Appendix E
Technical Specifications

Technical Specifications

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SECTION 01 11 03
SUMMARY OF WORK

1 PART 1 GENERAL

1.01 WORK COVERED

A. CH2M HILL is planning to undertake a removal action at River Mile (RM) 10.9 of the Lower Passaic River (LPR) which is located in the Township of Lyndhurst, New Jersey. The main objective of this removal action is to reduce the potential for exposure to receptors, and to mitigate potential migration of contaminated sediments from the RM 10.9 Removal Area.

B. Approximately 19,600 in situ cubic yards (yd^3) of contaminated surface sediment will be removed from the top 2 feet (ft) of the RM 10.9 Removal Area. The removed material will be transported down river to a designated stabilization facility for offloading. The sediment will be stabilized and transported off-site for disposal. Following sediment removal a protective cap will be constructed, monitored, and maintained over the RM 10.9 Removal Area. As part of the design process, a Long-Term Monitoring Plan, including operation and maintenance (O&M) procedures, will be developed in order to monitor the cap's performance with respect to the design standards during the post construction period.

C. The chemical testing data from the sediment samples collected in 2011 confirmed that portions of the sediment located in the RM 10.9 Sediment Deposit Area, including a mudflat on the eastern shore of the LPR that is exposed at low tide, contained elevated concentrations of polychlorinated dibenzo-p-dioxins (PCDDs)/ polychlorinated dibenzofurans (PCDFs), polychlorinated biphenyl (PCBs), mercury, and polycyclic aromatic hydrocarbon (PAHs). In the uppermost 6 inches of sediment, peak concentrations detected include 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) at 29,000 nanograms per kilogram (ng/kg), PCBs at 34 milligrams per kilogram (mg/kg), mercury at 22 mg/kg, and total high-molecular-weight PAHs at 510 mg/kg. Elevated concentrations of PCDDs, PCDFs, PCBs, and mercury are generally co-located in surface and subsurface sediments. Additional chemical contaminants were also identified. The RM 10.9 Removal Area dimensions were determined based on a review of sediment data collected at 54 locations within the RM 10.9 Sediment Deposit Area and were further refined based on data collected from 15 additional locations during a predesign investigation in 2012.

The data from the 2011 sampling effort are provided in the following document which is included as Attachment 1:

1. *River Mile 10.9 Characterization Program Summary, Lower Passaic River Study Area,* CH2M HILL & AECOM, April 19, 2012

D. The Project is divided into the following engineering design packages:

1. Dredging and Material Transport
2. Capping
3. Stabilization
4. Transportation and Disposal

These design packages will be combined into the following subcontracts:

1, Dredging and Material Transport, Capping and Stabilization; and
2. Transportation and Disposal

E. The Work includes, but is not limited to, the following:

1. Dredging: All work necessary to perform dredging at the site. During all dredging activities, the Subcontractor shall control and abate pollution resulting from, or likely to result from, dredging and conveyance of dredged materials in a manner to meet regulatory requirements and to maximize the likelihood of achieving the projects objectives.
2. Material Transport: All work necessary to coordinate and transport dredge materials down river to the designated unloading area.
3. Stabilization: All work necessary to remove and store excess barge water; remove, segregate and stage debris and oversize materials; and unloading and stabilize dredged materials.
4. Capping: All work necessary to construct the cap at the site. During all capping activities, the Subcontractor shall control and abate pollution resulting from, or likely to result from, capping and conveyance of capping materials in a manner to meet regulatory requirements and to maximize the likelihood of achieving the projects objectives.
5. Transportation and Disposal: All work necessary to transport and dispose of debris, excess barge water and stabilized materials.

F. All activities must be in strict accordance with Federal, State and Local regulations/requirements.

G. The Subcontractor shall demonstrate that all Project assignees have a full understanding of the CH2M HILL Site Specific Health & Safety Plan, and take these into consideration in their design to ensure that the appropriate safety in design is incorporated in the design, construction, and operational processes of the contracted works.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 32 00
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.01 SUBMITTALS

A. Overall Progress Schedule: Submit adjusted schedule for each weekly project meeting and with each monthly Application for Payment in accordance with the General Term and Conditions, and at such other times as necessary to reflect: (i) progress of Work to within 5 working days prior to submission; (ii) changes in Work scope and activities modified since submission; (iii) delays in Submittals or resubmittals, deliveries, or Work; (iv) adjusted or modified sequences of Work; (v) other identifiable changes; and (vi) revised projections of progress and completion.

B. Submit with Each Progress Schedule Submission:

1. Progress Schedule: For each schedule submission, one legible copy and one electronic copy provided in specified application format.
2. An example schedule is included as an attachment to this section.

1.02 PROGRESS OF THE WORK

A. If Subcontractor fails to complete activity by its latest scheduled completion date and this failure may extend Subcontract Times (or Milestones), Subcontractor shall, within 7 days of such failure, submit a written statement as to how Subcontractor intends to correct nonperformance and return to the acceptable current progress schedule. Actions by Subcontractor to complete Work within Contract Times (or Milestones) will not be justification for adjustment to Contract Price or Subcontract Times.

B. CH2M HILL may order Subcontractor to increase plant, equipment, labor force or working hours if Subcontractor fails to: (i) complete a critical scheduled activity by its latest Milestone completion date, or (ii) satisfactorily execute Work as necessary to prevent delay to the overall completion of the Project.

1.03 OVERALL PROGRESS SCHEDULE

A. General:

1. Notice to Proceed will be issued only after the Overall Progress Schedule has been reviewed as acceptable by CH2M HILL in accordance with Section 01 33 00, Submittal Procedures. CH2M HILL will review the initial submittal and subsequent resubmittals of the Overall Progress Schedule within 7 calendar days of receipt.

2. Schedule(s) shall reflect Work logic sequences, restraints, delivery windows, review times, Subcontract Times, and Milestones set forth in the Agreement and shall begin with the date of Notice to Proceed and conclude with the date of Final Completion.
3. The schedule requirement herein is the minimum required. Subcontractor may prepare a more sophisticated schedule if such will aid Subcontractor in execution and timely completion of Work.
4. Float time is a Project resource available to both parties to meet contract Milestones and Contract Times.
5. Use of float suppression techniques such as preferential sequencing or logic, special lead/lag logic restraints, and extended activity times are prohibited, and use of float time disclosed or implied by use of alternate float-suppression techniques shall be shared to proportionate benefit of CH2M HILL and Subcontractor.
6. Pursuant to above float-sharing requirement, no time extensions will be granted nor delay damages paid until a delay occurs which (i) impacts Project's critical path, (ii) consumes available float or contingency time, and (iii) extends Work beyond contract completion date.
7. If Subcontractor provides an accepted schedule with an early completion date, CH2M HILL reserves the right to reduce Contract Times to match the early completion date by issuing a deductive Change Order at no change in Contract Price.

B. Format:

1. Computer generated Gantt (Bar) chart or Network Analysis Diagram schedule using Critical Path Method (CPM), generally as outlined in Associated General Contractors of America (AGC) publication "The Use of CPM in Construction-A Manual for General Contractor's and the Construction Industry," latest edition, prepared on reproducible paper, not larger than 30 inches by 42 inches. Computer software used to generate the schedule shall be Microsoft Project 2003 or a later version acceptable to CH2M HILL.
    a. Show complete interdependence and sequence of construction and Project-related activities reasonably required to complete the Work, identifying Work of separate stages and other logically grouped activities, and clearly identify critical path of activities.
    b. Include at a Minimum: Subcontract Work; major and other equipment and critical product design, fabrication, testing, delivery and installation times including required lead time for Subcontractor-furnished products, move-in and other preliminary activities, Project closeout and cleanup, Substantial Completion dates, Submittals that may impact critical path, and system/subsystem/component testing, facility startup, and training activities that may impact critical path.
    c. Develop subschedules to further define critical portions of the Work.

d. Indicate dates for early- and late-start, early- and late-finish, float and duration.
e. No activity duration, exclusive of those for Submittals review and product fabrication/delivery, shall be less than 1 day or more than 30 working days, unless otherwise approved by CH2M HILL.
f. Activity duration for Submittals review shall not be less than review time specified unless clearly identified and prior written acceptance has been obtained from CH2M HILL.
g. Monthly Schedule Submissions: Include overall percent complete, projected and actual; and percent completion progress for each listed activity.

1.04 CLAIMS FOR ADJUSTMENT OF CONTRACT TIMES

A. Where CH2M HILL has not yet rendered formal decision on Subcontractor's claim for adjustment of Contract Times, and parties are unable to agree as to amount of adjustment to be reflected in progress schedule, Subcontractor shall reflect that amount of time adjustment in progress schedule as CH2M HILL may accept as appropriate for the interim. It is understood and agreed that such interim acceptance by CH2M HILL will not be binding and will be made only for purpose of continuing to schedule Work, until such time as formal decision as to an adjustment, if any, of the Contract Times acceptable to CH2M HILL has been rendered. Subcontractor shall revise progress schedule prepared thereafter in accordance with CH2M HILL's formal decision.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 DEFINITIONS

A. Action Submittal: Written and graphic information submitted by Subcontractor that requires CH2M HILL's approval.

B. Informational Submittal: Information submitted by Subcontractor that does not require CH2M HILL's approval.

1.02 PROCEDURES

A. Direct submittals to CH2M HILL at the following address, unless specified otherwise.

1. CH2M HILL
Kelways Business Park

1 Madison Street

Rutherford, NJ 07073

Attn: Gary Foster

B. Transmittal of Submittal:

1. Subcontractor shall:
   a. Review each submittal and check for compliance with Contract Documents.
   b. Stamp each submittal with uniform approval stamp before submitting to CH2M HILL
      1) Stamp to include Project name, submittal number, Specification number, Subcontractor's reviewer name, date of Subcontractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with Contract Documents.
      2) CH2M HILL will not review submittals that do not bear Subcontractor's approval stamp and will return them without action.
2. Complete, sign, and transmit with each submittal package, one Transmittal of Subcontractor's Submittal form attached at end of this section.
3. Identify each submittal with the following:
   a. Numbering and Tracking System:
      1) Sequentially number each submittal.

2) Resubmission of submittal shall have original number with sequential alphabetic suffix.

b. Specification section and paragraph to which submittal applies.

c. Project title and CH2M HILL's project number.

d. Date of transmittal.

e. Names of Subcontractor, Subcontractor or Supplier, and manufacturer as appropriate.

4. Identify and describe each deviation or variation from Contract Documents.

C. Format:

1. Do not base Shop Drawings on reproductions of Contract Documents.
2. Package submittal information by individual Specification section. Do not combine different Specification sections together in submittal package, unless otherwise directed in Specification.
3. Present in a clear and thorough manner and in sufficient detail to show kind, size, arrangement, and function of components, materials, and devices, and compliance with Contract Documents.
4. Index with labeled tab dividers in orderly manner.
5. When feasible, provide an electronic copy to the CH2M HILL in addition to hardcopy submittals.

D. Timeliness: Schedule and submit in accordance with Schedule of Submittals and requirements of individual Specification sections.

E. Processing Time:

1. Time for review shall commence on CH2M HILL's receipt of submittal.
2. CH2M HILL will act upon Subcontractor's submittal and transmit response to Subcontractor not later than 14 days after receipt, unless otherwise specified.
3. Resubmittals will be subject to same review time.
4. No adjustment of Contract Times or Price will be allowed due to delays in progress of Work caused by rejection and subsequent resubmittals.

F. Resubmittals: Clearly identify each correction or change made.

G. Incomplete Submittals:

1. CH2M HILL will return entire submittal for Subcontractor's revision if preliminary review deems it incomplete.
2. When any of the following are missing, submittal will be deemed incomplete:
   a. Subcontractor's review stamp, completed and signed.
   b. Transmittal of Subcontractor's Submittal, completed and signed.
   c. Insufficient number of copies.

H. Submittals not required by Contract Documents:

1. Will not be reviewed and will be returned stamped “Not Subject to Review.”
2. CH2M HILL will keep one copy and return all remaining copies to Subcontractor.

1.03 ACTION SUBMITTALS

A. Prepare and submit Action Submittals required by individual Specification sections.

B. Copies: Submit four copies.

C. Action Submittal Dispositions: CH2M HILL will review, mark, and stamp as appropriate, and distribute marked-up copies as noted:

1. Approved:
   a. Subcontractor may incorporate product(s) or implement Work covered by submittal.
   b. Distribution:
      1) One copy furnished to CH2M HILL’s onsite representative.
      2) One copy retained in CH2M HILL’s file.
      3) Remaining copies returned to Subcontractor appropriately annotated.
2. Approved as Noted:
   a. Subcontractor may incorporate product(s) or implement Work covered by submittal, in accordance with CH2M HILL’s notations.
   b. Distribution:
      1) One copy furnished to CH2M HILL’s onsite representative.
      2) One copy retained in CH2M HILL’s file.
      3) Remaining copies returned to Subcontractor appropriately annotated.
3. Partial Approval, Resubmit as Noted:
   a. Make corrections or obtain missing portions, and resubmit.
   b. Except for portions indicated, Subcontractor may begin to incorporate product(s) or implement Work covered by submittal, in accordance with CH2M HILL’s notations.
   c. Distribution:
      1) One copy furnished to CH2M HILL’s onsite representative.
      2) One copy retained in CH2M HILL’s file.
      3) Remaining copies returned to Subcontractor appropriately annotated.
4. Revise and Resubmit:
   a. Subcontractor may not incorporate product(s) or implement Work covered by submittal.

b. Distribution:
   1) One copy furnished to CH2M HILL's onsite representative.
   2) One copy retained in CH2M HILL's file.
   3) Remaining copies returned to Subcontractor appropriately annotated.

1.04 INFORMATIONAL SUBMITTALS

A. General:

1. Copies: Submit three copies, unless otherwise indicated in individual Specification section.
2. Refer to individual Specification sections for specific submittal requirements.
3. CH2M HILL will review each submittal. If submittal meets conditions of the Contract, CH2M HILL will forward copies to appropriate parties. If CH2M HILL determines submittal does not meet conditions of the Contract and is therefore considered unacceptable, CH2M HILL will retain one copy and return remaining copies with review comments to Subcontractor, and require that submittal be corrected and resubmitted.

B. Certificates:

1. General:
   a. Provide notarized statement that includes signature of entity responsible for preparing certification.
   b. Signed by officer or other individual authorized to sign documents on behalf of that entity.
2. Material Test: Prepared by qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
3. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or regulatory agency or specified in individual Specification sections.

C. Subcontract Closeout Submittals: In accordance with Section 01 77 00, Closeout Procedures.

D. Statement of Qualification: Evidence of qualification, certification, or registration as required in Contract Documents to verify qualifications of professional land surveyor, engineer, materials testing laboratory, specialty Contractor, trade, Specialist, consultant, installer, and other professionals.

E. Submittals Required by Laws, Regulations, and Regulatory Agencies:

1. Submit promptly notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.
2. Transmit to CH2M HILL for Owner's records one copy of correspondence and transmittals (to include enclosures and attachments) between Subcontractor and regulatory agency.

F. Test and Inspection Reports:

1. General: Shall contain signature of person responsible for test or report.
2. Field: As a minimum, include the following:
   a. Project title and number.
   b. Date and time.
   c. Record of temperature and weather conditions.
   d. Identification of product and Specification section.
   e. Type and location of test, Sample, or inspection, including referenced standard or code.
   f. Date issued, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.
   g. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
   h. Provide interpretation of test results, when requested by CH2M HILL.
   i. Other items as identified in individual Specification sections.

1.05 SUPPLEMENTS

A. The supplements listed below, following "End of Section," are part of this Specification.

1. Forms: Transmittal of Subcontractor's Submittal
2. Exhibit 1: Project Submittal Summary

1.06 BASIS FOR COMPENSATION

A. The Subcontractor's cost for complying with the requirements of this Section of the Specifications shall be considered incidental and no additional compensation will be provided.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

TRANSMITTAL OF SUBCONTRACTOR'S SUBMITTAL

(ATTACH TO EACH SUBMITTAL)

DATE: _____

TO: _____

_____

_____

_____

_____

Submittal No.: _____

☐ New Submittal ☐ Resubmittal

Project: _____

Project No.: _____

Specification Section No.: _____

(Cover only one section with each transmittal)

Schedule Date of Submittal:

_____

FROM: _____

Subcontractor

_____

_____

_____

SUBMITTAL TYPE: ☐ Shop Drawing ☐ Sample ☐ Informational

The following items are hereby submitted:

Number of Copies	Description of Item Submitted (Type, Size, Model Number, Etc.)	Spec. and Para. No.	Drawing or Brochure Number	Contains Variation to Contract	
				No	Yes

Subcontractor hereby certifies that (i) Subcontractor has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By: _____

Subcontractor (Authorized Signature)

SECTION 01 45 16
WATER QUALITY MONITORING AND CONTROL

PART 1 GENERAL

1.01 WATER QUALITY MONITORING

A. The sediments within the River Mile (RM) 10.9 removal area contain elevated levels of dibenzodioxins/polychlorinated dibenzofurans (PCDDs/PCDFs), polychlorinated biphenyls (PCBs, both homologs and congeners), polycyclic aromatic hydrocarbons (PAHs), mercury, and other chemicals of potential concern (COPCs) which can have significant environmental impacts if released to the water column in an uncontrolled manner. For this reason, the Subcontractor will be required to perform water quality monitoring during all dredging/capping operations within the RM 10.9 removal area.

B. Water quality monitoring programs have been and will continue to be used during all intrusive activities associated with remediation actions within the Lower Passaic River Study Area (LPRSA) which have the potential to result in unacceptable environmental impact to the water column. They are also used to limit the transport of contaminants away from the areas of operation to other portions of the river. In addition to the Subcontractor's monitoring program outlined below, CH2M HILL will conduct a more comprehensive program to further assess that the operation is carried out in an environmentally acceptable manner. CH2M HILL will conduct monitoring activities separately from the Subcontractor. CH2M HILL monitoring does not in any way alleviate the Subcontractor’s responsibilities under this section.

C. The overall construction activity will impact water quality to some degree in the vicinity of the operation. The level of impact will be dependent on the particular phase of the operation, contamination levels of the material being removed, means and methods used, and other conditions at the time of the work. Dredge repositioning and support vessel activity have the potential to re-suspend material and impact water quality. For these reasons, the Subcontractor shall perform water quality monitoring at varying levels of intensity as required herein during the course of the project, depending on dredge/capping locations and the specific operational activity.

D. The overall goal of the Subcontractor-based monitoring is to ensure that the construction operation is carried out in a manner such that:

1. The disturbance of the contaminated sediments or other bed materials does not result in resulting in adverse water quality conditions exceeding applicable water quality criteria and other standards established for the Project.

2. As practicable, potential is minimized for transport and deposition of sediments and their associated contaminants outside the construction zone to uncontaminated areas or areas that have already been remediated.

E. The Subcontractor shall perform water quality monitoring to ensure that the construction operation is carried out in a manner to limit the transport of contaminated sediments from the Removal Area. Water quality monitoring shall be performed during the following activities:

1. Installation of temporary dock structure and other activities in the shoreline area.
2. Dredging of sediments, as indicated on the Contract Drawings.
3. Capping, as indicated on the Contract Drawings
4. General vessel support of construction operations within or immediately adjacent to the Removal Area.
5. Other activities determined by CH2M HILL to cause an increase or potential increase in water turbidity or other transport of contaminants.

F. The Subcontractor shall meet with representatives of CH2M HILL prior to and during the course of the project to review planned operations to identify those activities that may warrant intensive monitoring, as defined herein. CH2M HILL may identify additional activities warranting Subcontractor Water Quality Monitoring, or modify which activities require Subcontractor monitoring during the Project.

1.02 SUBMITTALS

The following shall be submitted in accordance with Section Submittal Procedures:

A. SD-01 Preconstruction Submittals.

1. Water Quality Monitoring Plan.

The details of water quality monitoring requirements under this section and a description of how this monitoring will be accomplished shall be submitted to CH2M HILL for review and approval. At minimum the submittal shall include the following information:

a. Dredging/capping operational procedures and equipment fleet.
b. Approach for monitoring including equipment, monitoring locations, water quality parameters, sampling and testing procedures, sample depths, sample frequency, duration, data review and QA/QC procedures.
c. Compliance Threshold Criteria
d. Assessment and Management Procedures.
e. Water quality triggering levels, Contingency Measures including turbidity management, and response plan. These measures shall

address mitigation measures to be taken if compliance threshold criteria are exceeded during monitoring by the Subcontractor or CH2M HILL.

f. Reporting.

B. SD-06, Test Reports.

1. Monitoring Data and Reports

Monitoring data (including equipment calibration records) and reports shall be submitted to the Contracting Officer and others as specified herein.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Additional requirements relative to water quality monitoring and testing including submittal of a Debris Management Plan, and Bathymetry Surveys are located in Section 31 23 24 Dredging and Delivery.

1.04 COORDINATION MEETING

A. The Subcontractor shall meet with representatives of CH2M HILL and possible regulatory agency staff, prior to undertaking field work to review the Subcontractor's approved Water Quality Monitoring Plan and Contingency Plan. At a minimum, attendees will include CH2M HILL, the construction Subcontractor's project manager, and all other Subcontractor staff who will hold a supervisory position in the field. The purpose of this meeting is to provide the opportunity for regulatory and project staff involved with the Project to clarify Project requirements relative to Water Quality conditions.

1.05 DIVISION OF RESPONSIBILITIES

A. Monitoring Data

The Subcontractor shall be responsible for all collecting, preparing and transmitting monitoring data and reports, including but not limited to testing results obtained during Project work activities, as specified in this section.

B. Contract Administration Actions

Except as otherwise specified in this section, CH2M HILL will be responsible for contract administration actions relative to water quality monitoring. CH2M HILL will direct the Subcontractor to implement mitigation and contingency measures as indicated in 1.02(A)(1)(e) and identified in the contingency plan if the trigger/action levels are exceeded. The contingency plan is a submittal requirement of this section.

C. Environmental Monitoring by the Regulators

The Regulators may also be performing environmental monitoring including but not limited to water quality monitoring during dredging, capping and other construction activities as warranted. If it is determined that by CH2M HILL or the Regulators that unacceptable environmental impacts are occurring, CH2M HILL may direct the Subcontractor to adjust construction operation to alleviate those impacts. CH2M HILL will also provide oversight to the Subcontractor and periodically perform quality assurance checks of the Subcontractor's monitoring program as an additional data integrity assessment measure.

1.06 REPORTING

A. Requests for Changes

The Subcontractor may initiate requests for changes to the approved Water Quality Monitoring Plan. Such recommendations shall be submitted in writing to CH2M HILL, who will coordinate the request.

B. Monitoring Data and Reports

The Subcontractor shall develop a data reporting sheet to be approved by CH2M HILL for each day of monitoring which records and presents the following information:

1. Date, time location and type of construction activity as well as the names of sampling team members and team leader.
2. A sketch of the construction site which allows for the recording of daily work activities, visual events such as plumes, sheens, debris transported beyond the removal area, etc. which could assist in data interpretation.
3. Table or graphic of values for each monitoring parameter at each monitoring point with beginning and ending times and depth of sensor.
4. Notes on weather, tide, wind, water level, and other relevant activities.
5. A flagging system (i.e. box at the top of the page) which indicates if threshold criteria were exceeded on that particular day.
6. A comment section where field personnel may record visual observations which may assist in data interpretation.
7. Detailed documentation of contingency plan actions or other corrective actions taken.
8. Deviations from the Subcontractor's Water Quality Monitoring Plan or regulatory requirements.
9. Records of monitoring equipment maintenance and calibration.

C. Data sheets shall be delivered either electronically or in hard copy to CH2M HILL or their representative at the end of each day of monitoring. If established criteria are exceeded, CH2M HILL's Construction Manager or his

designated representative shall be immediately notified and corrective action taken.

D. Details that will be recorded in a written report in the event of an exceedence will include, but not be limited to, the sampling location, time, date, tidal movements, meteorological conditions, location of dredging operations and level of contaminants of concern (from grab samples taken prior to the event and following the event), and the corrective and other measures taken in response to the event. The report shall be submitted within 24 hours of the results of the exceedance being known.

1.07 CONTINGENCY PLAN

A. The Subcontractor shall prepare and submit to CH2M HILL a contingency plan as part of the water quality monitoring plan which outlines measures to be taken if compliance threshold criteria are exceeded. The plan will discuss triggering events, confirmatory monitoring actions, response actions, notifications, and documentation. The plan shall include materials and equipment that will be available to the Subcontractor during the duration of this contract, such as sorbet booms, silt curtains or the equipment. This plan may also include other techniques such as slowing the rate of dredging. The Subcontractor may suggest to CH2M HILL other contingency measures that will be acceptable to CH2M HILL.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 WATER COLUMN MONITORING, BASELINE

A. The Subcontractor shall establish upstream and downstream monitoring sites as shown on the Contract Drawings, and at the mid-depth of the water column as identified in Water Quality Monitoring Plan. These readings will form the basis of comparison for the monitoring data collected for that day.

B. Buoy #1 - downstream monitoring baseline location shall be established approximately 805 m from the northern boundary of the Removal Area.

C. Buoy #2 – downstream monitoring baseline location shall be established approximately 61 m from the northern boundary of the Removal Area

D. Buoy #3 – upstream monitoring baseline location shall be established approximately 61 m from the southern boundary of the Removal Area

E. Buoy #4 - upstream baseline monitoring point shall be established approximately 805 m from the southern boundary Removal Area.

F. Baseline TSS samples will be collected every 2 hours at surface and mid-depth over an 8-hour period each day for the initial 48 hours and weekly thereafter.

G. Baseline turbidity data will be collected continuously and reported in 15 minute intervals.

3.02 WATER COLUMN MONITORING, DREDGING AND TRANSPORTATION AND CAPPING

A. The Subcontractor shall perform monitoring for turbidity and other parameters listed in 3.02.B using a backscatter nephelometer with an underwater sensor and direct surface readout. Monitoring equipment shall be maintained and calibrated in accordance with the manufacture's recommend procedures. The Subcontractor shall include maintenance and calibration records with daily monitoring reports submitted to CH2M HILL.

B. Locations:

1. Turbidity

Turbidity monitoring shall be conducted at the following locations:

a. Buoy #1 - downstream monitoring baseline location shall be established approximately 805 m from the northern boundary of the Removal Area.
b. Buoy #2 - downstream monitoring site 61 m from the northern boundary of the Removal Area as identified on the Contract Drawings.
c. Buoy #3 - upstream monitoring site 61 m from the southern boundary of the Removal Area as indicated on the Contract Drawings.
d. Buoy #4 - upstream baseline monitoring point shall be established approximately 805 m from the southern boundary Removal Area
e.

C. Parameters:

1. Turbidity and Associated Parameters Monitoring:
   a. Water quality monitoring at the sites identified in 3.02 B 1 shall include the following parameters:

      1) Turbidity. (measured)
      2) pH. (measured)
      3) Temperature. (measured)
      4) Total Suspended Solids. (calculated from turbidity data)

D. Frequency:

1. Monitoring shall be collected every 15 minutes continuously using a data logger during all site dredging and capping, and as indicated in 3.02.E. The data logger shall be compatible with selected monitoring equipment.

E. Duration

1. Monitoring shall commence at least one month prior to commencement of dredging and capping operations and continue until 1 week after completion of dredging/capping operations, or as otherwise directed by CH2M HILL should the monitoring data indicate that an adverse trend in the water quality.

F. Water Quality Monitoring by CH2M HILL and/or Others

1. CH2M HILL may perform additional monitoring during dredging/capping and other construction activities. If CH2M HILL determines that unacceptable environmental impacts are occurring from the Subcontractor's actions irrespective of the Subcontractor's monitoring results, CH2M HILL will direct the Subcontractor to adjust construction operation to alleviate those impacts. CH2M HILL may also periodically perform unannounced quality assurance checks of the Subcontractor's monitoring efforts to further assess data integrity and the effectiveness of turbidity control measures.

3.03 EXEEDENCES OF WATER QUALITY CRITERIA

A. Reportable Event Criteria

The upper level turbidity criteria defined, as a "reportable event", will be a value which exceeds the background turbidity at the removal area perimeter monitoring points (Buoys #2 or #3) by more than 30 NTU above background for four consecutive readings (i.e., 60 minutes), An exceedance of more than 30 NTU above background for 60 minutes shall required the Subcontractor to contact CH2M HILL and evaluate causes and take actions to prevent further exceedances. An exceedance 50 NTUs above background at the removal area perimeter monitoring points (Buoys #2 or #3) for four consecutive readings (i.e., 60 minutes) shall cause the Subcontractor to stop work.

B. Exceedences of Action Levels Attributable to Project Activities

When the Action Levels has been exceeded because of Project Activities, construction activities shall be temporarily halted until WQ parameter readings decrease to an acceptable level. During this time, the Subcontractor shall notify CH2M HILL or CH2M HILL's representative and attempt to identify and rectify the cause of the exceedence. Explanatory details shall be made on the accompanying data sheet documenting the exceedence and any corrective measures taken. The Subcontractor shall note the presence and extent of turbidity and visible sheens which may emanate from the area of activity, whether or not

criteria limits have been or continue to be exceeded. The approximate area of turbidity or sheen coverage should be sketched onto the data sheet as provided in Paragraph Monitoring Data and Reports above.

END OF SECTION

SECTION 01 45 33
SUBCONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.01 PAYMENT

A. Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump sum prices contained in the Bidding Schedule.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. The Subcontractor is responsible for quality control and shall establish and maintain an effective quality control system.

B. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the Contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence.

C. The Subcontractor’s Project Superintendent is responsible for the quality of Work on the job and is subject to removal by CH2M HILL for noncompliance with requirements specified in the Contract. The Subcontractor’s Project Superintendent in this context shall mean the individual with the responsibility for the overall management of the project including quality and production.

3.02 QUALITY CONTROL PLAN

A. CH2M HILL's Construction Quality Control Plan is furnished in an Appendix to this section.

B. The Subcontractor shall furnish for review by CH2M HILL, not later than 20 business days after receipt of Notice to Proceed, the Subcontractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause. The Plan shall identify personnel, procedures, control, instructions, testing, records, and forms to be used. Construction will be permitted to begin only after approval of the CQC Plan by CH2M HILL.

1. Content of the CQC Plan: The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

    a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three-phase control system for all aspects of the Work specified.
    b. The staff shall include a CQC Officer who shall report to CH2M HILL.
    c. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.
    d. A copy of the letter to the CQC Officer signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC Officer, including authority to stop Work which is not in compliance with the Contract. The CQC Officer shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to CH2M HILL.
    e. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Specification Section 01 33 00, (Submittal Procedures).
    f. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of Work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by CH2M HILL prior to use.)
    g. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.
    h. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.

2. Reporting procedures, including proposed reporting formats: A list of the definable features of Work.

    a. A definable feature of Work is a task which is separate and distinct from other tasks, and has separate control requirements. It could be identified by different trades or disciplines, or it could be Work by the same trade in a different environment.
    b. Although each section of the Specifications may generally be considered as a definable feature of Work, there is frequently more than one definable feature under a particular section. This list will be agreed upon during the coordination meeting, as required by the paragraph Coordination Meeting.

C. Acceptance of Plan: Acceptance of the Subcontractor's plan by CH2M HILL is required prior to the start of construction. Acceptance shall be as defined in Specification Section 01 33. CH2M HILL reserves the right to require the Subcontractor to make changes in the CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

D. Notification of Changes: After acceptance of the CQC Plan, the Subcontractor shall notify the CH2M HILL CQC System Manager in writing of any proposed change. Proposed changes are subject to acceptance by the CQC System Manager.

3.03 COORDINATION MEETING

A. After the Preconstruction Conference, before start of construction, and prior to acceptance by CH2M HILL of the CQC Plan, the Subcontractor shall meet with the CH2M HILL CQC System Manager to discuss the Subcontractor's quality control system. The CQC Plan shall be submitted for review a minimum of 20 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite Work, and the interrelationship of the Subcontractor's management and control with the CH2M HILL.

B. Minutes of the meeting shall be prepared by CH2M HILL and signed by both the Subcontractor and CH2M HILL. The minutes shall become a part of the Contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Subcontractor.

3.04 QUALITY CONTROL ORGANIZATION

A. Personnel Requirements: The requirements for the CQC organization are a CQC Officer and sufficient number of additional qualified personnel to ensure safety and Contract compliance. The Subcontractor shall provide a CQC organization which shall be at the Site at all times during progress of the Work and with complete authority to take any action necessary to ensure compliance with the Contract. All CQC staff members shall be subject to acceptance by CH2M HILL.

B. CQC Officer: The Subcontractor shall identify as CQC Officer an individual within the organization at the site of the Work who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Subcontractor. This CQC Officer shall be on the Site at all times during construction and will be employed by the Subcontractor. The CQC Officer shall be assigned as the CQC Representative. An alternate for the CQC Officer will be identified in the plan to serve in the event of the CQC Officer's absence.

C. CQC Personnel: A staff shall be maintained under the direction of the CQC Officer to perform all QC activities. The staff must be of sufficient size to ensure adequate QC coverage of all Work phases, Work shifts, and Work crews involved in the construction. These personnel may perform other duties, but must be fully qualified by experience and technical training to perform their assigned QC responsibilities and must be allowed sufficient time to carry out these responsibilities. The QC plan will clearly state the duties and responsibilities of each staff member.

D. Organizational Changes: The Subcontractor shall maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, the Subcontractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.05 SUBMITTALS

A. Submittals shall be made as specified in Specification Section 01 33 00, (Submittal Procedures). The CQC organization shall be responsible for certifying that all submittals are in compliance with the Contract requirements.

3.06 CONTROL

A. Subcontractor Quality Control is the means by which the Subcontractor ensures that the construction, to include that of Subcontractors and suppliers, complies with the requirements of the Contract. At least three phases of control shall be conducted by the CQC Officer for each definable feature of Work as follows:

1. Preparatory Phase: This phase shall be performed prior to beginning Work on each definable feature of Work, after all required plans/documents/ materials are approved/accepted, and after copies are at the Work site. CH2M HILL shall be notified at least 24 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC Officer and attended by the Subcontractor's Project Superintendent, other CQC personnel (as applicable), the CH2M HILL CQC Manager and designated project representatives. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC Officer and attached to the daily CQC report. The Subcontractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet Contract Specifications. This phase shall include:

   a. A review of each paragraph of applicable specifications.
   b. A review of the Contract Drawings.
   c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.
   d. Review of provisions that have been made to provide required control inspection and testing.

e. Examination of the Work area to assure that all required preliminary Work has been completed and is in compliance with the Contract.
f. A physical examination of required materials, equipment, and sample Work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
g. A review of the appropriate activity hazard analysis (AHA) to assure safety requirements are met.
h. Discussion of procedures for controlling quality of the Work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of Work.
i. A check to ensure that the portion of the plan for the Work to be performed has been accepted by CH2M HILL.
j. Discussion of the initial control phase.

2. Initial Phase: This phase shall be accomplished at the beginning of a definable feature of Work. The following shall be accomplished:

a. A check of Work to ensure that it is in full compliance with Contract requirements. Review minutes of the preparatory meeting.
b. Verify adequacy of controls to ensure full Contract compliance. Verify required control inspection and testing.
c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards.
d. Resolve all differences.
e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
f. CH2M HILL shall be notified at least 24 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC Officer and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
g. The initial phase shall be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

3. Follow-up Phase: Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with Contract requirements, until completion of the particular feature of Work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of Work which may be affected by the deficient Work. The Subcontractor shall not build upon nor conceal nonconforming Work.

4. Additional Preparatory and Initial Phases: Additional preparatory and initial phases shall be conducted on the same definable features of Work if the quality of on-going Work is unacceptable, if there are changes in the

applicable CQC staff, onsite production supervision or work crew, if Work on a definable feature is resumed after a substantial period of inactivity, as determined by CH2M HILL, or if other problems develop.

3.07 TESTS

A. Testing Procedure:

1. The Subcontractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to Contract requirements. Upon request, the Subcontractor shall furnish to CH2M HILL duplicate samples of test specimens for possible testing by CH2M HILL. Testing includes operation and/or acceptance tests when specified.

2. The Subcontractor shall procure the services of an approved independent testing laboratory. The Subcontractor shall perform the following activities and record and provide the following data:

   a. Verify that testing procedures comply with Contract requirements.
   b. Verify that facilities and testing equipment are available and comply with testing standards.
   c. Check test instrument calibration data against certified standards.
   d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
   e. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If approved by CH2M HILL, actual test reports shall be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the CH2M HILL CQC Manager. Failure to submit timely test reports as stated may result in nonpayment for related Work performed and disapproval of the test facility for this Contract.

3.08 COMPLETION INSPECTION

A. Punch-Out Inspection:

1. Near the completion of all Work or any increment thereof, established by a completed time stated in the Subcontractor’s schedule subject to modification based on the progress of the work, the CQC Officer shall conduct an inspection of the Work and develop a “punch list” of items which do not conform to the approved drawings and specifications. Such a list of deficiencies shall be included in the CQC documentation, as required by

paragraph “Documentation” below, and shall include the estimated date by which the deficiencies will be corrected.

2. The CQC Officer or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Subcontractor shall notify CH2M HILL that the facility is ready for a Pre-Final inspection.

B. Pre-Final Inspection: CH2M HILL will perform this inspection to verify that the facility is complete and ready to be occupied. A “Pre-Final Punch List” may be developed as a result of this inspection. The Subcontractor's CQC Officer shall ensure that all items on this list have been corrected and notify CH2M HILL so that a “Final” inspection can be scheduled. Any items noted on the “Pre-Final” inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire Work or any particular increment thereof if the Project is divided into increments by separate completion dates.

C. Final Acceptance Inspection: The Subcontractor's Quality Control Inspection personnel, Subcontractor’s Project Superintendent or other primary management person, and the CH2M HILL CQC Manager will be in attendance at this inspection. The final acceptance inspection will be formally scheduled by CH2M HILL CQC Manager based upon results of the Pre-Final Inspection. Notice will be given to the CQC Manager at least 14 days prior to the final acceptance inspection and must include the Subcontractor's assurance that all specific items identified to the Subcontractor as being unacceptable, along with all remaining Work performed under the Contract, will be complete and acceptable by the date scheduled for the final acceptance inspection.

3.09 DOCUMENTATION

A. The Subcontractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

1. Subcontractor and their area of responsibility.
2. Operating plant/equipment with hours worked, idle, or down for repair.
3. Work performed each day, giving location, description, and by whom.
4. Test and/or control activities performed with results and references to specifications/drawings requirements. The Control Phase shall be identified (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.
5. Quantity of materials received at the Site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
6. Submittals reviewed, with Contract reference, by whom, and action taken.

7. Offsite surveillance activities, including actions taken.
8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
9. Instructions given/received and conflicts in plans and/or specifications.
10. Subcontractor's verification statement.

B. These records shall indicate a description of trades working on the Project, the number of personnel working, weather conditions encountered, and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the Work and workmanship comply with the Contract. The original and one copy of these records in report form shall be furnished to CH2M HILL daily within 24 hours after the date covered by the report, except that reports need not be submitted for days on which no Work is performed.

C. As a minimum, one report shall be prepared and submitted for every 7 days of no Work and on the last day of a no Work period. All calendar days shall be accounted for throughout the life of the Contract. The first report following a day of no Work shall be for that day only.

D. Reports shall be signed and dated by the CQC Officer. The report from the CQC Officer shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.10 NOTIFICATION OF NONCOMPLIANCE

A. CH2M HILL will notify the Subcontractor of any detected noncompliance with the foregoing requirements. The Subcontractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Subcontractor at the Work site, shall be deemed sufficient for the purpose of notification. If the Subcontractor fails or refuses to comply promptly, the CH2M HILL issue an order stopping all or part of the Work until satisfactory corrective action has been taken.

B. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Subcontractor.

C. See the General Terms and Conditions for penalties associated with noncompliance.

END OF SECTION

SECTION 01 45 55
ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.01 DEFINITIONS

A. Environmental Pollution and Damage: Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare, unfavourably alter ecological balances of importance to human life, affect other species of importance to humankind; or degrade the environment aesthetically, culturally and/or historically.

B. Environmental Protection: Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water and air; biological and cultural resources, and include management of visual aesthetics, noise, solid, chemical, gaseous, and liquid waste, radiant energy, and radioactive material, as well as other pollutants.

C. Subcontractor(s) Generated Hazardous Waste: Subcontractor(s) generated hazardous waste means materials that, if abandoned or disposed of, meet the definition of a Hazardous Waste as defined in 40 CFR 261.4(b)(1). These waste streams typically consist of material brought on site by the Subcontractor(s) to execute the work, but are not fully consumed during the course of construction. Examples include, but are not limited to, waste thinners, excess paints, excess solvents, and waste solvents. Unused chemical products identified for disposal may also constitute Hazardous Waste.

1.02 GENERAL REQUIREMENTS

A. The Subcontractor(s) shall minimize environmental pollution and damage that may occur as the result of construction operations.

B. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of this Contract.

C. The Subcontractor(s) shall comply with all applicable environmental Federal, State, and local laws and regulations.

D. The Subcontractor(s) shall be responsible for any delays resulting from failure to comply with environmental laws and regulations.

1.03 LOWER-TIER SUBCONTRACTORS

A. The Subcontractor(s) shall ensure compliance with this Specification Section 01 45 55 (Environmental Protection) by lower-tier Subcontractors.

1.04 PERMITS

A. CH2M HILL will obtain Federal and State permits and approvals prior to commencement of the Site Work and the Subcontractor will operate in accordance with these Federal and State approvals. CH2M HILL will provide a list of CH2M HILL provided permits at the time of bidding. If additional specific permits are required by the Subcontractor(s), the Subcontractor(s) shall be responsible for payment of fees associated with environmental permits, trucking, application, and/or notices obtained by the Subcontractor(s). Subcontractor(s) shall be responsible for obtaining all waste disposal approvals related to Subcontractor(s) Generated Wastes.

B. All costs associated with this Specification Section shall be included in the Contract price.

C. To the extent that is legally permissible the Subcontractor(s) shall be responsible for payment of all fines/fees for violation or noncompliance with Federal, State, and local laws and regulations.

D. Key approval requirements which are the responsibility of the Subcontractor include the following:

1. Stabilization Facility Air Permit and/or modifications
2. Authorized Use Determination (AUD) for the stabilization of RM 10.9 sediment

E. Key approval requirements which are the responsibility of CH2M HILL include the following:

1. Waterfront Development Permit (New Jersey Waterfront Development Law (NJSA 12:5-3))

2. Flood Hazard Area Permit (Flood Hazard Area Control Act N.J.S.A. 58: 16A-50 et. seq.)

1.05 SUBMITTALS

A. The following shall be submitted in accordance with Specification Section 01 33 00 (Submittal Procedures):

1. SD-01 Preconstruction Submittals: Evidence of Compliance with Regulatory Approved Environmental Management Plans (EMPs). Refer to Article 1.06, Paragraphs A through D and other applicable Articles. In addition, refer to Specification Section 01 45 16 (Water Quality Monitoring and Control).
2. SD-02 Preconstruction Submittals: Subcontractor(s) Prepared Management Plans. Refer to Article 1.06, Paragraph E, and other applicable Articles. In addition, refer to Specification Section 01 45 16 (Water Quality Monitoring and Control).

1.06 ENVIRONMENTAL MANAGEMENT PLANS

A. CH2M HILL will prepare Environmental Management Plans (EMPs) listed in this Article 1.06 in accordance with the requirements of the Administrative Settlement Agreement and Order on Consent for Removal Action, Docket No. 02-2012-2015 (USEPA, 2012a), by the Cooperating Parties Group (CPG) (hereinafter referred to as the AOC). The draft plans are expected to include: Water Quality Monitoring Plan, Air/Noise Monitoring Plan. Draft EMPs will be available at the time of bidding. The final EMPs will be available once completed, the regulatory approvals are obtained by CH2M HILL, and the licenses are finalized. All works undertaken by the Subcontractor shall be in accordance with the EMPs.

B. No requirement in this Specification Section shall be construed as relieving the Subcontractor(s) of any applicable Federal, State and local environmental protection laws and regulations. During construction, the Subcontractor(s) shall be responsible for identifying, implementing, and submitting for approval any additional requirements to be included in the EMPs.

C. Prior to commencement of construction and/or operation works the Subcontractor(s) shall meet with CH2M HILL to discuss the implementation of the EMPs. Resulting from these discussions, the Subcontractor(s) shall provide the following information to CH2M HILL for inclusion within the EMPs:

1. Name(s) of person(s) within the Subcontractor(s)' organization who is (are) responsible for ensuring adherence to the EMP.
2. Name(s) and qualifications of person(s) responsible for monitoring the movements of hazardous waste to be removed from the Site in accordance with the regulatory requirements.
3. Identification of any Subcontractors responsible for the transportation and disposal of waste, evidence of the disposal facility's licensed authority to accept the waste, any additional waste shipment and disposal approvals needed, and waste characterization records, if requested by CH2M HILL.
4. Name(s) and qualifications of person(s) responsible for training the Subcontractor(s)' environment protection personnel.

D. The Subcontractor(s) shall comply with, and supply evidence of compliance to CH2M HILL, with the EMPs listed below.

1. Water Quality Monitoring Program: This program will include the monitoring of turbidity and other parameters within the Lower Passaic River. The program will contain a Contingency Plan listing measures to be followed in the event that elevated levels of monitoring parameters are detected and a checklist of required actions.
2. Environmental Management Plan: This plan will include measures to monitor and control environmental impacts associated with dredging/capping works.

E. The Subcontractor(s) shall be responsible for preparation of the following management plans and drawings.

1. Work Area Plan showing the proposed activity in each portion of the removal area and identifying the areas of limited use or nonuse. The Plan shall include measures for marking the limits of use areas including methods for protection of features to be preserved within authorised work areas.
2. A detailed Spill Prevention and Control Plan shall include the procedures, instructions, and reports to be used in the event of an unforeseen spill of substance regulated under State or Local laws and regulations. The Spill Prevention and Control Plan shall include as a minimum:
   a. The name of the individual who shall report any spills or hazardous substance releases and who shall follow up with complete documentation. This individual shall immediately notify CH2M HILL who shall in turn report to the appropriate agencies.
   b. The name and qualifications of the individual who shall be responsible for implementing and supervising the containment and cleanup.
   c. Training requirements for Subcontractor(s)' personnel and methods of accomplishing the training.
   d. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.
   e. The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material placement equipment available in case of an unforeseen spill emergency.
   f. The methods and procedures to be used for expeditious contaminant cleanup.
3. A General Solid Waste Disposal Plan identifying methods and locations for solid waste disposal including clearing debris and soil contaminated with spilled hydraulic fluid, diesel fuel or oil. The Plan shall include schedules for disposal. The Subcontractor(s) shall identify any Subcontractors responsible for the transportation and disposal of solid waste. Licenses, permits, and/or additional approvals shall be submitted for solid waste disposal sites that are not commercial operating facilities. Evidence of the disposal facility's acceptance of the solid waste shall be attached to this Plan, prior to transportation.
4. A Hazardous Materials Management Plan identifying potentially hazardous substances to be used on the works site, the intended actions to prevent introduction of such materials into their water, or ground and details provisions for compliance with all regulatory standards relating to the storage and handling of these materials. A copy of the Material Safety Data Sheets (MSDS) and the maximum quantity of each hazardous material to be on Site at any given time shall be included in the Hazardous Materials Management Plan. As new

hazardous materials are brought on Site or removed from the Site the Plan shall be updated.

5. A Site Induction Program including details of environmental and occupational health and safety knowledge required for each employee engaged on-site. It shall be the Subcontractor(s) responsibility to ensure that only those people who have undertaken the appropriate site induction training are allowed on-site. It shall be the Subcontractor(s)' responsibility to maintain and update the training program as changes are made to environmental management practices throughout the dredging and remediation works.

1.07 PROTECTION FEATURES

A. Prior to start of any onsite construction activities, the Subcontractor(s) and CH2M HILL shall make a joint condition survey. Immediately following the survey, the Subcontractor(s) shall prepare a brief report including a plan describing the features requiring protection, which are not specifically identified on the Drawings as environmental features requiring protection along with the condition of trees, shrubs, and grassed areas immediately adjacent to the Site of work and adjacent to the Subcontractor(s)' assigned storage area and access route(s), as applicable.

B. The Subcontractor shall submit the survey report for review. This survey report shall be signed by both the Subcontractor(s) and CH2M HILL upon mutual agreement as to its accuracy and completeness. The Subcontractor(s) shall protect those environmental features included in the survey report and any indicated on the Drawings, regardless of interference which their preservation may cause to the Subcontractor(s)' work under the Contract.

1.08 ENVIRONMENTAL REQUIREMENTS

A. The Subcontractor(s) shall comply with the environmental water quality requirements identified in Specification Section 01 45 16 (Water Quality Monitoring and Control) and the Water Quality Monitoring Program. These environmental monitoring requirements are to be implemented prior to and throughout the course of the project.

1.09 ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS

A. Any deviations requested by the Subcontractor(s) from the Plans and Specifications which may have an environmental impact shall be subject to approval by CH2M HILL and may require an extended review, processing and approval time by CH2M HILL and potentially by the Regulators and other parties. CH2M HILL may disapprove alternate methods if CH2M HILL determines that the proposed such methods will have have potentially adverse environmental impacts.

1.10 NOTIFICATION

A. CH2M HILL will notify the Subcontractor(s) in writing of any observed noncompliance with applicable laws, regulations, permits, and other elements of the approved EMPs. The Subcontractor(s) shall, after receipt of such notice, inform CH2M HILL of the proposed corrective action and take such action when approved by CH2M HILL. CH2M HILL may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or equitable adjustments allowed to the Subcontractor(s) for any such suspensions. This is in addition to any other actions CH2M HILL may take under the Contract or in accordance with the law.

PART 2 EXECUTION

2.01 NATURAL RESOURCES

A. The Subcontractor(s) shall confine all activities to work and staging areas associated with the dredging and transport defined by the contract Drawings and Specifications. Prior to the commencement of construction, the Subcontractor(s) shall identify any natural resources to be preserved within the work area.

B. Except in areas indicated on the Drawings or specified to be cleared, the Subcontractor(s) shall not remove, cut, deface, injure, or destroy natural resources including trees, shrubs, vines, grasses, topsoil, and landforms without approval. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorised. The Subcontractor(s) shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Stone, soil or other materials displaced into un-cleared areas shall be removed by the Subcontractor(s).

C. Work Area Limits: Prior to commencing construction activities, CH2M HILL and the Subcontractor(s) shall survey the site and mark the areas that must remain undisturbed under this Contract. Isolated areas within the general work area which are not to be disturbed shall be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, any markers shall be visible in the dark. As part of the Site Induction Program the Subcontractor(s)' personnel shall be educated of the purpose for marking and/or protecting particular objects.

D. Landscape: Trees, shrubs, vines, grasses, land forms, and other landscape features indicated and defined on the Drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards or any other approved techniques. The Subcontractor(s) shall restore landscape features damaged or destroyed during construction operations outside the limits of the approved work area.

E. Subcontractor(s) Facilities and Work Areas: The Subcontractor(s)' field offices, and temporary buildings/docks to be provided by the Subcontractor

shall be placed in areas designated on the Drawings or as directed by CH2M HILL. Temporary movement or relocation of Subcontractor(s) facilities shall be made only when approved by CH2M HILL.

2.02 WATER RESOURCES

A. The Subcontractor(s) shall monitor construction activities to prevent pollution of surface and groundwater. Toxic or hazardous chemicals shall not be applied to soil or vegetation. All waters affected by construction activities shall be visually monitored or otherwise monitored by the Subcontractor(s) in accordance with environmental permits, EMPs, and Section 01 45 16 WATER QUALITY MONITORING AND CONTROL.

2.03 AIR RESOURCES

A. The Subcontractor(s) shall conduct construction, operations, maintenance, and all other activities or processes in accordance with all Federal and State air emission and performance laws and standards.

B. Particulates:

1. Dust particles, aerosols and gaseous by-products from construction activities, equipment, and processing and preparation of materials shall be controlled at all times, including weekends, holidays, and hours when work is not in progress.

2. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs.

C. Odor: Odor from construction activities shall be controlled at all times.

D. Sound Intrusions: The Subcontractor(s) shall keep construction activities under surveillance and control to minimize environment damage by noise, and in accordance with local noise ordinance limits. Work shall be limited to daylight hours, 12 hours/day, 6 days per week. The specific start times will vary due to seasonal changes in hours of daylight..

E. Burning: Burning will not be allowed on the project site.

2.04 SUBCONTRACTOR CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL

A. General Solid Wastes:

1. General solid wastes shall be placed in containers which are emptied on a regular schedule. Handling, storage, and disposal shall be conducted to prevent contamination. Segregation measures shall be employed so that no Hazardous Wastes or otherwise toxic wastes are co-mingled with each other or co-mingled with general solid waste.
2. The Subcontractor(s) shall transport general solid waste off the project site and dispose of it in accordance with Federal and State regulations.

3. The Subcontractor(s) shall verify that the selected transporters and disposal facilities have the necessary permits, licenses, and other approvals to operate.
4. The Subcontractor(s) shall comply with site procedures and local laws and regulations pertaining to the use of landfill areas and materials recycling.

B. Chemicals and Chemical Wastes:

1. Chemicals shall be stored, handled, and dispensed ensuring no spillage to the surface areas or water. The Subcontractor shall conduct and document periodic inspections of storage, handing, and dispensing areas to identify leaks or potentially unsafe conditions. The Subcontractor shall perform and document corrective actions as needed. Documentation shall be kept up to date on a daily basis. CH2M HILL will periodically review this documentation.
2. Chemical waste shall be collected in corrosion resistant, chemical specific compatible containers. Wastes shall be classified, managed, stored, and disposed of in accordance with applicable Federal and State regulations.

C. Subcontractor(s) Generated Hazardous Wastes:

1. Hazardous Wastes are as defined under RCRA and applicable State of New Jersey regulations. The Subcontractor(s) shall, at a minimum, manage and store Hazardous Waste in compliance with these regulations and EMPs.
2. The Subcontractor(s) shall segregate Hazardous Waste from other materials and wastes and shall protect it from the weather by placing it in a safe covered location or as otherwise allowable under federal and state regulations. The Subcontractor(s) shall take precautionary measures, such as berming or other appropriate measures, to protect against accidental spillage.
3. The Subcontractor(s) shall be responsible for storage, describing, packaging, labeling and marking of hazardous waste and hazardous material in accordance with RCRA and applicable state laws and regulations.
4. The Subcontractor(s) shall dispose of Hazardous Wastes in compliance with the applicable Federal and State regulations. Spills of hazardous or toxic materials shall be immediately reported to CH2M HILL. Cleanup and disposal costs due to spills shall be the Subcontractor(s)' responsibility, including but not limited to third property damage.

D. Fuel and Lubricants:

1. Storage, fueling, and lubrication of equipment and motor vehicles shall be conducted in accordance with the Subcontractor's SPCC, and in a manner that affords the maximum protection against spill and evaporation.

2. Fuel, lubricants and oil shall be managed and stored in accordance with the Subcontractor's SPCC and all applicable Federal and State laws and regulations. Used lubricants and used oil to be discarded shall be stored in marked corrosion-resistant containers and recycled or disposed in accordance with Federal and State laws and regulations. Storage of fuel on the project site shall be accordance with all Federal, State, and local laws and regulations.

E. Waste Water:

1. Disposal of waste water shall be as specified below:
   a. Waste water from construction activities shall not be allowed to enter water ways or to be discharged prior to being treated to remove pollutants.
   b. The Subcontractor(s) shall dispose of the construction-related waste water not associated with the dredged material off project property in accordance with all Federal and State and local laws and regulations.
   c. The Subcontractor is responsible for obtaining construction-related waste water disposal permits and approvals as necessary.

2.05 RECYCLING AND WASTE MINIMIZATION

A. The Subcontractor(s) shall participate in State and local government sponsored recycling programs as practicable. The Subcontractor(s) is further encouraged to minimize solid waste generation throughout the duration of the project.

2.06 BIOLOGICAL RESOURCES

A. The Subcontractor(s) shall minimize interference with, disturbance to and damage to fish, wildlife and plants, including their habitat.

B. The Subcontractor(s) shall be responsible for the protection of threatened and endangered animal and plant species including their habitat in accordance with Federal and State laws and regulations, including but not limited to Endangered Species Act requirements or equivalents established for the project

2.07 PREVIOUSLY USED EQUIPMENT

A. The Subcontractor(s) shall clean all previously used construction equipment prior to bringing it onto the project site.

B. The Subcontractor(s) shall ensure that the equipment is visually free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds.

C. The Subcontractor(s) shall consult with the Federal, State, and local jurisdictional offices for additional cleaning requirements.

2.08 MAINTENANCE OF POLLUTION CONTROL FACILITIES AND DEVICES

A. The Subcontractor(s) shall maintain permanent and temporary pollution control facilities and devices for the duration of the Contract or for that length of time construction activities create the particular pollutant.

2.09 TRAINING OF SUBCONTRACTOR PERSONNEL

A. The Subcontractor(s)' personnel shall be trained in all phases of environmental protection and pollution control. The Subcontractor(s) shall conduct environmental protection/pollution control meetings for all Subcontractor(s) personnel prior to commencing construction activities. Additional meetings shall be conducted for new personnel and when Site conditions change. The training and meeting agenda shall include: methods of detecting and avoiding pollution; familiarisation with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes and other regulated contaminants; recognition and protection of wetlands, and endangered species and their habitat that are known to be in the area.

2.10 CONTAMINATED MEDIA MANAGEMENT

A. Contaminated environmental media consisting of, but not limited to, groundwater, soils and sediments shall be managed in accordance with Specification Section 31 23 24 (Dredging and Delivery).

2.11 POST CONSTRUCTION CLEANUP

A. The Subcontractor(s) shall clean up all areas used for construction.

END OF SECTION

SECTION 01 50 10
SAFETY REQUIREMENTS AND PROTECTION OF PROPERTY

PART 1 GENERAL

1.01 SUBMITTALS

A. Informational: Name, address, and phone number of a responsible individual or individuals who will be available on a 24-hour basis to handle all emergency problems in connection with this project.

1.02 WORK INCLUDED

A. Work covered by these Contract Documents will be conducted in conjunction with cleanup operations in the vicinity of and on an uncontrolled hazardous waste site. All Work completed by the Subcontractor shall be accomplished in accordance with the Subcontractor's Site Health and Safety Plan as submitted to CH2M HILL.

PART 2 PRODUCTS

2.01 GENERAL

A. The Subcontractor agrees that each employee, while on the project site, shall meet the requirements of 29 CFR 1910.120 (HAZWOPER).

B. The Subcontractor agrees that each employee, while on the project site, shall wear the protective clothing and use all equipment specified in the Subcontractor's Site Health and Safety Plan. These requirements shall apply continuously.

C. Because all operations onsite have the potential for encountering hazardous substances, Level D shall be the minimum protection allowed. Although it is not expected, to adequately protect personnel in areas of higher potential hazardous substance exposure, Level C protection equipment may be required. The Subcontractor's Site Health and Safety Officer (SSO) will be responsible for informing the Subcontractor of the need to upgrade to Level C. The equipment required to be either worn or carried under these levels of protection must be listed in the Subcontractor's Site Health and Safety Plan.

PART 3 EXECUTION

3.01 GENERAL

A. The Subcontractor shall comply with its own Site Health and Safety Plan for the health and safety of persons and property working over water and in the vicinity of the Work areas. The Subcontractor's Site Health and Safety Plan shall be submitted to CH2M HILL for review and acceptance. All Work shall be

performed in accordance with the Site Health and Safety Plan. Noncompliance by the Subcontractor or its personnel with the Site Health and Safety Plan is grounds for a stop work order or dismissal of the Subcontractor with payment only for the Work completed.

B. CH2M HILL's Construction Health and Safety Plan is furnished in an Appendix for information purposes only. CH2M HILL will enforce its plan for its personnel only.

C. The Subcontractor shall develop and maintain, for the duration of this Contract, a comprehensive Health and Safety Program that is in compliance with all Federal, State and local regulations. The Subcontractor shall additionally designate a Site Safety Officer (SSO) whose sole responsibility will be to supervise and enforce the Subcontractor's safety program. The position may be held by a Subcontractor employee with other responsibilities on the project, such as a superintendent.

The acceptable qualifications for the SSO will be as follows: 1) A degree in Occupational Safety and Health from an ABET-accredited college; 2) Either a Certified Safety Professional (CSP) or Certified Industrial Hygienist (CIH) designation; 3) A Safety Trained Supervisor (STS) accreditation from the Board of Certified Safety Professionals plus 5 years of relevant work experience or 4) A resume that has been approved by CH2M HILL.

Additionally, the Subcontractor, as part of the Health and Safety program, shall: maintain tools and equipment to manufacturer specification, provide Personal Protective Equipment (PPE) adequate to perform all anticipated tasks, provide the proper equipment and trained personnel to administering First- AID/CPR, furnish Fire Extinguishing equipment and personnel trained in its use; as well as, provide for any other reasonable measures relating to Emergency Preparedness.

D. The duty of CH2M HILL to conduct review of the Subcontractor's performance is not intended to include a review or approval of the adequacy of the Subcontractor's health and safety supervisor, the Health and Safety Program, or any safety measures taken in, on, or near the site.

E. The Subcontractor shall be familiar with and comply with all applicable safety codes, ordinances, and statutes, and bear sole responsibility for the penalties imposed for noncompliance. This includes, but is not limited to waterway hazards, as well as those associated with barges, dredges, pipelines and boat traffic.

F. The Subcontractor shall submit the name, address, and phone number of a responsible individual or individuals who will be available on a 24-hour basis to handle all emergency problems in connection with this project.

G. The Subcontractor shall do all work necessary to protect the general public from hazards including, but not limited to, open boreholes, water sumps, and trenches

or excavation. Barricades, lanterns, and proper signs shall be furnished in sufficient amount to safeguard the public and the Work. All such barriers shall have adequate warning lights as necessary, or required, for safety.

H. The Subcontractor shall do all work necessary to protect the general public from on-water hazards created by the dredging/capping activities. This includes, but is not limited to pipeline identification and marker buoys, protection of commercial and recreational watercraft and maintenance of boat traffic.

I. CH2M HILL and authorized government agents, and their representatives, shall at all times be provided safe access to the Work wherever it is in progress, and the Subcontractor shall provide facilities for such access and for inspection.

PART 4 PAYMENT

4.01 GENERAL

A. All other work specified in this section shall be considered incidental to the project cost and expenses, and shall be included as part of the applicable lump sum or unit price bid amounts stated in the Subcontractor's compensation schedule.

END OF SECTION

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUBMITTALS

A. Submit prior to Final Application for Payment.

1. Record Documents: As required in 1.02 and General Terms and Conditions.
2. Special bonds, Special Guarantees, and Service Agreements.
3. Consent of Surety to Final Payment: As required in General Terms and Conditions.
4. Releases or Waivers of Liens and Claims: As required in General Terms and Conditions.
5. Releases from Agreements.

B. Final Application for Payment: Submit in accordance with procedures and requirements stated in Section 01 29 00, Measurement and Payment.

1.02 RECORD DOCUMENTS

A. Quality Assurance:

1. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain record documents.
2. Accuracy of Records:
   a. Coordinate changes within record documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.
   b. Purpose of Project record documents is to document factual information regarding aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive Site measurement, investigation, and examination.
3. Make entries within 24 hours after receipt of information that a change in the Work has occurred.
4. Prior to submitting each request for progress payment, request CH2M HILL's review and approval of current status of record documents. Failure to properly maintain, update, and submit record documents may result in a deferral by CH2M HILL to recommend whole or any part of Subcontractor's Application for Payment, either partial or final.

1.03 RELEASES FROM AGREEMENTS

A. Furnish CH2M HILL written releases from property owners or public agencies where side agreements or special easements have been made, or where Subcontractor's operations have not been kept within the CH2M HILL's construction right-of-way.

B. In the event Subcontractor is unable to secure written releases:

1. Inform CH2M HILL of the reasons.
2. CH2M HILL or its representatives will examine the Site, and will direct Subcontractor to complete the Work that may be necessary to satisfy terms of the side agreement or special easement.
3. Should Subcontractor refuse to perform this Work, CH2M HILL reserves the right to have it done by separate contract and deduct cost of same from Contract Price, or require Subcontractor to furnish a satisfactory bond in a sum to cover legal Claims for damages.
4. When CH2M HILL is satisfied that the Work has been completed in agreement with contract Documents and terms of side agreement or special easement, right is reserved to waive requirement for written release if: (i) Subcontractor's failure to obtain such statement is due to grantor's refusal to sign, and this refusal is not based upon any legitimate Claims that Subcontractor has failed to fulfill terms of side agreement or special easement, or (ii) Subcontractor is unable to contact or has had undue hardship in contacting grantor.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 MAINTENANCE OF RECORD DOCUMENTS

A. General:

1. Promptly following commencement of Contract Times, secure from CH2M HILL at no cost to Subcontractor, one complete set of Subcontract Documents.
2. Delete CH2M HILL's title block and seal from all documents.
3. Label or stamp each record document with title, "RECORD DOCUMENTS," in neat large printed letters.
4. Record information concurrently with construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded.

B. Preservation:

1. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
2. Make documents and Samples available at all times for observation by CH2M HILL.

C. Making Entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.
   a. Color Coding:
      1) Green when showing information deleted from Drawings.
      2) Red when showing information added to Drawings.
      3) Blue and circled in blue to show notes.
2. Date entries.
3. Call attention to entry by "cloud" drawn around area or areas affected.
4. Legibly mark to record actual changes made during construction, including, but not limited to:
   a. Horizontal and vertical locations of existing Underground Facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two measurements to permanent surface improvements.
   b. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, and Subcontractor's written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.

3.02 FINAL CLEANING

A. At completion of the Work or of a part thereof and immediately prior to Subcontractor's request for certificate of Substantial Completion; or if no certificate is issued, immediately prior to Subcontractor's notice of completion, clean entire Site or parts thereof, as applicable.

1. Leave the Work and adjacent areas affected in a cleaned condition satisfactory to CH2M HILL, and in accordance with requirements of applicable ordinances, land use/construction permits, or other agreements and approvals between CH2M HILL and the City or other Regulators.
2. Leave water courses, gutters, and ditches open and clean.

3.03 CLOSEOUT PUNCHLIST

A. Prior to submittal of Final Application for Payment, Subcontractor shall do a site walk with CH2M HILL's onsite representative. The purpose of this site walk will be for CH2M HILL to develop a punchlist of items that Subcontractor shall perform prior to the Work as described in the Subcontract Documents being

considered complete. Subcontractor shall complete all punchlist items before submitting its Final Application for Payment.

END OF SECTION

SECTION 01 91 14
DREDGED MATERIAL PROCESSING RELATED ACTIVITIES

PART 1 GENERAL

1.01 BACKGROUND

This dredged material (DM) processing scope of work for a Subcontractor is in support of dredging activities to be performed by a Dredger on River Mile 10.9 of the Lower Passaic River (LPR), located in the Township of Lyndhurst, New Jersey. Contracts downstream of DM processing will include pickup and removal of the decant water, processed DM (PDM) and debris from the Subcontractor's facilities at scheduled intervals by others.

Four main activities will occur at the DM offloading and treatment facility: 1) decanting of dredge scows (if necessary) with placement of the decant water (wastewater) into dedicated storage units (frac tanks or equivalent) for scheduled pick up by others; 2) debris removal from scows with placement of the consolidated materials in dedicated shipping containers (roll-off boxes or equivalent) for scheduled pick up and disposal by others; 3) DM processing using cementitious reagents followed by curing in a dedicated staging area to successfully pass the paint filter test (USEPA Method 9095A) and to yield a PDM that does not liquefy during transport to the PDM transfer facility (as simulated using ASTM D4253 and described herein); and, 4) scheduled load out of the processed DM (PDM) into trucks provided by others. CH2M HILL has the discretion to relax the plasticity requirement based on field assessments of the PDM consistency and workability.

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

Unless otherwise indicated, the most recent edition of the publication, including any revisions, shall be used.

A. NJ DEP Technical Manual for the Management and Regulation of Dredging Activities and Dredged Material in New Jersey's Tidal Waters (October 1997.)

B. USEPA SW-846 Method 9095A: Paint Filter Liquids Test

C. ASTM Standard D4253-00 (2006). "Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table," ASTM International, West Conshohocken, PA.

1.03 ORDER OF WORK

A. The Subcontractor's order of work and schedule shall be clearly stated in the Subcontractor's Work Plan.

B. The order of work for dredge scow unloading, DM processing, DM staging and loading for offsite disposal of DM requires coordination and scheduling with various facets and segments of work being accomplished by this and other ongoing contracts at the worksite and at off-site locations. At CH2M HILL's direction, the Subcontractor may be required to change the order or sequence of work as set forth in the Subcontractor's Work Plan and as initially approved by CH2M HILL to accommodate this coordination. Such direction from CH2M HILL shall not be the basis for a claim of increased costs from the Subcontractor as long as the Subcontractor can shift to other similar work at the time of the direction from CH2M HILL with only minor delays.

PART 2 DREDGED MATERIAL PROCESSING

2.01 SUMMARY

To make the DM processing as cost effective as possible per production run, consolidation of the DM in barges by the Subcontractor at its facilities prior to processing will be allowed. Additionally, in-scow DM processing and/or dockside DM processing will be allowed, which may both impact the necessity and ordering of the four main activities to be performed by the Subcontractor. All necessary state and federal permits required for the selected DM processing approach must be submitted by the Subcontractor in accordance with Section 01 33 00 – SUBMITTAL PROCEDURES.

The most significant of the work elements is the approach to DM processing and how it potentially relates to the dredging activities. In the Subcontractor submittals, the Subcontractor must describe which process will be implemented, and the associated dredge scow coordination and transfer issues with the Dredger. Constraints neither identified nor anticipated by Subcontractor in submittals will be treated as incidental to the work activities post award.

For in-scow DM processing, the potential coordination and transfer issues with the Dredger may include, but are not limited to: maximum total length and/or capacity of scows to be accepted daily based on bulkhead availability; willingness, limitations and/or schedule to accept partially full scows; required decanting (if necessary), processing, curing and offloading times in scow prior to returning scows to service to the Dredger; and other issues that would impact acceptance of scows, including physical size, draft, turning radius, etc. Barge consolidation approaches, if used, should be outlined.

For DM processing at land side facilities (temporary or permanent), the potential coordination and transfer issues with the Dredger may include, but are not limited to: maximum total length and/or capacity of scows to be accepted daily based on bulkhead availability; willingness, limitations and/or schedule to accept partially full scows; required decanting (if necessary) and offloading times prior to returning scows to service to the Dredger; and other issues that would impact acceptance of scows,

including physical size, draft, turning radius, etc. Barge consolidation approaches, if used, should be outlined.

It is envisioned that decanting water from the dredge scows will be necessary; however, the innovation and approach taken by the Subcontractor may obviate this requirement. It is envisioned that the DM will be solidified using some combination of cementitous reagents and pozzolans, as allowed by the NJDEP Alternative Use Determination (AUD) permit conditions for the Subcontractor's facility. Acceptance of the Subcontractor's mix design, reagents, mixing equipment, and methods shall be reviewed and approved by CH2M HILL based on bench scale test results and/or successful prior contract performance with DM having similar geotechnical attributes and consistency. CH2M HILL will be responsible for offsite PDM transportation and disposal fees; therefore, the economics of the transportation and disposal fee and the Subcontractor supplied unit price will also be considered in selecting alternative DM processing methods and amendments.

DM production runs associated with the RM 10.9 project must be kept separate from other materials (other sources) DM processed by the Subcontractor The use of dedicated decant water containers, debris shipping containers and PDM stockpiling, staging and load out areas is required. Decontamination of the processing and handling equipment is required after the RM 10.9 project materials are processed unless dedicated equipment is used for the duration of the contract.

As the dredging debris and PDM will be ultimately be disposed in a RCRA Subtitle C Landfill, the main performance requirements of the PDM will be to pass the paint filter test to allow for transport and for the PDM to not yield free liquids during transportation to the PDM transfer and disposal site. This PDM material consistency requirement is embodied by the requirement for the 24-hour cured PDM (minimum time) to not yield free liquid during a paint filter test performed immediately after the PDM has been vibrated for 15 minutes at 50 Hz on a vibratory table as described in ASTM D4253, Methods 1B or 2B. CH2M HILL has the discretion to relax the PDM material consistency requirement based on field assessments of the PDM consistency and workability. Performance under this contract will be verified at specified intervals.

2.02 SUBMITTALS

In addition to the requirements identified below, the Subcontractor shall comply with all documentation, reporting and Acceptable Use Determination (AUD) requirements contained in the NJDEP October, 1997 Manual "The Management and Regulation of Dredging Activities and Dredged Material in New Jersey's Tidal Waters." All plans, reports, forms and documents needed to comply with the requirements of the NJDEP Manual must be submitted to CH2M HILL within 30 days of contract award. Notice to Proceed (NTP) shall not be issued until all such plans, reports, forms and documents have been received and approved by CH2M HILL.

A. A. Pre-NTP Submittals

1. A facility list including the names, locations, relevant points of contact, telephone/fax numbers for the offloading and processing location(s).
2. A detailed facility map indicating the locations of DM offloading, handling, processing, stockpiling, staging and residuals management. Show all relevant equipment and reagent storage locations.
3. An equipment list including all equipment to be used on the project.
4. A detailed description or specification sheet for each piece of equipment
5. Subcontractor's Work Plan including:
    a. A schedule and flow chart showing the mobilization activities (if required), DM processing activities, throughputs, hold times, decision points, reprocessing activities and their inter-relationships to demonstrate adequate process capacity.
    b. A detailed description equipment, methods and techniques for DM unloading, scow consolidation, processing and PDM stockpiling, staging and load out areas. Provide visual information (figures, flow charts, etc.) or other information to illustrate the relationship between DM processing activities and residuals management including, but not limited to: placement and mooring details of unloading barges and equipment, decanting, decant water pumping, and description of spill pans or other methods to prevent spillage of dredged material into the water at the unloading location.
    c. The details of the Subcontractor's equipment and methods for the introduction and mixing of S/S reagents.
    d. A detailed description of S/S reagents, mix design formulation and test mix plan for the PDM.
    e. A detailed description of the low-permeability pad areas for stockpiling and staging dedicated by the Subcontractor for the RM 10.9 –derived PDM, including all soil and erosion control measures, construction access roads to accommodate material rehandling trucks, and a temporary retention basin, as appropriate. Subcontractor must size and design operations and stockpile pad as to ensure that processing operations are not impacted by lack of capacity. Show how runoff will be transferred to the dedicated storage containers for the decant water.
    f. A Subcontractor developed plan describing how RM 10.9-derived media (DM, decant water, leachates, surface water runoff) will be managed separately from other DM being processed at the facility.
    g. A Subcontractor developed plan describing how equipment in contact with RM 10.9-derived media (DM, decant water, leachates, surface water runoff) will be decontaminated after use and prior to re-purposing for the treatment of other sources of DM to prevent cross-contamination.

h. A description of the PDM load out operations, and measures taken to prevent cross-contamination and/or tracking of PDM onto roadways by haulers as they leave the Subcontractor's facility.
i. Copies of Notice to Mariners requests and all correspondence with the U.S. Coast Guard and local marine interests relative to the project.
j. A Quality Assurance Project Plan (QAPP) providing detailed methods for collecting and analyzing samples, including sampling techniques, transportation to the lab (if offsite), maintenance of chain-of-custody, and quality assurance/quality control measures.
k. A copy of the New Jersey Department of Environmental Protection (NJDEP) approved air permit for the stabilization facility.
l. A copy of the Authorized Use Determination (AUD) issued by the NJDEP for the dredged sediment to be stabilized.

B. Work Submittals

1. The format and content scope of all submittals included in the Work Submittals section shall be approved by CH2M HILL as a pre-NTP submittal.
2. Daily DM processing reports in a format and including detail as approved by CH2M HILL.
3. A copy of all daily source documents from which the summary report information was collected.
4. Daily reports tracking delivery and estimated quantities of DM
5. A report of the water handling activities at the Subcontractor's facility including decanting and pumping of decant water, sampling, analyses, results, and permit related submittals. Tracking details will include quantities of water handled, pumped, stored, released and/or spills, and removed from the site.
6. Weekly schedule updates to be used in judging the progress of the work.
7. Detailed reports of delivery and usage of materials used for amending the DM.
8. Daily reports tracking the quantities of PDM placed into specific stockpile locations.
9. Daily reports tracking the quantities of PDM removed from specific stockpiles including the detailed accounting of material removed offsite by others. Such reports shall include sampling and results for paint filter and ASTM D4253 tests.
10. Certified scale receipts of PDM removed from site, Origin and Destination (O&D) forms and transportation manifests for the PDM shipments are to be scanned and compiled in sequential order and provided as a PDF document weekly via CD or other approved electronic delivery.
11. PDM sampling and testing results and acceptability

2.03 QUALITY CONTROL AND ASSURANCE

A. The Subcontractor shall provide a Quality Control Manual that specifically details the inspection, testing, control, reporting, and review of his operations so as to ensure that the work is completed in accordance with the plans and specifications.

3.0 EXECUTION

3.01 MANAGEMENT AND DISPOSAL OF DECANT WATER

It is anticipated that the dredged scows will contain decant water that must be pumped off and stored in protected and dedicated containers for offsite removal and treatment. Likewise, wash and decontamination water from the equipment associated with RM 10.9-derived DM production runs and surface runoff collected from the RM 10.9-derived PDM dedicated stockpiling and staging areas will be similarly collected and managed. These RM 10.9-impacted waters will be collected and stored in truck accessible containers with controls and fittings that enable pneumatic removal by others at specified intervals.

The Subcontractor will be responsible for adequately sizing the decant water storage facilities and managing the decant water storage capacity. Using a 24-hour advance notification period, the Subcontractor will arrange for decant water removal with the following party:

NAME
Address 1
Address 2
City, State, ZIP

CONTACT PERSON:
Tel:
Fax:

The management, storage and removal of RM 10.9-derived waters are considered to be incidental to the DM processing operations and no separate measurement or payment for this work shall be made. CH2M HILL will be responsible for fees associated with the removal and treatment of said waters.

3.02 UNLOADING AND PROCESSING THE DREDGED MATERIAL

A. Dewatered DM shall be unloaded by the Subcontractor at its facility in order to sufficiently solidify the material for offsite disposal. Unloading cranes, buckets, hoppers and other equipment shall be designed and equipped with spill plates, drip pans, and or other mechanisms such that no DM or water is spilled into or allowed to run off into the water at or near the unloading site during the unloading process. The unloading and mixing system shall be designed by the Subcontractor and submitted for CH2M HILL's review. The unloading shall be by mechanical means.

B. Plans and AUD for Subcontractor's facility are to be submitted as part of the Subcontractor's Work Plan. The Subcontractor must allow and coordinate with any local marine traffic in the unloading area. The DM processing operations, S/S reagent addition, PDM curing, stockpiling, staging and load out operations shall utilize equipment and procedures that maximize dust control such as micro-mist and hanging curtains.

C. A dedicated low-permeability PDM stockpiling and staging pad and surface water runoff collection system shall be sized and designed by the Subcontractor and submitted for CH2M HILL's review. PDM must be stockpiled on an impermeable pad and must utilize erosion and sediment control processes that control any drainage water from the DM processing activities and direct it to lined settlement ponds for conveyance to the dedicated decant water storage location. The PDM stockpiling and staging pad shall be accessible for collection of representative samples for observation and testing. Lined settlement ponds (or the equivalent) are to be maintained to prevent overflow of accumulate sediment. Accumulated sediment is to be removed and processed with the PM for subsequent offsite disposal. The PDM stockpiling and staging pad is to be decontaminated or removed for offsite disposal in accordance with all applicable regulations at the end of the project.

D. The Subcontractor will be responsible to demonstrate that the PDM to be disposed of offsite passes the USEPA SW-846 Method 9095A: Paint Filter Liquids Test. Moreover, 24-hour cured PDM (minimum time) must not yield free liquid during a paint filter test performed immediately after the PDM has been vibrated for 15 minutes at 50 Hz on a vibratory table as described in ASTM D4253, Methods 1B or 2B. CH2M HILL has the discretion to relax the PDM material consistency requirement based on field assessments of the PDM consistency and workability.

E. The DM shall be amended with S/S reagents in accordance with the mix design submitted by the Subcontractor and approved by CH2M HILL. Field adjustments to the mix design to account for variations in DM properties and water content to enable the PDM to satisfy the requirements of Item D above will be approved in writing by CH2M HILL. All risk for deviations from the pre-NTP approved mix designs will reside with the Subcontractor. Specifically, the costs and consequences of increased curing duration and reagent dosing will be borne by the Subcontractor at no additional cost to the project or CH2M HILL.

F. The required testing interval is every 500 CY, or other smaller mutually agreed to quantity (in writing) by the Subcontractor and CH2M HILL. Additional tests may be directed by CH2M HILL. All tests and inspections required for determining compliance with the performance criteria shall be paid for by the Subcontractor including costs for processes that fail to meet the requirements.

G. CH2M HILL will provide written authorization for PDM load out and offsite hauling for disposal within 24 hours of the Subcontractor providing satisfactory test results. Any PDM that fails the performance criteria shall be remixed,

reprocessed and retested at the Subcontractor's time and expense until compliance with the performance criteria is attained.

H. Should the PDM liquify or become unworkable as a result of traffic-induced vibrations during offsite transport to the local PDM transfer facility for loading onto railcars, the Subcontractor will be responsible for all costs associated with non-compliance and PDM retreatment should the load(s) be rejected.

3.03 DM LOAD OUT OPERATIONS

A. Subcontractor will provide facility route map and traffic plan to designated PDM haulers and brief them on Subcontractor facility guidelines and safety issues and other requirements to ensure safe operations.

B. Subcontractor shall load trash, debris, oversized materials, water, DM and PDM into containers/trucks provided by CH2M HILL's transportation and disposal (T&D) Subcontractor.

C. Subcontractor is to implement measures to prevent offsite tracking of DM and PDM from the Subcontractor's facility. Such measures can include a stone tracking pad or a truck wash station.

D. CH2M HILL will provide templates for required Origin & Destination (O&D) form plus manifest of contaminated materials. Subcontractor is to prepare O&D and manifest for each load shipped offsite.

E. Subcontractor is responsible to maintain practices to ensure operations to not impact cleanliness of public roadways along the entire haul route. Subcontractor shall, further, provide street sweeping continuously from 7:00 AM until 4:00 PM within 150 feet of the facility entrance.

F. Subcontractor will accept trucks for PDM load out between the hours of 6 AM and 3 PM Eastern Standard Time (Eastern Daylight Time during Daylight Saving Time) Monday through Saturday. PDM load out will not be permitted occur on Sunday and all legal, state, and municipal holidays.

3.04 MANAGEMENT AND DISPOSAL OF TRASH AND DEBRIS REMOVED FROM SCOWS & DM PROCESSING EQUIPMENT

It is anticipated that the dredged scows will contain varying degrees of trash, debris and oversized materials along with the DM to be processed. Such material shall be separated from the DM, processed so as to be acceptable for transport and disposal at a Subtitle C landfill, and be stored in dedicated and protected storage containers for removal by others from the Subcontractor's facilities. It is anticipated that the trash, debris and oversized materials will be stored onsite only until a single truckload quantity has accumulated.

At that time and using a 24-hour advance notification period, the Subcontractor will arrange for debris container pickup and for new container replacement with the following party:

NAME
Address 1
Address 2
City, State, ZIP

CONTACT PERSON:
Tel:
Fax:

The management, storage and removal of debris are considered to be incidental to the DM processing operations and no separate measurement or payment for this work shall be made. CH2M HILL will be responsible for tipping fees associated with disposal of trash and debris.

3.05 MEASUREMENT

A. A. Measurement of successful PDM treatment shall be on the basis of certified scale receipts of PDM shipped offsite and shall be measured in tons..

3.06 QUANTITY CALCULATIONS

Final acceptance of the whole or part of the work and the deductions or corrections of deductions made thereon will not be reopened after once having been made, except on evidence of collusion, fraud or obvious error, and the acceptance of a completed section shall not change the time of payment of the retained percentages of the whole or part of the work.

The work will be accepted after completion of each of the major increments of DM processing based on the Subcontractor's work plan and as approved by CH2M HILL.

END OF SECTION

SECTION 02 32 00
SEDIMENT CAPPING

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
   a. C33, Standard Specification for Concrete Aggregates.
   b. C117, Standard Test Method for Materials Finer Than 75-Micrometers (No. 200) Sieve in Mineral Aggregates by Washing.
   c. C127, Standard Test Method for Density, Relation Density (Specific Gravity), and Absorption of Coarse Aggregate.
   d. C136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
   e. C295, Standard Guide for Petrographic Examination of Aggregates for Concrete.
   f. D75, Standard Practice for Sampling Aggregates.
   g. D638, Standard Test Method for Tensile Properties of Plastics
   h. D854, Standard Test Methods for Specific Gravity of Soil Solids by Water Pycnometer.
   i. D3776/D3776M, Standard Test Methods for Mass Per Unit Area (Weight) of Fabric.
   j. D4355, Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in Xenon Arc Type Apparatus.
   k. D4491, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
   l. D4533, Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
   m. D4632, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
   n. D4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile
   o. D4992, Standard Practice for Evaluation of Rock to be Used for Erosion Control.
   p. D5312, Standard Test Method for Evaluation of Durability of Rock for Erosion Control Under Freezing and Thawing Conditions.
   q. D5313, Standard Test Method for Evaluation of Durability of Rock for Erosion Control Under Wetting and Drying Conditions.
   r. D5519, Standard Test Methods for Particle size Analysis of Natural and Man-Made Riprap Materials.
   s. D6241, Standard Test Method for the Static Puncture Strength of Geotextile and Geotextile-Related Products Using a 50-mm Probe.

2. AASHTO
   a. M 288, Standard Specification for Geotextile Specification for Highway Applications.

1.02 DEFINITIONS

A. Sand Material: Clean sand material that will be placed on top of the newly dredged sediment surface as part of a combined sand/active material layer and on top of the armor stone as a habitat layer.

B. Active Material: AquaGate+PAC™ activated carbon. The active material will be placed with clean sand material to form a uniformly mixed sand/active material layer.

C. Geotextile Material: Permeable non-woven geosynthetic filter fabric that will be placed on top of the active layer.

D. Armor Material: Hard, angular stone that will be placed on top of the geotextile material for erosion protection.

E. Low-Energy Placement: Placement of granular material (active material, sand material, armor material) resulting in low-energy of the material as it impacts the river substrate by controlling the mass rate and velocity of the material delivery.

1. Acceptable methods for low-energy placement of sand and active materials, if shown to meet the environmental and physical tolerances of this Section, include the use of sand/salt broadcast spreaders, conveyor systems, hydraulic pumping and placement with the use of diffusers or tremies.

2. Acceptable methods for low-energy placement of armor stone include the excavator bucket or clamshell release of material just above the receiving layer surface, minimizing the drop height (free fall) and material mounding as further specified in this Section.

3. Bottom or belly dumping from floating vessels, submerged clamshell releases (for sand and active material), washing of materials from barges, mounding of material on river substrate and subsequent spreading, are prohibited.

1.03 SUBMITTALS

A. Submittals Prior to Construction. Submit the following plans and include specific equipment proposed for material handling and low-energy placement, where applicable, including anticipated long- and short-term storage methods and locations, land-side delivery, placement sequence, placement rates (volume per unit time) and means and methods to verify placement of each capping layer.

1. Sand/Active Material Placement Plan: Plan describing transport, delivery, transferring and
low-energy placement of the combined sand/active material. Include gradation test data and active material manufacturer specification sheets.
2. Geotextile Placement Plan: Plan describing transport, delivery, transferring and placement of geotextile material. Include manufacturer material specification sheets.
3. Armor Placement Plan: Plan describing transport, delivery, transferring and placement of armor materials. Include gradation and other specified physical test data.
4. Sand Habitat Layer Placement Plan: Plan describing transport, delivery, transferring and placement of the sand habitat layer. Include gradation test data.
5. Storm Water Pollution Prevention Plan which describing means and methods and best management practices to be utilized for keeping stockpile areas free of water, debris, and foreign material during storage handling and placement of materials.

B. Informational Submittals: Performance data from past projects using similar equipment and technologies.

PART 2 - PRODUCTS

2.01 SAND MATERIAL

A. The sand portion of the combined sand/active material layer shall be a maximum average of 70 percent by volume and a maximum of 75 percent by volume. The sand habitat layer shall be sufficient to cover the armor stone and form a smooth final cap surface. The sand material shall be medium to coarse sand (USCS Classification SW or SP) with no more than 1 percent passing the Number 200 sieve (P200). Clean, hard, durable imported material, free from foreign materials. Specific gravity as determined in accordance with ASTM C127 and ASTM D854: 2.5 minimum. Gradation as determined in accordance with ASTM C117 and ASTM C136:

Sieve Size	% Passing
3/8 in.	100
#4	95–100
#8	80–100
#16	50–85
#30	25–60

Sieve Size	% Passing
#50	10–30
#100	2–10
#200[a]	0–1

[a]Specification for passing #200 sieve reduced from 0 to 3 percent for ASTM C33 Fine Aggregate to 0 to 1 percent.

2.02 ACTIVE MATERIAL

A. The active material shall be placed as a uniform mixture within the sand layer and consist of a minimum average of 30 percent by volume and a minimum of 25 percent by volume of AquaGate+PAC™ as manufactured by AquaBlok, Ltd.

1. Physical Properties of AquaGate+PAC™ are as follows:
   a. Activated carbon by weight: 10%
   b. Dry Bulk Density: 60 to 70 lbs/ft3
   c. Settling velocity of standard AquaGate+PAC™: 15 cm/s

B. Active materials will be placed in strict accordance with the type, manufacturer, sequence, and thickness specified in this Section unless otherwise approved by CH2M HILL prior to construction.

C. Where applicable Matt Grab strength testing results shall be provided prior to construction.

2.03 ARMOR MATERIAL

A. Clean, hard, angular, durable imported material that is free from foreign materials.

B. Perform evaluation tests on stone samples collected from the proposed source under the direction of a registered geologist or registered engineer. The tests to which the stone shall be subjected include petrographic examination (ASTM C 295), bulk specific gravity (SSD), absorption (ASTM C 127), resistance of stone to freezing and thawing (ASTM D 5312), and if argillaceous limestone and sandstone are used, resistance to wetting and drying (ASTM D 5313) to meet the following requirements.

1. Bulk specific gravity (SSD) > 2.65
2. Absorption < 2 percent
3. Resistance to Freezing and Thawing, maximum loss < 10 percent
4. Resistance to Wetting and Drying, maximum loss < 1 percent

C. Gradation to be determined in accordance with ASTM D5519.

D. Provide Armor Material to an average thickness of 12 inches and a minimum thickness of 10 inches as shown on the plans.

Limits of Stone Weight (lb) for Percentage Lighter by Weight					
100		50		15	
Max.	Min.	Max.	Min.	Max.	Min.
23	9	7	5	3	1

2.04 GEOTEXTILE

A. Nonwoven 100 percent plastic high-strength dimensionally stable filter fabric.

B. Opening size, permittivity, UV resistance, and strength properties meet applicable standards as given below.

Geotextile Properties and Applicable Standards

Property[a]	Test Method	Units	MARV[b]
Grab Strength	ASTM D 4632	N	1400
Sewn Seam Strength[c]	ASTM D 4632	N	1260
Trapezoidal Tear Strength	ASTM D 4533	N	500
Puncture Strength	ASTM D 6241	N	2750
Permittivity	ASTM D 4491	sec^{-1}	0.5[d]
AOS	ASTM D 4751	mm	0.5[d,e]
UV stability (retained strength)	ASTM D 4355	percent	50 (after 500 hours)

AOS, apparent opening size; UV, ultraviolet; N, newton; mm, millimeter; sec, second.
[a] AASHTO Standard Specification M 288, Type 1 geotextile for erosion control, separation, and survivability.
[b] Minimum Average Roll Value in weaker principal direction, except as noted otherwise.
[c] If sewn seams required; otherwise overlap.
[d] AOS and Permittivity are perpendicular to plane of geotextile.
[e] AOS is maximum size allowed.

2.05 SOURCE AND QUALITY ASSURANCE

A. Subcontractor shall provide the results of one representative gradation test (ASTM D2487) per 1,000 cubic yards from the sand source prior to the delivery of the sand to the site. Subcontractor shall also perform chemical analyses of sand material according to the certification and testing requirements established by the USEPA to certify the material meets requirements prior to placement of the sand cover. These analytical testing include:

1. TAL metals (excluding mercury) and titanium using EPA Method 6010C/6020A
2. SVOCs using EPA Method 8270C
3. PAHs and alkyl PAHs using a laboratory-specific SOP based on California EPA Air Resources Board Method 429 and NOAA ORCA 130 Method
4. PCBs (homologs and congeners) using EPA Method 1668A
5. PCDDs/PCDFs using EPA Method 1613B
6. Organochlorine pesticides using a laboratory-specific SOP based on USEPA Method 1699
7. Chlorinated herbicides using EPA Method 8151A
8. TPHs (extractable) using NJDEP Method OQA-QAM-025-02/08
9. Butyltins using a laboratory-specific SOP based on Krone 1988
10. Mercury, low-level using EPA Method 1631
11. Cyanide using EPA Method 335.2
12. VOCs using EPA Method 8260B

B. Subcontractor shall also perform chemical analyses of sand material in accordance with N.J.A.C. 7:26E. Project-specific samples shall be collected and analyzed for the full TCL/TAL/metal suite.

C. Subcontractor must receive the approval from CH2M HILL prior to delivery and placement of the sand.

D. Subcontractor shall provide the results of testing of the armor stone source prior to the delivery of the stone to the site.

1. One representative series of evaluation tests specified in this Section per armor stone (riprap) source.
2. One representative gradation test (ASTM D5519) per 3,000 tons from the armor stone (riprap) source.

E. Subcontractor shall provide geotextile and active material manufacturer specifications and product literature including certification that furnished products have specified property values prior to the delivery to the site.

PART 3 – EXECUTION

3.01 GENERAL

A. Keep stockpile areas free of water, debris, and foreign material during storage handling and placement of materials. Provide storm water protection of material stockpiles in accordance BMPs described in the Storm Water Pollution Prevention Plan.

B. Place sand/active and bulk active materials using approved low-energy placement methods consisting of a conveyor/broadcast spreader system or a conveyor/diffuser system, or similar method of accurately placing a measured amount of material to a uniform thickness through the water column. Minimize

resuspension and mixing of in situ sediments or previously placed materials. Methods shall enable the material to be placed to the tolerances required in this Specification.

C. Tolerances:

1. Final Lines and Grades: Materials shall be placed to the dimensions shown or specified otherwise as follows:
   a. For the combined sand/active materials, the average thickness shall be 10 inches with a minimum thickness of 8 inches.
   b. For geotextile, place within a horizontal tolerance of 1.0 foot. Overlaps shall be a minimum of 18 inches for geotextile.
   c. For armor materials, within a horizontal tolerance of 2.0 feet, an average thickness of 12 inches, and a minimum thickness of 10 inches, except that no armor stone will be allowed within the shipping channel.
   d. For sand habitat material, cover the armor stone so that the final cap has a smooth surface.
2. Placement tolerances will be monitored and verified by CH2M HILL after each material is placed. Subcontractor shall complete corrective measures prior to placement of the next successive material.

D. Coordinate placement of capping materials with:

1. Placement of sampling and monitoring devices required for Subcontractor's Quality Control Plan prior to and during installation of capping materials;
2. Placement of sampling and monitoring devices required by CH2M HILL's Sampling and Analysis Plan (SAP) and/or Quality Assurance Plan (QAP).

E. In the event that the capping materials slough into the Federal Navigational Channel due to the design, the Subcontractor shall remove the sloughed material.

3.02 SAND AND ACTIVE MATERIAL PLACEMENT

A. Place clean sand and active material to the specified thickness over the sediment surface as shown on the plans so that the active material and sand form a combined uniformly mixed layer upon placement.

B. Place clean sand habitat layer to cover the armor stone.

C. Following placement, measurements will be performed by the Subcontractor in accordance with QC requirements to confirm that the thickness of the material placement is within specified tolerances.

D. Place material in such a manner as to minimize resuspension of sediments and to minimize turbidity caused by the placement techniques.

E. Subcontractor will not be reimbursed for placement of materials beyond tolerances.

3.03 GEOTEXTILE PLACEMENT

A. Use spreader bars or slings to unload, lift, move, store and deploy rolls in accordance with manufacturer's instructions and without damaging the material.

B. Orient geotextile with long (unrolled) direction perpendicular to shoreline.

C. Avoid damage to the bottom surface of the geotextile/RCM when moving across ground.

D. Spuds must not be placed on the geotextile.

E. All geotextile panels shall be installed flat, with no wrinkles or folds.

F. Secure geotextile during installation as necessary with sand bags or other means approved by CH2M HILL.

G. End-of-panel overlaps shall be sewn, stapled or hog-ringed along each side of a 1foot overlap.

H. Do not place successive layer(s) on top of geotextile until CH2M HILL provides authorization to proceed.

I. If tears, punctures, or other geotextile damage occurs during placement of geotextile or successive materials, remove overlying products as necessary to expose the damaged geotextile material and repair or replace as directed.

3.04 ARMOR PLACEMENT

A. Armor stone shall be carefully placed by mechanical means directly on the geotextile to avoid tears and punctures and disturbance of the geotextile material.

B. Do not allow armor stone to drop more than one foot free fall above water nor more than two foot free fall below water.

C. Armor stone shall be handled so that the stone size distribution of each load placed is representative of the specified armor stone gradation.

D. Armor stone shall be placed so it is not mounded to a thickness greater than the specified layer thickness.

3.05 QUALITY CONTROL TESTING

A. General: Subcontractor will be required to monitor properties and placement of completed work in accordance with the Construction Quality Control Plan. Specific testing requirements include the following:

B. Material Properties

1. Gradation of sand and armor materials as placed.

C. Material Placement

1. Tolerances: horizontal and vertical via cores for sand and active layers and settlement plates for armor layers. Post-construction surveys via bathymetric surveys and, as needed, poling or coring for verification of coverage.

D. The placement accuracy for and tolerance specifications of the sand, active and armor layers will have been satisfied when the following statistical criterion is demonstrated based on post-sand layer, post-active layer, post-armor layer and post-habitat layer placement measurements to be conducted by CH2M HILL:

Number of Samples Needed to Document Attainment of Minimum Thickness Requirement

Number of Samples Collected	Number of Samples Needed to Exceed Minimum Thickness	Number of Samples Collected	Number of Samples Needed to Exceed Minimum Thickness
11	11	21	20
12	12	22	21
13	13	23	22
14	14	24	23
15	15	25	23
16	16	26	24
17	17	27	25
18	17	28	26
19	18	29	27
20	19	30	28

Cap Layer Thickness Requirements

Cap Layer	Minimum Thickness (inches)	Minimum Average Thickness (inches)	Maximum Average Thickness (inches)
Combined Sand/Active	8	10	
Armor	10	12	
Habitat	Cover armor stone		
Total Cap Layers (Combined Sand/Active + Armor + Habitat)			24

END OF SECTION

SECTION 31 23 24
DREDGING AND DELIVERY

PART 1 GENERAL

1.01 DESCRIPTION

A. Summary: The Subcontractor shall furnish all labor, materials, equipment, transportation, plant, and supervision necessary to perform mechanical dredging of contaminated sediments at the Site, to transport the dredge material to the designated unloading area(s), and to exercise control and abatement of pollution resulting, or likely to result from dredging, transport of dredged materials, and/or activities associated with dredging, in accordance with the Contract.

General Statement: The principal contaminants of concern within the river sediments are dibenzodioxins/polychlorinated dibenzofurans (PCDDs/ PCDFs), polychlorinated biphenyls (PCBs, both homologs and congeners), polycyclic aromatic hydrocarbons (PAHs) and mercury. Additional chemical contaminants are also present as described in the *River Mile 10.9 Characterization Program Summary, Lower Passaic River Study Area*, CH2M HILL & AECOM, April 19, 2012 which is included as Attachment 1 of Specification Section 01 11 03 – Summary of Work.

B. Delivery:

1. The Subcontractor shall remove sediments and debris from a portion of the RM 10.9 reach of the LPRSA with a mechanical dredge and implement engineering controls to meet the environmental requirements.
2. The Subcontractor shall load sediment and debris into barges and transport downstream to the designated treatment facility(ies).
3. The dredged materials (DM) will be unloaded from the barge by the Subcontractor. The Sediment Treatment facility(ies) consists of barge unloading areas, receiving areas, and treatment areas and storage areas.

C. Environmental Protection Requirements (01 45 55): Provide and maintain during the life of the Contract, environmental protective measures including protection of existing structures, oil spill prevention and cleanup, air quality, water quality, noise abatement, debris management and protection of endangered species. Comply with all Federal, State, and local laws, regulations, approvals and plans pertaining to water, air, and noise pollution and specifically with the Administrative Settlement Agreement and Order on Consent for Removal Action, Docket No. 02-2012-2015, by the Cooperating Parties Group (CPG) (hereinafter referred to as the AOC).

D. Environmental Dredging: The primary function of this Contract is to improve and protect the environment. An industry-recognized environmental dredge system shall be used to remove contaminated sediments as set forth in Part 3, EXECUTION, below. Certain constraints and limitations will be imposed on the dredging Subcontractor and on the operation of the dredge equipment. The

Subcontractor must demonstrate the experience and equipment necessary to minimize or eliminate sediment resuspension and transport. The Subcontractor shall either demonstrate that dredge operators have been trained in the proper operation and control of environmental clamshell buckets and associated machine control software equipment and provide written documentation of appropriate training prior to startup. CH2M HILL shall have access to dredging equipment so they can observe operations and verify that proper operating protocols are being followed in accordance with the Contract Drawings and Specifications, Subcontractor work plans, CH2M HILL Environmental Management Plans (EMPs), and permit conditions. CH2M HILL will comply with the Subcontractor's Health and Safety Plan and instructions during these inspections.

1.02 PERMITS

A. All activities related to this Work will be undertaken in accordance with all statutory and other obligations including key legislation and policies, approvals, licences and agreements.

B. The Subcontractor will be responsible for obtaining and renewing all relevant maritime vessel and port access approvals.

C. Key approval requirements which are the responsibility of CH2M HILL include the following:

1. Clean Water Act 33 U.S.C. 1251, Section404 Dredge and Fill Requirements
2. Section 10 Rivers and Harbors Act of 1899/ Section 404 Clean Water Act
3. Waterfront Development Permit (New Jersey Waterfront Development Law (NJSA 12:5-3))
4. Flood Hazard Area Permit (Flood Hazard Area Control Act N.J.S.A. 58: 16A-50 et. seq.)

D. All plant facilities and equipment will be inspected by CH2M HILL to evaluate compliance with Project Health and Safety Requirements. Plant facilities and equipment will only be permitted to be used after they pass CH2M HILL's inspection.

1.03 DEFINITIONS

A. Contaminated Material: Contaminated material refers to the debris, river bed and subsurface materials such as silts, sands, clays, and other soils/sediments within the defined Removal Area limits identified on the Contract Drawings.

B. Debris: Debris includes but is not limited to logs and woody material larger than 3 feet in the longest dimension, anchors, chains, rope, cinderblocks, slag, steel work scrape material, and other man-made or naturally deposited material located within the dredging area that is not sediment or smaller woody or other naturally-occurring organic material less than 3 feet in the

longest dimension. Debris shall be segregated by the Subcontractor as the material is dredged, as practical as determined by CH2M HILL. The Subcontractor shall manage segregated debris separately for offloading by the Sediment Treatment Subcontractor at the designated unloading site.

C. Shoreline Vegetation: Shoreline vegetation includes branches, limbs, and trees that would otherwise prevent the dredge from accessing sediment along the shoreline of the river.

D. In Situ: In situ is the undisturbed physical and chemical condition of the dredge material prior to the start of dredging.

1.04 -SUPPORT FACILITIES

A. Facilities which the Subcontractor shall install include:

1. Suitable dock, docks, floating pontoons, or landing barge to safely move personnel and equipment from the Shoreside Support Facilities to dredge and back.

B. All Support Facilities shall be considered temporary, and shall comply with the provisions of Section 01 51 01, Support Facilities.

C. Subcontractor is responsible for obtaining permission/permits for use of Support Facilities

1.05 OBSTRUCTION OF NAVIGATION CHANNEL

A. The Subcontractor shall conduct the Work with means and methods that will obstruct the Navigation Channel as little as practicable. If the Subcontractor's equipment does obstruct the Navigation Channel and makes the passage of vessels difficult or endangers them, the Subcontractor shall promptly move or otherwise reconfigure equipment to afford practicable, safe, and expedient vessel passage. The Subcontractor shall communicate with the Newark Bay Port Authority, USACE, US Coast Guard and other affected Regulators on a regular basis concerning their planned activities so the appropriate Notice to Mariners and navigation restrictions can be issued or modified. The Subcontractor shall document these communications and resulting actions in writing.

B. Upon completion of the Work, the Subcontractor shall promptly remove its dredging plant equipment, including ranges, buoys, piles, and other marks installed under this Contract.

1.06 SUBMITTALS

A. The following shall be submitted in accordance with Section 01 33 00, Submittal Procedures:

1. SD-01 Preconstruction Submittals:
   a. Dredging and Operations Plan.

1) The Subcontractor shall submit for approval a preliminary dredging and operations plan. In general, the dredging and operation plan must include details of the dredging plant equipment the Subcontractor intends to use and a schedule indicating start and completion dates for work to be performed. The Subcontractor's dredging and operations plan shall include, but is not limited to, the following:
   a) A description and list of all operations that will be performed in connection with the removal and transport of contaminated material, including identification of specific plant equipment for each task.
   b) A description of all plant equipment (including names of dredges) and equipment that will be utilized in the removal and transport with pertinent details for each piece of equipment (cut sheets, dimensions, horsepower, environmental bucket size and type, crew, etc.).
   c) Dredging rates for the plant including proposed average cycle times and hours of operation.
   d) A description of the proposed dredging strategy/ sequence including drawings showing the width, length, and location of the dredge cuts and target elevations in each cut.
   e) Proposed cut or bite height relative to sediment thickness.
   f) Proposed method for dredging in shallow draft areas.
   g) Dredge barge movement procedure and frequency.
   h) Proposed staging areas.
   i) Information on the horizontal and vertical positioning. systems for the plants and equipment to be utilized.
   j) Means to control and accurately document position of dredge and prevent over-dredging.
   k) Means to minimize effect of wind and waves on dredging precision.
   l) Means to be employed to minimize resuspension of sediment during dredge plant relocation, and barge transport to the offloading facility.
   m) Number, relative location, and stabilization control design details of turbidity curtains deployed to control sediment resuspended during dredging activities.
   n) Means to install, maintain and inspect turbidity curtains
   o) Means to remove, segregate, and manage debris and vegetation.
   p) Proposed approach for deployment of equipment including mobilization of dredges and barges, and other ancillary equipment to the Project Site and daily deployment of personnel and vessels.

q) Proposed location(s) for equipment maintenance/ repair

r) Proposed approach for the Subcontractor to provide CH2M HILL with access to the dredging equipment prior to mobilization to the Project Site, and during project execution for the purposes of inspection.
s) A detailed schedule of Work.
t) Project Management Plan.
u) Communication Plan.
v) Spill Prevention and Control Plan as specified in Section 01 45 55, Environmental Protection.
w) Health and Safety Plan

b. Dredge Environmental Management Plan

1) The Subcontractor shall submit for approval a preliminary dredge environmental management plan. In general, the dredge environmental management plan shall detail the environmental management practices and procedures that will be followed during dredging activities undertaken to minimize potential environmental impacts and to identify statutory and other obligations that the Subcontractor is required to fulfill to assist in meeting these objectives. The Subcontractor's Dredge Environmental Management Plan shall include, but is not limited to, the following:

a) A description of the dredging activities to be conducted
b) Description of equipment to be utilized
c) Quantities of material to be dredged and methods of disposal/placement
d) A description of the environmental management structure including roles and responsibilities; statutory, approvals, permits and licensing requirements; training requirements; and emergency contacts and response
e) Environmental management measures and programs including monitoring locations, frequency and criteria for the following:
(1) Contaminated materials
(2) Odor
(3) Water Quality
(4) Noise
f) Dredging Environmental Monitoring Protocol
g) Handling of Complaints
h) Environmental schedules may include at a minimum the following:
(1) Environmental training register
(2) Environmental incident/non compliance register
(3) Environmental incident/non compliance and corrective action report

(4) Complaints register
(5) Dredge material disposal log
(6) Water quality monitoring records
(7) Environmental controls monitoring logs
(8) Environmental monitoring checklist

c. Contingency Plan - A contingency plan shall be developed and submitted. The plan shall include procedures and contingency actions associated with the following:
   1) Non compliance of applicable water quality, noise and odor criteria during dredging operations
   2) Floods, Heavy Rainfall and Storm Surge Events
   3) Failure of Sediment Controls
   4) Differing site conditions as described in Paragraph 1.08

d. Debris Management Plan: A debris management plan shall be developed and submitted. Procedures and equipment to be employed for separating, collecting and transporting debris shall be set forth therein.

e. Decontamination Plan: A decontamination plan shall be developed and submitted. Procedures and equipment to be employed for decontaminating equipment, confirmation of decontamination, collecting/storing waste streams and methods of disposal shall be set forth therein.

f. Quality Control Plan: The Subcontractor shall submit a Quality Control Plan. This Plan will be used to document inspections, monitoring, surveys, and other actions to be taken by the Subcontractor to ensure that the Work complies with all Contract requirements. The Subcontractor shall ensure that all required gauges, targets, ranges, and other survey markers are in place and properly maintained. The Subcontractor shall install sufficient tide gauge(s) or staff(s) at the dredging location so that the dredge operator, dredging inspectors, and hydrographic surveyors can observe the water level at all times. The Plan shall include a description of the methods and equipment that will be used to assure accuracy of the dredging operations.

2. SD-02: Shop Drawings:
   a. Equipment: The Subcontractor shall furnish dredge equipment and platform/structure drawings, as applicable, for approval by CH2M HILL.
   b. Operational Data: The Subcontractor shall furnish soundings and sweepings taken before, during and after dredging operations, both plan view bathymetry maps and cross sections. Survey requirements are described in Paragraph 3.02 – Surveys.
   c. Plans: The Subcontractor shall furnish staging area plans depicting the dimensions, location, and purpose of each area.

3. SD-05: Design Data:
   a. Electronic Tracking System Data: The Subcontractor shall furnish required discs, CD-ROM, and charts to CH2M HILL.
   b. Equipment and Performance Data: The Subcontractor shall furnish proof of electronic positioning equipment calibration to CH2M HILL on a daily basis.
   c. Daily/Monthly Report of Operations: The Subcontractor shall prepare and submit two copies of the Daily Report of Operations for each dredge working. This report shall be submitted by noon the following day. The daily report shall include, but not be limited to, number and types of equipment used, number, labor classification and hours worked of personnel used, any unusual incidents or occurrences, difficulties encountered, weather conditions, operating hours, downtime and causes, quantities dredged and barge trip logs. Figures, drawings, and records from the machine control system shall be provided that document the areas covered, depths dredged, volumes excavated and anomalies encountered. . Additionally, one copy of these documents shall be maintained by the Subcontractor on the dredge(s) for CH2M HILL's inspection purposes. Further instructions on the preparation of the reports will be furnished at the Preconstruction Conference.

1.07 NOTIFICATIONS

A. Pre Construction Notifications

1. Notice of Readiness for Pre-Construction Survey
   a. Provide 7-day advance request to CH2M HILL for a preconstruction bathymetric survey. Results of this survey will be used to establish the pre-dredge sediment elevation in the dredge areas.
   b. Interim quality control surveys to be conducted by the Subcontractor shall be in accordance with Paragraph 3.02 – Surveys.
2. Notice to Mariners
   a. Before beginning dredging operations under this Contract, the Subcontractor shall coordinate with the Newark Bay Port Authority, USACE, and other affected Regulators to issue a "Notice to Mariners" regarding the Work to be performed and the Subcontractor's proposed operations.
   b. This notification must be given in sufficient time so that it appears in the "Notice to Mariners" at least 6 weeks prior to the commencement of this dredging operation. A copy of the notification shall be provided to CH2M HILL.
   c. The information furnished shall be consistent with Local Notice to Mariners. When requesting local offices to issue navigational information for Work involving marine construction, the following terminology shall be used, or as otherwise modified by the Regulators:
      1) For Cautionary Areas: "Mariners are urged to use extreme caution in the area."

2) For Dredging and Work Operations: "Mariners are urged to transit at their slowest safe speed to minimize wake and proceed with caution after passing arrangements have been made."

B. Notifications During Construction

1. Notice of Readiness for Survey During Construction

Provide -7-day advance request to CH2M HILL for a post dredging bathymetric survey to confirm the removal of sediment as shown on the Contract Drawings. This survey shall be completed by the Subcontractor. CH2M HILL will coordinate with the subcontractor performing the surveys and utilize the survey data collected to evaluate the final elevations. The results of the final bathymetric survey will be compared to pre-dredge survey results to provide the sole basis for determining whether the Subcontractor has achieved the required dredge depths indicated on the Contract Drawings

2. Relocation of Navigation Aids

a. The temporary removal or changes in locations of existing channel markers may be required to facilitate dredging operations.

b. The Subcontractor shall notify CH2M HILL at least 21 calendar days prior to the date that the removal or relocation of existing channel markers will be required so that the Newark Bay Port Authority and USACE can remove, or approve and/or be present during the relocation, and so that navigation interests may be informed sufficiently in advance of the proposed removal or change in location.

1.08 EXISTING CONDITIONS

A. Materials to be Dredged: The material to be removed consists of sand, silt, clay, organic compounds, other river bed and subsurface sediment/soil materials, and debris. Explorations, including core borings, geotechnical analyses, and chemical analyses will be made available to the Subcontractor. The Subcontractor shall examine the Removal Area and satisfy itself of the character of materials.

B. Tides: The removal area is tidal influenced and the Subcontractor is responsible for planning the work accordingly. The removal area is situated between tidal datum located at East Rutherford, New Jersey and Bellevue, New Jersey. Information for these tidal datum is provided on the State of New Jersey Official website at:

http://www.state.nj.us/dep/njgs/geodata/dgsdown/njtidalbm.pdf

C. Debris: Debris may be present within the limits of Work. The Subcontractor shall perform any investigations deemed appropriate to satisfy itself as to the extent and limits of debris. Unless otherwise directed by CH2M HILL, all debris encountered shall be removed and transported to the stabilization

facility for unloading, segregation and storage. Transportation and off-site disposal of debris shall be the responsibilities of others.

D. Pump Station: The riprap associated with the Township of Lyndhurst's pump station will not be disturbed during dredging operations.

E. Harbor Operations:

1. Dredging activities are not anticipated to adversely affect Port operations. However, barges and dredges transiting port working areas shall be required to coordinate with ongoing port operations.
2. The Subcontractor shall coordinate dredging activities with USACE, the Port Authority, relevant landowners, other parties undertaking dredging works in the Newark Bay Areas, other affected parties, and other interested public and commercial users to ensure uninterrupted operations.
3. Minimize interference with the use of channels and passages. When directed by CH2M HILL or Regulators, the Subcontractor shall shift or move dredges or interrupt dredging operations to accommodate the movement of vessels and floating equipment, if necessary.

F. Existing Utilities: There are two (2) known utility crossings in the area indicated to be dredged. There is also a wire cable which crosses the removal area.. Additional unknown and/or unmarked utilities may be present. The presence or absence of utilities shall be verified by the Subcontractor prior to start up of dredging operations.

1.09 DIFFERING SITE CONDITIONS

A. The Subcontractor shall promptly, and before the conditions are disturbed, give a written notice to CH2M HILL of:

1. Subsurface or latent physical conditions at the Site which differ materially from those indicated in this Contract.
2. Unknown or unusual physical conditions at the Site, which differ materially from those anticipated or ordinarily encountered and generally recognized as inherent to Work and character of dredged materials described in the Contract.
3. Conditions currently unforeseen that the Subcontractor becomes aware of that could, or potential could create a health and safety hazard.

1.10 QUANTITY OF MATERIAL

A. The total estimated volume of material to be removed from within the specified limits, including side slopes and allowable over dredge, is set forth in the Contract Drawings. The estimated quantity for bidding purposes is the total quantity, including allowable over dredge. The quantities listed are estimates only. The Subcontractor shall complete the Work specified whether the quantities involved are greater or less than those estimated.

1.11 WORK AREA

A. Access

1. The Subcontractor shall be responsible for providing and maintaining access necessary for his equipment and plant to and from the Site
2. The Subcontractor shall ascertain the environmental conditions which can affect the access such as tides, climate, winds, currents, waves, depths, shoaling, and scouring tendencies. Permissible access, laydown, and staging areas are indicated on the Contract Drawings.

B. Protection of Existing Waterways

1. The Subcontractor shall conduct operations in such a manner that dredged material and debris are not pushed outside the confines of the removal area boundary identified on the Contract Drawings or otherwise deposited in existing side channels, basins, docking areas, or other areas.
2. The Subcontractor will be required to change the method of operations as may be required by CH2M HILL to comply with the above requirements.
3. Should any bottom material or other debris be pushed into areas described above as a result of the Subcontractor's operations, the material must be promptly removed and documented.

C. Adjacent Properties and Structures

1. Other than shown on the Contract Drawings, no staging, processing and disposal of dredged materials is permitting on the Riverside County Park (Township of Lyndhurst) which is located adjacent to the sediment removal area.
2. Damage to private or public property or structures resulting from the dredging and transport operations shall be repaired promptly by the Subcontractor at his expense.
3. Any damage to structures as a result of Subcontractor's negligence will result in suspension of dredging/transport and require prompt repair at the Subcontractor's expense as a prerequisite to resuming the dredging/transport.

1.12 OVERDREDGE AND SIDE SLOPES

A. Required Depth: The material to be dredged from the Removal Area shown on the Contract Drawings, plus allowable over dredge, will be estimated and paid for in accordance with the provisions contained in the Payment Procedures.

B. Allowable Overdredge:

1. To cover the inaccuracies of the dredging process, material removed from within the Removal Area specified on the Contract Drawings plus allowable over dredge, will be confirmed and documented and paid for at the Contract price.

a. Allowable over dredge is defined as a depth of not more than 4 inches beyond the Removal Area lines and grades shown on the Contract Drawings.

C. Side Slopes:

1. Dredging on side slopes shall follow, as closely as practicable, the lines indicated on the Contract Drawings.
2. To minimize potential for contamination of dredged area by slumping of side slopes, side slopes shall be formed by step cutting. Where cuts are 2 foot or less in vertical dimension, box cutting along side slopes will be permitted and material which slumps within the Removal Area (as determined by the Subcontractor or CH2M HILL from review of surveys or other information) shall be removed.
3. The above is not to be taken as a guarantee that all slopes will stand as shown on the Contract Drawings.
4. Side slopes shall extend no more than 1 foot beyond the natural angle of repose based on a 2 foot box cut at the perimeter of the removal area

D. Excessive Dredging:

1. Material taken from beyond the limits as extended in paragraph Quantity of Material above will be deducted from the total amount dredged as excessive overdredge, or excessive side-slope dredging for dredging more than the allowable positioning tolerances and will result in a deduction being assessed in an amount equal to the per cubic yard cost of material handling, sediment treatment, water treatment, and disposal for the actual number of cubic yards of excessive dredging.
2. The amount of excessive dredging will be calculated from surveys, as interpreted by CH2M HILL and will not be subject to appeal by the Subcontractor.

1.13 PROTECTION OF EXISTING STRUCTURES AND BRIDGES

A. Properties and Structures

1. Damage to existing structures and bridges resulting from the transport of materials to and from the removal area shall be repaired promptly by the Subcontractor at his expense.
2. Any damage to structures and bridges as a result of Subcontractor's negligence will result in suspension of material transport and require prompt repair at the Subcontractor's expense as a prerequisite to resuming the transport operations

1.14 DEBRIS MANAGEMENT PLAN

A. The Subcontractor shall handle debris in accordance with an accepted Debris Management Plan. Debris shall be considered as contaminated for the purposes of handling, transport, and disposal.

B. Debris Handling and Disposal:

1. During dredging operations, the Subcontractor shall collect, remove, and segregate all debris encountered.
2. Debris removed from the dredging area shall be delivered to the sediment unloading area. Where pilings or other debris is found to interfere with environmental bucket closure or equipment operation or failure to obtain dredge prism clearance, a conventional clamshell bucket or other means approved by CH2M HILL may be used to extract the pilings/debris, based on approval of a Subcontractor submitted plan at the time of the work.
3. Sediment removal during such activity shall be minimized to the greatest extent practicable. Containers and/or segregation areas for temporary storage of the collected debris shall be provided by the Subcontractor and maintained on the dredge or a support vessel dedicated to the handling of debris.

C. Oily Material Handling:

1. Subcontractor shall have on hand and deploy adsorbent booms and pads, or otherwise skim from the surface oils released during dredging or other Project activities. All oil booms or pads shall be classified as debris and transported by the Subcontractor for disposal by others at the designated unloading facility.

PART 2 PRODUCTS

2.01 DREDGE PLANT AND ASSOCIATED EQUIPMENT

A. Dredging Plant Performance Requirements: The primary function of this Contract is to improve and protect the environment. Subcontractor shall provide a mechanical dredge system, and shall provide operating data to show the ability to achieve certain constraints and limitations as follows:

1. Production Rate: The dredge production and material transfer rate for dredged material shall be capable of meeting an average minimum daily removal rate of 450 cubic yards over a 12 hour shift.
2. Environmental Dredge Equipment: Dredging of contaminated sediments shall be performed with an environmental clamshell bucket having the following capabilities:
   a. Provides a level cut during the closing cycle.
   b. Completely encloses the dredged sediment and water captured
   c. Escape valves or vents that close when the bucket is withdrawn from the water
   d. Bucket will have no teeth
   e. Hardware that allows the operator to position the bucket using positioning and machine control software to meet the specified horizontal and vertical accuracy requirements
   f. Software shall allow the operator to control bucket penetration to avoid overfilling, over dredging and minimise resuspension

3. Positioning System: The Subcontractor shall employ software capable of monitoring the x, y, z position of the bucket in real time. The software will be required to provide the following:
   a. A real time view of the barge and clamshell bucket position
   b. A onboard display indicating the surface derived from existing hydrographic survey data
   c. A onboard display which provides real time feedback showing current depth, final project depth, target depth, and current bucket depth.
4. Horizontal and Vertical Positioning Tolerances of the dredge bucket:
   a. The following tolerances shall be met:
      1) Horizontal position accuracy shall be plus or minus 3 inches.
      2) Vertical tolerance shall be plus or minus 2 inches.
5. The software shall be capable of recording all sensor information so that playback/review of past dredge activities is possible.
6. Anchoring: Use of spud anchors are acceptable for the dredge or barge equipment as long as their use does not result in non compliance of the water quality criteria and/or result in the pushing of dredge material outside the dredge prism. .
7. Re-Calibration: The positioning software shall be recalibrated daily or provide daily confirmation that the positioning software is within the manufacturers technical specifications.
8. Dredge Cut Data: The required data to determine the dredge cut will be supplied by CH2M HILL in electronic format. The file will contain northing and easting points with top of sediment and required depth of sediment to be removed coordinates. These x, y, z1, and z2 coordinates will be supplied as an ASCII file. This data shall be provided daily as part of the daily dredge report..

2.02 TOW BOATS AND SELF PROPELLED BARGES

A. All tow boats and self propelled barges used for propelling barges and transporting material and other equipment shall be equipped with DGPS navigational equipment, radar, corrected compass, at least two marine VHF radios, an AIS transponder, and depth sounding equipment which is to be maintained in good operating condition during each tow. The number and size of tow boats and self propelled barges to be used shall be specified in the Subcontractor's Dredge and Operation Plan. The tow boats and self propelled barges utilized by the Subcontractor for this purpose shall be of a size adequate for pushing the anticipated load and shall have necessary reserve power for maneuvering with material barges under emergency conditions as well as for control of material barges at the offloading or disposal point.

B. Thrusters/propulsion devices shall not exceed 60% of full power when operating within the removal area, or operating on the periphery and pointing toward the dredge cut.

2.03 MATERIAL BARGES

A. Provide material barges capable of transporting dredged material to the appropriate offloading facility

B. Bottom dumping barges are not permitted for transport unless they have been certified to be sealed.

C. Sediments and debris shall be transported to the designated treatment facility for unloading.

D. Provide and maintain markings on all material barges clearly indicating the draft of the barge. Each barge shall be used with an ullage table (i.e., displacement table) to provide required information regarding volume located in/on the barge.

E. Load barge evenly to maintain the stability of the barge. During loading operations, measure and record on the daily progress report the tonnage of each barge upon departure from the dredge area and upon arrival at the unloading/disposal area.

F. During the entire period of Work, provide and maintain sufficient spot or floodlights to permit the reading of the draft on the sides of material barges at bow and stern from the tow boat at night and when visibility is impaired. Ensure that adequate time is allowed by the tow boat captain for these readings to be obtained. These tonnage report logs shall be part of the daily progress report.

G. Trip logs will be completed for each barge trip to the unloading facility.

H. The following elements shall be monitored at a minimum for material barges utilised:

1. Barge ID designation
2. Barge location

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2.04 SILT CURTAINS

A. The dredge plant(s) shall be enclosed with a silt curtain/boom system in order to minimize turbidity and control unexpected spills.

B. The silt curtain systems shall be installed and maintained as indicated in the accepted Dredging and Operation Plan. CH2M HILL maintains the right to inspect the silt curtain installation/maintenance and direct changes as necessary.

C. The Subcontractor shall maintain the silt curtain/boom systems and associated markings/lighting in good and effective operating condition by performing daily inspections to determine condition and effectiveness, by repairing resuspension control materials, and by other protective measures.

D. Silt curtain shall be Gunderboom™ CPSC, or equivalent as approved by CH2M HILL.

E. Oil absorbent booms shall be Brockton Equipment Spilldam E810SN 8 inch x 10 foot sock and net, or equivalent as approved by CH2M HILL.

2.05 LIGHTS

A. All operations that are performed during the non-daylight hours shall be properly illuminated to allow for the complete performance and inspection of the Work.

B. Lighting shall consist of providing, installing, operating, maintaining, moving, and removing portable light towers and equipment-mounted lighting fixtures for nighttime construction operations, for the duration of nighttime Work on the Contract.

C. Each Work night, 30 minutes before sunset and 30 minutes after sunrise and during periods of restricted visibility, provide lights for floating plants, ranges, and markers. Also, provide lights for buoys that could endanger or obstruct navigation.

D. Lights shall be provided for installed equipment being used to perform Work even when not in use.

E. Lighting shall conform to Newark Bay Port Authority and USACE requirements for visibility and color.

2.06 COMMUNICATION

A. The Subcontractor shall provide a system of communication between the dredge crew, the sampling/monitoring Subcontractor, and CH2M HILL.

B. The Subcontractor shall provide a system of communication between the dredge crew and the crew at the offloading facility.

C. Radio telephone equipment shall be capable of transmitting and receiving on VHF Channels.

D. The Subcontractor shall provide CH2M HILL with three (3) hand-held VHF radio capable of communicating with the Subcontractor's marine plant for the duration of the Contract.

PART 3 EXECUTION

3.01 CONDUCT OF DREDGING WORK

A. Order of Work

1. The Subcontractor shall start and complete the Work in the sequence set forth in the accepted Dredging and Operations Plan.

B. Removal of Shoreline Vegetation

1. Prior to dredging the Subcontractor shall remove all shoreline vegetation which is determined to be an obstruction to dredging operations. The vegetation shall be removed and transported using different equipment

than is used for debris or dredging unless the equipment has been decontaminated.

2. The vegetation shall be transported and offloaded in accordance with the accepted Debris Management Plan prior to being transported by others for final disposition at a location approved by CH2M HILL. Coordination of transportation and disposal of shoreline vegetation removed shall be conducted prior to beginning dredging operations

C. Dredging

1. The Subcontractor shall perform all dredging for this Project using a mechanical dredge and its associated equipment as specified in Paragraph 2.01.
2. During dredging, the use of multiple attempts to achieve a full bucket or stockpiling of material within the river or on shoreline is not permitted.
3. The Subcontractor shall design the dredge equipment and methods to minimize the release of resuspended sediments during dredging and entrainment of surface water in dredged material.
4. The Subcontractor shall dredge the sediments to be at or lower than the lines and grades shown on the Contract Drawings based on post dredge elevations using high resolution bathymetric survey data. Any 10 foot by 10 foot grid within a completed dredge area having an average elevation 3 inches or more higher than the lines and grades shown on the Contract Drawings shall be re-dredged
5. Each pass shall be complete. There shall be no stockpiling in the water. Levelling of a completed dredge surface by dragging a beam or the bucket is not permitted. All high spots shall be removed by dredging only.
6. Dredge shall float at all times. The dredge may create adequate water depth by making a design cut only (i.e., no over dredging is allowed to comply with this section).
7. Subcontractor's equipment shall not be permitted to ground or bottom out in the removal area with the exception of spuds.
8. Pre- and post-dredge elevations shall be surveyed by the Subcontractor or a third party surveyor hired by the Subcontractor and acceptable to CH2M HILL. These measurements shall form the basis for decisions regarding completion of dredging and quantity calculations.

D. Unauthorized Placement of Dredged Material

1. Excavated material that is deposited other than in places designated or approved will not be paid for and the Subcontractor will be required to remove the misplaced excavated material and deposit it where directed at the Subcontractor's cost.

E. Water Quality Monitoring

1. Operations shall meet all Water Quality Criteria set forth in Section 01 45 16 Water Quality Monitoring and Control. Corrective measures, as set forth in the specifications, or as may be required to prevent Water

Quality Criteria non compliance, shall be accomplished as directed by CH2M HILL.

2. Water Quality Non Compliance:
   a. If water quality non compliance as a result of dredging operations is noted by the Subcontractor, CH2M HILL or the Regulators, the Subcontractor shall adjust or modify operations until compliance is achieved in accordance with the CH2M HILL-approved Water Quality Monitoring Plan and other regulatory requirements. Modifications that may be required include slowing swing speed, increasing bucket cycle times, and replacement of the bucket and/or addition or replacement of turbidity control features of the work .
   b. The Subcontractor shall stop all operations should water quality criteria continue to exceed the established criteria as a result of dredging operations. The Subcontractor shall then submit a revised operations plan that addresses these problems and shall not dredge until the revised plan has been reviewed and approved.

F. Noise

1. Operations shall meet all maximum noise contribution limits as described in Table 2-2, NJAC 7:29.
2. Noise limits shall not exceed the maximum hourly average at the three monitoring locations indicated in Table 1.

TABLE 1
Noise Limits and Monitoring Locations

Noise Level Monitoring Station	Location	Maximum Hourly Average	
		Daytime	Evening
1	North perimeter 100 ft upstream of Removal Area on east shore	75 dBA	65 dBA
2	South perimeter 100 ft downstream of Removal Area on east shore	75 dBA	65 dBA
3	Center perimeter of Removal Area on east shore	75 dBA	65 dBA

Day is defined as the period from 7:00 a.m. to 6:00 p.m., Monday to Saturday; evening is defined as the period from 6:00 p.m. to 10:00 p.m.

3. Noise Non-Compliance
   a. If noise non compliance as a result of dredging operations is noted by the Subcontractor, CH2M HILL or the Regulators, the Subcontractor shall adjust or modify operations until compliance is achieved in accordance with the CH2M HILL-approved Perimeter Air Monitoring Plan and other regulatory requirements.
   b. The Subcontractor shall stop all operations should the maximum hourly noise limits exceed the established criteria as a result of dredging operations. The Subcontractor shall then submit a revised operations plan that addresses these problems and shall not dredge until the revised plan has been reviewed and approved.

4.

3.02 SURVEYS

A. General: CH2M HILL shall be notified, in writing, ~~14~~ 7 days in advance of the need for pre-dredging and after-dredging surveys. Interim and progress surveys shall be subject to the same requirements as the pre- and post-surveys. The Subcontractor shall perform interim quality control surveys as specified below.

1. Standards: All single beam and multibeam hydrographic surveys shall be performed in accordance with the Corps of Engineers' Engineering and Design Manual - Hydrographic Surveying EM 1110-2-1003 (USACE, 2002) including the April 1, 2004 updates to Chapter 11 for multibeam surveying.
2. Methods: Pre and post dredge surveys shall be performed with single and/or multibeam survey equipment and intermediate surveys shall be performed with single or multibeam surveys. The survey software capable of collecting XYZ data in real time. The surveys shall cover 100 per cent of the dredge area. Horizontal positioning shall be by differential global positioning systems (DGPS) referenced to the local plane coordinate system. The Subcontractor shall perform Quality Control surveys a minimum once per week. The Subcontractor shall provide CH2M HILL a copy of all field notes and data, quantity calculations, plan views, and cross section drawings for each survey. Removal quantities shall be calculated using industry standard techniques such as the average end-area method or digital terrain modelling.

B. Subcontractor Representative: All in-place measurement surveys and final acceptance sweep surveys will be performed with a representative of the Subcontractor on board the third party surveyor's vessel during the full execution of the survey. No in-place measurement or final acceptance sweep survey will be performed without a representative of the Subcontractor on board the survey vessel. The Subcontractor's representative shall be fully knowledgeable in offshore construction subsurface surveying procedures, techniques, equipment, and horizontal and vertical calibration methods, and state-of-the-art horizontal and vertical accuracy limitations. The Subcontractor's representative shall observe and review, in progress, the adequacy and accuracy of the survey for in-place payment purposes, and for the potential existence of obvious error in the data.

C. Survey Certification:

1. Immediately upon completion of any survey, the Subcontractor's representative shall, based on his onsite review of the survey execution, determine that the survey contains no evidence of obvious error, and that subsequent horizontal and vertical corrections are accurately annotated on the subsurface record.
2. In the event the Subcontractor's authorised representative observes and quantifies specific documentary evidence of an obvious error, the survey

will be immediately rerun. Re-surveys will totally supersede any previously run survey and will be run over the full reach of the removal area.

3. If acceptability is not acquired after performing one re-survey a meeting shall be held between the Subcontractor and CH2M HILL to expeditiously resolve the issue causing rejection of the survey. Subcontractor equipment and personnel standby time to resolve acceptability of the survey shall be at the Subcontractor's expense.
4. In no case shall a previously unacceptable survey be later judged acceptable by the Subcontractor unless such a reassessment/ re-evaluation is performed within 24 hours after the original survey, and prior to initiating any re-survey action based upon identifiable or obvious error.
5. Should the Subcontractor or his authorized representative refuse to certify to the acceptability of a survey for Contract payment without identifiable collusion, fraud, or obvious error, then the following actions will follow:
    a. Preconstruction (Pre-Dredging) Survey: Dredging shall not commence until representatives of the Subcontractor and Principal have met and resolved the basis for refusal of certification. Should the Subcontractor commence excavation prior to obtaining an acceptable survey, he shall be liable for any excavation performed. If a re-survey is performed, and accepted, prior excavation will not be measured, estimated, or paid for.
    b. Post-construction (After-Dredging) Survey: Payment Procedures will be indefinitely extended until a final survey is accepted.
    c. Refusal to Certify: Subcontractor equipment and personnel standby time to resolve his refusal to certify to the acceptability of a survey when there is no identifiable or obvious error shall be at the Subcontractor's expense and resultant delays shall not be the basis for time extensions of the Contract.
    d. Intermediate surveys taken between the pre-dredging and post-dredging surveys will not be considered for the purposes of determining acceptance of the area dredged.

3.03 FINAL EXAMINATION AND ACCEPTANCE

A. Final Examination

1. The Subcontractor shall notify CH2M HILL in writing 7 days in advance that a defined area has been dredged and is ready for a post-dredge bathymetric survey.
2. Should the Work be determined to be incomplete, the Subcontractor shall immediately return to the identified area and complete the Work.
3. Post-dredging bathymetric data will be collected until removal of sediment to the lines and grades identified in the Contract Drawings has been verified by CH2M HILL.
4. The first acceptance survey of the identified dredge area will be paid for by CH2M HILL, subsequent re-surveys for acceptance of a dredged area will be paid for by the Subcontractor.

B. Final Acceptance

1. Final acceptance of the whole or part of the Work and the deductions or corrections of deductions made therein will not be reopened after having once been made, except on evidence of obvious error, and the acceptance of a completed section shall not change the time of payment of the retained percentages, if any, of the whole or any part of the Work.

3.04 SHOALING

A. If, before the Contract is completed, shoaling occurs in any section previously accepted as determined by CH2M HILL from review of surveys or other data, including shoaling in the finished channel because of the natural lowering of the side slopes, re-dredging at Contract unit prices within the limits of available funds may be completed if agreeable to both the Subcontractor and CH2M HILL, and directed by CH2M HILL.

3.05 DREDGE SAFETY

A. Prior to the start of Work the Subcontractor's dredge and sediment transport equipment shall have a current Certificate of Inspection issued by the USACE. The Certificate of Inspection shall be maintained for the duration of dredging activities.

B. The Subcontractor shall comply with USACE requirements

C. The Subcontractor shall comply withCH2M HILL’s Health and Safety Plan

3.06 FINAL CLEANUP

A. Final cleanup shall include the removal of all the Subcontractor's plant and equipment either for disposal or reuse.

B. Failure to promptly remove all plant, equipment, and materials upon completion of the dredging will be considered a delay in the completion of the final cleanup and demobilisation work. In such case, CH2M HILL will exercise its right to remove any plant, equipment, and materials at the Subcontractor's expense.

END OF SECTION