AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
J	1 | 14

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO.(If applicable)
0001	23-Jun-2004	W13G86-3140-0521	

6. ISSUED BY	CODE	7. ADMINISTERED BY (If other than item 6)	CODE
U S ARMY ENGR DISTRICT, NEW ENGLAND 696 VIRGINIA RD CONCORD MA 01742-2751	W912WJ	See Item 6	

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		
	X	9A. AMENDMENT OF SOLICITATION NO. W912WJ-04-B-0004
	X	9B. DATED (SEE ITEM 11) 01-Jun-2004
		10A. MOD. OF CONTRACT/ORDER NO.
		10B. DATED (SEE ITEM 13)
CODE / FACILITY CODE		

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer [X] is extended, [ ] is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

[ ] A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

[ ] B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

[ ] C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

[ ] D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor [ ] is not, [ ] is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

Amendment necessary to revise various specification sections, add an additional wage determination for dredging work, add requirement for insurance, and extend the bid opening date.

The Bid Opening Date has changed from "01 JUL 2004 at 2:00 PM" to "07 JUL 2004 at 2:00PM"

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) TEL: EMAIL:	
15B. CONTRACTOR/OFFEROR _____ (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY _____ (Signature of Contracting Officer)	16C. DATE SIGNED 23-Jun-2004

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION SF 30 - BLOCK 14 CONTINUATION PAGE

1.1 CHANGES TO SPECIFICATIONS

1.1.1 Table of Contents

The Table of Contents is deleted and a new Table of Contents, dated 06/16/04, is inserted in its place.

1.1.2 Deleted Sections

Section 02290 UNDERWATER WORK is deleted in its entirety from the specifications.

1.1.3 Revised Sections

a) The sections listed below are deleted and replaced with revised sections of the same section number as indicated.

DELETE SECTION:	REPLACE WITH SECTION DATED):	
Section 00010	Section 00010	06/23/04
Section 00800	Section 00800	06/23/04
Section 02325	Section 02325	06/23/04
Section 02390	Section 02390	06/16/04
Section 02465	Section 02465	06/23/04
Section 02495	Section 02495	06/23/04

b) The Wage Determination listed below has been added to the solicitation:

Wage Determination No. NH030011, Dated 5/21/04 – Dredging, is hereby incorpoated into this solicitation.

c) Contract Clause No. 52.236-4004, INSURANCE REQUIREMENTS has been incorporated into this solicitation.

Section 00010 - Solicitation Contract Form

The Bidding Schedule has been deleted in its entirety and replaced with the following. Please note the Wage Determination applicable for each portion of the work (line item).

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE		AMOUNT
0001		1	Lump Sum	NA	$	

MOBLIZATION AND DEMOBILIZATION

(WAGE DETERMINATION NO. NH030011, DTD 5/21/04 - DREDGING)

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE		AMOUNT
0002		500	Gross Ton	$	$	

REMOVE AND REPLACE STONE RIP RAP AT EAST BULKHEAD WALL

(WAGE DETERMINATION NO. NH030004, DTD 3/5/04 - HIGHWAY)

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE		AMOUNT
0003		1	Lump Sum	NA	$	

SHEET PILING BULKHEAD

(WAGE DETERMINATION NO. NH030004, DTD 3/5/04 - HIGHWAY)

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE		AMOUNT
0004		900	Square Yard	$	$	

GEOGRID MARINE MATTRESSES

(WAGE DETERMINATION NO. NH030004, DTD 3/5/04 - HIGHWAY)

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE		AMOUNT
0005		85,000	Cubic Yard	$	$	

DREDGING BLACKWATER RIVER WITH DISPOSAL OF DREDGED MATERIAL IN BULKHEAD

(WAGE DETERMINATION NO. NH030011, DTD 5/21/04 - DREDGING)

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0006	WOOD MARINE PILES	10	Each	$	$

(WAGE DETERMINATION NO. NH030004, DTD 3/5/04 - HIGHWAY)

OPTIONAL BID ITEM

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0007 OPTION	GEOTECHICAL INSTRUMENTATION	1	Lump Sum	NA	$

(WAGE DETERMINATION NO. NH030004, DTD 3/5/04 - HIGHWAY)

TOTAL ESTIMATED AMOUNT $_____

NOTES TO BIDDERS

Note 1: The work will be awarded as a whole to one bidder, including the Optional Item, if exercised. Bidders must bid all items. The low bidder will be determined by the TOTAL ESTIMATED AMOUNT, including the base bid item and the Optional Bid Item. The minimum work awarded will be the base bid.

Note 2: Option Bid Item Number 0007 may, at the option of the Government, be exercised at any time from the date of receipt by the Contractor of the Notice to Proceed to November 15, 2004. If Option Bid Item No. 0007 is exercised by the Government, no additional time will be added to the completion period of the contract.

Note 3: Please note there are two wage determinations applicable for this project. Bidders are responsible to pay the applicable rates for each type of work.

SECTION 00700 - CONTRACT CLAUSES

The following have been added by full text:

52.236-4004 INSURANCE REQUIRED JAN 2000

In accordance with CONTRACT CLAUSE titled "INSURANCE – WORK ON A GOVERNMENT INSTALLATION" the Contractor shall procure and maintain during the entire period of his performance under this contract the following kinds and minimum amounts of insurance:

TYPE	AMOUNT
Workmen's Compensation and Employers' Liability Insurance The Contractor shall comply with all applicable Workmen's Compensation Statutes and shall furnish evidence of Employers' Liability Insurance.	Not less than $100,000
General Liability Insurance Bodily injury liability insurance on the comprehensive form of policy.	Minimum limits of $500,000 per accident
Automobile Liability Insurance damage liability insurance on the comprehensive form of policy and shall cover the operation of all automobiles used in performance of the contract.	Minimum limits of $200,000 per person and $500,000 per accident $20,000 per accident For property damage.

WAGE DETERMINATION: The following Wage Determination is hereby incorporated into this solicitation for the Dredging Portion of the work:

General Decision Number: NH030011 05/21/2004

General Decision Number: NH030011 05/21/2004

State: **New Hampshire**

Construction Types: Heavy **Dredging**

Counties: Hillsborough and **Rockingham** Counties in **New Hampshire.**

NEW HAMPSHIRE

All **Dredging,** except self propelled hopper dredges, on the Atlantic Coast

Modification Number	Publication Date
0	06/13/2003
1	05/21/2004

* ENGI0025-001 10/01/2003

STATEWIDE

	Rates	Fringes
Company Lead Dredgeman		
Lead Dredgeman	$ 28.72	6.87+a+b
Dipper & Clamshell Dredge		
Boat Captain	$ 22.80	6.27+a+b
Boat Master	$ 23.89	6.87+a+b
Deckhand, Tug Deckhand	$ 18.78	5.67+a+b
Engineer	$ 25.37	6.87+a+b
Maintenance Engineer	$ 24.24	6.27+a+b
Mate	$ 22.64	6.27+a+b
Oiler	$ 19.24	5.67+a+b
Operator	$ 28.72	6.87+a+b
Scowman	$ 18.53	5.67+a+b
Welder	$ 23.87	6.27+a+b
Diver		
Diver	$ 41.53	6.87+a+b
Standby Diver	$ 27.85	6.87+a+b
Standby Tender	$ 23.26	6.27+a+b
Tender	$ 32.11	6.87+a+b
Drag Bucket Dredge		
Deckhand	$ 16.17	5.25+a+b
Engineer	$ 21.41	6.45+a+b
Maintenance Engineer	$ 21.21	5.85+a+b
Mate	$ 19.82	5.85+a+b

Operator.....$ 25.09 6.45+a+b

Dredging Pipeline
Cable-Laying
Control Tower Operator.....$ 25.55 6.87+a+b
Diver Tender.....$ 26.58 6.87+a+b
Diver.....$ 42.42 6.87+a+b
Leverman.....$ 28.83 6.87+a+b
Line up Operator, End
Prep.....$ 18.47 5.67+a+b
Rigger.....$ 19.07 5.67+a+b

Drill Boats
Blaster.....$ 23.81 6.45+a+b
Core Driller.....$ 18.56 5.25+a+b
Driller.....$ 23.55 6.45+a+b
Engineer.....$ 23.54 6.45+a+b
Machinist.....$ 23.30 5.85+a+b
Oiler.....$ 20.46 5.25+a+b
Tug Captain.....$ 19.53 5.85+a+b
Tug Deckhand.....$ 15.97 5.25+a+b
Tug Master.....$ 20.48 6.45+a+b
Welder.....$ 23.30 5.85+a+b

Engineer
1st.....$ 25.55 6.87+a+b
2nd, 3rd and 4th.....$ 25.23 6.87+a+b
Electrician.....$ 25.68 6.87+a+b
Electro Hydro Technician....$ 20.79 6.27+a+b
Tug Captain.....$ 23.44 6.87+a+b
Tug Master.....$ 26.80 6.87+a+b

Hydraulic Dredge
Asst. Fill Placer.....$ 22.45 6.87+a+b
Boat Captain.....$ 22.80 6.27+a+b
Boat Master.....$ 23.88 6.87+a+b
Chief Mate.....$ 24.47 6.87+a+b
Chief Welder.....$ 25.13 6.87+a+b
Deckhand.....$ 18.78 5.67+a+b
Engineer.....$ 24.82 6.87+a+b
Fill Placer.....$ 24.47 6.87+a+b
Janitor/Porter.....$ 18.14 5.67+a+b
Leverman.....$ 28.72 6.87+a+b
Maintenance Engineer.....$ 24.24 6.27+a+b
Mate.....$ 22.64 6.27+a+b
Messman.....$ 18.14 5.67+a+b
Night Cook.....$ 18.65 5.67+a+b
Oiler.....$ 19.24 5.67+a+b
Shoreman.....$ 18.55 5.67+a+b
Spider Barge Operator.....$ 23.66 6.27+a+b
Steward.....$ 22.59 6.87+a+b
Welder-Dredge.....$ 23.86 6.27+a+b

Tug Boats over 1000 H.P.
with master or captain

having license endorsed
for 200 miles off shore
Tug Captain.....$ 24.34 6.87+a+b
Tug Chief Engineeer.....$ 23.60 6.27+a+b
Tug Deckhand.....$ 18.78 5.67+a+b
Tug Engineer.....$ 23.13 6.27+a+b

PREMIUMS: Additional 20% for hazardous material work

FOOTNOTES APPLICABLE TO ABOVE CRAFTS:

a. PAID HOLIDAYS: New Year's Day, Martin Luther King, Jr.'s Birthday, Memorial Day, Good Friday, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day and Christmas Day

b. VACATION: Seven percent (7%) of the straight time rate multiplied by the total hours worked.

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.)

and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations

Wage and Hour Division

U.S. Department of Labor

200 Constitution Avenue, N.W.

Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator

U.S. Department of Labor

200 Constitution Avenue, N.W.

Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board

U.S. Department of Labor

200 Constitution Avenue, N.W.

Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

Section 00800, Special Contract Requirements

The previously transmitted section has been deleted in its entirety and replaced with the following:

SECTION 00800

SPECIAL CONTRACT REQUIREMENTS

02/95

1.1 COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK (APR 1984) FAR 52.211-10

a. The Contractor shall be required to--

(1) commence work under this contract within 15 calendar days after the date the Contractor receives the notice to proceed,

(2) prosecute the work diligently, and

(3) complete the entire work ready for use not later than February 28, 2005. The time stated for completion shall include final cleanup of the premises.

b. Environmental restrictions on this project permit dredging operations at the project only from November 15 through March 15, inclusive, of any year. Excavation incidental to the construction of the bulkheads that can be accomplished by mechanical means is not subject to the environmental restriction.

1.2 LIQUIDATED DAMAGES - CONSTRUCTION (SEPT 2000) FAR 52.211-12

(a) If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of $1,300.00 for each calendar day of delay until the work is completed or accepted.

(b) If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause.

1.3 CONTRACT DRAWINGS AND SPECIFICATIONS (AUG 2000) DFARS 252.236-7001

(a) The Government will provide to the Contractor, without charge, one set of contract drawings and specifications, except publications incorporated into the technical provisions by reference The drawings will be provided to the Contractor in electronic or paper media as chosen by the Contracting Officer.

(b) The Contractor shall-

(1) Check all drawings furnished immediately upon receipt;

(2) Compare all drawings and verify the figures before laying out the work;

(3) Promptly notify the Contracting Officer of any discrepancies;

(4) Be responsible for any errors that might have been avoided by complying with this paragraph (b); and

(5) Reproduce and print contract drawings and specifications as needed.

(c) In general--

(1) Large-scale drawings shall govern small-scale drawings; and

(2) The Contractor shall follow figures marked on drawings in preference to scale measurements.

(d) Omissions from the drawings or specifications or the misdescription of details of work that are manifestly necessary to carry out the intent of the drawings and specifications, or that are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work. The Contractor shall perform such details as if fully and correctly set forth and described in the drawings and specifications.

(e) The work shall conform to the specifications and to the contract drawings. The contract drawings are identified on the index of drawings found on Drawing C-1 (Sheet 2 of 11).

1.4 DESIGNATED BILLING OFFICE

Reference Contract Clause titled "PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS" located in SECTION 00700, CONTRACT CLAUSES. The "designated billing office" will be the Construction Area Engineer, Resident Engineer or project office where the Contracting Officer Representative for this contract is located. The Contractor will be notified of the exact location of this office at the project preconstruction conference specified in Section 01110 SUMMARY OF WORK.

1.5 BID GUARANTEE (SEP 1996) FAR 52.228-1

(a) Failure to furnish a bid guarantee in the proper form and amount, by the time set for opening of bids, may be cause for rejection of the bid.

(b) The bidder shall furnish a bid guarantee in the form of a firm commitment, e.g., bid bond supported by good and sufficient surety or sureties acceptable to the Government, postal money order, certified check, cashier's check, irrevocable letter of credit, or, under Treasury Department regulations, certain bonds or notes of the United States. The Contracting Officer will return bid guarantees, other than bid bonds, (1) to unsuccessful bidders as soon as practicable after the opening of bids, and (2) to the successful bidder upon execution of contractual documents and bonds (including any necessary coinsurance or reinsurance agreements), as required by the bid as accepted.

(c) The amount of the bid guarantee shall be twenty percent of the bid price or $3,000,000, whichever is less.

(d) If the successful bidder, upon acceptance of its bid by the Government within the period specified for acceptance, fails to execute all contractual documents or furnish executed bond(s) within 10 days after receipt of the forms by the bidder, the Contracting Officer may terminate the contract for default.

(e) In the event the contract is terminated for default, the bidder is liable for any cost of acquiring the work that exceeds the amount of its bid, and the bid guarantee is available to offset the difference.

1.6 PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984) FAR 52.236-1

The Contractor shall perform on the site, and with its own organization, work equivalent to at least twenty percent (20%) of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

1.7 OBSTRUCTION OF NAVIGABLE WATERWAYS DFAR 252.236-7002(DEC 1991)

(a) The Contractor shall-

(1) Promptly recover and remove any material, plant, machinery, or appliance which the contractor loses, dumps, throws overboard, sinks, or misplaces, and which, in the opinion of the Contracting Officer, may be dangerous to or obstruct navigation;

(2) Give immediate notice, with description and locations of any such obstructions, to the Contracting Officer; and

(3) When required by the Contracting Officer, mark or buoy such obstructions until the same are removed.

(b) The Contracting Officer may-

(1) Remove the obstructions by contract or otherwise should the Contractor refuse, neglect, or delay compliance with paragraph (a) of this clause; and

(2) Deduct the cost of removal from any monies due or to become due to the Contractor; or

(3) Recover the cost of removal under the Contractor's bond.

(c) The Contractor's liability for the removal of a vessel wrecked or sunk without fault or negligence is limited to that provided in Sections 15, 19, and 20 of the River and Harbor Act of March 3, 1899 (33 U.S.C. 410 et.seq.).

1.8 PAYMENT FOR MOBILIZATION AND DEMOBILIZATION
(DEC 1991) DFARS 252.236-7004.

a. The Government will pay all costs for the mobilization and demobilization of all of the Contractor's plant and equipment at the contract lump sum price for this item.

(1) Sixty percent of the lump sum price upon completion of the Contractor's mobilization at the work site.

(2) The remaining 40 percent upon completion of demobilization.

b. The Contracting Officer may require the Contractor to furnish cost data to justify this portion of the bid if the Contracting Officer believes that the percentages in paragraphs a(1) and a(2) of this clause do not bear a reasonable relation to the cost of the work in this contract.

(1) Failure to justify such price to the satisfaction of the Contracting Officer will result in payment, as determined by the Contracting Officer, of --

(i) Actual mobilization costs at completion of mobilization;

(ii) Actual demobilization costs at completion of demobilization; and

(iii) The remainder of this item in the final payment under this contract.

(2) The Contracting Officer's determination of the actual costs in paragraph b(1) of this clause is not subject to appeal.

1.9 QUANTITY SURVEYS. (APR 1984) ALTERNATE 1 FAR 52.236-16

a) Quantity surveys shall be conducted, and the data derived from these surveys shall be used in computing the quantities of work performed and the actual construction completed and in place.

(b) The Government will conduct the original and final surveys and make the computations based on them. The Contractor shall conduct the surveys for any periods for which progress payments are requested and

shall make the computations based on these surveys. All surveys conducted by the Contractor shall be conducted under the direction of a representative of the Contracting Officer, unless the Contracting Officer waives this requirement in a specific instance.

(c) Promptly upon completing a survey, the Contractor shall furnish the originals of all field notes and all other records relating to the survey or to the layout of the work to the Contracting Officer, who shall use them as necessary to determine the amount of progress payments. The Contractor shall retain copies of all such material furnished to the Contracting Officer.

1.10 LAYOUT OF WORK (APR 1984) 52.236-17

The Contractor shall lay out its work from Government established base lines and bench marks indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at its own expense, all stakes, templates platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the Contracting Officer. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the Contracting Officer until authorized to remove them. If such marks are destroyed by the Contractor or through its negligence before their removal is authorized, the Contracting Officer may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

-- End of Document --

The following are Clarifications/Responses to questions received:

Q1. In order to facilitate the schedule can channel dredging be deposited behind the West Bulkhead after the West bulkhead is installed and backfilled before the East bulkhead is started and/or completed?

A1. NO. Depositing any appreciable amount of material in the cut before completing the east wall may lead to shoaling in the state-anchorage prior to completion of the east wall. These structures and the bar will be submerged at high water and flow will occur, so we shouldn't tempt nature in this manner. However, the excavated material from preparing the west and east wall area foundations, clearing away material along the walls to install the tie-rods and whales and any material removed incidental to removing and replacing the stone along River Street where the walls tie back to the shore could and should be placed inside the cut, not outside the walls.

Q2. We note that the plans & specifications require that the bulkhead work begin at the west bulkhead on the north end (2465-1.5) where pre-excavation is required. Is the pre-excavation work shown considering dredging? Can this work be performed at low water and not be considered dredging?

A2. The pre-excavation and other minor movement of material as mentioned above in #1 are not "dredging" and can be done outside the dredging window. Any work done along the outer toe of the walls to assist in their construction may need to be checked and perhaps graded to some extent to enable proper placement of the concrete mats.

Q3. We have spoken to 3 dredging contractors that are indicating a schedule requirement of 2 months to perform the channel dredging work. If the pre-excavation is considered dredging then the bulkhead contractor cannot begin work until after 15 NOV 04 and after pre-excavation. If the project must be complete by 28 Feb 05 and the dredging will require 2 months then the bulkhead work must be completed 1.5 months which is impossible, To meet this schedule the contractor must begin working the fall. Please address this issue.

A3. See previous response

Q4. The specifications state that all dredging shall be hydraulic. Does this apply to the channel dredging only? Does it apply to the pre-excavation work required for wale and mattress installation and/or for backfill of the bulkhead?

A4. See previous response. Excavation to construct the sheet pile walls is not to be done w/ the hydraulic dredge. A mechanical method should be used to do this work.

Q5. The specification indicates that the bulkhead is to be backfilled with "dredged" sand. In order to facilitate the schedule and begin work before 15 Nov 04, will the contractor be allowed to backfill the bulkhead with borrowed sand at a water level below the top of the sheets?

A5. The contractor shall stockpile sandy material removed during construction of the wall inside the area to be filled and shall use this material to fill the void between the parallel walls. Any additional material needed to fill the space between the parallel wall segments shall also be taken from the area to be filled

(End of Summary of Changes)

ATTACHMENTS:

Section 02325 DTD, 06/23/04
Section 02390 DTD, 06/16/04
Section 02465 DTD, 06/23/04
Section 02495 DTD, 06/23/04

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE CONSTRUCTION

SECTION 02325

DREDGING

-- End of Section Table of Contents --

SECTION 02325

DREDGING

PART 1 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

1.1.1 Environmental Protection Requirements

Provide and maintain during the life of the contract, environmental protective measures. Also, provide environmental protective measures required to correct conditions, such as oil spills or debris, that occur during the dredging operations. Comply with Federal, State, and local regulations pertaining to water, air, and noise pollution. See Section 01355 ENVIRONMENTAL PROTECTION.

1.1.2 Underwater Diving Operations

In the event that underwater diving operations become necessary due to the work of this contract, such operations shall be conducted in accordance with Ssection 02490 UNDERWATER WORK

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Work Plan; G, RO.

The Contractor shall submit a work plan for accomplishing the dredging work of this contract. The following items shall be considered, at a minimum, for inclusion in the work plan:

a. Anticipated plant and equipment;
b. proposed means and methods for removal of derelict moorings and similar large items, if encountered;
c. expected coordination requirements;
d. survey requirements;
e. proposed measures for avoiding damage to adjacent structures and banks of the Harbor;
f. proposed measures to avoid overdredging;
g proposed equipment and methods for transport of dredge material to the disposal site;
h. a plan for monitoring and repairing leaks in the disposal pipe; and
i. proposed methods to prevent the discharge pipe from freezing in cold weather.

Debris Management Plan.

A debris management plan shall be developed as specified in this section and submitted to the Contracting Officer for review.

SD-05 Design Data

Daily/Monthly Report of Operations

The Contractor shall prepare and submit two (2) copies of the Daily Report of Operations, using ENG Form No. 4267, for each dredge. This report shall be submitted on a daily basis. A copy of this form is appended to the end of this Section. In addition to the daily report, the Contractor shall prepare a Monthly Report of Operations for each month or partial month's work on ENG Form No. 4267. The monthly report shall be submitted to the Contracting Officer on or before the 7th of each month, consolidating the previous month's work. Upon completion of the project, the Contractor shall submit a consolidated project report, combining the monthly reports.

Additionally, one copy of the reports shall be maintained by the Contractor on the dredge(s) for the Contracting Officer's inspection purpose. Further instructions on the preparation of the reports will be furnished at the Preconstruction Conference.

1.3 NOTIFICATIONS

1.3.1 Notice of Misplaced Material

The Contractor shall notify the Contracting Officer and the U.S. Coast Guard Marine Safety Office of any misplaced material.

1.3.2 Notice of Need for Dredging Survey

The Contractor shall give advance notice to the Contracting Officer of the need for a after-dredging survey for final acceptance for each acceptance section. See Section 01723FIELD ENGINEERING FOR DREDGING, Article GOVERNMENT SURVEYS.

1.3.3 Relocation of Navigation Aids

The Contractor shall not remove, change the location of, obstruct, willfully damage, make fast to, or interfere with any aid to navigation. The Contractor shall notify the Coast Guard District Commander, in writing, with a copy to the Contracting Officer, 30 days in advance of the time he plans to dredge adjacent to any aids which require relocation to facilitate the dredging operation. A copy of the notification shall be provided to the Contraction Officer.

1.4 MATERIAL TO BE REMOVED

1.4.1 Character of Materials to be Removed

Samples have been taken by the Government to determine the character of materials to be removed. Although the results of such explorations are representative of subsurface conditions at their respective locations, local minor variations in the subsurface materials are to be expected and, if encountered, will not be considered materially different within the purview of the contract. Analysis of samples taken by GeoTesting Express Inc. and a map of the locations where the samples were taken are attached

at the end of Section 00320 GEOTECHNICAL DATA. Analysis of samples taken by R. W. Gillespie and Associates, Inc are attached at the end of Section 00320 GEOTECHNICAL DATA, and the locations where the samples were taken are shown on the drawings. The material to be removed to accomplish the specified dredging work is anticipated to be fine sand. The Contractor is expected to examine the site of the work and decide the character of the material for himself.

1.5 WORK AREA

1.5.1 Access

The Contractor shall be responsible for providing and maintaining access necessary for his equipment and plant to and from the work site, any mooring areas, and the disposal area. The Contractor shall ascertain the environmental conditions which can affect the access such as climate, winds, currents, waves, depths, shoaling, and scouring tendencies.

1.5.2 Protection of Existing Waterways

The Contractor shall conduct his operations in such a manner that material or other debris are not pushed outside of dredging limits or otherwise deposited in existing side channels, basins, docking areas, or other areas being utilized by vessels. The Contractor will be required to change his method of operations as may be required to comply with the above requirements. Should any bottom material or other debris be pushed into areas described above, as a result of the Contractor's operations, the material must be promptly removed at no expense to the Government.

1.5.3 Adjacent Property and Structures

The Contractor shall conduct the dredging operation such that it does not undermine, weaken or otherwise impair existing structures located in or near the areas to be dredged. The Contractor shall investigate the existing structures at the site and plan the dredging work accordingly.

Damage to private or public property or structures resulting from the disposal or dredging operations shall be repaired promptly by the Contractor at his expense. Damage to structures resulting from the Contractor's negligence will result in suspension of dredging and require prompt repair at the Contractor's expense as a prerequisite to the resumption of dredging.

1.5.4 Artificial Obstructions

The Contractor may encounter bottom debris such as, but not limited to, pieces of broken cable, rope, miscellaneous metal, and broken and derelict moorings. The Government has no knowledge of existing wrecks, wreckage, or other artificial obstructions of such size or character as to require the use of explosives for its removal. However, special or additional plant may be required for economical removal of some items, such as derelict moorings. During dredging operations, the Contractor shall remove all debris encountered. Floating debris removed from the dredging area shall be separated and stockpiled for disposal. Disposal in accordance with local, Federal, and State laws and regulations shall be the responsibility of the Contractor. In case the actual conditions differ from those stated or shown, or both, an adjustment in contract price or time of completion, or both, will be made in accordance with "FAR 52.236-2, Differing Site Conditions."

1.6 QUANTITY OF MATERIAL

The total estimated amount of material to be removed from within the specified limits, including side slopes and allowable overdepths is shown on the Bidding schedule. The estimated quantity for bidding purposes and for application of the "FAR 52.212-11, Variation in Estimated Quantity" shall be the total quantity, including overdepth. The quantities listed are estimates only.

1.7 OVERDEPTH AND SIDE SLOPES

1.7.1 Allowable Overdepth

To cover unavoidable inaccuracies of dredging processes, material removed to the overdepth shown on the drawings and within the dredging limits will be measured and paid for at full contract price.

1.7.2 Side Slopes

Material dredged to provide for final indicated side slopes will be measured and paid for at the applicable unit price. The material may be dredged from the original position or by dredging the space below the indicated slope plane at the bottom of the slope for upslope material capable of falling into the cut. Payment will not be made for material in excess of the amount originally lying above the pay slope plane. The limiting amount of side-slope overdepth will be measured vertically.

1.7.3 Excessive Dredging

Material taken from beyond the limits as extended in the Article "OVERDEPTH AND SIDE SLOPES" above will be deducted from the total amount dredged as excessive overdepth dredging, or excessive side-slope dredging for which payment will not be made.

1.8 INSPECTION

Inspect the work, keep records of work performed, and ensure that gages, targets, ranges, and other markers are in place and usable for the intended purpose. See Section 01451 CONTRACTOR QUALITY CONTROL.

1.8.1 Method of Communication

Provide a system of communication between the dredge crew, the disposal inspector, and the Contracting Officer. Portable two-way marine radios are acceptable.

1.8.2 Transportation

The Contractor shall furnish, at the request of the Government Representative the use of such boats, boatmen, laborers, and material forming a part of the ordinary and usual equipment and crew of the equipment or marine plant as may be reasonably necessary in inspecting and monitoring the work. The Contractor shall furnish, on the request of the Government Representative, suitable transportation from all points on shore designated by the Contracting Officer to and from the various pieces of plant, and the work site.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 CONDUCT OF DREDGING WORK

3.1.1 Order of Work

a. The Contractor shall start dredging form the northeast end of the borrow area channel and proceed southward, dredging the full channel prism to the depth indicated. See Sections 01110 and 02465 for additional requirements relative to project coordination and sequence of work. The Government reserves the right to change the order of work at any time. The Contractor shall fully coordinate all work with the Harbormaster.

b. The Contractor shall prepare and submit to the Contracting Officer for review and approval a progress schedule in accordance with Section 01110, Paragraph "Work Sequence."

3.1.2 Method of Dredging

All dredging under this contract shall be performed using a hydraulic type of dredge.

3.1.3 Method of Disposal

Hydraulically removed material from the channel borrow area indicated shall be pumped to the sheet pile bulkhead, constructed in accordance with Section 02465 SHEET PILE BULKHEAD CONSTRUCTION. Pumping into the bulkhead area shall be controlled and restricted to prevent overtopping the bulkhead area with dredged material. Dredging shall continue until the bulkhead is uniformly filled with sand to the elevation shown. Dredge material shall not be placed in the sand flat until both the west and east bulkheads are complete.

3.1.4 Floating Pipeline

Should the Contractor's pipeline not rest on the bottom, it will be considered a floating pipeline and shall be visible on the surface and clearly marked. In no case will the Contractor's pipeline be allowed to fluctuate between the surface and the bottom, or lie partly submerged. Lights shall be installed on the floating pipeline as required in paragraph Signal Lights below. The lights shall be supported either by buoys or by temporary piling, provided by the Contractor and approved by the Contracting Officer. Where the pipeline does not cross a navigable channel, the flashing yellow all-around lights shall be spaced not over 200 feet apart, unless closer spacing is required by U.S. Coast Guard personnel, in which case the requirements of the U.S. Coast Guard shall govern, at no additional cost to the Government.

3.1.5 Misplaced Material Disposal

Material that is deposited elsewhere than in locations designated or approved by the Contracting Officer will not be paid for and the Contractor shall be required to remove such misplaced material and deposit it where directed at his expense.

3.1.6 Interference with Navigation

Minimize interference with the use of channels and passages. The Contracting Officer will direct the shifting or moving of dredges or the interruption of dredging operations to accommodate the movement of vessels and floating equipment, if necessary. The Contractor shall comply with all requests from the Contracting Officer to move or interrupt dredging operations for a reasonable time period at on no additional cost to the Government.

3.1.7 Ranges, Gages, and Lines

Furnish, set, and maintain ranges, buoys, and markers needed to define the work and to facilitate inspection. Establish and maintain gages in locations observable from each part of the work so that the depth may be determined. Suspend dredging when the gages or ranges cannot be seen or followed. The Contracting Officer will furnish, upon request by the Contractor, survey lines, points, and elevations necessary for the setting of ranges, gages, and buoys. Minimize interference to navigation.

3.1.8 Debris Management

Debris removed from the bottom during dredging operations, which is not suitable for disposal at the beach disposal site, shall be collected and removed from the site. Unsuitable materials include large items such as timbers, pilings, sections of piers, and metallic debris. A debris management plan shall be developed, reviewed by the Contracting Officer and followed by the Contractor. Each day during dredging operations, the Contractor shall use a boat to collect and remove floating debris resulting from project activities. Containers for temporary storage of the collected debris shall be maintained on the dredge or support barge.

3.1.9 Signal Lights

Each night, between sunset and sunrise and during periods of restricted visibility, provide lights for floating plants, pipelines, ranges, and markers. Also, provide lights for buoys that could endanger or obstruct navigation. When night work is in progress, maintain lights from sunset to sunrise for the observation of dredging operations. Lighting shall conform to United States Coast Guard requirements for visibility and color.

3.1.10 Bulkhead Construction/Disposal Area Markers

The Contractor shall mark the bulkhead construction areas, including the limits of the disposal area, with markers that are visible a distance of 500 yards, day or night. All markers shall be of the proper color and shape, and be lighted with lights of the proper color and intensity in accordance with U.S. Coast Guard regulations. The Contractor shall obtain approval from the Coast Guard for the proposed marker plan. After completion of all disposal operations and installation of the permanent 12 inch diameter piling by the Contractor, and with signage provided by others, the Contractor shall remove all temporary markers.

3.2 SHOALING

If, before the contract is completed, shoaling occurs in any section previously accepted, including shoaling in the finished channel because of the natural lowering of the side slopes, redredging at contract price, within the limits of available funds may be done if agreeable to both the

Contractor and the Contracting Officer.

3.3 FINAL CLEANUP

Final cleanup shall include the removal of all the Contractor's plant and equipment either for disposal or reuse. Plant, equipment, and materials to be disposed of shall only be disposed in a manner and at locations approved by the Contracting Officer. Unless otherwise approved by the Contracting Officer, the Contractor will not be permitted to abandon any equipment in the disposal area or other areas adjacent to the worksite.

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

-- End of Section --

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DIVISION 02 - SITE CONSTRUCTION

SECTION 02390

GEOGRID MARINE MATTRESSES

-- End of Section Table of Contents --

SECTION 02390

GEOGRID MARINE MATTRESSES

PART 1 GENERAL

1.1 1.1 SUMMARY

The work covered by this section consists of furnishing all labor, materials, plant and equipment and performing all operations required to provide geogrid marine mattresses at the locations shown on the drawings.

1.2 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 4759	(1988; R 1996) Determining the Specification Conformance of Geosynthetics
ASTM D 1388	(2002) Standard Test Methods for Stiffness of Fabrics

Geosynthetics Research Institute (GRI)

GRI GG2	(1987) Geogrid Junction Strength

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Marine Mattress; G, DO

Contractor shall provide shop drawings showing the fabrication of the marine mattresses including all braiding and connections.

SD-04 Samples

Geogrid; G, DO.

Matstone; G, DO

Braid; G, DO

Connector; G, DO

The Contractor shall furnish physical examples of the geogrid (3-ft. by 3-ft., minimum), matstone (50-lb. sample, minimum), and connectors that are physically identical to the materials to be used in the contract work. The Contractor shall also submit physical and engineering performance test data as specified in Subpart "Structural Geogrid". Deliver samples to the New England District Office at 696 Virginia Road, Concord, MA 01742.

SD-08 Statements

Work Plan; G, RO

Prior to the commencement of work under this section, the Contractor shall submit for approval his proposed plan for fabricating and filling the marine mattresses and for placing the mattresses. Include as a minimum, the equipment, labor, materials, and methods to be used for all tasks.

Manufacturer's Instructions

Contractor shall provide manufacturer's recommendations for fabrication, filling, installation and repair of the marine mattresses.

~~SD-09 Reports~~

~~Diver's Report; G, RO.~~

~~The Contractor shall submit the diver's report within 48 hours of completion of placement of the marine mattresses. The report shall include a description of the placed mattresses to include their location, the presence any damaged geogrid, and the amount of overlap or gap between each mattress. The Government will review this submittal and provide approval/disapproval within 48 hours of receipt of the submittal.~~

SD-13 Certificates

Marine Mattresses; G, RO

The Contractor shall furnish the Contracting Officer, manufacturer's certificates or affidavit signed by a legally authorized official from the company manufacturing the mattresses, that all materials contained within that shipment meet the composition, physical, and manufacturing requirements stated in this specification.

1.4 DESCRIPTION

The non-metallic compartmental rectangular mattresses, comprised of structural geogrid, shall be filled with stone. The required width and depth of the mattress units shall be as shown on the drawings. The mattress units may be fabricated and filled off-site or on-site, for lifting into place.

Mattresses, larger than shown on the contract drawings, may be utilized, if approved by the manufacturer. The final approval for the use of larger

mattresses shall be obtained from the Contracting Officer. The Contractor shall have the proper lifting equipment (including spreader bar) to lift and place the larger mattresses.

1.5 STORAGE

The geogrids shall be stored in conditions above -20 degrees F (-29 degrees C) and not greater than 140 degrees F (60 degrees C).

1.6 ON-SITE TECHNICAL ASSISTANCE

The Contractor shall coordinate with the mattress manufacturer for a qualified representative of the matress system to be present at the job site during the first week of installation to provide technical assistance as needed. The Contractor shall remain solely responsible for the quality of installation of the mattresses.

PART 2 PRODUCTS

2.1 GEOGRID MARINE MATTRESSES

2.1.1 Structural Geogrid

The structural geogrid shall be an integrally formed grid structure manufactured of a stress resistant polypropylene or high density polyethylene material with molecular weight and molecular characteristics which impart high resistance to loss of load capacity or structural integrity when the geogrid is subjected to mechanical stress in installation and/or long-term environmental stress.

		MD/XMD[1] (Min. Values)
Load Capacity		
True Initial Modulus at 1% Strain[2]	lb/ft	18,160/29,470
Structural Integrity		
Junction Strength[3]	lb/ft	~~11,432/1,233~~6,900/1,233
Flexural Stiffness[4]	mg-cm	750,000/
Torsional Stiffness[5]	kg-cm/deg	4.8/
Dimensions		
Max Aperture Size	in.	1.0/~~1.3~~6.0
Max Percent Open Area	%	70
Minimum Thickness (any dimension)	in.	0.045

The geogrid product shall also meet the following durability requirements:

Ultraviolet Stability[6]	98%
Resistance to installation damage (GP)[7]	71%
Resistance to long term degradation[8]	100%

Notes:

[1] MD dimension is along roll length. XMD dimension is across roll width. Unless indicated otherwise, values shown are determined in accordance with ASTM D 4759. Brief descriptions of test procedures are given in the following notes.

[2] True resistance to elongation when initially subjected to a load measured via ASTM D 6637 without deforming test materials under load before measuring such resistance or employing "secant" or "offset" tangent methods of measurement so as to overstate tensile properties.

[3] Load transfer capability measured via GRI GG2.

[4] Resistance to bending force measured via ASTM D 1388.

[5] Resistance to in-plane rotational movement measured by applying a 20 cm-kg moment to the central junction of a 9" x 9" specimen restrained at its perimeter.

2.1.2 Braid

The braid material shall be a hollow-core polyethylene braid and shall have a minimum diameter of 3/16 inch (nominal) with a breaking strength of not less than 400 lb load on a test specimen 36 inches in length. For UV stability, the braid material shall have a minimum carbon black content of 2.0% throughout.

2.1.3 Connectors

Bodkin connector rods shall be 3/8" diameter, round and composed of high density polyethylene.

2.1.4 Matstone

2.1.4.1 Quality

Matstone may be crushed stone. The stone shall be sound, durable and of suitable quality to ensure suitable performance in the mattresses and the climate at the work site. Stone shall be free from cracks, seams, and other defects that would tend to increase its deterioration in the mattresses. The inclusion of objectionable quantities of dirt, sand, clay, and rock fines shall not be permitted.

2.1.4.2 Gradation

Stone fill used in the mattresses shall be a well-graded mixture with the following gradation:

Sieve Size	%, by Weight, Passing (inches)
~~3~~4	100
~~2 1/2~~3	~~90-100~~60-80
2	~~35-70~~0-5
~~1 1/2~~	~~0-15~~
~~3/4~~	~~0-5~~

PART 3 EXECUTION

3.1 ASSEMBLY OF MARINE MATTRESSES

3.1.1 Assembling Individual Mattresses

Empty mattress units shall be assembled as recommended by the manufacturer and as indicated on the contract drawings. The joints where the ends and baffles of each unit join the top or bottom of the unit shall be made with a mechanical connection between geogrid elements. All cut ends of braid material shall be knotted within 1 inch to 2 inch of the end to prevent raveling of the braid material. The braid material shall be securely knotted to the geogrid at all ends of all stitched seams, and at a spacing not to exceed 6 feet along any stitched seam. Pieces of braid material may be spliced end to end by securely knotting. The stitches along each seam shall be sufficiently tight to close the gap between the adjacent pieces of geogrid. The braid material shall be stitched through each pair of apertures along each seam at least once. The spacing of stitches shall be reasonably uniform at approximately 6 (minimum) stitches per foot along the entire length of each seam. Lifting hoops shall be formed by joining the top and bottom layers of grid from each unit by means of approved mechanical connections.

3.1.2 Filling with Stone

The mattresses shall be pre-filled with stone prior to placement as specified below. The stone shall be carefully placed in the mattress. Stone filling operations shall carefully proceed with placement by hand or machine to assure a minimum of voids between the stones, and to avoid deformation throughout the filling process. Undue bulging of the geogrid shall be avoided. The maximum height from which the stone may be dropped into the basket units shall be 1 foot. The stone shall be leveled with the top of the mattress to allow for proper closing of the lid. The mattresses shall be closed over the stone as recommended by the manufacturer.

3.2 INSTALLATION OF MATTRESSES

During movement and placement of the pre-filled mattresses the Contractor shall insure that the mattresses are supported throughout their entire length and that the mattress and fasteners are protected from being damaged. All adjoining mattresses shall be butted as tightly as practicable along their contact surfaces in order to obtain a monolithic structure. Adjoining mattresses shall be set to the required lines and grades as shown on the contract drawings. The units shall be placed at the proper elevation, alignment and orientation as shown on the drawings. The procedure used in placement of the units shall be in accordance with the recommendations of the system supplier and as approved by the Contracting Officer. For lifting of each unit, a spreader beam and/or spreader bars shall be used in a manner that the unit is not subjected to severe bending or distortion and that the top and bottom layers of geogrid are tensioned uniformly across their width. Units should generally be lifted from a horizontal position. Personnel shall stay clear of the area beneath units and rigging during lifting.

3.3 REPAIRS OF MARINE MATTRESSES

Damaged geogrid shall be repaired by placing a geogrid patch over the damaged area such that it overlaps onto the acceptable geogrid material by at least one foot in all directions; the perimeter edges of the patch shall

be attached to the mattress in accordance with the seaming requirements, above. Damaged braid shall be repaired by installing a new braided seam in accordance with above, and extending at least one foot in either direction beyond the location of the damaged braid.

~~3.6 UTILIZATION OF DIVERS~~

~~To confirm proper placement of the marine mattresses, the Contractor shall utilize "surface air supplied" divers.~~

~~3.6.1 Diver's Inspection~~

~~The Contractor shall utilize divers to ensure that the mattresses are placed as specified herein. The diving inspection shall require submittals and be conducted in accordance with COE EM 385-1-1 as specified in Section 02490 UNDERWATER WORK. The Contractor shall submit a diving report as specified in the Submittals requirements of this section within 24 hours of the completion of the marine mattresses inspection. The Government will review this submittal and provide approval/disapproval within 24 hours of receipt of the submittal.~~

~~3.9 SURVEYS~~

~~To confirm the proper placement of the marine mattresses, the Contractor shall also conduct hydrographic surveys as specified in Section 01723 FIELD ENGINEERING.~~

3.4 CONTRACTOR QUALITY CONTROL

The Contractor shall conduct an inspection of each assembled mattress prior to and after filling with stone. The results of these inspections shall be documented in the daily Quality Control reports required under Section 01451 CONTRACTOR QUALITY CONTROL.

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DIVISION 02 - SITE CONSTRUCTION

SECTION 02465

SHEET PILE BULKHEAD CONSTRUCTION

-- End of Section Table of Contents --

SECTION 02465

SHEET PILE BULKHEAD CONSTRUCTION

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36	(1996) Carbon Structural Steel
ASTM A 123/A 123M	(1997; Rev. A) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 153/A 153M	(1995) Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 307	(1994) Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
ASTM D 638	(2002) Tensile Properties of Plastics
ASTM D 256	(1997) Determining the Izod Impact Resistance of Plastics
ASTM D 790	(1998) Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D 4226	(2000) Standard Test Methods for Impact Resistance of Rigid Poly(Vinyl Chloride) (PVC) Building Products

AMERICAN WOOD-PRESERVERS' ASSOCIATION (AWPA)

AWPA C2	(2001) Lumber, Timber, Bridge Ties and Mine Ties - Preservative Treatment by Pressure Processes
AWPA M6	(1997) Brands Used on Forest Products

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Sheet Piling; G, DO

Detail drawings for sheet piling including fabricated sections shall show complete piling dimensions and details, splices and location of installed piling. Detail drawings shall include details and dimensions of templates and other temporary guide structures for installing piling. Detail drawings shall provide details of the method of handling piling to prevent permanent deflection, distortion or damage to piling interlocks.

Construction Sequence; G, DO; G

A detailed construction sequence of installation of the Bulkheads shall be submitted for Government approval.

Driving;

Records of the sheet piling driving operations shall be submitted after driving is completed. These records shall provide a system of identification which shows the disposition of approved piling in the work, driving equipment performance data, piling penetration rate data, piling dimensions and top and bottom elevations of installed piling. The format for driving records shall be as directed.

Pulling and Redriving; G, DO

The proposed method of pulling and redriving sheet piling shall be submitted and approved prior to pulling any piling.

SD-03 Product Data

Pile Driving Equipment; G, DO

Complete descriptions of sheet piling driving equipment including hammers, vibratory equipment, jetting equipment, extractors, protection caps and other installation appurtenances shall be submitted for approval prior to commencement of work.

SD-04 Samples

Sheet Pile; G, DO

Within 20 calendar days of Notice to Proceed, the Contractor shall submit samples of proposed sheet pile and corner pieces. The submitted materials shall be manufactured in accordance with the requirements of this specification and shall be standard commercial products. Additional or better features which are not specifically prohibited by this specification, but which are a part of manufacturer's standard commercial product, shall be included in the material being furnished. A standard commercial product is one that has been sold or is being currently offered for sale on the commercial market through advertisements or manufacturer's catalogs or brochures, and represents the latest production model. The submittal shall include all testing and certifications, as specified herein.

Certified materials tests reports showing that sheet piling and appurtenant materials meet the specified requirements shall be submitted for the approval of the Contracting Officer prior to ordering, shipping and installing materials. Tests, as detailed herein, shall be performed by an independent third party testing agency. Test data over one year old will not be accepted. The submitted test data will be accompanied by a notarized certificate of compliance from the manufacturer attesting that the data reflects the characteristics of their product as it is currently being produced.

SD-07 Certificates

MSDS and CIS

Provide Material Safety Data Sheets (MSDS) and Consumer Information Sheets (CIS) associated with sheet piles. Contractor shall comply with all safety precautions indicated on MSDS and CIS.

1.3 QUALITY CONTROL

The manufacturer shall have in place a Quality Assurance Program that will ensure the sheet pile is in conformance with the ASTM and other specifications cited in this document

1.3.1 Examination

Each delivered section of sheet pile shall be examined by an inspector of Contractor's designation for compliance with the appropriate requirements of this specification. This inspection shall encompass all visual examinations and dimensional measurements. Noncompliance with any specified requirements or presence of one or more major defects preventing or lessening maximum efficiency shall constitute cause for rejection.

1.4 DELIVERY, STORAGE AND HANDLING

Materials delivered to the site shall be new and undamaged and shall be accompanied by certified test reports. Sheet piling shall be stored and handled in the manner recommended by the manufacturer to prevent permanent deflection, distortion or damage to the interlocks.

1.5 RECOMMENDED SEQUENCE OF WORK

The Contractor shall arrange its construction sequence in compliance with the following requirements:

a. minimize unbalanced lateral loads on sheeting;

b. complete construction of the West Bulkhead before starting construction of the East Bulkhead;

c. work from the north to south when constructing each Bulkhead;

d. and ensure that no vertical pressures on the finished surface of the Bulkhead, due to loads such as construction equipment and temporary stockpiles of materials, exceeds 100 pounds per square foot.

A recommended sequence of construction is presented below based on the above requirements. All proposed variations to the recommended sequence of

construction shall be submitted to the Contracting Officer for approval.

a. Mobilize to start construction of the West Bulkhead at the north end, Sta. 11+00W.

b. Drive temporary support piles and install the driving template (wales) for sheeting.

c. Construct a length of the Bulkhead, as determined by the Contractor, and install the interior cross-wall as shown on the drawings.

d. Connect wales and tie rods in the completed section of the Bulkhead.

e. Place dredged sand material within the completed section of the Bulkhead to Elevation +3.5.

f. Remove the temporary support piles and advance the pile driving operation.

g. Repeat the above steps "b" through "f" until construction of the West Bulkhead is complete at Sta. 1+00W.

h. Place the geogrid marine mattress at the toe of the West Bulkhead.

i. Mobilize to start construction of the East Bulkhead at the north end, Sta. 6+60E.

j. Remove existing rip rap at south end.

k. Repeat the above steps "b" through "f" until construction of the East Bulkhead is complete at Sta. 1+00E.

l. Place the geogrid marine mattress at the toe of the East Bulkhead

m. Replace rip rap at south end.

PART 2 PRODUCTS

2.1 GENERAL

The sheet piling shall consist of either Vinyl or Fiberglass Reinforced Polymer sections. Both bulkheads shall be constructed of only one type of sheet piling. Steel sheet piling will not be accepted as a substitute for the synthetic piling specified.

2.2 VINYL SHEET PILING

2.2.1 General Configuration

Vinyl sheet piling shall be a "Z" Section extruded plastic manufactured from rigid, impact modified, UV-inhibited, weatherable vinyl that meets or exceeds the requirements set out in Tables I and II below. The interlocks of the sheet piling shall be free-sliding, allowing a swing angle of not less than 5 degrees when threaded, and maintain continuous interlocking when installed. ~~Steel sheet piling will not be accepted as a substitute for vinyl sheet piling~~.

Table I - Vinyl Sheeting Mechanical Properties (minimum)

Property	ASTM Test	Value
Tensile Strength	ASTM D 638	6,300 psi
Modulus of Elasticity	ASTM D 790	380 ksi
Impact resistance	ASTM D 4226*	15,000 in-lb/in

*Procedure B, Impactor C.125.

Table II - Vinyl Sheeting Dimensions and Weight (minimum)

Specification	Value
Width (inches)	18.00
Depth (inches)	11.00
Thickness (inches)	0.60
Weight (lbs/sq ft)	8
Section Modulus (in^3/ft)	55

2.3 FIBERGLASS REINFORCED POLYMER SHEET PILING

2.3.1 General Configuration

Fiberglass reinforced polymer sheet piling shall be a "Z" section with ball and socket or "T" shaped interlock. The polymer resins shall be polyester, vinyl ester, or polyurethane containing stabilizers to provide long term resistance to ultraviolet light degradation. The piling shall be reinforced with a glass fiber matrix to produce a section that meets or exceeds the requirements set out in Table III and IV below. The interlocks of the sheet pilings shall be free-sliding, allowing a swing angle of not less than 5 degrees when threaded, and maintain continuous interlocking when installed.

Table III - Fiberglass Reinforced Polymer Sheeting Mechanical Properties (minimum)

Property	ASTM Test	Value
Ultimate Longitudinal Tensile Strength	ASTM D 638	60,000 psi
Ultimate Transverse Tensile Strength	ASTM D 638	10,000 psi
Longitudinal Modulus of Elasticity	ASTM D 638	$4.0x10^6$ psi
Transverse Modulus of Elasticity	ASTM D 638	$1.0x10^6$ psi
Longitudinal IZOD Impact	ASTM D 256	50 ft-lbs/in
Transverse IZOD Impact	ASTM D 256	15 ft-lbs/in

Table IV - Fiberglass Reinforced Polymer Sheeting Dimensions and Weight (minimum)

Specification	Value
Width (inches)	18.00
Depth (inches)	8.00
Thickness (inches)	0.25
Weight (lbs/sq ft)	5.0
Section Modulus (in^3/ft)	12.5

2.4 Color Selection

The Contracting Officer's Representative will select the color of the

piling from the manufacturer's standard color choices.

2.5 Manufacturers Experience Requirements

All sheet piles to be provided under this Section shall be furnished only by manufacturers having experience in the design and manufacture of the type of sheet pile product proposed. Manufacturers shall have a minimum of 5 years experience with the production of ~~vinyl~~synthetic sheet piles. If requested, the manufacturers shall demonstrate an experience record of at least three (3) previous, separate, similar successful installations in the last five (5) years.

2.6 STEEL WALES

Wales shall be fabricated from ASTM A 36 steel, hot-dip galvanized after fabrication.

2.7 WOOD WALES AND BLOCKING

2.7.1 Solid Sawn

Provide solid sawn lumber and timbers for wales of stress-rated Southern Pine or Douglas Fir-Larch, and identified by the grade mark of a recognized association or independent inspection agency using the specific grading requirements of an association recognized as covering the species used. The association or independent inspection agency shall be certified by the Board of Review, American Lumber Standards Committee, to grade the species used. Use commercial grade lumber for secondary members such as decking, joists and railings.

2.7.2 Preservative Treatment

Fabricate lumber and timbers for wales before preservative treatment. Each piece of treated lumber or timber shall be branded, by the producer, in accordance with AWPA M6. Treat wood to be used in contact with salt water or salt water splash in accordance with AWPA C2. Treat wood products with water-borne preservative The Contractor shall be responsible for the quality of treated wood products.

2.8 APPURTENANT METAL MATERIALS

Metal plates, shapes, bolts, nuts, tie rods, turn buckles, and other appurtenant fabrication and installation materials shall be as specified on the drawings. All materials shall be hot-dip galvanized after fabrication.

2.8.1 Hardware

Unless otherwise specified on the drawings, bolts with necessary nuts and washers shall conform to ASTM A 307. Provide hot-dip galvanize hardware as shown.

2.8.1.1 Zinc-Coating

Galvanize steel specified or indicated by the hot-dip process in accordance with ASTM A 123/A 123M or ASTM A 153/A 153M, as applicable.

PART 3 EXECUTION

3.1 REMOVAL AND REPLACEMENT OF STONE RIP RAP AT EAST BULKHEAD WALL

The existing rip rap located where the end of the East Bulkhead will be constructed shall be removed to allow driving of the sheeting. The rip rap may be stockpiled below the high water line adjacent to the Bulkhead wall construction. Following construction of the East Bulkhead, the rip rap shall be relocated against the end of the Bulkhead as directed.

3.2 INSTALLATION

3.2.1 Pile Driving Equipment

Pile driving equipment shall conform to the following requirements.

3.2.1.1 Driving Hammers

Hammers shall be steam, air, or diesel drop, single-acting, double-acting, differential-acting, or vibratory type, and of sufficient size as recommended by the sheet pile manufacturer. The driving energy of the hammers shall be as recommended by the manufacturer for the piling weights and subsurface materials to be encountered.

3.2.1.2 Jetting Equipment

Jetting equipment may be necessary in order to facilitate the installation of the sheet piles, as soil conditions warrant. The jet shall have not less than two removable or fixed jets of the water or combination air-water type. Water jets shall be designed so that the discharge volume and pressure are sufficient to freely erode the material under and adjacent to the piling. When jetting is utilized, all displaced material shall be backfilled to the original elevation after final installation of the sheets. All work associated with the jetting and backfilling shall be at no cost to the Government.

3.2.2 Placing and Driving

3.2.2.1 Placing

Any excavation required within the area where sheet pilings are to be installed shall be completed prior to placing sheet pilings. Pilings shall be picked up and completely threaded to demonstrate that they slide freely in interlock. Pilings shall be carefully located as shown. Pilings shall be placed plumb with out-of-plumbness not exceeding 1/8 inch per foot of length and true to line. Temporary bracing, templates, current deflectors or guide structures shall be provided to insure that the pilings are placed and driven to the correct alignment. Pilings properly placed and driven shall be interlocked throughout their length with adjacent pilings to form a continuous diaphragm throughout the length or run of piling wall.

3.2.2.2 Driving

Prior to driving pilings in water a horizontal line shall be painted on both sides of each piling at a fixed distance from the bottom so that it shall be visible above the water line after installation. This line shall indicate the profile of the bottom elevation of installed pilings so that potential problem areas can be identified by abrupt changes in its elevation. The Contractor shall also keep a log of sheet cutoffs to figure

the embedment of each pile. Pilings shall be driven with the proper size hammer and by approved methods so as not to subject the pilings to damage and to ensure proper interlocking throughout their lengths. Driving hammers shall be maintained in proper alignment during driving operations by use of leads or guides attached to the hammer. Caution shall be taken when a hard driving condition is encountered to avoid interlock-melt or damage. A protecting cap shall be employed in driving to prevent damage to the tops of pilings. The protection caps and other installation appurtenances shall be as recommended by the sheet pile manufacturer. Pilings damaged during driving or driven out of interlock shall be removed and replaced at the Contractor's expense. Jetting, when employed, shall be performed on both sides of the pilings simultaneously and must be discontinued at least 2 feet before final seating of pilings. Adequate precautions shall be taken to insure that pilings are driven plumb. If at any time the forward or leading edge of the piling wall is found to be out-of-plumb in the plane of the wall the piling being driven shall be driven to the required depth and tapered pilings shall be provided and driven to interlock with the out-of-plumb leading edge or other approved corrective measures shall be taken to insure the plumbness of succeeding pilings. The maximum permissible taper for any tapered piling shall be 1/8 inch per foot of length. Pilings in each run or continuous length of piling wall shall be driven alternately in increments of depth to the required depth or elevation. No piling shall be driven to a lower elevation than those behind it in the same run except when the pilings behind it cannot be driven deeper. If the piling next to the one being driven tends to follow below final elevation it may be pinned to the next adjacent piling. If obstructions restrict driving a piling to the specified penetration the obstructions shall be removed or penetrated with a chisel beam. If the Contractor demonstrates that removal or penetration is impractical the Contractor shall make changes in the design alignment of the piling structure as directed to insure the adequacy and stability of the structure. Pilings shall be driven to depths shown and shall extend up to the elevation indicated for the top of pilings. A tolerance of 1 inch above the indicated top elevation will be permitted.

3.2.3 Cut-Offs

All piles shall be driven to the indicated elevations. Should piles encounter difficulty or refusal above the indicated elevations, the Contractor shall employ whatever means necessary to drive the piles to the indicated elevation. Pilings driven to final elevation which are extending above the required top elevation in excess of the specified tolerance shall be cut off to the required elevation at no additional cost to the Government. Piling cut-offs shall become the property of the Contractor and shall be removed from the site. The tops of all fiberglass reinforced polymer piles that are cut off shall be sealed with a material as recommended by the pile manufacturer and approved by the Contracting Officer's Representative. ~~The Contractor shall cut holes in pilings for bolts, rods, and drains as shown or as directed. All cutting shall be done in a neat and workmanlike manner. Bolt holes in piling shall be drilled and reamed by approved methods which will not damage the surrounding material. Holes other than bolt holes shall be reasonably smooth and the proper size for rods and other items to be inserted.~~

3.2.4 Hole Cutting in Piling

The Contractor shall cut holes in pilings for bolts, rods, and drains as shown or as directed. All cutting shall be done in a neat and workmanlike manner. Bolt holes in piling shall be drilled and reamed by approved

methods which will not damage the surrounding material. Holes other than bolt holes shall be reasonably smooth and the proper size for rods and other items to be inserted. All holes shall be located in the flange of the sheets, centered between the corner and the knuckle joint, and not in the web. Anchor and tieback locations shall be locally and nominally adjusted by the Contractor to meet this requirement. Holes shall be of the minimum size that will allow the bolts, rods, and drains to be installed. Oversized holes will not be permitted.

3.2.5 Inspection of Driven Piling

The Contractor shall inspect the interlocked joints of driven pilings extending above ground. Pilings found to be out of interlock shall be removed and replaced at the Contractor's expense.

3.2.6 Pulling and Redriving

In the pulling and redriving of piles as directed, the Contractor shall pull selected pilings after driving to determine the condition of the underground portions of pilings. Any piling so pulled and found to be damaged to the extent that its usefulness in the structure is impaired shall be removed and replaced at the Contractor's expense. Pilings pulled and found to be in satisfactory condition shall be redriven when directed. Piles whose ends have been damaged shall be trimmed before redriving in order to reduce the likelihood of cracks propagating up the sheets. total trimming shall not exceed two inches so as not to reduce the effective length of the piles.

3.3 REJECTION OF SHEETS DUE TO DAMAGE

Crushing or shearing of sheets and the interlocks in any area due to excessive clamp pressure or driving equipment shall be unacceptable. Cracks propagating through the sheet piles as well as hairline cracks longer than 1 inch in any area of the sheet piling shall be unacceptable.

The Contractor may elect, at its own cost, to supply sheet piles longer than those identified in the contract documents in order to avoid the total rejection of sheet piles due to damage which may occur locally at the top or bottom few inches of the piles. All costs associated with this additional length, cut-off of damaged areas, cut-off to obtain final elevation, additional driving, and disposal shall be included in the the Contractor's original bid and shall be at no cost to the Government.

3.4 WALE AND TIEBACK CONSTRUCTION

3.4.1 Bolts, Hardware, Wales, Tiebacks

As shown on the drawings.

3.4.2 Wales

Steel wales shall be provided as shown on the drawings.

3.4.3 Framing

Cut and frame wales so that joints will fit over contact surface. Secure wales in alignment. Open joints are unacceptable. Shimming is not allowed.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE CONSTRUCTION

SECTION 02495

GEOTECHNICAL INSTRUMENTATION

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SECTION 02495

GEOTECHNICAL INSTRUMENTATION

PART 1 GENERAL

1.1 SUMMARY

The Work of this Section includes furnishing, installing and maintaining geotechnical instrumentation, protecting instrumentation from damage, monitoring instruments, and providing access to Government employees to monitor the instruments. The purpose of the Geotechnical Instrumentation Program is to provide verification of deformation performance of the sheet pile bulkhead and the placed fill material.

1.1.1 Contractor Requirements

a. Furnish components of instrumentation that are to be installed during construction.

b. Install instruments.

c. Protect from damage and maintain instruments.

d. Repair or replace damaged or inoperative instruments.

e. Monitor instruments and report readings.

f. Provide safe access to Government employees for data collection.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the Corps of Engineers office that will also review the submittal. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Manufacturers' Product Data; G, EO

a. At least 30 days prior to start of installation of the first of each type of instrument, the Contractor shall submit manufacturers' product data for approval.

b. At least 15 days prior to commencing installation of the first of each type of instrument, the Contractor shall submit to the Contracting Officer for review, the following items pertaining to that instrument type:

Detailed step-by-step procedure for installation, together with a sample installation record sheet. The procedures shall be bound and

indexed. The installation procedures shall include:

1. Method for conducting post-installation acceptance test.

2. Method for protecting instruments from damage.

3. A schedule indicating the proposed time sequence of instrument installation.

c. Within 2 workdays of receipt of each instrument at the site, the Contractor shall submit a copy of factory calibration, manufacturer's test equipment certification, completed copy of quality assurance checklist, and warranty for each portable readout unit.

d. Within 7 days of receipt of each instrument at the site, the Contractor shall submit to the Contracting Officer completed pre-installation acceptance test record form for that instrument.

e. Within 5 days of installing each instrument, the Contractor shall submit the installation record sheet for that instrument, including as-built instrument location as specified.

SD-07 Certificates

Personnel resumes; G, EO

At least 30 days prior to commencing installation of any instrument, the Contractor shall submit the resume of the personnel who will perform the instrument installations. The personnel shall include a superintendent who has documented evidence of experience of at least three years of field installation of instruments of the type specified .

1.3 QUALITY CONTROL

a. A factory calibration shall be conducted on the loadcell portable readout unit prior to shipment. Certification shall be provided to indicate that the test equipment used for this purpose is calibrated and maintained in accordance with the test equipment manufacturer's calibration requirements and that, where applicable, calibrations are traceable to the National Institute of Standards and Technology.

b. A final quality assurance inspection shall be made prior to shipment. During the inspection, a checklist shall be completed to indicate each inspection and test detail. A completed copy of the checklist shall be supplied with each instrument.

c. The Contractor shall provide the manufacturer's warranty for each portable readout unit.

1.4 STORAGE OF INSTRUMENTS

All instrumentation materials, after receipt at the site and prior to installation, shall be stored in an indoor, clean, dry and secure storage space. Instrumentation materials shall not be exposed to temperatures outside the manufacturer's stated working temperature range.

PART 2 PRODUCTS

2.1 GENERAL

a. Whenever a product is specified by brand name and model number, such specifications shall be deemed to be used for the purpose of establishing a standard of quality and facilitating the description of the product desired. The term "acceptable equivalent" shall be understood to indicate that the "acceptable equivalent" product is the same or better than the product named in the Specifications in function, performance, reliability, quality, and general configuration. This procedure is not to be construed as eliminating from competition other suitable products of equal quality by other manufacturers. The Contractor may, in such cases, submit complete comparative data to the Contracting Officer for consideration of another product. Substitute products shall not be ordered, delivered to the site, or used in the Work unless accepted by the Contracting Officer in writing. The Contracting Officer will be the sole judge of the suitability and equivalency of the substituted product.

b. A request from the Contractor for consideration of a substitution shall clearly state the nature of the deviation from the product specified.

c. Specified load cell readout unit, together with associated calibration devices and software, shall be furnished to the Contracting Officer no later than one week before commencing installation of the first load cell. In addition to the specified readout unit for the Contracting Officer's use when collecting data, the Contractor shall provide his own readout unit as needed for making pre-installation and post-installation acceptance tests, for taking any required readings during installation, and for taking the Formal Initial and subsequent readings, as specified herein. Such readout unit shall be identical to the specified readout unit.

d. The Contractor shall furnish all installation tools, materials and miscellaneous instrumentation components.

e. For load cells, provide an instruction manual which shall include the following:

1. A description of the purpose of the instrument.

2. Theory of operation.

3. Step-by-step procedures for:

(a). Pre-installation acceptance test when instruments are received on site, to ensure the instruments are functioning correctly prior to installation.

(b). Calibration of readout units.

4. A list of calibration equipment required, and recommended frequency of calibration.

5. Step-by-step instrument installation procedure including materials, tools, spare parts and any borehole requirements, and post-installation acceptance tests.

6. Maintenance procedure.

f. All graduations shall be in U.S. Customary Units, for example feet, inches, pounds.

2.2 DEFORMATION MONITORING POINTS

Deformation monitoring points (DMPs) will be used to monitor vertical and horizontal deformation of the sheet pile bulkheads at ~~selected locations~~ the same stationing as the load cella, as shown on the drawings. Each DMP shall consist of an observable point punchmarked on the top horizontal surface of sheeting or a waler. The point shall also be clearly identified using waterproof fluorescent spray paint adjacent to the point. A total of four (4) DMP's shall be provided.

2.3 LOAD CELLS

a. Load cells shall be Model 4900 Vibrating Wire Load Cell (3 gage, 6" OD, 400 KIPs, minimum), manufactured by Geokon Inc. of Lebanon, NH, Model VH-2500 Vibrating Wire Load Cell manufactured by Roctest LTD of Plattsburgh, NY, or acceptable equivalent. Load cells shall be capable of operating in submerged conditions.

b. Provide cable. Cable shall be from the same commercial source as the load cell. Cable shall be 4 conductor, 22 gage, with two shielded twisted pairs, a common drain wire, and a sheath of 0.065 inches thick pressure extruded vinyl with an outside diameter of 0.25 inch.

c. Provide a readout unit from the same commercial source as the load cell for the sole use of the Contracting Officer. Provide an identical unit for the Contractor's monitoring program. Terminal units shall be clearly marked with each strain gage number. Portable readout unit and jumper cable shall be capable of reading both the vibrating wire and thermistor reading, shall have a minimum of 64K RAM memory, and shall display readings in engineering units.

d. Provide a waterproof terminal box, ~~8"x8" minimum~~of sufficient size, bolted onto the installed vinyl sheets or wales. The box shall be fitted with vibrating wire and temperature readout terminals to enable readings to be obtained by directly attaching the portable readout unit. The protective box shall be capable of preventing moisture entry during high tides, when the entire assembly will be submerged under water. One box shall be provided for each load cell location, for a total of four boxes.

2.4 FACTORY CALIBRATION

A factory calibration shall be conducted on all instruments at the manufacturer's facility prior to shipment. Each factory calibration shall include a calibration curve with data points clearly indicated, and a tabulation of the data. Each instrument shall be marked with a unique identification number. Quality assurance procedures during factory calibration shall be as specified herein.

PART 3 EXECUTION

3.1 PRE-INSTALLATION ACCEPTANCE TESTS

a. When instruments are received at the site, the Contractor's instrumentation personnel shall perform pre-installation acceptance tests to ensure that the instruments and readout units are functioning correctly prior to installation. Pre-installation acceptance tests shall include

relevant items from the following list:

1. Examine factory calibration curve and tabulated data, to verify completeness.

2. Examine manufacturer's final quality assurance inspection check list, to verify completeness.

3. Check cable length.

4. Check tag numbers on instrument and cable.

5. Check, by comparing with procurement document, that model, dimensions, materials, etc. are correct.

6. Bend cable back and forth, at point of connection to instrument, while reading the instrument, to verify connection integrity.

7. Perform resistance and insulation testing, in accordance with criteria provided by the instrument manufacturer, using a gage insulation or circuit tester that applies 2 volts or less for resistance testing and 15 volts or less for insulation testing.

8. Verify that all components fit together in the correct configuration.

9. Check all components for signs of damage in transit.

10. Check that quantities received correspond to quantities ordered.

b. During pre-installation acceptance testing of each instrument the Contractor shall complete a pre-installation acceptance test record form.

c. An instrument that fails the specified pre-installation acceptance test shall be repaired such that it passes a subsequent pre-installation acceptance test, or shall be replaced by an identical instrument at no additional cost to the Government.

3.2 INSTALLATION - GENERAL

a. The Contractor shall install instruments, following the guidelines included in the manufacturers' instruction manuals, and as detailed in the reviewed submittal.

b. The Contractor shall notify the Contracting Officer at least 24 hours prior to installing each instrument.

C. As each instrument is installed, an installation record sheet shall be prepared, including appropriate items from the following list:

1. Project name.

2. Contract name and number.

3. Instrument type and number, including readout unit.

4. Planned location in horizontal position and elevation.

5. Personnel responsible for installation.

6. Plant and equipment used.

7. Date and time of start and completion.

8. Spaces on record sheet for necessary measurements or readings required at hold points during installation to ensure that all previous steps have been followed correctly, including instrument readings made during installation.

9. As-built location in horizontal position and elevation, including:

(a). Elevation referenced to the project datum, together with the location of the point used for the elevation measurement.

(b). Horizontal position referenced both to New Hampshire State Plane Grid Coordinates and to project baseline station and offset, together with the location of the point used for the horizontal position measurement.

(c). A location sketch showing the instrument number and the taped horizontal distances to the instrument, measured to an accuracy of ± 1 ft, from permanent physical features in the field. A sufficient number of taped measurements shall be included on the sketch to establish a unique horizontal position for the instrument. If such features are removed, the Contractor shall provide a new sketch, prior to removal, with taped measurements to other features.

10. Result of post-installation acceptance test.

11. Weather conditions at the time of installation.

12. A space on record sheet for notes, including problems encountered, delays, unusual features of the installation, and details of any events that may have a bearing on instrument behavior.

d. Instruments that fail the specified post-installation acceptance test shall be replaced by an identical instrument at no additional cost to the Government.

e. The Contractor shall submit updated as-built instrument location plans to the Contracting Officer. The location plans shall be reproducible composite plans of all installed instruments plotted on 24 in. x 36 in. sheets at a scale of 1 inch = 100 ft. The first plans shall be submitted within one week after completion of the first instrument installation, regardless of instrument type. Updated plans shall be submitted every subsequent two weeks. Updated plans need not be submitted for periods during which no instruments have been installed.

3.3 INSTALLATION OF DEFORMATION MONITORING POINTS

a. Deformation monitoring points (DMPs) shall be installed at the locations shown on the Plans.

b. After installation, determine the horizontal position to an accuracy of ± 0.03 foot. The least count (without estimation) of the rod and level combination shall read to 0.003 foot or less, such that the accuracy of an elevation measurement shall be ± 0.01 foot (at 95 percent level of

confidence).

3.4 DATA COLLECTION

a. The Contractor shall collect readings of all instruments for a continuous period of three weeks following installation of all of the instruments, at the direction of the Contracting Officer, in accordance with the following schedule:

Deformation Monitoring Points: Horizontal and vertical monitoring daily at low tide

Load Cells: Daily at low tide, when water elevation is below wale level.

b. The Government may collect its own data, generally weekly but occasionally daily or more often.

c. The Contractor shall provide and facilitate safe access to the Work at all times for the Government to collect data from specified instruments. Safe access shall include, but not be limited to, cessation of work activities, temporary relocation of obstructing materials and equipment, provision of ladders and boats, working platforms and hoisting services, and any other needs that, in the opinion of the Contracting Officer, are necessary to ensure the safety of data collection personnel. The Contractor shall furnish two sets of personal safety equipment, as appropriate, for use by the Government when collecting data.

d. Formal Initial Readings in each instrument shall be taken jointly with the Government,using the Contractor's readout unit. The Contractor shall satisfy itself on the validity of formal initial readings, and shall sign its agreement to such readings. The Contracting Officer shall be the sole judge of the acceptability of the formal initial readings, and no instrument will be accepted or paid for until formal initial readings are agreed upon as specified herein.

e. For vertical deformation monitoring, runs shall be performed by a single run beginning and ending on two different deep benchmarks. Deformation monitoring points shall be used as turning points or as intermediate foresights from two different turning points, allowing elevations to be adjusted and eliminating significant observational errors. The maximum length of line of sight shall be 230 feet, and the imbalance between backsight and foresight shall not exceed 30 feet. Allowable level loop misclosure shall not exceed $\pm$ 0.033 times the square root of M feet (where M is the distance of the level run in miles) for a single run between two deep benchmarks. A formal initial reading on a deformation monitoring point will consist of the average of three elevations, from three independent level runs which meet the closure specified herein. Elevations established subsequent to a formal initial reading shall be determined as specified herein, and to an accuracy of 0.005 ft. Vertical bench marks to be used in DMP monitoring shall be established by the Contractor in stable ground, to the satisfaction of the Contracting Officer.

For horizontal deformation monitoring, if a theodolite is used, the direction measurements shall be made in two sets of direct and reverse pointings, changing the circle setting by 90 degrees between sets. Reduced directions shall be rejected if they deviate from the mean by more than 5 arc seconds. The theodolite shall be plumbed over the occupied point by a high precision optical plummet or mechanical centering device. When distances are measured with a tape, each distance shall be measured

independently two separate times and shall be corrected for the temperature and tension of the tape. A formal initial reading on a deformation monitoring point will consist of the average of three readings, from three independent set?-ups, each as specified herein. Each reading other than the formal initial reading shall consist of a single set of readings, as specified herein. All readings shall be referenced to stable horizontal control points. Reading accuracy shall be ± 0.03 foot. Horizontal control points shall be established by the Contractor.

f. A formal initial set of load cell readings shall consist of three readings of load (average strains and calculated load) and temperature at each of the following five times:

1. Upon initial assembly.

2. With the tieback in place and ready for tensioning.

3. No less than 1 hour, and no more than two hours after tieback tensioning.

4. One day after installation, at low tide.

5. One day after completion of backfilling adjacent to the load cell location, at low tide.

Each subsequent reading after the formal initial reading shall consist of a single reading of load and temperature, taken at the direction of the Contracting Officer.

3.5 PRESENTATION OF DATA

a. Raw and reduced data shall be reported to the Contracting Officer within 24 hours of field collection.

b. All data shall be reported in both paper and electronic formats. Electronic monitoring data shall be reported in Microsoft Excel spreadsheets on CD-ROMs.

c. For load cells report strain reading in each gage and load (average of 3 gages) in KIPs, corrected for temperature.

3.6 DISCLOSURE OF DATA

The Contractor shall not disclose any instrumentation data to third parties and shall not publish data without prior approval and written consent of the Contracting Officer.

3.7 DAMAGE TO INSTRUMENTATION

a. The Contractor shall protect all instruments and appurtenant fixtures from damage due to tidal waters, construction operations, weather, traffic, and vandalism.

b. If an instrument is damaged or inoperative, the Contractor's personnel shall repair or replace the damaged or inoperative instrument within 72 hours, at no additional cost to the Government. The Contractor shall notify the Contracting Officer at least 24 hours prior to repairing or replacing a damaged or inoperative instrument. The Contracting Officer shall be the sole judge of whether repair or replacement is required. The

Contracting Officer may impose a work stoppage in the vicinity of the damaged or inoperative instrument until it is again operational, at no additional cost to the Government.

3.8 DISPOSITION OF INSTRUMENTS

The load cell portable readout unit furnished to the Government shall become the property of the Government upon receipt. The load cell portable readout unit used for the Contractor's monitoring program shall remain the property of the Contractor.

-- End of Section --