REMEDIAL ACTION PLAN
SAN DIEGO SHIPYARD SEDIMENT SITE

Cleanup and Abatement Order No. R9-2012-0024

Prepared by

Anchor QEA, L.P.

26300 La Alameda, Suite 240

Mission Viejo, California 92691

Amended

September 10, 2012

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LIST OF ACRONYMS AND ABBREVIATIONS

µg	microgram
BAE Systems	BAE Systems San Diego Ship Repair Facility
CAO	Cleanup and Abatement Order
CCA	California Coastal Act
City	City of San Diego
COC	contaminant of concern
CRP	Community Relations Plan
CWA	Clean Water Act
cy	cubic yard
DCR	Design Criteria Report
EIR	Environmental Impact Report
EFH	Essential Fish Habitat
ESA	Endangered Species Act
HASP	Health and Safety Plan
HPAH	high-molecular-weight polycyclic aromatic hydrocarbon
kg	kilogram
mg	milligram
NASSCO	National Steel and Shipbuilding Company Shipyard Facility
NEPA	National Environmental Policy Act
QAPP	Quality Assurance Project Plan
Port	San Diego Unified Port District
PCB	polychlorinated biphenyl
RAP	Remedial Monitoring Report
RMP	Remediation Monitoring Plan
Shipyard Sediment Site	San Diego Shipyard Sediment Site
SAP	Sampling and Analysis Plan
SDG&E	San Diego Gas & Electric
SMU	sediment management unit
SWAC	surface-weighted average concentration
TBT	tributyltin
USACE	U.S. Army Corps of Engineers

USEPA	U.S. Environmental Protection Agency
Water Board	San Diego Regional Water Quality Control Board
WDR	Waste Discharge Requirements
WQC	Water Quality Certification

CERTIFICATION STATEMENT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

T. MICHAEL CHEE	Minn Kee	9/7/12
Print Name	Signature	Date
NASSCO		
S. HALVAX	S Halvax	9/7/2012
Print Name	Signature	Date
BAE Systems		

1 INTRODUCTION

Discharges of metals and other pollutant wastes to San Diego Bay over the years have resulted in the accumulation of pollutants in marine sediments along the eastern shore of central San Diego Bay, in San Diego, California. This accumulation has resulted in conditions identified by the San Diego Regional Water Quality Control Board (Water Board) as adversely impacting beneficial uses (aquatic life, aquatic-dependent wildlife, and human health).

Required Element	Completed
Introduction (B.1.a)	✓
Selected Remedy (B.1.b)	
Wastes Generated (B.1.g)	
Pilot Testing (B.1.h)	
Design Criteria Report (B.1.i)	
VI. Compliance with applicable local, state, and federal regulations	
Equipment, Services, and Utilities (B.1.j)	
Regulatory Permits and Approvals (B.1.k)	
Remediation Monitoring Plan (B.1.l)	
Site Map (B.1.m)	✓
Remediation Schedule (B.1.o)	

The Water Board identified the affected areas as including waters adjacent to two adjoining, active shipyard facilities in San Diego Bay—the North Shipyard (owned by BAE Systems San Diego Ship Repair Facility [BAE Systems]) and the South Shipyard (owned by National Steel and Shipbuilding Company Shipyard Facility [NASSCO]), together termed the San Diego Shipyard Sediment Site (Shipyard Sediment Site). In March 2012, the Water Board issued Cleanup and Abatement Order No. R9-2012-0024 (CAO; Water Board 2012a) for the remediation of marine sediments containing elevated chemical concentrations within the Shipyard Sediment Site. Section 2.1 lists the identified contaminants of concern (COCs) and the numeric cleanup objectives stipulated by the Water Board in the CAO.

This Remedial Action Plan (RAP) is submitted in compliance with CAO Directive B.1 and describes the process by which cleanup of the Shipyard Sediment Site will be managed, designed, planned, implemented, and monitored in accordance with the CAO and is consistent with the U.S. Environmental Protection Agency's (USEPA's) National Contingency Plan. This RAP is also the basis of design for the detailed engineering of the project that will then be used to inform and control the remedial action to: 1) obtain construction bids; and 2) ensure that that project is implemented in a manner that achieves the directives of the CAO. The RAP also provides detail on the timing and scoping of subsequent submittals that require Water Board approval. Implementation of activities set forth in this RAP may commence as soon as 60 calendar days after submittal, although

elements may need to be adjusted or updated as project permits are received, if additional regulatory requirements are identified.

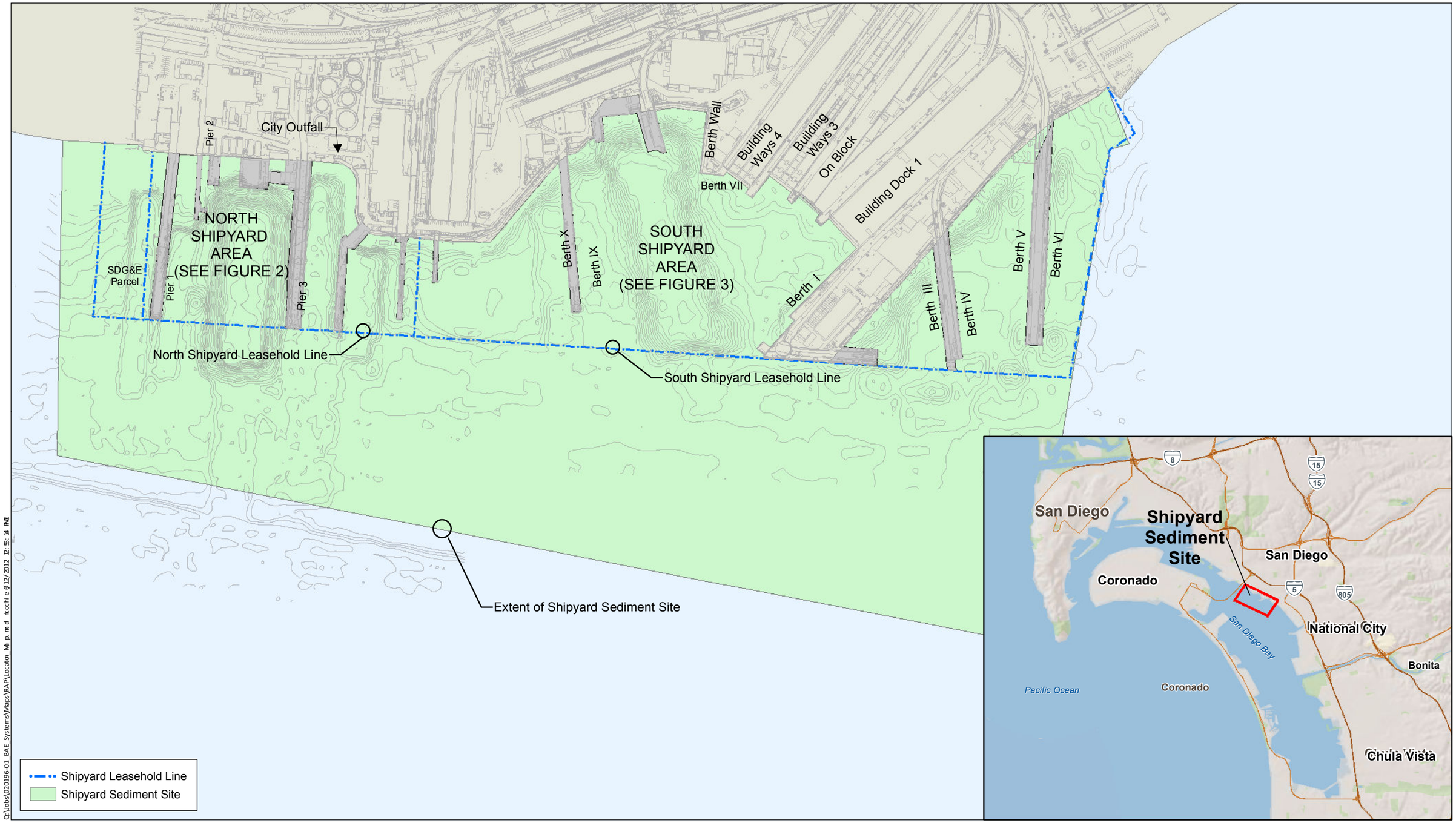
1.1 Description of Shipyard Sediment Site and History

Figure 1 depicts the location of the Shipyard Sediment Site and the layout of the North and South Shipyard Areas. The remedial footprint extends from the U.S. Bulkhead Line (shoreline) to San Diego Bay's main shipping channel to the west.

The North Shipyard is a ship repair, alteration, and overhaul facility located on approximately 39.6 acres of tidelands (23 acres on land and 16.6 acres offshore). Shipyard activities have taken place at this location since 1979, formerly under the title Southwest Marine, Inc., and now known as BAE Systems San Diego Ship Repair Inc. ("BAE Systems"). Site features include offices; buildings for washing, blasting, and painting; five piers (one of which is slated for demolition and replacement); one floating dry dock; and two remnant in-water portions of marine railways (which were partly removed in 1998).

The South Shipyard is owned and operated by NASSCO, a subsidiary of General Dynamics, and is a full-service ship construction, modification, repair, and maintenance facility that spans 126 acres of tidelands property (80 acres on land and 46 acres offshore). The South Shipyard serves the U.S. Navy and commercial customers and activities have taken place at this location since at least 1960. Current site features include office buildings, warehouses, shops, steel fabrication facilities, a floating dry dock, a graving dock, two shipbuilding ways, and five piers, providing 12 berthing spaces.

From the early 1900s through February 1963, the City of San Diego (City) was the Trustee of all relevant portions of the San Diego Bay tidelands, which include the Shipyard Sediment Site, and leased the tidelands to various operators. In 1962, the San Diego Unified Port District (Port) was created by an act of legislature, and in 1963, the Port became the Trustee for the tidelands, including the North and South Shipyard Areas leaseholds. The Port continues to maintain that role, with the North and South Shipyards as leaseholders, today.



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San Diego Shipyard Sediment Site Group

ANCHOR QEA

Feet
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Figure 1
Site Map
San Diego Shipyard Sediment Site

1.2 Structure of this Document

This RAP is a compilation of several interrelated documents are intended to lay out a detailed framework for execution of the remedial action while providing (at a minimum) all informational elements and sub-elements mandated by Directive B.1 of the CAO. The various documents included in this compilation are:

- This report: Remedial Action Plan (RAP)
- Appendix A: Design Criteria Report (DCR)
- Appendix B: Quality Assurance Project Plan (QAPP)
- Appendix C: Remediation Monitoring Plan (RMP)
- Appendix D: Sampling and Analysis Plan (SAP)
- Appendix E: Community Relations Plan (CRP)
- Appendix F: Health and Safety Plan (HASP)

The following paragraphs provide a brief description of the content and purpose of each separate document that are included as an appendix to this RAP.

1.2.1 Design Criteria Report (Appendix A)

The DCR defines in detail the technical parameters upon which the remedial design will be based. These parameters include, among other factors, the preliminary design assumptions and parameters; anticipated waste characterization; volumes and types of medium requiring removal; anticipated construction rates; performance standards removal rates; compliance with applicable local, state, and federal regulations; and technical factors of importance to the project design and implementation.

1.2.2 Quality Assurance Project Plan (Appendix B)

The QAPP describes the project objectives and organization, functional activities, and quality assurance/quality control protocols as they relate to the remedial action.

1.2.3 Remediation Monitoring Plan (Appendix C)

The RMP describes the water quality, sediment, and disposal monitoring programs and procedures to demonstrate that the implementation of the selected remedial action does not result in violations of water quality standards outside the construction area, to confirm that

the selected remedial action has achieved target cleanup levels within the remedial footprint, and to adequately characterize dredged sediments in order to identify appropriate disposal options.

1.2.4 Sampling and Analysis Plan (Appendix D)

The SAP defines sample and data collection methods to be used for the project, a description of the media and parameters to be monitored or sampled during the remedial action, a description of the analytical methods to be used, and an appropriate reference for each.

1.2.5 Community Relations Plan (Appendix E)

The CRP describes measures for informing the public about activities related to the final remedial design, the schedule for the remedial action, the activities to be expected during construction and remediation, provisions for responding to emergency releases and spills during remediation, and any potential inconveniences, such as excess traffic and noise, that may affect the community during the remedial action.

1.2.6 Health and Safety Plan (Appendix F)

The HASP describes health and safety measures to be used during the design, construction, and post-construction monitoring phases of the work, including employee training, protective equipment, medical surveillance requirements, standard operating procedures, and contingency plans.

1.3 Summary of RAP Elements Required by CAO

CAO Directive B.1 presents required elements of the RAP. Table 1 identifies each element required by the CAO and the location of the element in this RAP and/or its appendices.

Table 1
Elements Required by the CAO

Required Element	Completed	Location
Introduction (B.1.a)	✓	Section 1
Selected Remedy (B.1.b)	✓	Section 2
Health And Safety Plan (B.1.c)	✓	**HASP is provided Appendix F**
Community Relations Plan (B.1.d)	✓	**CRP is provided as Appendix E**
I. Activities related to the final remedial design	✓	Refer to CRP
II. Schedule for the remedial action	✓	Refer to CRP
III. Activities to be expected during construction and remediation	✓	Refer to CRP
IV. Provisions for responding to emergency releases and spills during remediation	✓	Refer to CRP
V. Any potential inconveniences such as excess traffic and noise that may affect the community during the remedial action	✓	Refer to CRP
Quality Assurance Project Plan (B.1.e)	✓	**QAPP is provided as Appendix B**
Sampling and Analysis Plan (B.1.f)	✓	**SAP is provided as Appendix D**
I. Sample and data collection methods to be used for the project	✓	Refer to SAP *Further detail in Sections 2.2.5.1 and 3.3.1 of the RMP (Appendix C)*
II. Description of the media and parameters to be monitored or sampled during the remedial action	✓	Refer to SAP *Further detail in Sections 2.2.1 and 3.3.3 of the RMP (Appendix C)*
III. Description of the analytical methods to be utilized and an appropriate reference for each	✓	Refer to SAP *Further detail provided in Post-Remedial Monitoring Plan (Exponent 2012)*
Wastes Generated (B.1.g)	✓	Section 5.2 *Further detail provided in Sections 2.4.2 and 3.4.2 of the DCR* (Appendix A)
Pilot Testing (B.1.h)	✓	Section 4.2 *Further detail provided in Section 3.4.3 of the DCR* (Appendix A)
Design Criteria Report (B.1.i)	✓	**DCR is provided as Appendix A**
I. Waste characterization	✓	Refer to DCR
II. Volume and types of each medium requiring	✓	Refer to DCR

Required Element	Completed	Location
removal or containment		
III. Removal or containment schemes and rates	✓	Refer to DCR
IV. Required qualities of waste streams (i.e., input and output rates to stockpiles, influent and effluent qualities of any liquid waste streams such as dredge spoil return water, potential air emissions, and so forth)	✓	Refer to DCR
V. Performance standards	✓	Refer to DCR *Further detail provided in Sections 5.1.1, 5.2.1, 5.3.1, and 5.4.1 of the QAPP (Appendix B)*
VI. Compliance with applicable local, state, and federal regulations	✓	Refer to DCR *Further detail provided in Sections 4.6 and 6 of the RAP (this document) and in Sections 2.2.4 and 4 of the RMP (Appendix C)*
VII. Technical factors of importance to the design, construction, and implementation of the selected remedy including use of currently accepted environmental control measures, constructability of the design, and use of currently acceptable construction practices and techniques	✓	Refer to DCR
Equipment, Services, and Utilities (B.1.j)	✓	Section 5.3 *Further detail provided in Sections 2.4.1, 3.4.1, 4.3.1, and 5.3.1 of the DCR (Appendix A)*
Regulatory Permits and Approvals (B.1.k)	✓	Section 6
Remediation Monitoring Plan (B.1.l)	✓	**RMP is provided as Appendix C** *Further detail provided in Section 5.5 of the RAP (this document)*
I. Water quality monitoring	✓	Refer to RMP
II. Sediment monitoring	✓	Refer to RMP
III. Disposal monitoring consistent with Section 34.1 of the Technical Report	✓	Refer to RMP
Site Map (B.1.m)	✓	Figures 1 through 4
Contingencies (B.1.n)	✓	Section 2.3 of the DCR (Appendix A)
Remediation Schedule (B.1.o)	✓	Section 7

1.5 Duty to Use Registered Professional

This RAP was prepared under the direction of qualified professionals in accordance with the California Business and Professions Code Sections 6735, 7835, and 7835.1.

David Templeton
Project Coordinator

Michael Whelan, P.E.
Project Engineer

2 SELECTED REMEDY

2.1 Cleanup Objectives and Cleanup Levels

Required Element	Completed
Introduction (B.1.a)	
Selected Remedy (B.1.b)	✓
Wastes Generated (B.1.g)	
Pilot Testing (B.1.h)	
Design Criteria Report (B.1.i)	
VI. Compliance with applicable local, state, and federal regulations	
Equipment, Services, and Utilities (B.1.j)	
Regulatory Permits and Approvals (B.1.k)	
Remediation Monitoring Plan (B.1.l)	
Site Map (B.1.m)	✓
Remediation Schedule (B.1.o)	

The cleanup of sediments with primary COCs must be completed to comply with cleanup objectives stipulated by the Water Board in the CAO. COCs with established cleanup levels include mercury, copper, high-molecular-weight polycyclic aromatic hydrocarbons (HPAHs), total polychlorinated biphenyls (PCBs), and tributyltin (TBT).

After implementation of the remedial action, the post-remedial surface-weighted average concentrations (SWACs) of the COCs are anticipated to meet the cleanup objectives set forth in the CAO and detailed in Table 2.

Table 2
Cleanup Objectives Mandated by the CAO

Chemical	Units (dry weight)	Targeted Post-Remedial Dredge Area Concentrations	Estimated Post-Remedial SWAC	Post-Remedial Trigger Concentrations
Copper	mg/kg	121	159	185
Mercury	mg/kg	0.57	0.68	0.78
HPAH[1]	µg/kg	663	2,451	3,208
Total PCB Congeners[2]	µg/kg	84	194	253
TBT	µg/kg	22	110	156

Notes:
Table taken from the CAO (Water Board 2012a).
µg/kg = microgram per kilogram
mg/kg = milligram per kilogram
1 HPAHs = sum of six PAHs: Fluoranthene, Perylene, Benzo(a)anthracene, Chrysene, Benzo(a)pyrene, and Dibenzo(a,h)anthracene.
2 Total PCBs Congeners = sum of 41 congeners: 18, 28, 37, 44, 49, 52, 66, 70, 74, 77, 81, 87, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 177, 180, 183, 187, 189, 194, 201, and 206.

2.2 Remedial Footprint

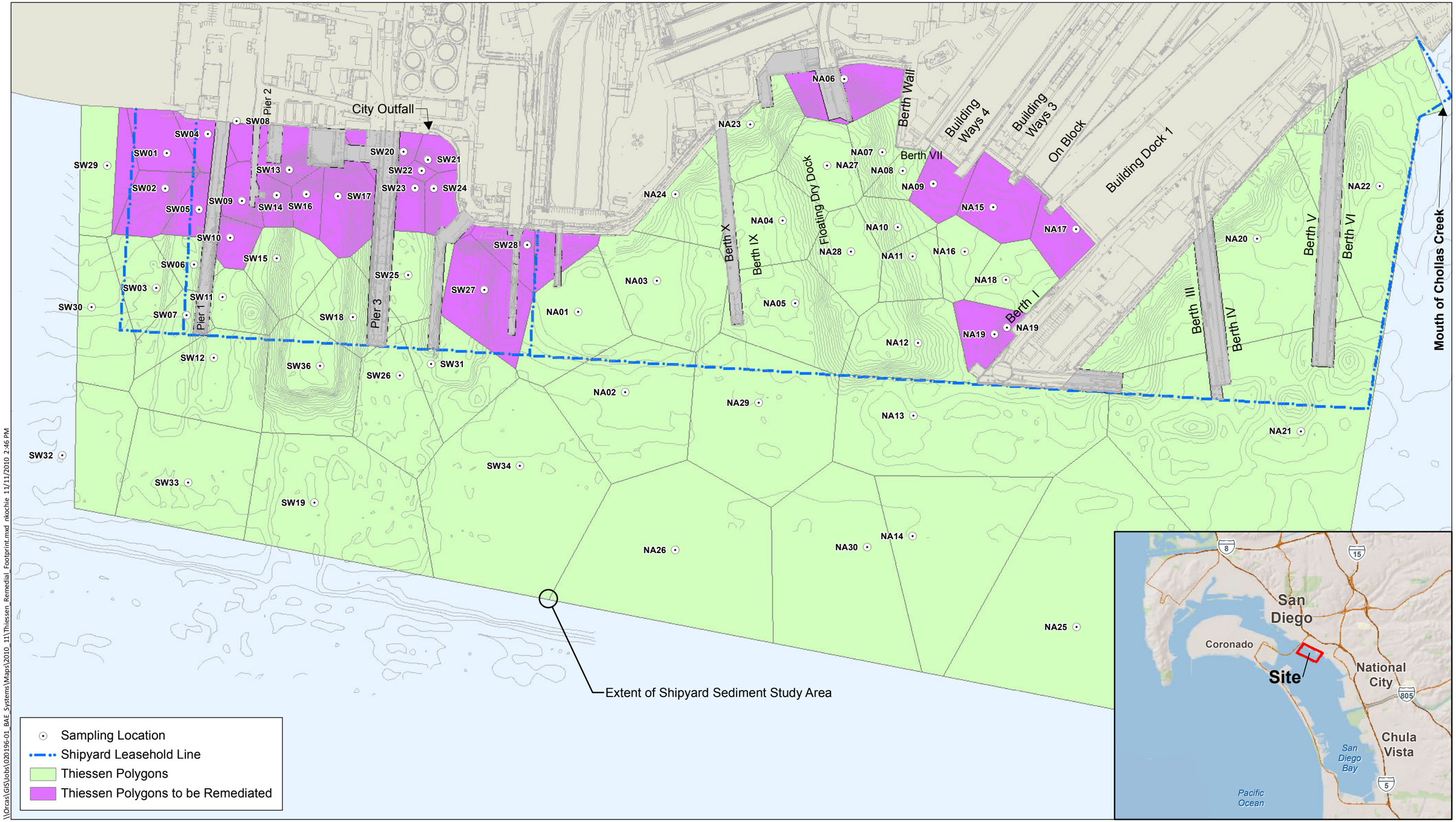
The Shipyard Sediment Site was characterized in 2002 through a series of 65 sampling stations (surface samples and sediment cores) that were subjected to chemical and biological testing as part of a detailed sediment investigation (Exponent 2003). A limited set of supplementary samples were also obtained in July 2009. As a means of facilitating comparative evaluations of feasibility, environmental protectiveness, and cost, the Shipyard Sediment Site was subdivided into a set of Thiessen polygons (bounded by half the distance between adjacent sampling stations), each of which is represented by a single sampling station at or near its mid-point. The distribution and extents of Thiessen polygons at the Shipyard Sediment Site are depicted on Figure 2.

Based on considerations of chemical and biological exposure and risk detailed in the Water Board's Technical Report (Water Board 2012b), 23 individual sampling stations and their accompanying Thiessen polygon areas have been targeted for cleanup, with the goal of achieving the desired SWAC values across the Shipyard Sediment Site (see Table 2). Five areas are located within the South Shipyard Area, 17 areas are located within the North Shipyard Area, and one area is shared by both areas. Based on available data, the proposed cleanup is intended to meet the cleanup levels for primary COCs.

The individual cleanup areas were converted from their Thiessen polygon geometry to more realistic design/construction boundaries within the North and South Shipyard Areas. Figures 3 and 4 depict the relevant Thiessen polygons and assumed equivalent remedial extents for the North and South Shipyard Areas, respectively. These figures show the remedial footprint subdivided into individual sediment management units (SMUs), which are discussed in Section 2.2.3 of the DCR (Appendix A).

2.3 Corrective Actions

Directive A.2 of the CAO states that "the Dischargers shall take all corrective actions necessary to remediate the contaminated marine bay sediment at the Shipyard Sediment Site" (Water Board 2012a). Several different remedial techniques were considered by the Water Board and the North and South Shipyards for their applicability to meeting this goal. The techniques considered were mechanical dredging, hydraulic dredging, subaqueous capping, natural recovery, confined aquatic disposal, and nearshore confined disposal.



San Diego Shipyard Sediment Site Group

ANCHOR QEA

Figure 2
Thiessen Polygon and Required Cleanup Areas
San Diego Shipyard Sediment Site

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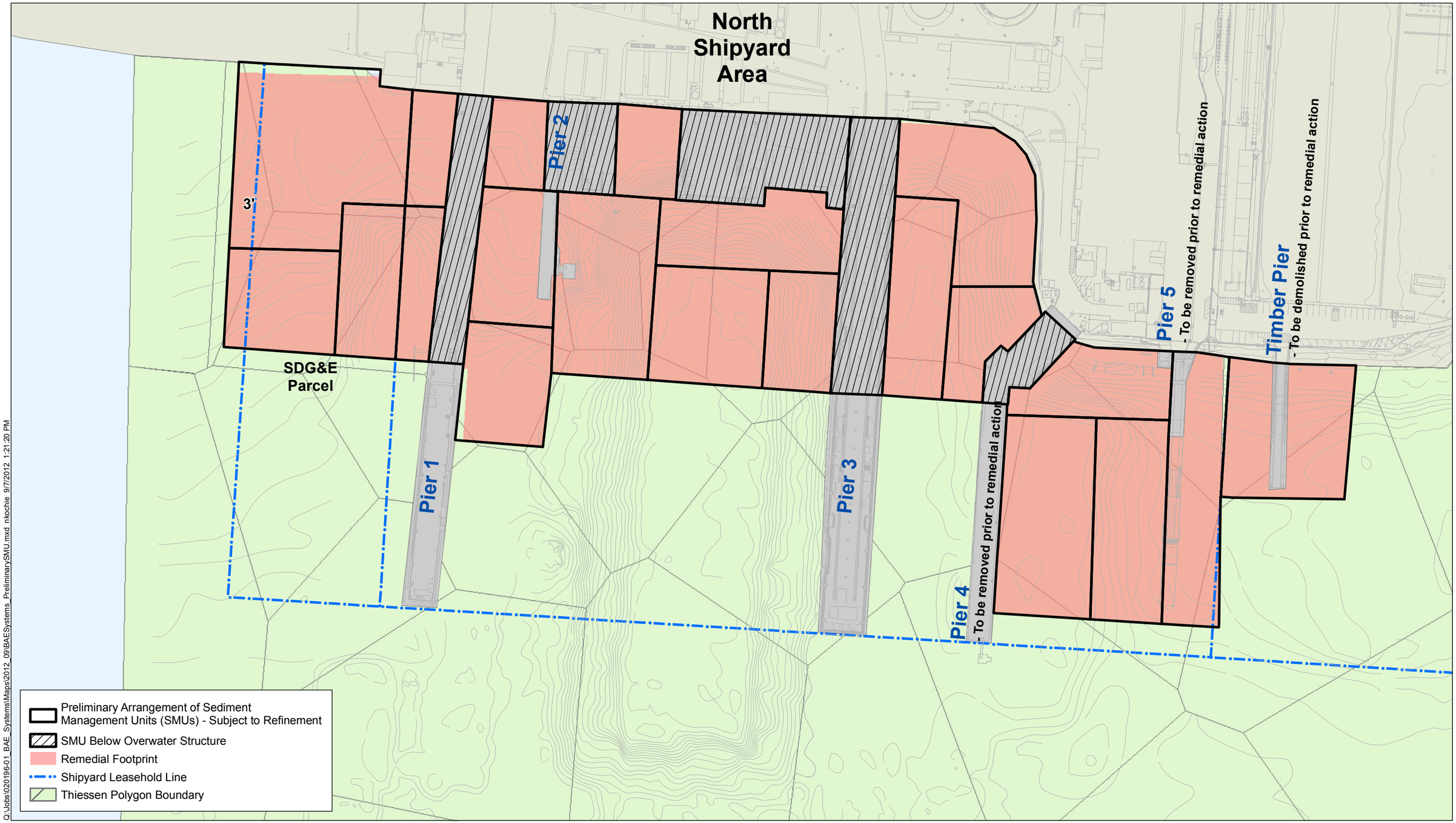

San Diego Shipyard Sediment Site Group

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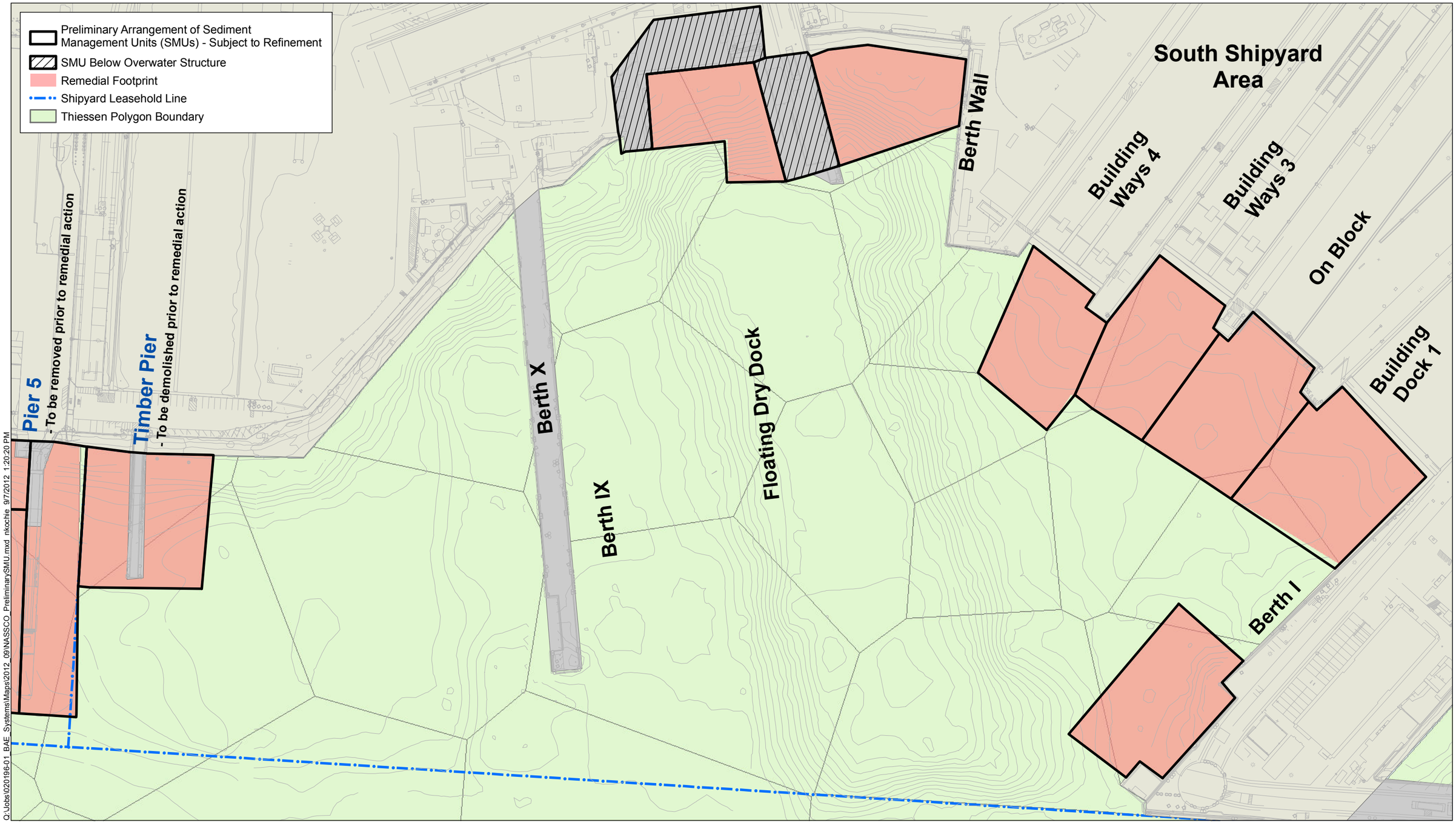
Figure 3
North Shipyard Area Remedial Footprint and SMUs
San Diego Shipyard Sediment Site



San Diego Shipyard Sediment Site Group

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Figure 4
South Shipyard Area Remedial Footprint and SMUs
San Diego Shipyard Sediment Site

Further consideration was given to the final disposition of contaminated sediments, including treatment in-place, offshore disposal, nearshore disposal, beneficial reuse (beach renourishment), and landfill disposal. All of these techniques have been used successfully on other marine or waterfront remedial actions.

The following summarizes each alternative corrective action considered; more detail is available in the Sediment Investigation Report (Exponent 2003):

- Mechanical dredging is technologically feasible at the site and is expected to be relatively cost-effective.
- Hydraulic dredging requires a sizable facility to store slurry generated, which could be three times greater than the volume of sediment removed. Owing to the highly restricted land space available at the North and South Shipyard Areas, this option would be very difficult to implement.
- Subaqueous capping would not be feasible for the site because of the potential for scour and damage from passing vessels, as well as the need to avoid restricting water depths to allow for ongoing shipyard activities.
- Natural recovery is currently ongoing at the site but has not been demonstrated to the Water Board's satisfaction to be substantially likely to achieve long-term remedial success at the site within a reasonable period of time.
- Confined aquatic disposal can be a successful means of permanently storing sediment in a stable, capped location offshore, but a suitable location has not been identified at the site.
- Nearshore confined disposal can be a successful means of permanently storing sediment in a stable, nearshore location, potentially reusable as upland space, but a suitable location has not been identified at the site.
- Sediment treatment in-place is suitable only under a specific range of circumstances and has not been demonstrated to the Water Board's satisfaction to be likely to achieve long-term remedial success at the site.
- Offshore disposal of sediment requires that sediment pass a comprehensive set of tests mandated by the USEPA and U.S. Army Corps of Engineers (USACE), to demonstrate that it will not adversely affect marine life. Although the full set of required tests has not been conducted on sediment, it appears unlikely that sediments will qualify for offshore disposal.
- Nearshore disposal of sediment requires that sediment pass a comprehensive set of

tests mandated by state and federal agencies, to demonstrate that it will not adversely affect nearshore beneficial uses. Although the full set of required tests has not been conducted on sediment from the Shipyard Sediment Site, it appears unlikely that sediments will qualify for nearshore disposal.

- Beneficial reuse, such as placement on beaches, requires physical and chemical testing commensurate with the intended use. Sediments from the shipyards site are chemically impacted and have too low of a sand content to qualify for beach nourishment. No other feasible reuse alternatives have been identified.
- Landfill disposal is technologically feasible, although costly. Certain local and regional landfills are known to be able to accept dredged San Diego Bay sediment.

After considering these corrective action alternatives, mechanical dredging with landfill disposal was selected as the remedial action for cleanup of the remedial footprint.

Dredging will be conducted to remove impacted sediments from all accessible portions of the Shipyard Sediment Site. Dredged material will be offloaded to an onshore stockpiling area where it will be dewatered, loaded into trucks, and transported to one or more off-site disposal locations. Mechanical dredging will be supplemented, where necessary, by localized placement of clean sand cover in cleanup areas (depending on various factors, including the results of post-remediation confirmatory sampling) as a mechanism for further enhancing the sediment surface. Cleanup areas below overwater structures will receive a cover layer of clean sand and gravel rather than being dredged, owing to accessibility issues and the need to maintain stability of the structures.

The target depth for remediation is the maximum depth of chemical exceedance relative to CAO target cleanup levels. Based on preliminary calculations, dredging to a point where the target sediment levels are achieved will result in the removal of approximately 143,400 cubic yards (cy) of material. Further design-level evaluations (e.g., calculation of structural setback distances and dredged side slopes) will better refine this estimated dredge volume. All dredged material will be offloaded to an onshore stockpiling area where it will be dewatered, loaded into trucks, and transported to one or more off-site disposal locations. Following sediment removal, the stability of existing marine structures, seawalls, and side slopes will be maintained, if needed, by placing a ridge or blanket of protective rock material adjacent to the structure in question, thereby overcoming the destabilizing effect of sediment removal.

3 PROJECT TEAM AND ORGANIZATION

The CAO identifies "Persons Responsible" as those parties that "caused or permitted the discharge of waste to the Shipyard Sediment Site resulting in the accumulation of waste in the marine sediment" (Water Board 2012a). The parties listed in the CAO are NASSCO; BAE Systems; the City; Campbell Industries; San Diego Gas & Electric (SDG&E), a subsidiary of Sempra Energy Company; the U.S. Navy; and the Port. Collectively, these parties are referred to as the "Dischargers."

Figure 5 presents an organizational chart for the Shipyard Sediment Site Group, which is comprised of all or a subset of the Dischargers who are identified on the organizational chart as the Performing Parties. Anchor QEA, L.P., has been retained as the Shipyard Site Group's primary representative, for which David Templeton is the Project Coordinator and Michael Whelan, P.E., is the Project Engineer. The North Shipyard technical representative is Shaun Halvax (BAE Systems) and the South Shipyard technical representative is Michael Chee (NASSCO). The Project Team is comprised of the North Shipyard, the South Shipyard, and Anchor QEA; additional Dischargers representatives may join the Project Team.

For matters of CAO compliance, the Water Board will serve as a point of communication and information dissemination for other governmental agencies (as necessary), including the USACE, National Oceanic and Atmospheric Administration, and California Department of Fish and Game. Separate matters of permit compliance may be communicated and managed directly with individual agencies.

Commentary from stakeholders, the public, and non-governmental organizations, such as environmental groups, will be managed by the Water Board until the Amended RAP is approved. During the implementation of the RAP, the Project Team will coordinate communications with the public, stakeholders, and the Water Board and in accordance with the CRP (Appendix E).

San Diego Regional Water Quality Control Board

Cleanup and Abatement Order No. R9-2012-0024

Dischargers

- San Diego Gas & Electric
- City of San Diego
- BAE Systems
- NASSCO
- San Diego Unified Port District
- Campbell Industries
- United States Navy
- Star & Crescent

San Diego Shipyard Sediment Site Group

CONTACTS:

David Templeton *dtempleton@anchorqea.com* 619-992-1440	Michael Whelan, P.E. *mwhelan@anchorqea.com* 760-845-2983
Michael Chee *mchee@nassco.com* 619-544-7778	Shaun Halvax *sandor.halvax@baesystems.com* 619-238-1000

Website: TBD

Local Community

San Diego Coast Keeper
Environmental Health Coalition

Project Team

David Templeton (AQ) – Project Coordinator
Michael Whelan, P.E. (AQ) – Project Engineer

Shaun Halvax – BAE Systems
Michael Chee - NASSCO

Health and Safety

Chris Torell, CSP (AQ)
ctorell@anchorqea.com

North Shipyard Representative (TBD)
South Shipyard Representative (TBD)

Contractor Representative (TBD)

Pre-Design Activities

Engineering Evaluations
Michael Whelan, P.E. (AQ)
Joe Perrone, P.E. (Triton Engineers)

Sediment Evaluations
Gabe Bolin (AQ)
Samantha Leskie (AQ)
Wendy Hovel, Ph.D. (AQ)

Permitting and Authorizations

Joshua Burnam, MPH, D.Env. (AQ)
Adam Gale (AQ)

Design and Contracting

Michael Whelan, P.E. (AQ)
Tracy Stofferahn, P.E. (AQ)

Construction and Construction Monitoring

Construction Management
Ed Berschinski (AQ)
Contractor (TBD)
Contractor Project Manager (TBD)

Water Quality Monitoring
Gabe Nagler (AQ)
Sediment Monitoring
Wendy Hovel, Ph.D. (AQ)

Post Remedial Monitoring

Rick Bodishbaugh (Exponent)

San Diego Shipyard Sediment Site Group

ANCHOR QEA

Figure 5
Project Team Organizational Chart
San Diego Shipyard Sediment Site

4 PREPARATION AND PLANNING FOR THE REMEDIAL ACTION

The Performing Parties and Project Team, defined on the Project Team Organizational Chart (Figure 5), will maintain close and regular communication and coordination with the Water Board regarding project progress and success. At a minimum, communications will include:

Required Element	Completed
Introduction (B.1.a)	
Selected Remedy (B.1.b)	
Wastes Generated (B.1.g)	
Pilot Testing (B.1.h)	✓
Design Criteria Report (B.1.i)	
VI. Compliance with applicable local, state, and federal regulations	✓
Equipment, Services, and Utilities (B.1.j)	
Regulatory Permits and Approvals (B.1.k)	
Remediation Monitoring Plan (B.1.l)	
Site Map (B.1.m)	
Remediation Schedule (B.1.o)	

- Attending briefings with Water Board representatives as necessary
- Sending notifications to the Water Board as required under the CAO
- Submitting quarterly progress reports
- Reviewing and approving of various permit applications necessary to attain required permits and approvals
- Reviewing and approving various technical memoranda developed during the design and permitting
- Reviewing and approving the Cleanup and Abatement Completion Report

4.1 Pre-Design Site Investigations

A number of additional site studies will be required to support the first step of the remedial action: project design and permitting. This step includes a pre-design sediment sampling program that will be used to obtain physical and geotechnical information on sediment properties (needed for engineering design) and to determine sediment and waste characterization suitability for disposal acceptance at local and/or regional landfills.

Additional details regarding the pre-design investigations are provided in the DCR (Appendix A). Corresponding methods of sampling and analysis for the pre-design investigations are detailed in the SAP (Appendix D).

4.2 Pilot Testing

Pilot tests are a means by which processing systems and physical or chemical modification techniques can be tested on a small scale in order to optimize their application for the full scale of construction. Because mechanical dredging methods have been identified as most suitable for remediation of the Shipyard Sediment Site, pilot testing is not anticipated to be necessary. One possible exception is that the contractor may elect to use chemical admixtures or mechanical methods to accelerate the dewatering process. In this event, a series of pilot tests may be considered to determine the correct ratio of chemical admixture to sediment. This pilot test will be more crucial if the identified offloading and dewatering area is small enough to limit production rates, which may require amplification of the natural drying process through chemical additives and filter presses.

4.3 Engineering Design Analyses

Using the information obtained during pre-design site investigations, engineering analyses will be conducted to evaluate methods, rates, vertical depths, and side slopes of the cleanup areas. Similarly, sand and/or gravel material types will be selected for underpier clean cover placement. Elements of structural protection will also be evaluated and selected as part of the design process.

Details regarding the engineering design process and the design criteria to be applied are provided in the DCR (Appendix A).

4.4 Suitable Sediment Stockpiling Area

Dredged material must be moved onto land to be loaded into trucks for disposal. This effort will require identifying and using a land-side area for sediment offloading and stockpiling. Neither the North nor South Shipyard Areas' facilities have available on-land area that would suffice for this processing; therefore, arrangements must be made with a different party for use of an off-site sediment stockpiling area. To effectively allow for sediment stockpiling and dewatering, while accommodating a reasonable sediment production and disposal rate, the area should have the following characteristics:

- Be situated on or adjacent to a waterfront dock, wharf, or seawall with sufficient depth to enable a sediment-loaded barge to pull immediately adjacent for offloading.

The waterfront area should be long enough to allow for the mooring of one to two barges at a time.

- Have waterfront structure (dock, wharf, or seawall) that is structurally capable of holding offloading equipment (such as a crane), the sediment stockpiles, and any ancillary dewatering equipment (if used).
- Be situated at or on a road or rail spur to allow trucks or railcars to be brought in and loaded with dewatered sediment for haul-off and disposal.
- Be at least 2 acres. The stockpiling area must have enough square footage area to hold sediment for enough time to undergo dewatering, whether that be through passive dewatering (by air-drying action supplemented by regular reworking, potentially accelerated with the use of water absorbent additives) or via a more active process involving filter presses or other equipment. The passive air-drying dewatering process is the slowest, while the amount of time needed for this process is dependent on weather conditions and physical character of the sediment. It is expected that 3 days will generally be sufficient.
- Be enough square footage to allow haul-off and disposal of sediment at the same overall rate as the sediment is being dredged. It is also beneficial to have enough space to accommodate segregated stockpiles if some sediment does not pass the requirements for disposal at local landfills.
- Be an area that remains available for the full duration of cleanup activities. The necessary duration of leasing the off-site stockpiling area should include an additional month before and after construction for setup, preparation, breakdown, and cleanup.
- Be a location that reasonably limits community impacts or can be designed in such a way as to limit such impacts.

The area currently proposed for the sediment stockpiling area is located immediately north of the North Shipyard Area. This location is on Port Tidelands property, under Tidelands Use and Occupancy Permit to SDG&E and subsequent subpermit to BAE Systems. To date, the Project Team's efforts have been focused on this site. Although there are other conceptual options for sediment stockpiling, as delineated in the Environmental Impact Report (EIR; Water Board 2012c); there has not been indication of acceptance from their property owners.

Ultimately, the North and South Shipyards will work with the appropriate managing entities to obtain full approval for preparation and usage of a stockpiling area. Discussions for the identified parcel north of the North Shipyard Area are underway. While logistical and contractual issues remain to be resolved the parties believe all such issues can be resolved. However, if that option becomes infeasible, then the Project Team will direct its attention to one or more of the other identified options.

For more information on the selection, preparation, and use of a temporary sediment offloading and stockpiling area, refer to Section 3 the DCR (Appendix A).

4.5 Community Relations Plan

Public coordination will be an important component of implementing the remedial action and will be accomplished in a manner consistent with community outreach elements used for other highly public environmental cleanup projects. Public outreach will commence prior to the start of construction operations and will be ongoing throughout the work's duration. Recognizing the cultural diversity of the San Diego Bay area, community outreach efforts will be done in both English and Spanish.

A detailed CRP has been prepared for this project, and is provided as Appendix E. That document provides further detail on planned community outreach efforts.

4.6 Contract Documents

Once engineering design tasks have been completed, all technical design details, including performance criteria, monitoring requirements, and compliance with all applicable local, state, and federal regulations will be documented in a set of construction plans and technical specifications. These documents, in conjunction with legal contract language, will comprise a set of contract documents that will be used by the contractor(s) in preparing bids for the work and that will then form the basis for the execution, monitoring, approval, and payment for the work.

4.7 Contract Award

The construction plans and technical specifications previously described in Section 4.6 will be used to create a bid-ready set of contract documents that will be made available to

selected, qualified contractors for bidding. The Project Team will select a responsive and responsible contractor for the work based on the value of their bid and on their capabilities to perform the work.

5 EXECUTION AND MONITORING OF THE REMEDIAL ACTION

Once a remedial contractor has been selected and contracted to perform the remedial action, the execution of the work will begin, in accordance with project permits and contract documents (construction plans and technical specifications). During construction, a remedial monitoring program will be undertaken to determine whether cleanup activities have been successfully completed without violation of any permit provisions.

Required Element	Completed
Introduction (B.1.a)	
Selected Remedy (B.1.b)	
Wastes Generated (B.1.g)	✓
Pilot Testing (B.1.h)	
Design Criteria Report (B.1.i)	
VI. Compliance with applicable local, state, and federal regulations	
Equipment, Services, and Utilities (B.1.j)	✓
Regulatory Permits and Approvals (B.1.k)	
Remediation Monitoring Plan (B.1.l)	✓
Site Map (B.1.m)	
Remediation Schedule (B.1.o)	

This section describes each of the remedial action execution and monitoring steps in greater detail.

5.1 Review of Construction Activities

The majority of the remedial footprint will be remediated by removing impacted sediments by dredging. Post-dredge confirmational samples will be used to determine whether dredging has been sufficient to remove sediments with elevated levels of COCs. If not, additional dredging, or placement of a clean sand layer, may be done. Dredged material will be hauled to a landside offloading and stockpiling area, where it will be dewatered, placed on haul trucks, and sent to one or more appropriate off-site disposal facilities or landfills.

Underpier areas will not be accessible to dredging equipment; these areas will be remediated through the placement of a clean cover layer consisting of sand and possibly gravel materials.

Dredging in the vicinity of existing slopes and marine structures will be offset a safe distance from these features to avoid undermining or destabilizing them. Protective buttresses or ridges of armor stone are also expected to be placed along these areas to structurally offset the loss of adjoining sediment.

5.2 Wastes Generated

Wastes generated during dredging activities are expected to include:

- Sediment (approximately 143,400 cy is anticipated to be removed per the CAO)
- Debris, which includes all material that is not sediment (e.g., rocks) and anything that is manmade (e.g., anchors, chains, and plastic bags)
- Effluent water from dredged material, both within haul barges and in the on-land stockpiling area
- Used hay bales/straw waddle, filter fabric, or other similar materials used to prevent free flow of material
- Contractor waste (e.g., oil, spilled fuels, other chemicals)

Sediments and debris encountered within the remedial footprint will be disposed of at one or more upland approved facilities, such as a Subtitle D landfill (see DCR; Appendix A). Effluent water from dredged sediment will be collected and tested to determine whether it can be disposed of in the North and South Shipyards' stormwater system, sent to City wastewater treatment, or sent off-site to a different disposal facility. Wastes generated as a result of the contractor's activities (e.g., used best management practice materials, oil, chemicals, or spilled fuel) will be the contractor's responsibility to manage, cleanup, and dispose of properly. Procedures for such cleanup activities will be documented in the contractor's Dredging and Disposal Work Plan, which will be subject to review and approval by the Project Team and Water Board.

For more details on the anticipated waste generated and on how it will be managed, refer to the DCR (Appendix A).

5.3 Equipment, Services, and Utilities

Because the remedial action will involve dredging and off-site sediment disposal, with clean cover material placed in underpier areas, no elements or components of the remedial action are expected to require custom fabrication or long lead-time for procurement. All equipment and materials anticipated to be used are expected to be readily available.

Dredging will be performed via barge-mounted, mechanical dredging equipment, with either a clamshell bucket or cable-arm bucket suspended from a crane. Sediments will be placed

into a scow or barge and offloaded to an onshore stockpiling area where it will be dewatered, loaded into trucks, and transported to one or more off-site disposal locations.

Placement of clean materials in underpier areas is expected to use similar equipment, possibly supplemented with a conveyor, tremie tube, or similar device for placing material in hard-to-access locations.

For more details on the anticipated equipment and materials that will be used during the course of the remedial action, refer to the DCR (Appendix A).

5.4 Construction Oversight

The Project Team will oversee the construction process to ensure and document compliance with contract documents and project permits. Continuous communication will be maintained with the contractor in order to alert them to any need to change or modify their equipment or methods. The contractor will be required to meet all construction performance standards, as described in the DCR (Appendix A).

Elements of construction management, construction oversight, and remedial monitoring are described in the QAPP (Appendix B) .

5.5 Remediation Monitoring Plan

Throughout the construction process, a remediation monitoring program will be conducted for the following purposes:

- To determine whether target cleanup levels have been reached within the remedial footprint
- To determine whether cleanup activities have violated water quality standards outside the remedial footprint
- To assess appropriate disposal options for the dredged sediment

Further details on how each of these goals will be accomplished are documented in the RMP (Appendix C). Corresponding methods of sampling and analysis for monitoring elements are detailed in the SAP (Appendix D).

5.6 Final Cleanup and Abatement Completion Report

After the work has been completed, a Final Cleanup and Abatement Completion Report will be prepared to verify completion of the remedial action. The report will include the following information:

- Compilation of results of all confirmatory sampling that demonstrates that cleanup areas have been remediated in compliance with the CAO
- Demonstration that all underpier areas have been remediated in compliance with the CAO
- Compilation of results of all confirmatory sampling that demonstrate compliance with required post-remedial SWAC values

5.7 Post-Remedial Monitoring Plan

The CAO requires that post-remedial monitoring be conducted at the Shipyard Sediment Site. The post-remedial monitoring is intended to verify that remediation is effective in reducing and maintaining chemical concentrations in sediment to an acceptable level. The work plan detailing the field sampling plan, quality assurance project plan, and data analysis and interpretation of results procedures are provided in the Post-Remedial Monitoring Plan (Exponent 2012).

6 REGULATORY PERMITS AND APPROVALS

The following state and federal permits and approvals must be received prior to implementation of the remedial action.

Required Element	Completed
Introduction (B.1.a)	
Selected Remedy (B.1.b)	
Wastes Generated (B.1.g)	
Pilot Testing (B.1.h)	
Design Criteria Report (B.1.i)	
VI. Compliance with applicable local, state, and federal regulations	✓
Equipment, Services, and Utilities (B.1.j)	
Regulatory Permits and Approvals (B.1.k)	✓
Remediation Monitoring Plan (B.1.l)	
Site Map (B.1.m)	
Remediation Schedule (B.1.o)	

6.1 California Environmental Quality Act

The Water Board has determined that an EIR is required to comply with the California Environmental Quality Act, with the Water Board acting as the lead agency. On November 16, 2011, the Water Board certified the Final Program EIR and adopted the Findings of Fact, Statement of Overriding Considerations, and Mitigation Monitoring and Reporting Plan as incorporated within the Resolution. The work will comply with the preferred alternative selected in the EIR. It is anticipated that the Water Board will lead any further CEQA- and EIR-related actions that may be necessary.

6.2 Rivers and Harbors Act Section 10 and Clean Water Act Section 404 Permits

Rivers and Harbors Act Section 10 and Clean Water Act Section 404 permits are needed for the work. The USACE will act as the lead agency for obtaining these permits and will be the lead agency for required Endangered Species Act (ESA) and Essential Fish Habitat (EFH) consultations. Because construction activities are a required component of the CAO, the USACE has the ability to issue a letter of verification for Nationwide Permit 38, which applies to "containment stabilization, or removal of hazardous or toxic waste materials that are performed, ordered, or sponsored by a government agency with established legal or regulatory authority (notice)" (Federal Register 77:34). The USACE does, however, also have the discretion to require a Standard Individual Permit.

The USACE will act as the lead National Environmental Policy Act (NEPA) agency. The USACE's decision on permit forms affects the form of the NEPA review. An Environmental Impact Statement is not anticipated to be required.

6.3 Endangered Species Act/Magnusson-Stevens Fishery Conservation and Management Act

Consultation under Section 7 of the ESA and under the Magnusson-Stevens Fishery Conservation and Management Act is required for this work. Consultations concern potential effects to federally listed, threatened, or endangered species and EFH issues. The USACE will act as the lead agency for consultations with the U.S. Fish and Wildlife Service and National Marine Fisheries Service and will make the final determination on requirements to comply with these regulations. Project construction activities may be limited to the period between September 15 and March 31 in order to protect the endangered California least tern (*Sterna antillarum browni*); although work within the least tern season may be requested per the terms of the EIR (Water Board 2012c). A Biological Assessment and EFH Evaluation Report will be required to support the consultation, and work windows may be confirmed during that process. Some other sensitive species, such as sea turtles, are known to be present near the Shipyard Sediment Site. An eelgrass survey will be required.

6.4 Section 401 Water Quality Certification and Waste Discharge Requirements

Clean Water Act Section 401 Water Quality Certification and Waste Discharge Requirements (WQC/WDRs) are needed for the work. The Water Board will publish its WQC/WDRs after submission and acceptance of the QAPP (Appendix B) and review and approval of the WQC/WDR application.

6.5 California Coastal Act Consistency

A California Coastal Act (CCA) consistency determination will be needed for the work. The Port is anticipated to act as the CCA agency through the Port's environmental process, as NASSCO and BAE Systems are Port tenants. The Port can consider the work under its California Coastal Commission approved Port Master Plan.

6.6 Other Reports and Entitlements

A project Stormwater Pollution Prevention Plan and construction and stormwater National Pollutant Discharge Elimination System permits may be required as a result of the upland sediment dewatering facility. The need for these items will be confirmed through discussions with the Water Board. Additionally, access agreements (right-of-entry, easements, etc.) and some form of a Memorandum of Understanding or lease for the use of an onshore dewatering facility may also be required by the Port or other land owners adjacent to the Shipyard Sediment Site.

7 REMEDIATION SCHEDULE

Required Element	Completed
Introduction (B.1.a)	
Selected Remedy (B.1.b)	
Wastes Generated (B.1.g)	
Pilot Testing (B.1.h)	
Design Criteria Report (B.1.i)	
VI. Compliance with applicable local, state, and federal regulations	
Equipment, Services, and Utilities (B.1.j)	
Regulatory Permits and Approvals (B.1.k)	
Remediation Monitoring Plan (B.1.l)	
Site Map (B.1.m)	
Remediation Schedule (B.1.o)	✓

The CAO states that the remedial action implementation is expected to take approximately 5 years to complete and that implementation of the RAP may commence 60 calendar days after it has been submitted to the Water Board (unless otherwise directed in writing by the Water Board). Figure 6 presents a schedule detailing the sequence of events and the timeframe for each activity based on the anticipated time required to complete each activity and concludes in March 2017 with submission of final reports documenting that the alternative sediment cleanup levels have been met. The schedule reflects the implementation of the remedial action required by the CAO. Initial implementation steps include applying for and securing required permits, conducting a design analysis, and preparing a bid-ready set of contract documents. The permitting and approval timelines are placeholders as the actual timeline is not controlled by the Dischargers. Similarly, other restrictions, not in the Dischargers control, may affect the timelines presented.

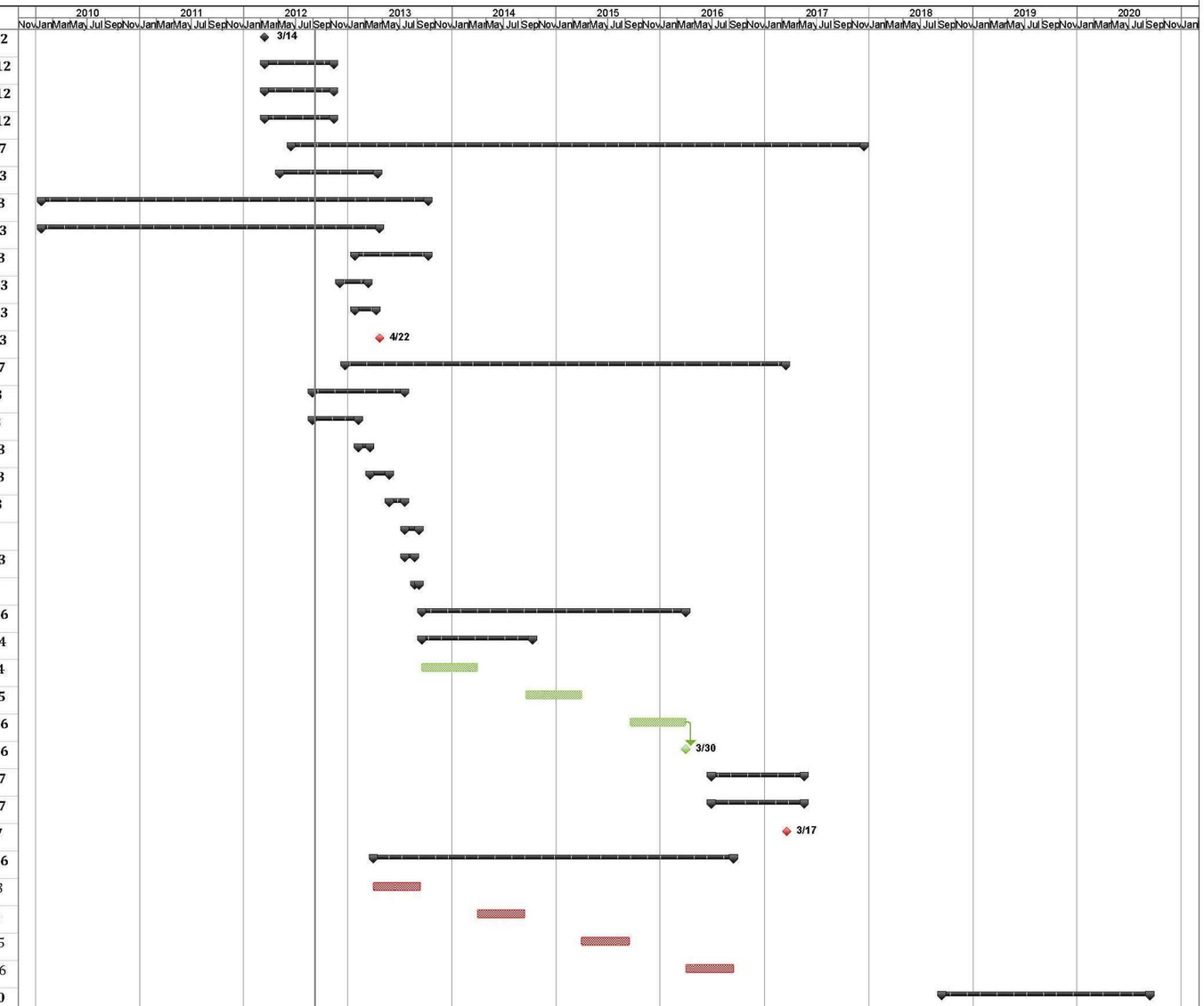
Once construction is underway, the project schedule may be constrained by the limited dredging window (September 15 through March 31) to protect the endangered California least tern (unless and except as authorized by resource agencies, as provided for in the EIR [Water Board 2012c]). As a result, dredging and marine construction work is typically restricted to the months of September through March. Further scheduling impacts are expected to result from the variety of ongoing and planned shipyard activities. Because of the reduced dredging window, at least three annual dredging episodes are anticipated to complete the required remedial action.

Once remedial construction activities have been completed and the CAO objectives have been met, the Dischargers will prepare and submit a Final Cleanup and Abatement Completion Report (CAO Directive C) to document that the alternative sediment cleanup levels have been met. Implementation of the RAP will be followed by post-remedial

monitoring activities (CAO Directive D) to ensure long-term compliance with the objectives of the CAO. These activities will begin 2 years after the remedial action implementation activities are completed.

CAO Implementation Schedule
San Diego Shipyard Sediment Site

ID	Task Name	Start	Finish
1	CAO Adopted	Wed 3/14/12	Wed 3/14/12
2	CAO Deliverables	Wed 3/14/12	Mon 11/12/12
3	Remedial Action Plan (Anticipated)	Wed 3/14/12	Mon 11/12/12
12	Post-Remedial Monitoring Plan	Wed 3/14/12	Mon 11/12/12
19	Progress Letters	Fri 6/15/12	Fri 12/15/17
43	Offloading Facility (Anticipated)	Mon 5/7/12	Mon 4/15/13
50	ANTICIPATED PERMITTING PROCESS	Thu 1/21/10	Tue 10/8/13
51	Anticipated Water Board CEQA Process	Thu 1/21/10	Mon 4/22/13
59	Anticipated USACE	Fri 1/25/13	Tue 10/8/13
67	Anticipated Water Board	Mon 12/3/12	Wed 3/13/13
71	Port of San Diego - CCA Consistency	Fri 1/25/13	Wed 4/10/13
75	Anticipated All Permits and Approvals Received	Mon 4/22/13	Mon 4/22/13
76	Community Relations	Sat 12/22/12	Tue 3/14/17
82	DESIGN ACTIVITIES	Wed 8/29/12	Fri 7/19/13
83	Pre-Design Activities	Wed 8/29/12	Thu 2/7/13
99	Design	Thu 2/7/13	Tue 3/19/13
103	Construction Documentation	Tue 3/19/13	Sun 5/26/13
110	Contractor Selection	Sun 5/26/13	Fri 7/19/13
117	PREPARATION FOR CONSTRUCTION	Fri 7/19/13	Fri 9/6/13
118	Contractor Submittals	Fri 7/19/13	Thu 8/22/13
123	Mobilization	Thu 8/22/13	Fri 9/6/13
125	CONSTRUCTION	Tue 9/17/13	Wed 3/30/16
126	BAE Pier 4 Project	Tue 9/17/13	Fri 10/10/14
129	Season 1 - Dredging and Pier Demolition	Tue 9/17/13	Sun 3/30/14
130	Season 2 - Dredging and Pier Demolition	Wed 9/17/14	Tue 3/31/15
131	Season 3 - Dredging	Thu 9/17/15	Wed 3/30/16
132	Construction Activities Complete	Wed 3/30/16	Wed 3/30/16
133	POST-CONSTRUCTION MONITORING	Wed 6/29/16	Thu 5/18/17
134	Cleanup and Abatement Completion Report	Wed 6/29/16	Thu 5/18/17
140	Remedial Action Implementation Complete	Fri 3/17/17	Fri 3/17/17
141	LEAST TERN CLOSURE WINDOWS	Sun 3/31/13	Wed 9/14/16
142	Dredging Closure Window - Least Tern Season	Sun 3/31/13	Thu 9/12/13
143	Dredging Closure Window - Least Tern Season	Mon 3/31/14	Fri 9/12/14
144	Dredging Closure Window - Least Tern Season	Tue 3/31/15	Mon 9/14/15
145	Dredging Closure Window - Least Tern Season	Thu 3/31/16	Wed 9/14/16
146	POST-REMEDIAL MONITORING	Thu 9/13/18	Sun 9/13/20



Task | Split | Milestone | Summary | Project Summary | External Tasks | External Milestone | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | Progress | Deadline

This timeline and noted durations are subject to the permit and approval process, Water Board approvals, and other schedule restrictions not in the Dischargers' control. These anticpated approval dates should be considered tentative.

Sep 07, 2012 10:48am ghowell L:\AutoCAD Project Files_Projects\0918-Gallagher\SD Shipyard\0918-RP-002-GANTT-2.dwg FIG 6

San Diego Shipyard Sediment Site Group

ANCHOR QEA

Figure 6
Remediation Schedule
San Diego Shipyard Sediment Site

8 REFERENCES

Exponent, 2003. *NASSCO and Southwest Marine Detailed Sediment Investigation.* Volume 1. Prepared for NASSCO and Southwest Marina, San Diego, California. October 2003.

Exponent, 2012. *Post-Remedial Monitoring Plan, San Diego Shipyard Sediment Site*. Prepared for the Regional Water Quality Control Board. June 2012.

Water Board (San Diego Regional Water Quality Control Board), 2012a. Cleanup and Abatement Order R9-2012-0024 for the Shipyard Sediment Site. March 14, 2012.

Water Board, 2012b. *Technical Report for Cleanup and Abatement Order No. R9-2012-0024 for the Shipyard Sediment Site*. March 14, 2012.

Water Board, 2012c. *Final Environmental Impact Report*. March 14, 2012.