



APPENDIX B
QUALITY ASSURANCE PROJECT PLAN
SAN DIEGO SHIPYARD SEDIMENT SITE

Cleanup and Abatement Order No. R9-2012-0024

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LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|-------------------------|---|
| BMP | best management practice |
| CAO | Cleanup and Abatement Order |
| CDFG | California Department of Fish and Game |
| CHASP | Contractor's Health and Safety Plan |
| CQAPP | Contractor's Quality Assurance Project Plan |
| CQC | Construction Quality Control |
| CUT | Cleanup Action Team |
| DMP | Dredging Management Plan |
| EIR | Environmental Impact Report |
| EPP | Environmental Protection Plan |
| EPS | Electronic Positioning System |
| MMRP | Mitigation Monitoring and Reporting Program |
| NOAA | National Oceanic and Atmospheric Administration |
| OSHA | Occupational Safety and Health Administration |
| QA | quality assurance |
| QAPP | Quality Assurance Project Plan |
| QC | quality control |
| RAP | Remedial Action Plan |
| RMP | Remediation Monitoring Plan |
| Shipyards Sediment Site | San Diego Shipyards Sediment Site |
| USACE | U.S. Army Corps of Engineers |
| USEPA | U.S. Environmental Protection Agency |
| Water Board | San Diego Regional Water Quality Control Board |
| WQMP | Water Quality Monitoring Plan |

1 INTRODUCTION

This Quality Assurance Project Plan (QAPP) is one component of the Remedial Action Plan (RAP) for the Shipyard Sediment Site. This document describes quality assurance/quality control (QA/QC) protocols to be taken during construction to ensure that the cleanup meets design specifications, the objectives of the cleanup action, and the requirements set forth in regulatory permits, when received.

The purpose of this QAPP is to describe and explain project objectives, organization, and functional activities, including dredging oversight and environmental monitoring as well as the rationale used to develop those activities. This document also identifies the QA/QC protocols to be used in construction management, including monitoring actions, reporting mechanisms, and documentation formats. This QAPP describes how environmental monitoring will be performed and how modifications to construction procedures will be made, as necessary, in response to the results of environmental monitoring. In addition, this QAPP defines QA methods and protocols to ensure that project personnel have a complete understanding of monitoring, feedback, and adjustment mechanisms.

The cleanup contractor will use this QAPP, together with the Construction Plans and Technical Specifications, to develop a Cleanup Construction Schedule, Contractor's Health and Safety Plan (CHASP), Contractor's Quality Assurance Project Plan (CQAPP), Dredging and Disposal Work Plan, Borrow Source Characterization Report, Environmental Protection Plan (EPP), and Vessel Management Plan.

The remainder of the QAPP is organized as follows:

- **Section 2.** Project Roles and Responsibilities
- **Section 3.** Contractor/Subcontractor Qualifications
- **Section 4.** Documentation and Reporting
- **Section 5.** Cleanup Construction Elements
- **Section 6.** Summary of Inspection Activities and Construction Monitoring
- **Section 7.** Final Report
- **Section 8.** References

2 PROJECT ROLES AND RESPONSIBILITIES

The roles and responsibilities of the parties involved in the Shipyard Sediment Site cleanup are discussed below. The Project Team (as described in the RAP) will be responsible for design, permitting, contractor selection, shipyard coordination, budgets, and communication. It is anticipated that the construction work will extend over a number of seasons.

2.1 Regulatory Oversight

The Water Board is the lead agency for the cleanup process and will issue approvals of the various key steps, including the development of the RAP and supporting documents and documentation of final cleanup completion. Additional regulatory agencies, including the U.S. Army Corps of Engineers (USACE), National Oceanic and Atmospheric Administration (NOAA), and California Department of Fish and Game (CDFG), will review and comment on the implementation of the remedial action and may issue additional regulatory authorizations.

2.2 Construction Contractor

One or more construction contractors will be selected to perform construction activities, including dredging and disposal of sediments, placement of clean sand cover, and other required cleanup activities. The selected contractor will have demonstrable experience with dredging, sediment rehandling, and sediment disposal and placement. The contractor's activities will be performed in accordance with the Construction Plans and Technical Specifications, pursuant to the remedial action and associated permits. The Construction Plans and Technical Specifications will contain specific, detailed requirements for accomplishing the work and achieving suitable overall quality compliance for the construction project.

The contractor will be responsible for QC during all phases of construction and will designate one or more job site superintendents with the responsibility to observe that the work is conducted in accordance with the contract requirements. The Technical Specifications will require the contractor to develop a CQAPP and to fully implement this plan, with documentation, throughout performance of the work. Details on the documentation required are presented in Section 4.

2.3 Subcontractors

The contractor may employ subcontractors to perform selected phases of the work for which they have special expertise; for example, the contractor might employ the services of a firm specializing in bathymetric surveys to perform these surveys. Subcontractors are responsible to their prime contractor for the quality of their work, and for the health and safety of their project personnel in accordance with the contractor's submittals (as outlined in Section 4). The subcontractor's principals will designate a job site superintendent or foreman with the responsibility to observe that work is conducted in accordance with contract requirements.

2.4 Construction Monitoring Responsibilities

Monitoring activities will be the responsibility of the Project Team, who will be acting in coordination with Cleanup Action Team (CUT). Certain aspects of monitoring activities, however, may be performed by the contractor but overseen by the Project Team to ensure that the contractor's construction and monitoring work is completed as stipulated by project permits, approvals, and contract documents. For further information on the overall project organization and the various roles and responsibilities, refer to Section 3 of the RAP.

3 CONTRACTOR/SUBCONTRACTOR QUALIFICATIONS

The contractor involved with the project will be required to name one or more QC managers who must have documented qualifications and experience to perform independent checks on the contractor's operations that are necessary to determine compliance with the contract provisions. Additionally, any subcontractors used in the work must have demonstrated to the satisfaction of the Project Team that they are qualified and have satisfactorily performed the type of work for which they will be engaged. Responsibility for subcontractor performance rests with the prime contractor.

The contractor and all subcontractors will be required to have all health and safety training required by the state of California and will be required to follow applicable guidance from Occupational Safety and Health Administration (OSHA) and the U.S. Environmental Protection Agency (USEPA).

The contractor will keep (as part of their permanent organization) high caliber, knowledgeable, and experienced key personnel to perform their jobs. These individuals will have demonstrable experience in the type of work being contracted. All operators, surveyors, and other personnel performing key jobs must have demonstrated the ability and skills to satisfactorily perform these assignments.

4 DOCUMENTATION AND REPORTING

This section summarizes the various submittals required of the contractor prior to, during, and at the completion of the required construction work. This information will also be required in the Technical Specifications, establishing it as minimum requirements for executing the work.

4.1 Documentation and Submittals prior to Construction

4.1.1 *Dredging Management Plan*

Prior to beginning work on the project, the contractor will be required to submit a detailed Dredging Management Plan (DMP) for review by the Project Team, the Water Board, and other regulatory agencies as necessary. The DMP will outline the equipment, materials, methods, procedures, and personnel that will be employed in the work. The Dredging cannot proceed until approval of the work plan is received. Within the DMP, the Contractor will also be required to submit the following additional documents.

4.1.2 *Environmental Protection Plan*

For construction activities, the contractor will be required to submit an EPP to the Project Team for approval. No physical work is to be performed at the Shipyard Site until the EPP is reviewed and approved by the Project Team and the construction management team. The EPP will present methods and equipment that will be used by the contractor to prevent or minimize potential environmental impacts resulting from the contractor's operations. It will address monitoring and prevention of leakage and other loss of contaminants into the surrounding environment, response to spills, cleanup, and control of water quality during the work.

4.1.3 *Contractor's Quality Assurance Project Plan*

The CQAPP will present the system through which the contractor ensures that the requirements of the contract and permits are in compliance. The CQAPP will identify a Construction Quality Control (CQC) supervisor and other personnel involved with executing QC activities, as well as all procedures, methods, instructions, inspections, records, and forms to be used in the CQC system.

The CQAPP will include information regarding equipment specifications and techniques to be used for positioning control, bathymetric surveys, and tracking and documentation of ongoing dredging and material placement activities in “real time” as the construction proceeds.

4.1.4 Cleanup Construction Schedule

The contractor will be required to submit a Cleanup Construction Schedule identifying areas of activity of the contractor and subcontractors for the various items of work. The contractor shall maintain the schedule throughout the construction period, record changes in responsibilities, and distribute the revised schedule on a weekly basis. The weekly revised schedule shall provide a 3-week forecast of planned construction activity. The Project Team may require the contractor to modify its equipment, methods, or operations if construction progress falls behind schedule.

4.1.5 Wastes Generated Plan

The contractor will be required to submit a Wastes Generated Plan, which will describe the plans for management, treatment, testing, storage, and disposal of all wastes generated by the remedial action. Management and disposal of sediment will also be detailed in the Construction Plans and Technical Specifications.

4.1.6 Borrow Source Characterization

The contractor will submit a Borrow Source Characterization Report prior to any on-site placement of import materials. This characterization report will include identification of import material source(s), map(s) documenting the origin of the materials, site inspection documentation, and material sampling results for characterization (physical and chemical testing, as specified) to ensure that the import material will uniformly meet the specifications of its intended use. Additional verification of import material will be performed by the Project Team representatives after the material has been delivered to the site. The Project Team construction management representatives will verify that import material continues to meet the physical and chemical specifications specified in the Construction Plans and Technical Specifications. These verifications will occur at on a periodic basis throughout the remedial action.

4.1.7 Vessel Management Plan

The contractor will be required to prepare a Vessel Management Plan prior to initiation of site activity. The Vessel Management Plan will document the means by which the contractor will coordinate its activities with other vessels and marine activities in the shipyard areas and adjoining locations in San Diego Bay. Commercial activities taking place at the shipyard areas will have precedence over the contractor's activities.

4.1.8 Health and Safety Plan

The contractor will submit a CHASP that presents the minimum health and safety requirements for job site activities and the measures and procedures to be employed for protection of on-site personnel and area residents from physical, chemical, and all other hazards posed by the cleanup construction. The CHASP will cover the controls, work practices, and other health and safety requirements that will be implemented by the contractor in connection with the cleanup construction. The CHASP will describe the training required by all applicable state and federal regulations and will be developed in accordance with OSHA requirements.

The Project Team's Health and Safety Plan is included as Appendix F, as required by Subsection B.1.c of the CAO.

4.2 Documentation and Submittals during Construction

During construction activities, the contractor will be required to participate in weekly construction meetings throughout the project duration and to submit daily and monthly reports to the Project Team. The Project Team and their construction management team, in turn, will submit regular reports to the Water Board. A brief description of key documentation to be prepared and submitted during the construction process is provided in Sections 4.2.1 and 4.2.2. The Technical Specifications will provide to the contractor all requirements for this documentation.

4.2.1 Daily Quality Control Report

The contractor will prepare a Daily QC Report for each day of active construction work at the Shipyard Sediment Site and will be required to submit it to the Project Team on the next

business day. The report will summarize the work performed by the contractor, the equipment used, and the QC inspection results, including water quality monitoring results.

When dredging activities are in progress, the Daily QC Reports will detail dredging and disposal operations for that day and will include the following, at a minimum:

- Daily and cumulative volume estimates of dredged material removed from each dredge area
- Depiction of areas in which dredging was accomplished that day and cumulatively for the project through that date
- Daily and cumulative estimates of dredged material moved to the off-site sediment offloading and stockpiling area
- Daily and cumulative estimates of dredged material hauled from the site for disposal, including truck tickets and disposal documentation from landfill(s)

When sand or rock placement activities are in progress, the Daily QC Reports will include the following, at a minimum:

- Shipping receipts and material volumes for all shipments of import fill materials used
- Daily and cumulative volume estimates of material placed
- Depiction of areas in which material placement was accomplished that day and cumulatively for the project through that date

4.2.2 Bathymetric Progress Surveys

The contractor will be required to conduct a daily bathymetric progress survey that covers, at a minimum, the area(s) in which dredging or material placement work occurred that day. Daily progress surveys will be required to be submitted to the Project Team within the ensuing calendar day with the Daily QC Report and will include a plot of the survey results, which will be contoured or color coded to facilitate interpretation, one or more cross-sectional presentations through the area surveyed, “isopach” plots comparing that day’s survey to the pre-construction conditions (depicting the total thickness of dredging and/or material placement to that date), and the electronic data file of the survey results for the use of the Project Team and their construction management team.

4.3 Post-Construction Documentation

The following submittals will be prepared following the completion of cleanup construction activities at the Shipyard Site.

4.3.1 Pre-Final Punch List

The pre-final “punch list” will be used by the Project Team as the basis for a final inspection, after the contractor has completed the required remedial construction work. Following a pre-final inspection of the completed work with the Project Team, the construction management team, the appropriate agencies, the contractor, and the Project Team will prepare this consolidated list of items that are required to be completed or corrected after inspection.

4.3.2 As-Built Drawings and Post-Remediation Bathymetric Survey

The contractor will be required to submit as-built drawings and a post-remediation bathymetric survey following completion of the cleanup work. These as-built drawings will include all areas that were dredged and where rock and clean sand materials were placed, including previously dredged areas, underpier areas, areas adjacent to marine structures, and slopes. As-built drawings will also be required for any areas on land or any overwater structures where the contractor made changes to pre-existing conditions, including the off-site offloading area(s).

4.4 Document Storage

All documents submitted to or by the Project Team relating to the project, including pre-construction submittals and daily construction reports, will be stored by the Project Team at their selected office(s). The Project Team will retain these documents as specified in the CAO. The contractor will maintain its own set of records.

5 CLEANUP CONSTRUCTION ELEMENTS

The work described herein includes dredging and disposal of contaminated sediments, protection of marine structures and slopes during dredging work, and localized placement of clean cover material in underpier areas and other areas as may be determined necessary during the work. The contractor shall meet performance standards associated with dredging, transport, and disposal of dredged material as well as with placement of clean cover materials, per the project's Construction Plans and Technical Specifications, 401 Water Quality Certification, and other permits for this work (all of which are currently pending).

The contractor will be required to perform the following activities (see Sections 5.1 through 5.4 for further detail):

- Dredging
- Management and disposal of sediments
- Protection of marine structures and slopes
- Placement of clean sand cover (including underpier areas)

All related work will be conducted in strict accordance with the Construction Plans and Technical Specifications. These documents contain specific, detailed requirements to achieve the overall quality of the construction product.

In this section, the following issues are discussed for each work activity:

- **Description.** A description of the tasks required for accomplishing the construction activity and the overall goal of the activity.
- **Potential Problems, Concerns, and Remedies.** A description and evaluation of potential construction concerns, sources of information regarding potential problems, and common or anticipated remedies.
- **Monitoring, Contingency Plans, and Corrective Actions.** A plan for monitoring to be performed during remediation, required laboratory tests and their interpretation, a description of applicable criteria, and common or anticipated remedies.
- **Description of Equipment, Monitoring, and Maintenance.** A description of the equipment likely to be used by the contractor to complete the work and monitor construction activities. This discussion will also include monitoring and maintenance of the construction equipment.

- **Documentation.** A description of the documentation that will be required for each activity (in addition to that described in Section 4).

5.1 Dredging

5.1.1 Description

Dredging includes the removal of sediments from specific areas of the Shipyard Site to prescribed depths, as depicted in the design details and performance standards of the Construction Plans, which represent the Project Team's estimate of the dredging depths necessary to achieve the remedial goals. The contractor may be required to perform additional dredging based on the results of post-dredge confirmational sampling, as necessary to achieve the required post-remedial concentrations. All sediment to be removed is designated for disposal at one or more permitted and approved off-site locations.

The primary factors governing the selection of dredging techniques and equipment are the physical characteristics of sediment, such as its density and grain size gradation; the depth, condition, and slope of the mudline; the required depth and extent of dredging; the sediment's disposal location; accessibility to dredge areas as dictated by confinements and obstructions; equipment availability; timing and construction duration; and environmental factors, such as the minimization of contamination to the water column.

Based on these factors, sediments will most likely be removed by mechanical dredging equipment, with either a clamshell or cable-arm bucket and placed into a scow or barge for transportation to sediment offloading and dewatering area (discussed in Section 5.2).

5.1.2 Potential Problems, Concerns, and Remedies

The main concerns in the dredging process include the following:

- **Achieving Specified Dredging Depths and Extents.** The Construction Plans will identify the extents and estimated depths of contaminated sediments designated for removal. These sediments must be satisfactorily removed to the depths and lateral extents required.
- **Achieving Post-Remedial Concentrations in Dredge Areas.** Following dredging activities, the post-dredge surface will be evaluated by the Project Team for

conformance with CAO requirements. If post-remedial dredge area concentrations are not met, the contractor will be required to undertake additional actions, including further dredging or placement of clean cover material over the surface.

- **Maintaining Water Quality Requirements during Dredging.** The Project Team and Contractor will be responsible for carrying out a water quality monitoring program during the work. The elements of this program, which are also applicable to the contractor's activities involving placement of clean materials (sand cover), are summarized in this section and described in detail in the Remediation Monitoring Plan (RMP; Appendix C).

The following subsections provide further detail on the dredging concerns described herein.

5.1.2.1 Achieving Specified Dredging Depths and Extents

To ensure that the actual dredging depths are accurately determined, the contractor will be required to employ a sonar sounding device on the dredging equipment. An automatic electronic tide recording system is also required for all dredging and surveying operations. Tide boards or gages will be installed at the site.

The contractor must ensure that contaminated sediments will be removed to the full lateral extent as depicted on the Construction Plans. In this regard, the contractor will be required to employ an Electronic Positioning System (EPS) for accurately locating and tracking the movement of its dredging equipment. The control for this system must meet Third Order, Class I accuracy standards (plus or minus 1 meter) as defined in standard bathymetric survey manuals; however, it is anticipated that better accuracy will be obtained due to the close proximity of the survey control.

To verify that the specified dredging depths and extents have been met, the contractor will perform pre- and post-dredge QC bathymetric surveys, as will be described in the Technical Specifications. To establish actual excavated depths and extent of dredging, these surveys will be performed for each dredging area following completion of dredging in that area. The contractor will also be required to perform and submit daily progress surveys, such that the Project Team can continuously monitor dredging progress and adequacy.

Additionally, the Project Team and its construction management team will work closely with the contractor's QC manager and bathymetric survey crew to independently verify the dredge's horizontal position and dredging depth. This verification may be completed either by evaluating the contractor's daily QC surveys or positioning data or by conducting independent surveys, or through a combination of both methods. If the Project Team determines that the contractor is not dredging at the proper depth or in the correct location, they will immediately contact the contractor's superintendent to correct the situation. Any such direction and corrective action will be documented on that day's Daily QC Report.

5.1.2.2 Achieving Post-Remedial Concentrations in Dredge Areas

The contractor will be required to remove sediments to depths and extents shown on the Construction Plans, which will be verified through bathymetric surveys. Once it has been adequately demonstrated that the required dredging depths have been achieved, the adequacy of sediment removal will be determined by evaluating chemical concentrations in the post-dredge subsurface sediments. The Project Team will collect post-dredge confirmation samples to determine if the cleanup levels are achieved or if further cleanup activities are required (as detailed in the RMP [Appendix C]). The RMP provides further information on using post-dredge sediment cores to verify that sediment quality objectives have been achieved in dredging areas.

In some instances, it may be appropriate to supplement dredged areas with placement of a clean cover layer over the dredged surface. Import materials used as clean cover must meet chemical and physical requirements that will be presented in the Technical Specifications. Physical requirements will ensure that the imported materials qualify as an appropriate sand product (consistent with engineering design requirements for the intended use) as well as containing sufficiently low concentrations of key chemicals for use in the remedial action. Refer to Section 5.4 for further discussion of the use of clean sand cover.

5.1.2.3 Maintaining Water Quality Requirements during Dredging

The contractor will be required to maintain water quality at the Shipyard Site during dredging, in accordance with regulatory and Water Board requirements. A water quality monitoring program (described in the RMP [Appendix C]) will be carried out by the Project Team to oversee the contractor's activities and to measure water quality at the Shipyard Site.

The contractor will be required to employ several best management practices (BMPs) during dredging to avoid and minimize impacts to water quality as a result of project activities.

These BMPs include:

1. Using a floating boom around the point of dredging.
2. Controlling dredge cycle time. Longer cycle time reduces the velocity of the ascending loaded bucket through the water column, which reduces the potential for sediment to be washed from the bucket. Limiting the velocity of the descending bucket reduces the volume of sediment that is picked up and requires more total bites to remove the project material. The majority of the sediment resuspension for a clamshell dredge occurs when the bucket hits the bottom.
3. Avoiding multiple dredge bites. When the clamshell bucket hits the bottom, an impact wave of suspended sediment travels along the bottom away from the dredge bucket. When the clamshell bucket takes multiple bites, the bucket loses sediment as it is reopened for subsequent bites. Sediment is also released higher in the water column as the bucket is raised, opened, and lowered.
4. Ensuring that the clamshell bucket is entirely closed when withdrawn from the water and moved to the barge. This action requires extra attention when debris is present to make sure that debris does not prevent the bucket from completely closing.
5. Installing two closure switches on each side of the bucket near the top and bottom to provide an electrical signal to the operator that the bucket is closed. Use of the switches shall minimize the potential for sediment to leak from the bucket into the water column during travel to the surface.
6. Prohibiting bottom stockpiling. Bottom stockpiling of the dredged sediment in silty sediment has an effect similar to that of multiple bite dredging—an increased volume of sediment is released into the water column from the operation.
7. Prohibiting sweeping or leveling the bottom surface with their dredge bucket.
8. Not overfilling the digging bucket because overfill results in material overflowing back into the water. Use of instrumentation such as Clam Vision® shall allow the operator to visualize in real time the depth of cut that shall be designed to prevent overfilling.
9. Using barges that have watertight containment to prevent return water from re-entering San Diego Bay.
10. Ensuring that sediment haul barges do not overflow. Because haul barges will necessarily be positioned outside of the silt curtain enclosure to allow timely traffic to

and from the sediment offloading and disposal site, the contractor will be required to ensure that the barge does not overflow during loading of sediment into the barge, transportation of dredged material to the offloading location, and sediment offloading. Each material barge shall be marked in a way that allows the operator to visually identify the maximum load point. The marking should allow sufficient interior freeboard to prevent spillage in rough water, such as that resulting from ship wakes during transit. Initiating the material barge marking shall minimize impact of load spillage during transit to the unloading area.

11. Placing material in the material barge such that splashing or sloshing does not occur, which could send sediment back into the water. Splashing can be controlled by restricting the drop height from the bucket.
12. Avoiding overdredging, both vertically and laterally, to the maximum extent possible, minimizes the amount of sediment being dredged and, therefore, available to be resuspended into the water column.
13. Using silt curtains. The contractor will be required to install a double set of silt curtains around the dredging area to further ensure against turbidity and water quality monitoring exceedances. These silt curtains should extend only a partial distance below the water surface (i.e., 5 to 10 feet). Extending silt curtains well below the surface has been shown to be an ineffective means of controlling turbidity at depth, and can have the deleterious effect of trapping fish in the enclosure. The other BMPs listed above will be significantly more effective than deploying a full-length silt curtain.
14. Implementing automatic monitoring of dredge operations. Automatic systems will be used to monitor turbidity and other water quality conditions in the vicinity of the dredging operations in accordance with Mitigation Measure 4.2.1 of the Mitigation Monitoring and Reporting Program (MMRP; Water Board 2012b).

5.1.3 Monitoring, Contingency Plans, and Corrective Actions

The key type of environmental monitoring that will be performed during dredging is water quality monitoring. Water quality in the area surrounding the dredging activity will be monitored in accordance with the 401 Water Quality Certification to be issued by the Water Board for this project.

The contractor will be required to implement automatic monitoring of dredge operations. Automatic systems will be used to monitor turbidity and other water quality conditions in the vicinity of the dredging operations in accordance with Mitigation Measure 4.2.1 of the MMRP (Water Board 2012b). In addition, a periodic water quality monitoring program (WQMP) will be implemented by the Project Team to confirm that requirements of the Section 401 Water Quality Certification are being met and to inform interpretation of the automatic monitoring performed by the contractor.

5.1.4 Description of Equipment, Monitoring, and Maintenance

Equipment for the dredging operations will likely be barge-mounted, mechanical dredging equipment, with either a clamshell bucket or cable-arm bucket suspended from a crane. Scow or barges will be used for sediment collection and tugboats and work skiffs will also likely be used to assist with maneuvering of the various dredging equipment. Dredging equipment will be equipped with automatic monitoring equipment, and water quality monitoring will be performed to confirm there are no violations of water quality standards outside the construction area.

In accordance with the technical specifications, the equipment will be maintained in good working order and in safe working condition at all times. Survey equipment will be maintained and calibrated for the life of the contract. Calibration techniques are prescribed to ensure that the equipment performs to the accuracy required.

5.1.5 Documentation

As described in Section 4, the contractor will be required to keep daily records of the dredging operations as part of his daily report. These daily reports will be required to be included as part of the Daily QC Report and will document daily and cumulative volume estimates of dredged material removed from each dredge area and will provide a depiction of areas in which dredging was accomplished that day and cumulatively for the project through that date. Additionally, the contractor will be required to perform daily progress surveys that cover the previous days dredging areas and submit them to the construction management team for review.

After dredging operations are complete, a post-dredge bathymetric survey will be performed to ensure that the required dredging depths and extents have been achieved. Post-dredge confirmation sampling will also be conducted to ensure the post-dredge surface is in compliance with the project objectives.

5.2 Management and Disposal of Sediments

5.2.1 Description

Dredged sediments will be transported to an off-site nearshore offloading facility by scow or barge where the sediments will be stockpiled and dewatered, in preparation for off-site disposal at one or more permitted and approved locations (i.e., solid waste landfills). Once sufficiently dewatered, the dredged material will be transferred to land-based vehicles (trucks or railcars) and hauled by road or rail to the permitted landfill facility. Specific design criteria and performance standards will be specified in the Construction Plans.

At the conclusion of dredging and marine construction, the contractor will be required to remove all equipment and materials from the offloading area and will be required to return the area to its pre-construction conditions, including any cleanup or improvements that are necessary.

5.2.2 Potential Problems, Concerns, and Remedies

The main concerns during the offloading, dewatering, and transporting of the dredged sediments to the offloading facility include the following:

- **Releases of Dredged Sediments.** To prevent contaminated sediments from re-entering the San Diego Bay or surrounding waters, the contractor will be required to avoid leakage or release of dredged sediments into the bay during transport and offloading activities.
- **Contamination of the Sediment Offloading Area.** To ensure that the sediment offloading area remains clean and free of contaminants, the contractor will be required to maintain the offloading area and ensure all dredged sediments are properly disposed of in the appropriate manner.
- **Overflow of Water into the San Diego Bay.** To ensure that waters surrounding the offloading area are not contaminated by sediment, the contractor will be required to

contain all free water and prevent it from flowing into the bay. The effluent water will be contained, sampled, and tested to identify appropriate disposal options which could include the shipyard site stormwater system, the City of San Diego's water treatment system, or an offsite disposal facility.

- **Suitability of Sediments for Hauling and Disposal.** For proper transport of sediments off site, "free liquids" must be removed from the sediments. Prior to sediments leaving the offloading site, the contractor will be required to demonstrate all sediments have passed "paint-filter" testing criteria.
- **Appropriate Transport of Sediments.** To ensure that sediments are not lost or otherwise improperly disposed of, all trucks or railcars will be required to follow all applicable federal and state guidelines set for the hauling of dredged sediments.

The following subsections provide further detail on the dredging concerns described herein.

5.2.2.1 Releases of Dredged Sediments

The contractor will be required to prevent any releases of dredged sediment into San Diego Bay during transport of the material from the dredging area to the offloading facility or during offloading activities.

Scows or haul barges that transport dredged sediment to the offloading facility for disposal must be sealed to prevent leakage during transport and be equipped with electronic monitoring equipment. Any barges or scows that do not seal properly will be removed from operation until satisfactory repairs are made. Overtopping of the scows or barges will not be allowed, so as to prevent sediments or water from flowing over the scow or barge during transport and reentering the San Diego Bay or surrounding waters.

The contractor will be required to install a spill prevention apron to prevent material spillage during the transfer of the dredged material from the scow or barge to the offloading facility. No transfer will be allowed to begin until the apron is approved by the construction management team and in place. Any spillage on the apron will be required to be removed as soon as practicable and disposed of properly. Any spillage outside of the enclosed offloading or into the bay will be required to be promptly cleaned up, possibly including dredging of sediment that has spilled offshore.

The contractor will be required to control its handling and offloading of dredged sediment so that it is placed on land only within the offloading facility, and that no sediment is placed outside of the facility limits.

5.2.2.2 *Contamination of the Sediment Offloading Area*

To prevent contaminated sediments or effluent water from contaminating the areas used for sediment offloading and stockpiling, the contractor will be required to fully contain the dredged material and prevent the uncontrolled runoff of dewatered or dredged material. Depending on the characteristics of the offloading facility that is used, this containment could be accomplished using impermeable liners, concrete barricades, a drainage sump, or other methods.

Upon completion of the dredging, the contractor will be required to remove all vestiges of dredged sediments and other contaminants from any and all areas used for sediment storage, stockpiling, offloading, or dewatering, and will be required to clean up the offloading area to the pre-project condition

5.2.2.3 *Overflow of Water into San Diego Bay*

To ensure that waters surrounding the offloading area are not impacted by effluent from the storage and rehandling area, the contractor will be required to contain all free water and off-flow that drains out of the sediment while stockpiled on land. The contractor will be required to collect all water in a temporary containment facility or tank(s), test it, and treat it as necessary to meet water quality criteria prior to it being discharged through one of the following disposal options:

- Shipyard site stormwater system
- City of San Diego's sanitary sewer system
- Off-site disposal facility

5.2.2.4 *Suitability of Sediments for Hauling and Disposal*

For proper transport of sediments off site, free liquids must be removed from the sediments. Prior to sediments leaving the offloading site, the contractor will be required to demonstrate all sediments have passed the paint filter test to ensure that sediments have been sufficiently

dewatered and do not contain free liquids. At the contractor's discretion, and as approved by the construction management team, an additive may be mixed in with the sediment to bind available water and decrease the dewatering time. The contractor may be required to perform additional analytical testing of disposal sediment to meet landfill acceptance criteria.

5.2.2.5 *Appropriate Transport of Sediments*

Truck traffic will be required to comply with all relevant provisions of the Environmental Impact Report (EIR) and MMRP (Water Board 2012b). All trucks or railcars will be required to follow all applicable federal and state guidelines set for the hauling of dredged sediments. Project Team representatives will also make regular checks to ensure that materials are transported to and disposed at the appropriate locations and facilities.

5.2.3 *Monitoring, Contingency Plans, and Corrective Actions*

During transport of materials to the offloading facility, the contractor will be required to monitor the surrounding waters for noticeable signs of turbidity that may indicate overtopping or leakage is occurring. If turbidity is noticed, the construction management team will be required to be notified to assess the situation. If a leak in the scow or barge is determined, the contractor will be required to remove equipment from the Shipyard Site until appropriate repairs have been made. In the event that sediment is lost during transport, the contractor will be required to cleanup and recover, to the extent feasible, whatever contaminated material was lost.

The contractor's procedures for offloading sediments from barges into the offloading facility will be continuously observed to ensure appropriate methods are used. If offloading activities are determined unacceptable by the construction management team, or if there is evidence of loss of sediment or turbid water into the bay at the offloading point, the contractor will be instructed to immediately modify its equipment, facility, or methods of transfer.

The contractor will be required to monitor water quality for any signs of spillage or leakage during all transport and offloading activities. The Project Team will also observe these activities as possible. The contractor will be required to test any outflow water from stockpiled sediment prior to it entering the City of San Diego's sanitary sewer system.

Monitoring Parameters and Performance Criteria. Water quality protection provisions will be documented in the Technical Specifications and will be designed to ensure compliance with the Clean Water Act and with the Section 401 Water Quality Certification that will be issued by the Water Board.

Operational Modifications if Out of Compliance. If sediment transport, offloading, or disposal is found to result in impacts to water quality or are out of compliance with the Section 401 Water Quality Certification issued by the Water Board for this project, the contractor will immediately take the actions described herein.

5.2.4 Description of Equipment, Monitoring, and Maintenance

Equipment used for this phase of work will consist of scows or barges for the transport of dredged sediments to the offloading facility. At the offloading facility, it is anticipated that a variety of equipment will be used, as selected by the contractor. Equipment could include crane-mounted clamshell buckets or other earth-moving equipment to unload sediment from the scow or barge and transfer it into trucks or railcars. Upon transfer of the dredged material into the offloading facility, the contractor will use earth-moving equipment to distribute the dredged material evenly within an area to promote dewatering and drying and to prevent excessive mounding of the material in the offloading area.

It is anticipated that the containment area at the offloading facility will be enclosed by a suitable barrier (i.e., Jersey Barrier, "Ecology" blocks, or similar method) that is lined along its interior with an impermeable liner of polypropylene or similar material. Sand, asphalt, hoses, wastewater handling facilities, and dewatering equipment are also anticipated to be used at the site. The height and weight of the stockpiles will not exceed restrictions applicable to the offloading site.

The contractor's containment enclosure will be required to have protective fencing, signs, placards, or reflective barriers placed around it that are highly visible at night in order to avoid inadvertent or purposeful entry by the public.

In accordance with the contract terms, all equipment will be maintained in good working order and in safe working condition at all times.

5.2.5 Documentation

As described in Section 4, the contractor will be required to keep daily records of operations during the transport, offloading, and disposal phases of work on the daily report. These daily reports will be required to be included as part of the Daily QC Report and will document the daily number of barge loads transported to the offloading facility, daily volume estimates of sediment transported and offloaded in the offloading facility, daily weight certificates of material removed from the offloading site, and tonnage weight certificates of disposal records at the landfill.

5.3 Protection of Marine Structures and Slopes

5.3.1 Description

Dredging near marine and shoreline structures and side slopes has the potential for creating an unstable condition due to removal of passive earth pressures or the possible undermining of the features. It is, therefore, necessary to take precautionary measures to retain the stability of the structures and slopes when dredging in the near vicinity. Such contingency measures in the design details and performance standards of the Construction Plans will include specifying offsets from the structures to prevent damage from impacts of construction equipment and the installation of a protective rock buttress or backfill along the side slopes and wharf faces to protect against unstable conditions.

The protective rock buttresses and backfills are anticipated to consist of quarry rock obtained from a local supplier, transported by truck to the project site, and rehandled onto a barge where it will be placed into the water. It is also possible that the rock material will be brought to the site via barge (for example, if it originates on Catalina Island).

Two dormant timber structures within Thiessen polygon SW28 are planned for demolition as part of this remedial effort because implementing the protection measures prescribed for other structures would be cost-prohibitive for these structures. Demolishing these timber structures will allow the sediment underlying these piers to be remediated by dredging.

5.3.2 **Potential Problems, Concerns, and Remedies**

The primary concerns during the protection of marine structures and slopes are as follows:

- **Appropriate Offset of Dredging Work from Structures and Slopes.** To prevent damage to existing structures and shoreline features during dredging, the contractor will be required to maintain a prescribed (nominal 4-foot) offset from overwater structures. This offset will be monitored in the field and will also be verified by daily surveys provided by the contractor. In the event that any damage occurs to any structure by the contractor's negligence, the contractor will be required to immediately repair the structure.
- **Correct Placement of Protective Rock Material.** Once dredging has been completed alongside a portion of an overwater structure or the shoreline, the contractor will be required to place a layer or buttress of protective rock back over the area for protection against future unstable conditions. This action is intended to correct for the lessening of passive earth pressures in front of existing structures as a result of dredging.
- **Timing of Placement of Protective Rock Material.** The contractor will be required to place protective rock material within a prescribed timeframe deemed appropriate by the construction management team in order to minimize the amount of time during which the structure or slope remains exposed with lessened stability.

The contractor will be required to establish and maintain control for placement of the protective rock buttress to ensure rock is placed in the prescribed locations and to the extents and thicknesses indicted in the contract documents. The contractor will also be required to place rock in a manner that avoids significant displacement or damage to underlying materials or in a manner that could cause breaking of stones.

To minimize the amount of time an existing structure is exposed to unstable or undermining conditions, the contractor will be required to place the protective rock in an area within a predetermined amount of time following the completion of dredging in that area. If the contractor is not placing the protective rock within the allocated time after dredging, the Project Team will require the contractor to modify its equipment, methods, or operations.

5.3.3 Monitoring, Contingency Plans, and Corrective Actions

The contractor will be required to perform daily progress surveys of areas where rock material was placed, so that the total thickness and extent of rock placed can be verified on a daily basis. The contractor will also be required to report, on a daily basis, the quantity (in tons) of rock material placed during that day, the area over which rock was placed (verified by vessel positioning system), and the cumulative tonnage of rock placed on the project to that date. These quantities will be monitored by the Project Team and the construction management team such that the adequacy of the work can be continuously evaluated. The Project Team may supplement these monitoring techniques by using divers to directly observe the placed rock material and to ensure that rock is being placed where it is intended, that required thicknesses are being achieved, and that coverage of the area is consistent and complete. Additionally, the construction management team will field-monitor the contractor to ensure all rock is being placed in the required time after dredging has occurred.

5.3.4 Description of Equipment, Monitoring, and Maintenance

Equipment for placement of rock material will likely consist of a floating dredge with clamshell bucket or reticulated long-reach excavator arm. Additional equipment may include a conveyor, hopper, and tremie or hydraulic system from a haul barge.

In accordance with the Technical Specifications, the equipment will be maintained in good working order and in safe working condition at all times. Survey equipment will be maintained and calibrated for the life of the contract. Calibration techniques are prescribed to ensure that the equipment performs to the accuracy required.

5.3.5 Documentation

The contractor will be required to keep daily records of operations during rock placement in Daily QC Reports. These reports will document daily estimates of tonnage of rock placed and areas of rock placed by stationing and offset. Additionally, the contractor will be required to perform daily surveys during the rock placement and submit them to the construction management team for review.

After protective rock placement is complete, a post-rock placement survey will be performed to ensure that the areas indicated on the Construction Plans are covered appropriately. A

dive team may also be employed to visually inspect the coverage areas and confirm that the work has been satisfactorily performed.

5.4 Placement of Clean Sand Cover (Including Underpier Areas)

5.4.1 Description

The design details and performance standards of the Construction Plans will include placement of a layer of clean sand in prescribed areas where dredging is not feasible. Specifically, clean sand cover will be placed in these two areas:

- Areas within the required remedial footprint that are beneath piers and other overwater structures, which will receive a layer of clean sand cover material placed over the pre-existing grade
- Dredged areas that have been subjected to confirmatory sampling, as described in the RMP (Appendix C)

Clean sand materials will be obtained from an off-site source approved by the Project Team and subject to physical and chemical testing requirements prior to use.

5.4.2 Potential Problems, Concerns, and Remedies

The main concerns in the process of placing clean sand cover include the following:

- **Verification of Import Material Quality.** The chemical and physical characteristics of the clean sand cover material must be verified as appropriate for its intended use, as specified in the contract documents.
- **Achieving Specified Placement Thickness and Extent of Clean Sand Cover.** Clean sand cover material must be satisfactorily placed over the required areas and to the required thicknesses depicted on the Construction Plans.

The following subsections provide further detail on the dredging concerns described herein.

5.4.2.1 Verification of Import Material Quality

Import material used for clean sand cover or for underpier remediation must meet chemical and physical requirements that will be presented in the Technical Specifications. Physical requirements will ensure that the imported materials qualify as an appropriate sand and/or

gravel product (consistent with engineering design requirements for the intended use) as well as containing sufficiently low concentrations of key chemicals for use in the remedial action.

Prior to the use of an imported material, the contractor must submit a Borrow Source Characterization Report for the material (as described in Section 4), verifying its specified physical properties, chemical properties, and gradation, as described below and further described in the Technical Specifications. A minimum of three representative samples should be analyzed to ensure that key chemical constituents are well below the cleanup levels listed in the CAO.

Individual delivery loads will be visually inspected by the Project Team representatives to ensure that objectionable content, unsuitable coatings, or unsuitable materials (i.e., debris, organics, etc.) are not present and that the load complies with the general physical requirements of the Technical Specifications. If necessary, the Project Team representative may obtain representative samples for physical testing to confirm compliance with the gradation. The Project Team representative inspector will have the right to refuse any loads, in which case the contractor shall return the load and obtain an acceptable load in its place, at no additional cost to the Project Team.

5.4.2.2 Achieving Specified Thickness and Extent of Clean Sand Cover

The effectiveness of clean sand cover placed over dredged areas will be determined by ensuring that the thickness of the cover and its horizontal extents are consistent with cleanup requirements and Construction Plans and Technical Specifications. To ensure that proper coverage and thickness of clean sand cover is achieved, the contractor will be required to perform daily progress surveys of areas where clean sand material was placed to allow daily verification of thickness and extent of sand cover. The contractor will also be required to provide daily reports of the extent and quantity (in tons) of sand placed in underpier areas on that day and the cumulative tonnage of sand placed on the project to that date. The extent of cover placement will be monitored and mapped using real-time GPS locating and positioning equipment. The Project Team may supplement these monitoring techniques by using divers to directly observe the placed sand material and to ensure accurate horizontal extent and depth of cover. Divers could observe areas to determine if

sand coverage is consistent and if the required amount of sand cover has been achieved, using probes or push cores to directly observe sand cover thickness at selected, representative locations.

Because it is likely that progress surveys will be difficult to conduct in underpier areas, evaluation of clean sand cover in these locations will be based a comparison of the quantity of sand placed to the overall area covered; the overall tonnage per square foot of area should be consistent with the target sand layer thickness.

The Project Team may also use divers to survey underpier areas where clean sand cover was placed as described in Section 5.4.3. If at any time it is determined that the contractor is not placing clean sand cover materials in the correct location or to the prescribed thickness, the contractor will be immediately required to correct the situation. Any such direction and corrective action will be documented on the Daily QC Report for that day's activities.

5.4.3 Monitoring, Contingency Plans, and Corrective Actions

The contractor will be required to perform daily progress surveys of areas where clean sand material was placed, such that the total thickness and extent of sand can be verified on a daily basis. The contractor will also be required to report, on a daily basis, the quantity (in tons) of sand placed during that day, the area over which sand was placed (verified by its vessel positioning system), and the cumulative tonnage of sand placed on the project to that date. The overall tonnage per square foot of area should be consistent with the target sand layer thickness. These quantities will be monitored by the Project Team and the construction management team for adequacy of the work can be continuously evaluated.

The Project Team may elect to supplement these monitoring techniques by using divers to ensure accurate horizontal extent and depth of cover. Divers would survey areas to determine if sand coverage is consistent and without voids, which will be accomplished using probes and/or push cores to directly observe sand cover thickness at selected, representative points, to determine if required thicknesses were achieved. Push cores may also be used to determine material thickness. Additionally, the construction management team will field-monitor the contractor to ensure that all sand is being placed in the required timeframe after dredging has occurred.

5.4.4 Description of Equipment, Monitoring, and Maintenance

Cover placement equipment will likely consist of a floating dredge with clamshell bucket or long-reach excavator arm. Additional equipment may include a conveyor, hopper, and tremie or hydraulic system from a haul barge. In accordance with the Technical Specifications, the equipment will be maintained in good working order and in safe working condition at all times. Survey equipment will be maintained and calibrated for the life of the contract. Calibration techniques are prescribed to ensure that the equipment performs to the accuracy required.

Equipment used for this phase of work will likely consist of flat deck barges or scows for the transport of clean sand materials to the Shipyard Site. The barges or scows will likely be unloaded using clamshell buckets or other typical earth-moving equipment and placed directly through the water column onto the targeted subgrade area or loaded into conveyor systems or tremie tubes for delivery to the mudline.

In accordance with the contract terms, the equipment will be maintained in good working order and in safe working condition at all times. Survey and settlement monitoring equipment will be maintained and calibrated for the life of the contract. Calibration techniques will be prescribed to ensure that the equipment performs to the accuracy required.

5.4.5 Documentation

The contractor will be required to keep daily records of operations during sand cover placement on its Daily QC Report. These reports will document daily estimates of tonnage of sand placed and areas of sand placed by stationing and offset. Additionally, the contractor will be required to perform daily surveys during clean sand placement and submit to the construction management team for review.

After clean sand cover placement is complete, a post-placement survey will be performed to ensure that the areas indicated on the Construction Plans are covered appropriately. A dive team may also be employed to visually inspect the coverage areas and confirm the work has been satisfactorily performed.

6 SUMMARY OF INSPECTION ACTIVITIES AND CONSTRUCTION MONITORING

The Project Team will arrange for or conduct sufficient inspections, independent checks of surveying, independent sampling and testing, and monitoring activities to ensure compliance with the terms of the contract. The required inspections, surveying, and material sampling and testing activities as well as the frequency for each of the remedial activities are described below. The results of these inspections, surveys, sampling, and testing activities will be documented as specified in Section 4. The contractor will be required to provide corrective measures for out-of-compliance work identified during inspection by the Project Team.

The inspection activities include the following items to be accomplished by the Project Team and its construction management team:

- Verify that the contractor performs checks on the location (stationing, offset, and elevation) of each dredging and clean cover placement activity within the remedial area. At a minimum, the bathymetric surveys performed by the contractor before and after remedial activities will be verified. The Project Team will accomplish additional inspections through independent means or verification of the contractor's CQC checks. These checks are critical to ensure that contaminated sediments are removed and clean cover materials are placed to the limits and depths specified.
- Verify compliance with the sediment quality cleanup objectives through the collection and laboratory analysis of confirmatory sediment samples.
- Verify conformance of field data collected by the contractor with the water quality monitoring procedures and compliance with the Section 401 Water Quality Certification for this project during in-water remedial activities at the Shipyard Sediment Site.
- Verify sand cover thickness and surface quality through review of contractor surveys (supplemented by diver observations and probing).
- Perform QC checks on the stockpiling, transportation, and eventual disposal of sediments.
- Provide verification that imported sand cover materials comply with contract requirements for quality, durability, gradation, and chemical quality prior to delivery to the job site. The contractor shall provide test results to the Project Team prior to delivery of materials to the job site. The Project Team will provide the Water Board with copies of these import material test reports, as necessary, for review.

- Perform a pre-final inspection following completion of discrete construction elements. Final inspections will then be conducted after completion of any additional work identified in the pre-final inspection reports.

6.1 Management of Changed Conditions

In the event that a change or changed condition is encountered, as defined in the Technical Specifications, the Project Team will review the condition and make a determination as to what revision in the construction activity or construction process is required, if any. This review and determination will be made in recognition of the project design documents.

If the changed condition(s) leads to a design change, the Project Team will notify the Water Board of the purpose and nature of the adjustments or changes made.

7 FINAL REPORT

As required by the CAO (Water Board 2012a), the Project Team will prepare and submit a Cleanup and Abatement Completion Report verifying completion of remedial cleanup construction activities on the project. This report is intended to demonstrate that dredging has achieved the sediment quality cleanup levels identified in the CAO, as demonstrated by sound technical analysis. Specific elements of the Cleanup and Abatement Completion Report will include:

- Key progress surveys demonstrating adequacy of dredging and sand cover placement
- Final post-cleanup bathymetry throughout the site
- Results of post-dredge confirmatory sampling and corresponding decisions regarding additional dredging
- Results of material testing on imported materials
- Quantities of dredged material and clean sand placement
- Contractor's Daily QC Reports and interim progress reports
- Results of water quality monitoring

This report will be submitted as a draft document to the Water Board and will be finalized after incorporating any comments received from the Water Board.

8 REFERENCES

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. *Final Environmental Impact Report*. March 14, 2012.