 mph	0.2 ft
2	Ventura Cove Park	Bahia Belle @ 5 mph	0.2 ft
3	Vacation Island SW	Bahia Belle @ 5 mph	0.2 ft
4	West Sail Bay	Wake Surfing Vessel @ 12 mph	1.6 ft
5	Crown Point	Wake Surfing Vessel @ 12 mph	1.6 ft
6	Vacation Island NW	Wake Surfing Vessel @ 12 mph	1.6 ft
7	Vacation Island NE – West of Ingraham St	Wake Surfing Vessel @ 12 mph	1.6 ft
8	Vacation Island NE – Ski Beach	Wake Surfing Vessel @ 12 mph	1.6 ft
9	De Anza Point	Wake Surfing Vessel @ 12 mph	1.6 ft
10	De Anza Cove	Wake Surfing Vessel @ 5 mph	0.2 ft

3.6.3 Swell Waves

Although Mission Bay is generally sheltered from oceanic swell by Mission Beach, swell waves do have the ability to enter through the Mission Bay channel. Propagation of oceanic swell through the jetties has been documented in two technical studies (Curren 1983 and Tetra Tech 1984) and two oceanographic publications (Melo and Guza 1991a and 1991b). Melo and Guza observational and model analysis identified rapid downchannel decay of wave energy. From the ocean-side end of the entrance channel to the bayside end of the jetty at Mission Bay Point, significant

wave height diminished by approximately 70%. Maximum observed wave height in the center of the channel was approximately 2.5 ft. Tetra Tech (1984) documented reports of waves entering Mission Bay Channel and reaching Quivira Basin with wave height of 6 ft and period between 10 and 15 seconds, and further to Mariner's Basin with a wave height up to 3.5 ft. Curren (1983) observed swell waves at locations most applicable to shoreline restoration sites, including Bonita Cove, Ventura Cove Park, and Vacation Island SW.

Since no observations of swell wave height is observed deeper into Mission Bay, the U.S. Geological Survey's Coastal Storm Modelling System (CoSMoS) 3.0 wave height analysis was used to identify swell wave heights at the concept locations (USGS 2016). Significant wave heights (Hs) corresponding to a 100-year storm event were extracted from point locations adjacent to each shoreline concept site (Figure 3-5) and are presented in Table 3-6.

Table 3-6. 100-Yr Swell Wave Height by Concept Site

Site No.	Site Name	Data Source	100-Yr Swell Wave Height (ft)
1	Bonita Cove	Curren (1983)	1.7
2	Ventura Cove Park	Curren (1983)	1.6
3	Vacation Island SW	Curren (1983)	1.6
4	West Sail Bay	CoSMoS 3.0	0.5
5	Crown Point	CoSMoS 3.0	0.4
6	Vacation Island NW	CoSMoS 3.0	0.0
7	Vacation Island NE – West of Ingraham St	CoSMoS 3.0	0.0
8	Vacation Island NE – Ski Beach	CoSMoS 3.0	0.5
9	De Anza Point	CoSMoS 3.0	0.0
10	De Anza Cove	CoSMoS 3.0	0.0

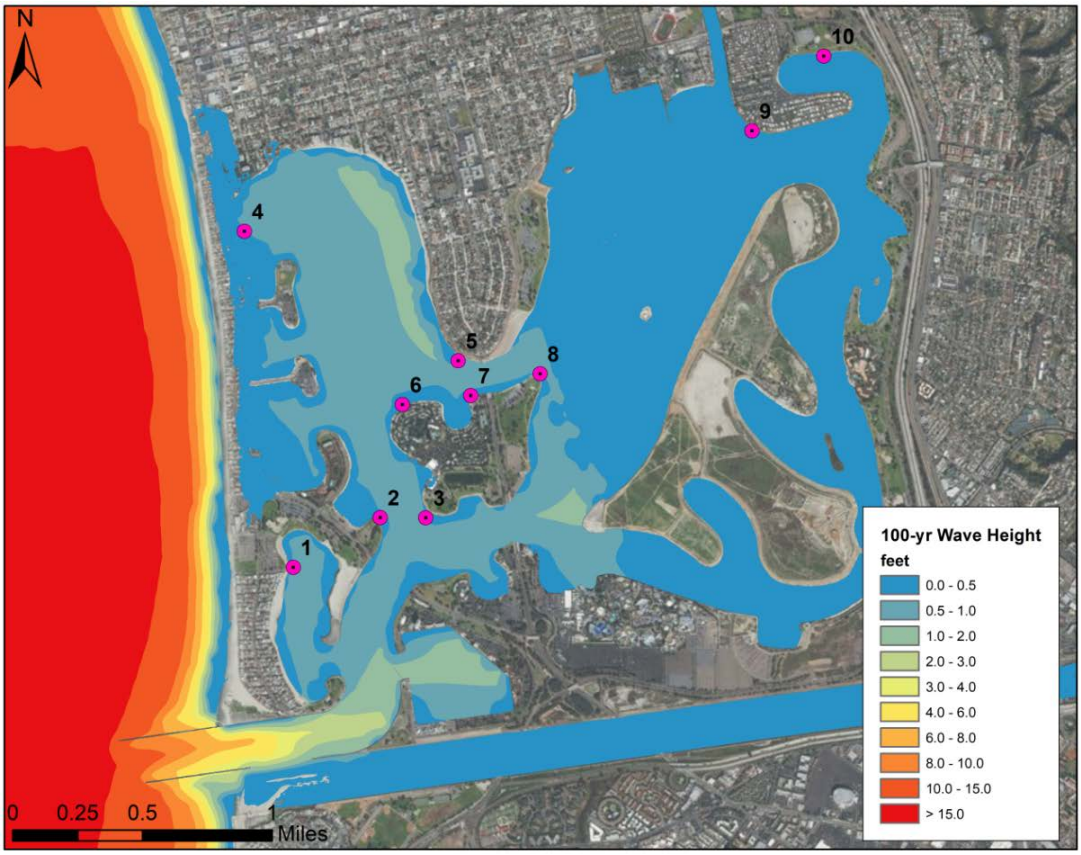


Figure 3-5. CoSMoS Wave Height and Data Extraction Points

3.6.4 Design Wave by Site

According to the above wave analysis, the largest anticipated wave is carried forward at each site. Wave conditions are used to qualitatively consider the appropriateness of shoreline design and quantitatively address armor sizing. Design waves are listed by site in Table 3-7.

Table 3-7. Design Wave by Site

Site No.	Site Name	Design Wave Type	Design Wave Height (ft)
1	Bonita Cove	Swell Wave (Current 1983)	1.7
2	Ventura Cove Park	Swell Wave (Current 1983)	1.6
3	Vacation Island SW	Swell Wave (Current 1983)	1.6
4	West Sail Bay	Wake Surfing Vessel @ 12 mph	1.6
5	Crown Point	Wake Surfing Vessel @ 12 mph	1.6
6	Vacation Island NW	Wake Surfing Vessel @ 12 mph	1.6
7	Vacation Island NE – West of Ingraham St	Wake Surfing Vessel @ 12 mph	1.6
8	Vacation Island NE – Ski Beach	Wake Surfing Vessel @ 12 mph	1.6
9	De Anza Point	Wake Surfing Vessel @ 12 mph	1.6
10	De Anza Cove	100-yr Wind Wave	0.5

4.0 Preliminary Design

This section is intended to describe the preliminary design of each restoration of shoreline site, its probable construction estimate, and preliminary construction schedule.

4.1 Project Sites

The following sections summarize the available information and existing conditions at each site, as well as the initial concepts considered. Section 4.1.9 summarizes the preliminary concepts selected to advance as the proposed restoration of shoreline concepts.

4.1.1 Bonita Cove

Bonita Cove is located in the southwest corner of Mission Bay. It is an area composed of inland parks and residential parcels, existing and proposed recreational beaches, and open water (City of San Diego 2002). The shoreline in the northwest corner of Bonita Cove has historically eroded, especially in the area of the San Fernando Place headland. Due to a process called wave refraction, wave energy tends to focus at convex-shaped headlands such as these, often causing more severe erosion than the adjacent concave-shaped shorelines to the north and south. An erosion rate of 2.0 feet per year has been estimated for the period of 1965 to 1979 (Tetra Tech 1984).

In 1964, the beach in front of San Fernando Place extended approximately 175 feet, compared to the December 7, 2017 beach width of approximately 25 feet (Figure 4-1). The current small beach width has required winter berm construction in winter 2018-2019 to protect land-based infrastructure from high tides and storm waves (Figure 4-2).

The concept for Bonita Cove proposes to relocate the sidewalk and nourish the beach at the headland off San Fernando Place (Figure 4-3). Relocating the sidewalk up to 30 feet inland will alleviate the immediate coastal erosion threats of undermining infrastructure. A 100-ft-wide dry beach is proposed to advance the land at the San Fernando Place headland. If a large (i.e., coarse) sand grain size can be identified for use in this project, the beach would be anticipated to resist erosion for a longer period of time. This beach is anticipated to protect infrastructure and public access for years but will erode over time. In order to curb such erosion, a cobble berm is proposed at the toe of the beach nourishment. With the use of soft engineering materials, the berm is intended to lessen wave energy in a similar manner to a breakwater and hold the shoreline position in a similar manner to a revetment.



Figure 4-1. Bonita Cove Historic Aerial – April 7, 1964 and December 7, 2017



Figure 4-2. Bonita Cove Existing Conditions – September 20, 2018

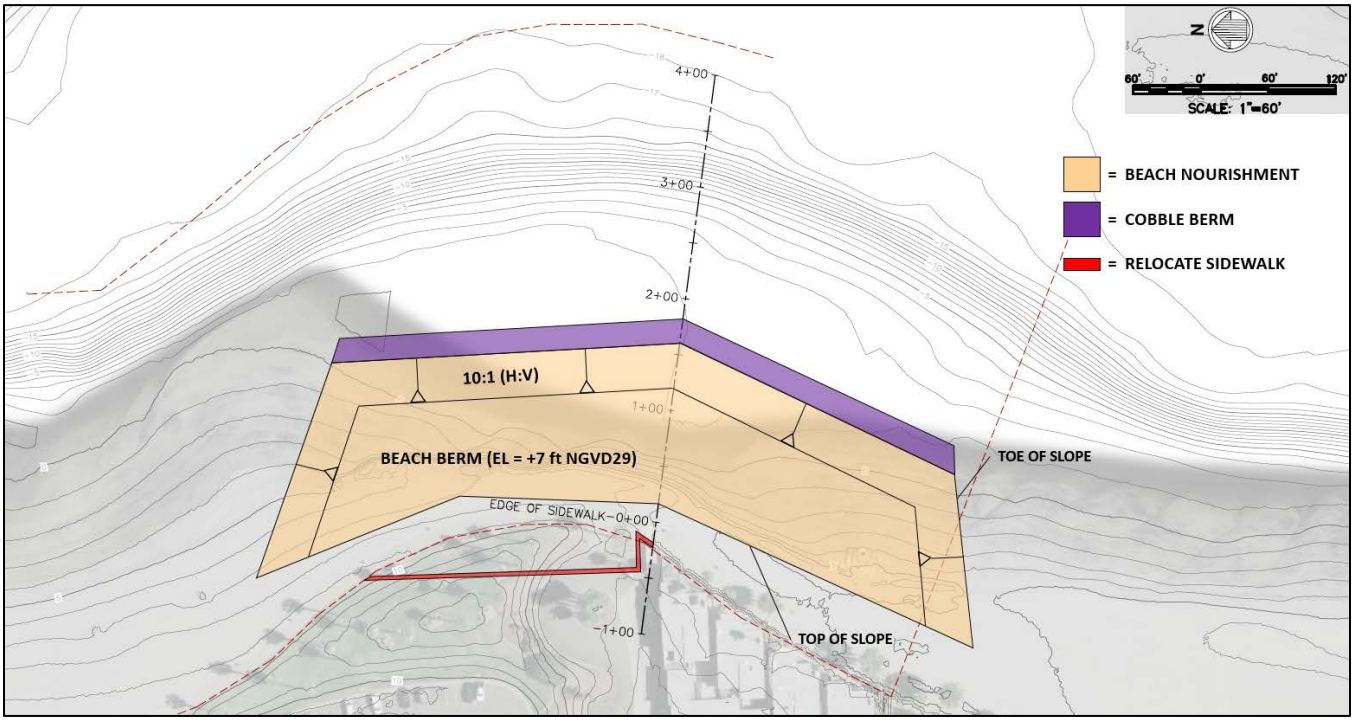


Figure 4-3. Bonita Cove – Preliminary Concept

4.1.2 Ventura Cove Park

Ventura Cove Park is located on the western point north of the Mission Bay Dr bridge. This area has previously been armored, however, the armor only extends up to +2 to +3 ft NGVD29. On the northern most tip of the park, the soil above +3 ft NGVD has given away and created a 4-ft scarp. West of the scarp, 200 ft of previously exposed shoreline had been repaired with large riprap extending up to +6 ft NGVD29. However, the rest of the park's shoreline remains exposed above +3 ft NGVD29 (Figure 4-4). Past study identified an approximate erosion rate of 4.6 feet per year at Ventura Cove, hypothesized to result from tidal currents and waves (Tetra Tech 1984). Based on review of the available storm drain inventory data from SanGIS, the Ventura Cove Park restoration area has one storm drain outfall within its limits, however this storm drain is currently proposed for improvements as part of a separate effort by the City of San Diego and was therefore not analyzed as part of this project.

The Ventura Cove Park concept proposes to repair and improve the revetment at the shoreline (Figure 4-5). The riprap revetment would be repaired and crest would be raised to accommodate rising sea level. A footpath would be constructed parallel to the revetment crest to improve public access, with the added benefit of stabilizing the soil behind revetment crest. This proposed concept includes oyster habitat improvements at the revetment toe, consisting of rocky substrate, oyster bags, and/or reef balls. In some cases, existing, undersized riprap can be reused for the creation of oyster habitat.



Figure 4-4. Ventura Cove Park Existing Conditions – September 20, 2018

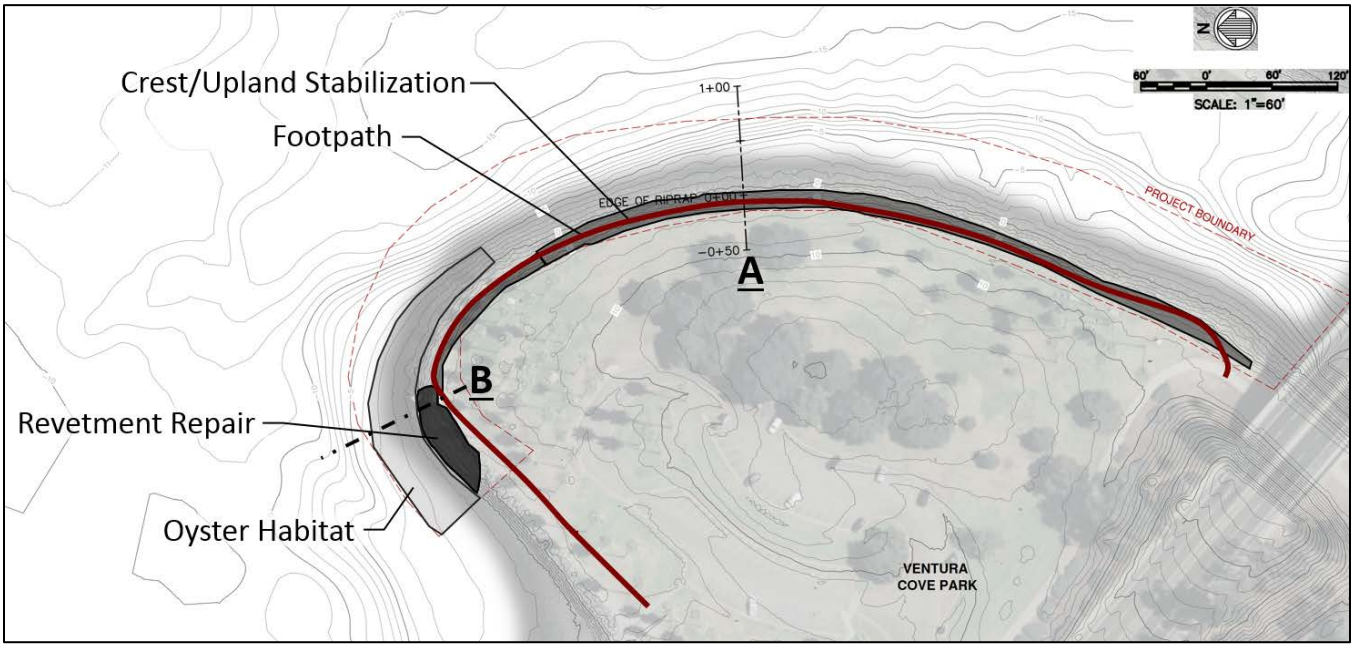


Figure 4-5. Ventura Cove Park – Preliminary Concept

4.1.3 Vacation Island Southwest

The Vacation Island Southwest (SW) site is approximately 1,600 feet of shoreline armored with riprap and backed by bare soil, bonfire pits, and a footpath. Over 40% of the revetment is failing, losing upland soil, and in need of repair. The crest elevation of the revetment varies over the site. Where the revetment is in good condition, the rock extends up to +5 to +6 ft NGVD 29. However, in the damaged areas, the rip rap only extends up to +3 to +4 ft NGVD29 (Figure 4-6). East of and adjacent to the site, the shoreline was repaired through revetment construction (Figure 4-7), as a part of the Mission Bay Shoreline Protection Phase III (Pountney Associates, 1998). Based on review of the available storm drain inventory data from SanGIS, the Vacation Island Southwest restoration area does not have any storm drain outfalls.

Similar to previous adjacent repair, the Vacation Island SW concept proposes to repair and improve the revetment at the shoreline (Figure 4-8). The riprap revetment would be raised up to accommodate SLR. The crest of the revetment would be buried by sand to create a recreational perched beach; the uplands behind the revetment would be improved with landscaping, benches, and improved bonfire facilities. The proposed concept includes oyster habitat improvements consisting of rocky substrate, oyster bags, and/or reef balls at the toe of the revetment. In some cases, existing, undersized riprap can be reused for the creation of oyster habitat.



Figure 4-6. Vacation Island Southwest Existing Conditions – September 20, 2018

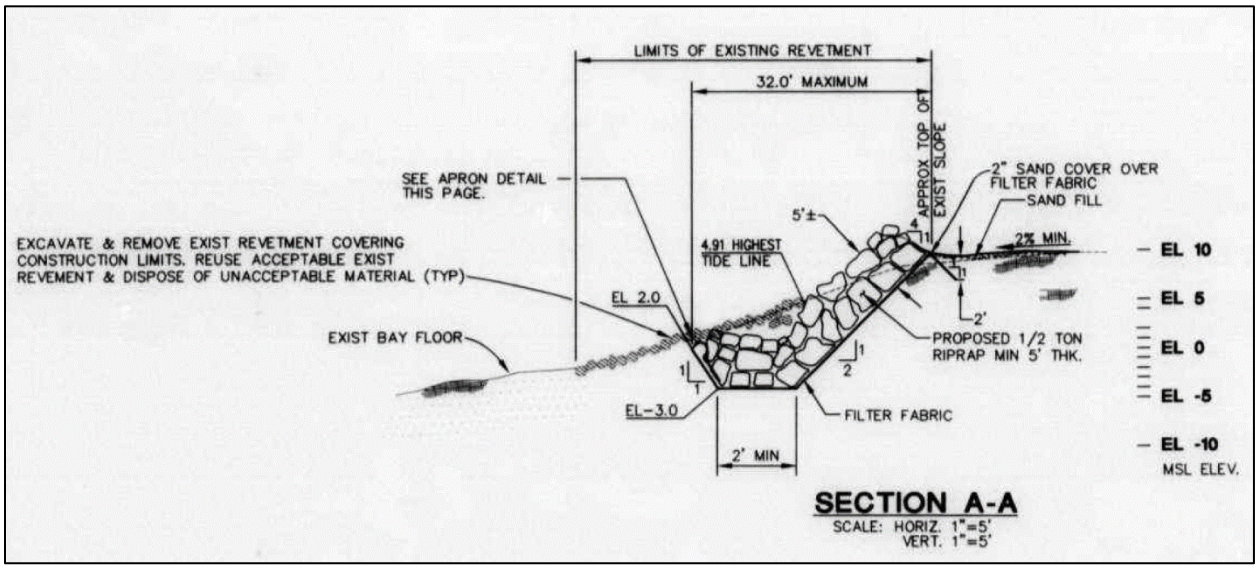


Figure 4-7. Shoreline Restoration – Vacation Island South Cove (Pountney Associates 1998)

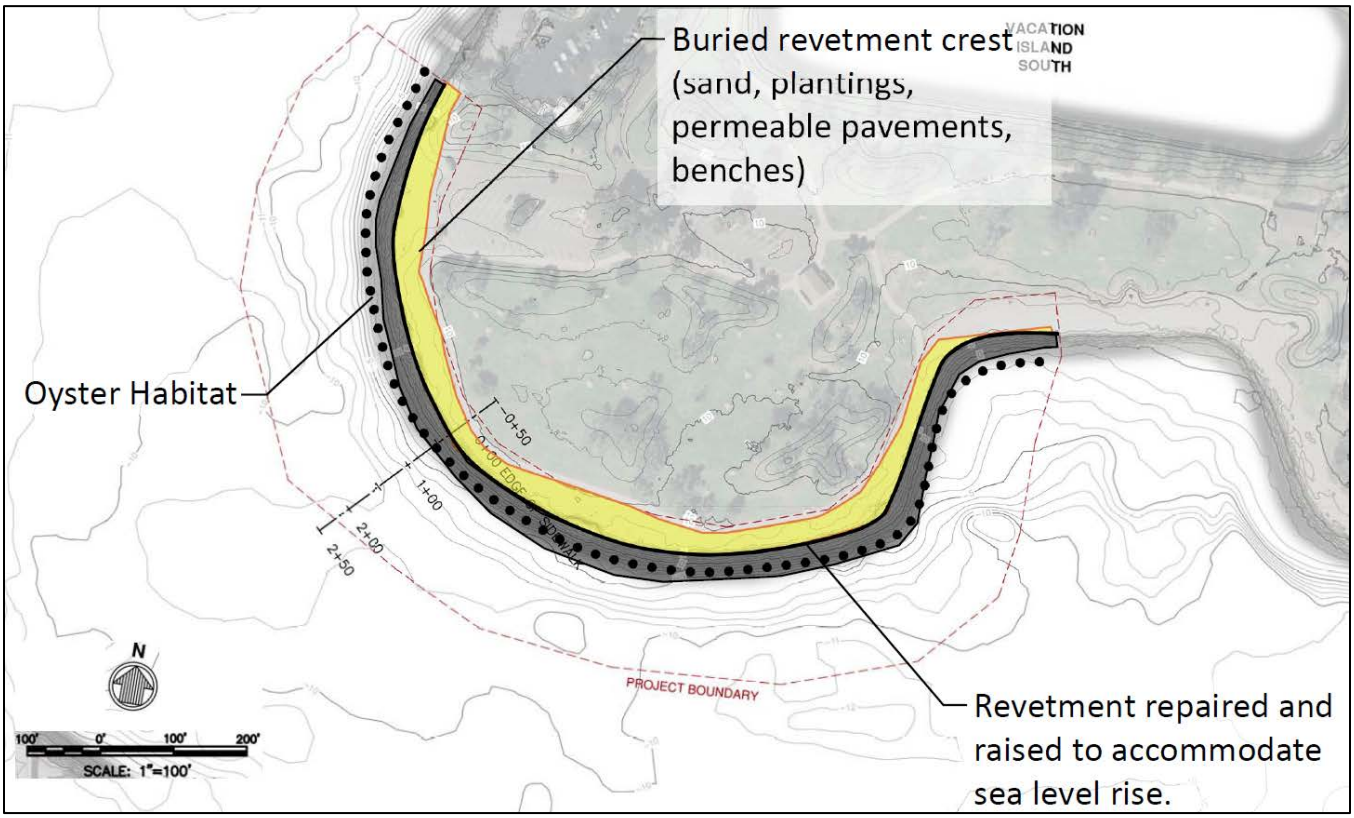


Figure 4-8. Vacation Island SW – Preliminary Concept

4.1.4 West Sail Bay

The beach on the western shore of West Sail Bay has narrowed over time and the erosion now threatens the bayside walk and increases the risk of flooding. At West Sail Bay, the narrowest beach width according to December 30, 2017 aerials was approximately 45 feet. In 1964, West Sail Bay beach extended approximately 75 ft wide (Figure 4-9). During winter seasons, a sand berm is typically constructed along the western shore of West Sail Bay to combat

flooding. At high tide, the existing beach width narrows to less than 20 ft in many places (Figure 4-10). Based on review of the available storm drain inventory data from SanGIS, the West Sail Bay restoration area has four storm drain outfalls within its limits, however these storm drains are currently proposed for improvements as part of a separate effort by the City of San Diego, and therefore they were not analyzed as part of this project.

In accordance with the Mission Bay Park Master Plan Update (City of San Diego 2002), West Sail Bay was identified to be a candidate for beach nourishment. Beach nourishment is proposed along approximately a one-quarter mile length, with a 100 foot wide beach berm (Figure 4-11). The beach width at the narrowest location will expand from 20 to 100 feet at high tide. The beach berm is proposed to tie-in with maximum beach heights at West Sail Bay (approximately +5 ft NGVD29); the beach nourishment maintains the general function and character of the existing shoreline. Beach nourishment will actively advance the shoreline into Mission Bay to protect land-based infrastructure from erosion and wave runup while expanding the sandy beach space for recreational users. Beach nourishment has the ability to be resilient to SLR; as the water level rises, the beach profile will retreat inland and rise in elevation. If a large sand grain size can be identified for use in this project, the beach would be anticipated to resist erosion for a longer period of time. A wide beach can provide protection for several years, but will endure slow, continuous erosion and will need to be re-nourished in the future. In the future, beach grooming may be required to redistribute the sand as it collects to the north and south of West Sail Bay.



Figure 4-9. West Sail Bay Historic Aerial – April 7, 1964



Figure 4-10. West Sail Bay Existing Conditions – September 20, 2018

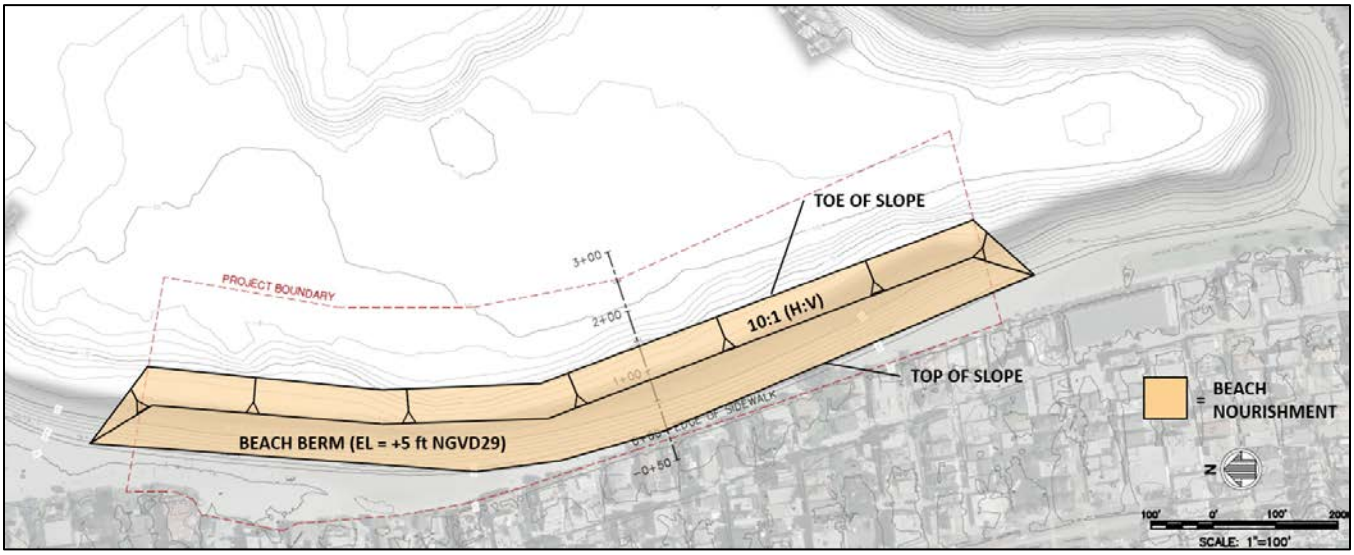


Figure 4-11. West Sail Bay – Preliminary Concept

4.1.5 Crown Point

Crown Point, also known as Riviera Shores, has been the site of previous shoreline restoration (Pountney Associates 1994, Figure 4-13). The focus of restoration was design and construction of the Crown Point seawall, and beach fill strategically placed at the northern and southern areas of the seawall. However, Crown Point is currently vulnerable to coastal erosion and SLR, especially south of the Crown Point seawall. A coastal process known as "end effects" has caused increased wave erosion where the seawall transitions to beach (Figure 4-21). Continuing south from this

location, coastal erosion has threatened beach access and the existing public pathway. Past study identified an average erosion rate of 4.3 feet per year, likely caused by wind waves and local waves (Tetra Tech 1984). Based on review of the available storm drain inventory data from SanGIS, the Crown Point restoration area has three storm drain outfalls within its limits. These outfalls were hydraulically analyzed for adequacy, as discussed in Section 4.2 below.

Per conversation with City staff during the City Restoration of Shoreline meeting, the proposed design focused specifically on the erosion at the south end of the Crown Point seawall (Paul Jacob, Personal Communication 2019). The proposed concept for Crown Point is to construct shoreline protection extending from the southern end of the existing seawall approximately 150 feet to the southeast (Figure 4-22). The shore protection will follow the alignment of the bike path and gradually diminish in size and transition into the existing public beach. Shore protection will take the form of a seawall. The seawall would match the existing seawall design and create a seamless aesthetic and structural transition protection.

In accordance with the Mission Bay Park - Master Plan Update (City of San Diego 2002) recommendations to preserve "all natural bluff areas, especially Riviera and Crown Point Shores," the Crown Point concept targets a vulnerable reach and proposes a shoreline stabilization solution.



Figure 4-12. Crown Point Existing Conditions – September 20, 2018

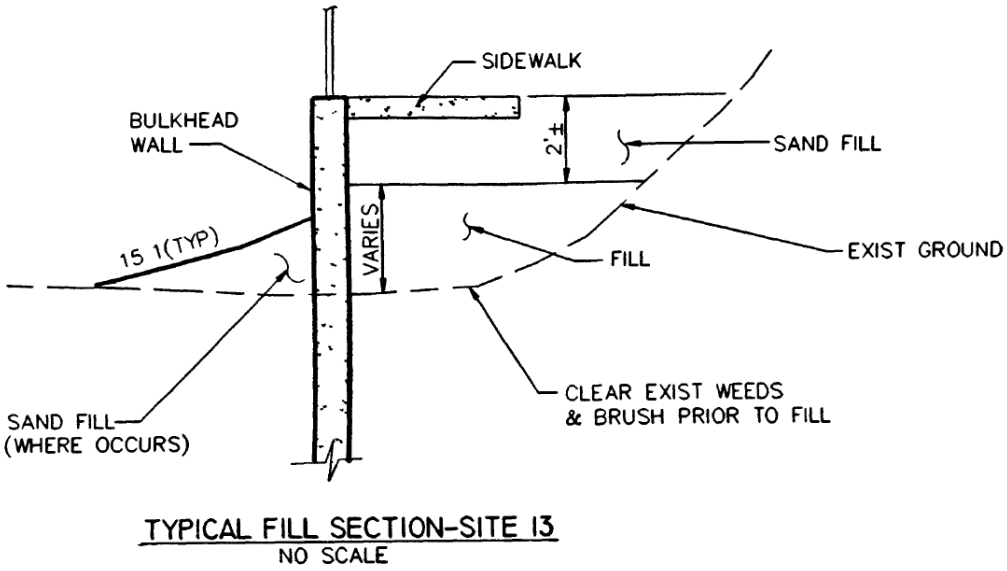


Figure 4-13. Seawall Section and Crown Point (Pountney Associates 1994)



Figure 4-14. Crown Point – Preliminary Concept

4.1.6 Vacation Island Northwest

Vacation Island Northwest (NW) currently suffers from shoreline erosion. The Mission Bay PEIR hydrology study (M&N 2019) has identified that tidal currents travel north to this project site, and then rapidly change direction with hydraulic energy directed at the eroding shoreline. Maximum velocities adjacent to the eroding shoreline are identified at 0.8 feet per second (fps). Additionally, from aerial photographs it is observed that bi-directional alongshore sediment transport is moving sand along Vacation Island NW (Figure 4-15). This longshore sediment transport was identified in a field study by Group Delta Consultants et al. (1992), where an average annual sediment transport rate was on the order of 800 cubic yards per year. Erosion rates have been estimated at approximately 5.0 feet per year between the period 1965 – 1979 (Tetra Tech 1984). Based on review of the available storm drain inventory data from SanGIS, the Vacation Island Northwest Restoration Area does not have any storm drain outfalls.

According to the Mission Bay Park - Master Plan Update (City of San Diego 2002), existing beaches are to be preserved within Mission Bay. Persistent erosion at this location, due to the shoreline position with respect to waves, currents, and sediment transport pattern, requires measures beyond sand nourishment to maintain a beach. The shoreline restoration concept at Vacation Island NW proposes the construction of two sand retention rock groins and beach nourishment (Figure 4-16). The concept is intended to restore and stabilize the sandy beach along the northwest corner of Vacation Island. Coarse sand replenishment is intended to widen and elevate the beach. The nourished sand is retained with two rock groins constructed on either side of the nourishment footprint, capturing the bi-directional alongshore sediment transport. This concept could provide additional recreational opportunities in the form of a pedestrian access way on top of the rock groins.



Figure 4-15. Observed Sediment Transport Patterns – Vacation Island NW

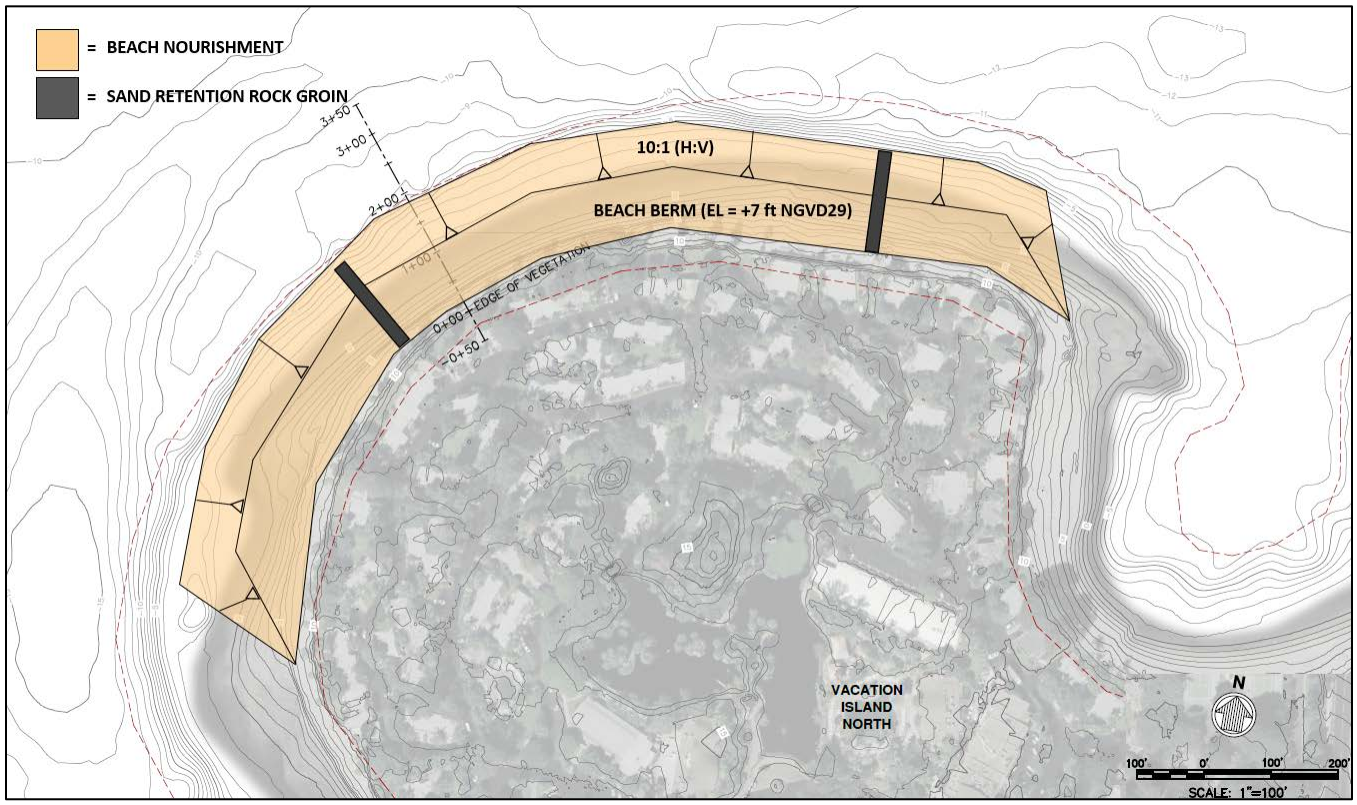


Figure 4-16. Vacation Island NW – Preliminary Concept

4.1.7 Vacation Island Northeast (West of Ingraham St & Ski Beach)

Two locations along Vacation Island Northeast (NE) were identified for restoration, located on opposite sides of Ingraham Street and accommodating different shoreline conditions and public uses.

West of Ingraham Street

West of Ingraham Street bridge, the shoreline of the public park is a degraded rip rap shoreline, likely suffering from wave-induced erosion and potentially back-slope erosion from upland runoff (Figure 4-17). The adjacent beach at North Cove was identified to have an erosion rate of 5 feet per year between 1965 and 1979, hypothesized to stem from tidal currents, wind waves, and boat waves (Tetra Tech 1984). Just south of the West of Ingraham Street project site, shore protection revetment was designed and constructed in front of the existing Paradise Point Resort lodging (Pountney Associates 1994). An approximately 200 linear foot section was designed and repaired (Figure 4-18). Based on review of the available storm drain inventory data from SanGIS, the portion of the Vacation Island Northeast Restoration Area west of Ingraham Street has one storm drain outfall within its limits. This outfall was hydraulically analyzed for adequacy, as discussed in Section 4.2 below.

The West of Ingraham Street concept was developed in conjunction with other similar Mission Bay restoration of shoreline sites: Ventura Cove Park and Vacation Island Southwest. The shoreline restoration concept proposes to stabilize and restore the shoreline by repairing the rock revetment west of Ingraham Street. The revetment crest height is proposed to be raised above existing elevation to improve performance under SLR. A drainage ditch running along the crest of the revetment channelizes surface runoff and prevents erosion of the underlying soil (Figure 4-20).



Figure 4-17. West of Ingraham Street Existing Conditions – September 20, 2018

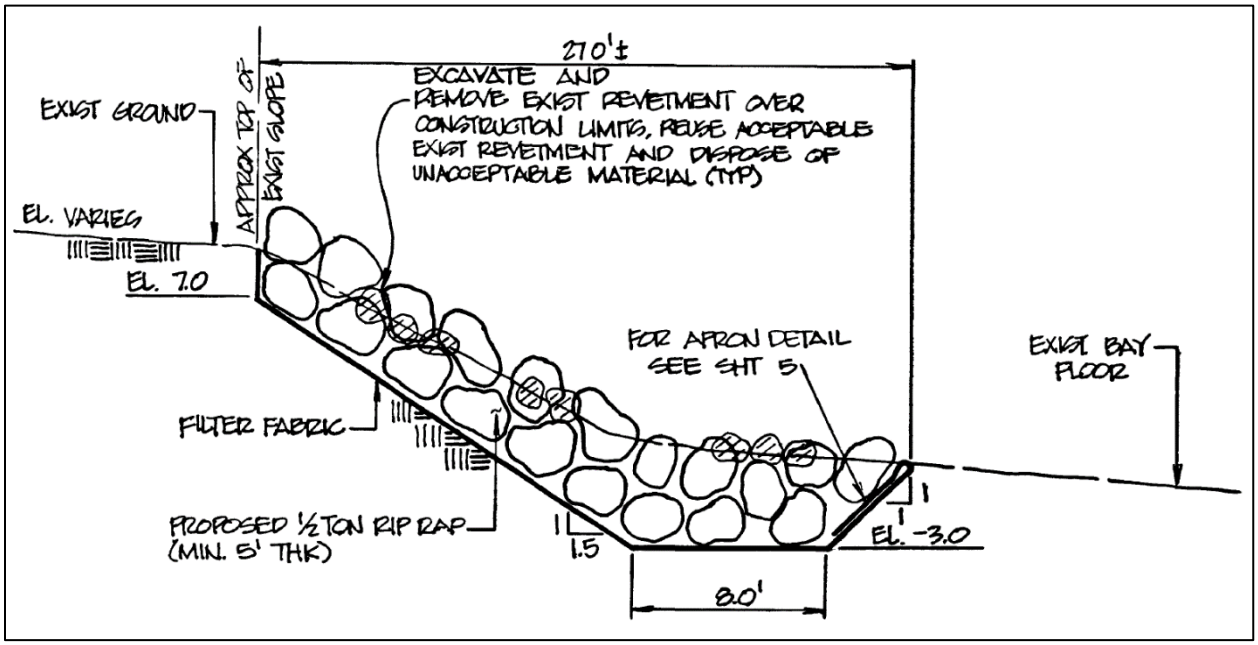


Figure 4-18. Revetment Section at Vacation Island North Cove (Pountney Associates 1994)

Ski Beach

Ski Beach is located east of the Ingraham Street bridge at Vacation Island Northeast (NE). Beach erosion limits recreational beach space, and wave action has caused upland erosion with scarps having been carved out of the earthen fill material (Figure 4-19). Ski Beach was identified to experience an erosion rate of 7 feet per year at the point to 2 feet per year at the adjacent shore (north and south), hypothesized to result from tidal currents and boat waves (Tetra Tech 1984). Vacation Island NE at Ski Beach was the site of a past City Shoreline Protection project with excavation of steep earthen scarp, backfill with sand material, and installation of new sod material in an approximately 100-foot wide swath. According to the Mission Bay Park Master Plan Update (City of San Diego 2002), existing beaches are to be preserved within Mission Bay, including Ski Beach. Based on review of the available storm

drain inventory data from SanGIS, the Ski Beach portion of the Vacation Island Northeast Restoration Area does not have any storm drain outfalls.

The concept for the Ski Beach shoreline restoration proposes beach nourishment around the entirety of the point extending the beach approximately 100 feet from the current shoreline. If a large sand grain size can be identified for use in this project, the beach would be anticipated to resist erosion for a longer period of time. At the toe of the beach nourishment, cobble material or small boulders would be constructed as a berm intended to lessen wave energy and hold the shoreline position. The cobble berm would be backfilled by beach nourishment, creating a wider public beach and providing additional shore protection (Figure 4-20). With the use of soft engineering materials, the berm is intended to lessen wave energy in a similar manner to a breakwater and hold the shoreline position in a similar manner to a revetment.

Construction of this concept is recommended to be monitored for beach erosion and sediment transport patterns with the intention of assessing the feasibility of sand retention measures. Potential future installation of a shore-perpendicular groin could be considered in a phasing strategy at the southern boundary of nourishment should sediment transport and losses be observed in this direction.



Figure 4-19. Ski Beach Existing Conditions – September 20, 2018

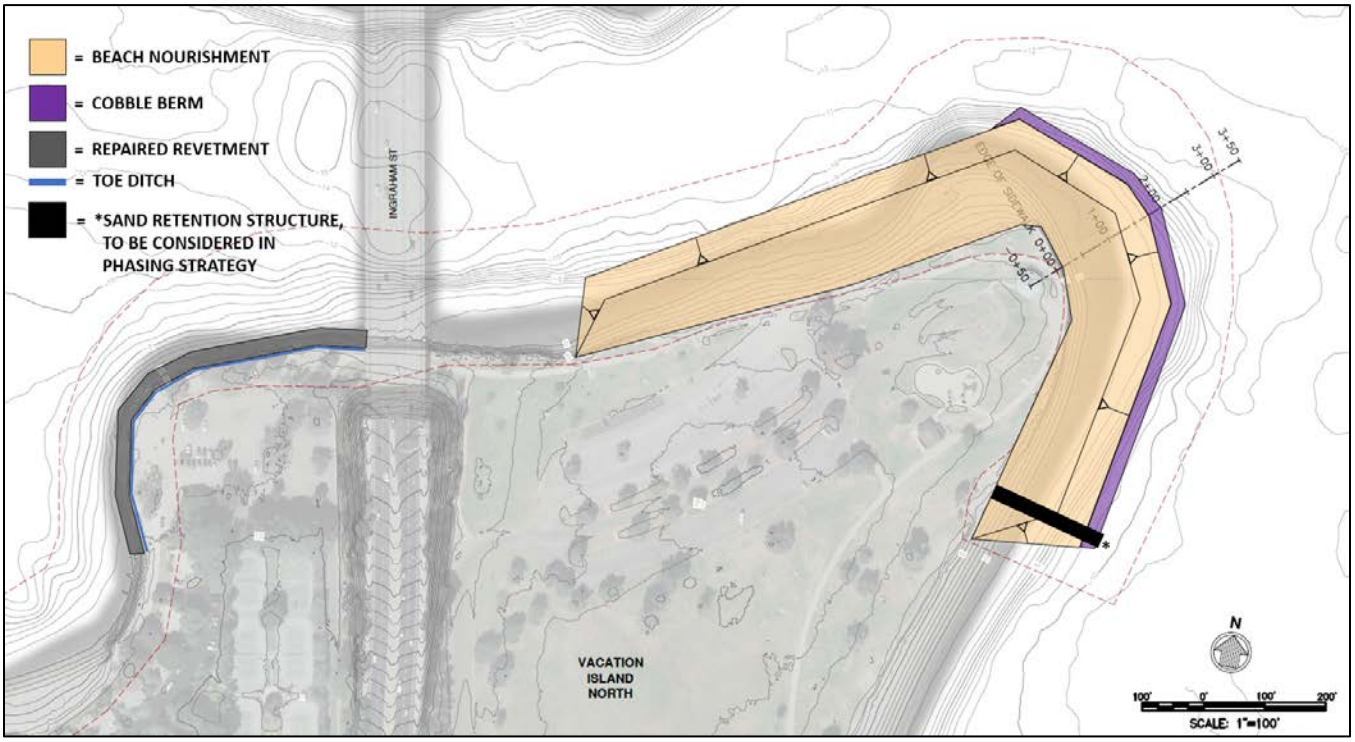


Figure 4-20. Vacation Island NE – Preliminary Concept

4.1.8 De Anza Point and Cove

De Anza Cove and Point are located in the northeast corner of Mission Bay. The De Anza area is planned as a Special Study Area (SSA) involving many uses and is thus incorporated into both this Mission Bay PEIR, and on its own as the De Anza Cove Amendment to the Mission Bay Park Master Plan. The De Anza Point area of concern for restoration of shoreline begins adjacent to Rose Creek and continues south and east of the proposed De Anza Guest Housing area. For the purposes of this report, the De Anza Point is distinguished into areas using foot-based anatomical descriptions including: "ankle," "heel," "sole," "toe," and "laces," corresponding to its boot-like shape. The De Anza Cove study area marks the northern end of De Anza Point, and continues along the north shoreline to the De Anza Boat Ramp on the eastern shoreline.

4.1.8.1 De Anza Point

The design for De Anza Point aims to restore marsh and dune habitat while considering future plans for development in accordance with the Mission Bay Park - Master Plan Update (City of San Diego 2002) and the De Anza Cove Amendment to the Mission Bay Park - Master Plan Update (in progress) conceptual land use plan. Based on review of the available storm drain inventory data from SanGIS, the De Anza Point Restoration Area does not have any storm drain outfalls.

The "heel" of the boot has experienced erosion and damage to existing shore protection from waves (Figure 4-21). Past studies have found an average shoreline erosion of 3.6 feet per year (Tetra Tech 1984). Local wind waves, tidal currents, and boat waves are hypothesized to cause erosion at the "heel" and "sole" and deposit a sand spit at the "toe."

Restoration design proposes the use of fill to build marsh habitat at the heel, creating a protective living shoreline (Figure 4-22). An oyster/reef ball/rock reef barrier could be used to protect the restored marsh and accrete sediment. Additionally, the heel of De Anza Point is extended, according to Shoreline Modifications Recommendation number 57, "In pursuit of a balance between environmental, commercial, and public recreational interests in the De Anza Special Study Area (SSA), filling part of the Cove's west end should be considered, up to 150 feet out from the current shore. This would shift the SSA eastward by the same distance, allowing for a larger marsh area at the Rose Creek Outfall and a more concentrated development area" (City of San Diego 2002). A proposed tidal creek extends along the interior perimeter of the guest housing and will serve as habitat, a barrier to prevent human interference, and swale to potentially treat runoff. The proposed design provides a marsh area that transitions to a restored beach and vegetated dune system at the "toe," which could serve as habitat for least tern and other nesting birds. The decision to create a sandy dune system capitalizes on the existing sandy beach and small spit, as well as the existing higher elevation at the "toe". The higher elevation of the dune system will also allow for migration of marsh habitat with SLR as well as providing a reserve source of sediment if erosion progresses.

At the northern edge or "laces" of the boot, the shoreline is proposed to be restored to marsh protected by coconut coir bags filled with oyster shell and a created tidal creek. Tidal creeks should be considered to connect over De Anza at some time in the future as sea level rises, allowing for migration of habitat and following Shoreline Modifications Recommendations number 57, "A channel through De Anza Point should be implemented to improve the Cove's water quality" (City of San Diego 2002). Primary concerns for this design are cut and fill balance and how marsh-dune transitions would reach equilibrium.



Figure 4-21. De Anza Point "Heel" Existing Conditions – September 20, 2018

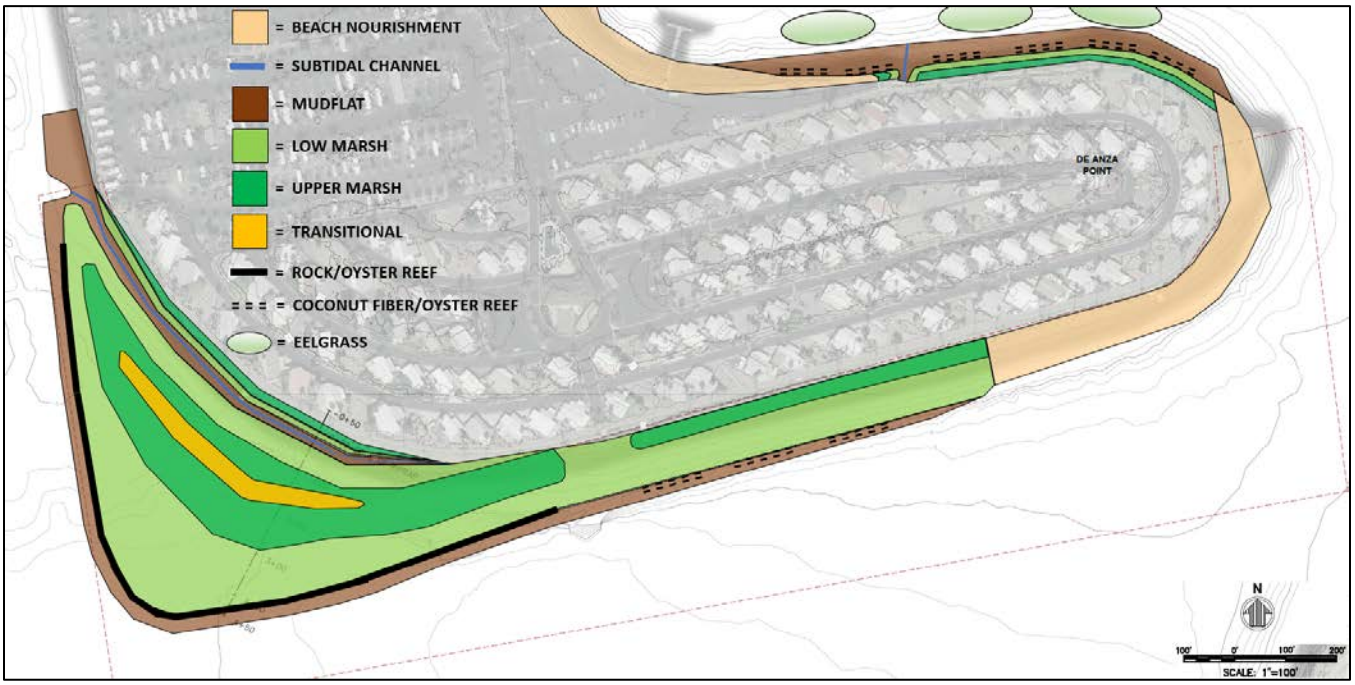


Figure 4-22. De Anza Point – Preliminary Concept

4.1.8.2 De Anza Cove

De Anza Cove beach has been subject to land sliding due to storm drain outlet discharge, surface runoff, and pedestrian traffic (Figure 4-24). The erosion rate is defined as mild (Tetra Tech 1984). The De Anza Cove design proposes the existing beaches (Figure 4-23) to be nourished with sand, creating recreational opportunities for new land use that can adapt to SLR, in accordance with the Mission Bay Park - Master Plan Update (City of San Diego 2002) and the De Anza Cove Amendment to the Mission Bay Park Master Plan (in progress) conceptual land use plan. Based on review of the available storm drain inventory data from SanGIS, the De Anza Cove restoration area has five storm drain outfalls within its limits. These outfalls were hydraulically analyzed for adequacy, as discussed in Section 4.2 below.

Sediment transport within the cove is not expected to be significant, making beach nourishment a lasting option. If a large sand grain size can be identified for use in this project, the beach would be anticipated to resist erosion for a longer period of time.



Figure 4-23. De Anza Cove Existing Conditions – September 20, 2018

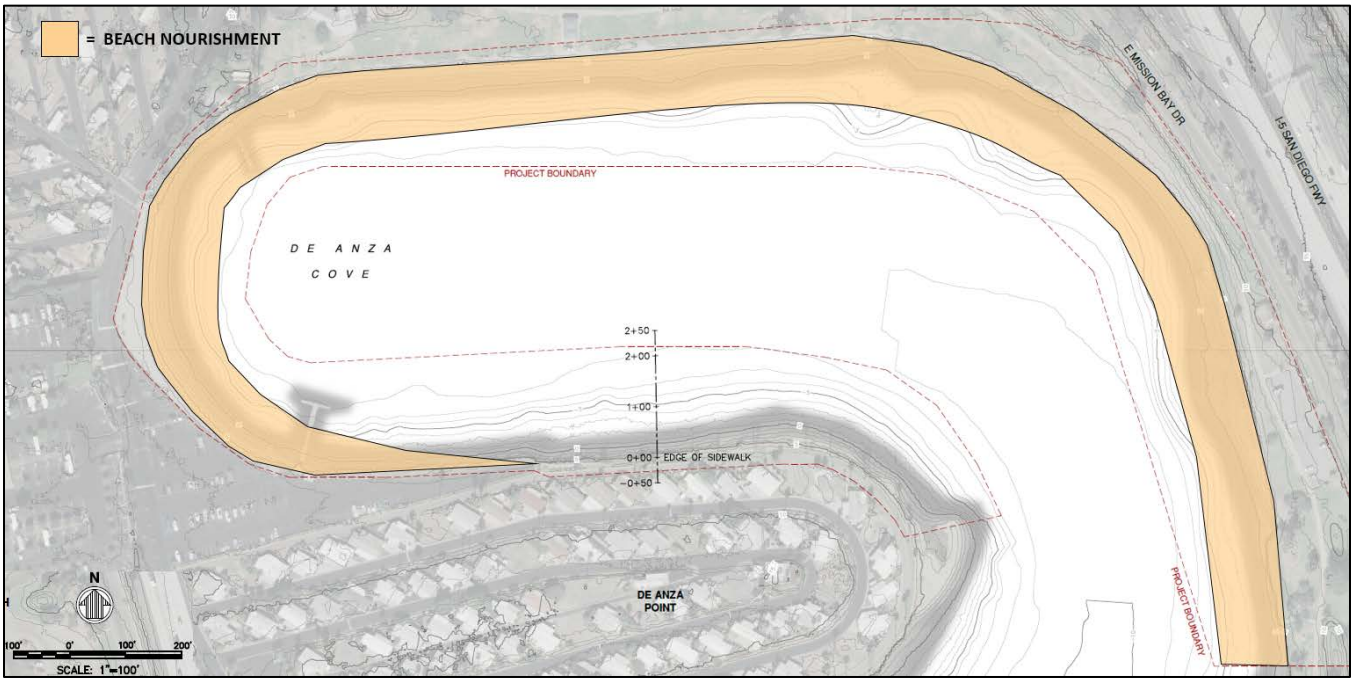


Figure 4-24. De Anza Cove – Preliminary Concept

4.1.9 Selected Restoration of Shoreline Concept

Restoration of shoreline concepts were presented to the City during a meeting on April 12, 2019. The meeting resulted in the City directing certain shoreline concepts to be carried forward, as summarized in Table 4-1.

Table 4-1. Restoration of Shoreline – 30% Design Concept Summary

Shoreline Area	Concept Description	Shoreline Stabilization	Shoreline Recovery	Water Quality Benefit	Habitat Benefit				Recreational Benefit
					Sand Beach	Vegetated Habitat	Oyster Habitat	Other	
Bonita Cove	Beach Nourishment, Cobble Berm, & Relocated Sidewalk	Yes	Yes	No	Yes	No	No	SLR Adaptation	Sand Beach, Pedestrian Pathway
Ventura Cove	Revetment Repair & Oysters	Yes	No	Yes	No	No	Yes	SLR Adaptation	Pedestrian Pathway
Crown Point	Shoreline Protection	Yes	Yes	No	No	No	No	Aesthetic Consistency	Pedestrian Pathway
West Sail Bay	Beach Nourishment	No	Yes	No	Yes	No	No	SLR Adaptation	Sand Beach
Vacation Island Southwest	Revetment Repair, Oysters and Perched Beach	Yes	No	Yes	Yes	No	Yes	SLR Adaptation	Benches/Sand Beach
Vacation Island Northwest	Beach Nourishment & Sand Groins	Yes	Yes	No	Yes	No	No	SLR Adaptation	Sand Beach
Vacation Island Northeast	Ski Beach: Beach Nourishment & Cobble Berm	No	Yes	No	Yes	No	No	SLR Adaptation	Sand Beach
	West of Ingraham St: Revetment Repair & Oysters	Yes	No	Yes	No	No	No	SLR Adaptation	No
De Anza Point	Salt Marsh, Sand Dune, and Oyster Protection	Yes	Yes	Yes	Yes	Yes	Yes	Mudflat Habitat	Natural Recreation
De Anza Cove	Beach Nourishment	No	Yes	No	Yes	No	No	SLR Adaptation	Sand Beach

4.2 Hydraulic Analysis

Hydraulic analyses were performed for the applicable storm drain outfalls to determine hydraulic adequacy of the existing sizes. It should be noted that many of these outfalls have extended storm drain systems upstream; however, only the outfall and most downstream storm drain segments were analyzed. The hydraulic analyses were completed using Manning's Equation calculations. Manning's equation considers the Manning's n-value (based on roughness of material), pipe slope, pipe size/geometry, and depth of flow within the pipe (i.e., full depth flow is the pipe capacity for this analysis). Manning's n-values of 0.13 for reinforced concrete pipe (RCP) and 0.24 for corrugated metal/steel pipe (CMP) were used for these calculations. Additionally, for storm drains where no slope or elevation data was available, a typical storm drain slope of 0.5% was assumed. Storm drain outfalls where the existing capacity was less than the 100-year storm event peak flow rate were determined to be inadequate, pursuant to the City of San Diego Drainage Design Manual. For these inadequate storm drains, a preliminary recommendation for storm drain size was determined based on Manning's equation calculations. It should be noted that these recommendations are preliminary and proposed storm drain sizes will need to be determined during final engineering using a hydraulic modeling methodology that considers the slight increase in flow capacity as a result of pressure flow. The hydraulic analyses results are summarized in Table 4-2.

Table 4-2. Hydraulic Analyses Results

Restoration Area	Hydrologic Basin ID	Storm Drain Size and Material	Storm Drain Slope	Existing Storm Drain Capacity (cfs)	100-year Storm Event Flow Rate (cfs)	Adequacy	Recommended Size and Material
De Anza Cove	100	60 inch RCP	0.30%	143	385.8	Inadequate	96 inch RCP
De Anza Cove	200	30 inch RCP	.5%*	29	42.8	Inadequate	42 inch RCP
De Anza Cove	300	48 inch RCP	.5%*	102	159.2	Inadequate	72 inch RCP
De Anza Cove	400	30 inch RCP	.5%*	29	20.5	Adequate	-
De Anza Cove	500	30 inch CMP	.5%*	15.8	72.3	Inadequate	48 inch RCP
Crown Point	600	18 inch RCP	.5%*	7.5	11.7	Inadequate	24 inch RCP
Crown Point	700	18 inch CMP	.5%*	4	28.5	Inadequate	36 inch RCP
Crown Point	800	18 inch CMP	.5%*	4	4.8	Inadequate	18 inch RCP
Vacation Island NE (West of Ingraham Street)	900	15 inch CMP	.5%*	2.5	2.3	Adequate	-

*For storm drain outfalls in which no slope or elevation information was available, a slope of 0.5% was assumed.
RCP = reinforced concrete pipe
CMP = corrugated metal pipe

4.3 Preliminary Drawings

Restoration of shoreline concepts carried to 30% design are provided in Appendix B. Drawings are not for construction.

4.4 Preliminary Opinion of Probable Construction Cost

Cost estimates based on 30% design concepts were prepared for two alternatives: Alternative 1, which assumes fill material will be imported from off-site, and Alternative 2, which assumes fill material will be dredged from Mission Bay.

All site subtotal cost estimates for both alternatives include cost allowances for:

- Mobilization & demobilization of equipment
- Stormwater Pollution Prevention Plan (SWPPP) development and submittal
- Pre- & post-construction hydrographic/topographic surveys
- Shoreline restoration as detailed in 30% design drawings (Appendix B) and described in Sections 4.1
- Construction and pedestrian access
- Installation of signage

In Alternative 2, dredge operations would be conducted for the De Anza Point, De Anza Cove, Vacation Island NE, Vacation Island NW, West Sail Bay, and Bonita Cove sites.

Estimates were prepared according to expected construction requirements, including requisite labor crews working 60-hour work weeks during dredge operations and 40-hour work weeks for other tasks. All estimates include a markup of 14.9% calculated over the entire project. While necessary assumptions were made to prepare these estimates, Section 5.1 further details potential construction-related considerations that may affect construction costs.

Table 4-3 provides summaries by site and totals for each alternative. The below sections provide details of estimated material and time requirements for each site. Detailed cost estimates of each alternative are provided in Appendix C. Additionally, Rick Engineering provides a storm drain improvement specific cost estimate for relevant sites in Section .

Table 4-3. Restoration of Shoreline – 30% Design Construction Cost Estimate

Item	Alternative 1	Alternative 2
Dredge Mobilization/Demobilization (to Mission Bay)	N/A	$270,261.02
Bonita Cove	$1,910,876.00	$1,348,754.25
Vacation Island Southwest	$2,092,446.43	$2,092,445.72
Ventura Cove Park	$1,412,519.54	$1,412,520.49
West Sail Bay	$9,732,250.33	$3,887,491.81
Crown Point	$2,214,569.31	$2,214,568.63
Vacation Island Northwest	$15,023,175.09	$7,608,743.09
Vacation Island Northeast (West of Ingraham Street)	$912,529.71	$912,529.64
Vacation Island Northeast (Ski Beach)	$9,859,003.68	$6,554,266.56
De Anza Point	$15,804,638.99	$11,372,978.52
De Anza Cove	$17,705,260.01	$7,671,617.60
Total	**$76,667,269.09**	**$45,346,177.33**

4.4.1 Bonita Cove

Table 4-4. Bonita Cove – 30% Design Quantity and Cost Estimate

Site Shoreline Construction Activity/Quantity	Alternative 1	Alternative 2
Dredging		
Volume [CY]	N/A	18,120
Place Sand Fill for Beach Nourishment		
Length [ft]	650	650
Volume [CY]	16,610	18,120
Place Caltrans Backing No. 3		
Length [ft]	650	650
Total Weight [ton]	3,902	3,902
Place Cobble Toe		
Length [ft]	650	650
Total Weight [ton]	2,458	2,458
Construct New Sidewalk		
Length [ft]	300	300
Total Estimated Manhours	**1,841**	**2,600**
Site Subtotal Cost Estimate	**$1,910,876**	**$1,348,754**

4.4.2 Ventura Cove Park

Table 4-5. Ventura Cove Park – 30% Design Quantity and Cost Estimate

Site Shoreline Construction Activity/Quantity	Alternative 1	Alternative 2
Recover Existing Rip Rap		
Length [ft]	1,000	1,000
Place Revetment Stone		
Length [ft]	1,000	1,000
Total Weight [ton]	8,033	8,033
Construct Oyster Habitat		
Length [ft]	1,000	1,000
Total Estimated Man Hours	**3,392**	**3,392**
Site Total Cost Estimate	**$1,412,520**	**$1,412,520**

4.4.3 Vacation Island Southwest

Table 4-6. Vacation Island SW – 30% Design Quantity and Cost Estimate

Site Shoreline Construction Activity/Quantity	Alternative 1	Alternative 2
Recover Existing Rip Rap		
Length [ft]	1,500	1,500
Place Revetment Stone		
Length [ft]	1,500	1,500
Total Weight [ton]	12,522	12,522
Place Sand Cover		
Length [ft]	1,500	1,500
Volume [CY]	1,260	1,260
Construct Oyster Habitat		
Length [ft]	1,500	1,500
Total Estimated Man Hours	**4,881**	**4,881**
Site Subtotal Cost Estimate	**$2,092,446**	**$2,092,446**

4.4.4 West Sail Bay

Table 4-7. West Sail Bay – 30% Design Quantity and Cost Estimate

Site Shoreline Construction Activity/Quantity	Alternative 1	Alternative 2
Dredging		
Volume [CY]	N/A	136,680
Place Sand Fill for Beach Nourishment		
Length [ft]	1,650	1,650
Volume [CY]	125,290	136,680
Sand Fill – Inshore Section		
Length [ft]	1,650	N/A
Volume [CY]	62,600	N/A
Total Estimated Man Hours	**7,976**	**10,201**
Site Subtotal Cost Estimate	**$9,732,250**	**$3,887,492**

4.4.5 Crown Point

Table 4-8. Crown Point – 30% Design Quantity and Cost Estimate

Site Shoreline Construction Activity/Quantity	Alternative 1	Alternative 2
Construct New Seawall		
Length [ft]	245	245
Total Estimated Man Hours	**428**	**428**
Site Subtotal Cost Estimate	**$2,214,569**	**$2,214,569**

4.4.6 Vacation Island Northwest

Table 4-9. Vacation Island NW – 30% Design Quantity and Cost Estimate

Site Shoreline Construction Activity/Quantity	Alternative 1	Alternative 2
Dredging		
Volume [CY]	N/A	197,040
Place Sand Fill for Beach Nourishment		
Length [ft]	1,800	1,800
Volume [CY]	180,620	197,040
Place Rip Rap Stone Groin		
Length [Ft]	350	350
Crest Width [ft]	10	10
Total Weight [ton]	21,420	21,420
Total Estimated Man Hours	**11,381**	**17,806**
Site Subtotal Cost Estimate	**$15,023,175**	**$7,608,743**

4.4.7 Vacation Island Northeast (West of Ingraham St & Ski Beach)

Table 4-10. Vacation Island NE (W of Ingraham St) – 30% Design Quantity and Cost Estimate

Site Shoreline Construction Activity/Quantity	Alternative 1	Alternative 2
Recover Existing Rip Rap		
Length [ft]	650	650
Place Revetment Stone		
Length [ft]	650	650
Total Weight [ton]	4,410	4,410
Place Sand Cover		
Length [ft]	650	650
Volume [CY]	374	374
Construct Oyster Habitat		
Length [ft]	650	650
Total Estiamte Man Hours	**2,205**	**2,205**
Site Subtotal Cost Estimate	**$912,530**	**$912,530**

Table 4-11. Vacation Island NE (Ski Beach) – 30% Design Quantity and Cost Estimate

Site Shoreline Construction Activity/Quantity	Alternative 1	Alternative 2
Dredging		
Volume [CY]	N/A	85,200
Place Sand Fill for Beach Nourishment		
Length [ft]	1,600	1,600
Volume [CY]	78,100	85,200
Place Caltrans Backing No. 3		
Length [ft]	1,300	1,300
Total Weight [ton]	26,100	26,100
Place Cobble Toe		
Length [ft]	1,300	1,300
Total Weight [ton]	27,090	27,090
Total Estimated Man Hours	**8,405**	**10,578**
Site Subtotal Cost Estimate	**$9,859,004**	**$6,554,267**

4.4.8 De Anza Point and Cove

Table 4-12. De Anza Point – 30% Design Quantity and Cost Estimate

Site Shoreline Construction Activity/Quantity	Alternative 1	Alternative 2
Dredging		
Volume [CY]	N/A	133,680
Excavation		
Volume [CY]	18,400	18,400
Place Excavated Material		
Volume [CY]	18,400	18,400
Place Fill Material		
Volume [CY]	122,540	133,680
Construct Breakwater		
Total Weight [ton]	33,813	33,813
Construct Oyster Habitat		
Length [ft]	1,600	1,600
Haul Off Excess Fill		
Volume [CY]	18,400	18,400
Place Revetment Stone		
Total Weight [ton]	17,325	17,325
Place Sand Fill		
Volume [CY]	11,880	11,880
Place Sand Cover		
Volume [CY}	1,103	1,103
Total Estimated Man Hours	**17,356**	**24,777**
Site Subtotal Cost Estimate	**$15,804,639**	**$11,372,979**

Table 4-13. De Anza Cove – 30% Design Quantity and Cost Estimate

Site Shoreline Construction Activity/Quantity	Alternative 1	Alternative 2
Dredging		
Volume [CY]	N/A	252,840
Place Sand Fill for Beach Nourishment		
Length [ft]	3,000	3,000
Volume [CY]	231,770	252,840
Total Estimated Man Hours	**17,606**	**20,920**
Site Subtotal Cost Estimate	**$17,705,260**	**$7,671,618**

4.4.9 Storm Drain Improvements

An opinion of probable cost was prepared by Rick Engineering for the replacement of storm drain pipe based on the recommended geometry as summarized in Section 4.2. To determine a cost estimate for this preliminary design, unit costs were derived from the City of San Diego Unit Price List and similar project cost estimates. The cost estimate for construction of the preliminary design is categorized by line item as shown in Table 4-14 and Table 4-15 below:

Table 4-14. De Anza Cove Storm Drain Improvements Quantity and Cost Estimate

Construction Activity/Item	Unit	Quantity	Unit Price	Total Cost
96" RCP (Basin 100)	LF	472	$912.21	$430,563
42" RCP (Basin 200)	LF	143	$296.92	$42,459
72" RCP (Basin 300)	LF	161	$512.86	$82,570
48" RCP (Basin 500)	LF	58	$314.91	$18,265
Trenching	CY	2,382	$44.57	$106,171
30% Contingency				$204,300
Subtotal				**$885,300**

Table 4-15. Crown Point Storm Drain Improvements Quantity and Cost Estimate

Construction Activity/Item	Unit	Quantity	Unit Price	Total Cost
24" RCP (Basin 600)	LF	105	$197.95	$20,784
36" RCP (Basin 700)	LF	49	$260.93	$12,785
18" RCP (Basin 800)	LF	126	$170.95	$21,540
Trenching	CY	246	$44.57	$10,965
30% Contingency				$20,100
Subtotal				**$87,100**

4.5 Preliminary Project Schedule

An estimated construction schedule of restoration of shoreline projects is provide in Appendix D. Preparation of this estimated construction schedule is based on the preliminary concepts. The schedule is created for planning purposes only. Available construction windows will depend on permit acquisition for each project; however, it is anticipated that project construction will aim to avoid the peak tourism period, approximately Memorial Day through Labor Day. De Anza Point, however, may be constructed during the summer season due to its current visitor restrictions.

Beach nourishment projects are assumed to be constructed by trucking in fill material, as opposed to dredging. De Anza Point wetland restoration incorporates a dredging phase. Projects are assumed to be constructed as individual construction events; however, grouping projects under one contract may significantly reduce construction durations and cost. For example, beach nourishment events could be coordinated to occur under one contract, eliminating duplicate efforts to administer the projects, identify sand sources, and mobilize and demobilize crew and equipment. Rock revetment construction projects could similarly be lumped under one project to eliminate duplicate efforts of administering the projects, identifying and importing rock, and mobilizing and demobilizing crews and equipment.

Should dredging of Mission Bay be utilized to source fill material, such projects which require dredging would see reduced costs and schedule if coordinated together.

5.0 Other Considerations as Appropriate

5.1 Feasibility Analysis of Constructability

Construction of the proposed restoration of shoreline projects is anticipated to be feasible. Construction means and methods will vary with respect to many variables including: site location, project type, permit restrictions, construction window, construction budget, awarded contractor, and more. To limit the effect of such variables on construction, it is optimal to maintain the widest lens of possible construction methods while designing and permitting a project.

The following section outlines two fundamental approaches to construction (landside and waterside construction), detailing the construction approach and equipment access and needs, followed by a specific discussion of each project site's unique constraints.

5.1.1 Landside Construction

Landside construction is a common form of construction for shoreline development projects. The majority of contractors are most familiar with landside construction and have access to land-based equipment. Landside construction occurs in dry conditions, utilizing backhoes, dump trucks, front-end loaders, and other land-based equipment to construct various project elements above MSL in dry conditions.

5.1.1.1 Staging Areas and Access

Mobilization and demobilization of equipment and personnel for construction requires site access points and staging areas.

Mobilization and demobilization of heavy construction equipment will be brought to the site by way of the regional highway (Interstate-5, Interstate-8, Pacific Coast Highway) and local street network. The larger pieces of equipment will likely be transported to the site on trucks during the late evening to early morning (between 9 PM and 6 AM) hours to minimize potential traffic congestion. Additional equipment may be brought onto the site, as the contractor deems necessary; however, this should be considered an isolated case and will not occur on a regular basis.

Landside construction requires direct access to the construction area. Daily traffic will consist of the personal vehicles owned by construction and construction management personnel, various inspectors, and other representatives from the various agencies and property owners involved with the project. The local roadways will require periodic maintenance and dust control that the contractor will provide. For most project sites, this will require coordination with private enterprises and residences. During discussions with such groups, topics including work hours, noise control, light control, and dust control will be touched upon to set expectations.

Staging areas are required for the delivery, storage, and maintenance of equipment and materials. Staging areas will be selected to minimize impacts to nesting areas and sensitive habitat. Staging areas do not necessarily need to be on-site; however, providing the most efficient access routes for equipment and crew will reduce construction period and cost.

5.1.1.2 Equipment Needs

The contractor will select construction equipment depending on the availability of equipment to the contractor at the time of construction and on regulatory permit requirements and restrictions. The following list outlines potential equipment types to be used for landside construction of projects:

- Loader,

- Backhoe,
- Excavator,
- Scraper,
- Bulldozer,
- Vibratory Compactor,
- Pick-Up Truck,
- Delivery Truck,
- Surveyor Van and Equipment,
- Oiler Truck,
- Fuel Truck, and
- Dump Truck.

Materials to be delivered to the staging area may include but are not limited to:

- Rock,
- Sand,
- Aggregate Base,
- Geotextile Fabric,
- Stormwater BMPs,
- Steel Plates,
- Construction Fencing, and
- Flaggers & Lifeguard Services.

Rock material can be brought over on a barge from Catalina Island to a staging area inside Oceanside Harbor or San Diego Bay and then transported on I-5 via trucks to the project site. Alternatively, rock for projects may be delivered by trucks from quarries located in various locations, including Chula Vista and Corona, California.

All proposed sites are accessible to public use, with the exception of the southern half of the De Anza Boot. Landside construction will require a defined boundary to isolate construction activities and protect public activity.

5.1.1.3 General Construction Approach

Landside construction will require a minimum of 18 to 20 feet of clear area behind the immediate area of construction to facilitate the mobility of heavy equipment (e.g. excavator). Should landside construction be opted for, it is important to note that long arm excavators are limited to an approximately 30-foot reach.

Excavation for shoreline treatment will be done with a clamshell or backhoe. The proposed projects are to maximize the re-use of material on-site. Import material will be hauled in from off-site or adjacent work areas and placed as appropriate. However, it is possible that portions of excavated material may be disposed of off-site.

Particularly for wetland construction, performing earthwork in the dry season is preferred over working in the wet season. Dry season work will require some measure of dewatering to excavate reaches and install stormwater controls. However, the amount of dewatering required during the dry season is much reduced compared to the wet season. Dewatering requires pumps to pull water from the site and store it in temporary "Baker" tanks for testing. Depending on its condition, the stored water is then either released into a different portion of the site, a nearby flood channel, or disposed of off-site. Dewatering adds costs to construction.

Beach fill projects may be constructed from landside. It is anticipated that dump trucks would be used to import sand. The average dump truck can carry approximately 10 to 12 cubic yards of material. Most landside constructed beach fill projects require several hundred or thousands of delivery trips, depending on the volume of material

required. Truck routes and work hours must be negotiated to facilitate project construction and minimize impacts to the public. Additionally, the farther away the source material is located, the more it may cost.

5.1.2 Waterside Construction

Waterside construction may be necessary for specific restoration of shoreline projects, and would take place in wet conditions, at or below MSL. Wet construction would involve working over water so that material below MSL could be removed and placed using dredge and/or excavator equipment. A land-based construction would be necessary, at a minimum through the use of a take-off area for equipment and materials to be transported to and from the water environment.

All proposed sites are accessible to public use, with the exception of the southern half of the De Anza Boot. Waterside construction will require a defined waterside boundary to isolate construction activities and protect public activity.

5.1.2.1 Staging Areas and Access

Mobilization and demobilization of equipment and personnel for construction requires access points and staging areas. Waterside staging areas may be located on a barge. In order to transport equipment and materials to the project site over water, an offloading and onloading area is required for vessel and barge. The farther away this site is located, the costlier construction will be. Possible access areas are the 24th Avenue and convention center marine terminals in San Diego Bay, and potentially Mission Bay. Use of marine terminals would require coordination with and authorization by the Port of San Diego.

As stated earlier, waterside construction would likely be paired with landside construction and land-based staging and access. This may take place on-site, at the staging area, and at the offloading/onloading wharf. Landside site preparation methods will be applicable in such cases.

5.1.2.2 Equipment Needs

The contractor will select construction equipment depending on the availability of equipment to the contractor at the time of construction and on regulatory permit requirements and restrictions. The following list outlines potential equipment types to be used for waterside construction of projects:

- Backhoe,
- Barge,
- Dredge,
- Discharge Line,
- Booster Pump,
- Scow,
- Tug,
- Work Boat,
- Survey Vessel,
- Excavator (to be placed on-barge), and/or
- Amphibious Excavator.

Access for waterside equipment must consider water depth and variable oceanographic conditions including water level and wave fluctuations from tidal and storm conditions. Work boats typically require up to 6 ft of water depth to accommodate draft. A barge that is fully-loaded with rock material may need up to 12 ft of water depth.

5.1.2.3 General Construction Approach

Waterside construction may require dredging activities, especially at beach fill and wetland restoration sites should material be sourced within Mission Bay. Should a hydraulic dredge be opted for by the contractor, a discharge pipe will be routed from the bay to the project site. The hydraulic cutter-head dredge provides the fastest method of material sourcing and placement. Construction with a hydraulic dredge requires use of a silt curtain to minimize turbidity impacts.

Sand sources within Mission Bay include the Mission Bay Channel and existing maintenance dredging sites as outlined in the 1990 Natural Resource Management Plan (Figure 5-1). More recently, the City of San Diego completed dredge design and construction of beneficially reused Mission Bay bottom material along the shoreline in 2018. The proximity of the 2018 dredging locations (Rick Engineering 2017) to proposed restoration of shoreline projects is presented in Figure 5-2.

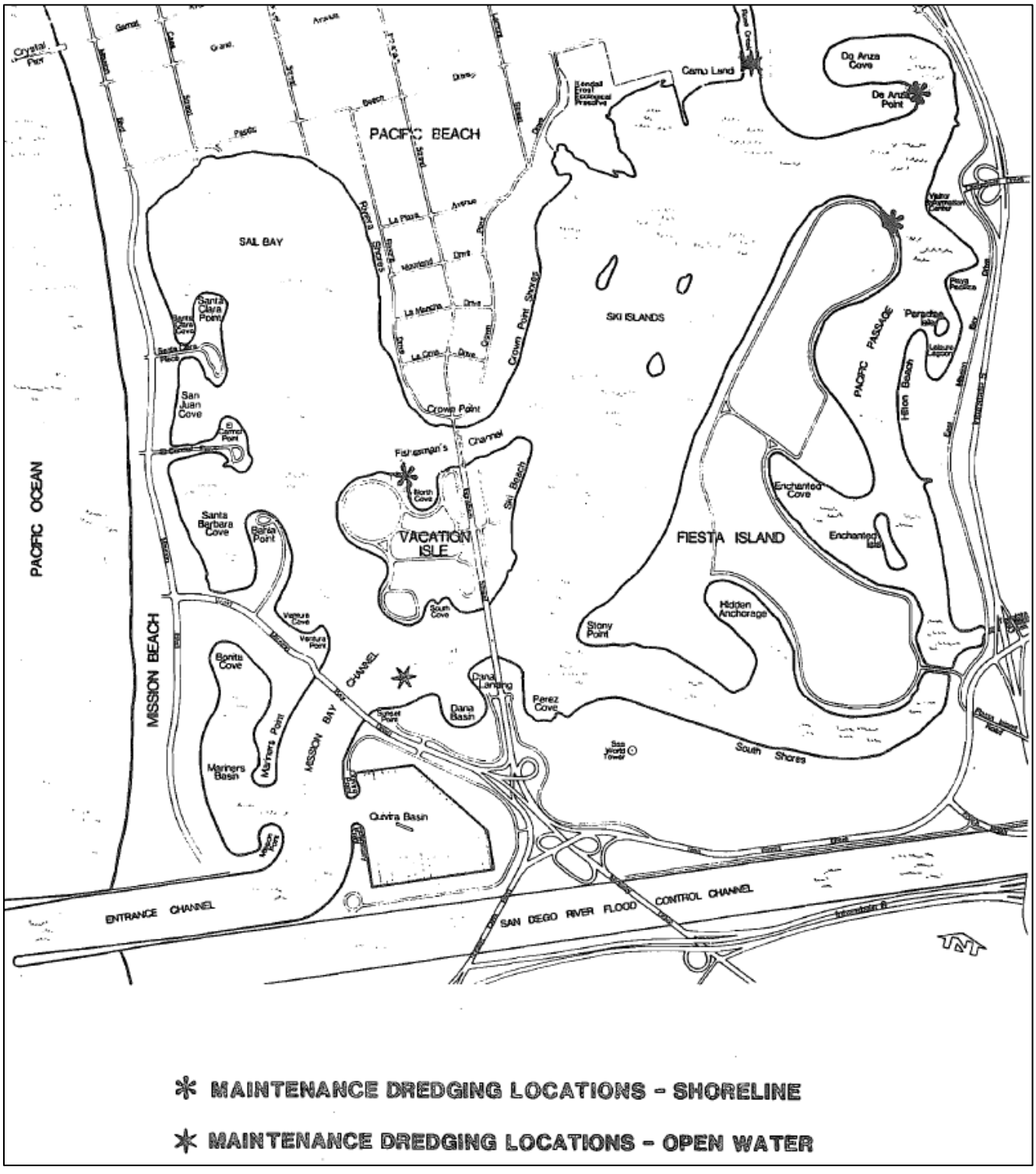


Figure 5-1. Maintenance Dredging Locations – Mission Bay (City of San Diego 2002)

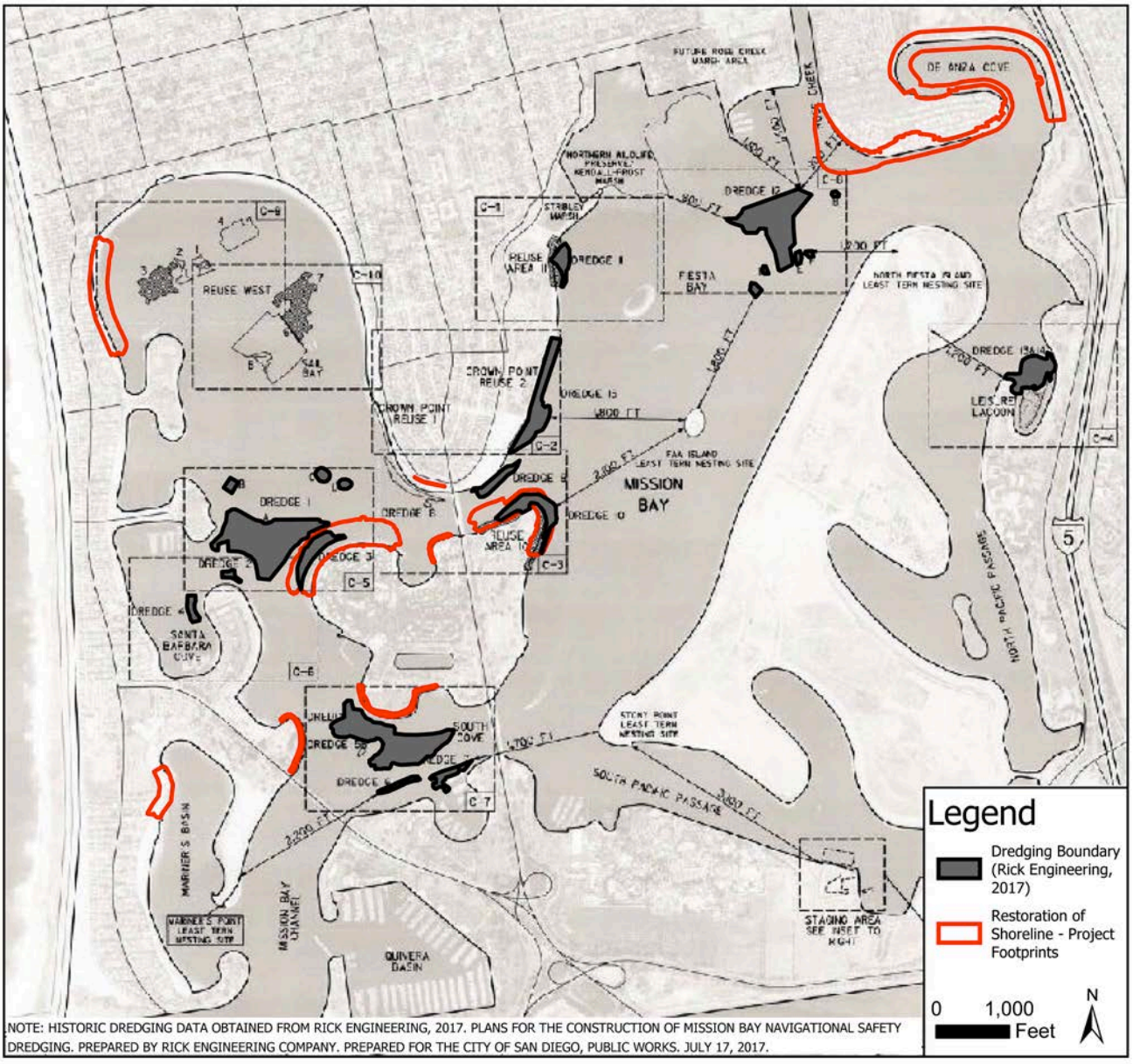


Figure 5-2. 2018 Dredging Boundaries and Proposed Restoration of Shoreline Footprint

5.1.3 Project Specific Construction Approach

Each site within the Restoration of Shoreline project carries unique constraints and considerations, as detailed below.

5.1.3.1 Bonita Cove

At Bonita Cove, relocation of the existing sidewalk would require basic civil works and landscaping operations. Bonita Cove cobble berm and beach fill may be constructed from landside and/or waterside. Beach fill could be constructed by importing sand by dump truck, hydraulic dredge, or barge. The cobble berm may require the construction of a temporary access path for land-based equipment to access the site. Alternatively, cobble import and placement may take place with a barge and excavator.

Two existing stormwater outfall pipes will require permanent refurbishing in order to coexist with the proposed beach widths. Stormwater outfall pipes may be retrofitted to extend into the bay, being buried by nourishment activities in the upland area.

5.1.3.2 Ventura Cove Park

Ventura Cove Park revetment, oyster habitat, and concrete footpath construction may utilize landside or waterside construction. The equipment used may include excavators and barges depending on the type of construction chosen. Project construction will have to ensure the protection of the existing revetment to the southwest.

5.1.3.3 Vacation Island Southwest

Vacation Island SW revetment, oyster habitat, and perched beach construction may utilize landside or waterside construction. The equipment used may include excavators and barges depending on the type of construction chosen. Project construction will have to ensure the protection of the existing revetment to the east. Perched beach construction should ensure that all revetment voids are filled to avoid potential sinkholes during public use.

5.1.3.4 West Sail Bay

West Sail Bay beach nourishment construction will the expand public beach significantly into the Bay. Construction may occur from the landside through importing sand by dump truck or from the waterside by hydraulic dredge or barge.

5.1.3.5 Crown Point

Installation of the seawall would likely be constructed through landside excavation and placement. However, construction of the Crown Point shoreline treatment may utilize landside or waterside construction. Depending on construction approach, working in the "wet" versus "dry" will trigger specific construction BMPs. Working in the "wet," this could include the use of a silt curtain to reduce turbidity effects. Working in the "dry," this could include the construction of a temporary dike and dewatering activities.

5.1.3.6 Vacation Island Northwest

Vacation Island NW groin and beach fill construction may take place from landside or waterside. Construction activities must coordinate with and may be limited in access by the adjacent Paradise Point Resort and Spa. Anticipated limitations may include crew access and staging area availability due to a lack of public space and construction window limitations to reduce impacts to tourism.

Construction phasing requires groin construction take place prior to beach fill. Groin construction will likely require beach excavation, depending on the existing beach height and width at the time of construction, and rock placement. Should the groin be constructed from the landside, the contractor would work towards the Bay, utilizing the partially constructed groin as an access way to continue bay-ward. Waterside groin construction would likely be constrained by barge depth limitations, as discussed in waterside staging area and access. Beach fill could be constructed by importing sand by dump truck, hydraulic dredge, or barge.

5.1.3.7 Vacation Island Northeast (West of Ingraham St & Ski Beach)

West of Ingraham Street

West of Ingraham Street revetment construction will likely utilize landside construction with equipment such as excavators and dump trucks. Project construction will have to ensure the protection of the existing revetment to the south.

Ski Beach

The Ski Beach cobble berm and beach fill may be constructed from landside and/or waterside. Beach fill could be constructed by importing sand by dump truck, hydraulic dredge, or barge. The cobble berm may require the construction of a temporary access path for land-based equipment to access the site. Alternatively, cobble import and placement may take place with a barge and excavator.

5.1.3.8 De Anza Point and Cove

De Anza Point

Construction of the De Anza Point living shoreline concept will require dredging, grading, and planting activities. Construction of wetland restoration projects often involves removing sediment from areas of the site to lower them sufficiently to form wetland. This sediment is either re-used elsewhere on site to "balance" cut and fill or is removed from the site and disposed of or re-used off site. An opportunity for material re-use is available in the coordination of adjacent wetland restoration projects in Mission Bay. The Rose Creek Wetland Restoration, De Anza Restoration of Shoreline, Cudahy Creek Wetland Restoration, Tecolote Creek Wetland Restoration, and North Fiesta Island Wetland Restoration projects could be grouped together under one or more contracts to allow for the contractor to strategically balance cut and fill volumes across all sites. The construction efficiency gained in this opportunity would also reduce total construction schedule and costs of all wetlands.

Specifically Rose Creek and North Fiesta Island wetland restoration projects will produce excess sediment, and it is preferable to re-use within Mission Bay. If timing of De Anza Point with adjacent wetland projects is infeasible, stockpiling of the excavated soil on Fiesta Island could occur at the kelp drying and sand processing area adjacent to the North Fiesta Island wetland restoration site. It is a 15-acre area just south of the proposed wetland. Stockpiled material can be re-used in restoring the De Anza Point shoreline.

The use of material for specific habitat types may be constrained by sediment grain size and percentage of organic material. Typically, wetland material requires a high fines percentage to promote the growth of vegetation. Additionally, chemical contamination may limit re-use of material on-site, especially due to the unknown nature of the existing fill material. Chemical and physical testing and approval by resource agencies will be required prior to construction.

Grading of wetland areas is anticipated to be performed by an amphibious excavator. Use of such equipment will require the contractor to consider methods of putting in and out, fueling, crew access, and depths of work.

Operations and maintenance will be required for the De Anza Boot wetland. The most intensive actions may include:

- Trash removal
- Weed removal from transitional habitat areas
- Channel maintenance
- SLR adaptive management

Maintenance should occur regularly to ensure the habitat functions at the highest level possible for the site.

A pre- and post-construction monitoring program may be required by the CCC to quantify changes to the site over time. The monitoring plan should be integrated into existing work at the Mission Bay Wetlands by local universities, and potentially coordinated with the regional monitoring program devised by the Science Advisory Panel for the Southern California Wetlands Recovery Project. Monitoring should occur for the lifetime of the project and include tidal elevations at several points in each marsh, water quality, and habitat condition and distribution.

Issues with compromised habitat conditions or hydrology would need to be addressed through adaptive SLR management. Adaptive management may include minor grading, planting, and periodic thin-layer sediment augmentation to maintain appropriate tidal/land elevation relationships that support the target marsh habitat diversity.

De Anza Cove

The De Anza Cove beach nourishment construction will expand the public beach approximately 200 ft into the Bay. Construction may occur from the landside through importing sand by dump truck, or from the waterside by hydraulic dredge or barge.

Three existing stormwater outfall pipes will require permanent refurbishing in order to coexist with such beach widths. Stormwater outfall pipes may either be redirected south of the project area or retrofitted to extend into the Bay, being buried by nourishment activities in the upland area.

5.2 Risk Assessment

Various risks are prevalent when undertaking the shoreline restoration planning and design process. This section explores the variety of risks to help shed light on the potential future challenges that may be encountered. By documenting the risks, and developing an understanding of common challenges, future pitfalls may be avoided or minimized to achieve the best possible outcome.

A risk assessment was performed based on three criteria: probability of each risk occurring, the potential impacts to cost, and the potential impacts to time until project completion. Each risk was given a value from very low, low, moderate, and high for each of the three risk assessment criteria. Additionally a strategy and response action for each risk was determined.

A risk assessment table containing all the information from the risk assessment can be found in Appendix F. These risks are further described below.

5.2.1 Land Ownership

The ten Restoration of Shoreline sites are located within Mission Bay Park, in San Diego, CA, and are owned and maintained by the City of San Diego. As such, there are no known land ownership conflicts that may present risk to this project.

5.2.2 Utilities

A review of existing utilities was performed utilizing data from SanGIS, published by the City of San Diego Public Utilities Department and SANDAG. Such utilities have been incorporated into 30% drawings.

The contractor will be required to take due precautionary measures to protect any existing utilities or structures located at the work site. It is the contractor's responsibility to contact the owners of sewer, gas and electric, water, and sewer outfall utilities or structures prior to any excavation for verification and location of utilities and notification of commencement of work.

5.2.3 Existing Soil Data

The Mission Bay Shoreline Erosion Study (Tetra Tech 1984) found the beaches of Mission Bay to be primarily composed of well-graded fine sand, with a median grain size (D_{50}) of 0.2 mm. A total of fifteen sampling locations throughout Mission Bay were analyzed, and the relevant data is presented in Table 5-1.

Table 5-1. Beach Sample Size Analyses (Tetra Tech 1984)

Location	Sample No.	Median Grain Size (mm)	Geometric Standard Deviation (σ_g)*
Sail Bay	6	0.22	1.65
Crown Point (a)	7	0.49	2.46
Crown Point (b)	8	0.51	3.54
Crown Point (c)	9	0.34	3.34
De Anza Point	12	0.26	1.53

*$\sigma_g = \frac{1}{2}(\frac{D_{84}}{D_{50}} + \frac{D_{50}}{D_{16}})$

Mission Bay soils have been investigated through past geologic investigations by The Bodhi Group (2018). This study concluded the following:

- There are no geologic hazards that cannot be avoided or addressed.
- There are no policies or recommendations of the Mission Bay Park Master Plan Update which will have a direct or indirect significant environmental effect with regard to geologic hazards.
- The proposed land uses are compatible with the known geologic hazards.
- There are no potential impacts related to geologic hazards from the implementation of the Mission Bay Park Improvement Projects that can't be avoided, reduced to an acceptable level of risk, or reduced below a level of significance through mandatory conformance with applicable regulatory requirements and the recommendations of this technical report.
- The impact of unstable soil can be reduced to less than significant levels by requiring geotechnical investigations on settlement sensitive projects (culverts, bridges, bulkheads and areas where substantial amounts of fill may be placed).

Soils sampled at De Anza Point are of the greatest relevance to the restoration of shoreline project. Compromised or contaminated soils have not been identified. The soils were identified to have "high potential for liquefaction due to high groundwater…and hydraulic fills" (The Bodhi Group 2018). Cone penetration testing of De Anza Point obtained soil behavior results identifying alternating layers of sands, silts, and clays, as shown in Figure 5-3. Further geotechnical, physical and/or, chemical investigations may be required to progress to final permitting and design.

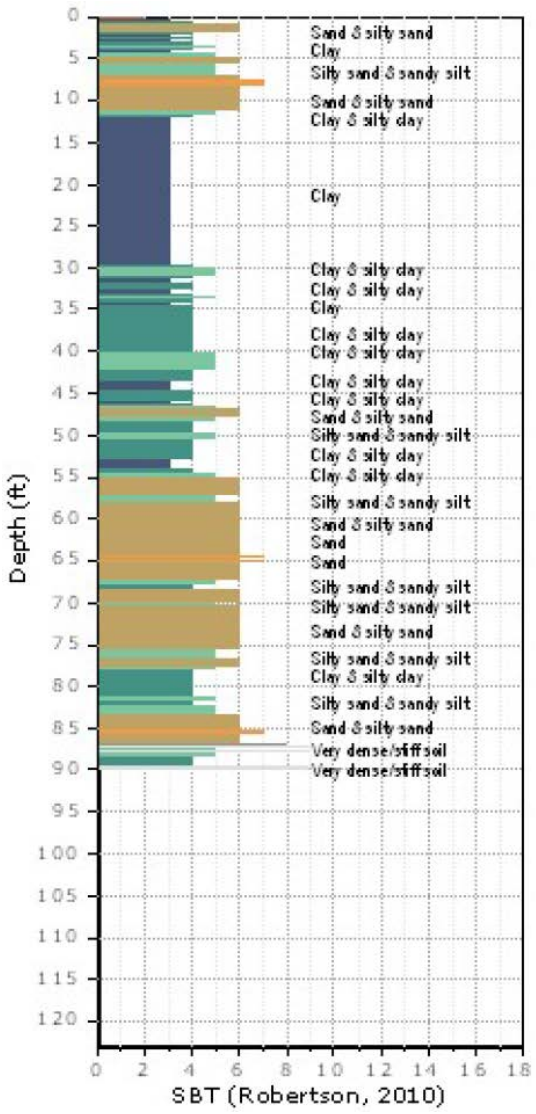


Figure 5-3. Soil Behavior Type – De Anza Point (The Bodhi Group 2019)

5.2.4 Proximity to Neighbors

Restoration of shoreline sites are located throughout Mission Bay. On the landward side, the sites are adjacent to many parcel types, including but not limited to residential areas, private businesses supporting local and tourist uses, and public parks and recreational facilities. On the waterside, the sites are adjacent to state lands below the mean high tide line and navigable waters. Construction of the restoration of shoreline sites will temporarily limit public access at all sites, with the exception of De Anza Point which is currently inaccessible to the public. However, long-term improvements to public access will result from project improvements.

Construction activities have the potential to impact neighbors in a multitude of ways, including, but not limited to noise impacts and traffic impacts.

Noise impacts have the potential to disrupt visitor, commercial, and residential activity throughout Mission Bay Park. This includes several surrounding park areas, including Fiesta Island, Tecolote Shores, Playa Pacifica Park, Mission Bay Park, De Anza Cove Park, Campland on the Bay, Crown Point Park, Ski Beach Park, Mission Beach and Mission Bay waters, which are actively used for recreation. Commercial impacts could be felt by, for example, visitor

supporting businesses, including the nearby Hilton San Diego Resort & Spa. Residential impacts could extend to the nearby Bay Park and Crown Point, and Mission Beach communities, and others.

Traffic impacts have the greatest potential to disrupt visitor use of Mission Bay Park and access to commercial and residential areas. Mobilization and demobilization of heavy construction equipment will be brought to the site by way of the regional highway (Interstate-5, Interstate-8, Pacific Coast Highway) and local street network. Construction activities may limit public access during certain periods of the day during construction.

Noise and traffic regulation may be necessary to restrict daily work hours and weekend work. Construction timing of the Project may be scheduled to reduce impacts to visitor use. Peak visitor use spans approximately from Memorial Day (May) through Labor Day (September). The Project is anticipated to occur from post-Labor Day to February 15th, as mentioned previously. The use of flaggers and traffic management may be necessary to protect public safety and access.

5.2.5 Environmental Windows

Environmental constraints of endangered bird nesting seasons can impose environmental construction windows on certain projects. Potential nearby special-status wildlife species include the endangered California least tern (Sternula (Sterna) antillarum browni) and threatened western snowy plover (Charadrius alexandrinus nivosus). The western snowy plover breeding season occurs from March through September. California least tern mating begins in April or May. The nearest known protected nesting sites within Mission Bay are as follows:

- Mariner's Point – This least tern site is approximately 1,500 linear feet from the Bonita Cove site.
- North Fiesta Island – This least tern site is located approximately 1,000 linear feet from the De Anza Point site.
- Stony Point – This least tern site is located approximately 2,500 linear feet from Vacation Island NE – Ski Beach, and approximately 2,700 linear feet from Vacation Island SW.

Additionally, the De Anza Point project area is approximately 1,400 linear feet from the Kendall-Frost Marsh Reserve.

Such distances to sensitive nesting sites is not anticipated to trigger construction timing restrictions. However, should threatened and or endangered species be found on or near the sites, certain elements of the overall Project may be necessarily phased or timed to mitigate impacts. For instance, breeding restrictions can limit construction from September 1st to February 15th. These potential project schedule impacts are an important part of the permits and engineering contract documents (plans, specifications, and estimates for contractor bidding). It is important to design the project with assurances to the resource agencies that the Project will be implemented without incurring unanticipated incidental impacts. If this window can be opened further, construction can be done with slightly less urgency and accommodate contingency actions if they became necessary.

5.2.6 Water Quality Concerns

Restoration of Shoreline is designed with consideration of the Master Plan water quality improvements initiative. The first Mission Bay Master Plan (City of San Diego 2002) key recommendation is:

> *It is broadly recognized that the Park's economic and recreational future depends on the quality of the Bay's water. In response to fluctuating quality of the Bay waters, this Plan proposes a comprehensive set of measures involving state-of-the-art biological, mechanical, public education and recreation management programs. Biological measures include the establishment of salt-water marshes that can naturally filter pollutants as they enter the Bay through the creeks that drain the Bay's watershed…*

A past Water Quality Control Study (Tetra Tech 1983) identified that the water quality problem largely stems from two issues:

- *A nearly continuous input of pollutants from various point and nonpoint sources within the increasingly urbanized drainage areas inland from the bay.*
- *Flushing and circulation conditions which are generally inadequate to transport pollutants out of the Bay. As a result, pollutants can build up to undesirable levels.*

The Project proposes to create a wide range of shoreline improvements that are anticipated to either have no negative long-term impacts to water quality or even provide water quality improvements. Beach nourishment, cobble berm construction, and other in-water construction activities are likely to cause temporarily increased turbidity. Turbidity can be reduced through the use of construction BMPs such as limited production rates, use of silt curtains, etc. However, beach nourishment, cobble berm construction, and revetment and groin construction are not anticipated to impact water quality in the long term. Since such projects will help to stabilize the shoreline, reduced upland erosion may in fact improve water quality.

Furthermore, restoration of shoreline improvements such as oyster habitat at Ventura Cove Park, Vacation Island, and De Anza Point, as well as wetland restoration at De Anza Point, are anticipated to improve water quality within Mission Bay. Oyster species are filter feeders, meaning they take in water and can sequester harmful pollutants. Additionally, wetland habitats such as cordgrass promote the settlement of suspended sediments, and vegetative growth can also sequester harmful pollutants.

5.2.7 Competing Interests

City Charter Section 55.2 proposes that the Mission Bay Park Improvements project include efforts to restore wetlands, wildlife habitat, and other environmental assets, preserve beneficial uses of the Improvement Zone by maintaining navigable water and eliminating navigational hazards, restore embankments and erosion control features, and improve the conditions of the Improvement Zone for the benefit and enjoyment of residents and visitors.

The Restoration of Shoreline project makes up one project of the wider Mission Bay Park Improvements. As such, the project is focused on certain aspects of the larger City Charter Section 55.2. The project is designed to restore embankments and erosion control features, restore wetlands, wildlife habitat, and other environmental assets, and improve the enjoyment of residents and visitors. The project proposes to extend the boundary of several shorelines into Mission Bay, in many cases restoring historic shoreline positions. Such projects may compete with navigable water interests, which have become accustomed to the existing conditions. However, the shoreline projects are intended to stabilize the shoreline, which in many cases may reduce the accretion of sediment in navigable channels, improving open water access.

5.2.8 Sensitive Habitat

Eelgrass is one of the most valuable coastal marine habitats in California and was designated as Essential Fish Habitat (EFH) and a Habitat of Particular Concern under the Magnuson-Stevens Fishery Conservation and Management Act in 1996. Eelgrass provides foraging, sheltering, and spawning areas to a wide variety of marine life including fish, invertebrates, waterfowl, and sea turtles (NOAA 2014). Project design shall be aligned to minimize eelgrass impacts. Should eelgrass impacts occur, it must be replanted or mitigated, with restoration efforts negotiated with the appropriate resource agencies.

Approximate eelgrass impacts for each project site were estimated using preliminary project footprints and the 2013 Mission Bay eelgrass survey (Merkel & Associates 2013). A total of approximately 33 acres of eelgrass may be

impacted by project construction. Potential eelgrass impact is depicted in Figure 5-4 and summarized in Table 5-2 and Table 5-2.

Existing eelgrass data is based on a 2013 survey. Prior to final design of Restoration of Shoreline projects, it is recommended that eelgrass inventory be updated to more accurately assess impact acreages. A portion of impacts are anticipated to be temporary for soft solutions, such as sand nourishment and mudflat construction, where eelgrass can re-establish in subtidal areas. To minimize eelgrass impacts, restoration of shoreline projects could be restricted to areas above the -5 ft NGVD 29 elevation, above which eelgrass establishment is rare. Such a goal could be achieved by reducing beach widths or steepening construction slopes for sand or rock shorelines.

Existing eelgrass that cannot be avoided may trigger mitigation. Mitigation will be detailed in the Habitat Restoration Plan (in progress) as a part of the Mission Bay PEIR and may take the form of subtidal habitat constructed as a part of the following projects:

- Rose Creek Wetland Restoration,
- North Fiesta Island Wetland Restoration,
- Tecolote Creek Wetland Restoration,
- Cudahy Creek Wetland Restoration,
- De Anza Point Wetland Restoration, and the
- Eel Grass Restoration Plan.

Table 5-2. Approximate Potential Eelgrass Impact

Project Site	Potential Eelgrass Impact (acres)
Bonita Cove	0.1
Ventura Cove Park	0.1
Vacation Island Southwest	0.0
West Sail Bay	6.2
Crown Point	0.0
Vacation Island Northwest	9.0
Vacation Island Northeast (West of Ingraham St & Ski Beach)	6.0
De Anza Point	14.6
De Anza Cove	2.1
Total	**38.1**

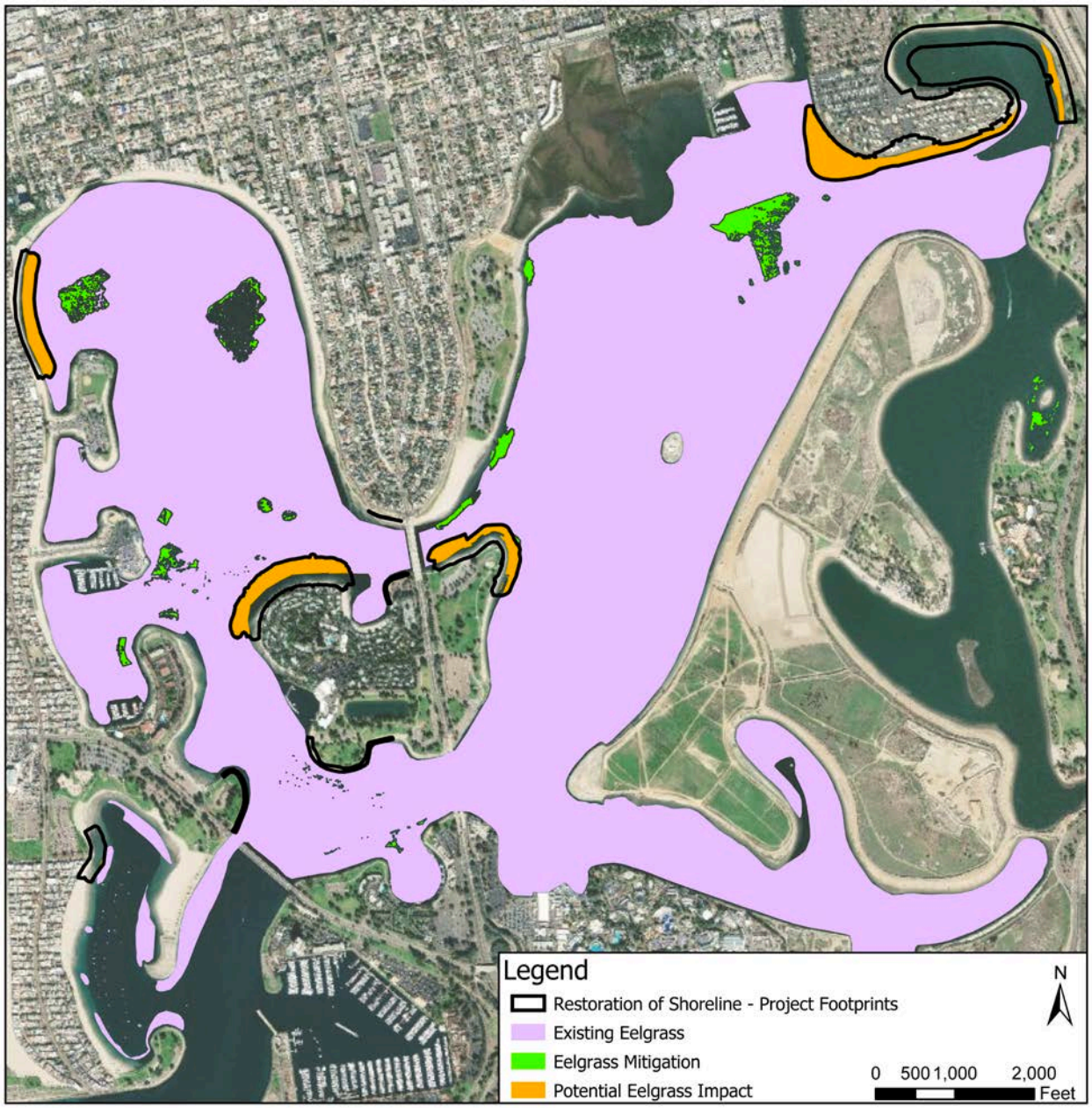


Figure 5-4. Potential Eelgrass Impact

5.2.9 Sea Level Rise

As directed by the City, the restoration of shoreline project was developed with consideration of SLR risks through the Year 2100. Two SLR projections (3.6 ft and 7.0 ft) were selected for Year 2100 that represent major thresholds for the project. These thresholds represent the 17% probability and 0.5% probability scenarios and are driven by coastal flooding that is expected to increase (progress inland) with a 100-year storm event in conjunction with SLR. There is a low probability that SLR could exceed 7.0 ft by the end of the century, but the range of scenarios selected capture important impact thresholds for the restoration of shoreline project regardless of when they occur.

For the purposes of shoreline planning, SWLs under SLR scenarios are projected to pinpoint tidal elevations important to habitat and public use. Existing SWL elevations and future elevations based on the two chosen SLR scenarios are provided in Table 5-3.

Table 5-3. Sea Level Rise Projected Still Water Levels

Datum	Abbreviation	Existing SWL (ft, NGVD29)	3.6 ft SLR SWL (ft NGVD29)	7.0 ft SLR SWL (ft NGVD29)
Highest Observed Tide (11/25/2015)	HOT	5.49	9.09	12.49
Mean Higher-High Water	MHHW	3.00	6.60	10.00
Mean High Water	MHW	2.28	5.88	9.28
Mean Sea Level	MSL	0.41	4.01	7.41
National Geodetic Vertical Datum of 1929	NGVD29	0.00	0.00	0.00
Mean Low Water	MLW	-1.42	2.18	5.58
North American Vertical Datum of 1988	NAVD88	-2.13	1.47	4.87
Mean Lower-Low Water	MLLW	-2.32	1.28	4.68
Lowest Observed Tide (12/17/1937)	LOT	-5.19	-1.59	1.81

Designing the restoration of shoreline projects for sea level rise is important to the longevity of Mission Bay's shoreline, public access, habitat value, and protection of inland development. Design elevations can either be raised above predicted water levels or can be designed to be more easily adapted in the future as sea level rises. Designing and adapting for sea level rise is discussed with regard to each proposed shoreline type:

- **Wetland Restoration:** Wetland vegetation distribution is directly dependent upon the elevation of a restored marsh relative to tidal elevations. The restored marsh is designed to incorporate habitat from low to high elevation, including subtidal, mudflat, low marsh, mid marsh, high marsh, transitional, and upland habitat. As sea level rises, these habitats will transform with their new elevation relative to the tides. For instance, high marsh will transform into mid marsh under approximately 1 ft of SLR. The restored salt marsh habitat will likely transform with less high- and mid-low marsh and more mudflat with subtidal habitat. The wetlands may be adapted to sea level rise as follows. Without raising the elevation of the site by filling or implementing adaptation measures, the site would effectively become mudflat with tidal channels. The exception is the transitional habitat area that becomes low marsh. When SLR causes significant habitat changes in the marsh, the site can be adapted by the following:
    - Should sediment inputs from Rose Creek and other sources be significant, the wetland may be able to capture sediment and rise in elevation as sea level rises. Accelerating rates of sea level rise reduce the potential for this natural process to occur as vegetative growth and sediment accretion may not be able to pace.
    - Reconfiguring and/or raising the wetland plains above future high internal wetland water levels through thin layer sediment additions (i.e., the pilot project at Seal Beach Naval Weapons Station in 2016). This will allow for mudflat and vegetated marsh habitat to persist.
    - Depending upon the results of the De Anza Cove Amendment to the Mission Bay Park Master Plan, inland portions of De Anza Point may be designed to slope gently and allow wetland habitats to transition inland and upland as sea level rises.

While it is possible that these adaptation strategies may need to be implemented in the near-term at some time between 2050 and 2100, they may also need to be repeated multiple times in the long-term after 2100 as sea levels rise in the future. Adaptation measures such as the ones listed above will be necessary if the vision is to provide vegetated marsh habitat at De Anza Point into perpetuity.

- **Oyster Restoration:** Oysters can only survive within a narrow window of tidal elevations. The Pacific oyster and Olympia oyster together can occupy an elevation range of between 3 and 4 vertical feet, with the native Olympia oyster preferring the lower elevations. Preliminary design for oyster restoration in Mission Bay places oyster habitat between -2.3 to 1.0 ft NGVD29 to promote maximum growth following construction. However, at such elevations, rapid sea level rise may begin to submerge oysters and limit their viable habitat areas. Therefore, oyster habitat will need to adapt to sea level rise:
    - As a form of living shoreline, oyster reefs can naturally grow in elevation given the right conditions. For instance, in Virginia, an oyster shoal was once been observed to grow at a rate of 0.2 inches/year, equivalent to 1.7 ft/century (USACE 2012). Should the City's recommended sea level rise projections occur, natural reef growth is unlikely to keep pace with sea level rise.
    - Oysters can migrate naturally as well. Where high numbers of oysters exist, higher levels of spat and recruitment are likely to occur. Given that oysters have been known to settle in areas of rip rap within San Diego Bay, it is possible that oysters will recruit to the rip rap shorelines and migrate inland and upland as sea level rises (Merkel & Associates, et al. 2015).
    - Oyster habitat can be artificially raised by the addition of oyster culth, reef balls, rip rap, or other promising recruiting substrates. Depending upon the occurring rate of sea level rise, such substrates could be brought to oyster sites and mounted to the existing reefs to incrementally raise elevations. This adaptation measure may need to be repeated multiple times in the long-term as sea level rise accelerates.
- **Beach Nourishment:** The beach nourishment bench is designed at +7 ft NGVD29, which is above the projected MHHW line under 3.6 ft of SLR. Beach nourishment projects on the open coast typically last about 5 years, depending upon fill volume, sediment grain size, and oceanographic conditions. It is likely that within the protected waters of Mission Bay, the life span of beach nourishment projects would exceed 5 years. However, it is unlikely that wide beach conditions would persist through the year 2100, especially given SLR projections and the historical evidence that wide beaches within Mission Bay have eroded substantially since construction in the mid-1900s. Therefore, adaptive measures will be necessary and could include the following:
    - Beach nourishment projects could be repeated multiple times as erosion and sea level rise begin to overwhelm the beaches. Nourishment design could be incrementally raised to keep pace with sea level rise.
    - Vegetated sand dunes could be constructed on the inland side of a wide sandy beach to protect against the high SLR projection. Vegetated sand dunes offer a living shoreline form of coastal protection, by raising shoreline elevations to minimize inland flooding, capturing wind blown sand, stabilizing sandy shorelines with rooted vegetation and installed fencing, and preserving a bank of sand in case of an extreme erosive event. Dunes are not proposed for the initial project construction to preserve the extensive beach access and viewshed, but as sea level rises and priorities shift towards flood control, sand dunes will contribute to creating an "exoskeleton" around the bay to buffer development from flooding, while maintaining the close proximity for the public to water access.

- **Cobble Berm:** A Cobble berm crest elevation is designed at +4 ft NGVD29. This is designed to be 1 foot above the existing MHHW elevation in order to maintain a level of wave protection during king tides, while limiting impact on viewshed. As sea level rises, the cobble berm will likely require adaptation to maintain surface wave interactions during high tide. Adaptation could take the following forms:
    - Cobble berms could be adapted through the addition of cobble material placed on the 20-ft wide berm crest. Maintaining the design slope of 4:1 (H:V), a maximum of 2.5 feet of elevation could be gained through cobble addition within the existing design footprint. Additional elevation could be gained through expanding the berm width. The addition of cobble material is anticipated to be of relatively low cost and high constructability. Cobble material could be sourced locally or from inland quarries. Cobble could be transported to the berm location across the beach by truck during low tide or by barge and offloaded by a backhoe during high tide.
    - Alternatively, should the cobble berm fail to provide adequate protection as a form of soft breakwater, the material could be repurposed by scraping onshore. The cobble could be reorganized as a foundation or "mattress" within the beach to provide a form of beach, which is less erodible than sand. This foundation could be buried with additional sand to provide improved public access in the near term, while the cobble would tend to better hold its place in the face of sea level rise and storms. See Section 5.5.3 for a discussion on the viability of cobble berms as a beach foundation.
- **Revetment:** Rock revetment crest elevations are designed at +10 ft NGVD29, equivalent to 7 ft above the current MHHW line. Therefore, under 7 ft of SLR, rock revetment crests would provide protection for upland resources from tidal inundation. Should the rock revetment begin to be overtopped by storm surge and wave action, the 9-ft wide crest can accommodate additional rip rap to raise the crest elevation up to 2 ft while maintaining a 3-ft wide crest and a 1.5:1 (H:V) slope.
- **Groin:** The rock groin at Vacation Island NW is designed with a crest (i.e., bench) elevation of +8 ft NGVD29, 5 ft above the current MHHW line. The rock groin can maintain a sandy beach up to +8 ft NGVD29 in elevation, 1 ft above current beach nourishment design, after which sediment transport will pass horizontally over the crest. Like beach nourishment design, the groin elevation can provide protection beyond the 3.6 ft SLR projection. Should SLR reach 7 ft, the rock groin may need to be adapted to maintain a dry sandy beach. To do so, rip rap could be imported and placed atop the 10-ft wide groin crest up to 2 ft while maintaining a 4-ft wide crest and 1.5:1 (H:V) side slopes. An additional 2 ft in crest elevation would equate with the projected MHHW tide line at 10 ft NGVD29 under 7 ft of SLR. It should be noted that due to the limited natural input of sediment to Vacation Island NW, occasional beach nourishment may also be necessary to maintain a dry sandy beach, especially should the groin be raised to accommodate SLR.
- **Seawall:** The seawall at Crown Point is intended to simply extend the existing design to the south and east to provide further horizontal protection. The existing seawall crest elevation is 7 ft NGVD29, which can protect against tidal inundation within the 3.6 ft SLR projection. No change is proposed to this crest elevation. Should the 7 ft SLR projection occur, adaptation measures will be required. This may take the form of retrofitting the seawall with a raised cap, replacing the seawall with a larger structure, or implementing new shoreline management measures in coordination with the community.

5.2.10 Permitting

As a result of the need to receive approval from multiple resource permitting agencies, the possibility of project delays during approval could occur which would result in an increased project schedule or require new mitigations, see Section 5.3.8.

5.3 Project Conflict Coordination and Evaluation

The following section evaluates potential conflict associated with each Restoration of Shoreline site.

5.3.1 Bonita Cove

Construction timing of the Bonita Cove shoreline project will likely be scheduled to reduce impacts to visitor use. Peak visitor use spans approximately from Memorial Day (May) through Labor Day (September). Additionally, due to Bonita Coves's close proximity to residential housing, close public coordination will be necessary to mitigate impacts. Specifically, noise regulation may be necessary to restrict daily work hours and weekend work. Should sand import come by truck, truck routes must be negotiated to minimize impacts to public use.

Potential conflict exists between the Bonita Cove shoreline restoration and the South Mission Beach Storm Drain and Green infrastructure Project. The South Mission Beach Storm Drain and Green infrastructure Project will replace/relocate five storm drains that outfall into Mariner's Basin and Bonita Cove and will construct one new outfall in Mariner's Basin. These systems will also install an additional storm drain within Mission Boulevard between San Fernando Place and North Jetty Road to capture runoff in new inlets versus numerous existing weep sumps. Additionally, two storm drains that outfall into the Mission Bay Jetty will also be replaced in place. The project also includes the replacement and addition of low flow diversion structures to nearby sewer mains for each of the outfalls, construction of nine water quality basins, street resurfacing, and grading of the beach at outfall locations, which will be designed to allow for eelgrass mitigation. One of the primary locations being considered for the eelgrass mitigation is at the storm drain outfall at San Fernando Place, which is located within the footprint of the Bonita Cove shoreline restoration. Conflict arises with the goal to accommodate eelgrass mitigation within the footprint of Bonita Cove shoreline restoration. Eelgrass could be planted on the bayside of the cobble berm, but is unlikely to be successful on the landward side as the beach nourishment is designed at intertidal elevations. Benefits of the two projects could come from the reuse of cut material from the outfall projects as fill for beach nourishment.

5.3.2 Ventura Cove Park

Construction timing of the Ventura Cove Park shoreline project will likely be scheduled to reduce impacts to visitor use. Peak visitor use spans approximately from Memorial Day (May) through Labor Day (September).

5.3.3 Vacation Island Southwest

Construction timing of the Vacation Island SW shoreline project will likely be scheduled to reduce impacts to visitor use. Peak visitor use spans approximately from Memorial Day (May) through Labor Day (September). Coordination with the nearby Paradise Point Resort & Spa will be necessary to mitigate impacts to commercial and visitor activities. Specifically, noise regulation may be necessary to restrict daily work hours and weekend work.

5.3.4 West Sail Bay

Construction timing of the West Sail Bay shoreline project will likely be scheduled to reduce impacts to visitor use. Peak visitor use spans approximately from Memorial Day (May) through Labor Day (September). Additionally, due to West Sail Bay's close proximity to residential housing and the Catamaran Resort Hotel and Spa, close public coordination will be necessary to mitigate impacts. Specifically, noise regulation may be necessary to restrict daily work hours and weekend work. Should sand import come by truck, truck routes must be negotiated to minimize impacts to public use.

5.3.5 Crown Point

Construction timing of the Crown Point shoreline project will likely be scheduled to reduce impacts to visitor use. Peak visitor use spans approximately from Memorial Day (May) through Labor Day (September). Additionally, due to Crown Point's close proximity to residential housing atop the bluffs, close public coordination will be necessary to mitigate impacts. Specifically, noise regulation may be necessary to restrict daily work hours and weekend work.

5.3.6 Vacation Island Northwest

Potential conflict with Vacation Island NW occurs with the protrusion of two new rock groins into Mission Bay. A public education campaign may be necessary to ensure the safety of boating Mission Bay. Additionally, construction timing of the Vacation Island NW shoreline project will likely be scheduled to reduce impacts to visitor use. Peak visitor use spans approximately from Memorial Day (May) through Labor Day (September). Coordination with the nearby Paradise Point Resort & Spa will be necessary to mitigate impacts to commercial and visitor activities. Specifically, noise regulation may be necessary to restrict daily work hours and weekend work. Staging and access areas will be necessary for construction; however, there is limited public space at Vacation Island NW. Agreements with Paradise Point Resort & Spa may be necessary to identify potential locations. It should be noted, as depicted in Figure 5-2, the proposed beach nourishment and rock groin at Vacation Island NW occurs in an area of recent navigational dredging by the City in 2018. Therefore, the need to maintain a wide, accessible shoreline at this site may conflict with the need to maintain a navigable channel. Coordination with the appropriate City of San Diego offices and stakeholders will be important in finalizing shoreline restoration design at Vacation Island NW.

5.3.7 Vacation Island Northeast (West of Ingraham St & Ski Beach)

West of Ingraham Street At West of Ingraham St, coordination with the nearby Paradise Point Resort & Spa will be necessary to mitigate impacts to commercial and visitor activities. Specifically, noise regulation may be necessary to restrict daily work hours and weekend work.

Ski Beach

Potential conflict regarding Vacation Island NE occurs primarily at Ski Beach. To avoid the heavy beach and boating season, construction timing of the Vacation Island NE shoreline project will likely be scheduled to reduce impacts to visitor use. Peak visitor use spans approximately from Memorial Day (May) through Labor Day (September). It should be noted, as depicted in Figure 5-2, the proposed beach nourishment and cobble berm at Ski Beach occurs in an area of recent navigational dredging by the City in 2018. Therefore, the need to maintain a wide, accessible shoreline at Ski Beach may conflict with the need to maintain a navigable channel between Vacation Island and Crown Point. The cobble berm is in part intended to contain beach nourishment on its landward side, which may reduce the erosion of beach sand and accretion of sediment in navigable channels. However, coordination with the appropriate City of San Diego offices and stakeholders will be important in finalizing shoreline restoration design at Ski Beach.

5.3.8 De Anza Point and Cove

5.3.8.1 De Anza Point

De Anza Point shoreline restoration design and construction must coordinate with two major development projects: De Anza Cove Amendment to the Mission Bay Park Master Plan and Rose Creek Wetland Restoration.

De Anza Cove Amendment to the Mission Bay Park Master Plan is a currently ongoing effort that is establishing the project and environmental baseline for major development at De Anza Cove Park. Design of the De Anza Point restoration project continues to coordinate and comply with the De Anza Cove Amendment to the Mission Bay Park Master Plan preparation. Currently, De Anza Point restoration of shoreline is restricted to the shoreline of the boot;

however, as these two projects progress, De Anza Point restoration should look to integrate with development at De Anza Cove Park.

The Rose Creek Wetland Restoration project is currently being designed as a part of this Mission Bay Park PEIR (M&N 2019). Rose Creek Wetland Restoration and De Anza Point shoreline restoration are being prepared in close coordination to facilitate the following:

- Promotion of consistent habitat and natural recreation,
- Management of Rose Creek discharge, and
- Potential need to balance cut and fill volume across projects, depending on the potential phasing of these two projects.

Due to the De Anza Point project area's close proximity to Kendall-Frost Marsh Reserve, environmental constraints may exceed those at other restoration of shoreline sites. Potential nearby special-status wildlife species include the endangered California least tern (*Sternula (Sterna) antillarum browni*) and threatened western snowy plover (*Charadrius alexandrinus nivosus*). Recent avian surveys on August 14th and 15th, 2019 by Dudek identified avian and plant species in Mission Bay and the surrounding area as shown in Table 5-4.

Table 5-4. Observed Species – August 14/15, 2019 Survey

Observed Avian Species	Observed Plant Species
American White Pelican	Beach Goldenaster
American Peregrin Falcon	California Box-Thorn
Belding's Savannah Sparrow	Cliff Spurge
Black Skimmer	Coast Woolly-Heads
Brant	Coulter's Goldfields
Brown Pelican	Decumbent Goldenbush
Burrying Owl (surveyed July 31, 2019)	Estuary Seablite
California Gull	Lewis' Evening-Primrose
California Least Tern	Nuttall's Acmispon
Cooper's Hawk	Palmer's Frankenia
Double-Crested Cormorant	Red Sand-Verbena
Elegant Tern	Robinson's Pepper-Grass
Horned Lark	Salt Marsh Bird's-Beak
Long-Billed Curlew	San Diego Barrel Cactus
Mallard	San Diego Marsh-Elder
Northern Harrier	San Diego Sagewort
Osprey	San Diego Viguiera
Reddish Egret	Santa Rosa Island Torrey Pine
Redhead	Shaw's Agave
Western Snowy Plover	Southwestern Spiny Rush
White-Faced Ibis	Torrey Pine
White-Tailed Kite	White Rabbit-Tobacco
	Woolly Seablite

According to the City of San Diego Land Development Code, Biology Guidelines, Section II.A.4:

All clearing, grubbing or grading (inside and outside the MHPA) will be restricted during the breeding season where development may impact the following species:

- *Western snow plover (March 1 – September 15)*
- *Least tern (April 1 – September 15)*

Project construction may require increased monitoring and potential mitigation efforts during these periods.

5.3.8.2 De Anza Cove

The De Anza Cove Restoration of Shoreline project is currently being prepared in coordination with the De Anza Cove Amendment to the Mission Bay Park Master Plan. The De Anza Cove design complies with the Mission Bay Park Master Plan Update (City of San Diego 2002) and the De Anza Cove Amendment recommendations to construct public beach. Construction timing of the De Anza Cove shoreline project will likely be scheduled to reduce impacts to visitor use. Peak visitor use spans approximately from Memorial Day (May) through Labor Day (September).

5.4 Environmental Considerations and Permits

Environmental permits that may be required to construct the Restoration of Shoreline projects are listed in, but not limited to, Table 5-5. As a part of the Mission Bay Improvements Plan, the City is seeking to streamline state and federal resource agency approval for all future projects, including the Restoration of Shoreline. This work includes but is not limited to preparation and submission of applications for regulatory permits to the U.S. Army Corps of Engineers (USACE), pursuant to Section 404 of the federal Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act; California Regional Water Quality Control Board (RWQCB), pursuant Section 401 of the federal CWA; and California Department of Fish and Wildlife (CDFW), pursuant to the California Fish and Game Code (Section 1600). Additionally, permitting support and strategy for CCC pursuant to the California Coastal Act and Coastal Zone Management Act is in progress.

Pursuit of USACE Section 404 CWA programmatic permit is anticipated to be applied for as a Regional General Permit (RGP) to authorize the implementation of multiple projects within Mission Bay. An RGP can authorize a category or categories of activities, such as the Mission Bay Park Improvements, in a specific geographical region for activities that are similar in nature and cause only minimal individual and cumulative environmental impacts.

In pursuit of a U.S. Fish and Wildlife Service (USFWS) Programmatic Biological Opinion, a Biological Assessment (BA), which is a modified version of a Biological Technical Report (BTR), is required in accordance with Section 7 of the Endangered Species Act (ESA). The BA is focused on project impacts on and restoration benefits for the California least tern, western snowy plover, and other federally listed species, including marine species, which have the potential to occur within the project area.

In pursuit of a RWQCB programmatic 401 Water Quality Certification, an application will be required as well as RWQCB issued General Waste Discharge Requirements (WDRs) for authorization of Mission Bay Park Improvements.

State Tideland Trust agreement may be required from the State Lands Commission for material use should dredge material be chosen as the source for beach nourishment and wetland fill.

Resource agency-imposed restrictions play a strong role in construction costs and duration. During discussions with resource agencies, permit restrictions will be negotiated, including but not limited to:

- Hours of Operations
- Noise Control (See Section 5.4.1)
- Light Control
- Dust Control

- Fueling
- Site Access
- Storage and Staging
- Impacts to Habitat and Sensitive Species

Regarding the above topics, the City should strive for the following in order to maintain flexibility of construction methods:

- 6-day work weeks
- Hours of operation from 7AM to 6PM with occasional night work, as necessary
- Fueling and equipment maintenance permitted on-site
- Land-based and water-based site access
- Wide environmental window
    - The timing of construction in sensitive areas may also be affected by the patterns of nesting and breeding birds. Typically, the nesting season window is mid-February through mid-September, which coincides with a large portion of the dry season. However, it may be argued that minimal sensitive habitat is present at all project sites, due to the high level of shoreline development in Mission Bay.
    - Optimally, the environmental window can be relaxed and the project can be constructed without breaks. For dredging activities, one approach to enable consideration of year-round construction would be to use an electric dredge. This equipment is quieter than standard diesel equipment with fewer air emissions and is, therefore, more environmentally sensitive. An electrical substation is assumed to be needed near the dredge launch site to accommodate the electric dredge.
- Flexible construction access and staging areas
    - Multiple construction access and staging areas allow various approaches to be conceived by contractors to increase competition during bidding.
    - Staging areas within or close in proximity to the construction area reduces construction duration and cost.

Table 5-5. Environmental Permit Considerations

Agency	Permit
Federal	
U.S. Army Corps of Engineers (USACE)	• Permit under Section 404 of the Clean Water Act, 33 USC Section 1344 • Section 10 of the River and Harbors Act of 1899, 33 USC Section 403 • Issue Record of Decision (ROD) • Fish and Wildlife Coordination Act, 16 USC Sections 661-666
National Marine Fisheries Service (NMFS)	• Magnuson-Stevens Fishery Conservation and Management Act, as amended 1996 (Public Law 104-267)
State Historic Preservation Officer/Tribal Historic Preservation Office	• National Historic Preservation Act of 1966 (NHPA), Section 106 Consultation with SHPO/THPO (36 CFR Part 800)
U.S. Fish and Wildlife Service (USFWS)	• Endangered Species Act, 16 USC Sections 1531-1544 Section 7 Consultation with the federal lead agency (i.e., USACE) • Programmatic Biological Opinion
State	

Agency	Permit
California Coastal Commission (CCC)	• Coastal Development Permit • Consistency Certification, Section 30600(a) of the California Coastal Act, or Waiver of Federal Consistency Provisions
California Department of Fish and Wildlife (CDFW)	• Streambed Alteration Agreement, Section 1602 of the California Fish and Game Code • California Endangered Species Act Section 2081 Incidental Take Permit
Regional Water Quality Control Board (RWQCB)	• Water Quality Certification under Section 401 of the Clean Water Act
Regional/Local	
San Diego Air Pollution Control District (APCD)	• Authority to Construct/Permit to Operate for any dredge

5.4.1 Noise Control

Federal and state noise regulations are enforced for the protection of public health and safety, to prevent the disruption of certain human activities, and address the effects of noise on the environment. The EPA established the Noise Control Act of 1972; regulatory responsibilities have since been transferred to state and local governments. Noise control measures often included the definition of construction windows, maximum noise level limits (measured in decibels [dBA]), noise level durations, regulation of vibration, consideration of nearby land uses, and more.

Construction noise can be a major, typically short-term, source of noise. Construction equipment which are likely to be used to construct the restoration of shoreline projects produce a range of noise levels, including but not limited to those presented in Table 5-6. Ambient noise values have been recorded as part of the De Anza Cove Environmental Analysis. Ambient noise has meen measured in the range of 42.9 to 77.5 dBA within Mission Bay in the De Anza Cove/Campland area. CEQA impact analysis for noise impacts will be required prior to the construction of the proposed projects to determine if the proposed project would affect San Diego Municipal Code (SDMC) and relevant standards, likely including but not limited to:

1. Result in or create a significant increase in the existing ambient noise levels;
2. Result in an exposure of people to current or future transportation noise levels which exceed guidelines established in the Noise Element of the General Plan;
3. Result in land uses which are not compatible with aircraft noise levels;
4. Result in the exposure of people to noise levels which exceed property line limits established in the Noise Abatement and Control Ordinance of the SDMC; or
5. Result in the exposure of people to significant temporary construction noise.

Table 5-6. Typical Construction Equipment Noise Levels

Equipment Type	Maximum of Noise Level at 50 ft (dBA)
Backhoe	80
Compactor (ground)	80
Compressor (air)	80
Dozer	85

Dump Truck	84
Excavator	85
Flat Bed Truck	84
Front End Loader	80
Generator (25 KVA or less)	70
Generator (more than 25 KVA)	82
Grader	85
Drill Rig Truck	84
Pumps	77
Soil Mix Drill Rig	80
Tractor	84

5.5 Design Considerations

Several design components are included across the restoration of shoreline sites. The following section provides background information on unique design considerations of beach nourishment, rip rap, cobble material, oyster restoration, dune restoration, and wetland restoration, as well as regulatory considerations in project construction. For a discussion of designing for sea level rise, see Section 5.2.9.

5.5.1 Beach Nourishment

Beach nourishment is a soft solution which protects upland development and provides public access. Beach nourishment design must consider sand grain size, beach width, crest height, slope, and volume.

- Sand Grain Size
  - Beaches within Mission Bay are composed of fine grain sand with an average grain size of approximately 0.2 mm (Tetra Tech 1984)
  - Beach nourishment with medium to coarse grain sand can improve the longevity of dry beach width due to its resistance to wave erosion
  - The Unified Soil Classification System defines sand grain size as:

USCS Classification	Minimum Diameter (mm)	Maximum Diameter (mm)
Fine Sand	0.074	0.42
Medium Sand	0.42	2.0
Coarse Sand	2.0	4.76

  - Past research in Mission Bay identified that beaches composed of median grain size of 0.4 mm sand was ineffective at protecting the shoreline. However, beaches composed of median grain size of 0.65 mm sand was found to be acceptably stable for the purposes of protecting the shoreline (Group Delta et al., 1992).
- Beach Widths
  - Optimized to provide sufficient towel space to pedestrians, while not excessively encroaching upon open water areas and activity.
- Crest Height
  - Optimized to protect upland development from extreme tides and wave action, while not becoming an obstacle for beach access or an obstruction for bay views.
- Beach Slope
  - A relatively steep beach slope of 8:1 (H:V) tends to erode (Tetra Tech 1984)

  - Past study recommended a beach slope of 15:1 (Tetra Tech 1984)
  - The majority of Mission Bay existing beaches are sloped at a 10:1 to 12:1 slope (Tetra Tech 1984)
  - Steeper slopes reduce construction footprints, and can limit sensitive habitat impacts such as eelgrass.
- Beach Volume
  - Beach fill volume is defined as the cubic yards (cy) of material placed at every linear foot (lf) of beach.
  - For projects that place 10 cy/lf, additional fill material is estimated to be needed every 3 to 6 years until a stable condition can be established (Tetra Tech 1984). Therefore, beach nourishment projects are recommended to be of a larger volume to build more sustainable beaches and reduce construction costs over time.

5.5.2 Rip Rap Armor Sizing

Armor sizing for shoreline slope protection is critical to the success and longevity of a structural design. Appropriate rip rap sizing analysis is relevant to six sites:

- Ventura Cove Park,
- Vacation Island SW,
- Vacation Island NW,
- Vacation Island NE (West of Ingraham St),
- Crown Point, and
- De Anza Point.

The stability of the armored slopes was evaluated using the Coastal Engineering Manual (CEM) Part VI, Chapter 5 equations for median stone mass (M_{50}), as follows:

$$M_{50} := \frac{\rho_s \cdot H_{10\%}^{3}}{K_{rr} \cdot \left(\frac{\rho_s}{\rho_w} - 1 \right)^{3} \cdot \cot\alpha}$$

Where, $H_{10\%}$ is the wave height exceeded by 10% of incoming waves, ρ_s is the mass density of rock, ρ_w is the mass density of water, cot(α) is the rock slope, and K_{rr} is the rip rap stability coefficient for breaking waves (USACE 2003). The design wave height and location for each site was determined from the Design Wave Analysis performed in Section 3.6.4.

The appropriate median stone mass was calculated to be approximately 50-100 pounds. However, site observations have indicated that existing rip rap is undersized at the project sites. Pountney Associates (1994 and 1998) restored shorelines with import rip rap of a minimum mass of ½-ton. This rip rap size design was driven by considerations of public safety, anticipating the possibility that the public may walk on rip rap. Following the example of these projects, rip rap size is recommended to have a minimum mass of ½-ton.

5.5.3 Cobble Berm

The use of cobble for shore protection has been studied and experimented within the past. Conclusions have been gathered that are important to the feasibility of a cobble berm proposed for several Mission Bay shorelines, described below:

- Performance of Cobble Berms in Southern California (Everts & Eldon 2002)
    - This article focuses on the performance of the naturally-occurring cobble berm on beaches north and south of the Batiquitos Lagoon inlet. The cobble berm at these locations showed an out-of-phase seasonal fluctuations in sand and cobble. Specifically, during the winter, the sand retreated from the shoreline and the cobble accumulated, whereas the contrary occurred during the summer. The long-term change in the volume of cobbles may be inversely proportional to the volume of sand in the littoral cell. The cobble berm accreted during the strongest El Niño winter in the 20th Century and a very intense storm in 1988. The study found that a comparatively small volume of cobbles with a relatively small footprint is needed to provide the same level of protection as a large volume of sand.
    - Although cobble berms have performed well in Southern California, there is a lack of quantitative design guidance for their use for coastal protection on a sandy coast. For example, the optimum void ratio has not yet been determined; however, a few design elements have been determined. Larger clasts require less volume to provide coastal protection due to the decreased tendency to mix with sand. Higher cobble berms provide greater protection from property flooding; however, lower berms allow for some overwash that can be beneficial to stabilization. One way to optimize both flood protection and stability is to increase the width of the cobble berm
- Alternative Shore Protection Strategies (Dare 2003)
    - Cobble berms are inexpensive to construct, natural in appearance, offer shoreline protection, and are flexible under the attack of waves. Storm waves can turn cobbles into projectiles that can result in damage to landside properties; however, the relatively protected nature of Mission Bay limits maximum wave heights. Other considerations including cobble berms offer less protection than a traditional revetment or seawall, require maintenance, and do not provide the same protection as a sandy beach.
- Surfer's Point – Cobble Berm Test Section (City of San Buenaventura 2003)
    - A cobble berm test section was constructed and monitored at Surfer's Point prior to the project being fully constructed. The test was conducted in September 2000. Two sections of varying berm face slopes were constructed with cobble from the Ventura River for a performance comparison. The section with a 5:1(H:V) slope held shape throughout the winter storms, whereas the section with a 3:1 (H:V) slope berm face flattened out. A 5:1 (H:V) slope was recommended for the project's berm face for stability.
    - Given the success of the Surfer's Point project, the City extended the cobble berm feature along 800 feet of shoreline to the east of the initial project. The project's goal was to effectively widen the beach and protect the bike path and other infrastructure from costly coastal damage. The project entailed the placement of 4,800 cy of cobble and 1,000 cy of sand topping. In addition, existing concrete and other debris encountered by this work would be removed (Figure 11). The project is recognized as a temporary fix (assumed approximately 10 years) that will require periodic maintenance in the form of future cobble nourishment (venturariver.org).
    - Design considerations for gravel, cobble, and/or boulder (gcb) berms are provided for the Surfer's Point Project through analysis of five naturally-occurring, prototype berms (Del Mar, Cardiff, Batiquitos Lagoon, South Carlsbad, and Emma Wood State Beach). Characteristics such as the crest

elevation, gcb clast size, bermface slope, porosity, and bermface to shore platform were analyzed relative to the prototype berm's short-term and long-term response to a wave climate. A summary of the study's findings are as follows:

- Clast size – Berm stability increases with clast size.
- Size distribution – A more uniform gcb size is more stable than a wide range of sizes.
- Berm porosity – The berm should be limited to cobbles and/or boulders without including sand or gravel to promote water infiltration.
- Crest elevation – Allowance of some overtopping during the most extreme wave events increases the stability of the berm.
- Base elevation of the berm – The lower surface of the berm should be at or below the scour limit of the fronting shore platform. If this scour limit cannot be meet, a scour apron should be placed in front of the berm to prevent undermining.
- Compatibility with sand replenishment – The gcb is not incompatible with sand replenishment; however, the sand should not be placed atop the berm.

  - The study finds that a comparatively small gcb volume and footprint is needed to provide the same level of protection as a large sand replenishment. Cobble berms are commonly associated with sandy beaches in Southern California and thus would be compatible for artificial use in the region.
  - Cobble berm design was construction of an approximately 1800 foot long, 94 to 110 foot wide (at base), 13.5 ft. high cobble berm consisting of approximately 33,000 cu. yds. of cobble; placement of approximately 27,500 cu. yds. of sand to provide infill and backfill for the cobble berm; placement of an additional approximately 16,500 cu. yds. of sand to create a vegetated sand dune above the berm. Cobble volume per linear foot calculates to approximately 18 CY/lf.

- Design with Nature (Komar & Allen 2010)
  - The study discusses the performance of a cobble berm and dune constructed in 2000 at Cape Lookout State Park, Oregon. The design consisted of a cobble berm and high vegetated back dune reinforced with sand-filled geotextile bags. Construction monitoring of the berm and dune showed the crest height to be approximately 3.3 to 6.6 feet below the recommended elevation that was intended to prevent wave overtopping. Although the northern end of the design was overtopped multiple times, the berm and dune have generally remained stable and have effectively protected the campground backing the dune.
  - Long-term monitoring of the project has shown a large reduction in the volume of cobbles following winter storms, as well as loss of sand and vegetation cover of the foredunes. The dune was nourished with sand in the summer of 2008 and the need for maintenance of the dunes were evident a decade after construction. Since then, it has been recommended to raise the dunes to the suggested elevation.

Cobble berm specifications shall consider the following:

- Construction of cobble berm could result in settlement of approximately 0.5 – 1.0 ft. Therefore, overbuilding of cobble berm crest by such amounts may be reasonable.
- Cobble material is defined as rounded stone with a diameter of 64 – 256 mm, or 2.5 – 10 in. (Wentworth, 1922). Potential sourcing of cobble material can be found at:
  - San Diego County beaches, especially during erosive winter beach seasons when sandy material is naturally washed offshore.

  - West Coast Sand & Gravel Inc, where 1.5 – 3 inch river rock and 2 – 4 inch cobble are available for purchase.
  - Other quarries may have available cobble such as Ortega Rock Quarry and Vulcan Materials Company
- Due to the limited availability of cobble material, it may be preferable to construct cobble berm with a 2-ft overlayer of cobble, underlain by a standardized material such as Caltrans Backing No. 3, which is composed of a majority of 5 lb rock (Caltrans, 2000).
- The cobble berm slope that faces incident wave direction will experience the highest energy and may benefit from construction at a gentle slope.
- Cobble berms have been preliminarily designed with the following dimension:
  - Crest Elevation = +4 ft NGVD29 (i.e., 1-foot above MHHW)
  - Crest Width = 20 feet (to facilitate on-crest vehicle access during construction, and to promote berm stability)
  - Slope = 4:1 on foreslope; 3:1 on backslope
  - Rock Size = ~2.5 – 10 inches for outer cobble layer; Caltrans Backing No. 3 for underlayer

5.5.4 Oyster Restoration

Two oyster species are prolific along the west coast of the United States: Pacific oyster and Olympia oyster (Bulseco 1982). The Olympia oyster is the native oyster to the west coast and is the smaller of the two species. The Pacific oyster was introduced to the west coast for harvesting purposes due to its rapid growth, large size, and ability to withstand high energy marine environments (Peter-Contesse and Peabody 2005).

The following characteristics constitute the optimal oyster restoration site (NOAA and NMFS 2017):

- Oyster reef elevations should lie in shallow subtidal and intertidal areas.
- Reef height should be at least an average of 12 inches higher than the surrounding substrate with no portion of the reef less than six inches.
- Oyster restoration sites should be located in areas where shellfish populations have historically existed.
- If oyster recruitment rates are low at the restoration site, the transplanting of seed oysters or oyster spat may be necessary.
- Water should be brackish waters with an average salinity concentration between 23 and 35 parts per thousand (ppt). For reference, open ocean salinities typically range between 32 and 37 ppt.
- Sites should have adequate water circulation. The ideal flow of water over an oyster bed is steady and non-turbulent.
- Sites should not be selected if they exhibit extremely low dissolved oxygen concentrations or periods of hypoxia.

Oyster restoration of the two species is specified at the following optimal elevations (Tronske, et al. 2018):

- Olympia Oyster – 0 to +1 ft MLLW
  - Unlikely to recruit above +2.3 ft MLLW
- Pacific Oyster – +0.7 to +3.9 ft MLLW
  - High density Pacific oyster observed in San Diego Bay at +1.3 to +3.3 ft MLLW (Merkel & Associates et al. 2015)

Oyster reefs can be designed with several material types including reef balls, oyster shells (i.e., cultch), and rip rap, as described below.

Oyster reef balls can provide a living breakwater and shoreline protection. Reef ball modules are concrete structures designed to be a foundation for oysters (Figure 5-5). Use of reef balls is prominent on the East Coast and has been implemented in one location on the West Coast in San Francisco Bay.



Figure 5-5. Reef Ball Project in San Francisco Bay (www.thewatershedproject.org)

Oyster shells are another common material for oyster reef construction. Oyster shells can be implemented in many forms including caged cultch, bagged cultch, or loose cultch. The San Francisco Bay Living Shorelines Project evaluated different methods and found bagged shells to be most effective, reducing wave energy from 30-50%. The three methods of cultch reef construction are described below:

- Caged cultch – Cages are similar in design to crab traps. Cages are filled with cultch to form oyster reef building blocks that can easily be anchored. This technique is especially beneficial in areas of high wave energy and has been used where shoreline protection is a project goal. As a part of the Southern California Wetlands Recovery Project, the Alamitos Bay Oyster Restoration Project implemented caged oyster restoration (Figure 5-6).



Figure 5-6. Caged Cultch – Solent Oyster Restoration Project (www.solentforum.org)

- Bagged cultch – Bagged cultch uses aquaculture grade mesh (≤1 inch mesh size) or coconut fiber bags to create bags that are filled with cultch material. This design is often used in softer sediments and can remain stable in areas with higher wave velocities. One example of bagged cultch implementation is the Upper Newport Bay Living Shorelines Project (Figure 5-7).



Figure 5-7. Bagged Cultch – Upper Newport Bay Living Shorelines Project (www.coastkeeper.org)

- Loose cultch – Loose cultch is placed either directly on the estuary floor or on top of core reef material to create a cultch veneer. This method is used most commonly for oyster reef enhancement and is used primarily for large subtidal oyster reef restorations. Loose shell may not be suitable in areas with moderate to high wave energy where cultch can easily be redistributed or in areas where there is a high risk of burial. Large volumes of shell are typically distributed from a barge but may also be placed by hand for smaller projects (Figure 5-8).



Figure 5-8. Loose Cultch – Alamitos Bay Oyster Restoration Project (www.scwrp.org)

- Rip rap – Rip rap material can function not only as shore protection but as a base for oyster recruitment. Oysters can currently be found on rip rap in several locations along Mission Bay. Within San Diego Bay, the Olympia oyster is only found to grow on man-made hardened structures such as rip rap. The two species can be found in the same horizontal footprint, displaying vertical zonation according to their optimal elevations (Figure 5-9). San Diego Bay oyster restoration concluded that their research results, "strongly suggest that settlement and growth rates for *O. lurida* [Olympia oyster] are sufficient to support populations of this species where appropriate hard subtrates are present" (Merkel & Associates et al. 2015).



Figure 5-9. Oyster Recruitment on Rip Rap – San Diego Bay, CA (Merkel & Associates et al. 2015)

5.5.5 Vegetated Dune Restoration

Vegetated sand dunes are proposed at the toe of De Anza Point, capitalizing on sediment transport dynamics as sediment has been observed to accrete in this area. Vegetated sand dunes should be constructed on the inland side of a wide sandy beach and can protect against the high SLR projection. Vegetated sand dunes offer a living shoreline form of coastal protection, by raising shoreline elevations to minimize inland flooding, capturing wind blown sand, stabilizing sandy shorelines with rooted vegetation and installed fencing, and preserving a bank of sand in case of an extreme erosive event. They can provide habitat for threatened and engangered avian species such as the western snowy plover and least tern. Examples of successful vegetated dunes within San Diego County include that at the Tijuana River Estuary, Coronado Beach, San Diego River Inlet, and the recently constructed Cardiff Living Shoreline Project at Cardiff State Beach in Encinitas, CA.

Vegetated sand dunes could be constructed at all beach nourishment sites should wide beach widths be maintained. Dunes are not proposed for the initial project construction to preserve the extensive beach access and viewshed, but as sea level rises and priorities shift towards flood control, sand dunes will contribute to creating an "exoskeleton" around the bay to buffer development from flooding while maintaining the close proximity for the public to water access. Dune heights must be above MHHW and may block the viewshed of residents; however, examples on the east coast of the U.S. are known for large dunes, which help protect against flooding while sacrificing viewshed.

5.5.6 Wetland Restoration

The preliminary design of De Anza Point proposes a living shoreline and wetland restoration from the mouth of Rose Creek towards the toe and laces of the "boot." The project is intended to create and protect a wide range of natural recreation and habitat. Wetland habitat will also serve to improve water quality. A fraction of Rose Creek stormflows spread into the marsh area, capturing sediment and allowing water infiltration and filtering through the marsh. Additionally, runoff from upland park improvements will be partially directed into the wetland to improve runoff infiltration.

Design of De Anza Point living shoreline involved several considerations, including:

- Considerations of Rose Creek stormwater discharge for De Anza "heel" design. Initial design was concerned with extending the "heel" into Mission Bay due to potential erosion due to high velocity stormflows. However, the Mission Bay Hydrology Report results (M&N 2019) suggested that this is not a great concern due to the natural westward veering of Rose Creek flows. Additionally, the inclusion of hard armoring of the "heel" will provide wave and current protection. Therefore, the "heel" of De Anza Point has been designed to extend into Mission Bay in accordance with the De Anza Cove Amendment to the Mission Bay Park Master Plan (in progress) conceptual land use plan.
- Considerations of hard armoring oyster habitat on the "heel" (i.e., reef balls or rip rap) and soft armoring oyster habitat on the "sole" and "laces" (i.e., bagged or loose cultch).
- Considerations of southwest channel elevation and width to allow for better tidal flushing.
- Considerations of the number of finger channels in coordination with Project Biologist.
- Considerations of transitional marsh acreage to account for landward migration of habitat with SLR.
- Incorporate upland habitat to facilitate pedestrian trail and viewpoint in accordance with the De Anza Cove Amendment to the Mission Bay Park Master Plan (in progress) conceptual land use plan.
- Considerations of sand dune at the "toe" as an area for marsh to expand into as sea level rises. Also considered as a region to capture and store sand for future restoration efforts.

The habitats proposed for wetland restoration include subtidal, mudflat, low-marsh, mid-marsh, high-marsh, transitional, and upland habitat. A water level analysis was performed in support of the Hydrology Report for the Mission Bay PEIR (M&N 2019). Tide gauge data was retrieved from De Anza Cove during the fall of 2018 through winter of 2018/2019. Based on water level analysis, inundation frequency was calculated in order to identify the proper elevation of proposed habitats (Table 5-7).

Table 5-7. Habitat Design Elevations – De Anza Point

Habitat Type	Common Vegetative Type	Inundation Frequency	Design Elevation (ft, NGVD29)
Subtidal	Eelgrass	100%	< -3.75
Mudflat	Unvegetated	100 to 40%	-3.75 to 1.2
Low-Marsh	Cordgrass	40 to 20%	+1.2 to 2
Mid-Marsh	Pickleweed/Salt Marsh	20 to 5%	+2 to 3.75
High-Marsh	Salt Marsh	0 to 5%	+3.75 to 4.4
Transitional	Coastal Sage Scrub	0%	+4.4 to 6.4
Upland	Coastal Sage Scrub	0%	> +6.4

5.6 History of Project Considerations

Several concepts were developed at each shoreline restoration site; the general characteristics of these are described below. The following focuses on concepts that were not carried forward to 30% design. For a description of the concepts as carried forward, see Section 4.1.

5.6.1 Bonita Cove

Two concepts were considered at Bonita Cove as follows:

- Concept 1 proposed to relocate the sidewalk inland and nourish the beach. Relocating the sidewalk up to 30 ft inland would alleviate the immediate coastal erosion threats of undermining infrastructure. Secondly, a 100 ft wide beach was proposed to advance the land at the San Fernando Place headland.
- Concept 2 proposed to relocate the sidewalk inland, nourish the beach, and construct a submerged reef. As in Concept 1, the relocated sidewalk would alleviate immediate infrastructure vulnerability, and the beach nourishment would advance the shoreline to protect the San Fernando Place headland. The added component of a submerged reef provides added shore protection and natural habitat. A submerged reef would act as a retaining structure, protecting beach nourishment sand from being transported out into deeper water of Bonita Cove and maintaining the protective beach for a long period of time. Additionally, the submerged reef would be designed to dampen incoming wave energy, which is believed to be the source of erosion. The submerged reef can be constructed of hard materials, interspersed with ECOncrete or similar materials that promote oyster growth. Landward of the reef, silt material would be used as backfill, creating a low-profile mudflat, creating new habitat in Bonita Cove.

Ultimately, in discussion with the City, a revised version of Concept 2 was carried forward for design. The oyster habitat function of the submerged reef was eliminated due to the large number of wading pedestrians at Bonita Cove who would be at risk of injury among oyster beds. Additionally, a sand retention groin was considered at the Bonita Cove site as well but was dismissed due to uncertainties of alongshore sediment transport directions and volumes.

5.6.2 Ventura Cove Park

At Ventura Cove Park, a concept was proposed to redistribute some of the newly placed large riprap from the crest to where the 4-ft scarp exists. This would lower the crest of the recently repaired area from +6 ft NGVD29 down to +4 or +5 ft NGVD29 and bring the damaged shoreline up to +4 or +5 ft NGVD29. This concept does not include recreational improvements, habitat improvements, or address the upland erosion risk present throughout the rest of the site. This concept was not selected, in part because it disrupts the previously improved shoreline reach, potentially exposing unanticipated vulnerabilities. Additionally, it is considered a low-cost solution that addresses an immediate need, as opposed to the concept carried forward which is anticipated as a longer-term solution.

5.6.3 Vacation Island Southwest

At Vacation Island SW, a concept was proposed to repair the revetment up to +6ft NGVD29, construct oyster habitat at the revetment toe, and create a stormwater treatment ditch behind the crest of the revetment. The stormwater toe ditch would direct runoff coming from the park and the west parking lot before reaching the bay, preventing backslope erosion. The oyster habitat would consist of rocky substrate, oyster bags, and/or reef balls. In some cases, existing, undersized riprap can be reused for the creation of oyster habitat. This concept does not contain specific features to improve recreational uses at the park; however, the repaired revetment will improve the appearance of the shoreline. Ultimately, the concept carried forward follows a similar approach, while incorporating a raised revetment crest elevation to account for SLR, and improved upland park uses with the import of sandy material.

5.6.4 West Sail Bay

One concept was developed at West Sail Bay. This concept proposed beach nourishment in two locations. The first location is identical to the location carried forward for design. The second location proposed beach nourishment in

the southern cove created by Santa Clara point. This concept was eliminated due to its reach outside of the project footprint defined by the City.

5.6.5 Crown Point

Two concepts considered but not carried forward for design are as follows:

- Concept 1 contains three components: a rock revetment, a nourished beach, and a seawall façade. The rock revetment would extend south and east of the the existing seawall and would be backfilled by a nourished beach, working together to create what is called a perched beach. The rock revetment provides coastal erosion protection from waves and currents, while protecting the upland beach fill that provides open space for the public. The perched beach is a form of protected beach access; however, it limits access to the water. The seawall façade is proposed along the existing seawall to use ECOncrete, or similar, which is an environmentally sensitive concrete solution. It is used to promote marine life growth on urban coastal infrastructure.
- Concept 2 is a soft-solution to coastal erosion south of the seawall that has two components: beach nourishment and a cobble foundation. The cobble foundation is proposed as an initial layer of material of large grain size that can maintain its general position on a beach under large wave events. The cobble foundation is proposed to secure a beach footprint that is approximately 75 ft wide and protects the pedestrian pathway and upland bluffs from undermining. Secondly, beach nourishment is proposed to cover the cobble foundation, providing further wave protection and improving public beach and water access. Beach nourishment has the ability to be resilient to SLR; as the water level rises, the beach profile will retreat inland and rise in elevation. A wide beach can provide protection for several years but will endure continuous erosion and will need to be re-nourished in the future.

After discussion with the City, the priority area for improvements was identified as the erosion hotspot south of the existing seawall. Discussions with experienced Park staff demonstrated that the narrowing of the beach in the erosive area is likely not only an "end effect" of the transition from seawall to beach, but a result of wave, tide, and current patterns in the area which contribute to the sand loss. It was determined that extending the existing seawall along the erosive area would be the preferred approach to protect upland assets and maintain aesthetic and public use consistency in the area.

5.6.6 Vacation Island Northwest

At Vacation Island NW, a considered concept was the construction of a breakwater and beach nourishment. A shore-parallel breakwater reduces sand migration by providing shelter from wind-waves, wakes, and potentially tidal currents. This decrease in energy on the landward side of the breakwater also promotes sediment deposition and formation of a salient-like feature adding to the footprint of the sandy beach and providing recreational benefits. However, the breakwater concept would potentially impede excessively on open water boat access areas. Additionally, due to the observed bi-directional sediment transport, a beach fill and sand retention groin project was considered as a viable solution. Coarse sand nourishment is intended to widen and elevate the beach. This concept was carried forward to restore and stabilize the sandy beach along the northwest corner of Vacation Island.

5.6.7 Vacation Island Northeast (West of Ingraham St & Ski Beach)

West of Ingraham Street

West of Ingraham Street, only one concept was proposed for design. Development of this concept was addressed in coordination with similar sites in Mission Bay: Ventura Cove Park and Vacation Island SW.

Ski Beach

Two concepts were considered at Ski Beach, as described below:

- Concept 1 for Ski Beach proposes a coarse beach sand nourishment underlain by a cobble foundation. This concept is intended to restore sandy beaches along the northeast corner of Vacation Island to historical widths. The use of coarse sand for replenishment of the beach favors the longevity of the nourishment, while the underlaying cobble ensures a stable upland footprint, providing additional buffer against flooding and shoreline erosion. Widening of the sandy/cobble beach provides recreational benefits.
- Concept 2 for Ski Beach proposes a coarse beach sand nourishment with a sand retention groin to the south. This concept is intended to restore and stabilize sandy beaches along the northeast corner of Vacation Island. In addition to coarse sand beach nourishment, installation of a shore normal structure favors retention of nourished sand as it reduces its migration to the south. This concept could provide additional recreational opportunities in the form of a boardwalk on top of the sand groin.

Ultimately, in discussion with the City, a revised version of Concept 1 was carried forward for design. The cobble foundation was relocated to the toe of beach nourishment. The sand retention groin contained uncertainties of alongshore sediment transport directions and volumes, and is instead considered as an adaptive measure.

5.6.8 De Anza Point and Cove

De Anza Point is designed in coordination with the City of San Diego with consideration of the ReWild Mission Bay: Wetlands Restoration Feasibility Study Report (Everest 2018). De Anza Cove was designed to be in accordance with the Mission Bay Park Master Plan (2002) and De Anza Cove Amendment to the Mission Bay Park Master Plan (in progress) conceptual land use plan.

5.7 City Professional Standards and Mission Bay Masterplan Consistency

Concept development, design, and permitting of restoration of shoreline projects must comply with City standards and Mission Bay Park Masterplan (2002). An inventory of relevant standards, potential conflicts, and potential resolutions to such conflicts, is provided in Table 5-8.

Table 5-8. Inventory of Relevant Standards

Source	Standards and Recommendations	Compliance / Potential Conflict	Implementation / Solution
Mission Bay Park Master Plan	It is broadly recognized that the Park's economic and recreational future depends on the quality of the bay's water. In response to fluctuating quality of the bay waters, this Plan proposes a comprehensive set of measures involving state-of-the-art biological, mechanical, public education, and recreation management programs.	Shoreline concepts are developed with the general goal of improving or maintaining water quality.	**Improvements** - Oyster Habitat - Wetland Habitat **No Effect** - Beach Nourishment - Cobble Berm - Rip Rap Structures
	The turf and beach areas along the Park's shorelines support the most intensive public recreational activity in Mission Bay. These areas draw users from throughout the San Diego region. With the County's population on the rise, the capacity of the park to accommodate this activity must be commensurately increased.	Shoreline concepts are developed with the general goal of improving or maintaining public recreational activity.	**Improvements** - Beach Widening - Shore Protection - Natural Recreation
	The rise of environmental awareness in recent decades has been paralleled by an increase in the desire for more natural recreation venues. The telephone survey conducted as part of the Master Plan Update revealed that a majority of San Diego residents would like to experience parts of Mission Bay in a more natural condition.	Shoreline concepts are developed with the general goal of improving or maintaining the natural condition of Mission Bay.	**Improvements** - Oyster Habitat - Wetland Habitat - Dune Habitat - Soft Shoreline Protection
	In response to an extraordinary level of public demand for preservation and enhancement of natural resources, this Plan includes a number of proposals aimed at improving the Park's wildlife habitats.	Shoreline concepts are developed with the general goal of improving or maintaining the natural condition of Mission Bay.	**Improvements** - Oyster Habitat - Wetland Habitat - Dune Habitat - Soft Shoreline Protection
	Rose Creek Outfall: 30 to 50-acre dredge area. Following this Plan's land use and recreation and environmental objectives, the creation of a new marsh may involve the removal of 30 to 50 acres of upland area depending on the ultimate disposition of the De Anza SSA and State and Federal Agency mitigation requirements.	In coordination with the De Anza Cove Amendment to the Mission Bay Park Master Plan, De Anza Point shoreline restoration proposes the construction of natural recreation.	**Improvements** - Oyster Habitat - Wetland Habitat - Dune Habitat

Source	Standards and Recommendations	Compliance / Potential Conflict	Implementation / Solution
Mission Bay Park Master Plan (Continued)	The SSA shall not be developed to the detriment of existing and/or future adjacent habitat areas. Foremost in consideration should be the extent to which the SSA can contribute to the Park's water quality. In fact, additional wetland creation must be considered as part of the SSA.	In coordination with the De Anza Cove Amendment to the Mission Bay Park Master Plan, De Anza Point shoreline restoration proposes the construction of natural recreation.	**Improvements** - Oyster Habitat - Wetland Habitat - Dune Habitat
	The SSA should facilitate the implementation of hydrologic improvements aimed at safeguarding the viability of marsh areas in its vicinity.	In coordination with the De Anza Cove Amendment to the Mission Bay Park Master Plan, De Anza Point shoreline restoration proposes marsh habitat design.	**Improvements** - Subtidal Channels - Wetland Habitat
	De Anza Channel and Cove: A channel through De Anza Point should be implemented to improve the Cove's water quality.	De Anza Boot restoration is restricted to the shoreline; therefore, it cannot incorporate a channel through De Anza Point.	**Solution** - Coordinate future De Anza Point design with the conclusions of De Anza Cove Amendment to the Mission Bay Park Master Plan
	In pursuit of a balance between environmental, commercial, and public recreational interests in the De Anza SSA, filling part of the Cove's west end should be considered up to 150 ft out from the current shore. This would shift the SSA eastward by the same distance, allowing for a larger marsh area at the Rose Creek Outfall and a more concentrated development area.	In coordination with the De Anza Cove Amendment to the Mission Bay Park Master Plan, De Anza Point shoreline restoration proposes to extend the “heel” westward, expanding marsh area at the Rose Creek Outfall.	**Improvements** - Wetland Habitat - Oyster Habitat

Source	Standards and Recommendations	Compliance / Potential Conflict	Implementation / Solution
Mission Bay Park Master Plan (Continued)	Occasional beach replenishment is needed in Mission Bay Park. The additional sand is needed after a storm event has carried away an existing beach. Currently, additional sand is also placed on some beaches where sand has been lost by erosion before summer to accommodate the increase in visitor activity. The Mission Bay Park Restoration and Stabilization Project Plan proposes softscape methods which would reduce the frequency of need for beach replenishment. CCC and U.S. Army Corps of Engineers (USACE) permits are required for beach replenishment activity.	Shoreline concepts are developed with the general goal of improving or maintaining existing beaches.	**Improvements** - Beach Widening - Sand Retention Measures - Soft Shoreline Protection
	The Mission Bay Park Shoreline Stabilization and Restoration Plan (SSRP), adopted by City Council in May of 1990, prescribes several types of shore treatment for the park, ranging from rock revetment to sand beach. These treatment proposals aim to reduce the amount of sediment generation from within Mission Bay while helping restore the stability of the bay's shoreline for navigation and recreation as illustrated on Figure 20.	Shoreline concepts developed are in general conformance to Mission Bay proposed shorelines. Non-conformance occurs at De Anza Point. However, the De Anza Cove Amendment to the Mission Bay Park Master Plan proposes a revised shoreline with which this restoration of shoreline project conforms.	No conflict.
	300-ft depth is established in the Design Guidelines component of this Plan as the primary zone of water influence. Within this zone, priority should be given to passive recreation uses or uses compatible with the water setting. Conversely, land uses which restrict public access and enjoyment of the shore should be discouraged and avoided to the greatest extent possible.	Shoreline concepts are developed with the general goal of improving or maintaining public recreational activity.	**Improvements** - Beach Widening - Shore Protection - Natural Recreation

Source	Standards and Recommendations	Compliance / Potential Conflict	Implementation / Solution
Mission Bay Park Master Plan (Continued)	The Master Plan Update recommends the preservation of all of the Park's natural bluff areas, namely the bluffs on Riviera and Crown Point Shores.	Protection of natural bluff areas at Crown Point will be improved by the proposed shoreline restoration.	**Improvements** - Shore Protection
	Existing beach areas are recommended to be preserved, except for the small beach south of the Visitor Center, which the Plan envisions as marsh to help improve the water quality in that area of North Pacific Passage.	Shoreline concepts are developed with the general goal of improving or maintaining existing beaches.	**Improvements** - Beach Widening - Sand Retention Measures
	The Design Guidelines call for the park to be encircled by a more natural band of vegetation to emphasize its unique coastal setting. In Sail Bay and Mariner's Basin, the rustic perimeter is already provided by the open sand areas, which should be maintained.	Shoreline concepts are developed with the general goal of improving or maintaining the natural condition of Mission Bay.	**Improvements** - Beach Widening - Natural Recreation - Oyster Habitat
2018 City CADD Mission Bay Park Master Plan (Continued) Standards	The City uses the Bentley MicroStation as its basic CADD graphics engine, for engineering design and drawing production. If approved by the City, Design Consultants may use other industry standard CADD systems, such as AutoCAD, to produce hard copy or PDF files that can be transmitted appropriately to the Project Managers as submittals. However, for compatibility reasons, all electronic CADD file submittals must be created in MicroStation or an approved CADD system using City-specified seed files that will be uploaded into the City's CADD file management system and shall conform to the requirements set forth in these standards (https://www.sandiego.gov/publicworks/edocref/drawings).	M&N may submit final electronic CADD files in MicroStation.	No conflict.
City Stormwater Guidelines	Project plans to comply with The City of San Diego Storm Water Standards and the MS4 Permit.	M&N project plans to comply with City standards.	No conflict.

5.8 ADA and Title 24

The Americans with Disabilities Act (ADA) of 1990 is a civil rights law prohibiting discrimination against individuals with disabilities. With respect to the Restoration of Shoreline project, ADA requirements pertain to the proposed pathway realignment at Bonita Cove. No changes to pathway type, width, or accessibility are proposed. Therefore, the Restoration of Shoreline project is anticipated to be in compliance with ADA requirements.

Title 24 is a California Building Standards Code establishing requirements for "energy conservation, green design, construction and maintenance, fire and life safety, and accessibility" of a building's "structural, mechanical, electrical, and plumbing systems." No buildings are proposed as a part of the Restoration of Shoreline project and, therefore, Title 24 requirements are not applicable.

6.0 References

The Bodhi Group. 2018. Draft – Geotechnical and Geologic Hazard Evaluation – Mission Bay Park Improvements Projects – San Diego, California. Prepared for Dudek. December 2018.

The Bodhi Group. 2019. Cone Penetration Test Study – Mission Bay Park Improvements Projects – San Diego, California. Prepared for Dudek. May 2019.

Bulseco, A., 1982. A synopsis of the Olympia Oyster (Ostrea lurida). Aquaculture, 262, pp.63-72.

Caltrans, 2000. California Bank and Shore Rock Slope Protection Design, Practitioner's Guide and Field Evaluations of Riprap Methods. Prepared by State of California Department of Transportation, Engineering Service Center, Office of Structural Foundations, Transportation Laboratory. Prepared in Cooperation with the US Department of Transportation Federal Highway Administration. Third Edition, October 2000.

CCC (California Coastal Commission). 2018. California Coastal Commission Sea Level Rise Policy Guidance: Interpretive Guidelines for Addressing Sea Level Rise in Local Coastal Programs and Coastal Development Permits. California Coastal Commission, San Francisco, CA.

City of San Buenaventura, Public Works Department (Buenaventura). 2003. Surfers Point Managed Shoreline Retreat – Final Environmental Impact Report. Prepared with the assistance of Rincon Consultants. March 2003.

City of San Diego, 2019. Sea Level Rise Vulnerability Assessment - Draft. Prepared by ICF. December 2019.

City of San Diego, 2017. Transportation & Storm Water Design Manual, Drainage Design Manual (Drainage Design Manual). January 2017.

City of San Diego, August 2, 1994 (Amended July 9, 2002). Mission Bay Park – Master Plan Update.

City of San Diego, May 1990. Final – Mission Bay Park – Natural Resource Management Plan. Prepared for Park and Recreation Department by the Development and Environmental Planning, Planning Department, City of San Diego.

Curren, C.R., 1983. Mission Bay Harbor, California, Design for Wave and Surge Protection and Flood Control. Hydraulic Model Investigation (No. WES/TR/HL-83-17). ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MS HYDRAULICS LAB.

Dare, J. 2003. Alternative Shore Protection Strategies: Innovative Options and Management Issues. Marine Resources Management Program, College of Oceanic and Atmospheric Sciences, Oregon State University, Corvallis, OR. July 2003.

Everest, 2018. ReWild Mission Bay: Wetlands Restoration Feasibility Study Report. Prepared by Everest, San Diego Audubon Society, CA State Coastal Conservancy, and U.S. Fish & Wildlife Service. September 2018.

Everts, C.H., and C.D. Eldon. 2002. Performance of Cobble Berms in Southern California. Shore & Beach 5-14.

Group Delta Consultants, Inc., Pacific Southwest Biological Services, Inc., and Ogden Environmental & Energy Services, Co., 1992. Report of Findings – Mission Bay Beach Stabilization Sand Test Project – Mission Bay Park, San Diego, California – Resolution Nos.: 275666 and 275667. Prepared for Pountney & Associates, Inc. under contract to City of San Diego – Department of Parks and Recreation. March 13, 1992.

IPCC, 2013: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp.

Jacob, Paul. 2019. Personal Communication with M&N.

Kriebel, David L. and William N. Seelig, 2005. An Empirical Model for Ship-Generated Waves. Proceedings of the Fifth International Symposium on Ocean Wave Measurement and Analysis.

Komar, P.D. and Allan, J.C., 2010. " Design with Nature" Strategies for Shore Protection: The Construction of a Cobble Berm and Artificial Dune in an Oregon State Park. Puget Sound Shorelines and the Impacts of Armoring—Proceedings of a State of the Science Workshop.

Kopp, R.E., Horton, R.M., Little, C.M., Mitrovica, J.X., Oppenheimer, M., Rasmussen, D.J., Strauss, B.H. and Tebaldi, C., 2014. Probabilistic 21st and 22nd century sea-level projections at a global network of tide-gauge sites. Earth's future, 2(8), pp.383-406.

Melo, E. and Guza, R.T., 1991a. Wave propagation in jettied entrance channels. I: Models. Journal of waterway, port, coastal, and ocean engineering, 117(5), pp.471-492.

Melo, E. and Guza, R.T., 1991b. Wave propagation in jettied entrance channels. II: Observations. Journal of waterway, port, coastal, and ocean engineering, 117(5), pp.493-510.

Merkel & Associates, Inc, Environmental Science Associates, and California State University Fullerton. 2015. San Diego Bay Native Oyster Restoration Plan. Prepared for California State Coastal Conservancy and San Diego Unified Port District. May 2015.

Merkel & Associates, Inc, 2013. Mission Bay Park, 2013 Bathymetry and Eelgrass Inventory. Prepared for City of San Diego, Public Works, E&CP, AEP Division. Prepared by Merkel & Associates, Inc.

Moffatt & Nichol, 2019. Draft – Mission Bay Hydrology Study – Mission Bay PEIR. Prepared for the City of San Diego. April 5, 2019.

NOAA, 2019. NOAA Tides & Currents. www.tidesandcurrents.noaa.gov/.

NOAA and NMFS, 2017. Oyster Reef Restoration: Best Management Practices. https://sero.nmfs.noaa.gov/habitat_conservation/documents/bmp_oyster_reef_restoration_v20170308.pdf

NOAA, 2014. “The Importance of Eelgrass.” NOAA Fisheries West Coast Region, 4 Nov. 2014, www.westcoast.fisheries.noaa.gov/stories/2014/04_11072014_eelgrass_mitigation.html.

Ocean Protection Council (OPC). 2017. Rising Seas in California. An Update on Sea Level Rise Science. April 2017.

Ocean Protection Council (OPC), 2018. State of California – Sea-Level Rise Guidance, 2018 Update.

Peter-Contesse, T. and Peabody, B., 2005. Reestablishing Olympia oyster populations in Puget Sound, Washington.

Pountney Associates, 1988. Report of Findings – Mission Bay Shoreline Restoration and Stabilization Master Plan – Mission Bay Park San Diego, California Resolution No.: C-02554. Prepared by Pountney Associates. Prepared for City of San Diego Department of Parks and Recreation. December 19, 1988.

Pountney Associates, 1994. As-Built, Mission Bay Shoreline Protection Phase I, Mission Bay Park, San Diego, California. Prepared for the City of San Diego.

Pountney Associates, 1998. As-Built, Mission Bay Shoreline Protection Phase II and Phase III, Mission Bay Park, San Diego, California. Prepared for the City of San Diego.

Pountney Associates and ERC Environmental and Energy Services Co., 1990. Final Mission Bay Park Shoreline Stabilization and Restoration Project Plan. Prepared in association with Group Delta Consultants Inc, Van Dyke & Associates, and JBF & Associates. Prepared for City of San Diego. May 1990.

Rick Engineering, 2017. Plans for the Construction of Mission Bay Navigational Safety Dredging. Prepared By Rick Engineering Company. Prepared for the City of San Diego, Public Works. July 17, 2017.

Sorensen, R.M., 1973. Ship-generated waves. Adv. Hydrosci, 9, pp.49-83.

Sweet, W. V., R. E. Kopp, C. P. Weaver, J. Obeysekera, R. Horton, E. R. Thieler, and C. Zervas (2017), Global and regional sea level rise scenarios for the United States, Technical Report NOS CO-OPS 083, National Oceanic and Atmospheric Administration. USACE (U.S. Army Corps of Engineers). 1982. Hydrologic Analysis of Ungaged Watersheds Using HEC-1. Training Document No. 15. HEC TD-15. U.S. Army Corps of Engineers, Hydrologic Engineering Center, Davis, CA.

Tetra Tech. 1983. Water Quality Control Studies – Mission Bay Park. Prepared for City of San Diego. March 1983.

Tetra Tech. 1984. Mission Bay Park – Shoreline Erosion Study. Prepared for Park and Recreation Department, City of San Diego. May 1984.

Tronske, N.B., Parker, T.A., Henderson, H.D., Burnaford, J.L. and Zacherl, D.C., 2018. Densities and Zonation Patterns of Native and Non-Indigenous Oysters in Southern California Bays. Wetlands, 38(6), pp.1313-1326.

USACE, 2012. Chesapeake Bay Oyster Recovery: Native Oyster Restoration Master Plan – Maryland and Virginia. Prepared by U.S. Army Corps of Engineers – Baltimore and Norfolk Districts. September 2012.

USACE, 2003. Coastal Engineering Manual. EM 1110-2-1100. Part VI, Chapter 5, U.S. Army Corps of Engineers.

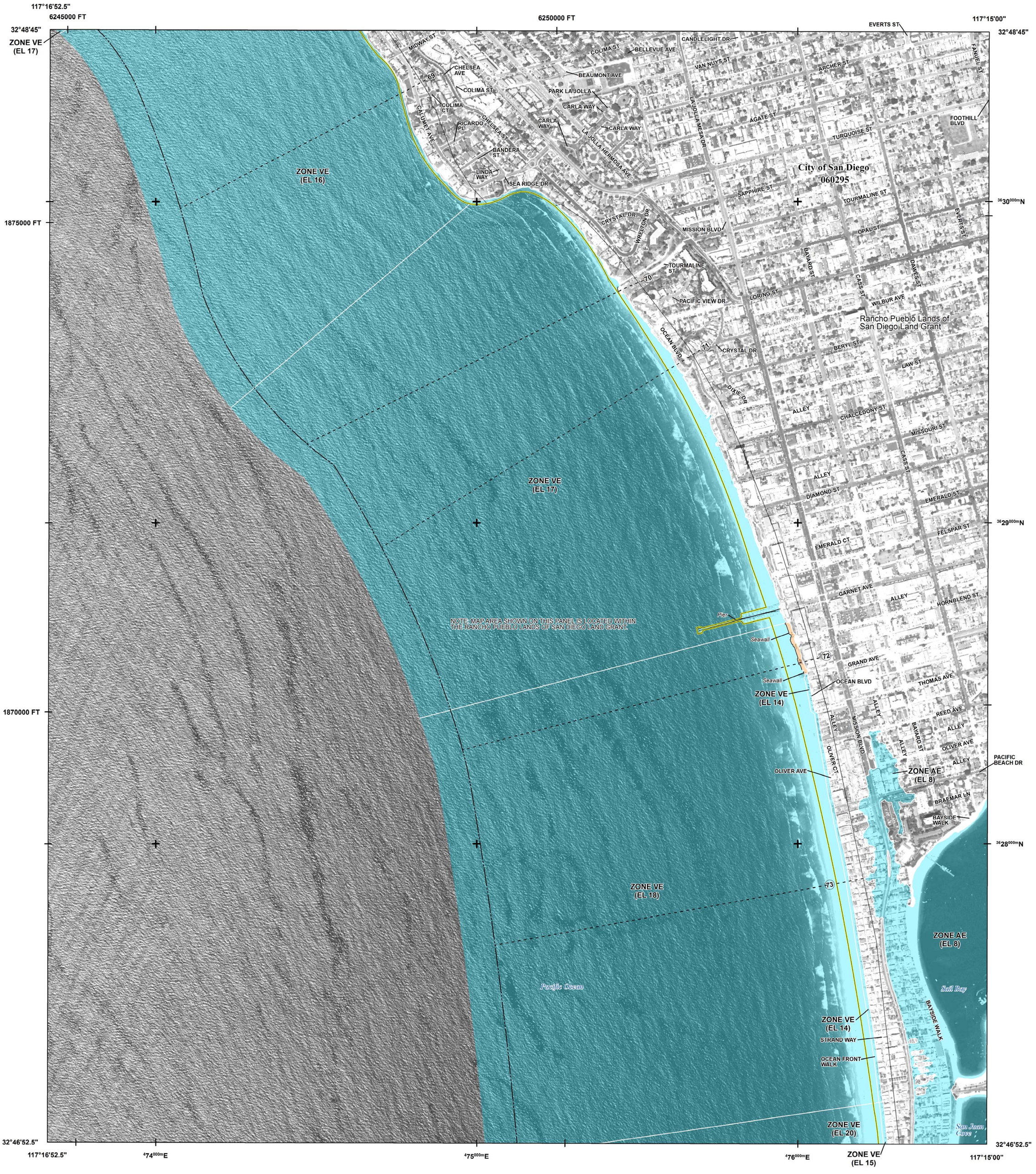
USACE, 2002. Coastal Engineering Manual. EM 1110-2-1100 (Part II), US Army Corps of Engineers, 30 Apr. 2002. P. II-7-55.

USGS, 2016. Coastal Storm Modeling System (CoSMoS) for Southern California, v3.0, Phase 2.

Verhey, H.J. and M.P. Bogaerts, 1989. Ship waves and the stability of armour layers protecting slopes. Delft Hydraulics Publication No. 428, November 1989. Paper presented at the 9th International Harbour Congress, Antwerp, Belgium, 20-24 June 1989.

Wentworth, C.K., 1922. A scale of grade and class terms for clastic sediments. The journal of geology, 30(5), pp.377-392.

A. FEMA Preliminary Flood Maps



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE) *Zone A,V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS

- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

- E 18.2 / 17.5 — Cross Sections with 1% Annual Chance Water Surface Elevation
- 8 — Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was derived from digital orthophotography collected by the U.S. Department of Agriculture Farm Service Agency. Department of Agriculture imagery was flown in 2016 and was produced with a 1-meter ground sample distance.

Coastal Base Flood Elevations shown on the map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Coastal flood elevations are also provided in the Coastal Transect Parameters table in the FIS Report for this jurisdiction. Elevations shown in the Coastal Transect Parameters table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on the FIRM.

SCALE

N

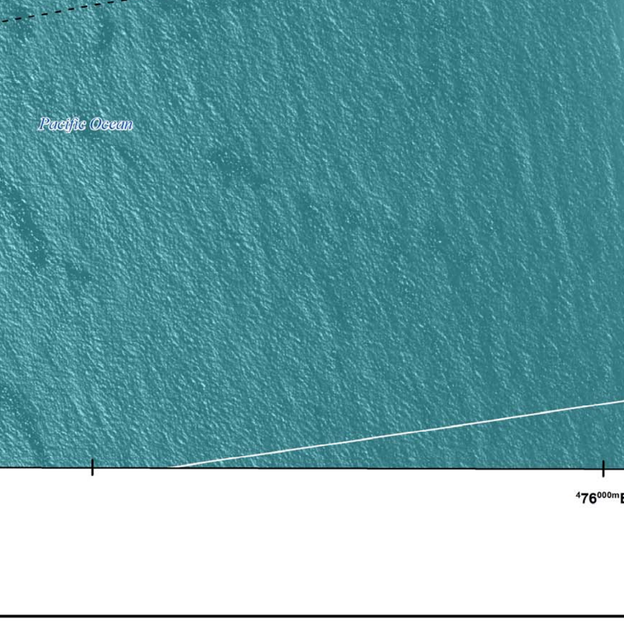
Map Projection:
Universal Transverse Mercator Zone 11N; North American Datum 1983; Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR



*PANEL NOT PRINTED

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA

and Incorporated Areas

PANEL 1592 OF 2375

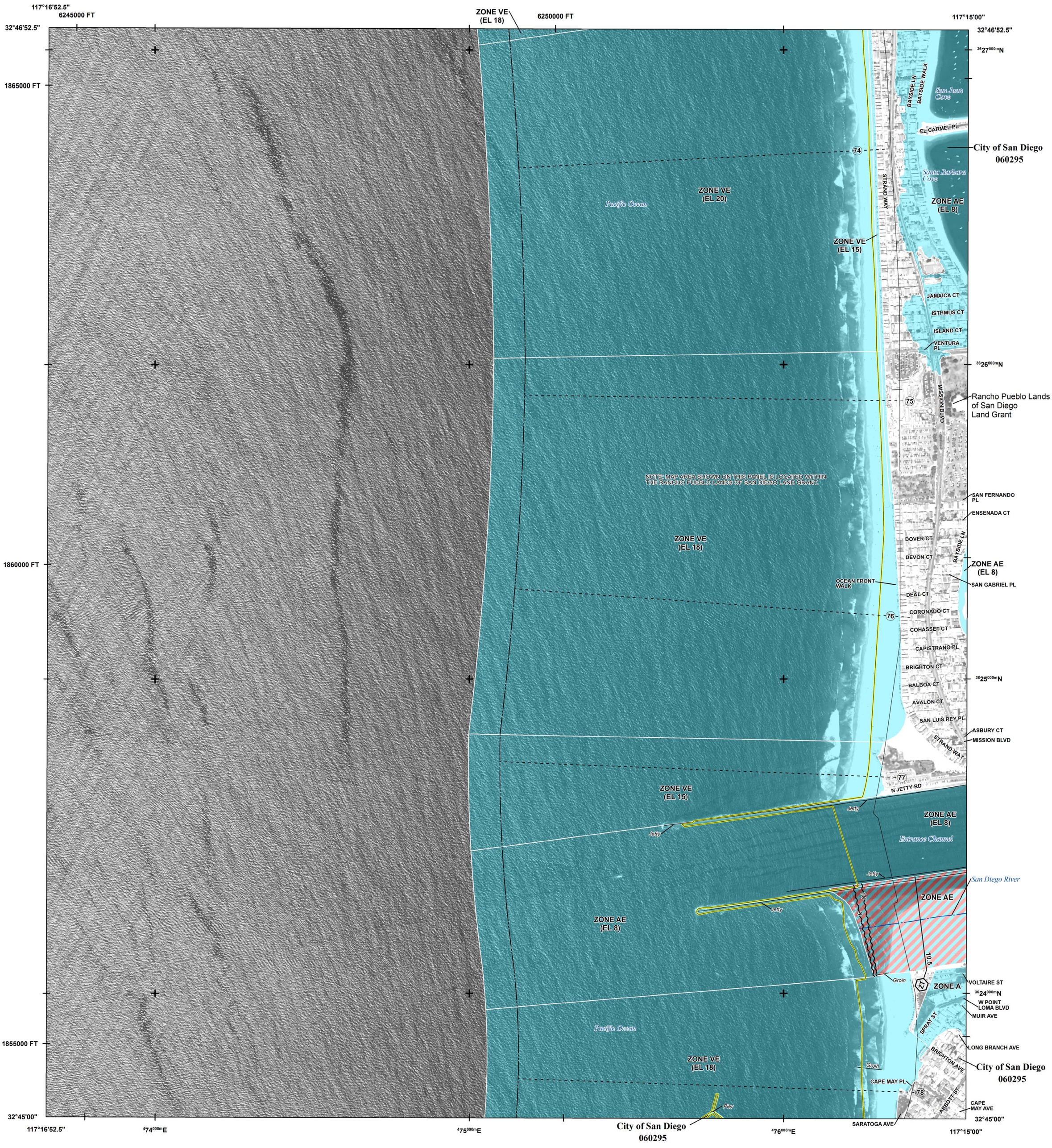
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
SAN DIEGO, CITY OF	060295	1592	H

VERSION NUMBER
2.3.3.3

MAP NUMBER
06073C1592H

MAP REVISED
DECEMBER 20, 2019



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE) *Zone A,V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS

- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

- E 18.2 / 17.5 — Cross Sections with 1% Annual Chance Water Surface Elevation
- 8 — Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was derived from digital orthophotography collected by the U.S. Department of Agriculture Farm Service Agency. Department of Agriculture imagery was flown in 2016 and was produced with a 1-meter ground sample distance.

Coastal Base Flood Elevations shown on the map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Coastal flood elevations are also provided in the Coastal Transect Parameters table in the FIS Report for this jurisdiction. Elevations shown in the Coastal Transect Parameters table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on the FIRM.

SCALE

N

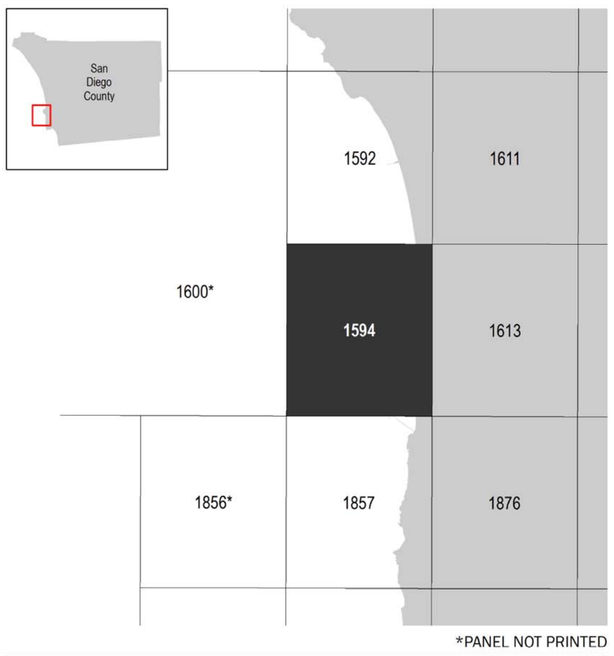
Map Projection:
Universal Transverse Mercator Zone 11N; North American Datum 1983; Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR



*PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA

and Incorporated Areas

PANEL 1594 OF 2375

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
SAN DIEGO, CITY OF	060295	1594	H

VERSION NUMBER
2.3.3.3

MAP NUMBER
06073C1594H

MAP REVISED
DECEMBER 20, 2019



SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTPS://MSC.FEMA.GOV

FLOOD HAZARD INFORMATION

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A,V, A99* With BFE or Depth *Zone AE, AO, AH, VE, AR* Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X* Future Conditions 1% Annual Chance Flood Hazard *Zone X* Area with Reduced Flood Risk due to Levee See Notes. *Zone X* Area with Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard *Zone X* Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
OTHER FEATURES	E 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation 8 Coastal Transect Coastal Transect Baseline Profile Baseline Hydrographic Feature 513 Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was derived from digital orthophotography collected by the U.S. Department of Agriculture Farm Service Agency. Department of Agriculture imagery was flown in 2016 and was produced with a 1-meter ground sample distance.

Coastal Base Flood Elevations shown on the map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Coastal flood elevations are also provided in the Coastal Transect Parameters table in the FIS Report for this jurisdiction. Elevations shown in the Coastal Transect Parameters table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on the FIRM.

SCALE

N

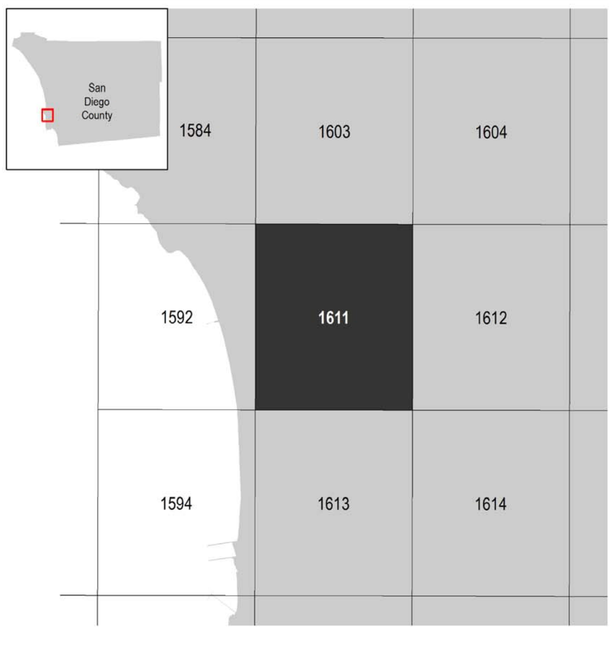
Map Projection:
Universal Transverse Mercator Zone 11N; North American Datum 1983;
Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR



FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA
and Incorporated Areas

PANEL 1611 OF 2375

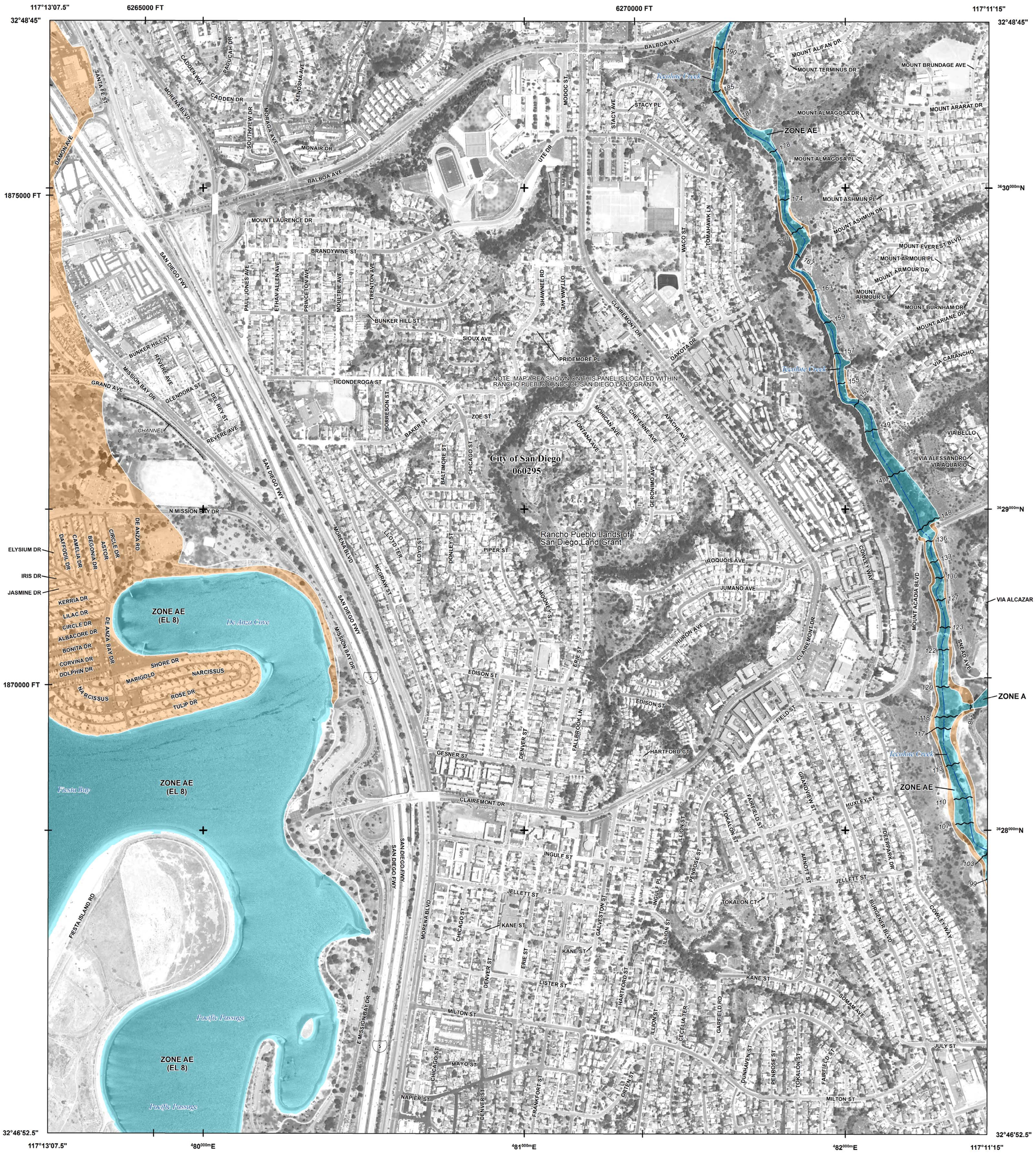
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
SAN DIEGO, CITY OF	060295	1611	H

VERSION NUMBER
2.3.3.3

MAP NUMBER
06073C1611H

MAP REVISED
DECEMBER 20, 2019



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A,V, A99* With BFE or Depth *Zone AE, AO, AH, VE, AR* Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X* Future Conditions 1% Annual Chance Flood Hazard *Zone X* Area with Reduced Flood Risk due to Levee See Notes. *Zone X* Area with Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard *Zone X* Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
OTHER FEATURES	E 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation 8 Coastal Transect Coastal Transect Baseline Profile Baseline Hydrographic Feature 513 Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was derived from digital orthophotography collected by the U.S. Department of Agriculture Farm Service Agency. Department of Agriculture imagery was flown in 2016 and was produced with a 1-meter ground sample distance.

Coastal Base Flood Elevations shown on the map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Coastal flood elevations are also provided in the Coastal Transect Parameters table in the FIS Report for this jurisdiction. Elevations shown in the Coastal Transect Parameters table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on the FIRM.

SCALE

N

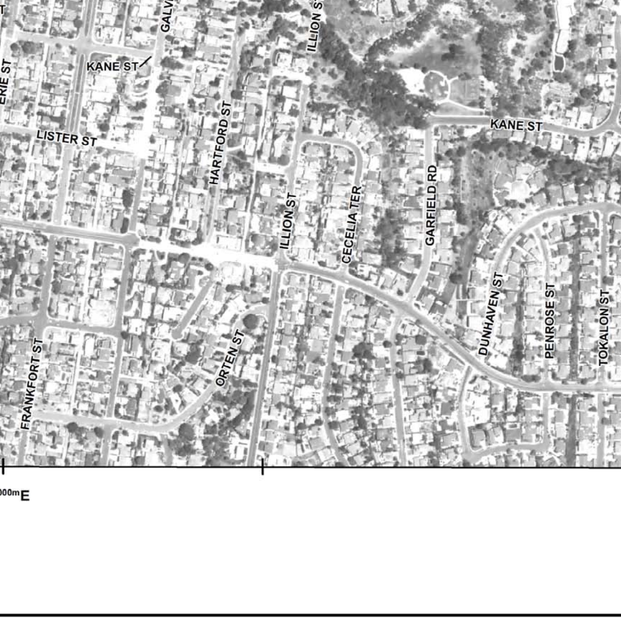
Map Projection:
Universal Transverse Mercator Zone 11N; North American Datum 1983; Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR



FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA
and Incorporated Areas

PANEL **1612** OF **2375**

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
SAN DIEGO, CITY OF	060295	1612	H

VERSION NUMBER
2.3.3.3

MAP NUMBER
06073C1612H

MAP REVISED
DECEMBER 20, 2019



Note: This area is shown as being protected from the 1-percent-annual-chance or greater flood hazard by a levee system that has been provisionally accredited. Overtopping or failure of any levee system is possible. For additional information see the "Provisionally Accredited Levee Note" in Notes to Users.

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A,V, A99*
	With BFE or Depth *Zone AE, AO, AH, VE, AR*
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	Area with Reduced Flood Risk due to Levee See Notes. *Zone X*
	Area with Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard *Zone X*
	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
OTHER FEATURES	E 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
	8 Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	513 Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was derived from digital orthophotography collected by the U.S. Department of Agriculture Farm Service Agency. Department of Agriculture imagery was flown in 2016 and was produced with a 1-meter ground sample distance.

Coastal Base Flood Elevations shown on the map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Coastal flood elevations are also provided in the Coastal Transect Parameters table in the FIS Report for this jurisdiction. Elevations shown in the Coastal Transect Parameters table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on the FIRM.

PROVISIONALLY ACCREDITED LEVEE: Check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection for areas on this panel. To maintain accreditation, the levee owner or community is required to submit the data and documentation necessary to comply with Section 65.10 of the NFIP regulations by July 23, 2009. If the community or owner does not provide the necessary data and documentation or if the data and documentation provided indicate the levee system does not comply with Section 65.10 requirements, FEMA will revise the flood hazard and risk information for this area to reflect de-accreditation of the levee system. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit https://www.fema.gov/national-flood-insurance-program.

SCALE

N

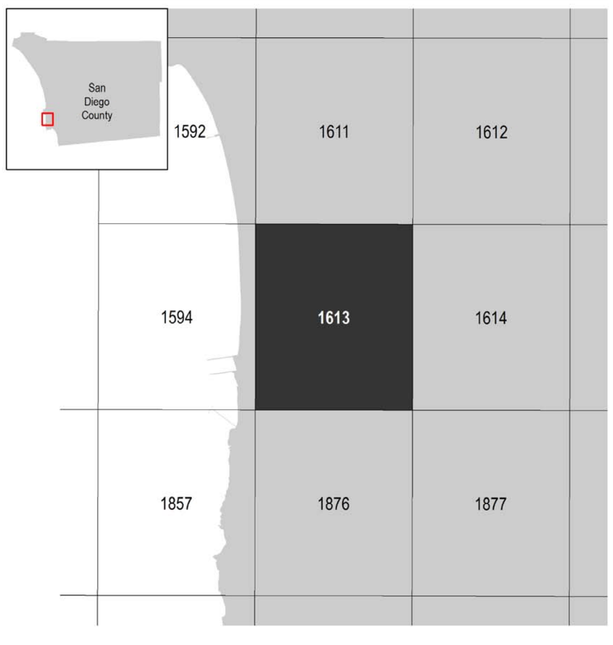
Map Projection:
Universal Transverse Mercator Zone 11N; North American Datum 1983; Western Hemisphere; Vertical Datum: NAVD 88

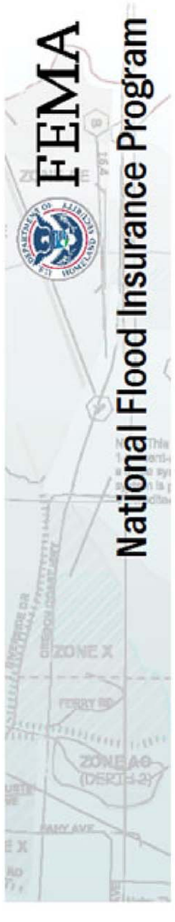
1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR





NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA
and Incorporated Areas

PANEL 1613 OF 2375

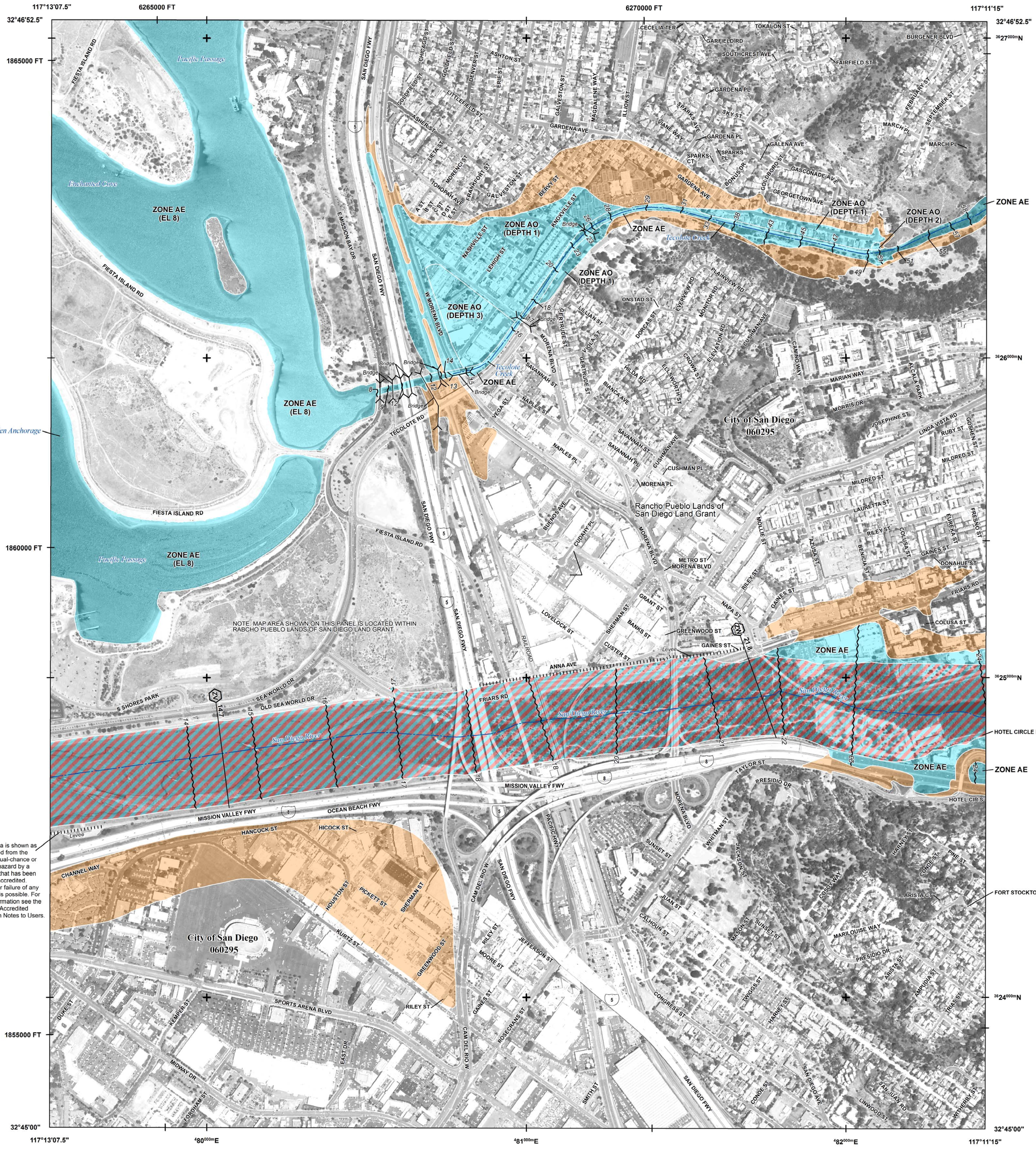
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
SAN DIEGO, CITY OF	060295	1613	H

VERSION NUMBER
2.3.3.3

MAP NUMBER
06073C1613H

MAP REVISED
DECEMBER 20, 2019



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A,V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- E 18.2 / 17.5 — Cross Sections with 1% Annual Chance Water Surface Elevation
- 8 — Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was derived from digital orthophotography collected by the U.S. Department of Agriculture Farm Service Agency. Department of Agriculture imagery was flown in 2016 and was produced with a 1-meter ground sample distance.

Coastal Base Flood Elevations shown on the map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Coastal flood elevations are also provided in the Coastal Transect Parameters table in the FIS Report for this jurisdiction. Elevations shown in the Coastal Transect Parameters table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on the FIRM.

PROVISIONALLY ACCREDITED LEVEE: Check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection for areas on this panel. To maintain accreditation, the levee owner or community is required to submit the data and documentation necessary to comply with Section 65.10 of the NFIP regulations by July 23, 2009. If the community or owner does not provide the necessary data and documentation or if the data and documentation provided indicate the levee system does not comply with Section 65.10 requirements, FEMA will revise the flood hazard and risk information for this area to reflect de-accreditation of the levee system. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit https://www.fema.gov/national-flood-insurance-program.

SCALE

N

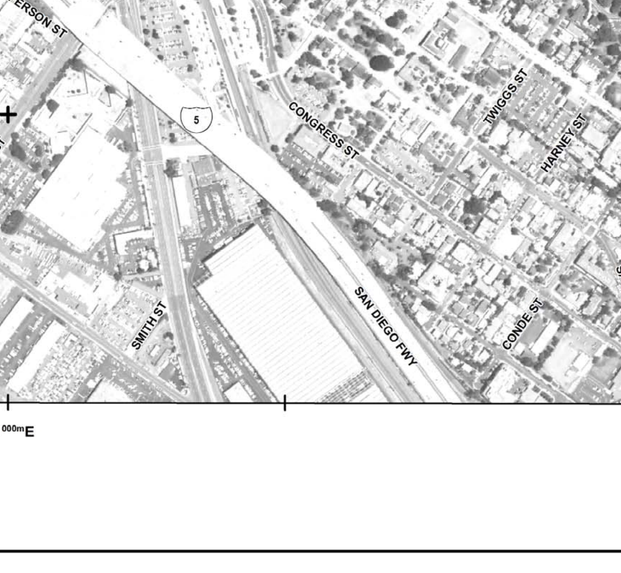
Map Projection:
Universal Transverse Mercator Zone 11N; North American Datum 1983; Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR





NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA and Incorporated Areas

PANEL 1614 OF 2375

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
SAN DIEGO, CITY OF	060295	1614	H

VERSION NUMBER
2.3.3.3

MAP NUMBER
06073C1614H

MAP REVISED
DECEMBER 20, 2019

B. Preliminary Drawings

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION

CONTRACTOR'S RESPONSIBILITIES

1. PURSUANT TO SECTION 4216 OF THE CALIFORNIA GOVERNMENT CODE, AT LEAST 2 WORKING DAYS PRIOR TO EXCAVATION, YOU MUST CONTACT THE REGIONAL NOTIFICATION CENTER (E.G., UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA) AND OBTAIN AN INQUIRY IDENTIFICATION NUMBER.

2. NOTIFY SDG&E AT LEAST 10 WORKING DAYS PRIOR TO EXCAVATING WITHIN 10' OF SDG&E UNDERGROUND HIGH VOLTAGE TRANSMISSION POWER LINES (I.E., 69 KV & HIGHER).

MONUMENTATION / SURVEY NOTES

THE CONTRACTOR SHALL BE RESPONSIBLE FOR SURVEY MONUMENTS AND/OR VERTICAL CONTROL BENCHMARKS WHICH ARE DISTURBED OR DESTROYED BY CONSTRUCTION. A LICENSED LAND SURVEYOR OR LICENSED CIVIL ENGINEER AUTHORIZED TO PRACTICE LAND SURVEYING IN THE STATE OF CALIFORNIA SHALL FIELD LOCATE, REFERENCE, AND/OR PRESERVE ALL HISTORICAL OR CONTROLLING MONUMENTS PRIOR TO ANY EARTHWORK, DEMOLITION, OR SURFACE IMPROVEMENTS. IF DESTROYED, A LICENSED LAND SURVEYOR SHALL REPLACE SUCH MONUMENT(S) WITH APPROPRIATE MONUMENT(S). WHEN SETTING SURVEY MONUMENTS USED FOR RE-ESTABLISHMENT OF THE DISTURBED CONTROLLING SURVEY MONUMENTS AS REQUIRED BY SECTIONS 6730.2 AND 8771 OF THE BUSINESS AND PROFESSIONS CODE OF THE STATE OF CALIFORNIA. A CORNER RECORD OR RECORD OF SURVEY, AS APPROPRIATE, SHALL BE FILED WITH THE COUNTY SURVEYOR. IF ANY VERTICAL CONTROL IS TO BE DISTURBED OR DESTROYED, THE CITY OF SAN DIEGO FIELD SURVEY SECTION SHALL BE NOTIFIED IN WRITING AT LEAST 7 DAYS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF REPLACING ANY VERTICAL CONTROL BENCHMARKS DESTROYED BY THE CONSTRUCTION.

ABBREVIATIONS

CY	CUBIC YARD
EL, ELEV	ELEVATION
EX, EXIST	EXISTING
FG	FINISH GRADE
FT	FEET
RCB	REINFORCED CONCRETE BOX
RCP	REINFORCED CONCRETE PIPE
SD	STORM DRAIN
TYP	TYPICAL
IE	INVERT ELEVATION
MIN	MINIMUM
PROP	PROPOSED
MIN	MINIMUM
MHHW	MEAN HIGHER HIGH WATER
MHW	MEAN HIGH WATER
MSL	MEAN SEA LEVEL
MLW	MEAN LOW WATER
MLLW	MEAN LOWER LOW WATER
NGVD29	NATIONAL GEODETIC VERTICAL DATUM OF 1929

DISCIPLINE CODE

G	GENERAL
D	DEMOLITION
C	CIVIL
T	TITLE

LEGEND

WETLAND ELEV RANGE (FT, NGVD29) / HABITAT

-5.0 - -3.75	SUBTIDAL / EELGRASS
-3.75 - 1.2	MUDFLAT
1.2 - 2.0	LOW MARSH
2.0 - 3.75	MID MARSH
3.75 - 4.4	HIGH MARSH
4.4 - 6.4	TRANSITIONAL
6.4 - 16.0+	UPLAND

SHEET INDEX		
INDEX #	SHEET #	DRAWING NAME
1	T-01	TITLE SHEET
2	G-01	SITE PLAN
3	C-01	BONITA COVE - PLAN VIEW
4	C-02	BONITA COVE - PROFILE VIEW
5	C-03	CROWN POINT - PLAN VIEW
6	C-04	CROWN POINT - PROFILE VIEW
7	C-05	VACATION ISLAND NE, SKI BEACH - PLAN VIEW
8	C-06	VACATION ISLAND NE, SKI BEACH - PROFILE VIEW
9	C-07	VACATION ISLAND NW - PLAN VIEW
10	C-08	VACATION ISLAND NW - PROFILE VIEW
11	C-09	VACATION ISLAND SW - PLAN VIEW
12	C-10	VACATION ISLAND SW - PROFILE VIEW
13	C-11	VACATION ISLAND NE, WEST OF INGRAHAM ST - PLAN VIEW
14	C-12	VACATION ISLAND NE, WEST OF INGRAHAM ST - PROFILE VIEW
15	C-13	WEST SAIL BAY - PLAN VIEW
16	C-14	WEST SAIL BAY - PROFILE VIEW
17	C-15	VENTURA COVE PARK - PLAN VIEW
18	C-16	VENTURA COVE PARK - PROFILE VIEW
19	C-17	DE ANZA POINT - PLAN VIEW
20	C-18	DE ANZA POINT - PROFILE VIEW 1
21	C-19	DE ANZA POINT - PROFILE VIEW 2
22	C-20	DE ANZA COVE - PLAN VIEW
23	C-21	DE ANZA COVE - PROFILE VIEW 1

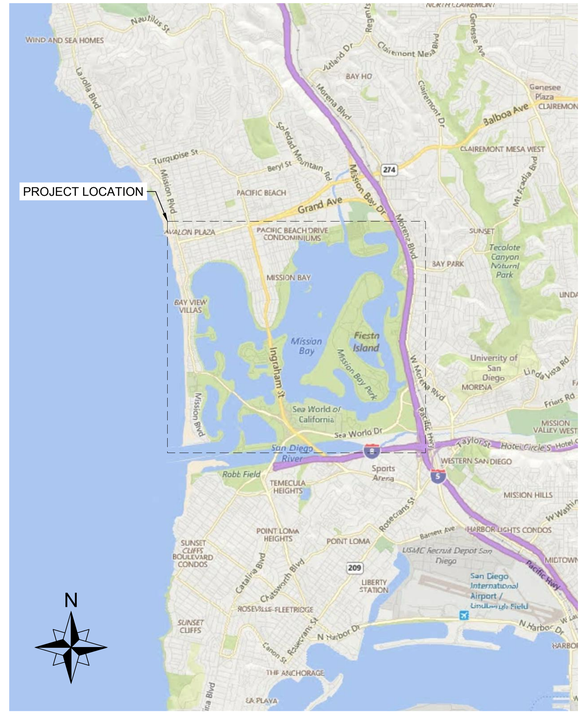
LEGEND

- EXISTING CONTOUR (5)
- PROPOSED CONTOUR (5)
- TOP OF SLOPE / CUT SLOPE / BOTTOM OF SLOPE
- TOP OF SLOPE / FILL SLOPE / BOTTOM OF SLOPE
- EXISTING WATER (W)
- EXISTING SEWER (SS)
- EXISTING STORM DRAIN (SD)
- DAYLIGHT
- OYSTER HABITAT



PROJECT LOCATION

PROJECT LOCATION
NTS



VICINITY MAP
NTS

TIDAL ELEVATIONS (NOAA STATION 9410230)

DATUM	ELEVATION (FT, NGVD29)
MHHW	3.00
MHW	2.28
MSL	0.41
MLW	-1.42
MLLW	-2.32

PROJECT TEAM

DUDEK: MATT VALERIO, SENIOR PLANNER
ANDREW TALBET, SENIOR PLANNER

MOFFATT & NICHOL: CHRIS WEBB, SUPERVISORY COASTAL SCIENTIST
CRAIG FRAMPTON, COASTAL SCIENTIST
KYLE LANDON, COASTAL ENGINEER
CONOR OFSTHUN, COASTAL SCIENTIST

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM

CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING
0 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

T-01

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
TITLE SHEET

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 1 OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

CCS27 COORDINATE

CCS83 COORDINATE

CONTRACTOR
INSPECTOR
DATE STARTED
DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

FILE NAME: Q:\SD\10278 - Mission Bay PEIR\7 Design\CADD_Active_SheetSet (Mission Bay Program EIR-Shoreline)\10278-T-01.dwg
PLOTTED: Monday, November 23, 2020 - 12:43pm USER: rdevis



N

800' 0' 800' 1600'

SCALE: 1"=800'

G-01

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
SITE LAYOUT

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM

CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING

0 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

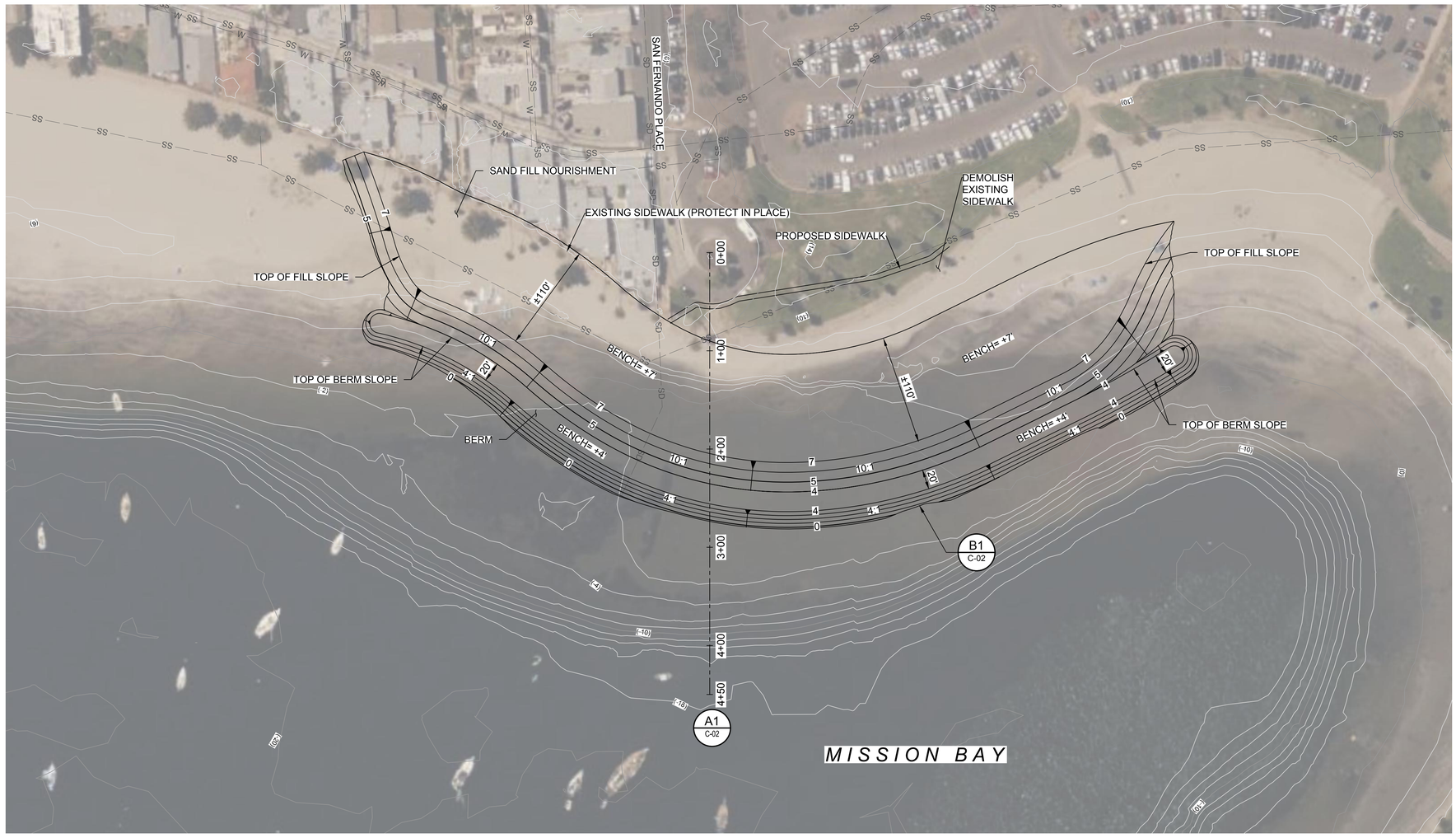
CCS27 COORDINATE

CCS83 COORDINATE

CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

FILE NAME: G:\SD\10278 - Mission Bay PDEIR\7 Design\CADD_Active_SheetSet (Mission Bay Program EIR-Shorelines)\10278-G-01.dwg
PLOTTED: Monday, November 23, 2020 - 12:34pm USER: rdeb



C–01

NOTES:

SEE TITLE SHEET, T-01, FOR LEGEND.

QUANTITIES:

VOLUME SAND FILL NOURISHMENT = 15,100 CY

VOLUME COBBLE STONE = 1,950 CY

CALTRANS BACKING NO. 3 = 2,550 CY

N

60' 0' 60' 120'

SCALE: 1"=60'

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
BONITA COVE – PLAN VIEW

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM			
CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING

0 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO — Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

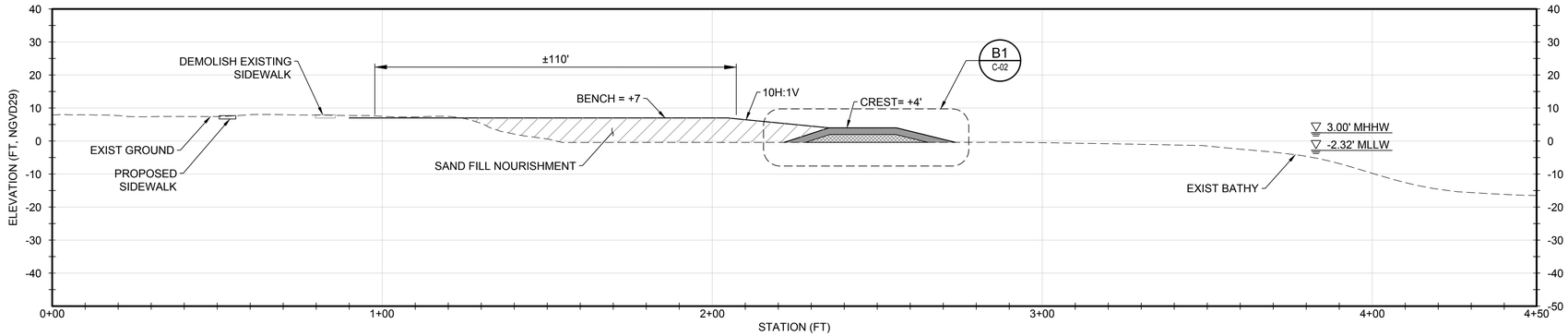
CCS27 COORDINATE

CCS83 COORDINATE

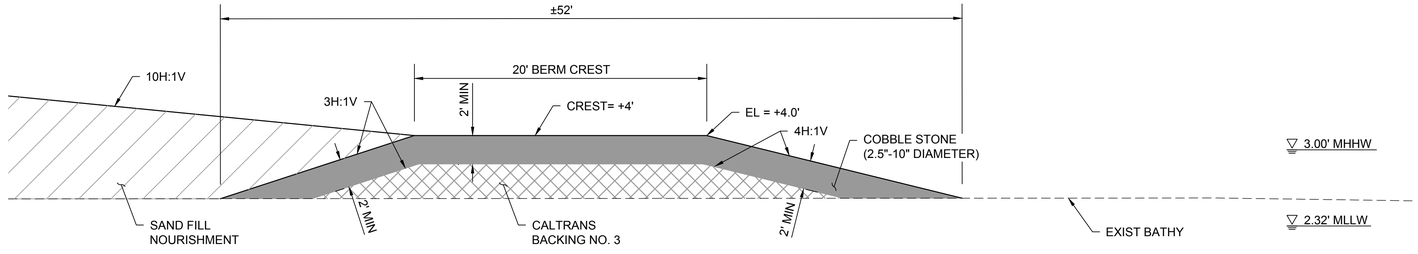
CONTRACTOR
INSPECTOR
DATE STARTED
DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

FILE NAME: G:\SD\10278 - Mission Bay PEIR\7 Design\CADD_Active_SheetSet (Mission Bay Program EIR-Shorelines)\10278-C-01.dwg
PLOTTED: Wednesday, November 18, 2020 - 5:19pm USER: rdenb



A1 C-01 BONITA COVE
SCALE: 1"=20'



B1 C-01 BONITA COVE BERM DETAIL
SCALE: 1"=5'

5' 0' 5' 10'
SCALE: 1"=5'
20' 0' 20' 40'
SCALE: 1"=20'

C-02

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
BONITA COVE – PROFILE VIEW

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM			
CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING
0 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER
CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

CCS27 COORDINATE
CCS83 COORDINATE

CONTRACTOR
INSPECTOR
DATE STARTED
DATE COMPLETED

FILE NAME: Q:\SD\10278 - Mission Bay PEIR\7 Design\CAD\3_Active_SheetSet (Mission Bay Program EIR-Shorelines)\10278-C-02.dwg
PLOTTED: Wednesday, November 18, 2020 - 5:20pm USER: rdeb



NOTES:

SEE TITLE SHEET, T-01, FOR LEGEND.

QUANTITIES:

LENGTH OF SEAWALL = 245.00'

N

60' 0' 60' 120'

SCALE: 1"=60'

C-03

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
CROWN POINT – PLAN VIEW

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM

CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING

0 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

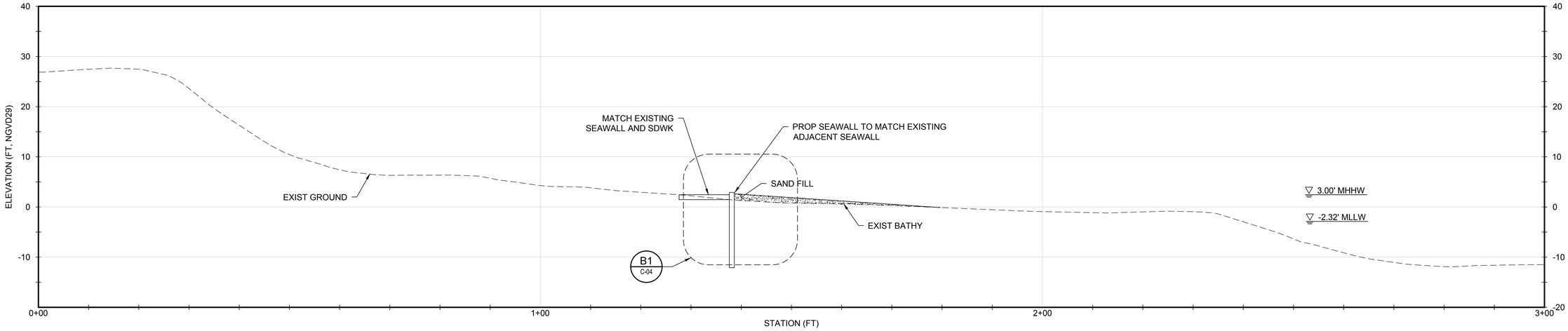
CCS27 COORDINATE

CCS83 COORDINATE

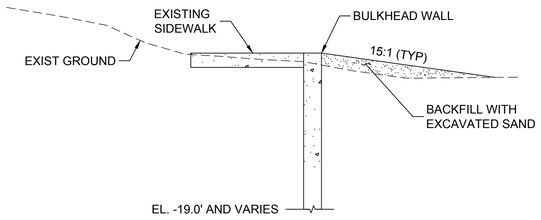
CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

FILE NAME: G:\SD\10278 - Mission Bay PEIR\7 Design\CADD_Active_SheetSet (Mission Bay Program EIR-Shoreline)\10278-C-03.dwg
PLOTTED: Wednesday, November 18, 2020 - 1:20pm USER: rdavis



A1 / C-03 CROWN POINT: SEAWALL
SCALE: 1"=10'



B1 / C-03 TYPICAL SEAWALL FILL SECTION
NTS

C-04

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM			
CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING
0 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

10' 0' 10' 20'
SCALE: 1"=10'

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
CROWN POINT – PROFILE VIEW

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

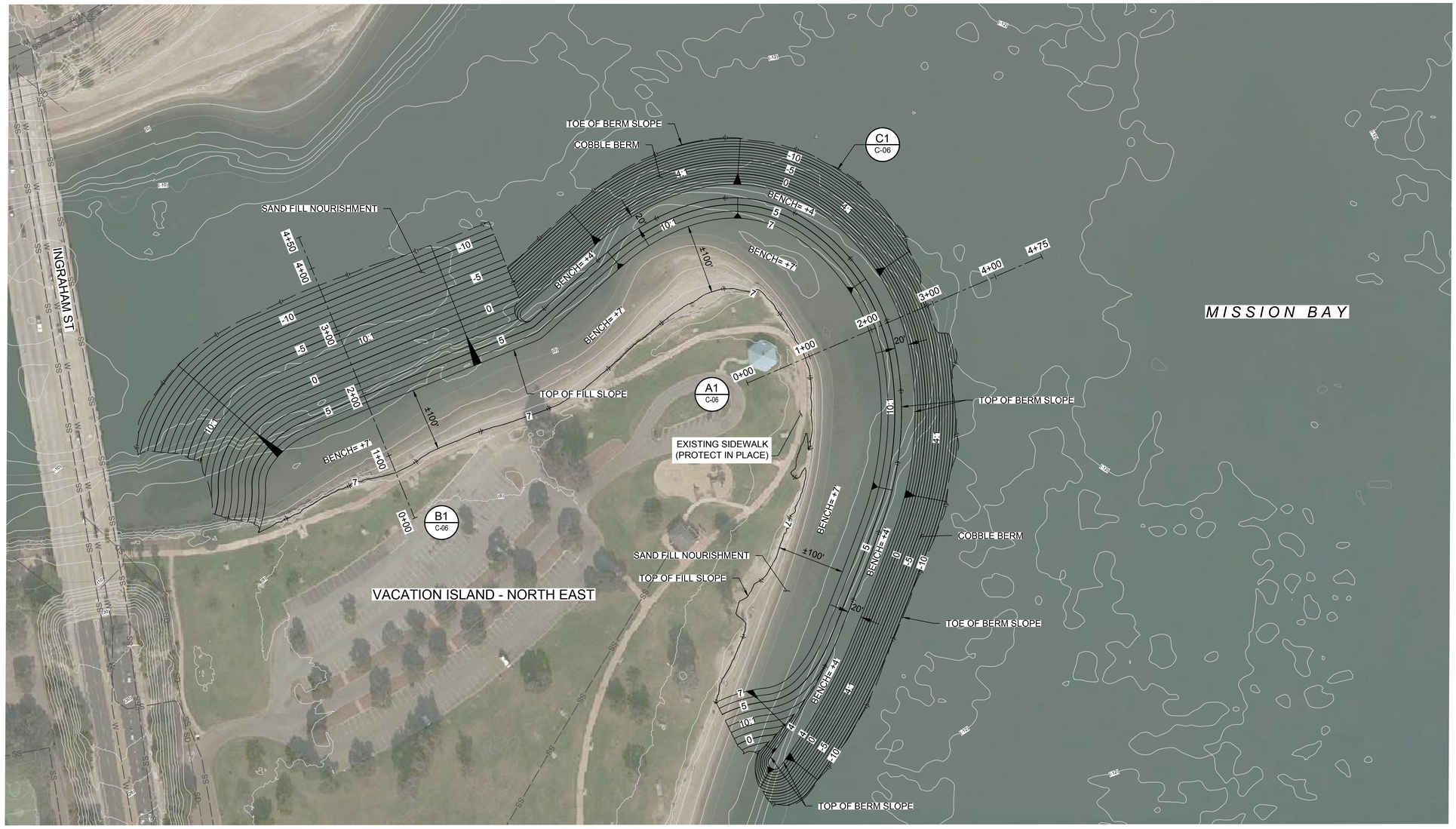
CCS27 COORDINATE

CCS83 COORDINATE

CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

FILE NAME: G:\SD\10278 - Mission Bay PEIR\7 Design\CADD_Active_SheetSet (Mission Bay Program EIR-Shoreline)\10278-C-04.dwg
PLOTTED: Wednesday, November 18, 2020 - 5:20pm USER: rdeeb



C–05

NOTES:

SEE TITLE SHEET, T-01, FOR LEGEND.

QUANTITIES:

VOLUME SAND FILL NOURISHMENT = 71,000 CY

VOLUME COBBLE STONE = 21,500 CY

VOLUME CALTRANS BACKING NO. 3 = 14,500 CY

N

80' 0' 80' 160'

SCALE: 1"=80'

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
VACATION ISLAND NE, SKI BEACH – PLAN VIEW

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM			
CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING

0 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

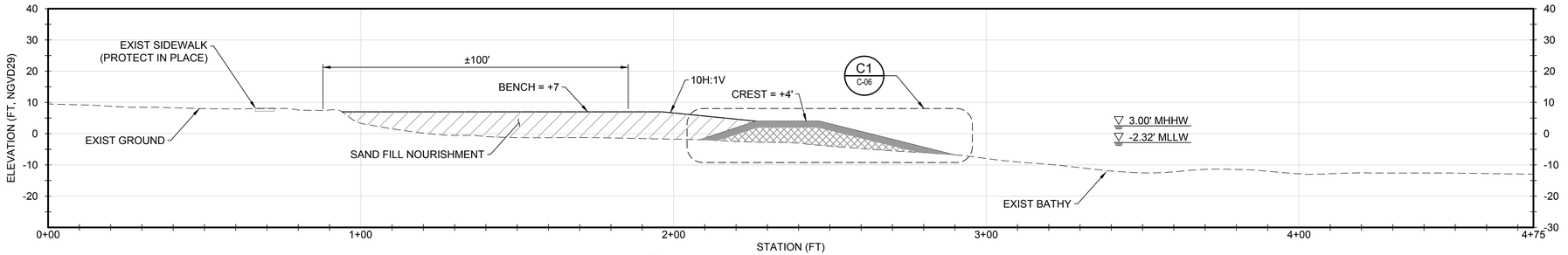
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

CCS27 COORDINATE

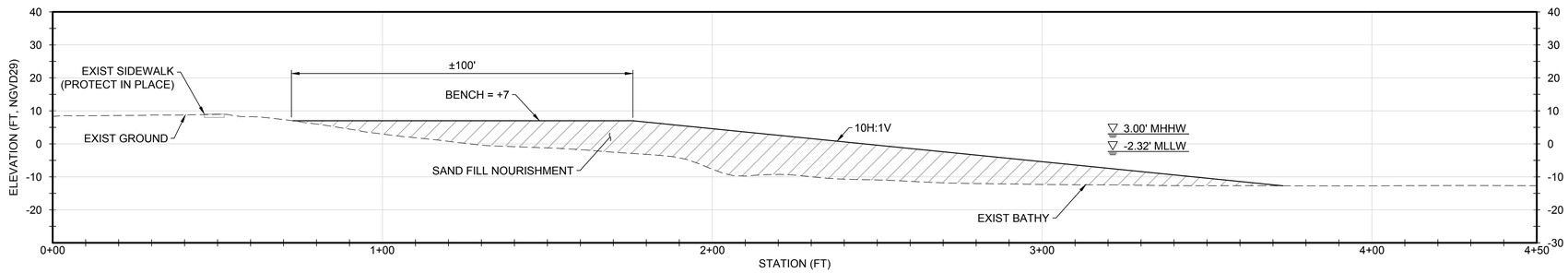
CCS83 COORDINATE

CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

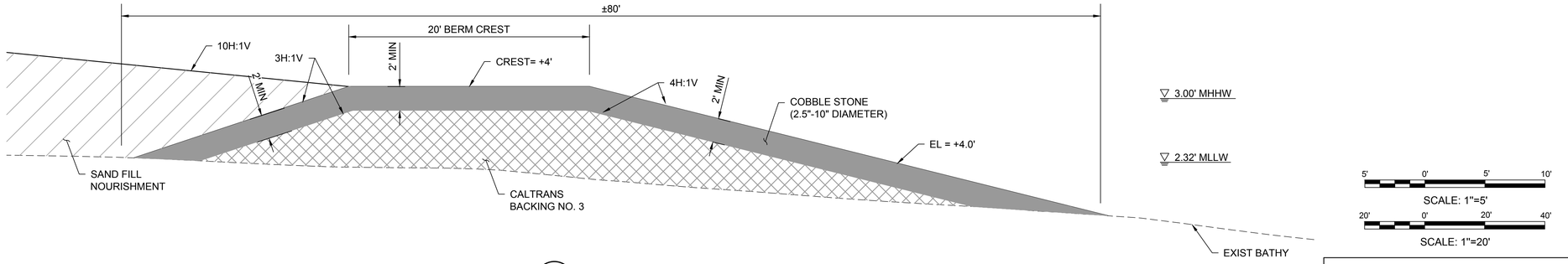
FILE NAME: G:\SD\10278 - Mission Bay PEIR\7 Design\CADD_Active_SheetSet (Mission Bay Program EIR-Shoreline)\10278-C-05.dwg
PLOTTED: Wednesday, November 18, 2020 - 1:21pm USER: rdavis



A1 C-05 VACATION ISLAND: NORTH EAST
SCALE: 1"=20'



B1 C-05 VACATION ISLAND: NORTH EAST - SAND FILL
SCALE: 1"=20'



C1 C-05 VACATION ISLAND : NORTH EAST BERM DETAIL
SCALE: 1"=5'

C-06

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM			
CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING
0 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
VACATION ISLAND NE, SKI BEACH
– PROFILE VIEW

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

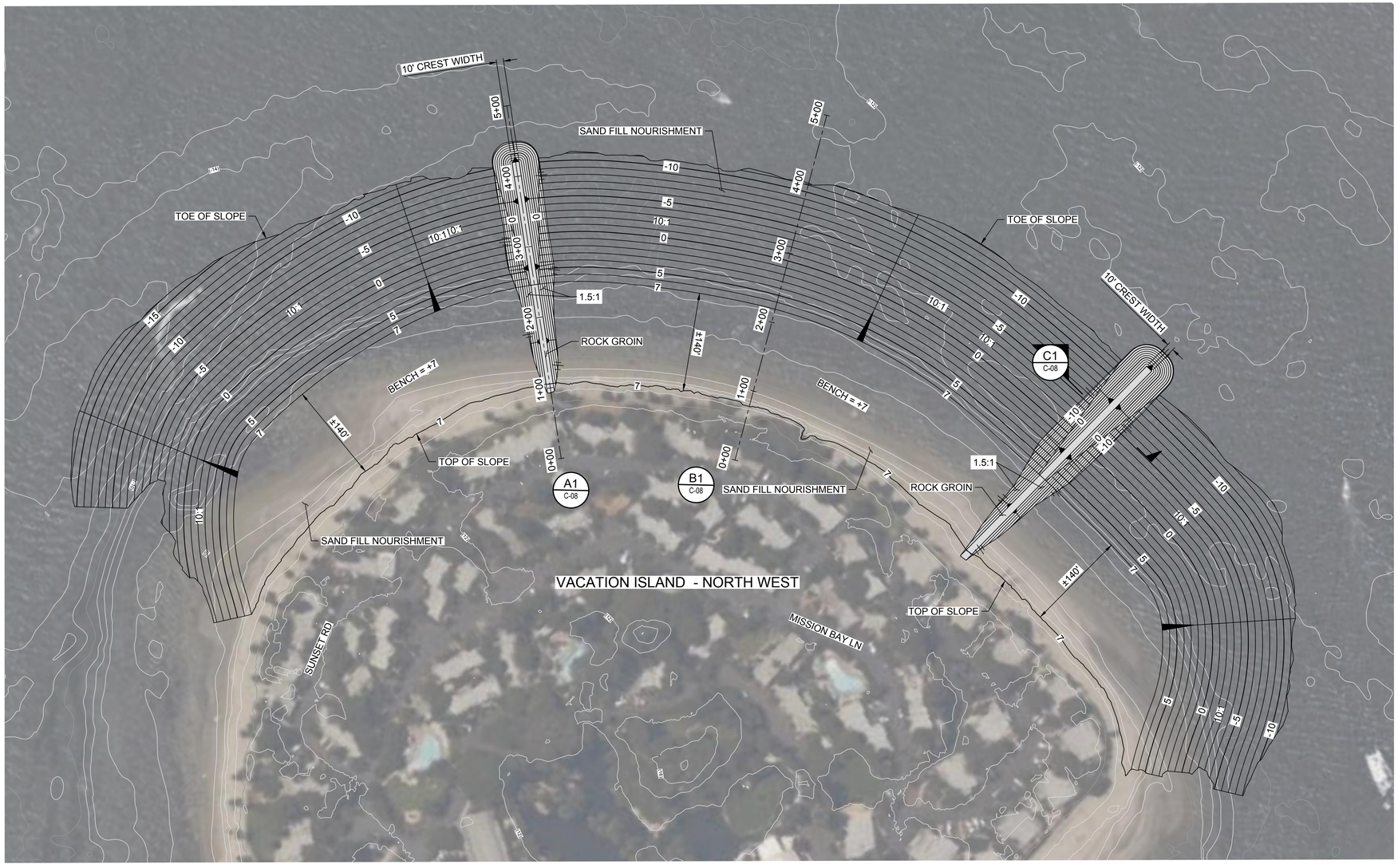
CCS27 COORDINATE

CCS83 COORDINATE

CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

FILE NAME: Q:\SD\10278 - Mission Bay (PDR)\7 Design\CADD_Active_SheetSet (Mission Bay Program EIR-Shorelines)\10278-C-06.dwg
PLOTTED: Wednesday, November 18, 2020 - 5:21pm USER: cdavis



NOTES:

SEE TITLE SHEET, T-01, FOR LEGEND.

QUANTITIES:

VOLUME SAND FILL NOURISHMENT = 164,200 CY

VOLUME ROCK GROIN = 13,600 CY

80' 0' 80' 160'

SCALE: 1"=80'

C–07

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
VACATION ISLAND NW – PLAN VIEW

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM

CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING

0 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

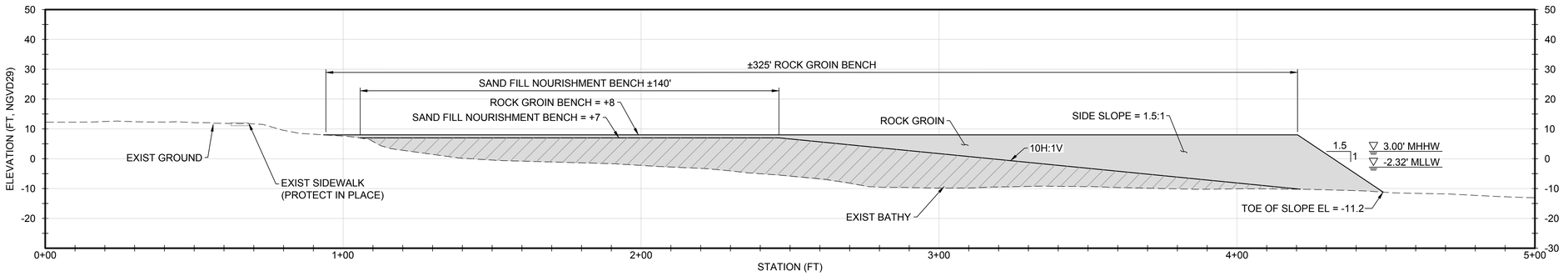
CCS27 COORDINATE

CCS83 COORDINATE

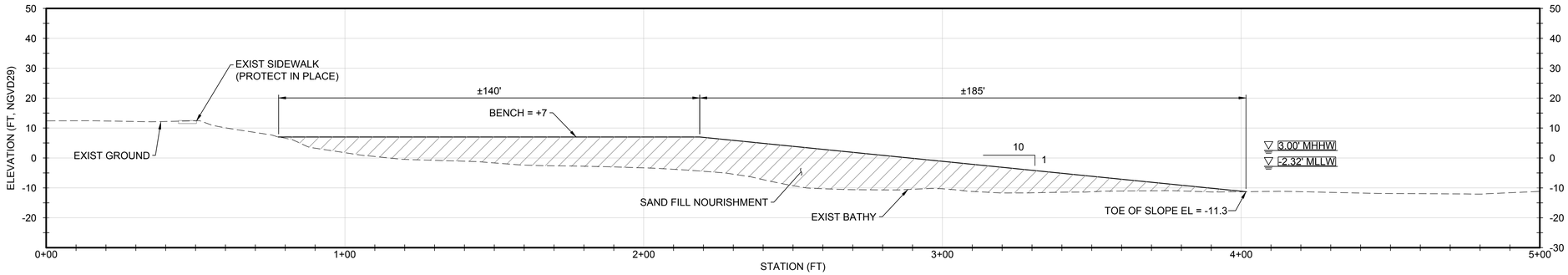
CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

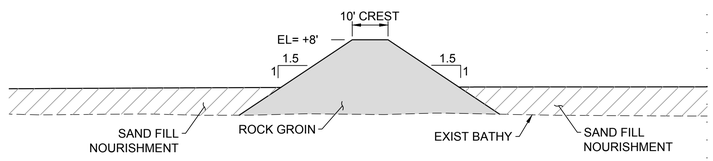
FILE NAME: O:\SD\10278 - Mission Bay PEIR\7 Design\CAD_Active_SheetSet (Mission Bay Program EIR-Shorelines)\10278-C-07.dwg
PLOTTED: Wednesday, November 18, 2020 - 5:22pm USER: rdavis



A1 / C-07 VACATION ISLAND : NORTH WEST - ROCK GROIN
SCALE: 1"=20'



B1 / C-07 VACATION ISLAND : NORTH WEST
SCALE: 1"=20'



C1 / C-07 ROCK GROIN TYP SECTION
SCALE: 1"=20'

20' 0' 20' 40'
SCALE: 1"=20'

C-08

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
VACATION ISLAND NW – PROFILE VIEW

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM

CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING
0 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

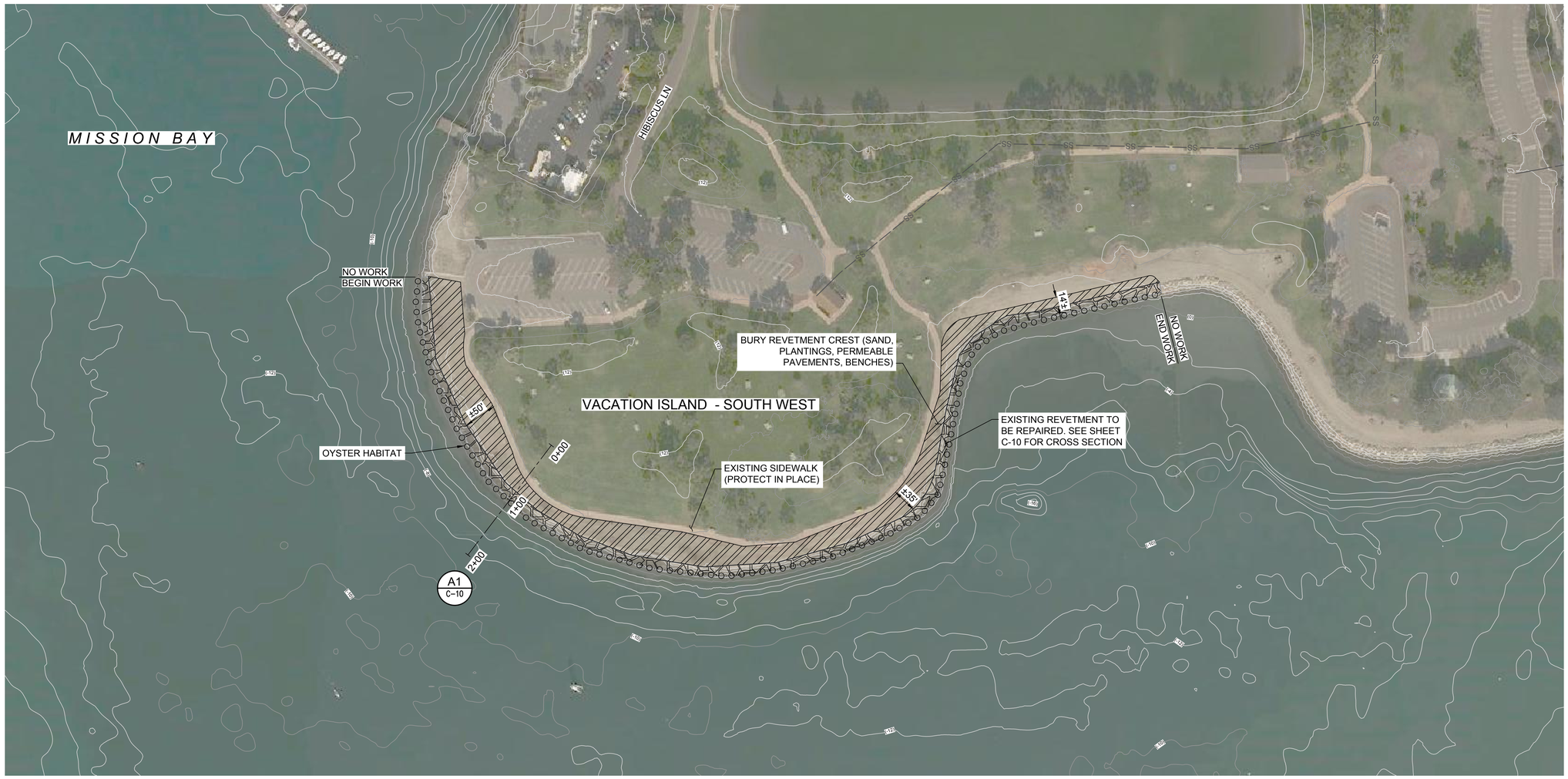
CCS27 COORDINATE

CCS83 COORDINATE

CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

FILE NAME: Q:\SD\10278 - Mission Bay PEIR\7 Design\CADD_Active_SheetSet (Mission Bay Program EIR-Shorelines)\10278-C-08.dwg
PLOTTED: Wednesday, November 18, 2020 - 5:22pm ISSR: rdeb



C–09

NOTES:

SEE TITLE SHEET, T-01, FOR LEGEND.

QUANTITIES:

REVETMENT VOLUME = 7,950 CY

SAND FILL = 1,200 CY

N

80' 0' 80' 160'

SCALE: 1"=80'

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
VACATION ISLAND SW – PLAN VIEW

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM			
CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING

0 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO — Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

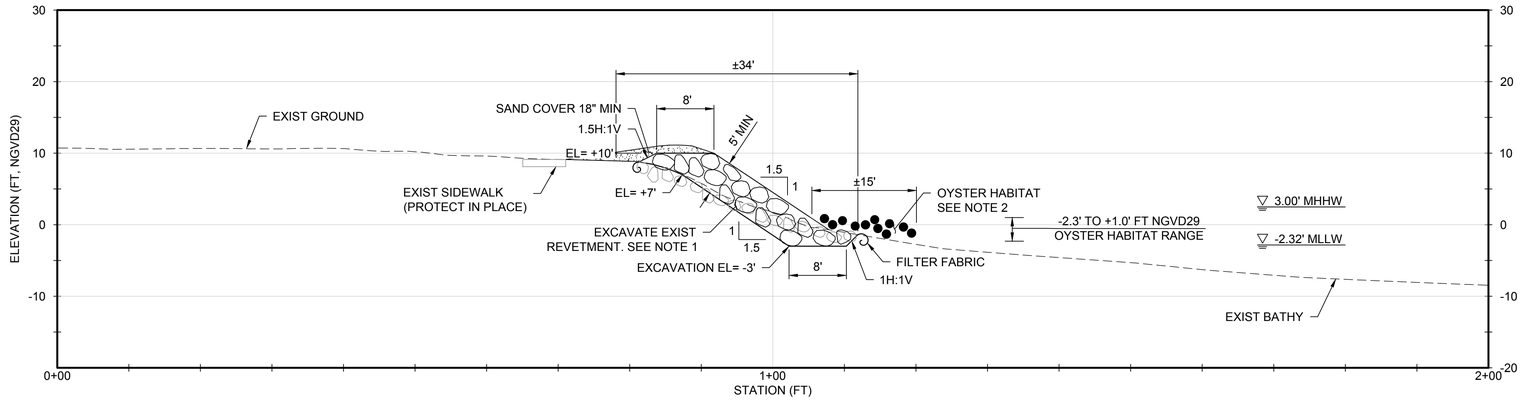
CCS27 COORDINATE

CCS83 COORDINATE

CONTRACTOR
INSPECTOR
DATE STARTED
DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

FILE NAME: G:\SD\10278 - Mission Bay PEIR\7 Design\CADD_Active_SheetSet (Mission Bay Program EIR-Shorelines)\10278-c-09.dwg
PLOTTED: Wednesday, November 18, 2020 - 5:23pm USER: rdelb



A1 / C-09 VACATION ISLAND : SOUTH WEST TYPICAL REVETMENT REPAIR

SCALE: 1"=10'

NOTES:

1. EXCAVATE AND REMOVE EXISTING REVETMENT WITHIN CONSTRUCTION LIMITS, REUSE ACCEPTABLE EXISTING REVETMENT AND DISPOSE OF UNACCEPTABLE AND NON-NATIVE MATERIAL
2. OYSTER HABITAT TO BE CONSTRUCTED OF ONE OR MORE OF THE FOLLOWING:
   - EXISTING, UNDERSIZED RIP RAP
   - OYSTER CULTCH BAGS
   - REEF BALLS, OR SIMILAR

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM			
CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING
0 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

10' 0' 10' 20'
SCALE: 1"=10'

C-10

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
VACATION ISLAND SW – PROFILE VIEW

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

CCS27 COORDINATE

CCS83 COORDINATE

CONTRACTOR
INSPECTOR
DATE STARTED
DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

FILE NAME: G:\SD\10278 - Mission Bay PDR\7 Design\CADD_Active_SheetSet (Mission Bay Program EIR-Shorelines)\10278-C-10.dwg
PLOTTED: Wednesday, November 18, 2020 - 5:23pm USER: cdavis



C—11

NOTES:

SEE TITLE SHEET, T-01, FOR LEGEND.

QUANTITIES:

VOLUME REVETMENT = 2,800 CY

N

40' 0' 40' 80'

SCALE: 1"=40'

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
VACATION ISLAND NE, W OF INGRAHAM ST – PLAN VIEW

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM			
CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING

0 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

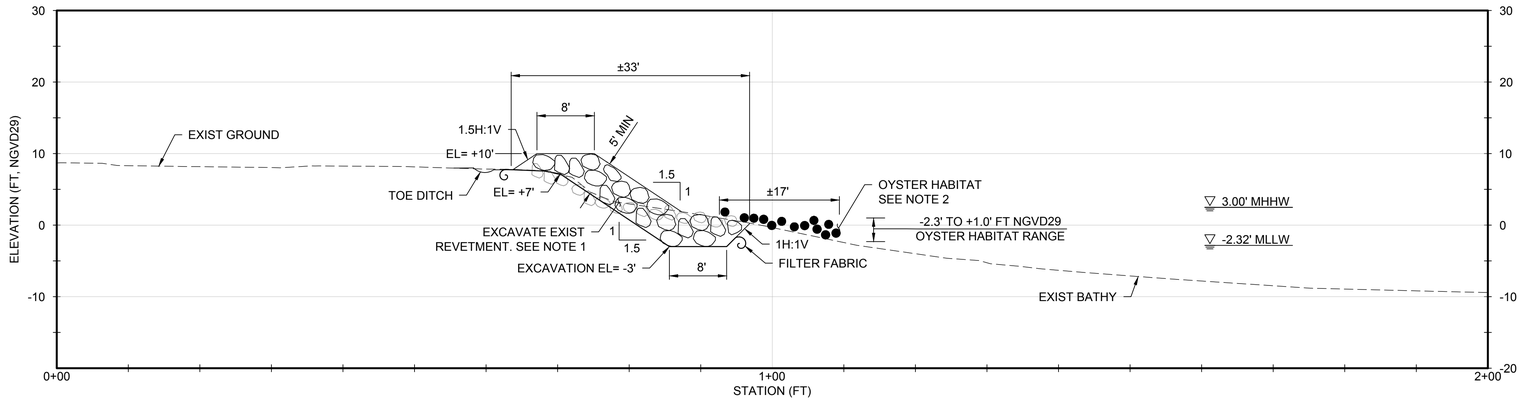
CCS27 COORDINATE

CCS83 COORDINATE

CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

FILE NAME: O:\SD\10278 - Mission Bay PERY 7 Design\CAD_Active_SheetSet (Mission Bay Program EIR-Shoreline)\10278-C-11.dwg
PLOTTED: Wednesday, November 18, 2020 - 5:24pm USER: rdeb



A1 / C-11 VACATION ISLAND: WEST OF INGRAHAM TYPICAL REVETMENT REPAIR
SCALE: 1"=10'

NOTES:

1. EXCAVATE AND REMOVE EXISTING REVETMENT WITHIN CONSTRUCTION LIMITS, REUSE ACCEPTABLE EXISTING REVETMENT AND DISPOSE OF UNACCEPTABLE AND NON-NATIVE MATERIAL
2. OYSTER HABITAT TO BE CONSTRUCTED OF ONE OR MORE OF THE FOLLOWING:
   - EXISTING, UNDERSIZED RIP RAP
   - OYSTER CULTCH BAGS
   - REEF BALLS, OR SIMILAR

10' 0' 10' 20'
SCALE: 1"=10'

C–12

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM			
CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING
0 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
VACATION ISLAND NE, W OF INGRAHAM ST – PROFILE VIEW

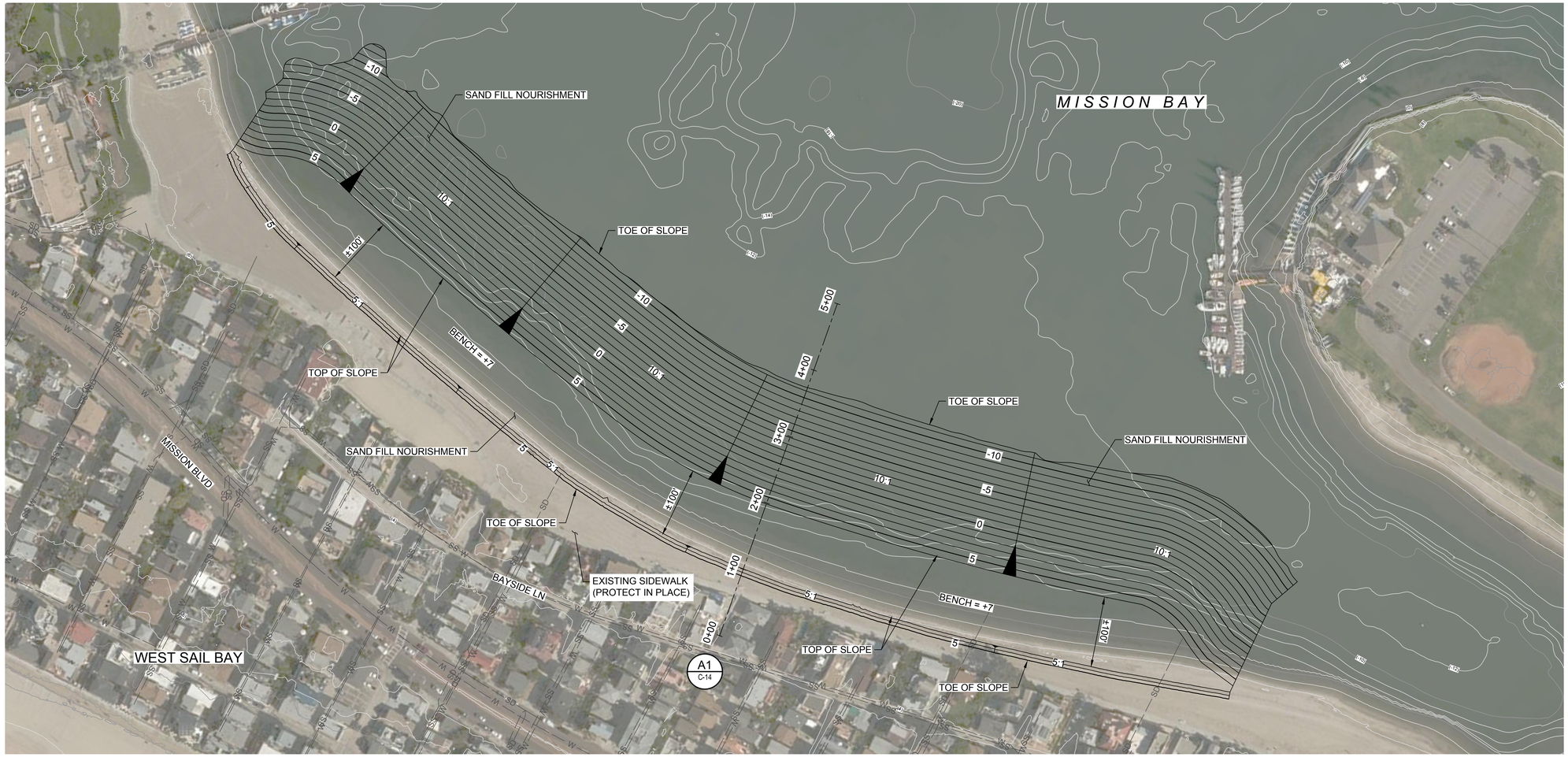
SPEC. NO.
CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS
WBS
APPROVED: FOR CITY ENGINEER DATE
PRINT NAME RCE#
SUBMITTED BY: PROJECT MANAGER
CHECKED BY: PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

CCS27 COORDINATE
CCS83 COORDINATE
CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

FILE NAME: G:\SD\10278 - Mission Bay PEIR\7 Design\VOADD_Active_Sheets\04 (Mission Bay Program EIR-Shorelines)\10278-C-12.dwg
PLOTTED: Wednesday, November 18, 2020 - 2:24pm USER: rdavis



C-13

NOTES:

SEE TITLE SHEET, T-01, FOR LEGEND.

QUANTITIES:

VOLUME SAND FILL NOURISHMENT = 113,900 CY

N

80' 0' 80' 160'

SCALE: 1"=80'

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
WEST SAIL BAY – PLAN VIEW

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM

CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING

0 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

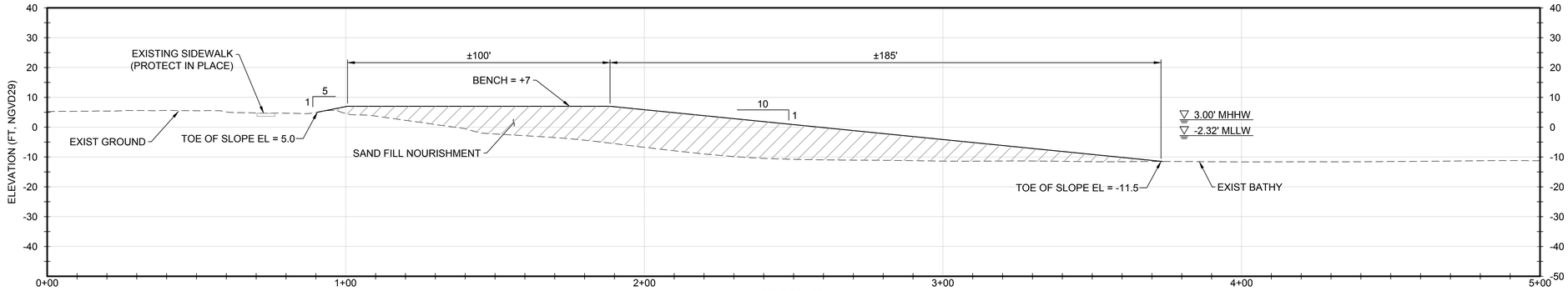
CCS27 COORDINATE

CCS83 COORDINATE

CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

FILE NAME: G:\SD\10278 – Mission Bay PEIR\7 Design\CAD_Active_SheetSet (Mission Bay Program EIR-Shoreline)\10278-C-13.dwg
PLOTTED: Wednesday, November 18, 2020 – 5:25pm USER: dweb



A1 / C-13 WEST SAIL BAY
SCALE: 1"=20'

20' 0' 20' 40'
SCALE: 1"=20'

C-14

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
WEST SAIL BAY – PROFILE VIEW

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM

CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING
0 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

CCS27 COORDINATE

CCS83 COORDINATE

CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

FILE NAME: Q:\SD\10278 - Mission Bay PEIR\7 Design\CAD_Active_SheetSet (Mission Bay Program EIR-Shorelines)\10278-C-14.dwg
PLOTTED: Wednesday, November 18, 2020 - 5:25pm \\SDS\...\dwb



C–15

NOTES:

SEE TITLE SHEET, T-01, FOR LEGEND.

QUANTITIES:

VOLUME REVETMENT = 5,100 CY

N

60' 0' 60' 120'

SCALE: 1"=60'

MISSION BAY PROGRAM EIR

SHORELINE RESTORATION VENTURA COVE PARK – PLAN VIEW

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM			
CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING

0 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

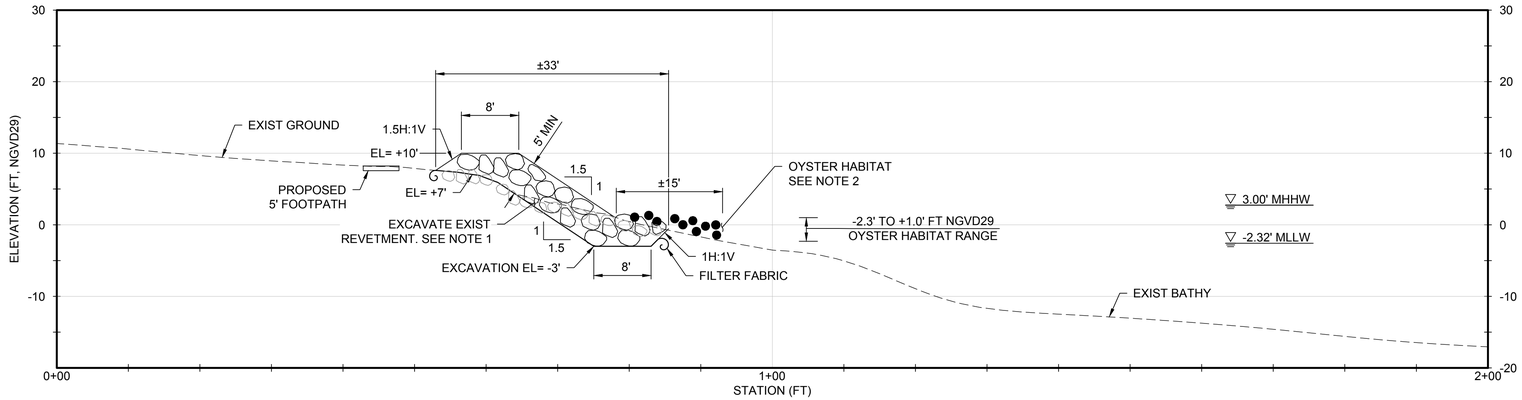
CCS27 COORDINATE

CCS83 COORDINATE

CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

FILE NAME: Q:\SD\10278 - Mission Bay PEIR\7 Design\CADD_Active_SheetSet (Mission Bay Program EIR-Shorelines)\10278-C-15.dwg
PLOTTED: Wednesday, November 18, 2020 - 5:25pm USER: rdeeb



A1 / C-15 VENTURA COVE TYPICAL REVETMENT REPAIR
SCALE: 1"=10'

NOTES:

1. EXCAVATE AND REMOVE EXISTING REVETMENT WITHIN CONSTRUCTION LIMITS, REUSE ACCEPTABLE EXISTING REVETMENT AND DISPOSE OF UNACCEPTABLE AND NON-NATIVE MATERIAL
2. OYSTER HABITAT TO BE CONSTRUCTED OF ONE OR MORE OF THE FOLLOWING:
   - EXISTING, UNDERSIZED RIP RAP
   - OYSTER CULTCH BAGS
   - REEF BALLS, OR SIMILAR

10' 0' 10' 20'
SCALE: 1"=10'

C-16

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM

CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING
0 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
VENTURA COVE PARK – PROFILE VIEW

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

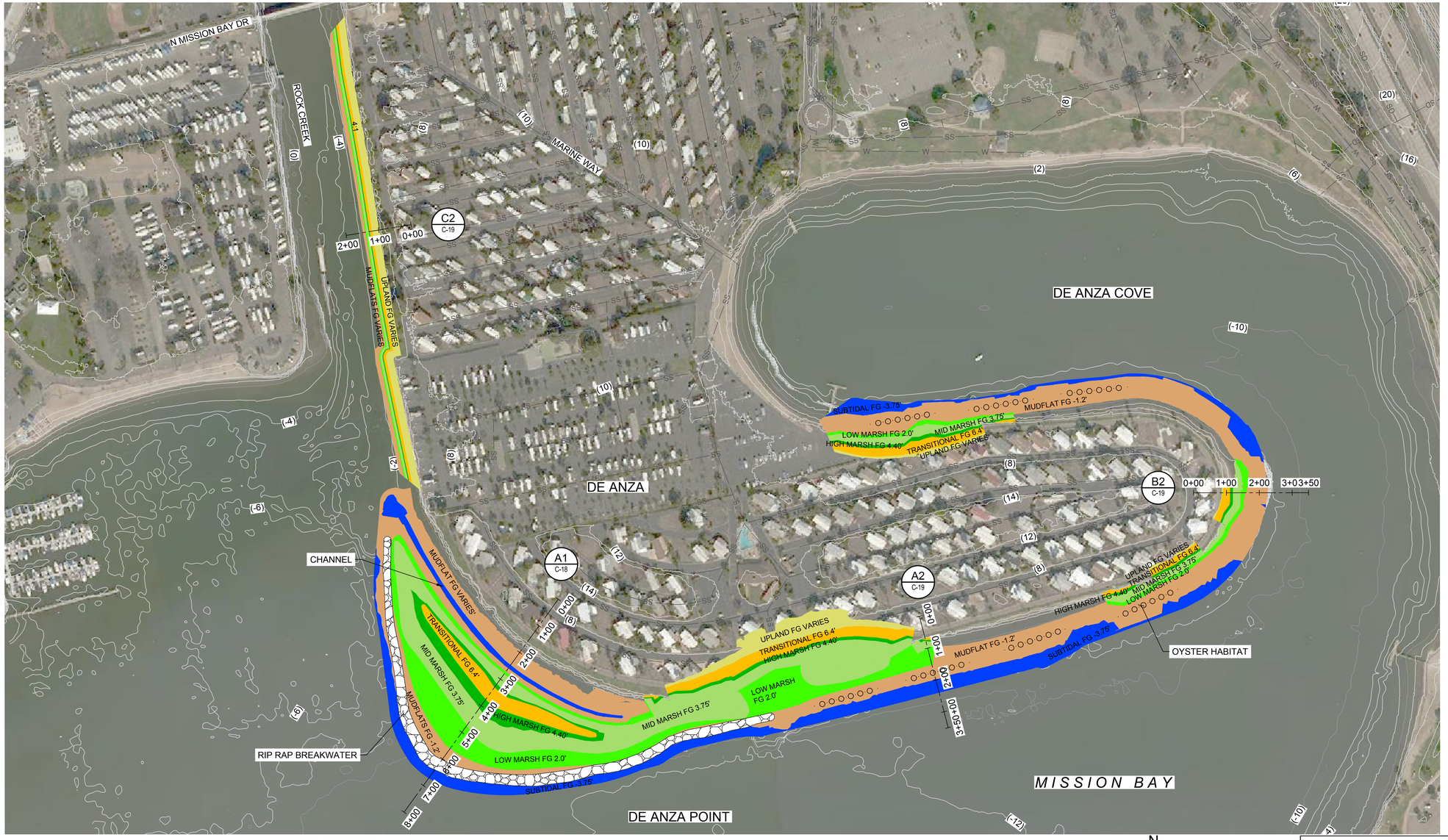
CCS27 COORDINATE

CCS83 COORDINATE

CONTRACTOR
INSPECTOR
DATE STARTED
DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

FILE NAME: Q:\SIY\10278 - Mission Bay PKWY 7 Design\CADD_Active_SheetSet (Mission Bay Program EIR-Shorelines)\10278-C-16.dwg
PLOTTED: Wednesday, November 18, 2020 - 5:26pm USER: rdeeb



C-17

NOTES:

1. SEE TITLE SHEET, T-01, FOR LEGEND.
2. SEE SHEET C-20 FOR DE ANZA COVE.

QUANTITIES:

DE ANZA POINT MARSHLAND FILL = 111,400 CY
DE ANZA POINT EXCAVATION = 18,400 CY
DE ANZA POINT REVETMENT = 22,100 CY

ROSE CREEK REVETMENT = 11,000 CY
ROSE CREEK FILL = 10,800 CY
ROSE CREEK SAND COVER = 1,050 CY

- UPLAND 6.4' - 16.0'
- TRANSITIONAL 4.4' - 6.4'
- HIGH MARSH 3.75' - 4.4'
- MID MARSH 2.0' - 3.75'
- LOW MARSH 1.2' - 2.0'
- MUDFLATS -3.75 - 1.2'
- SUBTIDAL -5.0' - -3.75'
- RIP-RAP

N

160' 0' 160' 320'

SCALE: 1"=160'

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
DE ANZA – PLAN VIEW

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM

CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING
0 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

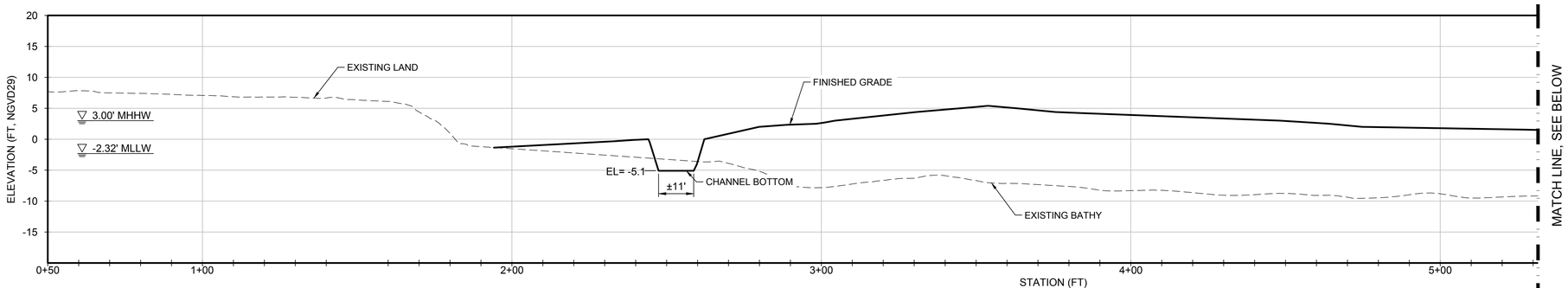
CCS27 COORDINATE

CCS83 COORDINATE

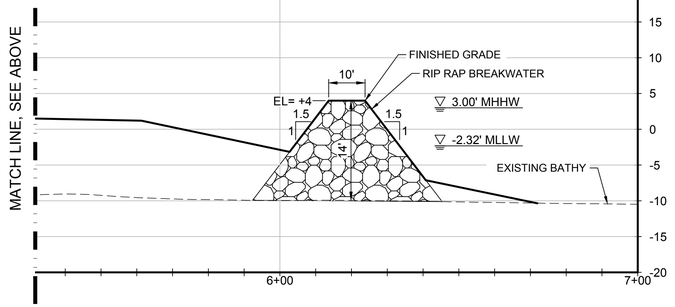
CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

FILE NAME: G:\SD\10278 – Mission Bay PEIR\7 Design\CAD_Active_SheetSet (Mission Bay Program EIR-Shoreline)\10278-C-17.dwg
PLOTTED: Wednesday, November 25, 2020 – 8:24am USER: rdeeb



A1 / C-17 DE ANZA POINT
SCALE: HORZ 1"=20', 1"=10" VERT



A1 / C-17 DE ANZA POINT
SCALE: HORZ 1"=20', 1"=10" VERT

10' 0' 10' 20'
SCALE: 1"=10'

20' 0' 20' 40'
SCALE: 1"=20'

C-18

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
DE ANZA – PROFILE VIEW 1

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM

CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING
0 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

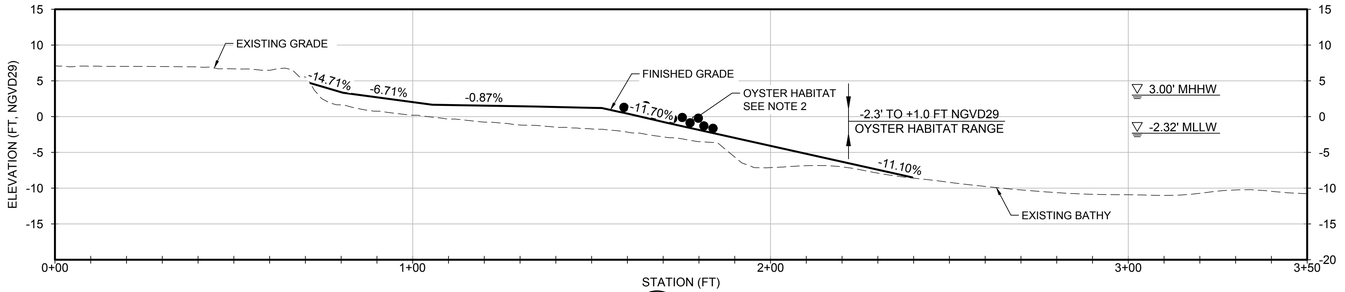
CCS27 COORDINATE

CCS83 COORDINATE

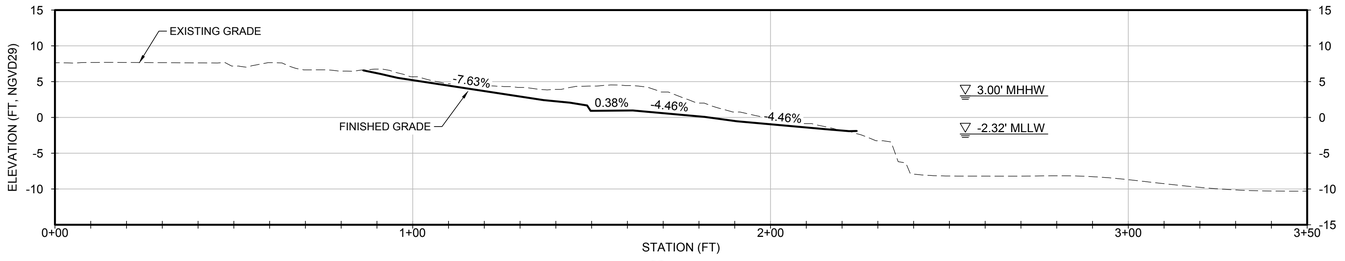
CONTRACTOR
INSPECTOR
DATE STARTED
DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

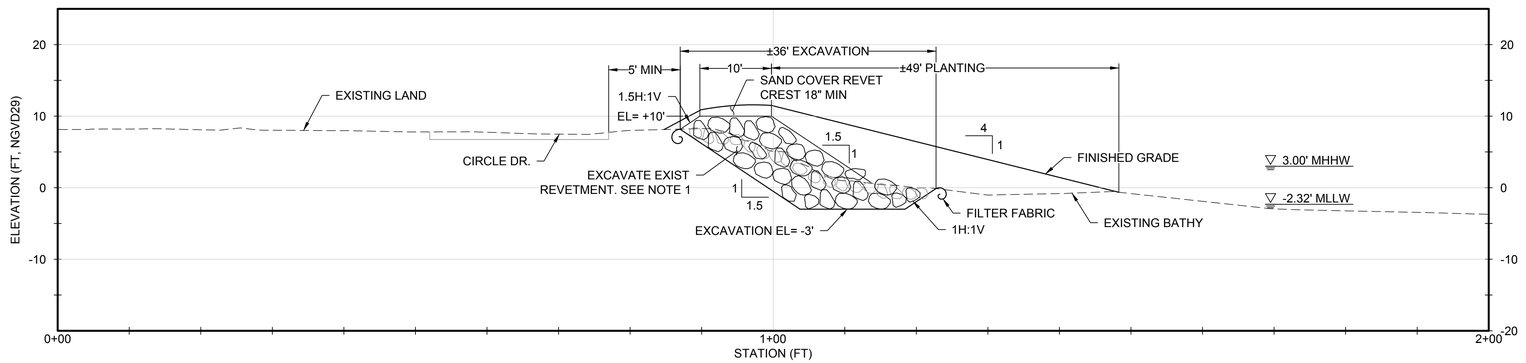
FILE NAME: G:\SD\10278 - Mission Bay PEIR\7 Design\CADD_Active_SheetSet (Mission Bay Program EIR-Shoreline)\10278-C-18.dwg
PLOTTED: Wednesday, November 25, 2020 - 8:24am USER: rdeob



A2 C-17 DE ANZA POINT
SCALE: HORIZ 1"=20', 1"=10" VERT



B2 C-17 DE ANZA POINT
SCALE: HORZ 1"=20', 1"=10" VERT



C2 C-17 ROSE CREEK/ DE ANZA
SCALE: 1"=10'

NOTES:

1. EXCAVATE AND REMOVE EXISTING REVETMENT WITHIN CONSTRUCTION LIMITS, REUSE ACCEPTABLE EXISTING REVETMENT AND DISPOSE OF UNACCEPTABLE AND NON-NATIVE MATERIAL
2. OYSTER HABITAT TO BE CONSTRUCTED OF ONE OR MORE OF THE FOLLOWING:
   - EXISTING, UNDERSIZED RIP RAP
   - OYSTER CULTCH BAGS
   - REEF BALLS, OR SIMILAR

10' 0' 10' 20'
SCALE: 1"=10'

20' 0' 20' 40'
SCALE: 1"=20'

C–19

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
DE ANZA – PROFILE VIEW 2

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM

CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING
0 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

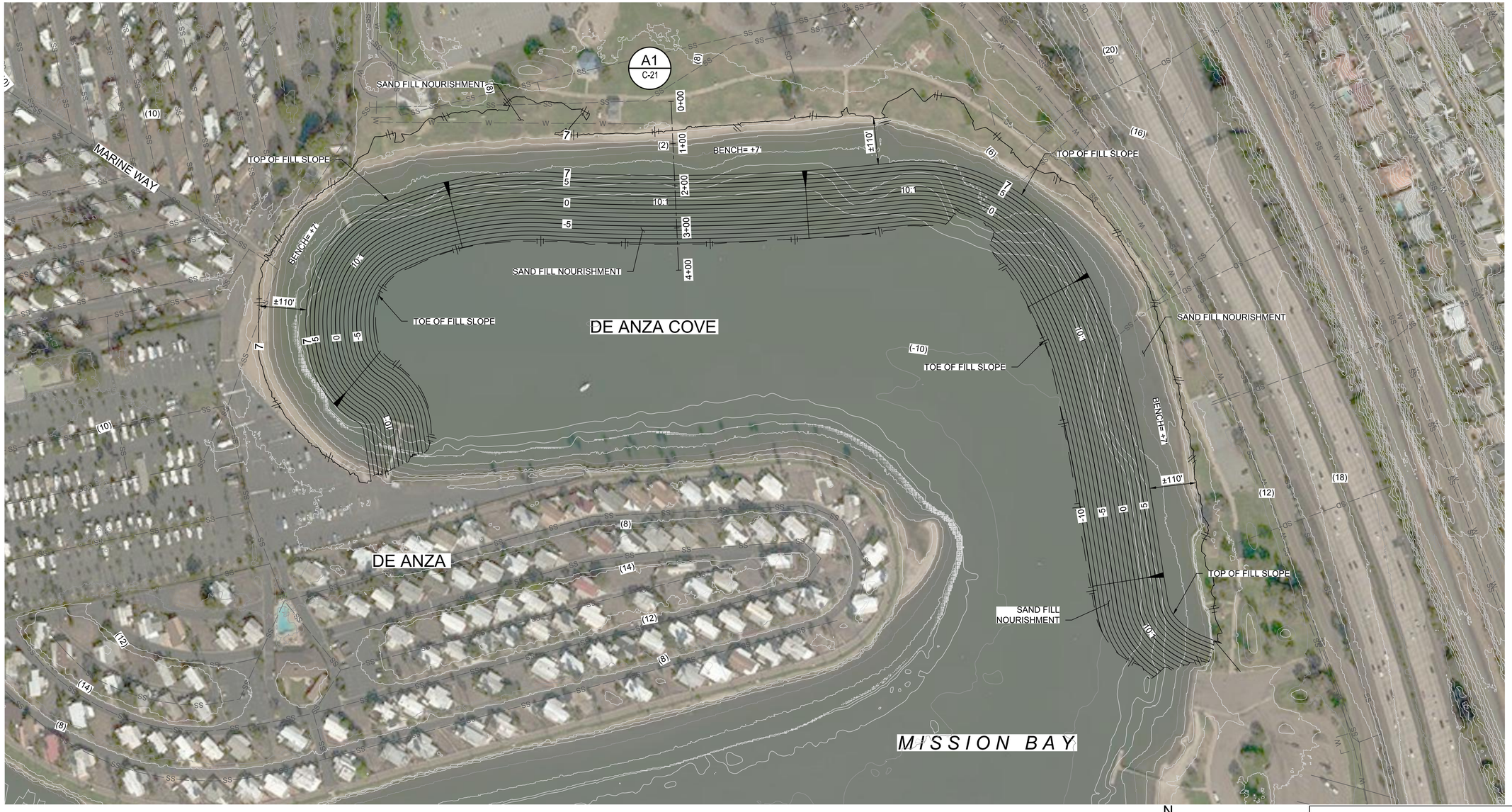
CCS27 COORDINATE

CCS83 COORDINATE

CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

FILE NAME: G:\SD\10278 - Mission Bay PEIR\7 Design\VD4000_Active_Sheet\Sht (Mission Bay Program EIR--Shorelines)\10278-C-19.dwg
PLOTTED: Wednesday, November 25, 2020 - 8:24am USER: rdeeb



C-20

NOTES:

1. SEE TITLE SHEET, T-01, FOR LEGEND.
2. SEE SHEET C-17 FOR DE ANZA POINT.

QUANTITIES:

DE ANZA COVE SAND FILL NOURISHMENT = 210,700 CY

N

120' 0' 120' 240'

SCALE: 1"=120'

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
DE ANZA COVE – PLAN VIEW

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM			
CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING

0 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

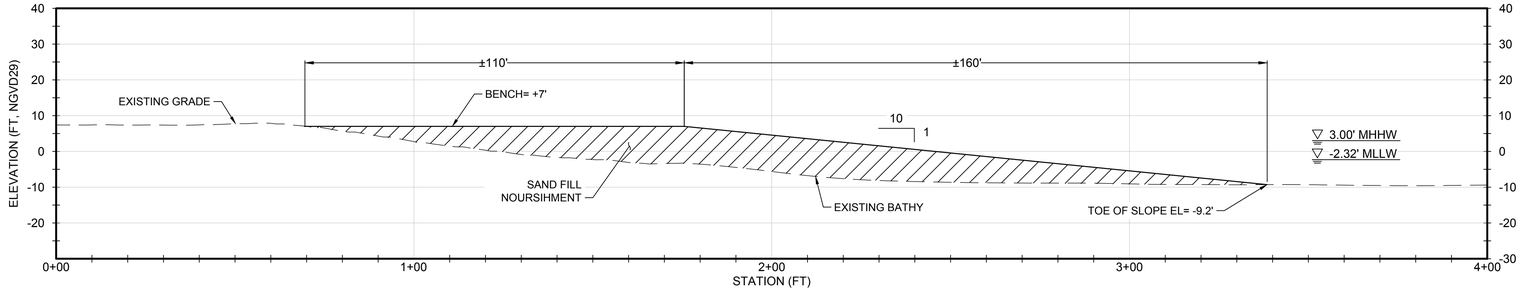
CCS27 COORDINATE

CCS83 COORDINATE

CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

FILE NAME: O:\SD\10278 - Mission Bay PEIR\7 Design\CAD_Active_SheetSet (Mission Bay Program EIR-Shoreline)\10278-C-20.dwg
PLOTTED: Wednesday, November 25, 2020 - 8:25am USER: rdavis



A1 / C-20 DE ANZA COVE
SCALE: 1"=20'

20' 0' 20' 40'
SCALE: 1"=20'

C-21

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION
DE ANZA COVE – PROFILE VIEW

PRELIMINARY
NOT FOR CONSTRUCTION

CONSTRUCTION CHANGE / ADDENDUM			
CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING
0 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works

moffatt & nichol
1660 HOTEL CIRCLE NORTH, SUITE 500
SAN DIEGO, CALIFORNIA 92108
PH (619) 220-6050 FAX (619) 220-6055

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET OF SHEETS

WBS

APPROVED:
FOR CITY ENGINEER DATE
PRINT NAME RCE#

SUBMITTED BY:
PROJECT MANAGER

CHECKED BY:
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			

CCS27 COORDINATE

CCS83 COORDINATE

CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

30% DESIGN - 25 NOVEMBER 2020

FILE NAME: Q:\SD\10278 - Mission Bay PMPR\7 Design\CADD_Active_SheetSet (Mission Bay Program EIR-Shorelines)\10278-C-21.dwg
PLOTTED: Wednesday, November 25, 2020 - 8:28am USER: rdeeb

C. Preliminary Opinion of Probable Construction Cost Estimate

11/24/2020 19:35
2020-70A
MISSION BAY PEIR - SHORELINE RESTORATION - ALT 1
*** Jack Fink

BID TOTALS

Biditem	Description	Status - Rnd	Quantity	Units	Unit Price	Bid Total
1000	BONITA COVE		1.000	LS	1,910,876.00	1,910,876.00
2000	VACATION ISLAND NE (SKI BEACH)		1.000	LS	9,859,003.68	9,859,003.68
3000	VACATION ISLAND NW		1.000	LS	15,023,175.09	15,023,175.09
4000	WEST SAIL BAY		1.000	LS	9,732,250.33	9,732,250.33
5000	VACATION ISLAND SW		1.000	LS	2,092,446.43	2,092,446.43
6000	VACATION ISLAND N (WEST OF INGRAHAM ST)		1.000	LS	912,529.71	912,529.71
7000	VENTURA COVE PARK		1.000	LS	1,412,519.54	1,412,519.54
8000	DE ANZA COVE		1.000	LS	17,705,260.01	17,705,260.01
8200	DE ANZA BOOT		1.000	LS	15,804,638.99	15,804,638.99
8400	CROWN POINT		1.000	LS	2,214,569.31	2,214,569.31

Bid Total ========> $76,667,269.09

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION - ALT. 1

Bid Item/ Activity	Bid Description	Bid Quantity	Units	Labor + Burden	Permanent Material	Construction Material	Total Equipment	Subs	Direct Total	Indirect Cost	Addon/ Bond Cost	Total Cost	Markup	Bid Total	Bid Total U.P.	Man Hours
1000	**BONITA COVE**	**1**	**LS**	**$153,817**	**$1,055,785**	**$35,042**	**$133,924**	**$106,976**	**$1,485,543**	**$172,651**	**$12,023**	**$1,670,217**	**$240,659**	**$1,910,876**	**$1,910,876**	**1,841**
1001	MOBILIZATION/DEMOBILIZATION	1	LS	$28,607	$0	$15,000	$17,211	$0	$60,818	$32,110	$492	$93,420	$44,758	$138,177	$138,177	368
A	*Mobilization of Land Based Equip*	*10*	*EA*	*$2,789*	*$0*	*$0*	*$4,711*	*$0*	*$7,500*	*$3,131*	*$61*	*$10,692*	*$4,364*	*$15,056*	*$1,506*	*40*
B	*Set up Site / Laydown Area*	*1*	*EA*	*$11,514*	*$0*	*$7,500*	*$3,894*	*$0*	*$22,908*	*$12,924*	*$185*	*$36,018*	*$18,015*	*$54,033*	*$54,033*	*144*
C	*Clean up Site*	*1*	*EA*	*$11,514*	*$0*	*$0*	*$3,894*	*$0*	*$15,408*	*$12,924*	*$125*	*$28,457*	*$18,015*	*$46,472*	*$46,472*	*144*
D	*Demobilization of Land Based Equip*	*10*	*EA*	*$2,789*	*$0*	*$7,500*	*$4,711*	*$0*	*$15,000*	*$3,131*	*$121*	*$18,253*	*$4,364*	*$22,617*	*$2,262*	*40*
1002	SWPPP	1	LS	$1,079	$170	$3,879	$191	$10,000	$15,318	$1,211	$124	$16,653	$1,688	$18,341	$18,341	14
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$81*	*$10,081*	*$0*	*$10,081*	*$10,081*	*0*
B	*Construct Temp Construction Entrance*	*1*	*EA*	*$1,079*	*$170*	*$3,879*	*$191*	*$0*	*$5,318*	*$1,211*	*$43*	*$6,572*	*$1,688*	*$8,260*	*$8,260*	*14*
1003	SHORELINE RECONSTRUCTION	1	LS	$118,655	$1,051,786	$0	$115,176	$96,976	$1,382,592	$133,184	$11,190	$1,526,966	$185,645	$1,712,611	$1,712,611	1,385
A	*Place Sand Fill for Beach Nourishment*	*16,610*	*CY*	*$80,507*	*$753,833*	*$0*	*$59,859*	*$0*	*$894,199*	*$90,365*	*$7,237*	*$991,802*	*$125,961*	*$1,117,762*	*$67.29*	*940*
B	*Place Caltrans Backing No. 3*	*3,902*	*TON*	*$21,002*	*$168,176*	*$0*	*$30,456*	*$0*	*$219,634*	*$23,574*	*$1,778*	*$244,986*	*$32,860*	*$277,846*	*$71.21*	*245*
C	*Place Cobble Toe*	*2,458*	*TON*	*$17,145*	*$129,776*	*$0*	*$24,862*	*$0*	*$171,783*	*$19,244*	*$1,390*	*$192,417*	*$26,825*	*$219,242*	*$89.20*	*200*
D	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$30,000*	*$30,000*	*$0*	*$243*	*$30,243*	*$0*	*$30,243*	*$15,121*	*0*
E	*Remove Concrete Sidewalk*	*300*	*LF*	*$0*	*$0*	*$0*	*$0*	*$18,781*	*$18,781*	*$0*	*$152*	*$18,933*	*$0*	*$18,933*	*$63.11*	*0*
F	*Construct New Sidewalk*	*300*	*LF*	*$0*	*$0*	*$0*	*$0*	*$48,195*	*$48,195*	*$0*	*$390*	*$48,585*	*$0*	*$48,585*	*$162*	*0*
1008	CONSTRUCTION ACCESS	1	LS	$4,364	$0	$16,163	$1,156	$0	$21,683	$4,899	$175	$26,757	$6,829	$33,586	$33,586	60
1009	INSTALL SIGNS	1	LS	$1,112	$3,829	$0	$191	$0	$5,132	$1,248	$42	$6,421	$1,740	$8,161	$8,161	14
2000	**VACATION ISLAND NE (SKI BEACH)**	**1**	**LS**	**$767,334**	**$6,108,494**	**$46,979**	**$761,750**	**$50,000**	**$7,734,557**	**$861,291**	**$62,600**	**$8,658,448**	**$1,200,556**	**$9,859,004**	**$9,859,004**	**8,405**
2001	MOBILIZATION/DEMOBILIZATION	1	LS	$41,328	$0	$0	$56,491	$0	$97,819	$46,389	$792	$144,999	$64,662	$209,661	$209,661	460
A	*Mobilization of Land Based Equip*	*20*	*EA*	*$5,578*	*$0*	*$0*	*$9,423*	*$0*	*$15,001*	*$6,261*	*$121*	*$21,384*	*$8,728*	*$30,112*	*$1,506*	*80*
B	*Demobilization of Land Based Equip*	*20*	*EA*	*$5,578*	*$0*	*$0*	*$9,423*	*$0*	*$15,001*	*$6,261*	*$121*	*$21,384*	*$8,728*	*$30,112*	*$1,506*	*80*
C	*Mobilization of Marine Equip*	*1*	*EA*	*$15,815*	*$0*	*$0*	*$17,829*	*$0*	*$33,643*	*$17,751*	*$272*	*$51,666*	*$24,743*	*$76,410*	*$76,410*	*160*
D	*Demobilization of Marine Equip*	*1*	*EA*	*$7,907*	*$0*	*$0*	*$8,914*	*$0*	*$16,822*	*$8,876*	*$136*	*$25,833*	*$12,372*	*$38,205*	*$38,205*	*80*
E	*Towing*	*2*	*EA*	*$6,450*	*$0*	*$0*	*$10,903*	*$0*	*$17,352*	*$7,239*	*$140*	*$24,732*	*$10,091*	*$34,823*	*$17,411*	*60*
2002	SWPPP	1	LS	$1,079	$170	$3,879	$191	$10,000	$15,318	$1,211	$124	$16,653	$1,688	$18,341	$18,341	14
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$81*	*$10,081*	*$0*	*$10,081*	*$10,081*	*0*
B	*Construct Temp Construction Entrance*	*1*	*EA*	*$1,079*	*$170*	*$3,879*	*$191*	*$0*	*$5,318*	*$1,211*	*$43*	*$6,572*	*$1,688*	*$8,260*	*$8,260*	*14*
2003	SHORELINE RECONSTRUCTION	1	LS	$715,151	$6,099,708	$0	$702,714	$40,000	$7,557,573	$802,719	$61,167	$8,421,459	$1,118,912	$9,540,370	$9,540,370	7,800
A	*Place Sand Fill for Beach Nourishment*	*78,100*	*CY*	*$423,710*	*$3,544,514*	*$0*	*$330,641*	*$0*	*$4,298,865*	*$475,592*	*$34,793*	*$4,809,249*	*$662,929*	*$5,472,178*	*$70.07*	*4,869*
B	*Place Caltrans Backing No. 3*	*26,100*	*TON*	*$91,171*	*$1,124,910*	*$0*	*$102,782*	*$0*	*$1,318,863*	*$102,335*	*$10,674*	*$1,431,872*	*$142,645*	*$1,574,516*	*$60.33*	*922*
C	*Place Cobble Toe*	*27,090*	*TON*	*$118,609*	*$1,430,284*	*$0*	*$133,714*	*$0*	*$1,682,608*	*$133,133*	*$13,618*	*$1,829,359*	*$185,574*	*$2,014,933*	*$74.38*	*1,200*
F	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$40,000*	*$40,000*	*$0*	*$324*	*$40,324*	*$0*	*$40,324*	*$20,162*	*0*
G	*Tow Rock Barges*	*27*	*EA*	*$65,846*	*$0*	*$0*	*$117,749*	*$0*	*$183,594*	*$73,908*	*$1,486*	*$258,989*	*$103,021*	*$362,010*	*$13,408*	*648*
I	*Grade Sand Fill Nourishment*	*1*	*LS*	*$15,815*	*$0*	*$0*	*$17,829*	*$0*	*$33,643*	*$17,751*	*$272*	*$51,666*	*$24,743*	*$76,410*	*$76,410*	*160*
2004	CONSTRUCTION ACCESS	1	LS	$7,274	$0	$43,100	$1,927	$0	$52,301	$8,165	$423	$60,889	$11,381	$72,270	$72,270	100
2005	INSTALL SIGNS	1	LS	$2,502	$8,616	$0	$429	$0	$11,546	$2,808	$93	$14,448	$3,914	$18,362	$18,362	32
3000	**VACATION ISLAND NW**	**1**	**LS**	**$1,129,933**	**$9,133,257**	**$46,979**	**$1,520,605**	**$60,000**	**$11,890,774**	**$1,268,290**	**$96,238**	**$13,255,302**	**$1,767,873**	**$15,023,175**	**$15,023,175**	**11,381**
3001	MOBILIZATION/DEMOBILIZATION	1	LS	$35,750	$0	$0	$47,068	$0	$82,818	$40,127	$670	$123,616	$55,934	$179,549	$179,549	380
A	*Mobilization of Land Based Equip*	*10*	*EA*	*$2,789*	*$0*	*$0*	*$4,711*	*$0*	*$7,500*	*$3,131*	*$61*	*$10,692*	*$4,364*	*$15,056*	*$1,506*	*40*
B	*Demobilization of Land Based Equip*	*10*	*EA*	*$2,789*	*$0*	*$0*	*$4,711*	*$0*	*$7,500*	*$3,131*	*$61*	*$10,692*	*$4,364*	*$15,056*	*$1,506*	*40*
C	*Mobilization of Marine Equip*	*1*	*EA*	*$15,815*	*$0*	*$0*	*$17,829*	*$0*	*$33,643*	*$17,751*	*$272*	*$51,666*	*$24,743*	*$76,410*	*$76,410*	*160*
D	*Demobilization of Marine Equip*	*1*	*EA*	*$7,907*	*$0*	*$0*	*$8,914*	*$0*	*$16,822*	*$8,876*	*$136*	*$25,833*	*$12,372*	*$38,205*	*$38,205*	*80*
E	*Towing*	*2*	*EA*	*$6,450*	*$0*	*$0*	*$10,903*	*$0*	*$17,352*	*$7,239*	*$140*	*$24,732*	*$10,091*	*$34,823*	*$17,411*	*60*
3002	SWPPP	1	LS	$1,079	$170	$3,879	$191	$10,000	$15,318	$1,211	$124	$16,653	$1,688	$18,341	$18,341	14
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$81*	*$10,081*	*$0*	*$10,081*	*$10,081*	*0*
B	*Construct Temp Construction Entrance*	*1*	*EA*	*$1,079*	*$170*	*$3,879*	*$191*	*$0*	*$5,318*	*$1,211*	*$43*	*$6,572*	*$1,688*	*$8,260*	*$8,260*	*14*

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION - ALT. 1

Bid Item/ *Activity*	Bid Description	Bid Quantity	Units	Labor + Burden	Permanent Material	Construction Material	Total Equipment	Subs	Direct Total	Indirect Cost	Addon/ Bond Cost	Total Cost	Markup	Bid Total	Bid Total U.P.	Man Hours
3003	SHORELINE RECONSTRUCTION	1	LS	$1,083,051	$9,123,514	$0	$1,470,943	$50,000	$11,727,508	$1,215,667	$94,917	$13,038,092	$1,694,522	$14,732,613	$14,732,613	10,852
A	*Place Sand Fill for Beach Nourishment*	*180,620*	*CY*	*$595,064*	*$8,197,312*	*$0*	*$670,844*	*$0*	*$9,463,219*	*$667,927*	*$76,591*	*$10,207,737*	*$931,026*	*$11,138,763*	*$61.67*	*6,020*
B	*Place Rip Rap Stone Groin*	*21,420*	*TON*	*$105,106*	*$926,201*	*$0*	*$115,413*	*$0*	*$1,146,721*	*$117,976*	*$9,281*	*$1,273,978*	*$164,448*	*$1,438,426*	*$67.15*	*1,064*
C	*Tow Sand/Rock Barges*	*157*	*EA*	*$382,881*	*$0*	*$0*	*$684,686*	*$0*	*$1,067,568*	*$429,764*	*$8,640*	*$1,505,972*	*$599,049*	*$2,105,020*	*$13,408*	*3,768*
D	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$50,000*	*$50,000*	*$0*	*$405*	*$50,405*	*$0*	*$50,405*	*$25,202*	*0*
3004	CONSTRUCTION ACCESS	1	LS	$7,274	$0	$43,100	$1,927	$0	$52,301	$8,165	$423	$60,889	$11,381	$72,270	$72,270	100
3005	INSTALL SIGNS	1	LS	$2,780	$9,573	$0	$476	$0	$12,829	$3,120	$104	$16,053	$4,349	$20,402	$20,402	35
4000	**WEST SAIL BAY**	**1**	**LS**	**$778,688**	**$5,694,990**	**$30,817**	**$1,024,061**	**$50,000**	**$7,578,556**	**$874,036**	**$61,337**	**$8,513,929**	**$1,218,321**	**$9,732,250**	**$9,732,250**	**7,976**
4001	MOBILIZATION/DEMOBILIZATION	1	LS	$35,750	$0	$0	$47,068	$0	$82,818	$40,127	$670	$123,616	$55,934	$179,549	$179,549	380
A	*Mobilization of Land Based Equip*	*10*	*EA*	*$2,789*	*$0*	*$0*	*$4,711*	*$0*	*$7,500*	*$3,131*	*$61*	*$10,692*	*$4,364*	*$15,056*	*$1,506*	*40*
B	*Demobilization of Land Based Equip*	*10*	*EA*	*$2,789*	*$0*	*$0*	*$4,711*	*$0*	*$7,500*	*$3,131*	*$61*	*$10,692*	*$4,364*	*$15,056*	*$1,506*	*40*
C	*Mobilization of Marine Equip*	*1*	*EA*	*$15,815*	*$0*	*$0*	*$17,829*	*$0*	*$33,643*	*$17,751*	*$272*	*$51,666*	*$24,743*	*$76,410*	*$76,410*	*160*
D	*Demobilization of Marine Equip*	*1*	*EA*	*$7,907*	*$0*	*$0*	*$8,914*	*$0*	*$16,822*	*$8,876*	*$136*	*$25,833*	*$12,372*	*$38,205*	*$38,205*	*80*
E	*Towing*	*2*	*EA*	*$6,450*	*$0*	*$0*	*$10,903*	*$0*	*$17,352*	*$7,239*	*$140*	*$24,732*	*$10,091*	*$34,823*	*$17,411*	*60*
4002	SWPPP	1	LS	$1,079	$170	$3,879	$191	$10,000	$15,318	$1,211	$124	$16,653	$1,688	$18,341	$18,341	14
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$81*	*$10,081*	*$0*	*$10,081*	*$10,081*	*0*
B	*Construct Temp Construction Entrance*	*1*	*EA*	*$1,079*	*$170*	*$3,879*	*$191*	*$0*	*$5,318*	*$1,211*	*$43*	*$6,572*	*$1,688*	*$8,260*	*$8,260*	*14*
4003	SHORELINE RECONSTRUCTION	1	LS	$728,966	$5,686,205	$0	$973,621	$40,000	$7,428,792	$818,226	$60,125	$8,307,143	$1,140,527	$9,447,670	$9,447,670	7,408
A	*Place Sand Fill for Beach Nourishment*	*125,290*	*CY*	*$412,761*	*$5,686,205*	*$0*	*$465,325*	*$0*	*$6,564,290*	*$463,302*	*$53,128*	*$7,080,721*	*$645,798*	*$7,726,519*	*$61.67*	*4,176*
B	*Sand Fill - Inshore Section*	*62,600*	*CY*	*$67,454*	*$0*	*$0*	*$63,468*	*$0*	*$130,923*	*$75,714*	*$1,060*	*$207,696*	*$105,538*	*$313,234*	*$5.00*	*784*
C	*Tow Sand Barges*	*102*	*EA*	*$248,751*	*$0*	*$0*	*$444,828*	*$0*	*$693,579*	*$279,210*	*$5,614*	*$978,402*	*$389,191*	*$1,367,593*	*$13,408*	*2,448*
D	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$40,000*	*$40,000*	*$0*	*$324*	*$40,324*	*$0*	*$40,324*	*$20,162*	*0*
4004	CONSTRUCTION ACCESS	1	LS	$10,392	$0	$26,938	$2,752	$0	$40,082	$11,664	$324	$52,070	$16,259	$68,329	$68,329	143
4005	INSTALL SIGNS	1	LS	$2,502	$8,616	$0	$429	$0	$11,546	$2,808	$93	$14,448	$3,914	$18,362	$18,362	32
5000	**VACATION ISLAND SW**	**1**	**LS**	**$414,595**	**$644,124**	**$30,817**	**$325,251**	**$50,000**	**$1,464,786**	**$216,249**	**$11,855**	**$1,692,890**	**$399,556**	**$2,092,446**	**$2,092,446**	**4,881**
5001	MOBILIZATION/DEMOBILIZATION	1	LS	$22,314	$0	$0	$37,690	$0	$60,004	$11,639	$486	$72,128	$21,504	$93,632	$93,632	320
A	*Mobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$5,819*	*$243*	*$36,064*	*$10,752*	*$46,816*	*$1,170*	*160*
B	*Demobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$5,819*	*$243*	*$36,064*	*$10,752*	*$46,816*	*$1,170*	*160*
5002	SWPPP	1	LS	$1,079	$170	$3,879	$191	$10,000	$15,318	$563	$124	$16,005	$1,040	$17,044	$17,044	14
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$81*	*$10,081*	*$0*	*$10,081*	*$10,081*	*0*
B	*Construct Temp Construction Entrance*	*1*	*EA*	*$1,079*	*$170*	*$3,879*	*$191*	*$0*	*$5,318*	*$563*	*$43*	*$5,924*	*$1,040*	*$6,963*	*$6,963*	*14*
5003	SHORELINE RECONSTRUCTION	1	LS	$383,438	$637,253	$0	$285,495	$40,000	$1,346,186	$199,998	$10,895	$1,557,078	$369,529	$1,926,607	$1,926,607	4,442
A	*Recover Existing Rip Rap*	*1*	*LS*	*$82,842*	*$0*	*$0*	*$75,924*	*$0*	*$158,766*	*$43,209*	*$1,285*	*$203,261*	*$79,837*	*$283,097*	*$283,097*	*960*
B	*Place Revetment Stone*	*12,522*	*TON*	*$226,903*	*$551,159*	*$0*	*$132,015*	*$0*	*$910,078*	*$118,350*	*$7,366*	*$1,035,794*	*$218,672*	*$1,254,466*	*$100*	*2,714*
C	*Place Sand Cover*	*1,260*	*CY*	*$14,389*	*$57,216*	*$0*	*$10,698*	*$0*	*$82,303*	*$7,505*	*$666*	*$90,474*	*$13,867*	*$104,341*	*$82.81*	*168*
D	*Construct Oyster Habitat*	*1*	*LS*	*$59,305*	*$28,877*	*$0*	*$66,857*	*$0*	*$155,039*	*$30,933*	*$1,255*	*$187,226*	*$57,153*	*$244,380*	*$244,380*	*600*
E	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$40,000*	*$40,000*	*$0*	*$324*	*$40,324*	*$0*	*$40,324*	*$20,162*	*0*
5004	CONSTRUCTION ACCESS	1	LS	$5,819	$0	$26,938	$1,541	$0	$34,298	$3,035	$278	$37,611	$5,608	$43,219	$43,219	80
5005	INSTALL SIGNS	1	LS	$1,946	$6,701	$0	$334	$0	$8,980	$1,015	$73	$10,068	$1,875	$11,943	$11,943	25
6000	**VACATION ISLAND N (WEST OF INGRAHAM S**	**1**	**LS**	**$185,374**	**$214,622**	**$20,042**	**$162,070**	**$50,000**	**$632,107**	**$96,673**	**$5,116**	**$733,896**	**$178,634**	**$912,530**	**$912,530**	**2,205**
6001	MOBILIZATION/DEMOBILIZATION	1	LS	$22,314	$0	$0	$37,690	$0	$60,004	$11,637	$486	$72,126	$21,502	$93,629	$93,629	320
A	*Mobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$5,818*	*$243*	*$36,063*	*$10,751*	*$46,814*	*$1,170*	*160*
B	*Demobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$5,818*	*$243*	*$36,063*	*$10,751*	*$46,814*	*$1,170*	*160*
6002	SWPPP	1	LS	$1,079	$170	$3,879	$191	$10,000	$15,318	$563	$124	$16,005	$1,039	$17,044	$17,044	14
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$81*	*$10,081*	*$0*	*$10,081*	*$10,081*	*0*
B	*Construct Temp Construction Entrance*	*1*	*EA*	*$1,079*	*$170*	*$3,879*	*$191*	*$0*	*$5,318*	*$563*	*$43*	*$5,924*	*$1,039*	*$6,963*	*$6,963*	*14*

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION - ALT. 1

Bid Item/ *Activity*	Bid Description	Bid Quantity	Units	Labor + Burden	Permanent Material	Construction Material	Total Equipment	Subs	Direct Total	Indirect Cost	Addon/ Bond Cost	Total Cost	Markup	Bid Total	Bid Total U.P.	Man Hours
6003	SHORELINE RECONSTRUCTION	1	LS	$156,783	$211,580	$0	$122,890	$40,000	$531,253	$81,763	$4,300	$617,315	$151,083	$768,398	$768,398	1,801
A	*Recover Existing Rip Rap*	*1*	*LS*	*$41,421*	*$0*	*$0*	*$37,962*	*$0*	*$79,383*	*$21,601*	*$642*	*$101,627*	*$39,915*	*$141,542*	*$141,542*	*480*
B	*Place Revetment Stone*	*4,410*	*TON*	*$80,307*	*$179,856*	*$0*	*$46,724*	*$0*	*$306,887*	*$41,880*	*$2,484*	*$351,251*	*$77,387*	*$428,638*	*$97.20*	*961*
C	*Place Sand Cover*	*374*	*CY*	*$3,426*	*$17,285*	*$0*	*$2,547*	*$0*	*$23,258*	*$1,787*	*$188*	*$25,233*	*$3,301*	*$28,534*	*$76.30*	*40*
D	*Construct Oyster Habitat*	*1*	*LS*	*$31,629*	*$14,439*	*$0*	*$35,657*	*$0*	*$81,725*	*$16,495*	*$661*	*$98,881*	*$30,479*	*$129,360*	*$129,360*	*320*
E	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$40,000*	*$40,000*	*$0*	*$324*	*$40,324*	*$0*	*$40,324*	*$20,162*	*0*
6004	CONSTRUCTION ACCESS	1	LS	$4,364	$0	$16,163	$1,156	$0	$21,683	$2,276	$175	$24,135	$4,206	$28,340	$28,340	60
6005	INSTALL SIGNS	1	LS	$834	$2,872	$0	$143	$0	$3,849	$435	$31	$4,315	$804	$5,118	$5,118	11
7000	**VENTURA COVE PARK**	**1**	**LS**	**$287,144**	**$379,369**	**$25,429**	**$236,212**	**$50,000**	**$978,154**	**$149,747**	**$7,917**	**$1,135,818**	**$276,702**	**$1,412,520**	**$1,412,520**	**3,392**
7001	MOBILIZATION/DEMOBILIZATION	1	LS	$22,314	$0	$0	$37,690	$0	$60,004	$11,637	$486	$72,126	$21,502	$93,629	$93,629	320
A	*Mobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$5,818*	*$243*	*$36,063*	*$10,751*	*$46,814*	*$1,170*	*160*
B	*Demobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$5,818*	*$243*	*$36,063*	*$10,751*	*$46,814*	*$1,170*	*160*
7002	SWPPP	1	LS	$1,079	$170	$3,879	$191	$10,000	$15,318	$563	$124	$16,005	$1,039	$17,044	$17,044	14
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$81*	*$10,081*	*$0*	*$10,081*	*$10,081*	*0*
B	*Construct Temp Construction Entrance*	*1*	*EA*	*$1,079*	*$170*	*$3,879*	*$191*	*$0*	*$5,318*	*$563*	*$43*	*$5,924*	*$1,039*	*$6,963*	*$6,963*	*14*
7003	SHORELINE RECONSTRUCTION	1	LS	$257,998	$374,412	$0	$196,937	$40,000	$869,347	$134,547	$7,036	$1,010,930	$248,615	$1,259,545	$1,259,545	2,980
A	*Recover Existing Rip Rap*	*1*	*LS*	*$69,035*	*$0*	*$0*	*$63,270*	*$0*	*$132,305*	*$36,002*	*$1,071*	*$169,378*	*$66,524*	*$235,902*	*$235,902*	*800*
B	*Place Revetment Stone*	*8,033*	*TON*	*$145,473*	*$352,755*	*$0*	*$84,638*	*$0*	*$582,865*	*$75,865*	*$4,717*	*$663,447*	*$140,182*	*$803,630*	*$100*	*1,740*
C	*Construct Oyster Habitat*	*1*	*LS*	*$43,490*	*$21,658*	*$0*	*$49,028*	*$0*	*$114,176*	*$22,680*	*$924*	*$137,781*	*$41,909*	*$179,689*	*$179,689*	*440*
D	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$40,000*	*$40,000*	*$0*	*$324*	*$40,324*	*$0*	*$40,324*	*$20,162*	*0*
7004	CONSTRUCTION ACCESS	1	LS	$4,364	$0	$21,550	$1,156	$0	$27,071	$2,276	$219	$29,566	$4,206	$33,771	$33,771	60
7005	INSTALL SIGNS	1	LS	$1,390	$4,787	$0	$238	$0	$6,415	$725	$52	$7,191	$1,339	$8,531	$8,531	18
8000	**DE ANZA COVE**	**1**	**LS**	**$1,539,898**	**$10,536,298**	**$83,183**	**$1,249,204**	**$50,000**	**$13,458,582**	**$1,728,454**	**$108,928**	**$15,295,964**	**$2,409,296**	**$17,705,260**	**$17,705,260**	**17,606**
8001	MOBILIZATION/DEMOBILIZATION	1	LS	$22,314	$0	$0	$37,690	$0	$60,004	$25,046	$486	$85,536	$34,912	$120,447	$120,447	320
A	*Mobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$12,523*	*$243*	*$42,768*	*$17,456*	*$60,224*	*$1,506*	*160*
B	*Demobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$12,523*	*$243*	*$42,768*	*$17,456*	*$60,224*	*$1,506*	*160*
8002	SWPPP	1	LS	$2,157	$339	$7,758	$381	$10,000	$20,636	$2,422	$167	$23,225	$3,375	$26,600	$26,600	28
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$81*	*$10,081*	*$0*	*$10,081*	*$10,081*	*0*
B	*Construct Temp Construction Entrance*	*2*	*EA*	*$2,157*	*$339*	*$7,758*	*$381*	*$0*	*$10,636*	*$2,422*	*$86*	*$13,144*	*$3,375*	*$16,519*	*$8,260*	*28*
8003	SHORELINE RECONSTRUCTION	1	LS	$1,497,389	$10,518,726	$0	$1,206,822	$40,000	$13,262,937	$1,680,739	$107,344	$15,051,020	$2,342,786	$17,393,807	$17,393,807	17,016
A	*Place Sand Fill for Beach Nourishment*	*231,770*	*CY*	*$1,497,389*	*$10,518,726*	*$0*	*$1,206,822*	*$0*	*$13,222,937*	*$1,680,739*	*$107,020*	*$15,010,697*	*$2,342,786*	*$17,353,483*	*$74.87*	*17,016*
B	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$40,000*	*$40,000*	*$0*	*$324*	*$40,324*	*$0*	*$40,324*	*$20,162*	*0*
8004	CONSRUCTION ACCESS	1	LS	$13,035	$0	$75,425	$3,453	$0	$91,913	$14,631	$744	$107,288	$20,395	$127,683	$127,683	179
8005	INSTALL SIGNS	1	LS	$5,003	$17,232	$0	$858	$0	$23,093	$5,616	$187	$28,895	$7,828	$36,723	$36,723	63
8200	**DE ANZA BOOT**	**1**	**LS**	**$1,415,905**	**$8,470,502**	**$75,102**	**$1,812,211**	**$130,000**	**$11,903,720**	**$1,589,278**	**$96,343**	**$13,589,341**	**$2,215,298**	**$15,804,639**	**$15,804,639**	**17,356**
8201	MOBILIZATION/DEMOBILIZATION	1	LS	$22,314	$0	$0	$37,690	$0	$60,004	$25,046	$486	$85,536	$34,912	$120,447	$120,447	320
A	*Mobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$12,523*	*$243*	*$42,768*	*$17,456*	*$60,224*	*$1,506*	*160*
B	*Demobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$12,523*	*$243*	*$42,768*	*$17,456*	*$60,224*	*$1,506*	*160*
8202	SWPPP	1	LS	$2,157	$339	$7,758	$381	$10,000	$20,636	$2,422	$167	$23,225	$3,375	$26,600	$26,600	28
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$81*	*$10,081*	*$0*	*$10,081*	*$10,081*	*0*
B	*Construct Temp Construction Entrance*	*2*	*EA*	*$2,157*	*$339*	*$7,758*	*$381*	*$0*	*$10,636*	*$2,422*	*$86*	*$13,144*	*$3,375*	*$16,519*	*$8,260*	*28*
8203	SHORELINE/WETLAND RECONSTRUCTION	1	LS	$869,531	$7,076,492	$0	$1,433,142	$80,000	$9,459,166	$976,003	$76,558	$10,511,727	$1,360,452	$11,872,179	$11,872,179	10,795
A	*Excavation*	*18,400*	*CY*	*$90,995*	*$0*	*$0*	*$143,476*	*$0*	*$234,471*	*$102,138*	*$1,898*	*$338,506*	*$142,370*	*$480,876*	*$26.13*	*1,152*
B	*Place Excavated Material*	*18,400*	*CY*	*$29,927*	*$0*	*$0*	*$40,482*	*$0*	*$70,409*	*$33,592*	*$570*	*$104,571*	*$46,824*	*$151,395*	*$8.23*	*360*
C	*Place Fill Material*	*122,540*	*CY*	*$279,203*	*$5,561,398*	*$0*	*$388,875*	*$0*	*$6,229,476*	*$313,391*	*$50,418*	*$6,593,285*	*$436,836*	*$7,030,121*	*$57.37*	*3,458*
D	*Construct Breakwater*	*33,813*	*TON*	*$112,515*	*$1,457,340*	*$0*	*$199,663*	*$0*	*$1,769,519*	*$126,293*	*$14,322*	*$1,910,133*	*$176,039*	*$2,086,173*	*$61.70*	*1,408*
E	*Construct Oyster Habitat*	*1*	*LS*	*$116,471*	*$57,754*	*$0*	*$133,714*	*$0*	*$307,939*	*$130,733*	*$2,492*	*$441,164*	*$182,228*	*$623,392*	*$623,392*	*1,200*
F	*Channel Excavation & Slope Shaping*	*45*	*SH*	*$62,131*	*$0*	*$0*	*$227,248*	*$0*	*$289,380*	*$69,739*	*$2,342*	*$361,461*	*$97,209*	*$458,670*	*$10,193*	*720*
G	*Haul Off Excess Fill*	*18,400*	*CY*	*$178,288*	*$0*	*$0*	*$299,685*	*$0*	*$477,972*	*$200,118*	*$3,868*	*$681,959*	*$278,946*	*$960,905*	*$52.22*	*2,497*
I	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$80,000*	*$80,000*	*$0*	*$647*	*$80,647*	*$0*	*$80,647*	*$40,324*	*0*

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION - ALT. 1

Bid Item/ *Activity*	Bid Description	Bid Quantity	Units	Labor + Burden	Permanent Material	Construction Material	Total Equipment	Subs	Direct Total	Indirect Cost	Addon/ Bond Cost	Total Cost	Markup	Bid Total	Bid Total U.P.	Man Hours
8204	ROSE CREEK	1	LS	$500,961	$1,371,653	$0	$336,048	$40,000	$2,248,661	$562,302	$18,200	$2,829,163	$783,794	$3,612,957	$3,612,957	5,932
A	*Recover Existing Rip Rap*	*1*	*LS*	*$82,842*	*$0*	*$0*	*$75,924*	*$0*	*$158,766*	*$92,985*	*$1,285*	*$253,037*	*$129,613*	*$382,649*	*$382,649*	*960*
B	*Place Revetment Stone*	*17,325*	*TON*	*$313,879*	*$782,413*	*$0*	*$182,619*	*$0*	*$1,278,912*	*$352,313*	*$10,351*	*$1,641,575*	*$491,090*	*$2,132,665*	*$123*	*3,755*
C	*Place Sand Fill*	*11,880*	*CY*	*$95,376*	*$539,177*	*$0*	*$70,913*	*$0*	*$705,466*	*$107,054*	*$5,710*	*$818,229*	*$149,223*	*$967,452*	*$81.44*	*1,114*
D	*Place Sand Cover*	*1,103*	*CY*	*$8,864*	*$50,063*	*$0*	*$6,591*	*$0*	*$65,518*	*$9,950*	*$530*	*$75,998*	*$13,869*	*$89,867*	*$81.48*	*104*
E	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$40,000*	*$40,000*	*$0*	*$324*	*$40,324*	*$0*	*$40,324*	*$20,162*	*0*
8205	CONSTRUCTION ACCESS	1	LS	$14,548	$0	$67,344	$3,854	$0	$85,746	$16,330	$694	$102,769	$22,762	$125,531	$125,531	200
8206	INSTALL SIGNS	1	LS	$6,393	$22,018	$0	$1,096	$0	$29,507	$7,176	$239	$36,922	$10,002	$46,924	$46,924	81
8400	**CROWN POINT**	**1**	**LS**	**$30,324**	**$3,999**	**$75,429**	**$39,613**	**$2,000,000**	**$2,149,364**	**$17,201**	**$17,396**	**$2,183,961**	**$30,608**	**$2,214,569**	**$2,214,569**	**428**
8401	MOBILIZATION/DEMOBILIZATION	1	LS	$22,314	$0	$50,000	$37,690	$0	$110,004	$12,657	$890	$123,552	$22,523	$146,075	$146,075	320
A	*Mobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$25,000*	*$18,845*	*$0*	*$55,002*	*$6,329*	*$445*	*$61,776*	*$11,262*	*$73,037*	*$1,826*	*160*
B	*Demobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$25,000*	*$18,845*	*$0*	*$55,002*	*$6,329*	*$445*	*$61,776*	*$11,262*	*$73,037*	*$1,826*	*160*
8402	SWPPP	1	LS	$1,079	$170	$3,879	$191	$10,000	$15,318	$612	$124	$16,054	$1,089	$17,143	$17,143	14
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$81*	*$10,081*	*$0*	*$10,081*	*$10,081*	*0*
B	*Construct Temp Construction Entrance*	*1*	*EA*	*$1,079*	*$170*	*$3,879*	*$191*	*$0*	*$5,318*	*$612*	*$43*	*$5,973*	*$1,089*	*$7,062*	*$7,062*	*14*
8403	SHORELINE RECONSTRUCTION	1	LS	$0	$0	$0	$0	$1,990,000	$1,990,000	$0	$16,106	$2,006,106	$0	$2,006,106	$2,006,106	0
A	*Construct New Seawall*	*245*	*LF*	*$0*	*$0*	*$0*	*$0*	*$1,960,000*	*$1,960,000*	*$0*	*$15,863*	*$1,975,863*	*$0*	*$1,975,863*	*$8,065*	*0*
B	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$30,000*	*$30,000*	*$0*	*$243*	*$30,243*	*$0*	*$30,243*	*$15,121*	*0*
8404	CONSTRUCTION ACCESS	1	LS	$5,819	$0	$21,550	$1,541	$0	$28,911	$3,301	$234	$32,446	$5,874	$38,320	$38,320	80
8405	INSTALL SIGNS	1	LS	$1,112	$3,829	$0	$191	$0	$5,132	$631	$42	$5,804	$1,122	$6,926	$6,926	14
9000	CONTRACTOR INDIRECTS	87	MO	$5,151,820	$0	$1,273,675	$548,374	$0	$6,973,868							
10000A	*Contractors Office*	*87*	*MO*	*$0*	*$0*	*$481,100*	*$0*	*$0*	*$481,100*							
10000B	*QC Facilities*	*87*	*MO*	*$0*	*$0*	*$43,500*	*$0*	*$0*	*$43,500*							
10000C	*Supervision*	*87*	*MO*	*$4,986,242*	*$0*	*$0*	*$0*	*$0*	*$4,986,242*							
10000D	*Survey*	*87*	*MO*	*$0*	*$0*	*$65,250*	*$0*	*$0*	*$65,250*							
10000E	*Vehicle Expenses*	*87*	*MO*	*$0*	*$0*	*$0*	*$548,374*	*$0*	*$548,374*							
10000F	*Lodging Expenses*	*87*	*MO*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*							
10000G	*Travel Expenses*	*87*	*MO*	*$0*	*$0*	*$87,000*	*$0*	*$0*	*$87,000*							
10000H	*Security*	*87*	*MO*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*							
10000I	*Safety Training & Supplies*	*87*	*MO*	*$0*	*$0*	*$230,700*	*$0*	*$0*	*$230,700*							
10000J	*Permits*	*1*	*LS*	*$0*	*$0*	*$5,000*	*$0*	*$0*	*$5,000*							
10000K	*Small Tools & Supplies*	*1*	*LS*	*$0*	*$0*	*$355,020*	*$0*	*$0*	*$361,125*							
10000L	*Premium for Unscheduled Overtime*	*1*	*LS*	*$162,779*	*$0*	*$0*	*$0*	*$0*	*$165,578*							
				$6,703,012	**$42,241,438**	**$469,817**	**$7,264,900**	**$2,596,976**	**$59,276,142**	**$6,973,870**	**$479,754**	**$66,729,766**	**$9,937,503**	**$76,667,269**		**75,470**

ESTIMATE SUMMARY - COSTS & BID PRICES

Bid# / Client# / Bid Description	Quantity	Unit	Manhours	Direct Labor	Perm Matl	Constr Matl	Equip-Ment	Sub-Contr	Direct Total	Indirect Charge	Total Cost	Total Cost Unit Price	Markup	Balanced Bid Total	Balanced Bid Unit Price	Bid Price	Bid Total
1000	1.00	LS	1,841	153,817	1,055,785	35,042	133,924	106,976	1,485,543	184,674	1,670,217	1,670,217.00	240,659	1,910,876	1,910,876.00	1,910,876.00	1,910,876.00
BONITA COVE			1,841.00	153,816.70	1,055,784.65	35,041.50	133,924.04	106,975.82	1,485,542.71	184,674.29			14.4 %				
1001	*1.00*	*LS*	*368*	*28,607*		*15,000*	*17,211*		*60,818*								
MOBILIZATION/DEMOBILIZATION			*368.00*	*28,606.86*		*15,000.00*	*17,210.84*		*60,817.70*								
1002	*1.00*	*LS*	*14*	*1,079*	*170*	*3,879*	*191*	*10,000*	*15,318*								
SWPPP			*14.00*	*1,078.71*	*169.71*	*3,879.00*	*190.58*	*10,000.00*	*15,318.00*								
1003	*1.00*	*LS*	*1,385*	*118,655*	*1,051,786*		*115,176*	*96,976*	*1,382,592*								
SHORELINE RECONSTRUCTION			*1,385.00*	*118,654.82*	*1,051,785.68*		*115,175.96*	*96,975.82*	*1,382,592.28*								
1008	*1.00*	*LS*	*60*	*4,364*		*16,163*	*1,156*		*21,683*								
CONSTRUCTION ACCESS			*60.00*	*4,364.47*		*16,162.50*	*1,156.08*		*21,683.05*								
1009	*1.00*	*LS*	*14*	*1,112*	*3,829*		*191*		*5,132*								
INSTALL SIGNS			*14.00*	*1,111.84*	*3,829.26*		*190.58*		*5,131.68*								
2000	1.00	LS	8,405	767,334	6,108,494	46,979	761,750	50,000	7,734,557	923,891	8,658,448	8,658,447.68	1,200,556	9,859,004	9,859,003.68	9,859,003.68	9,859,003.68
VACATION ISLAND NE (SKI BEACH)			8,405.02	767,333.68	6,108,493.66	46,979.00	761,750.43	50,000.00	7,734,556.77	923,890.91			13.9 %				
2001	*1.00*	*LS*	*460*	*41,328*			*56,491*		*97,819*								
MOBILIZATION/DEMOBILIZATION			*460.00*	*41,328.34*			*56,490.60*		*97,818.94*								
2002	*1.00*	*LS*	*14*	*1,079*	*170*	*3,879*	*191*	*10,000*	*15,318*								
SWPPP			*14.00*	*1,078.71*	*169.71*	*3,879.00*	*190.58*	*10,000.00*	*15,318.00*								
2003	*1.00*	*LS*	*7,800*	*715,151*	*6,099,708*		*702,714*	*40,000*	*7,557,573*								
SHORELINE RECONSTRUCTION			*7,799.52*	*715,150.86*	*6,099,708.11*		*702,713.65*	*40,000.00*	*7,557,572.62*								
2004	*1.00*	*LS*	*100*	*7,274*		*43,100*	*1,927*		*52,301*								
CONSTRUCTION ACCESS			*100.00*	*7,274.12*		*43,100.00*	*1,926.80*		*52,300.92*								
2005	*1.00*	*LS*	*32*	*2,502*	*8,616*		*429*		*11,546*								
INSTALL SIGNS			*31.50*	*2,501.65*	*8,615.84*		*428.80*		*11,546.29*								
3000	1.00	LS	11,381	1,129,933	9,133,257	46,979	1,520,605	60,000	11,890,774	1,364,528	13,255,302	13,255,302.09	1,767,873	15,023,175	15,023,175.09	15,023,175.09	15,023,175.09
VACATION ISLAND NW			11,381.40	1,129,933.47	9,133,256.55	46,979.00	1,520,604.66	60,000.00	11,890,773.68	1,364,528.41			13.3 %				
3001	*1.00*	*LS*	*380*	*35,750*			*47,068*		*82,818*								
MOBILIZATION/DEMOBILIZATION			*380.00*	*35,749.90*			*47,068.04*		*82,817.94*								
3002	*1.00*	*LS*	*14*	*1,079*	*170*	*3,879*	*191*	*10,000*	*15,318*								
SWPPP			*14.00*	*1,078.71*	*169.71*	*3,879.00*	*190.58*	*10,000.00*	*15,318.00*								

ESTIMATE SUMMARY - COSTS & BID PRICES

Bid# / Client# / Bid Description	Quantity	Unit	Manhours	Direct Labor	Perm Matl	Constr Matl	Equip-ment	Sub-Contr	Direct Total	Indirect Charge	Total Cost	Total Cost Unit Price	Markup	Balanced Bid Total	Balanced Bid Unit Price	Bid Price	Bid Total
3003	*1.00*	*LS*	*10,852*	*1,083,051*	*9,123,514*		*1,470,943*	*50,000*	*11,727,508*								
SHORELINE RECONSTRUCTION			*10,852.40*	*1,083,051.14*	*9,123,513.68*		*1,470,942.80*	*50,000.00*	*11,727,507.62*								
3004	*1.00*	*LS*	*100*	*7,274*		*43,100*	*1,927*		*52,301*								
CONSTRUCTION ACCESS			*100.00*	*7,274.12*		*43,100.00*	*1,926.80*		*52,300.92*								
3005	*1.00*	*LS*	*35*	*2,780*	*9,573*		*476*		*12,829*								
INSTALL SIGNS			*35.00*	*2,779.60*	*9,573.16*		*476.44*		*12,829.20*								
4000	1.00	LS	7,976	778,688	5,694,990	30,817	1,024,061	50,000	7,578,556	935,373	8,513,929	8,513,929.33	1,218,321	9,732,250	9,732,250.33	9,732,250.33	9,732,250.33
WEST SAIL BAY			7,975.90	778,688.12	5,694,990.10	30,816.50	1,024,061.29	50,000.00	7,578,556.01	935,373.32			14.3 %				
4001	*1.00*	*LS*	*380*	*35,750*			*47,068*		*82,818*								
MOBILIZATION/DEMOBILIZATION			*380.00*	*35,749.90*			*47,068.04*		*82,817.94*								
4002	*1.00*	*LS*	*14*	*1,079*	*170*	*3,879*	*191*	*10,000*	*15,318*								
SWPPP			*14.00*	*1,078.71*	*169.71*	*3,879.00*	*190.58*	*10,000.00*	*15,318.00*								
4003	*1.00*	*LS*	*7,408*	*728,966*	*5,686,205*		*973,621*	*40,000*	*7,428,792*								
SHORELINE RECONSTRUCTION			*7,407.54*	*728,966.06*	*5,686,204.55*		*973,621.44*	*40,000.00*	*7,428,792.05*								
4004	*1.00*	*LS*	*143*	*10,392*		*26,938*	*2,752*		*40,082*								
CONSTRUCTION ACCESS			*142.86*	*10,391.80*		*26,937.50*	*2,752.43*		*40,081.73*								
4005	*1.00*	*LS*	*32*	*2,502*	*8,616*		*429*		*11,546*								
INSTALL SIGNS			*31.50*	*2,501.65*	*8,615.84*		*428.80*		*11,546.29*								
5000	1.00	LS	4,881	414,595	644,124	30,817	325,251	50,000	1,464,786	228,104	1,692,890	1,692,890.43	399,556	2,092,446	2,092,446.43	2,092,446.43	2,092,446.43
VACATION ISLAND SW			4,880.74	414,595.49	644,123.50	30,816.50	325,250.64	50,000.00	1,464,786.13	228,104.30			23.6 %				
5001	*1.00*	*LS*	*320*	*22,314*			*37,690*		*60,004*								
MOBILIZATION/DEMOBILIZATION			*320.00*	*22,313.70*			*37,690.24*		*60,003.94*								
5002	*1.00*	*LS*	*14*	*1,079*	*170*	*3,879*	*191*	*10,000*	*15,318*								
SWPPP			*14.00*	*1,078.71*	*169.71*	*3,879.00*	*190.58*	*10,000.00*	*15,318.00*								
5003	*1.00*	*LS*	*4,442*	*383,438*	*637,253*		*285,495*	*40,000*	*1,346,186*								
SHORELINE RECONSTRUCTION			*4,442.24*	*383,438.06*	*637,252.58*		*285,494.87*	*40,000.00*	*1,346,185.51*								
5004	*1.00*	*LS*	*80*	*5,819*		*26,938*	*1,541*		*34,298*								
CONSTRUCTION ACCESS			*80.00*	*5,819.29*		*26,937.50*	*1,541.44*		*34,298.23*								
5005	*1.00*	*LS*	*25*	*1,946*	*6,701*		*334*		*8,980*								
INSTALL SIGNS			*24.50*	*1,945.73*	*6,701.21*		*333.51*		*8,980.45*								

Bid# / Client# / Bid Description	Quantity	Unit	Manhours	Direct Labor	Perm Matl	Constr Matl	Equip-Ment	Sub-Contr	Direct Total	Indirect Charge	Total Cost	Total Cost Unit Price	Markup	------Balanced Bid------ Total	Unit Price	Bid Price	Bid Total
6000	1.00	LS	2,205	185,374	214,622	20,042	162,070	50,000	632,107	101,789	733,896	733,895.71	178,634	912,530	912,529.71	912,529.71	912,529.71
VACATION ISLAND N (WEST OF INGR			2,205.14	185,373.57	214,621.73	20,041.50	162,069.93	50,000.00	632,106.73	101,788.98			24.3 %				
6001	*1.00*	*LS*	*320*	*22,314*			*37,690*		*60,004*								
MOBILIZATION/DEMOBILIZATION			*320.00*	*22,313.70*			*37,690.24*		*60,003.94*								
6002	*1.00*	*LS*	*14*	*1,079*	*170*	*3,879*	*191*	*10,000*	*15,318*								
SWPPP			*14.00*	*1,078.71*	*169.71*	*3,879.00*	*190.58*	*10,000.00*	*15,318.00*								
6003	*1.00*	*LS*	*1,801*	*156,783*	*211,580*		*122,890*	*40,000*	*531,253*								
SHORELINE RECONSTRUCTION			*1,800.64*	*156,782.80*	*211,580.07*		*122,890.10*	*40,000.00*	*531,252.97*								
6004	*1.00*	*LS*	*60*	*4,364*		*16,163*	*1,156*		*21,683*								
CONSTRUCTION ACCESS			*60.00*	*4,364.47*		*16,162.50*	*1,156.08*		*21,683.05*								
6005	*1.00*	*LS*	*11*	*834*	*2,872*		*143*		*3,849*								
INSTALL SIGNS			*10.50*	*833.89*	*2,871.95*		*142.93*		*3,848.77*								
7000	1.00	LS	3,392	287,144	379,369	25,429	236,212	50,000	978,154	157,664	1,135,818	1,135,817.54	276,702	1,412,520	1,412,519.54	1,412,519.54	1,412,519.54
VENTURA COVE PARK			3,391.66	287,144.23	379,368.68	25,429.00	236,211.91	50,000.00	978,153.82	157,663.72			24.4 %				
7001	*1.00*	*LS*	*320*	*22,314*			*37,690*		*60,004*								
MOBILIZATION/DEMOBILIZATION			*320.00*	*22,313.70*			*37,690.24*		*60,003.94*								
7002	*1.00*	*LS*	*14*	*1,079*	*170*	*3,879*	*191*	*10,000*	*15,318*								
SWPPP			*14.00*	*1,078.71*	*169.71*	*3,879.00*	*190.58*	*10,000.00*	*15,318.00*								
7003	*1.00*	*LS*	*2,980*	*257,998*	*374,412*		*196,937*	*40,000*	*869,347*								
SHORELINE RECONSTRUCTION			*2,980.16*	*257,997.53*	*374,412.39*		*196,936.79*	*40,000.00*	*869,346.71*								
7004	*1.00*	*LS*	*60*	*4,364*		*21,550*	*1,156*		*27,071*								
CONSTRUCTION ACCESS			*60.00*	*4,364.47*		*21,550.00*	*1,156.08*		*27,070.55*								
7005	*1.00*	*LS*	*18*	*1,390*	*4,787*		*238*		*6,415*								
INSTALL SIGNS			*17.50*	*1,389.82*	*4,786.58*		*238.22*		*6,414.62*								
8000	1.00	LS	17,606	1,539,898	10,536,298	83,183	1,249,204	50,000	13,458,582	1,837,382	15,295,964	15,295,964.01	2,409,296	17,705,260	17,705,260.01	17,705,260.01	17,705,260.01
DE ANZA COVE			17,605.80	1,539,898.39	10,536,297.58	83,183.00	1,249,203.52	50,000.00	13,458,582.49	1,837,381.52			15.8 %				
8001	*1.00*	*LS*	*320*	*22,314*			*37,690*		*60,004*								
MOBILIZATION/DEMOBILIZATION			*320.00*	*22,313.70*			*37,690.24*		*60,003.94*								
8002	*1.00*	*LS*	*28*	*2,157*	*339*	*7,758*	*381*	*10,000*	*20,636*								
SWPPP			*28.00*	*2,157.41*	*339.41*	*7,758.00*	*381.15*	*10,000.00*	*20,635.97*								

ESTIMATE SUMMARY - COSTS & BID PRICES

Bid# / Client# / Bid Description	Quantity	Unit	Manhours	Direct Labor	Perm Matl	Constr Matl	Equip-ment	Sub-Contr	Direct Total	Indirect Charge	Total Cost	Total Cost Unit Price	Markup	Balanced Bid Total	Balanced Bid Unit Price	Bid Price	Bid Total
8003	*1.00*	*LS*	*17,016*	*1,497,389*	*10,518,726*		*1,206,822*	*40,000*	*13,262,937*								
SHORELINE RECONSTRUCTION			*17,015.60*	*1,497,388.78*	*10,518,726.49*		*1,206,821.71*	*40,000.00*	*13,262,936.98*								
8004	*1.00*	*LS*	*179*	*13,035*		*75,425*	*3,453*		*91,913*								
CONSRUCTION ACCESS			*179.20*	*13,035.23*		*75,425.00*	*3,452.83*		*91,913.06*								
8005	*1.00*	*LS*	*63*	*5,003*	*17,232*		*858*		*23,093*								
INSTALL SIGNS			*63.00*	*5,003.27*	*17,231.68*		*857.59*		*23,092.54*								
8200	1.00	LS	17,356	1,415,905	8,470,502	75,102	1,812,211	130,000	11,903,720	1,685,621	13,589,341	13,589,340.99	2,215,298	15,804,639	15,804,638.99	15,804,638.99	15,804,638.99
DE ANZA BOOT			17,355.61	1,415,904.82	8,470,502.36	75,101.75	1,812,210.87	130,000.00	11,903,719.80	1,685,621.19			16.3 %				
8201	*1.00*	*LS*	*320*	*22,314*			*37,690*		*60,004*								
MOBILIZATION/DEMOBILIZATION			*320.00*	*22,313.70*			*37,690.24*		*60,003.94*								
8202	*1.00*	*LS*	*28*	*2,157*	*339*	*7,758*	*381*	*10,000*	*20,636*								
SWPPP			*28.00*	*2,157.41*	*339.41*	*7,758.00*	*381.15*	*10,000.00*	*20,635.97*								
8203	*1.00*	*LS*	*10,795*	*869,531*	*7,076,492*		*1,433,142*	*80,000*	*9,459,166*								
SHORELINE/WETLAND RECONSTRUCTI			*10,795.35*	*869,531.36*	*7,076,492.03*		*1,433,142.32*	*80,000.00*	*9,459,165.71*								
8204	*1.00*	*LS*	*5,932*	*500,961*	*1,371,653*		*336,048*	*40,000*	*2,248,661*								
ROSE CREEK			*5,931.76*	*500,961.05*	*1,371,652.66*		*336,047.75*	*40,000.00*	*2,248,661.46*								
8205	*1.00*	*LS*	*200*	*14,548*		*67,344*	*3,854*		*85,746*								
CONSTRUCTION ACCESS			*200.00*	*14,548.23*		*67,343.75*	*3,853.60*		*85,745.58*								
8206	*1.00*	*LS*	*81*	*6,393*	*22,018*		*1,096*		*29,507*								
INSTALL SIGNS			*80.50*	*6,393.07*	*22,018.26*		*1,095.81*		*29,507.14*								
8400	1.00	LS	428	30,324	3,999	75,429	39,613	2,000,000	2,149,364	34,597	2,183,961	2,183,961.31	30,608	2,214,569	2,214,569.31	2,214,569.31	2,214,569.31
CROWN POINT			428.00	30,323.54	3,998.97	75,429.00	39,612.84	2,000,000.00	2,149,364.35	34,596.96			1.4 %				
8401	*1.00*	*LS*	*320*	*22,314*		*50,000*	*37,690*		*110,004*								
MOBILIZATION/DEMOBILIZATION			*320.00*	*22,313.70*		*50,000.00*	*37,690.24*		*110,003.94*								
8402	*1.00*	*LS*	*14*	*1,079*	*170*	*3,879*	*191*	*10,000*	*15,318*								
SWPPP			*14.00*	*1,078.71*	*169.71*	*3,879.00*	*190.58*	*10,000.00*	*15,318.00*								
8403	*1.00*	*LS*						*1,990,000*	*1,990,000*								
SHORELINE RECONSTRUCTION								*1,990,000.00*	*1,990,000.00*								
8404	*1.00*	*LS*	*80*	*5,819*		*21,550*	*1,541*		*28,911*								
CONSTRUCTION ACCESS			*80.00*	*5,819.29*		*21,550.00*	*1,541.44*		*28,910.73*								

ESTIMATE SUMMARY - COSTS & BID PRICES

Bid# / Client# / Bid Description	Quantity	Unit	Manhours	Direct Labor	Perm Matl	Constr Matl	Equip-ment	Sub-Contr	Direct Total	Indirect Charge	Total Cost	Total Cost Unit Price	Markup	Balanced Bid Total	Balanced Bid Unit Price	Bid Price	Bid Total
8405	*1.00*	*LS*	*14*	*1,112*	*3,829*		*191*		*5,132*								
INSTALL SIGNS			*14.00*	*1,111.84*	*3,829.26*		*190.58*		*5,131.68*								
Totals:			75,470	6,703,012	42,241,437	469,816	7,264,900	2,596,975	59,276,142	7,453,623	66,729,766		9,937,503	76,667,269			76,667,269.09

Code between Balanced Bid & Bid Price: U=Unbalanced, F=Frozen, C=Closing Biditem (item to absorb unbalancing differences).
[bracketed numbers represent adjusted quantities]
** in front of the Biditem indicates a Non-Additive item

Markup % is shown as a percentage of cost

9000	CONTRACTOR INDIRECT			5,151,820		1,273,675	548,374		6,973,868							
Bond from Summary Table										479,753						
Markup on Resource Costs													9,937,503			
********* TOTAL	JOB =====>		75,470	11,854,831	42,241,437	1,743,491	7,813,274	2,596,975	66,250,010	479,753	66,729,766		9,937,503	76,667,269		76,667,269.09

Spread Indirects On LABOR COST Spread Markups On LABOR COST Spread Addons&Bonds On TOTAL COST

Bond Calculations
Selected Bond Table: B2Description: Bond Code #2 (RS

	Contract Amount	Rate per 1000	Bond Amount
First:	$ 500,000	17.00	$ 8,500.00
Next:	$ 2,000,000	10.00	$ 20,000.00
Next:	$ 2,500,000	7.50	$ 18,750.00
Next:	$ 2,500,000	7.00	$ 17,500.00
Next:	$ 7,500,000	6.00	$ 45,000.00
Remainder:		6.00	$ 370,003.61
		Subtotal:	$ 479,753.61
Time Threshold 1: 0	**Extended Time Rate 1:** 0.0000 %		$ 0.00
Time Threshold 2: 0	**Extended Time Rate 2:** 0.0000 %		$ 0.00
Length of Job: 75	**Total Bond Amount:**		$ 479,753.61

-----Estimate Notes-----
Bid Date: 11/17/2020 Owner: Engineering Firm:
Estimator in Charge: JF

ESTIMATE SUMMARY - COSTS & BID PRICES

Bid#	Client# / Bid Description	Quantity	Unit / Manhours	Direct Labor	Perm Matl	Constr Matl	Equip-ment	Sub-Contr	Direct Total	Indirect Charge	Total Cost	Total Cost Unit Price	Markup	Balanced Bid Total	Balanced Bid Unit Price	Bid Price	Bid Total

Desired Bid (if specified)= 0.00 Sort: Hold Acct: Y Subitem: Y NonAdd: Y
Last Summary on 11/24/2020 at 7:28 PM.
Last Spread on 11/24/2020 at 7:28 PM.

NOTE: Biditems that are subitems (have a parent biditem) are printed in italics.

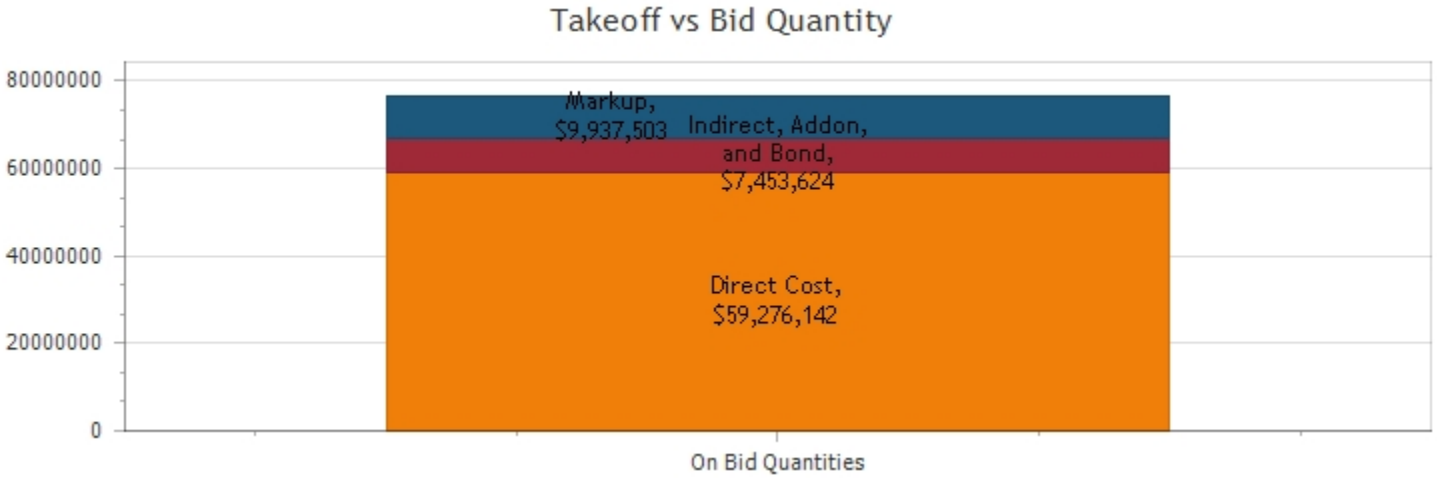
Estimate Recap Report

Project Information

Estimate:	2020-70A - MISSION BAY PEIR - SHORELINE RESTORATION	**Bid Date:**	11/17/2020
Project:	10278	**Review Date:**	-
Estimator In Charge:	JF - Jack Fink	**Job Duration:**	75 months
Owner:	-	**State:**	CA
Engineer:	-	**Estimate Type:**	Estimate
Related Estimate:	2017-03H - CARDIFF BEACH LIVING SHORELINE FINAL R2		

Estimate Summary

	On Bid Quantities	%
Direct Cost	59,276,142	77.32%
Indirect Cost	6,973,868	9.10%
Addons	0	0.00%
Bond	479,754	0.63%
Pass Through Cost	0	0.00%
Direct Markup	9,937,503	12.96%
Indirect Markup	0	0.00%
Markup Addons	0	0.00%
+ / - Adjustments	0	
Pass Through Adjustment	0	
Unbalancing Difference	0	0.00%
Rounding Difference	0	
Desired Bid	0.00	
Final Bid Total	76,667,269.09	100.00%
Final Markup (% Based on Cost)	9,937,503	14.89%



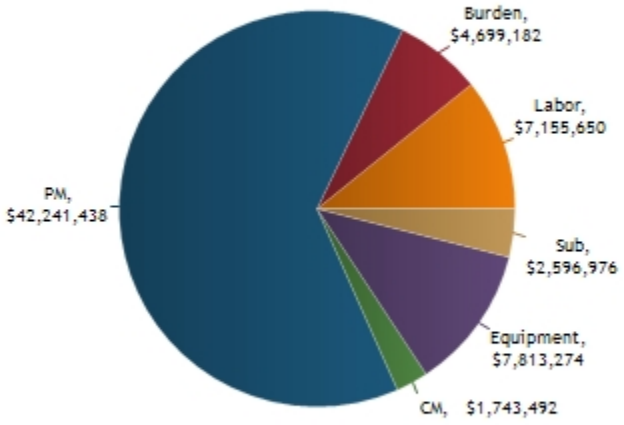
Other Totals

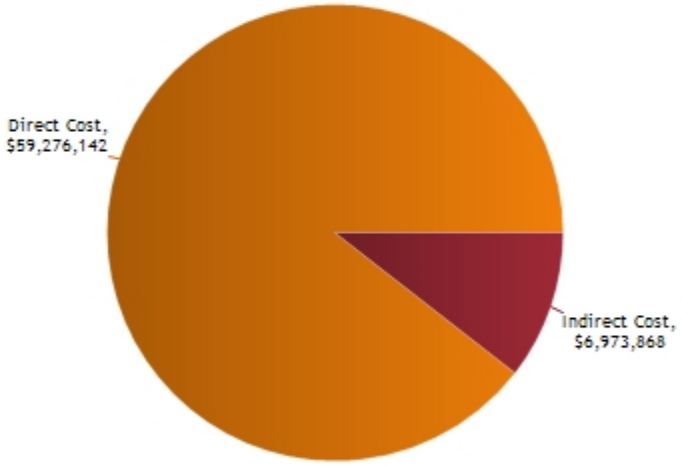
Total Sales Tax	$3,093,338
Total Escalation	$0
Labor % of Job Cost	17.77 %
Equipment % of Job Cost	11.71 %

Burden % of Direct Labor	48.79 %
Burden % of Indirect Labor	27.74 %
EOE % of Equipment	57.20 %
Current Minority %	0.00 %

Totals by Cost Type - Bid Quantities

	Direct	Indirect	Total	% of Total
Base Labor	3,432,840	3,722,810	7,155,650	10.80%
Burden	3,270,172	1,429,009	4,699,182	7.09%
Total Labor	**6,703,012**	**5,151,820**	**11,854,832**	**17.89%**
Inside Equipment	0	0	0	0.00%
Outside Equipment	3,268,252	75,553	3,343,805	5.05%
EOE	3,996,648	472,821	4,469,469	6.75%
Total Equipment	**7,264,900**	**548,374**	**7,813,274**	**11.79%**
Permanent Materials	42,241,438	0	42,241,438	63.76%
Construction Materials	469,817	1,273,675	1,743,492	2.63%
Subcontractors	2,596,976	0	2,596,976	3.92%
Misc 1	0	0	0	0.00%
Misc 2	0	0	0	0.00%
Misc 3	0	0	0	0.00%
Totals	**59,276,142**	**6,973,868**	**66,250,011**	**100.00%**





Fuel Summary

Fuel Type	Quantity	Units
Gasoline	497,775	Gal
Diesel	629,305	Gal
Off-Road	0	Gal

Sales Tax Summary

	Setup Tax %	Average Tax %	Total Taxes
Permanent Materials	7.75%	7.75%	3,038,247
Construction Materials	7.75%	3.26%	55,091
Inside Equipment	0.00%	0.00%	0
Outside Equipment	0.00%	0.00%	0
EOE	0.00%	0.00%	0
Subcontractors	0.00%	0.00%	0
Misc 1	0.00%	0.00%	0
Misc 2	0.00%	0.00%	0
Misc 3	0.00%	0.00%	0
Total Tax			**3,093,338**

Escalation Summary

	Average Escalation %	Total Escalation
Labor	0.00%	0
Inside Equipment	0.00%	0
Outside Equipment	0.00%	0
EOE	0.00%	0
Permanent Materials	0.00%	0
Construction Materials	0.00%	0
Subcontractors	0.00%	0
Misc 1	0.00%	0
Misc 2	0.00%	0
Misc 3	0.00%	0
Total Escalation		**0**

Labor Summary

	Direct	Indirect	Total
Hourly Labor (MH, MHS, MHR, MHRS)			
Manhours	75,470	0	75,470
Base Labor	3,431,918	0	3,431,918
Premium (on Base Labor)	922	0	922
Burden (includes Premium)	3,270,172	0	3,270,172
Total Labor	**6,703,012**	**0**	**6,703,012**
Daily Labor (DAY, DAYS, DY, DYS)			
None	0	0	0
Weekly Labor (WK, WKS, WEEK)			
None	0	0	0
Monthly Labor (MO, MON, MNTH, MMO, MMOS)			
Months	0	305	305
Base Labor	0	3,588,750	3,588,750
Premium (on Base Labor)	0	0	0
Burden (includes Premium)	0	1,397,492	1,397,492
Total Labor	**0**	**4,986,242**	**4,986,242**
Other Labor			
Base Labor	0	134,060	134,060
Premium (on Base Labor)	0	0	0
Burden (includes Premium)	0	31,518	31,518
Total Labor	**0**	**165,578**	**165,578**

Summary IS Current **Last run 11/24/2020 7:28:00 PM**

Balanced Markup Calculation

Spread IS Current **Last run 11/24/2020 7:28:00 PM**

	Cost	Markup %	Markup $
Labor	0	15.00%	0
Burden	0	15.00%	0
Permanent Materials	0	15.00%	0
Construction Materials	0	15.00%	0
Inside Equipment	0	15.00%	0
Outside Equipment	0	15.00%	0
EOE	0	15.00%	0
Subcontractors	0	15.00%	0
Misc 1	0	15.00%	0
Misc 2	0	15.00%	0
Misc 3	0	15.00%	0
Overrides	66,250,011	15.00%	9,937,503
Total	**66,250,011**	**15.00%**	**9,937,503**

Addons, Bond and Markup Summary Dependent on Bid Summary

	Total	%
Bond		
Bond	479,754	0.63 %
Markup		
Resource Markup	9,937,503	12.96 %
Total Markup	9,937,503	12.96 %
Markup, Addons, and Bond Total	**10,417,257**	**13.59 %**

Key Indicators Dependent on Bid Summary

	Result	Formula
Balanced Markup/Total Labor	83.83%	Balanced Markup / Total Labor
Indirect Cost/Direct Cost	11.77%	Indirect Cost / Direct Cost
Total Manhours	75,470.27	Direct Manhours + Indirect Manhours

Estimate Notes

THIS ESTIMATE IS AN UPDATE TO ESTIMATE 2019-32 (10/9/2019) AND INCLUDES UPDATED BEACH NOURISHMENT VOLUMES AND MATERIAL QUANTITIES. LABOR RATES, EQUIPMENT RATES, AND FUEL RATES HAVE BEEN UPDATED TO 2020.

DETAILS OF THIS ESTIMATE:
Shoreline restoration alternatives to be utilized at multiple locations in Mission Bay for the various eroding shoreline conditions. Shoreline restoration and protection options include revetments, rip rap, seawalls, beach nourishment, living shorelines (i.e. oyster reefs), wetlands, and hybrid solutions. Each location assumes a separate project and includes it's own mobilization and demobilization cost.

**********Estimate created on: 11/17/2020 by User#: 1 - Jack Fink
Source estimate used: L:\HEAVYBID\EST\2019-32

Cost Report

Biditem - Parent

1000

BONITA COVE

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	80,832.00	72,984.70	153,816.70	133,924.04	1,055,784.65	35,041.50	106,975.82	1,485,542.71
Total	80,832.00	72,984.70	153,816.70	133,924.04	1,055,784.65	35,041.50	106,975.82	1,485,542.71

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
1,841.0000	0.0005	1,841.0000	806.9216	43.9066	83.5506	0.0000

Biditem

1001

MOBILIZATION/DEMOBILIZATION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	14,079.20	14,527.66	28,606.86	17,210.84	0.00	15,000.00	0.00	60,817.70
Total	14,079.20	14,527.66	28,606.86	17,210.84	0.00	15,000.00	0.00	60,817.70

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
368.0000	0.0027	368.0000	165.2655	38.2587	77.7360	0.0078

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 10.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	1,075.60	1,713.61	2,789.21	4,711.28	0.00	0.00	0.00	7,500.49

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0490	4.0000	0.2500	187.5123	5.0000	2.0000	0.5000	1,500.0980

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
40.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 40 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 10 loads for loaders, excavator, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	40.00	HR	US$	16.91	100.00	16.91	676.44
820OHTT050	On Hwy Truck 50K	1.00	40.00	HR	US$	100.87	100.00	100.87	4,034.84
TE04	Truck Driver (Gr 5)	1.00	40.00	MH	US$	26.89	100.00	69.73	2,789.21

Activity: B Set up Site / Laydown Area (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	5,964.00	5,550.22	11,514.22	3,894.14	0.00	7,500.00	0.00	22,908.36
Total	5,964.00	5,550.22	11,514.22	3,894.14	0.00	7,500.00	0.00	22,908.36

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
15,408.3600	24.0000	0.0417	642.0150	3.0000	0.3333	3.0000	7,636.1200

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
144.0000	0.0069	144.0000	79.9599	5,964.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 4LAB 4-Man Labor Crew Prod: S 3 Eff: 100.00 Crew Hrs: 24 Labor Pcs: 6.00 Equipment Pcs: 1.00

Notes: Allow time to set up staging and laydown area, unload equipment, and set up trailers and security fencing.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
813RT700E	GROVE RT700E RT Crane 50mt	1.00	24.00	HR	US$	162.26	100.00	162.26	3,894.14
990200	Crane Mobilization	1.00	1.00	LS	US$	7,500.00	100.00	7,500.00	7,500.00
LA01	Laborer Foreman	1.00	24.00	MH	US$	41.02	100.00	78.48	1,883.55
LA02	Laborer (Gr 5)	4.00	96.00	MH	US$	39.02	100.00	75.76	7,272.79
OE10	Crane Operator (<100 tn)	1.00	24.00	MH	US$	51.40	100.00	98.25	2,357.88

Activity: C Clean up Site (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	5,964.00	5,550.22	11,514.22	3,894.14	0.00	0.00	0.00	15,408.36
Total	5,964.00	5,550.22	11,514.22	3,894.14	0.00	0.00	0.00	15,408.36

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
15,408.3600	24.0000	0.0417	642.0150	3.0000	0.3333	3.0000	5,136.1200

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
144.0000	0.0069	144.0000	79.9599	5,964.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 4LAB 4-Man Labor Crew Prod: S 3 Eff: 100.00 Crew Hrs: 24 Labor Pcs: 6.00 Equipment Pcs: 1.00

Notes: Load out trailers and equipment, remove security fencing, and clean up site.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
813RT700E	GROVE RT700E RT Crane 50mt	1.00	24.00	HR	US$	162.26	100.00	162.26	3,894.14
LA01	Laborer Foreman	1.00	24.00	MH	US$	41.02	100.00	78.48	1,883.55
LA02	Laborer (Gr 5)	4.00	96.00	MH	US$	39.02	100.00	75.76	7,272.79
OE10	Crane Operator (<100 tn)	1.00	24.00	MH	US$	51.40	100.00	98.25	2,357.88

Activity: D Demobilization of Land Based Equip (Unreviewed) Quantity: 10.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	750.00	0.00	1,500.05
Total	1,075.60	1,713.61	2,789.21	4,711.28	0.00	7,500.00	0.00	15,000.49

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0490	4.0000	0.2500	187.5123	5.0000	2.0000	0.5000	3,000.0980

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
40.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 40 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 10 loads for loaders, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	40.00	HR	US$	16.91	100.00	16.91	676.44
820OHTT050	On Hwy Truck 50K	1.00	40.00	HR	US$	100.87	100.00	100.87	4,034.84
990205	Crane Demobilization	1.00	1.00	LS	US$	7,500.00	100.00	7,500.00	7,500.00
TE04	Truck Driver (Gr 5)	1.00	40.00	MH	US$	26.89	100.00	69.73	2,789.21

Biditem

1002

SWPPP

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
14.0000	0.0714	14.0000	1,094.1429	40.5257	77.0507	0.2500

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $10,000 since only one entrance to beach from parking lot will be used and many trips will be made delivering sand fill and rock to the beach.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2900	4.0000	0.2500	317.3225	0.5000	2.0000	0.5000	10,636.0000

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.0714	14.0000	77.0507	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	21.00	TON	US$	7.50	107.75	8.08	169.71
3STRPL	Trench Plate Rental - 8'x10'	1.00	18.00	MO	US$	200.00	107.75	215.50	3,879.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	76.09	152.18
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	69.22	553.75
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	93.20	372.78

Biditem

1003

SHORELINE RECONSTRUCTION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	63,409.84	55,244.98	118,654.82	115,175.96	1,051,785.68	0.00	96,975.82	1,382,592.28
Total	63,409.84	55,244.98	118,654.82	115,175.96	1,051,785.68	0.00	96,975.82	1,382,592.28

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
1,385.0000	0.0007	1,385.0000	998.2616	45.7833	85.6714	0.0036

Activity: A Place Sand Fill for Beach Nourishment (Unreviewed) Quantity: 16610.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.59	2.26	4.85	3.60	45.38	0.00	0.00	53.83
Total	43,018.16	37,489.30	80,507.46	59,858.63	753,833.22	0.00	0.00	894,199.31

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
8.4507	0.0113	88.3511	746.6281	23.5000	706.8085	0.0014	38,051.0345

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
940.0000	17.6702	0.0566	85.6462	2.5899

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 88.3511 Eff: 100.00 Crew Hrs: 188 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Place sand fill to required template within dune footprint. Total amount of sand fill required - 15,100 cy. Assume 10% Waste, so 15,100 CY * 1.10 = 16,610 CY. Assume onsite daily stockpile, no offroad dump trucks, and 2 loaders to transport material. Allow sand at $12/ton plus $14/ton delivery.

```
Production Factors:
8       CY, Bucket Size (assumes 2 loaders)
1.0     Bucket Fill Factor
0.91    10% Add'l time - matl loss
91.0%   Avg. Percent, Full Bucket
50      Op. Efficiency (Working Minutes per Hour)
148     Sec., Transport Cycle Time
85.0%   Operator Skill Efficiency
100.0%  Machine Availability
Cycle Time      148

Excavation:
Cycles per Hour:                        =       17.2    cycles/hr
Production Rate:                        =     126       cy/hr
Excavation Time Efficiency (%):         =       70%
Daily Operating Time:                   =       5.60    hours
Monthly Operating Time:                 =       122     hours
Daily Gross Production:                 =       706     cy/day
Daily Gross Production:                 =        29     lf/day
Monthly Gross Production:                       =       15,372  cy/mo
Excavation Time:                                1.08    months
Excavation Time:                                23.49   days
```

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BB110	Sand Fill	1.00	26,908.20	TON	US$	26.00	107.75	28.01	753,833.22
809FEL950	CAT 950H F.E. Loader 4cy	2.00	376.00	HR	US$	89.04	100.00	89.04	33,477.91
809SCD06T	CAT D6T Dozer	1.00	188.00	HR	US$	140.32	100.00	140.32	26,380.72
LA02	Laborer (Gr 5)	2.00	376.00	MH	US$	39.02	100.00	73.48	27,628.28
OE03	Operator (Gr 14)	2.00	376.00	MH	US$	50.36	100.00	93.89	35,301.78
OE05	Operator (Gr 10)	1.00	188.00	MH	US$	50.06	100.00	93.50	17,577.40

Activity: B Place Caltrans Backing No. 3 (Unreviewed) Quantity: 3902.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.88	2.51	5.38	7.81	43.10	0.00	0.00	56.29
Total	11,226.88	9,775.60	21,002.48	30,455.61	168,176.20	0.00	0.00	219,634.29

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
13.1876	0.0126	79.6327	1,050.1651	6.1250	637.0612	0.0016	35,858.6596

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
245.0000	15.9265	0.0628	85.7244	2.8772

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 79.6327 Eff: 100.00 Crew Hrs: 49 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Allow for furnish and place of 2,550 cy of imported Caltrans Backing No. 3 as core of cobble berm. Allow for 2% Waste, so 2,550 cy * 1.02 = 2,601 CY. Rip rap is 1.5 Ton/ CY, so 2,601 * 1.5 = 3,902 Ton.

Allow furnish and delivery at $40/ton to stockpile site. Allow for 2 ea. loaders to transfer stone from stockpile to placement location at 80 cy/hr.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BA110	Armor Stone 2 -> 5 T	1.00	3,902.00	TON	US$	40.00	107.75	43.10	168,176.20
809FEL950	CAT 950H F.E. Loader 4cy	2.00	98.00	HR	US$	89.04	100.00	89.04	8,725.63
810CME385	CAT 385CL Excavator 5cy	1.00	49.00	HR	US$	443.47	100.00	443.47	21,729.98
LA02	Laborer (Gr 5)	2.00	98.00	MH	US$	39.02	100.00	73.48	7,200.99
OE03	Operator (Gr 14)	3.00	147.00	MH	US$	50.36	100.00	93.89	13,801.49

Activity: C Place Cobble Toe (Unreviewed) Quantity: 2458.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3.73	3.25	6.98	10.11	52.80	0.00	0.00	69.89
Total	9,164.80	7,980.08	17,144.88	24,861.72	129,776.26	0.00	0.00	171,782.86

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
17.0897	0.0163	61.4500	1,050.1650	5.0000	491.6000	0.0020	34,356.5720

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
200.0000	12.2900	0.0814	85.7244	3.7286

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 61.45 Eff: 100.00 Crew Hrs: 40 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Allow for furnish and place of 1,950 cy of imported 2.5"-10" cobble at the toe of the dune. Allow for 5% Waste, so 1,950 cy * 1.05 = 2,048 CY. #57 Stone is 1.2 Ton/ CY, so 2,048 * 1.2 = 2,458 Ton.

Allow furnish and delivery at $49/ton to stockpile site. Allow for 2 ea. loaders to transfer cobble from stockpile to placement location at 61 cy/hr.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2008	3'-8" Cobble	1.00	2,458.00	TON	US$	49.00	107.75	52.80	129,776.26
809FEL950	CAT 950H F.E. Loader 4cy	2.00	80.00	HR	US$	89.04	100.00	89.04	7,122.96
810CME385	CAT 385CL Excavator 5cy	1.00	40.00	HR	US$	443.47	100.00	443.47	17,738.76
LA02	Laborer (Gr 5)	2.00	80.00	MH	US$	39.02	100.00	73.48	5,878.36
OE03	Operator (Gr 14)	3.00	120.00	MH	US$	50.36	100.00	93.89	11,266.52

Activity: D Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Allow for pre- and post-construction surveys for cobble dike and sand fill. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	15,000.00	100.00	15,000.00	30,000.00

Activity: E Remove Concrete Sidewalk (Unreviewed) Quantity: 300.00 Unit: LF

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Demolish and remove existing sidewalk along back edge of beach. Total length of removal is approx. 300 lf. Assume sidewalk is similar to typical COSD details; 10' wide x 4' thick with 2'-4" x 12" cutoff wall; total removal area is 300'*10'/9 = 334 sq. yds. Use Caltrans max unit cost from District 11 for removal - $56.23/sq. yd.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4CONC	Concrete - Sub	1.00	334.00	SQYD	US$	56.23	100.00	56.23	18,780.82

Activity: F Construct New Sidewalk (Unreviewed) Quantity: 300.00 Unit: LF

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Construct new sidewalk assuming same size and configuration as existing - 10' wide x 4' thick with 2'-4" x 12" cutoff wall; total quantity of concrete for 300 lf is [(10'*0.33')+(2.33'*1')]*300' / 27 = 63 cy. Use Caltrans max unit cost from District 11 for minor concrete (sidewalk) - $765/cy.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4CONC	Concrete - Sub	1.00	63.00	CY	US$	765.00	100.00	765.00	48,195.00

Biditem

1008

CONSTRUCTION ACCESS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2,208.24	2,156.23	4,364.47	1,156.08	0.00	16,162.50	0.00	21,683.05
Total	2,208.24	2,156.23	4,364.47	1,156.08	0.00	16,162.50	0.00	21,683.05

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
60.0000	0.0167	60.0000	361.3842	36.8040	72.7412	0.0417

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 3.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	736.08	718.74	1,454.82	385.36	0.00	5,387.50	0.00	7,227.68
Total	2,208.24	2,156.23	4,364.47	1,156.08	0.00	16,162.50	0.00	21,683.05

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,840.1833	8.0000	0.1250	230.0229	3.0000	1.0000	1.0000	7,227.6833

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
60.0000	0.0500	20.0000	72.7412	736.0800

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 3 Eff: 100.00 Crew Hrs: 24 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing sidewalks and work areas for 2.8 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 770 lf/500 ft = 2 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 1 ea. move, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	3.00	MO	US$	5,000.00	107.75	5,387.50	16,162.50
820OHLDTC44	LD Truck 4x4 1.75t	1.00	24.00	HR	US$	48.17	100.00	48.17	1,156.08
LA01	Laborer Foreman	0.50	12.00	MH	US$	41.02	100.00	78.48	941.78
LA03	Laborer (Gr 4)	2.00	48.00	MH	US$	35.75	100.00	71.31	3,422.69

Biditem **INSTALL SIGNS**

1009

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	544.48	1,111.84	190.58	3,829.26	0.00	0.00	5,131.68
Total	567.36	544.48	1,111.84	190.58	3,829.26	0.00	0.00	5,131.68

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
14.0000	0.0714	14.0000	366.5486	40.5257	79.4171	0.2500

Activity: A Install Signs (Unreviewed) Quantity: 8.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	567.36	544.48	1,111.84	190.58	3,829.26	0.00	0.00	5,131.68

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8025	0.5000	2.0000	325.6050	0.5000	16.0000	0.0625	10,263.3600

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.5714	1.7500	79.4171	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 8 of each: Beach Access Signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	8.00	EA	US$	44.23	107.75	47.66	381.26
2T5101	Construction Signs	1.00	8.00	EA	US$	400.00	107.75	431.00	3,448.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	78.49	156.97
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	71.31	570.45
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	96.11	384.42

Biditem - Parent **VACATION ISLAND NE (SKI BEACH)**

2000

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	397,826.26	369,507.42	767,333.68	761,750.43	6,108,493.66	46,979.00	50,000.00	7,734,556.77
Total	397,826.26	369,507.42	767,333.68	761,750.43	6,108,493.66	46,979.00	50,000.00	7,734,556.77

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
8,405.0200	0.0001	8,405.0200	920.2306	47.3320	91.2947	0.0000

Biditem **MOBILIZATION/DEMOBILIZATION**

2001

Takeoff Qty: 1.000 LS
Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	19,563.80	21,764.54	41,328.34	56,490.60	0.00	0.00	0.00	97,818.94
Total	19,563.80	21,764.54	41,328.34	56,490.60	0.00	0.00	0.00	97,818.94

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
460.0000	0.0022	460.0000	212.6499	42.5300	89.8442	0.0044

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 20.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	2,151.20	3,427.23	5,578.43	9,422.56	0.00	0.00	0.00	15,000.99

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0495	4.0000	0.2500	187.5124	10.0000	2.0000	0.5000	1,500.0990

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
80.0000	0.2500	4.0000	69.7304	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 80 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 20 loads for loaders, dozers, office trailer storage trailers, and parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	80.00	HR	US$	16.91	100.00	16.91	1,352.88
820OHTT050	On Hwy Truck 50K	1.00	80.00	HR	US$	100.87	100.00	100.87	8,069.68
TE04	Truck Driver (Gr 5)	1.00	80.00	MH	US$	26.89	100.00	69.73	5,578.43

Activity: B Demobilization of Land Based Equip (Unreviewed) Quantity: 20.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	2,151.20	3,427.23	5,578.43	9,422.56	0.00	0.00	0.00	15,000.99

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0495	4.0000	0.2500	187.5124	10.0000	2.0000	0.5000	1,500.0990

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
80.0000	0.2500	4.0000	69.7304	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 80 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 20 loads for loaders, dozers, office trailer storage trailers, and parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	80.00	HR	US$	16.91	100.00	16.91	1,352.88
820OHTT050	On Hwy Truck 50K	1.00	80.00	HR	US$	100.87	100.00	100.87	8,069.68
TE04	Truck Driver (Gr 5)	1.00	80.00	MH	US$	26.89	100.00	69.73	5,578.43

Activity: C Mobilization of Marine Equip (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	7,920.00	7,894.60	15,814.60	17,828.55	0.00	0.00	0.00	33,643.15
Total	7,920.00	7,894.60	15,814.60	17,828.55	0.00	0.00	0.00	33,643.15

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
33,643.1500	32.0000	0.0313	1,051.3484	4.0000	0.2500	4.0000	8,410.7875

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.0063	160.0000	98.8413	7,920.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: S 4 Eff: 100.00 Crew Hrs: 32 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Allow for 3 days to mobilize crane barge and rock barge plus 1 day at the site to set up operations.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
811LGS0020D	20kW Large GenSet	1.00	32.00	HR	US$	23.96	100.00	23.96	766.56
814CB075	Crane Barge - 75 Ton	1.00	32.00	HR	US$	136.78	100.00	136.78	4,376.90
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	64.00	HR	US$	108.23	100.00	108.23	6,926.59
814ITB0250	Inland Tug - 250hp	1.00	32.00	HR	US$	133.81	100.00	133.81	4,281.89
814RUN016	Runabout 16ft	1.00	32.00	HR	US$	34.84	100.00	34.84	1,114.91
818PW350S	Portable Welder Skid 350 amp	1.00	32.00	HR	US$	11.30	100.00	11.30	361.70
OE10	Crane Operator (<100 tn)	1.00	32.00	MH	US$	51.40	100.00	100.10	3,203.05
OE17	Engineer	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE18	Mate	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE19	Deckhand	2.00	64.00	MH	US$	48.48	100.00	97.77	6,257.03

Activity: D Demobilization of Marine Equip (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3,960.00	3,947.30	7,907.30	8,914.28	0.00	0.00	0.00	16,821.58
Total	3,960.00	3,947.30	7,907.30	8,914.28	0.00	0.00	0.00	16,821.58

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
16,821.5800	16.0000	0.0625	1,051.3488	2.0000	0.5000	2.0000	8,410.7900

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
80.0000	0.0125	80.0000	98.8413	3,960.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: S 2 Eff: 100.00 Crew Hrs: 16 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Allow one day to clean up and one day to demobilize crane barge.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
811LGS0020D	20kW Large GenSet	1.00	16.00	HR	US$	23.96	100.00	23.96	383.28
814CB075	Crane Barge - 75 Ton	1.00	16.00	HR	US$	136.78	100.00	136.78	2,188.45
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	32.00	HR	US$	108.23	100.00	108.23	3,463.30
814ITB0250	Inland Tug - 250hp	1.00	16.00	HR	US$	133.81	100.00	133.81	2,140.94
814RUN016	Runabout 16ft	1.00	16.00	HR	US$	34.84	100.00	34.84	557.46
818PW350S	Portable Welder Skid 350 amp	1.00	16.00	HR	US$	11.30	100.00	11.30	180.85
OE10	Crane Operator (<100 tn)	1.00	16.00	MH	US$	51.40	100.00	100.10	1,601.52
OE17	Engineer	1.00	16.00	MH	US$	49.57	100.00	99.29	1,588.63
OE18	Mate	1.00	16.00	MH	US$	49.57	100.00	99.29	1,588.63
OE19	Deckhand	2.00	32.00	MH	US$	48.48	100.00	97.77	3,128.52

Activity: E Towing (Unreviewed) Quantity: 2.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,690.70	1,534.09	3,224.79	5,451.33	0.00	0.00	0.00	8,676.12
Total	3,381.40	3,068.18	6,449.58	10,902.65	0.00	0.00	0.00	17,352.23

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
8,676.1150	10.0000	0.1000	867.6115	2.0000	1.0000	1.0000	8,676.1150

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
60.0000	0.0333	30.0000	107.4930	1,690.7000

Calendar: 50S 5 x 10 Hr - Single Hrs/Shift: 10 WC: MARINE Over Water Work

Crew: TOWL Towing - Local Crew Prod: SU 1 Eff: 100.00 Crew Hrs: 20 Labor Pcs: 3.00 Equipment Pcs: 1.00

Notes: Allow for two tows to account for mobilization to site and demobilization from site. Assume contractor is local to San Diego and is towing from location in San Diego Bay. Allow one shift for each tow.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814TB1350	Tow Boat - 1,350hp %50	1.00	20.00	HR	US$	895.11	100.00	545.13	10,902.65
OE15	Leverman	1.00	20.00	MH	US$	55.65	110.00	114.17	2,283.44

OE17	Engineer	1.00	20.00	MH	US$	49.57	110.00	104.98	2,099.55
OE19	Deckhand	1.00	20.00	MH	US$	48.48	110.00	103.33	2,066.59

Biditem

2002

SWPPP

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
14.0000	0.0714	14.0000	1,094.1429	40.5257	77.0507	0.2500

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $10,000 since only one entrance to beach from parking lot will be used and many trips will be made delivering sand fill and rock to the beach.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2900	4.0000	0.2500	317.3225	0.5000	2.0000	0.5000	10,636.0000

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.0714	14.0000	77.0507	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	21.00	TON	US$	7.50	107.75	8.08	169.71
3STRPL	Trench Plate Rental - 8'x10'	1.00	18.00	MO	US$	200.00	107.75	215.50	3,879.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	76.09	152.18
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	69.22	553.75
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	93.20	372.78

Biditem

2003

SHORELINE RECONSTRUCTION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	372,738.14	342,412.72	715,150.86	702,713.65	6,099,708.11	0.00	40,000.00	7,557,572.62
Total	372,738.14	342,412.72	715,150.86	702,713.65	6,099,708.11	0.00	40,000.00	7,557,572.62

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
7,799.5200	0.0001	7,799.5200	968.9792	47.7899	91.6917	0.0007

Activity: A Place Sand Fill for Beach Nourishment (Unreviewed) Quantity: 78100.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.90	2.52	5.43	4.23	45.38	0.00	0.00	55.04
Total	226,560.15	197,149.75	423,709.90	330,640.84	3,544,513.83	0.00	0.00	4,298,864.57

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
9.6588	0.0104	96.2392	929.5529	101.4400	769.9132	0.0013	42,378.3968

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
4,869.1200	16.0399	0.0623	87.0198	2.9009

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 96.2392 Eff: 100.00 Crew Hrs: 811.52 Labor Pcs: 6.00 Equipment Pcs: 4.00

Notes: Place sand fill to required template within dune footprint. Total amount of sand fill required - 71,000 cy. Assume 10% Waste, so 71,000 CY * 1.10 = 78,100 CY. Assume weight of beach nourishment sand at 1.62 t/cy - 78,100cy*1.62t/cy = 126,522 ton sand. Assume onsite daily stockpile, no offroad dump trucks, and 3 loaders to transport material. Allow sand at $12/ton plus $14/ton delivery.

```
Production Factors:
12      CY, Bucket Size (assumes 3 loaders)
1.0     Bucket Fill Factor
0.91    10%     Additional time, slope excavation
91.0%   Avg. Percent, Full Bucket
50      Op. Efficiency (Working Minutes per Hour)
196     Sec., Cycle Time
85.0%   Operator Skill Efficiency
100.0%  Machine Availability

Excavation:
Cycles per Hour:                        =       13.0    cycles/hr
Production Rate:                        =       143     cy/hr
Excavation Time Efficiency (%):         =       70%
Daily Operating Time:                   =       5.60    hours
Monthly Operating Time:                 =       122     hours
Daily Gross Production:                 =       801     cy/day
Daily Gross Production:                 =       12      lf/day
Monthly Gross Production:                       =       17,446  cy/mo
Excavation Time:                                =      4.48     months
Excavation Time:                                =      97.44    days
```

Include placement crew for an adidtional four days to support the crane barge moving sand as required and grading slope at west end of project where rock berm is not being ocnstructed.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BB110	Sand Fill	1.00	126,522.00	TON	US$	26.00	107.75	28.02	3,544,513.83
809FEL950	CAT 950H F.E. Loader 4cy	3.00	2,434.56	HR	US$	89.04	100.00	89.04	216,765.92
809SCD06T	CAT D6T Dozer	1.00	811.52	HR	US$	140.32	100.00	140.32	113,874.92
LA02	Laborer (Gr 5)	2.00	1,623.04	MH	US$	39.02	100.00	73.48	119,260.11
OE03	Operator (Gr 14)	3.00	2,434.56	MH	US$	50.36	100.00	93.89	228,575.28
OE05	Operator (Gr 10)	1.00	811.52	MH	US$	50.06	100.00	93.50	75,874.51

Activity: B Place Caltrans Backing No. 3 (Unreviewed) Quantity: 26100.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1.75	1.74	3.49	3.94	43.10	0.00	0.00	50.53
Total	45,658.79	45,512.35	91,171.14	102,781.56	1,124,910.00	0.00	0.00	1,318,862.70

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7.4311	0.0071	141.4788	1,051.3487	23.0600	1,131.8306	0.0009	57,192.6893

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
922.4000	28.2958	0.0353	98.8412	1.7494

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: UH 141.4788 Eff: 100.00 Crew Hrs: 184.4799 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Allow for furnish and place of 14,500 cy of imported Caltrans Backing No. 3 as core of cobble berm. Allow for 2% Waste, so 14,500 cy * 1.02 = 17,400 cy. Rip rap is 1.5 Ton/ CY, so 17,400*1.5 = 26,100 Ton.

Allow furnish and delivery at $40/ton to contractor's barge. Allow for 75-ton crane barge to construct core of rock berm with No. 3 backing using 6 cy clamshell bucket.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BA110	Armor Stone 2 -> 5 T	1.00	26,100.00	TON	US$	40.00	107.75	43.10	1,124,910.00
811LGS0020D	20kW Large GenSet	1.00	184.48	HR	US$	23.96	100.00	23.96	4,419.22
814CB075	Crane Barge - 75 Ton	1.00	184.48	HR	US$	136.78	100.00	136.78	25,232.81

814DCB0220	Flat Deck Barge 2,000 Ton	2.00	368.96	HR	US$	108.23	100.00	108.23	39,931.80
814ITB0250	Inland Tug - 250hp	1.00	184.48	HR	US$	133.81	100.00	133.81	24,685.08
814RUN016	Runabout 16ft	1.00	184.48	HR	US$	34.84	100.00	34.84	6,427.47
818PW350S	Portable Welder Skid 350 amp	1.00	184.48	HR	US$	11.30	100.00	11.30	2,085.18
OE10	Crane Operator (<100 tn)	1.00	184.48	MH	US$	51.40	100.00	100.10	18,465.55
OE17	Engineer	1.00	184.48	MH	US$	49.57	100.00	99.29	18,316.90
OE18	Mate	1.00	184.48	MH	US$	49.57	100.00	99.29	18,316.90
OE19	Deckhand	2.00	368.96	MH	US$	48.48	100.00	97.77	36,071.79

Activity: C Place Cobble Toe (Unreviewed) Quantity: 27090.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.19	2.19	4.38	4.94	52.80	0.00	0.00	62.11
Total	59,400.00	59,209.44	118,609.44	133,714.08	1,430,284.28	0.00	0.00	1,682,607.80

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
9.3143	0.0089	112.8750	1,051.3480	30.0000	903.0000	0.0011	56,086.9267

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
1,200.0000	22.5750	0.0443	98.8412	2.1927

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: UH 112.875 Eff: 100.00 Crew Hrs: 240 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Allow for furnish and place of 21,500 cy of imported 2.5"-10" cobble cover over the berm. Placement layer is minimum 2 feet thick over No. 3 core of berm. Allow for 5% Waste, so 21,500 cy * 1.05 = 22,575 CY. #57 Stone is 1.2 ton/cy, so 22,575 * 1.2 = 27,090 ton. Allow furnish and delivery at $49/ton to contractors yard to load on barge. Allow for 75-ton crane barge to construct cobble berm using 6 cy clamshell bucket.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2008	3'-8" Cobble	1.00	27,090.00	TON	US$	49.00	107.75	52.80	1,430,284.28
811LGS0020D	20kW Large GenSet	1.00	240.00	HR	US$	23.96	100.00	23.96	5,749.20
814CB075	Crane Barge - 75 Ton	1.00	240.00	HR	US$	136.78	100.00	136.78	32,826.72
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	480.00	HR	US$	108.23	100.00	108.23	51,949.44
814ITB0250	Inland Tug - 250hp	1.00	240.00	HR	US$	133.81	100.00	133.81	32,114.16
814RUN016	Runabout 16ft	1.00	240.00	HR	US$	34.84	100.00	34.84	8,361.84
818PW350S	Portable Welder Skid 350 amp	1.00	240.00	HR	US$	11.30	100.00	11.30	2,712.72
OE10	Crane Operator (<100 tn)	1.00	240.00	MH	US$	51.40	100.00	100.10	24,022.82
OE17	Engineer	1.00	240.00	MH	US$	49.57	100.00	99.29	23,829.45
OE18	Mate	1.00	240.00	MH	US$	49.57	100.00	99.29	23,829.45
OE19	Deckhand	2.00	480.00	MH	US$	48.48	100.00	97.77	46,927.72

Activity: F Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Allow for pre- and post-construction surveys for cobble dike and sand fill. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	20,000.00	100.00	20,000.00	40,000.00

Activity: G Tow Rock Barges (Unreviewed) Quantity: 27.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,229.60	1,209.13	2,438.73	4,361.06	0.00	0.00	0.00	6,799.79
Total	33,199.20	32,646.58	65,845.78	117,748.62	0.00	0.00	0.00	183,594.40

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
6,799.7926	8.0000	0.1250	849.9741	27.0000	1.0000	1.0000	6,799.7926

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
648.0000	0.0417	24.0000	101.6139	1,229.6000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: TOWL Towing - Local Crew Prod: HU 8 Eff: 100.00 Crew Hrs: 216 Labor Pcs: 3.00 Equipment Pcs: 1.00

Notes: Allow for towing of rock barges to/from project site. Assume barges are towed from contractor's yard in San Diego Bay. Allow 8 hours for each tow. Assuming each barge holds 2,000 ton, total no. of tows - 53,190 ton/2,000 ton = 27 tows.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814TB1350	Tow Boat - 1,350hp %50	1.00	216.00	HR	US$	895.11	100.00	545.13	117,748.62
OE15	Leverman	1.00	216.00	MH	US$	55.65	100.00	107.79	23,281.81
OE17	Engineer	1.00	216.00	MH	US$	49.57	100.00	99.29	21,446.50
OE19	Deckhand	1.00	216.00	MH	US$	48.48	100.00	97.77	21,117.47

Activity: I Grade Sand Fill Nourishment (Unreviewed) Quantity: 1.00 Unit: LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	7,920.00	7,894.60	15,814.60	17,828.55	0.00	0.00	0.00	33,643.15
Total	7,920.00	7,894.60	15,814.60	17,828.55	0.00	0.00	0.00	33,643.15

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
33,643.1500	32.0000	0.0313	1,051.3484	4.0000	0.2500	4.0000	8,410.7875

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.0063	160.0000	98.8413	7,920.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: S 4 Eff: 100.00 Crew Hrs: 32 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Allow for crane barge crew to grade sand fill nourishment on west end of project where rock berm is not being constructed. Allow 4 shifts to move sand and grade to 1:10 slope as required.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
811LGS0020D	20kW Large GenSet	1.00	32.00	HR	US$	23.96	100.00	23.96	766.56
814CB075	Crane Barge - 75 Ton	1.00	32.00	HR	US$	136.78	100.00	136.78	4,376.90
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	64.00	HR	US$	108.23	100.00	108.23	6,926.59
814ITB0250	Inland Tug - 250hp	1.00	32.00	HR	US$	133.81	100.00	133.81	4,281.89
814RUN016	Runabout 16ft	1.00	32.00	HR	US$	34.84	100.00	34.84	1,114.91
818PW350S	Portable Welder Skid 350 amp	1.00	32.00	HR	US$	11.30	100.00	11.30	361.70
OE10	Crane Operator (<100 tn)	1.00	32.00	MH	US$	51.40	100.00	100.10	3,203.05
OE17	Engineer	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE18	Mate	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE19	Deckhand	2.00	64.00	MH	US$	48.48	100.00	97.77	6,257.03

Biditem

2004

CONSTRUCTION ACCESS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3,680.40	3,593.72	7,274.12	1,926.80	0.00	43,100.00	0.00	52,300.92
Total	3,680.40	3,593.72	7,274.12	1,926.80	0.00	43,100.00	0.00	52,300.92

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
100.0000	0.0100	100.0000	523.0092	36.8040	72.7412	0.0250

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 8.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	460.05	449.22	909.27	240.85	0.00	5,387.50	0.00	6,537.62
Total	3,680.40	3,593.72	7,274.12	1,926.80	0.00	43,100.00	0.00	52,300.92

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,150.1150	5.0000	0.2000	230.0230	5.0000	1.6000	0.6250	10,460.1840

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
100.0000	0.0800	12.5000	72.7412	460.0500

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 5 Eff: 100.00 Crew Hrs: 40 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing sidewalks and work areas for 8 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 1,800 lf/500 ft = 4 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 3 ea. moves, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	8.00	MO	US$	5,000.00	107.75	5,387.50	43,100.00
820OHLDTC44	LD Truck 4x4 1.75t	1.00	40.00	HR	US$	48.17	100.00	48.17	1,926.80
LA01	Laborer Foreman	0.50	20.00	MH	US$	41.02	100.00	78.48	1,569.63
LA03	Laborer (Gr 4)	2.00	80.00	MH	US$	35.75	100.00	71.31	5,704.49

Biditem

2005

INSTALL SIGNS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,276.56	1,225.09	2,501.65	428.80	8,615.84	0.00	0.00	11,546.29
Total	1,276.56	1,225.09	2,501.65	428.80	8,615.84	0.00	0.00	11,546.29

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
31.5000	0.0317	31.5000	366.5489	40.5257	79.4175	0.1111

Activity: A Install Signs (Unreviewed) Quantity: 18.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	1,276.56	1,225.09	2,501.65	428.80	8,615.84	0.00	0.00	11,546.29

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8028	0.5000	2.0000	325.6056	1.1250	16.0000	0.0625	10,263.3689

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
31.5000	0.5714	1.7500	79.4175	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 9 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 18 of each: Beach Access Signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	18.00	EA	US$	44.23	107.75	47.66	857.84
2T5101	Construction Signs	1.00	18.00	EA	US$	400.00	107.75	431.00	7,758.00
809TLB416E	CAT 416E Backhoe	1.00	9.00	HR	US$	47.64	100.00	47.64	428.80
LA01	Laborer Foreman	0.50	4.50	MH	US$	41.02	100.00	78.48	353.17
LA03	Laborer (Gr 4)	2.00	18.00	MH	US$	35.75	100.00	71.31	1,283.52
OE07	Operator (Gr 6)	1.00	9.00	MH	US$	49.83	100.00	96.11	864.96

Biditem - Parent

3000

VACATION ISLAND NW

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567,065.21	562,868.26	1,129,933.47	1,520,604.66	9,133,256.55	46,979.00	60,000.00	11,890,773.68
Total	567,065.21	562,868.26	1,129,933.47	1,520,604.66	9,133,256.55	46,979.00	60,000.00	11,890,773.68

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
11,381.4000	0.0001	11,381.4000	1,044.7549	49.8239	99.2790	0.0000

Biditem

3001

MOBILIZATION/DEMOBILIZATION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	17,412.60	18,337.30	35,749.90	47,068.04	0.00	0.00	0.00	82,817.94
Total	17,412.60	18,337.30	35,749.90	47,068.04	0.00	0.00	0.00	82,817.94

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
380.0000	0.0026	380.0000	217.9419	45.8226	94.0787	0.0068

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 10.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	1,075.60	1,713.61	2,789.21	4,711.28	0.00	0.00	0.00	7,500.49

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0490	4.0000	0.2500	187.5123	5.0000	2.0000	0.5000	1,500.0980

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
40.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 40 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	40.00	HR	US$	16.91	100.00	16.91	676.44
820OHTT050	On Hwy Truck 50K	1.00	40.00	HR	US$	100.87	100.00	100.87	4,034.84
TE04	Truck Driver (Gr 5)	1.00	40.00	MH	US$	26.89	100.00	69.73	2,789.21

Activity: B Demobilization of Land Based Equip (Unreviewed) Quantity: 10.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	1,075.60	1,713.61	2,789.21	4,711.28	0.00	0.00	0.00	7,500.49

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0490	4.0000	0.2500	187.5123	5.0000	2.0000	0.5000	1,500.0980

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
40.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 40 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	40.00	HR	US$	16.91	100.00	16.91	676.44
820OHTT050	On Hwy Truck 50K	1.00	40.00	HR	US$	100.87	100.00	100.87	4,034.84
TE04	Truck Driver (Gr 5)	1.00	40.00	MH	US$	26.89	100.00	69.73	2,789.21

Activity: C Mobilization of Marine Equip (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	7,920.00	7,894.60	15,814.60	17,828.55	0.00	0.00	0.00	33,643.15
Total	7,920.00	7,894.60	15,814.60	17,828.55	0.00	0.00	0.00	33,643.15

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
33,643.1500	32.0000	0.0313	1,051.3484	4.0000	0.2500	4.0000	8,410.7875

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.0063	160.0000	98.8413	7,920.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: S 4 Eff: 100.00 Crew Hrs: 32 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Allow for 3 days to mobilize crane barge and rock barge plus 1 day at the site to set up operations.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
811LGS0020D	20kW Large GenSet	1.00	32.00	HR	US$	23.96	100.00	23.96	766.56
814CB075	Crane Barge - 75 Ton	1.00	32.00	HR	US$	136.78	100.00	136.78	4,376.90
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	64.00	HR	US$	108.23	100.00	108.23	6,926.59
814ITB0250	Inland Tug - 250hp	1.00	32.00	HR	US$	133.81	100.00	133.81	4,281.89
814RUN016	Runabout 16ft	1.00	32.00	HR	US$	34.84	100.00	34.84	1,114.91
818PW350S	Portable Welder Skid 350 amp	1.00	32.00	HR	US$	11.30	100.00	11.30	361.70
OE10	Crane Operator (<100 tn)	1.00	32.00	MH	US$	51.40	100.00	100.10	3,203.05
OE17	Engineer	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE18	Mate	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE19	Deckhand	2.00	64.00	MH	US$	48.48	100.00	97.77	6,257.03

Activity: D Demobilization of Marine Equip (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3,960.00	3,947.30	7,907.30	8,914.28	0.00	0.00	0.00	16,821.58
Total	3,960.00	3,947.30	7,907.30	8,914.28	0.00	0.00	0.00	16,821.58

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
16,821.5800	16.0000	0.0625	1,051.3488	2.0000	0.5000	2.0000	8,410.7900

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
80.0000	0.0125	80.0000	98.8413	3,960.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: S 2 Eff: 100.00 Crew Hrs: 16 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Allow one day to clean up and one day to demobilize crane barge.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
811LGS0020D	20kW Large GenSet	1.00	16.00	HR	US$	23.96	100.00	23.96	383.28
814CB075	Crane Barge - 75 Ton	1.00	16.00	HR	US$	136.78	100.00	136.78	2,188.45
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	32.00	HR	US$	108.23	100.00	108.23	3,463.30
814ITB0250	Inland Tug - 250hp	1.00	16.00	HR	US$	133.81	100.00	133.81	2,140.94
814RUN016	Runabout 16ft	1.00	16.00	HR	US$	34.84	100.00	34.84	557.46
818PW350S	Portable Welder Skid 350 amp	1.00	16.00	HR	US$	11.30	100.00	11.30	180.85
OE10	Crane Operator (<100 tn)	1.00	16.00	MH	US$	51.40	100.00	100.10	1,601.52
OE17	Engineer	1.00	16.00	MH	US$	49.57	100.00	99.29	1,588.63
OE18	Mate	1.00	16.00	MH	US$	49.57	100.00	99.29	1,588.63
OE19	Deckhand	2.00	32.00	MH	US$	48.48	100.00	97.77	3,128.52

Activity: E Towing (Unreviewed) Quantity: 2.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,690.70	1,534.09	3,224.79	5,451.33	0.00	0.00	0.00	8,676.12
Total	3,381.40	3,068.18	6,449.58	10,902.65	0.00	0.00	0.00	17,352.23

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
8,676.1150	10.0000	0.1000	867.6115	2.0000	1.0000	1.0000	8,676.1150

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
60.0000	0.0333	30.0000	107.4930	1,690.7000

Calendar: 50S 5 x 10 Hr - Single Hrs/Shift: 10 WC: MARINE Over Water Work

Crew: TOWL Towing - Local Crew Prod: SU 1 Eff: 100.00 Crew Hrs: 20 Labor Pcs: 3.00 Equipment Pcs: 1.00

Notes: Allow for two tows to account for mobilization to site and demobilization from site. Assume contractor is local to San Diego and is towing from location in San Diego Bay. Allow one shift for each tow.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814TB1350	Tow Boat - 1,350hp %50	1.00	20.00	HR	US$	895.11	100.00	545.13	10,902.65
OE15	Leverman	1.00	20.00	MH	US$	55.65	110.00	114.17	2,283.44
OE17	Engineer	1.00	20.00	MH	US$	49.57	110.00	104.98	2,099.55

OE19	Deckhand	1.00	20.00	MH	US$	48.48	110.00	103.33	2,066.59

Biditem

3002

SWPPP

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
14.0000	0.0714	14.0000	1,094.1429	40.5257	77.0507	0.2500

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $10,000 due to size of area and length of beach that has to be traversed by land equipment.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2900	4.0000	0.2500	317.3225	0.5000	2.0000	0.5000	10,636.0000

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.0714	14.0000	77.0507	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	21.00	TON	US$	7.50	107.75	8.08	169.71
3STRPL	Trench Plate Rental - 8'x10'	1.00	18.00	MO	US$	200.00	107.75	215.50	3,879.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	76.09	152.18
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	69.22	553.75
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	93.20	372.78

Biditem

3003

SHORELINE RECONSTRUCTION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	543,986.45	539,064.69	1,083,051.14	1,470,942.80	9,123,513.68	0.00	50,000.00	11,727,507.62
Total	543,986.45	539,064.69	1,083,051.14	1,470,942.80	9,123,513.68	0.00	50,000.00	11,727,507.62

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
10,852.4000	0.0001	10,852.4000	1,080.6372	50.1259	99.7983	0.0004

Activity: A Place Sand Fill for Beach Nourishment (Unreviewed) Quantity: 180620.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1.65	1.64	3.29	3.71	45.38	0.00	0.00	52.39
Total	298,009.81	297,053.81	595,063.62	670,843.54	8,197,312.27	0.00	0.00	9,463,219.43

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7.0087	0.0067	150.0066	1,051.3480	150.5100	1,200.0532	0.0008	62,874.3567

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
6,020.4000	30.0013	0.0333	98.8412	1.6499

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: UH 150.0066 Eff: 100.00 Crew Hrs: 1204.08 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Place sand fill to required template using marine based equipment. Assume crane barge will start as close to shore as possible working high tides and place large mounds of sand that dozers can then push towards shore to complete shore connection. Offshore end to be completed similarly and slope cut with crane barge. Total amount of sand fill required - 164,200 cy. Assume 10% Waste, so 164,200 CY * 1.10 = 180,620 CY.

Production Factors:
6 CY, Bucket Size
0.95 Bucket Fill Factor
0.91 10% Additional time, slope excavation
86.5% Avg. Percent, Full Bucket
50 Op. Efficiency (Working Minutes per Hour)
62 Sec., Cycle Time
85.0% Operator Skill Efficiency
100.0% Machine Availability

Excavation:

Cycles per Hour:	=	41.1	cycles/hr
Production Rate:	=	214	cy/hr
Excavation Time Efficiency (%):	=	70%	
Daily Operating Time:	=	5.60	hours
Monthly Operating Time:	=	122	hours
Daily Gross Production:	=	1,198	cy/day
Daily Gross Production:	=	14	lf/day
Monthly Gross Production:	=	26,108	cy/mo
Excavation Time:		6.92	months
Excavation Time:		150.51	days

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BB110	Sand Fill	1.00	292,604.40	TON	US$	26.00	107.75	28.02	8,197,312.27
811LGS0020D	20kW Large GenSet	1.00	1,204.08	HR	US$	23.96	100.00	23.96	28,843.74
814CB075	Crane Barge - 75 Ton	1.00	1,204.08	HR	US$	136.78	100.00	136.78	164,691.65
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	2,408.16	HR	US$	108.23	100.00	108.23	260,630.34
814ITB0250	Inland Tug - 250hp	1.00	1,204.08	HR	US$	133.81	100.00	133.81	161,116.74
814RUN016	Runabout 16ft	1.00	1,204.08	HR	US$	34.84	100.00	34.84	41,951.35
818PW350S	Portable Welder Skid 350 amp	1.00	1,204.08	HR	US$	11.30	100.00	11.30	13,609.72
OE10	Crane Operator (<100 tn)	1.00	1,204.08	MH	US$	51.40	100.00	100.10	120,522.51
OE17	Engineer	1.00	1,204.08	MH	US$	49.57	100.00	99.29	119,552.35
OE18	Mate	1.00	1,204.08	MH	US$	49.57	100.00	99.29	119,552.35
OE19	Deckhand	2.00	2,408.16	MH	US$	48.48	100.00	97.77	235,436.41

Activity: B Place Rip Rap Stone Groin (Unreviewed) Quantity: 21420.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.47	2.44	4.91	5.39	43.24	0.00	0.00	53.54
Total	52,929.44	52,176.96	105,106.40	115,412.84	926,201.41	0.00	0.00	1,146,720.65

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
10.2950	0.0071	140.9211	1,450.7845	19.0000	1,127.3684	0.0009	60,353.7184

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
1,064.0000	20.1316	0.0497	98.7842	2.4710

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 (Mod) Crane Barge, 5-Men Prod: UH 140.9211 Eff: 100.00 Crew Hrs: 152 Labor Pcs: 7.00 Equipment Pcs: 9.00

Notes: Vacation Island rock groins = 13,600 cy total. That is assuming 1.5:1 side slopes all the way around. Assume 5% Waste, so 13,600 CY *1.05 = 14,280 CY, or 21,420 Ton @ 1.5 Ton.

Assume rip rap is placed using 75-ton crane barge. Assume crane barge will start as close to shore as possible working high tides and place rock to an elevation where an excavator can be placed on the rock groin to construct the segment from the crane barge inshore. Offshore end to be constructed with the crane barge with the slopes shaped by an excavator.

Budget cost for rip rap stone recieved from Granite Construction quarry (Rosemary's Mountain) in Fallbrook at $23/ton for

material and $14-15/ton for delivery to project site - $37/ton total cost. Use $40/ton.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BA110	Armor Stone 2 -> 5 T	1.00	21,420.00	TON	US$	40.00	107.75	43.10	923,202.00
2EC32	Woven Geotextile	1.00	2,226.94	SY	US$	1.25	107.75	1.35	2,999.41
809FEL950	CAT 950H F.E. Loader 4cy	1.00	152.00	HR	US$	89.04	100.00	89.04	13,533.62
810CMHE320	CAT 320DL Excavator 1.18cy	1.00	152.00	HR	US$	113.12	100.00	113.12	17,193.63
811LGS0020D	20kW Large GenSet	1.00	152.00	HR	US$	23.96	100.00	23.96	3,641.16
814CB075	Crane Barge - 75 Ton	1.00	152.00	HR	US$	136.78	100.00	136.78	20,790.26
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	304.00	HR	US$	108.23	100.00	108.23	32,901.31
814ITB0250	Inland Tug - 250hp	1.00	152.00	HR	US$	133.81	100.00	133.81	20,338.97
814RUN016	Runabout 16ft	1.00	152.00	HR	US$	34.84	100.00	34.84	5,295.83
818PW350S	Portable Welder Skid 350 amp	1.00	152.00	HR	US$	11.30	100.00	11.30	1,718.06
OE03	Operator (Gr 14)	2.00	304.00	MH	US$	50.36	100.00	98.64	29,987.07
OE10	Crane Operator (<100 tn)	1.00	152.00	MH	US$	51.40	100.00	100.10	15,214.46
OE17	Engineer	1.00	152.00	MH	US$	49.57	100.00	99.29	15,091.99
OE18	Mate	1.00	152.00	MH	US$	49.57	100.00	99.29	15,091.99
OE19	Deckhand	2.00	304.00	MH	US$	48.48	100.00	97.77	29,720.89

Activity: C Tow Sand/Rock Barges (Unreviewed) Quantity: 157.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,229.60	1,209.13	2,438.73	4,361.06	0.00	0.00	0.00	6,799.79
Total	193,047.20	189,833.92	382,881.12	684,686.42	0.00	0.00	0.00	1,067,567.54

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
6,799.7932	8.0000	0.1250	849.9742	157.0000	1.0000	1.0000	6,799.7932

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
3,768.0000	0.0417	24.0000	101.6139	1,229.6000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: TOWL Towing - Local Crew Prod: HU 8 Eff: 100.00 Crew Hrs: 1256 Labor Pcs: 3.00 Equipment Pcs: 1.00

Notes: Allow for towing of sand and rock barges to/from project site. Assume barges are towed from contractor's yard in San Diego Bay. Allow 8 hours for each tow. Assuming each barge holds 2,000 ton, total no. of tows - 292,604ton + 21,420 ton/2,000 ton = 157 tows.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814TB1350	Tow Boat - 1,350hp %50	1.00	1,256.00	HR	US$	895.11	100.00	545.13	684,686.42
OE15	Leverman	1.00	1,256.00	MH	US$	55.65	100.00	107.79	135,379.44
OE17	Engineer	1.00	1,256.00	MH	US$	49.57	100.00	99.29	124,707.46
OE19	Deckhand	1.00	1,256.00	MH	US$	48.48	100.00	97.77	122,794.22

Activity: D Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Allow for pre- and post-construction surveys for cobble dike and sand fill. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	25,000.00	100.00	25,000.00	50,000.00

Biditem

3004

CONSTRUCTION ACCESS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3,680.40	3,593.72	7,274.12	1,926.80	0.00	43,100.00	0.00	52,300.92
Total	3,680.40	3,593.72	7,274.12	1,926.80	0.00	43,100.00	0.00	52,300.92

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
100.0000	0.0100	100.0000	523.0092	36.8040	72.7412	0.0250

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 8.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	460.05	449.22	909.27	240.85	0.00	5,387.50	0.00	6,537.62
Total	3,680.40	3,593.72	7,274.12	1,926.80	0.00	43,100.00	0.00	52,300.92

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,150.1150	5.0000	0.2000	230.0230	5.0000	1.6000	0.6250	10,460.1840

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
100.0000	0.0800	12.5000	72.7412	460.0500

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 5 Eff: 100.00 Crew Hrs: 40 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing sidewalks and work areas for 7.8 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 1,900 lf/500 ft = 4 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 3 ea. moves, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	8.00	MO	US$	5,000.00	107.75	5,387.50	43,100.00
820OHLDTC44	LD Truck 4x4 1.75t	1.00	40.00	HR	US$	48.17	100.00	48.17	1,926.80
LA01	Laborer Foreman	0.50	20.00	MH	US$	41.02	100.00	78.48	1,569.63
LA03	Laborer (Gr 4)	2.00	80.00	MH	US$	35.75	100.00	71.31	5,704.49

Biditem

3005

INSTALL SIGNS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,418.40	1,361.20	2,779.60	476.44	9,573.16	0.00	0.00	12,829.20
Total	1,418.40	1,361.20	2,779.60	476.44	9,573.16	0.00	0.00	12,829.20

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
35.0000	0.0286	35.0000	366.5486	40.5257	79.4171	0.1000

Activity: A Install Signs (Unreviewed) Quantity: 20.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	1,418.40	1,361.20	2,779.60	476.44	9,573.16	0.00	0.00	12,829.20

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8020	0.5000	2.0000	325.6040	1.2500	16.0000	0.0625	10,263.3600

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
35.0000	0.5714	1.7500	79.4171	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 10 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 20 of each: Beach Access Signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	20.00	EA	US$	44.23	107.75	47.66	953.16
2T5101	Construction Signs	1.00	20.00	EA	US$	400.00	107.75	431.00	8,620.00
809TLB416E	CAT 416E Backhoe	1.00	10.00	HR	US$	47.64	100.00	47.64	476.44
LA01	Laborer Foreman	0.50	5.00	MH	US$	41.02	100.00	78.48	392.40
LA03	Laborer (Gr 4)	2.00	20.00	MH	US$	35.75	100.00	71.31	1,426.12
OE07	Operator (Gr 6)	1.00	10.00	MH	US$	49.83	100.00	96.11	961.08

Biditem - Parent **WEST SAIL BAY**

4000

Takeoff Qty: 1.000 LS
Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	391,544.40	387,143.72	778,688.12	1,024,061.29	5,694,990.10	30,816.50	50,000.00	7,578,556.01
Total	391,544.40	387,143.72	778,688.12	1,024,061.29	5,694,990.10	30,816.50	50,000.00	7,578,556.01

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
7,975.9000	0.0001	7,975.9000	950.1819	49.0909	97.6301	0.0000

Biditem

4001

MOBILIZATION/DEMOBILIZATION

Takeoff Qty: 1.000 LS
Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	17,412.60	18,337.30	35,749.90	47,068.04	0.00	0.00	0.00	82,817.94
Total	17,412.60	18,337.30	35,749.90	47,068.04	0.00	0.00	0.00	82,817.94

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
380.0000	0.0026	380.0000	217.9419	45.8226	94.0787	0.0068

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 10.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	1,075.60	1,713.61	2,789.21	4,711.28	0.00	0.00	0.00	7,500.49

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0490	4.0000	0.2500	187.5123	5.0000	2.0000	0.5000	1,500.0980

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
40.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 40 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	40.00	HR	US$	16.91	100.00	16.91	676.44
820OHTT050	On Hwy Truck 50K	1.00	40.00	HR	US$	100.87	100.00	100.87	4,034.84
TE04	Truck Driver (Gr 5)	1.00	40.00	MH	US$	26.89	100.00	69.73	2,789.21

Activity: B Demobilization of Land Based Equip (Unreviewed) Quantity: 10.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	1,075.60	1,713.61	2,789.21	4,711.28	0.00	0.00	0.00	7,500.49

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0490	4.0000	0.2500	187.5123	5.0000	2.0000	0.5000	1,500.0980

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
40.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 40 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	40.00	HR	US$	16.91	100.00	16.91	676.44
820OHTT050	On Hwy Truck 50K	1.00	40.00	HR	US$	100.87	100.00	100.87	4,034.84

TE04	Truck Driver (Gr 5)	1.00	40.00	MH	US$	26.89	100.00	69.73	2,789.21

Activity: C Mobilization of Marine Equip (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	7,920.00	7,894.60	15,814.60	17,828.55	0.00	0.00	0.00	33,643.15
Total	7,920.00	7,894.60	15,814.60	17,828.55	0.00	0.00	0.00	33,643.15

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
33,643.1500	32.0000	0.0313	1,051.3484	4.0000	0.2500	4.0000	8,410.7875

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.0063	160.0000	98.8413	7,920.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: S 4 Eff: 100.00 Crew Hrs: 32 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Allow for 3 days to mobilize crane barge and rock barge plus 1 day at the site to set up operations..

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
811LGS0020D	20kW Large GenSet	1.00	32.00	HR	US$	23.96	100.00	23.96	766.56
814CB075	Crane Barge - 75 Ton	1.00	32.00	HR	US$	136.78	100.00	136.78	4,376.90
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	64.00	HR	US$	108.23	100.00	108.23	6,926.59
814ITB0250	Inland Tug - 250hp	1.00	32.00	HR	US$	133.81	100.00	133.81	4,281.89
814RUN016	Runabout 16ft	1.00	32.00	HR	US$	34.84	100.00	34.84	1,114.91
818PW350S	Portable Welder Skid 350 amp	1.00	32.00	HR	US$	11.30	100.00	11.30	361.70
OE10	Crane Operator (<100 tn)	1.00	32.00	MH	US$	51.40	100.00	100.10	3,203.05
OE17	Engineer	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE18	Mate	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE19	Deckhand	2.00	64.00	MH	US$	48.48	100.00	97.77	6,257.03

Activity: D Demobilization of Marine Equip (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3,960.00	3,947.30	7,907.30	8,914.28	0.00	0.00	0.00	16,821.58
Total	3,960.00	3,947.30	7,907.30	8,914.28	0.00	0.00	0.00	16,821.58

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
16,821.5800	16.0000	0.0625	1,051.3488	2.0000	0.5000	2.0000	8,410.7900

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
80.0000	0.0125	80.0000	98.8413	3,960.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: S 2 Eff: 100.00 Crew Hrs: 16 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Allow one day to clean up and one day to demobilize crane barge.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
811LGS0020D	20kW Large GenSet	1.00	16.00	HR	US$	23.96	100.00	23.96	383.28
814CB075	Crane Barge - 75 Ton	1.00	16.00	HR	US$	136.78	100.00	136.78	2,188.45
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	32.00	HR	US$	108.23	100.00	108.23	3,463.30
814ITB0250	Inland Tug - 250hp	1.00	16.00	HR	US$	133.81	100.00	133.81	2,140.94
814RUN016	Runabout 16ft	1.00	16.00	HR	US$	34.84	100.00	34.84	557.46
818PW350S	Portable Welder Skid 350 amp	1.00	16.00	HR	US$	11.30	100.00	11.30	180.85
OE10	Crane Operator (<100 tn)	1.00	16.00	MH	US$	51.40	100.00	100.10	1,601.52
OE17	Engineer	1.00	16.00	MH	US$	49.57	100.00	99.29	1,588.63
OE18	Mate	1.00	16.00	MH	US$	49.57	100.00	99.29	1,588.63
OE19	Deckhand	2.00	32.00	MH	US$	48.48	100.00	97.77	3,128.52

Activity: E Towing (Unreviewed) Quantity: 2.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,690.70	1,534.09	3,224.79	5,451.33	0.00	0.00	0.00	8,676.12
Total	3,381.40	3,068.18	6,449.58	10,902.65	0.00	0.00	0.00	17,352.23

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
8,676.1150	10.0000	0.1000	867.6115	2.0000	1.0000	1.0000	8,676.1150

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
60.0000	0.0333	30.0000	107.4930	1,690.7000

Calendar: 50S 5 x 10 Hr - Single Hrs/Shift: 10 WC: MARINE Over Water Work

Crew: TOWL Towing - Local Crew Prod: SU 1 Eff: 100.00 Crew Hrs: 20 Labor Pcs: 3.00 Equipment Pcs: 1.00

Notes: Allow for two tows to account for mobilization to site and demobilization from site. Assume contractor is local to San Diego and is towing from location in San Diego Bay. Allow one shift for each tow.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814TB1350	Tow Boat - 1,350hp %50	1.00	20.00	HR	US$	895.11	100.00	545.13	10,902.65
OE15	Leverman	1.00	20.00	MH	US$	55.65	110.00	114.17	2,283.44
OE17	Engineer	1.00	20.00	MH	US$	49.57	110.00	104.98	2,099.55
OE19	Deckhand	1.00	20.00	MH	US$	48.48	110.00	103.33	2,066.59

Biditem

4002

SWPPP

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
14.0000	0.0714	14.0000	1,094.1429	40.5257	77.0507	0.2500

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $10,000 due to travel of equipment on and off the beach.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2900	4.0000	0.2500	317.3225	0.5000	2.0000	0.5000	10,636.0000

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.0714	14.0000	77.0507	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	21.00	TON	US$	7.50	107.75	8.08	169.71
3STRPL	Trench Plate Rental - 8'x10'	1.00	18.00	MO	US$	200.00	107.75	215.50	3,879.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	76.09	152.18
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	69.22	553.75
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	93.20	372.78

Biditem

4003

SHORELINE RECONSTRUCTION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	367,030.07	361,935.99	728,966.06	973,621.44	5,686,204.55	0.00	40,000.00	7,428,792.05
Total	367,030.07	361,935.99	728,966.06	973,621.44	5,686,204.55	0.00	40,000.00	7,428,792.05

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
7,407.5400	0.0001	7,407.5400	1,002.8690	49.5482	98.4087	0.0005

Activity: A Place Sand Fill for Beach Nourishment (Unreviewed) Quantity: 125290.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1.65	1.64	3.29	3.71	45.38	0.00	0.00	52.39
Total	206,711.99	206,048.92	412,760.91	465,325.01	5,686,204.55	0.00	0.00	6,564,290.47

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7.0084	0.0067	150.0120	1,051.3481	104.4000	1,200.0958	0.0008	62,876.3455

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
4,176.0000	30.0024	0.0333	98.8412	1.6499

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: UH 150.012 Eff: 100.00 Crew Hrs: 835.2 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Place sand fill to required template using marine based equipment. Assume crane barge will start as close to shore as possible working high tides and place large mounds of sand that dozers can then push towards shore to complete shore connection. Offshore end to be completed similarly and slope cut with crane barge. Total amount of sand fill required - 113,900 cy. Assume 10% Waste, so 113,900 CY * 1.10 = 125,290 CY.

```
Production Factors:
6       CY, Bucket Size
0.95    Bucket Fill Factor
0.91    10%
86.5%   Avg. Percent, Full Bucket
50      Op. Efficiency (Working Minutes per Hour)
62      Sec., Cycle Time
85.0%   Operator Skill Efficiency
100.0%  Machine Availability
Cycle Time      62

Excavation:
Cycles per Hour:                        =       41.1    cycles/hr
Production Rate:                        =       214     cy/hr
Excavation Time Efficiency (%):         =       70%
Daily Operating Time:                   =       5.60    hours
Monthly Operating Time:                 =       122     hours
Daily Gross Production:                 =       1,198   cy/day
Daily Gross Production:                 =       26      lf/day
Monthly Gross Production:                       =       26,108  cy/mo
Excavation Time:                                4.80    months
Excavation Time:                                104.4   days
```

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BB110	Sand Fill	1.00	202,970.00	TON	US$	26.00	107.75	28.02	5,686,204.55
811LGS0020D	20kW Large GenSet	1.00	835.20	HR	US$	23.96	100.00	23.96	20,007.22
814CB075	Crane Barge - 75 Ton	1.00	835.20	HR	US$	136.78	100.00	136.78	114,236.99
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	1,670.40	HR	US$	108.23	100.00	108.23	180,784.05
814ITB0250	Inland Tug - 250hp	1.00	835.20	HR	US$	133.81	100.00	133.81	111,757.28
814RUN016	Runabout 16ft	1.00	835.20	HR	US$	34.84	100.00	34.84	29,099.20
818PW350S	Portable Welder Skid 350 amp	1.00	835.20	HR	US$	11.30	100.00	11.30	9,440.27
OE10	Crane Operator (<100 tn)	1.00	835.20	MH	US$	51.40	100.00	100.10	83,599.43
OE17	Engineer	1.00	835.20	MH	US$	49.57	100.00	99.29	82,926.49
OE18	Mate	1.00	835.20	MH	US$	49.57	100.00	99.29	82,926.49
OE19	Deckhand	2.00	1,670.40	MH	US$	48.48	100.00	97.77	163,308.50

Activity: B Sand Fill - Inshore Section (Unreviewed) Quantity: 62600.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	0.56	0.52	1.08	1.01	0.00	0.00	0.00	2.09
Total	34,898.88	32,555.50	67,454.38	63,468.31	0.00	0.00	0.00	130,922.69

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
2.0914	0.0063	159.7892	334.1858	48.9708	1,278.3134	0.0008	2,673.4862

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
783.5400	79.8938	0.0125	86.0893	0.5575

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: EXC2 (Mod) ExcavationCrew blade Prod: UH 159.7892 Eff: 100.00 Crew Hrs: 391.7662 Labor Pcs: 2.00 Equipment Pcs: 1.00

Notes: Allow for dozers to push sand from stockpile placed by crane barge towards shore to complete inshore portion of sand fill template.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809LGPD06T	CAT D6T LGP Dozer	1.00	391.77	HR	US$	162.00	100.00	162.00	63,468.31
LA02	Laborer (Gr 5)	1.00	391.77	MH	US$	39.02	100.00	75.76	29,679.80
OE05	Operator (Gr 10)	1.00	391.77	MH	US$	50.06	100.00	96.42	37,774.58

Activity: C Tow Sand Barges (Unreviewed) Quantity: 102.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,229.60	1,209.13	2,438.73	4,361.06	0.00	0.00	0.00	6,799.79
Total	125,419.20	123,331.57	248,750.77	444,828.12	0.00	0.00	0.00	693,578.89

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
6,799.7930	8.0000	0.1250	849.9741	102.0000	1.0000	1.0000	6,799.7930

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
2,448.0000	0.0417	24.0000	101.6139	1,229.6000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: TOWL Towing - Local Crew Prod: HU 8 Eff: 100.00 Crew Hrs: 816 Labor Pcs: 3.00 Equipment Pcs: 1.00

Notes: Allow for towing of sand barges to/from project site. Assume barges are towed from contractor's yard in San Diego Bay. Allow 8 hours for each tow. Assuming each barge holds 2,000 ton, total no. of tows - 202,970 ton/2,000 ton = 102 tows.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814TB1350	Tow Boat - 1,350hp %50	1.00	816.00	HR	US$	895.11	100.00	545.13	444,828.12
OE15	Leverman	1.00	816.00	MH	US$	55.65	100.00	107.79	87,953.51
OE17	Engineer	1.00	816.00	MH	US$	49.57	100.00	99.29	81,020.13
OE19	Deckhand	1.00	816.00	MH	US$	48.48	100.00	97.77	79,777.13

Activity: D Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Allow for pre- and post-construction surveys for cobble dike and sand fill. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	20,000.00	100.00	20,000.00	40,000.00

Biditem

4004

CONSTRUCTION ACCESS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	5,257.81	5,133.99	10,391.80	2,752.43	0.00	26,937.50	0.00	40,081.73
Total	5,257.81	5,133.99	10,391.80	2,752.43	0.00	26,937.50	0.00	40,081.73

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
142.8600	0.0070	142.8600	280.5665	36.8039	72.7411	0.0175

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 5.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total

U. Cost	1,051.56	1,026.80	2,078.36	550.49	0.00	5,387.50	0.00	8,016.35
Total	5,257.81	5,133.99	10,391.80	2,752.43	0.00	26,937.50	0.00	40,081.73

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
2,628.8460	11.4286	0.0875	230.0239	7.1429	0.7000	1.4286	5,611.4380

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
142.8600	0.0350	28.5720	72.7411	1,051.5620

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 7.1429 Eff: 100.00 Crew Hrs: 57.1429 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing sidewalks and work areas for 4.8 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 1,650 lf/500 ft = 4 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 3 ea. moves, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	5.00	MO	US$	5,000.00	107.75	5,387.50	26,937.50
820OHLDTC44	LD Truck 4x4 1.75t	1.00	57.14	HR	US$	48.17	100.00	48.17	2,752.43
LA01	Laborer Foreman	0.50	28.57	MH	US$	41.02	100.00	78.48	2,242.21
LA03	Laborer (Gr 4)	2.00	114.29	MH	US$	35.75	100.00	71.31	8,149.59

Biditem 4005

INSTALL SIGNS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,276.56	1,225.09	2,501.65	428.80	8,615.84	0.00	0.00	11,546.29
Total	1,276.56	1,225.09	2,501.65	428.80	8,615.84	0.00	0.00	11,546.29

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
31.5000	0.0317	31.5000	366.5489	40.5257	79.4175	0.1111

Activity: A Install Signs (Unreviewed) Quantity: 18.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	1,276.56	1,225.09	2,501.65	428.80	8,615.84	0.00	0.00	11,546.29

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8028	0.5000	2.0000	325.6056	1.1250	16.0000	0.0625	10,263.3689

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
31.5000	0.5714	1.7500	79.4175	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 9 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 18 of each: Beach Access Signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	18.00	EA	US$	44.23	107.75	47.66	857.84
2T5101	Construction Signs	1.00	18.00	EA	US$	400.00	107.75	431.00	7,758.00
809TLB416E	CAT 416E Backhoe	1.00	9.00	HR	US$	47.64	100.00	47.64	428.80
LA01	Laborer Foreman	0.50	4.50	MH	US$	41.02	100.00	78.48	353.17
LA03	Laborer (Gr 4)	2.00	18.00	MH	US$	35.75	100.00	71.31	1,283.52
OE07	Operator (Gr 6)	1.00	9.00	MH	US$	49.83	100.00	96.11	864.96

Biditem - Parent 5000

VACATION ISLAND SW

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	214,519.67	200,075.82	414,595.49	325,250.64	644,123.50	30,816.50	50,000.00	1,464,786.13
Total	214,519.67	200,075.82	414,595.49	325,250.64	644,123.50	30,816.50	50,000.00	1,464,786.13

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
4,880.7400	0.0002	4,880.7400	300.1156	43.9523	84.9452	0.0000

Biditem

5001

MOBILIZATION/DEMOBILIZATION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94
Total	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
320.0000	0.0031	320.0000	187.5123	26.8900	69.7303	0.0031

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Activity: B Demobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Biditem **SWPPP**

5002

Takeoff Qty: 1.000 LS
Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
14.0000	0.0714	14.0000	1,094.1429	40.5257	77.0507	0.2500

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $10,000 due to travel of equipment on and off the beach.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2900	4.0000	0.2500	317.3225	0.5000	2.0000	0.5000	10,636.0000

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.0714	14.0000	77.0507	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	21.00	TON	US$	7.50	107.75	8.08	169.71
3STRPL	Trench Plate Rental - 8'x10'	1.00	18.00	MO	US$	200.00	107.75	215.50	3,879.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	76.09	152.18
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	69.22	553.75
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	93.20	372.78

Biditem

5003

SHORELINE RECONSTRUCTION

Takeoff Qty: 1.000 LS
Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	201,410.31	182,027.75	383,438.06	285,494.87	637,252.58	0.00	40,000.00	1,346,185.51
Total	201,410.31	182,027.75	383,438.06	285,494.87	637,252.58	0.00	40,000.00	1,346,185.51

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
4,442.2400	0.0002	4,442.2400	303.0420	45.3398	86.3164	0.0014

Activity: A Recover Existing Rip Rap (Unreviewed) Quantity: 1.00 Unit: LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	42,902.40	39,939.35	82,841.75	75,924.48	0.00	0.00	0.00	158,766.23
Total	42,902.40	39,939.35	82,841.75	75,924.48	0.00	0.00	0.00	158,766.23

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
158,766.2300	240.0000	0.0042	661.5260	30.0000	0.0333	30.0000	5,292.2077

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
960.0000	0.0010	960.0000	86.2935	42,902.4000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: EXC ExcavationCrew Prod: S 30 Eff: 100.00 Crew Hrs: 240 Labor Pcs: 4.00 Equipment Pcs: 3.00

Notes: Allow for time to remove existing rip rap and grade slope for new rock installation.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL950	CAT 950H F.E. Loader 4cy	1.00	240.00	HR	US$	89.04	100.00	89.04	21,368.88
810CMHE330	CAT 330D L Excavator 1.56cy	1.00	240.00	HR	US$	163.39	100.00	163.39	39,212.64
820OHRD007	On Hwy End Dump 7-8cy	1.00	240.00	HR	US$	63.93	100.00	63.93	15,342.96
LA02	Laborer (Gr 5)	2.00	480.00	MH	US$	39.02	100.00	75.76	36,363.95
OE03	Operator (Gr 14)	2.00	480.00	MH	US$	50.36	100.00	96.83	46,477.80

Activity: B Place Revetment Stone (Unreviewed) Quantity: 12522.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	9.67	8.45	18.12	10.54	44.02	0.00	0.00	72.68
Total	121,119.56	105,783.45	226,903.01	132,015.21	551,159.42	0.00	0.00	910,077.64

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
28.6630	0.0271	36.9076	1,057.8820	42.4100	295.2606	0.0034	21,459.0342

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
2,714.2400	4.6134	0.2168	83.5973	9.6725

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 36.9076 Eff: 100.00 Crew Hrs: 339.28 Labor Pcs: 8.00 Equipment Pcs: 4.00

Notes: Total amount of stone placed - 7950cy*1.5ton/cy = 11,925 ton. Allow waste at 5% - 11,925 ton*1.05 = 12,522 ton. Assume production at approx. 25 cy/hr or 37 ton/hr for placement. Include backhoe and 2 addl laborers to place filter fabric on slope ahead of rock placement. Budget cost for rip rap recieved from Granite Construction quarry (Rosemary's Mountain) in Fallbrook at $23/ton for material and $14-15/ton for delivery to Mission Bay - $37/ton total cost. Use $40/ton.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BA110	Armor Stone 2 -> 5 T	1.00	12,522.00	TON	US$	40.00	107.75	43.10	539,698.20
2EC32	Woven Geotextile	1.00	8,509.49	SY	US$	1.25	107.75	1.35	11,461.22
809FEL950	CAT 950H F.E. Loader 4cy	2.00	678.56	HR	US$	89.04	100.00	89.04	60,416.95
809TLB416E	CAT 416E Backhoe	1.00	339.28	HR	US$	47.64	100.00	47.64	16,164.66
810CMHE330	CAT 330D L Excavator 1.56cy	1.00	339.28	HR	US$	163.39	100.00	163.39	55,433.60
LA02	Laborer (Gr 5)	4.00	1,357.12	MH	US$	39.02	100.00	73.48	99,720.45
OE03	Operator (Gr 14)	3.00	1,017.84	MH	US$	50.36	100.00	93.89	95,562.67
OE07	Operator (Gr 6)	1.00	339.28	MH	US$	49.83	100.00	93.20	31,619.89

Activity: C Place Sand Cover (Unreviewed) Quantity: 1260.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	6.10	5.32	11.42	8.49	45.41	0.00	0.00	65.32
Total	7,688.35	6,700.22	14,388.57	10,698.14	57,216.16	0.00	0.00	82,302.87

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
19.9101	0.0267	37.5000	746.6283	4.2000	300.0000	0.0033	19,595.9214

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
168.0000	7.5000	0.1333	85.6463	6.1019

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 37.5 Eff: 100.00 Crew Hrs: 33.6 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Place Sand on top of revetment,Volume is 1200 CY of Sand Fill. Allow for 5% waste - 1200 *1.05 = 1260 cy.

Production Factors:
4 CY, Bucket Size
0.60 Bucket Fill Factor
0.91 10%

```
54.6%   Avg. Percent, Full Bucket
50      Op. Efficiency (Working Minutes per Hour)
60      Sec., Cycle Time
85.0%   Operator Skill Efficiency
100.0%  Machine Availability
Cycle Time      45

Excavation:
Cycles per Hour:                        =       56.7    cycles/hr
Production Rate:                        =       124     cy/hr
Excavation Time Efficiency (%):                 =       70%
Daily Operating Time:                   =       5.60    hours
Monthly Operating Time:                 =       122     hours
Daily Gross Production:                 =       694     cy/day
Daily Gross Production:                 =       1559    lf/day
Monthly Gross Production:                       =       15,128  cy/mo
Excavation Time:                                0.04    months
Excavation Time:                                0.87    days
```

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BB110	Sand Fill	1.00	2,042.34	TON	US$	26.00	107.75	28.02	57,216.16
809FEL950	CAT 950H F.E. Loader 4cy	2.00	67.20	HR	US$	89.04	100.00	89.04	5,983.29
809SCD06T	CAT D6T Dozer	1.00	33.60	HR	US$	140.32	100.00	140.32	4,714.85
LA02	Laborer (Gr 5)	2.00	67.20	MH	US$	39.02	100.00	73.48	4,937.82
OE03	Operator (Gr 14)	2.00	67.20	MH	US$	50.36	100.00	93.89	6,309.25
OE05	Operator (Gr 10)	1.00	33.60	MH	US$	50.06	100.00	93.50	3,141.50

Activity: D Construct Oyster Habitat (Unreviewed) Quantity: 1.00 Unit: LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	29,700.00	29,604.73	59,304.73	66,857.04	28,877.00	0.00	0.00	155,038.77
Total	29,700.00	29,604.73	59,304.73	66,857.04	28,877.00	0.00	0.00	155,038.77

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
126,161.7700	120.0000	0.0083	1,051.3481	15.0000	0.0667	15.0000	10,335.9180

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
600.0000	0.0017	600.0000	98.8412	29,700.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: S 15 Eff: 100.00 Crew Hrs: 120 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Use a crane barge crew to set oyster cultch bags, reef balls or similar oyster habitat. PRECAST CONCRETE MAT's represents cost to furnish reef balls for 1 acre of placement, based on Maryland Port Administration Bid Tabs.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PC	PRECAST CONCRETE MATL'S	1.00	1.00	AC	US$	26,800.00	107.75	28,877.00	28,877.00
811LGS0020D	20kW Large GenSet	1.00	120.00	HR	US$	23.96	100.00	23.96	2,874.60
814CB075	Crane Barge - 75 Ton	1.00	120.00	HR	US$	136.78	100.00	136.78	16,413.36
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	240.00	HR	US$	108.23	100.00	108.23	25,974.72
814ITB0250	Inland Tug - 250hp	1.00	120.00	HR	US$	133.81	100.00	133.81	16,057.08
814RUN016	Runabout 16ft	1.00	120.00	HR	US$	34.84	100.00	34.84	4,180.92
818PW350S	Portable Welder Skid 350 amp	1.00	120.00	HR	US$	11.30	100.00	11.30	1,356.36
OE10	Crane Operator (<100 tn)	1.00	120.00	MH	US$	51.40	100.00	100.10	12,011.41
OE17	Engineer	1.00	120.00	MH	US$	49.57	100.00	99.29	11,914.73
OE18	Mate	1.00	120.00	MH	US$	49.57	100.00	99.29	11,914.73
OE19	Deckhand	2.00	240.00	MH	US$	48.48	100.00	97.77	23,463.86

Activity: E Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Notes: Allow for pre- and post-construction surveys for cobble dike and sand fill. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	20,000.00	100.00	20,000.00	40,000.00

Biditem **CONSTRUCTION ACCESS**

5004

Takeoff Qty: 1.000 LS
Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2,944.32	2,874.97	5,819.29	1,541.44	0.00	26,937.50	0.00	34,298.23
Total	2,944.32	2,874.97	5,819.29	1,541.44	0.00	26,937.50	0.00	34,298.23

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
80.0000	0.0125	80.0000	428.7279	36.8040	72.7411	0.0313

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 5.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	588.86	574.99	1,163.86	308.29	0.00	5,387.50	0.00	6,859.65
Total	2,944.32	2,874.97	5,819.29	1,541.44	0.00	26,937.50	0.00	34,298.23

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,472.1460	6.4000	0.1563	230.0228	4.0000	1.2500	0.8000	8,574.5575

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
80.0000	0.0625	16.0000	72.7411	588.8640

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 4 Eff: 100.00 Crew Hrs: 32 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing sidewalks and work areas for 4.21 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 1,370 lf/500 ft = 3 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 2 ea. moves, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	5.00	MO	US$	5,000.00	107.75	5,387.50	26,937.50
820OHLDTC44	LD Truck 4x4 1.75t	1.00	32.00	HR	US$	48.17	100.00	48.17	1,541.44
LA01	Laborer Foreman	0.50	16.00	MH	US$	41.02	100.00	78.48	1,255.70
LA03	Laborer (Gr 4)	2.00	64.00	MH	US$	35.75	100.00	71.31	4,563.59

Biditem **INSTALL SIGNS**

5005

Takeoff Qty: 1.000 LS
Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	992.88	952.85	1,945.73	333.51	6,701.21	0.00	0.00	8,980.45
Total	992.88	952.85	1,945.73	333.51	6,701.21	0.00	0.00	8,980.45

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
24.5000	0.0408	24.5000	366.5490	40.5257	79.4176	0.1429

Activity: A Install Signs (Unreviewed) Quantity: 14.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	992.88	952.85	1,945.73	333.51	6,701.21	0.00	0.00	8,980.45

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8029	0.5000	2.0000	325.6057	0.8750	16.0000	0.0625	10,263.3714

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
24.5000	0.5714	1.7500	79.4176	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 7 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 14 of each: Beach Access Signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	14.00	EA	US$	44.23	107.75	47.66	667.21
2T5101	Construction Signs	1.00	14.00	EA	US$	400.00	107.75	431.00	6,034.00
809TLB416E	CAT 416E Backhoe	1.00	7.00	HR	US$	47.64	100.00	47.64	333.51
LA01	Laborer Foreman	0.50	3.50	MH	US$	41.02	100.00	78.48	274.68
LA03	Laborer (Gr 4)	2.00	14.00	MH	US$	35.75	100.00	71.31	998.29
OE07	Operator (Gr 6)	1.00	7.00	MH	US$	49.83	100.00	96.11	672.76

Biditem - Parent

6000

VACATION ISLAND N (WEST OF INGRAHAM ST)

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	93,795.05	91,578.52	185,373.57	162,069.93	214,621.73	20,041.50	50,000.00	632,106.73
Total	93,795.05	91,578.52	185,373.57	162,069.93	214,621.73	20,041.50	50,000.00	632,106.73

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
2,205.1400	0.0005	2,205.1400	286.6515	42.5347	84.0643	0.0000

Biditem

6001

MOBILIZATION/DEMOBILIZATION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94
Total	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
320.0000	0.0031	320.0000	187.5123	26.8900	69.7303	0.0031

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Activity: B Demobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit

160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Biditem

6002

SWPPP

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
14.0000	0.0714	14.0000	1,094.1429	40.5257	77.0507	0.2500

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $10,000 due to equipment trips on and off the beach.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2900	4.0000	0.2500	317.3225	0.5000	2.0000	0.5000	10,636.0000

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.0714	14.0000	77.0507	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	21.00	TON	US$	7.50	107.75	8.08	169.71
3STRPL	Trench Plate Rental - 8'x10'	1.00	18.00	MO	US$	200.00	107.75	215.50	3,879.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	76.09	152.18
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	69.22	553.75
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	93.20	372.78

Biditem **SHORELINE RECONSTRUCTION**

6003

Takeoff Qty: 1.000 LS
Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	81,989.13	74,793.67	156,782.80	122,890.10	211,580.07	0.00	40,000.00	531,252.97
Total	81,989.13	74,793.67	156,782.80	122,890.10	211,580.07	0.00	40,000.00	531,252.97

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
1,800.6400	0.0006	1,800.6400	295.0356	45.5333	87.0706	0.0032

Activity: A Recover Existing Rip Rap (Unreviewed) Quantity: 1.00 Unit: LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	21,451.20	19,969.67	41,420.87	37,962.24	0.00	0.00	0.00	79,383.11
Total	21,451.20	19,969.67	41,420.87	37,962.24	0.00	0.00	0.00	79,383.11

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
79,383.1100	120.0000	0.0083	661.5259	15.0000	0.0667	15.0000	5,292.2073

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
480.0000	0.0021	480.0000	86.2935	21,451.2000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: EXC ExcavationCrew Prod: S 15 Eff: 100.00 Crew Hrs: 120 Labor Pcs: 4.00 Equipment Pcs: 3.00

Notes: Allow for time to remove existing rip rap and grade slope for new rock installation.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL950	CAT 950H F.E. Loader 4cy	1.00	120.00	HR	US$	89.04	100.00	89.04	10,684.44
810CMHE330	CAT 330D L Excavator 1.56cy	1.00	120.00	HR	US$	163.39	100.00	163.39	19,606.32
820OHRD007	On Hwy End Dump 7-8cy	1.00	120.00	HR	US$	63.93	100.00	63.93	7,671.48
LA02	Laborer (Gr 5)	2.00	240.00	MH	US$	39.02	100.00	75.76	18,181.98
OE03	Operator (Gr 14)	2.00	240.00	MH	US$	50.36	100.00	96.83	23,238.89

Activity: B Place Revetment Stone (Unreviewed) Quantity: 4410.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	9.72	8.49	18.21	10.59	40.78	0.00	0.00	69.59
Total	42,867.37	37,439.52	80,306.89	46,723.61	179,856.31	0.00	0.00	306,886.81

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
28.8051	0.0272	36.7255	1,057.8822	15.0100	293.8041	0.0034	20,445.4903

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
960.6400	4.5907	0.2178	83.5973	9.7205

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 36.7255 Eff: 100.00 Crew Hrs: 120.08 Labor Pcs: 8.00 Equipment Pcs: 4.00

Notes: Total amount of stone placed - 2,800cy*1.5ton/cy = 4200 ton. Allow waste at 5% - 4200ton*1.05 = 4,410 ton. Assume production at approx. 25 cy/hr or 37 ton/hr for placement. Include backhoe and 2 addl laborers to place filter fabric on slope ahead of rock placement. Budget cost for rip rap recieved from Granite Construction quarry (Rosemary's Mountain) in Fallbrook at $23/ton for material and $14-15/ton for delivery to Mission Bay - $37/ton total cost. Other budget cost recieved from North County Sand & Gravel at $675/load delivered (~$34/ton).

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BA110	Armor Stone 2 -> 5 T	1.00	4,410.00	TON	US$	37.00	107.75	39.87	175,815.68
2EC32	Woven Geotextile	1.00	3,000.00	SY	US$	1.25	107.75	1.35	4,040.63
809FEL950	CAT 950H F.E. Loader 4cy	2.00	240.16	HR	US$	89.04	100.00	89.04	21,383.13
809TLB416E	CAT 416E Backhoe	1.00	120.08	HR	US$	47.64	100.00	47.64	5,721.09
810CMHE330	CAT 330D L Excavator 1.56cy	1.00	120.08	HR	US$	163.39	100.00	163.39	19,619.39
LA02	Laborer (Gr 5)	4.00	480.32	MH	US$	39.02	100.00	73.48	35,293.66
OE03	Operator (Gr 14)	3.00	360.24	MH	US$	50.36	100.00	93.89	33,822.12
OE07	Operator (Gr 6)	1.00	120.08	MH	US$	49.83	100.00	93.20	11,191.11

Activity: C Place Sand Cover (Unreviewed) Quantity: 374.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	4.89	4.27	9.16	6.81	46.22	0.00	0.00	62.19
Total	1,830.56	1,595.29	3,425.85	2,547.17	17,285.26	0.00	0.00	23,258.28

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
15.9706	0.0214	46.7500	746.6275	1.0000	374.0000	0.0027	23,258.2800

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
40.0000	9.3500	0.1070	85.6463	4.8945

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 46.75 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Place Sand overtop revetment at 1' depth. Average Width of placement is 15'. Approximate length of placement is 640'. Volume is 1x15x640/27 = 356 CY of Sand Fill. Allow for 5% waste - 356*1.05 = 374 cy.

```
Production Factors:
4       CY, Bucket Size
0.60    Bucket Fill Factor
0.91    10%
54.6%   Avg. Percent, Full Bucket
50      Op. Efficiency (Working Minutes per Hour)
45      Sec., Cycle Time
85.0%   Operator Skill Efficiency
100.0%  Machine Availability
Cycle Time      60

Excavation:
Cycles per Hour:                    =       56.7    cycles/hr
Production Rate:                    =       124     cy/hr
Excavation Time Efficiency (%):             =       70%
Daily Operating Time:               =       5.60    hours
Monthly Operating Time:             =       122     hours
Daily Gross Production:             =       694     cy/day
Daily Gross Production:             =       1170    lf/day
Monthly Gross Production:                   =       15,128  cy/mo
Excavation Time:                            0.02    months
Excavation Time:                            0.44    days
```

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BB110	Sand Fill	1.00	617.00	TON	US$	26.00	107.75	28.02	17,285.26
809FEL950	CAT 950H F.E. Loader 4cy	2.00	16.00	HR	US$	89.04	100.00	89.04	1,424.59
809SCD06T	CAT D6T Dozer	1.00	8.00	HR	US$	140.32	100.00	140.32	1,122.58
LA02	Laborer (Gr 5)	2.00	16.00	MH	US$	39.02	100.00	73.48	1,175.67
OE03	Operator (Gr 14)	2.00	16.00	MH	US$	50.36	100.00	93.89	1,502.21
OE05	Operator (Gr 10)	1.00	8.00	MH	US$	50.06	100.00	93.50	747.97

Activity: D Construct Oyster Habitat (Unreviewed) Quantity: 1.00 Unit: LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	15,840.00	15,789.19	31,629.19	35,657.08	14,438.50	0.00	0.00	81,724.77
Total	15,840.00	15,789.19	31,629.19	35,657.08	14,438.50	0.00	0.00	81,724.77

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
67,286.2700	64.0000	0.0156	1,051.3480	8.0000	0.1250	8.0000	10,215.5963

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
320.0000	0.0031	320.0000	98.8412	15,840.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: S 8 Eff: 100.00 Crew Hrs: 64 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Use a crane barge crew to set oyster cultch bags, reef balls or similar oyster habitat. PRECAST CONCRETE MAT's represents cost to furnish reef balls for 0.5 acre of placement, based on Maryland Port Administration Bid Tabs.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PC	PRECAST CONCRETE MATL'S	1.00	0.50	AC	US$	26,800.00	107.75	28,877.00	14,438.50
811LGS0020D	20kW Large GenSet	1.00	64.00	HR	US$	23.96	100.00	23.96	1,533.12
814CB075	Crane Barge - 75 Ton	1.00	64.00	HR	US$	136.78	100.00	136.78	8,753.79
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	128.00	HR	US$	108.23	100.00	108.23	13,853.18
814ITB0250	Inland Tug - 250hp	1.00	64.00	HR	US$	133.81	100.00	133.81	8,563.78
814RUN016	Runabout 16ft	1.00	64.00	HR	US$	34.84	100.00	34.84	2,229.82
818PW350S	Portable Welder Skid 350 amp	1.00	64.00	HR	US$	11.30	100.00	11.30	723.39

OE10	Crane Operator (<100 tn)	1.00	64.00	MH	US$	51.40	100.00	100.10	6,406.09
OE17	Engineer	1.00	64.00	MH	US$	49.57	100.00	99.29	6,354.52
OE18	Mate	1.00	64.00	MH	US$	49.57	100.00	99.29	6,354.52
OE19	Deckhand	2.00	128.00	MH	US$	48.48	100.00	97.77	12,514.06

Activity: E Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Notes: Allow for pre- and post-construction surveys for cobble dike and sand fill. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	20,000.00	100.00	20,000.00	40,000.00

Biditem

6004

CONSTRUCTION ACCESS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2,208.24	2,156.23	4,364.47	1,156.08	0.00	16,162.50	0.00	21,683.05
Total	2,208.24	2,156.23	4,364.47	1,156.08	0.00	16,162.50	0.00	21,683.05

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
60.0000	0.0167	60.0000	361.3842	36.8040	72.7412	0.0417

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 3.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	736.08	718.74	1,454.82	385.36	0.00	5,387.50	0.00	7,227.68
Total	2,208.24	2,156.23	4,364.47	1,156.08	0.00	16,162.50	0.00	21,683.05

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,840.1833	8.0000	0.1250	230.0229	3.0000	1.0000	1.0000	7,227.6833

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
60.0000	0.0500	20.0000	72.7412	736.0800

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 3 Eff: 100.00 Crew Hrs: 24 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing sidewalks and work areas for 2.8 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 570 lf/500 ft = 2 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 1 ea. move, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	3.00	MO	US$	5,000.00	107.75	5,387.50	16,162.50
820OHLDTC44	LD Truck 4x4 1.75t	1.00	24.00	HR	US$	48.17	100.00	48.17	1,156.08
LA01	Laborer Foreman	0.50	12.00	MH	US$	41.02	100.00	78.48	941.78
LA03	Laborer (Gr 4)	2.00	48.00	MH	US$	35.75	100.00	71.31	3,422.69

Biditem

6005

INSTALL SIGNS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	425.52	408.37	833.89	142.93	2,871.95	0.00	0.00	3,848.77
Total	425.52	408.37	833.89	142.93	2,871.95	0.00	0.00	3,848.77

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
10.5000	0.0952	10.5000	366.5495	40.5257	79.4181	0.3333

Activity: A Install Signs (Unreviewed) Quantity: 6.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	425.52	408.37	833.89	142.93	2,871.95	0.00	0.00	3,848.77

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8033	0.5000	2.0000	325.6067	0.3750	16.0000	0.0625	10,263.3867

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
10.5000	0.5714	1.7500	79.4181	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 3 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 6 of each: Beach Access Signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	6.00	EA	US$	44.23	107.75	47.66	285.95
2T5101	Construction Signs	1.00	6.00	EA	US$	400.00	107.75	431.00	2,586.00
809TLB416E	CAT 416E Backhoe	1.00	3.00	HR	US$	47.64	100.00	47.64	142.93
LA01	Laborer Foreman	0.50	1.50	MH	US$	41.02	100.00	78.49	117.73
LA03	Laborer (Gr 4)	2.00	6.00	MH	US$	35.75	100.00	71.31	427.84
OE07	Operator (Gr 6)	1.00	3.00	MH	US$	49.83	100.00	96.11	288.32

Biditem - Parent

7000

VENTURA COVE PARK

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	147,274.06	139,870.17	287,144.23	236,211.91	379,368.68	25,429.00	50,000.00	978,153.82
Total	147,274.06	139,870.17	287,144.23	236,211.91	379,368.68	25,429.00	50,000.00	978,153.82

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
3,391.6600	0.0003	3,391.6600	288.3997	43.4224	84.6619	0.0000

Biditem

7001

MOBILIZATION/DEMOBILIZATION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94
Total	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
320.0000	0.0031	320.0000	187.5123	26.8900	69.7303	0.0031

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Activity: B Demobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Biditem

7002

SWPPP

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
14.0000	0.0714	14.0000	1,094.1429	40.5257	77.0507	0.2500

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $10,000 due to equipment trips on and off the beach.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2900	4.0000	0.2500	317.3225	0.5000	2.0000	0.5000	10,636.0000

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.0714	14.0000	77.0507	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary

entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	21.00	TON	US$	7.50	107.75	8.08	169.71
3STRPL	Trench Plate Rental - 8'x10'	1.00	18.00	MO	US$	200.00	107.75	215.50	3,879.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	76.09	152.18
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	69.22	553.75
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	93.20	372.78

Biditem

7003

SHORELINE RECONSTRUCTION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	135,184.46	122,813.07	257,997.53	196,936.79	374,412.39	0.00	40,000.00	869,346.71
Total	135,184.46	122,813.07	257,997.53	196,936.79	374,412.39	0.00	40,000.00	869,346.71

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
2,980.1600	0.0003	2,980.1600	291.7114	45.3615	86.5717	0.0020

Activity: A Recover Existing Rip Rap (Unreviewed) Quantity: 1.00 Unit: LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	35,752.00	33,282.79	69,034.79	63,270.40	0.00	0.00	0.00	132,305.19
Total	35,752.00	33,282.79	69,034.79	63,270.40	0.00	0.00	0.00	132,305.19

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
132,305.1900	200.0000	0.0050	661.5260	25.0000	0.0400	25.0000	5,292.2076

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
800.0000	0.0013	800.0000	86.2935	35,752.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: EXC ExcavationCrew Prod: S 25 Eff: 100.00 Crew Hrs: 200 Labor Pcs: 4.00 Equipment Pcs: 3.00

Notes: Allow for time to remove existing rip rap and grade slope for new rock installation.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL950	CAT 950H F.E. Loader 4cy	1.00	200.00	HR	US$	89.04	100.00	89.04	17,807.40
810CMHE330	CAT 330D L Excavator 1.56cy	1.00	200.00	HR	US$	163.39	100.00	163.39	32,677.20
820OHRD007	On Hwy End Dump 7-8cy	1.00	200.00	HR	US$	63.93	100.00	63.93	12,785.80
LA02	Laborer (Gr 5)	2.00	400.00	MH	US$	39.02	100.00	75.76	30,303.29
OE03	Operator (Gr 14)	2.00	400.00	MH	US$	50.36	100.00	96.83	38,731.50

Activity: B Place Revetment Stone (Unreviewed) Quantity: 8033.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	9.67	8.44	18.11	10.54	43.91	0.00	0.00	72.56
Total	77,652.46	67,820.14	145,472.60	84,637.90	352,754.64	0.00	0.00	582,865.14

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
28.6456	0.0271	36.9299	1,057.8820	27.1900	295.4395	0.0034	21,436.7466

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
1,740.1600	4.6162	0.2166	83.5973	9.6667

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 36.9299 Eff: 100.00 Crew Hrs: 217.52 Labor Pcs: 8.00 Equipment Pcs: 4.00

Notes: Total amount of stone placed - 5,100cy*1.5ton/cy = 7650 ton. Allow waste at 5% - 7650ton*1.05 = 8,033 ton. Assume production at approx. 25 cy/hr or 37 ton/hr for placement. Include backhoe and 2 addl laborers to place filter fabric on slope ahead of rock placement. Budget cost for rip rap recieved from Granite Construction quarry (Rosemary's Mountain) in Fallbrook at $23/ton for material and $14-15/ton for delivery to Mission Bay - $37/ton total cost. Use $40/ton.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BA110	Armor Stone 2 -> 5 T	1.00	8,033.00	TON	US$	40.00	107.75	43.10	346,222.30
2EC32	Woven Geotextile	1.00	4,850.00	SY	US$	1.25	107.75	1.35	6,532.34
809FEL950	CAT 950H F.E. Loader 4cy	2.00	435.04	HR	US$	89.04	100.00	89.04	38,734.66
809TLB416E	CAT 416E Backhoe	1.00	217.52	HR	US$	47.64	100.00	47.64	10,363.52
810CMHE330	CAT 330D L Excavator 1.56cy	1.00	217.52	HR	US$	163.39	100.00	163.39	35,539.72
LA02	Laborer (Gr 5)	4.00	870.08	MH	US$	39.02	100.00	73.48	63,933.01
OE03	Operator (Gr 14)	3.00	652.56	MH	US$	50.36	100.00	93.89	61,267.36
OE07	Operator (Gr 6)	1.00	217.52	MH	US$	49.83	100.00	93.20	20,272.23

Activity: D Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Notes: Allow for pre- and post-construction surveys for cobble dike and sand fill. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	20,000.00	100.00	20,000.00	40,000.00

Activity: C Construct Oyster Habitat (Unreviewed) Quantity: 1.00 Unit: LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	21,780.00	21,710.14	43,490.14	49,028.49	21,657.75	0.00	0.00	114,176.38
Total	21,780.00	21,710.14	43,490.14	49,028.49	21,657.75	0.00	0.00	114,176.38

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
92,518.6300	88.0000	0.0114	1,051.3481	11.0000	0.0909	11.0000	10,379.6709

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
440.0000	0.0023	440.0000	98.8412	21,780.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: S 11 Eff: 100.00 Crew Hrs: 88 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Use a crane barge crew to set oyster cultch bags, reef balls or similar oyster habitat. PRECAST CONCRETE MAT's represents cost to furnish reef balls for 0.75 acre of placement, based on Maryland Port Administration Bid Tabs.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PC	PRECAST CONCRETE MATL'S	1.00	0.75	AC	US$	26,800.00	107.75	28,877.00	21,657.75
811LGS0020D	20kW Large GenSet	1.00	88.00	HR	US$	23.96	100.00	23.96	2,108.04
814CB075	Crane Barge - 75 Ton	1.00	88.00	HR	US$	136.78	100.00	136.78	12,036.46
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	176.00	HR	US$	108.23	100.00	108.23	19,048.13
814ITB0250	Inland Tug - 250hp	1.00	88.00	HR	US$	133.81	100.00	133.81	11,775.19
814RUN016	Runabout 16ft	1.00	88.00	HR	US$	34.84	100.00	34.84	3,066.01
818PW350S	Portable Welder Skid 350 amp	1.00	88.00	HR	US$	11.30	100.00	11.30	994.66
OE10	Crane Operator (<100 tn)	1.00	88.00	MH	US$	51.40	100.00	100.10	8,808.37
OE17	Engineer	1.00	88.00	MH	US$	49.57	100.00	99.29	8,737.47
OE18	Mate	1.00	88.00	MH	US$	49.57	100.00	99.29	8,737.47
OE19	Deckhand	2.00	176.00	MH	US$	48.48	100.00	97.77	17,206.83

Biditem

7004

CONSTRUCTION ACCESS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2,208.24	2,156.23	4,364.47	1,156.08	0.00	21,550.00	0.00	27,070.55
Total	2,208.24	2,156.23	4,364.47	1,156.08	0.00	21,550.00	0.00	27,070.55

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
60.0000	0.0167	60.0000	451.1758	36.8040	72.7412	0.0417

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 4.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total

U. Cost	552.06	539.06	1,091.12	289.02	0.00	5,387.50	0.00	6,767.64
Total	2,208.24	2,156.23	4,364.47	1,156.08	0.00	21,550.00	0.00	27,070.55

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,380.1375	6.0000	0.1667	230.0229	3.0000	1.3333	0.7500	9,023.5167

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
60.0000	0.0667	15.0000	72.7412	552.0600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 3 Eff: 100.00 Crew Hrs: 24 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing sidewalks and work areas for 3.91 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 970 lf/500 ft = 2 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 1 ea. move, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	4.00	MO	US$	5,000.00	107.75	5,387.50	21,550.00
820OHLDTC44	LD Truck 4x4 1.75t	1.00	24.00	HR	US$	48.17	100.00	48.17	1,156.08
LA01	Laborer Foreman	0.50	12.00	MH	US$	41.02	100.00	78.48	941.78
LA03	Laborer (Gr 4)	2.00	48.00	MH	US$	35.75	100.00	71.31	3,422.69

Biditem

7005

INSTALL SIGNS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	709.20	680.62	1,389.82	238.22	4,786.58	0.00	0.00	6,414.62
Total	709.20	680.62	1,389.82	238.22	4,786.58	0.00	0.00	6,414.62

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
17.5000	0.0571	17.5000	366.5497	40.5257	79.4183	0.2000

Activity: A Install Signs (Unreviewed) Quantity: 10.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	709.20	680.62	1,389.82	238.22	4,786.58	0.00	0.00	6,414.62

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8040	0.5000	2.0000	325.6080	0.6250	16.0000	0.0625	10,263.3920

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
17.5000	0.5714	1.7500	79.4183	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 5 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 10 of each: Beach Access Signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	10.00	EA	US$	44.23	107.75	47.66	476.58
2T5101	Construction Signs	1.00	10.00	EA	US$	400.00	107.75	431.00	4,310.00
809TLB416E	CAT 416E Backhoe	1.00	5.00	HR	US$	47.64	100.00	47.64	238.22
LA01	Laborer Foreman	0.50	2.50	MH	US$	41.02	100.00	78.48	196.21
LA03	Laborer (Gr 4)	2.00	10.00	MH	US$	35.75	100.00	71.31	713.07
OE07	Operator (Gr 6)	1.00	5.00	MH	US$	49.83	100.00	96.11	480.54

Biditem - Parent

8000

DE ANZA COVE

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	819,933.75	719,964.64	1,539,898.39	1,249,203.52	10,536,297.58	83,183.00	50,000.00	13,458,582.49
Total	819,933.75	719,964.64	1,539,898.39	1,249,203.52	10,536,297.58	83,183.00	50,000.00	13,458,582.49

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
17,605.8000	0.0001	17,605.8000	764.4403	46.5718	87.4654	0.0000

Biditem

8001

MOBILIZATION/DEMOBILIZATION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94
Total	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
320.0000	0.0031	320.0000	187.5123	26.8900	69.7303	0.0031

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Activity: B Demobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Biditem **SWPPP**

8002

Takeoff Qty: 1.000 LS
Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,134.72	1,022.69	2,157.41	381.15	339.41	7,758.00	10,000.00	20,635.97
Total	1,134.72	1,022.69	2,157.41	381.15	339.41	7,758.00	10,000.00	20,635.97

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
28.0000	0.0357	28.0000	736.9989	40.5257	77.0504	0.1250

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $10,000 since two entrances will be required.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 2.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,317.99
Total	1,134.72	1,022.69	2,157.41	381.15	339.41	7,758.00	0.00	10,635.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2800	4.0000	0.2500	317.3200	1.0000	2.0000	0.5000	10,635.9700

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
28.0000	0.0714	14.0000	77.0504	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	42.00	TON	US$	7.50	107.75	8.08	339.41
3STRPL	Trench Plate Rental - 8'x10'	1.00	36.00	MO	US$	200.00	107.75	215.50	7,758.00
809TLB416E	CAT 416E Backhoe	1.00	8.00	HR	US$	47.64	100.00	47.64	381.15
LA01	Laborer Foreman	0.50	4.00	MH	US$	41.02	100.00	76.09	304.34
LA03	Laborer (Gr 4)	2.00	16.00	MH	US$	35.75	100.00	69.22	1,107.49
OE07	Operator (Gr 6)	1.00	8.00	MH	US$	49.83	100.00	93.20	745.58

Biditem

8003

SHORELINE RECONSTRUCTION

Takeoff Qty: 1.000 LS
Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	801,045.83	696,342.95	1,497,388.78	1,206,821.71	10,518,726.49	0.00	40,000.00	13,262,936.98
Total	801,045.83	696,342.95	1,497,388.78	1,206,821.71	10,518,726.49	0.00	40,000.00	13,262,936.98

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
17,015.6000	0.0001	17,015.6000	779.4575	47.0771	88.0009	0.0004

Activity: A Place Sand Fill for Beach Nourishment (Unreviewed) Quantity: 231770.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3.46	3.00	6.46	5.21	45.38	0.00	0.00	57.05
Total	801,045.83	696,342.95	1,497,388.78	1,206,821.71	10,518,726.49	0.00	0.00	13,222,936.98

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
11.6676	0.0105	95.3472	1,112.4776	303.8500	762.7777	0.0013	43,517.9759

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
17,015.6000	13.6210	0.0734	88.0009	3.4562

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 95.3472 Eff: 100.00 Crew Hrs: 2430.8 Labor Pcs: 7.00 Equipment Pcs: 5.00

Notes: Place sand fill to required template within beach nourishment template. Total amount of sand fill required - 210,700 cy. Assume 10% waste, so 210,700 CY * 1.10 = 231,770 CY. Assume onsite daily stockpile, 4 loaders, and 1 dozer. Production is controlled by the loaders supplying the fill to the dozer. Add an excavator to place and grade the material below the waterline.

```
Production Factors:
16      CY, Bucket Size (assumes 4 loaders)
1.0     Bucket Fill Factor
0.91    10%     Additional time, slope excavation
91.0%   Avg. Percent, Full Bucket
50      Op. Efficiency (Working Minutes per Hour)
273     Sec., Cycle Time
85.0%   Operator Skill Efficiency
100.0%  Machine Availability

Excavation:
Cycles per Hour:                        =       9.3     cycles/hr
Production Rate:                        =       136     cy/hr
Excavation Time Efficiency (%):         =       70%
Daily Operating Time:                   =       5.60    hours
Monthly Operating Time:                 =       122     hours
Daily Gross Production:                 =       762     cy/day (Dozer - 838 cy/day)
Daily Gross Production:                 =       11      lf/day
Monthly Gross Production:                       =       16,592  cy/mo (Dozer - 18,256 cy/mo)
Excavation Time:                                13.97   months (Dozer - 12.70 months)
Excavation Time:                                303.85  days (Dozer - 276.23 days)
```

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BB110	Sand Fill	1.00	375,467.66	TON	US$	26.00	107.75	28.01	10,518,726.49
809FEL950	CAT 950H F.E. Loader 4cy	4.00	9,723.20	HR	US$	89.04	100.00	89.04	865,724.56
809SCD06T	CAT D6T Dozer	1.00	2,430.80	HR	US$	140.32	100.00	140.32	341,097.15
LA02	Laborer (Gr 5)	2.00	4,861.60	MH	US$	39.02	100.00	73.48	357,227.75
OE03	Operator (Gr 14)	4.00	9,723.20	MH	US$	50.36	100.00	93.89	912,889.04
OE05	Operator (Gr 10)	1.00	2,430.80	MH	US$	50.06	100.00	93.50	227,271.99

Activity: B Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Allow for pre- and post-construction surveys for sand fill. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	20,000.00	100.00	20,000.00	40,000.00

Biditem

8004

CONSRUCTION ACCESS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	6,595.28	6,439.95	13,035.23	3,452.83	0.00	75,425.00	0.00	91,913.06
Total	6,595.28	6,439.95	13,035.23	3,452.83	0.00	75,425.00	0.00	91,913.06

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
179.2000	0.0056	179.2000	512.9077	36.8040	72.7412	0.0140

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 14.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	471.09	460.00	931.09	246.63	0.00	5,387.50	0.00	6,565.22
Total	6,595.28	6,439.95	13,035.23	3,452.83	0.00	75,425.00	0.00	91,913.06

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,177.7186	5.1200	0.1953	230.0232	8.9600	1.5625	0.6400	10,258.1540

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
179.2000	0.0781	12.8000	72.7412	471.0914

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 8.96 Eff: 100.00 Crew Hrs: 71.68 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing sidewalks and work areas for 14 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 3420 lf/500 ft = 7 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 6 ea. moves, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	14.00	MO	US$	5,000.00	107.75	5,387.50	75,425.00
820OHLDTC44	LD Truck 4x4 1.75t	1.00	71.68	HR	US$	48.17	100.00	48.17	3,452.83
LA01	Laborer Foreman	0.50	35.84	MH	US$	41.02	100.00	78.48	2,812.77
LA03	Laborer (Gr 4)	2.00	143.36	MH	US$	35.75	100.00	71.31	10,222.46

Biditem

8005

INSTALL SIGNS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2,553.12	2,450.15	5,003.27	857.59	17,231.68	0.00	0.00	23,092.54
Total	2,553.12	2,450.15	5,003.27	857.59	17,231.68	0.00	0.00	23,092.54

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
63.0000	0.0159	63.0000	366.5483	40.5257	79.4170	0.0556

Activity: A Install Signs (Unreviewed) Quantity: 36.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	2,553.12	2,450.15	5,003.27	857.59	17,231.68	0.00	0.00	23,092.54

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8017	0.5000	2.0000	325.6033	2.2500	16.0000	0.0625	10,263.3511

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
63.0000	0.5714	1.7500	79.4170	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 18 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 36 of each: Beach Access Signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	36.00	EA	US$	44.23	107.75	47.66	1,715.68
2T5101	Construction Signs	1.00	36.00	EA	US$	400.00	107.75	431.00	15,516.00
809TLB416E	CAT 416E Backhoe	1.00	18.00	HR	US$	47.64	100.00	47.64	857.59
LA01	Laborer Foreman	0.50	9.00	MH	US$	41.02	100.00	78.48	706.32
LA03	Laborer (Gr 4)	2.00	36.00	MH	US$	35.75	100.00	71.31	2,567.02
OE07	Operator (Gr 6)	1.00	18.00	MH	US$	49.83	100.00	96.11	1,729.93

Biditem - Parent

8200

DE ANZA BOOT

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	707,365.48	708,539.34	1,415,904.82	1,812,210.87	8,470,502.36	75,101.75	130,000.00	11,903,719.80
Total	707,365.48	708,539.34	1,415,904.82	1,812,210.87	8,470,502.36	75,101.75	130,000.00	11,903,719.80

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH

17,355.6100	0.0001	17,355.6100	685.8716	40.7572	81.5820	0.0000

Biditem

8201

MOBILIZATION/DEMOBILIZATION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94
Total	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
320.0000	0.0031	320.0000	187.5123	26.8900	69.7303	0.0031

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, offroad trucks, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Activity: B Demobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, offroad trucks, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Biditem

8202

SWPPP

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total

U. Cost	1,134.72	1,022.69	2,157.41	381.15	339.41	7,758.00	10,000.00	20,635.97
Total	1,134.72	1,022.69	2,157.41	381.15	339.41	7,758.00	10,000.00	20,635.97

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
28.0000	0.0357	28.0000	736.9989	40.5257	77.0504	0.1250

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $10,000 since multiple construction entrances will be necessary.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 2.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,317.99
Total	1,134.72	1,022.69	2,157.41	381.15	339.41	7,758.00	0.00	10,635.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2800	4.0000	0.2500	317.3200	1.0000	2.0000	0.5000	10,635.9700

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
28.0000	0.0714	14.0000	77.0504	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	42.00	TON	US$	7.50	107.75	8.08	339.41
3STRPL	Trench Plate Rental - 8'x10'	1.00	36.00	MO	US$	200.00	107.75	215.50	7,758.00
809TLB416E	CAT 416E Backhoe	1.00	8.00	HR	US$	47.64	100.00	47.64	381.15
LA01	Laborer Foreman	0.50	4.00	MH	US$	41.02	100.00	76.09	304.34
LA03	Laborer (Gr 4)	2.00	16.00	MH	US$	35.75	100.00	69.22	1,107.49
OE07	Operator (Gr 6)	1.00	8.00	MH	US$	49.83	100.00	93.20	745.58

Biditem 8203

SHORELINE/WETLAND RECONSTRUCTION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	420,854.07	448,677.29	869,531.36	1,433,142.32	7,076,492.03	0.00	80,000.00	9,459,165.71
Total	420,854.07	448,677.29	869,531.36	1,433,142.32	7,076,492.03	0.00	80,000.00	9,459,165.71

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
10,795.3500	0.0001	10,795.3500	876.2259	38.9848	80.5468	0.0005

Activity: A Excavation (Unreviewed) Quantity: 18400.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.42	2.52	4.95	7.80	0.00	0.00	0.00	12.74
Total	44,609.28	46,386.13	90,995.41	143,475.59	0.00	0.00	0.00	234,471.00

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
12.7430	0.0070	143.7500	1,831.8047	16.0000	1,150.0000	0.0009	14,654.4375

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
1,152.0000	15.9722	0.0626	78.9891	2.4244

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC2 (Mod) ExcavationCrew blade Prod: UH 143.75 Eff: 100.00 Crew Hrs: 128 Labor Pcs: 9.00 Equipment Pcs: 6.00

Notes: Excavate material from top of slope as required. Excavate existing material and stockpile for use in bridging gap between existing shoreline and fill template. No screening is required. Assume general excavation of 18,400 cy of sand at 144 cy/hr to account for reach required to stockpile outside the limits of excavation. 18,400cy/144cy/hr = 128 hrs.; 128hrs/8hrs/sh = 16 shifts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL966	CAT 966H F.E. Loader 5.5cy	1.00	128.00	HR	US$	131.25	100.00	131.25	16,799.36
809SCD08R	CAT D8R SII Dozer	1.00	128.00	HR	US$	219.25	100.00	219.25	28,063.62
810CME385	CAT 385CL Excavator 5cy	1.00	128.00	HR	US$	443.47	100.00	443.47	56,764.03
820ARD725	CAT 725 Articulated End Dump	2.00	256.00	HR	US$	123.76	100.00	123.76	31,681.54
820OHWT004	On Hwy Water Tanker 4K gal	1.00	128.00	HR	US$	79.43	100.00	79.43	10,167.04
LA02	Laborer (Gr 5)	3.00	384.00	MH	US$	39.02	100.00	73.48	28,216.11
OE03	Operator (Gr 14)	2.00	256.00	MH	US$	50.36	100.00	93.89	24,035.25
OE05	Operator (Gr 10)	1.00	128.00	MH	US$	50.06	100.00	93.50	11,967.59
TE04	Truck Driver (Gr 5)	3.00	384.00	MH	US$	26.89	100.00	69.73	26,776.46

Activity: B Place Excavated Material (Unreviewed) Quantity: 18400.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	0.80	0.82	1.63	2.20	0.00	0.00	0.00	3.83
Total	14,763.60	15,163.75	29,927.35	40,482.00	0.00	0.00	0.00	70,409.35

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
3.8266	0.0039	255.5556	977.9076	9.0000	2,044.4444	0.0005	7,823.2611

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
360.0000	51.1111	0.0196	83.1315	0.8024

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: EXC (Mod) ExcavationCrew Prod: S 9 Eff: 100.00 Crew Hrs: 72 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Place excavated material at multiple locations along shoreline where marsh is being created to bridge gap between existing shoreline and fill placement locations to allow for trucks to deliver fill. Assume placement with 2 ea. D8 Dozers with material delivered by offroad trucks from stockpile location.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809SCD08R	CAT D8R SII Dozer	2.00	144.00	HR	US$	219.25	100.00	219.25	31,571.57
820ARD725	CAT 725 Articulated End Dump	1.00	72.00	HR	US$	123.76	100.00	123.76	8,910.43
LA02	Laborer (Gr 5)	2.00	144.00	MH	US$	39.02	100.00	75.76	10,909.18
OE05	Operator (Gr 10)	2.00	144.00	MH	US$	50.06	100.00	96.42	13,884.52
TE04	Truck Driver (Gr 5)	1.00	72.00	MH	US$	26.89	100.00	71.30	5,133.65

Activity: C Place Fill Material (Unreviewed) Quantity: 122540.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1.16	1.12	2.28	3.17	45.38	0.00	0.00	50.84
Total	141,820.79	137,382.41	279,203.20	388,874.59	5,561,397.73	0.00	0.00	6,229,475.52

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
5.4519	0.0056	177.1731	965.9328	86.4550	1,417.3848	0.0007	72,054.5431

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
3,458.2000	35.4346	0.0282	80.7366	1.1573

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 177.1731 Eff: 100.00 Crew Hrs: 691.64 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Place fill material in wetland areas where fill material is required. Total amount of sand fill required - 111,400 cy. Assume 10% Waste, so 111,400 CY * 1.10 = 122,540 CY. Assume weight of sand at 1.62 t/cy - 122,540cy*1.62t/cy = 198,515 ton sand. Assume onsite daily stockpile. Assume placement with 2 ea. D8 Dozers with material delivered by offroad trucks from stockpile location. Final channel and slope shaping will be performed with amphibious excavators.

Production Factors:
450 Avg. Push Distance
D8R Dozer size
Semi-U Blade type
1.0 Grade Factor (assumes flat grade)

1.2 Material factor (assumes loose stockpile)
3,240 lb/cy Material density
75.0% Operator Skill Efficiency
2,400 lf Project Length

Fill:
Production: 121 LCY
Production Rate: 121 cy/hr
Time Efficiency (%): 73%
Daily Operating Time: 5.83 hours
Monthly Operating Time: 127 hours
Daily Gross Production: 708 cy/day (1,416 cy/day w/2 ea. dozers)
Daily Gross Production: 14 lf/day (28 lf/day w/2 ea. dozers)
Monthly Gross Production: 15,416 cy/mo (30,832 cy/mo w/ 2 ea. dozers)
Excavation Time: 7.95 months (3.98 months w/ 2 ea. dozers)
Excavation Time: 172.91 days (86.5 days w/ 2 ea. dozers)

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BB110	Sand Fill	1.00	198,515.00	TON	US$	26.00	107.75	28.02	5,561,397.73
809SCD08R	CAT D8R SII Dozer	2.00	1,383.28	HR	US$	219.25	100.00	219.25	303,279.99
820ARD725	CAT 725 Articulated End Dump	1.00	691.64	HR	US$	123.76	100.00	123.76	85,594.60
LA02	Laborer (Gr 5)	2.00	1,383.28	MH	US$	39.02	100.00	73.48	101,642.67
OE05	Operator (Gr 10)	2.00	1,383.28	MH	US$	50.06	100.00	93.50	129,332.23
TE04	Truck Driver (Gr 5)	1.00	691.64	MH	US$	26.89	100.00	69.73	48,228.30

Activity: D Construct Breakwater (Unreviewed) Quantity: 33813.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1.62	1.71	3.33	5.90	43.10	0.00	0.00	52.33
Total	54,662.08	57,853.30	112,515.38	199,663.20	1,457,340.30	0.00	0.00	1,769,518.88

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
9.2325	0.0104	96.0597	886.8710	44.0000	768.4773	0.0013	40,216.3382

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
1,408.0000	24.0149	0.0416	79.9115	1.6166

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: EXC (Mod) ExcavationCrew Prod: UH 96.0597 Eff: 100.00 Crew Hrs: 352 Labor Pcs: 4.00 Equipment Pcs: 2.00

Notes: Breakwater dimensions are 10' crest width, 14' height, 1.5:1 slopes, and an overall length of 1,375 lf. Allow for furnish and place of 22,100 cy of imported Caltrans Backing No. 3 for the rip rap breakwater. Allow for 2% waste, so 22,100 cy*1.02 = 22,542 CY. Rip rap is 1.5 Ton/ CY, so 22,542*1.5 = 33,813 Ton.

Allow furnish and delivery at $40/ton to stockpile site. Allow for offroad truck to transfer rock from stockpile to placement location with placement by excavator at 96 ton/hr.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BA110	Armor Stone 2 -> 5 T	1.00	33,813.00	TON	US$	40.00	107.75	43.10	1,457,340.30
810CME385	CAT 385CL Excavator 5cy	1.00	352.00	HR	US$	443.47	100.00	443.47	156,101.09
820ARD725	CAT 725 Articulated End Dump	1.00	352.00	HR	US$	123.76	100.00	123.76	43,562.11
LA02	Laborer (Gr 5)	2.00	704.00	MH	US$	39.02	100.00	75.76	53,333.80
OE03	Operator (Gr 14)	1.00	352.00	MH	US$	50.36	100.00	96.83	34,083.72
TE04	Truck Driver (Gr 5)	1.00	352.00	MH	US$	26.89	100.00	71.30	25,097.86

Activity: E Construct Oyster Habitat (Unreviewed) Quantity: 1.00 Unit: LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	59,400.00	57,071.05	116,471.05	133,714.08	57,754.00	0.00	0.00	307,939.13
Total	59,400.00	57,071.05	116,471.05	133,714.08	57,754.00	0.00	0.00	307,939.13

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
250,185.1300	240.0000	0.0042	1,042.4380	30.0000	0.0333	30.0000	10,264.6377

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
1,200.0000	0.0008	1,200.0000	97.0592	59,400.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: CRBG5 Crane Barge, 5-Men Prod: S 30 Eff: 100.00 Crew Hrs: 240 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Use a crane barge crew to set oyster cultch bags, reef balls or similar oyster habitat. PRECAST CONCRETE MAT's represents cost to furnish reef balls for approx. 2 acre of placement, based on Maryland Port Administration Bid Tabs.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PC	PRECAST CONCRETE MATL'S	1.00	2.00	AC	US$	26,800.00	107.75	28,877.00	57,754.00
811LGS0020D	20kW Large GenSet	1.00	240.00	HR	US$	23.96	100.00	23.96	5,749.20
814CB075	Crane Barge - 75 Ton	1.00	240.00	HR	US$	136.78	100.00	136.78	32,826.72
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	480.00	HR	US$	108.23	100.00	108.23	51,949.44
814ITB0250	Inland Tug - 250hp	1.00	240.00	HR	US$	133.81	100.00	133.81	32,114.16
814RUN016	Runabout 16ft	1.00	240.00	HR	US$	34.84	100.00	34.84	8,361.84
818PW350S	Portable Welder Skid 350 amp	1.00	240.00	HR	US$	11.30	100.00	11.30	2,712.72
OE10	Crane Operator (<100 tn)	1.00	240.00	MH	US$	51.40	100.00	98.24	23,578.72
OE17	Engineer	1.00	240.00	MH	US$	49.57	100.00	97.50	23,401.17
OE18	Mate	1.00	240.00	MH	US$	49.57	100.00	97.50	23,401.17
OE19	Deckhand	2.00	480.00	MH	US$	48.48	100.00	96.02	46,089.99

Activity: F Channel Excavation & Slope Shaping (Unreviewed) Quantity: 45.00 Unit: SH

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	715.04	665.66	1,380.70	5,049.96	0.00	0.00	0.00	6,430.66
Total	32,176.80	29,954.51	62,131.31	227,248.20	0.00	0.00	0.00	289,379.51

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
6,430.6558	8.0000	0.1250	803.8320	45.0000	1.0000	1.0000	6,430.6558

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
720.0000	0.0625	16.0000	86.2935	715.0400

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: MEXC Marsh Excavator Prod: S 45 Eff: 100.00 Crew Hrs: 360 Labor Pcs: 2.00 Equipment Pcs: 3.00

Notes: Use marsh excavators to cut channel near existing shoreline and grade material near existing shoreline to the required slopes and elevation. Excavate excess material used to bridge gap at shoreline and stockpile for disposal.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL966	CAT 966H F.E. Loader 5.5cy	1.00	360.00	HR	US$	131.25	100.00	131.25	47,248.20
814MEXC	Marsh Excavtor	2.00	720.00	HR	US$	250.00	100.00	250.00	180,000.00
LA02	Laborer (Gr 5)	1.00	360.00	MH	US$	39.02	100.00	75.76	27,272.96
OE03	Operator (Gr 14)	1.00	360.00	MH	US$	50.36	100.00	96.83	34,858.35

Activity: G Haul Off Excess Fill (Unreviewed) Quantity: 18400.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3.99	5.70	9.69	16.29	0.00	0.00	0.00	25.98
Total	73,421.52	104,866.14	178,287.66	299,684.66	0.00	0.00	0.00	477,972.32

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
25.9768	0.0071	140.0000	3,636.7451	16.4286	1,119.9998	0.0009	29,093.9610

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
2,497.1500	7.3684	0.1357	71.3965	3.9903

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 4HAUL (Mod) 4-Man Haul Crew Prod: UH 140 Eff: 100.00 Crew Hrs: 131.4286 Labor Pcs: 19.00 Equipment Pcs: 17.00

Notes: Load out and haul off excess fill to landfill or other recycle location. Assume disposal location is 30 miles away from project site.

```
---------------------  TRUCKING BY THE CY      (Long Method)  --------------------

                          INPUT         COMPUTED
            Total     CY     18400.00
                  CY/Hr       140.00       131.43 Total Hours
           Hours/Shift          8.00        16.43 Total Shifts
                                          1120.00     CY/Shift
One Way Distance(Miles)         30.00        60.00 Miles/Round Trip
   Average Speed in MPH         45.00        80.00 HaulTime/RndTr (Min)
       Load Time in Min          3.00         5.14 Dmptime- 12     CY/Load
       Dump Time in Min         10.00        93.00 TotTime/RndTr (Min)
          Usable Min/Hr         50.00         0.54 RndTr,Loads/Hr/Truck
           CY/Truckload         16.50      1115.15 Total Truckloads
                                             15.78 Theor. No. of Trucks
 Use This No. of Trucks         16.00      2102.86 Total Truck Hours
    Price/Hr for Trucks        160.00    336457.14 Tot Price - Trucking
                                             18.29 Unit Price/CY    for Trucking
```

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL966	CAT 966H F.E. Loader 5.5cy	1.00	131.43	HR	US$	131.25	100.00	131.24	17,249.53
820OHRD015	On Hwy End Dump 15-18cy	16.00	2,102.86	HR	US$	134.31	100.00	134.31	282,435.13
LA02	Laborer (Gr 5)	2.00	262.86	MH	US$	39.02	100.00	73.48	19,314.82
OE03	Operator (Gr 14)	1.00	131.43	MH	US$	50.36	100.00	93.89	12,339.66
TE04	Truck Driver (Gr 5)	16.00	2,102.86	MH	US$	26.89	100.00	69.73	146,633.18

Activity: I Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Allow for pre- and post-construction surveys for marsh fill and channel excavation. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	40,000.00	100.00	40,000.00	80,000.00

Biditem

8204

ROSE CREEK

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	266,148.77	234,812.28	500,961.05	336,047.75	1,371,652.66	0.00	40,000.00	2,248,661.46
Total	266,148.77	234,812.28	500,961.05	336,047.75	1,371,652.66	0.00	40,000.00	2,248,661.46

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
5,931.7600	0.0002	5,931.7600	379.0884	44.8684	84.4540	0.0010

Activity: A Recover Existing Rip Rap (Unreviewed) Quantity: 1.00 Unit: LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	42,902.40	39,939.35	82,841.75	75,924.48	0.00	0.00	0.00	158,766.23
Total	42,902.40	39,939.35	82,841.75	75,924.48	0.00	0.00	0.00	158,766.23

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
158,766.2300	240.0000	0.0042	661.5260	30.0000	0.0333	30.0000	5,292.2077

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
960.0000	0.0010	960.0000	86.2935	42,902.4000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: EXC ExcavationCrew Prod: S 30 Eff: 100.00 Crew Hrs: 240 Labor Pcs: 4.00 Equipment Pcs: 3.00

Notes: Allow for time to remove existing rip rap and grade slope for new rock installation.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL950	CAT 950H F.E. Loader 4cy	1.00	240.00	HR	US$	89.04	100.00	89.04	21,368.88
810CMHE330	CAT 330D L Excavator 1.56cy	1.00	240.00	HR	US$	163.39	100.00	163.39	39,212.64
820OHRD007	On Hwy End Dump 7-8cy	1.00	240.00	HR	US$	63.93	100.00	63.93	15,342.96
LA02	Laborer (Gr 5)	2.00	480.00	MH	US$	39.02	100.00	75.76	36,363.95
OE03	Operator (Gr 14)	2.00	480.00	MH	US$	50.36	100.00	96.83	46,477.80

Activity: B Place Revetment Stone (Unreviewed) Quantity: 17325.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	9.67	8.45	18.12	10.54	45.16	0.00	0.00	73.82
Total	167,547.01	146,332.27	313,879.28	182,619.07	782,413.16	0.00	0.00	1,278,911.51

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
28.6579	0.0271	36.9141	1,057.8801	58.6667	295.3125	0.0034	21,799.6296

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
3,754.6600	4.6143	0.2167	83.5973	9.6708

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 36.9141 Eff: 100.00 Crew Hrs: 469.3333 Labor Pcs: 8.00 Equipment Pcs: 4.00

Notes: Total amount of stone placed - 11,000cy*1.5ton/cy = 16,500 ton. Allow waste at 5% - 16,500 ton*1.05 = 17,325 ton. Assume production at approx. 25 cy/hr or 37 ton/hr for placement. Include backhoe and 2 addl laborers to place filter fabric on slope ahead of rock placement. Budget cost for rip rap recieved from Granite Construction quarry (Rosemary's Mountain) in Fallbrook at $23/ton for material and $14-15/ton for delivery to Mission Bay - $37/ton total cost. Use $40/ton.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BA110	Armor Stone 2 -> 5 T	1.00	17,325.00	TON	US$	40.00	107.75	43.10	746,707.50
2EC32	Woven Geotextile	1.00	26,510.00	SY	US$	1.25	107.75	1.35	35,705.66
809FEL950	CAT 950H F.E. Loader 4cy	2.00	938.67	HR	US$	89.04	100.00	89.04	83,576.36
809TLB416E	CAT 416E Backhoe	1.00	469.33	HR	US$	47.64	100.00	47.64	22,360.76
810CMHE330	CAT 330D L Excavator 1.56cy	1.00	469.33	HR	US$	163.39	100.00	163.39	76,681.95
LA02	Laborer (Gr 5)	4.00	1,877.33	MH	US$	39.02	100.00	73.48	137,945.20
OE03	Operator (Gr 14)	3.00	1,408.00	MH	US$	50.36	100.00	93.89	132,193.90
OE07	Operator (Gr 6)	1.00	469.33	MH	US$	49.83	100.00	93.20	43,740.18

Activity: C Place Sand Fill (Unreviewed) Quantity: 11880.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	4.29	3.74	8.03	5.97	45.39	0.00	0.00	59.38
Total	50,962.79	44,412.84	95,375.63	70,913.38	539,176.69	0.00	0.00	705,465.70

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
13.9974	0.0187	53.3405	746.6281	27.8400	426.7241	0.0023	25,340.0036

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
1,113.6000	10.6681	0.0937	85.6462	4.2898

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 53.3405 Eff: 100.00 Crew Hrs: 222.72 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Place sand fill to required lines and grade within revetment template. Total amount of sand fill required - 10,800 cy. Assume 10% waste, so 10,800 CY * 1.10 = 11,880 CY. Assume onsite daily stockpile, 2 loaders, and 1 dozer. Production is controlled by the loaders supplying the fill to the dozer. Add an excavator to grade the slope waterline.

```
Production Factors:
8       CY, Bucket Size (assumes 4 loaders)
1.0     Bucket Fill Factor
0.91    10%     Additional time, slope excavation
91.0%   Avg. Percent, Full Bucket
50      Op. Efficiency (Working Minutes per Hour)
247     Sec., Cycle Time
85.0%   Operator Skill Efficiency
100.0%  Machine Availability

Excavation:
Cycles per Hour:                        =       10.3    cycles/hr
Production Rate:                        =       76      cy/hr
Excavation Time Efficiency (%): =       70%
Daily Operating Time:           =       5.60    hours
Monthly Operating Time:         =       122     hours
Daily Gross Production:         =       426     cy/day (Dozer - 1,490 cy/day)
Daily Gross Production:         =       55      lf/day
Monthly Gross Production:               =       9,272   cy/mo (Dozer - 32,456 cy/mo)
Excavation Time:                                1.28    months (Dozer - 0.37 months)
Excavation Time:                                27.84   days (Dozer - 8.05 days)
```

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BB110	Sand Fill	1.00	19,246.00	TON	US$	26.00	107.75	28.02	539,176.69
809FEL950	CAT 950H F.E. Loader 4cy	2.00	445.44	HR	US$	89.04	100.00	89.04	39,660.64
809SCD06T	CAT D6T Dozer	1.00	222.72	HR	US$	140.32	100.00	140.32	31,252.74
LA02	Laborer (Gr 5)	2.00	445.44	MH	US$	39.02	100.00	73.48	32,730.69
OE03	Operator (Gr 14)	2.00	445.44	MH	US$	50.36	100.00	93.89	41,821.34
OE05	Operator (Gr 10)	1.00	222.72	MH	US$	50.06	100.00	93.50	20,823.60

Activity: D Place Sand Cover (Unreviewed) Quantity: 1103.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	4.29	3.74	8.04	5.98	45.39	0.00	0.00	59.40
Total	4,736.57	4,127.82	8,864.39	6,590.82	50,062.81	0.00	0.00	65,518.02

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift

14.0120	0.0188	53.2850	746.6285	2.5875	426.2802	0.0023	25,320.9739

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
103.5000	10.6570	0.0938	85.6463	4.2943

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 53.285 Eff: 100.00 Crew Hrs: 20.7 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Place Sand on top of revetment,Volume is 1,050 CY of Sand Fill. Allow for 5% waste - 1,050 *1.05 = 1,103 cy.

```
Production Factors:
8       CY, Bucket Size (assumes 4 loaders)
1.0     Bucket Fill Factor
0.91    10%     Additional time, slope excavation
91.0%   Avg. Percent, Full Bucket
50      Op. Efficiency (Working Minutes per Hour)
247     Sec., Cycle Time
85.0%   Operator Skill Efficiency
100.0%  Machine Availability

Excavation:
Cycles per Hour:                      =       10.3    cycles/hr
Production Rate:                      =       76      cy/hr
Excavation Time Efficiency (%): =       70%
Daily Operating Time:           =       5.60    hours
Monthly Operating Time:         =       122     hours
Daily Gross Production:         =       426     cy/day
Daily Gross Production:         =       55      lf/day
Monthly Gross Production:               =       9,272   cy/mo
Excavation Time:                                0.19    months
Excavation Time:                                2.59    days
```

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BB110	Sand Fill	1.00	1,787.00	TON	US$	26.00	107.75	28.02	50,062.81
809FEL950	CAT 950H F.E. Loader 4cy	2.00	41.40	HR	US$	89.04	100.00	89.04	3,686.13
809SCD06T	CAT D6T Dozer	1.00	20.70	HR	US$	140.32	100.00	140.32	2,904.69
LA02	Laborer (Gr 5)	2.00	41.40	MH	US$	39.02	100.00	73.48	3,042.06
OE03	Operator (Gr 14)	2.00	41.40	MH	US$	50.36	100.00	93.89	3,886.94
OE05	Operator (Gr 10)	1.00	20.70	MH	US$	50.06	100.00	93.50	1,935.39

Activity: E Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Notes: Allow for pre- and post-construction surveys for cobble dike and sand fill. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	20,000.00	100.00	20,000.00	40,000.00

Biditem

8205

CONSTRUCTION ACCESS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	7,360.80	7,187.43	14,548.23	3,853.60	0.00	67,343.75	0.00	85,745.58
Total	7,360.80	7,187.43	14,548.23	3,853.60	0.00	67,343.75	0.00	85,745.58

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
200.0000	0.0050	200.0000	428.7279	36.8040	72.7412	0.0125

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 12.50 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	588.86	574.99	1,163.86	308.29	0.00	5,387.50	0.00	6,859.65
Total	7,360.80	7,187.43	14,548.23	3,853.60	0.00	67,343.75	0.00	85,745.58

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,472.1464	6.4000	0.1563	230.0229	10.0000	1.2500	0.8000	8,574.5580

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
200.0000	0.0625	16.0000	72.7412	588.8640

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 10 Eff: 100.00 Crew Hrs: 80 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing parking lot and housing areas for 12.3 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 4430 lf/500 ft = 23 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 8 ea. moves, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	12.50	MO	US$	5,000.00	107.75	5,387.50	67,343.75
820OHLDTC44	LD Truck 4x4 1.75t	1.00	80.00	HR	US$	48.17	100.00	48.17	3,853.60
LA01	Laborer Foreman	0.50	40.00	MH	US$	41.02	100.00	78.48	3,139.25
LA03	Laborer (Gr 4)	2.00	160.00	MH	US$	35.75	100.00	71.31	11,408.98

Biditem

8206

INSTALL SIGNS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3,262.32	3,130.75	6,393.07	1,095.81	22,018.26	0.00	0.00	29,507.14
Total	3,262.32	3,130.75	6,393.07	1,095.81	22,018.26	0.00	0.00	29,507.14

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
80.5000	0.0124	80.5000	366.5483	40.5257	79.4170	0.0435

Activity: A Install Signs (Unreviewed) Quantity: 46.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	3,262.32	3,130.75	6,393.07	1,095.81	22,018.26	0.00	0.00	29,507.14

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8017	0.5000	2.0000	325.6035	2.8750	16.0000	0.0625	10,263.3530

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
80.5000	0.5714	1.7500	79.4170	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 23 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 23 of each: Marsh Restoration signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	46.00	EA	US$	44.23	107.75	47.66	2,192.26
2T5101	Construction Signs	1.00	46.00	EA	US$	400.00	107.75	431.00	19,826.00
809TLB416E	CAT 416E Backhoe	1.00	23.00	HR	US$	47.64	100.00	47.64	1,095.81
LA01	Laborer Foreman	0.50	11.50	MH	US$	41.02	100.00	78.48	902.53
LA03	Laborer (Gr 4)	2.00	46.00	MH	US$	35.75	100.00	71.31	3,280.08
OE07	Operator (Gr 6)	1.00	23.00	MH	US$	49.83	100.00	96.11	2,210.46

Biditem - Parent

8400

CROWN POINT

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	12,683.84	17,639.70	30,323.54	39,612.84	3,998.97	75,429.00	2,000,000.00	2,149,364.35
Total	12,683.84	17,639.70	30,323.54	39,612.84	3,998.97	75,429.00	2,000,000.00	2,149,364.35

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
428.0000	0.0023	428.0000	5,021.8793	29.6351	70.8494	0.0000

Biditem

8401

MOBILIZATION/DEMOBILIZATION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	8,604.80	13,708.90	22,313.70	37,690.24	0.00	50,000.00	0.00	110,003.94
Total	8,604.80	13,708.90	22,313.70	37,690.24	0.00	50,000.00	0.00	110,003.94

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
320.0000	0.0031	320.0000	343.7623	26.8900	69.7303	0.0031

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	625.00	0.00	1,375.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	25,000.00	0.00	55,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	2,750.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
990200	Crane Mobilization	1.00	1.00	LS	US$	25,000.00	100.00	25,000.00	25,000.00
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Activity: B Demobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	625.00	0.00	1,375.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	25,000.00	0.00	55,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	2,750.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
990205	Crane Demobilization	1.00	1.00	LS	US$	25,000.00	100.00	25,000.00	25,000.00
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Biditem

8402

SWPPP

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total

U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
14.0000	0.0714	14.0000	1,094.1429	40.5257	77.0507	0.2500

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $10,000 due to equipment movement on and off the beach.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2900	4.0000	0.2500	317.3225	0.5000	2.0000	0.5000	10,636.0000

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.0714	14.0000	77.0507	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	21.00	TON	US$	7.50	107.75	8.08	169.71
3STRPL	Trench Plate Rental - 8'x10'	1.00	18.00	MO	US$	200.00	107.75	215.50	3,879.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	76.09	152.18
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	69.22	553.75
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	93.20	372.78

Biditem 8403

SHORELINE RECONSTRUCTION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	0.00	0.00	0.00	0.00	0.00	0.00	1,990,000.00	1,990,000.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	1,990,000.00	1,990,000.00

Activity: A Construct New Seawall (Unreviewed) Quantity: 245.00 Unit: LF

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Construct an additional 245 feet of concrete seawall and connect with existing. As-built drawings for existing seawall show the existing sidewalk contains a short cutoff wall to contain material. Allow for a new bulkhead wall to be constructed outside the existing sidewalk and cutoff wall, tying in to the existing bulkhead wall as necessary. Assume a subcontract cost for a sheet pile wall with a tall concrete cap.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4CONC	Concrete - Sub	1.00	245.00	LF	US$	8,000.00	100.00	8,000.00	1,960,000.00

Activity: B Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Allow for pre- and post-construction surveys for new concrete seawall.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	15,000.00	100.00	15,000.00	30,000.00

Biditem

8404

CONSTRUCTION ACCESS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2,944.32	2,874.97	5,819.29	1,541.44	0.00	21,550.00	0.00	28,910.73
Total	2,944.32	2,874.97	5,819.29	1,541.44	0.00	21,550.00	0.00	28,910.73

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
80.0000	0.0125	80.0000	361.3841	36.8040	72.7411	0.0313

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 4.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	736.08	718.74	1,454.82	385.36	0.00	5,387.50	0.00	7,227.68
Total	2,944.32	2,874.97	5,819.29	1,541.44	0.00	21,550.00	0.00	28,910.73

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,840.1825	8.0000	0.1250	230.0228	4.0000	1.0000	1.0000	7,227.6825

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
80.0000	0.0500	20.0000	72.7411	736.0800

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 4 Eff: 100.00 Crew Hrs: 32 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing sidewalks and work areas for 4 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 770 lf/500 ft = 2 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 1 ea. move, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	4.00	MO	US$	5,000.00	107.75	5,387.50	21,550.00
820OHLDTC44	LD Truck 4x4 1.75t	1.00	32.00	HR	US$	48.17	100.00	48.17	1,541.44
LA01	Laborer Foreman	0.50	16.00	MH	US$	41.02	100.00	78.48	1,255.70
LA03	Laborer (Gr 4)	2.00	64.00	MH	US$	35.75	100.00	71.31	4,563.59

Biditem

8405

INSTALL SIGNS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	544.48	1,111.84	190.58	3,829.26	0.00	0.00	5,131.68
Total	567.36	544.48	1,111.84	190.58	3,829.26	0.00	0.00	5,131.68

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
14.0000	0.0714	14.0000	366.5486	40.5257	79.4171	0.2500

Activity: A Install Signs (Unreviewed) Quantity: 8.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	567.36	544.48	1,111.84	190.58	3,829.26	0.00	0.00	5,131.68

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8025	0.5000	2.0000	325.6050	0.5000	16.0000	0.0625	10,263.3600

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.5714	1.7500	79.4171	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 8 of each: Beach Access Signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	8.00	EA	US$	44.23	107.75	47.66	381.26
2T5101	Construction Signs	1.00	8.00	EA	US$	400.00	107.75	431.00	3,448.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	78.49	156.97
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	71.31	570.45
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	96.11	384.42

Biditem

9000

CONTRACTOR INDIRECTS

Takeoff Qty: 87.000 MO

Bid Qty: 87.000 MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	42,790.92	16,425.40	59,216.32	6,303.15	0.00	14,639.94	0.00	80,159.41
Total	3,722,810.24	1,429,009.44	5,151,819.68	548,374.03	0.00	1,273,674.77	0.00	6,973,868.48

Activity: 10000A Contractors Office (Unreviewed) Quantity: 87.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	0.00	0.00	0.00	0.00	0.00	5,529.89	0.00	5,529.89
Total	0.00	0.00	0.00	0.00	0.00	481,100.00	0.00	481,100.00

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
990008	Office - Gen. Contractor	1.00	87.00	MO	US$	2,000.00	100.00	2,000.00	174,000.00
990009	Storage - Gen. Contractor	1.00	87.00	MO	US$	500.00	100.00	500.00	43,500.00
990010	Temporary Utilities	1.00	87.00	MO	US$	1,000.00	100.00	1,000.00	87,000.00
990012	Sanitary	1.00	87.00	MO	US$	900.00	100.00	900.00	78,300.00
990013	Temporary Fencing	1.00	2,000.00	LF	US$	10.00	100.00	10.00	20,000.00
990014	Telephone/Cell Phones	1.00	87.00	MO	US$	400.00	100.00	400.00	34,800.00
990016	Project Office Equipment	1.00	87.00	MO	US$	500.00	100.00	500.00	43,500.00

Activity: 10000B QC Facilities (Unreviewed) Quantity: 87.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	0.00	0.00	0.00	0.00	0.00	500.00	0.00	500.00
Total	0.00	0.00	0.00	0.00	0.00	43,500.00	0.00	43,500.00

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
990018	QC Storage Facility	1.00	87.00	MO	US$	0.00	100.00	0.00	0.00
990019	QC Laboratory - On-Site	1.00	87.00	MO	US$	0.00	100.00	0.00	0.00
990020	Testing Services - Off-Site	1.00	87.00	MO	US$	500.00	100.00	500.00	43,500.00

Activity: 10000C Supervision (Unreviewed) Quantity: 87.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	41,250.00	16,063.13	57,313.13	0.00	0.00	0.00	0.00	57,313.13
Total	3,588,750.00	1,397,491.88	4,986,241.88	0.00	0.00	0.00	0.00	4,986,241.88

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
ZZ02	▫ Project Manager	1.00	87.00	MO	US$	14,500.00	100.00	19,790.25	1,721,751.75
ZZ04	▫ Project Engineer	1.00	0.00	MO	US$	12,000.00	100.00	0.00	0.00
ZZ07	▫ QC Engineer	1.00	0.00	MO	US$	12,000.00	100.00	0.00	0.00

ZZ08	▫ Safety Engineer	0.50	43.50	MO	US$	9,500.00	100.00	12,967.75	564,097.13
ZZ10	▫ Field Engineer	1.00	87.00	MO	US$	9,500.00	100.00	12,967.75	1,128,194.25
ZZ11	▫ Office Engineer	1.00	0.00	MO	US$	8,500.00	100.00	0.00	0.00
ZZ13	▫ Project Superintendent	1.00	87.00	MO	US$	12,500.00	100.00	18,071.25	1,572,198.75
ZZ14	▫ Dredging Superintendent	1.00	0.00	MO	US$	11,500.00	100.00	0.00	0.00
ZZ20	▫ Yard Superintendent	1.00	0.00	MO	US$	11,500.00	100.00	0.00	0.00
ZZ23	▫ Project Controls Engr.	1.00	0.00	MO	US$	6,100.00	100.00	0.00	0.00

Activity: 10000D Survey (Unreviewed) Quantity: 87.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	0.00	0.00	0.00	0.00	0.00	750.00	0.00	750.00
Total	0.00	0.00	0.00	0.00	0.00	65,250.00	0.00	65,250.00

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
990025	Survey Equipment	1.00	87.00	MO	US$	500.00	100.00	500.00	43,500.00
990026	Survey Supplies	1.00	87.00	MO	US$	250.00	100.00	250.00	21,750.00

Activity: 10000E Vehicle Expenses (Unreviewed) Quantity: 87.00 Unit: MO

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Assume vehicles for 3 full time and 1 half-time supervisory personnel for 87 months
1*0.5+3 x 174/month x 87 months = 52,983 hrs.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
820OHLDTC42	▫ LD Truck 4x2 1.75t	3.50	52,983.00	HR	US$	10.35	100.00	10.35	548,374.03

Activity: 10000F Lodging Expenses (Unreviewed) Quantity: 87.00 Unit: MO

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Assume all labor and overhead personnel are local to the San Diego area so no per diem is required.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
990028	Subsistence	1.00	0.00	MO	US$	0.00	100.00	0.00	0.00

Activity: 10000G Travel Expenses (Unreviewed) Quantity: 87.00 Unit: MO

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Travel is for home office personnel and deliveries to site from yard/shop.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
990029	Travel	1.00	87.00	MO	US$	1,000.00	100.00	1,000.00	87,000.00

Activity: 10000H Security (Unreviewed) Quantity: 87.00 Unit: MO

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Assume sites are fenced so no security is required.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
990001	Security	0.00	0.00	MO	US$	4,500.00	100.00	0.00	0.00

Activity: 10000I Safety Training & Supplies (Unreviewed) Quantity: 87.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	0.00	0.00	0.00	0.00	0.00	2,651.72	0.00	2,651.72
Total	0.00	0.00	0.00	0.00	0.00	230,700.00	0.00	230,700.00

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Allow one hour of environmental training for each on-site employee.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
990100	Safety Supplies	1.00	87.00	MO	US$	2,500.00	100.00	2,500.00	217,500.00

990105	Environmental Training	1.00	220.00	HR	US$	60.00	100.00	60.00	13,200.00

Activity: 10000J Permits (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
990030	Permits	1.00	1.00	LS	US$	5,000.00	100.00	5,000.00	5,000.00

Activity: 10000K Small Tools & Supplies (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Small tools and supplies are based on 5% of total direct labor costs.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3*DL	Small Tools & Supplies	1.00	6,703,012.01	DLB$	US$	0.05	107.75	0.05	361,124.77

Activity: 10000L Premium for Unscheduled Overtime (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40P 4 x 10-Hr Single Shift Hrs/Shift: 10 WC: CA4 Concrete - foundation/docks

Notes: The premium for unscheduled overtime is based on 2.5% of total direct labor costs.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
Z*DL	▫ Premium for Unsheduled OT	1.00	6,703,012.01	DLB$	US$	0.02	100.00	0.02	165,577.80

Report Summary

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
Total	7,155,650	4,699,182	11,854,832	7,813,274	42,241,438	1,743,492	2,596,976	66,250,011

Job Notes

THIS ESTIMATE IS AN UPDATE TO ESTIMATE 2019-32 (10/9/2019) AND INCLUDES UPDATED BEACH NOURISHMENT VOLUMES AND MATERIAL QUANTITIES. LABOR RATES, EQUIPMENT RATES, AND FUEL RATES HAVE BEEN UPDATED TO 2020.

DETAILS OF THIS ESTIMATE:
Shoreline restoration alternatives to be utilized at multiple locations in Mission Bay for the various eroding shoreline conditions. Shoreline restoration and protection options include revetments, rip rap, seawalls, beach nourishment, living shorelines (i.e. oyster reefs), wetlands, and hybrid solutions. Each location assumes a separate project and includes it's own mobilization and demobilization cost.

**********Estimate created on: 11/17/2020 by User#: 1 - Jack Fink
Source estimate used: L:\HEAVYBID\EST\2019-32

Calendars Used In Estimate

40S	5 x 8 Hr - Single Shift
50S	5 x 10 Hr - Single
40P	4 x 10-Hr Single Shift

In equipment resources, Rent % and EOE % that are not 100% are represented as XXX%YYY, where XXX = Rent % and YYY = EOE %

Biditem	Activity	Resource	Sel Vendor	Quantity	Unit	Unit Cost	Tax/OT %	Pcs/W	Total	Esc %
1002	B	2B2005		21.000	TON	7.500	107.75	1.00	169.71	100.00
2002	B	2B2005		21.000	TON	7.500	107.75	1.00	169.71	100.00
3002	B	2B2005		21.000	TON	7.500	107.75	1.00	169.71	100.00
4002	B	2B2005		21.000	TON	7.500	107.75	1.00	169.71	100.00
5002	B	2B2005		21.000	TON	7.500	107.75	1.00	169.71	100.00
6002	B	2B2005		21.000	TON	7.500	107.75	1.00	169.71	100.00
7002	B	2B2005		21.000	TON	7.500	107.75	1.00	169.71	100.00
8002	B	2B2005		42.000	TON	7.500	107.75	1.00	339.41	100.00
8202	B	2B2005		42.000	TON	7.500	107.75	1.00	339.41	100.00
8402	B	2B2005		21.000	TON	7.500	107.75	1.00	169.71	100.00
Subtotal:	2B2005			252.000	TON	7.500	107.75		2,036.50	100.00
	3/4" Crushed Gravel									
1003	C	2B2008		2,458.000	TON	49.000	107.75	1.00	129,776.26	100.00
2003	C	2B2008		27,090.000	TON	49.000	107.75	1.00	1,430,284.28	100.00
Subtotal:	2B2008			29,548.000	TON	49.000	107.75		1,560,060.54	100.00
	3'-8" Cobble									
1003	B	2BA110		3,902.000	TON	40.000	107.75	1.00	168,176.20	100.00
2003	B	2BA110		26,100.000	TON	40.000	107.75	1.00	1,124,910.00	100.00
3003	B	2BA110		21,420.000	TON	40.000	107.75	1.00	923,202.00	100.00
5003	B	2BA110		12,522.000	TON	40.000	107.75	1.00	539,698.20	100.00
6003	B	2BA110		4,410.000	TON	37.000	107.75	1.00	175,815.68	100.00
7003	B	2BA110		8,033.000	TON	40.000	107.75	1.00	346,222.30	100.00
8203	D	2BA110		33,813.000	TON	40.000	107.75	1.00	1,457,340.30	100.00
8204	B	2BA110		17,325.000	TON	40.000	107.75	1.00	746,707.50	100.00
Subtotal:	2BA110			127,525.000	TON		107.75		5,482,072.18	100.00
	Armor Stone 2 -> 5 T									
1003	A	2BB110		26,908.200	TON	26.000	107.75	1.00	753,833.22	100.00
2003	A	2BB110		126,522.000	TON	26.000	107.75	1.00	3,544,513.83	100.00
3003	A	2BB110		292,604.400	TON	26.000	107.75	1.00	8,197,312.27	100.00
4003	A	2BB110		202,970.000	TON	26.000	107.75	1.00	5,686,204.55	100.00
5003	C	2BB110		2,042.340	TON	26.000	107.75	1.00	57,216.16	100.00
6003	C	2BB110		617.000	TON	26.000	107.75	1.00	17,285.26	100.00
8003	A	2BB110		375,467.660	TON	26.000	107.75	1.00	10,518,726.49	100.00
8203	C	2BB110		198,515.000	TON	26.000	107.75	1.00	5,561,397.73	100.00
8204	C	2BB110		19,246.000	TON	26.000	107.75	1.00	539,176.69	100.00
8204	D	2BB110		1,787.000	TON	26.000	107.75	1.00	50,062.81	100.00
Subtotal:	2BB110			1,246,679.600	TON	26.000	107.75		34,925,729.01	100.00
	Sand Fill									
3003	B	2EC32		2,226.940	SY	1.250	107.75	1.00	2,999.41	100.00
5003	B	2EC32		8,509.490	SY	1.250	107.75	1.00	11,461.22	100.00
6003	B	2EC32		3,000.000	SY	1.250	107.75	1.00	4,040.63	100.00
7003	B	2EC32		4,850.000	SY	1.250	107.75	1.00	6,532.34	100.00
8204	B	2EC32		26,510.000	SY	1.250	107.75	1.00	35,705.66	100.00
Subtotal:	2EC32			45,096.430	SY	1.250	107.75		60,739.26	100.00
	Woven Geotextile									
5003	D	2PC		1.000	AC	26,800.000	107.75	1.00	28,877.00	100.00
6003	D	2PC		0.500	AC	26,800.000	107.75	1.00	14,438.50	100.00
7003	C	2PC		0.750	AC	26,800.000	107.75	1.00	21,657.75	100.00
8203	E	2PC		2.000	AC	26,800.000	107.75	1.00	57,754.00	100.00
Subtotal:	2PC			4.250	AC	26,800.000	107.75		122,727.25	100.00
	PRECAST CONCRETE MATL'S									

Biditem	Activity	Resource	Sel Vendor	Quantity	Unit	Unit Cost	Tax/OT %	Pcs/W	Total	Esc %
1009	A	2PL4X4		8.000	EA	44.230	107.75	1.00	381.26	100.00
2005	A	2PL4X4		18.000	EA	44.230	107.75	1.00	857.84	100.00
3005	A	2PL4X4		20.000	EA	44.230	107.75	1.00	953.16	100.00
4005	A	2PL4X4		18.000	EA	44.230	107.75	1.00	857.84	100.00
5005	A	2PL4X4		14.000	EA	44.230	107.75	1.00	667.21	100.00
6005	A	2PL4X4		6.000	EA	44.230	107.75	1.00	285.95	100.00
7005	A	2PL4X4		10.000	EA	44.230	107.75	1.00	476.58	100.00
8005	A	2PL4X4		36.000	EA	44.230	107.75	1.00	1,715.68	100.00
8206	A	2PL4X4		46.000	EA	44.230	107.75	1.00	2,192.26	100.00
8405	A	2PL4X4		8.000	EA	44.230	107.75	1.00	381.26	100.00
Subtotal:	2PL4X4			184.000	EA	44.230	107.75		8,769.04	100.00
	Plastic Lumber 4x4x72"									
1009	A	2T5101		8.000	EA	400.000	107.75	1.00	3,448.00	100.00
2005	A	2T5101		18.000	EA	400.000	107.75	1.00	7,758.00	100.00
3005	A	2T5101		20.000	EA	400.000	107.75	1.00	8,620.00	100.00
4005	A	2T5101		18.000	EA	400.000	107.75	1.00	7,758.00	100.00
5005	A	2T5101		14.000	EA	400.000	107.75	1.00	6,034.00	100.00
6005	A	2T5101		6.000	EA	400.000	107.75	1.00	2,586.00	100.00
7005	A	2T5101		10.000	EA	400.000	107.75	1.00	4,310.00	100.00
8005	A	2T5101		36.000	EA	400.000	107.75	1.00	15,516.00	100.00
8206	A	2T5101		46.000	EA	400.000	107.75	1.00	19,826.00	100.00
8405	A	2T5101		8.000	EA	400.000	107.75	1.00	3,448.00	100.00
Subtotal:	2T5101			184.000	EA	400.000	107.75		79,304.00	100.00
	Construction Signs									
				COST TYPE TOTAL					42,241,437.78	
9000	10000K	3*DL		6,703,012.010	DLB$	0.050	107.75	1.00	361,124.77	100.00
Subtotal:	3*DL			6,703,012.010	DLB$	0.050	107.75		361,124.77	100.00
	Small Tools & Supplies									
1008	A	3S4005		3.000	MO	5,000.000	107.75	1.00	16,162.50	100.00
2004	A	3S4005		8.000	MO	5,000.000	107.75	1.00	43,100.00	100.00
3004	A	3S4005		8.000	MO	5,000.000	107.75	1.00	43,100.00	100.00
4004	A	3S4005		5.000	MO	5,000.000	107.75	1.00	26,937.50	100.00
5004	A	3S4005		5.000	MO	5,000.000	107.75	1.00	26,937.50	100.00
6004	A	3S4005		3.000	MO	5,000.000	107.75	1.00	16,162.50	100.00
7004	A	3S4005		4.000	MO	5,000.000	107.75	1.00	21,550.00	100.00
8004	A	3S4005		14.000	MO	5,000.000	107.75	1.00	75,425.00	100.00
8205	A	3S4005		12.500	MO	5,000.000	107.75	1.00	67,343.75	100.00
8404	A	3S4005		4.000	MO	5,000.000	107.75	1.00	21,550.00	100.00
Subtotal:	3S4005			66.500	MO	5,000.000	107.75		358,268.75	100.00
	Traffic Control									
1002	B	3STRPL		18.000	MO	200.000	107.75	1.00	3,879.00	100.00
2002	B	3STRPL		18.000	MO	200.000	107.75	1.00	3,879.00	100.00
3002	B	3STRPL		18.000	MO	200.000	107.75	1.00	3,879.00	100.00
4002	B	3STRPL		18.000	MO	200.000	107.75	1.00	3,879.00	100.00
5002	B	3STRPL		18.000	MO	200.000	107.75	1.00	3,879.00	100.00
6002	B	3STRPL		18.000	MO	200.000	107.75	1.00	3,879.00	100.00
7002	B	3STRPL		18.000	MO	200.000	107.75	1.00	3,879.00	100.00
8002	B	3STRPL		36.000	MO	200.000	107.75	1.00	7,758.00	100.00
8202	B	3STRPL		36.000	MO	200.000	107.75	1.00	7,758.00	100.00
8402	B	3STRPL		18.000	MO	200.000	107.75	1.00	3,879.00	100.00
Subtotal:	3STRPL			216.000	MO	200.000	107.75		46,548.00	100.00

Biditem	Activity	Resource	Sel Vendor	Quantity	Unit	Unit Cost	Tax/OT %	Pcs/W	Total	Esc %
	Trench Plate Rental - 8'x10'									
					COST TYPE TOTAL				765,941.52	
1003	E	4CONC		334.000	SQYD	56.230	100.00	1.00	18,780.82	100.00
1003	F	4CONC		63.000	CY	765.000	100.00	1.00	48,195.00	100.00
8403	A	4CONC		245.000	LF	8,000.000	100.00	1.00	1,960,000.00	100.00
Subtotal:	4CONC						100.00		2,026,975.82	100.00
	Concrete - Sub									
1003	D	4SURVEY		2.000	EA	15,000.000	100.00	1.00	30,000.00	100.00
2003	F	4SURVEY		2.000	EA	20,000.000	100.00	1.00	40,000.00	100.00
3003	D	4SURVEY		2.000	EA	25,000.000	100.00	1.00	50,000.00	100.00
4003	D	4SURVEY		2.000	EA	20,000.000	100.00	1.00	40,000.00	100.00
5003	E	4SURVEY		2.000	EA	20,000.000	100.00	1.00	40,000.00	100.00
6003	E	4SURVEY		2.000	EA	20,000.000	100.00	1.00	40,000.00	100.00
7003	D	4SURVEY		2.000	EA	20,000.000	100.00	1.00	40,000.00	100.00
8003	B	4SURVEY		2.000	EA	20,000.000	100.00	1.00	40,000.00	100.00
8203	I	4SURVEY		2.000	EA	40,000.000	100.00	1.00	80,000.00	100.00
8204	E	4SURVEY		2.000	EA	20,000.000	100.00	1.00	40,000.00	100.00
8403	B	4SURVEY		2.000	EA	15,000.000	100.00	1.00	30,000.00	100.00
Subtotal:	4SURVEY			22.000	EA		100.00		470,000.00	100.00
	Surveying/Positioning Sub									
1002	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
2002	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
3002	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
4002	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
5002	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
6002	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
7002	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
8002	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
8202	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
8402	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
Subtotal:	4SWPPP			10.000	LS	10,000.000	100.00		100,000.00	100.00
	SWPPP Plan									
					COST TYPE TOTAL				2,596,975.82	
					REPORT TOTAL				45,604,355.12	

Cost Types Selected: Permanent Materials, Construction Materials, Subcontractor

Subtotal selected vendor, quantity, units, and unit price only display if they are the same for all line items in the subtotal.

11/24/2020 10:39
2020-70B MISSION BAY SHORELINE RESTORATION-ALT 2
*** Jack Fink

BID TOTALS

Biditem	Description	Status - Rnd	Quantity	Units	Unit Price	Bid Total
500	MOBILIZE/DEMOBILIZE DREDGE		1.000	LS	270,261.02	270,261.02
1000	BONITA COVE		1.000	LS	1,348,754.25	1,348,754.25
2000	VACATION ISLAND NE (SKI BEACH)		1.000	LS	6,554,266.56	6,554,266.56
3000	VACATION ISLAND NW		1.000	LS	7,608,743.09	7,608,743.09
4000	WEST SAIL BAY		1.000	LS	3,887,491.81	3,887,491.81
5000	VACATION ISLAND SW		1.000	LS	2,092,445.72	2,092,445.72
6000	VACATION ISLAND N (WEST OF INGRAHAM ST)		1.000	LS	912,529.64	912,529.64
7000	VENTURA COVE PARK		1.000	LS	1,412,520.49	1,412,520.49
8000	DE ANZA COVE		1.000	LS	7,671,617.60	7,671,617.60
9000	DE ANZA BOOT		1.000	LS	11,372,978.52	11,372,978.52
10000	CROWN POINT		1.000	LS	2,214,568.63	2,214,568.63
			Bid Total	========>		$45,346,177.33

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION - ALT. 2

Bid Item/ Activity	Bid Description	Bid Quantity	Units	Labor + Burden	Permanent Material	Construction Material	Total Equipment	Subs	Direct Total	Indirect Cost	Addon/ Bond Cost	Total Cost	Markup	Bid Total	Bid Total U.P.	Man Hours
500	**MOBILIZE/DEMOBILIZE DREDGE**	**1**	**LS**	**$65,522**	**$0**	**$0**	**$84,109**	**$22,000**	**$171,632**	**$56,777**	**$1,622**	**$230,030**	**$40,231**	**$270,261**	**$270,261**	**656**
A	*Prepare Dredge for Transfer*	*1*	*EA*	*$9,600*	*$0*	*$0*	*$15,006*	*$0*	*$24,606*	*$8,319*	*$233*	*$33,157*	*$5,894*	*$39,052*	*$39,052*	*96*
B	*Prepare Pipeline for Transfer*	*1*	*EA*	*$4,789*	*$0*	*$0*	*$2,073*	*$3,000*	*$9,862*	*$4,150*	*$93*	*$14,105*	*$2,940*	*$17,045*	*$17,045*	*48*
C	*Truck Dredge Sections to Jobsite*	*1*	*EA*	*$6,442*	*$0*	*$0*	*$8,536*	*$8,000*	*$22,977*	*$5,582*	*$217*	*$28,776*	*$3,955*	*$32,732*	*$32,732*	*64*
D	*Prepare Pipeline for Transfer from Site*	*1*	*EA*	*$9,578*	*$0*	*$0*	*$8,714*	*$3,000*	*$21,292*	*$8,299*	*$201*	*$29,792*	*$5,881*	*$35,673*	*$35,673*	*96*
E	*Prepare Dredge for Transfer from Site*	*1*	*EA*	*$24,000*	*$0*	*$0*	*$37,515*	*$8,000*	*$69,515*	*$20,797*	*$657*	*$90,968*	*$14,736*	*$105,704*	*$105,704*	*240*
F	*Prepare Pipeline for Storage*	*1*	*EA*	*$4,789*	*$0*	*$0*	*$2,073*	*$0*	*$6,862*	*$4,150*	*$65*	*$11,076*	*$2,940*	*$14,017*	*$14,017*	*48*
G	*Prepare Dredge for Storage*	*1*	*EA*	*$6,325*	*$0*	*$0*	*$10,192*	*$0*	*$16,518*	*$5,481*	*$156*	*$22,155*	*$3,884*	*$26,039*	*$26,039*	*64*
1000	**BONITA COVE**	**1**	**LS**	**$246,767**	**$301,951**	**$37,735**	**$256,776**	**$130,976**	**$974,205**	**$213,829**	**$9,205**	**$1,197,239**	**$151,515**	**$1,348,754**	**$1,348,754**	**2,600**
1001	MOBILIZATION/DEMOBILIZATION	1	LS	$28,607	$0	$15,000	$17,211	$0	$60,818	$24,789	$575	$86,181	$17,565	$103,746	$103,746	368
A	*Mobilization of Land Based Equip*	*10*	*EA*	*$2,789*	*$0*	*$0*	*$4,711*	*$0*	*$7,500*	*$2,417*	*$71*	*$9,988*	*$1,713*	*$11,701*	*$1,170*	*40*
B	*Set up Site / Laydown Area*	*1*	*EA*	*$11,514*	*$0*	*$7,500*	*$3,894*	*$0*	*$22,908*	*$9,977*	*$216*	*$33,102*	*$7,070*	*$40,172*	*$40,172*	*144*
C	*Clean up Site*	*1*	*EA*	*$11,514*	*$0*	*$0*	*$3,894*	*$0*	*$15,408*	*$9,977*	*$146*	*$25,531*	*$7,070*	*$32,601*	*$32,601*	*144*
D	*Demobilization of Land Based Equip*	*10*	*EA*	*$2,789*	*$0*	*$7,500*	*$4,711*	*$0*	*$15,000*	*$2,417*	*$142*	*$17,559*	*$1,713*	*$19,272*	*$1,927*	*40*
1002	SWPPP	1	LS	$1,079	$170	$3,879	$191	$10,000	$15,318	$935	$145	$16,397	$662	$17,060	$17,060	14
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$94*	*$10,094*	*$0*	*$10,094*	*$10,094*	*0*
B	*Construct Temp Construction Entrance*	*1*	*EA*	*$1,079*	*$170*	*$3,879*	*$191*	*$0*	*$5,318*	*$935*	*$50*	*$6,303*	*$662*	*$6,965*	*$6,965*	*14*
1003	SHORELINE RECONSTRUCTION	1	LS	$114,461	$297,952	$0	$114,597	$96,976	$623,986	$99,183	$5,896	$729,066	$70,279	$799,345	$799,345	1,247
A	*Place Sand Fill for Beach Nourishment*	*18,120*	*CY*	*$76,313*	*$0*	*$0*	*$59,280*	*$0*	*$135,594*	*$66,127*	*$1,281*	*$203,002*	*$46,857*	*$249,859*	*$13.79*	*802*
B	*Place Caltrans Backing No. 3*	*3,902*	*TON*	*$21,002*	*$168,176*	*$0*	*$30,456*	*$0*	*$219,634*	*$18,199*	*$2,075*	*$239,909*	*$12,896*	*$252,804*	*$64.79*	*245*
C	*Place Cobble Toe*	*2,458*	*TON*	*$17,145*	*$129,776*	*$0*	*$24,862*	*$0*	*$171,783*	*$14,856*	*$1,623*	*$188,262*	*$10,527*	*$198,789*	*$80.87*	*200*
D	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$30,000*	*$30,000*	*$0*	*$283*	*$30,283*	*$0*	*$30,283*	*$15,142*	*0*
E	*Remove Concrete Sidewalk*	*300*	*LF*	*$0*	*$0*	*$0*	*$0*	*$18,781*	*$18,781*	*$0*	*$177*	*$18,958*	*$0*	*$18,958*	*$63.19*	*0*
F	*Construct New Sidewalk*	*300*	*LF*	*$0*	*$0*	*$0*	*$0*	*$48,195*	*$48,195*	*$0*	*$455*	*$48,650*	*$0*	*$48,650*	*$162*	*0*
1004	MOB./DEMOB. DREDGING	1	LS	$25,767	$0	$2,694	$29,467	$0	$57,928	$22,328	$547	$80,803	$15,821	$96,623	$96,623	256
A	*Prepare Dredge at Jobsite*	*1*	*EA*	*$3,221*	*$0*	*$0*	*$4,688*	*$0*	*$7,909*	*$2,791*	*$75*	*$10,774*	*$1,978*	*$12,752*	*$12,752*	*32*
B	*Prepare Pipeline at Jobsite*	*1*	*EA*	*$12,883*	*$0*	*$2,694*	*$14,844*	*$0*	*$30,422*	*$11,164*	*$287*	*$41,873*	*$7,910*	*$49,783*	*$49,783*	*128*
C	*Prepare Dredge for Transfer from Site*	*1*	*EA*	*$3,221*	*$0*	*$0*	*$4,688*	*$0*	*$7,909*	*$2,791*	*$75*	*$10,774*	*$1,978*	*$12,752*	*$12,752*	*32*
D	*Prepare Pipeline for Transfer from Site*	*1*	*EA*	*$6,442*	*$0*	*$0*	*$5,247*	*$0*	*$11,688*	*$5,582*	*$110*	*$17,381*	*$3,955*	*$21,336*	*$21,336*	*64*
1005	DREDGING	1	LS	$71,377	$0	$0	$93,963	$24,000	$189,340	$61,850	$1,789	$252,979	$43,826	$296,805	$296,805	641
A	*Dredge Area*	*18,120*	*CY*	*$71,377*	*$0*	*$0*	*$93,963*	*$0*	*$165,340*	*$61,850*	*$1,562*	*$228,753*	*$43,826*	*$272,578*	*$15.04*	*641*
B	*Hydrographic Surveys*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$24,000*	*$24,000*	*$0*	*$227*	*$24,227*	*$0*	*$24,227*	*$24,227*	*0*
1008	CONSTRUCTION ACCESS	1	LS	$4,364	$0	$16,163	$1,156	$0	$21,683	$3,782	$205	$25,670	$2,680	$28,350	$28,350	60
1009	INSTALL SIGNS	1	LS	$1,112	$3,829	$0	$191	$0	$5,132	$963	$48	$6,144	$683	$6,826	$6,826	14
2000	**VACATION ISLAND NE (SKI BEACH)**	**1**	**LS**	**$1,063,836**	**$2,563,980**	**$49,673**	**$1,181,133**	**$74,000**	**$4,932,622**	**$921,839**	**$46,609**	**$5,901,070**	**$653,196**	**$6,554,267**	**$6,554,267**	**10,578**
2001	MOBILIZATION/DEMOBILIZATION	1	LS	$41,328	$0	$0	$56,491	$0	$97,819	$35,812	$924	$134,555	$25,376	$159,931	$159,931	460
A	*Mobilization of Land Based Equip*	*20*	*EA*	*$5,578*	*$0*	*$0*	*$9,423*	*$0*	*$15,001*	*$4,834*	*$142*	*$19,977*	*$3,425*	*$23,402*	*$1,170*	*80*
B	*Demobilization of Land Based Equip*	*20*	*EA*	*$5,578*	*$0*	*$0*	*$9,423*	*$0*	*$15,001*	*$4,834*	*$142*	*$19,977*	*$3,425*	*$23,402*	*$1,170*	*80*
C	*Mobilization of Marine Equip*	*1*	*EA*	*$15,815*	*$0*	*$0*	*$17,829*	*$0*	*$33,643*	*$13,704*	*$318*	*$47,665*	*$9,710*	*$57,375*	*$57,375*	*160*
D	*Demobilization of Marine Equip*	*1*	*EA*	*$7,907*	*$0*	*$0*	*$8,914*	*$0*	*$16,822*	*$6,852*	*$159*	*$23,832*	*$4,855*	*$28,687*	*$28,687*	*80*
E	*Towing*	*2*	*EA*	*$6,450*	*$0*	*$0*	*$10,903*	*$0*	*$17,352*	*$5,589*	*$164*	*$23,105*	*$3,960*	*$27,065*	*$13,532*	*60*
2002	SWPPP	1	LS	$1,079	$170	$3,879	$191	$10,000	$15,318	$935	$145	$16,397	$662	$17,060	$17,060	14
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$94*	*$10,094*	*$0*	*$10,094*	*$10,094*	*0*
B	*Construct Temp Construction Entrance*	*1*	*EA*	*$1,079*	*$170*	*$3,879*	*$191*	*$0*	*$5,318*	*$935*	*$50*	*$6,303*	*$662*	*$6,965*	*$6,965*	*14*

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION - ALT. 2

Bid Item/ Activity	Bid Description	Bid Quantity	Units	Labor + Burden	Permanent Material	Construction Material	Total Equipment	Subs	Direct Total	Indirect Cost	Addon/ Bond Cost	Total Cost	Markup	Bid Total	Bid Total U.P.	Man Hours
2003	SHORELINE RECONSTRUCTION	1	LS	$650,265	$2,555,194	$0	$650,806	$40,000	$3,896,266	$563,470	$36,816	$4,496,552	$399,263	$4,895,815	$4,895,815	6,700
A	*Place Sand Fill for Beach Nourishment*	*85,200*	*CY*	*$358,824*	*$0*	*$0*	*$278,734*	*$0*	*$637,557*	*$310,929*	*$6,024*	*$954,511*	*$220,318*	*$1,174,829*	*$13.79*	*3,770*
B	*Place Caltrans Backing No. 3*	*26,100*	*TON*	*$91,171*	*$1,124,910*	*$0*	*$102,782*	*$0*	*$1,318,863*	*$79,002*	*$12,462*	*$1,410,327*	*$55,979*	*$1,466,306*	*$56.18*	*922*
C	*Place Cobble Toe*	*27,090*	*TON*	*$118,609*	*$1,430,284*	*$0*	*$133,714*	*$0*	*$1,682,608*	*$102,778*	*$15,899*	*$1,801,285*	*$72,826*	*$1,874,111*	*$69.18*	*1,200*
D	*Tow Rock Barges*	*27*	*EA*	*$65,846*	*$0*	*$0*	*$117,749*	*$0*	*$183,594*	*$57,057*	*$1,735*	*$242,386*	*$40,429*	*$282,815*	*$10,475*	*648*
E	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$40,000*	*$40,000*	*$0*	*$378*	*$40,378*	*$0*	*$40,378*	*$20,189*	*0*
F	*Grade Sand Fill Nourishment*	*1*	*LS*	*$15,815*	*$0*	*$0*	*$17,829*	*$0*	*$33,643*	*$13,704*	*$318*	*$47,665*	*$9,710*	*$57,375*	*$57,375*	*160*
2004	CONSTRUCTION ACCESS	1	LS	$7,274	$0	$43,100	$1,927	$0	$52,301	$6,303	$494	$59,098	$4,466	$63,565	$63,565	100
2005	INSTALL SIGNS	1	LS	$2,502	$8,616	$0	$429	$0	$11,546	$2,168	$109	$13,823	$1,536	$15,359	$15,359	32
2006	MOB./DEMOB DREDGING	1	LS	$25,767	$0	$2,694	$29,467	$0	$57,928	$22,328	$547	$80,803	$15,821	$96,623	$96,623	256
A	*Prepare Dredge at Jobsite*	*1*	*EA*	*$3,221*	*$0*	*$0*	*$4,688*	*$0*	*$7,909*	*$2,791*	*$75*	*$10,774*	*$1,978*	*$12,752*	*$12,752*	*32*
B	*Prepare Pipeline at Jobsite*	*1*	*EA*	*$12,883*	*$0*	*$2,694*	*$14,844*	*$0*	*$30,422*	*$11,164*	*$287*	*$41,873*	*$7,910*	*$49,783*	*$49,783*	*128*
C	*Prepare Dredge for Transfer from Site*	*1*	*EA*	*$3,221*	*$0*	*$0*	*$4,688*	*$0*	*$7,909*	*$2,791*	*$75*	*$10,774*	*$1,978*	*$12,752*	*$12,752*	*32*
D	*Prepare Pipeline for Transfer from Site*	*1*	*EA*	*$6,442*	*$0*	*$0*	*$5,247*	*$0*	*$11,688*	*$5,582*	*$110*	*$17,381*	*$3,955*	*$21,336*	*$21,336*	*64*
2007	DREDGING	1	LS	$335,622	$0	$0	$441,823	$24,000	$801,445	$290,824	$7,573	$1,099,842	$206,072	$1,305,914	$1,305,914	3,016
A	*Dredge Area*	*85,200*	*CY*	*$335,622*	*$0*	*$0*	*$441,823*	*$0*	*$777,445*	*$290,824*	*$7,346*	*$1,075,615*	*$206,072*	*$1,281,687*	*$15.04*	*3,016*
B	*Hydrographic Surveys*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$24,000*	*$24,000*	*$0*	*$227*	*$24,227*	*$0*	*$24,227*	*$24,227*	*0*
3000	**VACATION ISLAND NW**	**1**	**LS**	**$1,848,232**	**$935,944**	**$49,673**	**$1,908,934**	**$84,000**	**$4,826,783**	**$1,601,536**	**$45,609**	**$6,473,928**	**$1,134,815**	**$7,608,743**	**$7,608,743**	**17,806**
3001	MOBILIZATION/DEMOBILIZATION	1	LS	$35,750	$0	$0	$47,068	$0	$82,818	$30,978	$783	$114,579	$21,950	$136,529	$136,529	380
A	*Mobilization of Land Based Equip*	*10*	*EA*	*$2,789*	*$0*	*$0*	*$4,711*	*$0*	*$7,500*	*$2,417*	*$71*	*$9,988*	*$1,713*	*$11,701*	*$1,170*	*40*
B	*Demobilization of Land Based Equip*	*10*	*EA*	*$2,789*	*$0*	*$0*	*$4,711*	*$0*	*$7,500*	*$2,417*	*$71*	*$9,988*	*$1,713*	*$11,701*	*$1,170*	*40*
C	*Mobilization of Marine Equip*	*1*	*EA*	*$15,815*	*$0*	*$0*	*$17,829*	*$0*	*$33,643*	*$13,704*	*$318*	*$47,665*	*$9,710*	*$57,375*	*$57,375*	*160*
D	*Demobilization of Marine Equip*	*1*	*EA*	*$7,907*	*$0*	*$0*	*$8,914*	*$0*	*$16,822*	*$6,852*	*$159*	*$23,832*	*$4,855*	*$28,687*	*$28,687*	*80*
E	*Towing*	*2*	*EA*	*$6,450*	*$0*	*$0*	*$10,903*	*$0*	*$17,352*	*$5,589*	*$164*	*$23,105*	*$3,960*	*$27,065*	*$13,532*	*60*
3002	SWPPP	1	LS	$1,079	$170	$3,879	$191	$10,000	$15,318	$935	$145	$16,397	$662	$17,060	$17,060	14
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$94*	*$10,094*	*$0*	*$10,094*	*$10,094*	*0*
B	*Construct Temp Construction Entrance*	*1*	*EA*	*$1,079*	*$170*	*$3,879*	*$191*	*$0*	*$5,318*	*$935*	*$50*	*$6,303*	*$662*	*$6,965*	*$6,965*	*14*
3003	SHORELINE RECONSTRUCTION	1	LS	$999,394	$926,201	$0	$808,007	$50,000	$2,783,602	$865,998	$26,303	$3,675,903	$613,629	$4,289,532	$4,289,532	10,047
A	*Place Sand Fill for Beach Nourishment*	*197,040*	*CY*	*$867,462*	*$0*	*$0*	*$644,622*	*$0*	*$1,512,084*	*$751,676*	*$14,288*	*$2,278,047*	*$532,622*	*$2,810,669*	*$14.26*	*8,719*
B	*Place Rip Rap Stone Groin*	*21,420*	*TON*	*$105,106*	*$926,201*	*$0*	*$115,413*	*$0*	*$1,146,721*	*$91,077*	*$10,835*	*$1,248,633*	*$64,535*	*$1,313,169*	*$61.31*	*1,064*
C	*Tow Rock Barges*	*11*	*EA*	*$26,826*	*$0*	*$0*	*$47,972*	*$0*	*$74,798*	*$23,245*	*$707*	*$98,750*	*$16,471*	*$115,221*	*$10,475*	*264*
D	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$50,000*	*$50,000*	*$0*	*$472*	*$50,472*	*$0*	*$50,472*	*$25,236*	*0*
3004	CONSTRUCTION ACCESS	1	LS	$7,274	$0	$43,100	$1,927	$0	$52,301	$6,303	$494	$59,098	$4,466	$63,565	$63,565	100
3005	INSTALL SIGNS	1	LS	$2,780	$9,573	$0	$476	$0	$12,829	$2,409	$121	$15,359	$1,707	$17,066	$17,066	35
3006	MOB./DEMOB. DREDGING	1	LS	$25,767	$0	$2,694	$29,467	$0	$57,928	$22,328	$547	$80,803	$15,821	$96,623	$96,623	256
A	*Prepare Dredge at Jobsite*	*1*	*EA*	*$3,221*	*$0*	*$0*	*$4,688*	*$0*	*$7,909*	*$2,791*	*$75*	*$10,774*	*$1,978*	*$12,752*	*$12,752*	*32*
B	*Prepare Pipeline at Jobsite*	*1*	*EA*	*$12,883*	*$0*	*$2,694*	*$14,844*	*$0*	*$30,422*	*$11,164*	*$287*	*$41,873*	*$7,910*	*$49,783*	*$49,783*	*128*
C	*Prepare Dredge for Transfer from Site*	*1*	*EA*	*$3,221*	*$0*	*$0*	*$4,688*	*$0*	*$7,909*	*$2,791*	*$75*	*$10,774*	*$1,978*	*$12,752*	*$12,752*	*32*
D	*Prepare Pipeline for Transfer from Site*	*1*	*EA*	*$6,442*	*$0*	*$0*	*$5,247*	*$0*	*$11,688*	*$5,582*	*$110*	*$17,381*	*$3,955*	*$21,336*	*$21,336*	*64*
3007	DREDGING	1	LS	$776,188	$0	$0	$1,021,798	$24,000	$1,821,987	$672,586	$17,216	$2,511,788	$476,580	$2,988,369	$2,988,369	6,975
A	*Dredge Area*	*197,040*	*CY*	*$776,188*	*$0*	*$0*	*$1,021,798*	*$0*	*$1,797,987*	*$672,586*	*$16,989*	*$2,487,562*	*$476,580*	*$2,964,142*	*$15.04*	*6,975*
B	*Hydrographic Surveys*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$24,000*	*$24,000*	*$0*	*$227*	*$24,227*	*$0*	*$24,227*	*$24,227*	*0*
4000	**WEST SAIL BAY**	**1**	**LS**	**$1,054,505**	**$8,786**	**$33,510**	**$1,133,695**	**$74,000**	**$2,304,496**	**$913,754**	**$21,775**	**$3,240,025**	**$647,467**	**$3,887,492**	**$3,887,492**	**10,201**
4001	MOBILIZATION/DEMOBILIZATION	1	LS	$5,578	$0	$0	$9,423	$0	$15,001	$4,834	$142	$19,977	$3,425	$23,402	$23,402	80
A	*Mobilization of Land Based Equip*	*10*	*EA*	*$2,789*	*$0*	*$0*	*$4,711*	*$0*	*$7,500*	*$2,417*	*$71*	*$9,988*	*$1,713*	*$11,701*	*$1,170*	*40*
B	*Demobilization of Land Based Equip*	*10*	*EA*	*$2,789*	*$0*	*$0*	*$4,711*	*$0*	*$7,500*	*$2,417*	*$71*	*$9,988*	*$1,713*	*$11,701*	*$1,170*	*40*
4002	SWPPP	1	LS	$1,079	$170	$3,879	$191	$10,000	$15,318	$935	$145	$16,397	$662	$17,060	$17,060	14
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$94*	*$10,094*	*$0*	*$10,094*	*$10,094*	*0*
B	*Construct Temp Construction Entrance*	*1*	*EA*	*$1,079*	*$170*	*$3,879*	*$191*	*$0*	*$5,318*	*$935*	*$50*	*$6,303*	*$662*	*$6,965*	*$6,965*	*14*

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION - ALT. 2

Bid Item/ *Activity*	Bid Description	Bid Quantity	Units	Labor + Burden	Permanent Material	Construction Material	Total Equipment	Subs	Direct Total	Indirect Cost	Addon/ Bond Cost	Total Cost	Markup	Bid Total	Bid Total U.P.	Man Hours
4003	SHORELINE RECONSTRUCTION	1	LS	$470,772	$0	$0	$382,647	$40,000	$893,418	$407,935	$8,442	$1,309,795	$289,054	$1,598,849	$1,598,849	4,838
A	*Place Sand Fill for Beach Nourishment*	*136,680*	*CY*	*$470,772*	*$0*	*$0*	*$382,647*	*$0*	*$853,418*	*$407,935*	*$8,064*	*$1,269,417*	*$289,054*	*$1,558,472*	*$11.40*	*4,838*
C	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$40,000*	*$40,000*	*$0*	*$378*	*$40,378*	*$0*	*$40,378*	*$20,189*	*0*
4004	CONSTRUCTION ACCESS	1	LS	$10,392	$0	$26,938	$2,752	$0	$40,082	$9,005	$379	$49,465	$6,381	$55,846	$55,846	143
4005	INSTALL SIGNS	1	LS	$2,502	$8,616	$0	$429	$0	$11,546	$2,168	$109	$13,823	$1,536	$15,359	$15,359	32
4006	MOB./DEMOB. DREDGING	1	LS	$25,767	$0	$2,694	$29,467	$0	$57,928	$22,328	$547	$80,803	$15,821	$96,623	$96,623	256
A	*Prepare Dredge at Jobsite*	*1*	*EA*	*$3,221*	*$0*	*$0*	*$4,688*	*$0*	*$7,909*	*$2,791*	*$75*	*$10,774*	*$1,978*	*$12,752*	*$12,752*	*32*
B	*Prepare Pipeline at Jobsite*	*1*	*EA*	*$12,883*	*$0*	*$2,694*	*$14,844*	*$0*	*$30,422*	*$11,164*	*$287*	*$41,873*	*$7,910*	*$49,783*	*$49,783*	*128*
C	*Prepare Dredge for Transfer from Site*	*1*	*EA*	*$3,221*	*$0*	*$0*	*$4,688*	*$0*	*$7,909*	*$2,791*	*$75*	*$10,774*	*$1,978*	*$12,752*	*$12,752*	*32*
D	*Prepare Pipeline for Transfer from Site*	*1*	*EA*	*$6,442*	*$0*	*$0*	*$5,247*	*$0*	*$11,688*	*$5,582*	*$110*	*$17,381*	*$3,955*	*$21,336*	*$21,336*	*64*
4007	DREDGING	1	LS	$538,416	$0	$0	$708,787	$24,000	$1,271,203	$466,550	$12,012	$1,749,765	$330,588	$2,080,352	$2,080,352	4,838
A	*Dredge Area*	*136,680*	*CY*	*$538,416*	*$0*	*$0*	*$708,787*	*$0*	*$1,247,203*	*$466,550*	*$11,785*	*$1,725,538*	*$330,588*	*$2,056,126*	*$15.04*	*4,838*
B	*Hydrographic Surveys*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$24,000*	*$24,000*	*$0*	*$227*	*$24,227*	*$0*	*$24,227*	*$24,227*	*0*
5000	**VACATION ISLAND SW**	**1**	**LS**	**$414,595**	**$644,124**	**$30,817**	**$325,251**	**$50,000**	**$1,464,786**	**$359,257**	**$13,841**	**$1,837,884**	**$254,562**	**$2,092,446**	**$2,092,446**	**4,881**
5001	MOBILIZATION/DEMOBILIZATION	1	LS	$22,314	$0	$0	$37,690	$0	$60,004	$19,335	$567	$79,906	$13,701	$93,607	$93,607	320
A	*Mobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$9,668*	*$283*	*$39,953*	*$6,850*	*$46,803*	*$1,170*	*160*
B	*Demobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$9,668*	*$283*	*$39,953*	*$6,850*	*$46,803*	*$1,170*	*160*
5002	SWPPP	1	LS	$1,079	$170	$3,879	$191	$10,000	$15,318	$935	$145	$16,397	$662	$17,060	$17,060	14
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$94*	*$10,094*	*$0*	*$10,094*	*$10,094*	*0*
B	*Construct Temp Construction Entrance*	*1*	*EA*	*$1,079*	*$170*	*$3,879*	*$191*	*$0*	*$5,318*	*$935*	*$50*	*$6,303*	*$662*	*$6,965*	*$6,965*	*14*
5003	SHORELINE RECONSTRUCTION	1	LS	$383,438	$637,253	$0	$285,495	$40,000	$1,346,186	$332,258	$12,720	$1,691,164	$235,431	$1,926,595	$1,926,595	4,442
A	*Recover Existing Rip Rap*	*1*	*LS*	*$82,842*	*$0*	*$0*	*$75,924*	*$0*	*$158,766*	*$71,784*	*$1,500*	*$232,051*	*$50,865*	*$282,916*	*$282,916*	*960*
B	*Place Revetment Stone*	*12,522*	*TON*	*$226,903*	*$551,159*	*$0*	*$132,015*	*$0*	*$910,078*	*$196,617*	*$8,599*	*$1,115,294*	*$139,319*	*$1,254,612*	*$100*	*2,714*
C	*Place Sand Cover*	*1,260*	*CY*	*$14,389*	*$57,216*	*$0*	*$10,698*	*$0*	*$82,303*	*$12,468*	*$778*	*$95,549*	*$8,835*	*$104,383*	*$82.84*	*168*
D	*Construct Oyster Habitat*	*1*	*LS*	*$59,305*	*$28,877*	*$0*	*$66,857*	*$0*	*$155,039*	*$51,389*	*$1,465*	*$207,893*	*$36,413*	*$244,306*	*$244,306*	*600*
E	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$40,000*	*$40,000*	*$0*	*$378*	*$40,378*	*$0*	*$40,378*	*$20,189*	*0*
5004	CONSTRUCTION ACCESS	1	LS	$5,819	$0	$26,938	$1,541	$0	$34,298	$5,043	$324	$39,665	$3,573	$43,238	$43,238	80
5005	INSTALL SIGNS	1	LS	$1,946	$6,701	$0	$334	$0	$8,980	$1,686	$85	$10,751	$1,195	$11,946	$11,946	25
6000	**VACATION ISLAND N (WEST OF INGRAHAM ST**	**1**	**LS**	**$185,374**	**$214,622**	**$20,042**	**$162,070**	**$50,000**	**$632,107**	**$160,631**	**$5,973**	**$798,710**	**$113,820**	**$912,530**	**$912,530**	**2,205**
6001	MOBILIZATION/DEMOBILIZATION	1	LS	$22,314	$0	$0	$37,690	$0	$60,004	$19,335	$567	$79,906	$13,701	$93,607	$93,607	320
A	*Mobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$9,668*	*$283*	*$39,953*	*$6,850*	*$46,803*	*$1,170*	*160*
B	*Demobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$9,668*	*$283*	*$39,953*	*$6,850*	*$46,803*	*$1,170*	*160*
6002	SWPPP	1	LS	$1,079	$170	$3,879	$191	$10,000	$15,318	$935	$145	$16,397	$662	$17,060	$17,060	14
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$94*	*$10,094*	*$0*	*$10,094*	*$10,094*	*0*
B	*Construct Temp Construction Entrance*	*1*	*EA*	*$1,079*	*$170*	*$3,879*	*$191*	*$0*	*$5,318*	*$935*	*$50*	*$6,303*	*$662*	*$6,965*	*$6,965*	*14*
6003	SHORELINE RECONSTRUCTION	1	LS	$156,783	$211,580	$0	$122,890	$40,000	$531,253	$135,856	$5,020	$672,129	$96,265	$768,394	$768,394	1,801
A	*Recover Existing Rip Rap*	*1*	*LS*	*$41,421*	*$0*	*$0*	*$37,962*	*$0*	*$79,383*	*$35,892*	*$750*	*$116,025*	*$25,432*	*$141,458*	*$141,458*	*480*
B	*Place Revetment Stone*	*4,410*	*TON*	*$80,307*	*$179,856*	*$0*	*$46,724*	*$0*	*$306,887*	*$69,588*	*$2,900*	*$379,374*	*$49,308*	*$428,683*	*$97.21*	*961*
C	*Place Sand Cover*	*374*	*CY*	*$3,426*	*$17,285*	*$0*	*$2,547*	*$0*	*$23,258*	*$2,969*	*$220*	*$26,447*	*$2,103*	*$28,550*	*$76.34*	*40*
D	*Construct Oyster Habitat*	*1*	*LS*	*$31,629*	*$14,439*	*$0*	*$35,657*	*$0*	*$81,725*	*$27,407*	*$772*	*$109,904*	*$19,420*	*$129,325*	*$129,325*	*320*
E	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$40,000*	*$40,000*	*$0*	*$378*	*$40,378*	*$0*	*$40,378*	*$20,189*	*0*
6004	CONSTRUCTION ACCESS	1	LS	$4,364	$0	$16,163	$1,156	$0	$21,683	$3,782	$205	$25,670	$2,680	$28,350	$28,350	60
6005	INSTALL SIGNS	1	LS	$834	$2,872	$0	$143	$0	$3,849	$723	$36	$4,608	$512	$5,120	$5,120	11
7000	**VENTURA COVE PARK**	**1**	**LS**	**$287,144**	**$379,369**	**$25,429**	**$236,212**	**$50,000**	**$978,154**	**$248,817**	**$9,243**	**$1,236,214**	**$176,307**	**$1,412,520**	**$1,412,520**	**3,392**
7001	MOBILIZATION/DEMOBILIZATION	1	LS	$22,314	$0	$0	$37,690	$0	$60,004	$19,335	$567	$79,906	$13,701	$93,607	$93,607	320
A	*Mobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$9,668*	*$283*	*$39,953*	*$6,850*	*$46,803*	*$1,170*	*160*
B	*Demobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$9,668*	*$283*	*$39,953*	*$6,850*	*$46,803*	*$1,170*	*160*
7002	SWPPP	1	LS	$1,079	$170	$3,879	$191	$10,000	$15,318	$935	$145	$16,397	$662	$17,060	$17,060	14
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$94*	*$10,094*	*$0*	*$10,094*	*$10,094*	*0*
B	*Construct Temp Construction Entrance*	*1*	*EA*	*$1,079*	*$170*	*$3,879*	*$191*	*$0*	*$5,318*	*$935*	*$50*	*$6,303*	*$662*	*$6,965*	*$6,965*	*14*

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION - ALT. 2

Bid Item/ Activity	Bid Description	Bid Quantity	Units	Labor + Burden	Permanent Material	Construction Material	Total Equipment	Subs	Direct Total	Indirect Cost	Addon/ Bond Cost	Total Cost	Markup	Bid Total	Bid Total U.P.	Man Hours
7003	SHORELINE RECONSTRUCTION	1	LS	$257,998	$374,412	$0	$196,937	$40,000	$869,347	$223,561	$8,215	$1,101,122	$158,411	$1,259,533	$1,259,533	2,980
A	*Recover Existing Rip Rap*	*1*	*LS*	*$69,035*	*$0*	*$0*	*$63,270*	*$0*	*$132,305*	*$59,820*	*$1,250*	*$193,376*	*$42,387*	*$235,763*	*$235,763*	*800*
B	*Place Revetment Stone*	*8,033*	*TON*	*$145,473*	*$352,755*	*$0*	*$84,638*	*$0*	*$582,865*	*$126,055*	*$5,508*	*$714,428*	*$89,320*	*$803,748*	*$100*	*1,740*
C	*Construct Oyster Habitat*	*1*	*LS*	*$43,490*	*$21,658*	*$0*	*$49,028*	*$0*	*$114,176*	*$37,685*	*$1,079*	*$152,940*	*$26,703*	*$179,643*	*$179,643*	*440*
D	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$40,000*	*$40,000*	*$0*	*$378*	*$40,378*	*$0*	*$40,378*	*$20,189*	*0*
7004	CONSTRUCTION ACCESS	1	LS	$4,364	$0	$21,550	$1,156	$0	$27,071	$3,782	$256	$31,108	$2,680	$33,788	$33,788	60
7005	INSTALL SIGNS	1	LS	$1,390	$4,787	$0	$238	$0	$6,415	$1,204	$61	$7,680	$853	$8,533	$8,533	18
8000	**DE ANZA COVE**	**1**	**LS**	**$2,124,466**	**$17,571**	**$58,939**	**$2,208,948**	**$74,000**	**$4,483,924**	**$1,840,900**	**$42,369**	**$6,367,194**	**$1,304,424**	**$7,671,618**	**$7,671,618**	**20,920**
8001	MOBILIZATION/DEMOBILIZATION	1	LS	$22,314	$0	$0	$37,690	$0	$60,004	$19,335	$567	$79,906	$13,701	$93,607	$93,607	320
A	*Mobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$9,668*	*$283*	*$39,953*	*$6,850*	*$46,803*	*$1,170*	*160*
B	*Demobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$9,668*	*$283*	*$39,953*	*$6,850*	*$46,803*	*$1,170*	*160*
8002	SWPPP	1	LS	$2,157	$339	$7,758	$381	$10,000	$20,636	$1,869	$195	$22,700	$1,325	$24,025	$24,025	28
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$94*	*$10,094*	*$0*	*$10,094*	*$10,094*	*0*
B	*Construct Temp Construction Entrance*	*2*	*EA*	*$2,157*	*$339*	*$7,758*	*$381*	*$0*	*$10,636*	*$1,869*	*$101*	*$12,606*	*$1,325*	*$13,931*	*$6,965*	*28*
8003	SHORELINE RECONSTRUCTION	1	LS	$1,064,850	$0	$0	$827,173	$40,000	$1,932,023	$922,718	$18,256	$2,872,997	$653,819	$3,526,815	$3,526,815	11,188
A	*Place Sand Fill for Beach Nourishment*	*252,840*	*CY*	*$1,064,850*	*$0*	*$0*	*$827,173*	*$0*	*$1,892,023*	*$922,718*	*$17,878*	*$2,832,619*	*$653,819*	*$3,486,437*	*$13.79*	*11,188*
B	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$40,000*	*$40,000*	*$0*	*$378*	*$40,378*	*$0*	*$40,378*	*$20,189*	*0*
8004	CONSRUCTION ACCESS	1	LS	$8,380	$0	$48,488	$2,220	$0	$59,087	$7,261	$558	$66,907	$5,145	$72,052	$72,052	115
8005	INSTALL SIGNS	1	LS	$5,003	$17,232	$0	$858	$0	$23,093	$4,335	$218	$27,646	$3,072	$30,718	$30,718	63
8006	MOB./DEMOB. DREDGING	1	LS	$25,767	$0	$2,694	$29,467	$0	$57,928	$22,328	$547	$80,803	$15,821	$96,623	$96,623	256
A	*Prepare Dredge at Jobsite*	*1*	*EA*	*$3,221*	*$0*	*$0*	*$4,688*	*$0*	*$7,909*	*$2,791*	*$75*	*$10,774*	*$1,978*	*$12,752*	*$12,752*	*32*
B	*Prepare Pipeline at Jobsite*	*1*	*EA*	*$12,883*	*$0*	*$2,694*	*$14,844*	*$0*	*$30,422*	*$11,164*	*$287*	*$41,873*	*$7,910*	*$49,783*	*$49,783*	*128*
C	*Prepare Dredge for Transfer from Site*	*1*	*EA*	*$3,221*	*$0*	*$0*	*$4,688*	*$0*	*$7,909*	*$2,791*	*$75*	*$10,774*	*$1,978*	*$12,752*	*$12,752*	*32*
D	*Prepare Pipeline for Transfer from Site*	*1*	*EA*	*$6,442*	*$0*	*$0*	*$5,247*	*$0*	*$11,688*	*$5,582*	*$110*	*$17,381*	*$3,955*	*$21,336*	*$21,336*	*64*
8007	DREDGING	1	LS	$995,995	$0	$0	$1,311,159	$24,000	$2,331,154	$863,054	$22,027	$3,216,235	$611,542	$3,827,777	$3,827,777	8,950
A	*Dredge Area*	*252,840*	*CY*	*$995,995*	*$0*	*$0*	*$1,311,159*	*$0*	*$2,307,154*	*$863,054*	*$21,801*	*$3,192,008*	*$611,542*	*$3,803,550*	*$15.04*	*8,950*
B	*Hydrographic Surveys*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$24,000*	*$24,000*	*$0*	*$227*	*$24,227*	*$0*	*$24,227*	*$24,227*	*0*
9000	**DE ANZA BOOT**	**1**	**LS**	**$2,250,322**	**$2,909,105**	**$69,714**	**$2,582,909**	**$154,000**	**$7,966,050**	**$1,949,957**	**$75,272**	**$9,991,279**	**$1,381,699**	**$11,372,979**	**$11,372,979**	**24,777**
9001	MOBILIZATION/DEMOBILIZATION	1	LS	$22,314	$0	$0	$37,690	$0	$60,004	$19,335	$567	$79,906	$13,701	$93,607	$93,607	320
A	*Mobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$9,668*	*$283*	*$39,953*	*$6,850*	*$46,803*	*$1,170*	*160*
B	*Demobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$0*	*$18,845*	*$0*	*$30,002*	*$9,668*	*$283*	*$39,953*	*$6,850*	*$46,803*	*$1,170*	*160*
9002	SWPPP	1	LS	$2,157	$339	$7,758	$381	$10,000	$20,636	$1,869	$195	$22,700	$1,325	$24,025	$24,025	28
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$94*	*$10,094*	*$0*	*$10,094*	*$10,094*	*0*
B	*Construct Temp Construction Entrance*	*2*	*EA*	*$2,157*	*$339*	*$7,758*	*$381*	*$0*	*$10,636*	*$1,869*	*$101*	*$12,606*	*$1,325*	*$13,931*	*$6,965*	*28*
9003	SHORELINE/WETLAND RECONSTRUCTION	1	LS	$1,153,330	$1,515,094	$0	$1,481,606	$80,000	$4,230,031	$999,388	$39,970	$5,269,389	$708,145	$5,977,534	$5,977,534	13,252
A	*Excavation*	*18,400*	*CY*	*$90,995*	*$0*	*$0*	*$143,476*	*$0*	*$234,471*	*$78,850*	*$2,216*	*$315,536*	*$55,871*	*$371,407*	*$20.19*	*1,152*
B	*Place Stockpiled Material*	*18,400*	*CY*	*$29,927*	*$0*	*$0*	*$40,482*	*$0*	*$70,409*	*$25,933*	*$665*	*$97,007*	*$18,375*	*$115,383*	*$6.27*	*360*
C	*Place Sand Fill for Wetland*	*133,680*	*CY*	*$563,002*	*$0*	*$0*	*$437,339*	*$0*	*$1,000,341*	*$487,855*	*$9,452*	*$1,497,647*	*$345,684*	*$1,843,331*	*$13.79*	*5,915*
D	*Construct Breakwater*	*33,813*	*TON*	*$112,515*	*$1,457,340*	*$0*	*$199,663*	*$0*	*$1,769,519*	*$97,497*	*$16,720*	*$1,883,736*	*$69,085*	*$1,952,821*	*$57.75*	*1,408*
E	*Construct Oyster Habitat*	*1*	*LS*	*$116,471*	*$57,754*	*$0*	*$133,714*	*$0*	*$307,939*	*$100,925*	*$2,910*	*$411,774*	*$71,513*	*$483,287*	*$483,287*	*1,200*
F	*Channel Excavation & Slope Shaping*	*45*	*SH*	*$62,131*	*$0*	*$0*	*$227,248*	*$0*	*$289,380*	*$53,838*	*$2,734*	*$345,952*	*$38,149*	*$384,101*	*$8,536*	*720*
G	*Haul Off Excess Fill*	*18,400*	*CY*	*$178,288*	*$0*	*$0*	*$299,685*	*$0*	*$477,972*	*$154,490*	*$4,516*	*$636,979*	*$109,469*	*$746,448*	*$40.57*	*2,497*
I	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$80,000*	*$80,000*	*$0*	*$756*	*$80,756*	*$0*	*$80,756*	*$40,378*	*0*
9004	ROSE CREEK	1	LS	$500,961	$1,371,653	$0	$336,048	$40,000	$2,248,661	$434,095	$21,248	$2,704,004	$307,590	$3,011,594	$3,011,594	5,932
A	*Recover Existing Rip Rap*	*1*	*LS*	*$82,842*	*$0*	*$0*	*$75,924*	*$0*	*$158,766*	*$71,784*	*$1,500*	*$232,051*	*$50,865*	*$282,916*	*$282,916*	*960*
B	*Place Revetment Stone*	*17,325*	*TON*	*$313,879*	*$782,413*	*$0*	*$182,619*	*$0*	*$1,278,912*	*$271,984*	*$12,085*	*$1,562,980*	*$192,722*	*$1,755,702*	*$101*	*3,755*
C	*Place Sand Fill*	*11,880*	*CY*	*$95,376*	*$539,177*	*$0*	*$70,913*	*$0*	*$705,466*	*$82,645*	*$6,666*	*$794,777*	*$58,561*	*$853,338*	*$71.83*	*1,114*
D	*Place Sand Cover*	*1,103*	*CY*	*$8,864*	*$50,063*	*$0*	*$6,591*	*$0*	*$65,518*	*$7,681*	*$619*	*$73,818*	*$5,443*	*$79,261*	*$71.86*	*104*
E	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$40,000*	*$40,000*	*$0*	*$378*	*$40,378*	*$0*	*$40,378*	*$20,189*	*0*

MISSION BAY PROGRAM EIR
SHORELINE RESTORATION - ALT. 2

Bid Item/ *Activity*	Bid Description	Bid Quantity	Units	Labor + Burden	Permanent Material	Construction Material	Total Equipment	Subs	Direct Total	Indirect Cost	Addon/ Bond Cost	Total Cost	Markup	Bid Total	Bid Total U.P.	Man Hours
9005	CONSTRUCTION ACCESS	1	LS	$12,802	$0	$59,263	$3,391	$0	$75,456	$11,094	$713	$87,263	$7,861	$95,123	$95,123	176
9006	INSTALL SIGNS	1	LS	$6,393	$22,018	$0	$1,096	$0	$29,507	$5,540	$279	$35,326	$3,925	$39,251	$39,251	81
9007	MOB/DEMOB DREDGING	1	LS	$25,767	$0	$2,694	$29,467	$0	$57,928	$22,328	$547	$80,803	$15,821	$96,623	$96,623	256
A	*Prepare Dredge at Jobsite*	*1*	*EA*	*$3,221*	*$0*	*$0*	*$4,688*	*$0*	*$7,909*	*$2,791*	*$75*	*$10,774*	*$1,978*	*$12,752*	*$12,752*	*32*
B	*Prepare Pipeline at Jobsite*	*1*	*EA*	*$12,883*	*$0*	*$2,694*	*$14,844*	*$0*	*$30,422*	*$11,164*	*$287*	*$41,873*	*$7,910*	*$49,783*	*$49,783*	*128*
C	*Prepare Dredge for Transfer from Site*	*1*	*EA*	*$3,221*	*$0*	*$0*	*$4,688*	*$0*	*$7,909*	*$2,791*	*$75*	*$10,774*	*$1,978*	*$12,752*	*$12,752*	*32*
D	*Prepare Pipeline for Transfer from Site*	*1*	*EA*	*$6,442*	*$0*	*$0*	*$5,247*	*$0*	*$11,688*	*$5,582*	*$110*	*$17,381*	*$3,955*	*$21,336*	*$21,336*	*64*
9008	DREDGING	1	LS	$526,598	$0	$0	$693,229	$24,000	$1,243,827	$456,309	$11,753	$1,711,889	$323,331	$2,035,220	$2,035,220	4,732
A	*Dredge Area*	*133,680*	*CY*	*$526,598*	*$0*	*$0*	*$693,229*	*$0*	*$1,219,827*	*$456,309*	*$11,526*	*$1,687,662*	*$323,331*	*$2,010,993*	*$15.04*	*4,732*
B	*Hydrographic Surveys*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$24,000*	*$24,000*	*$0*	*$227*	*$24,227*	*$0*	*$24,227*	*$24,227*	*0*
10000	**CROWN POINT**	**1**	**LS**	**$30,324**	**$3,999**	**$75,429**	**$39,613**	**$2,000,000**	**$2,149,364**	**$26,276**	**$20,310**	**$2,195,950**	**$18,619**	**$2,214,569**	**$2,214,569**	**428**
10001	MOBILIZATION/DEMOBILIZATION	1	LS	$22,314	$0	$50,000	$37,690	$0	$110,004	$19,335	$1,039	$130,379	$13,701	$144,079	$144,079	320
A	*Mobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$25,000*	*$18,845*	*$0*	*$55,002*	*$9,668*	*$520*	*$65,189*	*$6,850*	*$72,040*	*$1,801*	*160*
B	*Demobilization of Land Based Equip*	*40*	*EA*	*$11,157*	*$0*	*$25,000*	*$18,845*	*$0*	*$55,002*	*$9,668*	*$520*	*$65,189*	*$6,850*	*$72,040*	*$1,801*	*160*
10002	SWPPP	1	LS	$1,079	$170	$3,879	$191	$10,000	$15,318	$935	$145	$16,397	$662	$17,060	$17,060	14
A	*SWPPP Development and Compliance Plan*	*1*	*LS*	*$0*	*$0*	*$0*	*$0*	*$10,000*	*$10,000*	*$0*	*$94*	*$10,094*	*$0*	*$10,094*	*$10,094*	*0*
B	*Construct Temp Construction Entrance*	*1*	*EA*	*$1,079*	*$170*	*$3,879*	*$191*	*$0*	*$5,318*	*$935*	*$50*	*$6,303*	*$662*	*$6,965*	*$6,965*	*14*
10003	SHORELINE RECONSTRUCTION	1	LS	$0	$0	$0	$0	$1,990,000	$1,990,000	$0	$18,804	$2,008,804	$0	$2,008,804	$2,008,804	0
A	*Construct New Seawall*	*245*	*LF*	*$0*	*$0*	*$0*	*$0*	*$1,960,000*	*$1,960,000*	*$0*	*$18,520*	*$1,978,520*	*$0*	*$1,978,520*	*$8,076*	*0*
B	*Surveys*	*2*	*EA*	*$0*	*$0*	*$0*	*$0*	*$30,000*	*$30,000*	*$0*	*$283*	*$30,283*	*$0*	*$30,283*	*$15,142*	*0*
10004	CONSTRUCTION ACCESS	1	LS	$5,819	$0	$21,550	$1,541	$0	$28,911	$5,043	$273	$34,226	$3,573	$37,800	$37,800	80
10005	INSTALL SIGNS	1	LS	$1,112	$3,829	$0	$191	$0	$5,132	$963	$48	$6,144	$683	$6,826	$6,826	14
11000	CONTRACTOR INDIRECTS	78	MO	$4,706,849	$0	$1,337,742	$2,248,982	$0	$8,293,573							0
10000A	*Contractors Office*	*78*	*MO*	*$0*	*$0*	*$433,400*	*$0*	*$0*	*$433,400*							
10000B	*QC Facilities*	*78*	*MO*	*$0*	*$0*	*$39,000*	*$0*	*$0*	*$39,000*							
10000C	*Supervision*	*78*	*MO*	*$4,470,424*	*$0*	*$0*	*$0*	*$0*	*$4,470,424*							
10000D	*Survey*	*78*	*MO*	*$0*	*$0*	*$58,500*	*$0*	*$0*	*$58,500*							
10000E	*Vehicle Expenses*	*78*	*MO*	*$0*	*$0*	*$0*	*$2,248,982*	*$0*	*$2,248,982*							
10000F	*Lodging Expenses*	*78*	*MO*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*							
10000G	*Travel Expenses*	*78*	*MO*	*$0*	*$0*	*$78,000*	*$0*	*$0*	*$78,000*							
10000H	*Security*	*78*	*MO*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*							
10000I	*Safety Training & Supplies*	*78*	*MO*	*$0*	*$0*	*$208,200*	*$0*	*$0*	*$208,200*							
10000J	*Permits*	*1*	*LS*	*$0*	*$0*	*$5,000*	*$0*	*$0*	*$5,000*							
10000K	*Small Tools & Supplies*	*1*	*LS*	*$0*	*$0*	*$515,642*	*$0*	*$0*	*$515,642*							
10000L	*Premium for Unscheduled Overtime*	*1*	*LS*	*$236,425*	*$0*	*$0*	*$0*	*$0*	*$236,425*							
				$9,571,088	**$7,979,450**	**$450,961**	**$10,119,649**	**$2,762,976**	**$30,884,123**	**$8,293,573**	**$291,827**	**$39,469,523**	**$5,876,654**	**$45,346,177**		**98,443**

ESTIMATE SUMMARY - COSTS & BID PRICES

Bid# / Client# / Bid Description	Quantity	Unit	Manhours	Direct Labor	Perm Matl	Constr Matl	Equip-ment	Sub-Contr	Direct Total	Indirect Charge	Total Cost	Total Cost Unit Price	Markup	Balanced Bid Total	Balanced Bid Unit Price	Bid Price	Bid Total
500	1.00	LS	656	65,522			84,109	22,000	171,632	58,398	230,030	230,030.21	40,231	270,261	270,261.02	270,261.02	270,261.02
MOBILIZE/DEMOBILIZE DREDGE			656.00	65,522.42			84,109.31	22,000.00	171,631.73	58,398.48			17.5 %				
1000	1.00	LS	2,600	246,767	301,951	37,735	256,776	130,976	974,205	223,035	1,197,239	1,197,239.32	151,515	1,348,754	1,348,754.25	1,348,754.25	1,348,754.25
BONITA COVE			2,600.17	246,766.72	301,951.43	37,735.25	256,775.56	130,975.82	974,204.78	223,034.54			12.7 %				
1001	*1.00*	*LS*	*368*	*28,607*		*15,000*	*17,211*		*60,818*								
MOBILIZATION/DEMOBILIZATION			*368.00*	*28,606.86*		*15,000.00*	*17,210.84*		*60,817.70*								
1002	*1.00*	*LS*	*14*	*1,079*	*170*	*3,879*	*191*	*10,000*	*15,318*								
SWPPP			*14.00*	*1,078.71*	*169.71*	*3,879.00*	*190.58*	*10,000.00*	*15,318.00*								
1003	*1.00*	*LS*	*1,247*	*114,461*	*297,952*		*114,597*	*96,976*	*623,986*								
SHORELINE RECONSTRUCTION			*1,246.77*	*114,460.80*	*297,952.46*		*114,597.40*	*96,975.82*	*623,986.48*								
1004	*1.00*	*LS*	*256*	*25,767*		*2,694*	*29,467*		*57,928*								
MOB./DEMOB. DREDGING			*256.00*	*25,766.88*		*2,693.75*	*29,466.97*		*57,927.60*								
1005	*1.00*	*LS*	*641*	*71,377*			*93,963*	*24,000*	*189,340*								
DREDGING			*641.40*	*71,377.16*			*93,963.11*	*24,000.00*	*189,340.27*								
1008	*1.00*	*LS*	*60*	*4,364*		*16,163*	*1,156*		*21,683*								
CONSTRUCTION ACCESS			*60.00*	*4,364.47*		*16,162.50*	*1,156.08*		*21,683.05*								
1009	*1.00*	*LS*	*14*	*1,112*	*3,829*		*191*		*5,132*								
INSTALL SIGNS			*14.00*	*1,111.84*	*3,829.26*		*190.58*		*5,131.68*								
2000	1.00	LS	10,578	1,063,836	2,563,980	49,673	1,181,133	74,000	4,932,622	968,448	5,901,070	5,901,070.27	653,196	6,554,267	6,554,266.56	6,554,266.56	6,554,266.56
VACATION ISLAND NE (SKI BEACH)			10,577.72	1,063,836.44	2,563,979.83	49,672.75	1,181,133.07	74,000.00	4,932,622.09	968,448.18			11.1 %				
2001	*1.00*	*LS*	*460*	*41,328*			*56,491*		*97,819*								
MOBILIZATION/DEMOBILIZATION			*460.00*	*41,328.34*			*56,490.60*		*97,818.94*								
2002	*1.00*	*LS*	*14*	*1,079*	*170*	*3,879*	*191*	*10,000*	*15,318*								
SWPPP			*14.00*	*1,078.71*	*169.71*	*3,879.00*	*190.58*	*10,000.00*	*15,318.00*								
2003	*1.00*	*LS*	*6,700*	*650,265*	*2,555,194*		*650,806*	*40,000*	*3,896,266*								
SHORELINE RECONSTRUCTION			*6,700.30*	*650,264.85*	*2,555,194.28*		*650,806.40*	*40,000.00*	*3,896,265.53*								
2004	*1.00*	*LS*	*100*	*7,274*		*43,100*	*1,927*		*52,301*								
CONSTRUCTION ACCESS			*100.00*	*7,274.12*		*43,100.00*	*1,926.80*		*52,300.92*								
2005	*1.00*	*LS*	*32*	*2,502*	*8,616*		*429*		*11,546*								
INSTALL SIGNS			*31.50*	*2,501.65*	*8,615.84*		*428.80*		*11,546.29*								

ESTIMATE SUMMARY - COSTS & BID PRICES

Bid# / Client# / Bid Description	Quantity	Unit	Manhours	Direct Labor	Perm Matl	Constr Matl	Equip-Ment	Sub-Contr	Direct Total	Indirect Charge	Total Cost	Total Cost Unit Price	Markup	Balanced Bid Total	Balanced Bid Unit Price	Bid Price	Bid Total
2006	*1.00*	*LS*	*256*	*25,767*		*2,694*	*29,467*		*57,928*								
MOB./DEMOB DREDGING			*256.00*	*25,766.88*		*2,693.75*	*29,466.97*		*57,927.60*								
2007	*1.00*	*LS*	*3,016*	*335,622*			*441,823*	*24,000*	*801,445*								
DREDGING			*3,015.92*	*335,621.89*			*441,822.92*	*24,000.00*	*801,444.81*								
3000	1.00	LS	17,806	1,848,232	935,944	49,673	1,908,934	84,000	4,826,783	1,647,145	6,473,928	6,473,927.60	1,134,815	7,608,743	7,608,743.09	7,608,743.09	7,608,743.09
VACATION ISLAND NW			17,806.46	1,848,231.66	935,944.28	49,672.75	1,908,933.86	84,000.00	4,826,782.55	1,647,145.05			17.5 %				
3001	*1.00*	*LS*	*380*	*35,750*			*47,068*		*82,818*								
MOBILIZATION/DEMOBILIZATION			*380.00*	*35,749.90*			*47,068.04*		*82,817.94*								
3002	*1.00*	*LS*	*14*	*1,079*	*170*	*3,879*	*191*	*10,000*	*15,318*								
SWPPP			*14.00*	*1,078.71*	*169.71*	*3,879.00*	*190.58*	*10,000.00*	*15,318.00*								
3003	*1.00*	*LS*	*10,047*	*999,394*	*926,201*		*808,007*	*50,000*	*2,783,602*								
SHORELINE RECONSTRUCTION			*10,046.58*	*999,394.02*	*926,201.41*		*808,006.74*	*50,000.00*	*2,783,602.17*								
3004	*1.00*	*LS*	*100*	*7,274*		*43,100*	*1,927*		*52,301*								
CONSTRUCTION ACCESS			*100.00*	*7,274.12*		*43,100.00*	*1,926.80*		*52,300.92*								
3005	*1.00*	*LS*	*35*	*2,780*	*9,573*		*476*		*12,829*								
INSTALL SIGNS			*35.00*	*2,779.60*	*9,573.16*		*476.44*		*12,829.20*								
3006	*1.00*	*LS*	*256*	*25,767*		*2,694*	*29,467*		*57,928*								
MOB./DEMOB. DREDGING			*256.00*	*25,766.88*		*2,693.75*	*29,466.97*		*57,927.60*								
3007	*1.00*	*LS*	*6,975*	*776,188*			*1,021,798*	*24,000*	*1,821,987*								
DREDGING			*6,974.88*	*776,188.43*			*1,021,798.29*	*24,000.00*	*1,821,986.72*								
4000	1.00	LS	10,201	1,054,505	8,786	33,510	1,133,695	74,000	2,304,496	935,529	3,240,025	3,240,024.99	647,467	3,887,492	3,887,491.81	3,887,491.81	3,887,491.81
WEST SAIL BAY			10,200.84	1,054,505.06	8,785.55	33,510.25	1,133,695.22	74,000.00	2,304,496.08	935,528.91			20.0 %				
4001	*1.00*	*LS*	*80*	*5,578*			*9,423*		*15,001*								
MOBILIZATION/DEMOBILIZATION			*80.00*	*5,578.42*			*9,422.56*		*15,000.98*								
4002	*1.00*	*LS*	*14*	*1,079*	*170*	*3,879*	*191*	*10,000*	*15,318*								
SWPPP			*14.00*	*1,078.71*	*169.71*	*3,879.00*	*190.58*	*10,000.00*	*15,318.00*								
4003	*1.00*	*LS*	*4,838*	*470,772*			*382,647*	*40,000*	*893,418*								
SHORELINE RECONSTRUCTION			*4,838.24*	*470,771.75*			*382,646.72*	*40,000.00*	*893,418.47*								
4004	*1.00*	*LS*	*143*	*10,392*		*26,938*	*2,752*		*40,082*								
CONSTRUCTION ACCESS			*142.86*	*10,391.80*		*26,937.50*	*2,752.43*		*40,081.73*								

ESTIMATE SUMMARY - COSTS & BID PRICES

Bid# / Client# / Bid Description	Quantity	Unit	Manhours	Direct Labor	Perm Matl	Constr Matl	Equip-ment	Sub-Contr	Direct Total	Indirect Charge	Total Cost	Total Cost Unit Price	Markup	Balanced Bid Total	Balanced Bid Unit Price	Bid Price	Bid Total
4005	*1.00*	*LS*	*32*	*2,502*	*8,616*		*429*		*11,546*								
INSTALL SIGNS			*31.50*	*2,501.65*	*8,615.84*		*428.80*		*11,546.29*								
4006	*1.00*	*LS*	*256*	*25,767*		*2,694*	*29,467*		*57,928*								
MOB./DEMOB. DREDGING			*256.00*	*25,766.88*		*2,693.75*	*29,466.97*		*57,927.60*								
4007	*1.00*	*LS*	*4,838*	*538,416*			*708,787*	*24,000*	*1,271,203*								
DREDGING			*4,838.24*	*538,415.85*			*708,787.16*	*24,000.00*	*1,271,203.01*								
5000	1.00	LS	4,881	414,595	644,124	30,817	325,251	50,000	1,464,786	373,098	1,837,884	1,837,883.81	254,562	2,092,446	2,092,445.72	2,092,445.72	2,092,445.72
VACATION ISLAND SW			4,880.74	414,595.49	644,123.50	30,816.50	325,250.64	50,000.00	1,464,786.13	373,097.68			13.9 %				
5001	*1.00*	*LS*	*320*	*22,314*			*37,690*		*60,004*								
MOBILIZATION/DEMOBILIZATION			*320.00*	*22,313.70*			*37,690.24*		*60,003.94*								
5002	*1.00*	*LS*	*14*	*1,079*	*170*	*3,879*	*191*	*10,000*	*15,318*								
SWPPP			*14.00*	*1,078.71*	*169.71*	*3,879.00*	*190.58*	*10,000.00*	*15,318.00*								
5003	*1.00*	*LS*	*4,442*	*383,438*	*637,253*		*285,495*	*40,000*	*1,346,186*								
SHORELINE RECONSTRUCTION			*4,442.24*	*383,438.06*	*637,252.58*		*285,494.87*	*40,000.00*	*1,346,185.51*								
5004	*1.00*	*LS*	*80*	*5,819*		*26,938*	*1,541*		*34,298*								
CONSTRUCTION ACCESS			*80.00*	*5,819.29*		*26,937.50*	*1,541.44*		*34,298.23*								
5005	*1.00*	*LS*	*25*	*1,946*	*6,701*		*334*		*8,980*								
INSTALL SIGNS			*24.50*	*1,945.73*	*6,701.21*		*333.51*		*8,980.45*								
6000	1.00	LS	2,205	185,374	214,622	20,042	162,070	50,000	632,107	166,603	798,710	798,710.14	113,820	912,530	912,529.64	912,529.64	912,529.64
VACATION ISLAND N (WEST OF INGR			2,205.14	185,373.57	214,621.73	20,041.50	162,069.93	50,000.00	632,106.73	166,603.41			14.3 %				
6001	*1.00*	*LS*	*320*	*22,314*			*37,690*		*60,004*								
MOBILIZATION/DEMOBILIZATION			*320.00*	*22,313.70*			*37,690.24*		*60,003.94*								
6002	*1.00*	*LS*	*14*	*1,079*	*170*	*3,879*	*191*	*10,000*	*15,318*								
SWPPP			*14.00*	*1,078.71*	*169.71*	*3,879.00*	*190.58*	*10,000.00*	*15,318.00*								
6003	*1.00*	*LS*	*1,801*	*156,783*	*211,580*		*122,890*	*40,000*	*531,253*								
SHORELINE RECONSTRUCTION			*1,800.64*	*156,782.80*	*211,580.07*		*122,890.10*	*40,000.00*	*531,252.97*								
6004	*1.00*	*LS*	*60*	*4,364*		*16,163*	*1,156*		*21,683*								
CONSTRUCTION ACCESS			*60.00*	*4,364.47*		*16,162.50*	*1,156.08*		*21,683.05*								
6005	*1.00*	*LS*	*11*	*834*	*2,872*		*143*		*3,849*								
INSTALL SIGNS			*10.50*	*833.89*	*2,871.95*		*142.93*		*3,848.77*								

ESTIMATE SUMMARY - COSTS & BID PRICES

Bid# / Client# / Bid Description	Quantity	Unit	Manhours	Direct Labor	Perm Matl	Constr Matl	Equip-Ment	Sub-Contr	Direct Total	Indirect Charge	Total Cost	Total Cost Unit Price	Markup	------Balanced Bid------ Total	Unit Price	Bid Price	Bid Total
7000	1.00	LS	3,392	287,144	379,369	25,429	236,212	50,000	978,154	258,060	1,236,214	1,236,213.74	176,307	1,412,520	1,412,520.49	1,412,520.49	1,412,520.49
VENTURA COVE PARK			3,391.66	287,144.23	379,368.68	25,429.00	236,211.91	50,000.00	978,153.82	258,059.92			14.3 %				
7001	*1.00*	*LS*	*320*	*22,314*			*37,690*		*60,004*								
MOBILIZATION/DEMOBILIZATION			*320.00*	*22,313.70*			*37,690.24*		*60,003.94*								
7002	*1.00*	*LS*	*14*	*1,079*	*170*	*3,879*	*191*	*10,000*	*15,318*								
SWPPP			*14.00*	*1,078.71*	*169.71*	*3,879.00*	*190.58*	*10,000.00*	*15,318.00*								
7003	*1.00*	*LS*	*2,980*	*257,998*	*374,412*		*196,937*	*40,000*	*869,347*								
SHORELINE RECONSTRUCTION			*2,980.16*	*257,997.53*	*374,412.39*		*196,936.79*	*40,000.00*	*869,346.71*								
7004	*1.00*	*LS*	*60*	*4,364*		*21,550*	*1,156*		*27,071*								
CONSTRUCTION ACCESS			*60.00*	*4,364.47*		*21,550.00*	*1,156.08*		*27,070.55*								
7005	*1.00*	*LS*	*18*	*1,390*	*4,787*		*238*		*6,415*								
INSTALL SIGNS			*17.50*	*1,389.82*	*4,786.58*		*238.22*		*6,414.62*								
8000	1.00	LS	20,920	2,124,466	17,571	58,939	2,208,948	74,000	4,483,924	1,883,269	6,367,194	6,367,193.78	1,304,424	7,671,618	7,671,617.60	7,671,617.60	7,671,617.60
DE ANZA COVE			20,919.88	2,124,466.43	17,571.09	58,939.25	2,208,947.71	74,000.00	4,483,924.48	1,883,269.30			20.5 %				
8001	*1.00*	*LS*	*320*	*22,314*			*37,690*		*60,004*								
MOBILIZATION/DEMOBILIZATION			*320.00*	*22,313.70*			*37,690.24*		*60,003.94*								
8002	*1.00*	*LS*	*28*	*2,157*	*339*	*7,758*	*381*	*10,000*	*20,636*								
SWPPP			*28.00*	*2,157.41*	*339.41*	*7,758.00*	*381.15*	*10,000.00*	*20,635.97*								
8003	*1.00*	*LS*	*11,188*	*1,064,850*			*827,173*	*40,000*	*1,932,023*								
SHORELINE RECONSTRUCTION			*11,187.60*	*1,064,850.00*			*827,173.11*	*40,000.00*	*1,932,023.11*								
8004	*1.00*	*LS*	*115*	*8,380*		*48,488*	*2,220*		*59,087*								
CONSRUCTION ACCESS			*115.20*	*8,379.77*		*48,487.50*	*2,219.67*		*59,086.94*								
8005	*1.00*	*LS*	*63*	*5,003*	*17,232*		*858*		*23,093*								
INSTALL SIGNS			*63.00*	*5,003.27*	*17,231.68*		*857.59*		*23,092.54*								
8006	*1.00*	*LS*	*256*	*25,767*		*2,694*	*29,467*		*57,928*								
MOB./DEMOB. DREDGING			*256.00*	*25,766.88*		*2,693.75*	*29,466.97*		*57,927.60*								
8007	*1.00*	*LS*	*8,950*	*995,995*			*1,311,159*	*24,000*	*2,331,154*								
DREDGING			*8,950.08*	*995,995.40*			*1,311,158.98*	*24,000.00*	*2,331,154.38*								
9000	1.00	LS	24,777	2,250,322	2,909,105	69,714	2,582,909	154,000	7,966,050	2,025,229	9,991,279	9,991,279.13	1,381,699	11,372,979	11,372,978.52	11,372,978.52	11,372,978.52
DE ANZA BOOT			24,776.50	2,250,322.26	2,909,104.63	69,714.25	2,582,908.70	154,000.00	7,966,049.84	2,025,229.29			13.8 %				

ESTIMATE SUMMARY - COSTS & BID PRICES

Bid# / Client# / Bid Description	Quantity	Unit	Manhours	Direct Labor	Perm Matl	Constr Matl	Equip-Ment	Sub-Contr	Direct Total	Indirect Charge	Total Cost	Total Cost Unit Price	Markup	Balanced Bid Total	Balanced Bid Unit Price	Bid Price	Bid Total
9001	*1.00*	*LS*	*320*	*22,314*			*37,690*		*60,004*								
MOBILIZATION/DEMOBILIZATION			*320.00*	*22,313.70*			*37,690.24*		*60,003.94*								
9002	*1.00*	*LS*	*28*	*2,157*	*339*	*7,758*	*381*	*10,000*	*20,636*								
SWPPP			*28.00*	*2,157.41*	*339.41*	*7,758.00*	*381.15*	*10,000.00*	*20,635.97*								
9003	*1.00*	*LS*	*13,252*	*1,153,330*	*1,515,094*		*1,481,606*	*80,000*	*4,230,031*								
SHORELINE/WETLAND RECONSTRUCTI			*13,252.20*	*1,153,330.15*	*1,515,094.30*		*1,481,606.41*	*80,000.00*	*4,230,030.86*								
9004	*1.00*	*LS*	*5,932*	*500,961*	*1,371,653*		*336,048*	*40,000*	*2,248,661*								
ROSE CREEK			*5,931.76*	*500,961.05*	*1,371,652.66*		*336,047.75*	*40,000.00*	*2,248,661.46*								
9005	*1.00*	*LS*	*176*	*12,802*		*59,263*	*3,391*		*75,456*								
CONSTRUCTION ACCESS			*176.00*	*12,802.45*		*59,262.50*	*3,391.17*		*75,456.12*								
9006	*1.00*	*LS*	*81*	*6,393*	*22,018*		*1,096*		*29,507*								
INSTALL SIGNS			*80.50*	*6,393.07*	*22,018.26*		*1,095.81*		*29,507.14*								
9007	*1.00*	*LS*	*256*	*25,767*		*2,694*	*29,467*		*57,928*								
MOB/DEMOB DREDGING			*256.00*	*25,766.88*		*2,693.75*	*29,466.97*		*57,927.60*								
9008	*1.00*	*LS*	*4,732*	*526,598*			*693,229*	*24,000*	*1,243,827*								
DREDGING			*4,732.04*	*526,597.55*			*693,229.20*	*24,000.00*	*1,243,826.75*								
10000	1.00	LS	428	30,324	3,999	75,429	39,613	2,000,000	2,149,364	46,586	2,195,950	2,195,949.96	18,619	2,214,569	2,214,568.63	2,214,568.63	2,214,568.63
CROWN POINT			428.00	30,323.54	3,998.97	75,429.00	39,612.84	2,000,000.00	2,149,364.35	46,585.61			0.8 %				
10001	*1.00*	*LS*	*320*	*22,314*		*50,000*	*37,690*		*110,004*								
MOBILIZATION/DEMOBILIZATION			*320.00*	*22,313.70*		*50,000.00*	*37,690.24*		*110,003.94*								
10002	*1.00*	*LS*	*14*	*1,079*	*170*	*3,879*	*191*	*10,000*	*15,318*								
SWPPP			*14.00*	*1,078.71*	*169.71*	*3,879.00*	*190.58*	*10,000.00*	*15,318.00*								
10003	*1.00*	*LS*						*1,990,000*	*1,990,000*								
SHORELINE RECONSTRUCTION								*1,990,000.00*	*1,990,000.00*								
10004	*1.00*	*LS*	*80*	*5,819*		*21,550*	*1,541*		*28,911*								
CONSTRUCTION ACCESS			*80.00*	*5,819.29*		*21,550.00*	*1,541.44*		*28,910.73*								
10005	*1.00*	*LS*	*14*	*1,112*	*3,829*		*191*		*5,132*								
INSTALL SIGNS			*14.00*	*1,111.84*	*3,829.26*		*190.58*		*5,131.68*								
Totals:			98,443	9,571,087	7,979,449	450,960	10,119,648	2,762,975	30,884,122	8,585,400	39,469,522		5,876,654	45,346,177			45,346,177.33

ESTIMATE SUMMARY - COSTS & BID PRICES

Bid#	Client# / Bid Description	Quantity	Unit / Manhours	Direct Labor	Perm Matl	Constr Matl	Equip-ment	Sub-Contr	Direct Total	Indirect Charge	Total Cost	Total Cost Unit Price	Markup	Balanced Bid Total	Balanced Bid Unit Price	Bid Price	Bid Total
											[39,469,523]						[14.9 %
11000	CONTRACTOR INDIRECT			4,706,849		1,337,742	2,248,982		8,293,573								
	Bond from Summary Table									291,827							
	Markup on Resource Costs												5,876,654				
*********	TOTAL	JOB =====>	98,443	14,277,936	7,979,449	1,788,702	12,368,630	2,762,975	39,177,695	291,827	39,469,522		5,876,654	45,346,177			45,346,177.33

Code between Balanced Bid & Bid Price: U=Unbalanced, F=Frozen, C=Closing Biditem (item to absorb unbalancing differences).
[bracketed numbers represent adjusted quantities]
** in front of the Biditem indicates a Non-Additive item

Markup % is shown as a percentage of cost

Spread Indirects On LABOR COST Spread Markups On LABOR COST Spread Addons&Bonds On TOTAL COST

Bond Calculations
Selected Bond Table: B2Description: Bond Code #2 (RS

	Contract Amount	Rate per 1000	Bond Amount
First:	$ 500,000	17.00	$ 8,500.00
Next:	$ 2,000,000	10.00	$ 20,000.00
Next:	$ 2,500,000	7.50	$ 18,750.00
Next:	$ 2,500,000	7.00	$ 17,500.00
Next:	$ 7,500,000	6.00	$ 45,000.00
Remainder:		6.00	$ 182,077.06
		Subtotal:	$ 291,827.06
Time Threshold 1: 0	**Extended Time Rate 1:** 0.0000 %		$ 0.00
Time Threshold 2: 0	**Extended Time Rate 2:** 0.0000 %		$ 0.00
Length of Job: 78	**Total Bond Amount:**		$ 291,827.06

-----Estimate Notes-----
Bid Date: 07/02/2018 Owner: Engineering Firm:
Estimator in Charge: JF

Desired Bid (if specified)= 0.00 Sort: Hold Acct: Y Subitem: Y NonAdd: Y
Last Summary on 11/24/2020 at 10:31 AM.
Last Spread on 11/24/2020 at 10:31 AM.

NOTE: Biditems that are subitems (have a parent biditem) are printed in italics.

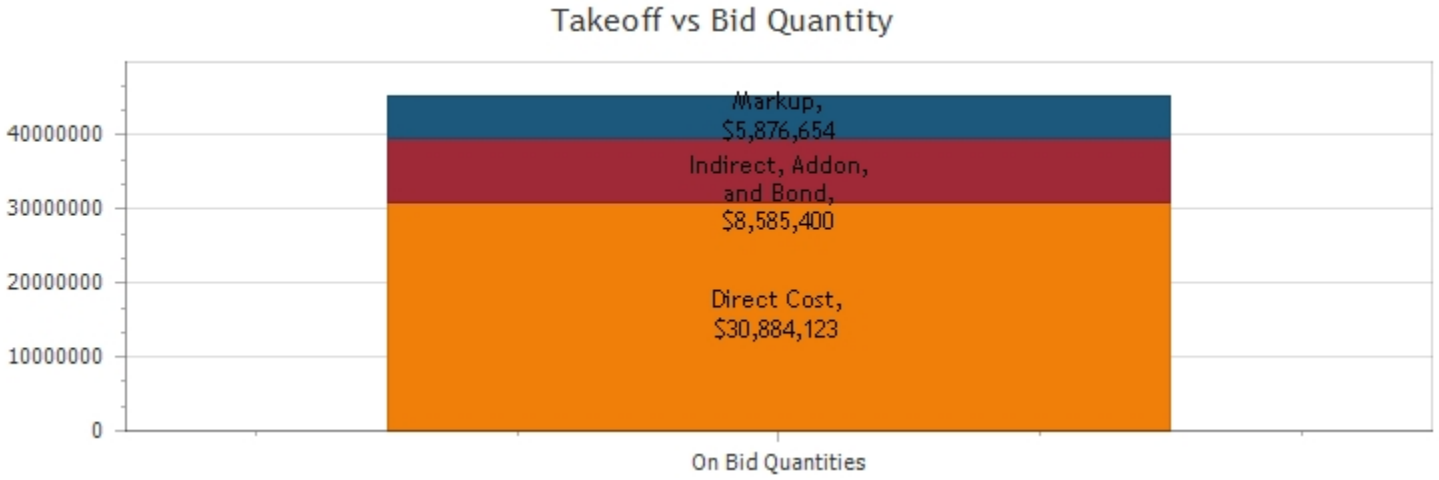
Estimate Recap Report

Project Information

Estimate:	2020-70B - MISSION BAY SHORELINE RESTORATION-ALT 2	**Bid Date:**	07/02/2018
Project:	10278	**Review Date:**	-
Estimator In Charge:	JF - Jack Fink	**Job Duration:**	78 months
Owner:	-	**State:**	CA
Engineer:	-	**Estimate Type:**	Estimate
Related Estimate:	2017-03H - CARDIFF BEACH LIVING SHORELINE FINAL R2		

Estimate Summary

	On Bid Quantities	%
Direct Cost	30,884,123	68.11%
Indirect Cost	8,293,573	18.29%
Addons	0	0.00%
Bond	291,827	0.64%
Pass Through Cost	0	0.00%
Direct Markup	4,632,618	10.22%
Indirect Markup	1,244,036	2.74%
Markup Addons	0	0.00%
+ / - Adjustments	0	
Pass Through Adjustment	0	
Unbalancing Difference	0	0.00%
Rounding Difference	0	
Desired Bid	0.00	
Final Bid Total	45,346,177.33	100.00%
Final Markup (% Based on Cost)	5,876,654	14.89%



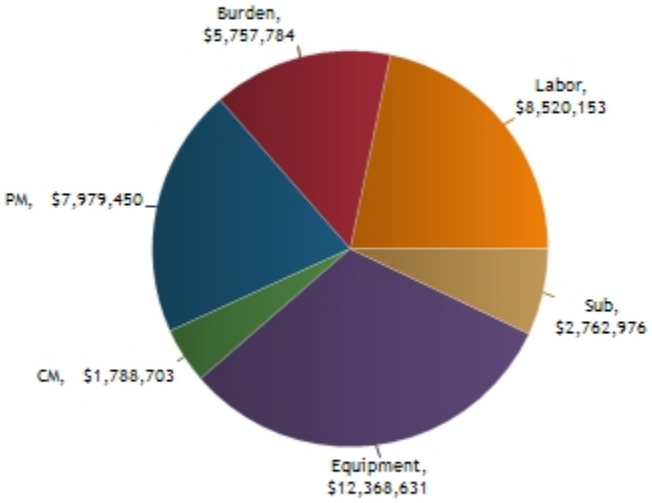
Other Totals

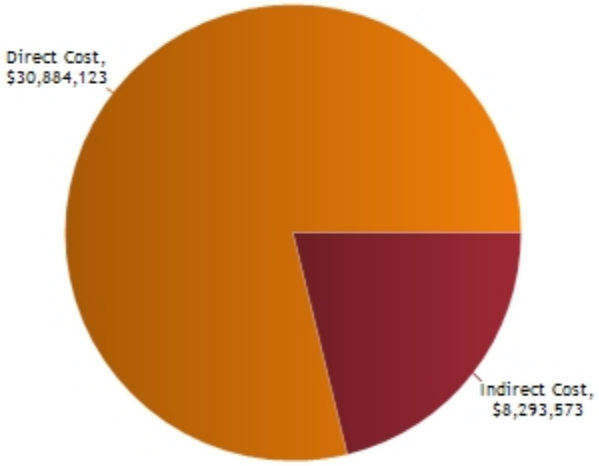
Total Sales Tax	$638,776
Total Escalation	$0
Labor % of Job Cost	36.17 %
Equipment % of Job Cost	31.34 %

Burden % of Direct Labor	46.60 %
Burden % of Indirect Labor	27.58 %
EOE % of Equipment	61.32 %
Current Minority %	0.00 %

Totals by Cost Type - Bid Quantities

	Direct	Indirect	Total	% of Total
Base Labor	5,111,231	3,408,922	8,520,153	21.75%
Burden	4,459,857	1,297,927	5,757,784	14.70%
Total Labor	**9,571,088**	**4,706,849**	**14,277,937**	**36.44%**
Inside Equipment	0	0	0	0.00%
Outside Equipment	4,474,256	309,856	4,784,111	12.21%
EOE	5,645,393	1,939,127	7,584,520	19.36%
Total Equipment	**10,119,649**	**2,248,982**	**12,368,631**	**31.57%**
Permanent Materials	7,979,450	0	7,979,450	20.37%
Construction Materials	450,961	1,337,742	1,788,703	4.57%
Subcontractors	2,762,976	0	2,762,976	7.05%
Misc 1	0	0	0	0.00%
Misc 2	0	0	0	0.00%
Misc 3	0	0	0	0.00%
Totals	**30,884,123**	**8,293,573**	**39,177,696**	**100.00%**





Fuel Summary

Fuel Type	Quantity	Units
Gasoline	456,452	Gal
Diesel	479,843	Gal
Off-Road	507,023	Gal

Sales Tax Summary

	Setup Tax %	Average Tax %	Total Taxes
Permanent Materials	7.75%	7.75%	573,928
Construction Materials	7.75%	3.76%	64,848
Inside Equipment	0.00%	0.00%	0
Outside Equipment	0.00%	0.00%	0
EOE	0.00%	0.00%	0
Subcontractors	0.00%	0.00%	0
Misc 1	0.00%	0.00%	0
Misc 2	0.00%	0.00%	0
Misc 3	0.00%	0.00%	0
Total Tax			638,776

Escalation Summary

	Average Escalation %	Total Escalation
Labor	0.00%	0
Inside Equipment	0.00%	0
Outside Equipment	0.00%	0
EOE	0.00%	0
Permanent Materials	0.00%	0
Construction Materials	0.00%	0
Subcontractors	0.00%	0
Misc 1	0.00%	0
Misc 2	0.00%	0
Misc 3	0.00%	0
Total Escalation		0

Labor Summary

	Direct	Indirect	Total
Hourly Labor (MH, MHS, MHR, MHRS)			
Manhours	98,443	0	98,443
Base Labor	4,546,270	0	4,546,270
Premium (on Base Labor)	564,961	0	564,961
Burden (includes Premium)	4,459,857	0	4,459,857
Total Labor	**9,571,088**	**0**	**9,571,088**
Daily Labor (DAY, DAYS, DY, DYS)			
None	0	0	0
Weekly Labor (WK, WKS, WEEK)			
None	0	0	0
Monthly Labor (MO, MON, MNTH, MMO, MMOS)			
Months	0	273	273
Base Labor	0	3,217,500	3,217,500
Premium (on Base Labor)	0	0	0
Burden (includes Premium)	0	1,252,924	1,252,924
Total Labor	**0**	**4,470,424**	**4,470,424**
Other Labor			
Base Labor	0	191,422	191,422
Premium (on Base Labor)	0	0	0
Burden (includes Premium)	0	45,003	45,003
Total Labor	**0**	**236,425**	**236,425**

Summary IS Current Last run 11/24/2020 10:31:00 AM

Balanced Markup Calculation

Spread IS NOT Current Last run 11/24/2020 10:31:00 AM

	Cost	Markup %	Markup $
Labor	8,520,153	15.00%	1,278,023
Burden	5,757,784	15.00%	863,668
Permanent Materials	7,979,450	15.00%	1,196,917
Construction Materials	1,788,703	15.00%	268,305
Inside Equipment	0	15.00%	0
Outside Equipment	4,784,111	15.00%	717,617
EOE	7,584,520	15.00%	1,137,678
Subcontractors	2,762,976	15.00%	414,446
Misc 1	0	15.00%	0
Misc 2	0	15.00%	0
Misc 3	0	15.00%	0
Overrides	0	0.00%	0
Total	**39,177,696**	**15.00%**	**5,876,654**

Addons, Bond and Markup Summary

Dependent on Bid Summary

	Total	%
Bond		
Bond	291,827	0.64 %
Markup		
Resource Markup	5,876,654	12.96 %
Total Markup	5,876,654	12.96 %
Markup, Addons, and Bond Total	**6,168,481**	**13.60 %**

Key Indicators

Dependent on Bid Summary

	Result	Formula
Balanced Markup/Total Labor	41.16%	Balanced Markup / Total Labor
Indirect Cost/Direct Cost	26.85%	Indirect Cost / Direct Cost
Total Manhours	98,443.11	Direct Manhours + Indirect Manhours

Estimate Notes

THIS ESTIMATE IS AN UDATE TO ESTIMATE 2019-32B (10/9/2019) AND INCLUDES UPDATED BEACH NOURISHMENT VOLUMES AND MATERTIAL QUANTITIES. LABOR RATES, EQUIPMENT RATES, AND FUEL RATES HAVE BEEN UPDATED TO 2020..

DETAILS OF THIS ESTIMATE:
Shoreline restoration alternatives to be utilized at multiple locations in Mission Bay for the various eroding shoreline conditions. Shoreline restoration and protection options include revetments, rip rap, seawalls, beach nourishment, living shorelines (i.e. oyster reefs), wetlands, and hybrid solutions. The sand fill for the beach nourishment in Alt. 2 is based on dredging material from within Mission Bay to provide the sand fill material.

**********Estimate created on: 11/19/2020 by User#: 1 - Jack Fink
Source estimate used: L:\HEAVYBID\EST\2019-32B

Cost Report

Biditem

500

MOBILIZE/DEMOBILIZE DREDGE

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	33,100.00	32,422.42	65,522.42	84,109.31	0.00	0.00	22,000.00	171,631.73
Total	33,100.00	32,422.42	65,522.42	84,109.31	0.00	0.00	22,000.00	171,631.73

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
656.0000	0.0015	656.0000	261.6337	50.4573	99.8817	0.0083

Activity: A Prepare Dredge for Transfer (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	4,847.68	4,752.34	9,600.02	15,005.93	0.00	0.00	0.00	24,605.95
Total	4,847.68	4,752.34	9,600.02	15,005.93	0.00	0.00	0.00	24,605.95

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
24,605.9500	16.0000	0.0625	1,537.8719	2.0000	0.5000	2.0000	12,302.9750

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
96.0000	0.0104	96.0000	100.0002	4,847.6800

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA3 Dredging

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 2 Eff: 100.00 Crew Hrs: 16 Labor Pcs: 6.00 Equipment Pcs: 4.00

Notes: Prepare dredge for transfer to jobsite at contractor's yard.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
813CMLBC555	MANITOWOC 555 150t	1.00	16.00	HR	US$	300.84	100.00	300.84	4,813.46
814CSURV90	Crew/Survey Boat	1.00	16.00	HR	US$	33.38	100.00	33.38	534.03
814HCDWT	Work Tugboat	1.00	16.00	HR	US$	252.13	100.00	252.13	4,034.10
814HCSD012CP	Hyd Cutterhead Dredge 12"	1.00	16.00	HR	US$	351.52	100.00	351.52	5,624.34
OE09	Crane Operator (>100 tn)	1.00	16.00	MH	US$	52.40	100.00	101.49	1,623.88
OE14	Crane Oiler	1.00	16.00	MH	US$	48.40	100.00	95.90	1,534.44
OE15	Leverman	1.00	16.00	MH	US$	55.65	100.00	107.79	1,724.57
OE18	Mate	1.00	16.00	MH	US$	49.57	100.00	99.29	1,588.63
OE19	Deckhand	1.00	16.00	MH	US$	48.48	100.00	97.77	1,564.25
OE21	Oiler	1.00	16.00	MH	US$	48.48	100.00	97.77	1,564.25

Activity: B Prepare Pipeline for Transfer (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2,415.84	2,373.00	4,788.84	2,073.08	0.00	0.00	3,000.00	9,861.92
Total	2,415.84	2,373.00	4,788.84	2,073.08	0.00	0.00	3,000.00	9,861.92

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
6,861.9200	8.0000	0.1250	857.7400	1.0000	1.0000	1.0000	9,861.9200

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
48.0000	0.0208	48.0000	99.7675	2,415.8400

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA3 Dredging

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 1 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 6.00 Equipment Pcs: 2.00

Notes: Load pipeline sections onto trucks for transport to project site. Allow for three truckloads to transport pipe.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4HHR	Hauling Sub - Hr	1.00	24.00	HR	US$	125.00	100.00	125.00	3,000.00
813RT600E	GROVE RT600E RT Crane 40mt	1.00	8.00	HR	US$	135.97	100.00	135.97	1,087.78
814HCDSP012	Submerged Pipeline - 12" %65	1.00	8.00	HR	US$	123.16	100.00	123.16	985.30

OE10	Crane Operator (<100 tn)	1.00	8.00	MH	US$	51.40	100.00	100.10	800.76
OE14	Crane Oiler	1.00	8.00	MH	US$	48.40	100.00	95.90	767.22
OE15	Leverman	1.00	8.00	MH	US$	55.65	100.00	107.79	862.29
OE18	Mate	1.00	8.00	MH	US$	49.57	100.00	99.29	794.31
OE19	Deckhand	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13
OE21	Oiler	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13

Activity: C Truck Dredge Sections to Jobsite (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3,234.88	3,206.82	6,441.70	8,535.66	0.00	0.00	8,000.00	22,977.36
Total	3,234.88	3,206.82	6,441.70	8,535.66	0.00	0.00	8,000.00	22,977.36

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
14,977.3600	16.0000	0.0625	936.0850	2.0000	0.5000	2.0000	11,488.6800

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
64.0000	0.0156	64.0000	100.6516	3,234.8800

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA3 Dredging

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: CH 16 Eff: 100.00 Crew Hrs: 16 Labor Pcs: 4.00 Equipment Pcs: 3.00

Notes: Dredge Floats Trucked to site and placed into water using 150ton crane; Allow two shifts to set dredge sections in the water & connect; Allow for 8 trips total at 8 hours/trip, 6 trips for dredge sections and 1 trip each for crew/survey boat and work tug.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4HHR	Hauling Sub - Hr	1.00	64.00	HR	US$	125.00	100.00	125.00	8,000.00
814CSURV90	Crew/Survey Boat %65	1.00	16.00	HR	US$	33.38	100.00	23.28	372.44
814HCDWT	Work Tugboat	1.00	16.00	HR	US$	252.13	100.00	252.13	4,034.10
814HCSD012CP	Hyd Cutterhead Dredge 12" % 65	1.00	16.00	HR	US$	351.52	100.00	258.07	4,129.12
OE15	Leverman	1.00	16.00	MH	US$	55.65	100.00	107.79	1,724.57
OE18	Mate	1.00	16.00	MH	US$	49.57	100.00	99.29	1,588.63
OE19	Deckhand	1.00	16.00	MH	US$	48.48	100.00	97.77	1,564.25
OE21	Oiler	1.00	16.00	MH	US$	48.48	100.00	97.77	1,564.25

Activity: D Prepare Pipeline for Transfer from Site (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	4,831.68	4,745.98	9,577.66	8,714.29	0.00	0.00	3,000.00	21,291.95
Total	4,831.68	4,745.98	9,577.66	8,714.29	0.00	0.00	3,000.00	21,291.95

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
18,291.9500	16.0000	0.0625	1,143.2469	2.0000	0.5000	2.0000	10,645.9750

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
96.0000	0.0104	96.0000	99.7673	4,831.6800

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA3 Dredging

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 2 Eff: 100.00 Crew Hrs: 16 Labor Pcs: 6.00 Equipment Pcs: 4.00

Notes: Allow one shift to pull pipeline from water, cut into 40 ft. lengths and load on trucks for transport to contractor's yard.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4HHR	Hauling Sub - Hr	1.00	24.00	HR	US$	125.00	100.00	125.00	3,000.00
813RT600E	GROVE RT600E RT Crane 40mt	1.00	16.00	HR	US$	135.97	100.00	135.97	2,175.57
814CSURV90	Crew/Survey Boat	1.00	16.00	HR	US$	33.38	100.00	33.38	534.03
814HCDSP012	Submerged Pipeline - 12"	1.00	16.00	HR	US$	123.16	100.00	123.16	1,970.59
814HCDWT	Work Tugboat	1.00	16.00	HR	US$	252.13	100.00	252.13	4,034.10
OE10	Crane Operator (<100 tn)	1.00	16.00	MH	US$	51.40	100.00	100.10	1,601.52
OE14	Crane Oiler	1.00	16.00	MH	US$	48.40	100.00	95.90	1,534.44
OE15	Leverman	1.00	16.00	MH	US$	55.65	100.00	107.79	1,724.57
OE18	Mate	1.00	16.00	MH	US$	49.57	100.00	99.29	1,588.63
OE19	Deckhand	1.00	16.00	MH	US$	48.48	100.00	97.77	1,564.25
OE21	Oiler	1.00	16.00	MH	US$	48.48	100.00	97.77	1,564.25

Activity: E Prepare Dredge for Transfer from Site (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	12,119.20	11,880.90	24,000.10	37,514.80	0.00	0.00	8,000.00	69,514.90
Total	12,119.20	11,880.90	24,000.10	37,514.80	0.00	0.00	8,000.00	69,514.90

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
61,514.9000	40.0000	0.0250	1,537.8725	5.0000	0.2000	5.0000	13,902.9800

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
240.0000	0.0042	240.0000	100.0004	12,119.2000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA3 Dredging

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: CH 40 Eff: 100.00 Crew Hrs: 40 Labor Pcs: 6.00 Equipment Pcs: 4.00

Notes: Allow five shifts to prepare dredge sections for hauling back to contractor's yard. Allow for 8 trips total at 8 hours/trip, 6 trips for dredge sections and 1 trip each for crew/survey boat and work tug.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4HHR	Hauling Sub - Hr	1.00	64.00	HR	US$	125.00	100.00	125.00	8,000.00
813CMLBC555	MANITOWOC 555 150t	1.00	40.00	HR	US$	300.84	100.00	300.84	12,033.64
814CSURV90	Crew/Survey Boat	1.00	40.00	HR	US$	33.38	100.00	33.38	1,335.08
814HCDWT	Work Tugboat	1.00	40.00	HR	US$	252.13	100.00	252.13	10,085.24
814HCSD012CP	Hyd Cutterhead Dredge 12"	1.00	40.00	HR	US$	351.52	100.00	351.52	14,060.84
OE09	Crane Operator (>100 tn)	1.00	40.00	MH	US$	52.40	100.00	101.49	4,059.70
OE14	Crane Oiler	1.00	40.00	MH	US$	48.40	100.00	95.90	3,836.10
OE15	Leverman	1.00	40.00	MH	US$	55.65	100.00	107.79	4,311.45
OE18	Mate	1.00	40.00	MH	US$	49.57	100.00	99.29	3,971.57
OE19	Deckhand	1.00	40.00	MH	US$	48.48	100.00	97.77	3,910.64
OE21	Oiler	1.00	40.00	MH	US$	48.48	100.00	97.77	3,910.64

Activity: F Prepare Pipeline for Storage (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2,415.84	2,373.00	4,788.84	2,073.08	0.00	0.00	0.00	6,861.92
Total	2,415.84	2,373.00	4,788.84	2,073.08	0.00	0.00	0.00	6,861.92

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
6,861.9200	8.0000	0.1250	857.7400	1.0000	1.0000	1.0000	6,861.9200

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
48.0000	0.0208	48.0000	99.7675	2,415.8400

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA3 Dredging

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 1 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 6.00 Equipment Pcs: 2.00

Notes: Allow 1 shift to unload pipe from trucks and place in storage at contractor's yard.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
813RT600E	GROVE RT600E RT Crane 40mt	1.00	8.00	HR	US$	135.97	100.00	135.97	1,087.78
814HCDSP012	Submerged Pipeline - 12" %65	1.00	8.00	HR	US$	123.16	100.00	123.16	985.30
OE10	Crane Operator (<100 tn)	1.00	8.00	MH	US$	51.40	100.00	100.10	800.76
OE14	Crane Oiler	1.00	8.00	MH	US$	48.40	100.00	95.90	767.22
OE15	Leverman	1.00	8.00	MH	US$	55.65	100.00	107.79	862.29
OE18	Mate	1.00	8.00	MH	US$	49.57	100.00	99.29	794.31
OE19	Deckhand	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13
OE21	Oiler	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13

Activity: G Prepare Dredge for Storage (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3,234.88	3,090.38	6,325.26	10,192.47	0.00	0.00	0.00	16,517.73
Total	3,234.88	3,090.38	6,325.26	10,192.47	0.00	0.00	0.00	16,517.73

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
16,517.7300	16.0000	0.0625	1,032.3581	2.0000	0.5000	2.0000	8,258.8650

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
64.0000	0.0156	64.0000	98.8322	3,234.8800

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 2 Eff: 100.00 Crew Hrs: 16 Labor Pcs: 4.00 Equipment Pcs: 3.00

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat	1.00	16.00	HR	US$	33.38	100.00	33.38	534.03
814HCDWT	Work Tugboat	1.00	16.00	HR	US$	252.13	100.00	252.13	4,034.10
814HCSD012CP	Hyd Cutterhead Dredge 12"	1.00	16.00	HR	US$	351.52	100.00	351.52	5,624.34
OE15	Leverman	1.00	16.00	MH	US$	55.65	100.00	105.78	1,692.52
OE18	Mate	1.00	16.00	MH	US$	49.57	100.00	97.51	1,560.08
OE19	Deckhand	1.00	16.00	MH	US$	48.48	100.00	96.02	1,536.33
OE21	Oiler	1.00	16.00	MH	US$	48.48	100.00	96.02	1,536.33

Notes: JOSH - This one is a bit of a conundrum since we have to pump the fill to build the cobble toe. Below are notes for the the different sub-bid items in Bonita Cove.

1.) Create a new bid item 500 for the MOB/DEMOB DREDGING and move the activities to the new bid item. Instead of Tow Dredge to Jobsite assume the sections will be trucked. Allow for a rented 150-T crane to load out the dredge sections onto trucks. Same for "Prepare Dredge at Jobsite, allow for rented 150-ton crane to set dredge sections into water. Bump hours from 16 to connect sections and test systems, ready to dredge. "Prepare Dredge for Transfer from Site" will also be 40 ours to disconnect sections and load out onto trucks. Again, include rented 150-ton crane. Add another activity for "Prepare Dredge for Storage" and set at 2 days to offload dredge sections and prep for storage.
2.) Under "Place Sand Fill for Beach Norishment" revise crew to be one loader and two dozers in shore crew. Same for "Place Sand Fill for Cobble Toe".
3.) Under "DREDGING" sub-bid item Replace Inland Tug with the Work Tugboat (814HCDWT). You will need to revise the working hours per month for the work tugboat to 260. Click on the piece of equipment under Equipment Setup, then click on "Single Equipment Cost Breakdown" in the lower left hand corner of the equipment setup tab. Change the inside rent to 260 hours/period and the outside rent to 260 hours/period. Also change fuel type to offroad. Click Save/Update and it shouold recalculate equipment costs for that item. You will also need to set up a 60S calendar and then change the calendar in the activity to the 60S calendar. Based on the CEDEP for West Sail Bay the pipeline cost was $32,022/mo or approx. $123.16/hr so you will need to revise pipeline cost on Equipment Setup also and revise working hours to 260/month.
4.) Reduce costs for pre- and post hydrographic surveys to $12k/each under "Hydrographic Surveys" under "DREDGING".
5.)"Prepare Pipeline at Jobsite" and "Prepare Pipeline for Transfer from Site" will go under the Mob/Demob item for each location. For the first site the prepare pipeline is fine as is. Prepare Pileine for Transfer will be disconnecting and cutting pipeline into 200' sections, rafting them up and towing them to next site. Prepare pipeline at next site will be reconnecting and refusing pipeline.

Biditem - Parent

1000

BONITA COVE

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	132,476.36	114,290.36	246,766.72	256,775.56	301,951.43	37,735.25	130,975.82	974,204.78
Total	132,476.36	114,290.36	246,766.72	256,775.56	301,951.43	37,735.25	130,975.82	974,204.78

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
2,600.1700	0.0004	2,600.1700	374.6696	50.9491	94.9041	0.0000

Biditem

1001

MOBILIZATION/DEMOBILIZATION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	14,079.20	14,527.66	28,606.86	17,210.84	0.00	15,000.00	0.00	60,817.70
Total	14,079.20	14,527.66	28,606.86	17,210.84	0.00	15,000.00	0.00	60,817.70

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
368.0000	0.0027	368.0000	165.2655	38.2587	77.7360	0.0078

Activity: B Set up Site / Laydown Area (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	5,964.00	5,550.22	11,514.22	3,894.14	0.00	7,500.00	0.00	22,908.36
Total	5,964.00	5,550.22	11,514.22	3,894.14	0.00	7,500.00	0.00	22,908.36

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
15,408.3600	24.0000	0.0417	642.0150	3.0000	0.3333	3.0000	7,636.1200

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
144.0000	0.0069	144.0000	79.9599	5,964.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 4LAB 4-Man Labor Crew Prod: S 3 Eff: 100.00 Crew Hrs: 24 Labor Pcs: 6.00 Equipment Pcs: 1.00

Notes: Allow time to set up staging and laydown area, unload equipment, and set up trailers and security fencing.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
813RT700E	GROVE RT700E RT Crane 50mt	1.00	24.00	HR	US$	162.26	100.00	162.26	3,894.14
990200	Crane Mobilization	1.00	1.00	LS	US$	7,500.00	100.00	7,500.00	7,500.00
LA01	Laborer Foreman	1.00	24.00	MH	US$	41.02	100.00	78.48	1,883.55
LA02	Laborer (Gr 5)	4.00	96.00	MH	US$	39.02	100.00	75.76	7,272.79
OE10	Crane Operator (<100 tn)	1.00	24.00	MH	US$	51.40	100.00	98.25	2,357.88

Activity: C Clean up Site (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	5,964.00	5,550.22	11,514.22	3,894.14	0.00	0.00	0.00	15,408.36
Total	5,964.00	5,550.22	11,514.22	3,894.14	0.00	0.00	0.00	15,408.36

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
15,408.3600	24.0000	0.0417	642.0150	3.0000	0.3333	3.0000	5,136.1200

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
144.0000	0.0069	144.0000	79.9599	5,964.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 4LAB 4-Man Labor Crew Prod: S 3 Eff: 100.00 Crew Hrs: 24 Labor Pcs: 6.00 Equipment Pcs: 1.00

Notes: Load out trailers and equipment, remove security fencing, and clean up site.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
813RT700E	GROVE RT700E RT Crane 50mt	1.00	24.00	HR	US$	162.26	100.00	162.26	3,894.14
LA01	Laborer Foreman	1.00	24.00	MH	US$	41.02	100.00	78.48	1,883.55
LA02	Laborer (Gr 5)	4.00	96.00	MH	US$	39.02	100.00	75.76	7,272.79
OE10	Crane Operator (<100 tn)	1.00	24.00	MH	US$	51.40	100.00	98.25	2,357.88

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 10.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	1,075.60	1,713.61	2,789.21	4,711.28	0.00	0.00	0.00	7,500.49

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0490	4.0000	0.2500	187.5123	5.0000	2.0000	0.5000	1,500.0980

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
40.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 40 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 10 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	40.00	HR	US$	16.91	100.00	16.91	676.44
820OHTT050	On Hwy Truck 50K	1.00	40.00	HR	US$	100.87	100.00	100.87	4,034.84
TE04	Truck Driver (Gr 5)	1.00	40.00	MH	US$	26.89	100.00	69.73	2,789.21

Activity: D Demobilization of Land Based Equip (Unreviewed) Quantity: 10.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	750.00	0.00	1,500.05
Total	1,075.60	1,713.61	2,789.21	4,711.28	0.00	7,500.00	0.00	15,000.49

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0490	4.0000	0.2500	187.5123	5.0000	2.0000	0.5000	3,000.0980

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
40.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 40 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	40.00	HR	US$	16.91	100.00	16.91	676.44
820OHTT050	On Hwy Truck 50K	1.00	40.00	HR	US$	100.87	100.00	100.87	4,034.84
990205	Crane Demobilization	1.00	1.00	LS	US$	7,500.00	100.00	7,500.00	7,500.00
TE04	Truck Driver (Gr 5)	1.00	40.00	MH	US$	26.89	100.00	69.73	2,789.21

Biditem

1002

SWPPP

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
14.0000	0.0714	14.0000	1,094.1429	40.5257	77.0507	0.2500

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $5,000 since only one entrance to beach from parking lot will be used and many trips will be made delivering sand fill and rock to the beach.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2900	4.0000	0.2500	317.3225	0.5000	2.0000	0.5000	10,636.0000

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.0714	14.0000	77.0507	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	21.00	TON	US$	7.50	107.75	8.08	169.71
3STRPL	Trench Plate Rental - 8'x10'	1.00	18.00	MO	US$	200.00	107.75	215.50	3,879.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	76.09	152.18
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	69.22	553.75
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	93.20	372.78

Biditem

1003

SHORELINE RECONSTRUCTION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	63,752.61	50,708.19	114,460.80	114,597.40	297,952.46	0.00	96,975.82	623,986.48
Total	63,752.61	50,708.19	114,460.80	114,597.40	297,952.46	0.00	96,975.82	623,986.48

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
1,246.7700	0.0008	1,246.7700	500.4824	51.1342	91.8059	0.0040

Activity: A Place Sand Fill for Beach Nourishment (Unreviewed) Quantity: 18120.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.39	1.82	4.21	3.27	0.00	0.00	0.00	7.48
Total	43,360.93	32,952.51	76,313.44	59,280.07	0.00	0.00	0.00	135,593.51

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7.4831	0.0088	113.0000	845.5886	16.0354	1,129.9999	0.0009	8,455.8857

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
801.7700	22.6000	0.0442	95.1812	2.3930

Calendar: 60S 6x10 hr - Single Hrs/Shift: 10 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 113 Eff: 100.00 Crew Hrs: 160.354 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Place inflated Sand Fill Volume (see dredging sub-item for explanantion) to required template within sand fill nourishment footprint. Allow for shore crew to place dredged material to required grades.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL950	CAT 950H F.E. Loader 4cy	1.00	160.35	HR	US$	89.04	100.00	89.04	14,277.08
809SCD06T	CAT D6T Dozer	2.00	320.71	HR	US$	140.32	100.00	140.32	45,002.99
LA02	Laborer (Gr 5)	2.00	320.71	MH	US$	39.02	118.33	81.69	26,197.77
OE03	Operator (Gr 14)	1.00	160.35	MH	US$	50.36	118.33	104.48	16,753.41
OE05	Operator (Gr 10)	2.00	320.71	MH	US$	50.06	118.33	104.03	33,362.26

Activity: B Place Caltrans Backing No. 3 (Unreviewed) Quantity: 3902.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.88	2.51	5.38	7.81	43.10	0.00	0.00	56.29
Total	11,226.88	9,775.60	21,002.48	30,455.61	168,176.20	0.00	0.00	219,634.29

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
13.1876	0.0126	79.6327	1,050.1651	6.1250	637.0612	0.0016	35,858.6596

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
245.0000	15.9265	0.0628	85.7244	2.8772

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 79.6327 Eff: 100.00 Crew Hrs: 49 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Allow for furnish and place of 2,550 cy of imported Caltrans Backing No. 3 as core of cobble berm. Allow for 2% Waste, so 2,550 cy * 1.02 = 2,601 CY. Rip rap is 1.5 Ton/ CY, so 2,601 * 1.5 = 3,902 Ton.

Allow furnish and delivery at $40/ton to stockpile site. Allow for 2 ea. loaders to transfer stone from stockpile to placement location at 80 cy/hr.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BA110	Armor Stone 2 -> 5 T	1.00	3,902.00	TON	US$	40.00	107.75	43.10	168,176.20
809FEL950	CAT 950H F.E. Loader 4cy	2.00	98.00	HR	US$	89.04	100.00	89.04	8,725.63
810CME385	CAT 385CL Excavator 5cy	1.00	49.00	HR	US$	443.47	100.00	443.47	21,729.98
LA02	Laborer (Gr 5)	2.00	98.00	MH	US$	39.02	100.00	73.48	7,200.99
OE03	Operator (Gr 14)	3.00	147.00	MH	US$	50.36	100.00	93.89	13,801.49

Activity: C Place Cobble Toe (Unreviewed) Quantity: 2458.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3.73	3.25	6.98	10.11	52.80	0.00	0.00	69.89
Total	9,164.80	7,980.08	17,144.88	24,861.72	129,776.26	0.00	0.00	171,782.86

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
17.0897	0.0163	61.4500	1,050.1650	5.0000	491.6000	0.0020	34,356.5720

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
200.0000	12.2900	0.0814	85.7244	3.7286

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 61.45 Eff: 100.00 Crew Hrs: 40 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Allow for furnish and place of 1,950 cy of imported 2.5"-10" cobble at the toe of the dune. Allow for 5% Waste, so 1,950 cy * 1.05 = 2,048 CY. #57 Stone is 1.2 Ton/ CY, so 2,048 * 1.2 = 2,458 Ton.

Allow furnish and delivery at $49/ton to stockpile site. Allow for 2 ea. loaders to transfer cobble from stockpile to placement location at 61 cy/hr.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2008	3'-8" Cobble	1.00	2,458.00	TON	US$	49.00	107.75	52.80	129,776.26
809FEL950	CAT 950H F.E. Loader 4cy	2.00	80.00	HR	US$	89.04	100.00	89.04	7,122.96
810CME385	CAT 385CL Excavator 5cy	1.00	40.00	HR	US$	443.47	100.00	443.47	17,738.76
LA02	Laborer (Gr 5)	2.00	80.00	MH	US$	39.02	100.00	73.48	5,878.36
OE03	Operator (Gr 14)	3.00	120.00	MH	US$	50.36	100.00	93.89	11,266.52

Activity: D Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Allow for pre- and post-construction surveys for cobble dike and sand fill. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	15,000.00	100.00	15,000.00	30,000.00

Activity: E Remove Concrete Sidewalk (Unreviewed) Quantity: 300.00 Unit: LF

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Demolish and remove existing sidewalk along back edge of beach. Total length of removal is approx. 300 lf. Assume sidewalk is similar to typical COSD details; 10' wide x 4' thick with 2'-4" x 12" cutoff wall; total removal area is 300'*10'/9 = 334 sq. yds. Use Caltrans max unit cost from District 11 for removal - $56.23/sq. yd.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4CONC	Concrete - Sub	1.00	334.00	SQYD	US$	56.23	100.00	56.23	18,780.82

Activity: F Construct New Sidewalk (Unreviewed) Quantity: 300.00 Unit: LF

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Construct new sidewalk assuming same size and configuration as existing - 10' wide x 4' thick with 2'-4" x 12" cutoff wall; total quantity of concrete for 300 lf is [(10'*0.33')+(2.33'*1')]*300' / 27 = 63 cy. Use Caltrans max unit cost from District 11 for minor concrete (sidewalk) - $765/cy.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4CONC	Concrete - Sub	1.00	63.00	CY	US$	765.00	100.00	765.00	48,195.00

Biditem

1004

MOB./DEMOB. DREDGING

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	12,939.52	12,827.36	25,766.88	29,466.97	0.00	2,693.75	0.00	57,927.60
Total	12,939.52	12,827.36	25,766.88	29,466.97	0.00	2,693.75	0.00	57,927.60

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
256.0000	0.0039	256.0000	226.2797	50.5450	100.6519	0.0156

Activity: A Prepare Dredge at Jobsite (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76
Total	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7,908.7600	8.0000	0.1250	988.5950	1.0000	1.0000	1.0000	7,908.7600

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
32.0000	0.0313	32.0000	100.6519	1,617.4400

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 1 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Allow one shift at jobsite to prepare dredge to work.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	8.00	HR	US$	33.38	100.00	23.28	186.22
814HCDSP012	Submerged Pipeline - 12" %65	1.00	8.00	HR	US$	123.16	100.00	123.16	985.30
814HCDWT	Work Tugboat %65	1.00	8.00	HR	US$	252.13	100.00	181.48	1,451.82
814HCSD012CP	Hyd Cutterhead Dredge 12" % 65	1.00	8.00	HR	US$	351.52	100.00	258.07	2,064.56
OE15	Leverman	1.00	8.00	MH	US$	55.65	100.00	107.79	862.29
OE18	Mate	1.00	8.00	MH	US$	49.57	100.00	99.29	794.31
OE19	Deckhand	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13
OE21	Oiler	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13

Activity: B Prepare Pipeline at Jobsite (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	6,469.76	6,413.70	12,883.46	14,844.49	0.00	2,693.75	0.00	30,421.70
Total	6,469.76	6,413.70	12,883.46	14,844.49	0.00	2,693.75	0.00	30,421.70

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
27,727.9500	32.0000	0.0313	866.4984	4.0000	0.2500	4.0000	7,605.4250

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
128.0000	0.0078	128.0000	100.6520	6,469.7600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 4 Eff: 100.00 Crew Hrs: 32 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Allow three shifts to offload pipeline from trucks, fuse pipeline, and pull pipeline sections into location and connect joints. Connect pipeline to dredge and place shore pipeline.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3FSMC	Fusion Machine Rental	1.00	5.00	DAY	US$	500.00	107.75	538.75	2,693.75
813RT600E	GROVE RT600E RT Crane 40mt	1.00	32.00	HR	US$	135.97	100.00	135.97	4,351.14
814CSURV90	Crew/Survey Boat %65	1.00	32.00	HR	US$	33.38	100.00	23.28	744.88
814HCDSP012	Submerged Pipeline - 12" %65	1.00	32.00	HR	US$	123.16	100.00	123.16	3,941.18
814HCDWT	Work Tugboat %65	1.00	32.00	HR	US$	252.13	100.00	181.48	5,807.29
OE15	Leverman	1.00	32.00	MH	US$	55.65	100.00	107.79	3,449.16
OE18	Mate	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE19	Deckhand	1.00	32.00	MH	US$	48.48	100.00	97.77	3,128.52
OE21	Oiler	1.00	32.00	MH	US$	48.48	100.00	97.77	3,128.52

Activity: C Prepare Dredge for Transfer from Site (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76
Total	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7,908.7600	8.0000	0.1250	988.5950	1.0000	1.0000	1.0000	7,908.7600

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit

32.0000	0.0313	32.0000	100.6519	1,617.4400

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 1 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Allow one shift to prepare dredge for tow back to next dredging area.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	8.00	HR	US$	33.38	100.00	23.28	186.22
814HCDSP012	Submerged Pipeline - 12" %65	1.00	8.00	HR	US$	123.16	100.00	123.16	985.30
814HCDWT	Work Tugboat %65	1.00	8.00	HR	US$	252.13	100.00	181.48	1,451.82
814HCSD012CP	Hyd Cutterhead Dredge 12" % 65	1.00	8.00	HR	US$	351.52	100.00	258.07	2,064.56
OE15	Leverman	1.00	8.00	MH	US$	55.65	100.00	107.79	862.29
OE18	Mate	1.00	8.00	MH	US$	49.57	100.00	99.29	794.31
OE19	Deckhand	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13
OE21	Oiler	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13

Activity: D Prepare Pipeline for Transfer from Site (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3,234.88	3,206.82	6,441.70	5,246.68	0.00	0.00	0.00	11,688.38
Total	3,234.88	3,206.82	6,441.70	5,246.68	0.00	0.00	0.00	11,688.38

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
11,688.3800	16.0000	0.0625	730.5238	2.0000	0.5000	2.0000	5,844.1900

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
64.0000	0.0156	64.0000	100.6516	3,234.8800

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 2 Eff: 100.00 Crew Hrs: 16 Labor Pcs: 4.00 Equipment Pcs: 3.00

Notes: Disconnect and cut pipeline into 200' sections, raft them and tow them to next site.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	16.00	HR	US$	33.38	100.00	23.28	372.44
814HCDSP012	Submerged Pipeline - 12" %65	1.00	16.00	HR	US$	123.16	100.00	123.16	1,970.59
814HCDWT	Work Tugboat %65	1.00	16.00	HR	US$	252.13	100.00	181.48	2,903.65
OE15	Leverman	1.00	16.00	MH	US$	55.65	100.00	107.79	1,724.57
OE18	Mate	1.00	16.00	MH	US$	49.57	100.00	99.29	1,588.63
OE19	Deckhand	1.00	16.00	MH	US$	48.48	100.00	97.77	1,564.25
OE21	Oiler	1.00	16.00	MH	US$	48.48	100.00	97.77	1,564.25

Biditem

1005

DREDGING

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	38,362.07	33,015.09	71,377.16	93,963.11	0.00	0.00	24,000.00	189,340.27
Total	38,362.07	33,015.09	71,377.16	93,963.11	0.00	0.00	24,000.00	189,340.27

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
641.4000	0.0016	641.4000	295.1984	59.8099	111.2834	0.0062

Activity: A Dredge Area (Unreviewed) Quantity: 18120.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.12	1.82	3.94	5.19	0.00	0.00	0.00	9.12
Total	38,362.07	33,015.09	71,377.16	93,963.11	0.00	0.00	0.00	165,340.27

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
9.1247	0.0088	113.0000	1,031.0954	16.0354	1,129.9999	0.0009	10,310.9539

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
641.4000	28.2507	0.0354	111.2834	2.1171

Calendar: 60S 6x10 hr - Single Hrs/Shift: 10 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: UH 113 Eff: 100.00 Crew Hrs: 160.354 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Total Bid Quantity, inflated by 20% markup to account for hydraulic lossses in the beach placement - 15,100cy*1.2 = 18,120 cy. Total dredge area based on a 3-foot borrow depth is 163,080 sf or 3.74 acres.

Dredge is assumed to work 10 hrs/day, 6 days/week (260 hrs/mo) each crew working a 10-hour shift. Gross production - 29,575 cy/mo or approx. 113 cy/hr.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	160.35	HR	US$	33.38	100.00	23.28	3,732.53
814HCDSP012	Submerged Pipeline - 12" %65	1.00	160.35	HR	US$	123.16	100.00	123.16	19,749.03
814HCDWT	Work Tugboat %65	1.00	160.35	HR	US$	252.13	100.00	181.48	29,099.98
814HCSD012CP	Hyd Cutterhead Dredge 12" % 65	1.00	160.35	HR	US$	351.52	100.00	258.07	41,381.57
OE15	Leverman	1.00	160.35	MH	US$	55.65	118.33	119.49	19,160.44
OE18	Mate	1.00	160.35	MH	US$	49.57	118.33	109.72	17,592.92
OE19	Deckhand	1.00	160.35	MH	US$	48.48	118.33	107.96	17,311.90
OE21	Oiler	1.00	160.35	MH	US$	48.48	118.33	107.96	17,311.90

Activity: B Hydrographic Surveys (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 50S 5 x 10 Hr - Single Hrs/Shift: 10 WC: MARINE Over Water Work

Notes: Allow for pre- and post-hydrographic surveys and required submittals.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	2.00	2.00	EA	US$	12,000.00	100.00	12,000.00	24,000.00

Biditem

1008

CONSTRUCTION ACCESS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2,208.24	2,156.23	4,364.47	1,156.08	0.00	16,162.50	0.00	21,683.05
Total	2,208.24	2,156.23	4,364.47	1,156.08	0.00	16,162.50	0.00	21,683.05

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
60.0000	0.0167	60.0000	361.3842	36.8040	72.7412	0.0417

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 3.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	736.08	718.74	1,454.82	385.36	0.00	5,387.50	0.00	7,227.68
Total	2,208.24	2,156.23	4,364.47	1,156.08	0.00	16,162.50	0.00	21,683.05

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,840.1833	8.0000	0.1250	230.0229	3.0000	1.0000	1.0000	7,227.6833

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
60.0000	0.0500	20.0000	72.7412	736.0800

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 3 Eff: 100.00 Crew Hrs: 24 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing sidewalks and work areas for 2.8 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 770 lf/500 ft = 2 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 1 ea. move, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	3.00	MO	US$	5,000.00	107.75	5,387.50	16,162.50
820OHLDTC44	LD Truck 4x4 1.75t	1.00	24.00	HR	US$	48.17	100.00	48.17	1,156.08

LA01	Laborer Foreman	0.50	12.00	MH	US$	41.02	100.00	78.48	941.78
LA03	Laborer (Gr 4)	2.00	48.00	MH	US$	35.75	100.00	71.31	3,422.69

Biditem

1009

INSTALL SIGNS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	544.48	1,111.84	190.58	3,829.26	0.00	0.00	5,131.68
Total	567.36	544.48	1,111.84	190.58	3,829.26	0.00	0.00	5,131.68

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
14.0000	0.0714	14.0000	366.5486	40.5257	79.4171	0.2500

Activity: A Install Signs (Unreviewed) Quantity: 8.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	567.36	544.48	1,111.84	190.58	3,829.26	0.00	0.00	5,131.68

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8025	0.5000	2.0000	325.6050	0.5000	16.0000	0.0625	10,263.3600

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.5714	1.7500	79.4171	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 8 of each: Beach Access Signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	8.00	EA	US$	44.23	107.75	47.66	381.26
2T5101	Construction Signs	1.00	8.00	EA	US$	400.00	107.75	431.00	3,448.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	78.49	156.97
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	71.31	570.45
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	96.11	384.42

Biditem - Parent

2000

VACATION ISLAND NE (SKI BEACH)

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	568,469.52	495,366.92	1,063,836.44	1,181,133.07	2,563,979.83	49,672.75	74,000.00	4,932,622.09
Total	568,469.52	495,366.92	1,063,836.44	1,181,133.07	2,563,979.83	49,672.75	74,000.00	4,932,622.09

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
10,577.7200	0.0001	10,577.7200	466.3219	53.7422	100.5733	0.0000

Biditem

2001

MOBILIZATION/DEMOBILIZATION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	19,563.80	21,764.54	41,328.34	56,490.60	0.00	0.00	0.00	97,818.94
Total	19,563.80	21,764.54	41,328.34	56,490.60	0.00	0.00	0.00	97,818.94

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
460.0000	0.0022	460.0000	212.6499	42.5300	89.8442	0.0044

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 20.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	2,151.20	3,427.23	5,578.43	9,422.56	0.00	0.00	0.00	15,000.99

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0495	4.0000	0.2500	187.5124	10.0000	2.0000	0.5000	1,500.0990

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
80.0000	0.2500	4.0000	69.7304	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 80 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 20 loads for loaders, dozers, office trailer storage trailers, and parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	80.00	HR	US$	16.91	100.00	16.91	1,352.88
820OHTT050	On Hwy Truck 50K	1.00	80.00	HR	US$	100.87	100.00	100.87	8,069.68
TE04	Truck Driver (Gr 5)	1.00	80.00	MH	US$	26.89	100.00	69.73	5,578.43

Activity: B Demobilization of Land Based Equip (Unreviewed) Quantity: 20.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	2,151.20	3,427.23	5,578.43	9,422.56	0.00	0.00	0.00	15,000.99

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0495	4.0000	0.2500	187.5124	10.0000	2.0000	0.5000	1,500.0990

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
80.0000	0.2500	4.0000	69.7304	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 80 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 20 loads for loaders, dozers, office trailer storage trailers, and parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	80.00	HR	US$	16.91	100.00	16.91	1,352.88
820OHTT050	On Hwy Truck 50K	1.00	80.00	HR	US$	100.87	100.00	100.87	8,069.68
TE04	Truck Driver (Gr 5)	1.00	80.00	MH	US$	26.89	100.00	69.73	5,578.43

Activity: C Mobilization of Marine Equip (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	7,920.00	7,894.60	15,814.60	17,828.55	0.00	0.00	0.00	33,643.15
Total	7,920.00	7,894.60	15,814.60	17,828.55	0.00	0.00	0.00	33,643.15

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
33,643.1500	32.0000	0.0313	1,051.3484	4.0000	0.2500	4.0000	8,410.7875

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.0063	160.0000	98.8413	7,920.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: S 4 Eff: 100.00 Crew Hrs: 32 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Allow for 3 days to mobilize crane barge and rock barge plus 1 day at the site to set up operations.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
811LGS0020D	20kW Large GenSet	1.00	32.00	HR	US$	23.96	100.00	23.96	766.56
814CB075	Crane Barge - 75 Ton	1.00	32.00	HR	US$	136.78	100.00	136.78	4,376.90
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	64.00	HR	US$	108.23	100.00	108.23	6,926.59
814ITB0250	Inland Tug - 250hp	1.00	32.00	HR	US$	133.81	100.00	133.81	4,281.89
814RUN016	Runabout 16ft	1.00	32.00	HR	US$	34.84	100.00	34.84	1,114.91

818PW350S	Portable Welder Skid 350 amp	1.00	32.00	HR	US$	11.30	100.00	11.30	361.70
OE10	Crane Operator (<100 tn)	1.00	32.00	MH	US$	51.40	100.00	100.10	3,203.05
OE17	Engineer	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE18	Mate	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE19	Deckhand	2.00	64.00	MH	US$	48.48	100.00	97.77	6,257.03

Activity: D Demobilization of Marine Equip (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3,960.00	3,947.30	7,907.30	8,914.28	0.00	0.00	0.00	16,821.58
Total	3,960.00	3,947.30	7,907.30	8,914.28	0.00	0.00	0.00	16,821.58

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
16,821.5800	16.0000	0.0625	1,051.3488	2.0000	0.5000	2.0000	8,410.7900

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
80.0000	0.0125	80.0000	98.8413	3,960.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: S 2 Eff: 100.00 Crew Hrs: 16 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Allow one day to clean up and one day to demobilize crane barge.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
811LGS0020D	20kW Large GenSet	1.00	16.00	HR	US$	23.96	100.00	23.96	383.28
814CB075	Crane Barge - 75 Ton	1.00	16.00	HR	US$	136.78	100.00	136.78	2,188.45
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	32.00	HR	US$	108.23	100.00	108.23	3,463.30
814ITB0250	Inland Tug - 250hp	1.00	16.00	HR	US$	133.81	100.00	133.81	2,140.94
814RUN016	Runabout 16ft	1.00	16.00	HR	US$	34.84	100.00	34.84	557.46
818PW350S	Portable Welder Skid 350 amp	1.00	16.00	HR	US$	11.30	100.00	11.30	180.85
OE10	Crane Operator (<100 tn)	1.00	16.00	MH	US$	51.40	100.00	100.10	1,601.52
OE17	Engineer	1.00	16.00	MH	US$	49.57	100.00	99.29	1,588.63
OE18	Mate	1.00	16.00	MH	US$	49.57	100.00	99.29	1,588.63
OE19	Deckhand	2.00	32.00	MH	US$	48.48	100.00	97.77	3,128.52

Activity: E Towing (Unreviewed) Quantity: 2.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,690.70	1,534.09	3,224.79	5,451.33	0.00	0.00	0.00	8,676.12
Total	3,381.40	3,068.18	6,449.58	10,902.65	0.00	0.00	0.00	17,352.23

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
8,676.1150	10.0000	0.1000	867.6115	2.0000	1.0000	1.0000	8,676.1150

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
60.0000	0.0333	30.0000	107.4930	1,690.7000

Calendar: 50S 5 x 10 Hr - Single Hrs/Shift: 10 WC: MARINE Over Water Work

Crew: TOWL Towing - Local Crew Prod: SU 1 Eff: 100.00 Crew Hrs: 20 Labor Pcs: 3.00 Equipment Pcs: 1.00

Notes: Allow for two tows to account for mobilization to site and demobilization from site. Assume contractor is local to San Diego and is towing from location in San Diego Bay. Allow one shift for each tow.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814TB1350	Tow Boat - 1,350hp %50	1.00	20.00	HR	US$	895.11	100.00	545.13	10,902.65
OE15	Leverman	1.00	20.00	MH	US$	55.65	110.00	114.17	2,283.44
OE17	Engineer	1.00	20.00	MH	US$	49.57	110.00	104.98	2,099.55
OE19	Deckhand	1.00	20.00	MH	US$	48.48	110.00	103.33	2,066.59

Biditem

2002

SWPPP

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total

U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
14.0000	0.0714	14.0000	1,094.1429	40.5257	77.0507	0.2500

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $10,000 since only one entrance to beach from parking lot will be used and many trips will be made delivering sand fill and rock to the beach.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2900	4.0000	0.2500	317.3225	0.5000	2.0000	0.5000	10,636.0000

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.0714	14.0000	77.0507	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	21.00	TON	US$	7.50	107.75	8.08	169.71
3STRPL	Trench Plate Rental - 8'x10'	1.00	18.00	MO	US$	200.00	107.75	215.50	3,879.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	76.09	152.18
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	69.22	553.75
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	93.20	372.78

Biditem 2003

SHORELINE RECONSTRUCTION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	350,060.00	300,204.85	650,264.85	650,806.40	2,555,194.28	0.00	40,000.00	3,896,265.53
Total	350,060.00	300,204.85	650,264.85	650,806.40	2,555,194.28	0.00	40,000.00	3,896,265.53

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
6,700.3000	0.0001	6,700.3000	581.5061	52.2454	97.0501	0.0007

Activity: A Place Sand Fill for Beach Nourishment (Unreviewed) Quantity: 85200.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.39	1.82	4.21	3.27	0.00	0.00	0.00	7.48
Total	203,882.01	154,941.88	358,823.89	278,733.59	0.00	0.00	0.00	637,557.48

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7.4831	0.0088	113.0000	845.5868	75.3982	1,130.0000	0.0009	8,455.8680

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
3,769.9000	22.6001	0.0442	95.1813	2.3930

Calendar: 60S 6x10 hr - Single Hrs/Shift: 10 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 113 Eff: 100.00 Crew Hrs: 753.9823 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Place 85,200 CY (inflated, please see "Dredging" Bid Item below for explanations) to required template within sand fill nourishment footprint. Allow for shore crew to place dredged material to required grades.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL950	CAT 950H F.E. Loader 4cy	1.00	753.98	HR	US$	89.04	100.00	89.04	67,132.12
809SCD06T	CAT D6T Dozer	2.00	1,507.96	HR	US$	140.32	100.00	140.32	211,601.47
LA02	Laborer (Gr 5)	2.00	1,507.96	MH	US$	39.02	118.33	81.69	123,180.43
OE03	Operator (Gr 14)	1.00	753.98	MH	US$	50.36	118.33	104.48	78,776.04
OE05	Operator (Gr 10)	2.00	1,507.96	MH	US$	50.06	118.33	104.03	156,867.42

Activity: B Place Caltrans Backing No. 3 (Unreviewed) Quantity: 26100.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1.75	1.74	3.49	3.94	43.10	0.00	0.00	50.53
Total	45,658.79	45,512.35	91,171.14	102,781.56	1,124,910.00	0.00	0.00	1,318,862.70

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7.4311	0.0071	141.4788	1,051.3487	23.0600	1,131.8306	0.0009	57,192.6893

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
922.4000	28.2958	0.0353	98.8412	1.7494

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: UH 141.4788 Eff: 100.00 Crew Hrs: 184.4799 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Allow for furnish and place of 14,500 cy of imported Caltrans Backing No. 3 as core of cobble berm. Allow for 2% Waste, so 14,500 cy * 1.02 = 17,400 cy. Rip rap is 1.5 Ton/ CY, so 17,400*1.5 = 26,100 Ton.

Allow furnish and delivery at $40/ton to contractor's barge. Allow for 75-ton crane barge to construct core of rock berm with No. 3 backing using 6 cy clamshell bucket.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BA110	Armor Stone 2 -> 5 T	1.00	26,100.00	TON	US$	40.00	107.75	43.10	1,124,910.00
811LGS0020D	20kW Large GenSet	1.00	184.48	HR	US$	23.96	100.00	23.96	4,419.22
814CB075	Crane Barge - 75 Ton	1.00	184.48	HR	US$	136.78	100.00	136.78	25,232.81
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	368.96	HR	US$	108.23	100.00	108.23	39,931.80
814ITB0250	Inland Tug - 250hp	1.00	184.48	HR	US$	133.81	100.00	133.81	24,685.08
814RUN016	Runabout 16ft	1.00	184.48	HR	US$	34.84	100.00	34.84	6,427.47
818PW350S	Portable Welder Skid 350 amp	1.00	184.48	HR	US$	11.30	100.00	11.30	2,085.18
OE10	Crane Operator (<100 tn)	1.00	184.48	MH	US$	51.40	100.00	100.10	18,465.55
OE17	Engineer	1.00	184.48	MH	US$	49.57	100.00	99.29	18,316.90
OE18	Mate	1.00	184.48	MH	US$	49.57	100.00	99.29	18,316.90
OE19	Deckhand	2.00	368.96	MH	US$	48.48	100.00	97.77	36,071.79

Activity: C Place Cobble Toe (Unreviewed) Quantity: 27090.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.19	2.19	4.38	4.94	52.80	0.00	0.00	62.11
Total	59,400.00	59,209.44	118,609.44	133,714.08	1,430,284.28	0.00	0.00	1,682,607.80

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
9.3143	0.0089	112.8750	1,051.3480	30.0000	903.0000	0.0011	56,086.9267

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
1,200.0000	22.5750	0.0443	98.8412	2.1927

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: UH 112.875 Eff: 100.00 Crew Hrs: 240 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Allow for furnish and place of 21,500 cy of imported 2.5"-10" cobble cover over the berm. Placement layer is minimum 2 feet thick over No. 3 core of berm. Allow for 5% Waste, so 21,500 cy * 1.05 = 22,575 CY. #57 Stone is 1.2 ton/cy, so 22,575 * 1.2 = 27,090 ton. Allow furnish and delivery at $49/ton to contractors yard to load on barge. Allow for 75-ton crane barge to construct cobble berm using 6 cy clamshell bucket.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total

2B2008	3'-8" Cobble	1.00	27,090.00	TON	US$	49.00	107.75	52.80	1,430,284.28
811LGS0020D	20kW Large GenSet	1.00	240.00	HR	US$	23.96	100.00	23.96	5,749.20
814CB075	Crane Barge - 75 Ton	1.00	240.00	HR	US$	136.78	100.00	136.78	32,826.72
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	480.00	HR	US$	108.23	100.00	108.23	51,949.44
814ITB0250	Inland Tug - 250hp	1.00	240.00	HR	US$	133.81	100.00	133.81	32,114.16
814RUN016	Runabout 16ft	1.00	240.00	HR	US$	34.84	100.00	34.84	8,361.84
818PW350S	Portable Welder Skid 350 amp	1.00	240.00	HR	US$	11.30	100.00	11.30	2,712.72
OE10	Crane Operator (<100 tn)	1.00	240.00	MH	US$	51.40	100.00	100.10	24,022.82
OE17	Engineer	1.00	240.00	MH	US$	49.57	100.00	99.29	23,829.45
OE18	Mate	1.00	240.00	MH	US$	49.57	100.00	99.29	23,829.45
OE19	Deckhand	2.00	480.00	MH	US$	48.48	100.00	97.77	46,927.72

Activity: D Tow Rock Barges (Unreviewed) Quantity: 27.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,229.60	1,209.13	2,438.73	4,361.06	0.00	0.00	0.00	6,799.79
Total	33,199.20	32,646.58	65,845.78	117,748.62	0.00	0.00	0.00	183,594.40

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
6,799.7926	8.0000	0.1250	849.9741	27.0000	1.0000	1.0000	6,799.7926

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
648.0000	0.0417	24.0000	101.6139	1,229.6000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: TOWL Towing - Local Crew Prod: HU 8 Eff: 100.00 Crew Hrs: 216 Labor Pcs: 3.00 Equipment Pcs: 1.00

Notes: Allow for towing of rock barges to/from project site. Assume barges are towed from contractor's yard in San Diego Bay. Allow 8 hours for each tow. Assuming each barge holds 2,000 ton, total no. of tows = 53,190 ton/2,000 ton = 27 tows.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814TB1350	Tow Boat - 1,350hp %50	1.00	216.00	HR	US$	895.11	100.00	545.13	117,748.62
OE15	Leverman	1.00	216.00	MH	US$	55.65	100.00	107.79	23,281.81
OE17	Engineer	1.00	216.00	MH	US$	49.57	100.00	99.29	21,446.50
OE19	Deckhand	1.00	216.00	MH	US$	48.48	100.00	97.77	21,117.47

Activity: E Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Notes: Allow for pre- and post-construction surveys for cobble dike and sand fill. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	20,000.00	100.00	20,000.00	40,000.00

Activity: F Grade Sand Fill Nourishment (Unreviewed) Quantity: 1.00 Unit: LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	7,920.00	7,894.60	15,814.60	17,828.55	0.00	0.00	0.00	33,643.15
Total	7,920.00	7,894.60	15,814.60	17,828.55	0.00	0.00	0.00	33,643.15

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
33,643.1500	32.0000	0.0313	1,051.3484	4.0000	0.2500	4.0000	8,410.7875

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.0063	160.0000	98.8413	7,920.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: S 4 Eff: 100.00 Crew Hrs: 32 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Allow for crane barge crew to grade sand fill nourishment on west end of project where rock berm is not being constructed. Allow 4 shifts to move sand and grade to 1:10 slope as required.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
811LGS0020D	20kW Large GenSet	1.00	32.00	HR	US$	23.96	100.00	23.96	766.56
814CB075	Crane Barge - 75 Ton	1.00	32.00	HR	US$	136.78	100.00	136.78	4,376.90

814DCB0220	Flat Deck Barge 2,000 Ton	2.00	64.00	HR	US$	108.23	100.00	108.23	6,926.59
814ITB0250	Inland Tug - 250hp	1.00	32.00	HR	US$	133.81	100.00	133.81	4,281.89
814RUN016	Runabout 16ft	1.00	32.00	HR	US$	34.84	100.00	34.84	1,114.91
818PW350S	Portable Welder Skid 350 amp	1.00	32.00	HR	US$	11.30	100.00	11.30	361.70
OE10	Crane Operator (<100 tn)	1.00	32.00	MH	US$	51.40	100.00	100.10	3,203.05
OE17	Engineer	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE18	Mate	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE19	Deckhand	2.00	64.00	MH	US$	48.48	100.00	97.77	6,257.03

Biditem

2004

CONSTRUCTION ACCESS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3,680.40	3,593.72	7,274.12	1,926.80	0.00	43,100.00	0.00	52,300.92
Total	3,680.40	3,593.72	7,274.12	1,926.80	0.00	43,100.00	0.00	52,300.92

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
100.0000	0.0100	100.0000	523.0092	36.8040	72.7412	0.0250

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 8.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	460.05	449.22	909.27	240.85	0.00	5,387.50	0.00	6,537.62
Total	3,680.40	3,593.72	7,274.12	1,926.80	0.00	43,100.00	0.00	52,300.92

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,150.1150	5.0000	0.2000	230.0230	5.0000	1.6000	0.6250	10,460.1840

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
100.0000	0.0800	12.5000	72.7412	460.0500

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 5 Eff: 100.00 Crew Hrs: 40 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing sidewalks and work areas for 7.9 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 1,800 lf/500 ft = 4 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 3 ea. moves, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	8.00	MO	US$	5,000.00	107.75	5,387.50	43,100.00
820OHLDTC44	LD Truck 4x4 1.75t	1.00	40.00	HR	US$	48.17	100.00	48.17	1,926.80
LA01	Laborer Foreman	0.50	20.00	MH	US$	41.02	100.00	78.48	1,569.63
LA03	Laborer (Gr 4)	2.00	80.00	MH	US$	35.75	100.00	71.31	5,704.49

Biditem

2005

INSTALL SIGNS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,276.56	1,225.09	2,501.65	428.80	8,615.84	0.00	0.00	11,546.29
Total	1,276.56	1,225.09	2,501.65	428.80	8,615.84	0.00	0.00	11,546.29

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
31.5000	0.0317	31.5000	366.5489	40.5257	79.4175	0.1111

Activity: A Install Signs (Unreviewed) Quantity: 18.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	1,276.56	1,225.09	2,501.65	428.80	8,615.84	0.00	0.00	11,546.29

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8028	0.5000	2.0000	325.6056	1.1250	16.0000	0.0625	10,263.3689

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
31.5000	0.5714	1.7500	79.4175	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 9 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 9 of each: Beach Access Signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	18.00	EA	US$	44.23	107.75	47.66	857.84
2T5101	Construction Signs	1.00	18.00	EA	US$	400.00	107.75	431.00	7,758.00
809TLB416E	CAT 416E Backhoe	1.00	9.00	HR	US$	47.64	100.00	47.64	428.80
LA01	Laborer Foreman	0.50	4.50	MH	US$	41.02	100.00	78.48	353.17
LA03	Laborer (Gr 4)	2.00	18.00	MH	US$	35.75	100.00	71.31	1,283.52
OE07	Operator (Gr 6)	1.00	9.00	MH	US$	49.83	100.00	96.11	864.96

Biditem

2006

MOB./DEMOB DREDGING

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	12,939.52	12,827.36	25,766.88	29,466.97	0.00	2,693.75	0.00	57,927.60
Total	12,939.52	12,827.36	25,766.88	29,466.97	0.00	2,693.75	0.00	57,927.60

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
256.0000	0.0039	256.0000	226.2797	50.5450	100.6519	0.0156

Activity: A Prepare Dredge at Jobsite (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76
Total	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7,908.7600	8.0000	0.1250	988.5950	1.0000	1.0000	1.0000	7,908.7600

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
32.0000	0.0313	32.0000	100.6519	1,617.4400

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 1 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Allow one shift at jobsite to prepare dredge to work.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	8.00	HR	US$	33.38	100.00	23.28	186.22
814HCDSP012	Submerged Pipeline - 12" %65	1.00	8.00	HR	US$	123.16	100.00	123.16	985.30
814HCDWT	Work Tugboat %65	1.00	8.00	HR	US$	252.13	100.00	181.48	1,451.82
814HCSD012CP	Hyd Cutterhead Dredge 12" % 65	1.00	8.00	HR	US$	351.52	100.00	258.07	2,064.56
OE15	Leverman	1.00	8.00	MH	US$	55.65	100.00	107.79	862.29
OE18	Mate	1.00	8.00	MH	US$	49.57	100.00	99.29	794.31
OE19	Deckhand	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13
OE21	Oiler	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13

Activity: B Prepare Pipeline at Jobsite (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	6,469.76	6,413.70	12,883.46	14,844.49	0.00	2,693.75	0.00	30,421.70
Total	6,469.76	6,413.70	12,883.46	14,844.49	0.00	2,693.75	0.00	30,421.70

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
27,727.9500	32.0000	0.0313	866.4984	4.0000	0.2500	4.0000	7,605.4250

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
128.0000	0.0078	128.0000	100.6520	6,469.7600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 4 Eff: 100.00 Crew Hrs: 32 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Allow three shifts to offload pipeline from trucks, fuse pipeline, and pull pipeline sections into location and connect joints. Connect pipeline to dredge and place shore pipeline.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3FSMC	Fusion Machine Rental	1.00	5.00	DAY	US$	500.00	107.75	538.75	2,693.75
813RT600E	GROVE RT600E RT Crane 40mt	1.00	32.00	HR	US$	135.97	100.00	135.97	4,351.14
814CSURV90	Crew/Survey Boat %65	1.00	32.00	HR	US$	33.38	100.00	23.28	744.88
814HCDSP012	Submerged Pipeline - 12" %65	1.00	32.00	HR	US$	123.16	100.00	123.16	3,941.18
814HCDWT	Work Tugboat %65	1.00	32.00	HR	US$	252.13	100.00	181.48	5,807.29
OE15	Leverman	1.00	32.00	MH	US$	55.65	100.00	107.79	3,449.16
OE18	Mate	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE19	Deckhand	1.00	32.00	MH	US$	48.48	100.00	97.77	3,128.52
OE21	Oiler	1.00	32.00	MH	US$	48.48	100.00	97.77	3,128.52

Activity: C Prepare Dredge for Transfer from Site (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76
Total	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7,908.7600	8.0000	0.1250	988.5950	1.0000	1.0000	1.0000	7,908.7600

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
32.0000	0.0313	32.0000	100.6519	1,617.4400

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 1 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Allow one shift to prepare dredge for tow back to next dredging area.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	8.00	HR	US$	33.38	100.00	23.28	186.22
814HCDSP012	Submerged Pipeline - 12" %65	1.00	8.00	HR	US$	123.16	100.00	123.16	985.30
814HCDWT	Work Tugboat %65	1.00	8.00	HR	US$	252.13	100.00	181.48	1,451.82
814HCSD012CP	Hyd Cutterhead Dredge 12" % 65	1.00	8.00	HR	US$	351.52	100.00	258.07	2,064.56
OE15	Leverman	1.00	8.00	MH	US$	55.65	100.00	107.79	862.29
OE18	Mate	1.00	8.00	MH	US$	49.57	100.00	99.29	794.31
OE19	Deckhand	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13
OE21	Oiler	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13

Activity: D Prepare Pipeline for Transfer from Site (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3,234.88	3,206.82	6,441.70	5,246.68	0.00	0.00	0.00	11,688.38
Total	3,234.88	3,206.82	6,441.70	5,246.68	0.00	0.00	0.00	11,688.38

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
11,688.3800	16.0000	0.0625	730.5238	2.0000	0.5000	2.0000	5,844.1900

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
64.0000	0.0156	64.0000	100.6516	3,234.8800

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 2 Eff: 100.00 Crew Hrs: 16 Labor Pcs: 4.00 Equipment Pcs: 3.00

Notes: Disconnect and cut pipeline into 200' sections, raft them and tow them to next site.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	16.00	HR	US$	33.38	100.00	23.28	372.44
814HCDSP012	Submerged Pipeline - 12" %65	1.00	16.00	HR	US$	123.16	100.00	123.16	1,970.59
814HCDWT	Work Tugboat %65	1.00	16.00	HR	US$	252.13	100.00	181.48	2,903.65
OE15	Leverman	1.00	16.00	MH	US$	55.65	100.00	107.79	1,724.57
OE18	Mate	1.00	16.00	MH	US$	49.57	100.00	99.29	1,588.63
OE19	Deckhand	1.00	16.00	MH	US$	48.48	100.00	97.77	1,564.25
OE21	Oiler	1.00	16.00	MH	US$	48.48	100.00	97.77	1,564.25

Biditem

2007

DREDGING

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	180,381.88	155,240.01	335,621.89	441,822.92	0.00	0.00	24,000.00	801,444.81
Total	180,381.88	155,240.01	335,621.89	441,822.92	0.00	0.00	24,000.00	801,444.81

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
3,015.9200	0.0003	3,015.9200	265.7381	59.8099	111.2834	0.0013

Activity: A Dredge Area (Unreviewed) Quantity: 85200.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.12	1.82	3.94	5.19	0.00	0.00	0.00	9.12
Total	180,381.88	155,240.01	335,621.89	441,822.92	0.00	0.00	0.00	777,444.81

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
9.1249	0.0088	113.0000	1,031.1181	75.3982	1,130.0000	0.0009	10,311.1812

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
3,015.9200	28.2501	0.0354	111.2834	2.1172

Calendar: 60S 6x10 hr - Single Hrs/Shift: 10 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: UH 113 Eff: 100.00 Crew Hrs: 753.9823 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Total Bid Quantity, inflated by 20% markup to account for hydraulic lossses in the beach placement - 71,000 cy * 1.2 = 85,200 cy. Total dredge area based on a 3-foot borrow depth is 766,800 sf or 17.6 acres.

Dredge is assumed to work 10 hrs/day, 6 days/week (260 hrs/mo) each crew working a 10-hour shift. Gross production - 29,575 cy/mo or approx. 113 cy/hr.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	753.98	HR	US$	33.38	100.00	23.28	17,550.69
814HCDSP012	Submerged Pipeline - 12" %65	1.00	753.98	HR	US$	123.16	100.00	123.16	92,861.68
814HCDWT	Work Tugboat %65	1.00	753.98	HR	US$	252.13	100.00	181.48	136,830.71
814HCSD012CP	Hyd Cutterhead Dredge 12" % 65	1.00	753.98	HR	US$	351.52	100.00	258.07	194,579.84
OE15	Leverman	1.00	753.98	MH	US$	55.65	118.33	119.49	90,094.15
OE18	Mate	1.00	753.98	MH	US$	49.57	118.33	109.72	82,723.50
OE19	Deckhand	1.00	753.98	MH	US$	48.48	118.33	107.96	81,402.12
OE21	Oiler	1.00	753.98	MH	US$	48.48	118.33	107.96	81,402.12

Activity: B Hydrographic Surveys (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 50S 5 x 10 Hr - Single Hrs/Shift: 10 WC: MARINE Over Water Work

Notes: Allow for pre- and post-hydrographic surveys and required submittals.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	2.00	2.00	EA	US$	12,000.00	100.00	12,000.00	24,000.00

Biditem - Parent **VACATION ISLAND NW**

3000

Takeoff Qty: 1.000 LS
Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	991,154.48	857,077.18	1,848,231.66	1,908,933.86	935,944.28	49,672.75	84,000.00	4,826,782.55
Total	991,154.48	857,077.18	1,848,231.66	1,908,933.86	935,944.28	49,672.75	84,000.00	4,826,782.55

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
17,806.4600	0.0001	17,806.4600	271.0692	55.6626	103.7956	0.0000

Biditem

3001

MOBILIZATION/DEMOBILIZATION

Takeoff Qty: 1.000 LS
Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	17,412.60	18,337.30	35,749.90	47,068.04	0.00	0.00	0.00	82,817.94
Total	17,412.60	18,337.30	35,749.90	47,068.04	0.00	0.00	0.00	82,817.94

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
380.0000	0.0026	380.0000	217.9419	45.8226	94.0787	0.0068

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 10.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	1,075.60	1,713.61	2,789.21	4,711.28	0.00	0.00	0.00	7,500.49

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0490	4.0000	0.2500	187.5123	5.0000	2.0000	0.5000	1,500.0980

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
40.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 40 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	40.00	HR	US$	16.91	100.00	16.91	676.44
820OHTT050	On Hwy Truck 50K	1.00	40.00	HR	US$	100.87	100.00	100.87	4,034.84
TE04	Truck Driver (Gr 5)	1.00	40.00	MH	US$	26.89	100.00	69.73	2,789.21

Activity: B Demobilization of Land Based Equip (Unreviewed) Quantity: 10.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	1,075.60	1,713.61	2,789.21	4,711.28	0.00	0.00	0.00	7,500.49

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0490	4.0000	0.2500	187.5123	5.0000	2.0000	0.5000	1,500.0980

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
40.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 40 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	40.00	HR	US$	16.91	100.00	16.91	676.44
820OHTT050	On Hwy Truck 50K	1.00	40.00	HR	US$	100.87	100.00	100.87	4,034.84

TE04	Truck Driver (Gr 5)	1.00	40.00	MH	US$	26.89	100.00	69.73	2,789.21

Activity: C Mobilization of Marine Equip (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	7,920.00	7,894.60	15,814.60	17,828.55	0.00	0.00	0.00	33,643.15
Total	7,920.00	7,894.60	15,814.60	17,828.55	0.00	0.00	0.00	33,643.15

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
33,643.1500	32.0000	0.0313	1,051.3484	4.0000	0.2500	4.0000	8,410.7875

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.0063	160.0000	98.8413	7,920.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: S 4 Eff: 100.00 Crew Hrs: 32 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Allow for 3 days to mobilize crane barge and rock barge plus 1 day at the site to set up operations.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
811LGS0020D	20kW Large GenSet	1.00	32.00	HR	US$	23.96	100.00	23.96	766.56
814CB075	Crane Barge - 75 Ton	1.00	32.00	HR	US$	136.78	100.00	136.78	4,376.90
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	64.00	HR	US$	108.23	100.00	108.23	6,926.59
814ITB0250	Inland Tug - 250hp	1.00	32.00	HR	US$	133.81	100.00	133.81	4,281.89
814RUN016	Runabout 16ft	1.00	32.00	HR	US$	34.84	100.00	34.84	1,114.91
818PW350S	Portable Welder Skid 350 amp	1.00	32.00	HR	US$	11.30	100.00	11.30	361.70
OE10	Crane Operator (<100 tn)	1.00	32.00	MH	US$	51.40	100.00	100.10	3,203.05
OE17	Engineer	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE18	Mate	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE19	Deckhand	2.00	64.00	MH	US$	48.48	100.00	97.77	6,257.03

Activity: D Demobilization of Marine Equip (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3,960.00	3,947.30	7,907.30	8,914.28	0.00	0.00	0.00	16,821.58
Total	3,960.00	3,947.30	7,907.30	8,914.28	0.00	0.00	0.00	16,821.58

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
16,821.5800	16.0000	0.0625	1,051.3488	2.0000	0.5000	2.0000	8,410.7900

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
80.0000	0.0125	80.0000	98.8413	3,960.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: S 2 Eff: 100.00 Crew Hrs: 16 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Allow one day to clean up and one day to demobilize crane barge.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
811LGS0020D	20kW Large GenSet	1.00	16.00	HR	US$	23.96	100.00	23.96	383.28
814CB075	Crane Barge - 75 Ton	1.00	16.00	HR	US$	136.78	100.00	136.78	2,188.45
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	32.00	HR	US$	108.23	100.00	108.23	3,463.30
814ITB0250	Inland Tug - 250hp	1.00	16.00	HR	US$	133.81	100.00	133.81	2,140.94
814RUN016	Runabout 16ft	1.00	16.00	HR	US$	34.84	100.00	34.84	557.46
818PW350S	Portable Welder Skid 350 amp	1.00	16.00	HR	US$	11.30	100.00	11.30	180.85
OE10	Crane Operator (<100 tn)	1.00	16.00	MH	US$	51.40	100.00	100.10	1,601.52
OE17	Engineer	1.00	16.00	MH	US$	49.57	100.00	99.29	1,588.63
OE18	Mate	1.00	16.00	MH	US$	49.57	100.00	99.29	1,588.63
OE19	Deckhand	2.00	32.00	MH	US$	48.48	100.00	97.77	3,128.52

Activity: E Towing (Unreviewed) Quantity: 2.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,690.70	1,534.09	3,224.79	5,451.33	0.00	0.00	0.00	8,676.12
Total	3,381.40	3,068.18	6,449.58	10,902.65	0.00	0.00	0.00	17,352.23

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
8,676.1150	10.0000	0.1000	867.6115	2.0000	1.0000	1.0000	8,676.1150

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
60.0000	0.0333	30.0000	107.4930	1,690.7000

Calendar: 50S 5 x 10 Hr - Single Hrs/Shift: 10 WC: MARINE Over Water Work

Crew: TOWL Towing - Local Crew Prod: SU 1 Eff: 100.00 Crew Hrs: 20 Labor Pcs: 3.00 Equipment Pcs: 1.00

Notes: Allow for two tows to account for mobilization to site and demobilization from site. Assume contractor is local to San Diego and is towing from location in San Diego Bay. Allow one shift for each tow.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814TB1350	Tow Boat - 1,350hp %50	1.00	20.00	HR	US$	895.11	100.00	545.13	10,902.65
OE15	Leverman	1.00	20.00	MH	US$	55.65	110.00	114.17	2,283.44
OE17	Engineer	1.00	20.00	MH	US$	49.57	110.00	104.98	2,099.55
OE19	Deckhand	1.00	20.00	MH	US$	48.48	110.00	103.33	2,066.59

Biditem

3002

SWPPP

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
14.0000	0.0714	14.0000	1,094.1429	40.5257	77.0507	0.2500

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $10,000 due to size of area and length of beach that has to be traversed by land equipment.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2900	4.0000	0.2500	317.3225	0.5000	2.0000	0.5000	10,636.0000

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.0714	14.0000	77.0507	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	21.00	TON	US$	7.50	107.75	8.08	169.71
3STRPL	Trench Plate Rental - 8'x10'	1.00	18.00	MO	US$	200.00	107.75	215.50	3,879.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	76.09	152.18
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	69.22	553.75
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	93.20	372.78

Biditem

3003

SHORELINE RECONSTRUCTION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	537,969.33	461,424.69	999,394.02	808,006.74	926,201.41	0.00	50,000.00	2,783,602.17
Total	537,969.33	461,424.69	999,394.02	808,006.74	926,201.41	0.00	50,000.00	2,783,602.17

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
10,046.5800	0.0001	10,046.5800	277.0696	53.5475	99.4760	0.0005

Activity: A Place Sand Fill for Beach Nourishment (Unreviewed) Quantity: 197040.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.39	2.01	4.40	3.27	0.00	0.00	0.00	7.67
Total	471,514.29	395,947.25	867,461.54	644,622.24	0.00	0.00	0.00	1,512,083.78

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7.6740	0.0088	113.0000	867.1613	174.3717	1,130.0000	0.0009	8,671.6133

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
8,718.5800	22.6000	0.0442	99.4957	2.3930

Calendar: 60S 6x10 hr - Single Hrs/Shift: 10 WC: MARINE Over Water Work

Crew: EXC (Mod) ExcavationCrew Prod: UH 113 Eff: 100.00 Crew Hrs: 1743.7168 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Place inflated Sand Fill Volume (see dredging sub-item for explanantion) of 197,040 cy to required template within sand fill nourishment footprint. Allow for shore crew to place dredged material to required grades.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL950	CAT 950H F.E. Loader 4cy	1.00	1,743.72	HR	US$	89.04	100.00	89.04	155,255.60
809SCD06T	CAT D6T Dozer	2.00	3,487.43	HR	US$	140.32	100.00	140.32	489,366.64
LA02	Laborer (Gr 5)	2.00	3,487.43	MH	US$	39.02	118.33	85.37	297,722.91
OE03	Operator (Gr 14)	1.00	1,743.72	MH	US$	50.36	118.33	109.23	190,473.95
OE05	Operator (Gr 10)	2.00	3,487.43	MH	US$	50.06	118.33	108.75	379,264.68

Activity: B Place Rip Rap Stone Groin (Unreviewed) Quantity: 21420.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.47	2.44	4.91	5.39	43.24	0.00	0.00	53.54
Total	52,929.44	52,176.96	105,106.40	115,412.84	926,201.41	0.00	0.00	1,146,720.65

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
10.2950	0.0071	140.9211	1,450.7845	19.0000	1,127.3684	0.0009	60,353.7184

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
1,064.0000	20.1316	0.0497	98.7842	2.4710

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 (Mod) Crane Barge, 5-Men Prod: UH 140.9211 Eff: 100.00 Crew Hrs: 152 Labor Pcs: 7.00 Equipment Pcs: 9.00

Notes: Vacation Island rock groins = 13,600 cy total. That is assuming 1.5:1 side slopes all the way around. Assume 5% Waste, so 13,600 CY *1.05 = 14,280 CY, or 21,420 Ton @ 1.5 Ton.

Assume rip rap is placed using 75-ton crane barge. Assume crane barge will start as close to shore as possible working high tides and place rock to an elevation where an excavator can be placed on the rock groin to construct the segment from the crane barge inshore. Offshore end to be constructed with the crane barge with the slopes shaped by an excavator.

Budget cost for rip rap stone recieved from Granite Construction quarry (Rosemary's Mountain) in Fallbrook at $23/ton for material and $14-15/ton for delivery to project site - $37/ton total cost. Use $40/ton.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BA110	Armor Stone 2 -> 5 T	1.00	21,420.00	TON	US$	40.00	107.75	43.10	923,202.00
2EC32	Woven Geotextile	1.00	2,226.94	SY	US$	1.25	107.75	1.35	2,999.41
809FEL950	CAT 950H F.E. Loader 4cy	1.00	152.00	HR	US$	89.04	100.00	89.04	13,533.62
810CMHE320	CAT 320DL Excavator 1.18cy	1.00	152.00	HR	US$	113.12	100.00	113.12	17,193.63
811LGS0020D	20kW Large GenSet	1.00	152.00	HR	US$	23.96	100.00	23.96	3,641.16

814CB075	Crane Barge - 75 Ton	1.00	152.00	HR	US$	136.78	100.00	136.78	20,790.26
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	304.00	HR	US$	108.23	100.00	108.23	32,901.31
814ITB0250	Inland Tug - 250hp	1.00	152.00	HR	US$	133.81	100.00	133.81	20,338.97
814RUN016	Runabout 16ft	1.00	152.00	HR	US$	34.84	100.00	34.84	5,295.83
818PW350S	Portable Welder Skid 350 amp	1.00	152.00	HR	US$	11.30	100.00	11.30	1,718.06
OE03	Operator (Gr 14)	2.00	304.00	MH	US$	50.36	100.00	98.64	29,987.07
OE10	Crane Operator (<100 tn)	1.00	152.00	MH	US$	51.40	100.00	100.10	15,214.46
OE17	Engineer	1.00	152.00	MH	US$	49.57	100.00	99.29	15,091.99
OE18	Mate	1.00	152.00	MH	US$	49.57	100.00	99.29	15,091.99
OE19	Deckhand	2.00	304.00	MH	US$	48.48	100.00	97.77	29,720.89

Activity: C Tow Rock Barges (Unreviewed) Quantity: 11.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,229.60	1,209.13	2,438.73	4,361.06	0.00	0.00	0.00	6,799.79
Total	13,525.60	13,300.48	26,826.08	47,971.66	0.00	0.00	0.00	74,797.74

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
6,799.7945	8.0000	0.1250	849.9743	11.0000	1.0000	1.0000	6,799.7945

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
264.0000	0.0417	24.0000	101.6139	1,229.6000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: TOWL Towing - Local Crew Prod: HU 8 Eff: 100.00 Crew Hrs: 88 Labor Pcs: 3.00 Equipment Pcs: 1.00

Notes: Allow for towing of rock barges to/from project site. Assume barges are towed from contractor's yard in San Diego Bay. Allow 8 hours for each tow. Assuming each barge holds 2,000 ton, total no. of tows - 21,420 ton/2,000 ton = 11 tows.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814TB1350	Tow Boat - 1,350hp %50	1.00	88.00	HR	US$	895.11	100.00	545.13	47,971.66
OE15	Leverman	1.00	88.00	MH	US$	55.65	100.00	107.79	9,485.19
OE17	Engineer	1.00	88.00	MH	US$	49.57	100.00	99.29	8,737.47
OE19	Deckhand	1.00	88.00	MH	US$	48.48	100.00	97.77	8,603.42

Activity: D Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Allow for pre- and post-construction surveys for cobble dike and sand fill. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	25,000.00	100.00	25,000.00	50,000.00

Biditem

3004

CONSTRUCTION ACCESS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3,680.40	3,593.72	7,274.12	1,926.80	0.00	43,100.00	0.00	52,300.92
Total	3,680.40	3,593.72	7,274.12	1,926.80	0.00	43,100.00	0.00	52,300.92

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
100.0000	0.0100	100.0000	523.0092	36.8040	72.7412	0.0250

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 8.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	460.05	449.22	909.27	240.85	0.00	5,387.50	0.00	6,537.62
Total	3,680.40	3,593.72	7,274.12	1,926.80	0.00	43,100.00	0.00	52,300.92

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,150.1150	5.0000	0.2000	230.0230	5.0000	1.6000	0.6250	10,460.1840

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit

100.0000	0.0800	12.5000	72.7412	460.0500

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 5 Eff: 100.00 Crew Hrs: 40 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing sidewalks and work areas for 7.6 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 1,900 lf/500 ft = 4 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 3 ea. moves, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	8.00	MO	US$	5,000.00	107.75	5,387.50	43,100.00
820OHLDTC44	LD Truck 4x4 1.75t	1.00	40.00	HR	US$	48.17	100.00	48.17	1,926.80
LA01	Laborer Foreman	0.50	20.00	MH	US$	41.02	100.00	78.48	1,569.63
LA03	Laborer (Gr 4)	2.00	80.00	MH	US$	35.75	100.00	71.31	5,704.49

Biditem 3005

INSTALL SIGNS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,418.40	1,361.20	2,779.60	476.44	9,573.16	0.00	0.00	12,829.20
Total	1,418.40	1,361.20	2,779.60	476.44	9,573.16	0.00	0.00	12,829.20

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
35.0000	0.0286	35.0000	366.5486	40.5257	79.4171	0.1000

Activity: A Install Signs (Unreviewed) Quantity: 20.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	1,418.40	1,361.20	2,779.60	476.44	9,573.16	0.00	0.00	12,829.20

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8020	0.5000	2.0000	325.6040	1.2500	16.0000	0.0625	10,263.3600

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
35.0000	0.5714	1.7500	79.4171	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 10 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 20 of each: Beach Access Signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	20.00	EA	US$	44.23	107.75	47.66	953.16
2T5101	Construction Signs	1.00	20.00	EA	US$	400.00	107.75	431.00	8,620.00
809TLB416E	CAT 416E Backhoe	1.00	10.00	HR	US$	47.64	100.00	47.64	476.44
LA01	Laborer Foreman	0.50	5.00	MH	US$	41.02	100.00	78.48	392.40
LA03	Laborer (Gr 4)	2.00	20.00	MH	US$	35.75	100.00	71.31	1,426.12
OE07	Operator (Gr 6)	1.00	10.00	MH	US$	49.83	100.00	96.11	961.08

Biditem 3006

MOB./DEMOB. DREDGING

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	12,939.52	12,827.36	25,766.88	29,466.97	0.00	2,693.75	0.00	57,927.60
Total	12,939.52	12,827.36	25,766.88	29,466.97	0.00	2,693.75	0.00	57,927.60

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
256.0000	0.0039	256.0000	226.2797	50.5450	100.6519	0.0156

Activity: A Prepare Dredge at Jobsite (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76
Total	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7,908.7600	8.0000	0.1250	988.5950	1.0000	1.0000	1.0000	7,908.7600

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
32.0000	0.0313	32.0000	100.6519	1,617.4400

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 1 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Allow one shift at jobsite to prepare dredge to work.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	8.00	HR	US$	33.38	100.00	23.28	186.22
814HCDSP012	Submerged Pipeline - 12" %65	1.00	8.00	HR	US$	123.16	100.00	123.16	985.30
814HCDWT	Work Tugboat %65	1.00	8.00	HR	US$	252.13	100.00	181.48	1,451.82
814HCSD012CP	Hyd Cutterhead Dredge 12" % 65	1.00	8.00	HR	US$	351.52	100.00	258.07	2,064.56
OE15	Leverman	1.00	8.00	MH	US$	55.65	100.00	107.79	862.29
OE18	Mate	1.00	8.00	MH	US$	49.57	100.00	99.29	794.31
OE19	Deckhand	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13
OE21	Oiler	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13

Activity: B Prepare Pipeline at Jobsite (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	6,469.76	6,413.70	12,883.46	14,844.49	0.00	2,693.75	0.00	30,421.70
Total	6,469.76	6,413.70	12,883.46	14,844.49	0.00	2,693.75	0.00	30,421.70

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
27,727.9500	32.0000	0.0313	866.4984	4.0000	0.2500	4.0000	7,605.4250

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
128.0000	0.0078	128.0000	100.6520	6,469.7600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 4 Eff: 100.00 Crew Hrs: 32 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Allow three shifts to offload pipeline from trucks, fuse pipeline, and pull pipeline sections into location and connect joints. Connect pipeline to dredge and place shore pipeline.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3FSMC	Fusion Machine Rental	1.00	5.00	DAY	US$	500.00	107.75	538.75	2,693.75
813RT600E	GROVE RT600E RT Crane 40mt	1.00	32.00	HR	US$	135.97	100.00	135.97	4,351.14
814CSURV90	Crew/Survey Boat %65	1.00	32.00	HR	US$	33.38	100.00	23.28	744.88
814HCDSP012	Submerged Pipeline - 12" %65	1.00	32.00	HR	US$	123.16	100.00	123.16	3,941.18
814HCDWT	Work Tugboat %65	1.00	32.00	HR	US$	252.13	100.00	181.48	5,807.29
OE15	Leverman	1.00	32.00	MH	US$	55.65	100.00	107.79	3,449.16
OE18	Mate	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE19	Deckhand	1.00	32.00	MH	US$	48.48	100.00	97.77	3,128.52
OE21	Oiler	1.00	32.00	MH	US$	48.48	100.00	97.77	3,128.52

Activity: C Prepare Dredge for Transfer from Site (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76
Total	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7,908.7600	8.0000	0.1250	988.5950	1.0000	1.0000	1.0000	7,908.7600

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit

32.0000	0.0313	32.0000	100.6519	1,617.4400

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 1 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Allow one shift to prepare dredge for tow back to next dredging area.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	8.00	HR	US$	33.38	100.00	23.28	186.22
814HCDSP012	Submerged Pipeline - 12" %65	1.00	8.00	HR	US$	123.16	100.00	123.16	985.30
814HCDWT	Work Tugboat %65	1.00	8.00	HR	US$	252.13	100.00	181.48	1,451.82
814HCSD012CP	Hyd Cutterhead Dredge 12" % 65	1.00	8.00	HR	US$	351.52	100.00	258.07	2,064.56
OE15	Leverman	1.00	8.00	MH	US$	55.65	100.00	107.79	862.29
OE18	Mate	1.00	8.00	MH	US$	49.57	100.00	99.29	794.31
OE19	Deckhand	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13
OE21	Oiler	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13

Activity: D Prepare Pipeline for Transfer from Site (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3,234.88	3,206.82	6,441.70	5,246.68	0.00	0.00	0.00	11,688.38
Total	3,234.88	3,206.82	6,441.70	5,246.68	0.00	0.00	0.00	11,688.38

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
11,688.3800	16.0000	0.0625	730.5238	2.0000	0.5000	2.0000	5,844.1900

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
64.0000	0.0156	64.0000	100.6516	3,234.8800

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 2 Eff: 100.00 Crew Hrs: 16 Labor Pcs: 4.00 Equipment Pcs: 3.00

Notes: Disconnect and cut pipeline into 200' sections, raft them and tow them to next site.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	16.00	HR	US$	33.38	100.00	23.28	372.44
814HCDSP012	Submerged Pipeline - 12" %65	1.00	16.00	HR	US$	123.16	100.00	123.16	1,970.59
814HCDWT	Work Tugboat %65	1.00	16.00	HR	US$	252.13	100.00	181.48	2,903.65
OE15	Leverman	1.00	16.00	MH	US$	55.65	100.00	107.79	1,724.57
OE18	Mate	1.00	16.00	MH	US$	49.57	100.00	99.29	1,588.63
OE19	Deckhand	1.00	16.00	MH	US$	48.48	100.00	97.77	1,564.25
OE21	Oiler	1.00	16.00	MH	US$	48.48	100.00	97.77	1,564.25

Biditem

3007

DREDGING

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	417,166.87	359,021.56	776,188.43	1,021,798.29	0.00	0.00	24,000.00	1,821,986.72
Total	417,166.87	359,021.56	776,188.43	1,021,798.29	0.00	0.00	24,000.00	1,821,986.72

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
6,974.8800	0.0001	6,974.8800	261.2212	59.8099	111.2834	0.0006

Activity: A Dredge Area (Unreviewed) Quantity: 197040.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.12	1.82	3.94	5.19	0.00	0.00	0.00	9.12
Total	417,166.87	359,021.56	776,188.43	1,021,798.29	0.00	0.00	0.00	1,797,986.72

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
9.1250	0.0088	113.0000	1,031.1231	174.3717	1,130.0000	0.0009	10,311.2313

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
6,974.8800	28.2499	0.0354	111.2834	2.1172

Calendar: 60S 6x10 hr - Single Hrs/Shift: 10 WC: CA3 Dredging

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: UH 113 Eff: 100.00 Crew Hrs: 1743.7168 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Total Bid Quantity, inflated by 20% losses to account for hydraulic lossses in the beach placement - 164,200 cy * 1.2 = 197,040 cy. Total dredge area based on a 3-foot borrow depth is 1,773,360 sf or 40.71 acres.

Dredge is assumed to work 10 hrs/day, 6 days/week (260 hrs/mo) each crew working a 10-hour shift. Gross production - 29,575 cy/mo or approx. 113 cy/hr.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	1,743.72	HR	US$	33.38	100.00	23.28	40,589.27
814HCDSP012	Submerged Pipeline - 12" %65	1.00	1,743.72	HR	US$	123.16	100.00	123.16	214,760.04
814HCDWT	Work Tugboat %65	1.00	1,743.72	HR	US$	252.13	100.00	181.48	316,446.64
814HCSD012CP	Hyd Cutterhead Dredge 12" % 65	1.00	1,743.72	HR	US$	351.52	100.00	258.07	450,002.34
OE15	Leverman	1.00	1,743.72	MH	US$	55.65	118.33	119.49	208,359.57
OE18	Mate	1.00	1,743.72	MH	US$	49.57	118.33	109.72	191,313.58
OE19	Deckhand	1.00	1,743.72	MH	US$	48.48	118.33	107.96	188,257.64
OE21	Oiler	1.00	1,743.72	MH	US$	48.48	118.33	107.96	188,257.64

Activity: B Hydrographic Surveys (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 50S 5 x 10 Hr - Single Hrs/Shift: 10 WC: CA3 Dredging

Notes: Allow for pre- and post-hydrographic surveys and required submittals.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	2.00	2.00	EA	US$	12,000.00	100.00	12,000.00	24,000.00

Biditem - Parent

4000

WEST SAIL BAY

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567,421.33	487,083.73	1,054,505.06	1,133,695.22	8,785.55	33,510.25	74,000.00	2,304,496.08
Total	567,421.33	487,083.73	1,054,505.06	1,133,695.22	8,785.55	33,510.25	74,000.00	2,304,496.08

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
10,200.8400	0.0001	10,200.8400	225.9124	55.6250	103.3743	0.0000

Biditem

4001

MOBILIZATION/DEMOBILIZATION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2,151.20	3,427.22	5,578.42	9,422.56	0.00	0.00	0.00	15,000.98
Total	2,151.20	3,427.22	5,578.42	9,422.56	0.00	0.00	0.00	15,000.98

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
80.0000	0.0125	80.0000	187.5123	26.8900	69.7303	0.0125

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 10.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	1,075.60	1,713.61	2,789.21	4,711.28	0.00	0.00	0.00	7,500.49

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0490	4.0000	0.2500	187.5123	5.0000	2.0000	0.5000	1,500.0980

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit

40.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 40 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 10 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	40.00	HR	US$	16.91	100.00	16.91	676.44
820OHTT050	On Hwy Truck 50K	1.00	40.00	HR	US$	100.87	100.00	100.87	4,034.84
TE04	Truck Driver (Gr 5)	1.00	40.00	MH	US$	26.89	100.00	69.73	2,789.21

Activity: B Demobilization of Land Based Equip (Unreviewed) Quantity: 10.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	1,075.60	1,713.61	2,789.21	4,711.28	0.00	0.00	0.00	7,500.49

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0490	4.0000	0.2500	187.5123	5.0000	2.0000	0.5000	1,500.0980

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
40.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 40 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 10 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	40.00	HR	US$	16.91	100.00	16.91	676.44
820OHTT050	On Hwy Truck 50K	1.00	40.00	HR	US$	100.87	100.00	100.87	4,034.84
TE04	Truck Driver (Gr 5)	1.00	40.00	MH	US$	26.89	100.00	69.73	2,789.21

Biditem

4002

SWPPP

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
14.0000	0.0714	14.0000	1,094.1429	40.5257	77.0507	0.2500

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $10,000 due to travel of equipment on and off the beach.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2900	4.0000	0.2500	317.3225	0.5000	2.0000	0.5000	10,636.0000

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.0714	14.0000	77.0507	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	21.00	TON	US$	7.50	107.75	8.08	169.71
3STRPL	Trench Plate Rental - 8'x10'	1.00	18.00	MO	US$	200.00	107.75	215.50	3,879.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	76.09	152.18
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	69.22	553.75
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	93.20	372.78

Biditem

4003

SHORELINE RECONSTRUCTION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	255,854.24	214,917.51	470,771.75	382,646.72	0.00	0.00	40,000.00	893,418.47
Total	255,854.24	214,917.51	470,771.75	382,646.72	0.00	0.00	40,000.00	893,418.47

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
4,838.2400	0.0002	4,838.2400	184.6577	52.8817	97.3023	0.0008

Activity: A Place Sand Fill for Beach Nourishment (Unreviewed) Quantity: 136680.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1.87	1.57	3.44	2.80	0.00	0.00	0.00	6.24
Total	255,854.24	214,917.51	470,771.75	382,646.72	0.00	0.00	0.00	853,418.47

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
6.2439	0.0088	113.0000	705.5625	120.9558	1,130.0000	0.0009	7,055.6255

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
4,838.2400	28.2499	0.0354	97.3023	1.8719

Calendar: 60S 6x10 hr - Single Hrs/Shift: 10 WC: MARINE Over Water Work

Crew: EXC ExcavationCrew Prod: UH 113 Eff: 100.00 Crew Hrs: 1209.5575 Labor Pcs: 4.00 Equipment Pcs: 3.00

Notes: Place inflated Sand Fill Volume (see dredging sub-item for explanantion) of 136,680 cy to required template within sand fill nourishment footprint. Allow for shore crew to place dredged material to required grades.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL950	CAT 950H F.E. Loader 4cy	1.00	1,209.56	HR	US$	89.04	100.00	89.04	107,695.59
810CMHE330	CAT 330D L Excavator 1.56cy	1.00	1,209.56	HR	US$	163.39	100.00	163.39	197,625.17
820OHRD007	On Hwy End Dump 7-8cy	1.00	1,209.56	HR	US$	63.93	100.00	63.93	77,325.96
LA02	Laborer (Gr 5)	2.00	2,419.12	MH	US$	39.02	118.33	85.37	206,520.97
OE03	Operator (Gr 14)	2.00	2,419.12	MH	US$	50.36	118.33	109.23	264,250.78

Activity: C Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Allow for pre- and post-construction surveys for cobble dike and sand fill. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	20,000.00	100.00	20,000.00	40,000.00

Biditem

4004

CONSTRUCTION ACCESS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	5,257.81	5,133.99	10,391.80	2,752.43	0.00	26,937.50	0.00	40,081.73
Total	5,257.81	5,133.99	10,391.80	2,752.43	0.00	26,937.50	0.00	40,081.73

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
142.8600	0.0070	142.8600	280.5665	36.8039	72.7411	0.0175

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 5.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,051.56	1,026.80	2,078.36	550.49	0.00	5,387.50	0.00	8,016.35
Total	5,257.81	5,133.99	10,391.80	2,752.43	0.00	26,937.50	0.00	40,081.73

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
2,628.8460	11.4286	0.0875	230.0239	7.1429	0.7000	1.4286	5,611.4380

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
142.8600	0.0350	28.5720	72.7411	1,051.5620

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 7.1429 Eff: 100.00 Crew Hrs: 57.1429 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing sidewalks and work areas for 5 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 1,650 lf/500 ft = 4 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 3 ea. moves, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	5.00	MO	US$	5,000.00	107.75	5,387.50	26,937.50
820OHLDTC44	LD Truck 4x4 1.75t	1.00	57.14	HR	US$	48.17	100.00	48.17	2,752.43
LA01	Laborer Foreman	0.50	28.57	MH	US$	41.02	100.00	78.48	2,242.21
LA03	Laborer (Gr 4)	2.00	114.29	MH	US$	35.75	100.00	71.31	8,149.59

Biditem

4005

INSTALL SIGNS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,276.56	1,225.09	2,501.65	428.80	8,615.84	0.00	0.00	11,546.29
Total	1,276.56	1,225.09	2,501.65	428.80	8,615.84	0.00	0.00	11,546.29

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
31.5000	0.0317	31.5000	366.5489	40.5257	79.4175	0.1111

Activity: A Install Signs (Unreviewed) Quantity: 18.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	1,276.56	1,225.09	2,501.65	428.80	8,615.84	0.00	0.00	11,546.29

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8028	0.5000	2.0000	325.6056	1.1250	16.0000	0.0625	10,263.3689

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
31.5000	0.5714	1.7500	79.4175	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 9 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 18 of each: Beach Access Signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	18.00	EA	US$	44.23	107.75	47.66	857.84
2T5101	Construction Signs	1.00	18.00	EA	US$	400.00	107.75	431.00	7,758.00
809TLB416E	CAT 416E Backhoe	1.00	9.00	HR	US$	47.64	100.00	47.64	428.80
LA01	Laborer Foreman	0.50	4.50	MH	US$	41.02	100.00	78.48	353.17
LA03	Laborer (Gr 4)	2.00	18.00	MH	US$	35.75	100.00	71.31	1,283.52
OE07	Operator (Gr 6)	1.00	9.00	MH	US$	49.83	100.00	96.11	864.96

Biditem

4006

MOB./DEMOB. DREDGING

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	12,939.52	12,827.36	25,766.88	29,466.97	0.00	2,693.75	0.00	57,927.60
Total	12,939.52	12,827.36	25,766.88	29,466.97	0.00	2,693.75	0.00	57,927.60

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
256.0000	0.0039	256.0000	226.2797	50.5450	100.6519	0.0156

Activity: A Prepare Dredge at Jobsite (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76
Total	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7,908.7600	8.0000	0.1250	988.5950	1.0000	1.0000	1.0000	7,908.7600

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
32.0000	0.0313	32.0000	100.6519	1,617.4400

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 1 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Allow one shift at jobsite to prepare dredge to work.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	8.00	HR	US$	33.38	100.00	23.28	186.22
814HCDSP012	Submerged Pipeline - 12" %65	1.00	8.00	HR	US$	123.16	100.00	123.16	985.30
814HCDWT	Work Tugboat %65	1.00	8.00	HR	US$	252.13	100.00	181.48	1,451.82
814HCSD012CP	Hyd Cutterhead Dredge 12" % 65	1.00	8.00	HR	US$	351.52	100.00	258.07	2,064.56
OE15	Leverman	1.00	8.00	MH	US$	55.65	100.00	107.79	862.29
OE18	Mate	1.00	8.00	MH	US$	49.57	100.00	99.29	794.31
OE19	Deckhand	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13
OE21	Oiler	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13

Activity: B Prepare Pipeline at Jobsite (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	6,469.76	6,413.70	12,883.46	14,844.49	0.00	2,693.75	0.00	30,421.70
Total	6,469.76	6,413.70	12,883.46	14,844.49	0.00	2,693.75	0.00	30,421.70

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
27,727.9500	32.0000	0.0313	866.4984	4.0000	0.2500	4.0000	7,605.4250

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
128.0000	0.0078	128.0000	100.6520	6,469.7600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 4 Eff: 100.00 Crew Hrs: 32 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Allow three shifts to offload pipeline from trucks, fuse pipeline, and pull pipeline sections into location and connect joints. Connect pipeline to dredge and place shore pipeline.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3FSMC	Fusion Machine Rental	1.00	5.00	DAY	US$	500.00	107.75	538.75	2,693.75
813RT600E	GROVE RT600E RT Crane 40mt	1.00	32.00	HR	US$	135.97	100.00	135.97	4,351.14
814CSURV90	Crew/Survey Boat %65	1.00	32.00	HR	US$	33.38	100.00	23.28	744.88
814HCDSP012	Submerged Pipeline - 12" %65	1.00	32.00	HR	US$	123.16	100.00	123.16	3,941.18
814HCDWT	Work Tugboat %65	1.00	32.00	HR	US$	252.13	100.00	181.48	5,807.29
OE15	Leverman	1.00	32.00	MH	US$	55.65	100.00	107.79	3,449.16
OE18	Mate	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE19	Deckhand	1.00	32.00	MH	US$	48.48	100.00	97.77	3,128.52
OE21	Oiler	1.00	32.00	MH	US$	48.48	100.00	97.77	3,128.52

Activity: C Prepare Dredge for Transfer from Site (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76
Total	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7,908.7600	8.0000	0.1250	988.5950	1.0000	1.0000	1.0000	7,908.7600

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
32.0000	0.0313	32.0000	100.6519	1,617.4400

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 1 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Allow one shift to prepare dredge for tow back to next dredging area.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	8.00	HR	US$	33.38	100.00	23.28	186.22
814HCDSP012	Submerged Pipeline - 12" %65	1.00	8.00	HR	US$	123.16	100.00	123.16	985.30
814HCDWT	Work Tugboat %65	1.00	8.00	HR	US$	252.13	100.00	181.48	1,451.82
814HCSD012CP	Hyd Cutterhead Dredge 12" % 65	1.00	8.00	HR	US$	351.52	100.00	258.07	2,064.56
OE15	Leverman	1.00	8.00	MH	US$	55.65	100.00	107.79	862.29
OE18	Mate	1.00	8.00	MH	US$	49.57	100.00	99.29	794.31
OE19	Deckhand	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13
OE21	Oiler	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13

Activity: D Prepare Pipeline for Transfer from Site (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3,234.88	3,206.82	6,441.70	5,246.68	0.00	0.00	0.00	11,688.38
Total	3,234.88	3,206.82	6,441.70	5,246.68	0.00	0.00	0.00	11,688.38

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
11,688.3800	16.0000	0.0625	730.5238	2.0000	0.5000	2.0000	5,844.1900

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
64.0000	0.0156	64.0000	100.6516	3,234.8800

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 2 Eff: 100.00 Crew Hrs: 16 Labor Pcs: 4.00 Equipment Pcs: 3.00

Notes: Disconnect and cut pipeline into 200' sections, raft them and tow them to next site.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	16.00	HR	US$	33.38	100.00	23.28	372.44
814HCDSP012	Submerged Pipeline - 12" %65	1.00	16.00	HR	US$	123.16	100.00	123.16	1,970.59
814HCDWT	Work Tugboat %65	1.00	16.00	HR	US$	252.13	100.00	181.48	2,903.65
OE15	Leverman	1.00	16.00	MH	US$	55.65	100.00	107.79	1,724.57
OE18	Mate	1.00	16.00	MH	US$	49.57	100.00	99.29	1,588.63
OE19	Deckhand	1.00	16.00	MH	US$	48.48	100.00	97.77	1,564.25
OE21	Oiler	1.00	16.00	MH	US$	48.48	100.00	97.77	1,564.25

Biditem

4007

DREDGING

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	289,374.64	249,041.21	538,415.85	708,787.16	0.00	0.00	24,000.00	1,271,203.01
Total	289,374.64	249,041.21	538,415.85	708,787.16	0.00	0.00	24,000.00	1,271,203.01

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
4,838.2400	0.0002	4,838.2400	262.7408	59.8099	111.2834	0.0008

Activity: A Dredge Area (Unreviewed) Quantity: 136680.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.12	1.82	3.94	5.19	0.00	0.00	0.00	9.12
Total	289,374.64	249,041.21	538,415.85	708,787.16	0.00	0.00	0.00	1,247,203.01

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
9.1250	0.0088	113.0000	1,031.1234	120.9558	1,130.0000	0.0009	10,311.2337

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
4,838.2400	28.2499	0.0354	111.2834	2.1172

Calendar: 60S 6x10 hr - Single Hrs/Shift: 10 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: UH 113 Eff: 100.00 Crew Hrs: 1209.5575 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Total Bid Quantity, inflated by 20% losses to account for hydraulic lossses in the beach placement - 113,900 cy * 1.2 = 136,680 cy. Total dredge area based on a 3-foot borrow depth is 1,230,120 sf or 28.24 acres.

Dredge is assumed to work 10 hrs/day, 6 days/week (260 hrs/mo) each crew working a 10-hour shift. Gross production - 29,575 cy/mo or approx. 113 cy/hr.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	1,209.56	HR	US$	33.38	100.00	23.28	28,155.41
814HCDSP012	Submerged Pipeline - 12" %65	1.00	1,209.56	HR	US$	123.16	100.00	123.16	148,971.83
814HCDWT	Work Tugboat %65	1.00	1,209.56	HR	US$	252.13	100.00	181.48	219,508.41
814HCSD012CP	Hyd Cutterhead Dredge 12" % 65	1.00	1,209.56	HR	US$	351.52	100.00	258.07	312,151.51
OE15	Leverman	1.00	1,209.56	MH	US$	55.65	118.33	119.49	144,532.04
OE18	Mate	1.00	1,209.56	MH	US$	49.57	118.33	109.72	132,707.81
OE19	Deckhand	1.00	1,209.56	MH	US$	48.48	118.33	107.96	130,588.00
OE21	Oiler	1.00	1,209.56	MH	US$	48.48	118.33	107.96	130,588.00

Activity: B Hydrographic Surveys (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 50S 5 x 10 Hr - Single Hrs/Shift: 10 WC: MARINE Over Water Work

Notes: Allow for pre- and post-hydrographic surveys and required submittals.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	2.00	2.00	EA	US$	12,000.00	100.00	12,000.00	24,000.00

Biditem - Parent

5000

VACATION ISLAND SW

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	214,519.67	200,075.82	414,595.49	325,250.64	644,123.50	30,816.50	50,000.00	1,464,786.13
Total	214,519.67	200,075.82	414,595.49	325,250.64	644,123.50	30,816.50	50,000.00	1,464,786.13

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
4,880.7400	0.0002	4,880.7400	300.1156	43.9523	84.9452	0.0000

Biditem

MOBILIZATION/DEMOBILIZATION

5001

Takeoff Qty: 1.000 LS
Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94
Total	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
320.0000	0.0031	320.0000	187.5123	26.8900	69.7303	0.0031

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Activity: B Demobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Biditem **SWPPP**

5002

Takeoff Qty: 1.000 LS
Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH

14.0000	0.0714	14.0000	1,094.1429	40.5257	77.0507	0.2500

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $10,000 due to travel of equipment on and off the beach.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2900	4.0000	0.2500	317.3225	0.5000	2.0000	0.5000	10,636.0000

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.0714	14.0000	77.0507	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	21.00	TON	US$	7.50	107.75	8.08	169.71
3STRPL	Trench Plate Rental - 8'x10'	1.00	18.00	MO	US$	200.00	107.75	215.50	3,879.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	76.09	152.18
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	69.22	553.75
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	93.20	372.78

Biditem 5003

SHORELINE RECONSTRUCTION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	201,410.31	182,027.75	383,438.06	285,494.87	637,252.58	0.00	40,000.00	1,346,185.51
Total	201,410.31	182,027.75	383,438.06	285,494.87	637,252.58	0.00	40,000.00	1,346,185.51

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
4,442.2400	0.0002	4,442.2400	303.0420	45.3398	86.3164	0.0014

Activity: A Recover Existing Rip Rap (Unreviewed) Quantity: 1.00 Unit: LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	42,902.40	39,939.35	82,841.75	75,924.48	0.00	0.00	0.00	158,766.23
Total	42,902.40	39,939.35	82,841.75	75,924.48	0.00	0.00	0.00	158,766.23

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
158,766.2300	240.0000	0.0042	661.5260	30.0000	0.0333	30.0000	5,292.2077

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
960.0000	0.0010	960.0000	86.2935	42,902.4000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: EXC ExcavationCrew Prod: S 30 Eff: 100.00 Crew Hrs: 240 Labor Pcs: 4.00 Equipment Pcs: 3.00

Notes: Allow for time to remove existing rip rap and grade slope for new rock installation.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL950	CAT 950H F.E. Loader 4cy	1.00	240.00	HR	US$	89.04	100.00	89.04	21,368.88
810CMHE330	CAT 330D L Excavator 1.56cy	1.00	240.00	HR	US$	163.39	100.00	163.39	39,212.64
820OHRD007	On Hwy End Dump 7-8cy	1.00	240.00	HR	US$	63.93	100.00	63.93	15,342.96
LA02	Laborer (Gr 5)	2.00	480.00	MH	US$	39.02	100.00	75.76	36,363.95
OE03	Operator (Gr 14)	2.00	480.00	MH	US$	50.36	100.00	96.83	46,477.80

Activity: B Place Revetment Stone (Unreviewed) Quantity: 12522.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	9.67	8.45	18.12	10.54	44.02	0.00	0.00	72.68
Total	121,119.56	105,783.45	226,903.01	132,015.21	551,159.42	0.00	0.00	910,077.64

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
28.6630	0.0271	36.9076	1,057.8820	42.4100	295.2606	0.0034	21,459.0342

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
2,714.2400	4.6134	0.2168	83.5973	9.6725

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 36.9076 Eff: 100.00 Crew Hrs: 339.28 Labor Pcs: 8.00 Equipment Pcs: 4.00

Notes: Total amount of stone placed - 7,950cy*1.5ton/cy = 11,925 ton. Allow waste at 5% - 11,925 ton*1.05 = 12,522 ton. Assume production at approx. 25 cy/hr or 37 ton/hr for placement. Include backhoe and 2 addl laborers to place filter fabric on slope ahead of rock placement. Budget cost for rip rap recieved from Granite Construction quarry (Rosemary's Mountain) in Fallbrook at $23/ton for material and $14-15/ton for delivery to Mission Bay - $37/ton total cost. Use $40/ton.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BA110	Armor Stone 2 -> 5 T	1.00	12,522.00	TON	US$	40.00	107.75	43.10	539,698.20
2EC32	Woven Geotextile	1.00	8,509.49	SY	US$	1.25	107.75	1.35	11,461.22
809FEL950	CAT 950H F.E. Loader 4cy	2.00	678.56	HR	US$	89.04	100.00	89.04	60,416.95
809TLB416E	CAT 416E Backhoe	1.00	339.28	HR	US$	47.64	100.00	47.64	16,164.66
810CMHE330	CAT 330D L Excavator 1.56cy	1.00	339.28	HR	US$	163.39	100.00	163.39	55,433.60
LA02	Laborer (Gr 5)	4.00	1,357.12	MH	US$	39.02	100.00	73.48	99,720.45
OE03	Operator (Gr 14)	3.00	1,017.84	MH	US$	50.36	100.00	93.89	95,562.67
OE07	Operator (Gr 6)	1.00	339.28	MH	US$	49.83	100.00	93.20	31,619.89

Activity: C Place Sand Cover (Unreviewed) Quantity: 1260.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	6.10	5.32	11.42	8.49	45.41	0.00	0.00	65.32
Total	7,688.35	6,700.22	14,388.57	10,698.14	57,216.16	0.00	0.00	82,302.87

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
19.9101	0.0267	37.5000	746.6283	4.2000	300.0000	0.0033	19,595.9214

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
168.0000	7.5000	0.1333	85.6463	6.1019

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 37.5 Eff: 100.00 Crew Hrs: 33.6 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Place Sand on top of revetment at 1' depth. Average Width of placement is 12'. Approximate length of placement is 1370'. Volume is 1,200 CY of Sand Fill Assume 5% Waste, 1200 CY * 1.05 = 1,260 cy.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BB110	Sand Fill	1.00	2,042.34	TON	US$	26.00	107.75	28.02	57,216.16
809FEL950	CAT 950H F.E. Loader 4cy	2.00	67.20	HR	US$	89.04	100.00	89.04	5,983.29
809SCD06T	CAT D6T Dozer	1.00	33.60	HR	US$	140.32	100.00	140.32	4,714.85
LA02	Laborer (Gr 5)	2.00	67.20	MH	US$	39.02	100.00	73.48	4,937.82
OE03	Operator (Gr 14)	2.00	67.20	MH	US$	50.36	100.00	93.89	6,309.25
OE05	Operator (Gr 10)	1.00	33.60	MH	US$	50.06	100.00	93.50	3,141.50

Activity: D Construct Oyster Habitat (Unreviewed) Quantity: 1.00 Unit: LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	29,700.00	29,604.73	59,304.73	66,857.04	28,877.00	0.00	0.00	155,038.77
Total	29,700.00	29,604.73	59,304.73	66,857.04	28,877.00	0.00	0.00	155,038.77

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
126,161.7700	120.0000	0.0083	1,051.3481	15.0000	0.0667	15.0000	10,335.9180

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
600.0000	0.0017	600.0000	98.8412	29,700.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: S 15 Eff: 100.00 Crew Hrs: 120 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Use a crane barge crew to set oyster cultch bags, reef balls or similar oyster habitat. PRECAST CONCRETE MAT's represents cost to furnish reef balls for 1 acre of placement, based on Maryland Port Administration Bid Tabs.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PC	PRECAST CONCRETE MATL'S	1.00	1.00	AC	US$	26,800.00	107.75	28,877.00	28,877.00
811LGS0020D	20kW Large GenSet	1.00	120.00	HR	US$	23.96	100.00	23.96	2,874.60
814CB075	Crane Barge - 75 Ton	1.00	120.00	HR	US$	136.78	100.00	136.78	16,413.36
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	240.00	HR	US$	108.23	100.00	108.23	25,974.72
814ITB0250	Inland Tug - 250hp	1.00	120.00	HR	US$	133.81	100.00	133.81	16,057.08
814RUN016	Runabout 16ft	1.00	120.00	HR	US$	34.84	100.00	34.84	4,180.92
818PW350S	Portable Welder Skid 350 amp	1.00	120.00	HR	US$	11.30	100.00	11.30	1,356.36
OE10	Crane Operator (<100 tn)	1.00	120.00	MH	US$	51.40	100.00	100.10	12,011.41
OE17	Engineer	1.00	120.00	MH	US$	49.57	100.00	99.29	11,914.73
OE18	Mate	1.00	120.00	MH	US$	49.57	100.00	99.29	11,914.73
OE19	Deckhand	2.00	240.00	MH	US$	48.48	100.00	97.77	23,463.86

Activity: E Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Allow for pre- and post-construction surveys for cobble dike and sand fill. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	20,000.00	100.00	20,000.00	40,000.00

Biditem

5004

CONSTRUCTION ACCESS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2,944.32	2,874.97	5,819.29	1,541.44	0.00	26,937.50	0.00	34,298.23
Total	2,944.32	2,874.97	5,819.29	1,541.44	0.00	26,937.50	0.00	34,298.23

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
80.0000	0.0125	80.0000	428.7279	36.8040	72.7411	0.0313

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 5.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	588.86	574.99	1,163.86	308.29	0.00	5,387.50	0.00	6,859.65
Total	2,944.32	2,874.97	5,819.29	1,541.44	0.00	26,937.50	0.00	34,298.23

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,472.1460	6.4000	0.1563	230.0228	4.0000	1.2500	0.8000	8,574.5575

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
80.0000	0.0625	16.0000	72.7411	588.8640

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 4 Eff: 100.00 Crew Hrs: 32 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing sidewalks and work areas for 4.21 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 1,370 lf/500 ft = 3 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 2 ea. moves, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	5.00	MO	US$	5,000.00	107.75	5,387.50	26,937.50
820OHLDTC44	LD Truck 4x4 1.75t	1.00	32.00	HR	US$	48.17	100.00	48.17	1,541.44
LA01	Laborer Foreman	0.50	16.00	MH	US$	41.02	100.00	78.48	1,255.70
LA03	Laborer (Gr 4)	2.00	64.00	MH	US$	35.75	100.00	71.31	4,563.59

Biditem

5005

INSTALL SIGNS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	992.88	952.85	1,945.73	333.51	6,701.21	0.00	0.00	8,980.45
Total	992.88	952.85	1,945.73	333.51	6,701.21	0.00	0.00	8,980.45

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
24.5000	0.0408	24.5000	366.5490	40.5257	79.4176	0.1429

Activity: A Install Signs (Unreviewed) Quantity: 14.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	992.88	952.85	1,945.73	333.51	6,701.21	0.00	0.00	8,980.45

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8029	0.5000	2.0000	325.6057	0.8750	16.0000	0.0625	10,263.3714

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
24.5000	0.5714	1.7500	79.4176	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 7 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 7 of each: Beach Access Signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	14.00	EA	US$	44.23	107.75	47.66	667.21
2T5101	Construction Signs	1.00	14.00	EA	US$	400.00	107.75	431.00	6,034.00
809TLB416E	CAT 416E Backhoe	1.00	7.00	HR	US$	47.64	100.00	47.64	333.51
LA01	Laborer Foreman	0.50	3.50	MH	US$	41.02	100.00	78.48	274.68
LA03	Laborer (Gr 4)	2.00	14.00	MH	US$	35.75	100.00	71.31	998.29
OE07	Operator (Gr 6)	1.00	7.00	MH	US$	49.83	100.00	96.11	672.76

Biditem - Parent

6000

VACATION ISLAND N (WEST OF INGRAHAM ST)

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	93,795.05	91,578.52	185,373.57	162,069.93	214,621.73	20,041.50	50,000.00	632,106.73
Total	93,795.05	91,578.52	185,373.57	162,069.93	214,621.73	20,041.50	50,000.00	632,106.73

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
2,205.1400	0.0005	2,205.1400	286.6515	42.5347	84.0643	0.0000

Biditem

6001

MOBILIZATION/DEMOBILIZATION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94
Total	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
320.0000	0.0031	320.0000	187.5123	26.8900	69.7303	0.0031

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Activity: B Demobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Biditem

6002

SWPPP

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
14.0000	0.0714	14.0000	1,094.1429	40.5257	77.0507	0.2500

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $10,000 due to equipment trips on and off the beach.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2900	4.0000	0.2500	317.3225	0.5000	2.0000	0.5000	10,636.0000

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.0714	14.0000	77.0507	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	21.00	TON	US$	7.50	107.75	8.08	169.71
3STRPL	Trench Plate Rental - 8'x10'	1.00	18.00	MO	US$	200.00	107.75	215.50	3,879.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	76.09	152.18
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	69.22	553.75
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	93.20	372.78

Biditem

6003

SHORELINE RECONSTRUCTION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	81,989.13	74,793.67	156,782.80	122,890.10	211,580.07	0.00	40,000.00	531,252.97
Total	81,989.13	74,793.67	156,782.80	122,890.10	211,580.07	0.00	40,000.00	531,252.97

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
1,800.6400	0.0006	1,800.6400	295.0356	45.5333	87.0706	0.0032

Activity: A Recover Existing Rip Rap (Unreviewed) Quantity: 1.00 Unit: LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	21,451.20	19,969.67	41,420.87	37,962.24	0.00	0.00	0.00	79,383.11
Total	21,451.20	19,969.67	41,420.87	37,962.24	0.00	0.00	0.00	79,383.11

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
79,383.1100	120.0000	0.0083	661.5259	15.0000	0.0667	15.0000	5,292.2073

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
480.0000	0.0021	480.0000	86.2935	21,451.2000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: EXC ExcavationCrew Prod: S 15 Eff: 100.00 Crew Hrs: 120 Labor Pcs: 4.00 Equipment Pcs: 3.00

Notes: Allow for time to remove existing rip rap and grade slope for new rock installation.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL950	CAT 950H F.E. Loader 4cy	1.00	120.00	HR	US$	89.04	100.00	89.04	10,684.44

810CMHE330	CAT 330D L Excavator 1.56cy	1.00	120.00	HR	US$	163.39	100.00	163.39	19,606.32
820OHRD007	On Hwy End Dump 7-8cy	1.00	120.00	HR	US$	63.93	100.00	63.93	7,671.48
LA02	Laborer (Gr 5)	2.00	240.00	MH	US$	39.02	100.00	75.76	18,181.98
OE03	Operator (Gr 14)	2.00	240.00	MH	US$	50.36	100.00	96.83	23,238.89

Activity: B Place Revetment Stone (Unreviewed) Quantity: 4410.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	9.72	8.49	18.21	10.59	40.78	0.00	0.00	69.59
Total	42,867.37	37,439.52	80,306.89	46,723.61	179,856.31	0.00	0.00	306,886.81

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
28.8051	0.0272	36.7255	1,057.8822	15.0100	293.8041	0.0034	20,445.4903

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
960.6400	4.5907	0.2178	83.5973	9.7205

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 36.7255 Eff: 100.00 Crew Hrs: 120.08 Labor Pcs: 8.00 Equipment Pcs: 4.00

Notes: Total amount of stone placed - 2,800cy*1.5ton/cy = 4200 ton. Allow waste at 5% - 4200ton*1.05 = 4,410 ton. Assume production at approx. 25 cy/hr or 37 ton/hr for placement. Include backhoe and 2 addl laborers to place filter fabric on slope ahead of rock placement. Budget cost for rip rap recieved from Granite Construction quarry (Rosemary's Mountain) in Fallbrook at $23/ton for material and $14-15/ton for delivery to Mission Bay - $37/ton total cost. Other budget cost recieved from North County Sand & Gravel at $675/load delivered (~$34/ton).

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BA110	Armor Stone 2 -> 5 T	1.00	4,410.00	TON	US$	37.00	107.75	39.87	175,815.68
2EC32	Woven Geotextile	1.00	3,000.00	SY	US$	1.25	107.75	1.35	4,040.63
809FEL950	CAT 950H F.E. Loader 4cy	2.00	240.16	HR	US$	89.04	100.00	89.04	21,383.13
809TLB416E	CAT 416E Backhoe	1.00	120.08	HR	US$	47.64	100.00	47.64	5,721.09
810CMHE330	CAT 330D L Excavator 1.56cy	1.00	120.08	HR	US$	163.39	100.00	163.39	19,619.39
LA02	Laborer (Gr 5)	4.00	480.32	MH	US$	39.02	100.00	73.48	35,293.66
OE03	Operator (Gr 14)	3.00	360.24	MH	US$	50.36	100.00	93.89	33,822.12
OE07	Operator (Gr 6)	1.00	120.08	MH	US$	49.83	100.00	93.20	11,191.11

Activity: C Place Sand Cover (Unreviewed) Quantity: 374.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	4.89	4.27	9.16	6.81	46.22	0.00	0.00	62.19
Total	1,830.56	1,595.29	3,425.85	2,547.17	17,285.26	0.00	0.00	23,258.28

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
15.9706	0.0214	46.7500	746.6275	1.0000	374.0000	0.0027	23,258.2800

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
40.0000	9.3500	0.1070	85.6463	4.8945

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 46.75 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Place Sand overtop revetment at 1' depth. Average Width of placement is 15'. Approximate length of placement is 640'. Volume is 1x15x640/27 = 356 CY of Sand Fill. Allow for 5% waste - 356*1.05 = 374 cy.

```
Production Factors:
4       CY, Bucket Size
0.60    Bucket Fill Factor
0.91    10%
54.6%   Avg. Percent, Full Bucket
50      Op. Efficiency (Working Minutes per Hour)
45      Sec., Cycle Time
85.0%   Operator Skill Efficiency
100.0%  Machine Availability
Cycle Time      60

Excavation:
Cycles per Hour:                        =       56.7    cycles/hr
Production Rate:                        =       124     cy/hr
Excavation Time Efficiency (%):                 =       70%
Daily Operating Time:                   =       5.60    hours
Monthly Operating Time:                 =       122     hours
Daily Gross Production:                 =       694     cy/day
Daily Gross Production:                 =       1170    lf/day
Monthly Gross Production:                       =       15,128  cy/mo
Excavation Time:                                0.02    months
```

Excavation Time: 0.44 days

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BB110	Sand Fill	1.00	617.00	TON	US$	26.00	107.75	28.02	17,285.26
809FEL950	CAT 950H F.E. Loader 4cy	2.00	16.00	HR	US$	89.04	100.00	89.04	1,424.59
809SCD06T	CAT D6T Dozer	1.00	8.00	HR	US$	140.32	100.00	140.32	1,122.58
LA02	Laborer (Gr 5)	2.00	16.00	MH	US$	39.02	100.00	73.48	1,175.67
OE03	Operator (Gr 14)	2.00	16.00	MH	US$	50.36	100.00	93.89	1,502.21
OE05	Operator (Gr 10)	1.00	8.00	MH	US$	50.06	100.00	93.50	747.97

Activity: D Construct Oyster Habitat (Unreviewed) Quantity: 1.00 Unit: LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	15,840.00	15,789.19	31,629.19	35,657.08	14,438.50	0.00	0.00	81,724.77
Total	15,840.00	15,789.19	31,629.19	35,657.08	14,438.50	0.00	0.00	81,724.77

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
67,286.2700	64.0000	0.0156	1,051.3480	8.0000	0.1250	8.0000	10,215.5963

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
320.0000	0.0031	320.0000	98.8412	15,840.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: S 8 Eff: 100.00 Crew Hrs: 64 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Use a crane barge crew to set oyster cultch bags, reef balls or similar oyster habitat. PRECAST CONCRETE MAT's represents cost to furnish reef balls for 0.5 acre of placement, based on Maryland Port Administration Bid Tabs.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PC	PRECAST CONCRETE MATL'S	1.00	0.50	AC	US$	26,800.00	107.75	28,877.00	14,438.50
811LGS0020D	20kW Large GenSet	1.00	64.00	HR	US$	23.96	100.00	23.96	1,533.12
814CB075	Crane Barge - 75 Ton	1.00	64.00	HR	US$	136.78	100.00	136.78	8,753.79
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	128.00	HR	US$	108.23	100.00	108.23	13,853.18
814ITB0250	Inland Tug - 250hp	1.00	64.00	HR	US$	133.81	100.00	133.81	8,563.78
814RUN016	Runabout 16ft	1.00	64.00	HR	US$	34.84	100.00	34.84	2,229.82
818PW350S	Portable Welder Skid 350 amp	1.00	64.00	HR	US$	11.30	100.00	11.30	723.39
OE10	Crane Operator (<100 tn)	1.00	64.00	MH	US$	51.40	100.00	100.10	6,406.09
OE17	Engineer	1.00	64.00	MH	US$	49.57	100.00	99.29	6,354.52
OE18	Mate	1.00	64.00	MH	US$	49.57	100.00	99.29	6,354.52
OE19	Deckhand	2.00	128.00	MH	US$	48.48	100.00	97.77	12,514.06

Activity: E Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Allow for pre- and post-construction surveys for cobble dike and sand fill. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	20,000.00	100.00	20,000.00	40,000.00

Biditem

6004

CONSTRUCTION ACCESS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2,208.24	2,156.23	4,364.47	1,156.08	0.00	16,162.50	0.00	21,683.05
Total	2,208.24	2,156.23	4,364.47	1,156.08	0.00	16,162.50	0.00	21,683.05

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
60.0000	0.0167	60.0000	361.3842	36.8040	72.7412	0.0417

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 3.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total

U. Cost	736.08	718.74	1,454.82	385.36	0.00	5,387.50	0.00	7,227.68
Total	2,208.24	2,156.23	4,364.47	1,156.08	0.00	16,162.50	0.00	21,683.05

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,840.1833	8.0000	0.1250	230.0229	3.0000	1.0000	1.0000	7,227.6833

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
60.0000	0.0500	20.0000	72.7412	736.0800

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 3 Eff: 100.00 Crew Hrs: 24 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing sidewalks and work areas for 2.8 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 570 lf/500 ft = 2 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 1 ea. move, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	3.00	MO	US$	5,000.00	107.75	5,387.50	16,162.50
820OHLDTC44	LD Truck 4x4 1.75t	1.00	24.00	HR	US$	48.17	100.00	48.17	1,156.08
LA01	Laborer Foreman	0.50	12.00	MH	US$	41.02	100.00	78.48	941.78
LA03	Laborer (Gr 4)	2.00	48.00	MH	US$	35.75	100.00	71.31	3,422.69

Biditem

6005

INSTALL SIGNS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	425.52	408.37	833.89	142.93	2,871.95	0.00	0.00	3,848.77
Total	425.52	408.37	833.89	142.93	2,871.95	0.00	0.00	3,848.77

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
10.5000	0.0952	10.5000	366.5495	40.5257	79.4181	0.3333

Activity: A Install Signs (Unreviewed) Quantity: 6.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	425.52	408.37	833.89	142.93	2,871.95	0.00	0.00	3,848.77

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8033	0.5000	2.0000	325.6067	0.3750	16.0000	0.0625	10,263.3867

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
10.5000	0.5714	1.7500	79.4181	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 3 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 3 of each: Beach Access Signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	6.00	EA	US$	44.23	107.75	47.66	285.95
2T5101	Construction Signs	1.00	6.00	EA	US$	400.00	107.75	431.00	2,586.00
809TLB416E	CAT 416E Backhoe	1.00	3.00	HR	US$	47.64	100.00	47.64	142.93
LA01	Laborer Foreman	0.50	1.50	MH	US$	41.02	100.00	78.49	117.73
LA03	Laborer (Gr 4)	2.00	6.00	MH	US$	35.75	100.00	71.31	427.84
OE07	Operator (Gr 6)	1.00	3.00	MH	US$	49.83	100.00	96.11	288.32

Biditem - Parent

7000

VENTURA COVE PARK

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	147,274.06	139,870.17	287,144.23	236,211.91	379,368.68	25,429.00	50,000.00	978,153.82
Total	147,274.06	139,870.17	287,144.23	236,211.91	379,368.68	25,429.00	50,000.00	978,153.82

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
3,391.6600	0.0003	3,391.6600	288.3997	43.4224	84.6619	0.0000

Biditem

7001

MOBILIZATION/DEMOBILIZATION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94
Total	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
320.0000	0.0031	320.0000	187.5123	26.8900	69.7303	0.0031

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Activity: B Demobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Biditem **SWPPP**

7002

Takeoff Qty: 1.000 LS
Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
14.0000	0.0714	14.0000	1,094.1429	40.5257	77.0507	0.2500

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $10,000 due to equipment trips on and off the beach.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2900	4.0000	0.2500	317.3225	0.5000	2.0000	0.5000	10,636.0000

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.0714	14.0000	77.0507	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	21.00	TON	US$	7.50	107.75	8.08	169.71
3STRPL	Trench Plate Rental - 8'x10'	1.00	18.00	MO	US$	200.00	107.75	215.50	3,879.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	76.09	152.18
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	69.22	553.75
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	93.20	372.78

Biditem

7003

SHORELINE RECONSTRUCTION

Takeoff Qty: 1.000 LS
Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	135,184.46	122,813.07	257,997.53	196,936.79	374,412.39	0.00	40,000.00	869,346.71
Total	135,184.46	122,813.07	257,997.53	196,936.79	374,412.39	0.00	40,000.00	869,346.71

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
2,980.1600	0.0003	2,980.1600	291.7114	45.3615	86.5717	0.0020

Activity: A Recover Existing Rip Rap (Unreviewed) Quantity: 1.00 Unit: LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	35,752.00	33,282.79	69,034.79	63,270.40	0.00	0.00	0.00	132,305.19
Total	35,752.00	33,282.79	69,034.79	63,270.40	0.00	0.00	0.00	132,305.19

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
132,305.1900	200.0000	0.0050	661.5260	25.0000	0.0400	25.0000	5,292.2076

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
800.0000	0.0013	800.0000	86.2935	35,752.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: EXC ExcavationCrew Prod: S 25 Eff: 100.00 Crew Hrs: 200 Labor Pcs: 4.00 Equipment Pcs: 3.00

Notes: Allow for time to remove existing rip rap and grade slope for new rock installation.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL950	CAT 950H F.E. Loader 4cy	1.00	200.00	HR	US$	89.04	100.00	89.04	17,807.40
810CMHE330	CAT 330D L Excavator 1.56cy	1.00	200.00	HR	US$	163.39	100.00	163.39	32,677.20
820OHRD007	On Hwy End Dump 7-8cy	1.00	200.00	HR	US$	63.93	100.00	63.93	12,785.80
LA02	Laborer (Gr 5)	2.00	400.00	MH	US$	39.02	100.00	75.76	30,303.29
OE03	Operator (Gr 14)	2.00	400.00	MH	US$	50.36	100.00	96.83	38,731.50

Activity: B Place Revetment Stone (Unreviewed) Quantity: 8033.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	9.67	8.44	18.11	10.54	43.91	0.00	0.00	72.56
Total	77,652.46	67,820.14	145,472.60	84,637.90	352,754.64	0.00	0.00	582,865.14

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
28.6456	0.0271	36.9299	1,057.8820	27.1900	295.4395	0.0034	21,436.7466

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
1,740.1600	4.6162	0.2166	83.5973	9.6667

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 36.9299 Eff: 100.00 Crew Hrs: 217.52 Labor Pcs: 8.00 Equipment Pcs: 4.00

Notes: Total amount of stone placed - 5,100cy*1.5ton/cy = 7650 ton. Allow waste at 5% - 7650ton*1.05 = 8,033 ton. Assume production at approx. 25 cy/hr or 37 ton/hr for placement. Include backhoe and 2 addl laborers to place filter fabric on slope ahead of rock placement. Budget cost for rip rap recieved from Granite Construction quarry (Rosemary's Mountain) in Fallbrook at $23/ton for material and $14-15/ton for delivery to Mission Bay - $37/ton total cost. Use $40/ton.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BA110	Armor Stone 2 -> 5 T	1.00	8,033.00	TON	US$	40.00	107.75	43.10	346,222.30
2EC32	Woven Geotextile	1.00	4,850.00	SY	US$	1.25	107.75	1.35	6,532.34
809FEL950	CAT 950H F.E. Loader 4cy	2.00	435.04	HR	US$	89.04	100.00	89.04	38,734.66
809TLB416E	CAT 416E Backhoe	1.00	217.52	HR	US$	47.64	100.00	47.64	10,363.52
810CMHE330	CAT 330D L Excavator 1.56cy	1.00	217.52	HR	US$	163.39	100.00	163.39	35,539.72
LA02	Laborer (Gr 5)	4.00	870.08	MH	US$	39.02	100.00	73.48	63,933.01
OE03	Operator (Gr 14)	3.00	652.56	MH	US$	50.36	100.00	93.89	61,267.36
OE07	Operator (Gr 6)	1.00	217.52	MH	US$	49.83	100.00	93.20	20,272.23

Activity: D Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Allow for pre- and post-construction surveys for cobble dike and sand fill. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	20,000.00	100.00	20,000.00	40,000.00

Activity: C Construct Oyster Habitat (Unreviewed) Quantity: 1.00 Unit: LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	21,780.00	21,710.14	43,490.14	49,028.49	21,657.75	0.00	0.00	114,176.38
Total	21,780.00	21,710.14	43,490.14	49,028.49	21,657.75	0.00	0.00	114,176.38

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
92,518.6300	88.0000	0.0114	1,051.3481	11.0000	0.0909	11.0000	10,379.6709

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit

440.0000	0.0023	440.0000	98.8412	21,780.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CRBG5 Crane Barge, 5-Men Prod: S 11 Eff: 100.00 Crew Hrs: 88 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Use a crane barge crew to set oyster cultch bags, reef balls or similar oyster habitat. PRECAST CONCRETE MAT's represents cost to furnish reef balls for 0.75 acre of placement, based on Maryland Port Administration Bid Tabs.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PC	PRECAST CONCRETE MATL'S	1.00	0.75	AC	US$	26,800.00	107.75	28,877.00	21,657.75
811LGS0020D	20kW Large GenSet	1.00	88.00	HR	US$	23.96	100.00	23.96	2,108.04
814CB075	Crane Barge - 75 Ton	1.00	88.00	HR	US$	136.78	100.00	136.78	12,036.46
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	176.00	HR	US$	108.23	100.00	108.23	19,048.13
814ITB0250	Inland Tug - 250hp	1.00	88.00	HR	US$	133.81	100.00	133.81	11,775.19
814RUN016	Runabout 16ft	1.00	88.00	HR	US$	34.84	100.00	34.84	3,066.01
818PW350S	Portable Welder Skid 350 amp	1.00	88.00	HR	US$	11.30	100.00	11.30	994.66
OE10	Crane Operator (<100 tn)	1.00	88.00	MH	US$	51.40	100.00	100.10	8,808.37
OE17	Engineer	1.00	88.00	MH	US$	49.57	100.00	99.29	8,737.47
OE18	Mate	1.00	88.00	MH	US$	49.57	100.00	99.29	8,737.47
OE19	Deckhand	2.00	176.00	MH	US$	48.48	100.00	97.77	17,206.83

Biditem

7004

CONSTRUCTION ACCESS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2,208.24	2,156.23	4,364.47	1,156.08	0.00	21,550.00	0.00	27,070.55
Total	2,208.24	2,156.23	4,364.47	1,156.08	0.00	21,550.00	0.00	27,070.55

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
60.0000	0.0167	60.0000	451.1758	36.8040	72.7412	0.0417

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 4.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	552.06	539.06	1,091.12	289.02	0.00	5,387.50	0.00	6,767.64
Total	2,208.24	2,156.23	4,364.47	1,156.08	0.00	21,550.00	0.00	27,070.55

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,380.1375	6.0000	0.1667	230.0229	3.0000	1.3333	0.7500	9,023.5167

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
60.0000	0.0667	15.0000	72.7412	552.0600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 3 Eff: 100.00 Crew Hrs: 24 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing sidewalks and work areas for 3.91 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 970 lf/500 ft = 2 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 1 ea. move, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	4.00	MO	US$	5,000.00	107.75	5,387.50	21,550.00
820OHLDTC44	LD Truck 4x4 1.75t	1.00	24.00	HR	US$	48.17	100.00	48.17	1,156.08
LA01	Laborer Foreman	0.50	12.00	MH	US$	41.02	100.00	78.48	941.78
LA03	Laborer (Gr 4)	2.00	48.00	MH	US$	35.75	100.00	71.31	3,422.69

Biditem

7005

INSTALL SIGNS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	709.20	680.62	1,389.82	238.22	4,786.58	0.00	0.00	6,414.62
Total	709.20	680.62	1,389.82	238.22	4,786.58	0.00	0.00	6,414.62

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
17.5000	0.0571	17.5000	366.5497	40.5257	79.4183	0.2000

Activity: A Install Signs (Unreviewed) Quantity: 10.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	709.20	680.62	1,389.82	238.22	4,786.58	0.00	0.00	6,414.62

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8040	0.5000	2.0000	325.6080	0.6250	16.0000	0.0625	10,263.3920

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
17.5000	0.5714	1.7500	79.4183	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 5 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 5 of each: Beach Access Signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	10.00	EA	US$	44.23	107.75	47.66	476.58
2T5101	Construction Signs	1.00	10.00	EA	US$	400.00	107.75	431.00	4,310.00
809TLB416E	CAT 416E Backhoe	1.00	5.00	HR	US$	47.64	100.00	47.64	238.22
LA01	Laborer Foreman	0.50	2.50	MH	US$	41.02	100.00	78.48	196.21
LA03	Laborer (Gr 4)	2.00	10.00	MH	US$	35.75	100.00	71.31	713.07
OE07	Operator (Gr 6)	1.00	5.00	MH	US$	49.83	100.00	96.11	480.54

Biditem - Parent

8000

DE ANZA COVE

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,169,818.03	954,648.40	2,124,466.43	2,208,947.71	17,571.09	58,939.25	74,000.00	4,483,924.48
Total	1,169,818.03	954,648.40	2,124,466.43	2,208,947.71	17,571.09	58,939.25	74,000.00	4,483,924.48

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
20,919.8800	0.0000	20,919.8800	214.3380	55.9190	101.5525	0.0000

Biditem

8001

MOBILIZATION/DEMOBILIZATION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94
Total	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
320.0000	0.0031	320.0000	187.5123	26.8900	69.7303	0.0031

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Activity: B Demobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Biditem

8002

SWPPP

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,134.72	1,022.69	2,157.41	381.15	339.41	7,758.00	10,000.00	20,635.97
Total	1,134.72	1,022.69	2,157.41	381.15	339.41	7,758.00	10,000.00	20,635.97

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
28.0000	0.0357	28.0000	736.9989	40.5257	77.0504	0.1250

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $10,000 since two entrances will be required.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 2.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,317.99
Total	1,134.72	1,022.69	2,157.41	381.15	339.41	7,758.00	0.00	10,635.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2800	4.0000	0.2500	317.3200	1.0000	2.0000	0.5000	10,635.9700

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
28.0000	0.0714	14.0000	77.0504	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	42.00	TON	US$	7.50	107.75	8.08	339.41
3STRPL	Trench Plate Rental - 8'x10'	1.00	36.00	MO	US$	200.00	107.75	215.50	7,758.00
809TLB416E	CAT 416E Backhoe	1.00	8.00	HR	US$	47.64	100.00	47.64	381.15
LA01	Laborer Foreman	0.50	4.00	MH	US$	41.02	100.00	76.09	304.34
LA03	Laborer (Gr 4)	2.00	16.00	MH	US$	35.75	100.00	69.22	1,107.49
OE07	Operator (Gr 6)	1.00	8.00	MH	US$	49.83	100.00	93.20	745.58

Biditem

8003

SHORELINE RECONSTRUCTION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	605,042.67	459,807.33	1,064,850.00	827,173.11	0.00	0.00	40,000.00	1,932,023.11
Total	605,042.67	459,807.33	1,064,850.00	827,173.11	0.00	0.00	40,000.00	1,932,023.11

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
11,187.6000	0.0001	11,187.6000	172.6933	54.0815	95.1813	0.0004

Activity: A Place Sand Fill for Beach Nourishment (Unreviewed) Quantity: 252840.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.39	1.82	4.21	3.27	0.00	0.00	0.00	7.48
Total	605,042.67	459,807.33	1,064,850.00	827,173.11	0.00	0.00	0.00	1,892,023.11

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7.4831	0.0088	113.0000	845.5886	223.7522	1,130.0000	0.0009	8,455.8857

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
11,187.6000	22.6000	0.0442	95.1813	2.3930

Calendar: 60S 6x10 hr - Single Hrs/Shift: 10 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 113 Eff: 100.00 Crew Hrs: 2237.5221 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Place inflated Sand Fill Volume (see dredging sub-item for explanantion) of 252,840 cy to required template within sand fill nourishment footprint. Allow for shore crew to place dredged material to required grades.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL950	CAT 950H F.E. Loader 4cy	1.00	2,237.52	HR	US$	89.04	100.00	89.04	199,222.07
809SCD06T	CAT D6T Dozer	2.00	4,475.04	HR	US$	140.32	100.00	140.32	627,951.04
LA02	Laborer (Gr 5)	2.00	4,475.04	MH	US$	39.02	118.33	81.69	365,551.70
OE03	Operator (Gr 14)	1.00	2,237.52	MH	US$	50.36	118.33	104.48	233,776.70
OE05	Operator (Gr 10)	2.00	4,475.04	MH	US$	50.06	118.33	104.03	465,521.60

Activity: B Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Allow for pre- and post-construction surveys for cobble dike and sand fill. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	20,000.00	100.00	20,000.00	40,000.00

Biditem

8004

CONSRUCTION ACCESS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	4,239.82	4,139.95	8,379.77	2,219.67	0.00	48,487.50	0.00	59,086.94
Total	4,239.82	4,139.95	8,379.77	2,219.67	0.00	48,487.50	0.00	59,086.94

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
115.2000	0.0087	115.2000	512.9075	36.8040	72.7411	0.0217

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 9.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	471.09	459.99	931.09	246.63	0.00	5,387.50	0.00	6,565.22
Total	4,239.82	4,139.95	8,379.77	2,219.67	0.00	48,487.50	0.00	59,086.94

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,177.7156	5.1200	0.1953	230.0226	5.7600	1.5625	0.6400	10,258.1493

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
115.2000	0.0781	12.8000	72.7411	471.0911

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 5.76 Eff: 100.00 Crew Hrs: 46.08 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing sidewalks and work areas for 8.6 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 3420 lf/500 ft = 7 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 6 ea. moves, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	9.00	MO	US$	5,000.00	107.75	5,387.50	48,487.50
820OHLDTC44	LD Truck 4x4 1.75t	1.00	46.08	HR	US$	48.17	100.00	48.17	2,219.67
LA01	Laborer Foreman	0.50	23.04	MH	US$	41.02	100.00	78.48	1,808.20
LA03	Laborer (Gr 4)	2.00	92.16	MH	US$	35.75	100.00	71.31	6,571.57

Biditem

8005

INSTALL SIGNS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2,553.12	2,450.15	5,003.27	857.59	17,231.68	0.00	0.00	23,092.54
Total	2,553.12	2,450.15	5,003.27	857.59	17,231.68	0.00	0.00	23,092.54

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
63.0000	0.0159	63.0000	366.5483	40.5257	79.4170	0.0556

Activity: A Install Signs (Unreviewed) Quantity: 36.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	2,553.12	2,450.15	5,003.27	857.59	17,231.68	0.00	0.00	23,092.54

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8017	0.5000	2.0000	325.6033	2.2500	16.0000	0.0625	10,263.3511

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
63.0000	0.5714	1.7500	79.4170	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 18 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 36 of each: Beach Access Signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	36.00	EA	US$	44.23	107.75	47.66	1,715.68
2T5101	Construction Signs	1.00	36.00	EA	US$	400.00	107.75	431.00	15,516.00
809TLB416E	CAT 416E Backhoe	1.00	18.00	HR	US$	47.64	100.00	47.64	857.59
LA01	Laborer Foreman	0.50	9.00	MH	US$	41.02	100.00	78.48	706.32
LA03	Laborer (Gr 4)	2.00	36.00	MH	US$	35.75	100.00	71.31	2,567.02
OE07	Operator (Gr 6)	1.00	18.00	MH	US$	49.83	100.00	96.11	1,729.93

Biditem

8006

MOB./DEMOB. DREDGING

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	12,939.52	12,827.36	25,766.88	29,466.97	0.00	2,693.75	0.00	57,927.60
Total	12,939.52	12,827.36	25,766.88	29,466.97	0.00	2,693.75	0.00	57,927.60

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
256.0000	0.0039	256.0000	226.2797	50.5450	100.6519	0.0156

Activity: A Prepare Dredge at Jobsite (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76
Total	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7,908.7600	8.0000	0.1250	988.5950	1.0000	1.0000	1.0000	7,908.7600

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
32.0000	0.0313	32.0000	100.6519	1,617.4400

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 1 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Allow one shift at jobsite to prepare dredge to work.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	8.00	HR	US$	33.38	100.00	23.28	186.22
814HCDSP012	Submerged Pipeline - 12" %65	1.00	8.00	HR	US$	123.16	100.00	123.16	985.30
814HCDWT	Work Tugboat %65	1.00	8.00	HR	US$	252.13	100.00	181.48	1,451.82
814HCSD012CP	Hyd Cutterhead Dredge 12" % 65	1.00	8.00	HR	US$	351.52	100.00	258.07	2,064.56
OE15	Leverman	1.00	8.00	MH	US$	55.65	100.00	107.79	862.29
OE18	Mate	1.00	8.00	MH	US$	49.57	100.00	99.29	794.31
OE19	Deckhand	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13
OE21	Oiler	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13

Activity: B Prepare Pipeline at Jobsite (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	6,469.76	6,413.70	12,883.46	14,844.49	0.00	2,693.75	0.00	30,421.70
Total	6,469.76	6,413.70	12,883.46	14,844.49	0.00	2,693.75	0.00	30,421.70

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
27,727.9500	32.0000	0.0313	866.4984	4.0000	0.2500	4.0000	7,605.4250

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
128.0000	0.0078	128.0000	100.6520	6,469.7600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 4 Eff: 100.00 Crew Hrs: 32 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Allow three shifts to offload pipeline from trucks, fuse pipeline, and pull pipeline sections into location and connect joints. Connect pipeline to dredge and place shore pipeline.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3FSMC	Fusion Machine Rental	1.00	5.00	DAY	US$	500.00	107.75	538.75	2,693.75
813RT600E	GROVE RT600E RT Crane 40mt	1.00	32.00	HR	US$	135.97	100.00	135.97	4,351.14
814CSURV90	Crew/Survey Boat %65	1.00	32.00	HR	US$	33.38	100.00	23.28	744.88
814HCDSP012	Submerged Pipeline - 12" %65	1.00	32.00	HR	US$	123.16	100.00	123.16	3,941.18
814HCDWT	Work Tugboat %65	1.00	32.00	HR	US$	252.13	100.00	181.48	5,807.29
OE15	Leverman	1.00	32.00	MH	US$	55.65	100.00	107.79	3,449.16
OE18	Mate	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE19	Deckhand	1.00	32.00	MH	US$	48.48	100.00	97.77	3,128.52
OE21	Oiler	1.00	32.00	MH	US$	48.48	100.00	97.77	3,128.52

Activity: C Prepare Dredge for Transfer from Site (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76
Total	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7,908.7600	8.0000	0.1250	988.5950	1.0000	1.0000	1.0000	7,908.7600

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
32.0000	0.0313	32.0000	100.6519	1,617.4400

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 1 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Allow one shift to prepare dredge for tow back to next dredging area.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	8.00	HR	US$	33.38	100.00	23.28	186.22
814HCDSP012	Submerged Pipeline - 12" %65	1.00	8.00	HR	US$	123.16	100.00	123.16	985.30
814HCDWT	Work Tugboat %65	1.00	8.00	HR	US$	252.13	100.00	181.48	1,451.82
814HCSD012CP	Hyd Cutterhead Dredge 12" % 65	1.00	8.00	HR	US$	351.52	100.00	258.07	2,064.56
OE15	Leverman	1.00	8.00	MH	US$	55.65	100.00	107.79	862.29
OE18	Mate	1.00	8.00	MH	US$	49.57	100.00	99.29	794.31
OE19	Deckhand	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13
OE21	Oiler	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13

Activity: D Prepare Pipeline for Transfer from Site (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3,234.88	3,206.82	6,441.70	5,246.68	0.00	0.00	0.00	11,688.38
Total	3,234.88	3,206.82	6,441.70	5,246.68	0.00	0.00	0.00	11,688.38

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
11,688.3800	16.0000	0.0625	730.5238	2.0000	0.5000	2.0000	5,844.1900

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
64.0000	0.0156	64.0000	100.6516	3,234.8800

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 2 Eff: 100.00 Crew Hrs: 16 Labor Pcs: 4.00 Equipment Pcs: 3.00

Notes: Disconnect and cut pipeline into 200' sections, raft them and tow them to next site.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	16.00	HR	US$	33.38	100.00	23.28	372.44
814HCDSP012	Submerged Pipeline - 12" %65	1.00	16.00	HR	US$	123.16	100.00	123.16	1,970.59
814HCDWT	Work Tugboat %65	1.00	16.00	HR	US$	252.13	100.00	181.48	2,903.65
OE15	Leverman	1.00	16.00	MH	US$	55.65	100.00	107.79	1,724.57
OE18	Mate	1.00	16.00	MH	US$	49.57	100.00	99.29	1,588.63
OE19	Deckhand	1.00	16.00	MH	US$	48.48	100.00	97.77	1,564.25
OE21	Oiler	1.00	16.00	MH	US$	48.48	100.00	97.77	1,564.25

Biditem

8007

DREDGING

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	535,303.38	460,692.02	995,995.40	1,311,158.98	0.00	0.00	24,000.00	2,331,154.38
Total	535,303.38	460,692.02	995,995.40	1,311,158.98	0.00	0.00	24,000.00	2,331,154.38

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
8,950.0800	0.0001	8,950.0800	260.4618	59.8099	111.2834	0.0004

Activity: A Dredge Area (Unreviewed) Quantity: 252840.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.12	1.82	3.94	5.19	0.00	0.00	0.00	9.12
Total	535,303.38	460,692.02	995,995.40	1,311,158.98	0.00	0.00	0.00	2,307,154.38

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
9.1250	0.0088	113.0000	1,031.1203	223.7522	1,130.0000	0.0009	10,311.2026

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
8,950.0800	28.2500	0.0354	111.2834	2.1172

Calendar: 60S 6x10 hr - Single Hrs/Shift: 10 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: UH 113 Eff: 100.00 Crew Hrs: 2237.5221 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Total Bid Quantity, inflated by 20% losses to account for hydraulic lossses in the beach placement - 210,700 cy * 1.2 = 252,840 cy. Total dredge area based on a 3-foot borrow depth is 2,275,560 sf or 52.24 acres.

Dredge is assumed to work 10 hrs/day, 6 days/week (260 hrs/mo) each crew working a 10-hour shift. Gross production - 29,575 cy/mo or approx. 113 cy/hr.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	2,237.52	HR	US$	33.38	100.00	23.28	52,083.65
814HCDSP012	Submerged Pipeline - 12" %65	1.00	2,237.52	HR	US$	123.16	100.00	123.16	275,577.44
814HCDWT	Work Tugboat %65	1.00	2,237.52	HR	US$	252.13	100.00	181.48	406,060.43
814HCSD012CP	Hyd Cutterhead Dredge 12" % 65	1.00	2,237.52	HR	US$	351.52	100.00	258.07	577,437.46
OE15	Leverman	1.00	2,237.52	MH	US$	55.65	118.33	119.49	267,364.43
OE18	Mate	1.00	2,237.52	MH	US$	49.57	118.33	109.72	245,491.23
OE19	Deckhand	1.00	2,237.52	MH	US$	48.48	118.33	107.96	241,569.87
OE21	Oiler	1.00	2,237.52	MH	US$	48.48	118.33	107.96	241,569.87

Activity: B Hydrographic Surveys (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 50S 5 x 10 Hr - Single Hrs/Shift: 10 WC: MARINE Over Water Work

Notes: Allow for pre- and post-hydrographic surveys and required submittals.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	2.00	2.00	EA	US$	12,000.00	100.00	12,000.00	24,000.00

Biditem - Parent

9000

DE ANZA BOOT

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,180,518.78	1,069,803.48	2,250,322.26	2,582,908.70	2,909,104.63	69,714.25	154,000.00	7,966,049.84
Total	1,180,518.78	1,069,803.48	2,250,322.26	2,582,908.70	2,909,104.63	69,714.25	154,000.00	7,966,049.84

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
24,776.5000	0.0000	24,776.5000	321.5163	47.6467	90.8249	0.0000

Biditem

MOBILIZATION/DEMOBILIZATION

9001

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94
Total	8,604.80	13,708.90	22,313.70	37,690.24	0.00	0.00	0.00	60,003.94

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
320.0000	0.0031	320.0000	187.5123	26.8900	69.7303	0.0031

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, offroad trucks, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Activity: B Demobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	0.00	0.00	750.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	0.00	0.00	30,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	1,500.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, offroad trucks, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Biditem

9002

SWPPP

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,134.72	1,022.69	2,157.41	381.15	339.41	7,758.00	10,000.00	20,635.97
Total	1,134.72	1,022.69	2,157.41	381.15	339.41	7,758.00	10,000.00	20,635.97

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH

28.0000	0.0357	28.0000	736.9989	40.5257	77.0504	0.1250

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $10,000 since multiple construction entrances will be necessary.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 2.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,317.99
Total	1,134.72	1,022.69	2,157.41	381.15	339.41	7,758.00	0.00	10,635.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2800	4.0000	0.2500	317.3200	1.0000	2.0000	0.5000	10,635.9700

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
28.0000	0.0714	14.0000	77.0504	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	42.00	TON	US$	7.50	107.75	8.08	339.41
3STRPL	Trench Plate Rental - 8'x10'	1.00	36.00	MO	US$	200.00	107.75	215.50	7,758.00
809TLB416E	CAT 416E Backhoe	1.00	8.00	HR	US$	47.64	100.00	47.64	381.15
LA01	Laborer Foreman	0.50	4.00	MH	US$	41.02	100.00	76.09	304.34
LA03	Laborer (Gr 4)	2.00	16.00	MH	US$	35.75	100.00	69.22	1,107.49
OE07	Operator (Gr 6)	1.00	8.00	MH	US$	49.83	100.00	93.20	745.58

Biditem 9003

SHORELINE/WETLAND RECONSTRUCTION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	598,928.31	554,401.84	1,153,330.15	1,481,606.41	1,515,094.30	0.00	80,000.00	4,230,030.86
Total	598,928.31	554,401.84	1,153,330.15	1,481,606.41	1,515,094.30	0.00	80,000.00	4,230,030.86

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
13,252.2000	0.0001	13,252.2000	319.1946	45.1946	87.0293	0.0004

Activity: A Excavation (Unreviewed) Quantity: 18400.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.42	2.52	4.95	7.80	0.00	0.00	0.00	12.74
Total	44,609.28	46,386.13	90,995.41	143,475.59	0.00	0.00	0.00	234,471.00

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
12.7430	0.0070	143.7500	1,831.8047	16.0000	1,150.0000	0.0009	14,654.4375

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
1,152.0000	15.9722	0.0626	78.9891	2.4244

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC2 (Mod) ExcavationCrew blade Prod: UH 143.75 Eff: 100.00 Crew Hrs: 128 Labor Pcs: 9.00 Equipment Pcs: 6.00

Notes: Excavate material from top of slope as required. Excavate existing material and stockpile for use in bridging gap between existing shoreline and fill template. No screening is required. Assume general excavation of 18,400 cy of sand at 144 cy/hr to account for reach required to stockpile outside the limits of excavation. 18,400cy/144cy/hr = 128 hrs.; 128hrs/8hrs/sh = 16 shifts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL966	CAT 966H F.E. Loader 5.5cy	1.00	128.00	HR	US$	131.25	100.00	131.25	16,799.36
809SCD08R	CAT D8R SII Dozer	1.00	128.00	HR	US$	219.25	100.00	219.25	28,063.62
810CME385	CAT 385CL Excavator 5cy	1.00	128.00	HR	US$	443.47	100.00	443.47	56,764.03
820ARD725	CAT 725 Articulated End Dump	2.00	256.00	HR	US$	123.76	100.00	123.76	31,681.54
820OHWT004	On Hwy Water Tanker 4K gal	1.00	128.00	HR	US$	79.43	100.00	79.43	10,167.04
LA02	Laborer (Gr 5)	3.00	384.00	MH	US$	39.02	100.00	73.48	28,216.11
OE03	Operator (Gr 14)	2.00	256.00	MH	US$	50.36	100.00	93.89	24,035.25
OE05	Operator (Gr 10)	1.00	128.00	MH	US$	50.06	100.00	93.50	11,967.59
TE04	Truck Driver (Gr 5)	3.00	384.00	MH	US$	26.89	100.00	69.73	26,776.46

Activity: B Place Excavated Material (Unreviewed) Quantity: 18400.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	0.80	0.82	1.63	2.20	0.00	0.00	0.00	3.83
Total	14,763.60	15,163.75	29,927.35	40,482.00	0.00	0.00	0.00	70,409.35

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
3.8266	0.0039	255.5556	977.9076	9.0000	2,044.4444	0.0005	7,823.2611

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
360.0000	51.1111	0.0196	83.1315	0.8024

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: EXC (Mod) ExcavationCrew Prod: UH 255.5556 Eff: 100.00 Crew Hrs: 72 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Place excavated material at multiple locations along shoreline where marsh is being created to bridge gap between existing shoreline and fill placement locations to allow for trucks to deliver fill. Assume placement with 2 ea. D8 Dozers with material delivered by offroad trucks from stockpile location.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809SCD08R	CAT D8R SII Dozer	2.00	144.00	HR	US$	219.25	100.00	219.25	31,571.57
820ARD725	CAT 725 Articulated End Dump	1.00	72.00	HR	US$	123.76	100.00	123.76	8,910.43
LA02	Laborer (Gr 5)	2.00	144.00	MH	US$	39.02	100.00	75.76	10,909.18
OE05	Operator (Gr 10)	2.00	144.00	MH	US$	50.06	100.00	96.42	13,884.52
TE04	Truck Driver (Gr 5)	1.00	72.00	MH	US$	26.89	100.00	71.30	5,133.65

Activity: C Place Sand Fill for Wetland (Unreviewed) Quantity: 133680.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.39	1.82	4.21	3.27	0.00	0.00	0.00	7.48
Total	319,895.03	243,106.96	563,001.99	437,338.68	0.00	0.00	0.00	1,000,340.67

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7.4831	0.0088	113.0000	845.5902	118.3009	1,130.0000	0.0009	8,455.9022

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
5,915.0500	22.6000	0.0442	95.1813	2.3930

Calendar: 60S 6x10 hr - Single Hrs/Shift: 10 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 113 Eff: 100.00 Crew Hrs: 1183.0088 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Place 133,680 CY (inflated, please see "Dredging" Bid Item below for explanations) to required template within wetland fill footprint. Allow for shore crew to place dredged material to required grades.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL950	CAT 950H F.E. Loader 4cy	1.00	1,183.01	HR	US$	89.04	100.00	89.04	105,331.66
809SCD06T	CAT D6T Dozer	2.00	2,366.02	HR	US$	140.32	100.00	140.32	332,007.02
LA02	Laborer (Gr 5)	2.00	2,366.02	MH	US$	39.02	118.33	81.69	193,272.61
OE03	Operator (Gr 14)	1.00	1,183.01	MH	US$	50.36	118.33	104.48	123,601.21
OE05	Operator (Gr 10)	2.00	2,366.02	MH	US$	50.06	118.33	104.03	246,128.17

Activity: D Construct Breakwater (Unreviewed) Quantity: 33813.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1.62	1.71	3.33	5.90	43.10	0.00	0.00	52.33
Total	54,662.08	57,853.30	112,515.38	199,663.20	1,457,340.30	0.00	0.00	1,769,518.88

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
9.2325	0.0104	96.0597	886.8710	44.0000	768.4773	0.0013	40,216.3382

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
1,408.0000	24.0149	0.0416	79.9115	1.6166

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: EXC (Mod) ExcavationCrew Prod: UH 96.0597 Eff: 100.00 Crew Hrs: 352 Labor Pcs: 4.00 Equipment Pcs: 2.00

Notes: Breakwater dimensions are 10' crest width, 14' height, 1.5:1 slopes, and an overall length of 1,375 lf. Allow for furnish and place of 22,100 cy of imported Caltrans Backing No. 3 for the rip rap breakwater. Allow for 2% Waste, so 22,100 cy*1.02 = 22,542 CY. Rip rap is 1.5 Ton/ CY, so 22,542*1.5 = 33,813 Ton.

Allow furnish and delivery at $40/ton to stockpile site. Allow for offroad truck to transfer rock from stockpile to placement location with placement by excavator at 96 ton/hr.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BA110	Armor Stone 2 -> 5 T	1.00	33,813.00	TON	US$	40.00	107.75	43.10	1,457,340.30
810CME385	CAT 385CL Excavator 5cy	1.00	352.00	HR	US$	443.47	100.00	443.47	156,101.09
820ARD725	CAT 725 Articulated End Dump	1.00	352.00	HR	US$	123.76	100.00	123.76	43,562.11
LA02	Laborer (Gr 5)	2.00	704.00	MH	US$	39.02	100.00	75.76	53,333.80
OE03	Operator (Gr 14)	1.00	352.00	MH	US$	50.36	100.00	96.83	34,083.72
TE04	Truck Driver (Gr 5)	1.00	352.00	MH	US$	26.89	100.00	71.30	25,097.86

Activity: E Construct Oyster Habitat (Unreviewed) Quantity: 1.00 Unit: LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	59,400.00	57,071.05	116,471.05	133,714.08	57,754.00	0.00	0.00	307,939.13
Total	59,400.00	57,071.05	116,471.05	133,714.08	57,754.00	0.00	0.00	307,939.13

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
250,185.1300	240.0000	0.0042	1,042.4380	30.0000	0.0333	30.0000	10,264.6377

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
1,200.0000	0.0008	1,200.0000	97.0592	59,400.0000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: CRBG5 Crane Barge, 5-Men Prod: S 30 Eff: 100.00 Crew Hrs: 240 Labor Pcs: 5.00 Equipment Pcs: 7.00

Notes: Construct oyster cultches using limestone or shells to construct breakwater type cultches. There are 3 cultch locations approx. 185' x 10' wide x 10' tall. Allow for approx. 11,930 cy of crushed limestone or shells to be placed. Assume placement with excavator from sand fill platform.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PC	PRECAST CONCRETE MATL'S	1.00	2.00	AC	US$	26,800.00	107.75	28,877.00	57,754.00
811LGS0020D	20kW Large GenSet	1.00	240.00	HR	US$	23.96	100.00	23.96	5,749.20
814CB075	Crane Barge - 75 Ton	1.00	240.00	HR	US$	136.78	100.00	136.78	32,826.72
814DCB0220	Flat Deck Barge 2,000 Ton	2.00	480.00	HR	US$	108.23	100.00	108.23	51,949.44
814ITB0250	Inland Tug - 250hp	1.00	240.00	HR	US$	133.81	100.00	133.81	32,114.16
814RUN016	Runabout 16ft	1.00	240.00	HR	US$	34.84	100.00	34.84	8,361.84
818PW350S	Portable Welder Skid 350 amp	1.00	240.00	HR	US$	11.30	100.00	11.30	2,712.72
OE10	Crane Operator (<100 tn)	1.00	240.00	MH	US$	51.40	100.00	98.24	23,578.72
OE17	Engineer	1.00	240.00	MH	US$	49.57	100.00	97.50	23,401.17
OE18	Mate	1.00	240.00	MH	US$	49.57	100.00	97.50	23,401.17
OE19	Deckhand	2.00	480.00	MH	US$	48.48	100.00	96.02	46,089.99

Activity: F Channel Excavation & Slope Shaping (Unreviewed) Quantity: 45.00 Unit: SH

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	715.04	665.66	1,380.70	5,049.96	0.00	0.00	0.00	6,430.66
Total	32,176.80	29,954.51	62,131.31	227,248.20	0.00	0.00	0.00	289,379.51

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
6,430.6558	8.0000	0.1250	803.8320	45.0000	1.0000	1.0000	6,430.6558

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
720.0000	0.0625	16.0000	86.2935	715.0400

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: MEXC Marsh Excavator Prod: S 45 Eff: 100.00 Crew Hrs: 360 Labor Pcs: 2.00 Equipment Pcs: 3.00

Notes: Use marsh excavators to cut channel near existing shoreline and grade material near existing shoreline to the required slopes and elevation. Excavate excess material used to bridge gap at shoreline and stockpile for disposal.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL966	CAT 966H F.E. Loader 5.5cy	1.00	360.00	HR	US$	131.25	100.00	131.25	47,248.20
814MEXC	Marsh Excavtor	2.00	720.00	HR	US$	250.00	100.00	250.00	180,000.00
LA02	Laborer (Gr 5)	1.00	360.00	MH	US$	39.02	100.00	75.76	27,272.96
OE03	Operator (Gr 14)	1.00	360.00	MH	US$	50.36	100.00	96.83	34,858.35

Activity: G Haul Off Excess Fill (Unreviewed) Quantity: 18400.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3.99	5.70	9.69	16.29	0.00	0.00	0.00	25.98
Total	73,421.52	104,866.14	178,287.66	299,684.66	0.00	0.00	0.00	477,972.32

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
25.9768	0.0071	140.0000	3,636.7451	16.4286	1,119.9998	0.0009	29,093.9610

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
2,497.1500	7.3684	0.1357	71.3965	3.9903

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 4HAUL (Mod) 4-Man Haul Crew Prod: UH 140 Eff: 100.00 Crew Hrs: 131.4286 Labor Pcs: 19.00 Equipment Pcs: 17.00

Notes: Load out and haul off excess fill to landfill or other recycle location. Assume disposal location is 30 miles away from project site.

```
---------------------  TRUCKING BY THE CY      (Long Method)  -------------------

                          INPUT         COMPUTED
            Total     CY     18400.00
                   CY/Hr       140.00       131.43 Total Hours
             Hours/Shift         8.00        16.43 Total Shifts
                                            1120.00     CY/Shift
One Way Distance(Miles)         30.00        60.00 Miles/Round Trip
   Average Speed in MPH         45.00        80.00 HaulTime/RndTr (Min)
       Load Time in Min          3.00         5.14 Dmptime- 12     CY/Load
       Dump Time in Min         10.00        93.00 TotTime/RndTr (Min)
          Usable Min/Hr         50.00         0.54 RndTr,Loads/Hr/Truck
           CY/Truckload         16.50      1115.15 Total Truckloads
                                            15.78 Theor. No. of Trucks
 Use This No. of Trucks         16.00      2102.86 Total Truck Hours
    Price/Hr for Trucks        160.00    336457.14 Tot Price - Trucking
                                            18.29 Unit Price/CY    for Trucking
-------------------------------------------------------------------------------
```

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL966	CAT 966H F.E. Loader 5.5cy	1.00	131.43	HR	US$	131.25	100.00	131.24	17,249.53
820OHRD015	On Hwy End Dump 15-18cy	16.00	2,102.86	HR	US$	134.31	100.00	134.31	282,435.13
LA02	Laborer (Gr 5)	2.00	262.86	MH	US$	39.02	100.00	73.48	19,314.82
OE03	Operator (Gr 14)	1.00	131.43	MH	US$	50.36	100.00	93.89	12,339.66
TE04	Truck Driver (Gr 5)	16.00	2,102.86	MH	US$	26.89	100.00	69.73	146,633.18

Activity: I Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Allow for pre- and post-construction surveys for marsh fill and channel excavation. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	40,000.00	100.00	40,000.00	80,000.00

Biditem

9004

ROSE CREEK

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	266,148.77	234,812.28	500,961.05	336,047.75	1,371,652.66	0.00	40,000.00	2,248,661.46
Total	266,148.77	234,812.28	500,961.05	336,047.75	1,371,652.66	0.00	40,000.00	2,248,661.46

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
5,931.7600	0.0002	5,931.7600	379.0884	44.8684	84.4540	0.0010

Activity: A Recover Existing Rip Rap (Unreviewed) Quantity: 1.00 Unit: LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	42,902.40	39,939.35	82,841.75	75,924.48	0.00	0.00	0.00	158,766.23
Total	42,902.40	39,939.35	82,841.75	75,924.48	0.00	0.00	0.00	158,766.23

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
158,766.2300	240.0000	0.0042	661.5260	30.0000	0.0333	30.0000	5,292.2077

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
960.0000	0.0010	960.0000	86.2935	42,902.4000

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: EXC ExcavationCrew Prod: S 30 Eff: 100.00 Crew Hrs: 240 Labor Pcs: 4.00 Equipment Pcs: 3.00

Notes: Allow for time to remove existing rip rap and grade slope for new rock installation.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
809FEL950	CAT 950H F.E. Loader 4cy	1.00	240.00	HR	US$	89.04	100.00	89.04	21,368.88
810CMHE330	CAT 330D L Excavator 1.56cy	1.00	240.00	HR	US$	163.39	100.00	163.39	39,212.64
820OHRD007	On Hwy End Dump 7-8cy	1.00	240.00	HR	US$	63.93	100.00	63.93	15,342.96
LA02	Laborer (Gr 5)	2.00	480.00	MH	US$	39.02	100.00	75.76	36,363.95
OE03	Operator (Gr 14)	2.00	480.00	MH	US$	50.36	100.00	96.83	46,477.80

Activity: B Place Revetment Stone (Unreviewed) Quantity: 17325.00 Unit: TON

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	9.67	8.45	18.12	10.54	45.16	0.00	0.00	73.82
Total	167,547.01	146,332.27	313,879.28	182,619.07	782,413.16	0.00	0.00	1,278,911.51

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
28.6579	0.0271	36.9141	1,057.8801	58.6667	295.3125	0.0034	21,799.6296

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
3,754.6600	4.6143	0.2167	83.5973	9.6708

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 36.9141 Eff: 100.00 Crew Hrs: 469.3333 Labor Pcs: 8.00 Equipment Pcs: 4.00

Notes: Total amount of stone placed - 11,000cy*1.5ton/cy = 16,500 ton. Allow waste at 5% - 16,500 ton*1.05 = 17,325 ton. Assume production at approx. 25 cy/hr or 37 ton/hr for placement. Include backhoe and 2 addl laborers to place filter fabric on slope ahead of rock placement. Budget cost for rip rap recieved from Granite Construction quarry (Rosemary's Mountain) in Fallbrook at $23/ton for material and $14-15/ton for delivery to Mission Bay - $37/ton total cost. Use $40/ton.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BA110	Armor Stone 2 -> 5 T	1.00	17,325.00	TON	US$	40.00	107.75	43.10	746,707.50
2EC32	Woven Geotextile	1.00	26,510.00	SY	US$	1.25	107.75	1.35	35,705.66
809FEL950	CAT 950H F.E. Loader 4cy	2.00	938.67	HR	US$	89.04	100.00	89.04	83,576.36
809TLB416E	CAT 416E Backhoe	1.00	469.33	HR	US$	47.64	100.00	47.64	22,360.76
810CMHE330	CAT 330D L Excavator 1.56cy	1.00	469.33	HR	US$	163.39	100.00	163.39	76,681.95
LA02	Laborer (Gr 5)	4.00	1,877.33	MH	US$	39.02	100.00	73.48	137,945.20
OE03	Operator (Gr 14)	3.00	1,408.00	MH	US$	50.36	100.00	93.89	132,193.90
OE07	Operator (Gr 6)	1.00	469.33	MH	US$	49.83	100.00	93.20	43,740.18

Activity: C Place Sand Fill (Unreviewed) Quantity: 11880.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	4.29	3.74	8.03	5.97	45.39	0.00	0.00	59.38
Total	50,962.79	44,412.84	95,375.63	70,913.38	539,176.69	0.00	0.00	705,465.70

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
13.9974	0.0187	53.3405	746.6281	27.8400	426.7241	0.0023	25,340.0036

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
1,113.6000	10.6681	0.0937	85.6462	4.2898

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 53.3405 Eff: 100.00 Crew Hrs: 222.72 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Place sand fill to required lines and grade within revetment template. Total amount of sand fill required - 10,800 cy. Assume 10% waste, so 10,800 CY * 1.10 = 11,880 CY. Considering the small amount of sand and the inability to place this hydrualically, assume the sand fill is imported. Assume onsite daily stockpile, 2 loaders, and 1 dozer. Production is controlled by the loaders supplying the fill to the dozer. Add an excavator to grade the slope waterline.

```
Production Factors:
8       CY, Bucket Size (assumes 4 loaders)
1.0     Bucket Fill Factor
0.91    10%     Additional time, slope excavation
91.0%   Avg. Percent, Full Bucket
50      Op. Efficiency (Working Minutes per Hour)
247     Sec., Cycle Time
85.0%   Operator Skill Efficiency
100.0%  Machine Availability

Excavation:
Cycles per Hour:                      =       10.3    cycles/hr
Production Rate:                      =       76      cy/hr
Excavation Time Efficiency (%): =       70%
Daily Operating Time:           =       5.60    hours
Monthly Operating Time:         =       122     hours
Daily Gross Production:         =       426     cy/day (Dozer - 1,490 cy/day)
Daily Gross Production:         =       55      lf/day
Monthly Gross Production:               =       9,272   cy/mo (Dozer - 32,456 cy/mo)
Excavation Time:                                1.28    months (Dozer - 0.37 months)
Excavation Time:                                27.84   days (Dozer - 8.05 days)
```

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BB110	Sand Fill	1.00	19,246.00	TON	US$	26.00	107.75	28.02	539,176.69
809FEL950	CAT 950H F.E. Loader 4cy	2.00	445.44	HR	US$	89.04	100.00	89.04	39,660.64
809SCD06T	CAT D6T Dozer	1.00	222.72	HR	US$	140.32	100.00	140.32	31,252.74
LA02	Laborer (Gr 5)	2.00	445.44	MH	US$	39.02	100.00	73.48	32,730.69
OE03	Operator (Gr 14)	2.00	445.44	MH	US$	50.36	100.00	93.89	41,821.34
OE05	Operator (Gr 10)	1.00	222.72	MH	US$	50.06	100.00	93.50	20,823.60

Activity: D Place Sand Cover (Unreviewed) Quantity: 1103.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	4.29	3.74	8.04	5.98	45.39	0.00	0.00	59.40
Total	4,736.57	4,127.82	8,864.39	6,590.82	50,062.81	0.00	0.00	65,518.02

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
14.0120	0.0188	53.2850	746.6285	2.5875	426.2802	0.0023	25,320.9739

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
103.5000	10.6570	0.0938	85.6463	4.2943

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: EXC (Mod) ExcavationCrew Prod: UH 53.285 Eff: 100.00 Crew Hrs: 20.7 Labor Pcs: 5.00 Equipment Pcs: 3.00

Notes: Place Sand on top of revetment,Volume is 1,050 CY of Sand Fill. Allow for 5% waste - 1,050*1.05 = 1,103 cy. Considering the small amount of sand and the inability to place this hydrualically, assume the sand fill is imported.

```
Production Factors:
8       CY, Bucket Size
1.0     Bucket Fill Factor
0.91    10% Additional time, slope excavation
91.0%   Avg. Percent, Full Bucket
50      Op. Efficiency (Working Minutes per Hour)
247     Sec., Cycle Time
85.0%   Operator Skill Efficiency
100.0%  Machine Availability

Excavation:
Cycles per Hour:                      =       10.3    cycles/hr
Production Rate:                      =       76      cy/hr
Excavation Time Efficiency (%): =       70%
Daily Operating Time:           =       5.60    hours
Monthly Operating Time:         =       122     hours
Daily Gross Production:         =       426     cy/day
Daily Gross Production:         =       55      lf/day
```

```
Monthly Gross Production:          =      9,272   cy/mo
Excavation Time:                          0.19    months
Excavation Time:                          2.59    days
```

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2BB110	Sand Fill	1.00	1,787.00	TON	US$	26.00	107.75	28.02	50,062.81
809FEL950	CAT 950H F.E. Loader 4cy	2.00	41.40	HR	US$	89.04	100.00	89.04	3,686.13
809SCD06T	CAT D6T Dozer	1.00	20.70	HR	US$	140.32	100.00	140.32	2,904.69
LA02	Laborer (Gr 5)	2.00	41.40	MH	US$	39.02	100.00	73.48	3,042.06
OE03	Operator (Gr 14)	2.00	41.40	MH	US$	50.36	100.00	93.89	3,886.94
OE05	Operator (Gr 10)	1.00	20.70	MH	US$	50.06	100.00	93.50	1,935.39

Activity: E Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Notes: Allow for pre- and post-construction surveys for cobble dike and sand fill. Allow for both hydrographic and topographic surveys.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	20,000.00	100.00	20,000.00	40,000.00

Biditem 9005

CONSTRUCTION ACCESS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	6,477.50	6,324.95	12,802.45	3,391.17	0.00	59,262.50	0.00	75,456.12
Total	6,477.50	6,324.95	12,802.45	3,391.17	0.00	59,262.50	0.00	75,456.12

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
176.0000	0.0057	176.0000	428.7280	36.8040	72.7412	0.0142

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 11.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	588.86	575.00	1,163.86	308.29	0.00	5,387.50	0.00	6,859.65
Total	6,477.50	6,324.95	12,802.45	3,391.17	0.00	59,262.50	0.00	75,456.12

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,472.1473	6.4000	0.1563	230.0230	8.8000	1.2500	0.8000	8,574.5591

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
176.0000	0.0625	16.0000	72.7412	588.8636

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 8.8 Eff: 100.00 Crew Hrs: 70.4 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing parking lot and housing areas for 10.6 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 4430 lf/500 ft = 23 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 8 ea. moves, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	11.00	MO	US$	5,000.00	107.75	5,387.50	59,262.50
820OHLDTC44	LD Truck 4x4 1.75t	1.00	70.40	HR	US$	48.17	100.00	48.17	3,391.17
LA01	Laborer Foreman	0.50	35.20	MH	US$	41.02	100.00	78.48	2,762.54
LA03	Laborer (Gr 4)	2.00	140.80	MH	US$	35.75	100.00	71.31	10,039.91

Biditem 9006

INSTALL SIGNS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total

U. Cost	3,262.32	3,130.75	6,393.07	1,095.81	22,018.26	0.00	0.00	29,507.14
Total	3,262.32	3,130.75	6,393.07	1,095.81	22,018.26	0.00	0.00	29,507.14

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
80.5000	0.0124	80.5000	366.5483	40.5257	79.4170	0.0435

Activity: A Install Signs (Unreviewed) Quantity: 46.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	3,262.32	3,130.75	6,393.07	1,095.81	22,018.26	0.00	0.00	29,507.14

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8017	0.5000	2.0000	325.6035	2.8750	16.0000	0.0625	10,263.3530

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
80.5000	0.5714	1.7500	79.4170	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 23 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 46 of each: Marsh Restoration signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	46.00	EA	US$	44.23	107.75	47.66	2,192.26
2T5101	Construction Signs	1.00	46.00	EA	US$	400.00	107.75	431.00	19,826.00
809TLB416E	CAT 416E Backhoe	1.00	23.00	HR	US$	47.64	100.00	47.64	1,095.81
LA01	Laborer Foreman	0.50	11.50	MH	US$	41.02	100.00	78.48	902.53
LA03	Laborer (Gr 4)	2.00	46.00	MH	US$	35.75	100.00	71.31	3,280.08
OE07	Operator (Gr 6)	1.00	23.00	MH	US$	49.83	100.00	96.11	2,210.46

Biditem

9007

MOB/DEMOB DREDGING

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	12,939.52	12,827.36	25,766.88	29,466.97	0.00	2,693.75	0.00	57,927.60
Total	12,939.52	12,827.36	25,766.88	29,466.97	0.00	2,693.75	0.00	57,927.60

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
256.0000	0.0039	256.0000	226.2797	50.5450	100.6519	0.0156

Activity: A Prepare Dredge at Jobsite (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76
Total	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7,908.7600	8.0000	0.1250	988.5950	1.0000	1.0000	1.0000	7,908.7600

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
32.0000	0.0313	32.0000	100.6519	1,617.4400

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 1 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Allow one shift at jobsite to prepare dredge to work.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	8.00	HR	US$	33.38	100.00	23.28	186.22
814HCDSP012	Submerged Pipeline - 12" %65	1.00	8.00	HR	US$	123.16	100.00	123.16	985.30
814HCDWT	Work Tugboat %65	1.00	8.00	HR	US$	252.13	100.00	181.48	1,451.82

814HCSD012CP	Hyd Cutterhead Dredge 12" % 65	1.00	8.00	HR	US$	351.52	100.00	258.07	2,064.56
OE15	Leverman	1.00	8.00	MH	US$	55.65	100.00	107.79	862.29
OE18	Mate	1.00	8.00	MH	US$	49.57	100.00	99.29	794.31
OE19	Deckhand	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13
OE21	Oiler	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13

Activity: B Prepare Pipeline at Jobsite (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	6,469.76	6,413.70	12,883.46	14,844.49	0.00	2,693.75	0.00	30,421.70
Total	6,469.76	6,413.70	12,883.46	14,844.49	0.00	2,693.75	0.00	30,421.70

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
27,727.9500	32.0000	0.0313	866.4984	4.0000	0.2500	4.0000	7,605.4250

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
128.0000	0.0078	128.0000	100.6520	6,469.7600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 4 Eff: 100.00 Crew Hrs: 32 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Allow three shifts to offload pipeline from trucks, fuse pipeline, and pull pipeline sections into location and connect joints. Connect pipeline to dredge and place shore pipeline.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3FSMC	Fusion Machine Rental	1.00	5.00	DAY	US$	500.00	107.75	538.75	2,693.75
813RT600E	GROVE RT600E RT Crane 40mt	1.00	32.00	HR	US$	135.97	100.00	135.97	4,351.14
814CSURV90	Crew/Survey Boat %65	1.00	32.00	HR	US$	33.38	100.00	23.28	744.88
814HCDSP012	Submerged Pipeline - 12" %65	1.00	32.00	HR	US$	123.16	100.00	123.16	3,941.18
814HCDWT	Work Tugboat %65	1.00	32.00	HR	US$	252.13	100.00	181.48	5,807.29
OE15	Leverman	1.00	32.00	MH	US$	55.65	100.00	107.79	3,449.16
OE18	Mate	1.00	32.00	MH	US$	49.57	100.00	99.29	3,177.26
OE19	Deckhand	1.00	32.00	MH	US$	48.48	100.00	97.77	3,128.52
OE21	Oiler	1.00	32.00	MH	US$	48.48	100.00	97.77	3,128.52

Activity: C Prepare Dredge for Transfer from Site (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76
Total	1,617.44	1,603.42	3,220.86	4,687.90	0.00	0.00	0.00	7,908.76

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
7,908.7600	8.0000	0.1250	988.5950	1.0000	1.0000	1.0000	7,908.7600

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
32.0000	0.0313	32.0000	100.6519	1,617.4400

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 1 Eff: 100.00 Crew Hrs: 8 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Allow one shift to prepare dredge for tow back to next dredging area.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	8.00	HR	US$	33.38	100.00	23.28	186.22
814HCDSP012	Submerged Pipeline - 12" %65	1.00	8.00	HR	US$	123.16	100.00	123.16	985.30
814HCDWT	Work Tugboat %65	1.00	8.00	HR	US$	252.13	100.00	181.48	1,451.82
814HCSD012CP	Hyd Cutterhead Dredge 12" % 65	1.00	8.00	HR	US$	351.52	100.00	258.07	2,064.56
OE15	Leverman	1.00	8.00	MH	US$	55.65	100.00	107.79	862.29
OE18	Mate	1.00	8.00	MH	US$	49.57	100.00	99.29	794.31
OE19	Deckhand	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13
OE21	Oiler	1.00	8.00	MH	US$	48.48	100.00	97.77	782.13

Activity: D Prepare Pipeline for Transfer from Site (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	3,234.88	3,206.82	6,441.70	5,246.68	0.00	0.00	0.00	11,688.38
Total	3,234.88	3,206.82	6,441.70	5,246.68	0.00	0.00	0.00	11,688.38

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
11,688.3800	16.0000	0.0625	730.5238	2.0000	0.5000	2.0000	5,844.1900

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
64.0000	0.0156	64.0000	100.6516	3,234.8800

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: S 2 Eff: 100.00 Crew Hrs: 16 Labor Pcs: 4.00 Equipment Pcs: 3.00

Notes: Disconnect and cut pipeline into 200' sections, raft them and tow them to next site.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	16.00	HR	US$	33.38	100.00	23.28	372.44
814HCDSP012	Submerged Pipeline - 12" %65	1.00	16.00	HR	US$	123.16	100.00	123.16	1,970.59
814HCDWT	Work Tugboat %65	1.00	16.00	HR	US$	252.13	100.00	181.48	2,903.65
OE15	Leverman	1.00	16.00	MH	US$	55.65	100.00	107.79	1,724.57
OE18	Mate	1.00	16.00	MH	US$	49.57	100.00	99.29	1,588.63
OE19	Deckhand	1.00	16.00	MH	US$	48.48	100.00	97.77	1,564.25
OE21	Oiler	1.00	16.00	MH	US$	48.48	100.00	97.77	1,564.25

Biditem 9008

DREDGING

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	283,022.84	243,574.71	526,597.55	693,229.20	0.00	0.00	24,000.00	1,243,826.75
Total	283,022.84	243,574.71	526,597.55	693,229.20	0.00	0.00	24,000.00	1,243,826.75

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
4,732.0400	0.0002	4,732.0400	262.8521	59.8099	111.2834	0.0008

Activity: A Dredge Area (Unreviewed) Quantity: 133680.00 Unit: CY

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2.12	1.82	3.94	5.19	0.00	0.00	0.00	9.12
Total	283,022.84	243,574.71	526,597.55	693,229.20	0.00	0.00	0.00	1,219,826.75

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
9.1250	0.0088	113.0000	1,031.1223	118.3009	1,130.0000	0.0009	10,311.2230

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
4,732.0400	28.2500	0.0354	111.2834	2.1172

Calendar: 60S 6x10 hr - Single Hrs/Shift: 10 WC: MARINE Over Water Work

Crew: CHD12 (Mod) 12" Cutterhead Dredge Crew Prod: UH 113 Eff: 100.00 Crew Hrs: 1183.0088 Labor Pcs: 4.00 Equipment Pcs: 4.00

Notes: Total Bid Quantity, inflated by 20% losses to account for hydraulic lossses in the beach placement - 111,400 cy * 1.2 = 133,680 cy. Total dredge area based on a 3-foot borrow depth is 1,203,120 sf or 27.6 acres.

Dredge is assumed to work 10 hrs/day, 6 days/week (260 hrs/mo) each crew working a 10-hour shift. Gross production - 29,575 cy/mo or approx. 113 cy/hr.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
814CSURV90	Crew/Survey Boat %65	1.00	1,183.01	HR	US$	33.38	100.00	23.28	27,537.40
814HCDSP012	Submerged Pipeline - 12" %65	1.00	1,183.01	HR	US$	123.16	100.00	123.16	145,701.88
814HCDWT	Work Tugboat %65	1.00	1,183.01	HR	US$	252.13	100.00	181.48	214,690.17
814HCSD012CP	Hyd Cutterhead Dredge 12" % 65	1.00	1,183.01	HR	US$	351.52	100.00	258.07	305,299.75
OE15	Leverman	1.00	1,183.01	MH	US$	55.65	118.33	119.49	141,359.54
OE18	Mate	1.00	1,183.01	MH	US$	49.57	118.33	109.72	129,794.85
OE19	Deckhand	1.00	1,183.01	MH	US$	48.48	118.33	107.96	127,721.58

OE21	Oiler	1.00	1,183.01	MH	US$	48.48	118.33	107.96	127,721.58

Activity: B Hydrographic Surveys (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 50S 5 x 10 Hr - Single Hrs/Shift: 10 WC: MARINE Over Water Work

Notes: Allow for pre- and post-hydrographic surveys and required submittals.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	2.00	2.00	EA	US$	12,000.00	100.00	12,000.00	24,000.00

Biditem - Parent

10000

CROWN POINT

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	12,683.84	17,639.70	30,323.54	39,612.84	3,998.97	75,429.00	2,000,000.00	2,149,364.35
Total	12,683.84	17,639.70	30,323.54	39,612.84	3,998.97	75,429.00	2,000,000.00	2,149,364.35

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
428.0000	0.0023	428.0000	5,021.8793	29.6351	70.8494	0.0000

Biditem

10001

MOBILIZATION/DEMOBILIZATION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	8,604.80	13,708.90	22,313.70	37,690.24	0.00	50,000.00	0.00	110,003.94
Total	8,604.80	13,708.90	22,313.70	37,690.24	0.00	50,000.00	0.00	110,003.94

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
320.0000	0.0031	320.0000	343.7623	26.8900	69.7303	0.0031

Activity: A Mobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	625.00	0.00	1,375.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	25,000.00	0.00	55,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	2,750.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
990200	Crane Mobilization	1.00	1.00	LS	US$	25,000.00	100.00	25,000.00	25,000.00
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Activity: B Demobilization of Land Based Equip (Unreviewed) Quantity: 40.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	107.56	171.36	278.92	471.13	0.00	625.00	0.00	1,375.05
Total	4,302.40	6,854.45	11,156.85	18,845.12	0.00	25,000.00	0.00	55,001.97

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift

750.0493	4.0000	0.2500	187.5123	20.0000	2.0000	0.5000	2,750.0985

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
160.0000	0.2500	4.0000	69.7303	107.5600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: LOW Lowbed Prod: HU 4 Eff: 100.00 Crew Hrs: 160 Labor Pcs: 1.00 Equipment Pcs: 2.00

Notes: Assume 40 loads for loaders, excavators, dozers, backhoes, office trailer storage trailers, parts trailers,etc @ 4 hours per load

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
819FGET0040	Fixed Gooseneck Trlr 40t	1.00	160.00	HR	US$	16.91	100.00	16.91	2,705.76
820OHTT050	On Hwy Truck 50K	1.00	160.00	HR	US$	100.87	100.00	100.87	16,139.36
990205	Crane Demobilization	1.00	1.00	LS	US$	25,000.00	100.00	25,000.00	25,000.00
TE04	Truck Driver (Gr 5)	1.00	160.00	MH	US$	26.89	100.00	69.73	11,156.85

Biditem

10002

SWPPP

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	10,000.00	15,318.00

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
14.0000	0.0714	14.0000	1,094.1429	40.5257	77.0507	0.2500

Activity: A SWPPP Development and Compliance Plan (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Allow for SWPPP Plan development and submittal. Average cost for Caltrans projects over the last 5 years for SWPPP preparation was approx. $4,400 although no costs were found for District 11. Use $10,000 due to equipment movement on and off the beach.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SWPPP	SWPPP Plan	1.00	1.00	LS	US$	10,000.00	100.00	10,000.00	10,000.00

Activity: B Construct Temp Construction Entrance (Unreviewed) Quantity: 1.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00
Total	567.36	511.35	1,078.71	190.58	169.71	3,879.00	0.00	5,318.00

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,269.2900	4.0000	0.2500	317.3225	0.5000	2.0000	0.5000	10,636.0000

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.0714	14.0000	77.0507	567.3600

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: UH 0.25 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Propose a temporary construction entrance in the middle of the adjacent parking lot. It appears that this access ramp is already used to allow vehicles access to the beach. Allow for gravel furnish, delivery and placement at the temporary entrances. Allow for sandbags or other bmp to contain sediment along with water tank and connection for truck tire washdown. Entrance will require steel plate over aggregate to protect existing concrete ramp.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2B2005	3/4" Crushed Gravel	1.00	21.00	TON	US$	7.50	107.75	8.08	169.71
3STRPL	Trench Plate Rental - 8'x10'	1.00	18.00	MO	US$	200.00	107.75	215.50	3,879.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	76.09	152.18
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	69.22	553.75
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	93.20	372.78

Biditem

10003

SHORELINE RECONSTRUCTION

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	0.00	0.00	0.00	0.00	0.00	0.00	1,990,000.00	1,990,000.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	1,990,000.00	1,990,000.00

Activity: A Construct New Seawall (Unreviewed) Quantity: 245.00 Unit: LF

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA6217 Excavation - Land

Notes: Construct an additional 245 feet of concrete seawall and connect with existing. As-built drawings for existing seawall show the existing sidewalk contains a short cutoff wall to contain material. Allow for a new bulkhead wall to be constructed outside the existing sidewalk and cutoff wall, tying in to the existing bulkhead wall as necessary. Assume a subcontract cost for a sheet pile wall with a tall concrete cap.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4CONC	Concrete - Sub	1.00	245.00	LF	US$	8,000.00	100.00	8,000.00	1,960,000.00

Activity: B Surveys (Unreviewed) Quantity: 2.00 Unit: EA

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Allow for pre- and post-construction surveys for new concrete seawall.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
4SURVEY	Surveying/Positioning Sub	1.00	2.00	EA	US$	15,000.00	100.00	15,000.00	30,000.00

Biditem

10004

CONSTRUCTION ACCESS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	2,944.32	2,874.97	5,819.29	1,541.44	0.00	21,550.00	0.00	28,910.73
Total	2,944.32	2,874.97	5,819.29	1,541.44	0.00	21,550.00	0.00	28,910.73

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
80.0000	0.0125	80.0000	361.3841	36.8040	72.7411	0.0313

Activity: A Pedestrian Access/Safety (Unreviewed) Quantity: 4.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	736.08	718.74	1,454.82	385.36	0.00	5,387.50	0.00	7,227.68
Total	2,944.32	2,874.97	5,819.29	1,541.44	0.00	21,550.00	0.00	28,910.73

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
1,840.1825	8.0000	0.1250	230.0228	4.0000	1.0000	1.0000	7,227.6825

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
80.0000	0.0500	20.0000	72.7411	736.0800

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LAB 2 ManLabor Crew Prod: S 4 Eff: 100.00 Crew Hrs: 32 Labor Pcs: 2.50 Equipment Pcs: 1.00

Notes: Allow for fence between existing sidewalks and work areas for 4 months while project is under construction. Assume fencing is placed in sections as work progresses so beach access is maintained. Allow for 500 ft. closures of work site - 770 lf/500 ft = 2 installs & removals plus initial unload and loadout. Allow 1 shift each for initial installation, 1 ea. move, and final removal of fencing and other safety controls. Allow additional cost for rental of warning signs, barricades, lights, etc.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3S4005	Traffic Control	1.00	4.00	MO	US$	5,000.00	107.75	5,387.50	21,550.00
820OHLDTC44	LD Truck 4x4 1.75t	1.00	32.00	HR	US$	48.17	100.00	48.17	1,541.44
LA01	Laborer Foreman	0.50	16.00	MH	US$	41.02	100.00	78.48	1,255.70
LA03	Laborer (Gr 4)	2.00	64.00	MH	US$	35.75	100.00	71.31	4,563.59

Biditem

10005

INSTALL SIGNS

Takeoff Qty: 1.000 LS

Bid Qty: 1.000 LS

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	567.36	544.48	1,111.84	190.58	3,829.26	0.00	0.00	5,131.68
Total	567.36	544.48	1,111.84	190.58	3,829.26	0.00	0.00	5,131.68

Manhours	Unit/MH	MH/Unit	$/MH	Base Labor/MH	Total Labor/MH	Unit/CH
14.0000	0.0714	14.0000	366.5486	40.5257	79.4171	0.2500

Activity: A Install Signs (Unreviewed) Quantity: 8.00 Unit: EA

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	70.92	68.06	138.98	23.82	478.66	0.00	0.00	641.46
Total	567.36	544.48	1,111.84	190.58	3,829.26	0.00	0.00	5,131.68

Crew $/Unit	Crew Hrs/Unit	Units/Crew Hr	$/Crew Hour	Shifts	Units/Shift	Shifts/Unit	$/Shift
162.8025	0.5000	2.0000	325.6050	0.5000	16.0000	0.0625	10,263.3600

Manhours	Unit/MH	MH/Unit	Total Labor/MH	Base Labor/Unit
14.0000	0.5714	1.7500	79.4171	70.9200

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Crew: 2LABBH 2 Man Labor Crew w/SSL Prod: HU 0.5 Eff: 100.00 Crew Hrs: 4 Labor Pcs: 3.50 Equipment Pcs: 1.00

Notes: Install 8 of each: Beach Access Signs and construction safety signs on 4x4 plastic lumber posts.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
2PL4X4	Plastic Lumber 4x4x72"	1.00	8.00	EA	US$	44.23	107.75	47.66	381.26
2T5101	Construction Signs	1.00	8.00	EA	US$	400.00	107.75	431.00	3,448.00
809TLB416E	CAT 416E Backhoe	1.00	4.00	HR	US$	47.64	100.00	47.65	190.58
LA01	Laborer Foreman	0.50	2.00	MH	US$	41.02	100.00	78.49	156.97
LA03	Laborer (Gr 4)	2.00	8.00	MH	US$	35.75	100.00	71.31	570.45
OE07	Operator (Gr 6)	1.00	4.00	MH	US$	49.83	100.00	96.11	384.42

Biditem

11000

CONTRACTOR INDIRECTS

Takeoff Qty: 78.000 MO

Bid Qty: 78.000 MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	43,704.13	16,640.09	60,344.21	28,833.11	0.00	17,150.54	0.00	106,327.86
Total	3,408,921.76	1,297,927.00	4,706,848.76	2,248,982.19	0.00	1,337,742.36	0.00	8,293,573.31

Activity: 10000A Contractors Office (Unreviewed) Quantity: 78.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	0.00	0.00	0.00	0.00	0.00	5,556.41	0.00	5,556.41
Total	0.00	0.00	0.00	0.00	0.00	433,400.00	0.00	433,400.00

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
990008	Office - Gen. Contractor	1.00	78.00	MO	US$	2,000.00	100.00	2,000.00	156,000.00
990009	Storage - Gen. Contractor	1.00	78.00	MO	US$	500.00	100.00	500.00	39,000.00
990010	Temporary Utilities	1.00	78.00	MO	US$	1,000.00	100.00	1,000.00	78,000.00
990012	Sanitary	1.00	78.00	MO	US$	900.00	100.00	900.00	70,200.00
990013	Temporary Fencing	1.00	2,000.00	LF	US$	10.00	100.00	10.00	20,000.00
990014	Telephone/Cell Phones	1.00	78.00	MO	US$	400.00	100.00	400.00	31,200.00
990016	Project Office Equipment	1.00	78.00	MO	US$	500.00	100.00	500.00	39,000.00

Activity: 10000B QC Facilities (Unreviewed) Quantity: 78.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	0.00	0.00	0.00	0.00	0.00	500.00	0.00	500.00
Total	0.00	0.00	0.00	0.00	0.00	39,000.00	0.00	39,000.00

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
990018	QC Storage Facility	1.00	78.00	MO	US$	0.00	100.00	0.00	0.00
990019	QC Laboratory - On-Site	1.00	78.00	MO	US$	0.00	100.00	0.00	0.00
990020	Testing Services - Off-Site	1.00	78.00	MO	US$	500.00	100.00	500.00	39,000.00

Activity: 10000C Supervision (Unreviewed) Quantity: 78.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	41,250.00	16,063.13	57,313.13	0.00	0.00	0.00	0.00	57,313.13
Total	3,217,500.00	1,252,923.75	4,470,423.75	0.00	0.00	0.00	0.00	4,470,423.75

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
ZZ02	▫ Project Manager	1.00	78.00	MO	US$	14,500.00	100.00	19,790.25	1,543,639.50
ZZ04	▫ Project Engineer	1.00	0.00	MO	US$	12,000.00	100.00	0.00	0.00
ZZ07	▫ QC Engineer	1.00	0.00	MO	US$	12,000.00	100.00	0.00	0.00
ZZ08	▫ Safety Engineer	0.50	39.00	MO	US$	9,500.00	100.00	12,967.75	505,742.25
ZZ10	▫ Field Engineer	1.00	78.00	MO	US$	9,500.00	100.00	12,967.75	1,011,484.50
ZZ11	▫ Office Engineer	1.00	0.00	MO	US$	8,500.00	100.00	0.00	0.00
ZZ13	▫ Project Superintendent	1.00	78.00	MO	US$	12,500.00	100.00	18,071.25	1,409,557.50
ZZ14	▫ Dredging Superintendent	1.00	0.00	MO	US$	11,500.00	100.00	0.00	0.00
ZZ20	▫ Yard Superintendent	1.00	0.00	MO	US$	11,500.00	100.00	0.00	0.00
ZZ23	▫ Project Controls Engr.	1.00	0.00	MO	US$	6,100.00	100.00	0.00	0.00

Activity: 10000D Survey (Unreviewed) Quantity: 78.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	0.00	0.00	0.00	0.00	0.00	750.00	0.00	750.00
Total	0.00	0.00	0.00	0.00	0.00	58,500.00	0.00	58,500.00

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
990025	Survey Equipment	1.00	78.00	MO	US$	500.00	100.00	500.00	39,000.00
990026	Survey Supplies	1.00	78.00	MO	US$	250.00	100.00	250.00	19,500.00

Activity: 10000E Vehicle Expenses (Unreviewed) Quantity: 78.00 Unit: MO

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Assume vehicles for 3 full time and 1 half-time supervisory personnel for 78 months
1*0.5+3 x 174/month x 78 months = 47,502 hrs.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
820OHLDTC42	▫ LD Truck 4x2 1.75t	3.50	47,502.00	HR	US$	47.35	100.00	47.35	2,248,982.19

Activity: 10000F Lodging Expenses (Unreviewed) Quantity: 78.00 Unit: MO

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Assume all labor and overhead personnel are local to the San Diego area so no per diem is required.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
990028	Subsistence	1.00	0.00	MO	US$	0.00	100.00	0.00	0.00

Activity: 10000G Travel Expenses (Unreviewed) Quantity: 78.00 Unit: MO

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Travel is for home office personnel and deliveries to site from yard/shop.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
990029	Travel	1.00	78.00	MO	US$	1,000.00	100.00	1,000.00	78,000.00

Activity: 10000H Security (Unreviewed) Quantity: 78.00 Unit: MO

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Assume sites are fenced so no security is required.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
990001	Security	0.00	0.00	MO	US$	4,500.00	100.00	0.00	0.00

Activity: 10000I Safety Training & Supplies (Unreviewed) Quantity: 78.00 Unit: MO

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
U. Cost	0.00	0.00	0.00	0.00	0.00	2,669.23	0.00	2,669.23
Total	0.00	0.00	0.00	0.00	0.00	208,200.00	0.00	208,200.00

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Allow one hour of environmental training for each on-site employee.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
990100	Safety Supplies	1.00	78.00	MO	US$	2,500.00	100.00	2,500.00	195,000.00
990105	Environmental Training	1.00	220.00	HR	US$	60.00	100.00	60.00	13,200.00

Activity: 10000J Permits (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
990030	Permits	1.00	1.00	LS	US$	5,000.00	100.00	5,000.00	5,000.00

Activity: 10000K Small Tools & Supplies (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40S 5 x 8 Hr - Single Shift Hrs/Shift: 8 WC: CA1 CA - Land Avg.

Notes: Small tools and supplies are based on 5% of total direct labor costs.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
3*DL	Small Tools & Supplies	1.00	9,571,087.82	DLB$	US$	0.05	107.75	0.05	515,642.36

Activity: 10000L Premium for Unscheduled Overtime (Unreviewed) Quantity: 1.00 Unit: LS

Calendar: 40P 4 x 10-Hr Single Shift Hrs/Shift: 10 WC: CA4 Concrete - foundation/docks

Notes: The premium for unscheduled overtime is based on 2.5% of total direct labor costs.

Resource	Description	Pcs/Wste	Quantity	Unit		Unit Cost	Tax/OT %	Actual UC	Total
Z*DL	▫ Premium for Unsheduled OT	1.00	9,571,087.82	DLB$	US$	0.02	100.00	0.02	236,425.01

Report Summary

	Base Labor	Burden	Total Labor	Equipment	Perm Matls	Const Matls	Sub	Total
Total	8,520,153	5,757,784	14,277,937	12,368,631	7,979,450	1,788,703	2,762,976	39,177,696

Job Notes

THIS ESTIMATE IS AN UDATE TO ESTIMATE 2019-32B (10/9/2019) AND INCLUDES UPDATED BEACH NOURISHMENT VOLUMES AND MATERTIAL QUANTITIES. LABOR RATES, EQUIPMENT RATES, AND FUEL RATES HAVE BEEN UPDATED TO 2020..

DETAILS OF THIS ESTIMATE:
Shoreline restoration alternatives to be utilized at multiple locations in Mission Bay for the various eroding shoreline conditions. Shoreline restoration and protection options include revetments, rip rap, seawalls, beach nourishment, living shorelines (i.e. oyster reefs), wetlands, and hybrid solutions. The sand fill for the beach nourishment in Alt. 2 is based on dredging material from within Mission Bay to provide the sand fill material.

**********Estimate created on: 11/19/2020 by User#: 1 - Jack Fink
Source estimate used: L:\HEAVYBID\EST\2019-32B

Calendars Used In Estimate

40S	5 x 8 Hr - Single Shift
60S	6x10 hr - Single
50S	5 x 10 Hr - Single
40P	4 x 10-Hr Single Shift

In equipment resources, Rent % and EOE % that are not 100% are represented as XXX%YYY, where XXX = Rent % and YYY = EOE %

Biditem	Activity	Resource	Sel Vendor	Quantity	Unit	Unit Cost	Tax/OT %	Pcs/W	Total	Esc %
1002	B	2B2005		21.000	TON	7.500	107.75	1.00	169.71	100.00
2002	B	2B2005		21.000	TON	7.500	107.75	1.00	169.71	100.00
3002	B	2B2005		21.000	TON	7.500	107.75	1.00	169.71	100.00
4002	B	2B2005		21.000	TON	7.500	107.75	1.00	169.71	100.00
5002	B	2B2005		21.000	TON	7.500	107.75	1.00	169.71	100.00
6002	B	2B2005		21.000	TON	7.500	107.75	1.00	169.71	100.00
7002	B	2B2005		21.000	TON	7.500	107.75	1.00	169.71	100.00
8002	B	2B2005		42.000	TON	7.500	107.75	1.00	339.41	100.00
9002	B	2B2005		42.000	TON	7.500	107.75	1.00	339.41	100.00
10002	B	2B2005		21.000	TON	7.500	107.75	1.00	169.71	100.00
Subtotal:	2B2005			252.000	TON	7.500	107.75		2,036.50	100.00
	3/4" Crushed Gravel									
1003	C	2B2008		2,458.000	TON	49.000	107.75	1.00	129,776.26	100.00
2003	C	2B2008		27,090.000	TON	49.000	107.75	1.00	1,430,284.28	100.00
Subtotal:	2B2008			29,548.000	TON	49.000	107.75		1,560,060.54	100.00
	3'-8" Cobble									
1003	B	2BA110		3,902.000	TON	40.000	107.75	1.00	168,176.20	100.00
2003	B	2BA110		26,100.000	TON	40.000	107.75	1.00	1,124,910.00	100.00
3003	B	2BA110		21,420.000	TON	40.000	107.75	1.00	923,202.00	100.00
5003	B	2BA110		12,522.000	TON	40.000	107.75	1.00	539,698.20	100.00
6003	B	2BA110		4,410.000	TON	37.000	107.75	1.00	175,815.68	100.00
7003	B	2BA110		8,033.000	TON	40.000	107.75	1.00	346,222.30	100.00
9003	D	2BA110		33,813.000	TON	40.000	107.75	1.00	1,457,340.30	100.00
9004	B	2BA110		17,325.000	TON	40.000	107.75	1.00	746,707.50	100.00
Subtotal:	2BA110			127,525.000	TON		107.75		5,482,072.18	100.00
	Armor Stone 2 -> 5 T									
5003	C	2BB110		2,042.340	TON	26.000	107.75	1.00	57,216.16	100.00
6003	C	2BB110		617.000	TON	26.000	107.75	1.00	17,285.26	100.00
9004	C	2BB110		19,246.000	TON	26.000	107.75	1.00	539,176.69	100.00
9004	D	2BB110		1,787.000	TON	26.000	107.75	1.00	50,062.81	100.00
Subtotal:	2BB110			23,692.340	TON	26.000	107.75		663,740.92	100.00
	Sand Fill									
3003	B	2EC32		2,226.940	SY	1.250	107.75	1.00	2,999.41	100.00
5003	B	2EC32		8,509.490	SY	1.250	107.75	1.00	11,461.22	100.00
6003	B	2EC32		3,000.000	SY	1.250	107.75	1.00	4,040.63	100.00
7003	B	2EC32		4,850.000	SY	1.250	107.75	1.00	6,532.34	100.00
9004	B	2EC32		26,510.000	SY	1.250	107.75	1.00	35,705.66	100.00
Subtotal:	2EC32			45,096.430	SY	1.250	107.75		60,739.26	100.00
	Woven Geotextile									
5003	D	2PC		1.000	AC	26,800.000	107.75	1.00	28,877.00	100.00
6003	D	2PC		0.500	AC	26,800.000	107.75	1.00	14,438.50	100.00
7003	C	2PC		0.750	AC	26,800.000	107.75	1.00	21,657.75	100.00
9003	E	2PC		2.000	AC	26,800.000	107.75	1.00	57,754.00	100.00
Subtotal:	2PC			4.250	AC	26,800.000	107.75		122,727.25	100.00
	PRECAST CONCRETE MATL'S									
1009	A	2PL4X4		8.000	EA	44.230	107.75	1.00	381.26	100.00
2005	A	2PL4X4		18.000	EA	44.230	107.75	1.00	857.84	100.00
3005	A	2PL4X4		20.000	EA	44.230	107.75	1.00	953.16	100.00
4005	A	2PL4X4		18.000	EA	44.230	107.75	1.00	857.84	100.00
5005	A	2PL4X4		14.000	EA	44.230	107.75	1.00	667.21	100.00

Biditem	Activity	Resource	Sel Vendor	Quantity	Unit	Unit Cost	Tax/OT %	Pcs/W	Total	Esc %
6005	A	2PL4X4		6.000	EA	44.230	107.75	1.00	285.95	100.00
7005	A	2PL4X4		10.000	EA	44.230	107.75	1.00	476.58	100.00
8005	A	2PL4X4		36.000	EA	44.230	107.75	1.00	1,715.68	100.00
9006	A	2PL4X4		46.000	EA	44.230	107.75	1.00	2,192.26	100.00
10005	A	2PL4X4		8.000	EA	44.230	107.75	1.00	381.26	100.00
Subtotal:	2PL4X4			184.000	EA	44.230	107.75		8,769.04	100.00
	Plastic Lumber 4x4x72"									
1009	A	2T5101		8.000	EA	400.000	107.75	1.00	3,448.00	100.00
2005	A	2T5101		18.000	EA	400.000	107.75	1.00	7,758.00	100.00
3005	A	2T5101		20.000	EA	400.000	107.75	1.00	8,620.00	100.00
4005	A	2T5101		18.000	EA	400.000	107.75	1.00	7,758.00	100.00
5005	A	2T5101		14.000	EA	400.000	107.75	1.00	6,034.00	100.00
6005	A	2T5101		6.000	EA	400.000	107.75	1.00	2,586.00	100.00
7005	A	2T5101		10.000	EA	400.000	107.75	1.00	4,310.00	100.00
8005	A	2T5101		36.000	EA	400.000	107.75	1.00	15,516.00	100.00
9006	A	2T5101		46.000	EA	400.000	107.75	1.00	19,826.00	100.00
10005	A	2T5101		8.000	EA	400.000	107.75	1.00	3,448.00	100.00
Subtotal:	2T5101			184.000	EA	400.000	107.75		79,304.00	100.00
	Construction Signs									
					COST TYPE TOTAL				7,979,449.69	
11000	10000K	3*DL		9,571,087.820	DLB$	0.050	107.75	1.00	515,642.36	100.00
Subtotal:	3*DL			9,571,087.820	DLB$	0.050	107.75		515,642.36	100.00
	Small Tools & Supplies									
1004	B	3FSMC		5.000	DAY	500.000	107.75	1.00	2,693.75	100.00
2006	B	3FSMC		5.000	DAY	500.000	107.75	1.00	2,693.75	100.00
3006	B	3FSMC		5.000	DAY	500.000	107.75	1.00	2,693.75	100.00
4006	B	3FSMC		5.000	DAY	500.000	107.75	1.00	2,693.75	100.00
8006	B	3FSMC		5.000	DAY	500.000	107.75	1.00	2,693.75	100.00
9007	B	3FSMC		5.000	DAY	500.000	107.75	1.00	2,693.75	100.00
Subtotal:	3FSMC			30.000	DAY	500.000	107.75		16,162.50	100.00
	Fusion Machine Rental									
1008	A	3S4005		3.000	MO	5,000.000	107.75	1.00	16,162.50	100.00
2004	A	3S4005		8.000	MO	5,000.000	107.75	1.00	43,100.00	100.00
3004	A	3S4005		8.000	MO	5,000.000	107.75	1.00	43,100.00	100.00
4004	A	3S4005		5.000	MO	5,000.000	107.75	1.00	26,937.50	100.00
5004	A	3S4005		5.000	MO	5,000.000	107.75	1.00	26,937.50	100.00
6004	A	3S4005		3.000	MO	5,000.000	107.75	1.00	16,162.50	100.00
7004	A	3S4005		4.000	MO	5,000.000	107.75	1.00	21,550.00	100.00
8004	A	3S4005		9.000	MO	5,000.000	107.75	1.00	48,487.50	100.00
9005	A	3S4005		11.000	MO	5,000.000	107.75	1.00	59,262.50	100.00
10004	A	3S4005		4.000	MO	5,000.000	107.75	1.00	21,550.00	100.00
Subtotal:	3S4005			60.000	MO	5,000.000	107.75		323,250.00	100.00
	Traffic Control									
1002	B	3STRPL		18.000	MO	200.000	107.75	1.00	3,879.00	100.00
2002	B	3STRPL		18.000	MO	200.000	107.75	1.00	3,879.00	100.00
3002	B	3STRPL		18.000	MO	200.000	107.75	1.00	3,879.00	100.00
4002	B	3STRPL		18.000	MO	200.000	107.75	1.00	3,879.00	100.00
5002	B	3STRPL		18.000	MO	200.000	107.75	1.00	3,879.00	100.00
6002	B	3STRPL		18.000	MO	200.000	107.75	1.00	3,879.00	100.00
7002	B	3STRPL		18.000	MO	200.000	107.75	1.00	3,879.00	100.00

Biditem	Activity	Resource	Sel Vendor	Quantity	Unit	Unit Cost	Tax/OT %	Pcs/W	Total	Esc %
8002	B	3STRPL		36.000	MO	200.000	107.75	1.00	7,758.00	100.00
9002	B	3STRPL		36.000	MO	200.000	107.75	1.00	7,758.00	100.00
10002	B	3STRPL		18.000	MO	200.000	107.75	1.00	3,879.00	100.00
Subtotal:	3STRPL			216.000	MO	200.000	107.75		46,548.00	100.00
	Trench Plate Rental - 8'x10'									
				COST TYPE TOTAL					901,602.86	
1003	E	4CONC		334.000	SQYD	56.230	100.00	1.00	18,780.82	100.00
1003	F	4CONC		63.000	CY	765.000	100.00	1.00	48,195.00	100.00
10003	A	4CONC		245.000	LF	8,000.000	100.00	1.00	1,960,000.00	100.00
Subtotal:	4CONC						100.00		2,026,975.82	100.00
	Concrete - Sub									
500	B	4HHR		24.000	HR	125.000	100.00	1.00	3,000.00	100.00
500	C	4HHR		64.000	HR	125.000	100.00	1.00	8,000.00	100.00
500	D	4HHR		24.000	HR	125.000	100.00	1.00	3,000.00	100.00
500	E	4HHR		64.000	HR	125.000	100.00	1.00	8,000.00	100.00
Subtotal:	4HHR			176.000	HR	125.000	100.00		22,000.00	100.00
	Hauling Sub - Hr									
1003	D	4SURVEY		2.000	EA	15,000.000	100.00	1.00	30,000.00	100.00
1005	B	4SURVEY		2.000	EA	12,000.000	100.00	2.00	24,000.00	100.00
2003	E	4SURVEY		2.000	EA	20,000.000	100.00	1.00	40,000.00	100.00
2007	B	4SURVEY		2.000	EA	12,000.000	100.00	2.00	24,000.00	100.00
3003	D	4SURVEY		2.000	EA	25,000.000	100.00	1.00	50,000.00	100.00
3007	B	4SURVEY		2.000	EA	12,000.000	100.00	2.00	24,000.00	100.00
4003	C	4SURVEY		2.000	EA	20,000.000	100.00	1.00	40,000.00	100.00
4007	B	4SURVEY		2.000	EA	12,000.000	100.00	2.00	24,000.00	100.00
5003	E	4SURVEY		2.000	EA	20,000.000	100.00	1.00	40,000.00	100.00
6003	E	4SURVEY		2.000	EA	20,000.000	100.00	1.00	40,000.00	100.00
7003	D	4SURVEY		2.000	EA	20,000.000	100.00	1.00	40,000.00	100.00
8003	B	4SURVEY		2.000	EA	20,000.000	100.00	1.00	40,000.00	100.00
8007	B	4SURVEY		2.000	EA	12,000.000	100.00	2.00	24,000.00	100.00
9003	I	4SURVEY		2.000	EA	40,000.000	100.00	1.00	80,000.00	100.00
9004	E	4SURVEY		2.000	EA	20,000.000	100.00	1.00	40,000.00	100.00
9008	B	4SURVEY		2.000	EA	12,000.000	100.00	2.00	24,000.00	100.00
10003	B	4SURVEY		2.000	EA	15,000.000	100.00	1.00	30,000.00	100.00
Subtotal:	4SURVEY			34.000	EA		100.00		614,000.00	100.00
	Surveying/Positioning Sub									
1002	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
2002	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
3002	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
4002	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
5002	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
6002	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
7002	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
8002	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
9002	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
10002	A	4SWPPP		1.000	LS	10,000.000	100.00	1.00	10,000.00	100.00
Subtotal:	4SWPPP			10.000	LS	10,000.000	100.00		100,000.00	100.00
	SWPPP Plan									
				COST TYPE TOTAL					2,762,975.82	

Biditem	Activity	Resource	Sel Vendor	Quantity	Unit	Unit Cost	Tax/OT %	Pcs/W	Total	Esc %

REPORT TOTAL 11,644,028.37

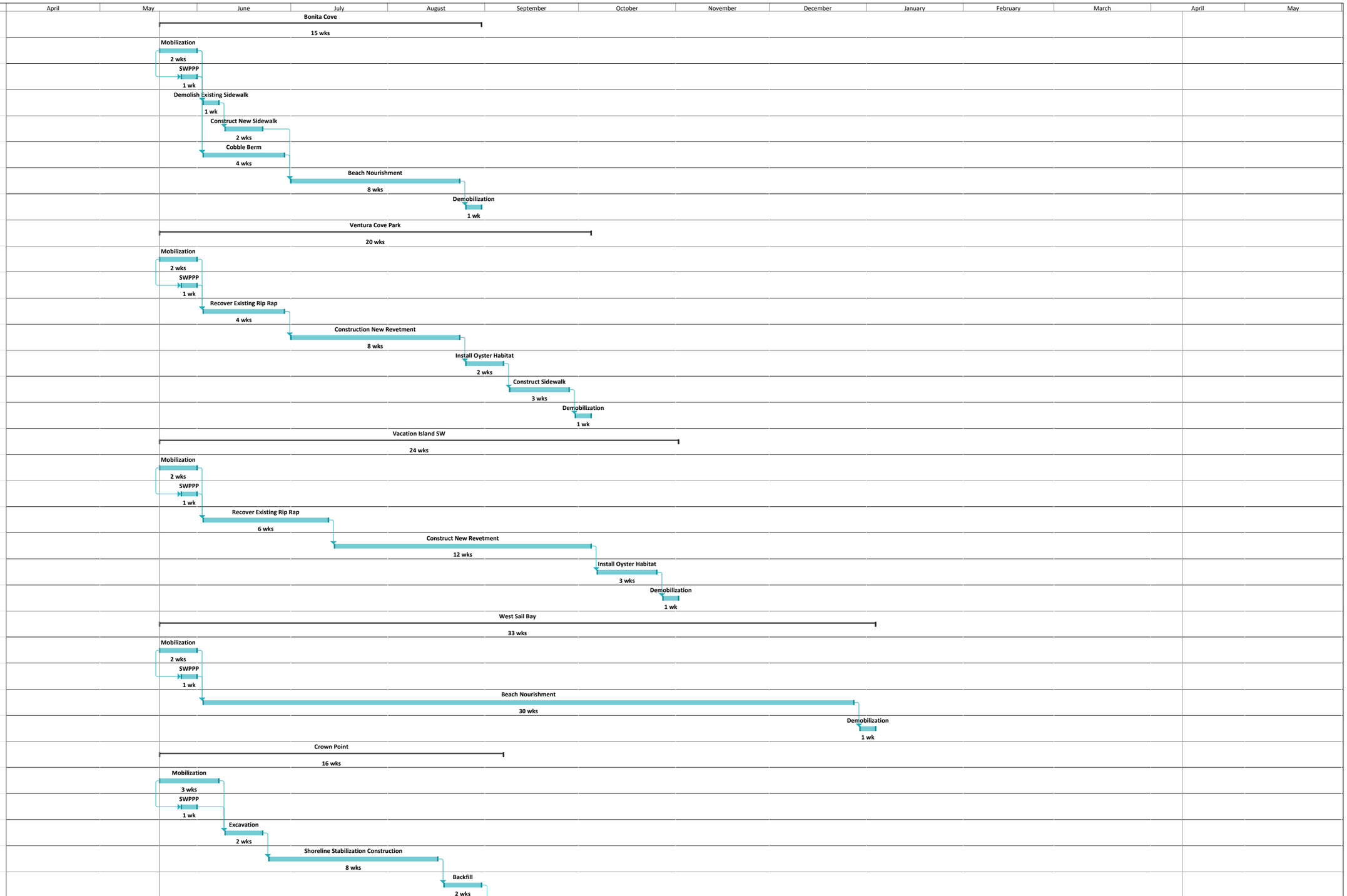
*** FACTORED TO BID QUANTITIES ***

Cost Types Selected: Permanent Materials, Construction Materials, Subcontractor

Subtotal selected vendor, quantity, units, and unit price only display if they are the same for all line items in the subtotal.

D. Estimated Project Schedule

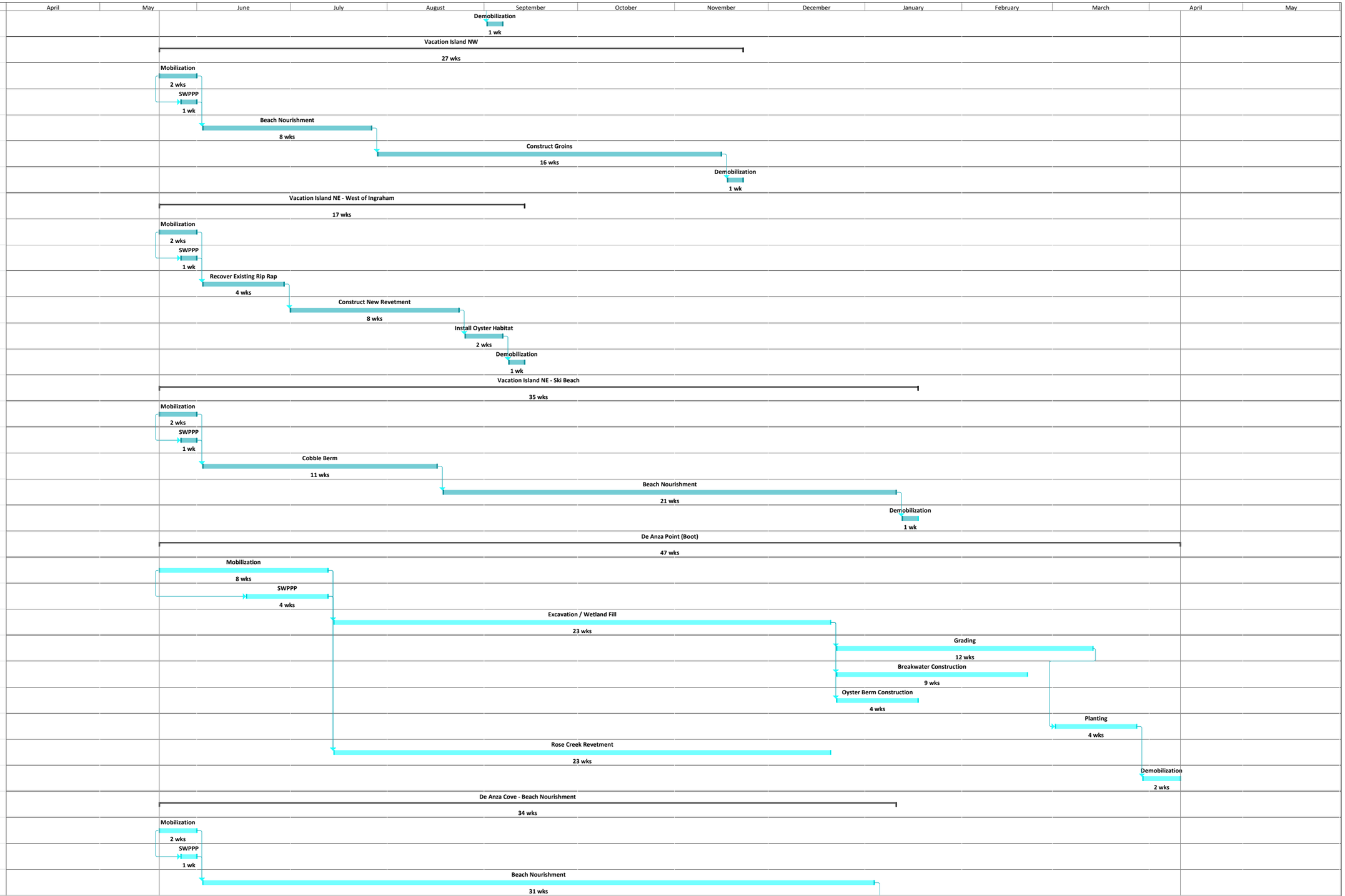
ID	Task Name	Duration
1	**Bonita Cove**	**15 wks**
2	Mobilization	2 wks
3	SWPPP	1 wk
4	Demolish Existing Sidewalk	1 wk
5	Construct New Sidewalk	2 wks
6	Cobble Berm	4 wks
7	Beach Nourishment	8 wks
8	Demobilization	1 wk
9	**Ventura Cove Park**	**20 wks**
10	Mobilization	2 wks
11	SWPPP	1 wk
12	Recover Existing Rip Rap	4 wks
13	Construction New Revetment	8 wks
14	Install Oyster Habitat	2 wks
15	Construct Sidewalk	3 wks
16	Demobilization	1 wk
17	**Vacation Island SW**	**24 wks**
18	Mobilization	2 wks
19	SWPPP	1 wk
20	Recover Existing Rip Rap	6 wks
21	Construct New Revetment	12 wks
22	Install Oyster Habitat	3 wks
23	Demobilization	1 wk
24	**West Sail Bay**	**33 wks**
25	Mobilization	2 wks
26	SWPPP	1 wk
27	Beach Nourishment	30 wks
28	Demobilization	1 wk
29	**Crown Point**	**16 wks**
30	Mobilization	3 wks
31	SWPPP	1 wk
32	Excavation	2 wks
33	Shoreline Stabilization Construction	8 wks
34	Backfill	2 wks



Project: 19-05-20_Restoration of
Date: Wed 11/25/20

Summary Task Manual Progress

ID	Task Name	Duration
35	Demobilization	1 wk
36	**Vacation Island NW**	**27 wks**
37	Mobilization	2 wks
38	SWPPP	1 wk
39	Beach Nourishment	8 wks
40	Construct Groins	16 wks
41	Demobilization	1 wk
42	**Vacation Island NE - West of Ingraham**	**17 wks**
43	Mobilization	2 wks
44	SWPPP	1 wk
45	Recover Existing Rip Rap	4 wks
46	Construct New Revetment	8 wks
47	Install Oyster Habitat	2 wks
48	Demobilization	1 wk
49	**Vacation Island NE - Ski Beach**	**35 wks**
50	Mobilization	2 wks
51	SWPPP	1 wk
52	Cobble Berm	11 wks
53	Beach Nourishment	21 wks
54	Demobilization	1 wk
55	**De Anza Point (Boot)**	**47 wks**
56	Mobilization	8 wks
57	SWPPP	4 wks
58	Excavation / Wetland Fill	23 wks
59	Grading	12 wks
60	Breakwater Construction	9 wks
61	Oyster Berm Construction	4 wks
62	Planting	4 wks
63	Rose Creek Revetment	23 wks
64	Demobilization	2 wks
65	**De Anza Cove - Beach Nourishment**	**34 wks**
66	Mobilization	2 wks
67	SWPPP	1 wk
68	Beach Nourishment	31 wks



Project: 19-05-20_Restoration of
Date: Wed 11/25/20

Summary Task Manual Progress

ID	Task Name	Duration	April	May	June	July	August	September	October	November	December	January	February	March	April	May
69	Demobilization	1 wk										Demobilization 1 wk				

Project: 19-05-20_Restoration of
Date: Wed 11/25/20

Summary Task Manual Progress

E. Passing Vessel Wave Analysis

Passing Vessel Wave Analysis

Bahia Belle

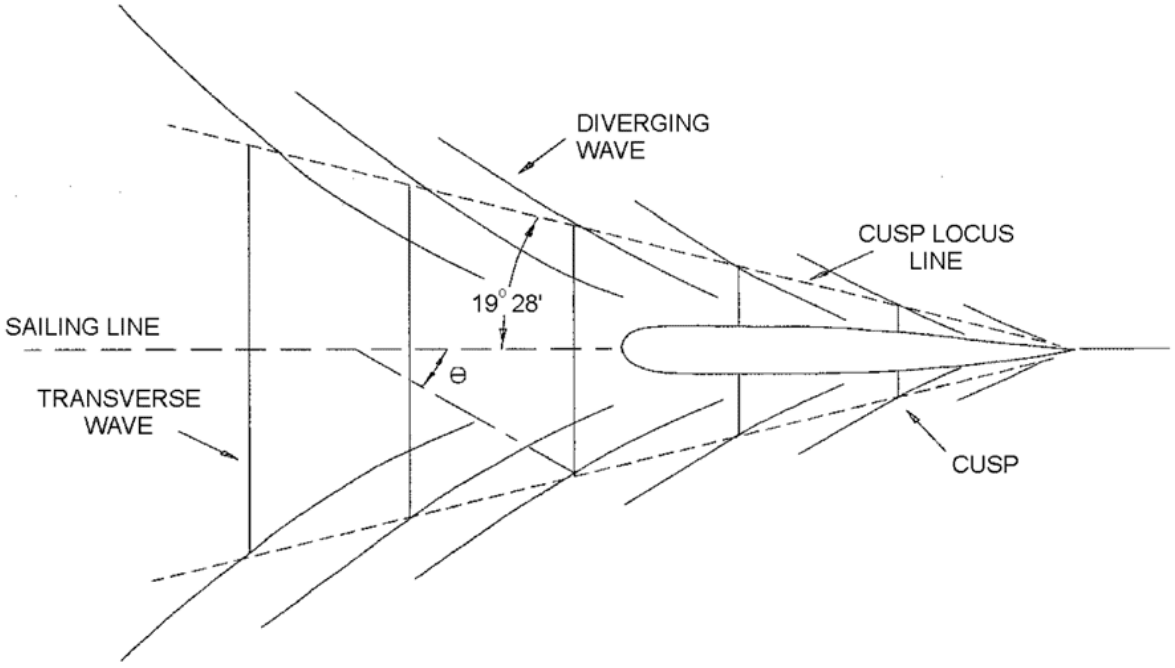
Project	Mission Bay PEIR - Restoration of Shoreline		
Prepared for	City of San Diego		
Project No.	10278		
Revision	A	Date	05-06-2019
Design	CO & AVS	Date	05-06-2019
Checked	<>	Date	<>
Subject	Assessment of vessel wake from sternwheeler boat.		

moffatt & nichol

2185 N. California Blvd., Suite 500
Walnut Creek, CA 94596

www.moffattnichol.com

Definitions



Parameters

Vessel Particulars (https://www.mastercraft.com/boat/detail/x26)

$V := 5mph$ Vessel speed.

$L := 75ft = 22.86\,m$ Vessel length.

$B := 25ft = 7.62\,m$ Vessel beam.

$L_e := 5 \cdot \% \cdot L$ Entrance length, $L_e = 1.1\,m$

$C_b := 0.50$ Block coefficient.

$T := 2m$ Draft.

$\alpha_1 := 0.35$ Coefficient (tug), Ref. [2].

$\alpha_3 := 2.67$ Exponent, Ref. [2].

Waterway Dimensions

$d := 10ft = 3.048\,m$ Water depth.

$X := 50ft = 15.24\,m$ Distance to shore.

Derived Quantities

$\alpha := 2.35\cdot(1 - C_b)$ Coefficient, $\alpha = 1.175$ α > 1 streamlined hulls. α = 0.2-0.4 blunt hulls.

$\beta := 1 + 8\cdot\tanh\left[0.45\cdot\left(\frac{L}{L_e} - 2\right)\right]^3$ Coefficient, $\beta = 9$ β = 1-2 streamlined hulls. β up to 9 = blunt hulls.

$F_L := \frac{V}{\sqrt{g\cdot L}}$ Length-based Froude number, $F_L = 0.149$

$F_d := \frac{V}{\sqrt{g\cdot d}}$ Depth-based Froude number, $F_d = 0.409$

$F_s := F_L\cdot\exp\left(\alpha\cdot\frac{T}{d}\right)$ Modified Froude Number, $F_s = 0.323$

Equations

$$H_k(x) := \begin{cases} \beta\cdot(F_s - 0.1)^2\cdot\left(\frac{x}{L}\right)^{-\frac{1}{3}}\cdot\frac{V^2}{g} & \text{if } F_s \geq 0.1 \\ 0\cdot m & \text{otherwise} \end{cases}$$ Kriebel and Seeling equation.

$H_p(x) := \alpha_1\cdot\left(\frac{x - \frac{B}{2}}{d}\right)^{-0.33}\cdot F_d^{\alpha_3}\cdot d$ Delft Hydraulics / PIANC equation.

Results

Vessel-generated waves

$\theta := 35.27\cdot deg\cdot\left[1 - e^{12\cdot(F_d - 1)}\right]$ Direction of wave propagation, $\theta = 35.241\cdot deg$

$C := V\cdot\cos(\theta)$ Celerity of transverse waves, $C = 1.83\,m\cdot s^{-1}$

$L := \begin{cases} L \leftarrow 1000\cdot ft \\ \text{root}\left[\frac{g}{2\cdot\pi}\cdot\left(\frac{L}{C}\right)^2\cdot\tanh\left(\frac{2\cdot\pi\cdot d}{L}\right) - L, L\right] \end{cases}$ Wave length, $L = -4.6\times10^{-11}\,m$

Check: deep water limit is d/L > 0.5, $\frac{d}{L} = -6.599\times10^{10}$

$k := \frac{2\cdot\pi}{L}$ Wave number, $k = -1.36\times10^{11}\,\frac{1}{m}$

$T := \frac{L}{C}$ Wave period, $T = -2.53 \times 10^{-11}\,s$

$\beta := \operatorname{acos}\left[\sqrt{\frac{8\cdot\left(1 - \frac{2\cdot k\cdot d}{\sinh(2\cdot k\cdot d)}\right)}{\left(3 - \frac{2\cdot k\cdot d}{\sinh(2\cdot k\cdot d)}\right)^2}}\right]$ Angle to cusp locus line, $\beta = \blacksquare\cdot deg$

Vessel-generated wave crest tracks

$n := 1 .. 28$ Number of wave crests along cusp to display.

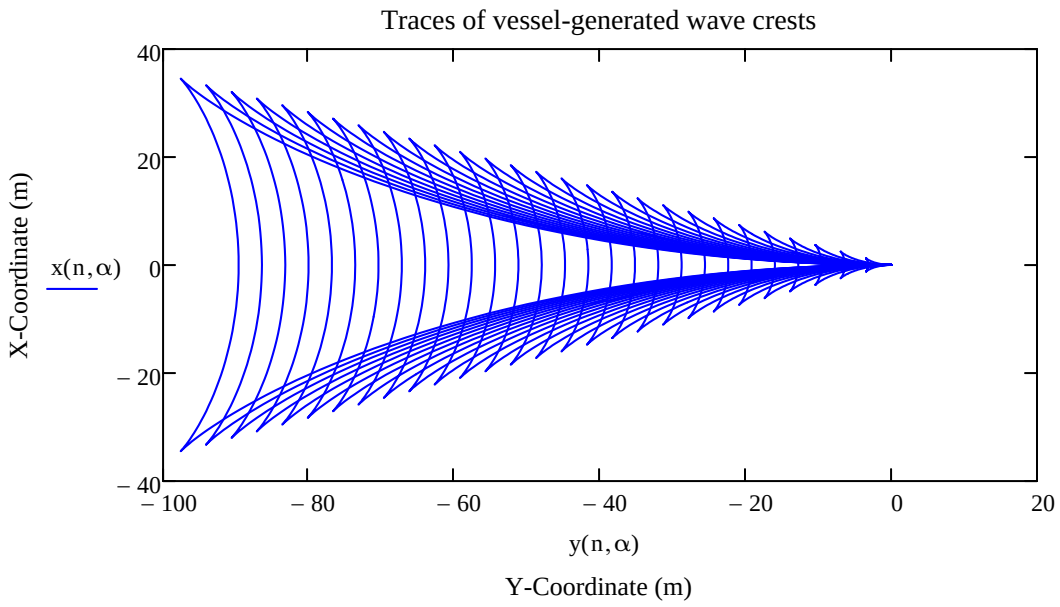
$x(n,\alpha) := \frac{n\cdot\pi\cdot V^2}{2\cdot g}\cdot(\sin(\alpha) + \sin(3\cdot\alpha))$ X-coordinate of wave crest.

$y(n,\alpha) := -\frac{n\cdot\pi\cdot V^2}{2\cdot g}\cdot(5\cdot\cos(\alpha) - \cos(3\cdot\alpha))$ Y-coordinate of wave crest.

Graphs

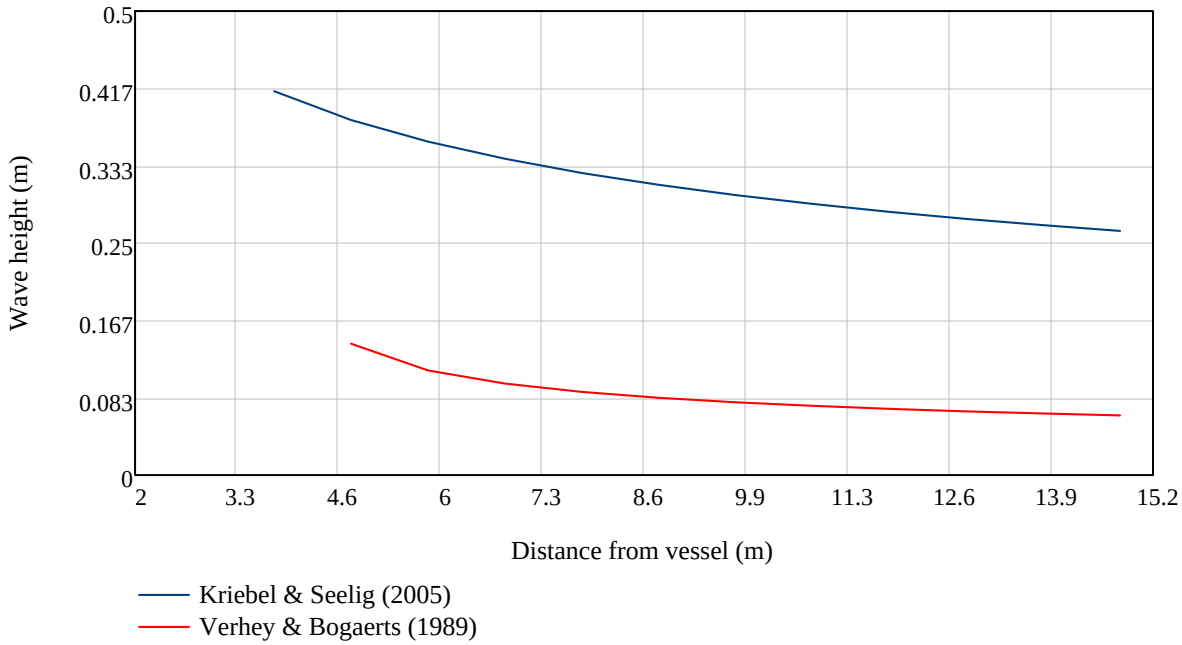
Vessel-generated wave crest tracks

$\alpha := -90\cdot deg, -89\cdot deg .. 90\cdot deg$ Angle between ship track and a line to the point (x,y).



Vessel-generated waves

$x := \frac{B}{2}, \frac{B}{2} + 1 \cdot m .. X$



$H_w := H_k(X)$ Wake wave height at shoreline, $H_w = 0.26\,m$ (Kriebel method).

$H_w := H_p(X)$ Wake wave height at shoreline, $H_w = 0.06\,m$ (PIANC method).

Summary

Wake wave height, $H_p(X) = 0.208 \cdot ft$

References

[1] *An Empirical Model for Ship-Generated Waves.* David L. Kriebel and William N. Seelig. Proceedings of the Fifth International Symposium on Ocean Wave Measurement and Analysis (2005).

[2] *Ship waves and the stability of armour layers protecting slopes.* H.J Verhey and M.P. Bogaerts. Delft Hydraulics Publication No. 428, November 1989. Paper presented at the 9th International Harbour Congress, Antwerp, Belgium, 20-24 June 1989.

[3] *Ship-Generated Waves*. R. M. Sorensen, Advances in Hydroscience, p. 49-83.

[4] *Coastal Engineering Manual*. EM 1110-2-1100 (Part II), US Army Corps of Engineers, 30 Apr. 2002. P. II-7-55.

Passing Vessel Wave Analysis

Wake Surfing Vessel

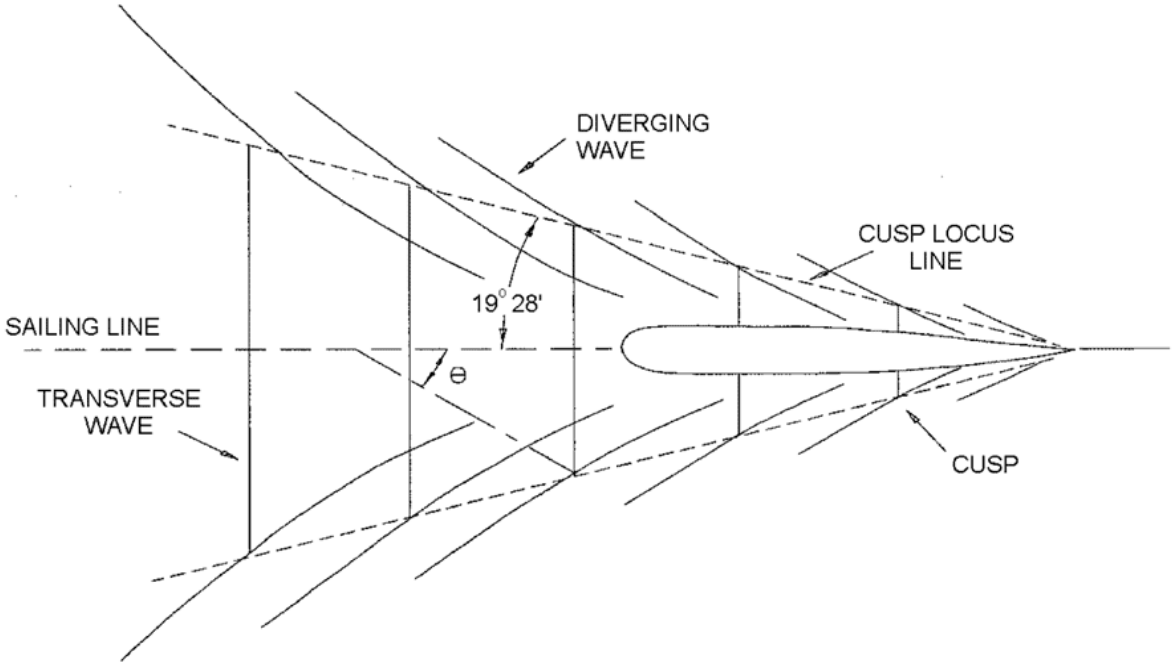
Project	Mission Bay PEIR - Restoration of Shoreline		
Prepared for	City of San Diego		
Project No.	10278		
Revision	A	Date	05-06-2019
Design	CO & AVS	Date	05-06-2019
Checked	<>	Date	<>
Subject	Assessment of vessel wake from wake boat.		

moffatt & nichol

2185 N. California Blvd., Suite 500
Walnut Creek, CA 94596

www.moffattnichol.com

Definitions



Parameters

Vessel Particulars (https://www.mastercraft.com/boat/detail/x26)

$V := 12mph$	Vessel speed.
$L := 7.92m$	Vessel length.
$B := 2.59 \cdot m$	Vessel beam.
$L_e := 30 \cdot \% \cdot L$	Entrance length, $L_e = 2.4\,m$
$C_b := 0.50$	Block coefficient.
$T := 0.74m$	Draft.
$\alpha_1 := 0.35$	Coefficient (tug), Ref. [2].
$\alpha_3 := 2.67$	Exponent, Ref. [2].

Waterway Dimensions

$d := 10ft = 3.048\ m$ Water depth.

$X := 100ft = 30.48\ m$ Distance to shore.

Derived Quantities

$\alpha := 2.35 \cdot (1 - C_b)$ Coefficient, $\alpha = 1.175$ $\alpha > 1$ streamlined hulls. $\alpha = 0.2\text{-}0.4$ blunt hulls.

$F_L := \frac{V}{\sqrt{g \cdot L}}$ Length-based Froude number, $F_L = 0.609$

$F_d := \frac{V}{\sqrt{g \cdot d}}$ Depth-based Froude number, $F_d = 0.981$

$F_s := F_L \cdot \exp\left(\alpha \cdot \frac{T}{d}\right)$ Modified Froude Number, $F_s = 0.81$

Equations

$H_p(x) := \alpha_1 \cdot \left(\frac{x - \frac{B}{2}}{d}\right)^{-0.33} \cdot F_d^{\alpha_3} \cdot d$ Delft Hydraulics / PIANC equation.

Results

Vessel-generated wave crest tracks

$n := 1 .. 28$ Number of wave crests along cusp to display.

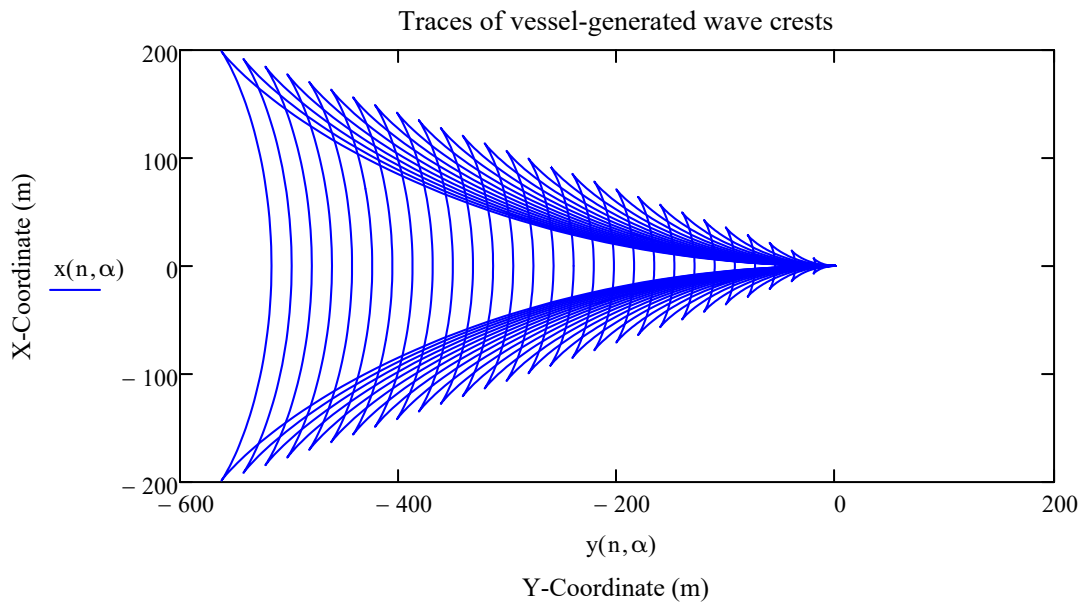
$x(n, \alpha) := \frac{n \cdot \pi \cdot V^2}{2 \cdot g} \cdot (\sin(\alpha) + \sin(3 \cdot \alpha))$ X-coordinate of wave crest.

$y(n, \alpha) := -\frac{n \cdot \pi \cdot V^2}{2 \cdot g} \cdot (5 \cdot \cos(\alpha) - \cos(3 \cdot \alpha))$ Y-coordinate of wave crest.

Graphs

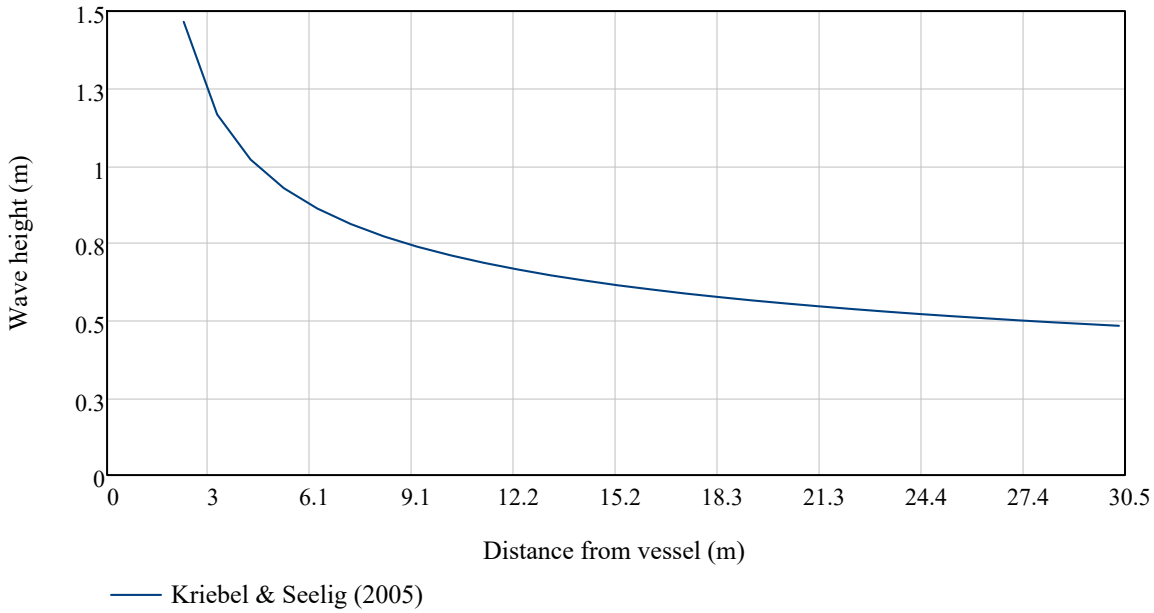
Vessel-generated wave crest tracks

$\alpha := -90 \cdot deg, -89 \cdot deg .. 90 \cdot deg$ Angle between ship track and a line to the point (x,y).



Vessel-generated waves

$x := \frac{B}{2}, \frac{B}{2} + 1 \cdot m .. X$



$H_w := H_p(X)$ Wake wave height at shoreline, $H_w = 1.58 \cdot ft$ (PIANC method).

Summary

Wake wave height, $H_p(X) = 1.579 \cdot ft$

References

[1] *An Empirical Model for Ship-Generated Waves.* David L. Kriebel and William N. Seelig. Proceedings of the Fifth International Symposium on Ocean Wave Measurement and Analysis (2005).

[2] *Ship waves and the stability of armour layers protecting slopes.* H.J Verhey and M.P. Bogaerts. Delft Hydraulics Publication No. 428, November 1989. Paper presented at the 9th International Harbour Congress, Antwerp, Belgium, 20-24 June 1989.

[3] *Ship-Generated Waves*. R. M. Sorensen, Advances in Hydroscience, p. 49-83.

[4] *Coastal Engineering Manual*. EM 1110-2-1100 (Part II), US Army Corps of Engineers, 30 Apr. 2002. P. II-7-55.

F. Risk Assessment

RISK ASSESSMENT TABLE			Project Name: **Restoration of Shoreline**					
Risk Description				Risk Assessment			Risk Response	
ID #	Category	Title	Risk Statement	Probability	Cost Impact	Time Impact	Strategy	Response Actions
1	Land Ownership	Project potential to cross jurisdictional boundaries	The ten Restoration of Shoreline sites are located within Mission Bay Park, in San Diego, CA, and are owned and maintained by the City of San Diego. As such, there are no known land ownership conflicts that may present risk to this project.	Very Low	Very Low	Very low	Permit	Permit project through necessary resource agencies, including California Coastal Commission, State Lands Commission, Regional Water Quality Control Board, and U.S. Army Corps of Engineers to ensure no conflict of land ownership.
2	Utilities	Existing electrical, gas, water, and telecommunication utilities	Utility conflicts associated with the projects include storm water management systems (e.g., outfalls). Outfall lines at Bonita Cove and De Anza Cove sites may require extension and burial to avoid conflict with concept design. A thorough field survey has not been performed to identify existing utilities.	Moderate	Moderate	Low	Mitigate	The contractor will be required to take due precautionary measures to protect any existing utilities or structures located at the work site. It is the contractor's responsibility to contact the owners of sewer, gas and electric, water, and storm drain outfall utilities or structures prior to any excavation for verification and location of utilities and notification of commencement of work.
3	Existing Soil Data	Soil physical composition, stratification, potential chemical contamination, and geotechnical characteristics.	The current extent of soil investigations on-site is likely insufficient to fully describe the material on-site. Should placement material be required to be physically compatible with the project area, additional investigations may be required. Should project area sediment be found to be physically or chemically incompatible for use as fill in adjacent project sites, off-site disposal may be required which will significantly impact cost and schedule.	Low	Moderate	Moderate	Mitigate	Further geotechnical and chemical investigations may be required to progress to final permitting and design.

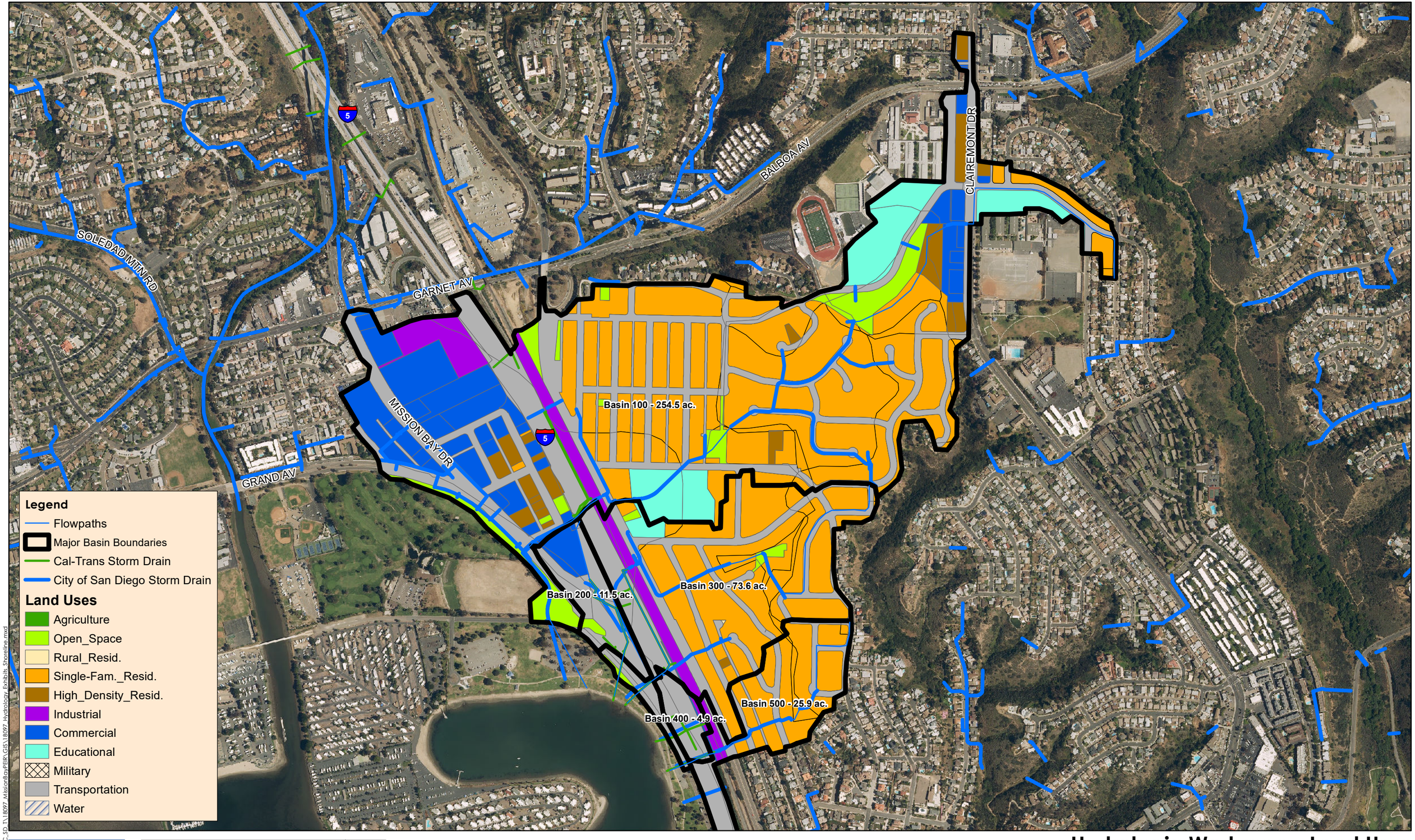
RISK ASSESSMENT TABLE			Project Name: **Restoration of Shoreline**					
Risk Description				Risk Assessment			Risk Response	
ID #	Category	Title	Risk Statement	Probability	Cost Impact	Time Impact	Strategy	Response Actions
4	Proximity to Neighbors	Adjacent land uses which may be impacted by the project	Restoration of shoreline sites are located throughout Mission Bay. Moderate risks are present, including potential traffic and noise impacts during construction, especially to nearby parks and businesses (e.g, Fiesta Island, Tecolote Shores, Playa Pacifica Park, Mission Bay Park, De Anza Cove Park, Campland on the Bay, Crown Point Park, Ski Beach Park, Mission Beach, Mission Bay waters, Playa Pacifica Park, San Diego Mission Bay Bay Resort, etc.). Construction of the restoration of shoreline sites will temporarily limit public access at all sites, with the exception of De Anza Point which is currently inaccessible to the public. However, long-term improvements to public access will result from project improvements.	Moderate	Low	High	Mitigate	Noise and traffic regulation may be necessary to restrict daily work hours and weekend work. Construction timing of the Project may be scheduled to reduce impacts to visitor use. Peak visitor use spans approximately from Memorial Day (May) through Labor Day (September). Project construction is anticipated to occur from post-Labor Day to February 15th. The risk associated with project controversy will be mitigated by involving the public in the development of the project and minimizing all negative project impacts.
5	Environmental Windows	Rare or endangered fish/wildlife present, and nesting or roosting migratory birds	As a result of constructing adjacent to Least Tern Preserves and Kendall Frost Marsh Preserve, the presence of threatened or endangered birds may occur requiring avoidance or mitigation.	Low	Low	Moderate	Mitigate	Nesting restrictions are imposed from February 15th to September 1st (with some flexibility on the end date for certain bird species) each year for the California Least Tern nesting area to the north. Should impacts require mitigation, this could limit construction activities to 5.5 months each year. Both dredging and earthwork in the dry is fairly loud and disturbing, so distance buffers from the nesting area would be required to enable earthwork to occur during the nesting season.

RISK ASSESSMENT TABLE			Project Name: **Restoration of Shoreline**					
Risk Description				Risk Assessment			Risk Response	
ID #	Category	Title	Risk Statement	Probability	Cost Impact	Time Impact	Strategy	Response Actions
6	Water Quality Concerns	Temporary or permanent water quality impacts	The Project proposes to create a wide range of shoreline improvements that are anticipated to either have no negative long-term impacts to water quality or even provide water quality improvments. Beach nourishment, cobble berm construction, and other in-water construction activities are likely to cause temporarily increased turbidity. Turbidity can be reduced through the use of construction BMPs such as limited production rates, use of silt curtains, etc. However, beach nourishment, cobble berm construction, and revetment and groin construction are not anticipated to impact water quality in the long term. Since such projects will help to stabilize the shoreline, reduced upland erosion may in fact improve water quality.	Low	Low	Low	Mitigate	Construction may take place in dry conditions to, in part, avoid water quality impacts. Should phases of construction take place in wet conditions, a turbidity boom may be necessary to curb effects of wetland grading or channel opening.
7	Competing Interests	City and public land use goals of the project area	The project is identified by the City in the Mission Bay Park Master Plan, prepared with siginificant pulbic input, and complies with key aspects of City Charter Section 55.2. Public which were not involved in the Master Plan may oppose, or want more from these projects.	Low	Low	High	Mitigate	The risk associated with project controversy will be mitigated by involving the public in the development of the project and minimizing all negative project impacts.

RISK ASSESSMENT TABLE			Project Name: **Restoration of Shoreline**					
Risk Description				Risk Assessment			Risk Response	
ID #	Category	Title	Risk Statement	Probability	Cost Impact	Time Impact	Strategy	Response Actions
8	Sensitive Habitat	Exisiting sensitive habitat which may be impacted by construction	Existing habitat maps of the Project site show extensive eelgrass throughout Mission Bay and may be impacted by projects which extend below MSL.	Low	Moderate	Low	Investigate	Confirmation of the on-site habitat should be made leading to final design. Should sensitive habitat be present, it is likely that the acreage of restored habitat, should all wetland restoration projects be constructed, will exceed the acreage of existing sensitive habitat by a ration of 4:1 or greater. Therefore, further mitigation is unlikely to be necessary.
9	Sea Level Rise	The potential for projected rising water levels to affect the wetland function	Two SLR projections (3.6 ft and 7.0 ft) were selected for Year 2100 that represent major thresholds for the project. Designing the restoration of shoreline projects for sea level rise is important to the longevity of Mission Bay's shoreline, public access, habitat value, and protection of inland development.	Moderate	High	Low	Adaptive	Design elevations can either be raised above predicted water levels or can be designed to be more easily adapted in the future as sea level rises. When SLR causes significant habitat changes in De Anza Point, the site can be adapted by: - Reconfiguring and/or raising the marsh plains above future high internal marsh water levels through thin layer sediment additions (i.e., the pilot project at Seal Beach Naval Weapons Station in 2016). This will allow for mudflat and vegetated marsh habitat to persist; and/or - Creating a muted salt marsh system by controlling the tide range. This can be accomplished by introducing culverts or tide gates, which allow flexibility in the management operation as water levels rise; the culverts and tide gates may need to be replaced over time to provide modified tide levels.

RISK ASSESSMENT TABLE			Project Name:	**Restoration of Shoreline**				
Risk Description				Risk Assessment			Risk Response	
ID #	Category	Title	Risk Statement	Probability	Cost Impact	Time Impact	Strategy	Response Actions
10	Permitting	Potential constraining environmental regulation requirements and unanticipated changes	As a result of the need to receive approval from multiple resource permitting agencies, the possibility of project delays during approval could occur which would result in an increased project schedule or require new mitigations	Moderate	Low	High	Mitigate	Engage resource agencies early in the process to anticipate and negotiate constraining regulations. During the approval process, the team will work directly with the resource agencies to ensure timely response times and the efficient transfer of information. The project will be required to comply with the latest regulations.

G. Hydrologic Support Matieral



C:\RICK\Projects\C_SD_TV\18097 MissionBayPEIR\GIS\18097 Hydrology Exhibits Shoreline.mxd

RICK ENGINEERING COMPANY

Scale in Feet
0 750 1,500

North

Date of Exhibit: 11/9/2020
DigitalGlobe Aerial Image: 04.2013

Hydrologic Workmap - Land Uses

Mission Bay PEIR - Shoreline Restoration PER

J-18097-A



C:\RICK\Projects\C_SD_TV_18097_MissionBayPEIR\GIS\18097_Hydrology_Exhibits_Shoreline.mxd

RICK ENGINEERING COMPANY

Scale in Feet
0 250 500

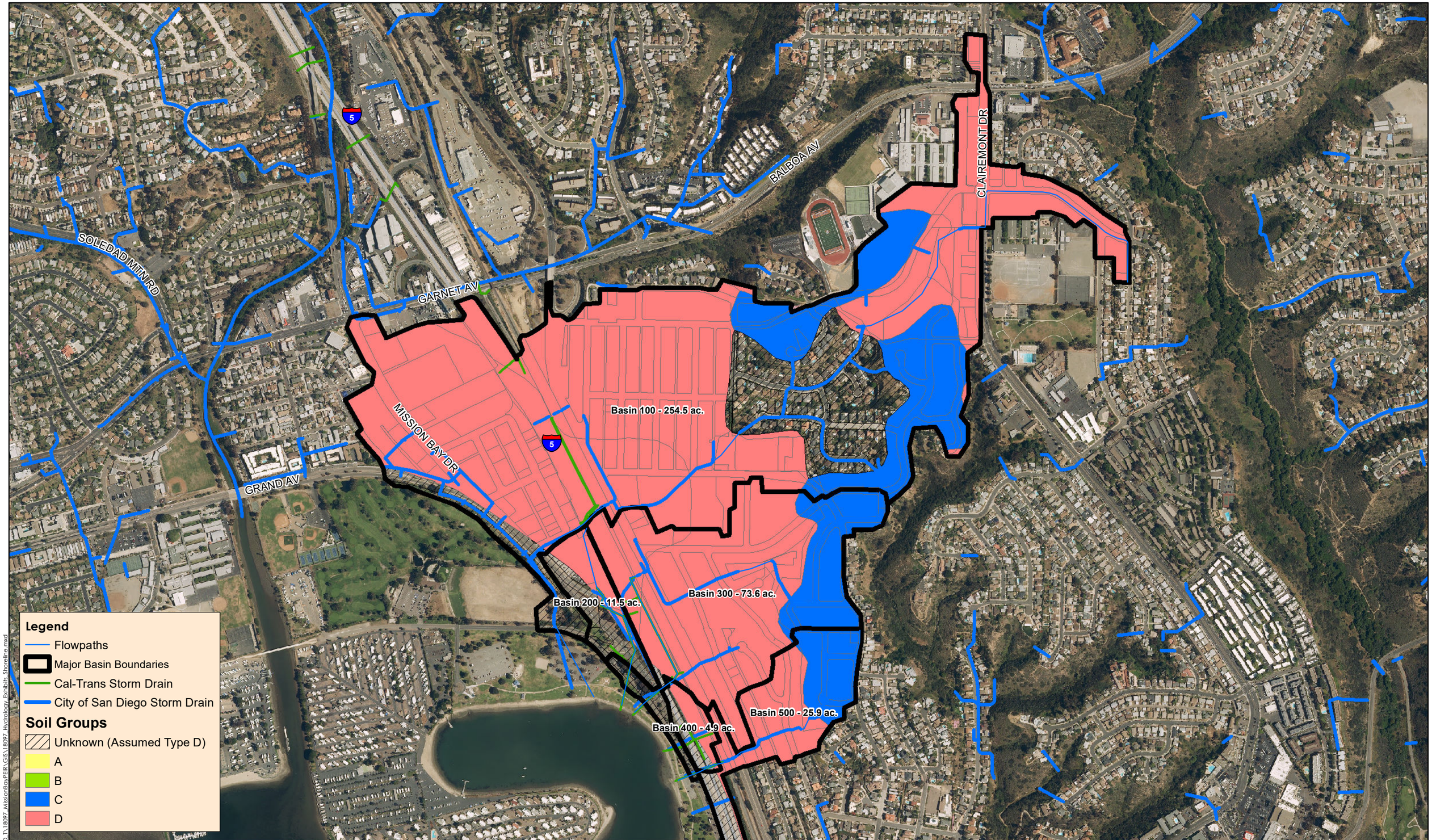
North

Date of Exhibit: 11/9/2020
DigitalGlobe Aerial Image: 04.2013

Hydrologic Workmap - Land Uses

Mission Bay PEIR - Shoreline Restoration PER

J-18097-A



C:\RICK Projects\C_SD_TV\18097 - MissionBay\PEIR\GIS\18097 Hydrology Exhibits Shoreline.mxd

RICK ENGINEERING COMPANY

Scale in Feet
0 750 1,500

North

Date of Exhibit: 11/11/2020
DigitalGlobe Aerial Image: 04.2013

Hydrologic Workmap - Soil Groups

Mission Bay PEIR - Shoreline Restoration PER

J-18097-A



C:\RICK\Projects\C_SD_TV\18097 MissionBay\PEIR\GIS\18097 Hydrology Exhibits Shoreline.mxd

RICK ENGINEERING COMPANY

Scale in Feet
0 250 500

North

Date of Exhibit: 11/11/2020
DigitalGlobe Aerial Image: 04.2013

Hydrologic Workmap - Soil Groups

Mission Bay PEIR - Shoreline Restoration PER

J-18097-A

```
**************************************************************************

           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2014 Advanced Engineering Software (aes)
             Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                           Analysis prepared by:

                         RICK ENGINEERING COMPANY
                             5620 Friars Road
                        San Diego, California 92110
                      619-291-0707   Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* MISSION BAY PEIR - SHORELINE RESTORATION BASIN 100                     *
* 100-YEAR EVENT, EXISTING CONDITIONS ANALYSIS                           *
* RICK ENGINEERING COMPANY JN: 18097                                     *
 ************************************************************************

  FILE NAME: SHOR100E.DAT
  TIME/DATE OF STUDY: 01:02 11/09/2020
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.250
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .6300
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    78.10
  UPSTREAM ELEVATION(FEET) =    345.00
  DOWNSTREAM ELEVATION(FEET) =    344.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.227
```

```
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    54.21
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.674
  SUBAREA RUNOFF(CFS) =      0.74
  TOTAL AREA(ACRES) =      0.25   TOTAL RUNOFF(CFS) =      0.74

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    105.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  344.50  DOWNSTREAM ELEVATION(FEET) =  304.00
  STREET LENGTH(FEET) =  1944.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.15
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   16.40
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.63
  STREET FLOW TRAVEL TIME(MIN.) =   9.02   Tc(MIN.) =   16.25
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.772
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.807
  SUBAREA AREA(ACRES) =   16.94      SUBAREA RUNOFF(CFS) =   38.03
  TOTAL AREA(ACRES) =       17.2        PEAK FLOW RATE(CFS) =      38.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.54   HALFSTREET FLOOD WIDTH(FEET) =  22.20
  FLOW VELOCITY(FEET/SEC.) =  4.25   DEPTH*VELOCITY(FT*FT/SEC.) =   2.31
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L = 1944.0 FT WITH ELEVATION-DROP =  40.5 FT, IS   81.3 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    105.00
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =    2022.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   304.00  DOWNSTREAM(FEET) =   260.00
  FLOW LENGTH(FEET) =   230.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.44
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.47
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   16.39
```

```
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    2252.60 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    260.00  DOWNSTREAM(FEET) =    182.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1281.10   CHANNEL SLOPE =  0.0609
 CHANNEL BASE(FEET) =   18.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.045   MAXIMUM DEPTH(FEET) =  30.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.410
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) FAIR COVER RUNOFF COEFFICIENT = .7300
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      66.53
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.62
 AVERAGE FLOW DEPTH(FEET) =   0.62   TRAVEL TIME(MIN.) =   3.80
 Tc(MIN.) =   20.18
 SUBAREA AREA(ACRES) =    31.77       SUBAREA RUNOFF(CFS) =   55.90
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.757
 TOTAL AREA(ACRES) =       49.0         PEAK FLOW RATE(CFS) =      89.35

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   6.24
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =    3533.70 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   182.00  DOWNSTREAM(FEET) =   104.00
 FLOW LENGTH(FEET) =  1617.90   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  19.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.97
 GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      89.35
 PIPE TRAVEL TIME(MIN.) =   1.29    Tc(MIN.) =   21.47
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =    5151.60 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.316
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .6300
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.6896
 SUBAREA AREA(ACRES) =   55.53   SUBAREA RUNOFF(CFS) =   81.02
 TOTAL AREA(ACRES) =      104.5   TOTAL RUNOFF(CFS) =     166.88
 TC(MIN.) =   21.47

****************************************************************************
 FLOW PROCESS FROM NODE    115.00 TO NODE    120.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    104.00  DOWNSTREAM(FEET) =     96.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   311.80   CHANNEL SLOPE =  0.0257
  CHANNEL BASE(FEET) =   55.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.045   MAXIMUM DEPTH(FEET) =  12.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.234
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     170.62
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.19
  AVERAGE FLOW DEPTH(FEET) =   0.72   TRAVEL TIME(MIN.) =   1.24
  Tc(MIN.) =   22.71
  SUBAREA AREA(ACRES) =     6.10       SUBAREA RUNOFF(CFS) =    7.49
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.682
  TOTAL AREA(ACRES) =      110.6         PEAK FLOW RATE(CFS) =     168.43

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.72   FLOW VELOCITY(FEET/SEC.) =   4.14
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    120.00 =    5463.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    125.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    96.00  DOWNSTREAM(FEET) =    23.00
  FLOW LENGTH(FEET) =  1414.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  25.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.22
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     168.43
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =   23.65
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    125.00 =    6878.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.176
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .7400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7071
  SUBAREA AREA(ACRES) =   84.59   SUBAREA RUNOFF(CFS) =  136.22
  TOTAL AREA(ACRES) =      195.2   TOTAL RUNOFF(CFS) =     300.33
  TC(MIN.) =   23.65

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    135.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    23.00  DOWNSTREAM(FEET) =     0.00
  FLOW LENGTH(FEET) =  1917.30   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.30
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     300.33
  PIPE TRAVEL TIME(MIN.) =   2.09    Tc(MIN.) =   25.73
```

```
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    135.00 =    8795.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    135.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.061
  *USER SPECIFIED(SUBAREA):
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7357
  SUBAREA AREA(ACRES) =   59.33   SUBAREA RUNOFF(CFS) =  101.47
  TOTAL AREA(ACRES) =      254.5   TOTAL RUNOFF(CFS) =     385.83
  TC(MIN.) =   25.73
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      254.5  TC(MIN.) =     25.73
  PEAK FLOW RATE(CFS)   =     385.83
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                              Analysis prepared by:

                            RICK ENGINEERING COMPANY
                                5620 Friars Road
                             San Diego, California 92110
                           619-291-0707   Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* MISSION BAY PEIR - SHORELINE RESTORATION BASIN 200                     *
* 100-YEAR EVENT, EXISTING CONDITIONS ANALYSIS                           *
* RICK ENGINEERING COMPANY JN: 18097                                     *
 **************************************************************************

  FILE NAME: SHOR200E.DAT
  TIME/DATE OF STUDY: 16:20 11/23/2020
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.250
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  22
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.928
  SUBAREA RUNOFF(CFS) =      0.91
  TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.91
```

```
+----------------------------------------------------------------------------+
| ************************************************************************   |
| INITIAL SUBAREA TIME OF CONCENTRATION CALCULATED WAS LESS THAN 5 MIN.       |
| A TC OF 5 MIN. WAS USED IN ACCORDANCE WITH DRAINAGE DESIGN MANUAL           |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    205.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     32.00  DOWNSTREAM(FEET) =     24.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   463.00   CHANNEL SLOPE =  0.0173
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   4.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.771
  *USER SPECIFIED(SUBAREA):
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .9300
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.05
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.86
  AVERAGE FLOW DEPTH(FEET) =   0.55   TRAVEL TIME(MIN.) =   2.00
  Tc(MIN.) =    7.00
  SUBAREA AREA(ACRES) =     5.42       SUBAREA RUNOFF(CFS) =   24.05
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.929
  TOTAL AREA(ACRES) =        5.6         PEAK FLOW RATE(CFS) =      24.78

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOW VELOCITY(FEET/SEC.) =   4.71
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    205.00 =    1969.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    210.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.00  DOWNSTREAM(FEET) =     5.00
  FLOW LENGTH(FEET) =  1207.10   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.98
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.78
  PIPE TRAVEL TIME(MIN.) =   2.02    Tc(MIN.) =    9.02
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =    3176.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.053
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .9100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.9193
  SUBAREA AREA(ACRES) =    5.89   SUBAREA RUNOFF(CFS) =   21.72
  TOTAL AREA(ACRES) =       11.5   TOTAL RUNOFF(CFS) =      42.77
  TC(MIN.) =    9.02
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       11.5  TC(MIN.) =      9.02
```

```
  PEAK FLOW RATE(CFS)   =      42.77
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************

           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2014 Advanced Engineering Software (aes)
             Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                           Analysis prepared by:

                         RICK ENGINEERING COMPANY
                             5620 Friars Road
                        San Diego, California 92110
                      619-291-0707   Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* MISSION BAY PEIR - SHORELINE RESTORATION BASIN 300                     *
* 100-YEAR EVENT, EXISTING CONDITIONS ANALYSIS                           *
* RICK ENGINEERING COMPANY JN: 18097                                     *
 **************************************************************************

  FILE NAME: SHOR300E.DAT
  TIME/DATE OF STUDY: 16:14 11/23/2020
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.250
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  22
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.928
  SUBAREA RUNOFF(CFS) =      1.23
  TOTAL AREA(ACRES) =      0.25   TOTAL RUNOFF(CFS) =      1.23
```

```
+---------------------------------------------------------------------------+
| ************************************************************************  |
| INITIAL SUB-AREA TIME OF CONCENTRATION CALCULATED WAS LESS THAN 5 MIN.    |
| A TC OF 5 MIN. WAS USED IN ACCORDANCE WITH DRAINAGE DESIGN MANUAL         |
+---------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    305.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  264.00  DOWNSTREAM ELEVATION(FEET) =  224.00
  STREET LENGTH(FEET) =  1383.50   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   15.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.72
  STREET FLOW TRAVEL TIME(MIN.) =   5.74   Tc(MIN.) =   10.74
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.621
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .6600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.663
  SUBAREA AREA(ACRES) =   14.35      SUBAREA RUNOFF(CFS) =   34.30
  TOTAL AREA(ACRES) =       14.6        PEAK FLOW RATE(CFS) =      35.05

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  19.50
  FLOW VELOCITY(FEET/SEC.) =  4.65   DEPTH*VELOCITY(FT*FT/SEC.) =   2.37
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L = 1383.5 FT WITH ELEVATION-DROP =  40.0 FT, IS   52.7 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    305.00
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =    1986.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    306.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   224.00  DOWNSTREAM(FEET) =   162.00
  FLOW LENGTH(FEET) =   418.20   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.22
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.05
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   11.01
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    306.00 =    2404.20 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    310.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    162.00  DOWNSTREAM(FEET) =    128.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   284.80   CHANNEL SLOPE =  0.1194
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.045   MAXIMUM DEPTH(FEET) =  30.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.422
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (2.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .5100
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      37.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.69
  AVERAGE FLOW DEPTH(FEET) =   0.51   TRAVEL TIME(MIN.) =   0.71
  Tc(MIN.) =   11.72
  SUBAREA AREA(ACRES) =     2.56       SUBAREA RUNOFF(CFS) =    4.47
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.640
  TOTAL AREA(ACRES) =       17.2         PEAK FLOW RATE(CFS) =      37.59

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.51   FLOW VELOCITY(FEET/SEC.) =   6.74
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    310.00 =    2689.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    315.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   128.00  DOWNSTREAM(FEET) =    39.00
  FLOW LENGTH(FEET) =  1146.90   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.11
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.59
  PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =   12.67
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    315.00 =    3835.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    315.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.254
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (2.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6763
  SUBAREA AREA(ACRES) =   45.35   SUBAREA RUNOFF(CFS) =  101.82
  TOTAL AREA(ACRES) =       62.5   TOTAL RUNOFF(CFS) =     137.56
  TC(MIN.) =   12.67

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    325.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    39.00  DOWNSTREAM(FEET) =     7.00
  FLOW LENGTH(FEET) =  1506.30   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  29.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.06
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     137.56
  PIPE TRAVEL TIME(MIN.) =   1.47    Tc(MIN.) =   14.14
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    325.00 =    5342.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    325.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.031
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .9200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7131
  SUBAREA AREA(ACRES) =   11.12   SUBAREA RUNOFF(CFS) =   31.01
  TOTAL AREA(ACRES) =       73.6   TOTAL RUNOFF(CFS) =     159.16
  TC(MIN.) =   14.14
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       73.6  TC(MIN.) =     14.14
  PEAK FLOW RATE(CFS)   =     159.16
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************

           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2014 Advanced Engineering Software (aes)
             Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                           Analysis prepared by:

                         RICK ENGINEERING COMPANY
                             5620 Friars Road
                        San Diego, California 92110
                      619-291-0707   Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* MISSION BAY PEIR - SHORELINE RESTORATION BASIN 500                     *
* 100-YEAR EVENT, EXISTING CONDITIONS ANALYSIS                           *
* RICK ENGINEERING COMPANY JN: 18097                                     *
 **************************************************************************

  FILE NAME: SHOR500E.DAT
  TIME/DATE OF STUDY: 01:25 11/09/2020
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.250
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    501.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7400
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   101.60
  UPSTREAM ELEVATION(FEET) =    235.00
  DOWNSTREAM ELEVATION(FEET) =    234.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.233
```

```
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    64.53
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.757
  SUBAREA RUNOFF(CFS) =      1.11
  TOTAL AREA(ACRES) =      0.26   TOTAL RUNOFF(CFS) =      1.11

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    505.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  234.00  DOWNSTREAM ELEVATION(FEET) =  148.00
  STREET LENGTH(FEET) =  1127.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.40
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.65
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.35
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.81
  STREET FLOW TRAVEL TIME(MIN.) =   3.51   Tc(MIN.) =    8.75
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.133
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .6400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.643
  SUBAREA AREA(ACRES) =    9.07      SUBAREA RUNOFF(CFS) =   23.99
  TOTAL AREA(ACRES) =        9.3        PEAK FLOW RATE(CFS) =      24.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.70
  FLOW VELOCITY(FEET/SEC.) =  6.21   DEPTH*VELOCITY(FT*FT/SEC.) =   2.49
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    505.00 =    1228.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    505.00 TO NODE    510.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   148.00  DOWNSTREAM(FEET) =    39.00
  FLOW LENGTH(FEET) =   761.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.77
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.79
  PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =    9.30
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    510.00 =    1989.60 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    510.00 TO NODE    510.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.972
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .6800
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.6635
 SUBAREA AREA(ACRES) =   11.66   SUBAREA RUNOFF(CFS) =   31.49
 TOTAL AREA(ACRES) =       21.0   TOTAL RUNOFF(CFS) =      55.31
 TC(MIN.) =    9.30

****************************************************************************
 FLOW PROCESS FROM NODE    510.00 TO NODE    515.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    39.00  DOWNSTREAM(FEET) =    19.00
 FLOW LENGTH(FEET) =   274.10   MANNING'S N =  0.024
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.22
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      55.31
 PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    9.65
 LONGEST FLOWPATH FROM NODE    500.00 TO NODE    515.00 =    2263.70 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    515.00 TO NODE    515.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.880
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .9500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7182
 SUBAREA AREA(ACRES) =    4.96   SUBAREA RUNOFF(CFS) =   18.28
 TOTAL AREA(ACRES) =       26.0   TOTAL RUNOFF(CFS) =      72.31
 TC(MIN.) =    9.65

****************************************************************************
 FLOW PROCESS FROM NODE    515.00 TO NODE    520.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    19.00  DOWNSTREAM(FEET) =    10.00
 FLOW LENGTH(FEET) =   198.30   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  18.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.46
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      72.31
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    9.82
 LONGEST FLOWPATH FROM NODE    500.00 TO NODE    520.00 =    2462.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       26.0  TC(MIN.) =      9.82
 PEAK FLOW RATE(CFS)   =      72.31
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                              Analysis prepared by:

                            RICK ENGINEERING COMPANY
                                5620 Friars Road
                             San Diego, California 92110
                           619-291-0707   Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* MISSION BAY PEIR - SHORELINE RESTORATION BASIN 600                     *
* 100-YEAR EVENT, EXISTING CONDITIONS ANALYSIS                           *
* RICK ENGINEERING COMPANY JN: 18097                                     *
 **************************************************************************

  FILE NAME: SHOR600E.DAT
  TIME/DATE OF STUDY: 01:53 11/09/2020
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.250
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   107.90
  UPSTREAM ELEVATION(FEET) =     44.50
  DOWNSTREAM ELEVATION(FEET) =     44.00
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.499
```

```
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    605.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   44.00  DOWNSTREAM ELEVATION(FEET) =   25.00
  STREET LENGTH(FEET) =   993.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.13
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.99
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.00
  STREET FLOW TRAVEL TIME(MIN.) =   5.54   Tc(MIN.) =   14.04
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.046
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.705
  SUBAREA AREA(ACRES) =    5.25      SUBAREA RUNOFF(CFS) =   11.35
  TOTAL AREA(ACRES) =        5.4        PEAK FLOW RATE(CFS) =      11.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.93
  FLOW VELOCITY(FEET/SEC.) =  3.46   DEPTH*VELOCITY(FT*FT/SEC.) =   1.36
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    605.00 =    1100.90 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        5.4  TC(MIN.) =     14.04
  PEAK FLOW RATE(CFS)   =      11.67
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                              Analysis prepared by:

                            RICK ENGINEERING COMPANY
                                5620 Friars Road
                             San Diego, California 92110
                           619-291-0707   Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* MISSION BAY PEIR - SHORELINE RESTORATION BASIN 700                       *
* 100-YEAR EVENT, EXISTING CONDITIONS ANALYSIS                             *
* RICK ENGINEERING COMPANY JN: 18097                                       *
 ****************************************************************************

  FILE NAME: SHOR700E.DAT
  TIME/DATE OF STUDY: 16:10 11/23/2020
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.250
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   20.0     15.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    701.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .9400
  S.C.S. CURVE NUMBER (AMC II) =   0
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.928
  SUBAREA RUNOFF(CFS) =      0.67
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.67
```

```
+----------------------------------------------------------------------------+
| ************************************************************************   |
| INITIAL SUB-AREA TIME OF CONCENTRATION CALCULATED WAS LESS THAN 5 MIN.     |
| THEREFOR A USER SPECIFIED TC OF 5 MIN. WAS USED IN ACCORDANCE WITH DRAIN   |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    701.00 TO NODE    705.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   40.00  DOWNSTREAM ELEVATION(FEET) =   34.00
  STREET LENGTH(FEET) =   465.50   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.83
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   3.48   Tc(MIN.) =    8.48
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.217
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .6700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.679
  SUBAREA AREA(ACRES) =    3.48      SUBAREA RUNOFF(CFS) =    9.83
  TOTAL AREA(ACRES) =        3.6        PEAK FLOW RATE(CFS) =      10.31

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.82
  FLOW VELOCITY(FEET/SEC.) =  2.54   DEPTH*VELOCITY(FT*FT/SEC.) =   1.02
  LONGEST FLOWPATH FROM NODE    700.00 TO NODE    705.00 =     545.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    705.00 TO NODE    710.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    34.00  DOWNSTREAM(FEET) =     4.00
  FLOW LENGTH(FEET) =   602.50   MANNING'S N =  0.024
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.66
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.31
  PIPE TRAVEL TIME(MIN.) =   1.31    Tc(MIN.) =    9.79
  LONGEST FLOWPATH FROM NODE    700.00 TO NODE    710.00 =    1147.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    710.00 TO NODE    710.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.843
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .6700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6729
  SUBAREA AREA(ACRES) =    7.40   SUBAREA RUNOFF(CFS) =   19.05
  TOTAL AREA(ACRES) =       11.0   TOTAL RUNOFF(CFS) =      28.45
  TC(MIN.) =    9.79
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       11.0  TC(MIN.) =      9.79
  PEAK FLOW RATE(CFS)   =      28.45
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```