PORT OF HOUSTON AUTHORITY

TECHNICAL SPECIFICATIONS FOR

HSC ECIP – SEGMENT 4 DREDGING

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PRELIMINARY
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DATE: 05/14/2021

HDR Engineering, Inc.
TBPELS P.E. Firm
Registration No. F-754

CSP Date: ____ 2021

PORT OF HOUSTON AUTHORITY

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The Technical Specifications for the above-referenced Project are the Port of Houston Authority (Port Authority) Standard Technical Specifications listed herein, inclusive of those that have been amended, supplemented, or otherwise modified herein, and inclusive of added sections as listed herein.

The Port of Houston Authority Standard Technical Specifications listed herein may be obtained from Port of Houston Authority Project & Construction Management Department.

Any Port of Houston Authority Standard Technical Specifications listed herein but not amended, supplemented, or otherwise modified herein shall apply as set forth in the Port of Houston Authority Standard Technical Specifications.

Amendments and other modifications to specific Sections of the Port of Houston Authority Standard Technical Specifications take precedence over such Specification Section language of the Port of Houston Authority Standard Technical Specifications.

Any newly added Technical Specification Sections are in addition to the Port of Houston Authority Standard Technical Specifications.

Subject to the foregoing, the Port of Houston Authority Technical Specifications for the above-referenced Project are as follows.

CSP Date: ____ 2021

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The following Sections of the Port of Houston Authority Standard Technical Specifications (December 2011) form a part of the Technical Specifications for the Project.

DIVISION 01 - GENERAL REQUIREMENTS

Section 01 57 23.13 Std	Temporary Storm Water Controls

The attached modifications to the following Sections of the Port of Houston Authority Standard Technical Specifications (December 2011) form a part of the Technical Specifications for the Project.

DIVISION 01 - GENERAL REQUIREMENTS

Section 01 35 29.00 Mod	Health, Safety and Emergency Response Procedures

The attached Technical Specification Sections are added to and form a part of the Technical Specifications for the Project.

DIVISION 01 – GENERAL REQUIREMENTS

Section 01 00 50.00 Add	Scope of Work
Section 01 16 60 Add	Environmental Protection Measures
Section 01 25 00 Add	Measurement and Basis of Payment
Section 01 35 53.00 Add	Security Procedures

DIVISION 02 – EXISTING CONDITIONS

Section 02 41 00 Add	Demolition, Removal and Disposal

DIVISION 31 – EARTHWORK

Section 31 05 19.13 Add	Geotextiles for Earthwork
Section 31 11 00.00 Add	Clearing and Grubbing

DIVISION 35 – WATERWAY AND MARINE CONSTRUCTION

Section 35 20 00 Add	Marine Construction Surveying
Section 35 20 23 Add	Dredging Attachment 1: Quantity Summary Table
Section 35 20 23.33 Add	National Dredging Quality Management Program
Section 35 31 19 Add	Revetment

APPENDICES

Appendix A	NMFS Sea Turtle and Sawtooth Sawfish Construction Conditions
Appendix B	Geotechnical Investigation Data
Appendix C	Geophysical Investigation Data
Appendix D	Cultural Resources Investigation

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SECTION 01 00 50.00 Add – SCOPE OF WORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The work consists of new work and maintenance dredging within Project 11 – Segment 4 located within the Houston Ship Channel near the Beltway 8 Bridge in Houston, Texas. Approximate coordinates are as follows: 13,835,605N 3,191,5090E (ref. Texas State Plane Coordinate System, South Central Zone, NAD 83, in U.S. Survey Feet). Placement of dredged material shall be at the Beltway 8 (BW8) dredged material placement area located adjacent to the Houston Ship Channel near Sam Houston Parkway and San Jacinto Boulevard (reference the following coordinates: 13,837,5001N 3,192,500E); and at the East Clinton (EC) and West Clinton (WC) dredged material placement areas located 1.5 miles north of the Houston Ship Channel near North Main Street and 19th Street (reference the following coordinates: 13,840,000N 3,160,000E).

B. The work includes dredging with a pipeline or mechanical (e.g. clamshell) dredge to remove approximately 4,700,000 CY of material within 4.8 miles of the Houston Ship Channel from Boggy Bayou to Hunting Turning Basin. The channel will be dredged to required depths of -48.5 ft MLLW and -49.5 ft MLLW, depending on location. The total volume consists of approximately 234,000 CY of maintenance material, and 4,466,000 CY of new-work material including allowable overdepth. Dredged material shall be transported hydraulically and placed within the BW8, EC, and WC dredged material placement areas.

C. The scope of work includes all dredge and pipeline mobilization with multiple setups and relocation; a pre-dredge hazard survey; debris removal from the channel prior to dredging; removal of a relic bulkhead, concrete slabs, and miscellaneous rubble from the shoreline; hydraulic dredging; dredging pipeline management; dredged material discharge management; dredged material placement area management; shoreline protection; topographic and bathymetric surveys of the work; demobilization and site cleanup; and related ancillary work.

D. The location of the dredging and placement of material shall occur as indicated on the Drawings and Specifications.

1.2 CONTRACT TIME

The Contract Time shall be 365 calendar days.

1.3 SAFETY

Contractor shall complete the work in accordance with the safety requirements of Port Authority including Section 01 35 29.00, “Health, Safety and Emergency Response Procedures.”

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

(NOT USED)

END OF SECTION

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SECTION 01 16 60 Add – ENVIRONMENTAL PROTECTION MEASURES

PART 1 GENERAL

1.1 SUMMARY

This section covers prevention of environmental pollution and damage as the result of construction operations under this Contract and for those measures set forth in the other Specifications. For the purpose of this specification, environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare, unfavorably alter ecological balances of importance to human life, affect other species of importance to man, or degrade the utility of the environment for aesthetic, cultural, and/or historical purposes. The control of environmental pollution and damage requires consideration of air, water, and land and includes management of visual aesthetics, noise, solid waste, radiant energy and radioactive materials, as well as other pollutants. The environment shall be protected and all natural resources shall be preserved during construction. All Federal, State, and local laws and regulations shall be complied with during construction.

1.2 RELATED SECTIONS

A. Technical Specifications:
Section 35 20 23 – Dredging

B. Appendices:
Appendix A – NMFS Sea Turtle and Sawtooth Sawfish Construction Conditions

1.3 SUBMITTALS

Port Authority's and Engineer's approval are required for:

A. Prior to construction, Contractor shall provide a VOC compliance plan (Paragraph 1.7). This information shall be submitted to the Port Authority at or prior to the preconstruction conference.

B. Refer to Paragraph 1.8, "Protection of Environmental Resources," for reporting requirements for required environmental monitoring.

C. Prior to construction, Contractor shall provide Environmental Monitoring Plan (EMP) (Paragraph 1.8) describing training and credentials for personnel for pollution control and environmental protection/monitoring of air, water, and land resources. This information shall be submitted to the Port Authority at or prior to the preconstruction conference.

D. Prior to construction, Contractor shall disclose to the Port Authority whether any of the marine vessels being used for work under this contract have been inspected by the U.S. Coast Guard as described in Paragraph 1.8.D. If inspections have been performed, Contractor shall provide the inspection results to the Port Authority.

1.4 CONTRACTOR FACILITIES

Contractor's field offices, staging areas, stockpile storage, and temporary buildings shall be placed

in areas approved by Port Authority. Temporary movement or relocation of Contractor facilities shall be made only on approval by Port Authority. Disposal areas shall not be located in any wetlands, water body, or stream bed. Equipment shall be fueled and lubricated in a manner that protects against spills and evaporation. Any equipment used for fueling and lubrication shall be stored in a manner that protects against spills and evaporation. A berm shall be provided with impervious liner around fuel and liquid chemical storage tanks to contain the tank contents in the event of a leak or spill. No refueling shall be done onsite unless approved by Port Authority in advance with acceptable spill protection measures. Refer to requirements in the Spill Contingency Plan to be prepared by Contractor.

1.5 QUALITY CONTROL

Contractor shall establish and maintain quality control for environmental protection of all items set forth herein. Contractor shall record on daily reports any problems in complying with laws, regulations, and ordinances and corrective action taken. Any damage caused by Contractor during construction shall be repaired, replaced, or restored by Contractor to the satisfaction of Port Authority.

1.6 TRAINING OF CONTRACTOR PERSONNEL IN POLLUTION CONTROL

Contractor shall train his personnel in all phases of environmental protection. The training shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, and installation and care of facilities (vegetative covers, and instruments required for monitoring purposes) to ensure adequate and continuous environmental pollution control.

1.7 VOLATILE ORGANIC COMPOUNDS (VOC)

Contractors are required to comply with local, state, and federal VOC laws and regulations and shall have an acceptable VOC compliance plan. Prior to construction, Contractor shall provide a VOC compliance plan. The plan shall demonstrate that the use of paints, solvents, adhesives, and cleaners comply with local VOC laws and regulations governing VOC materials and that all required permits have been obtained or will be obtained prior to starting work involving VOC's, in the air quality district in which the start of work. An acceptable compliance plan shall contain, as a minimum, a listing of each materials subject to restrictions in the air quality management district in question, the rule governing its use, a description of the actions which Contractor will take, a description of the actions which Contractor will use to comply with the laws and regulations, and any changes in the status of compliance during the life of Contract. Alternatively, if no materials are subject to the restrictions of the air quality management district where the work will be performed, or if there are no restrictions, the compliance plan shall so state.

1.8 PROTECTION OF ENVIRONMENTAL RESOURCES

A. General: The environmental resources within the Project boundaries and those affected outside the limits of permanent work under this Contract shall be protected during the entire period of this Contract. Contractor shall confine his activities to areas defined by the Drawings and Specifications. Environmental protection shall be as stated in the following subparagraphs. Contractor shall prepare an Environmental Monitoring Plan (EMP) to outline the specific measures that will be implemented prior to and during construction for protection of environmental resources.

B. Protection of Land Resources: Prior to the beginning of any construction, Contractor shall identify and list all land resources. This list shall be submitted as part of the EMP for concurrence by the Port Authority. Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without special direction from Port Authority. No ropes, cables, or guys shall be fastened to or attached to any

trees for anchorage unless specifically authorized.

1. Where use of areas containing environmental resources is permitted by Port Authority, Contractor shall provide effective protection for land and vegetation resources as follows. Trees, shrubs, vines, grasses, land forms, and other landscape features identified by the Port Authority to be preserved for removal by others shall be clearly identified by marking, fencing, or wrapping with boards, or other approved techniques.

2. Contractor shall clean areas used for construction, including staging areas, on a regular basis.

3. Contractor shall restore landscape features damaged or destroyed during construction operations outside the limits of the approved work areas. Restoration shall be in accordance with the EMP submitted for approval. This work will be accomplished at Contractor's expense.

C. Protection of Water Resources: Contractor shall keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters. Special management techniques as set out below shall be implemented to control water pollution by the listed construction activities which are included in this Contract. Contractor is responsible for maintaining area drainage during construction. Water shall not be allowed to pond on any roadway surface, and runoff from adjacent properties shall not be impeded by Project Work.

1. Contractor shall conduct dredging, dredged material disposal, excavation, grading, clearing/grubbing, and revetment construction operations in a manner to minimize turbidity and shall conform to all water sampling and water quality standards prescribed herein and by the permit requirements.

D. Air Quality: Contractor shall keep construction activities under surveillance, management, and control to minimize pollution of air resources. Activities, equipment, processes, and work operated or performed by Contractor in accomplishing the specified construction shall be in strict accordance with the State of Texas Clean Air Act implemented in 1967, and the Federal emission and performance laws and standards. Ambient Air Quality Standards set by the Environmental Protection Agency shall be maintained for the construction operations and activities specified herein. Contractor shall review air quality control measures specified by the Texas Commission on Environmental Quality (TCEQ) for meeting National Ambient Air Quality Standards. These measures can be found at tceq.texas.gov/airquality/sip/sipstrategies.html. Based on TCEQ recommendations, Contractor is encouraged to apply for Texas Emission Reduction Plan grants for this project. In addition, the following best management practices shall be followed:

1. Make every effort to use shore power instead of marine power when tied to a pier.
2. Voluntarily reduce vessel speed when in port to below normal speeds.
3. Use ultra-low-sulfur diesel (ULSD) in marine vessels where technically and logistically feasible.
4. Select assist tugs based on lowest NO_X emissions instead of lowest price.
5. Disclose to the Port Authority whether any of the marine vessels being used for work under this contract have been inspected by the U.S. Coast Guard, and whether that inspection covered the protocols for Annex VI of the International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978, known as Marine Pollution (MARPOL) 73/78, regarding the proper maintenance and operation of engines and their emissions controls. If so, Contractor shall provide proof of the appropriate U.S. Coast Guard inspection certification for compliance with MARPOL

73/78 Annex VI. Inspected vessels that did not receive certification may not be used for work under this contract until deficiencies that prevented certification are corrected.

6. On-road passenger vehicles (including both light-duty and heavy-duty vehicles) shall adhere to EPA regulations and standards for model years 2017-2025.

E. Protection of Fish and Wildlife Resources: Contractor shall keep construction activities under surveillance, management, and control to minimize interference with, disturbance to and damage of fish and wildlife. As part of EMP submitted prior to construction, Contractor shall list species that require specific attention and describe measures for their protection. At a minimum, Contactor shall have personnel onsite who are trained to identify and continuously observe the work area for the endangered and/or protected species described under Paragraph 1.8.F. All costs for environmental monitoring shall be borne by Contractor. Environmental monitoring and observations shall be documented in Contractor's daily activities reports each day regardless of whether or not species were observed.

F. Protected Species: Implement the following measures to avoid and minimize impacts to federal- and state-protected species and habitats:

1. Instruct personnel associated with project of the need to identify eagles and colonial nesting birds and avoid impacting them during the breeding season.

2. Port Authority will coordinate with Texas Parks and Wildlife Department to determine the need for any environmental protection measures related to protection of Bald Eagle, Black Rail, Piping Plover, Rufa Red Knot, and other migratory bird species. If directed by Port Authority, Contractor shall provide additional environmental observers to supplement the requirements stated in Paragraph 1.8.E.

3. Contractor shall not disturb bird nests between February 1 and September 1.

4. In the event that migratory birds are encountered onsite during construction, avoid adverse impacts on birds, active nests, eggs, and/or young.

   a. Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season (February 1 to September 1).

   b. Avoid the removal of unoccupied, inactive nests, as practicable.

   c. Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.

5. Contractor shall comply with the Sea Turtle and Smalltooth Sawfish Construction Conditions contained in Appendix A.

G. Protection of Cultural Resources: In the event that Contractor encounters historical or archeological resources within the project footprint, Contractor shall not remove or disturb, or cause or permit to be removed or disturbed, any historical, archaeological, architectural, or other cultural artifacts, relics, vestiges, remains, or objects of antiquity. If any such items are discovered on the premises, Contractor shall immediately notify the Port Authority of such discovery, and the site and the items discovered shall be protected by Contractor from further disturbance until a professional examination of them can be made or until clearance to proceed is authorized by the Port Contract Representative.

1.9 CONTROL AND DISPOSAL OF WASTES

A. Hazardous Waste: Hazardous wastes are defined in 40 CFR 261. Hazardous wastes that are produced as a result of performing Work under this Contract shall be handled, stored, transported, and disposed of according to 40 CFR 262, where applicable. Prevent hazardous wastes from entering the ground, drainage areas, and surface waters. Immediately notify Port Authority of hazardous material spills. Also refer to Article 3.13 of the General Conditions for requirements if hazardous environmental conditions are encountered at the site.

B. Sanitary Waste: All sanitary waste shall be collected by a licensed sanitary waste management contractor from the portable units as necessary, or as required by local regulation.

C. Construction Debris: Contractor shall collect and properly dispose all trash and construction debris in accordance with all local and state solid waste management regulations and practices. No construction waste material shall be buried within the Project limits. Contractor shall store all waste materials in approved metal dumpsters or other containers approved by Port Authority. The dumpster shall be emptied as necessary or as required by local and state regulation and the contents hauled away for proper disposal.

1.10 POST CONSTRUCTION CLEAN UP

Contractor shall clean up areas used for construction to the satisfaction of Port Authority.

1.11 RESTORATION OF DAMAGE

Contractor shall restore all features damaged or destroyed during construction operations outside the limits of the approved Work areas. Such restoration shall be in accordance with the EMP submitted for approval by Port Authority. This work shall be considered subsidiary to other work and be accomplished at Contractor's expense without additional compensation.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

(NOT USED)

END OF SECTION

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SECTION 01 25 00 Add – MEASUREMENT AND BASIS OF PAYMENT

PART 1 GENERAL

1.1 SUMMARY

The extended prices stated on Contractor's Price Exhibit Form will be considered maximum Contract prices with unit price provisions. Unit price provisions are for Port Authority's convenience in adjusting extended prices based on quantity adjustments resulting from Port Authority-initiated Change Orders. The extended prices shall be full compensation for furnishing all labor, materials, tools, equipment, plant supplies, superintendence, insurance, incidentals, services, overhead, and profit necessary to complete the construction of the various items of Work. Contractor's Price Exhibit Form is not intended to itemize each and every labor, material, or incidental requirement. Any requirement, explicit or implied, as determined by Port Authority for Project completion and not specifically listed on Contractor's Price Exhibit Form shall be included in items with which they are considered subsidiary. Any item not specifically identified as an Additive/Alternate Price shall be considered as part of the Base Price, unless specified otherwise.

1.2 SUBMITTALS

Port Authority's and Engineer's approval are required for:

A. Certificates (Paragraph 1.3.D) – Certified Weight Tickets or Certified Barge Displacement Tickets for debris removal.

1.3 QUANTITIES AND MEASUREMENTS

A. Quantities: All quantities of Work stated on Contractor's Price Exhibit Form are nominal estimates, computed by Engineer, based on Contract Documents. Contractor shall verify these quantities by preparing his own estimates. In any case, prices stated shall reflect all Work required by Contract Documents. No quantity adjustment shall be made for work performed outside the specified lines and grades, nor work completed within its specified tolerance.

B. Measurements: Only length, area, and/or volume measurements shall be made to compute the quantities of Work stated on Contractor's Price Exhibit Form. Weight, load size/counts, and production rate/time shall not be valid measurement techniques, except as specified for debris removal.

C. Contract Adjustments: Port Authority reserves the right to adjust the quantities of Work stated on Contractor's Price Exhibit Form as it deems appropriate. Adjustments must be in form of a Change Order to Contract.

D. Certified Tickets: Submit certified weight tickets or certified displacement tables for debris removal. Refer to Paragraph 1.4.F.

1.4 BASIS OF PAYMENT

A. Unit Price Provisions:

1. Extended prices stated on Contractor's Price Exhibit Form shall be considered maximum

Contract prices unless the quantities of work are adjusted by a Port Authority-initiated Change Order.

2. If quantities of work are adjusted by Port Authority, the cost or credit to Port Authority shall be computed in accordance with the unit prices stated on Contractor's Price Exhibit Form.

B. Lump Sum/Progress Payments: Lump Sum Work items listed on Contractor's Price Exhibit Form will be paid for according to the estimated percentage of Work completed for each item. This amount shall be full compensation for completed in-place Work. Engineer will be the sole judge and make the final decision as to the percentage complete of each item and the monetary amount for progress payments to Contractor.

C. Mobilization/Demobilization: Payment Mobilization/Demobilization (Price Item No. 1) will be made on a lump-sum basis. Payment for mobilization will not exceed sixty percent (60%) of the amount stated for Mobilization/Demobilization. The total lump sum amount for Mobilization/Demobilization shall include all costs in connection with the mobilization and demobilization of all plant and equipment associated with Dredging necessary to perform the Work for the Base Bid, including costs associated with compliance with the National Dredging Quality Management Program.

D. Pre-Dredge Hazard Survey: Payment for Pre-Dredge Hazard Survey (Price Item No. 2) will be made on a lump-sum basis for costs associated with performing a Pre-Dredge Hazard Survey (magnetometer or similar) and related work as described in Section 35 20 00, "Marine Construction Surveying."

E. Marine Construction Surveying: Payment for Marine Construction Surveying (Price Item No. 3) will be made on a lump-sum basis for costs associated with channel surveys and shoreline protection surveys. Costs shall include bathymetric and topographic surveying; preparation of associated quantity computations and drawings; and related work as described in Section 35 20 00, "Marine Construction Surveying."

F. Debris Removal from Dredging Template:

1. Payment for Debris Removal from Dredging Template (Price Item No. 4) will be made on a unit price (per ton) basis for costs associated with materials, labor, and equipment for demolition, removal and disposal of debris from the dredging template and within the specified footprint of the proposed Shoreline Protection as shown on the drawings. Refer to debris removal requirements on Drawings, in Section 35 20 23, "Dredging," and in Section 02 41 00, "Demolition, Removal, and Disposal."

2. Debris removal during construction shall include all of the debris and relic structures listed on the drawings that are within the dredging template; within the shoreline protection construction footprint; and any additional debris encountered within the dredging template during the course of work, that cannot be removed through ordinary dredging. Removal of incidental debris during dredging shall not be included in this pay item.

3. Contract Price for all Debris Removal line items shall include excavation (removal) and relocation of the debris to an offsite disposal facility in accordance with applicable laws and ordinances. All disposal fees are the responsibility of Contractor.

4. Measurement for Debris Removal from Dredging Template shall be per short ton of 2,000 pounds based on Contractor's submittal of Certified Weight Tickets or Certified Barge Displacement Tables for debris actually removed. Sediment shall not be included in the debris weight.

5. Measurement for Debris Transported by Rail or Truck

    a. Measure the debris in tons (2,000 pounds). Certified railroad or truck weight scale tickets will be accepted for determination of the weight of debris. Have the debris weighed on standard railroad track scales by a certified Weighmaster. A copy of the Weight Scale Certification from the regulation agency attesting to the scale's accuracy shall be submitted with the weigh scale tickets. The Contractor shall have the scales tested in the presence of Engineer at any time requested by Port Authority.

    b. The original Certified Weight Scale Tickets or a certified copy prepared in ink or indelible pencil shall be furnished to Engineer promptly after a car or truck is weighed. The report of weight for each carload or truckload shall show the gross, tare, and net weights, and measures or changes on a report shall be explained by a memorandum made on, or attached to, the report and be signed by the Weighmaster. If deemed advisable, the Port Authority will employ an inspector at the scales, in which event, necessary facilities shall be furnished for the inspector for observing the weighing and for recording the scale weights and stenciled light weights on the cars or trucks. Expense of weighing debris and testing scales shall be borne by Contractor. Other methods of measurement may be used when approved by Engineer.

    c. Net Weight of Debris. The weight of sideboards, stakes, and skips, if any, will be determined by actual weighing or by estimates, mutually agreed upon by Engineer and the Contractor, and the weights so determined, together with the tare weight of the car or truck, shall be deducted from the gross weight to determine the net weight of debris.

6. Measurement for Debris Transported by Barge

    a. If transported by barge, debris will be measured for payment by the Port Authority by weight determined by barge displacement. All measurements for determining gauging tables and for calculating loads are to be made in still water close to the work site. The gauging table shall be based upon 62.4 lb/cf in fresh water and 64 lb/cf in salt water.

    b. Furnish the Port Authority a barge displacement table not less than 10 work days prior to loading the debris onto any barge. Each table submitted shall show the name and/or number of the barge owner, the name of the fabricator, and the certification and date of certification of the person or firm preparing the table.

    c. Furnish with the barge displacement tables a drawing or sketch of each barge, dimensioned in sufficient detail to permit checking of the tables. The drawings shall show, as a minimum, the length, width, depth of the barge, and dimensions of the rake or rakes.

    d. Each such table shall have its accuracy certified by a person or firm, other than the Contractor, customarily performing this service. Each table submitted shall contain, in parallel columns, the freeboard of the barge in feet and tenths from zero to the full depth of the barge and the corresponding gross displacement to the nearest ton.

    e. Each barge shall be suitably marked with three displacement gaging locations on each side near each end of the barge and two amidships on opposite sides. Each gaging location shall be marked by a line perpendicular to the edge of the barge, 4 inches wide and 1 foot long, on both the deck and side of the barge and two amid

ship on opposite sides.

f. Barges with rakes shall have the displacement gaging lines placed at each corner of the box section between the rakes. If a barge has a box end or ends, the gaging locations shall be placed approximately 4 feet from the box end(s). The freeboard will be measured at the six gaging locations and the displacement determined by the use of a barge/vessel displacement table from the average of these measurements. The displacement will be determined before and after being unloaded and the difference between these values shall be the debris quantity.

g. Submit the Gaging Table Data, debris hauling vessel, gaging tables and a copy of the data and calculations used for the preparation of the tables. Barges shall be loaded so that the readings taken at the gaging locations do not vary more than 1.5 feet port to starboard fore and aft and do not vary more than 0.5 feet port to starboard. If such is not the case, trim the carrier by shifting the debris until this limit is reached, before the measurement will be accepted. The draft shall be determined from the average of all six readings weighting the readings of the middle gage at double those of the end gages. ($G_1 + G_2 + 2xG_3 + 2xG_4 + G_5 + G_6$) divided by 8 = average draft.

h. Facilities for inspecting the hold of each carrier to determine whether leakage is occurring shall be provided. Each carrier shall also be provided with adequate pumping facilities, and if water is found to be accumulating in the hold, the carrier shall be pumped dry before each gaging, both before and after loading. Lightening by pumping or by transfer of crew or supplies will not be permitted while debris is being transferred.

G. Bulkhead Removal: Payment for Bulkhead Removal (Price Item No. 5) will be made on a lump-sum basis for costs associated with excavation/backfilling, demolition, removal, and disposal of relic bulkhead near Sta 753+00 as shown on the drawings. Bulkhead removal shall include all components of bulkhead system including sheetpiling, tie-back rods, and anchors. Refer to debris removal requirements on Drawings, in Section 35 20 23, “Dredging,” and in Section 02 41 00, “Demolition, Removal, and Disposal.”

H. Clearing and Grubbing: Payment for Clearing and Grubbing (Price Item No. 6) will be made on a lump-sum basis for costs associated with removal and disposal of trees, roots, stumps, logs, brush, and other vegetation as described in Section 31 11 00.00, “Clearing and Grubbing,” and as shown on the Drawings, as needed for completion of specified dredging.

I. Pipeline Management: Payment for Pipeline Management (Price Item No. 7) will be made on a lump-sum basis for costs associated with laying, relocating, removing, and handling shore pipelines to Beltway 8 Dredged Material Placement Area (BW8), East Clinton Dredged Material Placement Area (EC), and West Clinton Dredged Material Placement Area (WC); procurement of the materials and construction of ramps or installation of temporary culvert pipes which may be necessary for maintaining public access and laying the shore pipes; clearing pipeline routes as needed for installation of shore pipes; excavation and grading along pipeline routes as needed for installation of shore pipes; hauling any cleared and/or surplus excavated material from pipeline routes to placement areas for disposal; maintenance of pipeline during construction; final cleanup of pipeline routes; and any other related work.

J. Dredging:

1. Payment for Dredging (Maintenance) (Price Item No. 8) will be made for removal, transportation, and placement of dredged material from the Existing O&M Template as specified in Section 35 20 23, “Dredging,” and as shown on the Drawings. Payment for dredging will include costs for identification and removal of incidental debris and dredging

obstructions, and any other related work.

2. Payment for Dredging (New Work) (Price Item No. 9) will be made for removal, transportation, and placement of dredged material from the New-Work Template as specified in Section 35 20 23, "Dredging," and as shown on the Drawings. Payment for dredging will include costs for identification and removal of incidental debris and dredging obstructions, and any other related work.

3. Payment for Dredging (Price Item Nos. 8 and 9) will be based on computations of quantities removed from the pay templates specified in Section 35 20 23, "Dredging," and as shown on the drawings, as measured by cubic yards in place.

    a. No payments will be made for material removed beyond the limits shown on the Drawings. Quantity computations will be performed by Port Authority based on before-dredging (BD) and after-dredging (AD) surveys performed by Port Authority.

    b. Side and End Slopes:

        i. Dredging of side and end slopes is required. Dredging of the side and end slopes are to follow, as closely as practicable, the lines indicated or specified. Material removed from the required side slope section shown on the contract drawings – and within the defined template – will be computed and paid for at the dredging unit cost per cubic yard for that acceptance section.

        ii. For the purpose of dredging, the side slopes constitute a design criterion. Side slopes may fall flatter than those shown on the contract drawings. However, no payment will be made for material removed outside of the specified template, and no allowable overdepth will be paid on the side slopes. Refer to Section 35 20 23, "Dredging" for requirements for avoiding impacts to adjacent improvements.

4. Acceptance and payment for Dredging may be requested for Work completed in Channel Acceptance Segments as defined in Section 35 20 23, "Dredging," and as defined on the Drawings. Contractor may request payment for shorter segments; however, length of pay sections shall not be less than 500 feet.

5. Regardless of actual measured quantities, total payment for Dredging (Price Item No. 6 and 7) will not exceed the associated Extended Prices shown on Contractor's Price Exhibit Form without a Port Authority-initiated Change Order (for example, to increase Contract quantity).

6. All costs associated with the National Dredging Quality Management Program (Section 35 20 23.33, "National Dredging Quality Management Program") shall be considered subsidiary to the dredging cost.

K. Stockpiling and Shaping Dredged Material: Payment for Stockpiling and Shaping Dredged Material (Price Item Nos. 10 and 11) will be made on a lump-sum basis for costs associated with stockpiling and shaping dredged material within BW8, EC, and WC. Costs shall include the mobilization and operation of amphibious earthwork machinery suitable for working in extremely soft and wet soils and in shallow water; redistribution, stockpiling, and shaping dredged material within upland dredged material placement areas; degrading any areas where excessive mounding occurs; and installation/removal of temporary grade control stakes to monitor mounding heights adjacent to perimeter dikes within each placement area. Ditching and control of water within each PA is considered subsidiary to this work item.

L. Revetment: Payment for revetment (Price Item No. 12) will be made on a lump-sum basis for costs associated with revetment construction from Sta 839+52 to 841+94 including surveys,

clearing and grubbing, mechanical excavation and grading for subgrade preparation, disposal of surplus excavated material, geotextile fabric, and graded riprap. Removal of existing rubble and debris shall be covered under Price Item No. 4 (Debris Removal from Dredging Template.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

(NOT USED)

END OF SECTION

EXHIBIT A: PRICE EXHIBIT

RESPONDENT: _____

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total Amount
1	Mobilization and Demobilization	1	LS		$
2	Pre-Dredge Hazard Survey	1	LS		$
3	Marine Construction Surveying	1	LS		$
4	Debris Removal From Dredging Template	2,100	TON		$
5	Bulkhead Removal	1	LS		$
6	Clearing and Grubbing	1	LS		$
7	Pipeline Management	1	LS		$
8	Dredging (Maintenance):	234,000	CY		$
9	Dredging (New Work):	4,466,000	CY		$
10	Stockpiling and Shaping Dredged Material: Beltway 8 Placement Area (BW8)	1	LS		$
11	Stockpiling and Shaping Dredged Material: East and West Clinton Placement Areas	1	LS		$
12	Shoreline Protection	1	LS		$

TOTAL AMOUNT PROPOSED - Total of Unit Prices Extended (For Comparison of Proposals) $ _____

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TECHNICAL SPECIFICATIONS FOR

HSC ECIP – SEGMENT 4 DREDGING

SECTION 01 35 29.00 Mod – HEALTH, SAFETY AND EMERGENCY RESPONSE PROCEDURES

Section 01 35 29.00 Std – Health, Safety and Emergency Response Procedures of the Port of Houston Authority Standard Technical Specifications (December 2011) is modified as set forth below.

Part 1.2 Delete the following sections:

Section 01 56 13.00 Std – Containment Barriers
Section 02 83 00.00 Std – Lead-Based Paint Removal and Disposal

Part 1.3 Bullet 2 is revised as follows:

- Other federal, state, and local ordinances, statutes, and regulations as applicable.

Part 1.4 Subsection C is revised as follows:

Contractor's Plan shall include but not necessarily be limited to, the following components, as appropriate:

1. Safe Work Practices
2. Engineering Safeguards
3. Personal Protective Equipment (PPE)
4. Training
5. Standard Operating Procedures
6. Emergency and Contingency Planning
7. Logs and Reports
8. Hazard Communication Program

Contractor's Plan shall be approved by signature of a designated representative of Contracting firm, stating that the plan is in compliance with 29 CFR 1910 and 29 CFR 1926. The signed Contractor's Plan shall be submitted to the Port Authority for review, prior to commencing site work activities.

Part 3.1 Delete Part 3.1
Part 3.2 Delete Part 3.2
Part 3.3 Delete Part 3.3
Part 3.4 Delete Part 3.4
Part 3.5 Delete Part 3.5

Add the following section:

Part 3.8 DREDGING PIPELINE SAFETY

Contractor shall reference U.S. Army Corps of Engineers EM 385-1-1, Section 19.G.03, "Submerged and floating dredge pipeline," for regulations with the following exceptions:

A. Whenever buoyant or semi-buoyant pipeline is used, the dredge operator will assure that the pipeline remains fully submerged and on the bottom. When it is necessary to raise the pipeline, proper clearances shall be made and maintained and the entire

length of the pipeline shall be adequately marked at an interval not to exceed 400 feet to clearly show the pipeline length and course.

B. Indicators, such as signs or buoys that state “DANGER SUBMERGED PIPELINE” shall be placed at the beginning and end of the pipeline. In addition, indicators are required beginning in areas which reduce the charted depth by more than 10 percent, and, as a minimum, every 400 feet to clearly warn of the pipeline length and course.

C. Lengths of submerged pipeline located outside of the navigation channel which reduce the charted depth by more than 10 percent shall be identified with high visibility buoys marked with 360 degree visibility retro-reflective tape, such as orange neoprene buoys, placed at an interval not to exceed 400 feet to clearly show the pipeline length and course. Indicators meeting the requirements of Paragraph 3.8A above shall be placed midway between each high visibility buoy.

No other clauses or requirements of Section 01 35 29.00 Std – Health, Safety and Emergency Response Procedures of the Port of Houston Authority Standard Technical Specifications (December 2011) are modified hereby.

END OF SECTION

PORT OF HOUSTON AUTHORITY

TECHNICAL SPECIFICATIONS FOR

HSC ECIP – SEGMENT 4 DREDGING

SECTION 01 35 53.00 Add – SECURITY PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

Due to absence of physical access barriers around the project area, Contractor shall expect the potential for security risks to assets, equipment, and staff. Possible security concerns include but are not limited to theft, robbery, burglary, vandalism, and assault. It is the responsibility of Contractor to protect his assets, equipment, and staff from security threats. Engineer or Port Authority shall not be deemed responsible for damages, losses, and harms incurred to Contractor's assets, equipment, and staff from security threats.

1.2 RELATED SECTIONS

Section 35 20 23 Add – Dredging

1.3 SUBMITTALS

Prior to commencement of work, Contractor shall submit a Security Procedures Plan to Port Authority for approval. It is the responsibility of Contractor to ensure his proposed security methods and procedures are adequate and comply with all Federal, State, and Local laws, rules and ordinances. Approval of a Security Procedures Plan shall solely confer Port Authority's consent to execution of such plan on Port Authority's property and shall not make the Engineer or Port Authority responsible for losses, damages, injuries, or harms incurred despite or during execution of such plan nor shall it confirm lawfulness of Contractor's Security Procedures Plan.

The Security Procedures Plan shall at minimum include:

1. Cover Letter briefly explaining intended Security Procedures;
2. Drawings of proposed physical barriers, surveillance cameras, and lamp posts (if any); and
3. Name and address of security services subcontractor (if any).

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 GENERAL

Contractor and his security services subcontractor (if any) shall obey all federal, state, and local laws and rules during conduct of security procedures. All security interventions shall be enacted in a professional, dignified, and humane manner. If necessary, it is the responsibility of Contractor and his security services subcontractor (if any) to pay all related fees and appear in the court of law as plaintiff or defendant regarding all security-related matters.

3.2 PHYSICAL BARRIERS

If included in the Security Procedures Plan and upon approval by Port Authority, Contractor may install physical barriers at the project site. Physical barriers shall only be installed at locations

shown on the Security Procedures Plan. Approval from Port Authority is required should Contractor wishes to modify locations of physical barriers. All physical barriers shall be removed from the site during demobilization.

3.3 LAMP POSTS

If included in the Security Procedures Plan and upon approval by Port Authority, Contractor may install lamp posts at the project site to maintain adequate lighting for security purposes. Lamp posts may only be installed at locations shown on the Security Procedures Plan. Approval from Port Authority is required should Contractor wish to modify locations of lamp posts. Contractor is responsible for the energy supply required to operate lamp posts. All lamp posts shall be removed from the site during demobilization.

3.4 SURVEILLANCE CAMERAS

If included in the Security Procedures Plan and upon approval by Port Authority, Contractor may install surveillance cameras at the project site. Surveillance cameras may only be installed at locations shown on the Security Procedures Plan. Approval from Port Authority is required should Contractor wish to modify locations of surveillance cameras. Contractor is responsible for the energy supply required to operate the cameras. All surveillance cameras shall be removed from the site during demobilization.

3.5 SECURITY PERSONNEL

If included in the Security Procedures Plan and upon approval by Port Authority, Contractor may employ security personnel to patrol the project site. All security personnel employed by Contractor or his security services subcontractor shall be well-groomed and wear clean and pressed uniforms. Contractor shall ensure that security personnel receive orientation training regarding construction sites and known or potential hazards and methods for recognizing and avoiding known or potential hazards. All security personnel shall have adequate security training and be properly licensed and certified to bear and use service weapons.

END OF SECTION

PORT OF HOUSTON AUTHORITY

TECHNICAL SPECIFICATIONS FOR

HSC ECIP – SEGMENT 4 DREDGING

SECTION 02 41 00 Add – DEMOLITION, REMOVAL AND DISPOSAL

PART 1 GENERAL

1.1 SUMMARY

This section shall govern all work necessary to perform the demolition, removal, and disposal of timber piles; steel sheetpiling, tie rods, and anchors; concrete pads; concrete debris; riprap; stone; logs; driftwood; and other obstructions and/or debris within the dredging limits in accordance with these Specifications and applicable Drawings.

1.2 RELATED SECTIONS

Section 01 16 60 Add – Environmental Protection Measures
Section 35 20 23 Add – Dredging

1.3 SUBMITTALS

A. Demolition and Debris Removal Plan: Not less than ten days prior to starting demolition Work, submit acceptable plan for demolition and debris removal Work, including:

1. Equipment proposed for use in demolition and debris removal operations.
2. Recycling/disposal facility(ies) proposed, including facility name, location, and processes. Include copy of appropriate permits and licenses, and compliance status.
3. Planned demolition operating sequences.
4. Detailed schedule of demolition Work in accordance with the Schedule accepted by Port Authority.

B. Provide written notification of intended demolition start.

C. Provide Daily Activities Reports (Paragraph 1.5, A)

D. Provide Certified Weight Tickets or Certified Barge Displacement Tickets for debris removal (Section 01 25 00, “Measurement and Basis of Payment)

1.4 QUALITY ASSURANCE

A. Daily Activities Reports: Contractor shall include Demolition, Removal, and Disposal related information in the Daily Activities Reports required under Specification 35 20 23, “Dredging.” Contractor shall document debris removal with before and after photographs. Photographs of debris removal shall be included in Daily Activities Reports.

B. Regulatory Requirements:

1. Demolition, debris removal, and disposal Work shall be in accordance with 29 CFR 1926.850 through 29 CFR 1926.860 (Subpart T – Demolition), and all other Laws and Regulations.
2. Comply with requirements of authorities having jurisdiction.

1.5 SITE CONDITIONS

A. Port Authority makes no representation of:

1. Condition or structural integrity of area(s) to be demolished or where debris removal is required by the Contract Documents.
2. Underground facilities or utilities. Utility locations and conditions inside area(s) to be demolished or where debris removal is required by the Contract Documents are limited or unknown.
3. Condition, makeup, or size of abandoned structures or shoreline protection inside area(s) to be demolished or where debris removal is required by the Contract Documents.
4. Condition, makeup, or size of underwater debris inside area(s) where debris removal is required by the Contract Documents.
5. Geotechnical integrity of area(s) where debris removal is required by the Contract Documents.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.1 PREPARATION

A. Notification and Public Safety:

1. Not less than 48 hours prior to commencing demolition or debris removal, advise Port Authority in writing of planned start of demolition Work. Do not start debris removal without permission of Port Authority.
2. Entrance to secure sites must be coordinated with Port Authority 24 hours prior to arrival. Some areas require workers to have a TWIC card in hand.
3. Where demolition or debris removal has potential to affect adjacent properties, public thoroughfares, transportation facilities, and utilities, furnish required notices to Port Authority and occupants of properties, buildings, and structures that may be affected by the demolition of debris removal.
4. In accordance with laws and regulations, furnish to authorities having jurisdiction, including emergency services as necessary, appropriate notices of planned demolition and debris removal.
5. Submit to Port Authority copies of notices furnished to adjacent property, occupants, and authorities having jurisdiction.
6. Where pedestrian and driver safety are endangered in the area of demolition work, temporary traffic barricades with flashing lights shall be installed and maintained until the demolition work is complete.

B. Protection of Adjacent Areas and Facilities:

1. Conduct of the work shall not interfere with Port Authority operations, including but not limited to Fire Department Boat Docks.
2. Perform demolition and debris removal work in manner that prevents damage and injury to property, structures, occupants, the public, and facilities. Do not interfere with use of, and free and safe access to and from, structures and properties unless allowed by the Contract Documents otherwise allowed in writing by Port Authority. Stop work immediately if adjacent structures appear to be in danger.
3. Closing or obstructing of roads, access routes, sidewalks, and passageways adjacent to the Work is not allowed.

4. Obstructing the ship channel or Fire Boat channel adjacent to the Work is not allowed.
5. Provide appropriate temporary barriers, lighting, fencing, and other necessary protections pursuant to current and applicable laws and regulations.
6. Repair damage to facilities that are to remain when such damages results from Contractor's operations.
7. Qualify remaining structures are sound and safe for operations in accordance with Paragraph 3.2.E of this Specifications Section and other requirements of the Contract Documents, as applicable.

C. Existing Utilities:

1. Unforeseen, unknown, or incorrectly shown or indicated underground facilities may be encountered. Cooperate with Port Authority and utility owners in keeping adjacent services and facilities in operation.
2. Before proceeding with demolition, locate all existing utilities, such as electric and communications serving the project area, and ensure these utilities are abandoned.
3. Shutdown of utility services shall be coordinated by Contractor, assisted by Port Authority as required relative to contacting utility owners.

D. Remediation:

1. Prior to performing demolition Work that disturbs asbestos, remove and dispose of asbestos in accordance with Federal, State and Local laws and regulations.
2. Prior to performing demolition Work involving lead-based paint, remediate lead in accordance with Federal, State and Local laws and regulations.
3. If unanticipated Hazardous Environmental Condition is believed to be encountered during demolition and debris removal, comply with requirements of the General Conditions, as may be modified by the Supplementary Conditions.

E. Environmental Protection: Environmental protection measures shall be maintained continuously throughout the duration of demolition and removal activities. Refer to Section 01 16 60 Add, "Environmental Protection Measures," for environmental protection requirements.

3.2 DEMOLITION - GENERAL

A. Equipment:

1. Locate construction equipment used for demolition work in a manner not to impede Port Authority operations. Contractor may be required to relocate equipment at the request of Port Authority.
2. Coordinate equipment deliveries and hauling schedules with Port Authority.

B. Pollution Controls:

1. Use water sprinkling, temporary enclosures, and other suitable methods to limit emissions of dust and dirt to lowest practical level.
2. Do not use water when water may create hazardous or objectionable conditions such as flooding or pollution.
3. Clean adjacent structures, facilities, properties, and improvements of dust, dirt, and debris caused by demolition work, in accordance with the General Conditions.

C. Explosives: The use of explosives is prohibited.

D. Burning: Burning of trash or debris onsite is prohibited.

E. Temporary Bracing and Supports:

1. Provide temporary bracing and supports sufficient to maintain safety, stability, and resist all loads to which the structure may be subject during demolition and debris removal, until entirety is permanently removed or permanently stabilized.

2. Temporary bracing and supports shall be sufficient for associated dead load, live load, transient loading, and dynamic loads such as wind, hydraulic, and other loads to which the temporary bracing or support may be subject.

3. Where appropriate, retain a professional structural engineer, duly licensed and registered in the State of Texas, to design temporary bracing and supports.

3.3 UNDERWATER DEBRIS REMOVAL

A. Existing debris may obstruct dredging required under this Contract. Such debris shall be removed from water and disposed by Contractor outside of Port Authority and Federal property. In the event that existing conditions of debris differ materially from those shown in the side scan sonar report and other investigations provided by the Port Authority, an adjustment in contract price or time of completion, or both, will be made in accordance with the following:

1. Contractor shall promptly and before the site conditions are disturbed, provide notification to Port Authority of unknown physical conditions at the site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract.

2. Port Authority will investigate the site conditions promptly after receiving Contractor's notice. If conditions do materially so differ and cause an increase or decrease in Contractor's cost of or time required for performing any part of the work under this Contract, whether or not changed as a result of the conditions, an equitable adjustment will be made under this section through a Change order or other written agreement.

3. No request by Contractor for an equitable adjustment to the Contract under this section shall be allowed unless Contractor has provided written notice prior to disturbing existing site conditions.

B. Emergency Spill Response Equipment. Prior to commencing debris removal activities, sufficient spill response equipment, i.e. boom, etc. shall be on-site and ready for deployment in the event that debris releases hazardous material. Refer to additional requirements in Section 35 20 23, "Dredging."

3.4 EXCAVATION

A. Marine

1. Contractor may excavate adjacent to structures to be removed and side cast material to facilitate debris removal.

2. Existing structures that are to remain shall not be undermined. Contractor shall verify structural integrity of remaining structures.

3. Material excavated is to be returned to its original position.

4. The excavated material is subsidiary to structural demolition and debris removal.

B. Land

1. Contractor may excavate adjacent to structures to be removed.

2. Excavations shall follow applicable safety regulations and guidelines.

3. Backfill shall be graded in a manner that drains freely towards the channel.

3.5 STRUCTURAL DEMOLITION AND DEBRIS REMOVAL

A. Remove structures to extents indicated on Drawings, unless otherwise directed by Port Authority. Debris removal beyond limits shown or indicated shall be at Contractor's risk and expense, and such excess debris removal shall be reconstructed to satisfaction of Port Authority without additional cost to Port Authority.

B. Recycling and Reuse of Demolition Materials:

1. All concrete, reinforcing steel, structural metals, miscellaneous metals, wire mesh, and other items contained in or upon the project location or structure to be demolished shall be removed, transported, and disposed of away from the Site, unless otherwise approved by Port Authority.

2. Do not use demolished or removed debris as fill or backfill.

C. Where parts of existing structures are to remain in service following demolition, remove the portions shown or indicated for debris removal, repair damage, and leave the structure in proper condition for the intended use.

1. Qualify remaining structures are sound and safe for operations.

2. Remove concrete and masonry to the lines shown or indicated by sawing, drilling, chipping, and other suitable methods. Leave the resulting surfaces true and even, with sharp, straight corners that will be satisfactory for the purpose intended.

3. Do not damage reinforcing bars beyond the area of concrete and masonry debris removal.

4. Do not saw-cut beyond the area to be removed.

D. Demolition of asphalt or concrete rubble, slabs, piles, piers, foundations, sheetpiling, tie-back rods, soil anchors, lumber, driftwood, and other miscellaneous site improvements shall be total. Complete removal of these items within the project limits is required.

E. Existing shoreline protection material shall be removed. This material may be reused onsite if pre-approved by Port Authority.

F. Completely remove below-grade posts and concrete, including potential below grade concrete from preexisting fence structures.

3.6 DISPOSAL OF DEMOLITION DEBRIS

A. Disposal – General:

1. Promptly remove from the Site all debris, waste, rubbish, material, and equipment resulting from demolition and debris removal operations.

B. Transportation and Disposal:

1. Non-Hazardous Materials, Equipment, and Debris:

a. Properly transport and dispose of non-hazardous demolition materials, equipment, and debris at appropriate landfill or other suitable location, in accordance with Laws and Regulations.

b. Non-hazardous material does not contain constituents of concern such as asbestos, arsenic, chromium, creosote, PCBs, petroleum, hazardous waste, radioactive material, or other material designated as hazardous in Laws or Regulations.

2. Hazardous Materials and Debris: When handling and disposal of items containing constituents of concern, properly transport and dispose of such items in accordance with the Contract Documents and Laws and Regulations.

3.7 CLEANUP

Demolished materials and/or debris shall be transported in a manner that will prevent spillage along the shoreline, into the channel, onto adjacent properties, and onto roadways. If spillage occurs, Contractor shall conduct all cleanup operations at no additional cost to Port Authority.

END OF SECTION

PORT OF HOUSTON AUTHORITY

TECHNICAL SPECIFICATIONS FOR

HSC ECIP – SEGMENT 4 DREDGING

SECTION 31 05 19.13 Add – GEOTEXTILES FOR EARTHWORK

PART 1 GENERAL

1.1 SUMMARY

Work includes furnishing materials, labor, and equipment for the installation of geotextile filter fabric beneath the graded riprap (GRR) used to construct the shoreline protection in accordance with these Specifications and applicable Drawings.

1.2 RELATED SECTIONS

Section 01 25 00 Add – Measurement and Basis of Payment
Section 35 20 00 Add – Marine Construction Surveying
Section 35 31 19 Add – Revetment

1.3 REFERENCES

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.

A. American Society for Testing and Materials (ASTM) Publications

D 4354	Standard Practice for Sampling Geosynthetics for Testing
D 4355	Standard Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light (Xenon-Arc Type Apparatus)
D 4533	Standard Test Method for Trapezoidal Tearing Strength of Geotextiles
D 4632	Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
D 4751	Standard Test Method for Determining Apparent Opening Size of a Geotextile
D 4759	Standard Practice for Determining the Specification Conformance of Geosynthetics
D 4884	Standard Test Method for Seam Strength of Sewn Geotextiles
D 6241	Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe

1.4 SUBMITTALS

Engineer's approval is required for submittals with an "E" designation; submittals not having an "E" designation are for information only.

1. Manufacturer's Product Data (Paragraph 2.1, C)

2. Manufacturer's Installation Instructions (Paragraph 3.3, C)

3. Certified Test Reports (Paragraph 2.1, D), E

4. Sewn Seam Details and Laboratory Test Reports (Paragraph 2. 1, E), E

5. Initial Survey (Paragraph 3. 2), E

1.5 DELIVERY, STORAGE AND HANDLING OF MATERIALS

Materials delivered to the site shall be inspected for damage, unloaded, and stored with the minimum of handling. Materials shall not be stored directly on the ground without a fabric or plastic liner beneath and shall be kept free of dirt and debris.

PART 2 PRODUCTS

2.1 GEOTEXTILE FILTER FABRIC

A. Filter Fabric: Filter fabric shall be pervious woven sheet, consisting of long-chain synthetic polymers composed of at least 85 percent by weight polyolefins, polyesters, or polyamides. Sheets shall be formed into a stable network such that filaments or yarns retain their relative position to each other. Sheets shall be inert to chemicals commonly encountered in natural water, the soil conditions encountered at the site, and UV stabilized. The edges of sheets shall be selvedged or otherwise finished to prevent outer filaments or yarns from pulling away from the sheet. Geotextile fabric shall be free from defects or tears.

B. Physical Properties: Conformance of filter fabric shall be in accordance with ASTM D 4759. Filter fabric shall be sampled in accordance with ASTM D 4354 and tested to verify the following minimum physical properties and requirements as shown in Table 1:

Table 1. Filter Fabric Properties

Physical Properties	Unit	Test Method	Measure
Apparent Opening Size	U.S. Sieve	ASTM D 4751	#70
Grab Tensile Strength	lb	ASTM D 4632	250 min.
Tensile Elongation	%	ASTM D 4632	15 (max.)
CBR Puncture Strength	lb	ASTM D 6241	950 min.
Trapezoidal Tear Strength	lb	ASTM D 4533	100 – 60 min. (MD – CD)
Ultraviolet Resistance (500 Hours)	%	ASTM D 4355	70 min.

C. Acceptable Products: The following products may be used for geotextile filter fabric:

1. US Fabrics – US 670
2. Mirafi FW 700
3. Propex Geotex 104 F

Listing of specific manufacturer's products shall not be construed as product approval without certified tests. Actual physical properties of the products furnished must conform to the minimum physical properties specified under paragraph 2.1, B. In addition to the minimum physical properties listed, other properties (such as fabric weight and weave type) shall be considered by the manufacturer in providing a product that is appropriate for the native

material, method of installation, and method of GRR placement for the proper functioning of the filter.

D. Certified Test Reports: Submit manufacturer's certified test results to the Engineer showing test values of the filter fabric physical properties. Certified test results shall be for tests performed within one year prior to the Notice to Proceed.

E. Sewn Seams: Submit details for sewn seams if sewn seams are planned. Details shall address, but not be limited to, thread type, thread tension (sewing device), stitch density and type, overlap, and number of rows and type of chainstitch. Also submit laboratory test reports evaluating the load-transfer capability of the proposed seams in accordance with ASTM D 4884.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION

The surface to receive the geotextile filter fabric shall be prepared by locating and removing obstructions or debris.

3.2 INITIAL SURVEY

Lines and grade of graded riprap (GRR) subgrade shall be surveyed by the Contractor and submitted to the Engineer prior to placement of geotextile fabric. Refer to Section 35 00 01, "Marine Construction Surveying" for survey requirements.

3.3 GEOTEXTILE FILTER FABRIC

A. General: Geotextile fabric shall be placed over the prepared subgrade as indicated on the drawings.

B. Protection: Work shall be sequenced so that geotextile filter fabric are not exposed more than 7 days from the time rolls are removed from their protective covering and are fully covered by GRR or opaque temporary coverings. During periods of shipment and storage, geotextile fabric shall be protected from direct sunlight, ultra-violet rays, and high temperatures and in accordance with any other instructions of the manufacturer. Unpackaged rolls or sheets shall be protected with temporary opaque coverings.

C. Placement: Geotextile fabric shall be free from defects or tears and placed in accordance with the manufacturer's instructions, but placement method shall meet, as a minimum, the following criteria:

1. Construction equipment and vehicles shall not operate directly on geotextile fabric, unless otherwise permitted by the Engineer.

2. Geotextile fabric sheets shall be loosely laid and conform to surface irregularities so as to minimize tension in the sheets when subsequent stone is placed.

3. Laps between geotextile sheets shall be no less than 3 ft except where specified on the drawings. When used, sewn seams must be pre-approved by Engineer. Sewn seams shall be installed in accordance with manufacturer's recommendations.

4. Geotextile fabric sheets shall not be staked down such that they are taut and subject to significant puncture or tearing during stone placement.

5. Loose staking of geotextile fabric or placement of GRR to tack edges of geotextile fabric prior to loading central portion of breakwater to maintain alignment may be required.

6. Method of GRR placement shall be such that geotextile fabric sheets are not pulled apart at the laps or significantly punctured or torn.

END OF SECTION

PORT OF HOUSTON AUTHORITY

TECHNICAL SPECIFICATIONS FOR

HSC ECIP – SEGMENT 4 DREDGING

SECTION 31 11 00.00 Add – CLEARING AND GRUBBING

PART 1 GENERAL

1.1 SUMMARY

Subject to the requirements of the General and Special Conditions, this section includes, the Clearing and Grubbing of existing terrain as described and specified herein and as shown on the drawings.

1.2 RELATED SECTIONS

SECTION 01 25 00 Add - Measurement and Basis of Payment

PART 2 PRODUCTS

2.1 MATERIALS

A. Tree Wound Paint

1. Use bituminous based paint from standard manufacture specially formulated for tree wounds.

B. Herbicide

1. Herbicides shall not be used for this work.

PART 3 EXECUTION

3.1 CLEARING

A. Clearing consists of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared. Cut off flush with or below the original ground surface trees, stumps, roots, brush, and other vegetation in areas to be cleared, except such trees and vegetation as may be indicated or directed to be left standing. Trim dead branches 1-1/2 inches or more in diameter on trees designated to be left standing within the cleared areas and trim all branches to the heights indicated or directed. Neatly cut close to the bole of the tree or main branches, limbs and branches to be trimmed. Paint, with an approved tree-wound paint, cuts more than 1-1/2 inches in diameter.

1. Tree Removal

Where indicated or directed, trees and stumps that are designated as trees shall be removed from areas outside those areas designated for clearing and grubbing. This work includes the felling of such trees and the removal of their stumps and roots as specified in paragraph GRUBBING. Dispose of trees as specified in paragraph DISPOSAL OF MATERIALS.

2. Pruning

Trim trees designated to be left standing within the cleared areas of dead branches 1-1/2 inches or more in diameter; and trim branches to heights and in a manner as indicated. Neatly cut limbs and branches to be trimmed close to the bole of the tree or main branches. Paint cuts more than 1-1/4 inches in diameter with an approved tree wound paint.

3. Grubbing

Grubbing consists of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas. Remove material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings, and areas to be paved. Fill depressions made by grubbing with suitable material and compact to make the surface conform with the original adjacent surface of the ground.

3.2 DISPOSAL OF MATERIALS

Dispose solid waste materials, wood or wood-like materials, and any other excess materials remaining from clearing, pruning, or grubbing in accordance with local laws and ordinances. This material shall not be disposed in dredged material placement areas.

END OF SECTION

PORT OF HOUSTON AUTHORITY

TECHNICAL SPECIFICATIONS FOR

HSC ECIP – SEGMENT 4 DREDGING

SECTION 35 20 00 Add – MARINE CONSTRUCTION SURVEYING

PART 1 GENERAL

1.1 SUMMARY

A. Marine Construction Surveying includes furnishing materials, labor, and equipment for hazard, topographic, and hydrographic surveying where required under Contract Documents.

B. The Port Authority intends to perform all before-dredging and after-dredging surveys for payment and acceptance of channel dredging. However, if directed by Port Authority, Contractor shall perform Before-Dredging (BD) and After-Dredging (AD) surveys. All channel surveys performed by Contractor, including daily surveys performed for quality control, shall match the surveying methods and procedures applied by the Port Authority and as otherwise as described herein.

1.2 RELATED SECTIONS

Section 01 25 00 – Measurement and Basis of Payment
Section 35 20 23 – Dredging
Section 35 31 19 – Revetment

1.3 REFERENCES

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.

U.S. Army Corps of Engineers (USACE) Publications:

EM 1110-1-1005	(2007) Control and Topographic Surveying
EM 1110-2-1003	(2004) Hydrographic Surveying.

1.4 SUBMITTALS

A. Port Authority's and Engineer's approval are required for submittals with an "E" designation; submittals not having an "E" designation are for information only. Contractor shall be aware that the Port Authority will forward these submittals to the U.S. Army Corps of Engineers for additional review.

1. Name of Registered Professional Land Surveyor (Paragraph 1.5.A); E
2. Surveying Plan (Paragraph 1.5.B); E
3. Survey Submittal Log (Paragraph 3.2.C); E
4. Pre-Dredge Hazard Survey (Paragraph 3.4)
5. Shoreline Protection Surveys (Paragraph 3.6); E

B. Should the Port Authority direct Contractor to perform channel surveys, Contractor shall provide the following additional submittals:

1. Channel BD and AD Surveys and Quantity Computations (Paragraph 3.5); E
2. Multi-Beam Surveys (Paragraph 3.5); E

1.5 QUALITY ASSURANCE

A. General: All survey plots submitted to Engineer shall be sealed by a professional land surveyor registered in the State of Texas, experienced in topographic and bathymetric surveying, and familiar and experienced with the USACE's surveying guidelines in Engineer Manuals (EM) 1110-1-1005 and 1110-2-1003. Prior to commencing Work, Contractor shall provide name and credentials of a Registered Professional Land Surveyor (RPLS) who will oversee surveys. Use of an RPLS who is certified as an American Congress on Surveying and Mapping (ACSM) Hydrographer is strongly encouraged.

B. Surveying Plan: As part of the Dredging Work Plan required under specification Section 35 20 23, "Dredging," Contractor shall provide description of methods and equipment to be applied for required surveys as well as quality assurance and quality control (QA/QC) procedures to be applied. Contractor shall also provide documentation that survey equipment meets the Minimum Performance Standards for Corps of Engineers Hydrographic Surveys, as shown in Table 3-1 of Engineer Manual (EM) 1110-2-1003, and a description of calibration and other QA/QC procedures to be applied. No other equipment shall be used for surveying without prior notification to Engineer. Refer to Paragraph 3.5.B for additional QA/QC requirements for multi-beam surveys.

C. Transducer Frequency: Where electronic fathometers/echosounders are applied for bathymetric surveys, transducer frequency shall be consistent between BD and AD surveys within any particular area. Measurements shall normally be determined based on high frequency (200 kHz) data. Low frequency (40 kHz or less) data shall require prior written concurrence from Engineer.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.1 GENERAL

Table 1 designates the surveys that are required to be performed by Contractor and surveys that are planned to be completed by Port Authority. Contractor shall perform channel BD and AD surveys if directed by Port Authority.

Table 1. Summary of Required Surveys				
Survey	**Intended Purpose**	**Survey Schedule**	**Type**	**Completed By**
Channel Dredging				
Pre-Dredge Hazard Survey	Magnetometer or similar survey required to locate and avoid pipelines, utilities, hazards, and obstructions.	Prior to commencement of dredging	Magnetometer or similar	Contractor
BD Surveys	To verify existing conditions and document pre-dredging grades and volumes	Prior to commencement of dredging	Multi-beam supplemented with RTK GPS in shallow and emergent areas	Port Authority
Contractor Dredging Surveys	Channel surveys conducted by Contractor to measure its own construction progress and compliance	Daily (as safety and weather allows)	Minimum of Single Beam supplemented with RTK GPS in shallow and emergent areas	Contractor
Interim AD Surveys for Progress Payment	Channel surveys performed to monitor dredging and to determine quantities for payment and percentage completion of work performed during pay period	Approximately, but not more frequently than, once per week	Multi-beam supplemented with RTK GPS in shallow and emergent areas	Port Authority
AD Surveys for Dredging Section Acceptance	Channel surveys performed to determine that the dredging template within an acceptance section has been dredged to the required lines and grades.	Upon request of Contractor to have an acceptance section accepted, subject to provisions of Paragraph 3.5.E	Multi-beam supplemented with RTK GPS in shallow and emergent areas	Port Authority
Shoreline Protection (Revetment)				
Initial	To verify existing conditions and for review by Engineer in assessing need for any adjustments to specified template and/or work limits prior to start of shoreline protection construction.	Prior to commencement of shoreline protection construction.	RTK GPS with Single Beam (minimum)	Contractor
Final	Final survey shall be performed to document final lines and grades.	After completion of excavation, shoreline protection installation, and backfilling (req'd prior to final payment).	RTK GPS with Single Beam (minimum)	Contractor

3.2 SURVEY PLOTS

A. Plots showing lines and grades, and quantity computations as applicable, shall accompany all payment requisitions. All construction surveys submitted to Engineer shall be in the form of plan-view, cross section plots, and digital data. All surveys shall be referenced to the project datums shown on the Drawings. Plots shall be transmitted digitally in PDF and AutoCAD format. All plots shall legibly and clearly display the following information:

1. Project name and owner (Port Houston Authority)
2. Professional Land Surveyor's seal, signature, and Company's Certificate of Authorization (COA) (required on pdf transmittals)
3. Date(s) surveys were performed

4. Location and description of survey control
5. Vertical and horizontal datums
6. Sheet name and number
7. Name of Contractor
8. Drawing scale(s)
9. Transducer frequency (where fathometer/echo sounders used)
10. Submittal title (e.g., “Shoreline Protection Initial Survey”)

B. Survey plots shall include the following:

1. Plan sheets clearly documenting locations, limits, and dimensions of completed Work (as applicable) and locations where cross sections were taken. Bathymetry and topography shall be plotted using an elevation color scale.
2. Cross-section sheets providing an overlay of sequential survey transects (as applicable) along with specified templates. A legend shall be provided indicating the date and survey type (e.g., Initial, Final, etc.) for each transect shown.

C. Digital Data: In addition to plots in pdf format, all survey submittals shall include digital data on a labeled USB flash drive, on a portable (external) hard drive, or via a file sharing system approved by the Port Authority. Digital data shall include the following:

1. A submittal log documenting surveys submitted to date with descriptors for survey dates and locations.
2. AutoCAD files
3. ASCII files containing the following Northing, Easting, Elevation, and Station for Single Beam and Topographic surveys; and Northing, Easting, and Elevation for Multi-beam surveys.
4. PDF files with signed Registered PLS seal

3.3 PRE-DREDGE HAZARD SURVEY

Prior to commencing dredging, Contactor shall perform a hazard survey (magnetometer, side-scan sonar, sub-bottom profiler, and/or similar method) over the entire area to be dredged, and any other areas where ground disturbances will occur, to search for surface debris, uncharted pipelines, and/or other anomalies on or below the existing seafloor. Hazard survey shall be supplemented with probing as required to determine depth of uncharted hazards/obstructions. Probing shall be coordinated with utility owners. Contractor shall be solely responsible for determining necessary extent and methods of pre-dredge hazard survey. Planned scope of pre-dredge hazard survey shall be summarized in Surveying Plan (Paragraph 1.5.B). Results of the pre-dredge hazard survey shall be provided with a summary of findings, interpretation of any located anomalies, and considerations for dredging.

3.4 SURVEY TRANSECTS

A. The survey transects specified herein apply to all Single-Beam and Topographic surveys performed by Contractor for QA/QC, acceptance, and/or submittal with monthly pay requests.

B. Shot spacing along each transect shall not exceed 20 ft.

C. Shoreline Protection Surveys: Where shoreline protection is specified on the Drawings, survey transects shall consist of cross-sections of the shoreline protection at 50 ft (max) intervals (minimum of 4 cross sections) extending 20 ft (min) beyond the inner and outer limits of the shoreline protection. Final surveys shall reoccupy location of cross-sections performed for the Initial Survey.

3.5 MULTI-BEAM SURVEYS

A. General: Multi-beam (acoustic sweep) surveys will be performed by Port Authority before and after dredging. Contractor shall provide Port Authority and USACE a minimum of 24-hour notice prior to the request of a multi-beam survey. The Port Authority and USACE will afford Contractor opportunity to be present during collection of multi-beam survey data.

B. Surveys by Contractor: Should Port Authority direct Contractor to perform BD and AD surveys, Contractor's surveys shall match the surveying methods and procedures planned to be applied by Port Authority as described herein. Contractor shall allow Port Authority and USACE personnel to be present during collection of survey data.

C. Survey Equipment and QA/QC: Equipment applied for multi-beam surveys shall comply with the guidelines stated in EM 1110-2-1003. Perform patch tests and quality assurance tests as described in Chapter 11 of EM 1110-2-1003. Documentation of tests shall be submitted to Port Authority with overall survey results.

D. Survey Limits: Surveys shall provide 100% coverage of required dredging limits. Multi-beam surveys shall be supplemented with RTK GPS topographic surveys within specified dredging areas that are too shallow for multi-beam surveys, and within areas that are dry ground.

E. Before Dredging (BD) Multi-Beam Surveys: BD Multi-Beam survey will be performed by Port Authority within 15 days prior to commencement of dredging.

F. After Dredging (AD) Multi-Beam Surveys: AD Multi-Beam survey will be performed by Port Authority as soon as practicable after completion of dredging. Should any shoals, lumps, or other lack of contract depth be disclosed by this examination, Contractor shall remove same and Port Authority will repeat surveys to show that acceptance area is clear. Quantities will be subdivided into Maintenance and New Work volumes by Acceptance Section.

G. Quantity Computations: After completion of dredging, Port Authority will provide volume calculations to Contractor based on comparison of BD and AD surfaces. Port Authority will create BD and AD surfaces (triangulated irregular network or similar) using BD and AD Multi-Beam surveys supplemented by topographic BD and AD survey shots collected at Survey Transects (refer to Paragraph 3.4).

H. Data Processing

1. Selected representative "shot," "average," and "minimum" depths will be derived from the entire edited multi-beam dataset. Extraneous noise and spikes will be removed from the raw dataset before any other data processing is performed.

   a. Shot depth will be applied to represent the general condition of the bottom for plotting and graphical purposes. Shot depth will be defined as the depth reading closest to the center of 5 ft x 5 ft cells.

   b. Average depth will be applied for volume computations (not for pay purposes). Average depth will be defined as the average of all depths within 3 ft x 3 ft cells. Volume

calculations will be performed through development of a triangulated irregular network (TIN) as described on page 15-11 of EM 1110-2-1003.

c. Minimum depth will be applied to determine acceptance to the required depth as described on page 11-44, "Dredge Clearance & Acceptance Surveys (Shoal/Strike Detection)" of EM 1110-2-1003. Minimum depth will be defined as the "shoalest" depth within a 3 ft x 3 ft cell. Shoals will be delineated by a minimum of 3 hits over successive passes. A single high spot unsupported by other data will be disregarded.

I. Plots: For required surveys performed by Contractor, Contractor shall provide survey data plots within 10 days of completion of field surveys. Plots shall consist of surface renderings for visualization of each BD and AD survey. A color scheme shall be applied that clearly highlights shoals and/or locations that exceed the allowable dredging depth.

1. Shot depth plots shall be printed at a scale of one inch = 200 feet with a cell size of 40 ft x 40 ft.
2. Average depth plots are not required.
3. Minimum depth plots shall be printed at an overall scale of one inch = 200 ft. In addition, a surface rendering of each shoal shall be printed on separate sheets at a scale of one inch = 20 ft.

J. Acceptance: Port Authority will accept the dredging work as being complete based on "minimum depth" plots showing no depths above the required Contract depth.

3.6 SHORELINE PROTECTION SURVEYS

A. Initial Survey: Contractor shall perform a topographic survey (i.e. cross sections) along the specified shoreline protection alignment prior to any excavation.

B. Final Survey: As the shoreline protection is completed, Contractor shall provide a topographic survey (i.e., cross sections) that documents the following:

1. Revetment subgrade after completion of excavation and grading, prior to placement of geotextile fabric.
2. Finished revetment surface after completion of graded riprap placement, prior to any backfilling.
3. Finished grade after completion of any backfilling and final site grading.

END OF SECTION

PORT OF HOUSTON AUTHORITY

TECHNICAL SPECIFICATIONS FOR

HSC ECIP – SEGMENT 4 DREDGING

SECTION 35 20 23 Add – DREDGING

PART 1 GENERAL

1.1 SUMMARY

Dredging work includes furnishing materials, labor, and equipment for dredging, transport of dredged material, and placement of dredged material in accordance with these Specifications and applicable Drawings. Material shall be excavated by pipeline dredge, or by mechanical (e.g. clamshell) dredge into scows with hydraulic unloaders. Hopper dredging is not permitted.

1.2 MEASUREMENT AND PAYMENT

Measurement and payment for dredging and debris removal will be paid for in accordance with provisions of 01 22 10.01, “Measurement and Basis of Payment.”

1.3 EXISTING CONDITIONS

The drawings represent conditions existing as of the date of their preparation based on surveys performed by the Port Authority. However, to reflect anticipated shoaling occurring between the dates of preparation of the drawings and the dates of the "Before Dredging (BD)" sections, the estimated dredging quantities stated in the attached Exhibit A: Price Exhibit have been adjusted accordingly. The depths and elevations shown will be verified and corrected by fathometer soundings taken by Port Authority before dredging.

1.4 RELATED SECTIONS

A. Technical Specifications:
Section 01 16 60 – Environmental Protection Measures
Section 02 41 00 – Demolition, Removal and Disposal
Section 35 20 00 – Marine Construction Surveying
Section 35 20 23.33 – National Dredging Quality Management Program

B. Appendices:
Appendix B – Geotechnical Investigation Data
Appendix C – Geophysical Investigation Data
Appendix D – Cultural Resources Investigation

C. Attachments:
Attachment 1 – Quantity Summary Table

1.5 REFERENCES

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

U.S. Army Corps of Engineers (USACE) Publications:

EM 1110-2-5025	(2015) Dredging and Dredged Material Management
EM 385-1-1	(2014) Safety and Health Requirements

1.6 SUBMITTALS

Port Authority's and Engineer's approval are required for the following submittals. Contractor shall be aware that the Port Authority will forward these submittals to the U.S. Army Corps of Engineers for additional review.

1. Daily Activities Reports (Paragraph 1.12.G)
2. Logs/Records (Paragraph 1.12.B)
3. Dredging Work Plan (Paragraph 1.12.D)
4. Documentation of USACE and USCG Notification (Paragraphs 1.12.A and 1.15)
5. Request for Temporary Removal of Aids to Navigation (Paragraph 1.13)
6. Dredge Pipeline Map (Paragraph 3.9.A)
7. Traffic Control Plan (Paragraph 3.9.D)
8. Spill Contingency Plan (Paragraph 3.10)
9. Pre-Dredge Hazard Survey (Refer to Section 35 20 00, "Marine Construction Surveying")

1.7 CHARACTER OF MATERIAL

The material to be removed is primarily new-work (virgin-cut) material. Bidders are expected to examine the worksite and geotechnical data and, after investigation, decide for themselves the character of materials. Bidders are encouraged to perform their own site investigations prior to bidding, including supplemental soil investigations which they deem necessary to perform the work.

1.8 UTILITIES ACROSS THE LIMITS OF DREDGING

It is Contractor's responsibility to investigate the location of utility and pipeline crossings. Contractor shall take precautions against damages which can result from dredging operations in the vicinity of the utility and pipeline crossings. If damage to utilities or pipelines occurs as a result of dredging operations, Contractor shall suspend dredging until the damage is repaired and approved. Costs of these repairs and downtime of the dredge and attendant plant shall be at Contractor's expense.

1.9 KNOWN PIPELINE/UTILITY CROSSINGS

There are pipelines and utilities which are within the work limits. Pipelines and utilities identified by Port Authority and Engineer are shown on the Drawings. Additional pipelines and utilities may exist. Prior to work, Contractor shall contact the following to verify pipeline locations:

1. Lonestar Notification Center
   1-713-223-4567 or 1-800-545-6005

2. Texas 811 (Dig-Tess)
   1-800-344-8377

Immediately notify Engineer and Port Authority if additional pipelines are identified.

1.10 WORK BY OTHER CONTRACTORS IN THE VICINITY

During the course of this Contract, other contractors may be performing work in the vicinity, such as mowing the dikes of the Placement Areas (PAs). The Port Authority may hold coordination meetings between the various contractors, the U.S. Army Corps of Engineers, the U.S. Coast Guard Vessel Traffic Service, Houston Pilots Association, dock/facility operators, and users of the channel on an as-needed basis. Contractor is required to attend these coordination meetings.

1.11 ORDER OF WORK

Contractor shall commence work no later than 30 days after issuance of Notice to Proceed.

1.12 QUALITY ASSURANCE

A. Permits

1. Port Authority-Obtained Permits: The Federal authorizations for this project included completion of an Environmental Impact Statement (EIS) by the U.S. Army Corps of Engineers for the Houston Ship Channel Expansion Channel Improvement Project. Refer to the following report for documentation of the environmental regulatory approvals for this work: "Final Integrated Feasibility Report – Environmental Impact Statement for Houston Ship Channel Expansion Channel Improvement Project, Harris, Chambers, and Galveston Counties, Texas," prepared by USACE Galveston District. A copy of this report is available from Port Authority.

2. Contractor-Obtained Permits: Contractor shall be responsible for all permits not provided by Port Authority, including the following:

   a. Water Quality: Contractor shall be responsible for coordination of Texas Commission on Environmental Quality (TCEQ) Storm Water Program Texas Pollutant Discharge Elimination System (TPDES) General Permit TXR150000 as applicable for any land-based work on this project.

   b. Notice to Mariners: Contractor shall provide U.S. Coast Guard a work schedule within seven days after the construction Notice to Proceed has been received so that a Notice to Mariners can be issued by the U.S. Coast Guard. A copy of this correspondence shall be provided to Engineer. Should Contractor encounter any objects on the seafloor which could be a hazard to navigation, it shall notify the U.S. Coast Guard, any other pertinent agencies, and Engineer immediately as to the location of said object and any other pertinent information necessary for the U.S. Coast Guard to issue a Notice to Mariners.

3. Contractor shall make application for and pay for any necessary permit fees, temporary or permanent utility interruption fees, and/or re-location fees for any Contractor-obtained permits.

B. Logs/Records: Contractor shall provide documentation as may be required for Port Authority to comply with his obligations under the Permits listed in Paragraph 1.12.A.

C. Environmental Protection Requirements: Refer to Section 01 16 60, "Environmental Protection Measures."

D. Dredging Work Plan: Prior to commencing Work, Contractor shall provide a Dredging Work Plan containing the planned procedure and timing for the work to be performed. The plan will be reviewed by Engineer for general conformance with the project design intent. The plan shall include the following:

1. The planned number and type of dredges to be used.
2. Dredging sequence.
3. Dredged material placement area sequence.
4. Dredge pipeline route(s) (Paragraph 3.9.A).
5. Description of bed leveling apparatus and operation (Paragraph 3.7.C).

6. Spill Contingency Plan (Paragraph 3.10).
7. Site specific management plan for water quality monitoring (Paragraph 3.11.J).

E. Easements: Permits authorizing the laying of shore pipe, and for placement of dredged material in the PAs, may be requested from the Port Authority. The instruments authorizing the laying of dredge pipelines on shore may contain certain restrictions relative to specific route, location, and general use of the land. These instruments form a part of these specifications and Contractor is to strictly comply with the terms thereof.

F. Construction Observation: At the request of Port Authority/Engineer, Contractor shall provide boats, boatmen, laborers, and materials necessary for Port Authority/Engineer to observe the Work.

G. Daily Activities Reports: Contractor shall provide daily reports documenting completed/ongoing/upcoming work, comparison of scheduled versus actual work completed, adverse weather or other problems that cause delays, and other items as may be required throughout these specifications. Reports shall be completed for every calendar day from the Notice to Proceed to the date of complete demobilization (including site management operations at each PA after placement operations are complete). Reports shall be submitted via email to Port Authority and Engineer daily. Reports shall include the following information:

1. Weather and marine conditions.
2. Problems that cause delays.
3. Equipment and personnel on site.
4. Percent of project completion.
5. Status of pre-construction submittals.
6. Mobilization/demobilization.
7. Approximate cubic yards dredged.
8. Approximate quantity and location of debris removed from channel.
9. Locations where dredging occurred and material was placed.
10. Dredge pipeline locations/routes and discharge points.
11. General composition and consistency of material dredged.
12. Condition and status of drop-outlet structures and placement area containment dikes.
13. Water quality testing results (TSS).

H. DQM System: The work requires use of the National Dredging Quality Management Program (DQM), formerly known as Silent Inspector (SI), to monitor status of the dredge at all times during this Contract. Refer to Specification Section 35 20 23.33, “National Dredging Quality Management Program,” for Dredge Quality Management System requirements.

1.13 TEMPORARY REMOVAL OF AIDS TO NAVIGATION

The temporary removal or changes in locations of channel markers may be required to facilitate dredging operations. Refer to Paragraph 1.15.D for notification requirements.

1.14 SUBSURFACE DATA

A. Geotechnical investigation data are provided in Appendix B. These data represent the most recent information available. Detailed laboratory test data from the geotechnical investigation are available upon request. Variations may exist in the soil conditions between sample locations. Contractor shall draw his own conclusions as to the character of the in-situ soil materials.

B. Contractor shall be aware that debris will be encountered during dredging. Refer to Paragraph 3.8 regarding Contractor's requirements for locating surface and subsurface debris and potential dredging obstructions.

C. Geophysical Investigation Data (i.e., magnetometer and side scan sonar data) are provided in Appendices C and D. This information is made available as a courtesy to Contractor but is not necessarily complete, accurate, or correct.

1.15 NOTIFICATION PRIOR TO COMMENCEMENT OF DREDGING OPERATIONS

A. Contractor shall notify the Resident Engineer at the Northern Area Office of the U.S. Army Corps of Engineers (USACE), Galveston District, in writing and electronically at least 10 days prior to commencement of dredging activities. Documentation of notice shall be provided to Engineer prior to commencement of dredging.

B. Contractor shall notify the U.S. Coast Guard (USCG) to arrange a pre-dredging Safety Coordination Meeting at least 15 days prior to commencement of dredging activities. It is Contractor's responsibility to contact Vessel Traffic Service Houston/Galveston (VTS) at 281-464-4837 to coordinate and schedule this meeting. Contractor is to inform the Port Authority at least 48 hours prior to the scheduled meeting so that the Port Authority Representative may attend. In addition, comply with all other USCG requirements including submittal of a Channel Obstruction Request and submittal of a work schedule for issuance of Notice to Mariners (see paragraph 1.12.A). The following items shall be discussed at the pre-dredging Safety Coordination Meeting regarding the VTS Area:

1. Location of intended operation.
2. Description of intended operation including channel obstructions anticipated by Contractor.
3. Configuration of dredge pipelines and equipment in or along the channel, including pipeline staging.
4. Termination point of dredge pipelines in or along the channel.
5. Time required to re-open channel or move for vessel traffic.
6. Plan for managing operating impairments, including VHF-FM radios.
7. Names of the dredges and assist boats being used.
8. Traffic consideration required. For example: slow bell, no meeting or overtaking, and advance notice requirements.
9. Point of contact phone numbers and working frequencies.
10. The master of dredge or floating plant is to immediately notify the VTS of changes to the above report, and at the completion of operations.
11. The VTS operating area includes the Houston Ship Channel from the sea buoy to the Buffalo Bayou Turning Basin, Galveston Channel, Texas City Channel, Bayport Ship Channel, Barbours Terminal Channel, and 10 miles of the Intracoastal Waterway.
12. Communications with the Vessel Traffic Center, call sign "HOUSTON TRAFFIC," is to be accomplished via VHF-FM Channel 12 or 13. The Traffic Center guards both Channel 12 and Channel 13 on a 24 hour basis.
13. The master of a dredge or floating plant is to be aware of and comply with the provision of the order relating to lighting and bunkering operations and multiple vessel moorings, and will notify the VTS when refueling operations are to be conducted.

C. Contractor shall call the Texas One Call System (811) a minimum of 48 hours prior to the commencement of any excavation (digging, dredging, jetting, etc.) or any demolition activity. Pipeline safety and the protection of pipelines or other utilities shall be the responsibility of Contractor.

D. The temporary removal or changes in locations of channel markers may be required to facilitate dredging operations. Notify Port Authority at least 30 days prior to the date that the removal or change in location of channel markers will be required so USCG can perform the work and so navigation interests may be informed sufficiently in advance of the proposed removal or change in location. Contractor shall not remove, change the location of, obstruct, willfully damage, make fast to, or interfere with aids to navigation.

1.16 SIGNAL LIGHTS

A. Contractor shall display signal lights and conduct his operations in accordance with the general regulations of the Department of the U.S. Army and the USCG. These general regulations govern lights and day signals on towing vessels with tows, vessels working on wrecks, dredges, vessels engaged in laying cables or pipe, dredge pipelines, vessels of more than 65 feet in length moored or anchored in a fairway or channel, and floating plant working in navigable channels, as set forth in Commandant U.S. Coast Guard Instruction M16672.2, Navigation Rules: International – Inland (COMDTINST M16672.2) or 33CFR81 Appendix A (International) and 33 VFR 84 through 89 (inland) as applicable.

1.17 PLANT

A. General Requirements: Keep the necessary dredge equipment and attendant plant on the job to meet the requirements of the work. The dredge equipment and attendant plant is to be in satisfactory operating condition and capable of safely and efficiently performing the work as set forth in specifications and be subject to inspection by the Port Authority's representative at all times.

B. Capacity: No reduction in the capacity of the dredge equipment and attendant plant employed to execute the work shall be made without written approval of the Port Authority. The measure of the capacity of the dredge equipment and attendant plant is to be its actual performance on the work to which these specifications apply.

1.18 INSPECTION

A. The presence of the Port Authority's on-site representative will not relieve Contractor of responsibility for the proper execution of the work in accordance with the specifications. Contractor is required to furnish the following items.

1. Equipment: At the request of the Port Authority, furnish the use of boats, boatmen, laborers, and material forming a part of the ordinary and usual equipment and crew of the dredging plant as may be reasonably necessary for Port Authority and its representatives to inspect and observe the work.

2. Transportation: At the request of the Port Authority, furnish suitable transportation from all points on shore designated by the Port Authority to and from the various pieces of plant, and to and from the PAs. If Contractor refuses, neglects, or delays compliance with these requirements, the specific facilities may be furnished and maintained by the Port Authority, and the cost thereof will be deducted from the amounts due or to become due Contractor.

PART 2 PRODUCTS

2.1 BRIDGE-TO-BRIDGE RADIO TELEPHONE EQUIPMENT

All dredge and self-propelled attendant floating plant shall be radiotelephone equipped to comply with the provisions of the Vessel Bridge-to-Bridge Radiotelephone Act (Public Law 92-63). This will require, as a minimum, radiotelephone equipment capable of transmitting and receiving on 156.6 MHZ (Channel 12) and 156.65 MHZ (Channel 13). Multi-channel equipment also requires 156.8 MHZ (Channel 16). Dredge tugs and tenders shall be considered towing vessels within the meaning of these requirements.

2.2 LOOKOUTS AND RADIO COMMUNICATIONS

Contractor shall have a lookout posted in the dredge control room at all times to monitor the movement of vessels around the dredge plant, perform radio communications with company work boats, and deliver passing arrangements with other commercial, fishing, and recreational vessels. The lookout shall be competent in USCG and Federal Communication Commission's radio communications procedures and requirements and be trained in the Vessel Bridge-to-Bridge Radiotelephone Act. Lookout shall maintain up-to-the-minute information as required to prevent collisions. Each company work boat shall check in with the lookout when arriving at the dredge and shall receive radio clearance from the lookout before departing the dredge.

FAILURE TO COMPLY WITH THIS REQUIREMENT WILL BE CONSIDERED A VIOLATION OF THE SAFETY PROTOCOL ESTABLISHED HEREIN. PURSUANT TO THE DIRECTION OF ENGINEER, CONTRACTOR MAY BE REQUIRED TO CEASE OPERATIONS UNTIL THIS PROVISION IS COMPLIED WITH. ANY SUSPENSION, DELAY, OR INTERRUPTION OF WORK ARISING FROM NONCOMPLIANCE OF THIS PROVISION SHALL NOT BE CONSTRUED AS STANDBY TIME.

2.3 MATERIAL TO BE REMOVED

A. Dredged Material: Dredged Material includes any material—including but not limited to soil, mud, sediment, sand, clay, silt, gravel, and incidental debris—within the specified dredging template. The dredged material to be removed is primarily new-work material. As described in Paragraph 1.14, explorations, including core borings, to determine the character of materials to be removed have been obtained by the Port Authority.

B. Debris: Debris includes material such as metal bands, pallets, pieces of broken cable, rope, stumps, broken piles, riprap, and other miscellaneous objects that cannot be removed through dredging. As described in Paragraph 1.14, explorations, including side-scan sonar and magnetometer surveys, have been obtained by the Port Authority to help identify debris.

PART 3 EXECUTION

3.1 AREAS TO BE DREDGED

Required dredging areas are shown on the Drawings.

3.2 CONDUCT OF DREDGING WORK

A. Pre-Dredging Safety Coordination Meeting: Prior to arrival on location and commencing dredge operations, Contractor shall arrange a pre-dredging safety coordination meeting between the dredge operators, pilots, towing industry representatives, Vessel Traffic Service (VTS), USCG, Port Authority, and USACE. Refer to Paragraph 1.15.B for additional requirements.

B. Protection of Existing Waterways: Conduct dredging operations using a method that will ensure that material or other debris are not pushed outside of the dredging limits or be otherwise

deposited in existing side channels, basins, docking areas, or other areas being used by vessels. Contractor will be required to change his method of operations as may be required to comply with the above requirements. If bottom material or other debris is pushed into areas noted above as a result of Contractor's operations, the same is to be promptly removed by and at the expense of Contractor to the satisfaction of the Port Authority.

C. Adjacent Property and Structures: No dredging shall occur within 25 feet of an existing bulkhead, dock, wharf, revetment, mooring structure, pile, or other existing structure unless specifically stated or shown otherwise on the drawings. Damage to private or public property or structures resulting from the disposal or dredging operations are to be repaired promptly by and at Contractor's expense. Damage to structures as a result of Contractor's negligence will result in suspension of dredging and require prompt repair at Contractor's expense as a prerequisite to the resumption of dredging. Where dredging to obtain the required dimensions might endanger a structure, the Port Authority shall be notified prior to dredging that area. Upon notification, the Port Authority may reduce the required excavation in the vicinity of this structure.

3.3 PREPARATION

A. Pre-Dredge Hazard Survey: Prior to dredging, a magnetometer survey, side-scan sonar survey, sub-bottom profile survey, and/or other similar survey shall be performed to search for uncharted pipelines and other anomalies within the dredging template. Refer to Section 35 20 00, “Marine Construction Surveying,” for requirements of pre-dredge hazard survey. In addition to performing pre-dredge hazard survey, Contractor shall locate and avoid pipelines, cables, and other hazards prior to anchoring, spudding, laying/removing dredge pipeline, etc. throughout the course of the Work. If utility damage occurs as a result of Contractor’s operations, Contractor shall suspend work until the damage is repaired and approved. Costs of these repairs and downtime of the dredge and attendant plant(s) shall be Contractor’s responsibility.

B. Debris Removal: Prior to dredging, Contractor shall rake the dredging areas and remove any surface debris from the dredging template. Refer to Paragraph 3.8 for debris removal requirements.

C. Emergency Spill Response Equipment: Prior to commencing dredging activities, sufficient spill response equipment, i.e. boom, etc. shall be on-site and ready for deployment in the event of an emergency or accident.

3.4 SURVEYING

Refer to Specification Section 35 20 00, “Marine Construction Surveying,” for surveying requirements.

3.5 AUTOMATIC IDENTIFICATION SYSTEM

A Class “A” Automatic Identification System (AIS) in accordance with the Code of Federal Regulations (CFR) title 33, CFR 164.46, as amended, is required for dredges used under this Contract.

3.6 OBSTRUCTION OF NAVIGATION AND USCG COORDINATION

A. Port Authority will not undertake measures to keep the channel free from vessels or other obstructions. All work shall be conducted in such manner to obstruct navigation as little as possible. If the plant does obstruct the use of channels or passages and makes traffic movement difficult or endangers the passage of vessels, said plant shall be promptly moved

on the approach of any vessel to the extent necessary to afford a practicable passage. Refer to Paragraph 1.15 for required coordination with the USCG. Contractor shall comply with all "moving security zone" requirements set forth by USCG. Delays caused by vessel traffic shall not be considered justification for Standby Time.

C. Project site is located adjacent to existing ship docks which may be utilized by others during construction. Contractor shall coordinate with Port Authority and schedule work so that dredging operations do not impact use of adjacent docks, and so that use of adjacent docks by others does not impact Contractor's dredging work schedule. Delays caused by use of docks by others shall not be grounds for standby time, claims, changed conditions, or time extensions to Contract.

D. Contractor shall be aware that the Houston Pilots prohibits operation of a dredge within 5 miles of another dredge. Contractor shall schedule and sequence all dredging to comply with this requirement.

3.7 DREDGING

A. Material Removal: All dredging shall be performed within the limits and depths shown on the drawings.

B. Dredging Limits/Tolerance: Dredging shall not extend below the allowable depths shown on the Drawings and/or specified herein. Contractor shall establish such control as may be necessary to ensure that the allowable dredging depths are not exceeded. The dredge cut tolerance/allowable overdepth shall be as indicated on the Drawings and specified herein.

C. Bed Leveling: Final leveling of a dredged area may be performed with a drag bar or other approved apparatus. Bed leveling by dragging the bottom shall be allowed only in areas specified for dredging. Shop drawings and photographs showing proposed dragging apparatus shall be included in Contractor's Dredging Work Plan (Paragraph 1.12.D).

D. Excessive Dredging: Contractor shall not dredge any material beyond the allowable overdepth and specified limits shown on the Drawings. Such dredging shall be considered excessive overdepth dredging, or excessive side or end slope dredging. Contractor shall be responsible for damage to adjacent property due to overdredging, and shall pay for all repairs or refilling and compacting to the designed grade.

E. Protection of Existing Waterways: Contractor shall conduct dredging operations in a manner that prevents displacement of material or debris outside of the dredging limits or otherwise causes deposition within adjacent portions of existing channel or side channels, basins, docking areas, or other navigable areas. Such material shall be removed immediately at Contractor's expense.

3.8 DEBRIS WITHIN THE DREDGING LIMITS

A. Contractor shall remove debris including but not limited to broken cable, rope, chains, stumps, rock, concrete rubble, tires, piles, sheet piling (including anchor rods), concrete pads, and other relic structures and miscellaneous trash from the dredging template. The Port Authority has no knowledge of existing wrecks, wreckage, or other material of the size or character that would require the use of explosives or special or additional plant for its economical removal. Use of explosives is not allowed for any purpose on this project. Refer to Section 02 41 00 (Demolition, Removal and Disposal) for additional debris removal requirements.

B. Removed debris shall become the property of Contractor and shall be disposed of in accordance with applicable law and applicable codes and standards. Contractor shall dispose debris at a disposal facility outside Port Authority's property.

C. In the event that existing conditions of debris differ materially from those shown on the drawings and described in the geotechnical and geophysical data in Appendices B, C, and D, an adjustment in contract price or time of completion, or both, will be made in accordance with the following:

1. Contractor shall promptly, and before the site conditions are disturbed, provide notification to Port Authority of unknown physical conditions at the site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in Contract.

2. Port Authority will investigate the site conditions promptly after receiving Contractor's notice. If conditions do materially so differ and cause an increase or decrease in Contractor's cost of, or time required for, performing any part of the work under this Contract, whether or not changed as a result of the conditions, an equitable adjustment will be made under this section through a Change Order or other written agreement in accordance with and subject to Section 8.09, "Claims for Changed Conditions," of the General Conditions.

D. Pay requests for debris removal shall substantiated by supporting evidence including but not limited to weight tickets and/or barge displacement measurements, timestamped and georeferenced photos of the debris, journal entries describing the debris, and log entries for delays caused specifically by the debris.

E. Port Authority and Engineer assume no responsibility for failure to show any or all debris and other obstructions on the Drawings, or to show them in their exact location. Failure to show will not be considered sufficient basis for claims for additional compensation for extra work in any manner whatsoever, unless the obstruction encountered necessitates substantial changes in the lines or grades, or requires the building of special work for which no provision is made in the Drawings and which is not essentially subsidiary to some item of work for which provision is made. It is assumed that as elsewhere provided Contractor has thoroughly inspected the site, is informed as to the correct location of surface structures, and has included the cost of such incidental work in the price bid, and has considered and allowed for all foreseeable incidental work due to variable subsurface conditions, whether such conditions and such work are fully and properly described on the drawings or not. Minor changes and variations of the work specified and shown on the Drawings shall be expected by Contractor and allowed for as incidental to the satisfactory completion of a whole and functioning work or improvement.

3.9 DREDGE PIPELINES

A. Pipeline Map: Contractor shall provide drawings showing all planned dredge pipeline routes, channel crossing details, pipeline anchor locations, and pipeline markings as part of the Dredging Work Plan (Paragraph 1.12.D). Drawings shall include pipe section joining methods. Pipeline maps shall be provided for each PA.

B. Pipeline map(s) required under paragraph 3.9 A shall be accompanied by a written plan that outlines measures that will be taken to prevent damage to existing bridges under which dredge pipeline(s) will be routed. The plan shall:

1. Describe preventative measures that will be taken to prevent damage.

2. Describe emergency measures and actions to be implemented should an allision or damage occur.

3. Contain documentation of pre-construction condition of bridge including photography.

Upon completion of construction, Contractor shall provide photographs to document that bridge is in the same condition (undamaged) that existed prior to construction. All costs associated with protection of existing bridges shall be borne by Contractor. Should Contractor damage bridge, all costs associated with repairs shall be borne by Contractor.

C. Pipeline Routes:

1. Dredge pipeline route to each PA shall follow the pipeline corridors shown on the Drawings. Contractor shall obtain approval from Port Authority for any alternate pipeline routes.

2. The dredge pipeline route to each PA is to follow closely the location shown or approved. Detailed right-of-way drawings showing the location of the pipeline routes with respect to property lines are available from the Port Authority. Refer to Paragraph 1.12.E regarding pipeline easements obtained by the Port Authority.

3. Pipeline corridors shown on Drawings may utilize drainage ditch easements and/or existing streams for a portion of the routes. The ditches and streams are prone to rapid water rise and strong currents from short-duration rain events. Routes may require passing pipeline through culverts along ditches. Contractor shall ensure security of pipelines for stability and leak control within steams, wetlands, ditches and culverts. Contactor shall be responsible for protecting streams, ditches, and wetlands such that proper water conveyance is maintained. Contractor shall coordinate with Port Authority prior to placement of pipeline through Port Authority's property and/or any private property, through culverts, along any improved drainage ditches, and though any wetlands.

C. Pipeline in Water: Pontooned or submerged dredge pipeline shall be located, marked, and maintained so as not to interfere with navigation or present a hazard to boats and other channel users. Contractor shall mark navigation openings following USCG regulations as required in 33 C.F.R. 88.15. Should Contractor elect to use a submerged section in the dredge discharge pipeline for crossing a navigable channel, detailed plans of the submerged section shall be submitted as part of (or as an amendment to) the Dredging Work Plan (Paragraph 1.12.D). The plans shall indicate the width and depth of the navigation opening and the method used to mark it by day and by night for the safety of navigation. The minimum bottom width of the submerged section shall match the bottom width of the channel template. The highest point on the pipe or ball connection across the bottom width of a submerged section shall not be higher than the authorized depth in the channel. Lighted buoys meeting the requirements of USCG Regulation 33 C.F.R. 62.25 shall be provided by Contractor to mark the navigation opening. A red buoy exhibiting a quick flashing red light shall mark the right side of the opening, and a black buoy exhibiting a quick flashing green light shall mark the left side of the opening. The frequency of the flashes shall not be less than 60 per minute. "Right side" and "left side" of the opening shall be in conformance with the lateral system of buoyage established by USCG. Requirements for the lighted buoys and descriptions of the lateral system shall be as found in the USCG publication CG 208 entitled "Aids to Navigation."

D. Pipeline over Land: Provide a traffic control plan for all pipelines that will be installed adjacent to, or over, existing roadways. Pipelines shall not interfere with road traffic. Where pipeline is adjacent to or over existing roadway, signs shall be provided in both approach directions indicating "Utility Construction Ahead." Where pipeline crosses an existing road, provide a ramp over pipeline as required on drawings.

E. Pipeline Interferences: To the extent such information was available to Port Authority/Engineer, pertinent details on the locations of existing utility pipelines and other facilities which may be encountered in trenching or jacking operations have been provided on the Drawings. Contractor shall investigate existing conditions to determine if additional interferences may exist.

F. Pipeline Leaks: Pipeline leaks or breaks shall be promptly reported to Engineer and repaired. Dredged material that is improperly placed due to leaks and/or breaks shall be removed immediately. Refer to Paragraph 3.12," Unauthorized Placement of Material."

G. Cleanup: Upon removal of pipeline, pipeline corridor shall be restored to original or better condition. Refer to Paragraph 3.13, "Preservation of Public and Private Property."

3.10 SPILL CONTINGENCY PLAN

Contractor shall ensure that all hazardous material spills are immediately reported to the proper authorities, to Port Authority, and to Engineer. All hazardous material spills shall be immediately cleaned up in accordance with the U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, and all changes and amendments thereto. In accordance with EM 385-1-1, Contractor shall use suitable methods such as dikes or curbs to prevent the spread of hazardous materials from above ground storage tanks and piping in case of leakage. Contractor shall provide and maintain an effective Spill Contingency Plan that includes the following as a minimum:

A. During all hours of operation, placement of dredged material within upland PAs shall be monitored continuously by field personnel experienced with dredging and operation/management of dredged material placement areas.

B. Contractor's Spill Contingency Plan shall include the following procedures to be followed in the event of a spill of (1) dredged material outside of the specified PAs and/or (2) fuel, oil, hydraulic fluid, etc.:

1. Dredging shall cease immediately.

2. Contractor shall notify Port Authority and Engineer immediately.

3. Contractor shall submit a specific cleanup plan to Engineer. No cleanup actions will commence until the plan has been submitted to Engineer. All cleanup actions shall be at Contractor's expense.

4. Contractor shall identify and have available the names and contact information of companies having portable hydraulic dredged or vacuum pumps that would be ready to clean up any dredged material discharge from the project due to being misplaced or associated with a spill.

3.11 DREDGED MATERIAL PLACEMENT

A. Dredged material shall be transported by hydraulic means and placed in the Beltway 8 (BW8), East Clinton (EC), and West Clinton (WC) PAs shown on the Drawings. Material shall be discharged within the discharge corridors shown on the drawings.

B. Contractor shall have sole responsibility for safe operation and maintenance of the PAs during dredging activities. Contractor shall inspect PAs to ensure that Contractor's operations and dredged material discharge will not be in violation or cause a violation of the applicable project permits and regulations.

C. Every effort has been made to give pertinent details of the location of utilities, pipelines, and other facilities which may be encountered in trenching or jacking operations. Investigate existing conditions and be satisfied that no additional construction which may interfere with dredge pipeline laying specified herein exists.

D. The perimeter and training dikes of the upland PAs shall be maintained as necessary for the duration of this Contract. Repairs to the breaches or low areas shall be constructed to the lines and grades of the existing adjacent dikes. Discharge shall not be directed towards nearby dikes. Refer to drawings for required separation between the dredge pipeline discharge point and adjacent dikes.

E. Placement of dredged material within designated PAs shall commence at the locations stated on the Drawings. Denser material that tends to build up or stack within the discharge corridors shall be retained/stockpiled and roughly shaped as specified on the drawings. If, in the opinion of Engineer, the initial discharge point becomes full or otherwise overloaded, Contractor shall relocate the discharge pipe, adding pipe as needed to advance the discharge point, and deposit remaining material in succeeding discharge points.

F. A spreader shall be used on the end of the discharge pipe to reduce scour and help distribute the material evenly. Contractor shall monitor and control the movement of the discharge pipe throughout PA to ensure an even build-up of material and to prevent overflowing the dikes. The effluent ditches shall be maintained and excavated, as necessary, to prevent overflowing of the ditches.

G. Contractor shall maintain a minimum of 1 feet of freeboard between pool level and dike crest throughout the dredging and placement operations. Sediments shall not be allowed to stack higher than the crest of adjacent perimeter dikes.

H. Contractor shall operate and maintain decant structures (drop-outlet structures) through the duration of Contract as required to restrict the flow of effluent over the weirs while efficiently draining water from the PA. Water quality standards shall be maintained for all return water. If satisfying water quality standards requires Contractor to provide additional weir boards or additional settling time by temporarily ceasing dredging, Contractor shall do so at no additional cost to Port Authority. Existing outfall pipes shall be cleared of all debris and accumulated sediment to allow for unimpeded drainage on a regular basis or as needed. Care shall be taken to not damage outfall pipes.

I. Contractor shall collect samples from the PA outfalls for total suspended solids (TSS) analysis. EPA method 160.2 requirements for detection limits, holding times, and preservation for TSS shall be the standard for measuring TSS. Samples shall be collected from the outfalls twice per day. Sampling shall occur at the same time each day at the same location. Contractor shall utilize an appropriately qualified and licensed laboratory for collection and analysis of the TSS samples.

J. Contractor shall develop a site specific management plan for water quality monitoring that will include dredging production/placement modifications prior to reaching a threshold of 8 grams per liter for Total Suspended Solids (TSS) more than the corresponding density of the receiving body of water. The management plan shall include specific management actions for measurements exceeding 8 grams per liter more than the corresponding density of the receiving body of water. Management plans may include weir board management, reduced production, and/or end of pipe management. At no time shall Contractor exceed 8 grams per liter more than the corresponding density of the receiving body of water. Contractor shall provide daily updates to Port Authority on water quality issues associated with weir operations and water quality measurements.

K. Contractor shall maintain daily records of TSS results and make them part of the Daily Activities Reports. Contractor shall notify Port Authority when TSS levels exceed 8 grams per liter more than the corresponding density of the receiving body of water and indicate which portions of management plan will be implemented. If TSS levels exceed the requirement of 8 grams per liter more than the corresponding density of the receiving body of water, immediate actions (e.g., add boards, cease dredging) shall be implemented to improve water quality, and Port Authority shall be notified immediately. Contractor shall be solely responsible for developing and implementing the necessary response measures to maintain acceptable effluent water quality, at no additional cost to Port Authority. No payment will be made for delays that occur due to noncompliance with water quality criteria.

L. Contractor shall be aware that upland PAs are located adjacent to sensitive environmental habitat. Movement of equipment outside of dikes is prohibited except as otherwise shown on Drawings.

M. Contractor shall inspect containment dikes daily during dredged material discharge. Inspections shall be recorded in Daily Activities Reports. If a dike, weir, or drop-outlet structure failure occurs while materials are being discharged, dredging shall cease and Port Authority shall be notified immediately. Discharge of material into the PA shall not resume until the confining structures have been restored by Contractor to a condition that is acceptable to Port Authority.

N. Contractor shall perform site management operations at each PA for a period of 30 calendar days after placement operations are complete. This 30-day period is NOT included in the construction Contract Time. During the site management period, the boards on the drop-outlet structures shall be removed at a proper rate to allow continued drainage of the PAs. Water quality standards shall continue to be maintained. Daily water quality tests shall continue to be taken and submitted on Contractor's daily activities reports. During this period, Contractor shall not allow deposited material to impound water or impede natural drainage. Contractor shall, if necessary, excavate and maintain ditches to drain low areas in the PAs to the drop-outlet structure. The ditches shall be of adequate number and size to eliminate ponding of water within the limits of the PAs.

3.12 UNAUTHORIZED PLACEMENT OF MATERIAL

A. Contractor will not be paid for dredged material that is not deposited in specified PAs. Contractor may be required to remove misplaced material and deposit it where directed by Port Authority/Engineer without cost to Port Authority/Engineer. Material shall not be deposited or allowed to flow into project channels or into a bayou, stream tributary to the channel, or into an existing drainage outlet ditch, canal, water intake or outlet facility, nor shall materials be allowed to flow onto improved areas including highways and roads in or adjacent to the PA. If a stream, bayou drainage outlet, ditch, canal, water intake or outlet facility becomes shoaled as a result of the pipeline dredging or placement operations, immediately notify the Port Authority. Unless otherwise instructed by the Port Authority in writing, Contractor shall promptly remove these shoals and the material shall be placed in the PA. Dragging or washing operations to remove the shoals will not be permitted. Any mitigation required by environmental regulatory agencies for unauthorized placement of fill shall be performed at Contractor’s expense.

B. During the progress of the Work, worn out discharge pipe, wire rope, scrap metal, timbers, broken concrete, or any other such type of rubbish or obstructive material shall not be discarded in the PAs, within a water body, along the shoreline, or anywhere else on public or private property. Such material that may be encountered during the dredging activities shall become the property of Contractor and be removed from the Project Site and disposed of in accordance with applicable federal, state, and local law, codes, and standards.

C. Contractor shall indemnify and hold harmless Port Authority/Engineer from any and all losses, expenses, damages, demands, and claims asserted against or sustained by Port Authority/Engineer as a result of or alleged to be the result of illegal, improper, or unauthorized disposal of dredged material or objectionable material.

3.13 PRESERVATION OF PUBLIC AND PRIVATE PROPERTY

Unless otherwise shown on the drawings for removal and relocation, all existing navigation channels, docks, mooring piles, seawalls, jetties, groins, bulkheads, informational and directional signs, fences, roads, ditches, houses/decks, driveways, ramps, private or public grounds, camp facilities, water wells and tanks, station markers, mile markers, and other structures or improvements that are damaged as a result of Contractor's operations under these Specifications shall be repaired or rebuilt by Contractor at his expense. The areas used by Contractor in laying and maintaining his pipelines shall be restored to the same or better condition as existed prior to commencement of the Work. Upon completion of the Work, all trenches and cuts shall be backfilled to original ground level, the ends of temporary culverts shall be fully closed with wooden bulkheads, and trenches and bank cuts shall be backfilled to the original ground level.

3.14 HOUSTON-GALVESTON VESSEL TRAFFIC SERVICE (VTS) AREA

Comply with the following requirements while operating within the VTS Area.

A. General: When Contractor's dredge or floating plant is to be operated within the VTS Area, Contractor shall furnish the Vessel Traffic Center the following report at least 30 minutes prior to beginning operations:

1. Location of intended operation.
2. Description of intended operation including Channel obstructions.
3. Configuration of pipelines and equipment in or along the Channel.
4. Termination point of pipelines in or along the Channel.
5. Time required to re-open Channel or move for vessel traffic.
6. Operating impairments, including VHF-FM radios.
7. Names of the assist boats being used.
8. Traffic considerations required, for example: slow bell, no meeting or overtaking, and advance notice requirements.
9. Point of Contact phone numbers and working frequencies.

B. Report Changes: Contractor shall immediately notify the VTS of changes to the above report and at the completion of operations.

C. Vessel Traffic Service Location: The VTS Area consists of the navigable Channels between the Galveston Entrance Channel Buoy 1 and the Houston Turning Basin, Galveston Channel, Texas City Channel, the Gulf Intracoastal Waterway, Bayport Channel and Galveston-Freeport Cutoff from mile 346 to mile 352.

D. Communications: Communications with the Vessel Traffic Center, call sign "HOUSTON TRAFFIC," shall be accomplished via VHF-FM Channel 12. The Traffic Center guards both Channel 12 and Channel 13 on a 24 hour basis.

E. Operations: The master of a dredge of floating plant is to be aware of and comply with the provisions of the Order Relating to Lightering and Bunkering Operations and Multiple Vessel Moorings and will notify the VTS when refueling operations are to be conducted.

3.15 WORK IN THE VICINITY OF OTHER CONTRACTORS

Coordinate dredging operations, through the Port Authority, with other Contractors who may be working in the vicinity (for example: revetment, jetty repairs, and dike construction). Refer to Paragraph 1.10 (Work by Other Contractors in the Vicinity), for additional coordination requirements.

3.16 DREDGE PLANT INSTRUMENTATION

The Dredge Plant Instrumentation is a part of the dredge plant and shall be functional at all times. If failure of any part thereof occurs, repair the failed part within the next 36 hours restoring full operations. If the system is not fully functional within this period, the particular plant affected will be considered non-responsive to this Contract requirement and shall either be replaced or a redundancy part added to render the plant fully operational to include the monitored data at no additional increase in price or time to this Contract.

3.17 ESTIMATED QUANTITY OF MATERIAL

Within the limits of available funds, Contractor shall excavate the entire quantity of material necessary to complete the work specified whether the quantities involved are greater or less than those estimated. The work is to be done in accordance with this Contract and at Contract price or prices, subject to the provisions of Paragraph 3.20 (Variations in Estimated Quantities – Dredging).

3.18 QUANTITY SURVEYS

A. Dredging quantity surveys will be conducted by Port Authority as described in Section 35 20 00, “Marine Construction Surveying.” The data derived from these surveys will be applied to compute the quantities of work performed and the actual construction completed and in place.

B. Contractor shall notify Port Authority when a before dredging (BD) survey is required to establish a volume baseline or an after dredging (AD) survey is required to support a request for a progress payment. Port Authority will perform the surveys and computations necessary to determine the quantity of work that has been performed or is finally in place, including intermediate periods for which progress payments are requested. Pay quantities for dredging volumes will be calculated using the average end area method.

3.19 FINAL EXAMINATION AND ACCEPTANCE

A. General: Channel Acceptance Sections are designated on the Drawings. Port Authority will perform AD survey as soon as practicable after the completion of any Channel Acceptance Segment. If shoals, lumps, or other lack of Contract depth are disclosed by this survey, Contractor shall remove same by dragging the bottom or by dredging at Contract rate for dredging. If the bottom is soft and the shoal areas are small and form no material obstruction to navigation, the removal of the shoal may be waived at the discretion of the Port Authority. When the area is found to be in a satisfactory condition, it will be accepted finally.

B. Determination of Pay Quantities: The total estimated amount of material to be removed from within the specified limits, including side and end slopes, anticipated shoaling occurring prior to the dates of the BD surveys, incidental material during dredging (see Paragraph 3.19.E), and overdepth, is shown in the Quantity Summary Table attached to this specification. Pay quantities for actual work will be determined based on AD surveys performed by Port Authority

for each Channel Acceptance Segment. Refer to Section 01 25 00, “Measurement and Basis of Payment,” for additional conditions of payment, and Section 35 20 00, “Marine Construction Surveying,” for additional conditions of Acceptance.

C. Overdepth: To cover inaccuracies of the dredging process, material actually removed from within the specific area(s) to be dredged to depths as specified on the Drawings will be estimated based on the BD and AD surveys and paid for at the Unit Price rate for Dredging. The maximum amount of allowable overdepth dredging is listed in the Quantity Summary Table.

D. Side and End Slopes: Dredging for side slopes shall follow, as closely as practicable, the lines indicated or specified. There shall be no vertical faces greater than 6 feet along side slopes. Material actually removed from within approved limits to provide for final side and end slopes as specified on the Drawings, but not in excess of the amounts originally above these limiting side and end slopes, will be estimated based on BD and AD surveys and paid for at the Unit Price for Dredging. In computing the limiting amount of side and end slopes, net dimensions, without allowance for Overdepth, shall be applied.

E. Incidental Material: Any adjacent material that migrates into the required dredging limits as physical dredging is being performed shall be considered incidental material. No adjustments in pay volume will be made for such incidental material.

F. Final Examination:

1. If shoals, lumps, or other lack of contract depth are disclosed by Port Authority’s AD survey, Contractor shall remove same by dragging the bottom or by dredging. Port Authority will then resurvey the Channel Acceptance Segment for compliance. If more than two surveys by Port Authority of a Segment are necessary for removal of shoals disclosed at prior surveys, the cost of the third and any subsequent surveys will be charged against Contractor.

2. Prior to final completion of the work and handover of the project to Port Authority, the Contractor may be required to undertake a final dredging pass within the new work dredging limits to ensure compliance with the new work lines and grades as shown on the Drawings. Any areas within the contract limits which have material within the New-Work Template above the authorized depth of -46.5 feet MLLW shall be dredged and removed by Contractor at no additional cost to the Port Authority. Contractor shall utilize their own means and methods for dredging and template cleanup, subject to approval by Engineer. Material to be removed, if any, shall be disposed of within East Clinton or West Clinton Placement Areas, subject to the direction and approval by the Port Authority.

G. Excessive Dredging: Material taken from beyond the limits specified will be deducted from the total pay volume as excessive overdepth dredging or excessive side or end slope dredging, for which payment will not be made. Nothing herein shall be construed to prevent payment for the removal of shoals performed in accordance with Paragraph 3.19.F.

3.20 VARIATIONS IN QUANTITIES

A. Contractor is cautioned that funding on this Contract is based on the quantities shown in the Price Exhibit. Therefore, Contractor is not to exceed the estimated quantities in Contract bid line items without prior specific authorization, and only with a signed modification issued by the Port Authority. Contractor shall specifically notify Port Authority, in writing, once Contractor reaches approximately 75 percent of the quantities specified in Contract Line Items. This notification will be separate and in addition to other reporting required elsewhere in this

Contract. Contractor shall notify Port Authority as soon as it recognizes that the estimated quantities are not sufficient to complete the work indicated and specified.

B. If the actual total quantity of material within the required dredging prism varies from the Quantity Summary Table, an equitable adjustment will be processed in accordance with FAR 52.211-18, Variation in Estimated Quantity. The equitable adjustment applies only to the quantity within the required dredging prism, which does not include the allowable overdepth. If the total quantity of material to be paid for and actually removed under this Contract exceeds the limit established by FAR 52.211-18, Variation in Estimated Quantity, an additional time will be allowed at the rate of 1 calendar day for each 12,000 cubic yards in excess of the established limit. Contractor shall not exceed the estimated quantities in Contract Line Items without prior authorization and only with a signed modification issued by the Port Authority.

C. If Contractor exceeds the estimated quantities without a signed modification in place, it will be considered unauthorized work for which Contractor may not be reimbursed. Once the potential quantity overrun is identified, the Port Authority may, among other choices, provide additional funds (if available) to complete the work and equitably adjust the quantities in Contract Line Item, modify the work to fit within the estimated quantities, consider Contract complete once the contractually indicated quantities have been reached, or terminate Contract for the convenience of Port Authority.

D. This provision is not to be interpreted as an order for Contractor to stop work upon reaching 75 percent of the estimated quantities, it merely requires notice and potential corrective action at that point. However, absent further specific direction, Contractor shall be prepared to stop work at no additional cost to Port Authority once 100 percent of the line item quantity has been obtained.

3.21 DISPOSAL FEES

There are no disposal fees imposed by Port Authority for placement of dredged material in the PAs shown on the Drawings.

3.22 CLEANUP

Upon completion of the work, dredging plant, including pipeline, ranges, buoys, survey stakes, piles, signage, cables, and any other markers or obstructions placed by of for Contractor shall be removed.

END OF SECTION

ATTACHMENT 1

DREDGING QUANTITY SUMMARY TABLE							
ACCEPTANCE SECTIONS				CONTRACT QUANTITIES			
Section No.	From Station	To Station	Length of Section (ft)	Required Depth (CY)	Allowable Overdepth (CY)	Total Estimate (CY)	Placement Area
				①②	②	②	
MAINTENANCE DREDGING							
1	677+00	728+00	5,100	5,000	N/A	5,000	BW8
2	728+00	778+00	5,000	63,000	N/A	63,000	BW8 & E/WC
3	778+00	828+00	5,000	56,000	N/A	56,000	E/WC
4	828+00	878+00	5,000	28,000	N/A	28,000	E/WC
5	878+00	930+50	5,250	82,000	N/A	82,000	E/WC
SUBTOTAL (Maintenance Dredging)			**25,350**	**234,000**	**N/A**	**234,000**	
NEW WORK DREDGING							
1	677+00	728+00	5,100	1,094,000	169,000	1,263,000	BW8
2	728+00	778+00	5,000	1,611,000	141,000	1,752,000	BW8 & E/WC
3	778+00	828+00	5,000	691,000	75,000	766,000	E/WC
4	828+00	878+00	5,000	213,000	51,000	264,000	E/WC
5	878+00	930+50	5,250	347,000	74,000	421,000	E/WC
SUBTOTAL (New Work Dredging)			**25,350**	**3,956,000**	**510,000**	**4,466,000**	
TOTAL (All Pipeline Dredging - Maintenance & New Work)			**N/A**	**4,190,000**	**510,000**	**4,700,000**	
①	The term "Required Depth" is synonymous with the term "Prescribed Depth" and "Required Dredging Prism" used elsewhere in the						
②	Includes anticipated shoaling.						

PORT OF HOUSTON AUTHORITY

TECHNICAL SPECIFICATIONS FOR

HSC ECIP – SEGMENT 4 DREDGING

SECTION 35 20 23.33 Add – NATIONAL DREDGING QUALITY MANAGEMENT PROGRAM

PART 1 GENERAL

1.1 SUMMARY

A. The work under this Contract requires use of the US Army Corps of Engineers (USACE) National Dredging Quality Management Program (DQM) to monitor the dredge's status at all times during Contract and manage data history.

B. This performance-based specification section identifies the minimum required output as well as the precision and instrumentation requirements. The requirements may be satisfied using equipment and technical procedures selected by Contractor.

1.2 RELATED SECTIONS

A. Technical Specifications:
Section 35 20 23 – Dredging

1.3 SUBMITTALS

Port Authority's and Engineer's approval are required for the following submittals. Contractor shall be aware that the Port Authority will forward these submittals to the U.S. Army Corps of Engineers for additional review. The following shall be submitted in accordance with Section 01 33 00, "Submittal Procedures":

1. Preconstruction Submittals: Dredge Plant Instrumentation Plan Revisions or Addendum (Paragraph 1.07)

2. Test Reports: Data Appropriately Archived e-mail, Contractor Data Backup (Paragraph 3.03.D)

3. Certificates: Letter of National Dredging Quality Management Program Certification (Paragraph 1.06)

1.4 PAYMENT

No separate payment will be made for the installation, operation, and maintenance of the DQM-certified system as specified herein for the duration of the dredging operations; all costs in connection therewith will be considered a subsidiary obligation of Contractor and covered under Contract unit price for dredging in the bid schedule.

1.5 NATIONAL DREDGING QUALITY MANAGEMENT PROGRAM (DQM) CERTIFICATION

Contractor is required to have a current certification from the DQM Program for the cutter/suction head hydraulic dredge instrumentation system to be used under this Contract. Standard Operating Procedures (SOP) and criteria for certification are presented on the DQM website at https://dqm.usace.army.mil.

1.6 DREDGE PLANT INSTRUMENTATION PLAN (DPIP)

Contractor shall have a digital copy of the Dredge Plant Instrumentation Plan (DPIP) on file with the DQM Support Center. While working on site, Contractor shall also maintain on the dredge a copy of the DPIP, which is easily accessible to Government personnel at all times. This document shall accurately describe the sensors used, the configuration of the system, how sensor data will be collected, how quality control on the data will be performed, and how the sensors/data-reporting equipment will be calibrated and repaired if it fails. A description of the computed dredge-specific data and how the sensor data will be transmitted to the DQM database shall also be included. Prior to the start of work, Contractor shall submit to the DQM Support Center any addendum or modifications made to the plan subsequent to its original submission. Requirements and a template for the DPIP are available on the DQM website at https://dqm.usace.army.mil.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 REQUIREMENTS FOR REPORTED DATA

Provide, operate, and maintain all hardware and software to meet these specifications. Also be responsible for the replacement, repair, and calibration of the sensors and other necessary data acquisition equipment needed to supply the required data.

The procedure to complete a repair shall be documented and completed as soon as practical. If repair is not possible within two business days of any sensor failure, a plan and timeline to complete the repair shall be submitted. Upon completion of a repair, replacement, installation, modification, or calibration, Contractor shall notify Engineer and USACE. Engineer or USACE may request recalibration of the sensors or other hardware components at any time during Contract as deemed necessary.

Keep a log of sensor repair, replacement, installation, modification, and calibration in the dredge's onboard copy of the DPIP. The log shall contain a three-year history of sensor maintenance, including the time of the sensor failures (and subsequent repairs), the time and results of sensor calibrations, the time of sensor replacements, and the time that backup sensor systems were initiated to provide the required data. It shall also contain the name of the person responsible for the sensor work.

Sensors installed shall be capable of collecting parameters within the specified accuracies and resolutions indicated in the following subparagraphs and transmit these parameters to the DQM database. All data shall be transmitted in JSON message bundles. Each bundle can contain multiple message types. Sensor data shall be transmitted as work event messages, and data which relates to the operational state of the dredge or its sensors shall be transmitted as state event messages. (See Paragraph titled "Parameter Transmission to the Web Service.")

A. Message Bundle Data: Every message bundle shall contain descriptive data that relates the message to a given dredge plant and date/time. The start of a message bundle shall be identified by the tag “DQM_data.”

1. Messages: Messages contain operational data that populates the DQM database for a dredge plant. A message shall consist of an event type and its associated data (as defined in Paragraph titled "Dredge Events"), a date/time stamp indicating when the event occurred or started, and a comment providing clarification or metadata about the situation. There are multiple event types, but they all fall into one of two categories - work events and state events.

    a. Message Time: In a work event message, message time is the date and time that the data is collected from the sensors; in a state event message, message time is the date and time that the state event begins. The message time shall be reported to the nearest second and referenced to Coordinated Universal Time (UTC) time based on a 24-hour format (YYYY-MM-DD HH:MM:SS). In order to ensure accuracy and reliability, the time stamp shall be synchronized to UTC format from an accurate, unchangeable source (for example, a GPS National Marine Electronics Association (NMEA) datastring). Message time shall be identified by the tag "msg_time".

    b. Comment: Comments concerning the work event or state event messages being transmitted provide descriptive information that relates to the data. An example of a comment for work event data is information about a sensor issue; an example of a comment for state event data is a description of operations. A comment shall be identified by the introductory tag "comment", and the comment shall consist of no more than 250 characters.

2. Dredge Events – Work Event: There are two types of dredge event messages - work event messages and state event messages. Work event messages contain data that are instantaneously collected or calculated from sensors and are logged as a series of events. Work events are triggered by a time interval change (as described in Paragraph titled "Work Event Messages"). All work event messages shall be initiated by the header tag "work_event".

    a. Vertical Correction: The variation of the water level from the vertical datum for the river stage or tidal gage described in the state events shall be obtained using appropriate equipment to give the water level with an accuracy of plus/minus 0.1 ft. Vertical correction values above project datum described in the dredging specification shall be entered with a positive sign and those below with a negative sign. The tag for vertical correction shall be "vert_correction".

    b. Cutter/Suction Head Location and Movement: The X, Y, and Z components of the cutter/suction head location shall be monitored. Additional calculations made from the observed values determine the rates of movement to track the progress of the dredge.

        b.1. Cutter/Suction Head Horizontal Position: The forwardmost point of the cutter/suction head shall be obtained using a positioning system operating with a minimum accuracy level of 3-10 feet horizontal Circular Error Probable

(CEP). It shall be reported as Latitude/Longitude WGS 84 in decimal degrees with West Longitude and South Latitude values reported as negative. Position values shall be identified by the tags "ch_latitude" and "ch_longitude".

b.2. Cutter/Suction Invert Depth: Cutter/suction invert depth is the depth of the invert of the suction mouth relative to the surface of the water. Instrumentation shall be capable of reporting to an accuracy of plus/minus 0.5 foot and a resolution to the nearest 0.1 foot with no tidal adjustments. Minimum accuracies are conditional to relatively calm water. The tag "ch_depth" shall be used to identify the cutter/suction head depth.

b.3. Cutter/Suction Head Heading: The cutter/suction head heading is the angle of the centerline of the cutter/suction head and dredge ladder measured relative to true north. All headings shall be provided using industry-standard equipment. The heading shall be accurate to within 5 degrees and reported to the nearest whole degree with values from 000 (true north) to 359 degrees referenced to a clockwise positive direction convention. The tag "ch_heading" shall be used to identify the cutter/suction head heading.

c. Dredge Activity: Dredge activity shall be monitored using a combination of the following parameters.

c.1. Slurry Velocity: A flow-metering device, calibrated according to the manufacturer's specifications, shall be used to record the slurry velocity to the nearest 0.01 fps with an accuracy of plus 0.1 fps. If the manufacturer does not specify a frequency of recalibration, calibration shall be conducted prior to the commencement of work. The slurry velocity shall be measured for the same pipeline inside diameter as that used for the slurry density measurement. The tag "slurry_velocity" shall be associated with this value.

c.2. Slurry Density: A density-metering device, calibrated according to the manufacturer's specifications, shall be used to record the slurry density to the nearest 0.01 g/cc. It is understood that the accuracy of this sensor can vary based on several factors, including the type of material, the magnitude of the cut, and the length of time since calibration. If the manufacturer does not specify a frequency of recalibration, calibration shall be conducted prior to the commencement of work. Continuous monitoring of this sensor ensures that drift and other factors inherent in the dredging process can be accounted for in monitoring dredge activity. The tag "slurry_density" shall be associated with this value.

c.3. Pump RPM: The pump rpm is the number of revolutions per minute measured for the slurry pump shaft. The shaft revolution rate (rev/min) shall be measured with the highest level of accuracy that is standard on the vessel's operational displays either at the bridge or in the engine room. This value shall be identified by the tag "rpm".

c.4. Pump Vacuum: The vacuum pressure of the dredge pump(s) (inches of mercury) shall be measured as near to the eye as practicable in the pump's suction pipe with the highest level of accuracy that is standard on the vessel's operational displays either at the leverman's controls or in the engine room. Vacuum pressure shall be identified by the tag "vacuum".

c.5. Pump Outlet Pressure: The pump outlet pressure shall be measured in the discharge line on the pump side of the flap valve in terms of pounds per square inch (psi) on a gauge. Pump outlet pressure shall be identified by the tag "outlet_psi".

d. Outfall Information (Open Water/Spill Barge Disposal): The X and Y position of the terminal end of the outfall pipe shall be monitored continuously and the position reported as part of the work event string.

d.1. Discharge Horizontal Position: The horizontal position of the outfall end of the discharge pipe shall be obtained using a positioning system operating with a minimum accuracy level of 3-10 feet horizontal Circular Error Probable (CEP). It shall be reported as Latitude/ Longitude WGS 84 in decimal degrees with West Longitude and South Latitude values being reported as negative. Position values shall be identified by the tags "outfall_latitude" and "outfall_longitude".

3. Dredge Events - State Event: There are two types of dredge event messages - work event messages and state event messages. State event messages provide information about the current state of the dredge equipment or operations. They are created and sent only when a state changes. Since state events often cannot be collected in real time, state events are tagged with a date time stamp (referenced to Coordinated Universal Time (UTC)) that indicates when the state change happened relative to the work event message tag. This data is considered to be "true" until another state event tag is received. Each type of state event message shall be indicated by a specific header tag as enumerated in the following subparagraphs. State events can be transmitted along with work event message bundles directly by Contractor using the indicated format, or they can be entered on the "State" tab in the DQM-provided software.

a. Message Time: The state event time is the date and time that the event starts. The leverman's time shall be entered to the nearest second as local time and automatically converted to and reported in UTC based on a 24-hour format (YYYY-MM-DD HH:MM:SS). Message time shall be identified by the tag "msg_time".

b. Contract Event: Information concerning Contract under which dredging is being performed shall be reported at the start and completion of each Contract using the header tag "contract_event".

b.1. Contract Number: The USACE-assigned Contract number for the project shall be reported using the tag "contract_number".

b.2. Contract Start and End: The start and end of a Contract shall be reported using the tag "event_type" with the appropriate value of "start" or "end".

c. Tide Station/River Stage Gage Event Properties associated with the vertical correction (see Paragraph titled "Vertical Correction") for the tide station/river stage gage shall be grouped together under the header tag "station_event". This information shall be sent at the start of Contract and each time the dredge has moved enough to change the station being used.

c.1. Station Name: The station name is a concise name defining the tide station/river stage gage begin referred to. It shall be introduced by the tag

"station_name", and it shall consist of a descriptor of no more than 25 characters.

d. Length of Pipe Event: The leverman's estimate of the length of pipe downflow from the dredge pump, measured to the nearest whole foot, shall be reported under the header tag "pipe_length_event". This information shall be sent at the start of Contract and at the completion of each 24-hour period ending at midnight local time.

d.1. Floating Pipe: The total length of floating pipe shall be reported with the tag "length_floating".

d.2. Submerged Pipe: The total length of floating pipe shall be reported with the tag "length_submerged".

d.3. Shore Pipe: The total length of shore pipe shall be reported with the tag "length_land".

d.4. Booster Pump Event: Information concerning the booster pumps being used shall be included under the header tag "booster_pump_event". A message shall be sent to indicate any change in the status of the booster pumps being used.

e. Dredge Advance: The dredge advance, the total forward progress of the dredge relative to the centerline of the cut, shall be measured to the nearest whole foot and cumulatively calculated over a 24-hour period from midnight to midnight local time. It shall be identified by the tag "advance_daily". The msg_time associated with this tag shall be reported as the first timestamp of the following 24-hour period (based on the local time) rather than as midnight of the day for which the value was calculated, and it shall be reported in Greenwich Mean Time (GMT).

f. Outfall Information: The X and Y position of the terminal end of the outfall pipe shall be monitored and sent at the start of Contract and thereafter according to the following table. Discharge Heading and Pipe Elevation may be omitted if the dredge is not discharging into an upland disposal site. For beach nourishment, the horizontal X and Y position of the outfall shall be sent at the start of Contract and at the completion of each 24-hour period ending at midnight local time.

Discharge Location	Horizontal Position	Discharge Pipe Elevations	Discharge Outfall Heading
Open Water	Continuous Work Event	N/A	N/A
Scow	Upon Change	N/A	N/A
Beach	Every 24 Hours	N/S	N/S
Upland	Upon Change	Upon Change	Upon Change

f.1. Discharge Location: Information on where the slurry is being discharged shall be reported with the tag "outfall_location". Acceptable values include "upland", "open water", "beach", and "scow".

f.2. Discharge Horizontal Position: The horizontal position of the outfall end of the discharge pipe shall be obtained using a positioning system operating with a minimum accuracy level of 3-10 feet horizontal Circular Error Probable (CEP). It shall be reported as Latitude/ Longitude WGS 84 in decimal degrees with West Longitude and South Latitude values being reported as

negative. Position values shall be identified by the tags "outfall_latitude" and "outfall_longitude".

f.3. Discharge Outfall Heading: The discharge outfall heading is the angle relative to true north measured from the centerline of the pipe in the direction of discharge. All headings shall be provided using industry-standard equipment. They shall be accurate to within 5 degrees and reported to the nearest whole degree with values from 000 (true north) to 359 degrees referenced to a clockwise positive direction convention. The discharge heading shall be identified by the tag "outfall_heading".

f.4. Discharge Outfall Heading: The discharge pipe elevation is the height of the outfall measured in feet and tenths of a foot relative to the project datum. The required accuracy is contingent upon Contract requirements. The tag "outfall_elevation" shall be used to identify this elevation.

g. Non-effective Work Event: Delays and dredge downtime shall be reported at the conclusion of the event. The reason for the non-effective work time shall be submitted under the header tag "non_eff_event" within 24 hours of the event.

g.1. Non-effective Work Interval: The start and end times for the non-effective work event shall be reported using the tags "msg_start_time" and "msg_end_time".

g.2. Dredge Function Code: The dredge operator indication of production delays, as listed on Form 4267, shall be transmitted at the end of the non-effective interval. Dredge function event messages shall be identified by the tag "function_code" and shall consist of one of the following standardized entries to indicate the operation:

AGV Assisting Grounded Vessels
CCH Change Cutterhead
CCSH Clear Cutter Suction
CLPJ Change Location Bar
COLL Collision
CPPL Clear Pump Pipeline
CPR Change Impeller
DR Dike Repair
FBD Fire Boat Drills
HPL Handling Pipe Line
HSL Handling Swing Line
HSP Handling Shore Pipe
LDNE Loss Due to Natural Elements
LDPV Loss Due to Passing Vessel
LNL Transfer to New Location
MISC Miscellaneous
MOB Mobilization & Demobilization
MSC Miscellaneous/Non-pay
OC Out of Commission
OR Operating Repairs
P Preparation
PREP Preparation & Making Up Tow
RPL Repair Pipeline
SB Sounding & Buoying
SBT Stand-By Time as Directed

SH Sundays-Holidays
TFS Taking on Fuel & Supplies
TOW Time on Tow
WAP Waiting Attendant Plant

g.3. Additional Comments: The "comment" tag shall be used to provide additional explanation for the noted delays or downtimes. For example, when the code "LDPV" (Loss Due to Passing Vessel) is indicated, the name of the vessel and the number of tows shall be listed with the "comment" tag.

3.2 NATIONAL DREDGING QUALITY MANAGEMENT PROGRAM SYSTEM REQUIREMENTS

Contractor's DQM system shall be capable of collecting and transmitting information to the DQM onboard computer. The applicable parameters from Paragraph titled "Requirements for Reported Data," shall be recorded as events locally and continuously transmitted to the DQM database anytime an Internet connection is available. The dredge shall be equipped with a DQM computer system consisting of a computer, monitor, keyboard, mouse, data modem, Universal Power Supply (UPS), and network hub. The computer system shall be a standalone system, exclusive to the DQM monitoring system, and shall have USACE DQM software installed on it. If a hardware problem occurs, or if a part of the system is physically damaged, then Contractor shall be responsible for repairing it within two business days of the determination of the condition or submitting a plan and timeline for repair if the repair will take more than two business days.

A. Computer Requirements: Provide a dedicated onboard computer for use by the Dredging Quality Management system. This computer shall run the USACE DQM software and receive data from Contractor's data-reporting interface. This computer must meet or exceed the following performance specifications:

CPU	Intel or AMD processor with a (non-overclocked) clock speed of at least 1.8 gigahertz (GHz)
Hard Drive	250 gigabytes (GB); internal
RAM	4 gigabytes (GB)
Ethernet Adapter Connector	10 or 100 megabit (Mbit) internal network card with an RJ 45
Video Adapter	Must support a resolution of 1024x768 at 16-bit color depth
Keyboard	Standard 101-key keyboard
Mouse	Standard 2-button mouse
Monitor	Must support a resolution of 1024x768 at 16-bit color depth
Ports	2 free serial ports with standard 9-pin connectors; 1 free USB port
Other Hardware	Category 5 (Cat-5) cable with standard RJ-45 plugs connecting the network adapter to the network hub; one spare cable

Install a fully licensed copy of Windows 7 Professional Operating System on the computer specified above. Also install any necessary manufacturer- provided drivers for the installed hardware.

This computer shall be located and oriented to allow data entry and data viewing as well as to provide access to data ports for connection of external hardware.

B. Software: The DQM computer's primary function is to transmit data to the DQM shoreside database. No other software which conflicts with this function shall be installed on it. The DQM computer shall also have the USACE-provided Dredging Quality Management Onboard Software (DQMOBS) installed on it by DQM personnel.

C. UPS: Supply an Uninterruptible Power Supply (UPS) for the computer and networking equipment. It shall interface with the DQM computer to communicate UPS status, and it shall provide backup power at 1 kVA for a minimum of 10 minutes. Ensure that sufficient power outlets are available to run all specified equipment.

D. Internet Access: Maintain an Internet connection capable of transmitting real-time data to the DQM server as well as enough additional bandwidth to clear historically queued data when a connection is re-established. The telemetry system shall always be available and have connectivity in Contract area. If connectivity is lost, unsent data shall be queued and transmitted upon restoration of connectivity. Contractor shall acquire and install all necessary hardware and software to make the Internet connection available for data transmission to the DQM web service. The hardware and software shall be configured to allow the DQM Support Center remote access to this computer, and the telemetry system shall be capable of meeting these minimum reporting requirements in all operating conditions.

In areas with poor cellular service and at the local District's discretion, it may be required to manually download the data on a daily basis using the protocol for retrieving and submitting backup files provided by the DQM Support Center. This method of data transmission should be used only if Internet connectivity is unavailable at the dredging site, and it should be considered a temporary measure.

E. Data Routing Requirements: Onboard sensors continually monitor dredge conditions, operations, and efficiency and route this information to the shipboard dredge-specific system (DSS) computer to assist in guiding dredge operations. Portions of this Contractor-collected information, as described in this specification, shall be routed to the DQM computer on a real-time basis. Standard sensor data shall be sent to the DQM computer via an RS-232 serial interface with a baud rate of 9600 or 19200bps. The serial interface shall be configured as 8 bits, no parity, and no flow control

Information regarding changes in the state of the dredge shall be digitally logged and transmitted as close to the time of the occurrence as possible. These events can either be included in a separate message bundle going to the DQM onboard computer, or they can be entered on the "State" tab in the DQM Pipeline Software

3.3 DREDGE MONITORING DATA

A. General: Onboard sensors continuously collect dredging data in support of the dredge Contractor's operations. Portions of this Contractor-collected information, as described in this specification, and calculations based on them shall be stored and transmitted to the DQM database on a near real-time basis. Additionally, information regarding the state of the dredge shall be digitally logged and transmitted.

B. Data Measurement Frequency: The frequency of data transmission is dependent on the type of message being sent. Work Event messages contain data that are instantaneously collected or calculated from sensors and are logged as a series of events. State event messages are activated by a change in the dredge state.

1. Work Event Messages: Data shall be logged as a series of events. Each event shall consist of a dataset containing dredge information (as defined in Paragraph titled "Requirements for Reported Data"). Each set of measurements (for example, time and position) shall be considered an event, and there shall be a 6-12 second interval between work events. This interval shall remain consistent across event types for the dredge plant.

   A standard data string shall be recorded within one second of an event trigger with the time stamp and all parameters reflecting when the event happened.

2. State Event Messages: A set of descriptive information (event name, time, description, comment) shall be considered a state event. These events shall be recorded within 24 hours of a change in state with the time stamp reflecting when the event happened.

C. Parameter Transmission to the Web Service: The data shall be formatted as JSON (JavaScript Object Notation, as defined at http://www.json.org) strings of arbitrary length. These JSON strings represent a hierarchical data structure consisting of a message bundle which may contain 0-3 automatic data messages and any number of manual data messages.

A tag/parameter is reported only when it contains a value. No "Null" value strings shall be included in a message bundle.

```
**************************
Message bundle
**************************

{
    "DQM_Data": { "
      messages":
        {
          "work_event": {
          "msg_time":                <24-hour UTC time YYYY-MM-DD HH:MM:SS>,
          "vert_correction":         <floating point 100th decimal place>,
          "ch_latitude":             <decimal to 6 decimal places>,
          "ch_longitude":            <decimal to 6 decimal places>,
          "ch_depth":                <floating point 100th decimal
          "ch_heading":              <integer value 000-359>,
          "slurry_velocity":         <floating point 100th decimal place>,
          "slurry_density":          <floating point 100th decimal place>,
          "pump_rpm":                <integer>,
          "vacuum":                  <floating point 100th decimal place>,
          "outlet_psi":              <floating point 100th decimal place>,
          "comment":                 <string>},
        }
      },
      {
        "contract_event": {
          "msg_time":                <24-hour UTC time YYYY-MM-DD HH:MM:SS>,
          "contract_number":         <string>,
          "event_type":              <string - "start" or "end">,
```

```
      "comment":                  <string>
    }
  },
  {
    "station_event": {
      "msg_time":                 <24-hour UTC time YYYY-MM-DD HH:MM:SS>,
      "station_name":             <string>,
      "comment":                  <string>
    }
  },
  {
    "pipe_length_event": {
      "msg_time":                 <24-hour UTC time YYYY-MM-DD HH:MM:SS>,
      "length_floating":          <integer>,
      "length_submerged":         <integer>, "length_land":       <integer>,
      "comment":                  <string>
    }
  },
  {
    "booster_pump_event": {
      "msg_time":                 <24-hour UTC time YYYY-MM-DDHH:MM:SS>,
      "booster_total":            <integer>,
      "comment":                  <string>
    }
  },
  {
    "advance_Event": {
      "msg_time":                 <24-hour UTC time YYYY-MM-DD HH:MM:SS>,
      "advance_daily":            <integer>,
      "comment":                  <string>
    }
  },
  {
    "outfall_position": {
      "msg_time":                 <24-hour UTC time YYYY-MM-DD HH:MM:SS>,
      "outfall_location":         <string-"upland", "beach", "scow",
"open water">
      "outfall_latitude":         <decimal to 6 decimal places>,
      "outfall_longitude":        <decimal to 6 decimal places>,
      "outfall_heading":          <integer value 000-359>,
      "outfall_elevation":        <floating point 10th decimal place>,
      "comment":                  <string>
    }
  },
  {
    "non_eff_event": {
      "msg_start_time":           <24-hour UTC time YYYY-MM-DD HH:MM:SS>,
      "msg_end_time":             <24-hour UTC time YYYY-MM-DD HH:MM:SS>,
      "function_code":            <string - 1 to 4 characters>,
      "comment":                  <string>

    }
  }

}
```

}

D. Contractor Data Backup: Maintain an archive of all data sent to the DQM computer during the dredging Contract. The COR may require, at no increase in Contract price, that Contractor provide a copy of these data covering specified time periods. The data shall be provided in the same JSON format as would have been transmitted to the DQM computer. There shall be no line breaks between the parameters, and each record string shall be on separate line. The naming convention for the files shall be <dredgename>_<StartYYYYMMddhhmmss>_<EndYYYYMMddhhmmss>.txt. Data submission shall be via a storage medium acceptable to the COR.

At the end of the dredging Contact, Contractor shall call the National DQM Support Center prior to discarding the data to ensure that it has been appropriately archived. Record the following information in a separate section at the end of the dredge's onboard copy of the DPIP:

- Person who called the National DQM Support Center
- Date of the call
- DQM representative who gave permission to discard the data

On the same day that the call is made, but prior to discarding the data, Contractor shall submit a "Data Appropriately Archived" e-mail to the local USACE District's COR with the above information and cc: the DQM Support Center representative who granted the permission. In addition to the above information, the following shall also be included in the e-mail:

- Project name and Contract number
- Dredge start and end dates
- Name of the dredge

3.4 PERFORMANCE REQUIREMENTS

Contractor's National Dredging Quality Management Program's data transmission shall be fully operational at the start of dredging operations. To meet Contract requirements for operability, Contractor's system shall provide an accurate data string return and be compliant with hardware requirements. Data string return is defined as the number of quality records within an event or state tag sent by Contractor's system to the DQM database. Quality data strings are considered to be those providing accurate values for all parameters reported when operating according to the specification. Repairs necessary to restore data return compliance shall be made within two business days, or a plan and timeline for repair shall be submitted if the repair will take more than two business days. Failure by Contractor to report quality data within the specified time window for dredge measurements as stated in the specifications (see Paragraphs titled "Internet Access", "Data Measurement Frequency" and "Parameter Transmission to the Web Service"), may result in withholding progress payments.

3.5 QUALITY ASSURANCE CHECKS

Quality assurance (QA) checks are a part of the DQM dredge certification procedure. They are required prior to the commencement of dredging and, at the discretion of the COR, periodically throughout the duration of Contract. The SOP and criteria for QA checks are presented on the DQM website at https://dqm.usace.army.mil.

3.6 CONTRACTOR QUALITY CONTROL

The dredging Contractor shall designate a Quality Control Systems Manager (QCSM), who shall develop and maintain daily procedures to ensure quality control (QC) of the dredge Contractor's DQM system. These methods shall include the procedure by which data being collected is

checked against known values, and verification that the telemetry is functioning. These procedures shall be outlined in the DPIP and submitted prior to the Notice to Proceed. In the event a Contractor Quality Control (CQC) Report is required, daily annotations shall be made in the Daily CQC Report, documenting all actions taken on each day of work, including all deficiencies found and the corrective actions taken.

3.7 LIST OF ITEMS PROVIDED BY CONTRACTOR

- DPIP Paragraph titled "Dredge Plant Instrumentation Plan (DPIP)"

- DQM System Paragraph titled "National Dredging Quality Management Program System Requirements," including all subparagraphs

- Dredge Data Paragraph titled "Dredging Monitoring Data"

END OF SECTION

PORT OF HOUSTON AUTHORITY

TECHNICAL SPECIFICATIONS FOR

HSC ECIP – SEGMENT 4 DREDGING

SECTION 35 31 19 Add – REVETMENT

PART 1 GENERAL

1.1 SUMMARY

The work includes furnishing materials, labor, and equipment for construction of graded riprap (GRR) structures in accordance with these specifications and applicable drawings.

1.2 RELATED SECTIONS

Section 01 25 00 Add – Measurement and Basis of Payment
Section 31 05 19.13 Add– Geotextiles for Earthwork

1.3 REFERENCES

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.

American Society for Testing and Materials (ASTM) Publications:

C 535	Standard Test Method for Resistance to Degradation of Large-Size Course Aggregate by Abrasion and Impact in the Los Angeles Machine
D 75	Standard Practice for Sampling Aggregates
D 3740	Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
D 5519	Standard Test Method for Particle Size Analysis of Natural and Man-Made Riprap Materials
D 6092	Standard Practice for Specifying Standard Sizes of Stone for Erosion Control
D 6473	Standard Test Method for Specific Gravity and Absorption of Rock for Erosion Control
E 329	Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.4 SUBMITTALS

Submittals under this section include the following:

1. Name, Location, and Historical Quality Reports from Quarry (Paragraph 1.6, B)

2. Qualifications/Certifications for Sampling/Testing Agency (Paragraph 1.6, B)

3. GRR Quality and Test Report Schedule and GRR Delivery Schedule (Paragraph 1.6, B)

4. GRR Quality Test Reports (Paragraph 1.6, B)

5. GRR Gradation Test Reports (Paragraph 1.6, B)

6. GRR Gradation Test Methodology Description (Paragraph 1.6, B)

7. Daily Activities Reports (Paragraph 1.6, C)

8. Initial Survey (Section 35 00 01 “Marine Construction Surveying”)

9. Final Survey (Section 35 00 01 “Marine Construction Surveying”)

1.5 STORAGE OF CONSTRUCTION MATERIALS

Construction materials unloaded from the barges, trucks, or railroad cars that cannot be immediately used for construction shall be stored in approved storage areas. Storage areas shall be located reasonably near the job site and approved by Port Authority. The storage areas shall be prepared by Contractor and made relatively smooth in order that all of the stored material may later be recovered free from dirt or other foreign materials.

1.6 QUALITY CONTROL / QUALITY ASSURANCE

A. Environmental Protection Requirements: Refer to Section 01 16 60, “Environmental Protection Measures.”

B. Materials Testing:

1. Contractor/Quarry shall provide all equipment and facilities for testing construction materials.

2. Acceptable GRR shall meet the quality acceptance criteria in paragraph 2.1, A, when tested in accordance with the procedures listed below:

a. Sampling of the GRR shall be performed in accordance with ASTM D 75.

b. The absorption of GRR shall be determined in accordance with ASTM D 6473.

c. The unit weight of GRR shall be provided based on the apparent specific gravity determined in accordance with ASTM D 6473.

d. The loss by abrasion of GRR shall be determined in accordance with ASTM C 535, processed and tested for No. 1 grading.

e. The gradation of the GRR shall be determined in accordance with ASTM D 5519, Test Method C.

3. Throughout the duration of the work, Contractor/Quarry shall inspect, sample, and test construction materials for compliance with the specified requirements and record the inspection of all operations. All sampling and testing shall be performed by a qualified testing laboratory meeting the requirements of ASTM D 3740 and ASTM E 329, or a commercial testing facility qualified by U.S. Army Corps of Engineers (USACE) Materials Testing Center (MTC). A copy of the records of inspection, as well as the records of corrective action taken, shall be provided to Engineer. As a minimum, Contractor/Quarry

shall perform quality control inspection and testing in accordance with the following requirements and Table 1, or approved alternative submittal schedule (see GRR Submittal No. 3).

a. **Gradation:** Sample sizes shall consist of at least 50 stones per test and weigh at least 10 tons per test. Refer to paragraph 2.1 for gradation requirements.

b. **Quality:** Refer to paragraph 2.1 for quality requirements.

c. **Placement:** Continuous inspection of placement to ensure proper thickness and that material is not segregated. Refer to paragraph 3.3 for placement requirements.

4. Prior to performing quality or gradation testing of stone, Contractor shall provide at least 3 days advance notice, in writing, so that Engineer may have the opportunity to attend and observe the testing. Contractor shall conduct gradation tests at the quarry, not at the project site.

5. Table 1 provides required submittals associated with GRR quality. Detailed descriptions of submittals are below.

Table 1. GRR Submittal Schedule

GRR Submittal Number	Submittal Description	Required Submission Timeframe
1	Name, Location, and Historical Quality Reports from Quarry	Prior to preconstruction meeting.
2	Testing Laboratory Qualifications	Prior to preconstruction meeting.
3	GRR Delivery, Staging, and Testing Schedule	Prior to transport or delivery of any GRR from quarry.
4	GRR Quality and Gradation Test Report	With or after GRR delivery, staging, and testing schedule but prior to transport or delivery of any GRR from quarry.

6. GRR Submittal 1: Contractor shall provide the name and location of the quarry that will be the source of the GRR for the project prior to the preconstruction meeting. Contractor shall also provide historical quality reports from the selected quarry to determine the acceptability of the GRR from the proposed source. Historical quality reports are not considered suitable alternatives to the quality and gradation reports required during construction. Quality and gradation reports during construction shall be from new tests performed on actual GRR to be used on the project.

7. GRR Submittal 2: Testing laboratory qualifications shall be submitted prior to the preconstruction meeting.

8. GRR Submittal 3: Prior to commencing GRR delivery to project site, Contractor shall submit a GRR delivery, staging, and testing schedule, and a description of the planned gradation test procedure. The schedule shall describe when GRR quality and gradation testing will be performed to ensure that test results are available for Engineer's review **prior to GRR being shipped from the quarry**.

9. GRR Submittal 4: Contractor shall obtain Engineer's review and confirmation of compliance of gradation and quality tests **prior to shipment of GRR**. Contractor may request variations to timeframes in Table 1 in GRR delivery, staging, and testing schedule.

C. Daily Activities Reports: Contractor shall provide a daily record of activities. Daily reports shall include approximate quantity (including tonnage of GRR transported from quarry) and locations of GRR placement, and percent project completion.

PART 2 PRODUCTS

2.1 GRADED RIPRAP (GRR) MATERIAL

A. Stone: All stone for GRR shall be a durable natural stone. It shall be free from visible cracks, clay pockets, cavities (vugs or "honeycombs"), laminations, and other defects that would tend to increase unduly its deterioration from natural causes. Stone shall not include objectionable quantities of dirt, sand, clay, and/or rock fines. Stone shall comply with quality parameters in Table 2.

Table 2. Gradation Quality Parameters

Parameter	Value	Max/Min
Unit Weight	155 PCF	Min
Absorption	3%	Max
Loss by Abrasion	36%	Max

The GRR shall be reasonably well graded and shall include essentially all stone sizes between the two extremes specified which will result in a dense, fairly well-graded material not having noticeable voids or a lack of the larger sizes. Bi-modal or gap graded stone gradation test results may result in rejection of the stone material. GRR stone size range (gradation) shall conform to the requirements specified below. The specified gradation is for the installed (in-place) condition. The contractor shall consider breakage during material handling, delivery and installation in order to provide the specified in-place stone gradations.

Table 3. Gradation Limits for GRR (ASTM R-700)

Particle Mass, lb	Percent Lighter than the Mass Specified
1,500	100
700	50 to 100
300	15 to 50
60	0 to 15

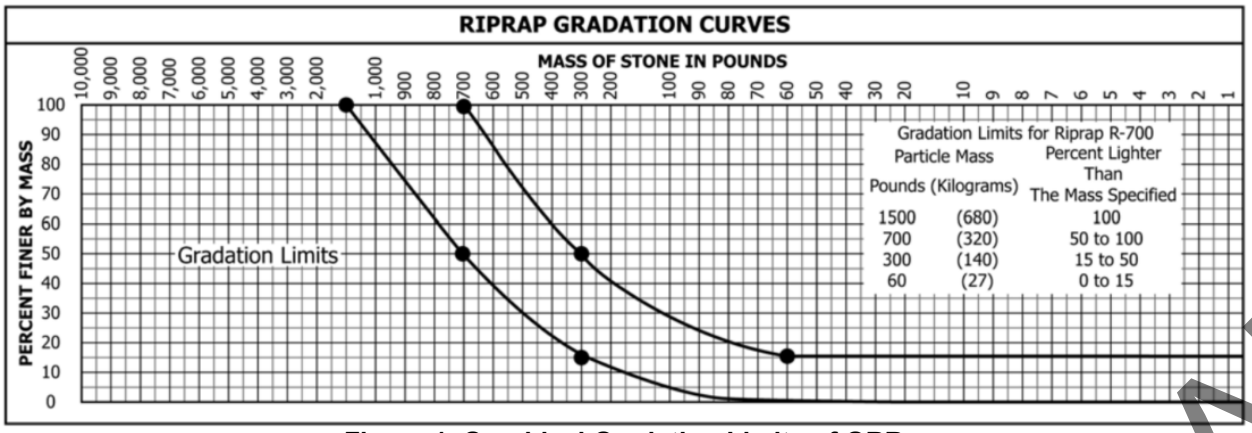

Figure 1. Graphical Gradation Limits of GRR

B. Stone Shape: The greatest dimension of each stone shall not be more than three times its least dimension. The faces of individual stones shall be roughly angular, not rounded, in shape.

PART 3 EXECUTION

3.1 GEOTEXTILE FILTER FABRIC

Refer to Section 31 05 19.13, "Geotextiles for Earthwork."

3.2 COORDINATION WITH QUARRY

Contractor shall be knowledgeable of the methods used at the quarry to produce the GRR gradations specified, especially the effects of repeated handling. Contractor shall coordinate with the quarry and use loading and unloading methods that ensure that required gradations are provided for placement.

3.3 GRR PLACEMENT

A. General: GRR shall be placed over the prepared subgrade and geotextile fabric within the limits indicated on the drawings.

B. Slope Preparation: Embankment to receive riprap protection shall be shaped and prepared as shown in Drawings. Excess excavated material shall be removed from the site.

C. Placement: The GRR layers shall be constructed as indicated on the drawings, and include the following characteristics:

1. A placement technique and drop height less than 1 foot shall be used that will not damage the geotextile materials.
2. Contact between individual stones shall be maximized on all sides. Each stone shall have at least three (minimum) points of contact with other stones.
3. GRR shall be placed and spread in such a manner that the various stone sizes produce a relatively uniform surface and a completed layer that is a reasonably well-graded, compact mass of rock with minimal percentage of voids. Smaller stones shall be placed as required to produce a relatively uniform finished outer surface.

4. Actual GRR limits shall be such that the finished surface of GRR is within the specified tolerance limits. Requirements with respect to the finished GRR crest elevation, crest width, and side slopes are provided in the drawings. Refer to drawings for tolerances.

3.4 MISPLACED MATERIALS

If any stone is deposited elsewhere than in places designated or approved, Contractor may be required to remove such misplaced material and redeposit it where directed at no additional cost to Port Authority.

3.5 SURVEYING AND ACCEPTANCE

A. General: Contractor shall provide initial and final surveys, as described in Section 35 00 01, "Marine Construction Surveying," for measurement and acceptance of GRR placement.

B. Acceptance Criteria: Acceptance of the GRR shall be based upon field observations and review of the final surveys to verify that the GRR meets the limits and tolerances specified in the drawings and the requirements of paragraph 3.3.

3.6 CLEANUP

Upon completion of the work, all plant, including ranges, buoys, stakes, piles, excess stone, and other markers or obstructions placed by or for Contractor shall be promptly removed.

END OF SECTION