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_____ November 2004

Final Survey/Data Report

Boston Harbor Deep Draft Navigation Improvement Project

Biological Resource Surveys Benthic Infauna Collection Survey

FINAL SURVEY/DATA REPORT
BOSTON HARBOR DEEP DRAFT NAVIGATION IMPROVEMENT PROJECT
BIOLOGICAL RESOURCE SURVEYS
BENTHIC INFAUNA COLLECTION SURVEY

Contract Number DACW33-03-D-004
Delivery Order No. 05

To:

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Battelle
The Business of Innovation

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- Appendix 3. Results of Grain Size and TOC Analyses

1.0 INTRODUCTION

On September 16 and 17, 2004 sediment grab sampling was conducted at 15 stations within five areas in and around Boston Harbor, MA. The five areas have been proposed for hard bottom habitat creation by the U. S. Army Corps of Engineers, New England District (USACE). The survey information will be used in conjunction with a sidescan survey and a sediment profile imaging (SPI) survey to describe the benthic community. The R/V *Aquamonitor*, owned and operated by Battelle Memorial Institute, served as a sampling platform for the survey. Mr. Robert Ryder captained the vessel. Survey personnel are shown in Table 1.

Table 1. Survey Personnel for Sediment Sampling.

Activity: Date:	Sediment Collection Survey September 16, 2004	Sediment Collection Survey September 17, 2004
Physical Oceanographer	C. Gagnon	C. Gagnon
Facilities Engineer	M. Fitzpatrick	M. Fitzpatrick
Marine Benthic Ecologist	L. Short	L. Short
Marine Benthic Ecologist	J. Fahey	J. Fahey
Marine Benthic Ecologist	T. Barber	
Boat Operator	R. Ryder	R. Ryder

This survey report describes the activities conducted during sampling and provides a synopsis of some preliminary observations from the survey. Figures 1 – 6 show actual sample collection locations. A description of survey methods is provided in Section 2. A chronological summary of survey activities for sediment sampling is provided in Section 3. Preliminary survey results are provided in Section 4. A description of survey problems and corrective actions, and recommendations for future surveys, can be found in Section 5.

2.0 METHODS

This survey involved collecting benthic infauna samples. Results will be used to (a) determine whether there are differences in benthic community and/or habitat parameters between sites, (b) determine whether there are differences in benthic community and/or habitat parameters associated with differences in grain size of the substrate, and (c) determine which sites are appropriate to support rock rubble by determining the surface and underlying sediment type. Ultimately this data will be used to rank sites for suitability for placement of rock for lobster habitat enhancement. Details on the survey/sampling methods can be found in the Survey Plan for Boston Harbor (Battelle, 2004).

2.1 Grab Sampling

Five areas were surveyed in and around Boston Harbor with three stations sampled per area. Station coordinates were determined based on sidescan work provided by CR Environmental

(Battelle 2004a) and SPI data collected by Diaz and Daughters (Battelle 2004b) in support of this project. Based on these surveys, three (3) stations were chosen to represent the range of soft bottom sediments within each area. At each of these stations sediment was collected for benthic infauna sample enumeration. Observations for each grab sample include a visual description of the grain size (e.g., silty sand, presence of gravel, etc.), estimate of apparent Redox Potential Depth (RPD), presence of surface features such as shells, mats, etc., presence of biota such as crabs or shellfish, presence of any layering, any problems encountered, and any other descriptive information noted. One grab sample per station was also collected for grain size and total organic carbon (TOC) analyses.

2.2 Processing

2.2.1 Infaunal Samples

Samples for infaunal analysis were collected with a 0.04-m² Young-modified van Veen grab sampler. After the sample was determined to be acceptable and the visual measurements were recorded, the entire sample was washed with filtered seawater from the sampler into a plastic bucket positioned beneath the grab. Any sediment adhering to the surface of the ruler after depth measurements were obtained was also rinsed back into the grab for processing with the remainder of the sample. Grab samples for infaunal analysis were rinsed with filtered seawater through 500- μ m mesh sieves. The samples retained on the screens were transferred to labeled jars and fixed in 10% formalin [10 parts saturated solution (37-40%) of aqueous formaldehyde to 90 parts sample/seawater]. No sample jar was more than ½ full of sieved sediment so that there was, at a minimum, an equal volume of 10% formalin/seawater solution overlying the sediment. One teaspoon of borax was added for each liter of fixed sample to buffer the formalin. The jar was gently turned around on its side to distribute the borax and formalin evenly throughout the sample. Sieving technicians initialed the survey log to identify themselves as the sample processor. Sieves were scrubbed with nylon brushes to remove any clinging material between samples. In between stations, the 0.04-m² grab sampler was cleaned with soap and water.

2.2.2 Grain Size and TOC Samples

One additional grab sample, as detailed above, was collected at each station. Two subsamples were taken from each these grab samples for analysis of grain size and total organic carbon (TOC). After the grab sample was deemed acceptable and the visual measurements were recorded, the overlying water was siphoned from the grab. The top two centimeters of sediment were removed with a Kynar-coated scoop and homogenized in a clean, glass bowl. The sediment was divided between two subsample containers and refrigerated (grain size, ~4°C) or frozen (TOC).

Station Logs for this study are provided in Appendix 1. Chain of Custody Logs are provided in Appendix 2.

2.3 Grain Size and TOC Analyses

Sediment samples for grain size and TOC analysis were collected from 15 stations. Grain size and TOC analyses were performed at Applied Marine Sciences (AMS) in League City, TX. Grain size samples were analyzed according to method National Oceanic and Atmospheric Administration (NOAA) EMAP protocol (NOAA 1993). TOC samples were analyzed according to EPA Method 9060. Original data sheets and quality control results are provided in Appendix 3.

2.4 Deviations

No deviations from the survey plan or proposed methods occurred.

3.0 SURVEY CHRONOLOGY

Note: All times are recorded as Eastern Daylight Time

Sediment Collection Survey: Thursday, September 16, 2004

- 0704 Perform navigation check. Depart for station MB1.
- 0750 Arrive station MB1: collect 4 good grabs. Proceed to station MB4.
- 0842 Arrive station MB4: collect 6 grabs (2 unacceptable). Proceed to station MB7.
- 0922 Arrive station MB7: collect 6 grabs (2 unacceptable). Proceed to station MA1.
- 1110 Arrive station MA1: collect 6 grabs (2 unacceptable). Proceed to station MA3.
- 1149 Arrive station MA3: collect 4 good grabs. Proceed to station MA7.
- 1217 Arrive station MA7: collect 4 good grabs. *Aquamonitor* developing steering problems. Proceed to station NR2.
- 1406 Arrive station NR2: collect 5 grabs (1 unacceptable). Proceed to station NR4.
- 1439 Arrive station NR4: collect 4 good grabs. Proceed to station NR7.
- 1502 Arrive station NR7: collect 4 good grabs. Proceed to Hewitts Cove Marina.
- 1545 Arrive Hewitts Cove. Perform navigation check.

Sediment Collection Survey: Friday, September 17, 2004

- 0930 Perform navigation check. Depart for station NB3. Late start due to repairs needed on *Aquamonitor* steering system.
- 1035 Arrive station NB3: collect 4 good grabs. Proceed to station NB5.
- 1058 Arrive station NB5: collect 4 good grabs. Proceed to station NB7.
- 1121 Arrive station NB7: collect 4 good grabs. Proceed to station BR1.
- 1200 Arrive station BR1: collect 6 grabs (2 unacceptable). Proceed to station BR3.
- 1238 Arrive station BR3: collect 6 grabs (2 unacceptable). Proceed to station BR6.
- 1316 Arrive station BR6: collect 5 grabs (1 unacceptable). Survey complete. Proceed to Hewitts Cove Marina.
- 1440 Arrive Hewitts Cove. Perform navigation check.

4.0 SURVEY RESULTS

4.1 Grab Sample Collection Information

Sediment samples were collected at 15 planned locations in and around Boston Harbor. Three separate grabs were collected for benthic infauna analyses and one grab was collected for sediment analyses. Sampling was completed in two days. Station coordinates are provided in Table 2. The date, time and location were recorded and linked to a specific sample ID.

Table 2. Benthic Infauna Station Coordinates.

Site	Station ID	Sample ID	Longitude	Latitude	Sample/Date/Time	Depth (m)
Broad Sound	BR1	11D41068	-70.9050	42.4070	09/17/2004 12:09:05	26.20
	BR1	11D41069	-70.9047	42.4069	09/17/2004 12:15:24	26.50
	BR1	11D4106B	-70.9046	42.4070	09/17/2004 12:25:12	26.50
	BR1	11D4106C	-70.9047	42.4070	09/17/2004 12:31:30	26.70
	BR3	11D41071	-70.8926	42.4086	09/17/2004 12:47:04	29.60
	BR3	11D41072	-70.8927	42.4085	09/17/2004 12:53:04	29.50
	BR3	11D41073	-70.8927	42.4085	09/17/2004 12:59:18	29.50
	BR3	11D41076	-70.8924	42.4085	09/17/2004 13:09:27	29.60
	BR6	11D4107B	-70.8940	42.3964	09/17/2004 13:25:42	28.20
	BR6	11D4107C	-70.8940	42.3964	09/17/2004 13:31:32	28.20
	BR6	11D4107D	-70.8942	42.3964	09/17/2004 13:38:12	28.20
	BR6	11D4107E	-70.8939	42.3964	09/17/2004 13:43:54	28.00
Magnolia	MA1	11D41023	-70.7510	42.5649	09/16/2004 11:17:41	18.70
	MA1	11D41026	-70.7510	42.5650	09/16/2004 11:31:00	18.90
	MA1	11D41027	-70.7510	42.5652	09/16/2004 11:36:57	18.50
	MA1	11D41028	-70.7511	42.5651	09/16/2004 11:41:55	18.70
	MA3	11D4102C	-70.7525	42.5560	09/16/2004 11:52:53	25.50
	MA3	11D4102D	-70.7525	42.5561	09/16/2004 11:58:28	25.50
	MA3	11D4102E	-70.7524	42.5559	09/16/2004 12:04:43	25.60
	MA3	11D4102F	-70.7524	42.5561	09/16/2004 12:10:20	25.50
	MA7	11D41033	-70.7390	42.5532	09/16/2004 12:19:31	30.40
	MA7	11D41034	-70.7391	42.5533	09/16/2004 12:26:04	30.50
	MA7	11D41035	-70.7392	42.5532	09/16/2004 12:32:04	30.50
	MA7	11D41036	-70.7390	42.5532	09/16/2004 12:38:06	30.50
Mass Bay	MB1	11D41003	-70.8201	42.3477	09/16/2004 7:57:49	31.90
	MB1	11D41004	-70.8201	42.3477	09/16/2004 8:08:47	32.00
	MB1	11D41006	-70.8200	42.3476	09/16/2004 8:20:19	31.90
	MB1	11D41007	-70.8200	42.3475	09/16/2004 8:28:27	31.80
	MB4	11D4100E	-70.8159	42.3445	09/16/2004 8:47:27	32.90
	MB4	11D41014	-70.8158	42.3443	09/16/2004 9:00:59	33.10

Site	Station ID	Sample ID	Longitude	Latitude	Sample/Date/Time	Depth (m)
	MB4	11D41015	-70.8158	42.3443	09/16/2004 9:07:47	33.30
	MB4	11D41016	-70.8158	42.3444	09/16/2004 9:13:55	33.30
	MB7	11D4101C	-70.8035	42.3432	09/16/2004 9:34:48	35.20
	MB7	11D4101D	-70.8032	42.3432	09/16/2004 9:41:39	35.30
	MB7	11D4101E	-70.8035	42.3433	09/16/2004 9:48:02	35.30
	MB7	11D4101F	-70.8034	42.3433	09/16/2004 9:56:01	35.30
Nahant Bay	NB3	11D41052	-70.9138	42.4503	09/17/2004 10:36:53	10.40
	NB3	11D41053	-70.9137	42.4503	09/17/2004 10:42:05	10.60
	NB3	11D41054	-70.9136	42.4504	09/17/2004 10:46:44	10.60
	NB3	11D41055	-70.9136	42.4502	09/17/2004 10:50:39	10.70
	NB5	11D41059	-70.8979	42.4435	09/17/2004 11:01:21	22.00
	NB5	11D4105A	-70.8979	42.4434	09/17/2004 11:06:59	22.20
	NB5	11D4105B	-70.8979	42.4434	09/17/2004 11:11:25	22.50
	NB5	11D4105C	-70.8979	42.4434	09/17/2004 11:16:21	22.30
	NB7	11D41060	-70.8922	42.4473	09/17/2004 11:25:58	23.30
	NB7	11D41061	-70.8920	42.4473	09/17/2004 11:32:11	23.60
	NB7	11D41062	-70.8922	42.4473	09/17/2004 11:38:20	23.50
	NB7	11D41063	-70.8921	42.4472	09/17/2004 11:44:29	23.60
Nantasket Roads	NR2	11D4103B	-70.9424	42.3104	09/16/2004 14:14:45	11.50
	NR2	11D4103C	-70.9421	42.3105	09/16/2004 14:20:18	11.20
	NR2	11D4103D	-70.9422	42.3108	09/16/2004 14:24:53	10.70
	NR2	11D4103E	-70.9422	42.3107	09/16/2004 14:29:04	10.80
	NR4	11D41042	-70.9581	42.2986	09/16/2004 14:40:33	8.80
	NR4	11D41043	-70.9583	42.2985	09/16/2004 14:45:04	8.50
	NR4	11D41044	-70.9581	42.2985	09/16/2004 14:50:16	8.50
	NR4	11D41045	-70.9579	42.2987	09/16/2004 14:55:36	8.80
	NR7	11D41049	-70.9626	42.2897	09/16/2004 15:04:36	6.70
	NR7	11D4104A	-70.9622	42.2896	09/16/2004 15:12:04	6.80
	NR7	11D4104B	-70.9623	42.2896	09/16/2004 15:17:02	6.60
	NR7	11D4104C	-70.9624	42.2895	09/16/2004 15:21:45	6.60

4.2 Grain Size and TOC Results

Tables 3 and 4 summarize the results of the TOC and grain size analyses, respectively. Results for quality control samples were all within method specific criteria. Appendix 3 contains the original data sheets for all samples and includes the results of all QC samples.

Table 3. Results of TOC Analyses.

Site	Station ID	Battelle ID	AMS ID	TOC (%)
Mass Bay	MB1	11D41007TC1 MB1	20749	0.84
	MB4	11D41016TC1 MB4	20750	0.90
	MB7	11D4101FTC1 MB7	20751	3.05
Magnolia	MA1	11D41028TC1 MA1	20752	0.22
	MA3	11D4102FTC1 MA3	20753	0.22
	MA7	11D41036TC1 MA7	20754	0.21
Nantasket Roads	NR2	11D4103ETC1 NR2	20755	2.31
	NR4	11D41045TC1 NR4	20756	1.24
	NR7	11D4104CTC1 NR7	20757	2.01
Nahant Bay	NB3	11D41055TC1 NB3	20758	0.09
	NB5	11D4105CTC1 NB5	20759	1.16
	NB7	11D41063TC1 NB7	20760	0.27
Broad Sound	BR1	11D4106CTC1 BR1	20761	0.52
	BR3	11D41076TC1 BR3	20762	1.30
	BR6	11D4107ETC1 BR6	20763	1.86

Table 4. Results of Grain Size Analyses.

Site	Station ID	Gravel (>1 ϕ) (%)	V. Cs Sand (0 ϕ) (%)	Coarse Sand (1 ϕ) (%)	Medium Sand (2 ϕ) (%)	Fine Sand (3 ϕ) (%)	V. Fine Sand (4 ϕ) (%)	Silt (5-7 ϕ) (%)	Clay (<8 ϕ) (%)
Mass Bay	MB1	0.25	0.42	1.17	3.54	26.42	25.88	29.34	12.97
	MB4	1.08	0.11	0.41	1.35	12.07	34.19	33.16	17.64
	MB7	0.00	0.05	0.12	2.33	8.13	5.36	42.89	41.12
Magnolia	MA1	0.05	0.12	0.27	2.77	33.24	52.57	8.94	2.04
	MA3	0.11	0.04	0.03	0.12	7.79	67.61	21.66	2.64
	MA7	0.01	0.01	0.08	0.98	6.91	68.64	20.14	3.23
Nantasket Roads	NR2	0.56	0.20	0.11	0.59	5.33	24.42	35.96	32.84
	NR4	0.53	0.15	0.78	2.01	12.46	35.40	26.79	21.89
	NR7	0.00	0.25	1.69	2.31	13.39	32.43	29.03	20.91
Nahant Bay	NB3	0.05	0.02	0.27	1.57	19.11	75.61	2.18	1.18
	NB5	0.00	0.01	0.03	0.24	11.03	45.84	32.75	10.09
	NB7	0.02	0.07	0.05	0.37	20.37	59.18	15.63	4.31
Broad Sound	BR1	0.00	0.16	0.34	2.10	10.12	48.51	32.20	6.57
	BR3	0.05	0.09	0.25	0.90	7.41	25.03	50.92	15.35
	BR6	0.00	0.08	0.19	0.62	5.84	15.42	53.93	23.92

5.0 PROBLEMS EXPERIENCED, ACTIONS TAKEN, AND RECOMMENDATIONS

5.1 Technical

No problems were experienced during the sampling operation

6.0 REFERENCES

Battelle 2004. Survey Plan for Boston Harbor Deep Draft Navigation Improvement Project. Biological Resource Surveys Task 11D. Revision Number 1.0. September 2004.

Battelle 2004a. Boston Harbor Deep Draft Navigation Improvement Project Biological Resource Surveys, 11A Sidescan Report. October 2004. Draft.

Battelle 2004b. Boston Harbor Deep Draft Navigation Improvement Project Biological Resource Surveys, *Task 11B* Sediment Profile Imaging (SPI) Survey. October 2004. Draft.

NOAA. 1993. Comprehensive descriptions of complementary measurements. Sampling and Analytical Methods of the National Status and Trends Program, National Benthic Surveillance and Mussel Watch Projects, 1984-1992 (Volume II). NOAA Technical Memorandum NOS/ORCA/CMBAD 71. pp II.15 to II.22.

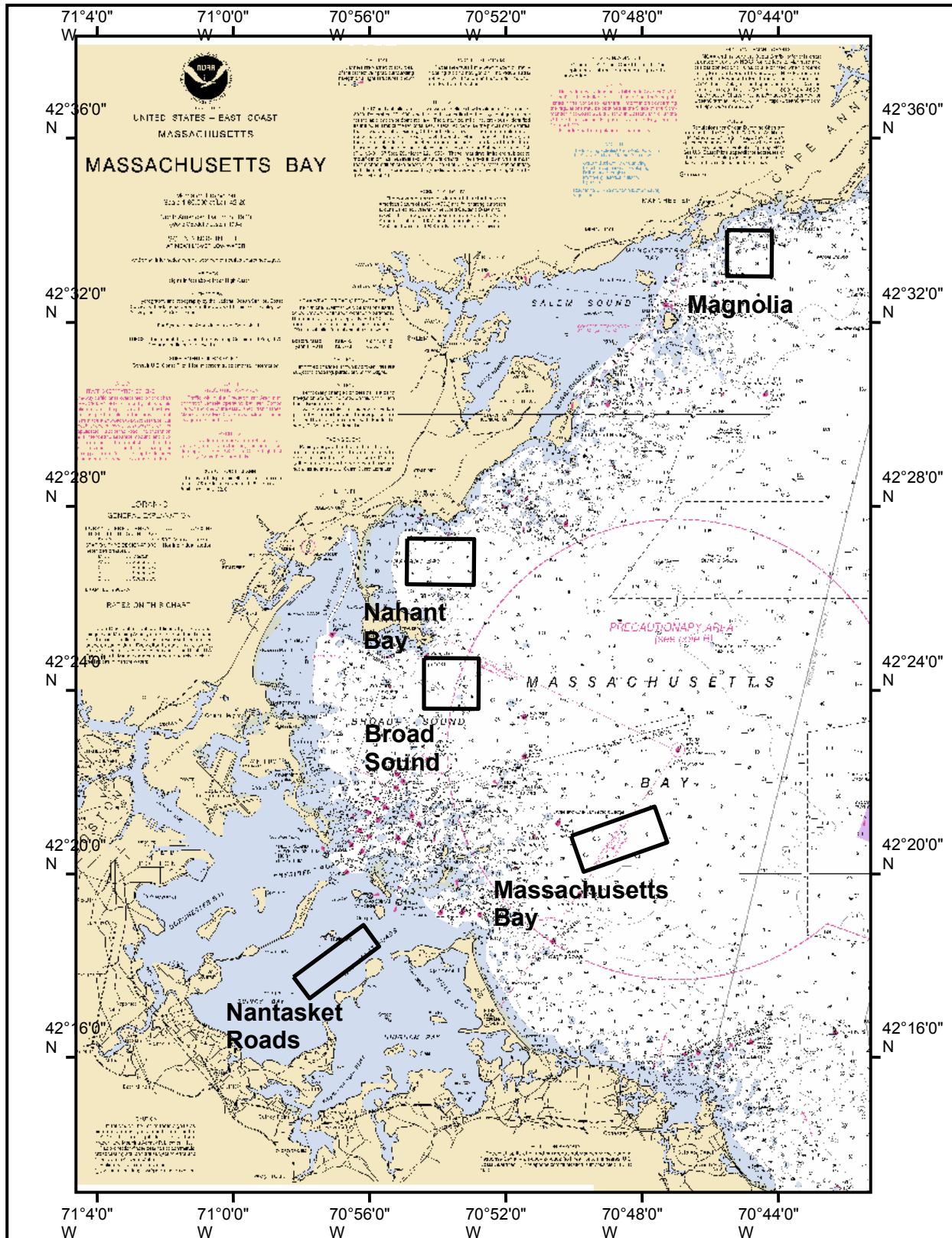


Figure 1. Benthic Sampling Areas.

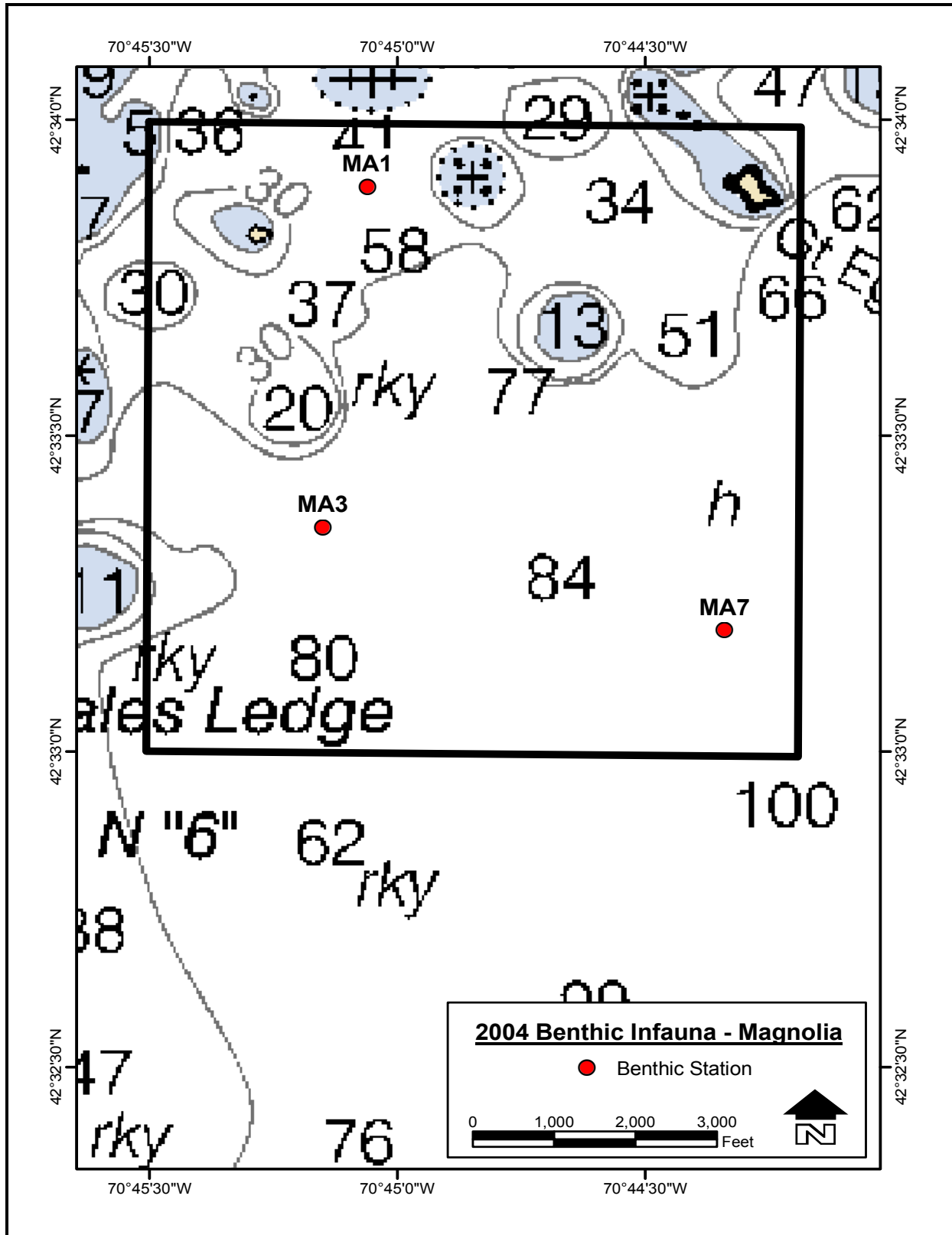


Figure 2. Benthic Stations, Magnolia.

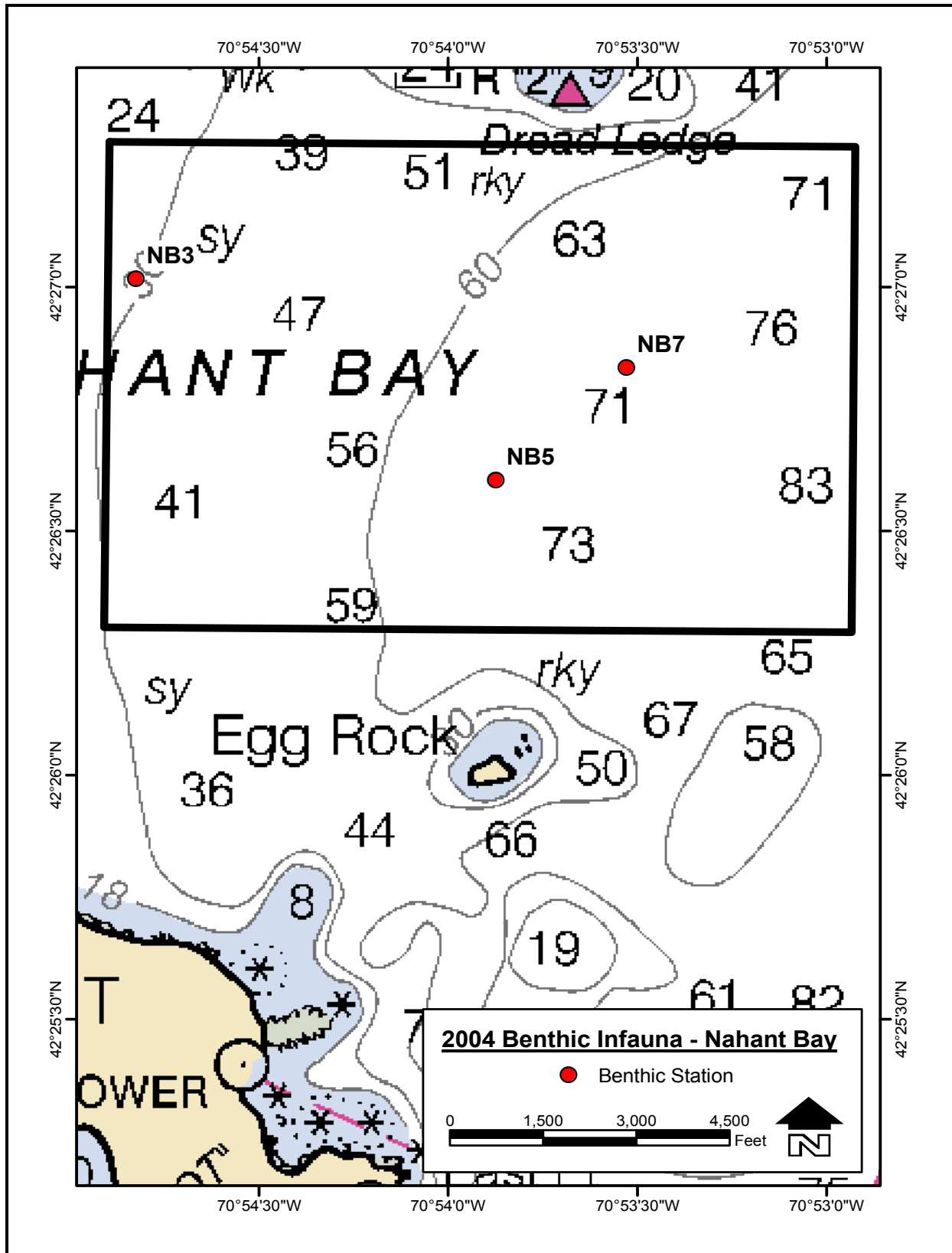


Figure 3. Benthic Stations, Nahant Bay.

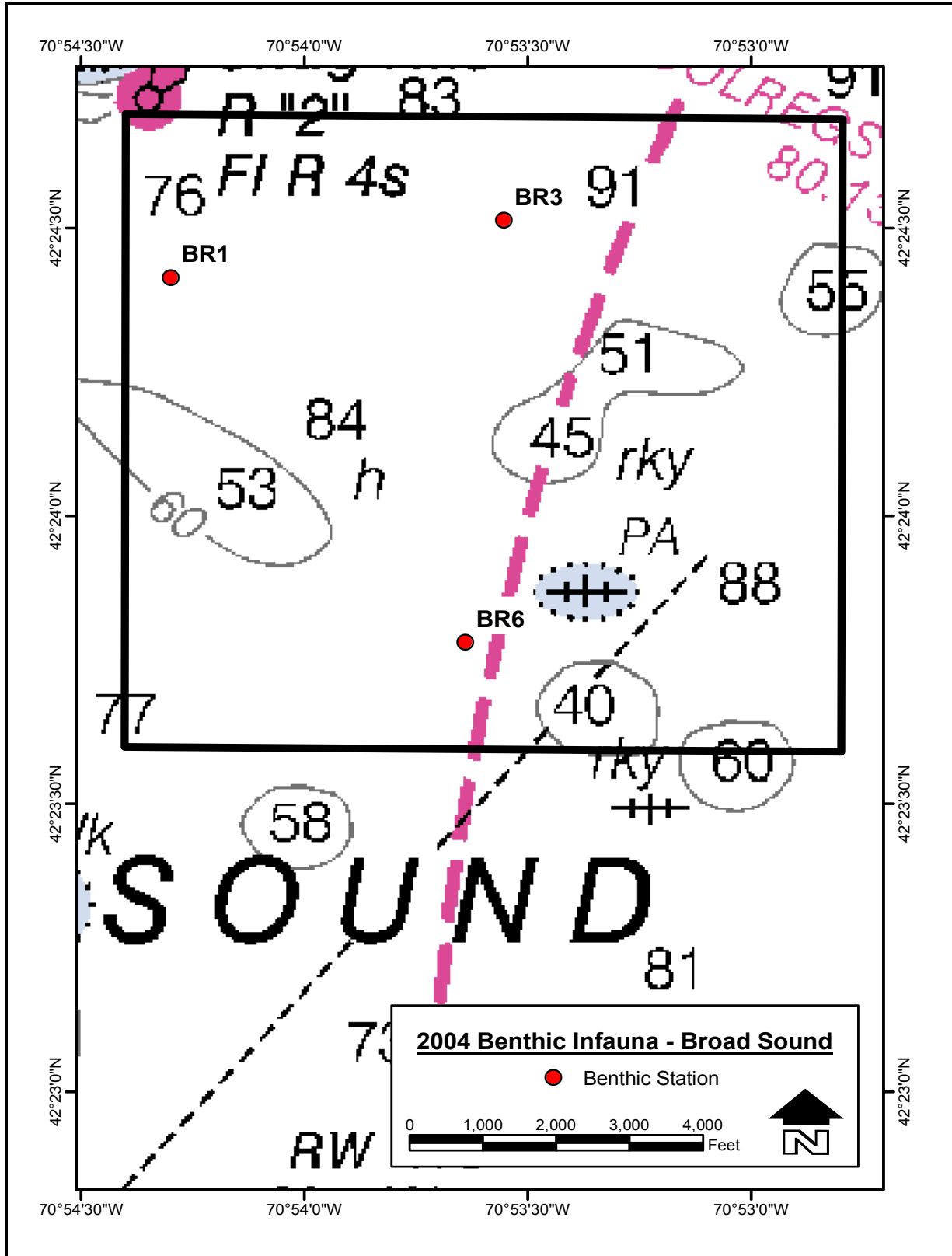


Figure 4. Benthic Stations, Broad Sound.

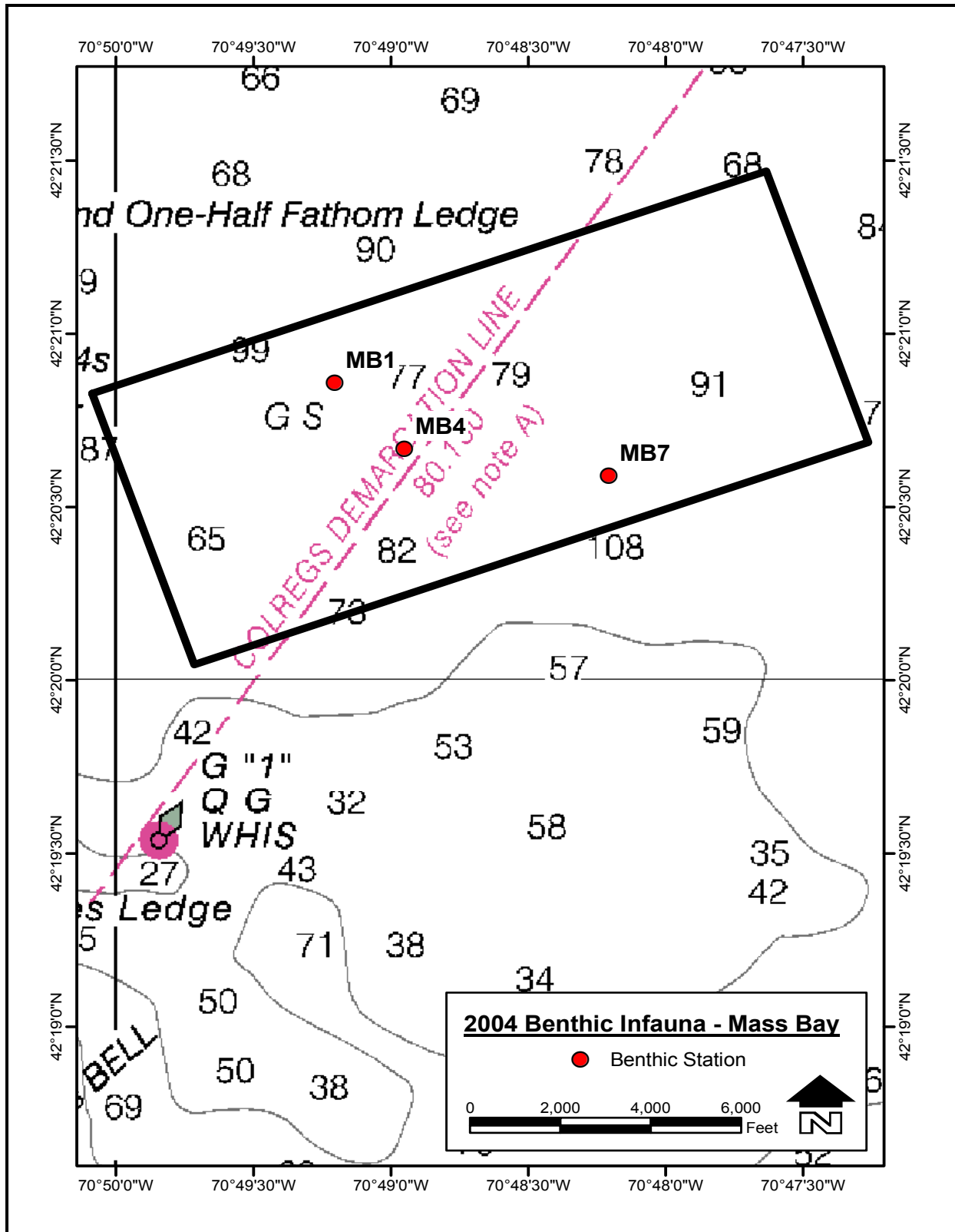


Figure 5. Benthic Stations, Massachusetts Bay.

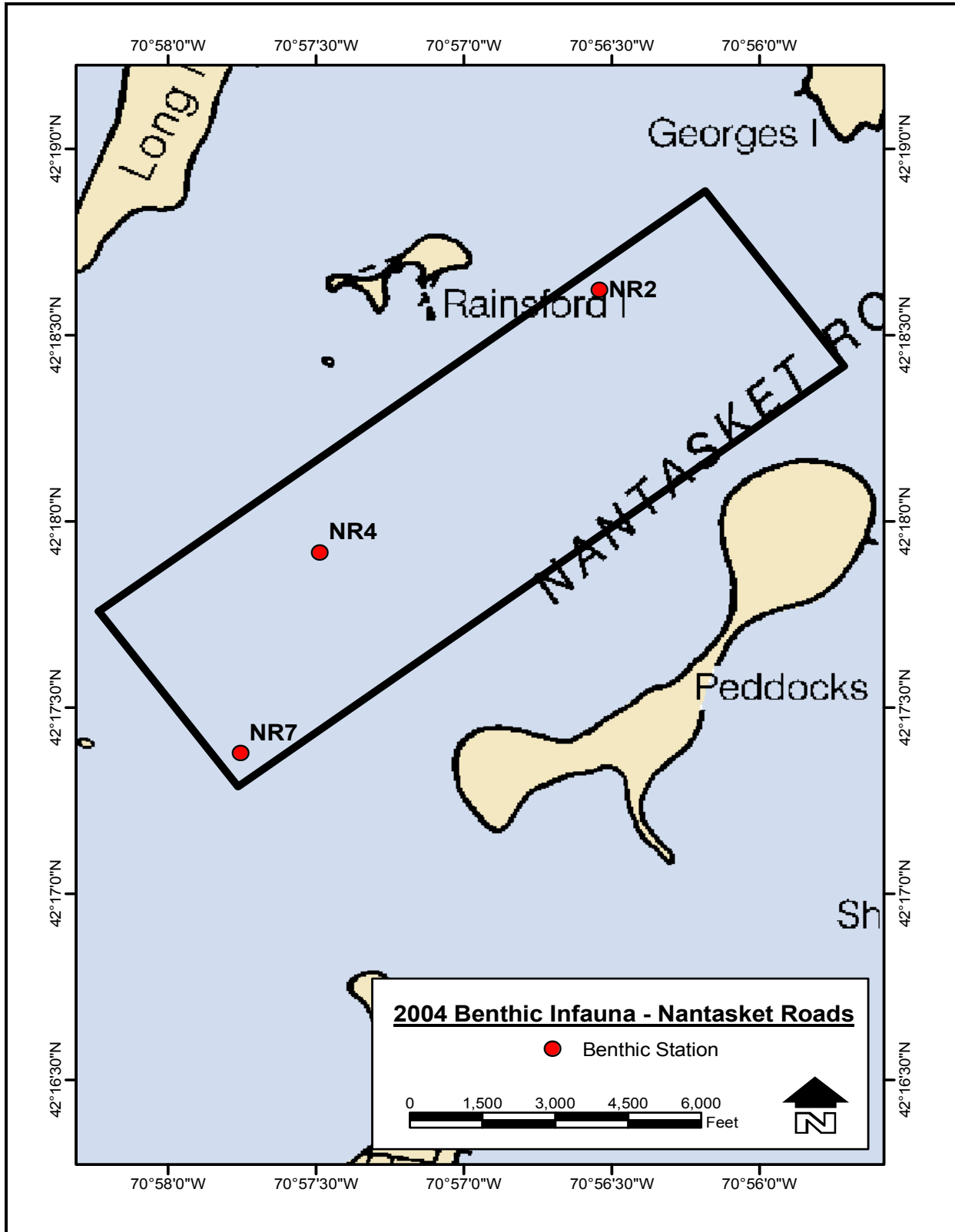







Figure 6. Benthic Stations, Nantasket Roads.

Appendix 1






Field Station Logs

**Station Log for USACE Boston Harbor Biological Research SPI Survey - Project G606405
Boston Harbor Deep Draft Improvement Project - Contract No. DACW33-01-0004**



Survey ID: 11D41	Sample ID Label	Field Measurements
Station ID: MB1	 Di 11D41002 Station Log Survey: 11D41 Station: MB1 Bright White 9/16/2004 7:50:22 AM Depth: -999 -70.81997 42.34777 T	Station Depth (M): 32
On Station		Weather: Cloudy
Date: 9/16/04		Winds: light + variable
Time: 750		Sea: Calm
757 good	 11D41003 Station Log Survey: 11D41 Station: MB1 Light Red 9/16/2004 7:57:49 AM Depth: -999 -70.82008 42.34768	Recorded by: MRP
		Grab Size: 0.04-m ²
		Grab penetration (cm): 10
		Redox Depth (cm): 1.5
		Sediment Texture: fine sandy silt
		Analyses: Infauna
	Comments: slightly OP, tubes, shell hash, olive	
Sieved by: TB		
806 good	 11D41004 Station Log Survey: 11D41 Station: MB1 Light Yellow 9/16/2004 8:08:47 AM Depth: -999 -70.82005 42.34768	Grab Size: 0.04-m ²
		Grab penetration (cm): 9.5
		Redox Depth (cm): 1.3
		Sediment Texture: fine sandy silt
		Analyses: Infauna
	Comments: tubes, olive	
Sieved by: TF		
0814 OP 0820 good	 11D41006 Station Log Survey: 11D41 Station: MB1 Light Green 9/16/2004 8:20:19 AM Depth: -999 -70.81997 42.34758	Grab Size: 0.04-m ²
		Grab penetration (cm): 9.5
		Redox Depth (cm): 1.5
		Sediment Texture: fine sandy silt
		Analyses: Infauna
	Comments: slightly op on 1 side, olive	
Sieved by: TR		
0828 good	 11D41007 Station Log Survey: 11D41 Station: MB1 Light Blue 9/16/2004 8:28:27 AM Depth: -999 -70.81997 42.34755	Grab Size: 0.04-m ²
		Grab penetration (cm): 9.5
		Redox Depth (cm): 1.5
		Sediment Texture: fine sand, silt
		Analyses: TC, GS
	Comments: slightly op, 1 barrel, tubes, olive	
Collected by: LS		

Depart HCM @ 0704


Station Log for USACE Boston Harbor Biological Research SPI Survey - Project G606405
Boston Harbor Deep Draft Improvement Project - Contract No. DACW33-01-0004

Survey ID: 11D41	Sample ID Label	Field Measurements
Station ID: MB4	 D: 11D4100C Station Log T: Survey: 11D41 Station: MB4 Bright White 9/16/2004 8:42:32 AM Depth: -999 -70.81580 42.34440	Station Depth (M): 33
On Station		Weather: Cloudy
Date: 9/16/04		Winds: light variable
Time: 0842		Sea: None
		Recorded by: MRF
NGEP 0842	 11D4100E Station Log Survey: 11D41 Station: MB4 Light Red 9/16/2004 8:47:27 AM Depth: -999 -70.81586 42.34450	Grab Size: 0.04-m ²
Good 0847		Grab penetration (cm): 9.5
		Redox Depth (cm): .5
		Sediment Texture: fine silty sand
		Analyses: Infauna sandy silt
	Comments: tubes, olive, slightly OP	
Sieved by: LS		
NGEP 0854	 11D41014 Station Log Survey: 11D41 Station: MB4 Light Yellow 9/16/2004 9:00:59 AM Depth: -999 -70.81577 42.34428	Grab Size: 0.04-m ²
Good 0900		Grab penetration (cm): 9.5
		Redox Depth (cm): just below surface
		Sediment Texture: fine sandy silt
		Analyses: Infauna
	Comments: tubes, some shell hash, burrow, olive	
Sieved by: TB		
Good 0907	 11D41015 Station Log Survey: 11D41 Station: MB4 Light Green 9/16/2004 9:07:47 AM Depth: -999 -70.81580 42.34432	Grab Size: 0.04-m ²
		Grab penetration (cm): 9
		Redox Depth (cm): 1.5
		Sediment Texture: fine sandy silt
		Analyses: Infauna
	Comments: tubes, olive	
Sieved by: LS		
Good 0913	 11D41016 Station Log Survey: 11D41 Station: MB4 Light Blue 9/16/2004 9:13:55 AM Depth: -999 -70.81575 42.34437	Grab Size: 0.04-m ²
		Grab penetration (cm): 9.5
		Redox Depth (cm): 1.5
		Sediment Texture: fine sandy silt
		Analyses: TC, GS
	Comments:	
Collected by: JF		


**Station Log for USACE Boston Harbor Biological Research SPI Survey - Project G606405
Boston Harbor Deep Draft Improvement Project - Contract No. DACW33-01-0004**

Survey ID: 11D41	Sample ID Label	Field Measurements
Station ID: MB7	 11D41019 Station Log Survey: 11D41 Station: MB7 Bright White 9/16/2004 9:22:08 AM Depth: -999 -70.80327 42.34338	Station Depth (M): 3.5
On Station		Weather: Cloudy
Date: 9/16/04		Winds: light variable
Time: 0922		Sea: None
NO CP 0924	 11D4101C Station Log Survey: 11D41 Station: MB7 Light Red 9/16/2004 9:34:48 AM Depth: -999 -70.80347 42.34324	Recorded by: MRF
NO CP 0929		Grab Size: 0.04-m ²
good 0934		Grab penetration (cm): 9.5
		Redox Depth (cm): 1
		Sediment Texture: fine silty sand
		Analyses: Infauna sandy silt


Comments: tubes, olive-brown

Sieved by: JF	 11D4101D Station Log Survey: 11D41 Station: MB7 Light Yellow 9/16/2004 9:41:39 AM Depth: -999 -70.80318 42.34322	Grab Size: 0.04-m ²
good 0941		Grab penetration (cm): 9.5
		Redox Depth (cm): 1.5
		Sediment Texture: fine silty sand
		Analyses: Infauna sandy silt

Comments: tubes, olive

Sieved by: TB	 11D4101E Station Log Survey: 11D41 Station: MB7 Light Green 9/16/2004 9:48:02 AM Depth: -999 -70.80347 42.34333	Grab Size: 0.04-m ²
good 0946		Grab penetration (cm): 10
		Redox Depth (cm): 4.5 sandy silt
		Sediment Texture: fine silt
		Analyses: Infauna

Comments: slightly UP, some tubes, olive






Sieved by: JF	 11D4101F Station Log Survey: 11D41 Station: MB7 Light Blue 9/16/2004 9:56:01 AM Depth: -999 -70.80338 42.34327	Grab Size: 0.04-m ²
good 0956		Grab penetration (cm): 8.5
		Redox Depth (cm): 1
		Sediment Texture: fine sandy silt
		Analyses: TC, GS

Comments: 1 large amphipod, burrow, tubes

Collected by: LS used 1 weight + the shoe






Depart for Magnolia 0957

**Station Log for USACE Boston Harbor Biological Research SPI Survey - Project G606405
Boston Harbor Deep Draft Improvement Project - Contract No. DACW33-01-0004**

Survey ID: 11D41	Sample ID Label	Field Measurements
Station ID: <i>MA1</i>	 11D41022 Station Log Survey: 11D41 Station: MA1 Bright White 9/16/2004 11:10:29 AM Depth: -95 -70.75087 42.56507	Station Depth (M): <u>18.5</u>
On Station		Weather: <u>cloudy</u>
Date: <u>9/16/04</u>		Winds: <u>SE - 5</u>
Time: <u>1100</u>		Sea: <u>light swell (1' or less)</u>
<i>good 1117</i>	 11D41023 Station Log Survey: 11D41 Station: MA1 Light Red 9/16/2004 11:17:41 AM Depth: -95 -70.75100 42.56495	Recorded by: <u>ARF</u>
		Grab Size: 0.04-m ²
		Grab penetration (cm): <u>6</u>
		Redox Depth (cm): <u>2</u>
		Sediment Texture: <u>fine sand</u>
		Analyses: Infauna
	Comments: <u>shell hash, sand dollars, vegetation, 1 lg tube</u>	
Sieved by: <u>TB</u>	<u>1 lg amphipod (used shoe and weights remove shoe)</u>	
<i>no good 1122</i>	 11D41026 Station Log Survey: 11D41 Station: MA1 Light Yellow 9/16/2004 11:31:00 AM Depth: -95 -70.75103 42.56505	Grab Size: 0.04-m ²
<i>no good 1127</i>		Grab penetration (cm): <u>8.5</u>
<i>good 1131</i>		Redox Depth (cm): <u>variable 5-3</u>
		Sediment Texture: <u>fine sand</u>
		Analyses: Infauna
	Comments: <u>slightly sloped on 1 side, shell hash, sand dollars, tubes</u>	
Sieved by: <u>LS</u>		
<i>good 1136</i>	 11D41027 Station Log Survey: 11D41 Station: MA1 Light Green 9/16/2004 11:36:57 AM Depth: -95 -70.75101 42.56522	Grab Size: 0.04-m ²
		Grab penetration (cm): <u>7.5</u>
		Redox Depth (cm): <u>~1</u>
		Sediment Texture: <u>fine sand</u>
		Analyses: Infauna
	Comments: <u>slightly sloped on 1 side, shell hash, sand dollars, tubes</u>	
Sieved by: <u>JF</u>		
<i>good 1141</i>	 11D41028 Station Log Survey: 11D41 Station: MA1 Light Blue 9/16/2004 11:41:55 AM Depth: -95 -70.75108 42.56513	Grab Size: 0.04-m ²
		Grab penetration (cm): <u>6.5</u>
		Redox Depth (cm): <u>1.5</u>
		Sediment Texture: <u>fine sand</u>
		Analyses: TC, GS
	Comments: <u>shell hash, tubes, sand dollars, amphipods</u>	
Collected by:		






Depart for MA3 @ 1143

**Station Log for USACE Boston Harbor Biological Research SPI Survey - Project G606405
Boston Harbor Deep Draft Improvement Project - Contract No. DACW33-01-0004**

Survey ID: 11D41	Sample ID Label	Field Measurements
Station ID: <i>MA3</i>	 11D4102B Station Log Survey: 11D41 Station: MA3 Bright White 9/16/2004 11:49:52 AM Depth: -96 -70.75237 42.55580	Station Depth (M): <i>25.5</i>
On Station		Weather: <i>cloudy</i>
Date: <i>9/16/04</i>		Winds: <i>light SE</i>
Time: <i>1149</i>		Sea: <i>~ 1' swell</i>
<i>good</i>	 11D4102C Station Log Survey: 11D41 Station: MA3 Light Red 9/16/2004 11:52:53 AM Depth: -99 -70.75250 42.55597	Recorded by: <i>MRF</i>
		Grab Size: 0.04-m ²
		Grab penetration (cm): <i>7.5</i>
		Redox Depth (cm): <i>0.5</i>
		Sediment Texture: <i>Fine sandy silt w/ clay</i>
		Analyses: Infauna
	Comments: <i>sloped on both sides, tubes, shell hash, 1 sm. crab</i>	
Sieved by: <i>TB</i>		
<i>good 1158</i>	 11D4102D Station Log Survey: 11D41 Station: MA3 Light Yellow 9/16/2004 11:58:28 AM Depth: -96 -70.75246 42.55613	Grab Size: 0.04-m ²
		Grab penetration (cm): <i>9</i>
		Redox Depth (cm): <i>0.2</i>
		Sediment Texture: <i>Silt w/ a little fine s.</i>
		Analyses: Infauna
	Comments: <i>Slightly OP, shell hash, tubes, amphipods</i>	
Sieved by: <i>TB</i>		
<i>good 1209</i>	 11D4102E Station Log Survey: 11D41 Station: MA3 Light Green 9/16/2004 12:04:43 PM Depth: -99 -70.75242 42.55588	Grab Size: 0.04-m ²
		Grab penetration (cm): <i>8.5</i>
		Redox Depth (cm): <i>0.5</i>
		Sediment Texture: <i>Fine sandy silt</i>
		Analyses: Infauna
	Comments: <i>sloped on both sides, tubes, shell hash</i>	
Sieved by: <i>JP</i>		
<i>good 1210</i>	 11D4102F Station Log Survey: 11D41 Station: MA3 Light Blue 9/16/2004 12:10:20 PM Depth: -99 -70.75240 42.55608	Grab Size: 0.04-m ²
		Grab penetration (cm): <i>8.5</i>
		Redox Depth (cm): <i>0.2</i>
		Sediment Texture: <i>Fine sandy silt</i>
		Analyses: TC, GS
	Comments: <i>sloped on both sides and OP in center, tubes, shell hash</i>	
Collected by: <i>LS</i>		






Depart for MA7 @ 1214

**Station Log for USACE Boston Harbor Biological Research SPI Survey - Project G606405
Boston Harbor Deep Draft Improvement Project - Contract No. DACW33-01-0004**

Survey ID: 11D41	Sample ID Label	Field Measurements
Station ID: MA7	 11D41032 Station Log Survey: 11D41 Station: MA7 Bright White 9/16/2004 12:17:34 PM Depth: -95 -70.73925 42.55327	Station Depth (M): 30.5
On Station		Weather: cloudy
Date: 9/16/04		Winds: SE ~ 5
Time: 1217		Sea: 1' swell
good 1219	 11D41033 Station Log Survey: 11D41 Station: MA7 Light Red 9/16/2004 12:19:31 PM Depth: -95 -70.73900 42.55325	Recorded by: MRF
		Grab Size: 0.04-m ²
		Grab penetration (cm): 7
		Redox Depth (cm): 1.5
		Sediment Texture: fine sand w/ clay
		Analyses: Infauna
	Comments: slightly sloped on both sides, tubes, worms	
Sieved by: LS		
good 1226	 11D41034 Station Log Survey: 11D41 Station: MA7 Light Yellow 9/16/2004 12:26:04 PM Depth: -95 -70.73911 42.55327	Grab Size: 0.04-m ²
		Grab penetration (cm): 6
		Redox Depth (cm): 1.5
		Sediment Texture: clay + fine sand w/ clay
		Analyses: Infauna
	Comments: tubes, vegetation, some shells	
Sieved by: TB		
good 1232	 11D41035 Station Log Survey: 11D41 Station: MA7 Light Green 9/16/2004 12:32:04 PM Depth: -95 -70.73922 42.55323	Grab Size: 0.04-m ²
		Grab penetration (cm): 8
		Redox Depth (cm): 1
		Sediment Texture: fine sand w/ clay
		Analyses: Infauna
	Comments: slightly sloped on both sides, tubes, amphipods	
Sieved by:		
1238	 11D41036 Station Log Survey: 11D41 Station: MA7 Light Blue 9/16/2004 12:38:06 PM Depth: -95 -70.73898 42.55317	Grab Size: 0.04-m ²
		Grab penetration (cm): 7
		Redox Depth (cm): 1.5
		Sediment Texture: fine sand w/ clay
		Analyses: TC, GS
	Comments: slightly sloped on both sides, tubes, vegetation	
Collected by:		

Depart for Naticket @ 1240

Station Log for USACE Boston Harbor Biological Research SPI Survey - Project G606405
Boston Harbor Deep Draft Improvement Project - Contract No. DACW33-01-0004






Survey ID: 11D41	Sample ID Label	Field Measurements
Station ID: <i>NR2</i>	 D 11D41039 Station Log T Survey: 11D41 Station: NR2 Bright White 9/16/2004 2:06:07 PM Depth: -999 -70.94195 42.31063	Station Depth (M): <i>11</i>
On Station		Weather: <i>Cloudy</i>
Date: <i>9/16/04</i>		Winds: <i>S 5-10</i>
Time: <i>1706</i>		Sea: <i>< 1'</i>
		Recorded by: <i>MRF</i>
OP <i>1409</i> good <i>1414</i>	 11D4103B Station Log Survey: 11D41 Station: NR2 Light Red 9/16/2004 2:14:45 PM Depth: -999 -70.94235 42.31042	Grab Size: 0.04-m ²
		Grab penetration (cm): <i>10</i>
		Redox Depth (cm): <i>none apparent</i>
		Sediment Texture: <i>fine sandy silt</i>
		Analyses: Infauna
	Comments: <i>Slightly OP, tube mat, small crabs</i>	
Sieved by: <i>TR</i>	 11D4103C Station Log Survey: 11D41 Station: NR2 Light Yellow 9/16/2004 2:20:18 PM Depth: -999 -70.94213 42.31050	Grab Size: 0.04-m ²
good <i>1420</i>		Grab penetration (cm): <i>8.5</i>
		Redox Depth (cm): <i>none apparent</i>
		Sediment Texture: <i>fine sandy silt</i>
		Analyses: Infauna
	Comments: <i>Shell hash, tube mat, small crabs</i>	
Sieved by: <i>vs</i>	 11D4103D Station Log Survey: 11D41 Station: NR2 Light Green 9/16/2004 2:24:53 PM Depth: -999 -70.94220 42.31077	Grab Size: 0.04-m ²
good <i>1424</i>		Grab penetration (cm): <i>8.5</i>
		Redox Depth (cm): <i>none apparent</i>
		Sediment Texture: <i>fine sandy silt</i>
		Analyses: Infauna
	Comments: <i>Shell hash, tube mat, small crab</i>	
Sieved by:	 11D4103E Station Log Survey: 11D41 Station: NR2 Light Blue 9/16/2004 2:29:04 PM Depth: -999 -70.94223 42.31067	Grab Size: 0.04-m ²
good <i>1429</i>		Grab penetration (cm): <i>7.5</i>
		Redox Depth (cm): <i>none apparent</i>
		Sediment Texture: <i>fine sandy silt</i>
		Analyses: TC, GS
	Comments: <i>Shell hash, tube mat, small crab</i>	

add shoe

Collected by: *TR/CG*

Depart for NR4 @ 1431

**Station Log for USACE Boston Harbor Biological Research SPI Survey - Project G606405
Boston Harbor Deep Draft Improvement Project - Contract No. DACW33-01-0004**

Survey ID: 11D41	Sample ID Label	Field Measurements
Station ID: NR4	 11D41041 Station Log Survey: 11D41 Station: NR4 Bright White 9/16/2004 2:39:09 PM Depth: -99C -70.95805 42.29872	Station Depth (M): 8.9
On Station		Weather: Cloudy
Date: 9/16/04		Winds: SE 5-10
Time: 1739		Sea: None
good 1440	 11D41042 Station Log Survey: 11D41 Station: NR4 Light Red 9/16/2004 2:40:33 PM Depth: -99C -70.95811 42.29865	Recorded by: MRF
		Grab Size: 0.04-m ²
		Grab penetration (cm): 9.5
		Redox Depth (cm): 1
		Sediment Texture: fine sandy silt w/ clay
		Analyses: Infauna
	Comments: tubes, hermit crabs	
Sieved by: TB		
good 1445	 11D41043 Station Log Survey: 11D41 Station: NR4 Light Yellow 9/16/2004 2:45:04 PM Depth: -99C -70.95828 42.29855	Grab Size: 0.04-m ²
		Grab penetration (cm): 9
		Redox Depth (cm): 1.5
		Sediment Texture: fine sandy silt w/ clay
		Analyses: Infauna
	Comments: tubes, algae on surface, some shells	
Sieved by: TB		
good 1450	 11D41044 Station Log Survey: 11D41 Station: NR4 Light Green 9/16/2004 2:50:16 PM Depth: -99C -70.95807 42.29850	Grab Size: 0.04-m ²
		Grab penetration (cm): 9.5
		Redox Depth (cm): 1
		Sediment Texture: fine sandy silt w/ clay
		Analyses: Infauna
	Comments: algae on surface, tubes, some shells	
Sieved by: LS		
good 1455	 11D41045 Station Log Survey: 11D41 Station: NR4 Light Blue 9/16/2004 2:55:36 PM Depth: -99C -70.95786 42.29870	Grab Size: 0.04-m ²
		Grab penetration (cm): 9
		Redox Depth (cm): 1
		Sediment Texture: fine sandy silt w/ clay
		Analyses: TC, GS
	Comments: algae on surface, crab	
Collected by: JF/CG		

depart for NR7 @ 1457

**Station Log for USACE Boston Harbor Biological Research SPI Survey - Project G606405
Boston Harbor Deep Draft Improvement Project - Contract No. DACW33-01-0004**

Survey ID: 11D41 Sample ID Label Field Measurements

Station ID: NR7

On Station
Date: 9/16/04
Time: 1502

Da
Ti
11D41048 Station Log
Survey: 11D41 Station: NR7 Bright White
9/16/2004 3:02:50 PM Depth: -999
-70.96253 42.28952

Station Depth (M): 6.7
Weather: Cloudy
Winds: SE 5-10
Sea: < 1'
Recorded by: MRF

good 1504

11D41049 Station Log
Survey: 11D41 Station: NR7 Light Red
9/16/2004 3:04:36 PM Depth: -999
-70.96259 42.28967

Grab Size: 0.04-m²
Grab penetration (cm): 9
Redox Depth (cm): .5
Sediment Texture: fine sandy silt w/ clay
Analyses: Infauna

Comments: small tubes, shrimp, hermit crab

Sieved by: JF

good 1512

11D4104A Station Log
Survey: 11D41 Station: NR7 Light Yellow
9/16/2004 3:12:04 PM Depth: -999
-70.96223 42.28963

Grab Size: 0.04-m²
Grab penetration (cm): 9
Redox Depth (cm): .5
Sediment Texture: fine sandy silt w/ clay
Analyses: Infauna

Comments: brown algae on surface, tubes

Sieved by:

good 1517

11D4104B Station Log
Survey: 11D41 Station: NR7 Light Green
9/16/2004 3:17:02 PM Depth: -999
-70.96228 42.28963

Grab Size: 0.04-m²
Grab penetration (cm): 9
Redox Depth (cm): .5
Sediment Texture: very fine sandy silt w/ clay
Analyses: Infauna

Comments: brown algae on surface, shrimp, amphipod

Sieved by:

good 1521

11D4104C Station Log
Survey: 11D41 Station: NR7 Light Blue
9/16/2004 3:21:45 PM Depth: -999
-70.96245 42.28953


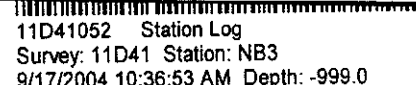

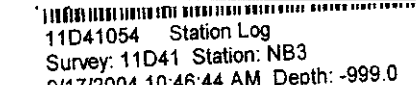
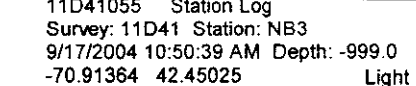
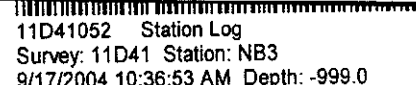

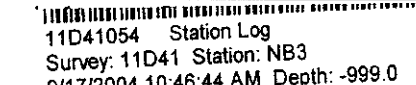
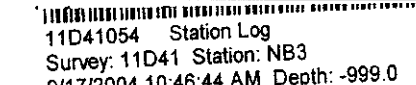
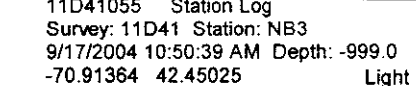
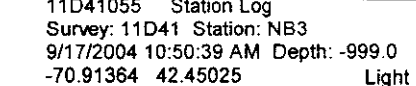
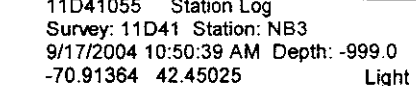
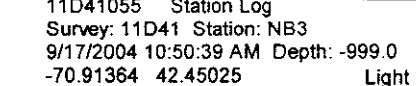
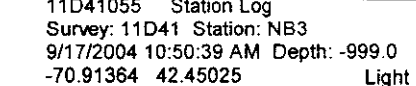
Grab Size: 0.04-m²
Grab penetration (cm): 9.5
Redox Depth (cm): .3
Sediment Texture: very fine sandy silt w/ clay
Analyses: TC, GS

Comments: brown algae on surface, hermit crabs, burrow

Collected by:

Depart for HCM @ 1525
Arrive HCM @ 1545

**Station Log for USACE Boston Harbor Biological Research SPI Survey - Project G606405
Boston Harbor Deep Draft Improvement Project - Contract No. DACW33-01-0004**

Survey ID: 11D41	Sample ID Label	Field Measurements
Station ID: <u>NB3</u>	 De 11D41051 Station Log T Survey: 11D41 Station: NB3 Bright White 9/17/2004 10:35:24 AM Depth: -99 -70.91360 42.45016	Station Depth (M): <u>10.5</u>
On Station		Weather: <u>Hazy</u>
Date: <u>9/17/04</u>	 11D41052 Station Log Survey: 11D41 Station: NB3 9/17/2004 10:36:53 AM Depth: -999.0 -70.91376 42.45033 Light Red	Winds: <u>Light SW</u>
Time: <u>1035</u>		Sea: <u>None</u>
<u>good 1036</u>	 11D41053 Station Log Survey: 11D41 Station: NB3 9/17/2004 10:42:05 AM Depth: -99 -70.91368 42.45030 Light Yellow	Recorded by: <u>MRF</u>
		Grab Size: 0.04-m ²
	 11D41054 Station Log Survey: 11D41 Station: NB3 9/17/2004 10:46:44 AM Depth: -999.0 -70.91362 42.45038 Light Green	Grab penetration (cm): <u>7</u>
		Redox Depth (cm): <u>3.0</u>
	 11D41055 Station Log Survey: 11D41 Station: NB3 9/17/2004 10:50:39 AM Depth: -999.0 -70.91364 42.45025 Light Blue	Sediment Texture: <u>compact fine sand</u>
		Analyses: Infauna
Comments: <u>brown algae on surface, tubes, little bit of shell hash</u>		
Sieved by: <u>LS</u>	<u>alive underneath</u>	
<u>good 1042</u>	 11D41052 Station Log Survey: 11D41 Station: NB3 9/17/2004 10:36:53 AM Depth: -999.0 -70.91376 42.45033 Light Red	Grab Size: 0.04-m ²
		Grab penetration (cm): <u>8</u>
	 11D41053 Station Log Survey: 11D41 Station: NB3 9/17/2004 10:42:05 AM Depth: -99 -70.91368 42.45030 Light Yellow	Redox Depth (cm): <u>2.0</u>
		Sediment Texture: <u>compact fine sand</u>
	 11D41054 Station Log Survey: 11D41 Station: NB3 9/17/2004 10:46:44 AM Depth: -999.0 -70.91362 42.45038 Light Green	Analyses: Infauna
		Comments: <u>see above</u>
Sieved by: <u>JF</u>		
<u>good 1046</u>	 11D41054 Station Log Survey: 11D41 Station: NB3 9/17/2004 10:46:44 AM Depth: -999.0 -70.91362 42.45038 Light Green	Grab Size: 0.04-m ²
		Grab penetration (cm): <u>7.5</u>
	 11D41055 Station Log Survey: 11D41 Station: NB3 9/17/2004 10:50:39 AM Depth: -999.0 -70.91364 42.45025 Light Blue	Redox Depth (cm): <u>1.0</u>
		Sediment Texture: <u>compact fine sand</u>
	 11D41055 Station Log Survey: 11D41 Station: NB3 9/17/2004 10:50:39 AM Depth: -999.0 -70.91364 42.45025 Light Blue	Analyses: Infauna
		Comments: <u>see above</u>
Sieved by: <u>LS</u>		
<u>good 1050</u>	 11D41055 Station Log Survey: 11D41 Station: NB3 9/17/2004 10:50:39 AM Depth: -999.0 -70.91364 42.45025 Light Blue	Grab Size: 0.04-m ²
		Grab penetration (cm): <u>9</u>
	 11D41055 Station Log Survey: 11D41 Station: NB3 9/17/2004 10:50:39 AM Depth: -999.0 -70.91364 42.45025 Light Blue	Redox Depth (cm): <u>1.5</u>
		Sediment Texture: <u>compact fine sand</u>
	 11D41055 Station Log Survey: 11D41 Station: NB3 9/17/2004 10:50:39 AM Depth: -999.0 -70.91364 42.45025 Light Blue	Analyses: TC, GS
		Comments: <u>see above</u>
Collected by:		


Depart HCM for NB3 @ 0930


1010 Dolphins (species unknown) seen in
Block Sound near BR6

depart for NB5 @ 1057


**Station Log for USACE Boston Harbor Biological Research SPI Survey - Project G606405
Boston Harbor Deep Draft Improvement Project - Contract No. DACW33-01-0004**

Survey ID: 11D41	Sample ID Label	Field Measurements
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Station ID:	 11D41058 Station Log Survey: 11D41 Station: NB5 Bright White 9/17/2004 10:58:12 AM Depth: -95 -70.89793 42.44343	Station Depth (M): 22 Weather: <u>heavy / cloudy</u> Winds: <u>SW 5-10</u> Sea: <u>None</u> Recorded by: <u>MRF</u>
-------------	--	---

On Station Date: <u>9/17/04</u> Time: <u>1058</u> good 1101	 11D41059 Station Log Survey: 11D41 Station: NB5 Light Red 9/17/2004 11:01:21 AM Depth: -95 -70.89790 42.44347	Grab Size: 0.04-m ² Grab penetration (cm): <u>8.5</u> Redox Depth (cm): <u>.5</u> Sediment Texture: <u>fine sandy silt w/c</u> Analyses: Infauna
--	---	---


Comments: Slightly sloped on 1 side, shell hash tubes olive color

Sieved by: <u>JF</u>	 11D4105A Station Log Survey: 11D41 Station: NB5 Light Yellow 9/17/2004 11:06:59 AM Depth: -95 -70.89790 42.44342	Grab Size: 0.04-m ² Grab penetration (cm): <u>7.5</u> Redox Depth (cm): <u>.3</u> Sediment Texture: <u>fine sandy silt w/c</u> Analyses: Infauna
----------------------	--	---

Comments: see above

Sieved by: <u>LS</u>	 11D4105B Station Log Survey: 11D41 Station: NB5 Light Green 9/17/2004 11:11:25 AM Depth: -95 -70.89787 42.44340	Grab Size: 0.04-m ² Grab penetration (cm): <u>7</u> Redox Depth (cm): <u>1</u> Sediment Texture: <u>fine sandy silt w/c</u> Analyses: Infauna
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Comments: Slightly sloped on both sides, tubes, some shell hash

Sieved by: <u>JF</u>	 11D4105C Station Log Survey: 11D41 Station: NB5 Light Blue 9/17/2004 11:16:21 AM Depth: -95 -70.89785 42.44343	Grab Size: 0.04-m ² Grab penetration (cm): <u>9</u> Redox Depth (cm): <u>1</u> Sediment Texture: Analyses: TC, GS
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Comments: Slight UP tubes, shell hash slight H₂S odor depart for NB7 @ 1118






Collected by: CG

**Station Log for USACE Boston Harbor Biological Research SPI Survey - Project G606405
Boston Harbor Deep Draft Improvement Project - Contract No. DACW33-01-0004**

Survey ID: 11D41	Sample ID Label	Field Measurements
Station ID: NB7	 11D4105F Station Log Survey: 11D41 Station: NB7 Bright White 9/17/2004 11:21:21 AM Depth: -99 -70.89225 42.44715	Station Depth (M): 23.1
On Station		Weather: Cloudy
Date: 9/17/04		Winds: SW 5-10
Time: 11:17		Sea: Calm
		Recorded by: MRF
good 1125	 11D41060 Station Log Survey: 11D41 Station: NB7 Light Red 9/17/2004 11:25:58 AM Depth: -99 -70.89215 42.44730	Grab Size: 0.04-m ²
		Grab penetration (cm): 7.5
		Redox Depth (cm): .3
		Sediment Texture: silty sand w/ clay
		Analyses: Infauna fine
	Comments: slight sloped on both sides, tubes, some shell hash	
Sieved by: LS		
good 1132	 11D41061 Station Log Survey: 11D41 Station: NB7 Light Yellow 9/17/2004 11:32:11 AM Depth: -99 -70.89204 42.44733	Grab Size: 0.04-m ²
		Grab penetration (cm): 8.5
		Redox Depth (cm): 1
		Sediment Texture: silty fine sand w/ clay
		Analyses: Infauna
	Comments: sloped one side, tubes, some shell hash	
Sieved by: JF	1 sm crab	
good 1138	 11D41062 Station Log Survey: 11D41 Station: NB7 Light Green 9/17/2004 11:38:20 AM Depth: -99 -70.89218 42.44725	Grab Size: 0.04-m ²
		Grab penetration (cm): 8
		Redox Depth (cm): .3
		Sediment Texture: silty fine sand w/ clay
		Analyses: Infauna
	Comments: sloped on both sides, tubes, some shell hash	
Sieved by: LS	1 sm crab some vegetation in a tube	
good 1144	 11D41063 Station Log Survey: 11D41 Station: NB7 Light Blue 9/17/2004 11:44:29 AM Depth: -99 -70.89214 42.44720	Grab Size: 0.04-m ²
		Grab penetration (cm): 9
		Redox Depth (cm): 1.2
		Sediment Texture:
		Analyses: TC, GS
	Comments: slightly sloped on side, tubes, some shell hash	
Collected by: CG	amphipods on surface, 1 lg, mean soil	
	Depart for BRT @ 1146	
	olive color	

TC=Total Organic Carbon, GS=Grain Size

**Station Log for USACE Boston Harbor Biological Research SPI Survey - Project G606405
Boston Harbor Deep Draft Improvement Project - Contract No. DACW33-01-0004**












Survey ID: 11D41	Sample ID Label	Field Measurements
Station ID: <u>BR1</u> On Station Date: <u>9/17/04</u> Time: <u>1200</u>	 11D41066 Station Log Survey: 11D41 Station: BR1 Bright White 9/17/2004 12:00:08 PM Depth: -99 -70.90469 42.40697	Station Depth (M): <u>26.4</u> Weather: <u>cloudy / Foggy</u> Winds: <u>SW ~ 5</u> Sea: <u>calm</u> Recorded by: <u>MRF</u>
<u>OP 1201</u> <u>good 1209</u>	 11D41068 Station Log Survey: 11D41 Station: BR1 Light Red 9/17/2004 12:09:05 PM Depth: -99 -70.90500 42.40695	Grab Size: 0.04-m ² Grab penetration (cm): <u>6</u> Redox Depth (cm): <u>3</u> Sediment Texture: <u>clay-silt w/ fine sand</u> Analyses: Infauna
Comments: <u>remove weights, tubes, shell hash</u>		
Sieved by: <u>JF</u> <u>good 1215</u>	 11D41069 Station Log Survey: 11D41 Station: BR1 Light Yellow 9/17/2004 12:15:24 PM Depth: -99 -70.90466 42.40693	Grab Size: 0.04-m ² Grab penetration (cm): <u>7.5</u> Redox Depth (cm): <u>2.5</u> Sediment Texture: <u>clay-silt w/ fine sand</u> Analyses: Infauna
Comments: <u>add 1 weight, slightly sloped on both sides, tubes, shell hash</u>		
Sieved by: <u>LS</u> <u>good 1221</u>	 11D4106B Station Log Survey: 11D41 Station: BR1 Light Green 9/17/2004 12:25:12 PM Depth: -99 -70.90465 42.40697	Grab Size: 0.04-m ² Grab penetration (cm): <u>8</u> Redox Depth (cm): <u>9</u> Sediment Texture: <u>silty fine sand w/ clay</u> Analyses: Infauna
Comments: <u>use both weights, tubes, shell hash</u>		
Sieved by: <u>JF</u> <u>good 1231</u>	 11D4106C Station Log Survey: 11D41 Station: BR1 Light Blue 9/17/2004 12:31:30 PM Depth: -99 -70.90470 42.40698	Grab Size: 0.04-m ² Grab penetration (cm): <u>7.5</u> Redox Depth (cm): <u>2.5</u> Sediment Texture: <u>clay-silt w/ fine sand</u> Analyses: TC, GS
Comments: <u>use both weights, sloped on 1 side, tubes, shell hash</u>		
Collected by: <u>LS/CG</u> <u>Depart for BR3 @ 1233</u>		
<u>olive color</u>		
(Empty rows for additional notes)		

Station Log for USACE Boston Harbor Biological Research SPI Survey - Project G606405
Boston Harbor Deep Draft Improvement Project - Contract No. DACW33-01-0004

Survey ID: 11D41	Sample ID Label	Field Measurements
Station ID: BR3	 11D4106F Station Log Survey: 11D41 Station: BR3 Bright White 9/17/2004 12:38:56 PM Depth: -9 -70.89260 42.40858	Station Depth (M): 29.5 Weather: Cloudy / foggy Winds: Light variable Sea: none Recorded by: MRF
On Station Date: 9/17/04 Time: 1238		Grab Size: 0.04-m ² Grab penetration (cm): 8.5 Redox Depth (cm): 1.5 Sediment Texture: silty clay w/a little fine Analyses: Infauna
NG OP 1242 good 1247	 11D41071 Station Log Survey: 11D41 Station: BR3 Light Red 9/17/2004 12:47:04 PM Depth: -9 -70.89256 42.40860	Comments: slightly sloped on 1 side, tubes, shell hash amphipods on surface (small)
Sieved by: LS		
good 1249 good 1253	 11D41072 Station Log Survey: 11D41 Station: BR3 Light Yellow 9/17/2004 12:53:04 PM Depth: -9 -70.89267 42.40848	Comments: slightly up in the middle, sloped on 1 side, tubes, shell hash
Sieved by: JF		
good 1259	 11D41073 Station Log Survey: 11D41 Station: BR3 Light Green 9/17/2004 12:59:18 PM Depth: -9 -70.89273 42.40854	Comments: tubes, small amphipods, some shell hash
Sieved by: LS		
NG OP 1304 good 1309	 11D41076 Station Log Survey: 11D41 Station: BR3 Light Blue 9/17/2004 1:09:27 PM Depth: -9 -70.89243 42.40845	Comments: slight OP, tubes, some shell hash small amphipods
Collected by:		
all grabs were alive in color		

TC=Total Organic Carbon, GS=Grain Size

Station Log for USACE Boston Harbor Biological Research SPI Survey - Project G606405
Boston Harbor Deep Draft Improvement Project - Contract No. DACW33-01-0004

Survey ID: 11D41	Sample ID Label	Field Measurements
Station ID: BR6	 11D41079 Station Log Survey: 11D41 Station: BR6 Bright White 9/17/2004 1:16:52 PM Depth: -999 -70.89407 42.39655	Station Depth (M): 28.3
On Station		Weather: Cloudy / Base Fog
Date: 9/17/04	 11D4107B Station Log Survey: 11D41 Station: BR6 Light Red 9/17/2004 1:25:42 PM Depth: -999 -70.89400 42.39639	Winds: light variable
Time: 1316		Sea: none
OP 1320	 11D4107C Station Log Survey: 11D41 Station: BR6 Light Yellow 9/17/2004 1:31:32 PM Depth: -999 -70.89397 42.39640	Recorded by: MRF
good 1325		Grab Size: 0.04-m ²
	 11D4107D Station Log Survey: 11D41 Station: BR6 Light Green 9/17/2004 1:38:12 PM Depth: -999 -70.89417 42.39640	Grab penetration (cm): 9
		Redox Depth (cm): 1.5
	 11D4107E Station Log Survey: 11D41 Station: BR6 Light Blue 9/17/2004 1:43:54 PM Depth: -999 -70.89390 42.39637	Sediment Texture: silt w/ some fine sand + clay very
		Analyses: Infauna
	Comments: use mud shoe + 2 weights, 1 burrow	
Sieved by: JF	olive w/ white spots, some amphipods	
good 1331	 11D4107D Station Log Survey: 11D41 Station: BR6 Light Green 9/17/2004 1:38:12 PM Depth: -999 -70.89417 42.39640	Grab Size: 0.04-m ²
		Grab penetration (cm): 9.5
	 11D4107E Station Log Survey: 11D41 Station: BR6 Light Blue 9/17/2004 1:43:54 PM Depth: -999 -70.89390 42.39637	Redox Depth (cm): 1
		Sediment Texture: silt w/ some very fine sand clay near bottom
	Comments: olive w/ white spots, tubes,	
Sieved by: LS		
good 1338	 11D4107D Station Log Survey: 11D41 Station: BR6 Light Green 9/17/2004 1:38:12 PM Depth: -999 -70.89417 42.39640	Grab Size: 0.04-m ²
		Grab penetration (cm): 9.5
	 11D4107E Station Log Survey: 11D41 Station: BR6 Light Blue 9/17/2004 1:43:54 PM Depth: -999 -70.89390 42.39637	Redox Depth (cm): 1.5
		Sediment Texture: same as above
	Comments: olive w/ white spots, tubes	
Sieved by: JP		
1343	 11D4107E Station Log Survey: 11D41 Station: BR6 Light Blue 9/17/2004 1:43:54 PM Depth: -999 -70.89390 42.39637	Grab Size: 0.04-m ²
		Grab penetration (cm): 9.5
	 11D4107E Station Log Survey: 11D41 Station: BR6 Light Blue 9/17/2004 1:43:54 PM Depth: -999 -70.89390 42.39637	Redox Depth (cm): 2
		Sediment Texture: same as above
	Comments: olive w/ white spots, tubes (not many)	
Collected by: CG		

Depart for HCM @ 1346
 Arrive HCM @ 1440

Appendix 2

Chain of Custody Logs

U.S. Army Corps of Engineers, New England District

Contract No. DACW33-03-D-0004 (Delivery Order 0005)

Sample Custody Form

Today's Date : 9/17/2004 1:52:38 P

Laboratory : Battelle Duxbury Operations

Chain-of-Custody # : 11D41-SA-0003

Field Samples

Survey ID : 11D41

397 Washington St

Analysis ID : SA
















Duxbury

MA 02332

Analysis Description : Station Arrival

Matt Fitzpatrick

781-934-0571 (Phone) 781-934-2124 (Fax)

Bottle ID :	Bottle ID :	Sampling Date :	Station ID :	Depth Code:	Ck 1	Ck 2	Ck 3
	11D41002SA1	9/16/2004 7:50:22 AM	MB1	SA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D4100CSA1	9/16/2004 8:42:32 AM	MB4	SA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41019SA1	9/16/2004 9:22:08 AM	MB7	SA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41022SA1	9/16/2004 11:10:29 AM	MA1	SA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D4102BSA1	9/16/2004 11:49:52 AM	MA3	SA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41032SA1	9/16/2004 12:17:34 PM	MA7	SA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41039SA1	9/16/2004 2:06:07 PM	NR2	SA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41041SA1	9/16/2004 2:39:09 PM	NR4	SA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41048SA1	9/16/2004 3:02:50 PM	NR7	SA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41051SA1	9/17/2004 10:35:24 AM	NB3	SA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41058SA1	9/17/2004 10:58:12 AM	NB5	SA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D4105FSA1	9/17/2004 11:21:21 AM	NB7	SA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41066SA1	9/17/2004 12:00:08 PM	BR1	SA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D4106FSA1	9/17/2004 12:38:56 PM	BR3	SA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41079SA1	9/17/2004 1:16:52 PM	BR6	SA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Shipping Condition - Room Temperature: _____ Cold(ice): _____ Frozen(dry ice): _____
 Received Condition - Room Temperature: _____ Cold(ice): _____ Frozen(dry ice): _____

Relinquished By / Date / Time / Company / Transport-Airbill #	Received By / Date / Time / Company

U.S. Army Corps of Engineers, New England District

Contract No. DACW33-03-D-0004 (Delivery Order 0005)

Sample Custody Form

57 HCS

Today's Date : 9/17/2004 1:52:39 P

Laboratory : Applied Marine Sciences, Inc.

Chain-of-Custody #: 11D41-TC-0004

Survey ID : 11D41

Analysis ID : TC















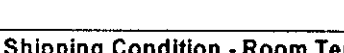
Analysis Description : TOC

502 N. Highway 3, Suite B

League City TX 77573

Mr. Kenneth Davis

281-554-7272 (Phone) 281-554-6356 (Fax)

Bottle ID :	Bottle ID :	Sampling Date :	Station ID :	Depth Code:	Ck 1	Ck 2	Ck 3
	11D41007TC1	9/16/2004 8:28:27 AM	MB1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41016TC1	9/16/2004 9:13:55 AM	MB4		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4101FTC1	9/16/2004 9:56:01 AM	MB7		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41028TC1	9/16/2004 11:41:55 AM	MA1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4102FTC1	9/16/2004 12:10:20 PM	MA3		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41036TC1	9/16/2004 12:38:06 PM	MA7		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4103ETC1	9/16/2004 2:29:04 PM	NR2		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41045TC1	9/16/2004 2:55:36 PM	NR4		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4104CTC1	9/16/2004 3:21:45 PM	NR7		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41055TC1	9/17/2004 10:50:39 AM	NB3		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4105CTC1	9/17/2004 11:16:21 AM	NB5		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41063TC1	9/17/2004 11:44:29 AM	NB7		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4106CTC1	9/17/2004 12:31:30 PM	BR1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41076TC1	9/17/2004 1:09:27 PM	BR3		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4107ETC1	9/17/2004 1:43:54 PM	BR6		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Shipping Condition - Room Temperature: _____ Cold(ice): _____ Frozen(dry ice):

Received Condition - Room Temperature: _____ Cold(ice): _____ Frozen(dry ice): _____

Relinquished By / Date / Time / Company / Transport-Airbill # <i>COG 9/20/04 1330 RDD</i> <i>Marshall Bynum 9/21/04 1400 BDD</i>	Received By / Date / Time / Company <i>Marshall Bynum 9/21/04 0900 BS</i>
--	--

Page 1 of 1

Invoice :	Date : 09/21/2004	Shipping :	61.03
Customer : K. DAVIS	Weight : 51.0	Special :	4.27
Phone # :	COO : 0.00	Handling :	0.00
Dept :	DV : 0.00	Total :	65.30

Svcs: PRIORITY OVERNIGHT ICE
TRCK: 6592 0694 1235

U.S. Army Corps of Engineers, New England District

Contract No. DACW33-03-D-0004 (Delivery Order 0005)

Sample Custody Form

488 1105

Today's Date : 9/17/2004 1:52:37 P

Laboratory : Applied Marine Sciences, Inc.

Chain-of-Custody # : 11D41-GS-0002

Survey ID : 11D41

Analysis ID : GS
















Analysis Description : Grain size

502 N. Highway 3, Suite B

League City TX 77573

Mr. Kenneth Davis

281-554-7272 (Phone) 281-554-6356 (Fax)

Bottle ID :	Bottle ID :	Sampling Date :	Station ID :	Depth Code :	Ck 1	Ck 2	Ck 3
	11D41007GS1	9/16/2004 8:28:27 AM	MB1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41016GS1	9/16/2004 9:13:55 AM	MB4		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4101FGS1	9/16/2004 9:56:01 AM	MB7		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41028GS1	9/16/2004 11:41:55 AM	MA1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4102FGS1	9/16/2004 12:10:20 PM	MA3		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41036GS1	9/16/2004 12:38:06 PM	MA7		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4103EGS1	9/16/2004 2:29:04 PM	NR2		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41045GS1	9/16/2004 2:55:36 PM	NR4		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4104CGS1	9/16/2004 3:21:45 PM	NR7		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41055GS1	9/17/2004 10:50:39 AM	NB3		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4105CGS1	9/17/2004 11:16:21 AM	NB5		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41063GS1	9/17/2004 11:44:29 AM	NB7		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4106CGS1	9/17/2004 12:31:30 PM	BR1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41076GS1	9/17/2004 1:09:27 PM	BR3		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4107EGS1	9/17/2004 1:43:54 PM	BR6		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Shipping Condition - Room Temperature: _____ Cold(ice): Frozen(dry ice): _____
 Received Condition - Room Temperature: _____ Cold(ice): _____ Frozen(dry ice): _____

Relinquished By / Date / Time / Company / Transport-Airbill #	Received By / Date / Time / Company
<i>COG 9/20/04 1330 BDD</i>	<i>Matthew R. Hightower 9/21/04 900</i>
<i>Matthew R. Hightower 9/21/04 1900 BDD</i>	

Page 1 of 1

Customer : K. DAVIS Weight : 48.0 Special : 4.02
 Phone # : COD : 0.00 Handling : 0.00
 Dept : DV : 0.00 Total : 61.42

Svcs: PRIORITY OVERNIGHT

TRCK: 6592 0694 1224

(781) 934-0571 Ship Date

U.S. Army Corps of Engineers, New England District

Contract No. DACW33-03-D-0004 (Delivery Order 0005)

Sample Custody Form

Today's Date : 9/17/2004 1:52:36 P

Laboratory : Barry A. Vittor and Associates

Chain-of-Custody # : 11D41-FA-0001

Survey ID : 11D41

Analysis ID : FA

Analysis Description : Infauna















8060 Cottage Hill Rd.

Mobile AL 36695

Ms. Linda Sierke

(251) 633-61 (Phone)

(Fax)

Bottle ID :	Bottle ID :	Sampling Date :	Station ID :	Depth Code:	Ck 1	Ck 2	Ck 3
	11D41003FA1	9/16/2004 7:57:49 AM	MB1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41004FA1	9/16/2004 8:08:47 AM	MB1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41006FA1	9/16/2004 8:20:19 AM	MB1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D4100EFA1	9/16/2004 8:47:27 AM	MB4		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41014FA1	9/16/2004 9:00:59 AM	MB4		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41015FA1	9/16/2004 9:07:47 AM	MB4		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D4101CFA1	9/16/2004 9:34:48 AM	MB7		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D4101DFA1	9/16/2004 9:41:39 AM	MB7		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D4101EFA1	9/16/2004 9:48:02 AM	MB7		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41023FA1	9/16/2004 11:17:41 AM	MA1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41026FA1	9/16/2004 11:31:00 AM	MA1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41027FA1	9/16/2004 11:36:57 AM	MA1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D4102CFA1	9/16/2004 11:52:53 AM	MA3		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D4102DFA1	9/16/2004 11:58:28 AM	MA3		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Shipping Condition - Room Temperature: Precooled Cold(ice): _____ Frozen(dry ice): _____
 Received Condition - Room Temperature: _____ Cold(ice): _____ Frozen(dry ice): _____

Relinquished By / Date / Time / Company / Transport-Airbill #	Received By / Date / Time / Company

U.S. Army Corps of Engineers, New England District

Contract No. DACW33-03-D-0004 (Delivery Order 0005)

Sample Custody Form

Today's Date : 9/17/2004 1:52:37 P

Laboratory : Barry A. Vittor and Associates

Chain-of-Custody #: 11D41-FA-0001

Survey ID : 11D41

Analysis ID : FA

Analysis Description : infauna















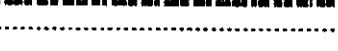

8060 Cottage Hill Rd.

Mobile AL 36695

Ms. Linda Sierke

(251) 633-61 (Phone)

(Fax)

Bottle ID :	Bottle ID :	Sampling Date :	Station ID :	Depth Code:	Ck 1	Ck 2	Ck 3
	11D4102EFA1	9/16/2004 12:04:43 PM	MA3		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	11D4103BFA1	9/16/2004 2:14:45 PM	NR2		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D4103CFA1	9/16/2004 2:20:18 PM	NR2		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D4103DFA1	9/16/2004 2:24:53 PM	NR2		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41042FA1	9/16/2004 2:40:33 PM	NR4		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41043FA1	9/16/2004 2:45:04 PM	NR4		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41044FA1	9/16/2004 2:50:16 PM	NR4		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	11D4104AFA1	9/16/2004 3:12:04 PM	NR7		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D4104BFA1	9/16/2004 3:17:02 PM	NR7		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41052FA1	9/17/2004 10:36:53 AM	NB3		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41053FA1	9/17/2004 10:42:05 AM	NB3		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41054FA1	9/17/2004 10:46:44 AM	NB3		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Preserved

Shipping Condition - Room Temperature: Cold(ice): Frozen(dry ice):
 Received Condition - Room Temperature: Cold(ice): Frozen(dry ice):

Relinquished By / Date / Time / Company / Transport-Airbill #	Received By / Date / Time / Company

U.S. Army Corps of Engineers, New England District

Contract No. DACW33-03-D-0004 (Delivery Order 0005)

Sample Custody Form

Today's Date : 9/17/2004 1:52:37 P

Laboratory : Barry A. Vittor and Associates

Chain-of-Custody # : 11D41-FA-0001

Survey ID : 11D41

Analysis ID : FA

Analysis Description : Infauna
















8060 Cottage Hill Rd.

Mobile AL 36695

Ms. Linda Sierke

(251) 633-61 (Phone)

(Fax)

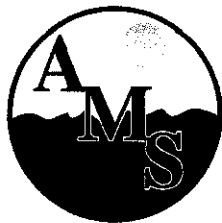
Bottle ID :	Bottle ID :	Sampling Date :	Station ID :	Depth Code:	Ck 1	Ck 2	Ck 3
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	11D4105AFA1	9/17/2004 11:06:59 AM	NB5		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D4105BFA1	9/17/2004 11:11:25 AM	NB5		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41060FA1	9/17/2004 11:25:58 AM	NB7		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41061FA1	9/17/2004 11:32:11 AM	NB7		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41062FA1	9/17/2004 11:38:20 AM	NB7		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41068FA1	9/17/2004 12:09:05 PM	BR1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41069FA1	9/17/2004 12:15:24 PM	BR1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D4106BFA1	9/17/2004 12:25:12 PM	BR1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41071FA1	9/17/2004 12:47:04 PM	BR3		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41072FA1	9/17/2004 12:53:04 PM	BR3		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D41073FA1	9/17/2004 12:59:18 PM	BR3		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D4107BFA1	9/17/2004 1:25:42 PM	BR6		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D4107CFA1	9/17/2004 1:31:32 PM	BR6		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11D4107DFA1	9/17/2004 1:38:12 PM	BR6		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Shipping Condition - Room Temperature: Approved Cold(ice): _____ Frozen(dry ice): _____
 Received Condition - Room Temperature: _____ Cold(ice): _____ Frozen(dry ice): _____

Relinquished By / Date / Time / Company / Transport-Airbill #	Received By / Date / Time / Company

Appendix 3

Results of Grain Size and TOC Analyses



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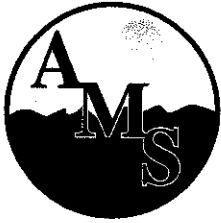
Client: Battelle
Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D41007TC1 MB1
AMS Sample ID: 20749

AMS Project Number: 2004-03-35
Date Sampled: 9/16/2004
Date Received: 9/22/2004

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Matrix</u>	<u>Date Analyzed</u>
Total Organic Carbon	0.84	%		0.01	EPA 9060	Sediment	9/28/2004

Quality Assurance: These analyses were performed in accordance with EPA guidelines for quality assurance.


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Client: Battelle
Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D41016TC1 MB4
AMS Sample ID: 20750

AMS Project Number: 2004-03-35
Date Sampled: 9/16/2004
Date Received: 9/22/2004

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Matrix</u>	<u>Date Analyzed</u>
Total Organic Carbon	0.90	%		0.01	EPA 9060	Sediment	9/28/2004

Quality Assurance: These analyses were performed in accordance with EPA guidelines for quality assurance.


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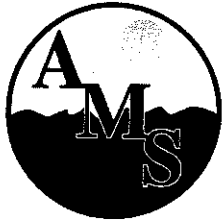
Client: Battelle
Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D4101FTC1 MB7
AMS Sample ID: 20751

AMS Project Number: 2004-03-35
Date Sampled: 9/16/2004
Date Received: 9/22/2004

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Matrix</u>	<u>Date Analyzed</u>
Total Organic Carbon	3.05	%		0.01	EPA 9060	Sediment	9/28/2004

Quality Assurance: These analyses were performed in accordance with EPA guidelines for quality assurance.


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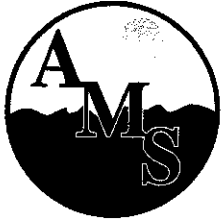
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Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D41028TC1 MA1
AMS Sample ID: 20752

AMS Project Number: 2004-03-35
Date Sampled: 9/16/2004
Date Received: 9/22/2004

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Matrix</u>	<u>Date Analyzed</u>
Total Organic Carbon	0.22	%		0.01	EPA 9060	Sediment	9/28/2004

Quality Assurance: These analyses were performed in accordance with EPA guidelines for quality assurance.


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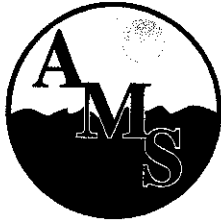
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Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D4102FTC1 MA3
AMS Sample ID: 20753

AMS Project Number: 2004-03-35
Date Sampled: 9/16/2004
Date Received: 9/22/2004

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Matrix</u>	<u>Date Analyzed</u>
Total Organic Carbon	0.22	%		0.01	EPA 9060	Sediment	9/28/2004

Quality Assurance: These analyses were performed in accordance with EPA guidelines for quality assurance.


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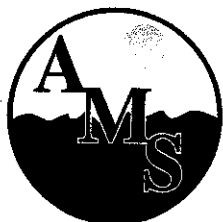
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Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D41036TC1 MA7
AMS Sample ID: 20754

AMS Project Number: 2004-03-35
Date Sampled: 9/16/2004
Date Received: 9/22/2004

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Matrix</u>	<u>Date Analyzed</u>
Total Organic Carbon	0.21	%		0.01	EPA 9060	Sediment	9/28/2004

Quality Assurance: These analyses were performed in accordance with EPA guidelines for quality assurance.


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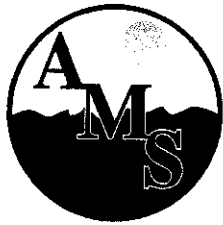
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Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D4103ETC1 NR2
AMS Sample ID: 20755

AMS Project Number: 2004-03-35
Date Sampled: 9/16/2004
Date Received: 9/22/2004

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Matrix</u>	<u>Date Analyzed</u>
Total Organic Carbon	2.31	%		0.01	EPA 9060	Sediment	9/28/2004

Quality Assurance: These analyses were performed in accordance with EPA guidelines for quality assurance.

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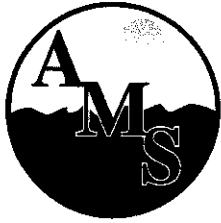
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Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D41045TC1 NR4
AMS Sample ID: 20756

AMS Project Number: 2004-03-35
Date Sampled: 9/16/2004
Date Received: 9/22/2004

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Matrix</u>	<u>Date Analyzed</u>
Total Organic Carbon	1.24	%		0.01	EPA 9060	Sediment	9/28/2004

Quality Assurance: These analyses were performed in accordance with EPA guidelines for quality assurance.


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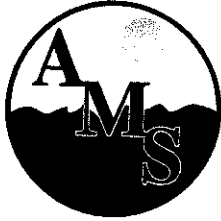
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Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D4104CTC1 NR7
AMS Sample ID: 20757

AMS Project Number: 2004-03-35
Date Sampled: 9/16/2004
Date Received: 9/22/2004

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Matrix</u>	<u>Date Analyzed</u>
Total Organic Carbon	2.01	%		0.01	EPA 9060	Sediment	9/28/2004

Quality Assurance: These analyses were performed in accordance with EPA guidelines for quality assurance.


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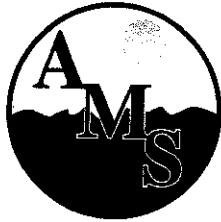
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Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D41055TC1 NB3
AMS Sample ID: 20758

AMS Project Number: 2004-03-35
Date Sampled: 9/17/2004
Date Received: 9/22/2004

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Matrix</u>	<u>Date Analyzed</u>
Total Organic Carbon	0.09	%		0.01	EPA 9060	Sediment	9/28/2004

Quality Assurance: These analyses were performed in accordance with EPA guidelines for quality assurance.


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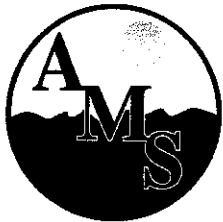
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Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D4105CTC1 NB5
AMS Sample ID: 20759

AMS Project Number: 2004-03-35
Date Sampled: 9/17/2004
Date Received: 9/22/2004

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Matrix</u>	<u>Date Analyzed</u>
Total Organic Carbon	1.16	%		0.01	EPA 9060	Sediment	9/28/2004

Quality Assurance: These analyses were performed in accordance with EPA guidelines for quality assurance.


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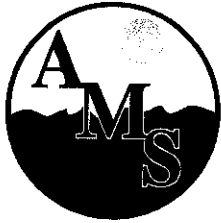
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Project Number: DACW33-03-D-0004
Client Sample ID: 11D41063TC1 NB7
AMS Sample ID: 20760

AMS Project Number: 2004-03-35
Date Sampled: 9/17/2004
Date Received: 9/22/2004

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Matrix</u>	<u>Date Analyzed</u>
Total Organic Carbon	0.27	%		0.01	EPA 9060	Sediment	9/28/2004

Quality Assurance: These analyses were performed in accordance with EPA guidelines for quality assurance.

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Applied Marine Sciences, Inc.

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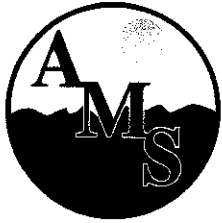
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Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D4106CTC1 BR1
AMS Sample ID: 20761

AMS Project Number: 2004-03-35
Date Sampled: 9/17/2004
Date Received: 9/22/2004

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Matrix</u>	<u>Date Analyzed</u>
Total Organic Carbon	0.52	%		0.01	EPA 9060	Sediment	9/28/2004

Quality Assurance: These analyses were performed in accordance with EPA guidelines for quality assurance.


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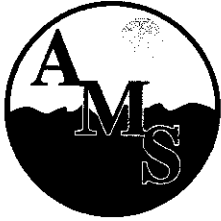
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Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D41076TC1 BR3
AMS Sample ID: 20762

AMS Project Number: 2004-03-35
Date Sampled: 9/17/2004
Date Received: 9/22/2004

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Matrix</u>	<u>Date Analyzed</u>
Total Organic Carbon	1.30	%		0.01	EPA 9060	Sediment	9/28/2004

Quality Assurance: These analyses were performed in accordance with EPA guidelines for quality assurance.


AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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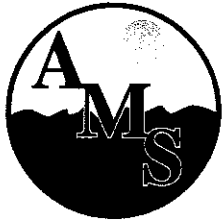
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Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D4107ETC1 BR6
AMS Sample ID: 20763

AMS Project Number: 2004-03-35
Date Sampled: 9/17/2004
Date Received: 9/22/2004

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Matrix</u>	<u>Date Analyzed</u>
Total Organic Carbon	1.86	%		0.01	EPA 9060	Sediment	9/28/2004

Quality Assurance: These analyses were performed in accordance with EPA guidelines for quality assurance.


AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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Quality Control Report

Client: Battelle
Project Title: USACE NAE Delivery Order 0005
Project No.: DACW33-03-D-0004
Client ID: 11D4107ETC1 BR6

AMS Project No.: 2004-03-35
Date Sampled: 9/17/2004
Date Received: 9/22/2004
Date Analyzed: 9/28/2004
Matrix: Sediment
Method: EPA 9060

Continuing Calibration Data					
AMS Sample ID	Parameter	SRM Result (%)	SRM Theoretical (%)	RPD (%)	QC Limits (% RPD)
CC03	TOC	2.08	2.00	3.92	<5

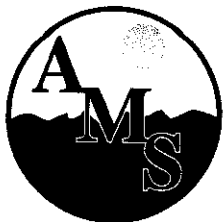
TOC Method Blank				
AMS Sample ID	Weight (g)	Result (µg C)	TOC (%)	MDL (%)
CB03	0.4846	0.6	ND	0.01

Replicate Analysis					
AMS Sample ID	Parameter	Sample Result (%)	Replicate Result (%)	RPD (%)	QC Limits (% RPD)
20763	TOC	1.86	1.87	0.54	<25

Samples in Batch (AMS ID): 20749 20752 20755 20758 20761
20750 20753 20756 20759 20762
20751 20754 20757 20760 20763

Quality Assurance: These analyses were performed in accordance with EPA guidelines for quality assurance.

KSA
AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

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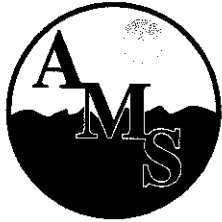
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Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D41007GS1 MB1
AMS Sample ID: 20764

AMS Project Number: 2004-03-35
Date Sampled: 9/16/2004
Date Received: 9/22/2004
Matrix: Sediment

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Analyzed</u>
Gravel (<-1 ϕ)	0.25	%		0.01	NOAA EMAP 1993	9/24/2004
Very Coarse Sand (0 ϕ)	0.42	%		0.01	NOAA EMAP 1993	9/24/2004
Coarse Sand (1 ϕ)	1.17	%		0.01	NOAA EMAP 1993	9/24/2004
Medium Sand (2 ϕ)	3.54	%		0.01	NOAA EMAP 1993	9/24/2004
Fine Sand (3 ϕ)	26.42	%		0.01	NOAA EMAP 1993	9/24/2004
Very Fine Sand (4 ϕ)	25.88	%		0.01	NOAA EMAP 1993	9/24/2004
Silt (5-7 ϕ)	29.34	%		0.01	NOAA EMAP 1993	9/24/2004
Clay (>8 ϕ)	12.97	%		0.01	NOAA EMAP 1993	9/24/2004

Quality Assurance: These analyses were performed in accordance with EPA/ASTM guidelines for quality assurance.


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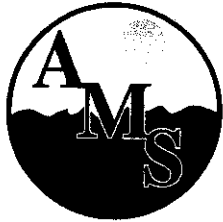
Client: Battelle
Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D41016GS1 MB4
AMS Sample ID: 20765

AMS Project Number: 2004-03-35
Date Sampled: 9/16/2004
Date Received: 9/22/2004
Matrix: Sediment

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Analyzed</u>
Gravel (<1 ϕ)	1.08	%		0.01	NOAA EMAP 1993	9/24/2004
Very Coarse Sand (0 ϕ)	0.11	%		0.01	NOAA EMAP 1993	9/24/2004
Coarse Sand (1 ϕ)	0.41	%		0.01	NOAA EMAP 1993	9/24/2004
Medium Sand (2 ϕ)	1.35	%		0.01	NOAA EMAP 1993	9/24/2004
Fine Sand (3 ϕ)	12.07	%		0.01	NOAA EMAP 1993	9/24/2004
Very Fine Sand (4 ϕ)	34.19	%		0.01	NOAA EMAP 1993	9/24/2004
Silt (5-7 ϕ)	33.16	%		0.01	NOAA EMAP 1993	9/24/2004
Clay (>8 ϕ)	17.64	%		0.01	NOAA EMAP 1993	9/24/2004

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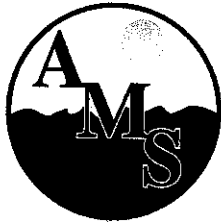
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Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D4101FGS1 MB7
AMS Sample ID: 20766

AMS Project Number: 2004-03-35
Date Sampled: 9/16/2004
Date Received: 9/22/2004
Matrix: Sediment

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Analyzed</u>
Gravel (<-1 ϕ)	0.00	%		0.01	NOAA EMAP 1993	9/24/2004
Very Coarse Sand (0 ϕ)	0.05	%		0.01	NOAA EMAP 1993	9/24/2004
Coarse Sand (1 ϕ)	0.12	%		0.01	NOAA EMAP 1993	9/24/2004
Medium Sand (2 ϕ)	2.33	%		0.01	NOAA EMAP 1993	9/24/2004
Fine Sand (3 ϕ)	8.13	%		0.01	NOAA EMAP 1993	9/24/2004
Very Fine Sand (4 ϕ)	5.36	%		0.01	NOAA EMAP 1993	9/24/2004
Silt (5-7 ϕ)	42.89	%		0.01	NOAA EMAP 1993	9/24/2004
Clay (>8 ϕ)	41.12	%		0.01	NOAA EMAP 1993	9/24/2004

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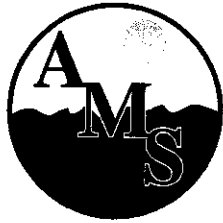
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Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D41028GS1 MA1
AMS Sample ID: 20767

AMS Project Number: 2004-03-35
Date Sampled: 9/16/2004
Date Received: 9/22/2004
Matrix: Sediment

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Analyzed</u>
Gravel (<1 ϕ)	0.05	%		0.01	NOAA EMAP 1993	9/24/2004
Very Coarse Sand (0 ϕ)	0.12	%		0.01	NOAA EMAP 1993	9/24/2004
Coarse Sand (1 ϕ)	0.27	%		0.01	NOAA EMAP 1993	9/24/2004
Medium Sand (2 ϕ)	2.77	%		0.01	NOAA EMAP 1993	9/24/2004
Fine Sand (3 ϕ)	33.24	%		0.01	NOAA EMAP 1993	9/24/2004
Very Fine Sand (4 ϕ)	52.57	%		0.01	NOAA EMAP 1993	9/24/2004
Silt (5-7 ϕ)	8.94	%		0.01	NOAA EMAP 1993	9/24/2004
Clay (>8 ϕ)	2.04	%		0.01	NOAA EMAP 1993	9/24/2004

Quality Assurance: These analyses were performed in accordance with EPA/ASTM guidelines for quality assurance.

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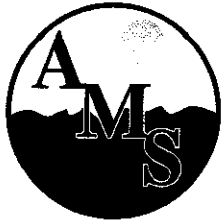
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Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D4102FGS1 MA3
AMS Sample ID: 20768

AMS Project Number: 2004-03-35
Date Sampled: 9/16/2004
Date Received: 9/22/2004
Matrix: Sediment

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Analyzed</u>
Gravel (<-1 ϕ)	0.11	%		0.01	NOAA EMAP 1993	9/24/2004
Very Coarse Sand (0 ϕ)	0.04	%		0.01	NOAA EMAP 1993	9/24/2004
Coarse Sand (1 ϕ)	0.03	%		0.01	NOAA EMAP 1993	9/24/2004
Medium Sand (2 ϕ)	0.12	%		0.01	NOAA EMAP 1993	9/24/2004
Fine Sand (3 ϕ)	7.79	%		0.01	NOAA EMAP 1993	9/24/2004
Very Fine Sand (4 ϕ)	67.61	%		0.01	NOAA EMAP 1993	9/24/2004
Silt (5-7 ϕ)	21.66	%		0.01	NOAA EMAP 1993	9/24/2004
Clay (>8 ϕ)	2.64	%		0.01	NOAA EMAP 1993	9/24/2004

Quality Assurance: These analyses were performed in accordance with EPA/ASTM guidelines for quality assurance.

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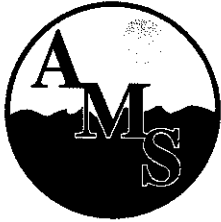
Client: Battelle
Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D41036GS1 MA7
AMS Sample ID: 20769

AMS Project Number: 2004-03-35
Date Sampled: 9/16/2004
Date Received: 9/22/2004
Matrix: Sediment

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Analyzed</u>
Gravel (<-1 ϕ)	0.01	%		0.01	NOAA EMAP 1993	9/24/2004
Very Coarse Sand (0 ϕ)	0.01	%		0.01	NOAA EMAP 1993	9/24/2004
Coarse Sand (1 ϕ)	0.08	%		0.01	NOAA EMAP 1993	9/24/2004
Medium Sand (2 ϕ)	0.98	%		0.01	NOAA EMAP 1993	9/24/2004
Fine Sand (3 ϕ)	6.91	%		0.01	NOAA EMAP 1993	9/24/2004
Very Fine Sand (4 ϕ)	68.64	%		0.01	NOAA EMAP 1993	9/24/2004
Silt (5-7 ϕ)	20.14	%		0.01	NOAA EMAP 1993	9/24/2004
Clay (>8 ϕ)	3.23	%		0.01	NOAA EMAP 1993	9/24/2004

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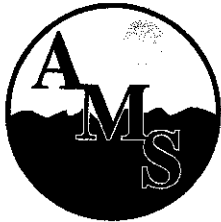
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Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
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AMS Sample ID: 20770

AMS Project Number: 2004-03-35
Date Sampled: 9/16/2004
Date Received: 9/22/2004
Matrix: Sediment

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Analyzed</u>
Gravel (<-1 ϕ)	0.56	%		0.01	NOAA EMAP 1993	9/24/2004
Very Coarse Sand (0 ϕ)	0.20	%		0.01	NOAA EMAP 1993	9/24/2004
Coarse Sand (1 ϕ)	0.11	%		0.01	NOAA EMAP 1993	9/24/2004
Medium Sand (2 ϕ)	0.59	%		0.01	NOAA EMAP 1993	9/24/2004
Fine Sand (3 ϕ)	5.33	%		0.01	NOAA EMAP 1993	9/24/2004
Very Fine Sand (4 ϕ)	24.42	%		0.01	NOAA EMAP 1993	9/24/2004
Silt (5-7 ϕ)	35.96	%		0.01	NOAA EMAP 1993	9/24/2004
Clay (>8 ϕ)	32.84	%		0.01	NOAA EMAP 1993	9/24/2004

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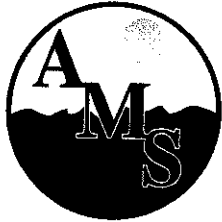
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Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D41045GS1 NR4
AMS Sample ID: 20771

AMS Project Number: 2004-03-35
Date Sampled: 9/16/2004
Date Received: 9/22/2004
Matrix: Sediment

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Analyzed</u>
Gravel (<1 ϕ)	0.53	%		0.01	NOAA EMAP 1993	9/24/2004
Very Coarse Sand (0 ϕ)	0.15	%		0.01	NOAA EMAP 1993	9/24/2004
Coarse Sand (1 ϕ)	0.78	%		0.01	NOAA EMAP 1993	9/24/2004
Medium Sand (2 ϕ)	2.01	%		0.01	NOAA EMAP 1993	9/24/2004
Fine Sand (3 ϕ)	12.46	%		0.01	NOAA EMAP 1993	9/24/2004
Very Fine Sand (4 ϕ)	35.40	%		0.01	NOAA EMAP 1993	9/24/2004
Silt (5-7 ϕ)	26.79	%		0.01	NOAA EMAP 1993	9/24/2004
Clay (>8 ϕ)	21.89	%		0.01	NOAA EMAP 1993	9/24/2004

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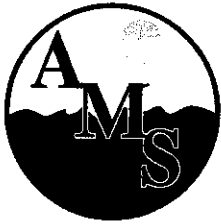
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Project Number: DACW33-03-D-0004
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AMS Sample ID: 20772

AMS Project Number: 2004-03-35
Date Sampled: 9/16/2004
Date Received: 9/22/2004
Matrix: Sediment

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Analyzed</u>
Gravel (<-1 ϕ)	0.00	%		0.01	NOAA EMAP 1993	9/24/2004
Very Coarse Sand (0 ϕ)	0.25	%		0.01	NOAA EMAP 1993	9/24/2004
Coarse Sand (1 ϕ)	1.69	%		0.01	NOAA EMAP 1993	9/24/2004
Medium Sand (2 ϕ)	2.31	%		0.01	NOAA EMAP 1993	9/24/2004
Fine Sand (3 ϕ)	13.39	%		0.01	NOAA EMAP 1993	9/24/2004
Very Fine Sand (4 ϕ)	32.43	%		0.01	NOAA EMAP 1993	9/24/2004
Silt (5-7 ϕ)	29.03	%		0.01	NOAA EMAP 1993	9/24/2004
Clay (>8 ϕ)	20.91	%		0.01	NOAA EMAP 1993	9/24/2004

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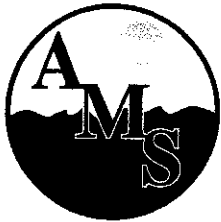
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Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D41055GS1 NB3
AMS Sample ID: 20773

AMS Project Number: 2004-03-35
Date Sampled: 9/17/2004
Date Received: 9/22/2004
Matrix: Sediment

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Analyzed</u>
Gravel (<-1 ϕ)	0.05	%		0.01	NOAA EMAP 1993	9/24/2004
Very Coarse Sand (0 ϕ)	0.02	%		0.01	NOAA EMAP 1993	9/24/2004
Coarse Sand (1 ϕ)	0.27	%		0.01	NOAA EMAP 1993	9/24/2004
Medium Sand (2 ϕ)	1.57	%		0.01	NOAA EMAP 1993	9/24/2004
Fine Sand (3 ϕ)	19.11	%		0.01	NOAA EMAP 1993	9/24/2004
Very Fine Sand (4 ϕ)	75.61	%		0.01	NOAA EMAP 1993	9/24/2004
Silt (5-7 ϕ)	2.18	%		0.01	NOAA EMAP 1993	9/24/2004
Clay (>8 ϕ)	1.18	%		0.01	NOAA EMAP 1993	9/24/2004

Quality Assurance: These analyses were performed in accordance with EPA/ASTM guidelines for quality assurance.


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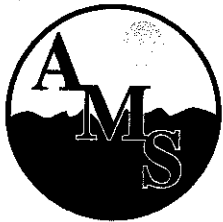
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Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D4105CGS1 NB5
AMS Sample ID: 20774

AMS Project Number: 2004-03-35
Date Sampled: 9/17/2004
Date Received: 9/22/2004
Matrix: Sediment

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Analyzed</u>
Gravel (<-1 ϕ)	0.00	%		0.01	NOAA EMAP 1993	9/24/2004
Very Coarse Sand (0 ϕ)	0.01	%		0.01	NOAA EMAP 1993	9/24/2004
Coarse Sand (1 ϕ)	0.03	%		0.01	NOAA EMAP 1993	9/24/2004
Medium Sand (2 ϕ)	0.24	%		0.01	NOAA EMAP 1993	9/24/2004
Fine Sand (3 ϕ)	11.03	%		0.01	NOAA EMAP 1993	9/24/2004
Very Fine Sand (4 ϕ)	45.84	%		0.01	NOAA EMAP 1993	9/24/2004
Silt (5-7 ϕ)	32.75	%		0.01	NOAA EMAP 1993	9/24/2004
Clay (>8 ϕ)	10.09	%		0.01	NOAA EMAP 1993	9/24/2004

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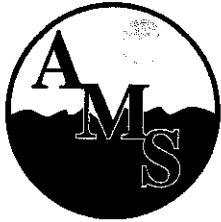
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Project Number: DACW33-03-D-0004
Client Sample ID: 11D41063GS1 NB7
AMS Sample ID: 20775

AMS Project Number: 2004-03-35
Date Sampled: 9/17/2004
Date Received: 9/22/2004
Matrix: Sediment

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Analyzed</u>
Gravel (<-1 ϕ)	0.02	%		0.01	NOAA EMAP 1993	9/24/2004
Very Coarse Sand (0 ϕ)	0.07	%		0.01	NOAA EMAP 1993	9/24/2004
Coarse Sand (1 ϕ)	0.05	%		0.01	NOAA EMAP 1993	9/24/2004
Medium Sand (2 ϕ)	0.37	%		0.01	NOAA EMAP 1993	9/24/2004
Fine Sand (3 ϕ)	20.37	%		0.01	NOAA EMAP 1993	9/24/2004
Very Fine Sand (4 ϕ)	59.18	%		0.01	NOAA EMAP 1993	9/24/2004
Silt (5-7 ϕ)	15.63	%		0.01	NOAA EMAP 1993	9/24/2004
Clay (>8 ϕ)	4.31	%		0.01	NOAA EMAP 1993	9/24/2004

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Client: Battelle
Project Title: USACE NAE Delivery Order 0005
Project Number: DACW33-03-D-0004
Client Sample ID: 11D4106CGS1 BR1
AMS Sample ID: 20776

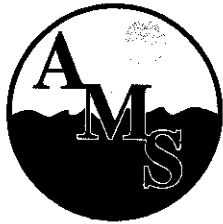
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Date Received: 9/22/2004
Matrix: Sediment

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Analyzed</u>
Gravel (<-1φ)	0.00	%		0.01	NOAA EMAP 1993	9/24/2004
Very Coarse Sand (0φ)	0.16	%		0.01	NOAA EMAP 1993	9/24/2004
Coarse Sand (1φ)	0.34	%		0.01	NOAA EMAP 1993	9/24/2004
Medium Sand (2φ)	2.10	%		0.01	NOAA EMAP 1993	9/24/2004
Fine Sand (3φ)	10.12	%		0.01	NOAA EMAP 1993	9/24/2004
Very Fine Sand (4φ)	48.51	%		0.01	NOAA EMAP 1993	9/24/2004
Silt (5-7φ)	32.20	%		0.01	NOAA EMAP 1993	9/24/2004
Clay (>8φ)	6.57	%		0.01	NOAA EMAP 1993	9/24/2004

Quality Assurance: These analyses were performed in accordance with EPA/ASTM guidelines for quality assurance.

KSN

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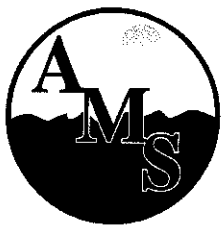
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Project Number: DACW33-03-D-0004
Client Sample ID: 11D41076GS1 BR3
AMS Sample ID: 20777

AMS Project Number: 2004-03-35
Date Sampled: 9/17/2004
Date Received: 9/22/2004
Matrix: Sediment

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Analyzed</u>
Gravel (<-1 ϕ)	0.05	%		0.01	NOAA EMAP 1993	9/24/2004
Very Coarse Sand (0 ϕ)	0.09	%		0.01	NOAA EMAP 1993	9/24/2004
Coarse Sand (1 ϕ)	0.25	%		0.01	NOAA EMAP 1993	9/24/2004
Medium Sand (2 ϕ)	0.90	%		0.01	NOAA EMAP 1993	9/24/2004
Fine Sand (3 ϕ)	7.41	%		0.01	NOAA EMAP 1993	9/24/2004
Very Fine Sand (4 ϕ)	25.03	%		0.01	NOAA EMAP 1993	9/24/2004
Silt (5-7 ϕ)	50.92	%		0.01	NOAA EMAP 1993	9/24/2004
Clay (>8 ϕ)	15.35	%		0.01	NOAA EMAP 1993	9/24/2004

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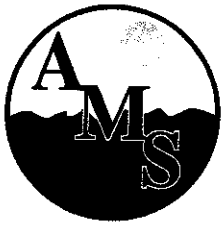
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AMS Sample ID: 20778

AMS Project Number: 2004-03-35
Date Sampled: 9/17/2004
Date Received: 9/22/2004
Matrix: Sediment

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Flag</u>	<u>MDL</u>	<u>Method</u>	<u>Analyzed</u>
Gravel (<-1 ϕ)	0.00	%		0.01	NOAA EMAP 1993	9/24/2004
Very Coarse Sand (0 ϕ)	0.08	%		0.01	NOAA EMAP 1993	9/24/2004
Coarse Sand (1 ϕ)	0.19	%		0.01	NOAA EMAP 1993	9/24/2004
Medium Sand (2 ϕ)	0.62	%		0.01	NOAA EMAP 1993	9/24/2004
Fine Sand (3 ϕ)	5.84	%		0.01	NOAA EMAP 1993	9/24/2004
Very Fine Sand (4 ϕ)	15.42	%		0.01	NOAA EMAP 1993	9/24/2004
Silt (5-7 ϕ)	53.93	%		0.01	NOAA EMAP 1993	9/24/2004
Clay (>8 ϕ)	23.92	%		0.01	NOAA EMAP 1993	9/24/2004

Quality Assurance: These analyses were performed in accordance with EPA/ASTM guidelines for quality assurance.

AMS, Inc. Project Manager



Applied Marine Sciences, Inc.

502 N. Highway 3, Suite B • League City, TX 77573 • (281) 554-7272 • Fax (281) 554-6356

AMS QUALITY CONTROL REPORT

Client: Battelle
Project Number: DACW33-03-D-0004
Project Title: USACE NAE Delivery Order 0005
Client Sample ID: 11D4107EGS1 BR6
AMS Sample ID: 20778

AMS Project Number: 2004-03-35
Date Sampled: 9/17/2004
Date Received: 9/22/2004
Date Analyzed: 9/24/2004
Matrix: Sediment
Method: EMAP 1993

Replicate Analysis

Particle Diameter Range (mm)	U.S. Standard Sieve Mesh #	Size Class	Sample Result (%)	Duplicate Result (%)	RPD (%)	#	QC Limits (% RPD)
<4.00-2.00	No. 10	Gravel	0.00	0.00	0.00		≤25
<2.00-0.0625	No. 230	Sand	22.15	19.96	10.40		≤25
<0.0625-0.0039	Pipette	Silt	53.93	55.34	2.58		≤25
<0.0039	Pipette	Clay	23.92	24.70	3.21		≤25

Column to be used to flag RPD values outside of given limit of 25%
"EXCEEDS" indicates a value outside of the QC Limits

RPD: 0 out of 4 outside limit

amples in Batch (AMS ID): 20764 20767 20770 20773 20776
20765 20768 20771 20774 20777
20766 20769 20772 20775 20778

AMS, Inc. Project Manager

U.S. Army Corps of Engineers, New England District

Contract No. DACW33-03-D-0004 (Delivery Order 0005)

Sample Custody Form

Today's Date : 9/17/2004 1:52:39 P

Laboratory : Applied Marine Sciences, Inc.

Chain-of-Custody # : 11D41-TC-0004

Survey ID : 11D41

Analysis ID : TC
















Analysis Description : TOC

502 N. Highway 3, Suite B

League City TX 77573

Mr. Kenneth Davis

281-554-7272 (Phone) 281-554-6356 (Fax)

Bottle ID :	Bottle ID :	Sampling Date :	Station ID :	Depth Code:	Ck 1	Ck 2	Ck 3
	11D41007TC1	9/16/2004 8:28:27 AM	MB1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41016TC1	9/16/2004 9:13:55 AM	MB4		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4101FTC1	9/16/2004 9:56:01 AM	MB7		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41028TC1	9/16/2004 11:41:55 AM	MA1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4102FTC1	9/16/2004 12:10:20 PM	MA3		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41036TC1	9/16/2004 12:38:06 PM	MA7		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4103ETC1	9/16/2004 2:29:04 PM	NR2		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41045TC1	9/16/2004 2:55:36 PM	NR4		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4104CTC1	9/16/2004 3:21:45 PM	NR7		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41055TC1	9/17/2004 10:50:39 AM	NB3		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4105CTC1	9/17/2004 11:16:21 AM	NB5		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41063TC1	9/17/2004 11:44:29 AM	NB7		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4106CTC1	9/17/2004 12:31:30 PM	BR1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D41076TC1	9/17/2004 1:09:27 PM	BR3		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11D4107ETC1	9/17/2004 1:43:54 PM	BR6		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Shipping Condition - Room Temperature: _____ Cold(ice): _____ Frozen(dry ice):

Received Condition - Room Temperature: _____ Cold(ice): _____ Frozen(dry ice): _____

Relinquished By / Date / Time / Company / Transport-Airbill #	Received By / Date / Time / Company
<i>COG 9/20/04 1330 RDD</i>	<i>Matthew R. Blythe 9/21/04 0900 BDO</i>
<i>Matthew R. Blythe 9/21/04 1400 BDO</i>	<i>Kenneth Davis 9/21/04 1000 ARS</i>

U.S. Army Corps of Engineers, New England District

Contract No. DACW33-03-D-0004 (Delivery Order 0005)

Sample Custody Form

Today's Date : 9/17/2004 1:52:37 P

Laboratory : Applied Marine Sciences, Inc.

Chain-of-Custody # : 11D41-GS-0002

Survey ID : 11D41

Analysis ID : GS
















Analysis Description : Grain size

502 N. Highway 3, Suite B

League City TX 77573

Mr. Kenneth Davis

281-554-7272 (Phone) 281-554-6356 (Fax)

Bottle ID :	Bottle ID :	Sampling Date :	Station ID :	Depth Code:	Ck 1	Ck 2	Ck 3
	11D41007GS1	9/16/2004 8:28:27 AM	MB1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	11D41016GS1	9/16/2004 9:13:55 AM	MB4		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	11D4101FGS1	9/16/2004 9:56:01 AM	MB7		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	11D41028GS1	9/16/2004 11:41:55 AM	MA1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	11D4102FGS1	9/16/2004 12:10:20 PM	MA3		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	11D41036GS1	9/16/2004 12:38:06 PM	MA7		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	11D4103EGS1	9/16/2004 2:29:04 PM	NR2		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	11D41045GS1	9/16/2004 2:55:36 PM	NR4		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	11D4104CGS1	9/16/2004 3:21:45 PM	NR7		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	11D41055GS1	9/17/2004 10:50:39 AM	NB3		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	11D4105CGS1	9/17/2004 11:16:21 AM	NB5		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	11D41063GS1	9/17/2004 11:44:29 AM	NB7		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	11D4106CGS1	9/17/2004 12:31:30 PM	BR1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	11D41076GS1	9/17/2004 1:09:27 PM	BR3		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	11D4107EGS1	9/17/2004 1:43:54 PM	BR6		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Shipping Condition - Room Temperature: _____ Cold(ice): Frozen(dry ice): _____
 Received Condition - Room Temperature: _____ Cold(ice): _____ Frozen(dry ice): _____

Relinquished By / Date / Time / Company / Transport-Airbill #	Received By / Date / Time / Company
<i>CO Guy 9/20/04 1330 BDD</i>	<i>Matthew R. Lyman 9/21/04 0900 BR</i>
<i>Matthew R. Lyman 9/21/04 1900 BDD</i>	<i>Kenneth S. / 9/21/04 / 1000 / AMS</i>