

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT				1. CONTRACT ID CODE J	PAGE OF PAGES 1
2. AMENDMENT/MODIFICATION NO. 0004		3. EFFECTIVE DATE 15-Mar-2002	4. REQUISITION/PURCHASE REQ. NO. W81LJ8-1144-7965		5. PROJECT NO.(If applicable)
6. ISSUED BY USAED, WILMINGTON-(910)251-4116 ATTN: JOHN B. ROBERTS, II 69 DARLINGTON AVE(28403) PO BOX 1890 WILMINGTON NC 28402-1890		CODE K7P0000	7. ADMINISTERED BY (If other than item 6) CODE See Item 6		
8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)				<input checked="" type="checkbox"/> 9A. AMENDMENT OF SOLICITATION NO. DACW54-01-R-0009	
				<input checked="" type="checkbox"/> 9B. DATED (SEE ITEM 11) 14-Jan-2002	
				10A. MOD. OF CONTRACT/ORDER NO.	
				10B. DATED (SEE ITEM 13)	
CODE		FACILITY CODE			
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS					
<input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer <input type="checkbox"/> is extended, <input checked="" type="checkbox"/> 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 <u>1</u> 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 <input type="checkbox"/> is not, <input type="checkbox"/> 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 ISSUED TO INCORPORATE THE FOLLOWING PER THE ATTACHED SUMMARY OF CHANGES:					
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)		
15B. CONTRACTOR/OFFEROR		15C. DATE SIGNED	16B. UNITED STATES OF AMERICA		16C. DATE SIGNED
_____ (Signature of person authorized to sign)			BY _____ (Signature of Contracting Officer)		15-Mar-2002

SUMMARY OF CHANGES

1. SECTION 00010, PAGE 5, ADD SUB-CLINS 0004AA, 0004AB AND 0004AC.

CLIN 0004

The CLIN type has changed from priced to informational
The CLIN extended description has been deleted.
The unit of issue has been deleted.
The pricing detail quantity has decreased from 3,800.00 by 3,800.00 to 0.00

SUB-CLIN 0004AA was added.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0004AA		2,600.00	Hours		
	MAINTENANCE DREDGING				
	FFP - STA. 13+50 ANCHORAGE BASIN TO STA. 86+81.64 LOWER				
	BRUNSWICK CHANNEL				

NET AMT

SUB-CLIN 0004AB was added.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0004AB		750.00	Hours		
	MAINTENANCE DREDGING				
	FFP - STA. 0+00 UPPER BIG ISLAND CHANNEL TO STA. 108+24.57				
	LOWER LILLIPUT CHANNEL				

NET AMT

SUB-CLIN 0004AC was added.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0004AC	MAINTENANCE DREDGING FFP - STA. 0+00 UPPER MIDNIGHT CHANNEL TO STA. 65+31.19 REAVES POINT CHANNEL	450.00	Hours		

NET AMT

2. SECTION 00100, PAGE 10, ADD "PAST PERFORMANCE INFORMATION SHEET"

PAST PERFORMANCE INFORMATION (TO BE COMPLETED BY OFFEROR)	
Offeror's Name: _____	
1. Project Name and Location: _____	
2. Contract Name and Number _____	
3. Contract Information:	
Who With _____	
Address _____	
Person to Contact: _____	
Telephone No.: _____	
Fax. No.: _____	
E-Mail Address: _____	
Brief Description of Project and Relevancy to this Offer (Attach Additional Sheets, As Needed)	

Contract Dollar Value: _____	
Status: Active _____ Complete _____	
Date of Award: _____	
Scheduled Contract Completion Date (Including Extensions): _____	
Actual Contract Completion Date: _____	
Work Performed as a Prime _____ or Subcontractor _____	
Level of Involvement on this Project: High _____ Medium _____ Low _____	

3. SECTION 00100, 52.215-4305 I, IS HEREBY DELETED IN ITS ENTIRETY.

4. SECTION 00100, PAGE 25, PARAGRAPH 5.3, SUBPARAGRAPH 5.3.a, THIRD SENTENCE THE FOLLOWING IS ADDED, "IN ADDITION TO THE INFORMATION REQUESTED ON THE "PAST PERFORMANCE INFORMATION SHEET"

5.3. Past Performance Information (Factor 3.) The Offeror shall submit past performance information described in the following paragraphs:

5.3.a. For Past Performance, using the Past Performance Information sheet, located in Section 00100, the Offeror shall provide past performance information about all current projects and projects completed that include dredging contracts similar in nature to the requirements of this proposed project. These contracts may be with government agencies and/or commercial customers. **In addition to the information requested on the "Past Performance Information Sheet,** the Offeror shall include for each of these contracts, the plant involved, responsible individual's name (e.g. - project manager, QC, and safety professional), accident rates, accident descriptions, causes and corrective actions. Additionally, the offeror shall address the specific actions planned for this contract to preclude similar accidents. (A separate sheet is required for each contract/subcontract.)

5. Section 00800, PAGE 140, CONTRACT 52.211-12 IS CHANGED TO READ AS FOLLOWS:

52.211-12 LIQUIDATED DAMAGES--CONSTRUCTION (SEP 2000)

(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 THREE THOUSAND DOLLARS (**\$3000.00**) 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.

(End of clause)

6. DACW54-01-R-0009 - TECHNICAL SPECIFICATIONS AND DRAWINGS is being amended as follows:

VOLUME 1 (SECTION 00010-02325)

a. SECTION 01100: Delete existing Table of Contents and Page 18 through Page 25 in their entirety and substitute enclosed revised Table of Contents and Page 18 through Page 27.

b. SECTION 1354: Delete existing Page 15 and Page 16 in their entirety and substitute enclosed revised pages.

c. SECTION 02200: Delete existing Table of Contents (Page 1 and Page 2) and SECTION (Page 3 through Page 26) in their entirety and substitute enclosed revised Table of Contents and SECTION.

d. SECTION 02325:

(1) Delete existing Page 3, Page 4, Page 7 through Page 12, Page 27, Page 28, and Page 29 in their entirety and substitute enclosed revised pages.

NOTE:

Text that is added or revised by this amendment is replaced in its entirety and/or underlined and printed in bold and/or stamped appropriately.

The text changes may have necessitated reformatting of subsequent text or pages. If this is the case, those pages have also been issued as amended pages but are not underlined with bold text.

VOLUME 2 (APPENDIX A - BORING LOGS)

e. APPENDIX A: ADD enclosures with Cover Sheet.

VOLUME 3 (APPENDIX C)

f. APPENDIX C: ADD enclosures with Cover Sheet.

PROJECT DRAWINGS:

g. DRAWINGS.

(1) PLANS. Delete existing Plates in their entirety and substitute enclosed revised Plate Nos. P-1, P-17, P-18, P-21, and P-28.

(2) CADD Files. Delete existing P-01.DGN, P-16.DGN, P-17N.DGN, P-17S.DGN, P-18.DGN, P-19S.DGN, P-21NS.DGN, and P-28.DGN, in their entirety and substitute enclosed revised .dgn files.

DIGITAL TERRAIN MODEL FILES:

h. DIGITAL TERRAIN MODEL FILES. Files torab2lb.dtm and torki2rp.dtm are Intergraph InRoads binary digital terrain model files developed using version 07.01.01 of InRoads. The point and exterior boundary data contained in the files represents the rock data points developed by the US Army Corps of Engineers using selected borings, probes, and seismic data. The exterior boundary generally follows the extent of the subsurface data. Note that because of sparse data in some locations, contours generated by InRoads sometimes fail to follow the accepted rules of contouring (e.g., crossing contours, single line contours). Corrections to the contours were manually applied in these areas on the contract drawings.

File torab2lb.dtm covers from Anchorage Basin to Lower Brunswick Channels.

File torki2rp.dtm covers from Keg Island to Reaves Point Channels.

Encls
As stated

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01100

SUPPLEMENTARY SPECIAL CONTRACT REQUIREMENTS

PART 1 GENERAL

- 1.1 U.S. COAST GUARD REQUIREMENTS - DREDGING OPERATIONS
- 1.2 UNDERWATER DIVING OPERATIONS
- 1.3 PERFORMANCE AND PAYMENT BONDS
- 1.4 WATER CONSERVATION
- 1.5 BULLETIN BOARD
- 1.6 FINAL EXAMINATION AND ACCEPTANCE
- 1.7 ACCOMMODATIONS AND MEALS FOR INSPECTORS
- 1.8 RETAINAGE FOR UNTIMELY SUBMISSION OF SUBCONTRACTING REPORTS
- 1.9 SHOP DRAWINGS AND MATERIALS SUBMITTAL
- 1.10 SAMPLING, CERTIFICATES, AND TESTING
- 1.11 CERTIFICATES OF COMPLIANCE
- 1.12 MINIMUM INSURANCE REQUIREMENTS
- 1.13 SAFETY REQUIREMENTS
- 1.14 ACCIDENT REPORTING AND RECORD KEEPING
- 1.15 REQUIRED CONSTRUCTION MEETINGS
- 1.16 "AS-BUILT" RECORD DRAWINGS
- 1.17 SURVEY DATA
- 1.18 PLANT LOCATION
- 1.19 PLANT
- 1.20 WORK IN QUARANTINED AREA
- 1.21 INSPECTION
- 1.22 SIGNAL LIGHTS
- 1.23 PARTNERING
- 1.24 PROTECTION OF EXISTING FACILITIES
- 1.25 COORDINATION WITH OTHER CONTRACTORS
- 1.26 SEAGOING BARGE ACT (1979 OCE)
- 1.27 CONTRACT DRAWINGS AND SPECIFICATIONS
- 1.28 RATES OF WAGES
- 1.29 LIST OF ATTACHMENTS
- 1.30 **TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER**

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section Table of Contents --

Drawing File No. WH 104-04-44

<u>Sheet No.</u>	<u>Plate No.</u>	<u>Title</u>	<u>Revision Date</u>
1	P-1	LOCATION MAP AND INDEX OF DRAWINGS	11 March 2002
2	P-2	ANCHORAGE BASIN STA 39+70 - 45+54	21 February 2002
3	P-3	ANCHORAGE BASIN STA 45+54 - 84+83.64 & BETWEEN CHANNEL	21 February 2002
4	P-4	FOURTH EAST JETTY CHANNEL	21 February 2002
5	P-5	UPPER BRUNSWICK CHANNEL	21 February 2002
6	P-6	LOWER BRUNSWICK CHANNEL STA 0+00 - 60+00	21 February 2002
7	P-7	KEG ISLAND CHANNEL STA 55+00 - 77+26.39	21 February 2002
8	P-8	UPPER LILLIPUT CHANNEL	21 February 2002
9	P-9	LOWER LILLIPUT CHANNEL STA 0+00 - 90+00	21 February 2002
10	P-10	LOWER LILLIPUT CHANNEL STA 90+00 - 108+24.57	21 February 2002
11	P-11	UPPER MIDNIGHT CHANNEL STA 0+00 - 90+00	21 February 2002
12	P-12	UPPER MIDNIGHT CHANNEL STA 90+00 - 137+35.95	21 February 2002
13	P-13	LOWER MIDNIGHT CHANNEL	21 February 2002
14	P-14	REAVES POINT CHANNEL	21 February 2002

<u>Sheet No.</u>	<u>Plate No.</u>	<u>Title</u>	<u>Revision Date</u>
15	P-15	ANCHORAGE BASIN BORING LOCATIONS AND TOP OF ROCK CONTOURS STA 39+70 - 45+54	21 February 2002
16	P-16	ANCHORAGE BASIN STA 45+54 - 84+83.64 & BETWEEN CHANNEL BORING LOCATIONS AND TOP OF ROCK CONTOURS	21 February 2002
17	P-17	FOURTH EAST JETTY CHANNEL BORING LOCATIONS AND TOP OF ROCK CONTOURS	11 March 2002
18	P-18	UPPER BRUNSWICK CHANNEL BORING LOCATIONS AND TOP OF ROCK CONTOURS	11 March 2002
19	P-19	LOWER BRUNSWICK CHANNEL BORING LOCATIONS AND TOP OF ROCK CONTOURS STA 0+00 - 60+00	21 February 2002
20	P-20	KEG ISLAND CHANNEL BORING LOCATIONS AND TOP OF ROCK CONTOURS STA 55+00 - 77+26.39	21 February 2002
21	P-21	UPPER LILLIPUT CHANNEL BORING LOCATIONS AND TOP OF ROCK CONTOURS	11 March 2002
22	P-22	LOWER LILLIPUT CHANNEL BORING LOCATIONS AND TOP OF ROCK CONTOURS STA 0+00 - 90+00	21 February 2002
23	P-23	LOWER LILLIPUT CHANNEL BORING LOCATIONS AND TOP OF ROCK CONTOURS STA 90+00 - 108+24.57	21 February 2002
24	P-24	UPPER MIDNIGHT CHANNEL BORING LOCATIONS AND TOP OF ROCK CONTOURS STA 0+00 - 90+00	21 February 2002
25	P-25	UPPER MIDNIGHT CHANNEL BORING LOCATIONS AND TOP OF ROCK CONTOURS STA 90+00 - 137+35.95	21 February 2002

<u>Sheet No.</u>	<u>Plate No.</u>	<u>Title</u>	<u>Revision Date</u>
26	P-26	LOWER MIDNIGHT CHANNEL BORING LOCATIONS AND TOP OF ROCK CONTOURS	21 February 2002
27	P-27	REAVES POINT CHANNEL BORING LOCATIONS AND TOP OF ROCK CONTOURS	21 February 2002
28	P-28	EAGLE ISLAND DISPOSAL AREA CELL NOS. 1, 2 & 3	11 March 2002
29	P-29	NEW OCEAN DREDGED MATERIAL DISPOSAL SITE (ODMDS)	21 February 2002
30	R-1	PIPELINE LOCATION MAP - CAPE FEAR RIVER PIPELINE CROSSING	15 June 2001

(End of Clause)

1.28 RATES OF WAGES

a. General Decision Number NC010050 applies to all dredging, drilling, and blasting, including mobilization and demobilization.

General Decision Number NC020050
Superseded General Decision No. NC010050
State: North Carolina
Construction Type:
DREDGING
County(ies):
STATEWIDE
DREDGING CONSTRUCTION PROJECTS
Modification Number Publication Date
 0 03/01/2002
 1 03/08/2002

COUNTY(ies):
STATEWIDE
* ENGI0025E 02/01/2002

	Rates	Fringes
HYDRAULIC DREDGES 20" & OVER		
Leverman	19.22	4.01+a
Engineer	18.09	4.01+a
Derrick Operator	16.78	4.01+a
Mate	15.70	3.81+a
Welder	16.22	3.81+a
Spill Barge Operator	16.45	3.81+a
Carpenter	16.68	4.01+a
Electrician	17.10	4.01+a
Oiler	12.32	3.61+a
Deckhand	11.53	3.61+a
Shoreman	11.30	3.61+a
Handyman	11.53	3.61+a
Fill Placer	16.68	4.01+a
Asst. Fill Placer	15.18	4.01+a
HYDRAULIC DREDGES UNDER 20"		
Leverman	10.03	1.73+b
Engineer	9.59	1.73+b
Welder	9.79	1.73+b
Mate	8.82	1.73+b
Oiler & Fireman	8.11	1.73+b
Deckhand	7.77	1.73+b
Launchman	8.19	1.73+b
Shoreman	7.82	1.73+b
Spill Barge Operator	8.68	1.73+b
Spider Barge Operator	8.68	1.73+b
Cook	8.11	1.73+b
Mess Cook	7.71	1.73+b
Messman & Janitor	7.53	1.73+b

	Rates	Fringes
CLAMSHELL DREDGES:		
Operator	19.13	4.01+a
Engineer	17.11	4.01+a
Welder	15.96	3.81+a
Mate	15.37	3.81+a
Oiler	12.32	3.61+a
Deckhand	11.53	3.61+a
Scowman	11.69	3.61+a
Handyman	11.53	3.61+a
DIPPER DREDGES:		
Operator	19.31	4.01+a
Engineer	17.91	4.01+a
Welder	16.22	3.81+a
Mate	15.70	3.81+a
Oiler	12.32	3.61+a
Deckhand	11.53	3.61+a
Scowman	11.69	3.61+a
Handyman	11.53	3.61+a
TUGS LESS THAN 600 HP:		
Tug Master	15.34	4.01+a
Tug Captain	14.85	4.01+a
Tug Deckhand	11.53	3.61+a
TUGS 600 HP TO 1350 HP:		
Tug Master	16.30	4.01+a
Tug Captain	15.00	4.01+a
Tug Deckhand	11.53	3.61+a
TUGS GREATER THAN 1350 HP		
Tug Master	17.34	4.01+a
Tug Captain	16.44	4.01+a
Tug Engineer	16.44	4.01+a
Tug Deckhand	11.53	3.61+a
STEWARD DEPARTMENT:		
Steward	12.70	3.81+a
2nd Cook	11.53	3.61+a
Night Cook	11.53	3.61+a
Messman	11.31	3.61+a
Janitor	11.53	3.61+a
DRILL BOATS:		
Engineer	18.08	4.01+a
Driller	17.42	4.01+a
Blaster	17.42	4.01+a

FOOTNOTE:

- a. New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day and Good Friday. Plus Vacation Contribution of 7% of straight time pay for all hours worked.
- b. New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day. Plus Vacation Contribution of 7% of straight time pay for all hours worked.

	Rates	Fringes
TRUCK DRIVERS	5.15	
TV & GROUTING TECHNICIANS	9.21	

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

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 (29 CFR 5.5(a)(1)(v)).

In the listing above, the "SU" designation means that rates listed under that 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, D. C. 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, D. C. 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, D. C. 20210

4.) All decisions by the Administrative Review Board are final.
END OF GENERAL DECISION

1.29 LIST OF ATTACHMENTS

Sample forms attached at the end of this section include:

- ATTACHMENT 1 - UNDERWATER DIVING OPERATIONS
(CESAWDR 385-1-1)
- ATTACHMENT 2 - REPORT OF SAFETY MEETING
(SAW FORM 297)
- ATTACHMENT 3 - ACCIDENT INVESTIGATION REPORT
(ENG FORM 3394)
- ATTACHMENT 4 - CORPS OF ENGINEERS FIRST AID CASE HISTORY REPORT
(SAW FORM 618)
- ATTACHMENT 5 - CONTRACTOR MONTHLY EXPOSURE MAN-HOUR REPORT
(SAW FORM 648)
- ATTACHMENT 6 - APPENDIX DD - RISK MANAGEMENT
(dtd: 29 Jan 2001)
- ATTACHMENT 7 - DEFINITION OF FIRST AID

1.30 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER
ER 415-1-15 dtd 31 OCT 89

(a) This provision specifies the procedure for determination of time extensions for unusually severe weather in accordance with the contract clause entitled "DEFAULT: (Fixed Price Construction)". In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

(1) The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

(2) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.

(b) The information in the following table is based on US Army Corps of Engineers, Engineer Research and Development Center, Waterways Experiment Station wave height data over a 20 year hindcast period (1976-1995) at an offshore location near the new Ocean Dredged Material Disposal Site (ODMDS). Wave heights greater than 2 meters will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays due to wave conditions.

Number of Days During each Month When Wave
Height of 2 Meters is Equalled or Exceeded

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3.5	3.0	4.5	1.5	0.5	0.5	0	0.5	2.0	1.5	2.5	2.5

(c) The information in the following table is based on data gathered over a 30 year period by the National Weather Service at the Wilmington International Airport in Wilmington, NC. Visibility less than or equal to one quarter of a mile due to fog will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse delays due to reduced visibility caused by fog.

Mean Number of Days During Each Month When Visibility is
Less Than or Equal to One Quarter of a Mile Due to Heavy Fog

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2.5	1.5	2.0	1.5	2.0	1.5	1.0	1.5	2.5	2.5	2.5	2.5

(d) Upon acknowledgment of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day.

(e) The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraphs b and c, above, the Contracting Officer will convert any

qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the contract clause entitled "Default (Fixed Price Construction)."

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

b. Reporting. Daily observer reports shall be submitted with the daily "Report of Operations-Hopper Dredges." Reports of take of any listed species shall be furnished to the Contracting Officer as soon as possible. All sea turtle sightings and locations (name of channel reach) shall be noted on the daily observer reports.

3.4.4 Pipeline Dredges

Special precautions to protect listed species are not required for pipeline dredges.

3.4.5 Mechanical Dredges

Special precautions to protect listed species are not required for mechanical dredges except as noted in subparagraph Avoidance of Marine Animals, below.

3.4.6 Avoidance of Marine Animals

(1) Records shall be kept of the date, time, and approximate location of all marine mammal sightings. Care shall be taken not to closely approach (within 300 feet) any whales, manatees, or other marine mammals during dredging or transportation of dredged material. The observer shall serve as a lookout to alert the dredge operator and/or vessel pilot of the occurrence of these animals.

(2) If whales or manatees are observed within 300 feet of the area being dredged, all work shall cease until the animals have left the area. If any marine mammals are observed during transit to the new Ocean Dredged Material Disposal Site (ODMDS), collisions shall be avoided either through reduced vessel speed, course, alteration, or both.

(3) Sightings of whales or manatees in the work area shall be reported to the Contracting Officer as soon as possible. **Sightings of whales shall also be reported as soon as possible to the NMFS Whale Stranding Network at 305-862-2850.**

(4) During ocean transit of dredging and disposal equipment from 1 December through 31 March one endangered species observer with at-sea large whale identification experience must be present to conduct daytime observations. Records shall be kept of the date, time, and approximate location of all marine mammal sightings. Care shall be taken not to closely approach any whales or manatees observed during dredging. The observer shall serve as a lookout to alert the vessel pilot of the occurrence of these animals. If any are observed, collisions shall be avoided either through reduced vessel speed, course alteration, or both. During the evening hours, when there is limited visibility due to fog, or when there are sea states of greater than Beaufort 3, the dredge must slow down to 5 knots or less when transiting between areas if whales have been spotted within 15 nautical miles of the vessel's path within the previous 24 hours.

3.5 PROTECTION OF AIR RESOURCES

Special management techniques as set out below shall be implemented to control air pollution by the construction activities. These techniques supplement the requirements of Federal, State, and local laws and regulations; and the safety requirements under this Contract. If any of the following techniques conflict with the requirements of Federal, State, or local laws or regulations, or safety requirements under this contract, then those requirements shall be followed in lieu of the following.

3.5.1 Particulates

Airborne particulates, including dust particles, from construction activities and processing and preparation of materials shall be controlled at all times, including weekends, holidays, and hours when work is not in progress. The Contractor shall maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, disposal sites, borrow areas, and all other work areas free from airborne dust which would cause a hazard or nuisance.

3.6 INSPECTION

If the Contracting Officer notifies the Contractor in writing of any observed noncompliance with contract requirements or Federal, State, or local laws, regulations, or permits, the Contractor shall inform the Contracting Officer of proposed corrective action and take such action to correct the noncompliance. If the Contractor fails to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action is taken. No time extensions shall be granted or costs or damages allowed to the Contractor for any such suspension.

3.7 COMPLIANCE OF SUBCONTRACTORS

Compliance with the provisions of the contract specifications by subcontractors shall be the responsibility of the Contractor.

3.8 MAINTENANCE OF POLLUTION CONTROL FACILITIES

The Contractor shall maintain all constructed pollution control facilities and portable pollution control devices for the duration of the Contract or for the length of time construction activities create the particular pollutant.

3.9 TRAINING OF CONTRACTOR PERSONNEL

Contractor personnel shall be trained in environmental protection and pollution control. The Contractor shall conduct monthly environmental protection/pollution control meetings for all Contractor personnel. The training and meeting agenda shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, installation and care of facilities, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control. Anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants, shall also be discussed. Other items to be discussed shall include recognition and protection of archaeological sites and artifacts.

-- End of Section --

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SECTION 02200

BLASTING

1.1 GENERAL

There is no separate bid item for blasting. The Contractor should expect blasting to be required for removal of rock, and should therefore bid accordingly. The Contractor's blasting methods shall be in accordance with the procedures specified herein.

1.2 GLOSSARY OF EXPLOSIVES AND BLASTING TERMS

AIR-OVERPRESSURE (AIR BLAST) - The pulsating pressure changes above and below ambient air pressure generated by an explosion. Its spectrum includes both audible noise and low frequency concussion.

AMMONIUM NITRATE - The ammonium salt of nitric acid represented chemically as NH_4NO_3 .

ANFO - An explosive material consisting of ammonium nitrate and fuel oil.

BASE CHARGE - The main charge of a blasting cap or other detonator.

BENCH - A horizontal ledge in or at the top of a highwall from which holes are drilled vertically down into the material to be blasted; benching is a process of excavating where a highwall is worked in steps or lifts.

BENCH HEIGHT - The vertical distance from the top of a bench to grade or to the top of the next bench.

BLACK POWDER - A deflagrating or low explosive compound consisting of an intimate mixture of sulfur, charcoal, and an alkali nitrate, usually potassium or sodium nitrate.

BLAST, BLASTING - The firing of explosives for such purposes as breaking rock or other material, moving material, or generating seismic waves. Also, the assembly of explosive materials for such purpose.

BLAST AREA - The area of a blast within the influence of flying rock or overburden debris, gases, and air-overpressure.

BLAST SITE - The area extending 50 feet in all directions around charged blast holes and explosive products in the area during charging operations.

BLAST PATTERN (or LAYOUT) - The plan of the drill holes laid out on a bench; an expression of the burden distance and the spacing distance and their relationship to each other.

BLASTER - That qualified person in charge of, and responsible for, the loading and firing of a blast.

BLASTING CAP - An initiating device that is crimped to a slow burning safety fuse. See DETONATOR.

BLASTING GALVANOMETER - An electrical resistance instrument designed specifically for testing electric detonators and circuits containing them.

BLASTING MACHINE - An electrical or electromechanical device which provides the electrical energy to fire the detonators in an electric blasting circuit.

BLASTING MACHINE-GENERATOR TYPE - A hand-operated electromechanical device which provides an output current to fire electric detonators.

BLASTING SPECIALIST - A person who has experience and academic knowledge of commercial explosives and equipment and as his livelihood plans, supervises, and uses explosives in a safe and effective manner in commercial applications in accordance with blasting industry and regulatory standards.

BLASTING VIBRATIONS - The seismic energy from a blast that manifests itself in earthborne vibrations that are transmitted through the ground away from the immediate blast area.

BLASTING VIBRATION SPECIALIST - A person who has experience and academic knowledge of commercial blasting, blasting vibration and air-overpressure control monitoring, and as his livelihood plans, supervises, and uses blasting monitoring equipment to maintain compliance with regulation and safety and to prevent or minimize damage from blasting vibrations and air-overpressure.

BLAST NOISE - Air-overpressure occurring at frequencies above 20 Hz.

BOOSTER - An explosive charge, usually of high strength and high detonation velocity, used to improve the initiation of less sensitive explosive materials.

BOREHOLE (BLAST HOLE or BLASTING HOLE) - A hole drilled in the material to be blasted for the purpose of containing an explosive charge.

BULK STRENGTH - The strength per unit volume of an explosive calculated from its weight strength and density.

BURDEN - The distance from the borehole to the nearest free face or the distance between boreholes measured perpendicular to the spacing. Also, the total amount of material to be blasted by a given hole, usually measured in cubic yards or tons.

COLLAR - The mouth or opening of a borehole.

CONCUSSION - The portion of the air-overpressure spectrum lying below 20 Hz.

COMMERCIAL EXPLOSIVES - Explosives designed, produced, and used for commercial or industrial applications rather than for military purposes.

DECK LOADING (DECKING) - A method of loading blast holes in which two or more explosive charges, called decks or deck charges, are loaded in the same hole separated by stemming or an air cushion.

DECK - An explosive charge that is separated from other charges in the blast hole by stemming or an air cushion.

DEFLAGRATION - An explosive reaction or a rapid combustion that moves through an explosive material at a velocity less than the speed of sound in the material.

DELAY - A distinct pause of predetermined time between detonation or initiation impulses, to permit the firing of explosive charges separately. Also, the device used to cause the delay, often incorporated in the detonator.

DELAY BLASTING - The practice of initiating individual explosive decks, boreholes, or rows of boreholes at predetermined time intervals using delays or delay detonators, as compared to instantaneous blasting where all holes are fired simultaneously.

DELAY DETONATOR - An electric or nonelectric detonator used to introduce a predetermined lapse of time between the application of a firing signal and the detonation of the base charge within the detonator's metal casing.

DELAY INTERVAL - The nominal time between the detonations of delay detonators of adjacent periods in a delay series; the nominal time between successive detonations in a blast.

DELAY PATTERN - A description by narrative and graphic representation of how delay blasting is to be implemented.

DELAY PERIOD - A designation given to a delay detonator to show its relative or absolute delay time in a given series.

DELAY SERIES - A series of delay detonators designed to satisfy specific blasting requirements. There are basically two types of delay series: millisecond (MS) with delay intervals on the order of milliseconds, and long period (LP) with delay times on the order of seconds.

DENSITY - The mass of an explosive per unit of volume, usually expressed in grams per cubic centimeter.

DETONATING CORD - A flexible cord containing a center core of high explosives.

DETONATING CORD DOWNLINE - The section of detonating cord that extends from the trunkline to and down the blast hole to the explosive charge(s).

DETONATOR - Any device containing an initiating or primary explosive that is used for initiating detonation.

DOWNLINE - The section of line of explosive material (i.e. detonating cord or shock tube) that extends from the trunkline to and down the blast hole to the explosive charge(s).

DYNAMITE - A high explosive used for blasting, consisting essentially of a mixture of, but not limited to nitroglycerin, nitrocellulose, ammonium nitrate, sodium nitrate, and carbonaceous material.

ELECTRIC DETONATOR - A detonator designed for, and capable of, initiation by means of an electric current. Sometimes referred to as an electric blasting cap. (NOT ALLOWABLE UNDER THIS CONTRACT.)

EXPLOSION - A chemical reaction involving an extremely rapid expansion of gases usually associated with the liberation of heat.

EXPLOSIVE - Any chemical compound, mixture or device, the primary or common purpose of which is to function by explosion.

EXPLOSIVE LOADING FACTOR - The amount of explosive used per unit of rock. Also called POWDER FACTOR.

EXPLOSIVE MATERIALS - These include explosives, blasting agents and detonators. The term includes, but is not limited to, dynamite and other high explosives; slurries, emulsions, and water gels; black powder and pellet powder; initiating explosives; detonators; safety fuse; squibs; detonating cord; igniter cord; and igniters.

FIRING LINE - The wire(s) connecting the electrical power source with the electric blasting circuit.

FRAGMENTATION - The breaking of a solid mass into pieces by blasting.

FREE FACE - A rock surface exposed to air or water that provides room for expansion upon fragmentation; sometimes called open face.

FUEL - A substance which may react with oxygen to produce combustion.

FUMES - The gaseous products of an explosion. For the purpose of fume classification, only poisonous or toxic gases such as carbon monoxide, hydrogen sulfide and nitrogen oxides are considered.

HIGH EXPLOSIVES - Explosives, which are characterized by a very high rate of reaction, high gas pressure development, and the presence of a detonation wave in the explosive.

IMPULSE - For blasting work, impulse is the area under plotted pressure-time history curves. Impulse values, expressed in units of psi-ms (pounds per square inch-milliseconds), can be calculated for air-overpressure and water-overpressure measurements. Several software packages, including D-Plot -- a free data analysis package available from WES (Waterways Experimental Station) -- can be used to calculate

peak impulse values from recorded pressure-time data saved in ASCII format.

INITIATION - The act of causing an explosive material to detonate or deflagrate.

INITIATION INDICATOR - A shock tube (reverse lead-in line) connected between the last-to-fire hole in the blast and a detonator installed inside a floating device that will visually indicate the entire blast was successfully initiated.

INITIATOR - A detonator or detonating cord used to start detonation in an explosive material.

LIQUID FUELS - Fuels in a liquid state. They may be used with oxidizers to form explosive materials.

LOADING - Placing explosive material in a blast hole or against the material to be blasted.

LOADING DENSITY - The weight of explosive loaded per unit length of borehole occupied by the explosive, expressed as pounds/foot or kilograms/meter of borehole.

LOADING POLE - A non-metallic pole used to assist the placing and compacting of explosives in boreholes.

MAGAZINE - Any building, structure, or container, other than an explosives manufacturing building, approved for the storage of explosive materials.

MILLISECOND - One thousandth of a second.

MISFIRE - A blast that fails to detonate completely after an attempt at initiation; also, the explosive material itself that failed to detonate as planned.

MUCKPILE - The pile of broken material resulting from a blast.

MUDCAPPING - Firing a mud-covered or unconfined explosive charge directly in contact with a rock surface without the use of a borehole.

NITROGLYCERIN - An explosive chemical compound used as a sensitizer in dynamite.

NON-ELECTRIC INITIATION DEVICE - A device using shotgun shell primers, plasma, or some other form of energy that is specially designed to initiate shock tube.

POWDER FACTOR - See EXPLOSIVE LOADING FACTOR.

PREBLAST SURVEY - A documentation of the existing condition of structures near an area where blasting is to be conducted.

PRIMARY BLAST - A blast used to fragment and displace material from its original position to facilitate subsequent handling.

PRIMARY INITIATION - The method the blaster uses to initiate blast(s) from a remote and safe location. Primary initiation systems use pneumatic tubing, electrical current, detonating cord or shock tubes to convey firing energy from blasters to blast locations.

PRIMER - a unit, package, cartridge, or explosives used to initiate other explosives or blasting agents, and which contains: (1) a detonator; or (2) detonating cord.

REDUNDANT RIGGING - The connecting of initiating lines to explosives in a duplicate manner so that in the event one initiating line is impaired, the duplicate initiating line will initiate the explosive.

RELIEF - The effective distance from a blast hole to the nearest free face.

SHOCK TUBE - Hollow plastic tubing containing aluminum and HMX powders that react at a rate of approximately 6,000 feet per second and are used to convey non-electric initiation signals through lead-in-lines or tubes attached to detonators.

SPACING - The distance between blast holes in a row. In bench blasting, the distance is measured parallel to the free face and perpendicular to the burden.

STEMMING - Inert material, usually clean crushed stone, placed in a borehole after the explosive. It is used to confine explosive gases, increase rock fragmentation, reduce air-overpressure, and minimize fly rock. It is also used to separate decked charges.

STRAY CURRENT - A flow of electricity outside an insulated conductor system.

SYMPATHETIC PROPAGATION - The detonation of an explosive material as the result of receiving sufficient impulse from another detonation through air, earth, or water.

TAMPING - The action of compacting the explosive charge or the stemming in a blasthole with the loading pole.

TRUNKLINE - The main line(s) of detonating cord or shock tube to which individual detonating cord or shock tube downlines are connected.

1.3 GENERAL REQUIREMENTS, RESPONSIBILITIES, AND RESTRICTIONS

Extra caution and skill shall be required to accomplish this work in a satisfactory manner. Blasting shall be safely done within an operating waterway and within an environment containing endangered species (see Section 01354, subparagraph 3.4.1 Endangered Species and Threatened Species.) Accordingly, the Contractor shall be required to choose highly qualified personnel to implement drilling and blasting and devote efforts toward application planning and blasting safety. The Contracting Officer and/or the Contracting Officer's Representative

will carefully examine the qualifications of persons whose knowledge and skills may bear on the outcome of the work and will reject any persons not deemed qualified for the work required under this contract.

Ground vibration and air-overpressure shall be monitored and recorded under the supervision of a qualified monitoring professional. See paragraph, BLASTING CONTROL, for vibration and air-overpressure monitoring and recording requirements. Blast-induced water overpressure shall also be monitored and recorded under the supervision of a qualified monitoring professional. See Section 02300: WATER PRESSURE MONITORING DURING BLASTING for water overpressure monitoring and recording requirements.

1.3.1 Liability

The Contractor shall assume all liability and hold and save the Government, its Officers, Agents, and Employees harmless from any and all claims for personal injuries, property damages, or other claims arising out of or in connection with the transportation, storage, and the use of explosives under this contract.

1.3.2 Licenses, Permits, and Approvals

The Contractor shall be responsible for determining, obtaining, and providing the Contracting Officer copies of all licenses, permits, and approvals relevant to blasting as required by law and for keeping the accounts and records, as well as for arranging the transportation and protection of all explosives on the project.

1.3.3 Plans, Examinations, and Surveys

The Contractor shall make necessary plans, examinations, calculations, and surveys to determine the quantity of explosives that can be fired without damaging property. The Contractor shall control the quantity of explosives fired in any blasts to prevent injuries to persons or damage to structures, homes, utilities, vehicles, vessels moored or underway, or any property, including the Eagle Island Disposal Area Dikes. The blasts shall be those necessary to accomplish excavations in accordance with the specifications and drawings.

1.3.4 Pre-Blast Property Condition Surveys

The Contractor shall be responsible for conducting appropriate pre-blast surveys of structures potentially affected by blasting conducted under this contract.

1.3.5 Codes, Regulations, and References

The Contractor shall comply fully with applicable sections of the following codes, regulations, and references:

a. North Carolina Fire Code Vol. 5 Chapter 19 and NFPA-69 Explosives Regulations;

b. Organized Crime Control Act of 1970, Title XI, Regulation of Explosives (P.L. 91-452);

- c. Title 27 CFR Part 55, Commerce in Explosives;
- d. Title 33 CFR Part 126, Handling of Explosives or other Dangerous Cargoes Within or Contiguous to Waterfront Facilities;
- e. Title 49 CFR Parts 106, 107, 171-198, 383, and 390 - 399;
- f. Army Corps of Engineers EM-385-1-1 Revised 3 Sept., 1996 Safety and Health Requirements Manual;
- g. Institute of Makers of Explosives (IME): Safety Library Publications.

In case of conflict between codes and regulations, the more stringent shall apply.

1.3.6 Applicable Agencies

The Contractor shall coordinate blasting with or determine and comply with regulations or policy for which the following agencies have authority:

- a. Bureau of Alcohol, Tobacco, and Firearms - (910) 815-4936
- b. U.S. Coast Guard, Marine Safety Office - (910) 772-2200
- c. City of Wilmington Fire Marshall - (910) 343-0696
- d. New Hanover County Fire Marshall - (910) 341-7419
- e. Brunswick County Fire Marshall - (910) 253-4376
- f. Cape Fear Pilots Association - (910) 457-6909 or (910) 763-4931
- g. North Carolina State Port Authority, General Manager - (910) 343-6238
- h. Occupational Safety & Health Administration - (919) 856-4770

1.3.7 Suspension of Blasting

The Contracting Officer reserves the right to suspend blasting for failure of the Contractor to obtain any licenses, permits, or approvals required by law or non-compliance with regulations or procedures governing the handling or use of explosives until the time full compliance is met.

The Contracting Officer reserves the right to suspend the blasting operation, due to personal injury or to damage to man-made structures, including a failure in the Eagle Island Disposal Area Dikes. The shot and monitoring records shall be carefully examined to determine what caused the incident. Appropriate corrections shall be made to shot design, including quantity of explosives per delay and shot duration. The blasting operation may be allowed to proceed if, in the opinion of the Government and its agents, the blasting can be conducted without

additional loss. No claim upon the Government shall be made for costs incurred by the Contractor during the blasting suspension. All damage caused by blasting shall be rectified or replaced by the Contractor at no cost to the Government.

If a marine mammal is injured or killed during blasting, all blasting operations shall be suspended and shall not resume until written permission is obtained from the Contracting Officer.

1.3.8 Private Citizen Blasting Damage Claims

The Contractor shall process any and all claims of private citizens arising out of said use of explosives promptly; in particular, all property damage claims shall be acknowledged by the Contractor (or his agent) immediately. The alleged damage shall be inspected within 5 days following initial notification, and processed to a conclusion (honored, denied, or compromised) within 90 days if possible. However, in no case shall the claim(s) remain unresolved for a period exceeding 6 months (180 calendar days). The Contractor's written plan to effect compliance with the notification requirements of this paragraph shall be included in the Contractor's Operational Blasting Plan and shall be submitted for approval accordingly. The Contractor shall document the receipt of claims on a daily basis in the Quality Control Report, and provide a monthly report to the Contracting Officer of the status of all blasting damage claims.

1.3.9 Blasting Specialist and Vibration Specialist

The Contractor shall employ a Blasting Specialist and/or a Vibration Specialist to oversee blast designs, execution, and monitoring. See paragraph BLASTING PERSONNEL for qualification requirements for the Blasting Specialist and Vibration Specialist.

1.3.10 General Blasting Prohibitions or Requirements

a. The use of cap and fuse ignition, detonating cords with greater than 5-grain/foot strength, black powder, ammonium nitrate and fuel oil (ANFO) or straight nitroglycerin are prohibited. If the Contractor chooses to use nitroglycerin-sensitized dynamite, only phlegmatized products shall be used (D-GEL or Powerditch.) The Contractor's proposed explosive shall be a product meeting the requirements of paragraph SPECIFICATIONS OF EXPLOSIVES and shall have been designed for use in water.

b. Explosives shall not be older than one year from date of manufacture.

c. Blasting shall be performed during daylight hours, between 2 hours after sunrise and 1 hour before sunset.

d. Blast holes shall be stemmed with clean washed crushed stone (see paragraph, STEMMING).

e. Blasting shall be by systematically delayed pattern.

f. Blasting operations shall not be conducted when there exists a temperature inversion (as determined by the Blasting

Specialist from the local weather forecast or observation) or heavy low-level cloud cover (as determined by the Contracting Officer or Blasting Specialist).

g. Blasting is restricted to the months of August through January, inclusive.

h. A Pre-blast Public Information Meeting shall be held in accordance with paragraph, PRE-BLAST PUBLIC INFORMATION MEETING.

i. The duration of each individual blast shall be held under 2 (two) seconds.

j. All blasts shall be designed with a minimum scaled distance of 40 to all locations where the peak particle velocity is limited to 0.5 inches/second.

1.4 BLASTING-RELATED SUBMITTALS AND APPROVALS

The Contractor shall furnish blasting-related submittals to the Contracting Officer for approval, including but not limited to the following:

a. Operational Blasting Plan (see paragraph, OPERATIONAL BLASTING PLAN).

b. Shot Plan and Shot Report (see paragraph, SHOT PLAN AND SHOT REPORT).

c. Daily Explosives Report (see paragraph, DAILY EXPLOSIVES REPORT).

d. Blast monitoring data (see paragraph, BLASTING CONTROL).

e. Blasting Specialist's, Blaster's, and other blasting-related personnel's qualifications (see paragraph, BLASTING PERSONNEL).

f. Drilling records with blast hole information (see paragraph, DRILLING RECORDS).

g. Weekly blasting safety meeting documentation (see paragraph, WEEKLY SAFETY MEETING).

h. Activity Hazard Analysis. An Activity Hazard Analysis shall be prepared and submitted conforming to the requirements in EM 385-1-1, 3 September 1996, page 3, paragraph 01.A.10.

1.5 OPERATIONAL BLASTING PLAN

The Operational Blasting Plan describes every aspect of how the Contractor proposes to accomplish the blasting. The Plan shall be signed by the Contractor's authorized representative. No blasts will be allowed until the Operational Blasting Plan has been reviewed and accepted by the Contracting Officer and the U.S. Coast Guard. The Contracting Officer will coordinate review of the Operational Blasting

Plan with the U.S. Coast Guard. The Contractor shall make corrections and/or respond to comments and receive final approval in writing from the Contracting Officer prior to blasting.

The Operational Blasting Plan shall include as a minimum the following items:

a. Plan for complying with the environmental protection requirements for blasting in SECTION 01354 ENVIRONMENTAL PROTECTION FOR CIVIL WORKS.

b. Details of the Contractor's plans for coordination with the Cape Fear Pilots Association and the North Carolina State Ports Authority for avoiding or minimizing blasting interference with shipping operations.

c. Copies of licenses, permits, and approvals required for the transportation, storage, handling, and use of explosives.

d. Proposed methods of conducting pre-blast surveys of structures potentially affected by blasting.

e. Copies of all applicable codes, regulations, and ordinances governing blasting under this contract.

f. Copy of certificate of insurance required for blasting.

g. Names, addresses, and telephone numbers of Contractor's representatives to whom any claims from the public for damage due to blasting should be addressed.

h. Names, addresses, resumes, responsibilities, and qualifications of all blasting control personnel. Also include names, addresses, resumes, and qualifications for non-control personnel.

i. Proposed methods of transportation and routing, storage, handling, and security of explosives. Also include name, address, and telephone number of explosives supplier.

j. Description of the drilling operation including planned use and specifications of the drill barge, drilling equipment, casing, crane, drill barge layout diagram; size, spacing, patterns, and depths of blast holes.

k. Description of type of water resistant explosives and boosters, configuration of explosives in the blast hole, type of downline, types and millisecond delays of detonators, delay patterns, redundant riggings to preclude misfires, depth and type of stemming, initiation indicator to show successful operation of initiation system, and how the blast is to be initiated.

l. Procedures for monitoring the blasts and the detection and disposal of misfires, hangfires, inadvertent initiator extraction, or accidental loss of downlines. See paragraph CONTINGENCY PLAN.

m. Plan showing location and type of buoys, blast warning signs, and signals to be used.

- n. Method of controlling vessel traffic and communications.
- o. Specifications for bulk storage vessels and transfer systems, drill frame delivery system, associated loading tubes and reel systems, and measuring devices.
- p. Method of survey and control for positioning the drilling barge.
- q. Plan for emergencies including fire, collision, and severe weather conditions endangering any floating plants with explosives on board including evacuation of personnel.
- r. Plan for containment and cleanup of spills of free-flowing, pourable explosives and all drilling fluids.
- s. Plan for containment and cleanup of vessel or drilling rig fuel spills.
- t. Explosives manufacturer's catalog information for products including explosives, initiation systems, boosters and primary initiation devices.
- u. Manufacturer's specifications of non-electric initiation device used for primary initiation of blasts.
- v. Manufacturer's literature and performance specifications for all equipment and software proposed to be used to: a) measure ground motion, air-overpressure, and water pressure; b) record data in standard ASCII format on removable media (floppy disks, zip disks or CD-ROM), and c) calculate impulse values from water pressure-time history data. Copies of calibration certificates indicating that all equipment has been calibrated, within one year of current use, by the manufacturer or by a facility approved by the manufacturer shall also be submitted.
- w. Specifications of the dredge plant, barges transporting explosives, tugs, and scows or pipelines and explanation of how these plants are to be used.
- x. Manufacturer's literature of the drill rods, bits, etc.
- y. Proposed Shot Plan form and Proposed Shot Record form.
- z. Contingency plan in case of environmental or weather delays.

1.6 PRE-BLAST PUBLIC INFORMATION MEETING

The Contractor shall arrange and conduct one Pre-blast Public Information meeting, to inform the public about planned drilling and blasting operations, 20 days or earlier before drilling and blasting begins. The Contractor shall place a public notice announcing the meeting in local newspapers including the Wilmington Morning Star. The public notice shall appear in the newspaper daily for one (1) week ending no more than two (2) days prior to the meeting. The Contractor

shall obtain approval of the public notice from the Contracting Officer prior to its publication. Copies of all correspondence publicizing the meeting shall be furnished to the Contracting Officer. Federal, State and Local agencies likely to be interested in the project shall be contacted in writing directly, including the North Carolina State Ports Authority, the Cape Fear Pilots Association, Law Enforcement, Fire Prevention, and Environmental Authorities. Representatives of the Contracting Officer may participate in the meeting. The Contractor shall provide a representative and specialist(s) who are qualified in blast vibration and air-overpressure control and have familiarity with the specifications. The specialist(s) shall answer questions about the magnitude of the expected seismic motion and air-overpressure and their impact on the public, public property and private property. The specialist(s) shall disseminate basic project information to interested members of the public, solicit comments from the public, evaluate proposed blasting methods in light of valid concerns, and identify key Contractor and Corps of Engineers representatives who may be contacted for current project information or to report complaints. A public question-and-answer period shall be held at the conclusion of the public presentation.

1.7 TRANSPORTATION, STORAGE, HANDLING, AND SECURITY OF EXPLOSIVES

1.7.1 General

The Bureau of Alcohol, Tobacco, and Firearms (ATF) has enforcement, inspection, and investigative jurisdiction in all matters pertaining to explosives. The Contractor shall notify the appropriate office of the ATF in writing with copies to the local law enforcement authority and the Contracting Officer as to all related facilities, plans, and procedures, prior to construction of explosives storage facilities or receipt of explosives on the site. All transportation, storage, handling, and security of explosives shall be in strict accordance with ATF regulations. In addition, the U.S. Coast Guard shall also have jurisdiction over all explosives handling on water and along the waterfront. The Contractor shall obtain approval from the U.S. Coast Guard for the waterfront facility to be used for loading explosives on vessels. When loading explosives at waterfront facilities, the U.S. Coast Guard shall be notified and allowed adequate time to be present to monitor the loading operations. No explosives will be allowed to stay aboard any vessel at night unless the vessel is anchored in a U.S. Coast Guard designated explosive anchorage area and manned 24 hours a day with a standby tug in the vicinity of the anchorage area. All transportation, storage, handling, and security of explosives must also be in accordance with State and local regulations.

1.7.2 Storage Facilities

Any storage facilities for explosives shall be constructed to conform as a minimum to equal Type 2 Storage Facilities as specified in Part 55 of Title 27 of the Code of Federal Regulations, listed in the above references, which includes requirements for hinges and hasps and the locking system.

1.7.2.1 The Contractor's storage facilities shall meet all requirements of the ATF and shall be inspected by the Contracting Officer and ATF prior to use or as necessary. All water storage

facilities for explosives shall also meet all requirements of the U.S. Coast Guard and be inspected by the Contracting Officer and the U.S. Coast Guard prior to use.

1.7.2.2 Explosives-in-use kept during non-blasting periods and overnight on working boats, shall be kept in Type 2 magazines. Magazines holding detonating devices shall be located at least 50 feet away from magazines holding other explosives, blasting agents, or oxidizers. Appropriately trained personnel must guard or attend explosive materials at all times.

1.7.3 Fencing, Gates, and Entrances

Storage magazines/containers conforming to the referenced standards, shall be enclosed by a chain-link fence (Federal Spec. RR-F-191/1 Type 1). Chain-link fence, including gates, must be constructed of 7-foot material (6-foot for controlled areas). Chain-link fence must be of 9-gauge (.1508 inches) or heavier wire galvanized with mesh opening not larger than 2 inches per side, and twisted and barbed selvage at top and bottom. It must be taunt and securely fastened to rigid metal or reinforced concrete posts set in concrete. It must reach within 2 inches of hard ground or paving. On soft ground it must reach below the surface deeply enough to compensate for shifting soil or sand. Chain-link fence shall also be comprised of standard barbed wire and top guards. Standard barbed wire is twisted, double-strand, 12 gauge wire with four point barbs spaced an equal distance apart. A top guard must be constructed on all perimeter fences and may be added on interior enclosures for additional protection. A top guard is an overhang of barbed wire or barbed tape along the top of a fence, facing outward and upward at approximately a 45-degree angle. Top guard supporting arms shall be permanently affixed to the top of fence posts to increase the overall height of the fence at least 1 foot. Three strands of barbed wire, spaced 6 inches apart, shall be installed on the supporting arms. The number of strands of wire or tape shall be increased when required. The top guard of fencing adjoining the gates shall range from a vertical height of 18 inches to normal 45-degree outward protection, but only for sufficient distance along the fence to open the gate(s) adequately. A bottom and top wire shall be used for reinforcement. The number of gates and perimeter entrances shall be the minimum required for safe and efficient operation. Active perimeter entrances shall be designed so that the guard maintains full control of ingress and egress. Semi-active entrances, such as infrequently used vehicular gates, shall be locked when not in use. Gates and entrances, when closed, must provide a barrier structurally comparable to their associated barrier(s). Top guards, which may be vertical, are required for all gates. The gate(s) shall be secured at all times when not in actual use by 5-tumbler padlocks (or higher quality). The padlocks shall be protected by ¼ inch steel caps constructed so as to prevent sawing or lever action on the locks and constructed so as to prevent being defeated by a hand-held drill. The keys to the locks shall be of a non-duplicating type and shall be strictly controlled by the blasting specialist, blaster, or security personnel. The Security Guard shall be responsible for controlling the gate(s) ingress and egress at all times by using a sign-in/out sheet.

1.7.4 Lighting

The explosives storage area shall be protected by security lighting installed in a manner that will provide illumination in the storage area at a minimum of 3 foot-candles, see U.S. Army Corps of Engineers Safety and Health Requirements Manual, pages 99 and 100.

1.7.5 Explosives Storage Facilities Personnel Requirements

The Contractor shall maintain at the explosive storage facility one approved individual during all operational periods. This individual shall be responsible for receiving and issuing explosives materials and for maintaining the daily record of transactions. During non-operational hours two armed security guards or one security guard and one individual representing the blaster or blasting specialist to manage risk associated with stored or emplaced explosives shall be posted at the storage facility while explosives are stored at the job site.

1.7.5.1 Security Guard

The Contractor shall implement security guard service. The Contractor shall submit to the Contracting Officer for approval the name of the security guard service he proposes to use, a copy of the standard operating procedures (SOP) and insurance information of the security guard service. The security guard service SOP shall provide guidance for personal appearance, communications procedures, guidance for performance of duties, etc. Armed security guard(s) shall be approved and licensed by the North Carolina State Private Protection Services Board. Required items of safety apparel shall be worn by personnel of both sexes such as safety shoes, hard hats, personal floatation device, etc. Appropriately lettered breast badges indicating the jurisdiction from which police/guard authority is obtained shall be worn and prominently displayed as part of the uniform. Shoulder patches indicating the security contractor shall be worn on the left shoulder of the uniform. The Contractor shall provide an office with electricity, toilet accommodations, and communications including telephone and hand-held radio.

1.7.6 Report of Loss

Should a loss or theft of explosives occur, all circumstances and details of the incident shall be immediately reported to the nearest office of the Bureau of Alcohol, Tobacco, and Firearms, the Brunswick County Sheriff's Department, the New Hanover County Sheriff's Department, the Contracting Officer, and the Wilmington District Security and Law Enforcement Office (910-251-4809).

1.7.7 Bulk Product Requirements

If a "pourable" explosive such as POURVEX is used, the following bulk product requirements shall apply.

a. Bulk blasting agents or explosives delivered to the work area shall be weighed by a certified weigh master at the transfer location nearest the work area to determine the quantity of explosives delivered each day.

- b. Bulk storage containers on barges shall be permanently attached to the barge and electrically grounded. Pumps, hoses, and valves containing bulk product after transfer operations shall be stored in a locked magazine.
- c. All access ports, valves, vents, and drains shall be secured to prevent vandalism or theft of explosives.
- d. A flow-metering device capable of measuring the quantity of explosives to within 0.5% of the actual quantity in pounds shall be utilized for all bulk transfers to or from the bulk storage containers.
- e. The delivery system to load holes on each drill frame shall be designed to load each hole to within 0.5% of the design quantity required for each drill hole.
- f. For each blast, each drill frame shall measure the quantity of explosives loaded in all holes with weigh scales or flow metering devices. The total quantity of all loaded holes shall be checked with the total quantity delivered for the respective blast. Should the bulk quantity delivered vary from the recorded quantity loaded, the bulk quantity shall be certified correct and all measuring devices or meters recalibrated.
- g. Holes charged with emulsion or slurry explosives shall be primed with at least two separate primers and ms-delay initiators. At least one primer shall be secured in the hole with a spyder or some other locking device to ensure it is not pulled out of the charged hole prematurely.
- h. The top elevation of the emulsion or slurry product shall be measured to check for voids and actual quantity loaded. Any voids or discrepancies in the quantity loaded shall be noted on blasting reports.
- i. All loading tubes or hoses shall be equipped to pump explosives from the bottom of the hole upward while the loading hose is retracted automatically. The system shall in effect place the product in each hole in a tremie method. All loading tubes or hoses shall be equipped with a control valve to prevent siphoning of product from the tank when product loading has ceased.
- j. Should a fissure be encountered during the drilling process which could cause loading problems, a bore hole liner or other device shall be used to prevent explosives from entering the fissure.

1.7.8 Explosives on Deck

No explosives shall be stored on the drill barge deck in the open except for the case that is to be loaded immediately in the blast holes. Any explosives not loaded shall be returned to the on-board magazines before blasting.

1.8 DAILY EXPLOSIVES REPORT

The Contractor shall keep a daily record of the receiving and issuing of explosives at each storage magazine. The inventory records shall be updated at the close of business each day. The record shall show the name, class, code dates, and quantities of the explosive and initiating materials that were received and issued, the quantity of explosives and initiating products remaining at each storage magazine at the end of each day, and the time and name of the personnel to whom materials were issued. Copies of the daily inventory records shall be furnished with the Daily Contractor Quality Control Report.

1.9 BLASTING PERSONNEL

Personnel who handle explosives (i.e. laborers, loaders, or those who assemble explosives for loading) shall be in suitable physical condition. For each individual who will handle explosives, the Contractor shall furnish the Contracting Officer a Duty Status Statement signed by a physician certifying that the individual is medically fit.

1.9.1 Blasting Specialist and Blaster-in-Charge

The Blasting Specialist shall plan and supervise the use of explosives in a safe and effective manner in accordance with blasting industry and regulatory standards. The Blaster-in-Charge shall directly supervise or personally load the drill holes with explosives, attach the detonators, make connections, prepare individual holes for detonation, and initiate the blast. The Blasting Specialist and Blaster shall jointly oversee and direct blasting safety. The Blasting Specialist and all Blasters-in-Charge each shall have a minimum of ten years demonstrated experience in blasting (at least 5 years in underwater blasting) and knowledge of current explosive products. The Contractor shall provide certifications and qualifications for proposed Blasters-in-Charge. The resume for the proposed Blasting Specialist shall also be included in the Operational Blasting Plan submittal.

1.9.2 Vibration Specialist

Maintaining ground vibration and air-overpressure within the limits imposed under this contract is critical to success of this project. To assure that the process for obtaining vibration and air-overpressure measurements is satisfactory for achieving complete and accurate data, the collection of these data must be conducted under the supervision of a qualified Vibration Specialist. The Vibration Specialist shall be responsible only for monitoring and recording vibration and air-overpressure, except that he may also serve as the Water Pressure Specialist responsible for monitoring the blast-induced water overpressure (see Section 02300: WATER PRESSURE MONITORING DURING BLASTING), if he meets the qualification requirements under both sections. The Vibration Specialist shall inform the Blaster and Blasting Specialist about monitoring results and may recommend modifications to the blasting procedures; however, the Contractor's Blasting Specialist shall be responsible for all blasting decisions. The Vibration Specialist must have documented education and experience in monitoring and recording vibration and air-overpressure for similar construction projects. The Vibration Specialist's education and

experience shall be provided in the Operational Blasting Plan submittal.

1.9.2.1 Vibration Specialist - Third Party Requirement.

The Vibration Monitoring Specialist must be an independent third party. He cannot be an employee of or have ownership interest in any contractors directly involved with the execution of the explosives work or have any conflict of interest association with owners of monitored property.

1.9.3 Inexperienced Personnel

Inexperienced personnel or those without resumes who will handle explosives shall have orientation in the detailed safety and technical requirements of handling explosives and shall be directly supervised by a supervisor/trainer. The orientation shall be documented and signed by the employee and the supervisor/trainer. The document shall be submitted to the Contracting Officer prior to the employee commencing work with explosives.

1.10 WEEKLY SAFETY MEETING

Each week the Blasting Specialist in conjunction with the Site Safety and Health Officer shall conduct a safety meeting for those handling explosives, drilling, or under the Blasting Specialist's responsibility. The meeting shall not be less than 10 minutes long. The subject of the safety meeting shall be documented and signed by attendees of the meeting. The original of the document shall be provided to the Contracting Officer with the Daily Quality Control Report.

1.11 DRILLING EQUIPMENT REQUIREMENTS

The drilling platform shall be capable of drilling in conditions indigenous to the contract area. The drilling platform and drilling equipment shall have been expressly designed or used successfully for jobs as intended for this contract.

1.12 DRILLING RECORDS

The Drilling Record is a record containing specific information for the drilling of each blast hole for each blast. Drill hole and drilling information shall include but is not limited to the following: Hole number and location, time start drilling, time end drilling, elevation river bottom, elevation top of rock, elevation of top of collar and bottom of drill casing, elevation drilled bottom of hole, elevation of weighted tape check of bottom of hole, elevation of weighted tape check of top of explosive product, elevation of weighted tape check of top of stemming, range of elevation of the well cemented rock (well-indurated or hard rock) requiring blasting for removal, time loaded, tide, etc. See example of Drill Log in Attachment 1.

1.13 SPECIFICATIONS OF EXPLOSIVES

Explosives shall be water resistant, possess low hazard sensitivity, and shall not produce high levels of toxic fumes. Density shall not be less than 1.20 grams per cubic centimeter. The explosives shall have been specifically manufactured for use in marine blasting work and be recommended for such use.

1.14 BLAST HOLES AND LAYOUT

Blast holes shall be vertical and easy to load with explosive. Blast hole size shall conform to explosive manufacturer's recommendations for the explosives utilized. The Contractor shall monitor the drilling of blast holes to insure that there is no significant deviation from the vertical that could lead to accidental detonation of loaded holes. Blast holes shall be accurately positioned horizontally using differential GPS or higher quality surveying and recorded with electronic drill monitoring or other means in which each blast hole location is known and recorded instantaneously. The Contractor should expect to blast outside the channel prism lines shown on the drawings to achieve the required side slopes. Drilling within 8 feet laterally of a hole loaded with explosive materials will not be allowed. Holes shall be loaded with explosives through a solid casing.

1.15 STEMMING

All blast holes shall be stemmed. The Blaster or Blasting Specialist shall determine the thickness of stemming using blasting industry conventional stemming calculation. The minimum stemming shall be 2 feet thick. Stemming shall be placed in the blast hole in a zone encompassed by competent rock. Measures shall be taken to prevent bridging of explosive materials and stemming within the hole. Stemming shall be clean, angular to subangular, hard stone chips without fines having an approximate diameter of 1/2-inch to 3/8-inch. A barrier shall be placed between the stemming and explosive product, if necessary, to prevent the stemming from settling into the explosive product. Anything contradicting the effectiveness of stemming shall not extend through the stemming.

1.16 COORDINATION WITH THE U.S. COAST GUARD

The Contractor shall notify the U.S. Coast Guard 24 hours prior to a scheduled blast and 2 hours prior to the actual blast. The channel must be kept open to navigational traffic or as arranged with governing authorities.

1.17 NAVIGATION CONTROL DURING DRILLING, LOADING AND BLASTING OPERATIONS

For the protection of vessel traffic in the vicinity of the project site the Contractor as a minimum shall perform the following:

- a. Place warning signs on the drill barge legible from a distance of 200 feet with the message, "DANGER - EXPLOSIVES IN USE."

b. Operate two or more patrol boats during blasting operations to control vessel traffic. Visual observation locations shall be determined by the Contractor and approved by the Contracting Officer.

c. Inspect and insure that no boat traffic exists within the buoyed work area prior to detonation and until such time as the Contractor has sounded an "All Clear Signal."

d. Establish and maintain a warning system as required by the U.S. Army Corps of Engineers Safety Manual.

e. Equip and maintain floating plant with radio equipment capable of communications with the U.S. Coast Guard.

f. Upon inspection of the area after each blast, immediately notify the U.S. Coast Guard and the Contracting Officer if "ALL CLEAR" or a "MISFIRE" is noted.

g. Immediately after each blast in or within 50 feet of the existing navigation channel, the Contractor shall check for upheaval of material as a result of blasting by performing a multibeam "clearance survey" or by other approved means or methods within 50 feet of the perimeter of the blast. The Contractor shall use horizontal and vertical positioning corrections and tide corrections from the RTK system. Unless otherwise directed by the Contracting Officer, the Contractor shall process all multibeam survey data for upload to the FTP site based on five feet by five feet matrix cells. The data file for each survey shall be posted on the FTP site within 2 hours of completion of the survey. The Contracting Officer will provide the Contractor an FTP site address, directory location and file-naming format. The Contractor shall use minimum depth for sounding selection and center of cell for sounding position.

Final plots shall consist of one-foot contour intervals for elevations -35 feet to -40 feet. The Contractor shall provide and deliver to the Contracting Officer 3 printed copies of the final plot from each multibeam survey performed within 4 hours of completion of the survey. Each plot shall include a title block with the Contractor's company name, date of the survey, scale, any and all navigation aids located by the Contractor, a reference to the tide gage used when data was collected, and signature of the party responsible for the data.

If a clearance survey indicates rock or other material above elevation -38 feet MLLW within the navigation channel, the Contractor shall immediately notify the U.S. Coast Guard so that a Notice to Mariners can be issued. The Contractor shall also mobilize removal equipment to the area of reduced navigation clearance within one hour and immediately begin clearing the channel to the current project depth (-38 feet MLLW). If a clearance survey indicates rock or other material above elevation -43 feet MLLW within an acceptance section previously accepted, the Contractor shall remove all heaved, cast, or sloughed material above -43 feet MLLW resulting from blasting or dredging operations in adjacent work areas.

1.18 PRIMARY INITIATION SYSTEM

No electrical firing systems shall be used for primary initiation of blasts. Blasts shall be initiated using shock tube lead-in-lines and splices exposed to water shall be watertight. Spools holding lead-in-line tubing shall be held or mounted such that there is no possibility that tubing can become snagged or pulled when unreeled.

1.19 DISPOSAL OF SHOCK TUBE

Upon completion of each blast, all visible shock tube shall be removed from the river and disposed of in accordance with Federal, State, and local requirements. Special care shall be taken to ensure that shock tube is not carried away by the river currents after each blast.

1.20 CONTINGENCY PLAN

In the case of a misfire, inadvertent initiator extraction, or accidental loss of down lines, the following shall be met:

a. All loading of blast holes shall be completed early enough each day to allow time, in case of a misfire, inadvertent initiator extraction, or accidental loss of down lines, to implement a contingency plan for removing or detonating the explosives before dark.

b. The Contractor shall submit a contingency plan to the U.S. Coast Guard and the Contracting Officer prior to the beginning of any blasting and shall notify both parties in the event of a misfire, inadvertent initiator extraction, or accidental loss of down lines.

c. All undetonated explosives due to misfire, inadvertent initiator extraction, or accidental loss of down lines shall be detonated or destroyed.

d. The Contractor shall immediately notify the U.S. Coast Guard upon giving the "All Clear Signal" after correcting the misfire, inadvertent initiator extraction, or accidental loss of down lines."

1.21 SHOT PLAN AND SHOT REPORT

1.21.1 General

A Shot Plan (see Attachment 2) is a plan of a proposed blast. A Shot Report is the updated shot plan showing changes or additional information not available before the blast was initiated such as the tide elevation or specific time the blast was initiated, pounds of explosives utilized, powder factor, hazard incidents, blast holes not loaded, etc. A Shot Report shall also include blast monitoring data (see Attachment 3) and water pressure monitoring data as required by Section 02300.

1.21.2 Shot Plan

The Contractor shall submit a Shot Plan to the Contracting Officer's Representative twenty-four hours or more prior to drilling blast holes for each blast. Each Shot Plan shall include all necessary narratives,

tabular data and map of the blast site. Each Shot Plan shall be signed by both the Contractor's job site authorized representative and the Contractor's Blasting Specialist.

1.21.3 The Shot Plan shall include as a minimum the following items:

a. The overall parameters of the blast shall be specified which include: the date and order number of the blast that day, the GPS (or higher quality survey method approved by the Contracting Officer) lateral location of each hole and the lift elevations, the total weight of explosives to be shot, the total number of holes to be shot, the number and ascending time order of delays for the blast, maximum charge weight per delay for the blast, the closest approach to the monitoring locations, scaled distance for nearest structure of interest and the monitoring location(s), the estimated particle velocities and air blast overpressures calculated for nearest structure of interest and the monitoring locations, and powder factors both in charge weight per cubic yard of material shot and in charge weight per foot of total drill hole depth.

b. The location of the blast area on a plan map of the project.

c. A large-scale plan map depicting the delay pattern to be employed.

d. A tabular listing by hole describing: blast hole length, blast hole diameter, top and bottom hole elevation, water elevation anticipated at the time of shooting, sub-drilling depth, stemming material and elevations, type of stemming separator, primer and/or booster elevations in the hole, delays in the hole, and the total charge weight of explosive elements for the entire hole, and charge weight per delay within the hole.

e. An elevation sketch of each hole pattern, sub-drilling, decking charges, locations of explosives and stemming, and the locations of primers and/or boosters. Before every blast the Contractor shall submit a shot plan and a diagram of the blasting hole layout. The shot plan shall include information such as the blasting hole locations and spacing; type of explosives; type of down-hole line; amount of explosives; powder factor; a diagram of a typically loaded hole depicting top of overburden elevation, top of rock elevation, bottom of hole elevation and diameter of hole; locations of explosives, amount of explosives in each hole; how many, the kind, and the location of boosters and centering devices; blasting cap delay; elevation or depths of top and bottom of stemming; pattern and sequence of delays; firing times; anticipated peak particle velocity and the maximum peak air blast overpressure at the vessel or structure nearest the blast.

1.21.4 Shot Report

The Contractor shall furnish a Shot Report to the Contracting Officer's Representative within 3 hours after completion of each blast. Each Shot Report shall include:

a. All "as-built" information required for the Shot Plan;

b. Copies of all blast monitoring data (see Attachment 3) and water pressure monitoring data as required by Section 02300.

1.22 BLASTING CONTROL

1.22.1 General

Blasting control refers to the monitoring and recording of vibration and air blast overpressure created by blasting. These shall be accomplished in accordance with the procedures specified herein. Note that the blast-induced water pressure shall also be monitored and recorded for each blast. Water pressure limits and water pressure monitoring and recording requirements are detailed in Section 02300: WATER PRESSURE MONITORING DURING BLASTING.

1.22.2 Monitoring and Technical Requirements

Vibration and air blast shall be monitored at several locations throughout the project. If the Government implements a supplemental blasting monitoring program, under no circumstances shall this relieve the Contractor of monitoring and controlling the blasting or any other requirements of this section. Both air blast overpressure measured in pounds per square inch (PSI) and vibration measured in peak particle velocity in inches per second (IPS) shall be recorded for each blast at the monitoring locations. Monitoring locations shall be determined by the Contractor's Vibration Specialist within the guidelines below and approved by the Contracting Officer. Each monitoring location shall be a secure, marked and surveyed position and shall remain at the same position for a series of blasts. The Contractor may elect at the Contractor's expense to provide additional instrumentation at additional monitoring locations for any purpose.

1.22.2.1 Vibration Control

The Contractor's Vibration Specialist shall place at least one (1) seismograph near or at the closest residence to the blast and one (1) seismograph at another residence or structure of interest (or as recommended by the Vibration Specialist and approved by the Contracting Officer) to measure and record ground movements caused by each blast. In addition, seismographs shall be placed at the Eagle Island Disposal Area as required by paragraph, EAGLE ISLAND DISPOSAL AREA DIKE MONITORING DURING BLASTING AND DREDGING, of SECTION 02325: DREDGING. The Contractor's Vibration Specialist shall provide qualified personnel capable of setting up instruments at designated locations to accurately record the blast, deploy the instruments, and operate, gather, and analyze the vibration data. The Blasting Specialist and Vibration Specialist shall use the collected data to control future blast vibration so as not to exceed the limits established in these specifications. The instrumentation shall record three orthogonal components (vertical, radial and transverse with respect to the location of the blast) of particle velocity direction. The instantaneous vector sum of the three directional components of vibration shall be used to compute the maximum vibration level. The instrument records for each blast shall consist of instrument readings identified by instrument number; the location of instruments by North Carolina State Lambert Grid Coordinate, Datum (NAD 83); the date, time

and location of the blast; the amount of explosives used and the peak particle velocity.

1.22.2.2 Vibration Control Parameters

Blasting shall be controlled in such a manner that the maximum ground vibration level at any structure shall not exceed a particle velocity control value of 0.5 inch-per-second. The particle velocity data shall be included in the Shot Report. The Contracting Officer shall be notified immediately when such intensity exceeds a peak particle velocity of 0.40 IPS in the ground adjacent to an occupied building or at a dike location on Eagle Island. The Contractor shall submit a printed copy of the monitoring records showing peak values and particle velocity and air-overpressure waveforms. A digital copy of the monitoring event records on a floppy disk or CD-ROM disk shall also be submitted.

1.22.2.3 Air-Overpressure (Airblast) Control

The Contractor shall control air-overpressure for every blast. The maximum peak air-overpressure at any structures, vehicles, or vessels, moored or underway, shall not exceed 131 dBL (.01 PSI) for any blast. The Vibration Specialist shall analyze the results onsite and make air blast predictions for succeeding detonations. The air blast records from each blast identifying the date, time and location of the blast, the peak overpressure recorded, the monitoring position, and equipment information shall be included in the Shot Report. The Contracting Officer shall be notified immediately when the intensity exceeds an overpressure of 128 dBL at a monitored structure. The Contractor shall submit a copy of the records in tabular paper and electronic form for each blast.

1.22.2.4 Specifications for Monitoring Equipment

Equipment for particle velocity and air overpressure monitoring shall be 4-channel (1 overpressure and 3 seismic channels) units capable of digitally storing collected data. Equipment shall be capable of printing ground motion time histories and summaries of peak motion intensities, frequencies and USBM RI8507 ppv-frequency plots. Printed report records must also include date, time of recording, operator name, instrument number and date of last calibration.

a. Instruments shall have a flat frequency response between 2 and 250 Hz for particle velocity and from 2 to 200 Hz for air overpressure.

b. The digitizing sampling rate for peak particle velocity and air overpressure measurements shall be at least 1,024 samples per second.

c. Seismographs shall be capable of performing a self-test of velocity transducers and printed event records shall indicate whether or not the sensor test was successful.

d. Seismographs used for compliance monitoring shall be capable of recording overpressure from 0.000073 to 0.073 psi (88 to 148-dBL), and particle velocity from 0.01 to 5.0 in/sec.

e. Systems shall be capable of providing printed event reports that include all peak measurements, frequencies and complete waveform plots.

f. Seismographs shall have adequate memory to digitally record the entire duration of the blast-induced motion.

g. All seismograph software systems shall be capable of saving back-up copies of all event files on floppy or Zip disks, and copies shall be furnished to the Contracting Officer with the Shot Report of each blast.

h. The Contractor shall provide the seismograph reporting software to the Contracting Officer with the first submittal of the vibration and air blast measurement records.

1.23 SIGNIFICANT COMMODITIES ROUTINELY STORED AND SHIPPED

The commodities stored at and shipped through the harbor facilities include military ordnance, anhydrous ammonia, paraxylene, methanol, petroleum products, fertilizer materials, and other chemicals. The dangerous conditions created by blasting in the vicinity of these materials shall be addressed and included in the Operational Blasting Plan by the Contractor.

1.24 LIGHTNING DETECTION EQUIPMENT AND SAFETY

The Contractor shall furnish, maintain, and operate lightning detection equipment for the duration of the blasting operations and/or during the periods that explosives are used or stored at the site. The detection equipment shall be installed where approved by the Contracting Officer. A lightning detector shall be operated at all times to detect lightning within a 25-mile radius. When lightning is detected within a 25-mile radius, the Contractor shall perform the following:

a. Notify the U.S. Coast Guard and the Contracting Officer of the potential hazard.

b. Clear the buoyed area of all vessels and personnel.

c. Terminate all loading of holes and return unused explosives to the day storage area.

d. The lightning detector shall be taken off the Drill Barge with the last evacuation vessel and continuously monitored until the lightning danger has passed.

e. Monitor the blast area to prevent any boat or vessels from inadvertently entering the blasting area during the lightning hazard.

f. After sounding the "All Clear Signal," the Blaster-In-Charge shall notify the U.S. Coast Guard and the Contracting Officer that the potential hazard has passed.

g. Resume Operations only after all potential hazards have passed. All other applicable safety requirements shall be implemented in addition to that required above.

2.1 MEASUREMENT AND PAYMENT

No separate measurement for payment purposes will be made for blasting work required by this section. All costs for labor, materials, equipment, tools, supplies, and incidentals necessary to complete the blasting work included in this section shall be included in the cost for "Unclassified Excavation" of the BIDDING SCHEDULE.

3.1 OBTAINING GEOTECHNICAL DATA

In addition to the Contracting Officer's inspection staff there will be additional Government personnel present during the Contractor's work. These personnel will obtain rock specimens from the excavated material; observe any drilling for blast holes or core samples; observe the assembly and loading of explosives; take or record measurements to ascertain drill depth, bottom and top of stemming, etc.; observe the dredging methods and collect records such as, but not limited to, tide readings and dredge locations. These personnel will be provided the same accommodations and transportation as the Contracting Officer's inspection staff but will not have any authority to represent the Government in the execution of this contract.

- - End of Section - -

SECTION 02325

DREDGING

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

The work consists of furnishing plant, equipment, materials, and labor to perform dredging and associated work as required by these specifications and the drawings for Wilmington Harbor, North Carolina - 96 Act, Anchorage Basin and Passing Lane Dredging, Sta 39+70 Anchorage Basin to Sta 60+00 Lower Brunswick Channel and Sta 55+00 Keg Island Channel through Reaves Point Channel.

The work consists of deepening the existing channels consisting of the following ranges: Anchorage Basin (Sta 39+70 to 84+83.64), Between, Fourth East Jetty, Upper Brunswick, Lower Brunswick (Sta 0+00 to 60+00), Keg Island (Sta 55+00 to 77+26.39), Upper Lilliput, Lower Lilliput, Upper Midnight, Lower Midnight, and Reaves Point.

The work also includes channel and turn wideners. Turn wideners are required at the intersection of the following ranges: Upper Brunswick and Lower Brunswick, Upper Lilliput and Lower Lilliput, and Lower Midnight and Reaves Point. A 100-foot widener is required on the west side of the Fourth East Jetty Channel and on each side of Lower Lilliput Channel. A 200-foot widener is required on the west side of Upper Midnight and Lower Midnight Channels. A widener is also required on the northwest side of the turning area within the Anchorage Basin.

North Carolina State Ports Authority Berth Area Deepening is identified as an optional bid item in the Bid Schedule. See the drawings for further details.

The bottom depth, widths, and lengths to be dredged are shown on the drawings.

The work also includes maintenance dredging as directed by the Contracting Officer of the existing channel from Sta 13+50 Anchorage Basin to the intersection of Reaves Point and Horseshoe Shoal Channels including all channel ranges in between and North Carolina State Ports Authority berth areas to provide the current project depth (either -38' MLLW plus 1 foot of allowable overdepth or -42' MLLW plus 2 feet of allowable overdepth) as directed by the Contracting Officer during the life of the contract.

1.2 WORK COVERED BY CONTRACT PRICE

1.2.1 Unclassified Excavation

The contract price(s) per cubic yard for the "Unclassified Excavation" sub-items includes all costs associated with plant, equipment, materials, and labor required for removal and disposal of all dredged material during deepening of the existing channel and widening of the channel and turns, with the exception of material removed under subparagraph, Maintenance Dredging, below.

1.2.2 Maintenance Dredging

Maintenance dredging under this contract will be limited to those areas in the existing channel not scheduled by the Contractor to be dredged under the unclassified excavation item for any one individual hydraulic pipeline dredging environmental window (1 August - 31 January) and in which the Contracting Officer considers that there exist or are likely to exist shoals that will be an impediment to navigation. The Contractor shall provide a hydraulic cutterhead suction dredge, with 14-20" discharge pipe, capable of dredging an average of 8000-12000 cubic yards per day along with all required pipe, and attendant plant. As directed by the Contracting Officer, maintenance dredging shall be executed to remove shoaling from the existing channel and from the North Carolina State Ports Authority berth areas to maintain 38' MLLW plus 1' of allowable overdepth during Phase 1. After completion and acceptance of phase 1 in total, the Contracting Officer may direct maintenance dredging to -42' MLLW plus 2 feet of allowable overdepth or may perform some or all maintenance dredging in this area by separate contract, at the Government's discretion. The contract price (s) per hour for the "Maintenance Dredging" sub-items includes all costs associated with plant, equipment, materials, and labor required for removal and disposal of all maintenance dredging material.

1.3 SUBMITTALS

The following shall be submitted to the Contracting Officer in accordance with Section 01330 SUBMITTAL PROCEDURES:

- a. Dredging Plan.
- b. Dredged Material Disposal Plan.
- c. Traffic Control Plan.
- d. Emergency Plan for Obstruction to Navigation.
- e. Ocean disposal verification data.
- f. Debris screen design (required if mechanical dredge is to be used to accomplish the work).
- g. Turtle deflector device design (required if hopper dredge is to be used to accomplish the work).
- h. Inflow basket or screen design (required if hopper dredge is to be used to accomplish the work).

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 NOTICES

(a) The Contractor shall give the Contracting Officer five (5) days advance written notice before commencing work.

Government surveys will be made of the areas dredged as soon as practicable after completion of dredging to determine if the typical maintenance dredging section has been achieved -38 feet MLLW plus 1 foot of allowable overdepth or -42 feet MLLW plus 2 feet of allowable overdepth as directed by the Contracting Officer). Payment for effective dredging time will be made at the unit price bid per hour for Maintenance Dredging of the bidding schedule. The Contracting Officer will determine effective dredging time based on the time active dredging was underway as contained in the Report of Operations - Pipeline, Dipper or Bucket Dredges or the Report of Operations - Hopper Dredges submitted by the Contractor. Repositioning of the swing anchors and moves directed by the Contracting Officer will not be included in the effective dredging time. There will be no direct payment made for movement of the dredge associated with change of location between work areas. There will be no direct payment made for down time for any reason including, but not limited to maintenance, movement to allow vessel traffic through the channel or delays due to sea and weather conditions. Payment for Maintenance Dredging shall also include all disposal cost associated with transporting and disposal of material.

(c) North Carolina State Ports Authority Berth Area Deepening. Measurement and payment for material removed during deepening of the North Carolina State Ports Authority berth areas will be made consistent with measurement and payment for unclassified excavation.

(d) Mobilization & Demobilization - Maintenance Dredging. Payment for mobilization and demobilization for maintenance dredging will be made for each instance where the dredge for maintenance dredging is mobilized for one hydraulic pipeline dredging period (1 August - 31 January). Each instance will be paid as outlined in Paragraph 252.236-7004, Section 00800, Special Contract Requirements. This includes the full cost of mobilizing and demobilizing all equipment, pipe and attendant plant required to accomplish maintenance dredging.

(e) The drawings referred to in SECTION 01100: SUPPLEMENTARY SPECIAL CONTRACT REQUIREMENTS, paragraph, CONTRACT DRAWINGS AND SPECIFICATIONS, are believed to represent the conditions existing on the dates of survey. The bottom conditions will be determined by before dredging surveys of each acceptance section prior to commencement of dredging and new maps will be furnished to the Contractor. Determination of quantities removed and the deductions made therefrom to determine quantities by in-place measurement to be paid for in the areas specified, after having once been made, will not be reopened, except on evidence of collusion, fraud, or obvious error.

(f) No payment will be made for Unclassified Excavation in an acceptance section until the full depth required under this contract is secured in the whole of such area.

(g) Method of Survey. Hydrographic surveys to determine the volume of material removed under this contract will be accomplished by the Government with the use of a fully automated survey vessel. The RTK system shall be used by the Government and the Contractor for horizontal and vertical positioning corrections and for tide corrections. Horizontal location of survey lines and depth sounding points will be determined by the use of an automated positioning system utilizing either a microwave line-of-sight system or differential global positioning system. Depth soundings will be taken with a 200 kHz/28 kHz depth sounder/digitizer system. Payment for unclassified excavation and North Carolina State Ports Authority Berth Area Deepening will be based on 28 kHz depth soundings.

The 28 kHz depth soundings will also be the basis for determining if the typical maintenance dredging section has been achieved. The fathometer will be adjusted twice daily using the bar check method to account for variations of the speed of sound in the water at the survey area. On automated surveys, position and depth data will be collected, stored on magnetic media, and subsequently processed by the Government for map preparation and quantity computations.

(h) Data will be secured by running survey lines parallel to the longitudinal axis of the channel. A sufficient number of lines will be run within the channel to assure good coverage of the bottom. A sufficient number of lines will also be run in the side slope area to account for side slope ratio versus project depth. The after dredging surveys will be performed in the same manner as the before dredging surveys. Weather permitting, before and after dredge surveys will be made during the same tidal stage.

3.9 ACCEPTANCE SURVEYS

As soon as practicable after the completion of the entire work or any acceptance section which, in the opinion of the Contracting Officer will not be subject to damage by further operations under the contract, multibeam surveys will be performed by the government. The purpose of the multibeam surveys will be to determine the presence of material above required project depth and will not be used to determine volume of material dredged for payment purposes. Other methods, depending on density of bottom material, may be required to determine bottom elevations. Should any material above required project depth be encountered by this examination the Contractor will be required to remove same at the contract rate for Unclassified Excavation and/or North Carolina State Ports Authority Berth Area Deepening. When the area is found to be in a satisfactory condition, it will be accepted. If more than two sounding operations by the Government over an area are necessary because of work for the removal of material disclosed by prior soundings, the cost of such subsequent soundings will be charged against the Contractor at the rate of \$5,000.00 per day in which the Government plant is engaged in sounding, is enroute to or from the site, or is held at or near the site for such operations.

3.10 DREDGE POSITIONING SYSTEM

Each dredge shall be equipped with an electronic positioning system, capable of positioning the dredge in the channel with accuracies equal to contract payment surveys (Class 1), as specified in the U.S. Army Corps of Engineers, Engineer Manual, EM 1110-2-1003, Hydrographic Surveying, dated 31 October 1994 and as superseded by EC 1130-2-210 dated 1 October 1998. This positioning system shall be established, operated, and maintained by the Contractor during the entire period of the contract. The positioning system shall be used to precisely locate the dredge and shall be capable of displaying and recording the dredge's location in an acceptable coordinate system which can be related to, or is directly based on, the North Carolina Lambert State Plane Coordinate System. Navigation channel control, and shore station control, if required, will be provided to the Contractor in the same North Carolina Coordinate System prior to the commencement of work. It shall be the responsibility of the Contractor to have the positioning/navigation system reviewed and inspected by the Contracting Officer's Representative prior to the commencement of work.

3.11 HOPPER DREDGE EQUIPMENT

Hopper dredge drag heads shall be equipped with rigid sea turtle deflectors that are rigidly attached. No dredging shall be performed by a hopper dredge without a turtle deflector device that has been approved by the Contracting Officer.

3.11.1 Deflector Design

a. The leading vee-shaped portion of the deflector shall have an included angle of less than 90 degrees. Internal reinforcement shall be installed in the deflector to prevent structural failure of the device. The leading edge of the deflector shall be designed to have a plowing effect when the drag head is being operated. Appropriate instrumentation or indicator shall be used and kept in proper calibration to insure the critical "approach angle".

b. If adjustable depth deflectors are installed, they shall be rigidly attached to the drag head using either a hinged aft attachment point or an aft trunnion attachment point in association with an adjustable pin front attachment point or cable front attachment point with a stop set to obtain the plowing effect. This arrangement allows fine-tuning the plowing effect for varying depths. After the deflector is properly adjusted there shall be NO openings between the deflector and the drag head that are more than 4" by 4".

INFORMATION ONLY NOTE: The design "approach angle" or the angle of lower drag head pipe relative to the average sediment plane is very important to the proper operation of a deflector. If the lower drag head pipe angle in actual dredging conditions varies tremendously from the design angle of approach used in the development of the deflector, the plowing effect does not occur. Therefore, every effort should be made to insure this design "approach angle" is maintained with the lower drag pipe.

3.11.2 Inflow Basket Design

The Contractor shall install baskets or screening over the hopper inflow(s) with no greater than 4" x 4" openings. The method selected shall depend on the construction of the dredge used and shall be approved by the Contracting Officer prior to commencement of dredging. The screening shall provide 100% screening of the hopper inflow(s). The screens and/or baskets shall remain in place throughout the work.

The Contractor shall install and maintain floodlights suitable for illumination of the baskets or screening to allow the observer to safely monitor the hopper basket(s) during non-daylight hours or other periods of poor visibility. Safe access shall be provided to the inflow baskets or screens to allow the observer to inspect for turtles and sturgeons, or parts thereof, and clean the baskets or screens for the next loading cycle.

The inflow screens shall be maintained in operational condition throughout the period of work.

3.11.3 Hopper Dredge Operation

The Contractor shall operate the hopper dredge to minimize the possibility of taking sea turtles.

When initiating dredging, suction through the drag heads shall be allowed just long enough to prime the pumps, then the drag heads must be placed firmly on the bottom. When lifting the drag heads from the bottom, suction through the drag heads shall be allowed just long enough to clear the lines, and then must cease. Pumping water through the drag heads shall cease while maneuvering or during travel to/from the disposal area.

INFORMATION ONLY NOTE:

Optimal suction pipe densities and velocities occur when the deflector is operated properly. If the required dredging section includes compacted fine sands or stiff clays, a properly configured arrangement of teeth may enhance dredge efficiency which reduces total dredging hours and "turtle takes". The operation of a drag head with teeth must be monitored for each dredged section to insure that excessive material is not forced into the suction line. When excess high-density material enters the suction line, suction velocities drop to extremely low levels causing conditions for plugging of the suction pipe. Dredge operators should configure and operate their equipment to eliminate all low level suction velocities. Pipe plugging in the past was easily corrected when low suction velocities occurred by raising the drag head off the bottom until the suction velocities increased to an appropriate level. Arrangements of teeth and/or the reconfiguration of teeth should be made during the dredging process to optimize the suction velocities.

Raising the drag head off the bottom to increase suction velocities is not acceptable. The primary adjustment for providing additional mixing water to the suction line should be through water ports. To insure that suction velocities do not drop below appropriate levels, the Contractor's personnel shall monitor production meters throughout the job and adjust primarily the number and opening sizes of water ports. Water port openings on top of the drag head or on raised stand pipes above the drag head shall be screened before they are utilized on the dredging project. If a dredge section includes sand shoals on one end of a tract line and mud sediments on the other end of the tract line, the Contractor shall adjust the equipment to eliminate drag head pick-ups to clear the suction line.

Near the completion of each payment section, the Contractor shall perform sufficient surveys to accurately depict those portions of the acceptance section requiring cleanup. The Contractor shall keep the drag head buried in the sediment at all times. Although the over depth prism is not the required dredging prism, the Contractor shall achieve the required prism by removing material from the allowable over depth prism.

During turning operations the pumps must either be shut off or reduced in speed to the point where no suction velocity or vacuum exists.

The Contractor must comply with all requirements of this specification and the Contractor's accepted Environmental Protection Plan. The contents of this specification and the Contractor's Environmental Protection Plan shall be shared with all applicable crew members of the hopper dredge.

3.12 FENDER TIRES

All fender tires used on Contractor dredging equipment or vessels shall be permanently marked by the Contractor with the company name and equipment plant name. All fender tires shall be securely attached to prevent them from falling overboard.

3.13 DISPOSAL OF DREDGED MATERIAL

The Eagle Island Disposal Area, Disposal Area 4, Disposal Area 10 and the new Wilmington Ocean Dredged Material Disposal Site (ODMDS) are Government furnished disposal areas available to the Contractor.

3.13.1 Eagle Island Disposal Area and Disposal Areas 4 and 10

Disposal areas are available as follows:

Maintenance material only - Eagle Island Cell No. 1
Disposal Area 4
Disposal Area 10

New work excavation - Eagle Island Cell No. 3
(unclassified excavation and
NCSA Berth Area Deepening)

Through the use of separate contracts the Contracting Officer will maintain and increase the capacity of the upland disposal areas as necessary to meet the disposal needs of the contractor as outlined in the Contractor's Dredged Material Disposal Plan. In order to properly manage and operate the Eagle Island Disposal Area, the Contracting Officer may request changes to the Contractor's Dredged Material Disposal Plan with regard to the specific cell to be used. The Contractor shall obtain approval of the pipeline access route and initial discharge point from the Contracting Officer prior to commencement of disposal operations. The Contractor shall provide a total of two people, fully awake and alert, on the disposal areas at all times pumping operations are in progress and, if in the opinion of the Contracting Officer it is necessary, during non-pumping hours. One dozer and operator shall be stationed at the dredging discharge line to ensure that the effluent is controlled in such a manner that high velocity discharge will not impinge on or cause erosion of the dike. The Contractor shall monitor the spillways during disposal operations and adjust the height of the spillway stoplogs to assure proper drainage of the retained water. The two people at the disposal area shall be in constant contact with the lever room of the dredge and shall monitor the discharge and the pipeline for leaks to be certain material is not deposited outside the limits of the disposal area. The breaking of dikes to permit free drainage will not be permitted. The Contractor shall be responsible for maintenance of the Government furnished disposal areas including the dikes and spillway system throughout the life of the contract.

3.13.2 New Wilmington Ocean Dredged Material Disposal Site

Disposal of excavated material in the new Wilmington Ocean Dredged Material Disposal Site (ODMDS) shall be within the designated disposal zone shown on the drawings. Disposal shall be conducted in such a manner that water above the dumped material will have a minimum clearance of 30 feet at mean lower low water (MLLW). In order to maximize ODMDS capacity and minimize mounding of material, the dumps shall be scattered throughout the designated disposal zone and not placed repeatedly at one location. This

shall be accomplished by dividing the disposal zone into quadrants and placing successive dump loads into successive quadrants. The Contracting Officer can direct the placement of material within any portion of the disposal zone.

3.13.3 Dredged Material Disposal Plan

Prior to commencement of dredging and disposal operations, the Contractor shall submit to the Contracting Officer a disposal plan for dredged material. The plan shall include but not be limited to the following:

- a. staging area location(s).
- b. identification of disposal area(s) for dredged material from each channel reach or dredging area.
- c. pipeline route to each disposal area at Eagle Island.
- d. pipeline discharge point location(s) at each disposal area at Eagle Island.
- e. procedure for maximizing capacity of each disposal area at Eagle Island and anticipated volumes for each.
- f. procedures for maximizing the new ODMDS disposal zone capacity and minimizing mounding of material (reference subparagraph New Wilmington Ocean Dredged Material Disposal Site) and anticipated disposal volume.
- g. procedures for recording verification of ocean disposal in the new ODMDS and ensuring minimum clearance is provided (reference paragraph OCEAN DISPOSAL VERIFICATION)
- h. anticipated cycle times and disposal vessel route to and from the new ODMDS (reference paragraph REQUIRED TRANSPORTATION ROUTE).
- i. identification of public or private upland disposal area for disposal of wood and other debris (reference subparagraph Disposal of Wood and Other Debris).

3.14 CONTRACTOR-FURNISHED DISPOSAL AREAS

The Contractor may furnish area(s) for disposal of dredged material for Contracting Officer's approval. If the Contractor-furnished disposal area(s) are approved by the Contracting Officer, the Contractor shall submit the information required by the form entitled "CONTRACTOR-FURNISHED DISPOSAL AREAS", Attachment 6 of SECTION: CONTRACTOR QUALITY CONTROL, including the written permission of the owners of the property involved in obtaining access to the proposed disposal areas, together with the written approval of the following Federal, State, and local fish and wildlife and pollution control agencies for use of the proposed disposal areas:

39+70 to station 84+83.64, are complete at the frequency of once a week for two months. The Contractor shall vary the day of the week for data collection, but the data shall be collected a minimum of 5 days and a maximum of 8 days apart. The seismographs do not need to operate during this 2 month period, but should remain in-place and operational if needed.

3.33.6 Data to be Collected

The Contractor shall collect the locations (x & y) of the survey points, the elevation of the survey points, piezometer locations (x & y), the elevation of the top of the piezometer tube, and the depth to water from the top of the piezometer tube, as measured in the tube. The Contractor shall organize the data and show the difference between the latest readings and the previous reading, and the difference between the latest reading and the reading measured just prior to the start of dredging and/or blasting operations. The Contractor shall also show the piezometer readings in plotted form. The Contractor shall take all necessary pictures of Eagle Island Disposal Area Dikes, before, during, and after the blasting/dredging operations as visual documentation, and submit the pictures to the Contracting Officer.

3.33.7 Reporting of Data

The Contractor shall submit all data collected, in plotted form, to the Contracting Officer within 24 hours of being collected. The Geotechnical Engineer shall provide a verbal recommendation after each event before the succeeding blast may occur, and daily before continuing dredging. This requirement may be relaxed after appropriate experience upon recommendation of the Contractor's expert and the approval of the Contracting Officer. The data shall be presented in a logical, readable and understandable manner and attached electronically in text or Excel format to the daily QC report. The Geotechnical Engineer shall review the data daily to determine if a critical threshold value of movement that requires immediate action has been reached. If the readings indicate a dike movement equal to or greater than 0.25 feet per 24 hour period, then work shall cease and the Contracting Officer notified immediately. If cumulative movement over the course of the monitoring period is greater than or equal to 1.0 feet, then work shall cease and the Contracting Officer notified. In both cases, work shall be ceased until the Contractor and the Contracting Officer agree that it may continue, without endangering the stability of the dike(s). If the cumulative 1.0 foot limit is reached, the Geotechnical Engineer and the Contracting Officer will decide on a daily basis whether work shall continue. During the two (2) month period, after dredging and/or blasting has been completed, the Contractor shall submit his report of data collected every two weeks, or after every two readings.

3.33.8 Contractor Responsibility

As stated in other sections of these specifications, the Contractor is responsible for protecting all man-made structures, including the dikes on Eagle Island, from damage. In the event of damage, such as slope failures or anything else which jeopardizes the use of the cells or dikes, as a result of his negligence or improper operations, the Contractor shall be responsible for the repair of the dike(s), at no expense to the Government. At the end of the two month monitoring period, the Contractor shall submit two (2) copies of a monitoring report to the Contracting Officer. The report shall be in electronic form, CD's, and shall contain all data collected, locations of all survey points, piezometers, and seismographs, and any recommendations made during the operation concerning the

monitoring. The Contractor shall submit this report within four (4) weeks of the end of the monitoring period defined above.

3.33.9 Measurement and Payment

No separate measurement for payment will be made for monitoring work required by this paragraph, 3.33. All costs for labor, materials, equipment, tools, supplies, and incidentals necessary to complete the monitoring work required by paragraph 3.33, shall be included in the cost for "Unclassified Excavation - Sta. 39+70 Anchorage Basin to Sta. 60+00 Lower Brunswick Channel" of the BIDDING SCHEDULE.

3.34 SUBMARINE UTILITIES

Submarine utilities owned by AT&T Inc. and ExxonMobil Chemical Company cross the river in the Fourth East Jetty Channel. The AT&T utility is a light guide cable installed by directional bore in approximately 1988. The ExxonMobil Chemical Company utilities consist of one 4-inch and two 6-inch pipelines which were trenched into the river bottom in 1973. An additional 6-inch pipeline was installed for ExxonMobil Chemical Company by directional bore in 1993 and currently carries paraxylene. The Contractor shall contact each utility owner prior to commencement of work.

3.35 RESTRICTED WORK AREA

One of the three ExxonMobil Chemical Company pipelines trenched into the river bottom in 1973 is leased and used by North Carolina Natural Gas Corporation (NCNG) to carry natural gas (the other two pipelines are not in use). Therefore, a restricted work area exists between station 57+80 and station 58+60 in the Fourth East Jetty Channel as indicated on Plate P-4 of the drawings. The drawings include Plate R-1 which is a reference drawing indicating known existing locations of the ExxonMobil Chemical Company pipelines. Special requirements apply to work in the restricted work area. All work in this area shall be coordinated with ExxonMobil Chemical Company and NCNG. Written documentation of this coordination shall be submitted prior to commencement of work.

Point of contact with ExxonMobil Chemical Company is Mr. Greg Ferrone at telephone number 281-870-6817. Mr. Ferrone's address is:

ExxonMobil Chemical Company
13501 Katy Freeway
Houston, Texas 77079-1398

Point of contact with NCNG is Mr. Tim Greenhouse at telephone number 910-350-2200. Mr. Greenhouse's address is:

NCNG
P.O. Box 4489
Wilmington, NC 28406

A minimum of four weeks notice to NCNG is required prior to commencement of work in the restricted work area. NCNG will arrange to shutdown and purge this line prior to dredging activities in the restricted work area.

In addition to other contract requirements, the Contractor will not be allowed to perform work in the restricted work area from 1 November to 31 March.

Work shall proceed continuously in the restricted work area until all dredging is completed across the entire width of the channel including the 100-foot widener and the side slopes prior to commencing work in other areas. All work in this area shall be completed within two calendar days.

The following special requirements shall apply while working in the restricted work area:

1. There shall be no blasting.
2. No spuds or anchors shall be set within this area.
3. Material removal equipment shall not be placed any lower than elevation -45 feet MLLW.
4. Immediately after completion of work in this area the contractor shall perform a multi-beam clearance survey of the work area in accordance with the requirements in paragraph, NAVIGATION CONTROL DURING DRILLING, LOADING, AND BLASTING OPERATIONS, of Section, BLASTING, and provide three printed copies of the final plot to the Contracting Officer's Representative.

-- End of Section --

APPENDIX A

(Additional Borings)

THESE BORINGS ARE LOCATED WITHIN THE PROJECT LIMITS.

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1
1. PROJECT Wilmington Harbor		South Atlantic	Wilmington District	OF 1 SHEETS
2. LOCATION (Coordinates or Station) 93+00 X Range & 100' West		Upper Lilliput	10. SIZE AND TYPE OF I.D. Splitspoon & NQM D.T.C.B. MLW	
3. DRILLING AGENCY Mobile District			11. DATUM FOR ELEVATION SHOWN MLW	
4. HOLE NO. (As shown on drawing title and file number) CDH #8			12. MANUFACTURER'S DESIGNATION OF DRILL Failing 314-C	
5. NAME OF DRILLER E. R. Grebe			13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED: 2 UNDISTURBED: 0	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED _____ DEG. FROM VERT.			14. TOTAL NUMBER CORE BOXES 1	
7. THICKNESS OF OVERBURDEN -			15. ELEVATION GROUND WATER 0.0'	
8. DEPTH DRILLED INTO ROCK -			16. DATE HOLE STARTED: 10/19/64 COMPLETED: 10/19/64	
9. TOTAL DEPTH OF HOLE 8.4'			17. ELEVATION TOP OF HOLE -36.6'	
			18. TOTAL CORE RECOVERY FOR BORING 75.0 %	
			19. SIGNATURE OF <i>[Signature]</i> Engr. Geologist	

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
a	b	c	d	e	f	g
-36.6	0.0		Water			Overburden
			Very soft soil			Jar No. Case 2 0.0'-1.5' depth: No sample taken Weight of hammer and rods
	2.0	SP & SC	Tan, fine - med sand and gray, clayey, fine sand (SP & SC)		22	
40			Brn - gray, fine sandy silt (ML)		23	
-41.0	4.0					Started core drilling 50/0.4'
	4.4	Slts	Green, mod - well cemented, mod hard siltstone			Pull, -41.0' to 45.0': Run - 4.0' Rec - 3.0' C.L. - 1.0'
42.2	6.0		Dk. weathered Ls			
			Soft			
			Ls			
			Soft			
	8.0		Ls			
-45.0				75.0	3	Drilling terminated

Notes:
 Top of hole sounded with 8" plate attached to drill rods.
 Blows: Number of blows required to drive splitspoon sampler one foot after penetrating one-half foot w/140 lb hammer falling 30 inches.
 Soils visually classified by unified soils classification system.
 Ls indicates limestone or shell limestone.
 Slts indicates siltstone.

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS
1. PROJECT WILMINGTON HARBOR COMPREHENSIVE STUDY		10. SIZE AND TYPE OF BIT 5/8" FISHTAIL	
2. LOCATION (Coordinates or Station) LAT-34° 10' 8.577", LONG-97 57' 37.581"		11. DATUM FOR ELEVATION SHOWN (TBM or MSU) MLW	
3. DRILLING AGENCY SAVANNAH DISTRICT		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 314 (CESAS, "EXPLORER")	
4. HOLE NO. (As shown on drawing title and file number) WHP93-111		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN 0 DISTURBED 0 UNDISTURBED	
5. NAME OF DRILLER DAVID JUSTISS		14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER N/A	
7. THICKNESS OF OVERBURDEN 53.8' (WATER 35.2")		16. DATE HOLE STARTED 28/AUG/93 COMPLETED 28/AUG/93	
8. DEPTH DRILLED INTO ROCK 0.0'		17. ELEVATION TOP OF HOLE 0.0'	
9. TOTAL DEPTH OF HOLE 53.8'		18. TOTAL CORE RECOVERY FOR BORING N/A %	
19. SIGNATURE OF INSPECTOR JAMES ARTHUR, P.G.			

ELEVATION MLW	DEPTH (FEET)	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
	0		0.0' TO 35.2' WATER			<p>BORING LOCATION NC Coord. N. 154159.9 NAD 27 E. 2314481.3 Approx. Station & Offset 16+50' 200' Right of Centerline</p> <p>NOTE: TOP OF HOLE is defined as surface of water and compensation is made for the tide such that Top of Hole is 0.0 EL MLW. Data transcribed from field log by Larry Benjamin, Civil Engr. Tech., Nov. 1993 Scale changed at 35.0' to 1"-5'.</p> <p>NOTE: Washed with fishtail to refusal at 53.8'</p>
-35.2'	35.2		RIVER BOTTOM @ 35.2'			
	35.2		35.2' TO 53.8' Wash probe, overburden not classified			
-53.8'	53.8		BOTTOM OF HOLE @ 53.8'			

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 3 SHEETS
1. PROJECT WILMINGTON HARBOR COMPREHENSIVE STUDY		10. SIZE AND TYPE OF BIT 2 1/4" Side-Discharge Drag Bit	
2. LOCATION (Coordinates or Station) N151217, E2314904 (NAD 83)		11. DATUM FOR ELEVATION SHOWN MLLW	
3. DRILLING AGENCY S&ME, Inc. (Raleigh, NC)		12. MANUFACTURER'S DESIGNATION OF DRILL CME-55 (Barge Mounted)	
4. HOLE NO. (As shown on drawing title and file number) WH98-49		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED: 26 UNDISTURBED: 0	
5. NAME OF DRILLER RAY NORWOOD		14. TOTAL NUMBER CORE BOXES 1	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER N/A	
7. THICKNESS OF OVERBURDEN 46.8ft (Water 9.1ft)		16. DATE HOLE STARTED: 27 APR 98 COMPLETED: 27 APR 98	
8. DEPTH DRILLED INTO ROCK 5.0ft		17. ELEVATION TOP OF HOLE 0.0 MLLW	
9. TOTAL DEPTH OF HOLE 51.8ft		18. TOTAL CORE RECOVERY FOR BORING 72.0 %	
19. SIGNATURE OF INSPECTOR GINA LONG (ZAPATA ENGINEERING)			

ELEVATION (MLLW) a	DEPTH (feet) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
0.0	0		0.0 to 9.1 ft, Water			WOR - Weight of Rods WOH - Weight of Hammer
	9.1		RIVER BOTTOM @ 9.1 FT			NOTE: CHANGED SCALE @ 9 FT AND 45 FT
-9.1	9.1		SM, Olive gray silty fine sand		1	BLOWS/FOOT: NUMBER REQUIRED TO DRIVE 1 1/4" I.D. SPLIT SPOON WITH 140 LB. HAMMER FALLING 30 INCHES WOR
	11		SW, Olive gray fine to medium sand, trace silt		2	1-2-1
	13				3	1-1-1
	15		SP, Olive gray fine sand trace of silt		4	2-2-3
	17				5	1-1/12"
	19		SM, Dark gray clayey fine sandy silt with trace mica		6	WOH/12"-1
			MH, Gray clayey silt with mica		7A	Split spoon fell to 19.6 ft
	21		SW, Gray fine to medium sand		7B	WOR-1-2
	23		SM, Gray silty fine sand with mica		8	2-1-2
	24.4		SP, Olive gray fine to medium sand with mica		9	Lab Classification SP, w=33.8
-24.4	24.4		CONTINUED ON SHEET 2			3-6-7
			NOTE: Soils field classified in accordance with the Unified Soil Classification System.			

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE		Hole No. WH98-49		
PROJECT		INSTALLATION		SHEET 2		
WILMINGTON HARBOR COMP. STUDY		WILMINGTON DISTRICT		OF 3 SHEETS		
ELEVATION (MLLW)	DEPTH (feet)	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc. If significant)
						BLOWS/FOOT
	23		SP, continued as above			
	24.4					
-24.4	25				10	4-5-5
	27		SW-SM, Olive gray slightly silty fine to medium sand, trace mica		11	1-2-2
	29		SP, Olive gray fine to medium sand with mica		12	3-5-5
	31		trace silt		14	3-4-5
	33		SW, Olive gray fine to medium sand with mica, trace silt		15	3-5-5
	35		SP, Gray fine to medium sand with mica and thin lenses of clayey sand		16A	1-2-2
			trace mica		16B	
	37				17	3-3-5
	39		SW, Olive gray fine to medium sand with mica, trace silt		18	2-3-4
			no mica		19	3-3-5
			trace silt		20	
	41				21	2-3-5
			gray fine to coarse sand, trace fine gravel			
	43				22A	3-3-3
			trace clay			
	45.0		ML, Gray fine clay sandy silt		22B	1-4-4
			CONTINUED ON SHEET 3			

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE		Hole No.		
		0.0 MLLW		WH98-49		
PROJECT			INSTALLATION		SHEET	
WILMINGTON HARBOR COMP. STUDY			WILMINGTON DISTRICT		3	
OF 3 SHEETS						
ELEVATION (MLLW)	DEPTH (feet)	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
a	b	c	d	e	f	g
						20 40 60 80 100
			ML, continued as above			BLOWS/FOOT
-45.0	45.0					
	46		MH, Gray calcareous clayey silt, trace sand		23	Lab Classification CH, w=30.5 LL=53, PL=20 PI=33 4-4-5
	46.8		TOP OF ROCK @ 46.8 FT			Split spoon refusal @ 46.8 ft "100/2"
-46.8	47		PEEDEE FORMATION Calcite-cemented sandstone: Moderately hard to hard, slightly weathered to unweathered, fine grained, light gray		BOX	PULL 1: 46.8 to 51.8 ft RUN 5.0 ft REC 3.5 ft LOSS 1.4 ft UL 1.0 ft Hydraulic press: 500psi Drill water return: 46.8 to 48.8 ft, 100% 48.8 to 49.3 ft, 0 49.3 to 51.8 ft, 100%
	48	CORE LOSS	SM, Brown gray silty fine sand Calcite-cemented sandstone, as above		1	Drilling time: 15 min. RQD = 9.8%
	49		SM, Brown gray silty fine sand		NQ	
	50				78	OF
	51		Calcite-cemented sandstone, as above		1	
	51.8		Not recovered			Tape check, Corrected depth = 51.4 ft
-51.8	51.8		BOTTOM OF HOLE @ 51.8 FT			Hole terminated at predetermined depth

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 2 SHEETS
1. PROJECT WILMINGTON HARBOR COMPREHENSIVE STUDY		10. SIZE AND TYPE OF BIT 2 7/8" Side-Discharge Drag Bit	
2. LOCATION (Coordinates or Station) N107594, E2321442 (NAD 83)		11. DATUM FOR ELEVATION SHOWN MLLW	
3. DRILLING AGENCY S&ME, Inc. (Raleigh, NC)		12. MANUFACTURER'S DESIGNATION OF DRILL CME-55 (Barge Mounted)	
4. HOLE NO. (As shown on drawing title and file number) WH98-105		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED: 15 UNDISTURBED: 0	
5. NAME OF DRILLER MIKE MOSELEY		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER N/A	
7. THICKNESS OF OVERBURDEN 50.6ft (Water 25.2 ft)		16. DATE HOLE STARTED: 30 MAY 98 COMPLETED: 30 MAY 98	
8. DEPTH DRILLED INTO ROCK N/A		17. ELEVATION TOP OF HOLE 0.0 MLLW	
9. TOTAL DEPTH OF HOLE 50.6ft		18. TOTAL CORE RECOVERY FOR BORING N/A	
		19. SIGNATURE OF INSPECTOR GINA LONG (ZAPATA ENGINEERING)	

ELEVATION (MLLW) a	DEPTH (feet) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
0.0	0		0.0 to 25.2 ft, Water			WOR - Weight of Rods WOH - Weight of Hammer NOTE: CHANGED SCALE @ 25 FT
-25.2	25.2		RIVER BOTTOM @ 25.2 FT			
	27		MH-OH, Dark gray clayey silt, trace fine to medium sand		1	BLOWS/FOOT: NUMBER REQUIRED TO DRIVE 1 1/8" I.D. SPLIT SPOON WITH 140 LB. HAMMER FALLING 30 INCHES WOR
	27		wood fragments		2	Lab Classification CH-OH, w=148.2 LL=194, PL=63, PI=131, SG=2.32 WOH
	29		brown gray		3	WOR
	31				4	WOR-WOH-2
	33				5	1/18"
	35				6	WOR/12"-1
	35					Hole clean out to 35.2 ft.
	37		CH, Light gray clay with wood		7	2-1-1
	39				8	1/18"
	39					Split Spoon fell to 39.2 ft.
	41				9	Lab Classification CH, w=52.2 LL=60, PL=26, PI=34, SG=2.77 1-1/12"
	41.6		CONTINUED ON SHEET 2			Split Spoon fell to 41.4 ft.
			NOTE: Soils field classified in accordance with the Unified Soil Classification System.			

DRILLING LOG (Cont Sheet) ELEVATION TOP OF HOLE 0.0 MLLW Hole No. WH98-105

PROJECT WILMINGTON HARBOR COMP. STUDY INSTALLATION WILMINGTON DISTRICT SHEET 2 OF 2 SHEETS

ELEVATION (MLLW)	DEPTH (feet)	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS
						(Drilling time, water loss, depth of weathering, etc., if significant)
	41		CH, continued as above			BLOWS/FOOT
-41.6	41.6		trace fine sand		10	
	43				X	1-1-1
	45				11	Hole clean out to 44.0 ft.
	47				12	WOH/12"-1
	49				X	WOH/12"-1
	49				13	1-1/12"
	49				14A	
	50.6		MH-OH, Brown clayey silt, wood		X	3-1-1
-50.6	50.6		<u>BOTTOM OF HOLE @ 50.6 FT</u>			Split spoon fell to 50.5 ft.
						Hole terminated at predetermined depth

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS
1. PROJECT WILMINGTON HARBOR COMPREHENSIVE STUDY		10. SIZE AND TYPE OF BIT 3 7/8" Side-Discharge Drag Bit	
2. LOCATION (Coordinates or Station) N150920, E2314754 (NAD 83)		11. DATUM FOR ELEVATION SHOWN MLLW	
3. DRILLING AGENCY S&ME, INC. (Raleigh, NC)		12. MANUFACTURER'S DESIGNATION OF DRILL ARDCO C-1000 (Barge Mounted)	
4. HOLE NO. (As shown on drawing title and file number) WHP98-35		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED N/A UNDISTURBED N/A	
5. NAME OF DRILLER MIKE MOSELEY		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER N/A	
7. THICKNESS OF OVERBURDEN 50.4ft (Water 37.5ft)		16. DATE HOLE STARTED 23 APR 98 COMPLETED 23 APR 98	
8. DEPTH DRILLED INTO ROCK N/A		17. ELEVATION TOP OF HOLE 0.0 MLLW	
9. TOTAL DEPTH OF HOLE 50.4ft		18. TOTAL CORE RECOVERY FOR BORING N/A %	
19. SIGNATURE OF INSPECTOR CHAD GRUBBS (ZAPATA ENGINEERING)			

ELEVATION (MLLW) a	DEPTH (feet) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
0.0	0		0.0 ft to 37.5 ft, Water			Washed probe with 3 7/8" side-discharge drag bit and water
	10					
	20					
	30					
	37.5		RIVER BOTTOM @ 37.5 ft			NOTE: CHANGED SCALE @ 40 FT
-37.5	40		Probably fine sand with clay fragments and trace mica			Classification of material based on drill cuttings and drilling resistance
	45		Probably medium sand with limestone fragments			
	50		Probably clay			
	50.4		Probably medium sand and limestone fragments			Harder/denser @ 47.7 ft and 50.0 ft
-50.4	50.4		PROBABLE TOP OF ROCK @ 50.4 ft			
			BOTTOM OF HOLE @ 50.4 ft			Drag bit refusal @ 50.4 ft

APPENDIX C

ROCK STRENGTHS FROM GREAT LAKES DREDGE & DOCK CO.

The following data was provided by Great Lakes Dredge & Dock Company. The data came from samples collected in the Great Lakes Dredge & Dock Company February 2002 dredging area shown on Plates P-4 and P-17 of the drawings while dredging under a private contract. Rock samples were taken from the dredge ladder. This information is provided in addition to Government Compressive strengths added to Appendix C by Amendment No. 0003.

**THIS INFORMATION WAS PROVIDED BY
GREAT LAKES DREDGE & DOCK CO. TO THE
U.S. ARMY CORPS OF ENGINEERS,
WILMINGTON DISTRICT. THIS
INFORMATION IS PROVIDED FOR
INFORMATION ONLY.**

(Added by Amendment No. 0004)

**LOCATIONS OF ROCK SAMPLES FROM GREAT LAKES
DREDGE & DOCK COMPANY**

<u>SPECIMEN ID #</u>	<u>STATION</u>	<u>DEPTH</u>	<u>NORTHING</u>	<u>EASTING</u>
C-1 & C-2	5+10	-40' MLLW	160113	2315647
C-3 & C-4	7+00	-41' MLLW	160145	2315649
C-5 & C-6	7+50	-43' MLLW	160312	2315659
C-7 & C-8	8+00	-38' MLLW	160362	2315662
C-9	5+32	-34' MLLW	160412	2315666

All samples were similar in nature and was described as predominately the following:

Light to dark grey, well indurated, thickly bedded, fine crystalline fossiliferous limestone also present.

NOTE: All information was supplied by Great Lakes Dredge & Dock Company.
Dredging was performed in February of 2002 under a private contract.

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.
WILMINGTON, NORTH CAROLINA

TESTING DATASHEET FOR
COMPRESSIVE STRENGTH OF DRILLED CONCRETE CORES
ASTM C 42

PROJECT NAME: Great Lakes / Harbor Dredge

ATLANTIC DIVING

LAW ENGINEERING PROJECT NUMBER: 31000-1-1470

DATE: 2/13/02

CORE IDENTIFICATION	TEST DATE	MOISTURE CONTENT (%)	ORIGINAL LENGTH (inches)	AVERAGED CORE DIAMETER (inches)	CROSS-SECTIONAL AREA (sq.inches)	CAPPED LENGTH (inches)	L/D	CORRECTION FACTOR	LOAD (lbs)	COMPRESSIVE STRENGTH (psi)	CORRECTED COMPRESSIVE STRENGTH (psi)
C-1	2-18-02		4.0	1.99	3.11	3.9	1.98	1.000	58500	18792	18792
C-5	2-18-02		3.9	1.99	3.11	3.9	1.98	1.000	23000	7395	7395
C-6	2-18-02		3.9	1.99	3.11	4.0	2.00	1.000	49000	15740	15740
C-9	2-18-02		3.9	1.99	3.11	3.9	1.96	1.000	28500	9173	9173

APPENDIX C
Page 2 of 3

L/D = CAPPED LENGTH / AVERAGED CORE DIAMETER (ROUNDED TO NEAREST 0.01 INCHES)
 COMPRESSIVE STRENGTH = LOAD / CROSS-SECTIONAL AREA
 CORRECTED COMPRESSIVE STRENGTH = COMPRESSIVE STRENGTH X CORRECTION FACTOR

RECORD ORIGINAL LENGTH AND CAPPED LENGTH TO NEAREST 0.1 INCHES.
 RECORD CORE DIAMETER (AVERAGE OF TWO MEASUREMENTS TAKEN AT RIGHT ANGLES TO EACH OTHER AT APPR. MIDHEIGHT OF SPECIMEN) TO THE NEAREST 0.01 INCHES,
 AND USE THIS VALUE TO DETERMINE AREA FOR STRENGTH CALCULATIONS. RECORD CROSS-SECTIONAL AREA TO THE NEAREST .01 IN.
 TESTING EQUIPMENT: REPORT CORRECTED COMPRESSIVE STRENGTH TO THE NEAREST 10 PSI.

CALIPERS: 0.615 REMARKS: C-5 had large voids present
 SCALES:
 OVEN:

TESTING DATASHEET/Concrete/Strength/DRILLED CORES-SPREAD.xls TECHNICIAN: AJM CALCULATIONS: BSC CHECKED BY: DCA

000 014 1018 1100/00
 11 1988 0175 1011K 017W 001PANT WITH NO.751 1338 TO 16305742909 P.04/04

Summary of Laboratory Tests
Splitting Tensile Strength of Intact Rock Core Specimens
Great Lakes
LAW Project 31000-1-1470

Specimen ID	Thickness (in.)	Diameter (in.)	Tensile Strength (psi)	Unit Weight (pcf)
C-2A	0.678	1.990	480	144.5
C-2A	0.625	1.990	501	153.7
C-2B	0.684	1.990	1422	162.4
C-2B	0.654	1.988	1125	163.4
C-3	0.725	1.990	675	154.3
C-3	0.657	1.990	755	153.8
C-4	0.737	1.988	649	156.7
C-4	0.701	1.990	523	155.8
C-5	0.689	1.990	1408	160.5
C-5	0.694	1.990	1433	161.9
C-6	0.730	1.986	800	155.9
C-6	0.688	1.990	959	153.9
C-7	0.726	1.990	1058	159.4
C-7	0.653	1.990	969	159.2
C-8	0.688	1.990	1095	156.4
C-8	0.683	1.990	1070	162.0
C-9	0.718	1.990	829	158.6
C-9	0.687	1.990	838	156.6

Samples were tested in general accordance with ASTM D 3967-95a for splitting tensile strength. Modifications include an average of two samples for tensile strength results.