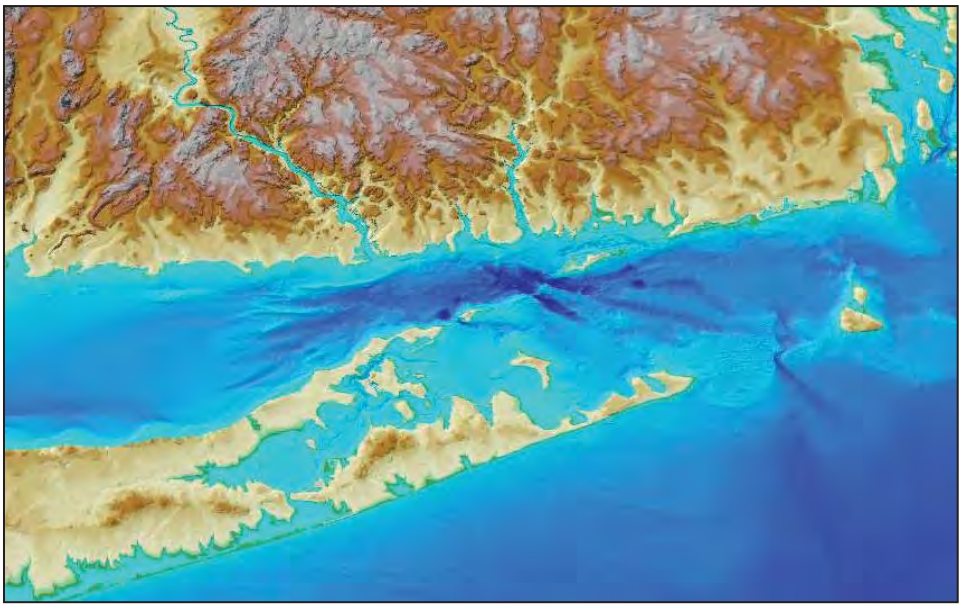
Supplemental Environmental Impact Statement for the Designation of Dredged Material Disposal Site(s) in Eastern Long Island Sound, Connecticut and New York

APPENDIX D

Side-Scan Sonar Data Processing and Mosaicking: Eastern Long Island Sound



Prepared for: **United States Environmental Protection Agency**

and

Eastern Research Group, Inc.

Prepared by: **Woods Hole Group**

February 2014

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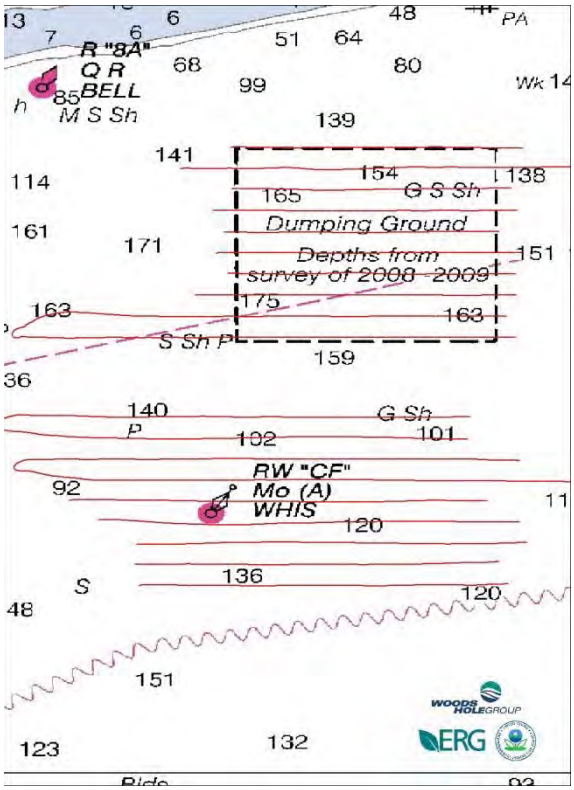
FINAL

SIDE-SCAN SONAR DATA PROCESSING AND MOSAICKING:

EASTERN LONG ISLAND SOUND

USEPA Contract no. EP-C-09-020
ERG Subcontract no. OCPD-020/7



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ACRONYMS

AGC	Automatic Gain Control
BAC	Beam Angle Correction
CTI	Chesapeake Technology, Inc.
DAMOS	Disposal Area Monitoring System
EGN	Empirical Gain Normalization
ELIS	Eastern Long Island Sound
ERG	Environmental Research Group
GEOTIFF	Georeferenced Tagged Image File Format
GIS	Geographic Information System
kHz	Kilohertz
LIS	Long Island Sound
NOAA	National Oceanic and Atmospheric Administration
SPI	Sediment Profile Image
USACE-NAE	United State Army Corps of Engineers New England District
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WHG	Woods Hole Group, Inc.
XTF	Extended Triton Format (a common side-scan sonar file extension)

1.0 INTRODUCTION

1.1 PURPOSE OF STUDY

Ocean disposal sites are designated by the United States Environmental Protection Agency (EPA). The EPA Region 1 (R1) monitors disposal sites with the assistance of the United States Army Corps of Engineers New England District (USACE) following guidance outlined in Site Management and Monitoring Plans (SMMPs) for EPA designated dredged material disposal sites. EPA has designated two dredged material disposal sites in Long Island Sound (LIS). EPA is conducting a Supplemental Impact Statement for eastern Long Island Sound (ELIS) and this data will support that effort. In ELIS, there are two sites currently being used (under the USACE's site selection authority) that have not been designated; these two sites are: 1) the Cornfield Shoals Disposal Site (CSDS), and 2) the New London Disposal Site (NLDS). EPA Region 1 is compiling information necessary to support the Supplemental Impact Statement for ELIS; this report will be used for that purpose. The EPA has a voluntary policy under the National Environmental Policy Act (NEPA) which describes the studies to be conducted.

This effort processes side-scan sonar data collected by the EPA R1. Side-scan data is a useful tool in evaluating seafloor properties. An acoustic pulse emitted by the sonar equipment reflects back to receivers, and that information is processed to produce an "image" of the seafloor, which may be used to characterize geology, morphology, shipwrecks or other structures.

1.2 WORK OBJECTIVES

Under contract number EP-C-09-020, subcontract OCPD-020/7, Woods Hole Group (WHG) provided analysis, interpretation, and reporting of side-scan sonar data to assess seafloor characteristics and classification at 28 sites in eastern Long Island Sound. Analysis included review of individual side-scan sonar files to create a mosaic for each of the 28 sites. The single mosaic created by grouping the side-scan sonar files from a particular site facilitated characterization of the entire survey area. Raw data were provided to WHG in XTF (Extended Triton Format) files, the industry standard, which is compatible with the Chesapeake Technology SonarWiz 5 processing software. Upon the completion of side-scan data processing, WHG was to provide a GIS-compatible mosaic image for each project location (e.g., GEOTIFF), along with supporting files (e.g., SHP) that identify seafloor characteristics and individual targets. This document serves as the summary report of this data processing task and complements the electronic data deliverables described above.

2.0 METHODS

This section provides the methodological context for which the work tasks were performed. Detail about the processing methods, data quality review and other project specific information is documented in the Quality Assurance Project Plan (QAPP) produced as part of this contract (Woods Hole Group, 2014).

2.1 METHODS: PROCESSING SIDE-SCAN SONAR DATA

The side-scan surveys were conducted by USEPA using the L3-Klein Model 3000 side-scan sonar system aboard the USEPA OSV *BOLD*. Digital data from the 100- and 500-kHz data channels of the side-scan were acquired, using a range setting of 100m and 75m resolution. Survey lanes were spaced at approximately 100 meter intervals running east-west, and some north-south across the width of the survey areas. Considering that the vessel may, at times, wander 20 to 30 m off the intended lane, 100% bottom coverage was achieved by the survey plans, and 100% overlap (but not for all sites). Bottom coverage is defined as the percentage of seafloor area that the side-scan sonar receives reflected acoustic energy, or "backscatter". Overlap is defined as the percentage of area that is surveyed more than once, and from more than one direction, such that the seafloor does not contain shadows, or areas of acoustic energy loss. Vessel speed was maintained between 3 and 5 knots. The altitude of the tow fish was maintained between 5 and 15 meters from the seafloor. All project locations were surveyed in ELIS within the 100 meter (330-feet) isobaths.

Raw side-scan sonar data were provided to WHG in XTF file format. Data were processed on Windows PCs using the SonarWiz 5 software package by Chesapeake Technology Inc. (Chesapeake Technology, Inc., 2013). Technicians followed the standard operating procedure (SOP) for side-scan data processing and mosaic creation described in the QAPP (Woods Hole Group, 2014). The data collected from the 500-kHz channels (channels 3 and 4) on the L3-Klein towfish were used for data processing because it provides less backscatter and higher resolution imagery. Side-scan sonar backscatter intensity was displayed in mosaics using the L3-Klein proprietary copper color scale, where low-intensity backscatter is black and high-backscatter is a golden-yellow (Figure 2.1.1). High backscatter intensity is characteristic of an object that reflects the most acoustic energy originally transmitted by the side-scan sonar transducers. Dense objects, such as boulders or metals, are often indicated by high backscatter. From a geologic perspective, fine-grained sediments are characterized by lower backscatter than coarser sediments such as sand and gravel.

Figure 2.1.1. L3-Klein backscatter intensity color scale

As part of processing, raw data were trimmed and removed to provide a consistent mosaic edge (survey area) and data quality. All data files used for the mosaics met quality acceptance categories. In cases where data files were trimmed, it was because they were either: 1) data from turning; 2) poor signal return; 3) striping. Raw data was recorded during transect turns for some but not all files; these data were removed because it was not required for this project.

When processing the data using CTI SonarWiz 5, processes called "nadir blanking", "offset altitude adjustment", and "adjusted display range", along with several filters, were applied to produce a final data product that could be used for interpretation. The nadir is area of ensonified data directly beneath the side-scan towfish, including the water column. The nadir blanking distance is the distance away from nadir center where seafloor bottom track is set to begin. The altitude offset adjustment sets the distance added to each pixel to translate the bottom track further from the nadir, which is used to hide visual artifacts that can occur at the nadir/bottom track boundary. Adjusted display range sets the total range of each line that is visible, with reductions occurring at the far starboard and port edges of the trackline. For example, an adjusted display range of 98 of 100 means that 1 meter is hidden from both the starboard and port edges of the sonar swath. The display range was adjusted along with trimming to provide a consistent edge of the survey area and to hide visual artifacts on the far edges of tracklines.

Mosaics were developed using three primary filters to normalize the acoustic backscatter signal: Beam Angle Correction (BAC), Automatic Gain Control (AGC), and empirical gain normalization (EGN). The BAC and AGC filters were used to provide a "smooth" image, while the EGN filter was used to assist with the interpretation of the survey area and evaluate more subtle difference in backscatter.

Following creation of the mosaic, the SonarWiz 5 Classification function was used to quantitatively define three (3) seafloor classifications based on the relative differences of side-scan backscatter intensity (e.g., low, moderate or high return) in a single mosaic. The results of the classification function are unique to each mosaic. This task was performed to ultimately assist with the interpretation of the seafloor geology represented in the side-scan mosaic by providing an objective classification of bottom backscatter, which is used as a proxy for sediment texture. Use of the Classification function results with supplemental ground-truthing data sources, such as sediment grain size samples, can increase the confidence level of the seafloor interpretation over the mosaic area.

Classification could be done in one step, however, due to the functionality of the SonarWiz5 software, projects with a large number of side-scan files (>80 XTF files) were split into several steps. The classification process works by using a single side-scan sonar file as a reference and applying the criteria to other files. Whenever a split was necessary, the same sonar file was used as a reference between all successive steps for one project location so that all files were being classified in the same way. For example, project location Eastern_LIS_Niantic_Master contained 825 side-scan sonar files and required twelve (12) steps to classify all files.

2.2 METHODS: TARGET IDENTIFICATION

Target identification was based solely on side-scan sonar backscatter intensity in the data provided. An assessment of multiple data types, such as surficial sediment samples or magnetic anomaly data, could reduce the uncertainty of interpretation of this side-scan sonar data, but this level of assessment was beyond the scope of this work. Without additional information to ground-truth the survey area, WHG cannot characterize the seafloor or a particular target with 100% accuracy. However, EPA sediment grain size data, EPA sediment profile images, and USGS sediment classifications have been reviewed to increase the confidence level of accuracy. The EPA provided ground-truthing data for select survey sites. Data included grain-size characterization from sediment grabs and sediment profile images (SPI). A summary of the data sets that correspond to specific survey areas is presented in Table 2.3.1.

Woods Hole Group (WHG) has classified targets according to categories approved by EPA. These categories are based on a general knowledge of Long Island Sound marine geology and site specific history. Targets are classified according to the categories listed in Table 2.3.2. Some targets have a lower percentage of confidence and are therefore classified as "Unidentified/Other" until additional data are collected.

Targets are identified and recorded as a point in the sonar image that has a corresponding position (e.g., latitude and longitude) and supporting metadata, all which are stored in the SonarWiz 5 Target Catalog. In some mosaics with dense target items, instead of a single point for every item, a polygon was used to delineate an area of targets. Using the SonarWiz 5 terminology, a "target" is defined as a single point, and a "feature" is defined as a polygon. Both targets and features were exported as GIS-compatible shapefiles.

2.3 METHODS: MOSAIC INTERPRETATION

An interpretation of the seafloor geology in each mosaic was primarily based on the results of the SonarWiz5 Classification function, which evaluated the relative differences in side-scan backscatter intensity within a mosaicked area.

All mosaic images were processed with the BAC, AGC, and EGN filters. Evaluation of the mosaics revealed that the BAC and AGC filters tended to "wash out" subtle differences in backscatter that may be related to seafloor geology (e.g., sediment grain size). Therefore, mosaics were created and evaluated using different combinations of filters, but interpretation for 24 of 28 sites was completed using the EGN mosaics

Upon review of the classification results and EPA ground-truthing data, the Woods Hole Group evaluated supplemental data sets from existing publications to help reduce the uncertainty of the seafloor interpretation for each mosaic. In particular, Woods Hole Group evaluated the features from:

- NOAA Electronic Navigation Charts (ENCs);
- NOAA hydrographic surveys h11250, h11252, h11997;
- U.S. Geological Survey Open-File Reports 00-304, 2005-1001, and USGS (2011);

Table 2.3.1. EPA ground-truthing data used for target identification and mosaic interpretation.

Site ID	Data Type (# of samples))
ELIS14	SPI (2)
6MILE10	SPI (3)
MTK9	SPI (1)
FALKNER8	SPI (2)
CLINTON7	SPI (3)
FISEHOLE1	SPI (3)
FISEHOLE6	SPI (3)
Eastern_LIS_Niantic_Master	SPI (1), Sediment (3)
Eastern_LIS_EastHole_Master	Sediment (4)
Eastern_LIS_Fishers_Master	Sediment (4)
FISE_NEW	Sediment (4)
FISE_OLD_2009	Sediment (3)
NLDN_REF	Sediment (8)
CSDS_ACT	Sediment (4)
NTDS_NEW	Sediment (2)
NTDS_HIST	Sediment (3)
NLDN_ACT	Sediment (7)

Table 2.3.2. Target classifications

Classification Category	Definition
Debris Pile	Isolated reflector area with backscatter intensity in contrast with surrounding area; often round or ellipse shaped. Anthropogenic origin, occurring in a designated disposal area.
Field of Debris Piles	Larger area with multiple targets as described above. Anthropogenic origin, occurring in a designated disposal area.
Trawl/Anchor mark	Linear reflectors on the seafloor caused by fishing gear or anchors. Trawl marks often occur in parallel over large expanses of seafloor. Anchor marks are definitive if singular and confined within a federal anchorage area.
Fishing Gear - trap/buoy	Rectangular, box-like contact, often in series. Occasionally a line may be observed connecting the reflector series.
Wreck	Defined as plotted on NOAA navigation charts; observed as an irregular reflector on the seafloor, often oblong with high backscatter
Navigation aid/buoy	Defined as plotted on NOAA navigation charts; observed as a box or block shaped contact on the seafloor, with a linear connecter
Bedform(s)	Any reflectors that resemble naturally occurring seafloor morphology, this could be erosional (e.g., scour and sorting "comet trails"), depositional, or active transport (e.g., sand waves).
Rock outcrop/geological	Reflector that is angular, with block-like structure, often with linear reflectors of high backscatter relative to surrounding area.
Boulder	Rounded or angular contact of high backscatter relative to surrounding seafloor, greater than 1 meter in size (large boulder).
Boulder Field	Area of rounded or angular, high backscatter contacts, as defined above.
Bathy slope reflection	Linear reflector of high backscatter relative to surrounding seafloor that corresponds with a steeply sloping change in bathymetry.
Unidentified/Other	Any other contact or reflector of interest that cannot be positively identified according to the definitions above.

3.0 RESULTS

3.1 SURVEY SITES

The 28 sites selected for data processing and interpretation are listed in Table 3.1.1, and mapped with their respective mosaic areas in Figure 3.1.1. Note that some mosaics overlap (e.g., ELIS14 and FISEHOLE6). All survey sites are located in eastern Long Island Sound, between Sachem Head, Guilford, CT and Watch Hill Point, Westerly, RI.

In general, the 28 survey sites were located at or in close proximity to the two active dredged material disposal sites in ELIS: Cornfield Shoals Disposal Site (CSDS) and New London Disposal Site (NLDS). Figures 3.1.2 through 3.1.4 provide larger-scale maps of the survey sites and resulting mosaic areas. These figures also map the boundaries of CSDS, NLDS, and historical disposal sites, provided by the USACE-NAE DAMOS Program. There are seven (7) historical disposal sites, which are documented as having had a disposal event; these include Falkner Island, Mattituck, Clinton Harbor, Six Mile Reef, Niantic Bay, North Dumpling, and Stonington.

The mosaics for all survey sites are presented in Appendix M. The targets and features identified for each survey site are presented in Appendix T. The SonarWiz5 Classification function output for each survey site is provided in Appendix Z. These appendices have been provided electronically.

Table 3.1.1. Identification for each mosaic site

Site ID	Data Acquisition Date	Number of XTF Files Collected	Survey Line Spacing /Resolution
ELIS16	7/22/12	41	100m/75m
ELIS15	7/20/12	16	100m/75m
ELIS14	7/18/12	194	100m/75m
ELIS13	7/16/12	52	100m/75m
ELIS12	7/14/12	43	100m/75m
6MILE10	7/26/11	73	100m/100 res
MTK9	7/25/11	97	100m/75m up to line 3, then 100 m resolution
FALKNER8	7/24/11	74	100m/75m
CLINTON7	7/23/11	86	100m/75m
FISEHOLE1	7/19/11	221	100m/75m
FISEHOLE2	7/18/11	20	100m/75m
FISEHOLE3	7/18/11	24	100m/75m
FISEHOLE4	7/18/11	26	100m/75m
FISEHOLE5	7/17/11	100	100m/75m
FISEHOLE6	7/16/11	145	100m/75m
Eastern_LIS_Niantic_Master	6/9/10	825	100m/100 res
Eastern_LIS_EastHole_Master	6/8/10	640	100m/100 res
Eastern_LIS_Fishers_Master	6/7/10	431	100m/100 res
FISE_SW_ADD2	7/23/07	17	100m/100 res
FISE_NEW	7/18/07	40	100m/100 res
FISE_OLD_2009	7/17/07	55	100m/100 res
NLDN_REF_ADD	7/17/07	60	100m/100 res
NLDN_REF	7/16/07	92	100m/100 res
CSDS_ACT	7/16/07	63	100m/100 res
CSDS_ADD	7/16/07	61	100m/100 res
NTDS_NEW	7/15/07	110	100m/100 res
NTDS_HIST	7/15/07	89	100m/100 res
NLDN_ACT	7/14/07	64	100m/100 res

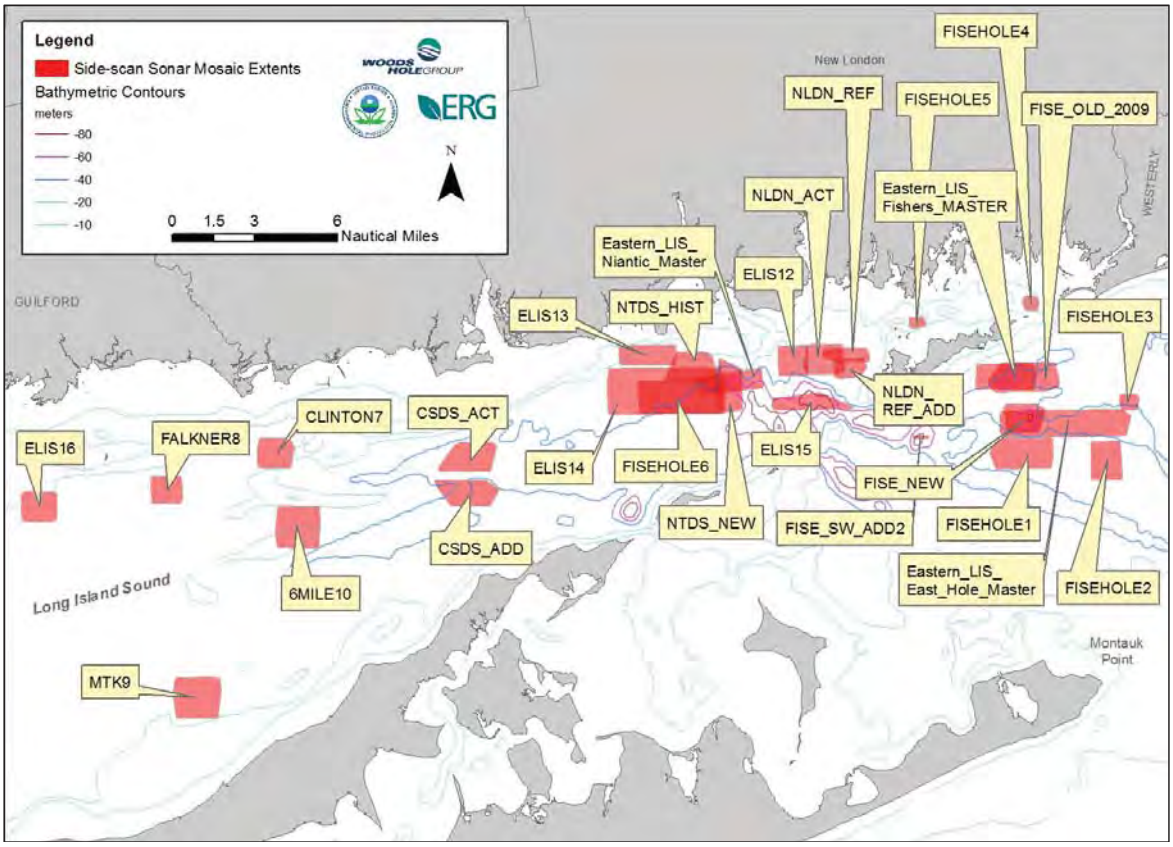

Figure 3.1.1. Basemap of the 28 side-scan sonar survey sites selected for data processing and interpretation.

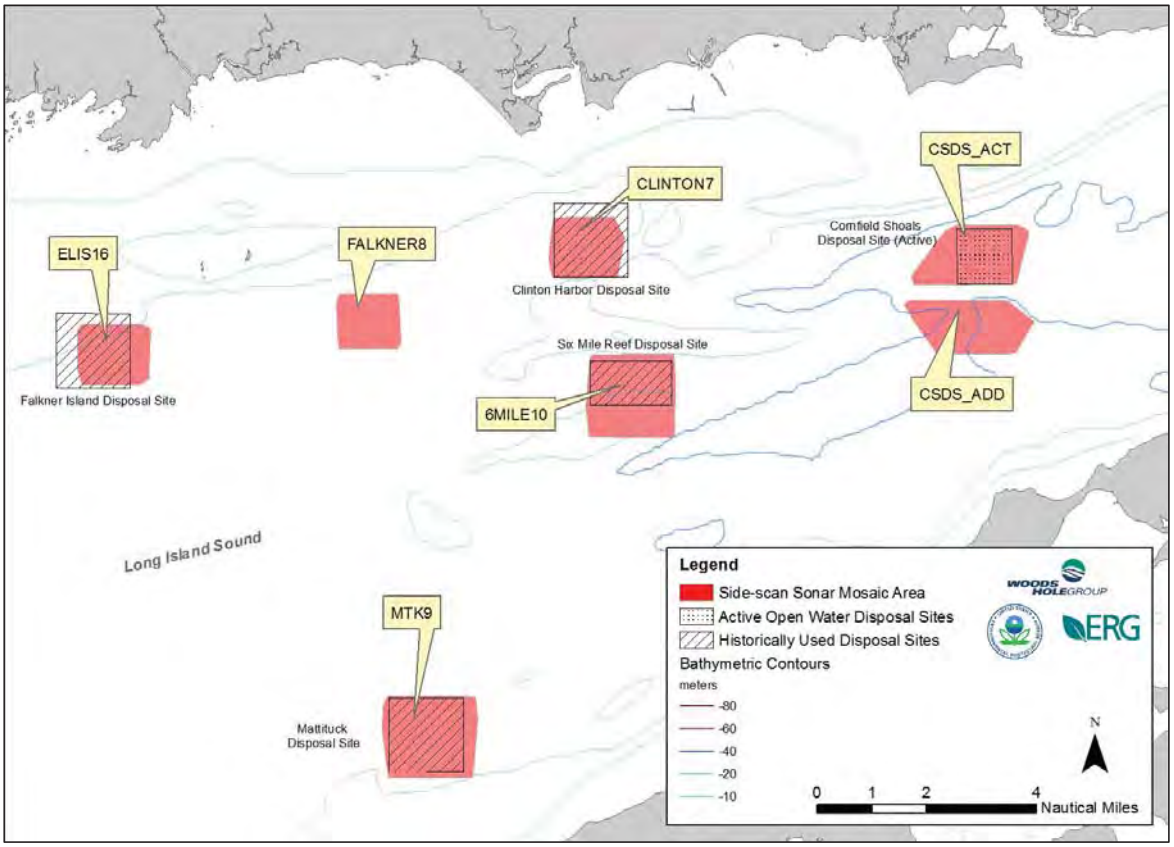

Figure 3.1.2. Basemap of western survey areas along with active and historical disposal sites.

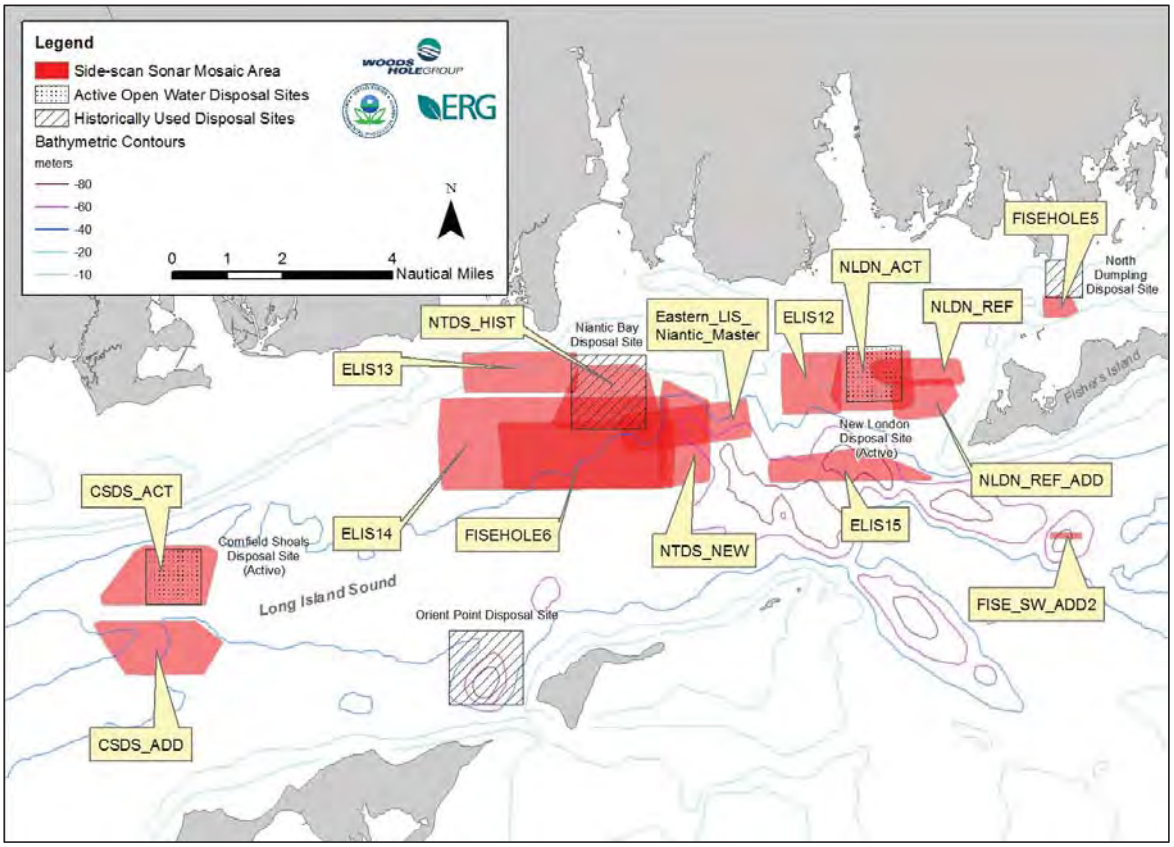

Figure 3.1.3. Basemap of central survey areas along with active and historical disposal sites.

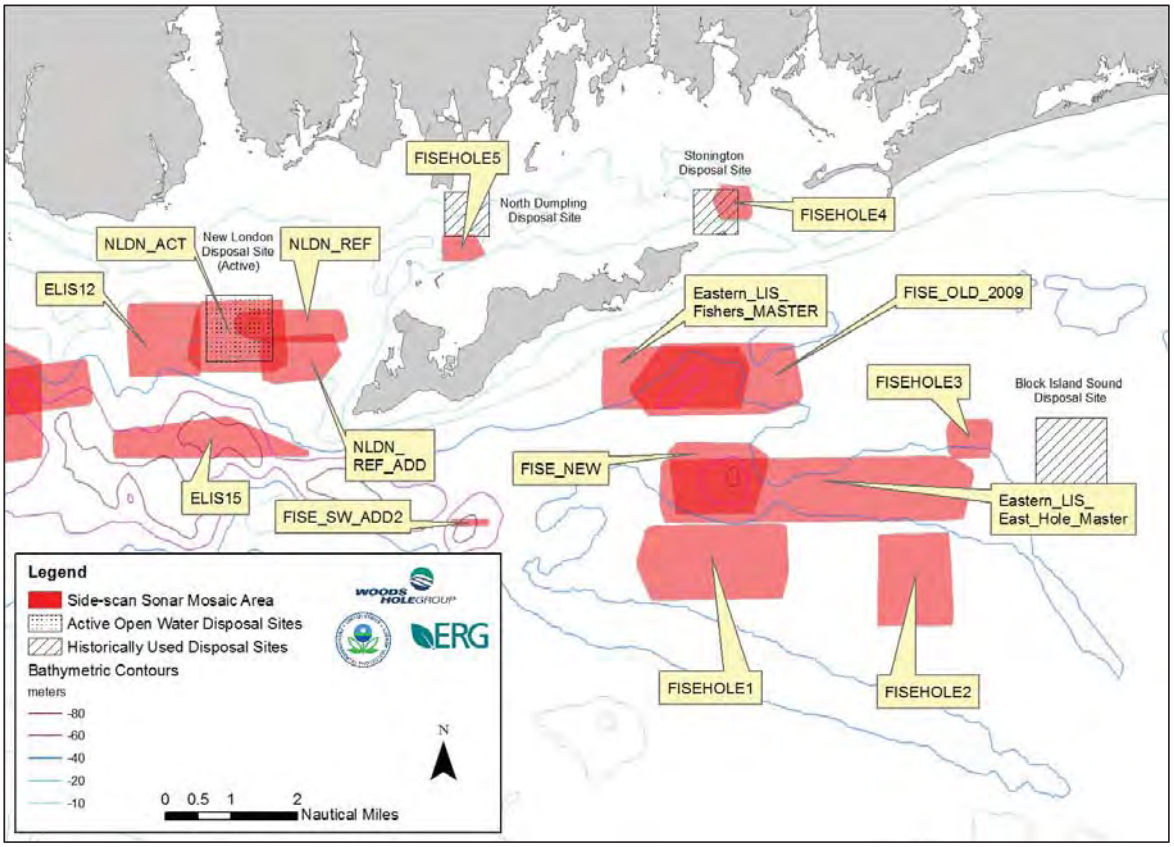

Figure 3.1.4. Basemap of eastern survey areas along with active and historical disposal sites.

3.2 ELIS16

3.2.1 Mosaic Overview

Project location ELIS16 is located approximately 10 km south of Branford, CT and 6 km southwest of Falkner Island (Figure 3.1.2). Depths vary between 18 to 30 meters at this location. The Falkner Island disposal site (historical) covers approximately 80% of the survey area, extending from the west to the east.

Processing summary statistics are listed in Table 3.2.1. Forty-one (41) side-scan sonar XTF files were imported for this project location. A quality control assessment was conducted and zero (0) files were rejected. Two (2) files were trimmed of data. Data coverage is presented in Figure 3.2.1. The green shade indicates survey area with 100% coverage (0% overlap); the blue shade represents area with 200% coverage (100% overlap). In total, the project area was surveyed at approximately 30–50% over1ap in data coverage. Navigation/layback information was imbedded in the sonar data files. Side-scan data covered 4.24 million sq. meters. The mosaic and navigation lines are presented in Figure 3.2.2.

Table 3.2.1. ELIS16 processing statistics used in SonarWiz 5.

ELIS16	
# XTF files	41
Navigation/layback imbedded in sonar data?	Yes
Nadir Blanking dist. (m)	4
Nadir Threshold	8
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	98 of 100
# Tracklines trimmed	2
Tracklines trimmed	ELIS16_06_05_120721205600
	ELIS16_38_37_120722000800
# Tracklines removed/hidden	0
Tracklines removed/hidden	N/A

3.2.2 Target Summary

Seventy-five (75) unique targets and one (1) feature were identified at ELIS16 using specific descriptions. Targets were assigned to four classifications, with the number of targets assigned to each classification given in parentheses: boulder (3), debris pile (1), trawl/anchor mark (28), or unidentified/other (42). The one feature outlined an area of trawl/anchor marks in the center of the project location, extending roughly east-west. Trawl marks were observed mostly in the center of the project location and would often continue on several adjacent survey lines. Approximately half of the targets were

isolated, meaning there were no other adjacent targets. Targets and features are compiled in Appendix T. Targets are indicated on Figure 3.2.2 and example target images are indicated in Figure 3.2.3.

3.2.3 Seafloor Classification & Geological Interpretation

The seafloor at ELIS16 consists of material with medium intensity acoustic backscatter, which is homogenously distributed in the project area. No bottom samples or SPI images were provided within the survey area. Sediment texture interpretation performed by the USGS describes the entire project area as a mix of sand-silt-clay (USGS, 2000). Figure 3.2.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned a single class to the entire study area, which is consistent with the USGS data, and further supports the interpretations of a seafloor composed of one sediment type. SonarWiz 5 bottom classifications are located in Appendix Z.

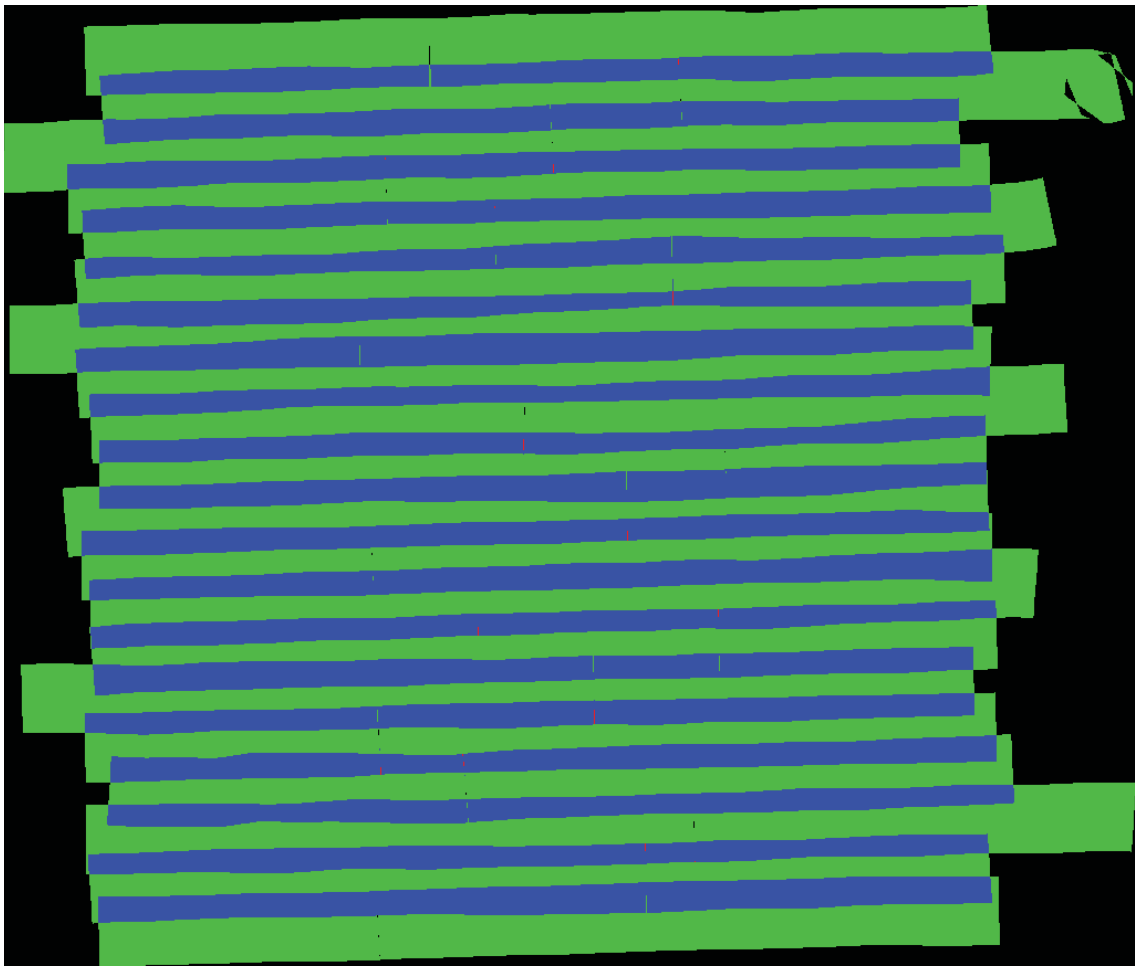

Figure 3.2.1. ELIS16 survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively.

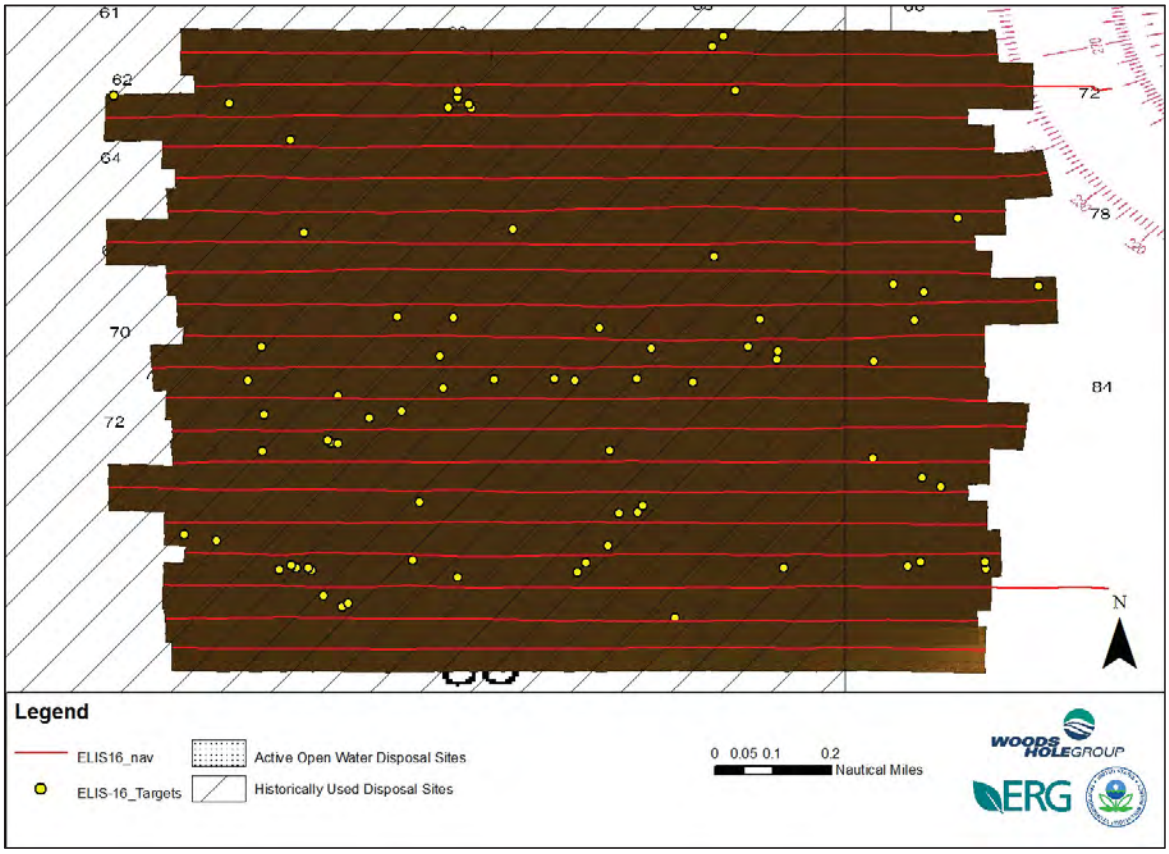

Figure 3.2.2. ELIS16 mosaic with navigation lines and targets.

Figure 3.2.3. ELIS16 target examples: trawl/anchor marks (L), unidentified/other (R).

Figure 3.2.4. ELIS16 mosaic with supplemental data to assist with interpretation.

3.3 ELIS15

3.3.1 Mosaic Overview

Project location ELIS15 is located near Race Rock Reef approximately 10 km south of New London Harbor, CT and 5 km west of Fishers Island (Figure 3.1.3). The site is 1.3 km south of the New London Disposal Site (active). Depth ranges from 15 to 91 meters in this area.

Sixteen (16) side-scan sonar XTF files were imported for this project location, and one (1) file was rejected for QA reasons. Three (3) files were trimmed of data (Table 3.3.1). Data coverage is presented in Figure 3.3.1. The project area was surveyed at approximately 0% over1ap in data coverage. Side-scan data covered 2.45 million sq. meters at this location. The navigation and mosaic lines are presented in Figure 3.3.2.

Table 3.3.1. ELIS15 processing statistics used in SonarWiz 5.

ELIS15	
# XTF files	16
Navigation/layback imbedded in sonar data?	Yes
Nadir Blanking dist. (m)	4
Nadir Threshold	8
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	74 of 75
# Tracklines trimmed	3
Tracklines trimmed	ELIS15_2_1120720080100
	ELIS15_2_1120720081100
	ELIS15_14_13_120721152100
# Tracklines removed/hidden	1
Tracklines removed/hidden	ELIS15_2_1120720082100

3.3.2 Target Summary

Forty (40) unique targets and zero (0) features were identified at ELIS15 using specific descriptions. Targets were assigned to four classifications, with the number of targets assigned to each classification given in parentheses: boulder area/field (35), debris (1), rock outcrop/geological (1), or unidentified (3). Very few targets were isolated since they were surrounded by other similar bottom features. Targets and features are compiled in Appendix T. Targets are indicated in Figure 3.3.2 and example target images are indicated in Figure 3.3.3.

3.3.3 Seafloor Classification & Geological Interpretation

The seafloor at ELIS15 consists of material with medium intensity backscatter that is interrupted by small, intermittent areas of higher intensity backscatter. Numerous piles of boulders and rock outcrops were interpreted from survey data. There were no grab samples of bottom material at this location. The USGS model of bottom sediment is a complex mix of mostly gravel and sand, with areas of san-silt-clay, where grain size increases as depth decreases (USGS, 2000). The proximity to the swift currents of The Race suggests the bottom in shallower areas is composed of coarse sediment and exposed bedrock, and deeper areas are composed of finer sediments. Figure 3.3.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned three classes to the study area: two dominant classes which correspond to the seafloor sediment and the larger debris fields, and a third class which corresponds mainly to outcrop shadows and is not considered an actual change in the seafloor. However, since the survey lines do not provide data overlap this classification should be used with caution. SonarWiz 5 bottom classifications are located in Appendix Z.

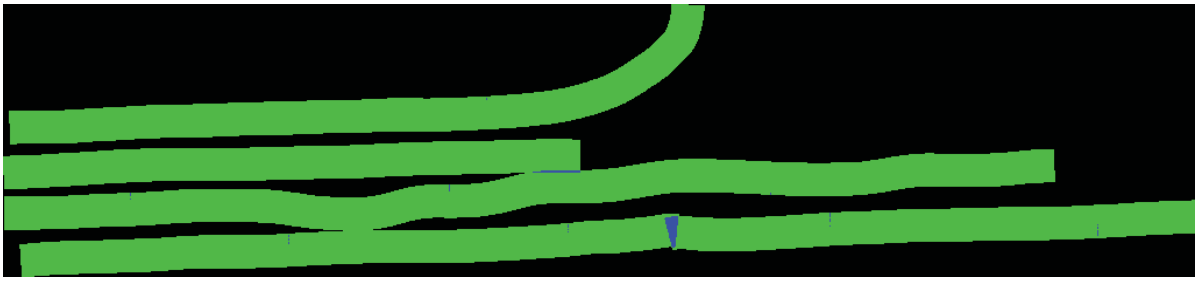

Figure 3.3.1. ELIS15 survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively.

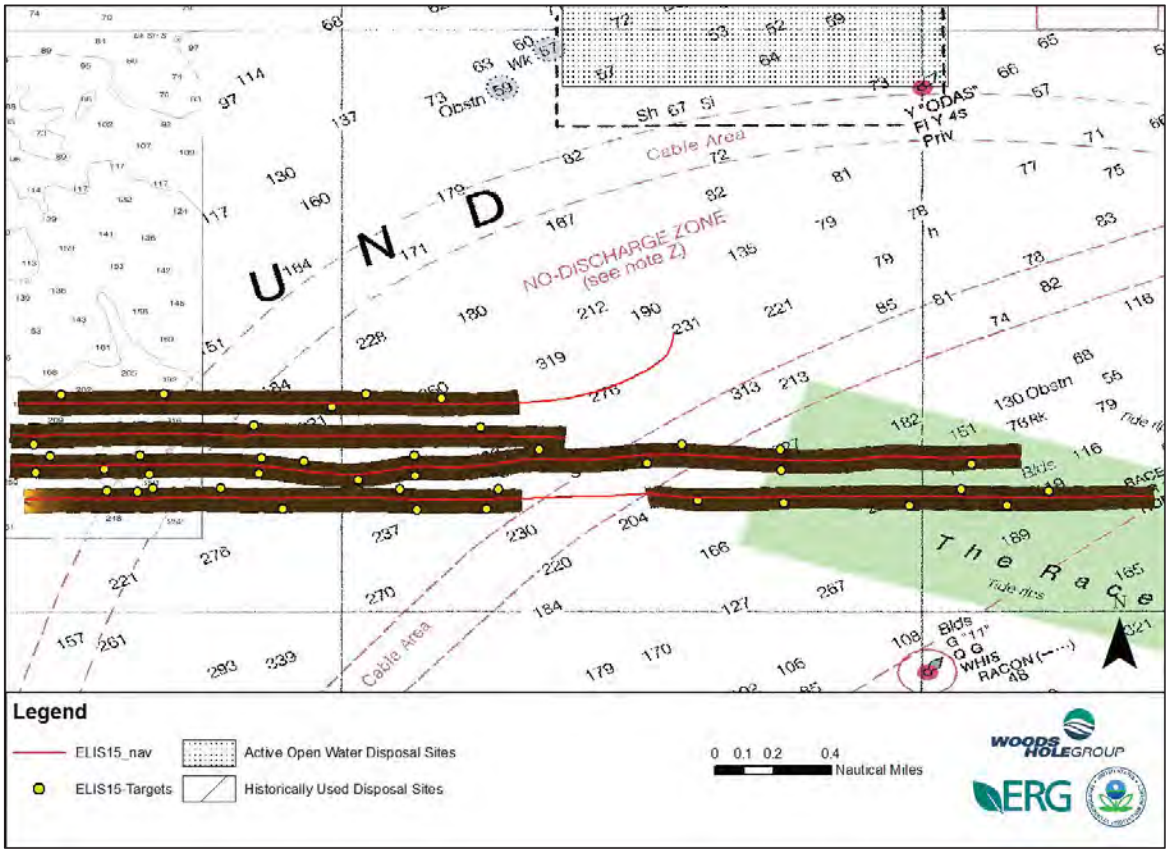

Figure 3.3.2. ELIS15 mosaic with navigation lines and targets.

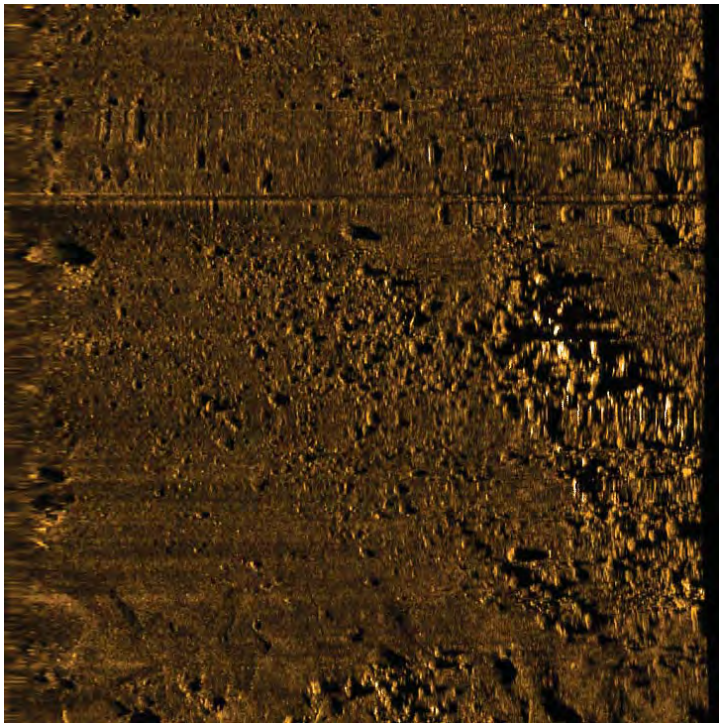

Figure 3.3.3. ELIS15 target example: boulder area/field.

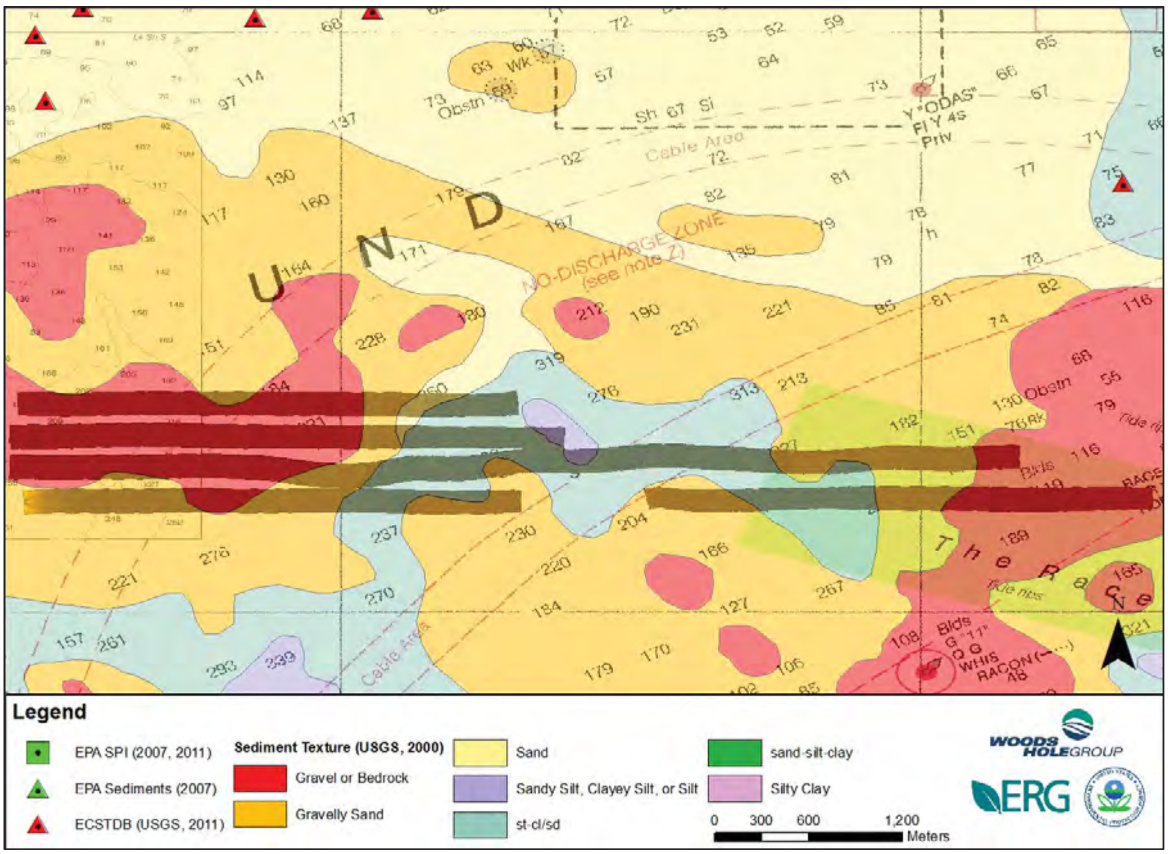

Figure 3.3.4. ELIS15 mosaic with supplemental data to assist with interpretation.

3.4 ELIS14

3.4.1 Mosaic Overview

Project location ELIS14 is located approximately 8 km south of Niantic Bay, CT (Figure 3.1.3). Depth varies between 12 and 61 meters in this area. This site overlaps with project locations FISEHOLE6, NTDS_HIST, NTDS_NEW, and Eastern_LIS _Niantic_Master. The Niantic Bay disposal site (historical) overlaps the site in the northeast corner.

One hundred ninety-four (194) side-scan sonar XTF files were imported for this project location, and zero (0) files were rejected for QA reasons. Two (2) files were trimmed of data (Table 3.4.1). Data coverage is presented in Figure 3.4.1. The project area was surveyed at approximately 100% over1ap in data coverage. Navigation/layback information was imbedded in the sonar data files. Side-scan data covered 8.13 million sq. meters at this location.

Table 3.4.1. ELIS14 processing statistics used in SonarWiz 5.

ELIS14	
# XTF files	194
Navigation/layback imbedded in sonar data?	Yes
Nadir Blanking dist. (m)	4
Nadir Threshold	8
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	98 of 100
# Tracklines trimmed	2
Tracklines trimmed	ELIS14_47_48_120717142200
	ELIS14_44_43_120717144300
# Tracklines removed/hidden	0
Tracklines removed/hidden	N/A

3.4.2 Target Summary

Ninety-five (95) unique targets and four (4) features were identified at ELIS14 using specific descriptions. Targets were assigned to nine classifications, with the number of targets assigned to each classification given in parentheses: bedforms (1), boulder (5), boulder area/field (39), debris pile (9), fishing gear – trap/buoy (4), rock outcrop/geological (3), trawl/anchor mark (8), unidentified/other (24), and wreck (2). The features outlined boulder area/fields in the center and east edge of the project location. The wrecks were located in the center and southeast areas of the site: target ELIS14-T0044 is identified on NOAA charts, but target ELIS-T0089 is not. Targets and

features are compiled in Appendix T. Targets are indicated on Figure 3.4.2 and example target images are indicated in Figure 3.4.3.

3.4.3 Seafloor Classification & Geological Interpretation

The seafloor at ELIS14 consists of homogenously distributed medium backscatter material, with infrequent and isolated patches of higher backscatter. Closer examination of the seafloor reveals bedforms that may be sand waves in the west. Sediment grabs by the USGS consisted of gravel with varying percentages of sand (USGS, 2011). SPI images provided by the EPA show the bottom to be coarse sand with shells and shell hash. The USGS modeled seafloor classification described the survey area as dominantly gravelly sand with patches of gravel in the east, fining to the west to sand and silty sand (USGE, 2000). The large number of targets identified as boulder fields in the project area supports this interpretation of a hard bottom. Figure 3.4.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned one class to the study area, despite there being clear visual differences in backscatter between bottom sediment and exposed bedrock and boulders. Possibly this is because the total area of boulders and bedrock was not great enough to be considered a unique class when compared to the surrounding survey area. SonarWiz 5 bottom classifications are located in Appendix Z.

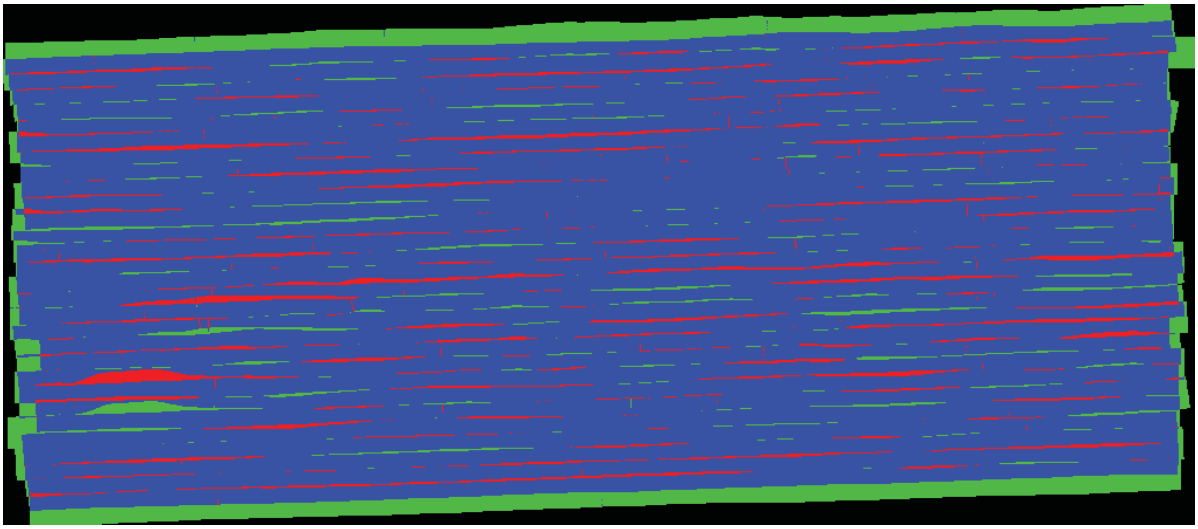

Figure 3.4.1. ELIS14 survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively. The color red represents area with 300% coverage.

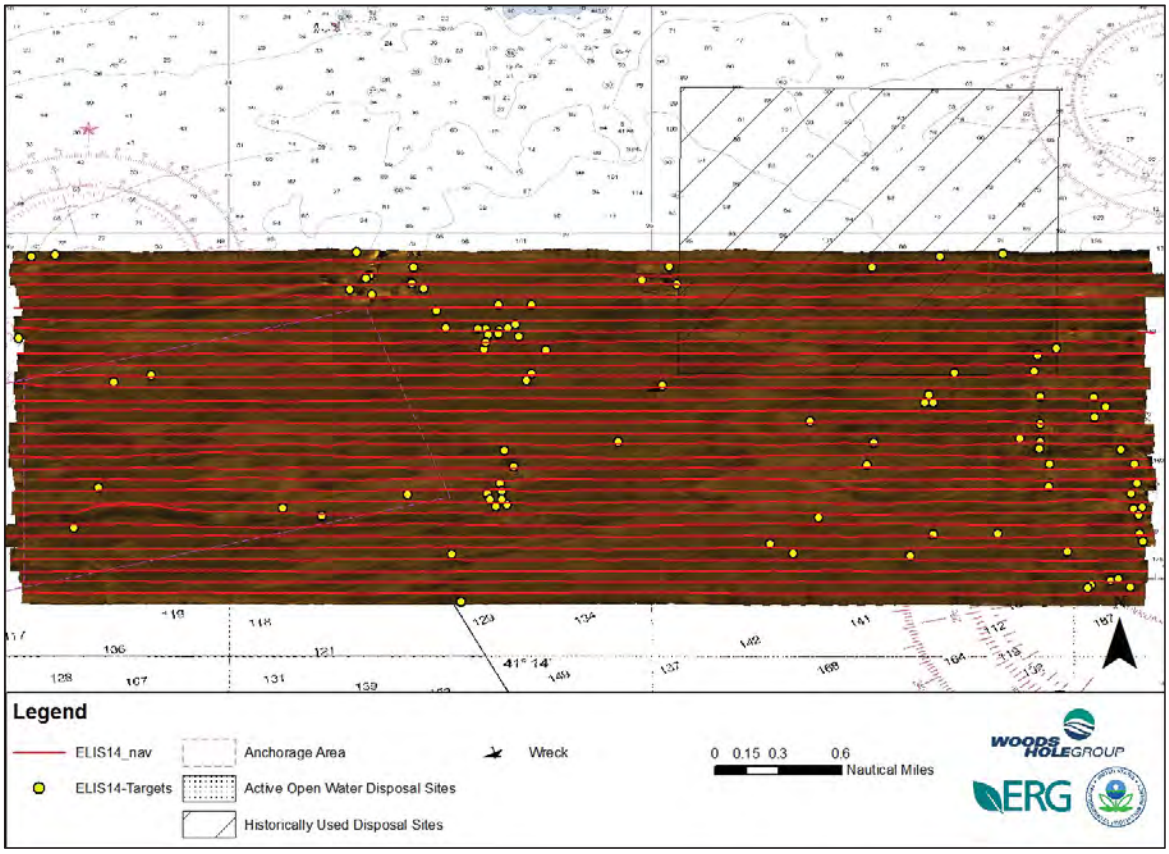

Figure 3.4.2. ELIS14 mosaic with navigation lines and targets.

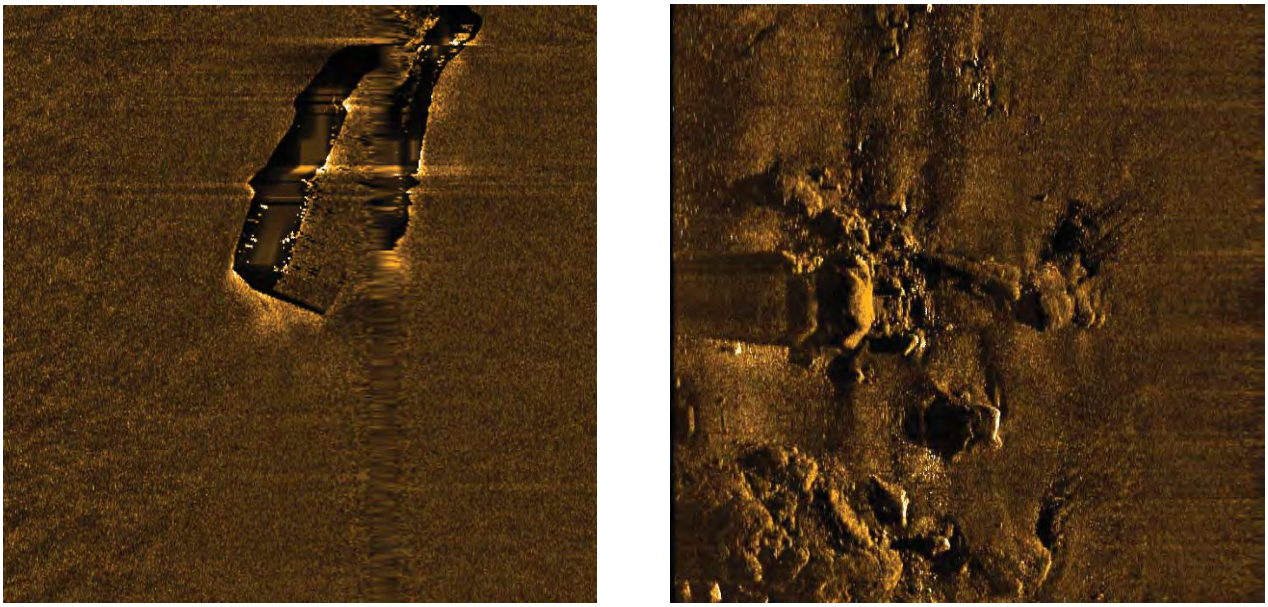

Figure 3.4.3. ELIS14 target examples: wreck (L), boulder area/field (R).

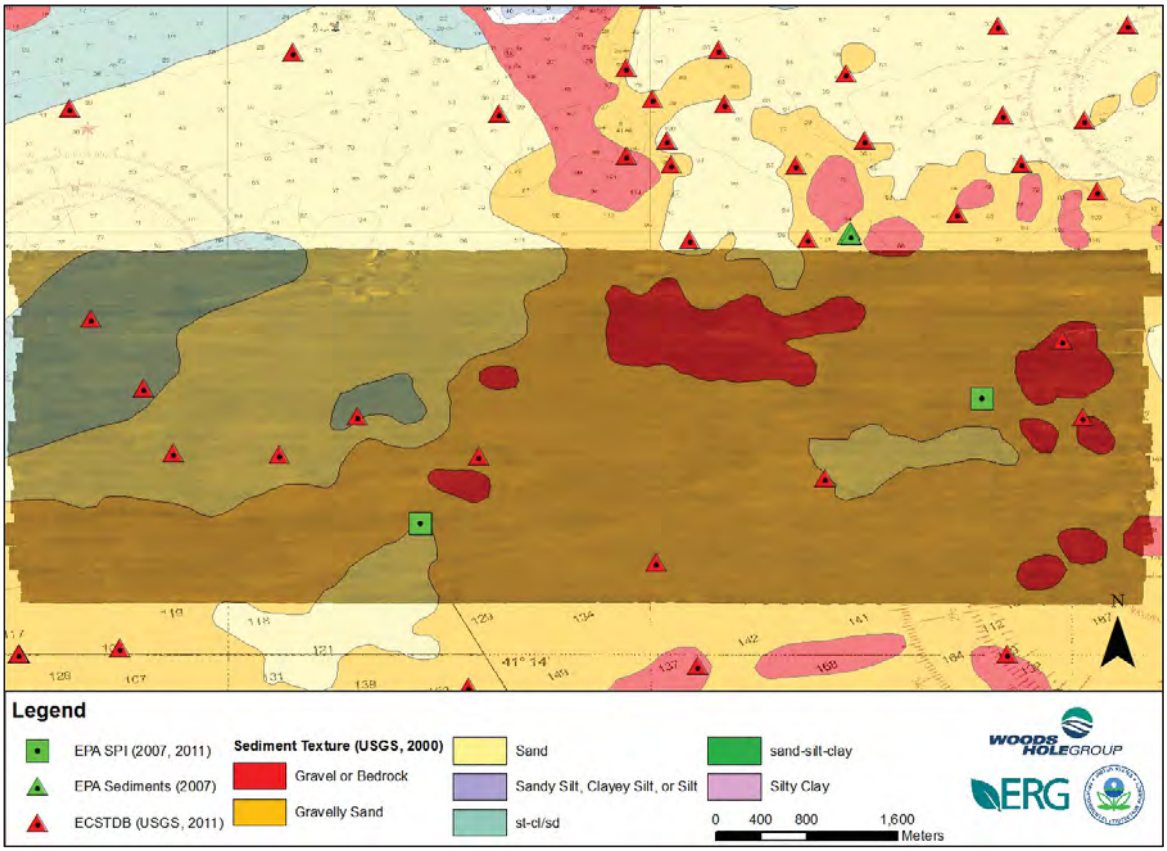

Figure 3.4.4. ELIS14 mosaic with supplemental data to assist with interpretation.

3.5 ELIS13

3.5.1 Mosaic Overview

Project location ELIS13 is located approximately 4 km southwest of Niantic Bay, CT (Figure 3.1.3). Project location NTDS_NEW and the Niantic Bay disposal site (historical) overlap to a small degree in the eastern edge of ELIS13. Depth varies between 6 and 30 meters in this area.

Fifty-two (52) side-scan sonar XTF files were imported for this project location, and zero (0) files were rejected for QA reasons. Four (4) files were trimmed of data (Table 3.5.1). Data coverage is presented in Figure 3.5.1. The project area was surveyed at approximately 50–60% over1ap in data coverage. Navigation/layback information was imbedded in the sonar data files. Side-scan data covered 5.75 million sq. meters at this location.

Table 3.5.1. ELIS13 processing statistics used in SonarWiz 5.

ELIS13	
# XTF files	52
Navigation/layback imbedded in sonar data?	Yes
Nadir Blanking dist. (m)	4
Nadir Threshold	10
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	73 of 75
# Tracklines trimmed	4
Tracklines trimmed	ELIS13_24_23_120717081800
	ELIS13_20_19_120716183500
	ELIS13_6_5_120716121300
	ELIS13_20_19_120716181500
# Tracklines removed/hidden	0
Tracklines removed/hidden	N/A

3.5.2 Target Summary

Eighty-eight (88) unique targets and four (4) features were identified at ELIS13 using specific descriptions. Targets were assigned to seven classifications, with the number of targets assigned to each classification given in parentheses: bedforms (12), boulder (5), boulder area/field (36), debris pile (2), rock outcrop/geological (20), unidentified/other (12), and wreck (1). The features outlined three boulder area/fields in distinct sections running north-south in the center and eastern areas of the project location, with the fourth being much smaller and lacking directional orientation. The wreck (target identification

ELIS13-T0072) is located in the south-center of the site and is not identified on NOAA charts. Targets and features are compiled in Appendix T. Targets are indicated on Figure 3.5.2 and example target images are indicated in Figure 3.5.3.

3.5.3 Seafloor Classification & Geological Interpretation

The seafloor at ELIS13 consists of evenly distributed material with medium intensity backscatter with areas of either exposed bedrock or boulder fields in the east and central areas of the project. This is supported by USGS bottom samples in the area which range from sand in the west to gravel and bedrock in the east (USGS, 2011). A large area of rock outcrops/boulder fields in the center of the project area identified in the sonar data was not present in the USGS model of bottom classification (USGS, 2000). This discrepancy could be due to the difference is survey coverage, the frequency acquired survey data (100-kHz vs. 500-kHz), or morphological changes to the seafloor. In this case, the USGS side-scan sonar coverage ends at the outcropping bedrock off Black Point, and there were no samples that indicated bedrock at this location, therefore the model of bottom classification was inaccurate. The presence of bedforms (sand waves) in the east-central section of the study area is evidence that ocean currents play a role in shaping the seafloor at this location, either by producing bedforms or exposing bedrock. Figure 3.5.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned two classes to the study area, with a dominant class and a secondary class. The primary class was assigned to the vast majority of the seafloor, which according to the USGS (2000, 2011) is comprised of sand. The secondary class partially covers the higher backscatter features in the center and eastern part of the study area (likely outcropping bedrock or rocks, but also was assigned to areas of possible bedforms (e.g. sand waves). SonarWiz 5 bottom classifications are located in Appendix Z.

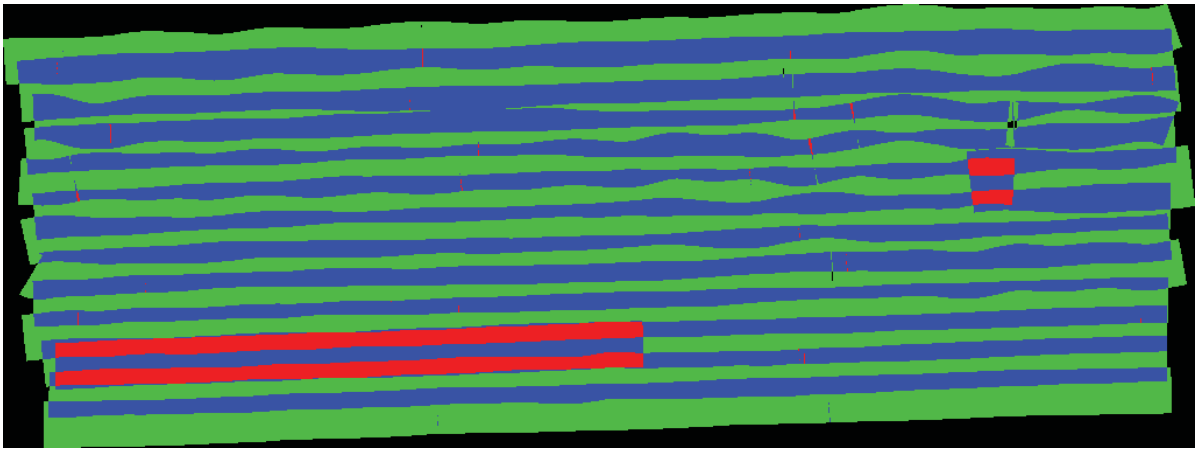

Figure 3.5.1. ELIS13 survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively. The color red represents area with 300% coverage.

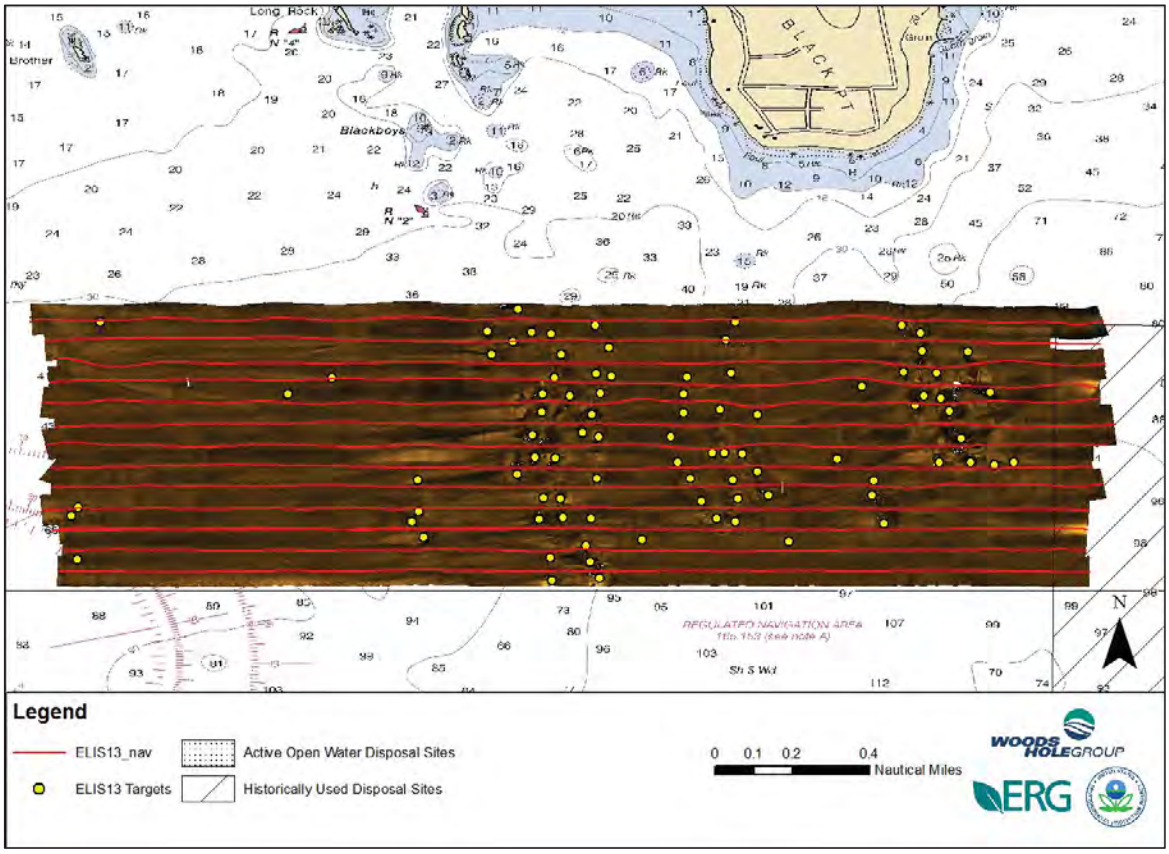

Figure 3.5.2. ELIS13 mosaic with navigation lines and targets.

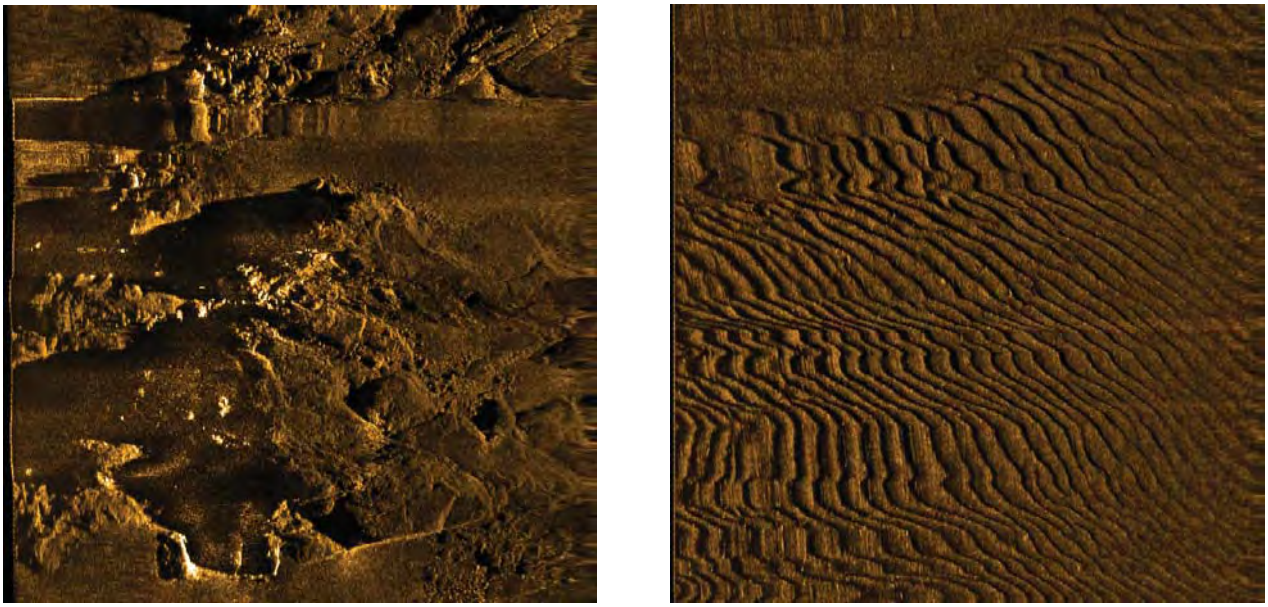

Figure 3.5.3. ELIS13 target examples: rock outcrop/geological (L), bedforms (R).

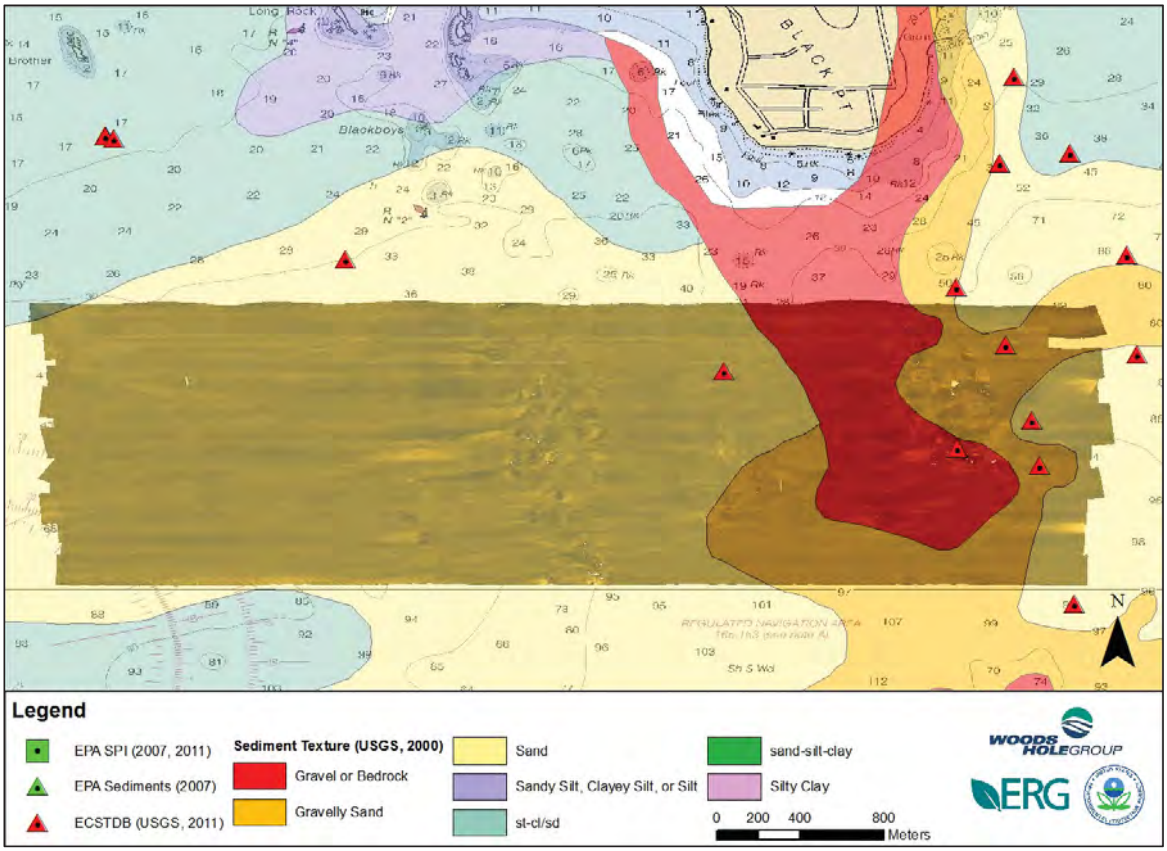

Figure 3.5.4. ELIS13 mosaic with supplemental data to assist with interpretation.

3.6 ELIS12

3.6.1 Mosaic Overview

Project location ELIS12 is located approximately 2 km east of Bartlett Reef and 5 km southwest of New London Harbor, CT (Figure 3.1.3). Project location NLDN_ACT overlaps this site briefly to the east. Depth varies between 15 and 43 meters in this area. Figure 3.6.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Forty-three (43) side-scan sonar XTF files were imported for this project location. Zero (0) files were rejected for QA reasons, and zero (0) files were trimmed of data (Table 3.6.1). Data coverage is presented in Figure 3.6.1. The project area was surveyed at approximately 50% over1ap in data coverage. Navigation/layback information was imbedded in the sonar data files. Side-scan data covered 4.43 million sq. meters.

Table 3.6.1. ELIS12 processing statistics used in SonarWiz 5.

ELIS12	
# XTF files	43
Navigation/layback imbedded in sonar data?	Yes
Nadir Blanking dist (m)	4
Nadir Threshold	8
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	74 of 75
# Tracklines trimmed	0
Tracklines trimmed	N/A
# Tracklines removed/hidden	0
Tracklines removed/hidden	N/A

3.6.2 Target Summary

Sixty-nine (69) unique targets and three (3) features were identified at ELIS12 using specific descriptions. Targets were assigned to nine classifications, with the number of targets assigned to each classification given in parentheses: bedforms (6), boulder (5), boulder area/field (36), debris pile (12), field of debris pile (1), fishing gear – trap/buoy (1), rock outcrop/geological (4), trawl/anchor mark (1), unidentified/other (3). Nearly all targets were identified in the north-central or southwest areas of the project location. Two features outlining boulder area/fields were located in the north-center and southwest corner of the project location and the feature describing bedforms was in the southwest of the site. Targets and features are compiled in Appendix T. Targets are indicated on Figure 3.6.2 and example target images are indicated in Figure 3.6.3.

3.6.3 Seafloor Classification & Geological Interpretation

The seafloor at ELIS12 is composed of material with medium backscatter along with intermittent features of higher backscatter in the north-center and southwest. Higher backscatter returns were nearly continuous in the north-central and were described as boulder areas/fields. Bedforms in the southwest imply currents are strong enough to shape the bottom, which could explain how boulders and bedrock may be exposed. Several USGS samples in the project area describe bottom type as sand with some gravel, especially in the east and southwest (USGS, 2011). USGS modeled bottom type describes the area as almost entirely sand, with few areas of gravelly sand (USGS, 2000). Figure 3.6.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned two classes to the study area. The primary class (blue) covers nearly 100% of the project area. The secondary class occupies such an extremely small area within the sections of high backscatter that it is negligible. The Classification function was run through several iterations (using different settings) in an attempt to better delineate the areas of higher backscatter in the southwest and north-central; unfortunately the Classification function could not resolve these features from the rest of the seafloor; the result is located in Appendix Z.

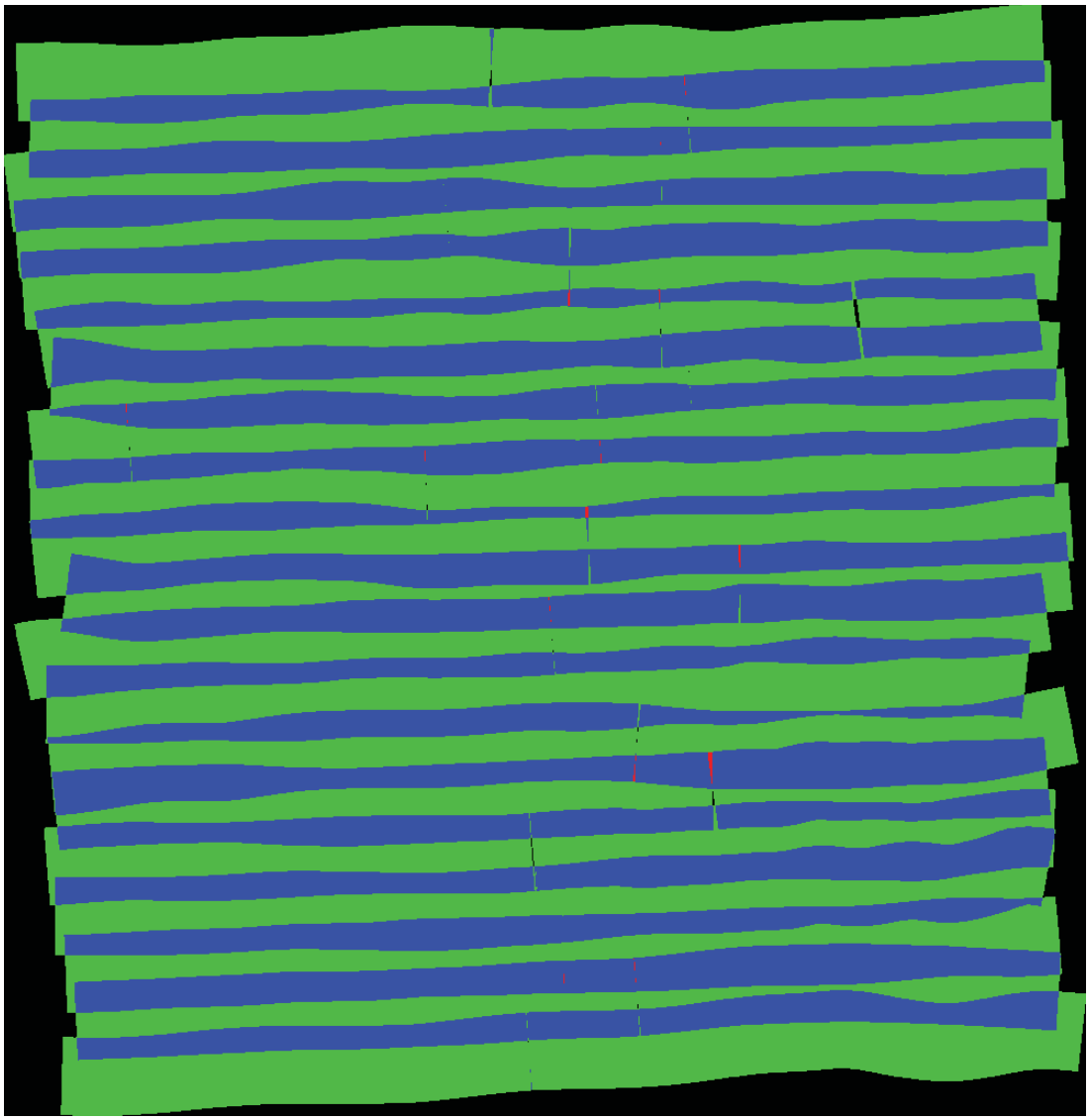

Figure 3.6.1. ELIS12 survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively.

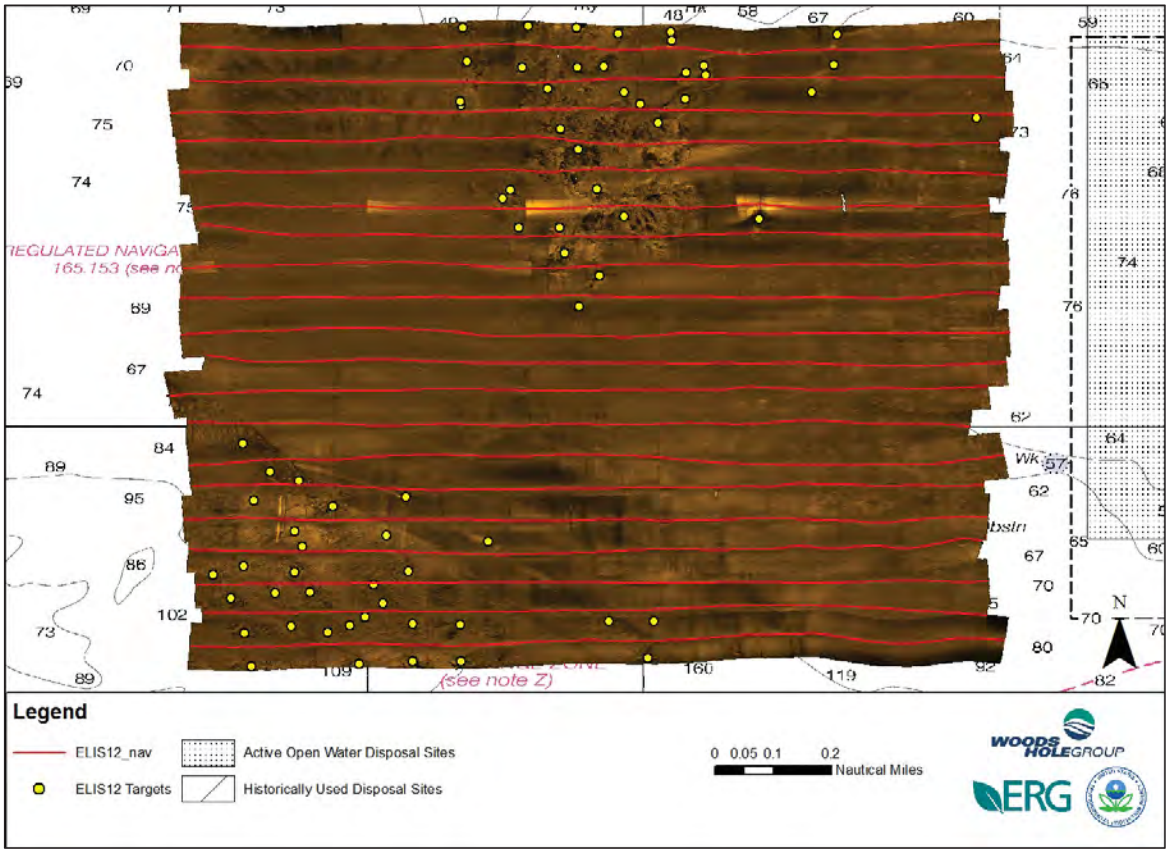

Figure 3.6.2. ELIS12 mosaic with navigation lines and targets.

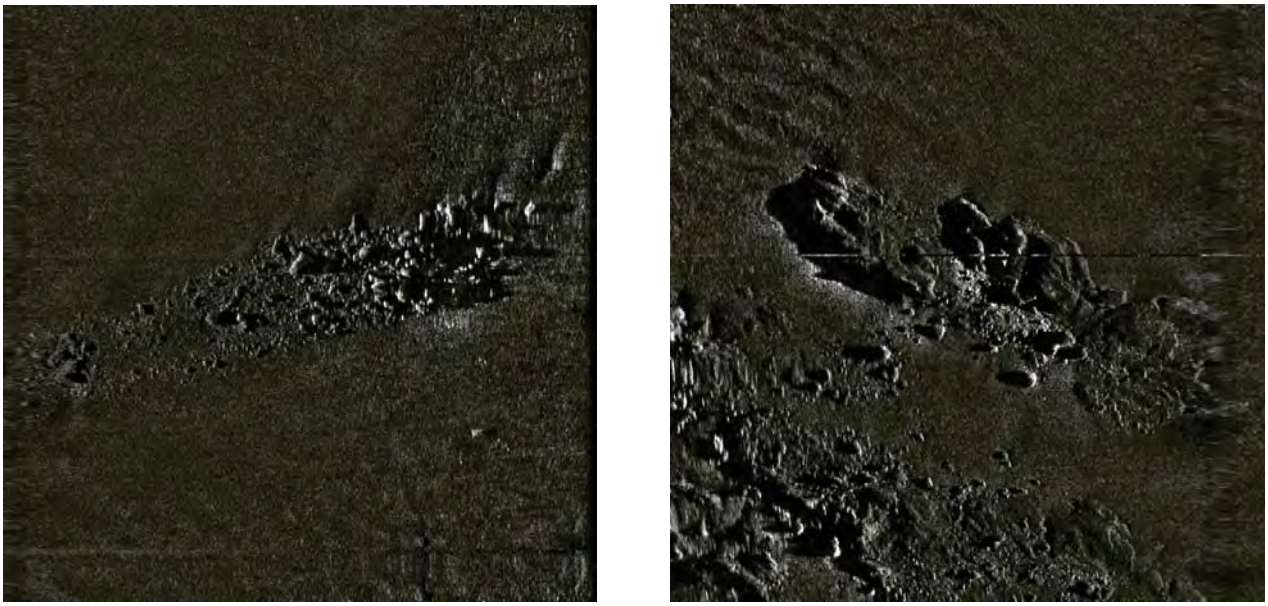

Figure 3.6.3. ELIS12 target examples: debris pile (L), boulder area/field (R).

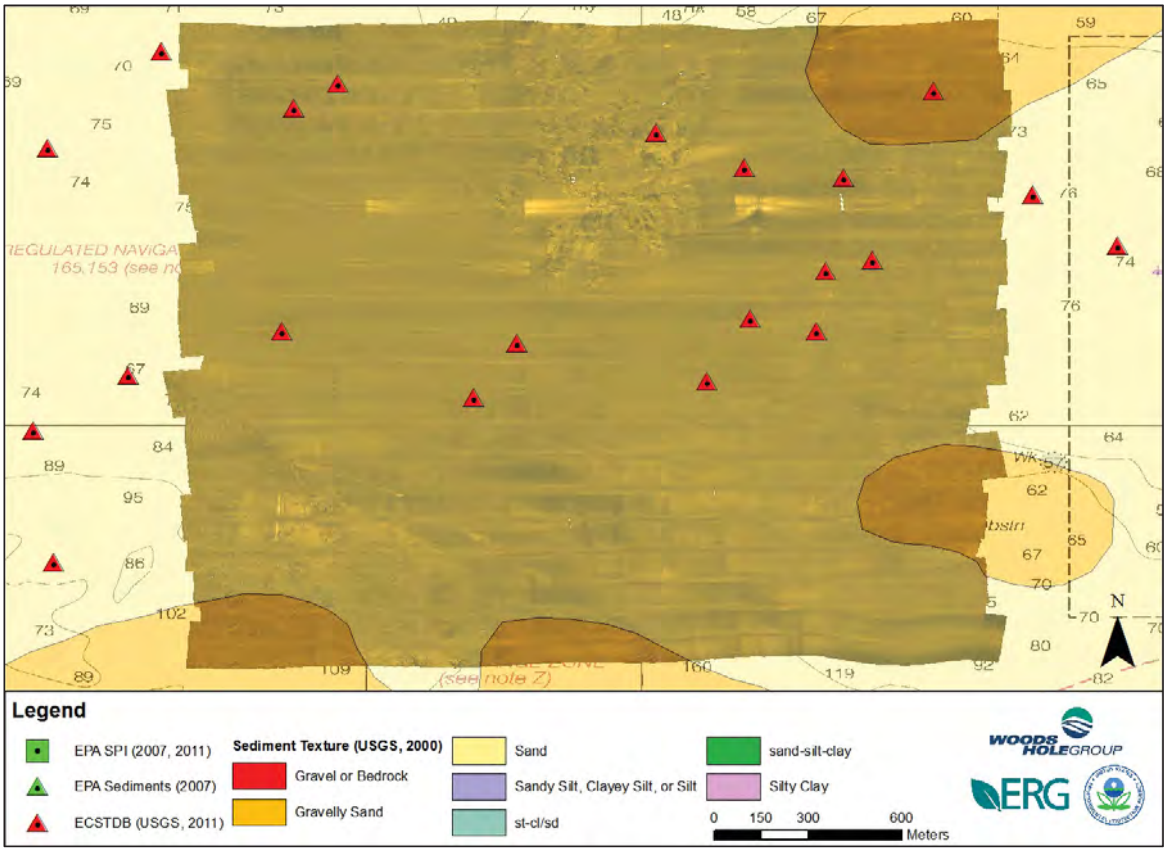

Figure 3.6.4. ELIS12 mosaic with supplemental data to assist with interpretation.

3.7 6MILE10

3.7.1 Mosaic Overview

Project location 6MILE10 is located approximately 0.5 km southeast of Sixmile Reef and 9 km south of Clinton Harbor, CT (Figure 3.1.2). The Six Mile Reef disposal site (historical) is entirely located in the northern half of this project location. Depth varies between 9 and 43 meters in this area. Figure 3.7.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Seventy-three (73) side-scan sonar XTF files were imported for this project location. One (1) file was rejected for QA reasons, and two (2) files were trimmed of data (Table 3.7.1). Data coverage is presented in Figure 3.7.1. The project area was surveyed at approximately 0% over1ap in data coverage. Side-scan data covered 7.82 million sq. meters.

Table 3.7.1. 6MILE10 processing statistics used in SonarWiz 5.

6MILE10	
# XTF files	73
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4
Nadir Threshold	8
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	98 of 100
# Tracklines trimmed	2
Tracklines trimmed	6MILE10_6_5_110726091200
	6MILE10_54_53_110726154300
# Tracklines removed/hidden	1
Tracklines removed/hidden	6MILE10_6_5_110726090700

3.7.2 Target Summary

Zero (0) unique targets and one (1) feature was identified at 6MILE10. The feature identifies bedforms and encompasses the entire project location. This feature is compiled in Appendix T. An example of bedforms is presented in Figure 3.7.3.

3.7.3 Seafloor Classification & Geological Interpretation

The seafloor at 6MILE10 is composed of material with medium backscatter defined by bedforms of both large and small-scale. Adjacent USGS bottom samples were described as sand (USGS, 2011). The USGS modeled seafloor sediment type was sand with a very small patch of gravelly sand in the north-central (USGS, 2000). Based on the extent and

size of bedforms in this project area, it is apparent that a large amount of sediment transport is occurring. SPI images provided by the EPA show the bottom to be sandy silt with shells. 6MILE10 is identified as a historical disposal site yet there are no significant targets or evidence of disposal in the side-scan sonar data. Due to the abundance of sand waves and evidence of sediment transport, debris piles may have been covered/dispersed. Figure 3.7.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned two classes to the study area, with the primary class occupying nearly 100% of the project area. The secondary class occupies only the parts of tracklines most distant from the nadir, and may represent either data shadows from bedforms or slope reflections. SonarWiz 5 bottom classifications are located in Appendix Z.

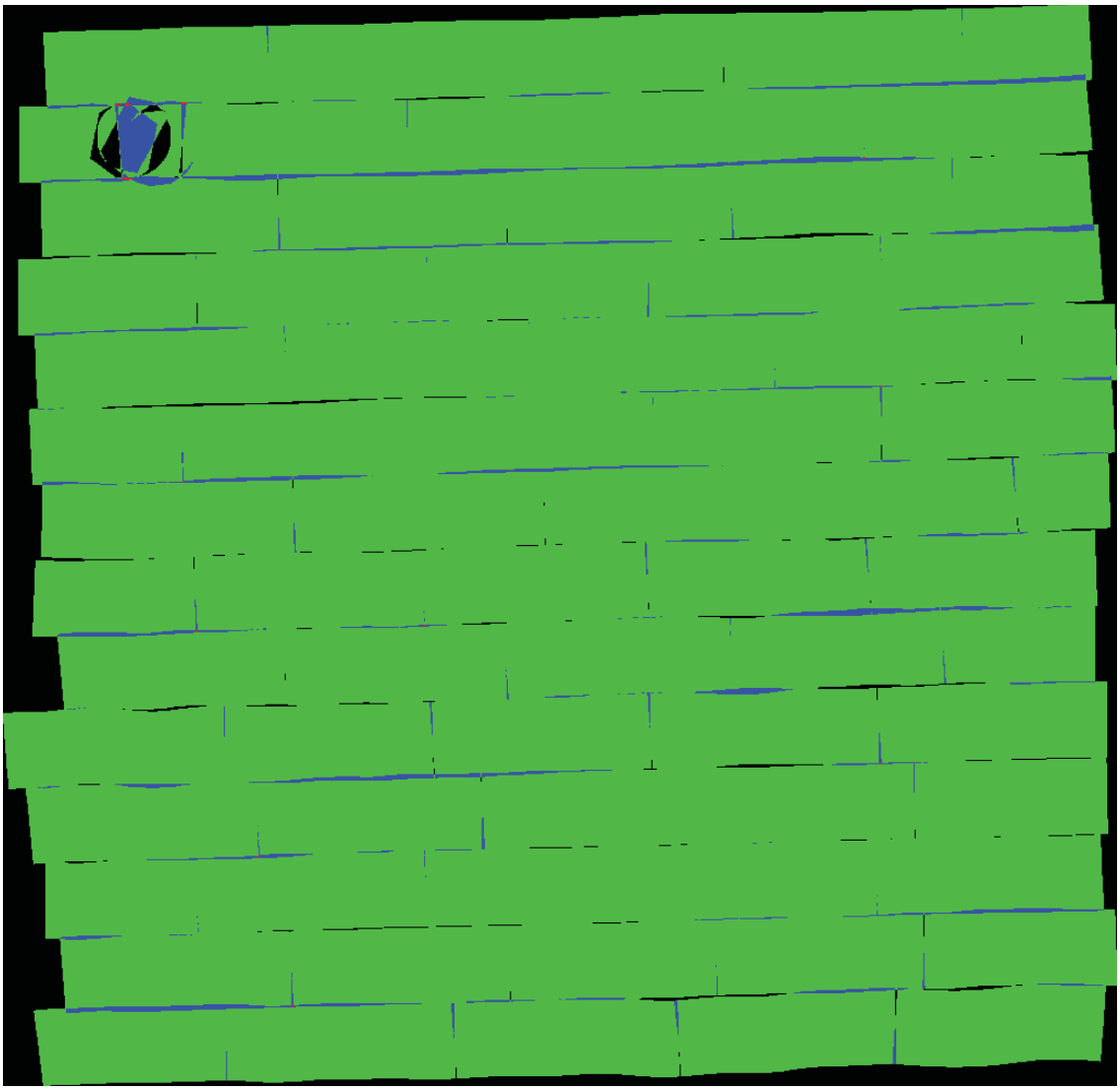

Figure 3.7.1. 6MILE10 survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively.

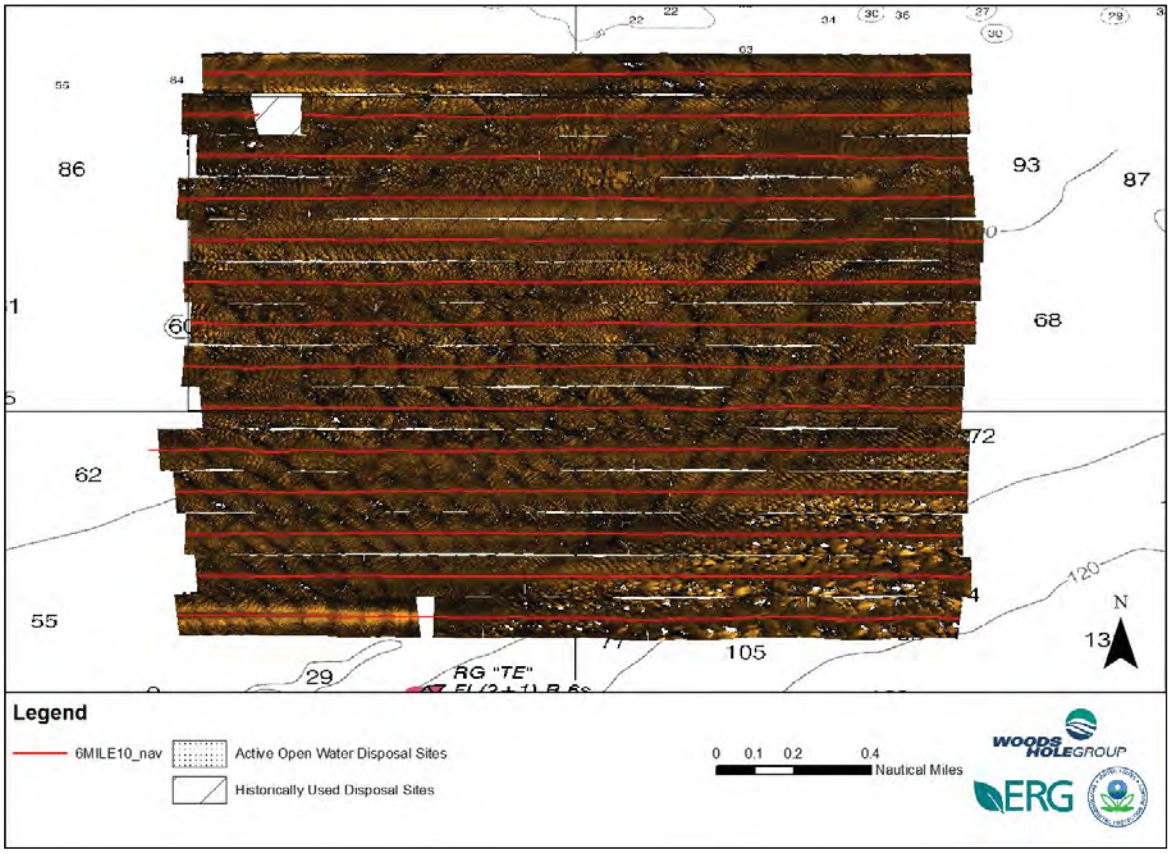

Figure 3.7.2. 6MILE10 mosaic with navigation lines and targets.

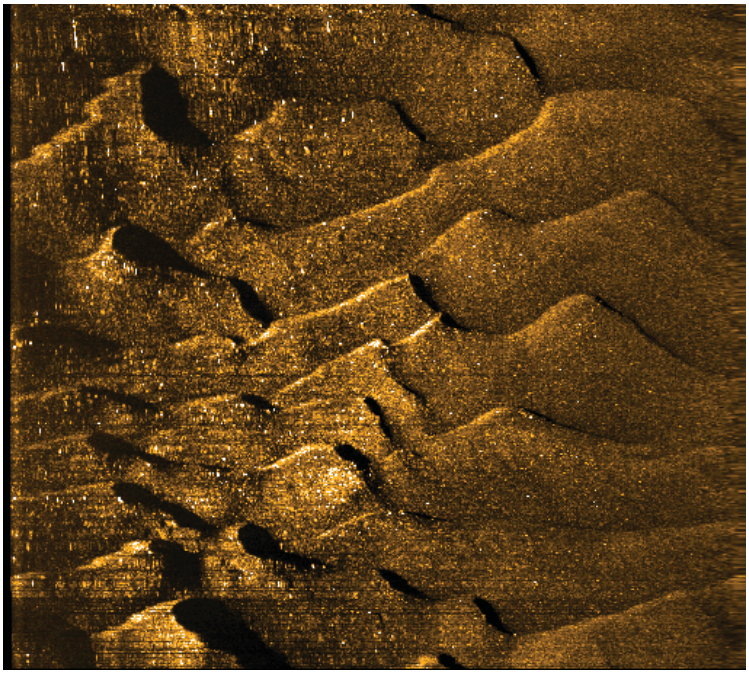

Figure 3.7.3. 6MILE10 feature example: bedforms.

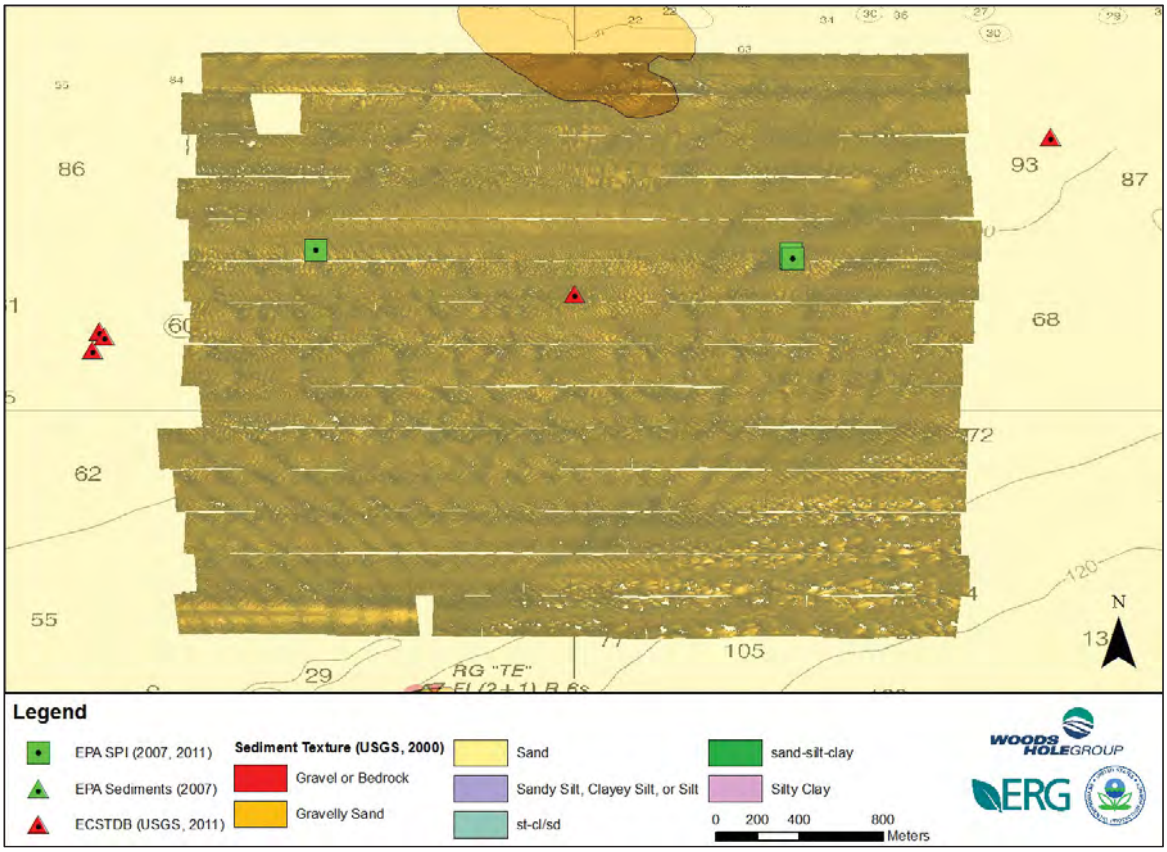

Figure 3.7.4. 6MILE10 mosaic with supplemental data to assist with interpretation.

3.8 MTK9

3.8.1 Mosaic Overview

Project location MTK9 is located approximately 4.6 km northeast of Mattituck Inlet, NY and 9.6 km west of Horton Point, NY (Figure 3.1.2). The Mattituck disposal site (historical) is entirely located within the site area. Depth varies between 17 and 34 meters in this area. Figure 3.8.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Ninety-seven (97) side-scan sonar XTF files were imported for this project location. Five (5) files were rejected for QA reasons, and nine (9) files were trimmed of data (Table 3.8.1). Data coverage is presented in Figure 3.8.1. The project area was surveyed at approximately 0-50% over1ap in data coverage depending on location. Side-scan data covered 7.63 million sq. meters.

Table 3.8.1. MTK9 processing statistics used in SonarWiz 5.

MTK9	
# XTF files	97
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4
Nadir Threshold	2
Nadir Blanking Duration	6
Offset Alt (m)	1
Adjusted display range (m)	74 of 75
# Tracklines trimmed	9
Tracklines trimmed	MTK9_6_5_110725084700
	MTK9_14_13_110725101800
	MTK9_14_13_110725101300
	MTK9_17_18_110725103900
	MTK9_17_18_110725104400
	MTK9_25_26_110725132000
	MTK9_38_37_110725151200
	MTK9_49_50_110725172400
	MTK9_49_50_110725173900
# Tracklines removed/hidden	5
Tracklines removed/hidden	MTK9_38_37_110725151700
	MTK9_30_29_110725140900
	MTK9_33_34_110725144600
	MTK9_41_42_110725155600
	MTK9_4_3_110725183400

3.8.2 Target Summary

Thirty-seven (37) unique targets and three (3) features were identified at MTK9 using specific descriptions. Targets were assigned to three classifications, with the number of targets assigned to each classification given in parentheses: bedforms (11), trawl/anchor mark (24), unidentified/other (2). Targets were widely distributed throughout the project location. One feature outlining bedforms extended from the northwest corner to the northeast corner, then arching down towards to southwest. The feature describing trawl/anchor marks occupied much of the central and southwest portions of the project area. Targets and features are compiled in Appendix T. Targets are indicated on Figure 3.8.2 and example target images are indicated in Figure 3.8.3

3.8.3 Seafloor Classification & Geological Interpretation

The seafloor at MTK9 is composed of medium backscatter material defined by bedforms, mainly sand waves in the northeast, and a bathymetry slope reflection in the southeast. Bedforms extend from the north/northeast to the southwest along the ridge that is the peak of the bathymetry slope. The slope is defined by long, linear, parallel reflectors of slightly higher intensity backscatter oriented perpendicular to the direction of increasing depth, like rings in a bathtub. Several USGS bottom samples in the proximity to the project area were described as sand (USGS, 2011). The modeled seafloor sediment type lists sand as the bottom type, but as depth increases down the slope, the bottom type changes to silt/silty sand (USGS, 2000). SPI images provided by the EPA show the bottom to be sandy silt with shells. MTK9 is identified as a historical disposal site yet there is no evidence of dumping in the side-scan sonar data. Due to the abundance of sand waves and evidence of sediment transport, perhaps any debris piles have been covered. Figure 3.8.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned a single class to the study area, showing there is virtually no difference in sonar backscatter between sand and silty sand. SonarWiz 5 bottom classifications are located in Appendix Z.

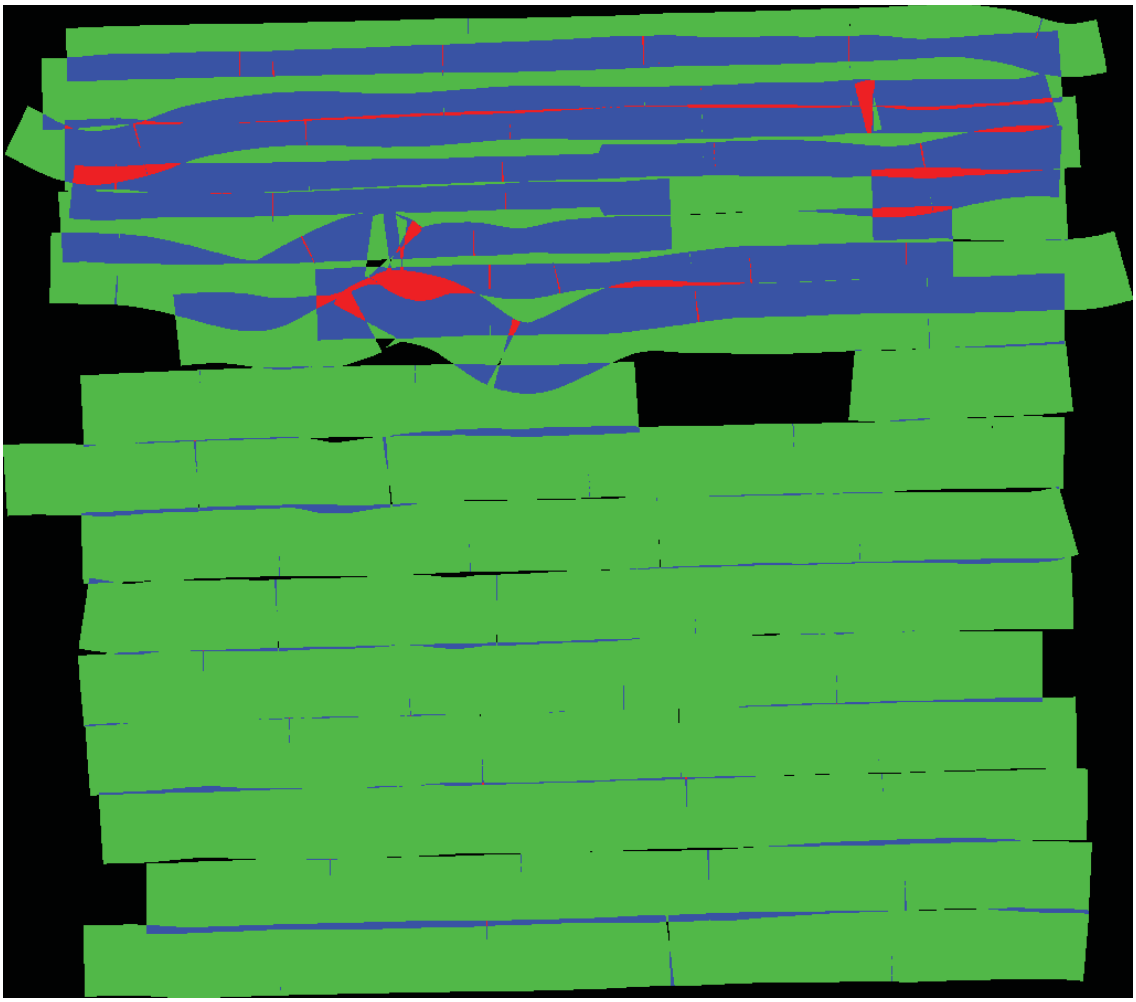

Figure 3.8.1. MTK9 survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively. The color red represents area with 300% coverage.

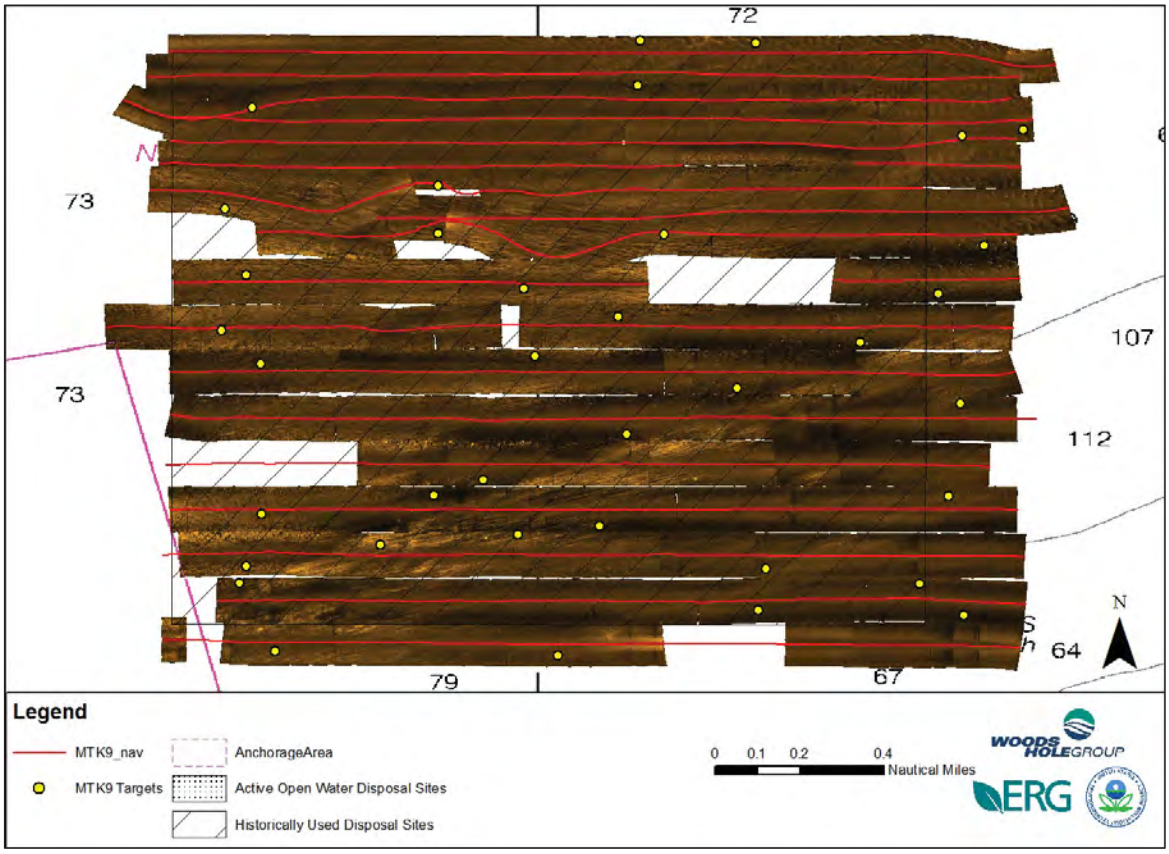

Figure 3.8.2. MTK9 mosaic with navigation lines and targets.

Figure 3.8.3. MTK9 target examples: bedforms (L), trawl/anchor marks (R).

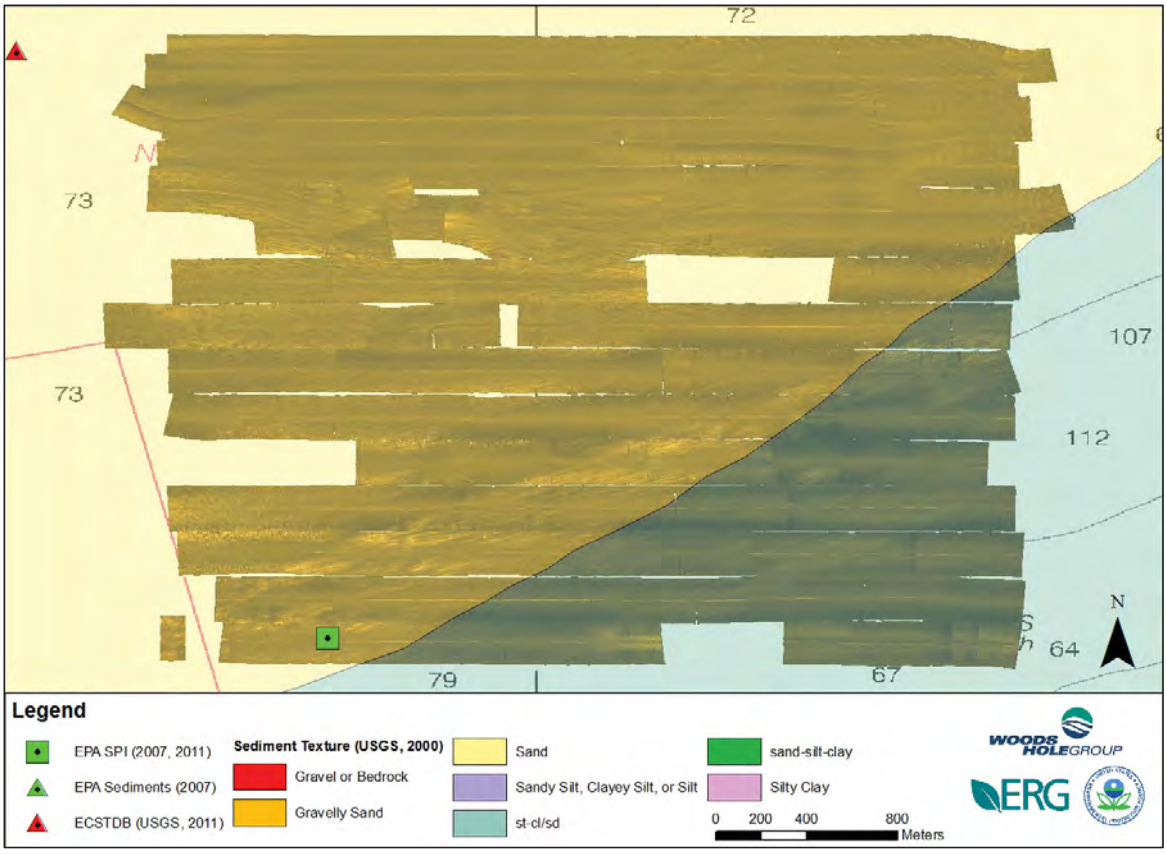

Figure 3.8.4. MTK9 mosaic with supplemental data to assist with interpretation.

3.9 FALKNERS

3.9.1 Mosaic Overview

Project location FALKNER8 is located approximately 3.3 km east of Falkner Island and 8 km southwest of Clinton Harbor, CT (Figure 3.1.2). Depth varies between 19 and 30 meters in this area. Figure 3.9.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Seventy-four (74) side-scan sonar XTF files were imported for this project location. Three (3) files were rejected for QA reasons, and seven (7) files were trimmed of data (Table 3.9.1). Data coverage is presented in Figure 3.9.1. The project area was surveyed at approximately 50% over1ap in data coverage. Side-scan data covered 3.63 million sq. meters.

Table 3.9.1. FALKNER8 processing statistics used in SonarWiz 5.

FALKNER8	
# XTF files	74
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4
Nadir Threshold	6
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	73 of 75
# Tracklines trimmed	7
Tracklines trimmed	FALKNER8_2_1_110724130200
	FALKNER8_7_8_110724201500
	FALKNER8_7_8_110724202000
	FALKNER8_20_19_110724185500
	FALKNER8_20_19_110724190000
	FALKNER8_20_19_110724190500
	FALKNER8_26_25_110724154400
# Tracklines removed/hidden	3
Tracklines removed/hidden	FALKNER8_28_27_110724175900
	FALKNER8_28_27_110724180400
	FALKNER8_10_9_110724135900

3.9.2 Target Summary

Zero (0) unique targets and features were identified at FALKNER8. The seafloor at this site is featureless.

3.9.3 Seafloor Classification & Geological Interpretation

The seafloor at MTK9 is a homogenous expanse of medium backscatter material. There are no USGS grab samples in the project area, but the modeled seafloor describes the area as a mix between sand and silty sand (USGS, 2000). SPI images provided by the EPA show the bottom to be silty sand. These two sediment types are indistinguishable in side-scan sonar data. Figure 3.9.3 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned two classes to the study area. However, this classification is considered poor because the demarcation between classes parallels the nadir, which is obviously an error of the classification function. Settings were adjusted many times to create a classification that did not have this artifact, but all attempts were unsuccessful. This may have occurred because the bottom is devoid of features and any irregularities in the sonar data, no matter how small, were interpreted as secondary classes. SonarWiz 5 bottom classifications are located in Appendix Z.

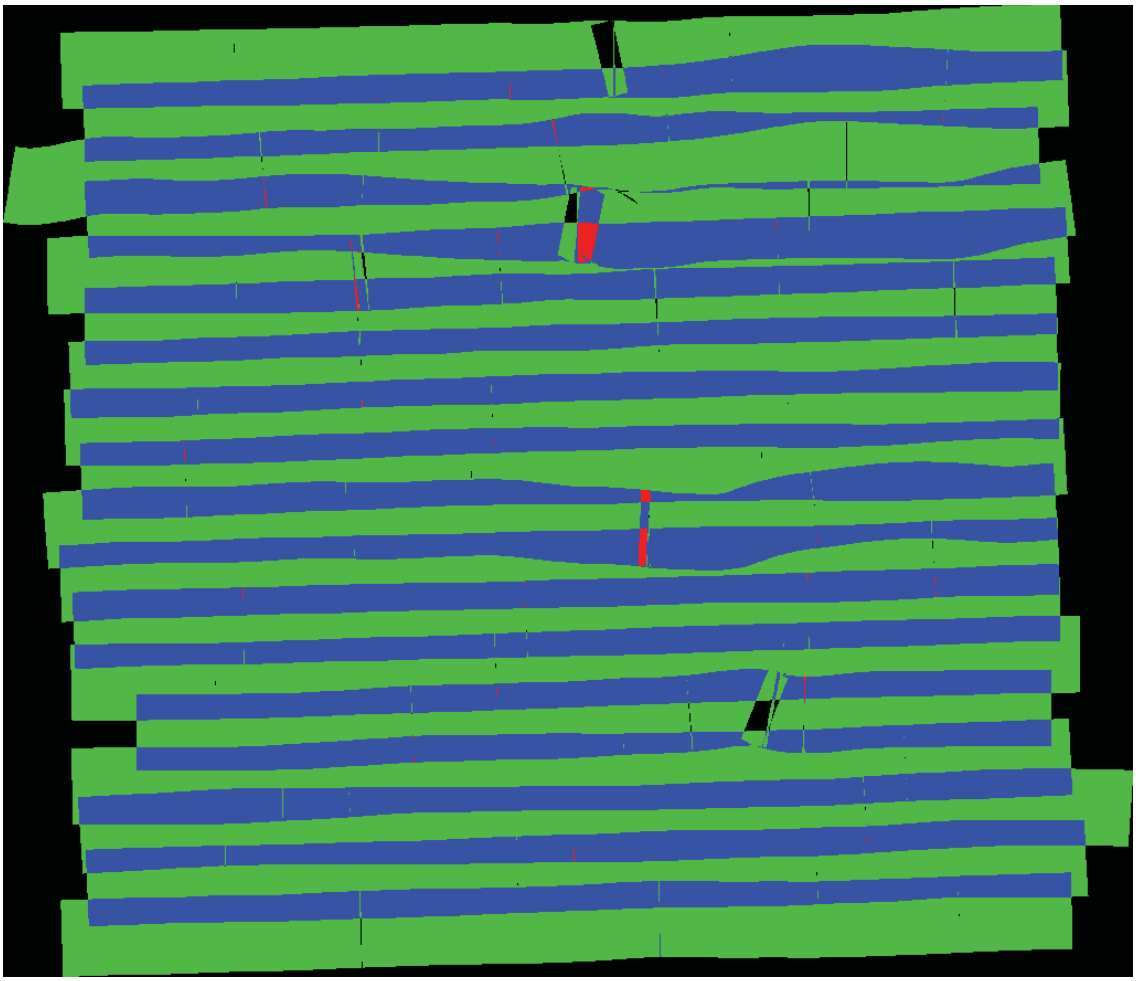

Figure 3.9.1. FALKNER8 survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively.

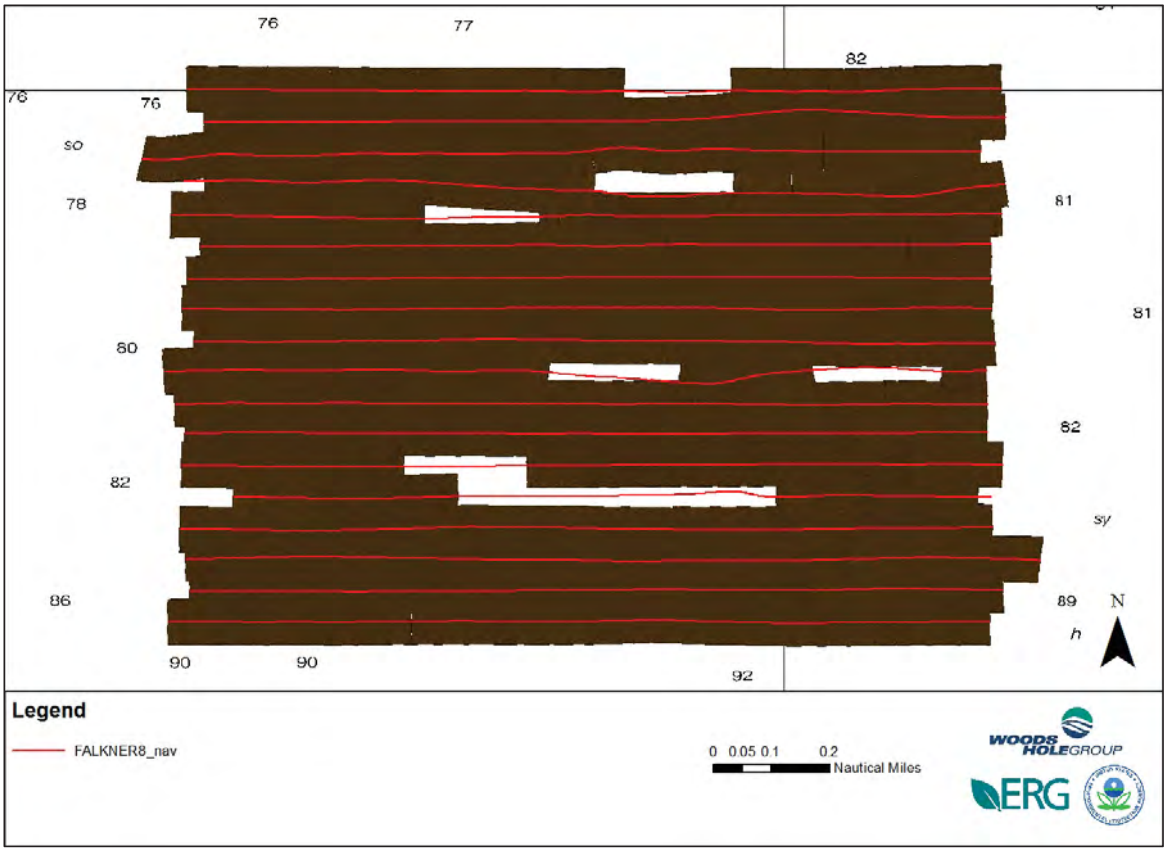

Figure 3.9.2. FALKNER8 mosaic with navigation lines and targets.

Figure 3.9.3. FALKNER8 mosaic with supplemental data to assist with interpretation.

3.10 CLINTON7

3.10.1 Mosaic Overview

Project location CLINTON7 is located approximately 4 km south of Clinton Harbor, CT and 2 km north of Sixmile Reef (Figure 3.1.2). The project location is within the boundaries of the Clinton Harbor disposal site (historical). Depth varies between 14 and 34 meters in this area. Figure 3.10.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Eighty-six (86) side-scan sonar XTF files were imported for this project location. One (1) file was rejected for QA reasons, and one (1) file was trimmed of data (Table 3.10.1). Data coverage is presented in Figure 3.10.1. The project area was surveyed at approximately 50% over1ap in data coverage. Side-scan data covered 4.40 million sq. meters.

Table 3.10.1. CLINTON7 processing statistics used in SonarWiz 5.

CLINTON7	
# XTF files	86
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4
Nadir Threshold	6
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	74 of 75
# Tracklines trimmed	1
Tracklines trimmed	CLINTON7_13_14_110723170500
# Tracklines removed/hidden	1
Tracklines removed/hidden	CLINTON7_13_14_110723171000

3.10.2 Target Summary

Twenty-eight (28) unique targets and one (1) feature were identified at CLINTON7. Targets were assigned to six classifications, with the number of targets assigned to each classification given in parentheses: boulder (5), boulder area/field (4), debris pile (4), rock outcrop/geological (5), unidentified/other (5), or wreck (1). Nearly all targets were identified in the central to northeast areas of the project location, with some identified in the southeast. The wreck is identified on NOAA charts. The feature of bedforms occupied the entire project area except the northeast corner. Targets and features are compiled in Appendix T. Targets are indicated on Figure 3.10.1 and example target images are indicated in Figure 3.10.3.

3.10.3 Seafloor Classification & Geological Interpretation

The seafloor at CLINTON7 is composed of a medium intensity backscatter material defined by large expanses of bedforms. Bedforms cover approximately 75% of the project area, indicating that ocean currents acting on the seafloor cause a significant amount of sediment transport at this site. The northeast corner had several targets described as boulders, rock outcrop or debris pile, which shows agreement with the USGS bottom samples and modeled seafloor classification. Bottom samples adjacent to the majority of the project area were described as sand, and as bedrock for the northeast corner (USGS, 2011). SPI images provided by the EPA within the survey area show the bottom to be silty sand with shells and shell hash. Seafloor classification shows sand for the entire project area except for the northeast corner, which was gravel/bedrock (USGS, 2000). Figure 3.10.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned two classes to the study area. The primary class covers nearly 100% of the project area and the secondary class is so minimal that the total area it occupies is negligible. The classification feature was run several times with different settings to try to emphasize the difference between soft bottom and rock outcrops, but attempts were unsuccessful. For the purposes of this report, site CLINTON7 has only one class. SonarWiz 5 bottom classifications are located in Appendix Z.

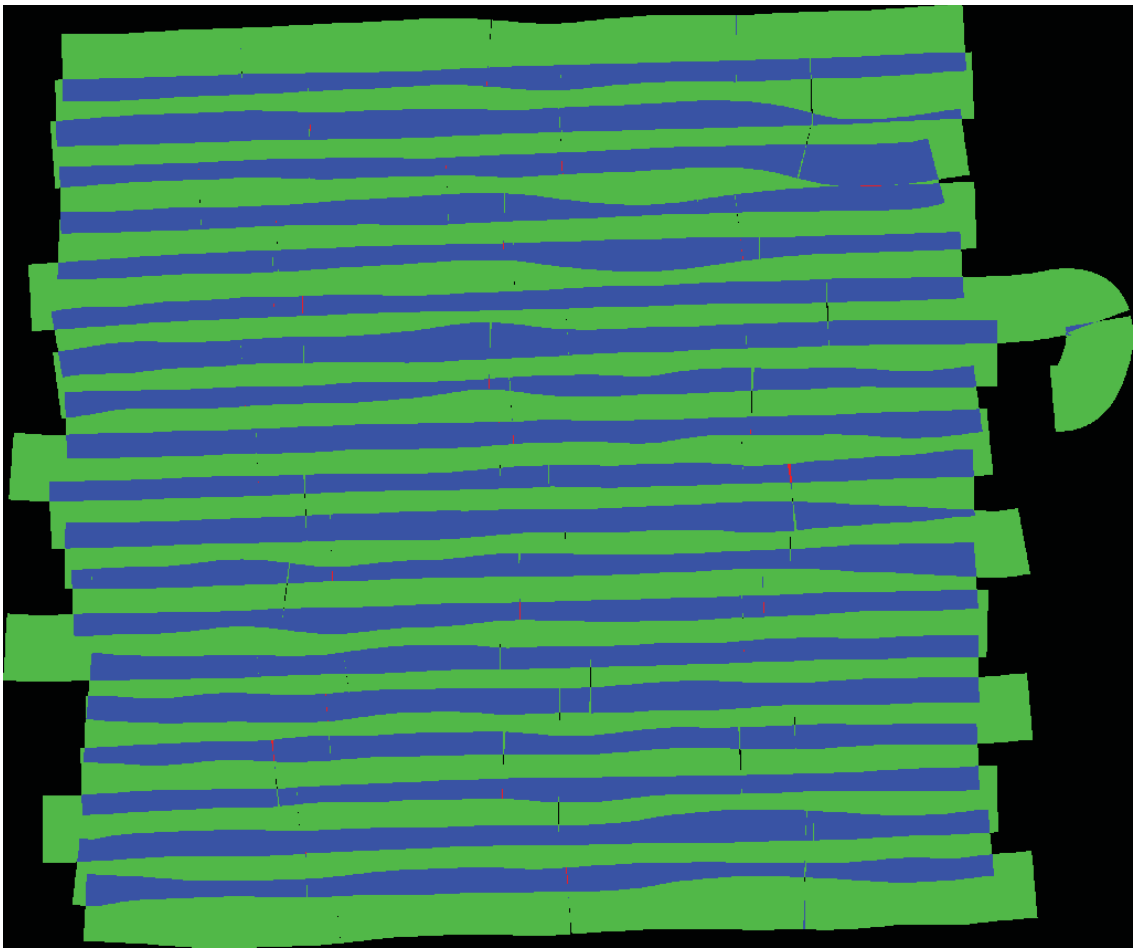

Figure 3.10.1. CLINTON7 survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively.

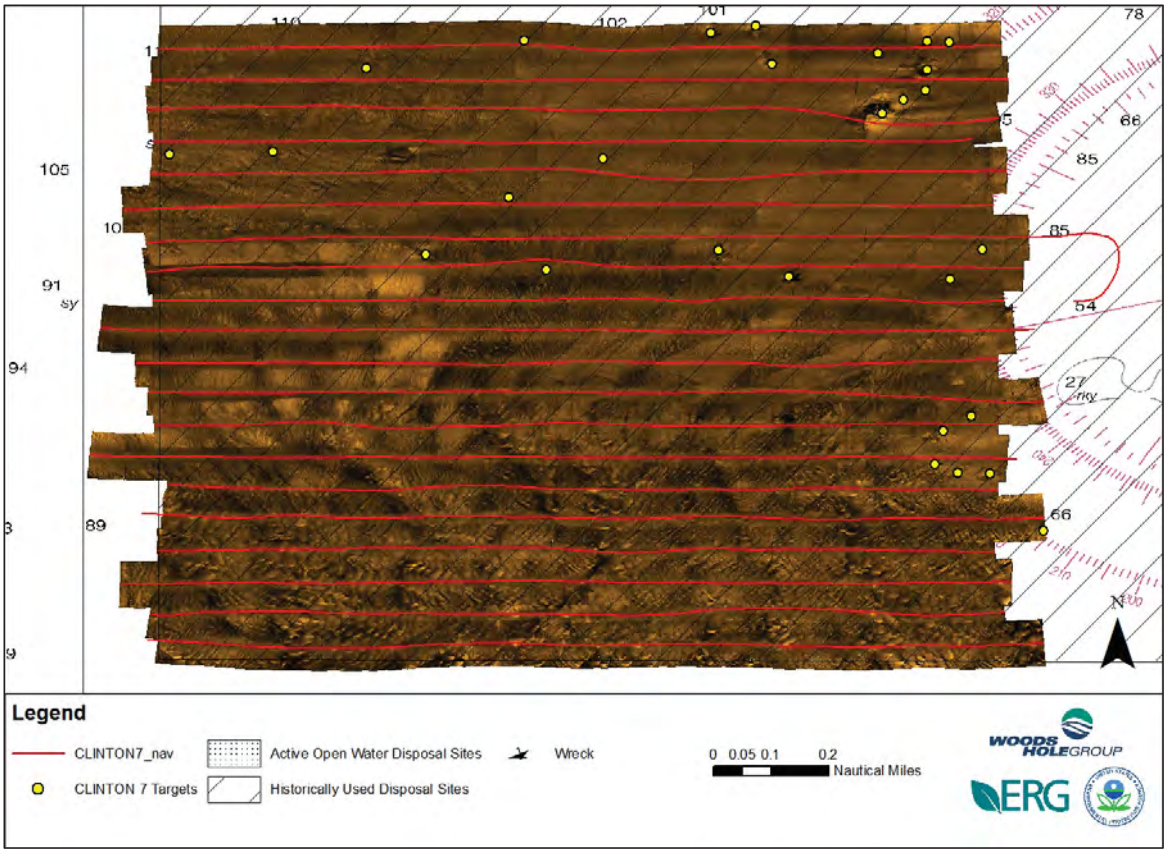

Figure 3.10.2. CLINTON7 mosaic with navigation lines and targets.

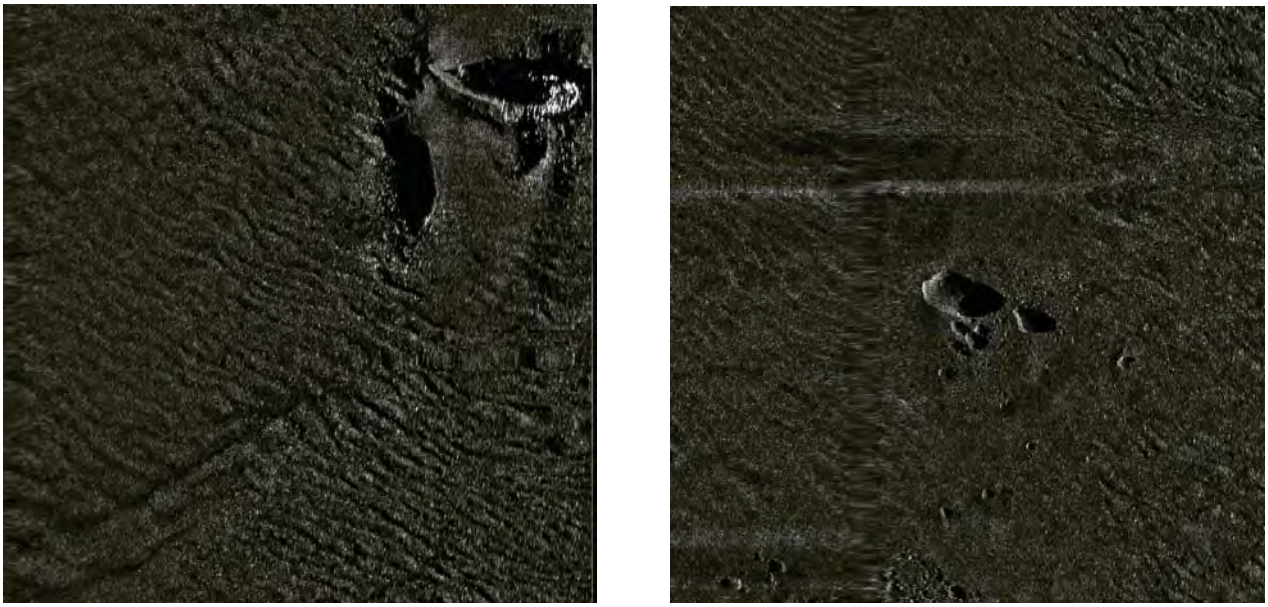

Figure 3.10.3. CLINTON7 target examples: wreck (L), boulder (R).

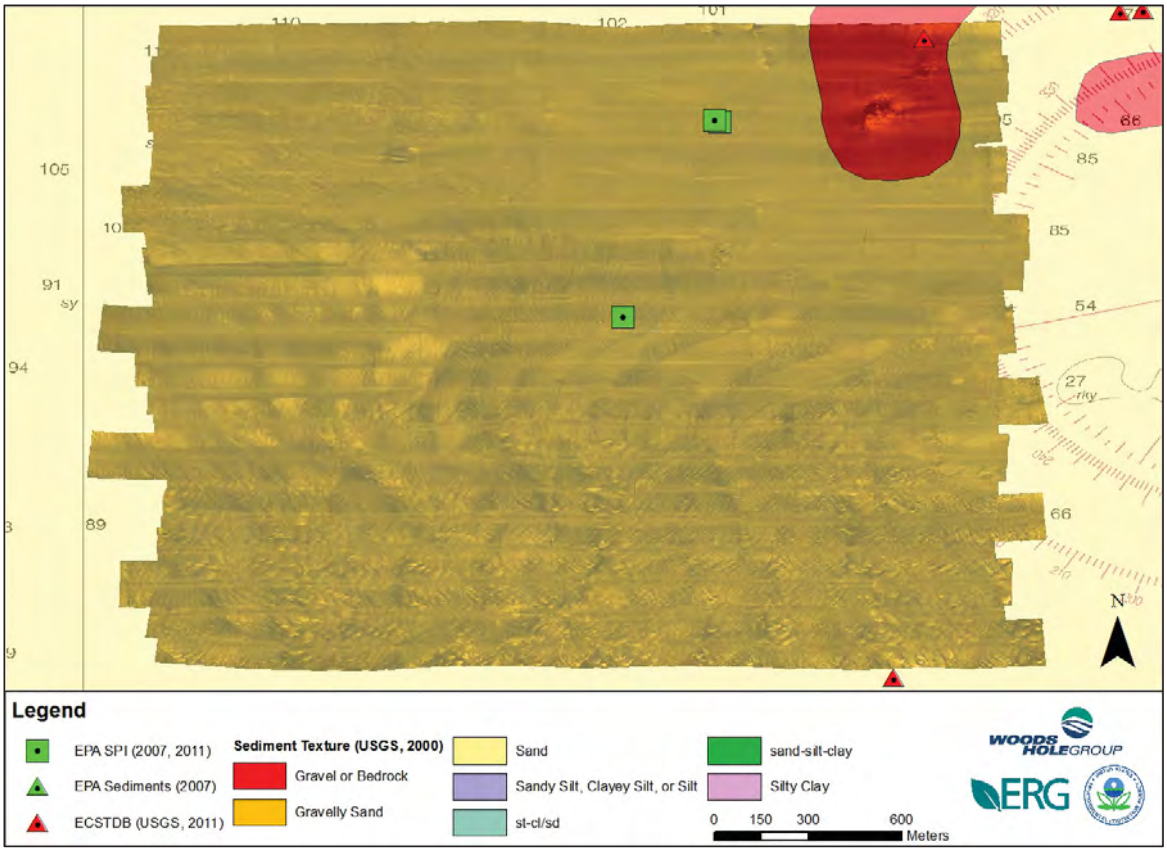

Figure 3.10.4. CLINTON7 mosaic with supplemental data to assist with interpretation.

3.11 FISEHOLE1

3.11.1 Mosaic Overview

Project location FISEHOLE1 is located approximately 14.8 km northwest of Montauk Point, NY and 6.3 km southeast of Fishers Island, NY (Figure 3.1.4). Depth varies between 27 and 99 meters in this area. Figure 3.11.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

One hundred forty-five (145) side-scan sonar XTF files were imported for this project location. Thirteen (13) files were rejected for QA reasons, and two (2) files were trimmed of data (Table 3.11.1). Data coverage is presented in Figure 3.11.1. The project area was surveyed at approximately 100% over1ap in data coverage with one line having 200% overlap. Side-scan data covered 6.66 million sq. meters.

Table 3.11.1. FISEHOLE1 processing statistics used in SonarWiz 5.

FISEHOLE1	
# XTF files	145
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4
Nadir Threshold	8
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	98 of 100
# Tracklines trimmed	2
Tracklines trimmed	FISEHOLE_38_37_110717002400
	FISEHOLE_22_21_110716214700
# Tracklines removed/hidden	13
Tracklines removed/hidden	FISEHOLE_22_21110716212400
	FISEHOLE_22_21_110716212700
	FISEHOLE_22_21110716212900
	FISEHOLE_22_21_110716213200
	FISEHOLE_22_21110716213400
	FISEHOLE_22_21_110716213700
	FISEHOLE_22_21110716213900
	FISEHOLE_22_21_110716214200
	FISEHOLE_22_21110716214400
	FISEHOLE_22_21_110716214700
	FISEHOLE_22_21_110716215200
	FISEHOLE_22_21110716214900
	FISEHOLE_40_39_110717032400

3.11.2 Target Summary

Six (6) unique targets and three (3) features were identified at FISEHOLE1 using specific descriptions. All six targets were assigned the same classification, unidentified/other. Targets were spread evenly across the northern edge of the project area. The first feature outlines trawl/anchor marks and extended from the north-central to northeast corner. The other feature describes bedforms and covers nearly the entire area of the triangle formed from the northwest to the southeast to the southwest corners. Targets and features are compiled in Appendix T. Targets are indicated on Figure 3.11.2 and example target images are indicated in Figure 3.11.3.

3.11.3 Seafloor Classification & Geological Interpretation

The seafloor at FISEHOLE1 is composed of a medium intensity backscatter material defined by large expanses of bedforms and trawl marks. Bedforms cover an area between from west side to the southeast corner and trawl marks are apparent in the north-central to northeast corners of the survey area. No USGS bottom samples were collected in this area, but SPI images provided by the EPA show an apparent bottom type of silty sand. A USGS modeled seafloor classification described the entire survey area as sand (USGS, 2000). Figure 3.11.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned one classes to the study area. Given the homogeneity observed in side-scan data and SPI images, this classification is believed to be accurate. SonarWiz 5 bottom classifications are located in Appendix Z.

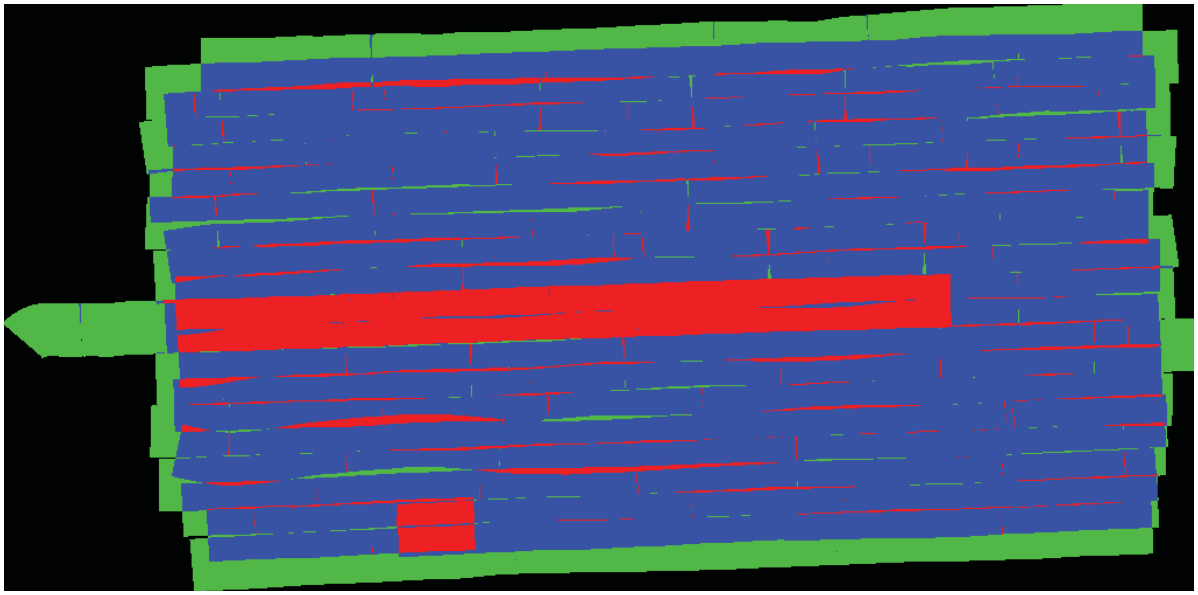

Figure 3.11.1. FISEHOLE1 survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively. The color red represents area with 300% coverage.

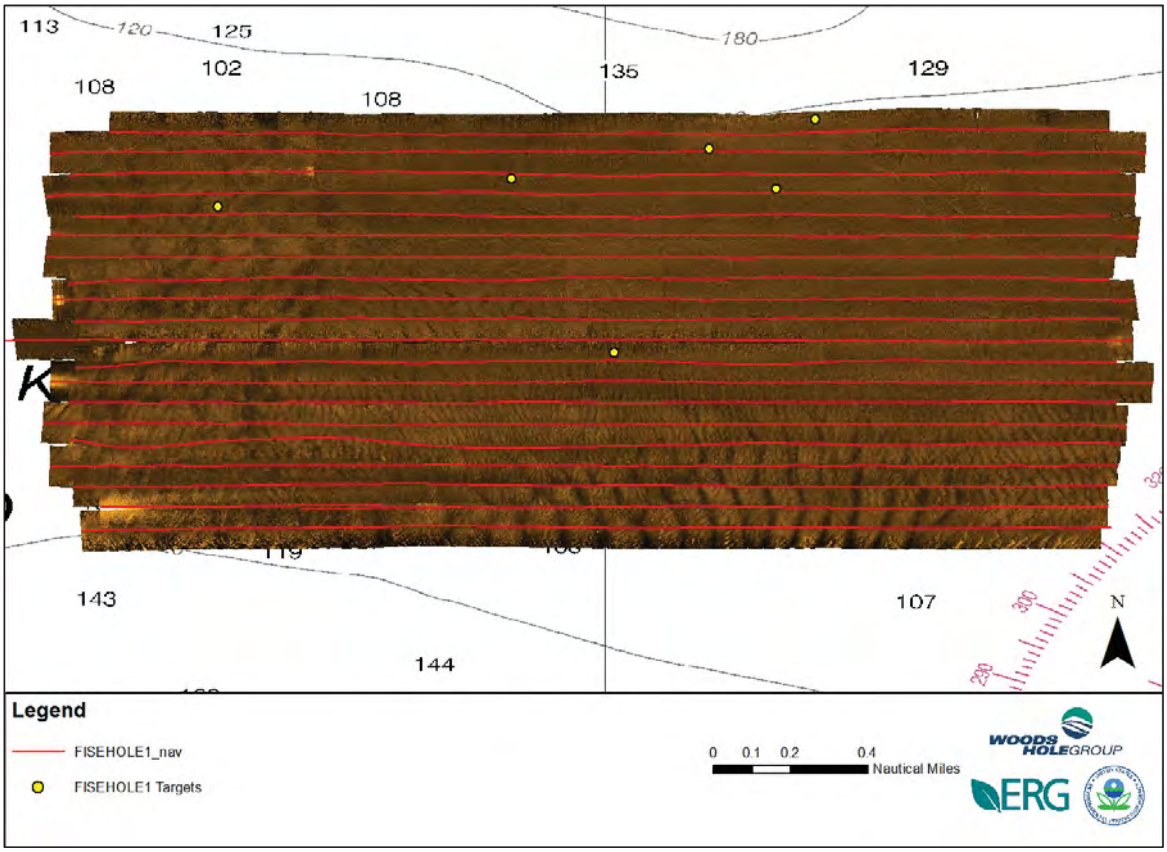

Figure 3.11.2. FISEHOLE1 mosaic with navigation lines and targets.

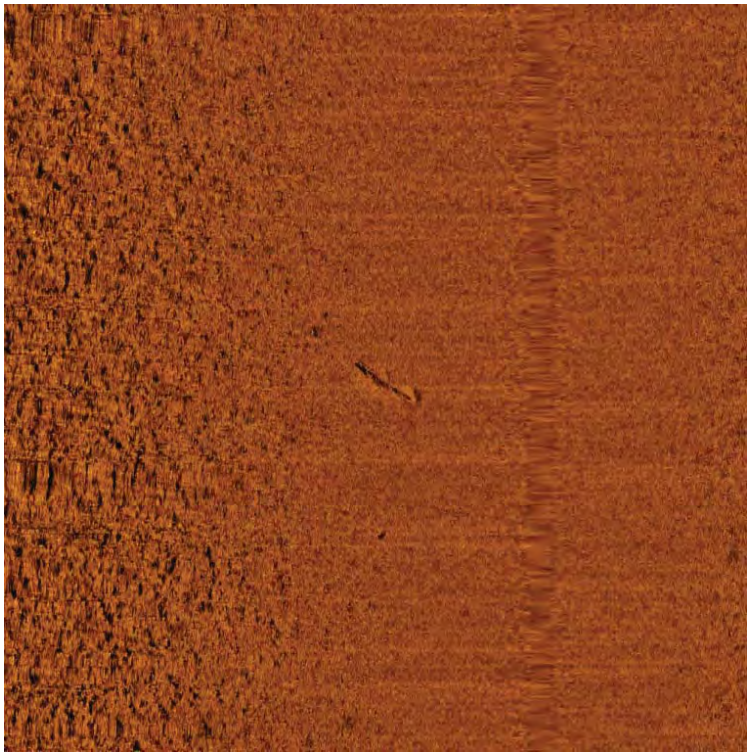

Figure 3.11.3. FISEHOLE1 target example: unidentified/other.

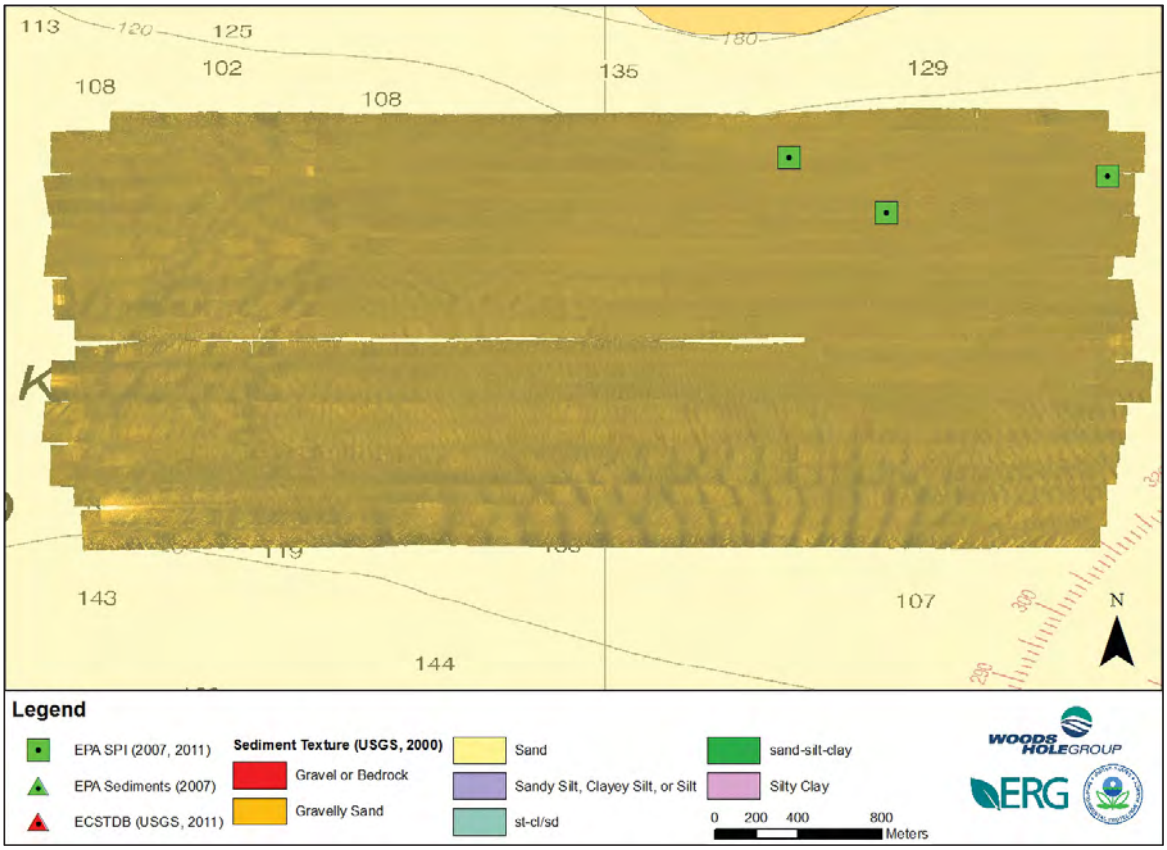

Figure 3.11.4. FISEHOLE1 mosaic with supplemental data to assist with interpretation.

3.12 FISEHOLE2

3.12.1 Mosaic Overview

Project location FISEHOLE2 is located approximately 13.4 km south of Montauk Point, NY and 9.3 km southeast of Fishers Island, NY (Figure 3.1.4). Depth varies between 27 and 58 meters in this area. Figure 3.12.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

One hundred (100) side-scan sonar XTF files were imported for this project location. Zero (0) files were rejected for QA reasons, and one (1) file was trimmed of data (Table 3.12.1). Data coverage is presented in Figure 3.12.1. The project area was surveyed at approximately 100% over1ap in data coverage. Side-scan data covered 5.14 million sq. meters.

Table 3.12.1. FISEHOLE2 processing statistics used in SonarWiz 5.

FISEHOLE2	
# XTF files	100
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4
Nadir Threshold	8
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	98 of 100
# Tracklines trimmed	1
Tracklines trimmed	FISEHOLE2_1_2_110717140300
# Tracklines removed/hidden	0
Tracklines removed/hidden	N/A

3.12.2 Target Summary

Zero (0) targets and one (1) feature were identified at FISEHOLE2 using specific descriptions. The feature describes trawl/anchor marks and encompasses the entire project area. Features are compiled in Appendix T. An example of trawl/anchor marks is presented in Figure 3.12.3.

3.12.3 Seafloor Classification & Geological Interpretation

The seafloor at FISEHOLE2 is composed of a medium intensity backscatter material that is covered in trawl/anchor marks. No bottom samples were provided in this area by USGS or EPA. Two SPI images provided by the EPA approximately 2 km to the west of the survey area show a coarse sand bottom with possible shells and bedforms. The USGS modeled seafloor classification only partially covers the survey area, but describes the

bottom as sand, with a small area of silty/clayey sand in the northeast (USGS, 2000). Figure 3.12.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned two classes to the study area, but the classification was very poor. Despite modifying settings and re-running several times, the Classification function delineated two classes parallel to the direction of the nadir in a repeated pattern across the survey area. Considering the side-scan sonar data, nearby SPI images and USGS modeled seafloor, this classification is not believed to be accurate. SonarWiz 5 bottom classifications are located in Appendix Z.

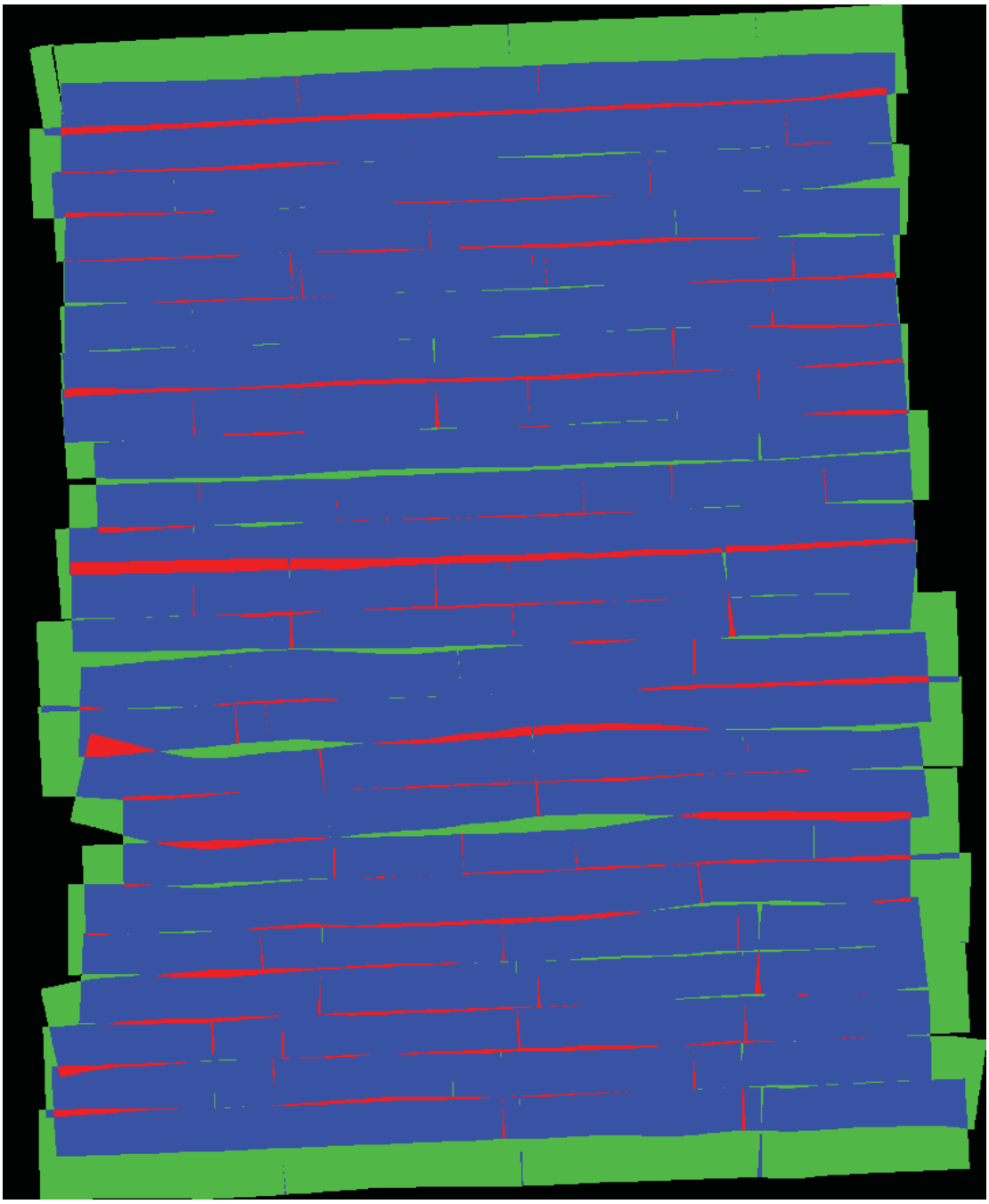

Figure 3.12.1. FISEHOLE2 survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively. The color red represents area with 300% coverage.

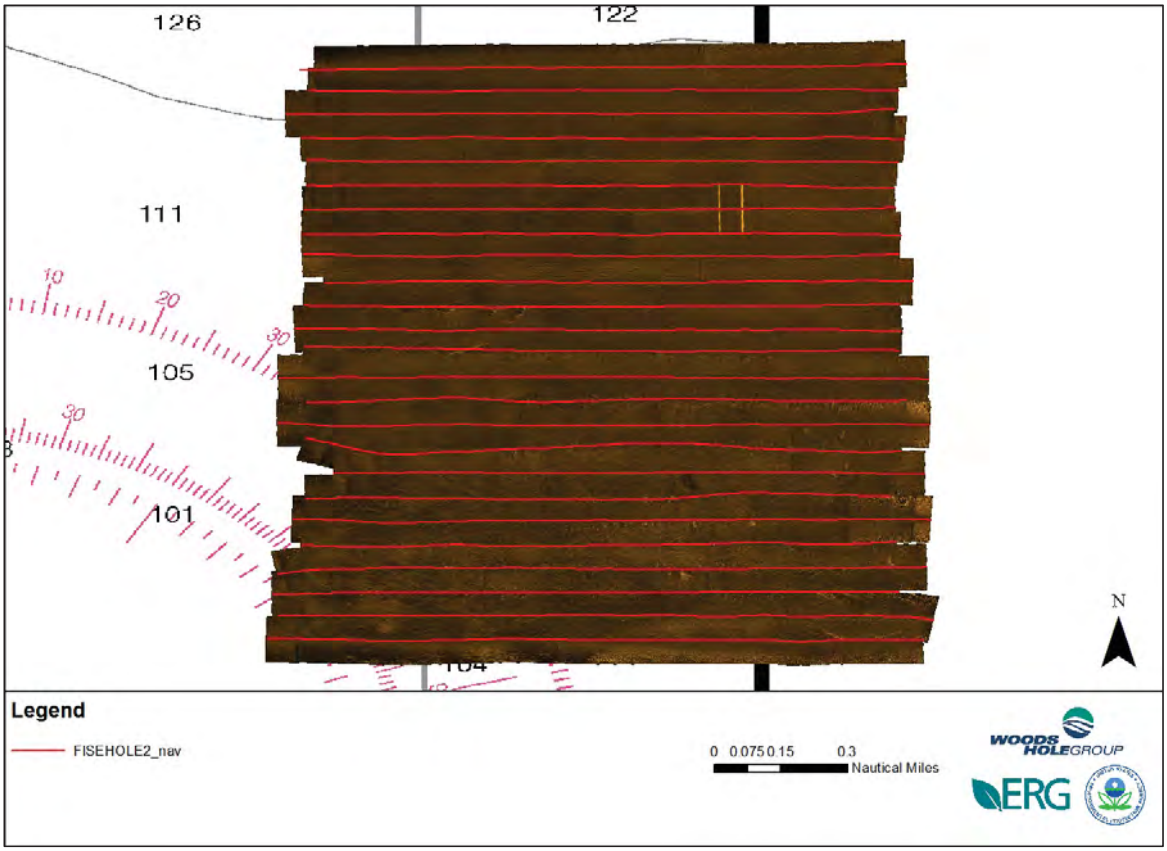

Figure 3.12.2. FISEHOLE2 mosaic with navigation lines and targets.

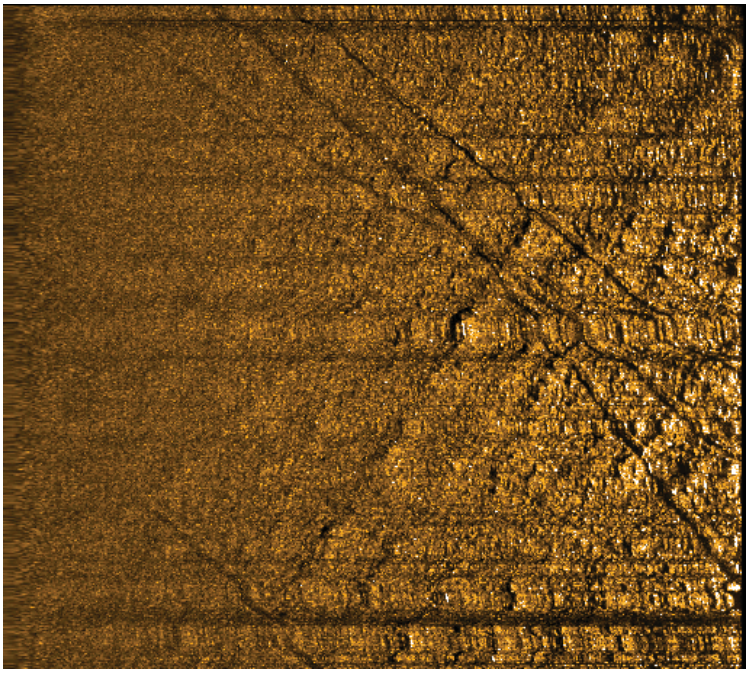

Figure 3.12.3. FISEHOLE2 feature example: trawl/anchor marks.

Figure 3.12.4. FISEHOLE2 mosaic with supplemental data to assist with interpretation.

3.13 FISEHOLE3

3.13.1 Mosaic Overview

Project location FISEHOLE3 is located approximately 6.6 km southeast of Watch Hill Point, RI and 8.7 km east of Fishers Island, NY (Figure 3.1.4). Depth is approximately 35 meters in this area. Figure 3.13.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Twenty-six (26) side-scan sonar XTF files were imported for this project location. One (1) file was rejected for QA reasons, and one (1) file was trimmed of data (Table 3.13.1). Data coverage is presented in Figure 3.13.1. The project area was surveyed at approximately 100% over1ap in data coverage. Side-scan data covered 1.23 million sq. meters.

Table 3.13.1. FISEHOLE3 processing statistics used in SonarWiz 5.

FISEHOLE3	
# XTF files	26
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4
Nadir Threshold	6 to 8
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	98 of 100
# Tracklines trimmed	1
Tracklines trimmed	FISEHOLE3_1_2110718074000
# Tracklines removed/hidden	1
Tracklines removed/hidden	FISEHOLE3_9_10_110718082800

3.13.2 Target Summary

Ten (10) unique targets and one (1) feature were identified at FISEHOLE3 using specific descriptions. Targets were assigned to three classifications, with the number of targets assigned to each classification given in parentheses: rock outcrop/geological (1), trawl/anchor mark (7), unidentified/other (2). Targets were evenly distributed in the project area. The feature outlining trawl/anchor marks covers the entire project area. Targets and features are compiled in Appendix T. Targets are indicated on Figure 3.13.2 and an example target image is indicated in Figure 3.13.3.

3.13.3 Seafloor Classification & Geological Interpretation

The seafloor at FISEHOLE3 is composed of a medium intensity backscatter material covered with trawl/anchor marks. No bottom samples were provided by USGS or EPA in the survey area. No SPI images were provided within the survey area. The modeled USGS seafloor classification partially covers the survey area in the west and describes the bottom as silty/clayey sand with adjacent areas of sand (USGS, 2000). A bathy slope reflection is evident in the south-center of the survey area that is also apparent on NOAA charts. Figure 3.13.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned two classes to the study area, but the classification is considered poor. Similar to FISEHOLE2, the Classification function assigned classes parallel to the direction of the nadir. This was encountered even when settings were changed and the function was re-run. Due to the homogeneity in the side-scan sonar data, this classification is considered to be inaccurate. SonarWiz 5 bottom classifications are located in Appendix Z.

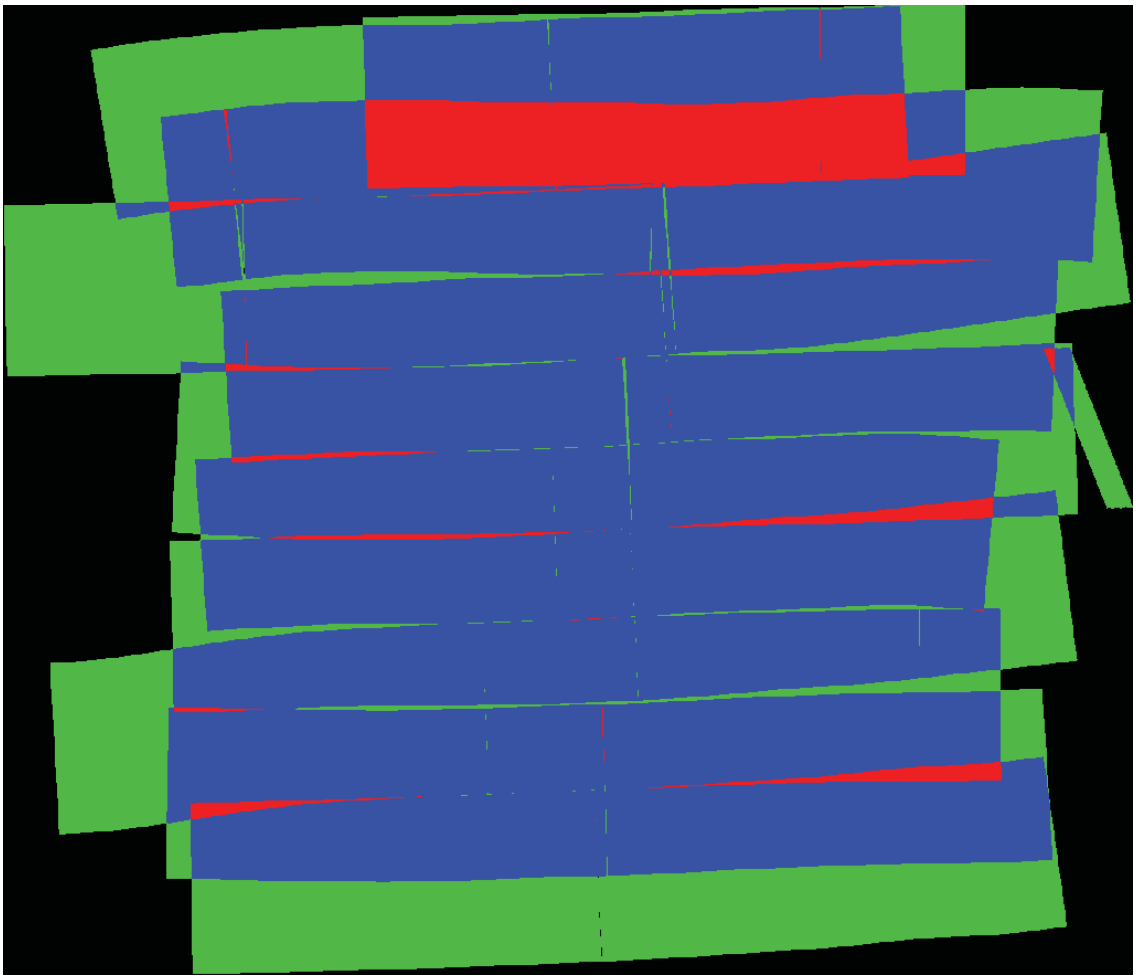

Figure 3.13.1. FISEHOLE3 survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively. The color red represents area with 300% coverage.

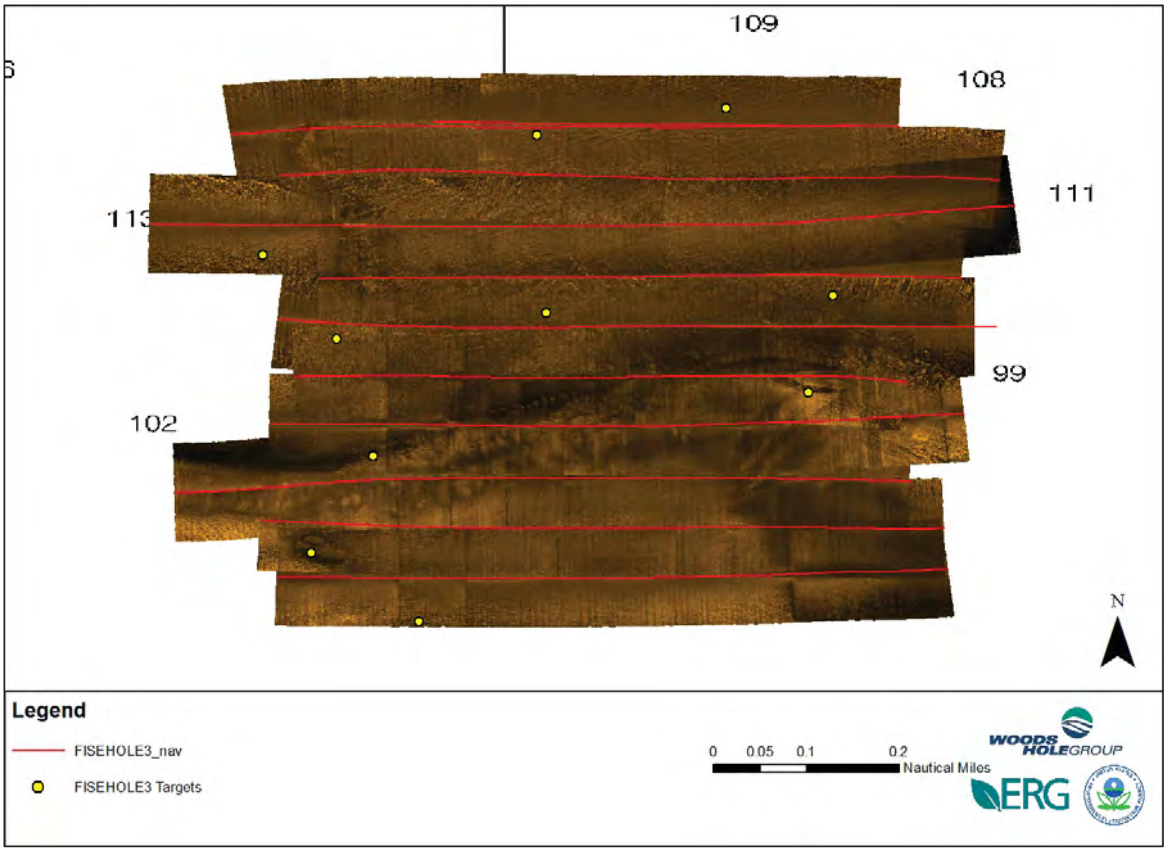

Figure 3.13.2. FISEHOLE3 mosaic with navigation lines and targets.

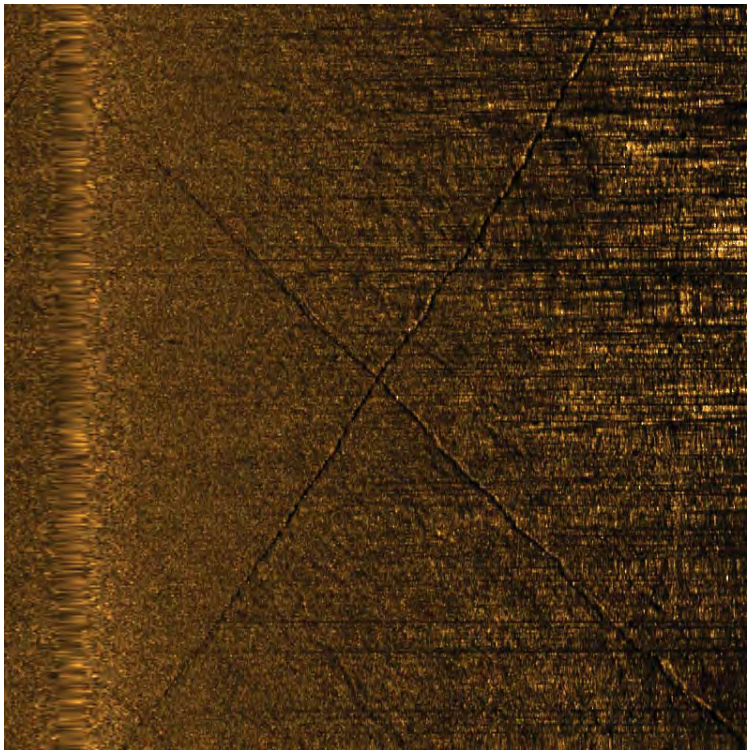

Figure 3.13.3. FISEHOLE3 target example: trawl/anchor marks.

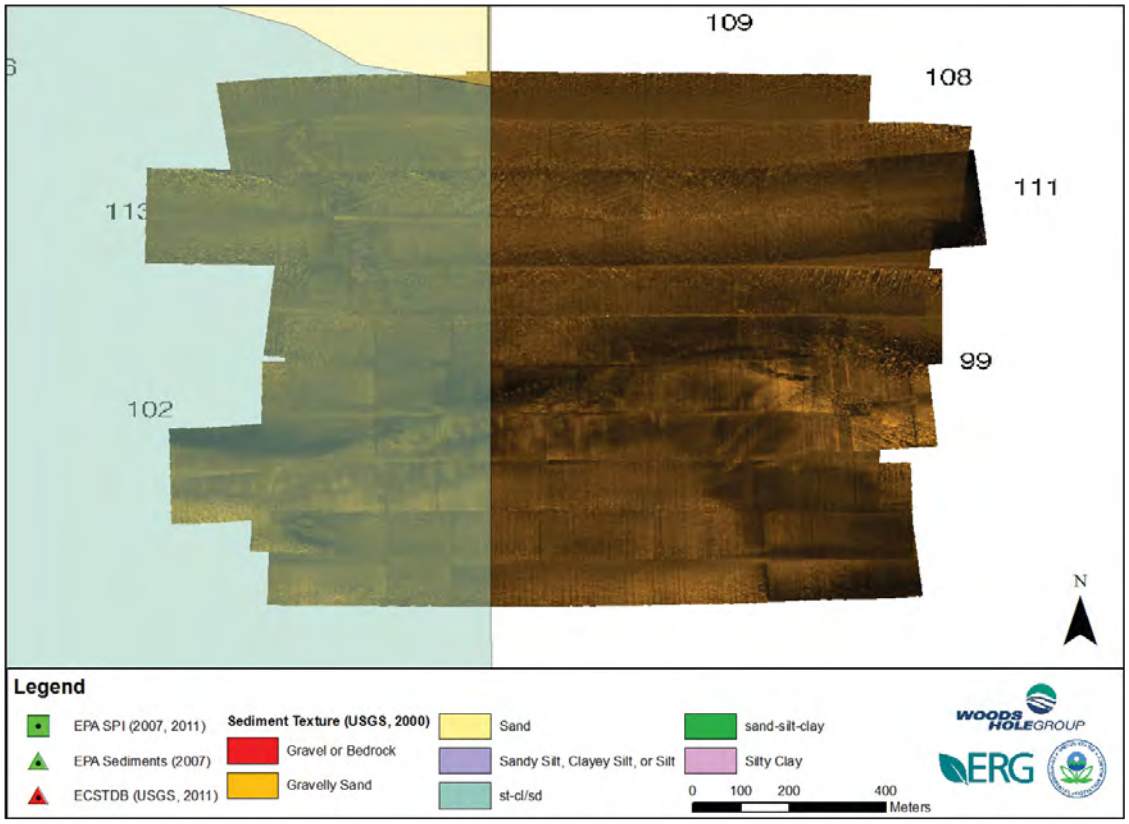

Figure 3.13.4. FISEHOLE3 mosaic with supplemental data to assist with interpretation. Note, the USGS (2000) seafloor classification coverage ends in this location.

3.14 FISEHOLE4

3.14.1 Mosaic Overview

Project location FISEHOLE4 is located approximately 0.9 km northeast of East Point (Fishers Island, NY) and 3.5 km south of Stonington Harbor, CT (Figure 3.1.4). The project location lies partially within the Stonington disposal site (historical). Depth varies between 3.6 and 31 meters in this area. Figure 3.14.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Twenty-four (24) side-scan sonar XTF files were imported for this project location. Two (2) files were rejected for QA reasons, and two (2) files were trimmed of data (Table 3.14.1). Data coverage is presented in Figure 3.14.1. The project area was surveyed at approximately 50% over1ap in data coverage. Side-scan data covered 0.82 million sq. meters.

Table 3.14.1. FISEHOLE4 processing statistics used in SonarWiz 5.

FISEHOLE4	
# XTF files	24
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4
Nadir Threshold	6 to 8
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	74 of 75
# Tracklines trimmed	2
Tracklines trimmed	FISEHOLE4_1_2_110718141100
	FISEHOLE4_7_8_110718161800
# Tracklines removed/hidden	2
Tracklines removed/hidden	FISEHOLE4_9_10_110718145700
	FISEHOLE4_14_13_110718151800

3.14.2 Target Summary

Sixteen (16) unique targets and one (1) feature were identified at FISEHOLE4 using specific descriptions. Targets were assigned to three classifications, with the number of targets assigned to each classification given in parentheses: boulder (3), debris pile (8), unidentified/other (5). All targets were identified in the western edge of the project location. Targets identified as debris piles fall within the area of overlap between the project location and the Stonington disposal site. The feature outlines a field of debris pile which occupies the entire eastern half of the project area. Targets and features are

compiled in Appendix T. Targets are indicated on Figure 3.14.2 and example target images are indicated in Figure 3.14.3.

3.14.3 Seafloor Classification & Geological Interpretation

The seafloor at FISEHOLE4 is composed of a medium and higher intensity backscatter material with many bottom features. A large field of debris pile extends from the eastern edge to the center of the survey area. This area is defined by many high intensity reflectors of significant enough height to cause data shadows. The presence of debris is not surprising, since disposal events have occurred here in the past. Several bottom samples collected by the USGS were described as gravelly or boulder (USGS, 2011), which verifies the classification of targets identified for this site. The EPA did not provide SPI images for this site. The USGS modeled seafloor classification described the survey area as a complex mix of gravelly sand interspersed with areas of gravel, including one that extends from the eastern sides to the survey area to the center, just like the bottom feature described in this study. Figure 3.14.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned three classes to the study area. The primary class (blue) covers approximately 60% of the project area, with most coverage occurring in the west and central portions of the survey area. The secondary class (red) approximately mirrors the shape of the field of debris piles defined in the eastern side of the survey area. The tertiary class (yellow) is not likely to be an accurate representation of the bottom, since it mostly occurs in lines parallel to the nadir. SonarWiz 5 bottom classifications are located in Appendix Z.

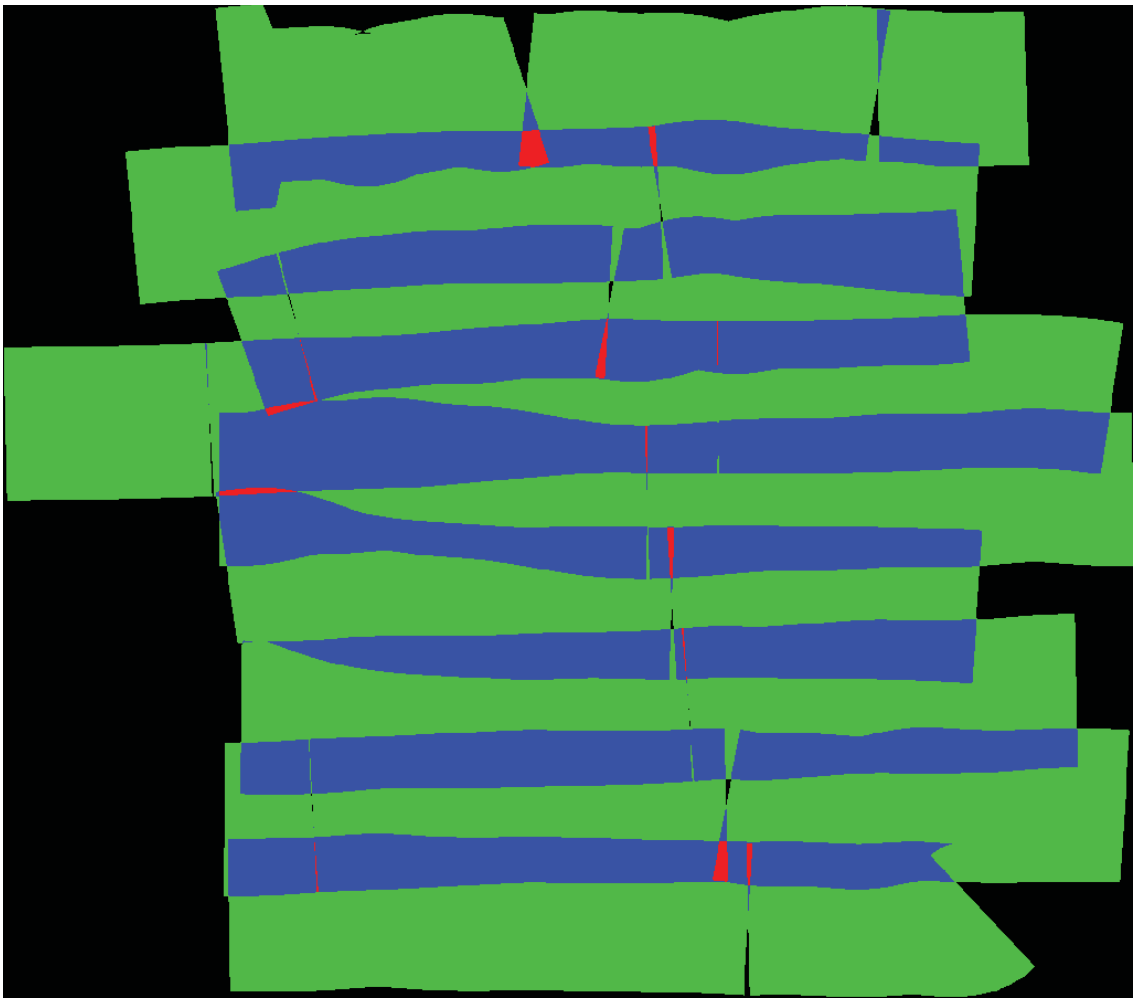

Figure 3.14.1. FISEHOLE4 survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively.

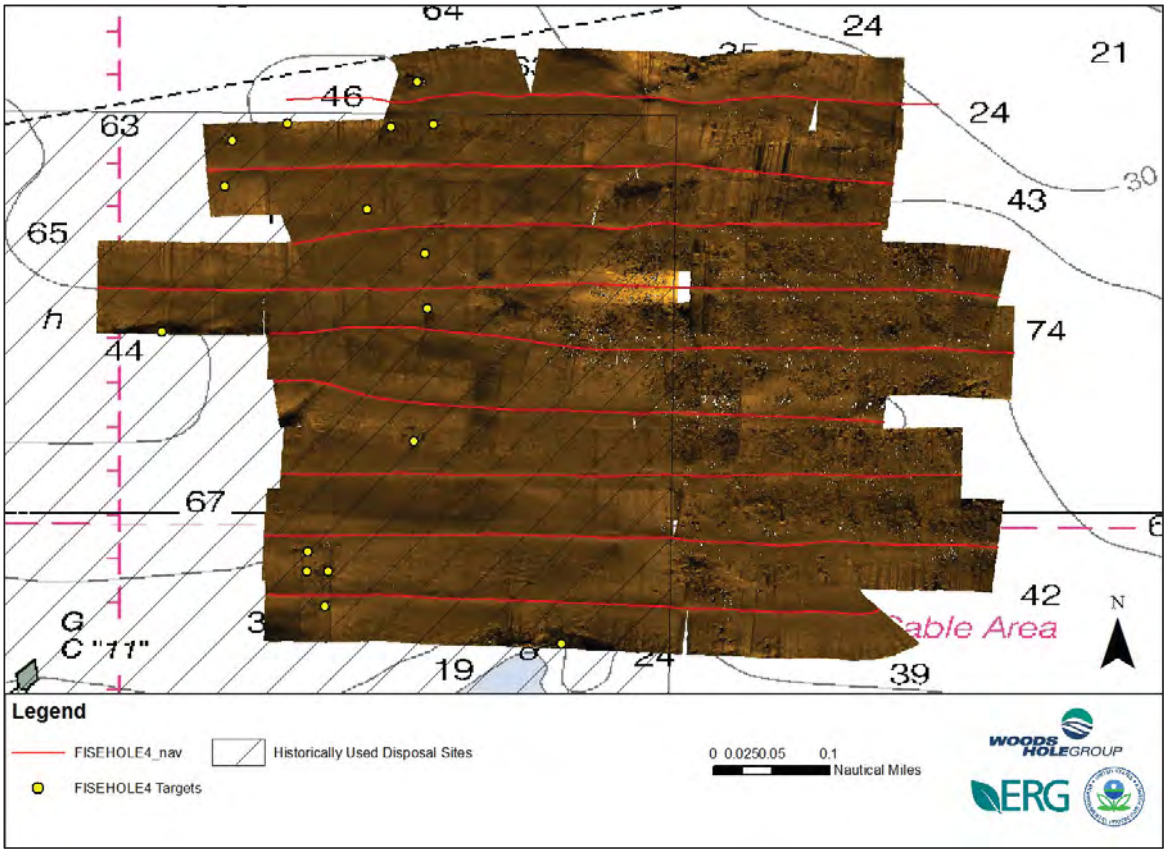

Figure 3.14.2. FISEHOLE4 mosaic with navigation lines and targets.

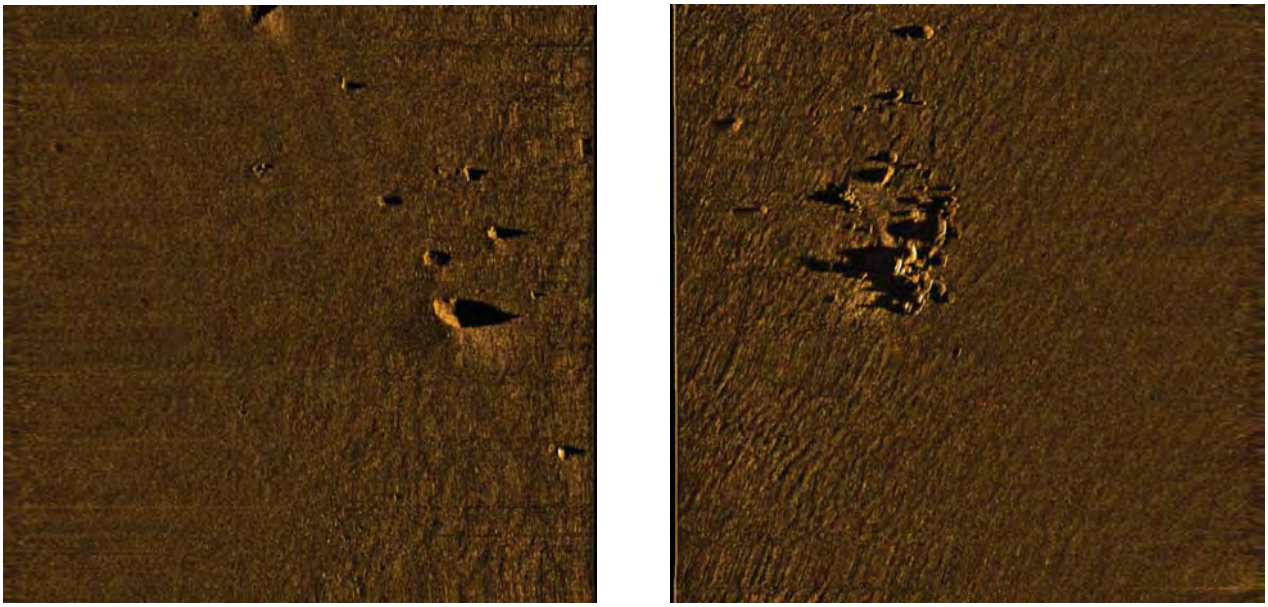

Figure 3.14.3. FISEHOLE4 target examples: boulder (L), debris pile (R).

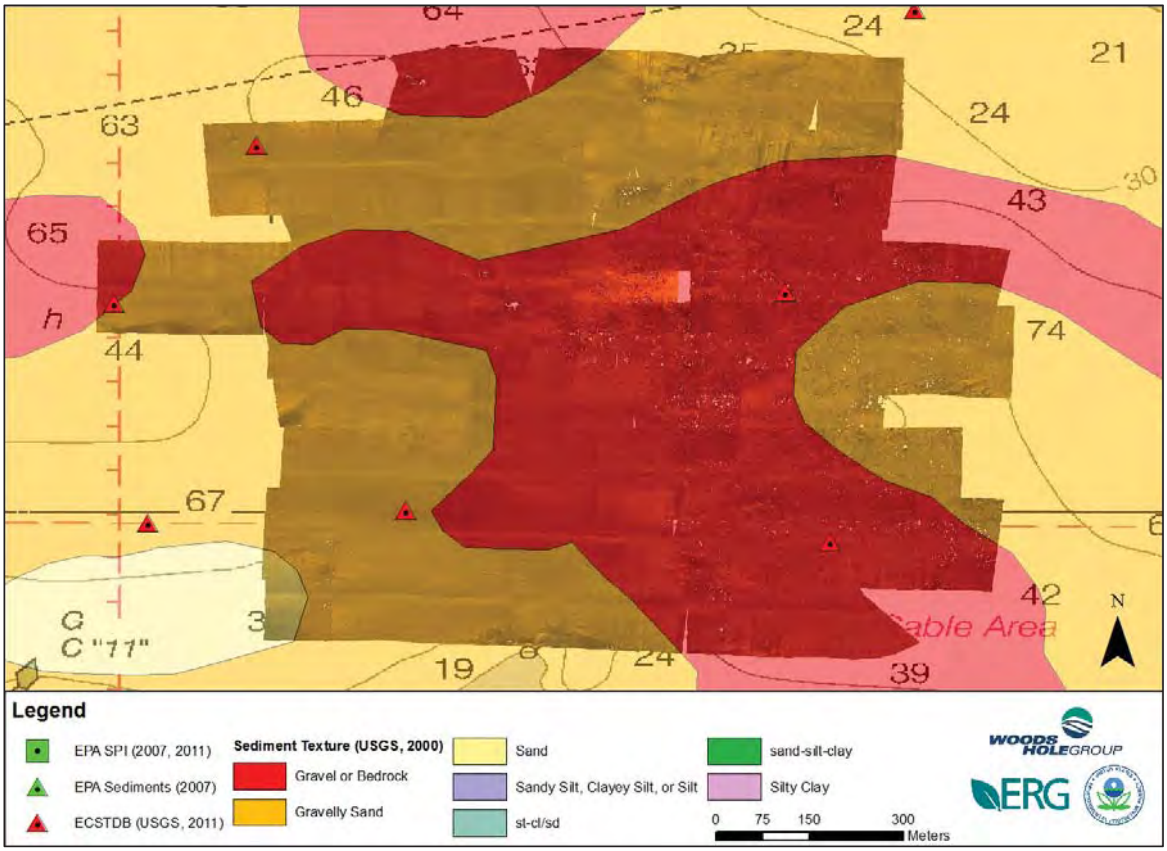

Figure 3.14.4. FISEHOLE4 mosaic with supplemental data to assist with interpretation.

3.15 FISEHOLE5

3.15.1 Mosaic Overview

Project location FISEHOLE5 is located approximately 1 km northwest of Fishers Island, NY and 1.3 km south of Groton Long Point, CT (Figure 3.1.4). The North Dumpling disposal site (historical) is directly north of the project area but does not overlap. Depth varies between 6 and 27 meters in this area. Figure 3.15.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Twenty (20) side-scan sonar XTF files were imported for this project location. Zero (0) files were rejected for QA reasons, and one (1) file was trimmed of data (Table 3.15.1). Data coverage is presented in Figure 3.15.1. The project area was surveyed at approximately 50% over1ap in data coverage. Side-scan data covered 0.72 million sq. meters.

Table 3.15.1. FISEHOLE5 processing statistics used in SonarWiz 5.

FISEHOLE5	
# XTF files	20
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4
Nadir Threshold	6 to 9
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	74 of 75
# Tracklines trimmed	1
Tracklines trimmed	FISEHOLE5_2_1_110718190500
# Tracklines removed/hidden	0
Tracklines removed/hidden	N/A

3.15.2 Target Summary

Twelve (12) unique targets and four (4) features were identified at FISEHOLE5 using specific descriptions. Targets were assigned to nine classifications, with the number of targets assigned to each classification given in parentheses: boulder (2), debris pile (8), unidentified/other (1), or wreck (1). Most targets were identified near the northwest corner of the project area, and most targets identified as debris piles were located proximal to the North Dumpling disposal area. The wreck is identified on NOAA charts. Three features were identified as fields of debris pile, located in the northern half of the project area. The other feature was identified as bedforms, and was located in the southwest corner of the project area. Targets and features are compiled in Appendix T. Targets are indicated on Figure 3.15.2 and example target images are indicated in Figure 3.15.3.

3.15.3 Seafloor Classification & Geological Interpretation

The seafloor at FISEHOLE5 is composed of a medium intensity backscatter material with intermittent areas of higher backscatter. The seafloor is homogenous in most of the survey area, with exceptions in the northeast and northwest corners where higher backscatter objects dominate the seafloor. Most of the higher backscatter areas were identified as debris piles due to the proximity to the North Dumpling disposal site (historical). USGS bottom samples in the survey area were identified as gravelly sediment and boulders, the latter of which is located within the feature delineated as a field of debris piles in this study (USGS, 2011). EPA did not provide SPI images for this survey area. USGS modeled seafloor classification describes the general area as predominantly sand with approximately equal areas gravelly sand and gravel arranged in a complex pattern where most gravel is located in the northern half of the survey area (USGS, 2000). The organization of sediment types and sorting in the survey area is likely influenced by currents due to relatively shallow depth. Figure 3.15.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned two classes to the study area, but the result is poor. Despite re-running the function with different settings several times, classes are organized in a manner roughly parallel to the nadir. The classification function was not able to effectively distinguish between the rockier northern areas from the sandier southern areas. SonarWiz 5 bottom classifications are located in Appendix Z.

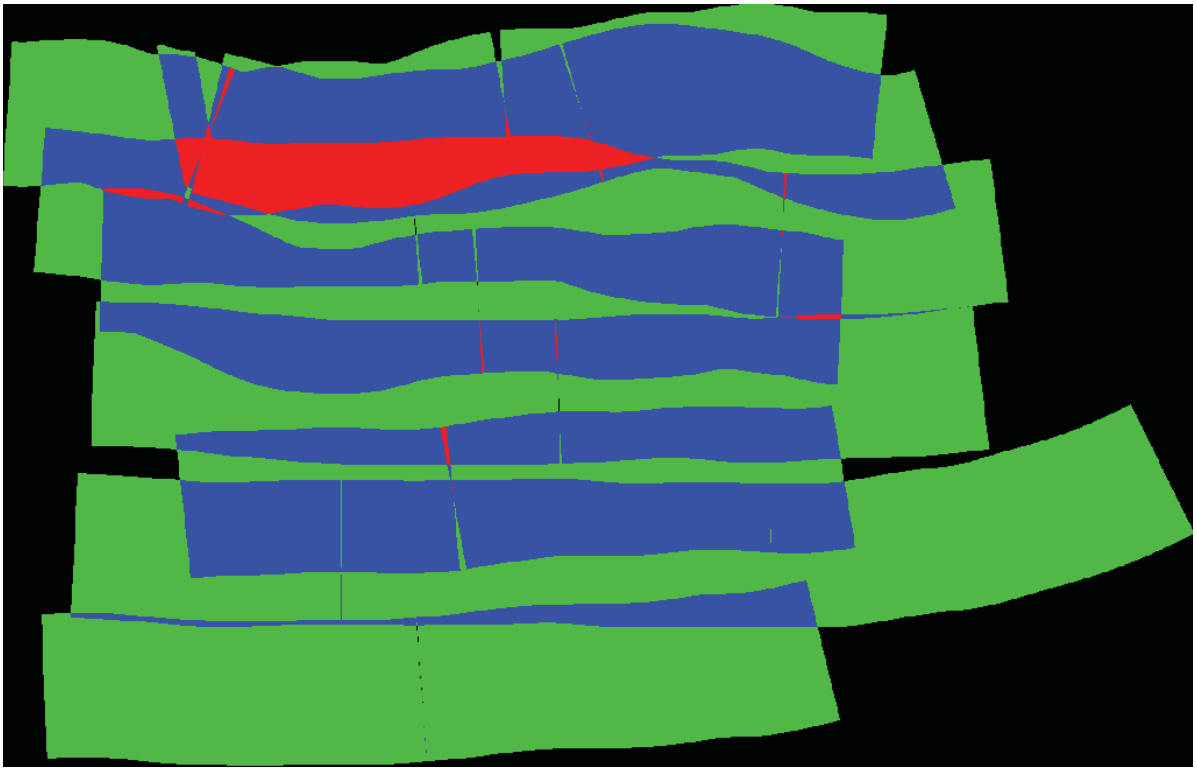

Figure 3.15.1. FISEHOLE5 survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively. The color red represents area with 300% coverage.

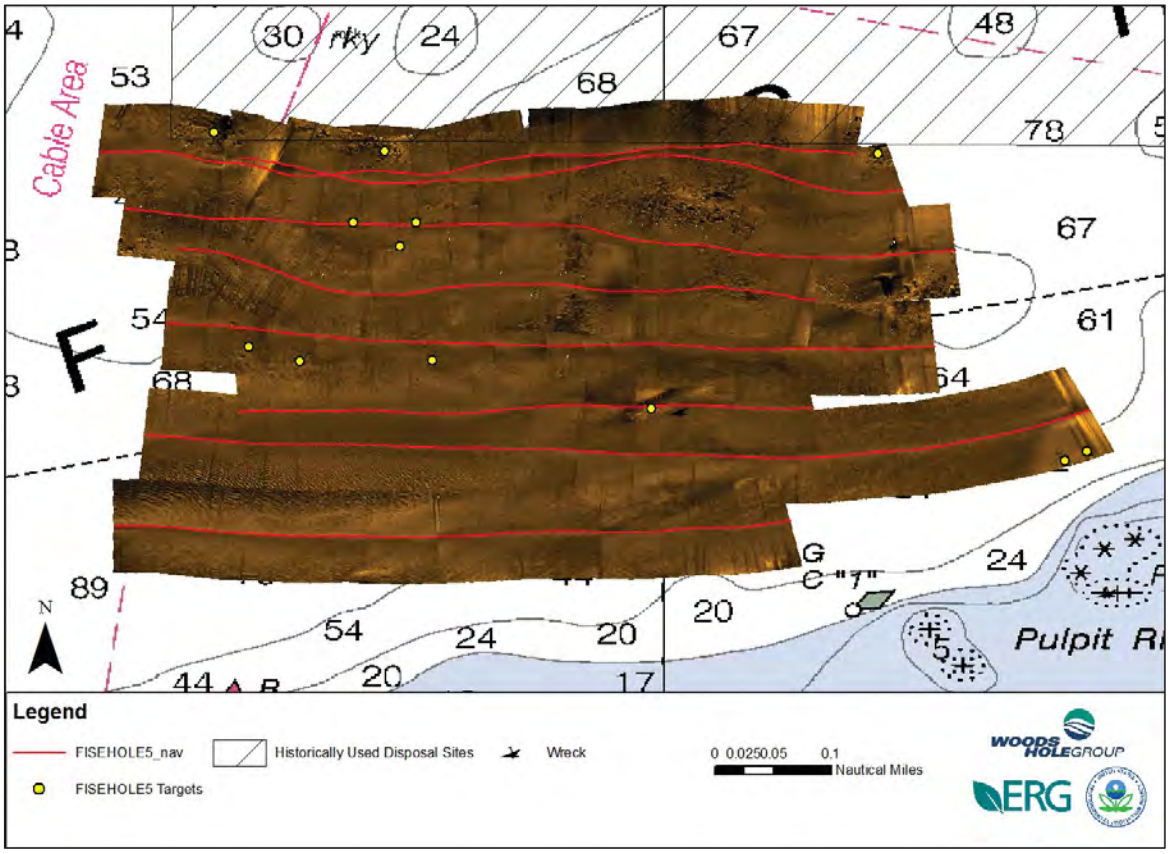

Figure 3.15.2. FISEHOLE5 mosaic with navigation lines and targets.

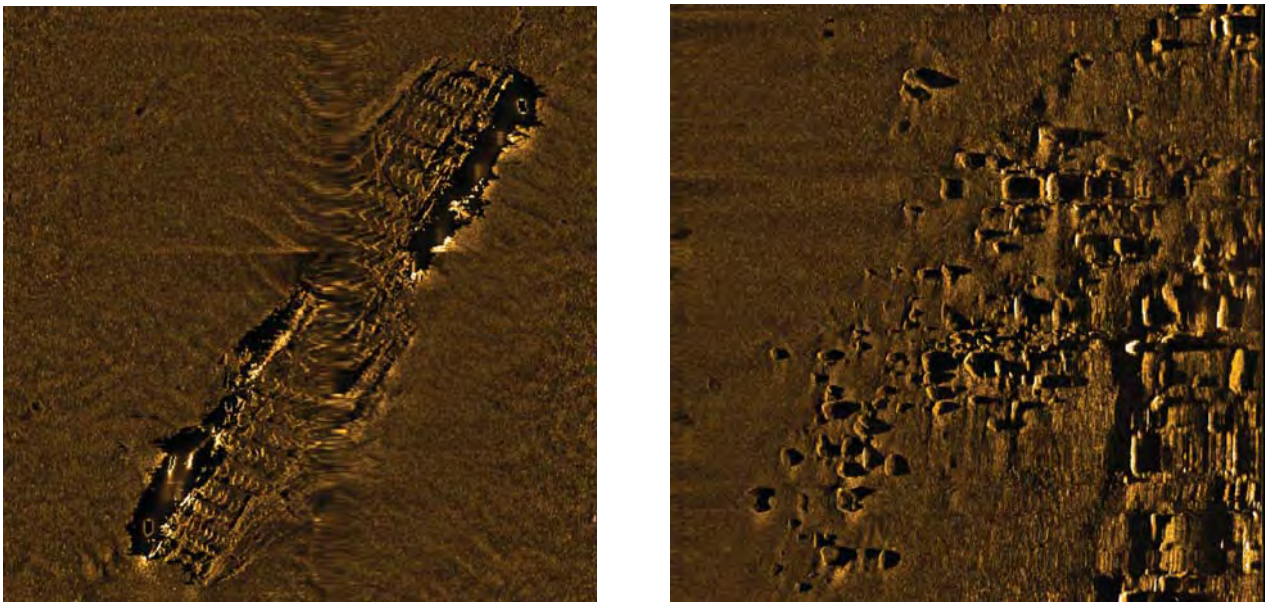

Figure 3.15.3. FISEHOLE5 target examples: wreck (L), debris pile (R).

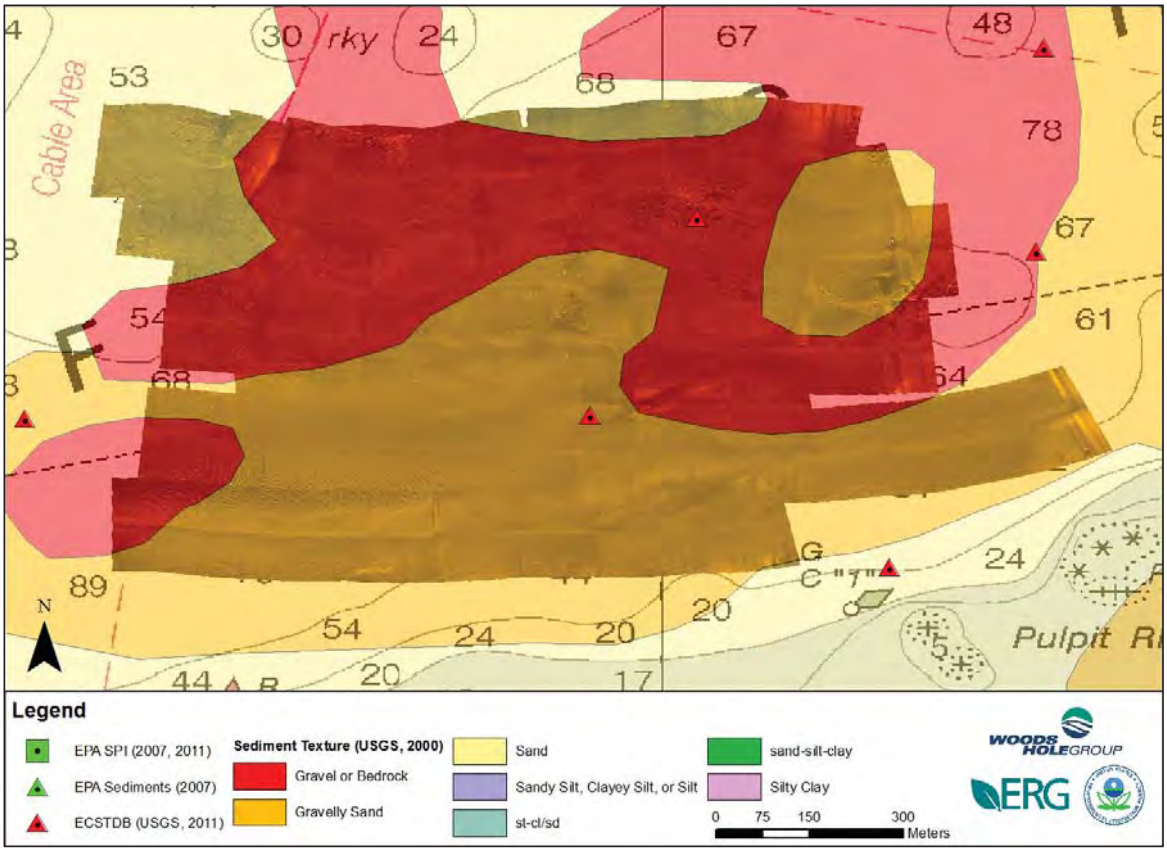

Figure 3.15.4. FISEHOLE5 mosaic with supplemental data to assist with interpretation.

3.16 FISEHOLE6

3.16.1 Mosaic Overview

Project location FISEHOLE6 is located approximately 3.2 km south of Black Point, CT and 5.4 km north of Plum Island, NY (Figure 3.1.3). Project locations ELIS14, Eastern_LIS_Niantic_Master, NTDS_HIST, and NTDS_NEW overlap with FISEHOLE6. The Niantic Bay disposal site (historical) has a small area of overlap in the north central area of FISEHOLE6. Depth varies between 19 and 61 meters in this area. Figure 3.16.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Two hundred twenty-one (221) side-scan sonar XTF files were imported for this project location. One (1) file was rejected for QA reasons, and two (2) files were trimmed of data (Table 3.16.1). Data coverage is presented in Figure 3.16.1. The project area was surveyed at approximately 50% over1ap in data coverage. Side-scan data covered 8.40 million sq. meters.

Table 3.16.1. FISEHOLE6 processing statistics used in SonarWiz 5.

FISEHOLE6	
# XTF files	221
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4
Nadir Threshold	6
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	98 of 100
# Tracklines trimmed	2
Tracklines trimmed	FISEHOLE6_11_12_110720042100
	FISEHOLE6_11_12_110720043100
# Tracklines removed/hidden	1
Tracklines removed/hidden	FISEHOLE6_11_12_110720042600

3.16.2 Target Summary

Thirty-two (32) unique targets and four (4) features were identified at FISEHOLE6 using specific descriptions. Targets were assigned to seven classifications, with the number of targets assigned to each classification given in parentheses: boulder (2), boulder area/field (2), debris pile (1), fishing gear – trap/buoy (11), rock outcrop/geological (3), unidentified/other (12), or wreck (1). Most targets were identified in the northwest and southeast corners. The majority of targets identified as fishing gear – trap/buoys were located in the southeast corner. All four features outline fields of debris pile, and were located along the central to east-central sections of the project location. Targets and

features are compiled in Appendix T. Targets are indicated on Figure 3.16.2 and example target images are indicated in Figure 3.16.3.

3.16.3 Seafloor Classification & Geological Interpretation

The seafloor at FISEHOLE6 is composed of a medium intensity backscatter material evenly distributed around the survey area with an area of debris piles in the east. Bottom samples collected by USGS were described as gravelly sediment or gravel and are equally distributed around the survey area (USGS, 2011). SPI images provided by EPA show a bottom consisting of coarse sand overlain with shells, in agreement with the bottom samples collected by USGS. The USGS modeled seafloor classification shows gravelly sand as the dominant sediment type, with intermittent smaller areas of gravel mainly in the north and east, as well as a small area of sand in the central area. These changes in bottom types are not evident in the side-scan sonar data, likely because the only varying factor is the gravel percentage, which is not resolvable at the scale used in this study. Figure 3.16.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned two classes to the study area. The primary class covers nearly 100% of the project area and the secondary class is minimal to the point that that the total area it occupies is negligible. The field of debris piles in the east was not distinguishable using the Classification function. SonarWiz 5 bottom classifications are located in Appendix Z.

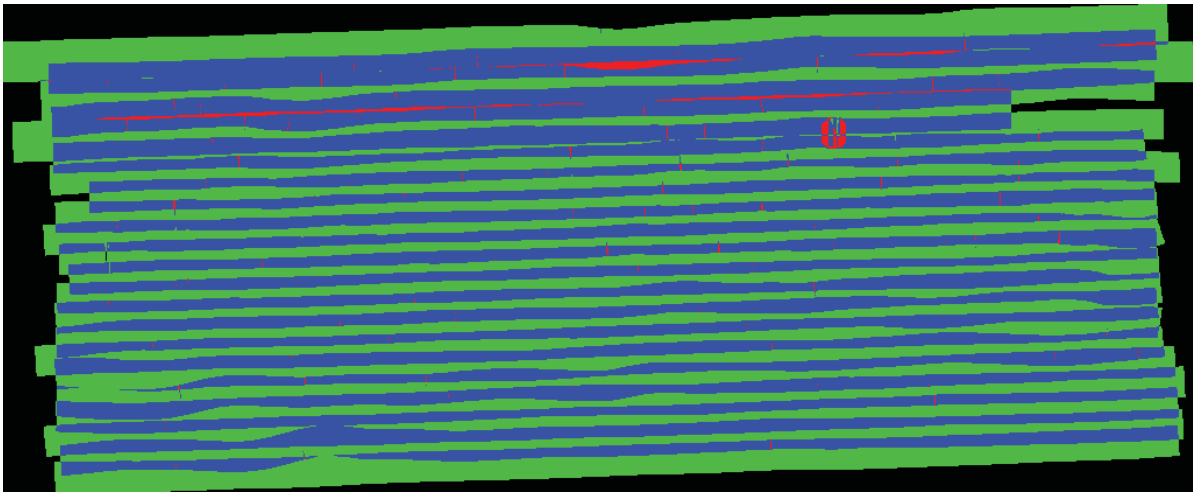

Figure 3.16.1. FISEHOLE6 survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively. The color red represents area with 300% coverage.

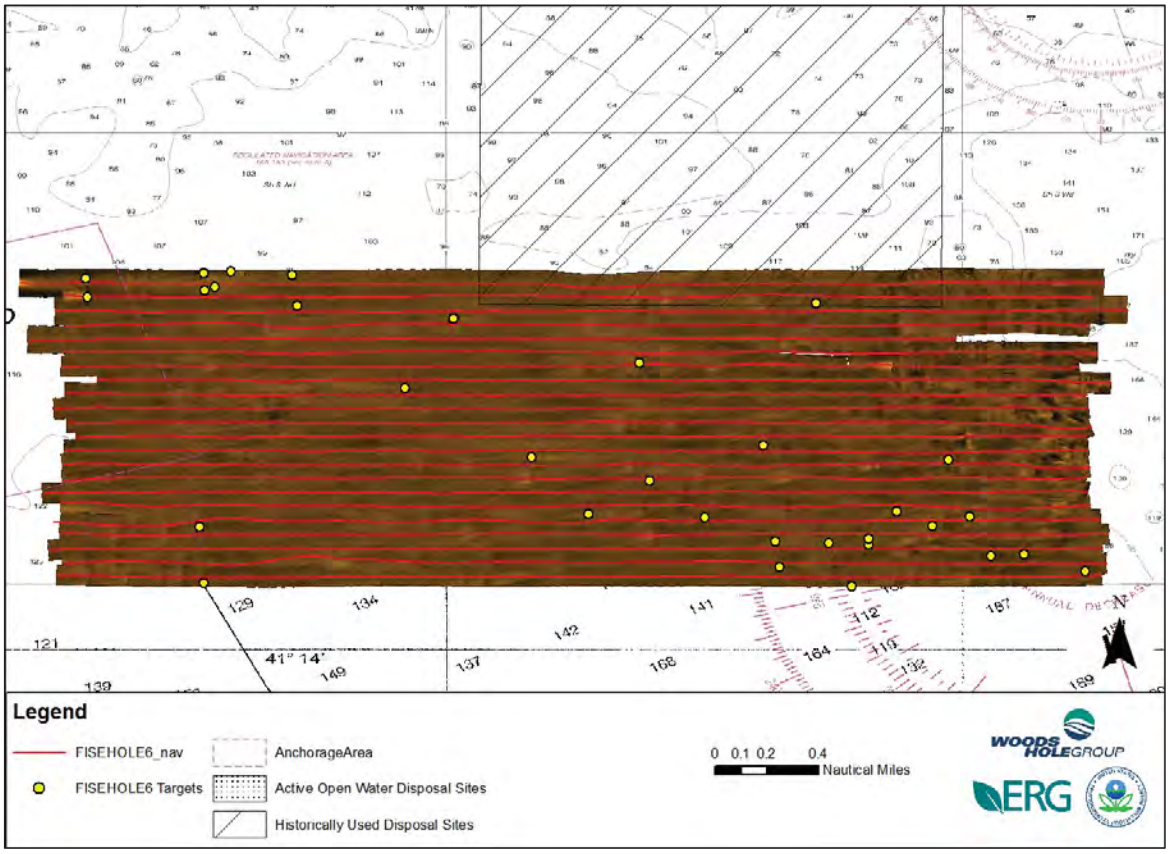

Figure 3.16.2. FISEHOLE6 mosaic with navigation lines and targets.

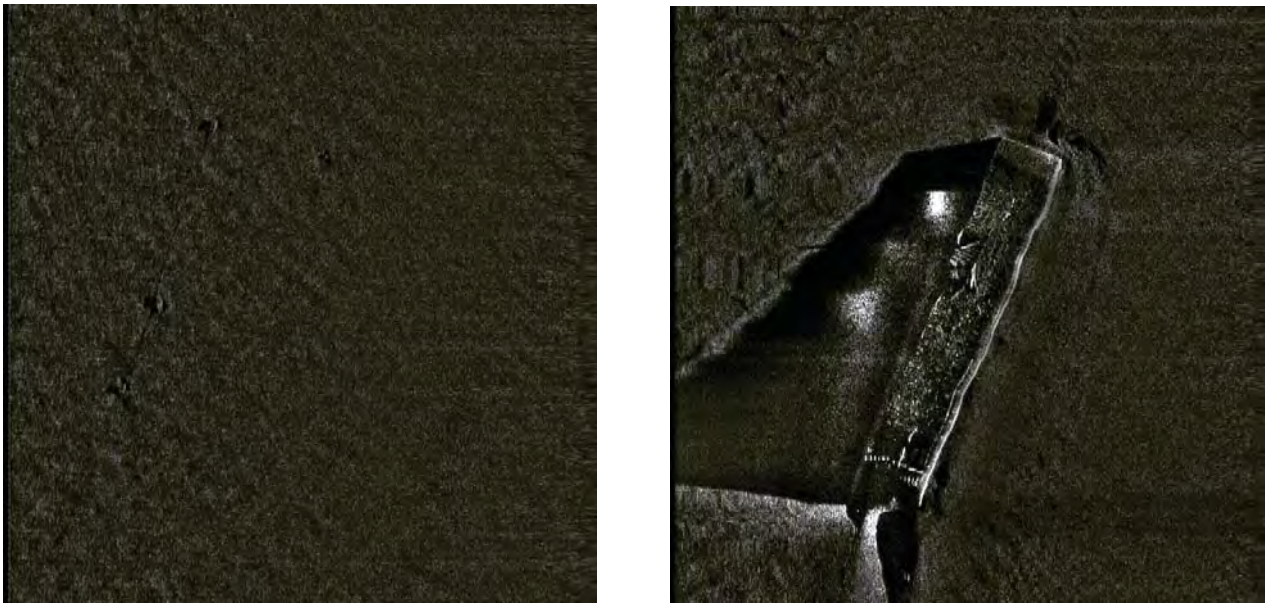

Figure 3.16.3. FISEHOLE6 target examples: fishing gear – trap/buoy (L), wreck (R).

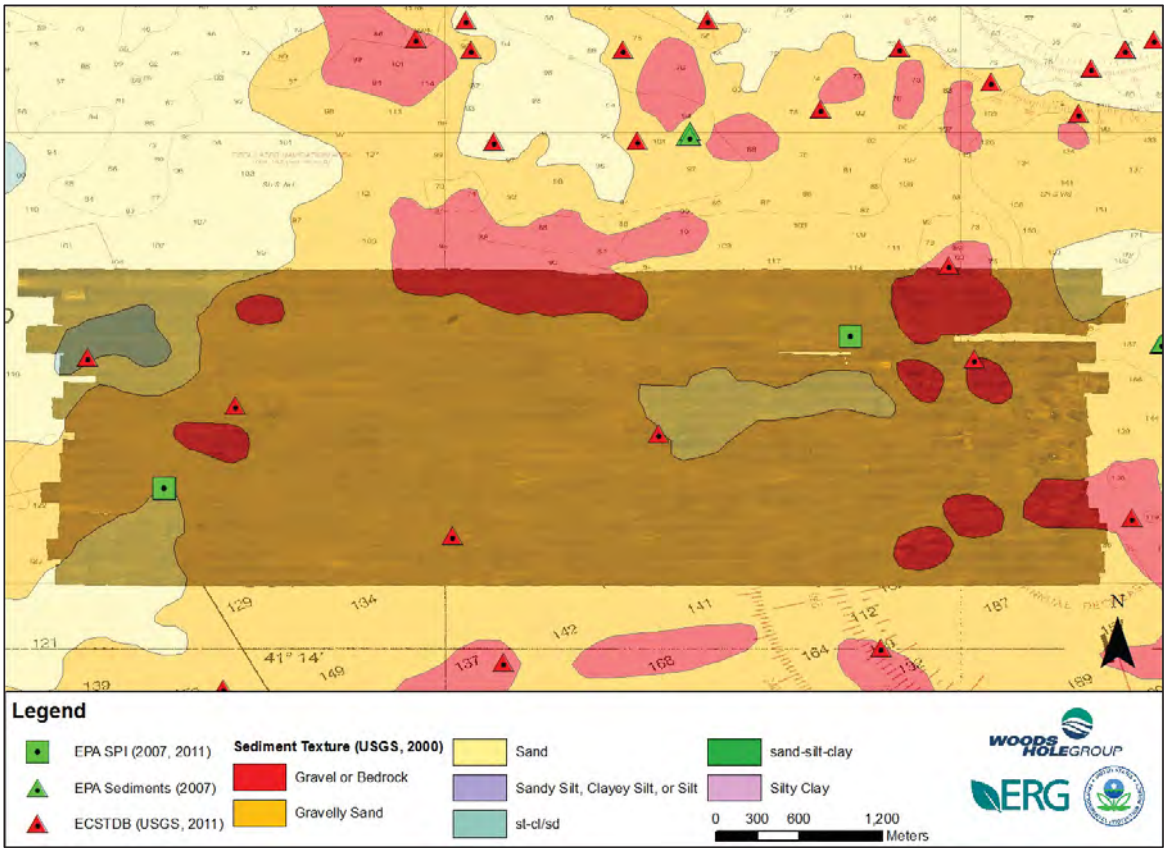

Figure 3.16.4. FISEHOLE6 mosaic with supplemental data to assist with interpretation.

3.17 EASTERN_LIS_NIANTIC_MASTER

3.17.1 Mosaic Overview

Project location Eastern_LIS_Niantic_Master is located approximately 6.5 km north of Plum Island, NY and 6.5 km south of Niantic Harbor, CT (Figure 3.1.3). Depth varies between 25 and 91 meters in this area. Project locations NTDS_NEW, NTDS_HIST, FISEHOLE6, and ELIS14 overlap this project location. The Niantic Bay disposal site (historical) overlaps very briefly in the northwest corner of the project area. Figure 3.17.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Eight hundred twenty-five (825) side-scan sonar XTF files were imported for this project location. Thirty (30) files were rejected for QA reasons, and nine (9) files were trimmed of data (Table 3.17.1). Data coverage is presented in Figure 3.17.1. The project area was surveyed at approximately 0% over1ap in data coverage in some areas and 100% in others. Side-scan data covered 5.37 million sq. meters.

Table 3.17.1. Eastern_LIS_Niantic_Master processing statistics used in SonarWiz 5.

Eastern_LIS_Niantic_Master	
# XTF files	825
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4
Nadir Threshold	6
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	48 of 50
# Tracklines trimmed	9
Tracklines trimmed	N_02-01100609080100
	N_03_04_redo100610071500
	N_03_04_redo100610071600
	N_08_07_redo100610081500
	N_21_22100609121500
	N_26_25100609130300
	N_29_30100609140800
	N_29_30100609140900
	N_39_40_redo100610120500
# Tracklines removed/hidden	30
Tracklines removed/hidden	N_05_06100609092000
	N_08_07_redo100610082700
	N_13_14100609105800

Table 3.17.1. (cont.) Eastern_LIS_Niantic_Master processing statistics.

Tracklines removed/hidden (cont.)	N_16_15_redo100610095900
	N_18_17100609113900
	N_18_17100609113800
	N_26_25100609130800
	N_26_25100609130900
	N_26_25100609131000
	N_26_25100609131100
	N_26_25100609131200
	N_26_25100609131300
	N_26_25100609131400
	N_26_25100609131500
	N_26_25100609131600
	N_26_25100609134000
	N_29_30100609142300
	N_31_32_redo100610105100
	N_39_40_redo100610123000
	N_44_43_redo100610131900
	N_45_46100609181200
	N_26_25100609130400
	N_26_25100609130500
	N_26_25100609130600
	N_26_25100609130700
	N_44REDO_100609195300
	N_44REDO_100609195400
	N_3940_100609200600
	N_3940_100609200700
	N_3940_100609200800

3.17.2 Target Summary

Forty-three (43) unique targets and two (2) features were identified at Eastern_LIS_Niantic_Master using specific descriptions. Targets were assigned to five classifications, with the number of targets assigned to each classification given in parentheses: boulder (9), debris pile (17), fishing gear – trap/buoy (6), rock outcrop/geological (2), or unidentified/other (9). Most targets were identified in the north and north-central areas of the project location. Targets identified as debris piles were predominantly located in the north-central and east areas of the project location. Two

features outline fields of debris pile, and occupy the majority of the project area with only sections in the west, north-central and east remaining outside their coverage. Targets and features are compiled in Appendix T. Targets are indicated on Figure 3.17.2 and example target images are indicated in Figure 3.17.3.

3.17.3 Seafloor Classification & Geological Interpretation

The seafloor at Eastern_LIS_Niantic_Master is composed of evenly-distributed, medium intensity backscatter material with fields of debris pile occupying the majority of the central area. Bottom samples collected by USGS were described as gravel and were only collected in the western half of the survey area (USGS, 2011). SPI images provided by EPA show a bottom consisting of coarse sand overlain with shells, consistent with the bottom samples collected by USGS and the seafloor interpretation. The USGS modeled seafloor classification shows gravelly sand as the dominant sediment type, with intermittent smaller areas of gravel in the west and northeast, as well as a small area of sand in the center and west. These changes in bottom types are not evident in the side-scan sonar data, likely because the only varying factor is the gravel percentage, which is not resolvable at the scale used in this study. Figure 3.17.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned one class to the study area. The primary class covers 100% of the project. This is in agreement with the side-scan sonar data interpretation as well as the supplemental data from USGS and EPA. SonarWiz 5 bottom classifications are located in Appendix Z.

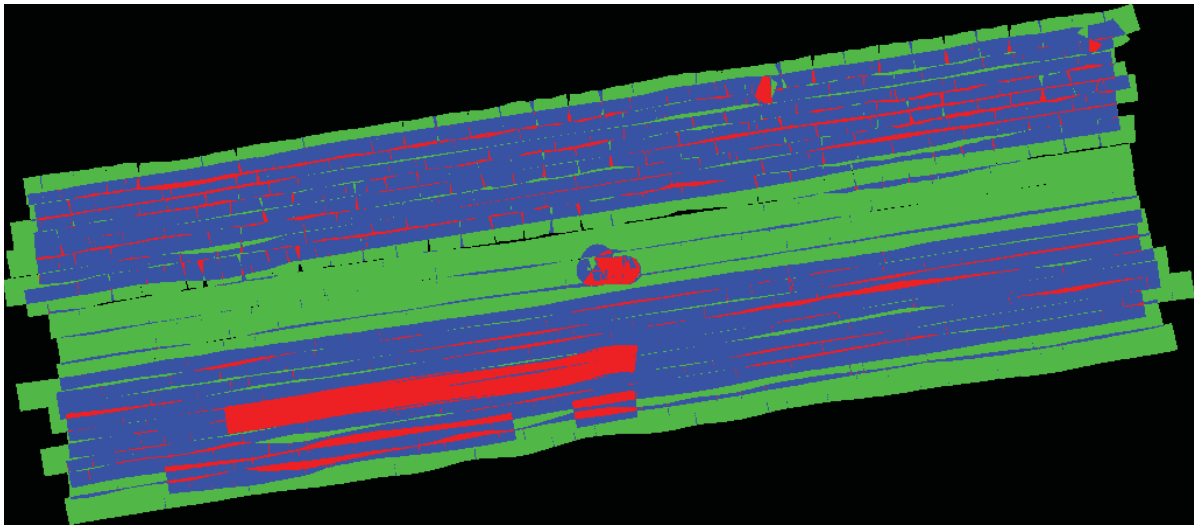

Figure 3.17.1. Eastern_LIS_Niantic_Master survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively. The color red represents area with 300% coverage.

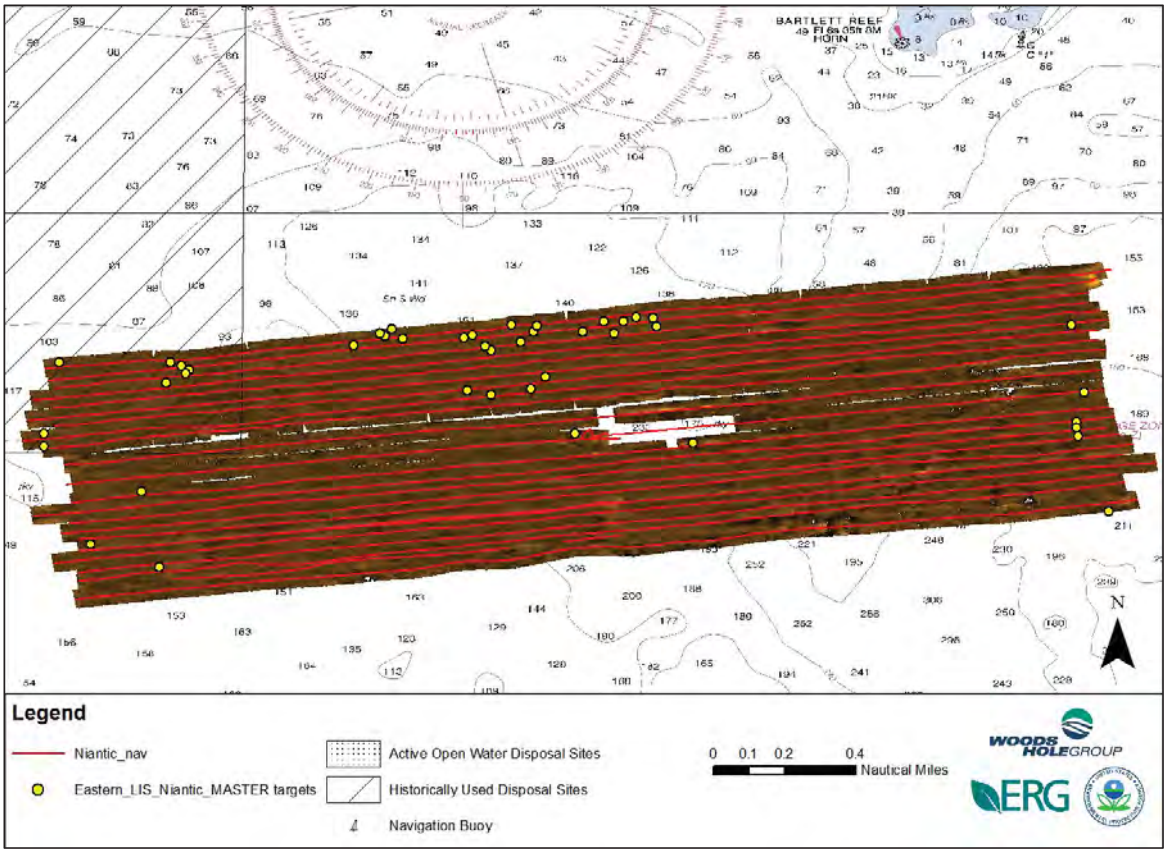

Figure 3.17.2. Eastern_LIS_Niantic_Master mosaic with navigation lines and targets.

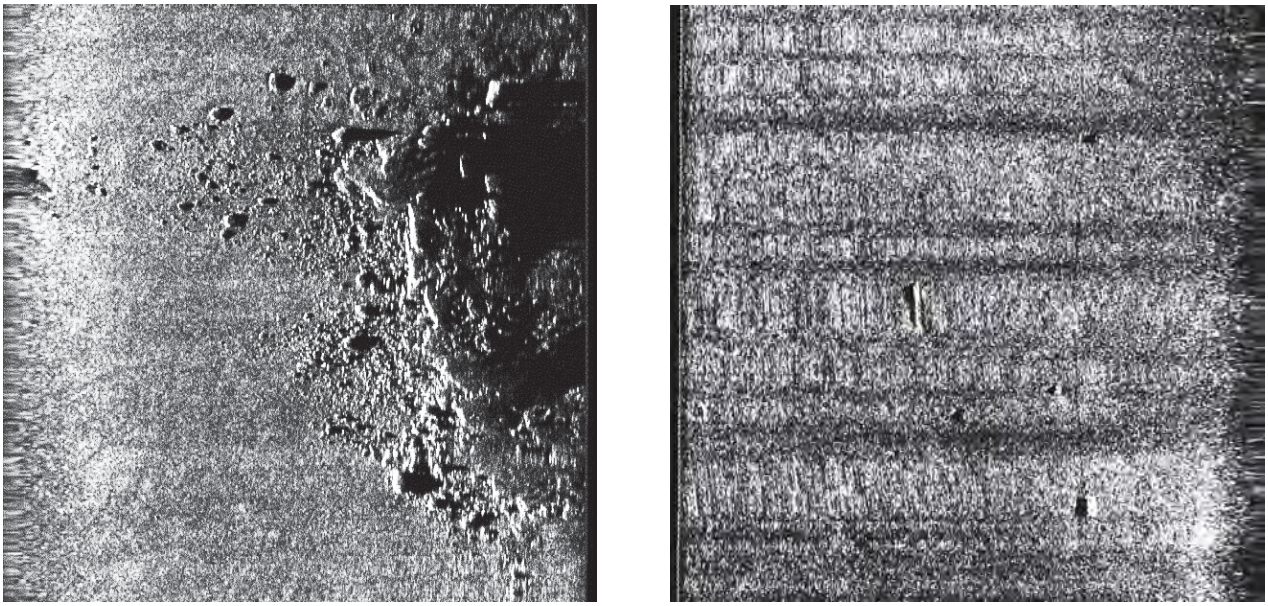

Figure 3.17.3. Eastern_LIS_Niantic_Master target examples: debris pile (L), fishing gear – trap/buoy (R).

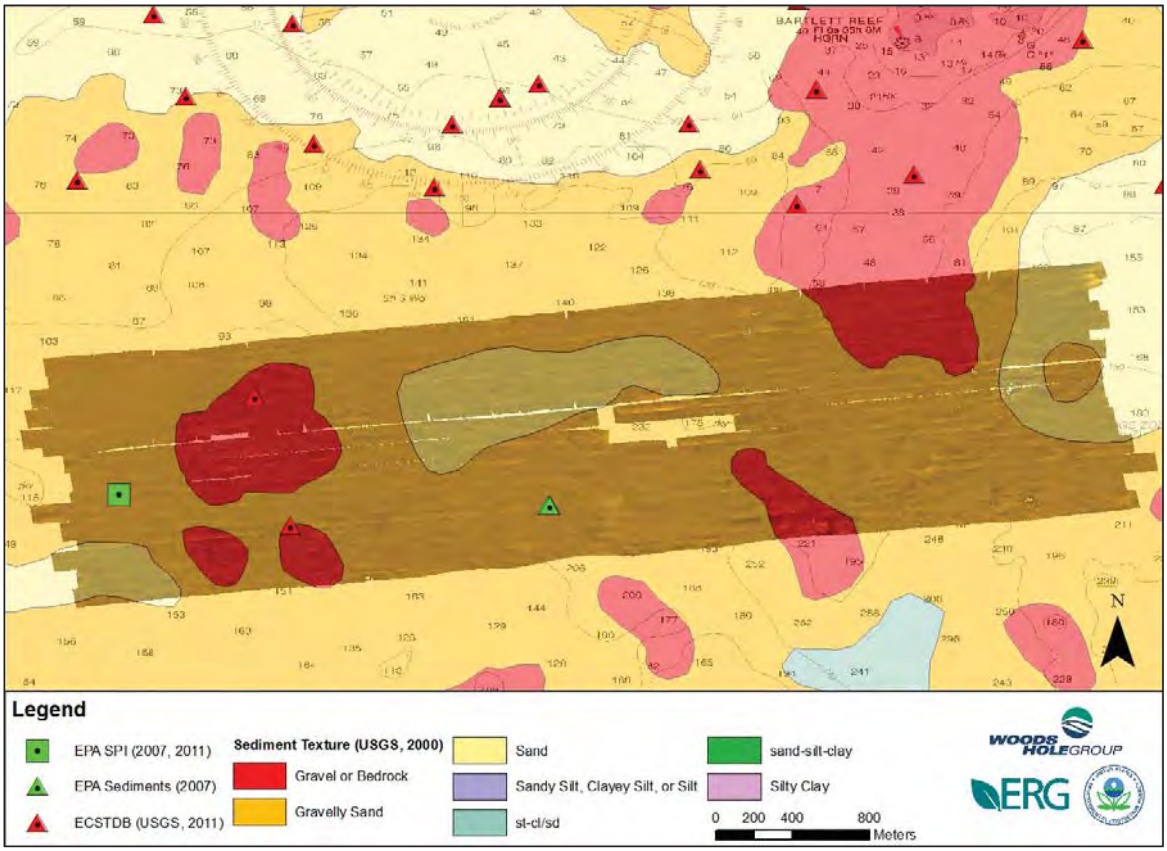

Figure 3.17.4. Eastern_LIS_Niantic_Master mosaic with supplemental data to assist with interpretation.

3.18 EASTERN_LIS_EASTHOLE_MASTER

3.18.1 Mosaic Overview

Project location Eastern_LIS_EastHole_Master is located approximately 16.9 km north of Montauk Point, NY and 4.6 km southeast of Fishers Island, NY (Figure 3.1.4). Project location FISE_NEW overlaps this site in the west. Depth varies between 27 and 99 meters in this area. Figure 3.18.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Six hundred forty (640) side-scan sonar XTF files were imported for this project location. Seven (7) files were rejected for QA reasons, and two (2) files were trimmed of data (Table 3.18.1). Data coverage is presented in Figure 3.18.1. The project area was surveyed at approximately 0% over1ap in data coverage. Side-scan data covered 7.58 million sq. meters.

Table 3.18.1. Eastern_LIS_EastHole_Master processing statistics used in SonarWiz 5.

Eastern_LIS_EastHole_Master	
# XTF files	640
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4
Nadir Threshold	4
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	48 of 50
# Tracklines trimmed	2
Tracklines trimmed	East_Hole100608072900
	East_Hole_34_33100608191700
# Tracklines removed/hidden	7
Tracklines removed/hidden	East_Hole100608071900
	East_Hole2526red100608193400
	East_Hole2526red100608194800
	East_Hole_13_14100608122500
	East_Hole_18_17100608134900
	East_Hole_21_22100608151000
	East_Hole_34_33100608191900

3.18.2 Target Summary

Thirty-three (33) unique targets and four (4) features were identified at Eastern_LIS_EastHole_Master using specific descriptions. Targets were assigned to seven classifications, with the number of targets assigned to each classification given in parentheses: bedforms (4), boulder (2), debris pile (1), field of debris pile (9), rock outcrop/geological (2), trawl/anchor mark (2), unidentified/other (13). The majority of targets were identified in the western half of the project location. Three small features outlining fields of debris pile were located in the west-central, center and the east of the project. The entire project area was covered by a feature describing trawl/anchor marks, which were observed throughout. Targets and features are compiled in Appendix T. Targets are indicated on Figure 3.18.2 and example target images are indicated in Figure 3.18.3.

3.18.3 Seafloor Classification & Geological Interpretation

The seafloor at Eastern_LIS_EastHole_Master is composed of a medium intensity backscatter material with trawl/anchor marks throughout. Three small fields of debris piles are located in the east, center and west-center. A bathymetry slope reflection is visible in the west-central of the survey area, where depth increases from approximately 130 feet to 320 feet. Four bottom samples provided by the EPA in the west-center of the survey area were described as organic silty clay with fine sand. These bottom samples are in agreement with the USGS bottom samples collected in the center of the survey area, described as silty sand or clayey silt (USGS, 2011). Three SPI images were provided by the EPA outside the survey area to the south, and showed a bottom of silty sand. The USGS modeled seafloor classification describes the survey area as predominantly sand, with areas of gravelly sand in the center and silty sand in the west and east (USGS, 2000). Figure 3.18.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned one class to the study area. The primary class covers 100% of the project area, since the survey area is dominantly sand with varying percentages of fines, which cannot be resolved in the side-scan sonar data. Side-scan sonar and supplemental data support the conclusion that the bottom at Eastern_LIS_EastHole_Master is mostly homogeneous. SonarWiz 5 bottom classifications are located in Appendix Z.

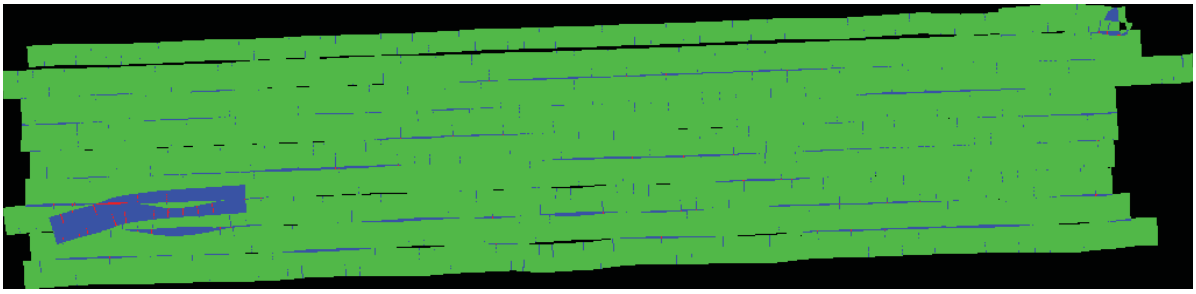

Figure 3.18.1. Eastern_LIS_EastHole_Master survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively.

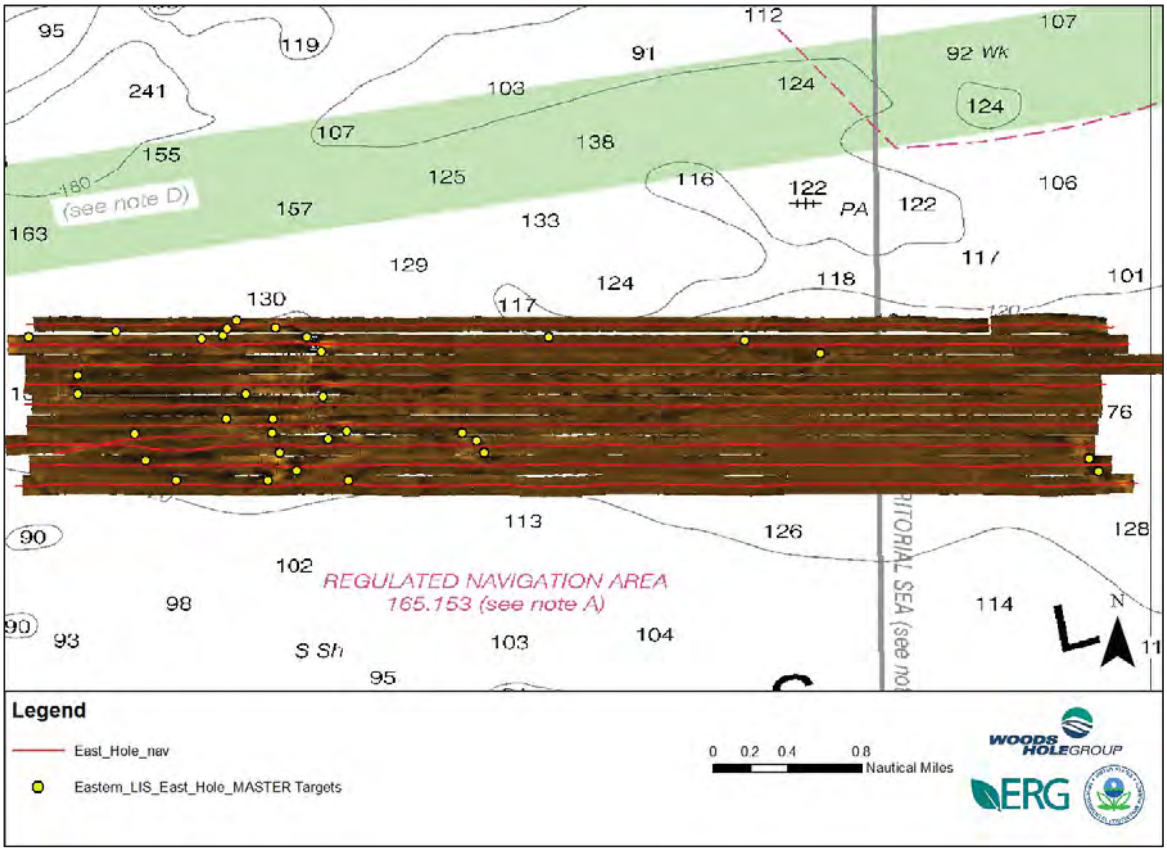

Figure 3.18.2. Eastern_LIS_EastHole_Master mosaic with navigation lines and targets.

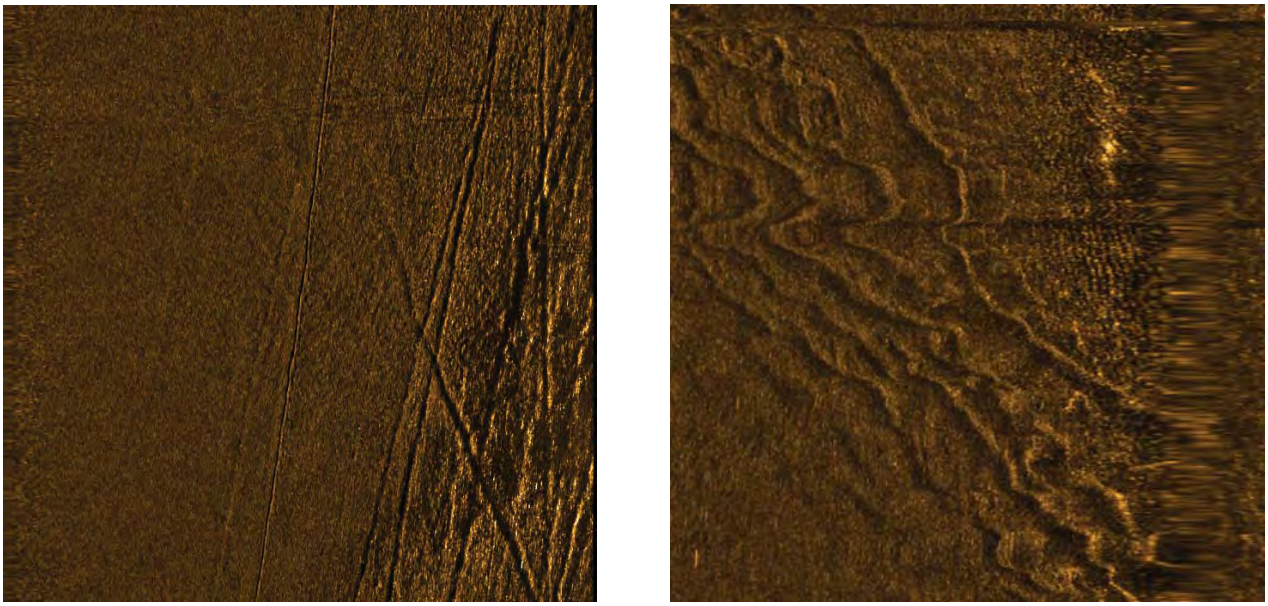

Figure 3.18.3. Eastern_LIS_EastHole_Master target examples: trawl/anchor marks (L), bedforms (R).

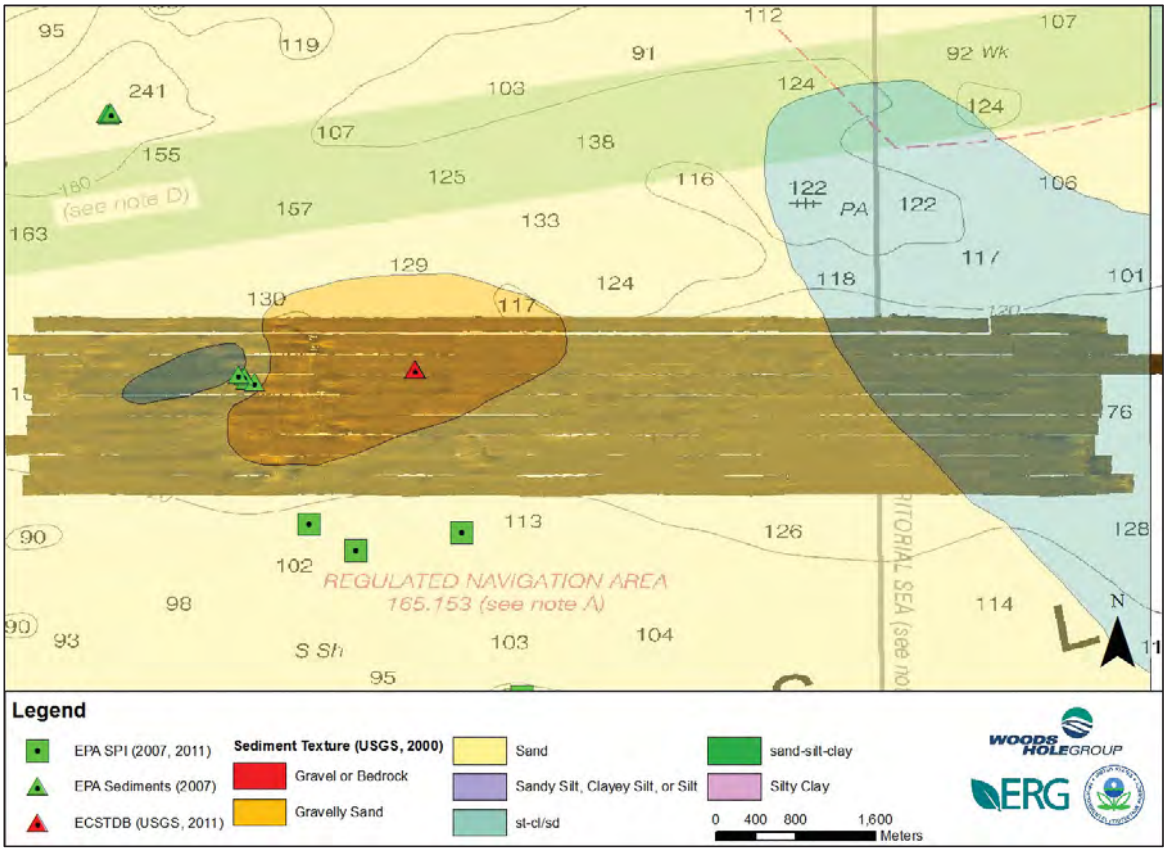

Figure 3.18.4. Eastern_LIS_EastHole_Master mosaic with supplemental data to assist with interpretation.

3.19 EASTERN_LIS_FISHERS_MASTER

3.19.1 Mosaic Overview

Project location Eastern_LIS_Fishers_Master is located approximately 1 km southeast of Fishers Island, NY and 6 km southwest of Watch Hill Point, RI (Figure 3.1.4). Project location FISE_OLD_2009 overlaps with the majority of the site, mainly in the east. Depth varies between 17 and 76 meters in this area. Figure 3.19.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Four hundred thirty-one (431) side-scan sonar XTF files were imported for this project location. Forty-four (44) files were rejected for QA reasons, and five (5) files were trimmed of data (Table 3.19.1). Data coverage is presented in Figure 3.19.1. The project area was surveyed at approximately 25% over1ap in data coverage, with certain area having 100% overlap. Side-scan data covered 6.60 million sq. meters.

Table 3.19.1. Eastern_LIS_Fishers_Master processing statistics used in SonarWiz 5.

Eastern_LIS_Fishers_Master	
# XTF files	431
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4 to 25
Nadir Threshold	6 to 10
Nadir Blanking Duration	0 to 2
Offset Alt (m)	2
Adjusted display range (m)	98 of 100
# Tracklines trimmed	5
Tracklines trimmed	sonar_data_1817_100607122400
	sonar_data_1817_100607122500
	sonar_data_1817_100607123000
	sonar_data_2122_100607133600
	sonar_data_2425_100607135900
# Tracklines removed/hidden	44
Tracklines removed/hidden	10276710_F100607092600
	10276710_F100607093100
	10276710_F100607093600
	10276710_F100607094100
	sonar_data100607104200
	sonar_data_1009_100607112800
	sonar_data_1314_100607121200

Table 3.19.1. (cont.) Eastern_LIS_Fishers_Master processing statistics.

Tracklines removed/hidden (cont.)	sonar_data_1817_100607123100
	sonar_data_1817_100607123200
	sonar_data_1817_100607123300
	sonar_data_1817_100607123400
	sonar_data_1817_100607123500
	sonar_data_1817_100607123600
	sonar_data_1817_100607123700
	sonar_data_1817_100607123800
	sonar_data_1817_100607130100
	sonar_data_2122_100607134100
	sonar_data_2122_100607134200
	sonar_data_2122_100607134300
	sonar_data_2122_100607134400
	sonar_data_2122_100607134500
	sonar_data_2122_100607134600
	sonar_data_2122_100607134700
	sonar_data_2122_100607134800
	sonar_data_2425_100607135500
	sonar_data_2425_100607140100
	sonar_data_2425_100607140600
	sonar_data_2425_100607140800
	sonar_data_2425_100607140900
	sonar_data_2425_100607141000
	sonar_data_2425_100607141100
	sonar_data_2425_100607141200
	sonar_data_2425_100607143400
	sonar_data_3231_100607152000
	sonar_data_3334_100607160600
	sonar_data_3738_100607163900
	sonar_data_3738_100607164000
	sonar_data_3738_100607165300
	sonar_data_0102_100607181000
	sonar_data_0102_100607184100
	sonar_data15redo100607191800
	sonar_data25redo100607192500
	sonar_data25redo100607192600
	sonar_data25redo100607193400

3.19.2 Target Summary

Thirteen (13) unique targets and one (1) feature were identified at Eastern_LIS_Fishers_Master using specific descriptions. Targets were assigned to five classifications, with the number of targets assigned to each classification given in parentheses: bedforms (6), debris pile (12), fishing gear – trap/buoy (1), unidentified/other (3), or wreck (1). Targets were evenly distributed in the project area with no pattern of distribution. The wreck (target identification ELISFishM-T0001) is not present on NOAA charts and was located in the northwest corner of the project area. Targets and features are compiled in Appendix T. Targets are indicated on Figure 3.19.2 and example target images are indicated in Figure 3.19.3.

3.19.3 Seafloor Classification & Geological Interpretation

The seafloor at Eastern_LIS_Fishers_Master is composed of a homogeneous medium intensity backscatter material. Bottom samples collected in the east-center by the EPA were described as sandy silt with varying percentages of clay. There were no SPI images provided in the survey area. The USGS modeled seafloor classification shows sand as the dominant bottom sediment, with an area of gravelly sand in the southwest corner (USGS, 2000). The Figure 3.19.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned one class to the study area. The primary class covers 100% of the project area. The side-scan data combined with supplemental data suggest the seafloor of Eastern_LIS_Fishers_Master is dominated by sand, and that slight changes in gravel and silt content are not resolvable at the scale used in this survey. SonarWiz 5 bottom classifications are located in Appendix Z.

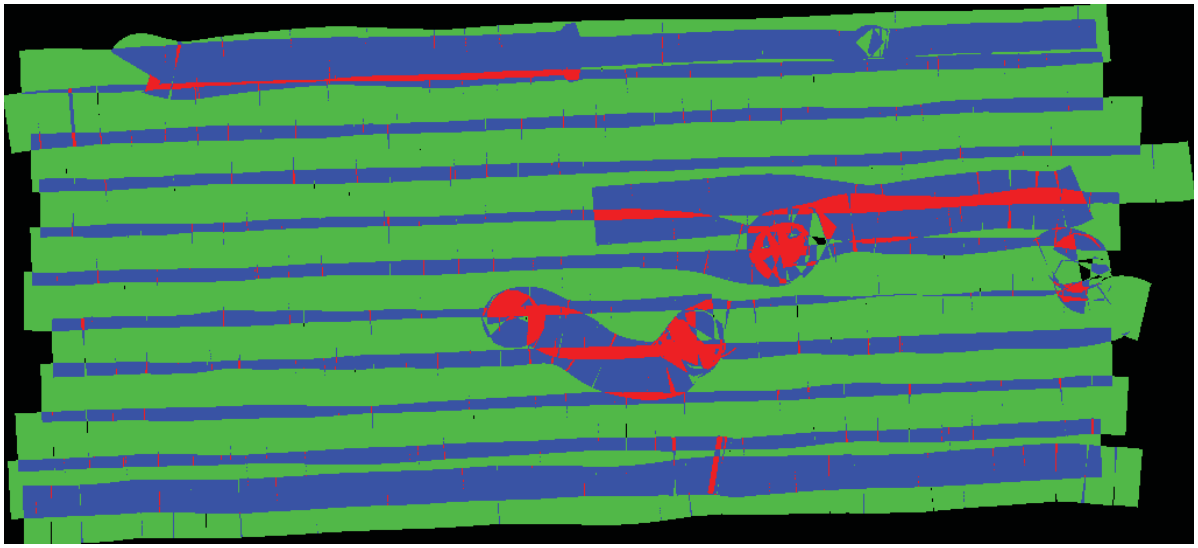

Figure 3.19.1. Eastern_LIS_Fishers_Master survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively. The color red represents area with 300% coverage.

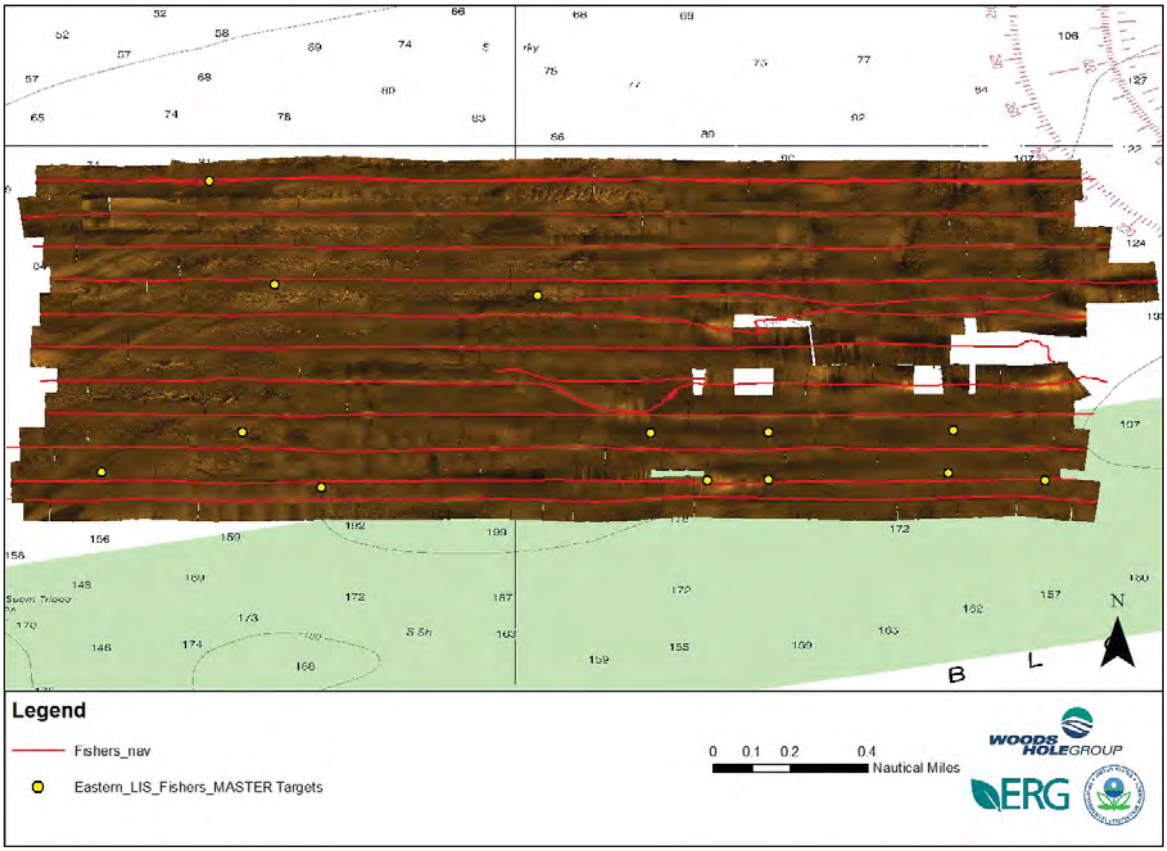

Figure 3.19.2. Eastern_LIS_Fishers_Master mosaic with navigation lines and targets.

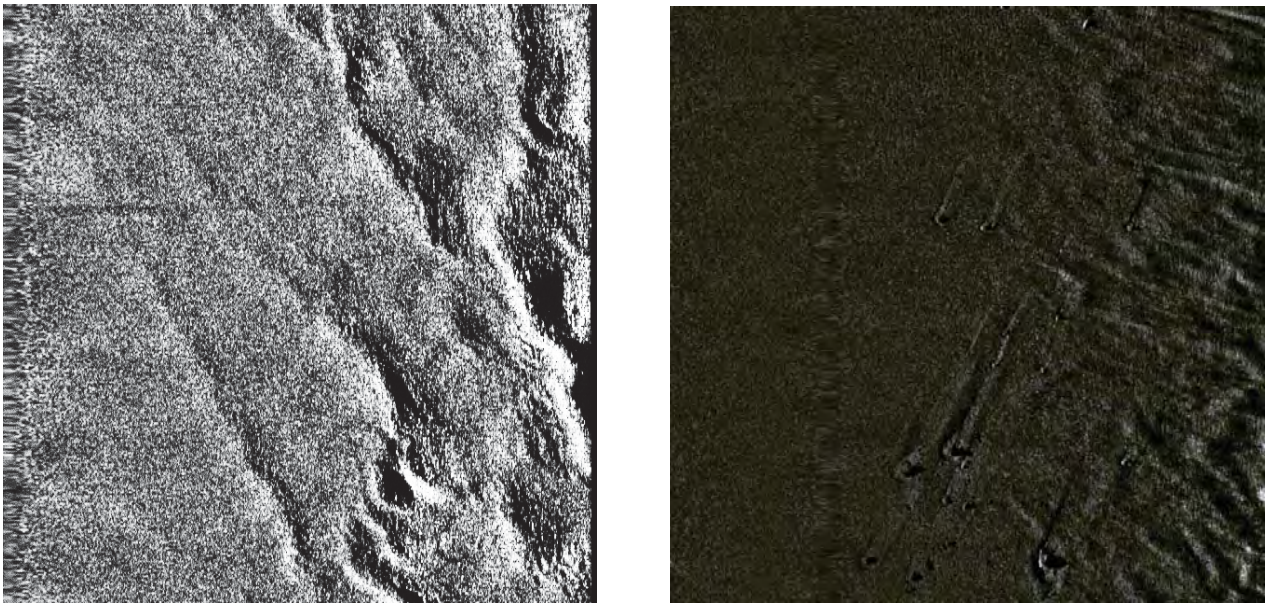

Figure 3.19.3. Eastern_LIS_Fishers_Master target examples: bedforms (L), debris pile (R).

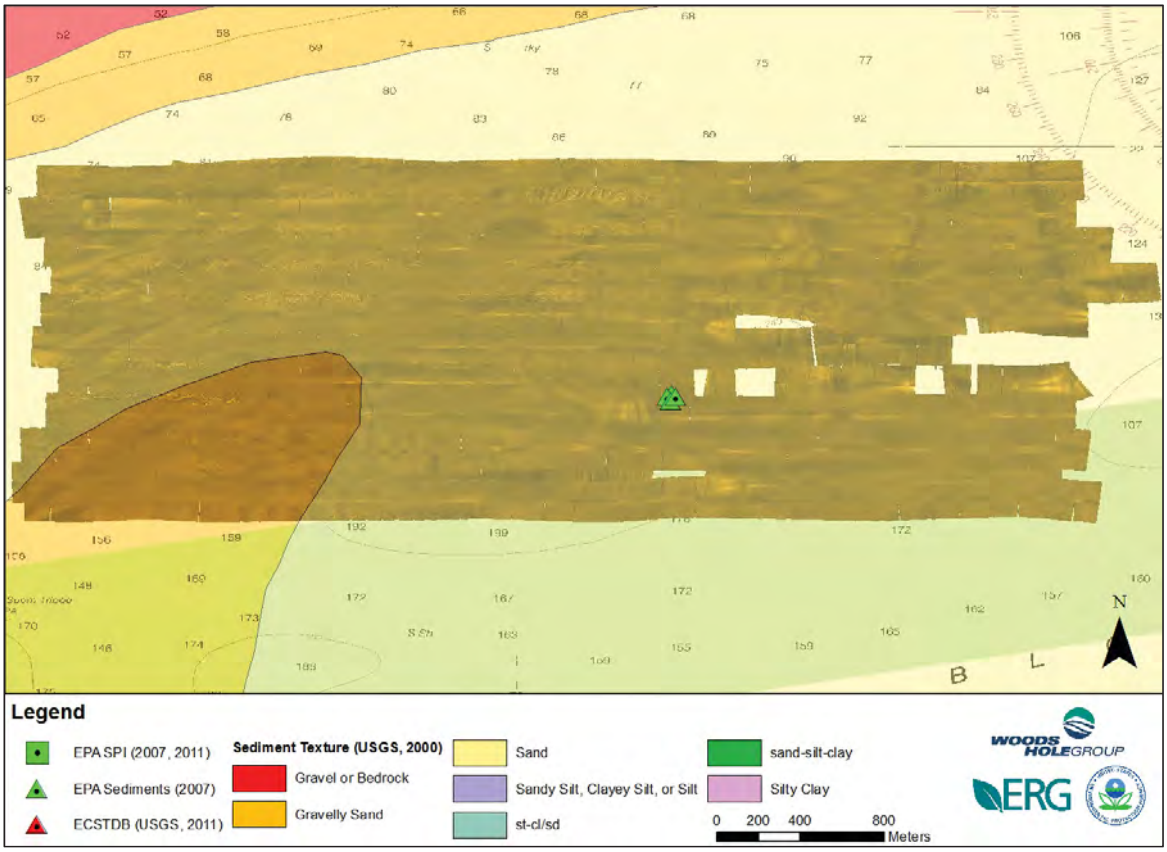

Figure 3.19.4. Eastern_LIS_Fishers_Master mosaic with supplemental data to assist with interpretation.

3.20 FISE_SW_ADD2

3.20.1 Mosaic Overview

Project location FISE_SW_ADD2 is located approximately 3.5 km south of Fishers Island, NY and 15.3 km northeast of Gardiners Island, NY (Figure 3.1.4). Depth varies between 30 and 95 meters in this area. Figure 3.20.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Seventeen (17) side-scan sonar XTF files were imported for this project location. Four (4) files were rejected for QA reasons, and zero (0) files were trimmed of data (Table 3.20.1). Data coverage is presented in Figure 3.20.1. The project area was surveyed at 0% over1ap in data coverage, because there is only one trackline of data. Side-scan data covered 0.26 million sq. meters.

Table 3.20.1. FISE_SW_ADD2 processing statistics used in SonarWiz 5.

FISE_SW_ADD2	
# XTF files	17
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4
Nadir Threshold	6 to 20
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	98 of 100
# Tracklines trimmed	0
Tracklines trimmed	N/A
# Tracklines removed/hidden	4
Tracklines removed/hidden	FISE_SW_ADD070723121300
	FISE_SW_ADD070723121400
	FISE_SW_ADD070723121500
	FISE_SW_ADD070723121600

3.20.2 Target Summary

Seven (7) unique targets and zero (0) features were identified at FISE_SW_ADD2 using specific descriptions. Targets were assigned to four classifications, with the number of targets assigned to each classification given in parentheses: boulder area/field (1), fishing gear – trap/buoy (1), rock outcrop/geological (1), or unidentified/other (4). Six of seven targets were located in the eastern half of the project area. Targets are compiled in Appendix T. Targets are indicated on Figure 3.20.2 and example target images are indicated in Figure 3.20.3.

3.20.3 Seafloor Classification & Geological Interpretation

The seafloor at FISE_SW_ADD2 is composed of a medium intensity backscatter material. No bottom samples were provided in the survey area by USGS or EPA. No SPI images were provided by EPA in the survey area. The USGS modeled seafloor classification describes the bottom as gravelly sand in the west, grading to sand then silty/clayey sand as depth increases in the east of the survey area (USGS, 2000). A more detailed description of the survey area could be produced if the survey area were larger or consisted of more than a single trackline. Figure 3.20.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned two classes to the study area. The primary class covers nearly 100% of the project area and the secondary class is so minimal that the total area it occupies is negligible. SonarWiz 5 bottom classifications are located in Appendix Z.

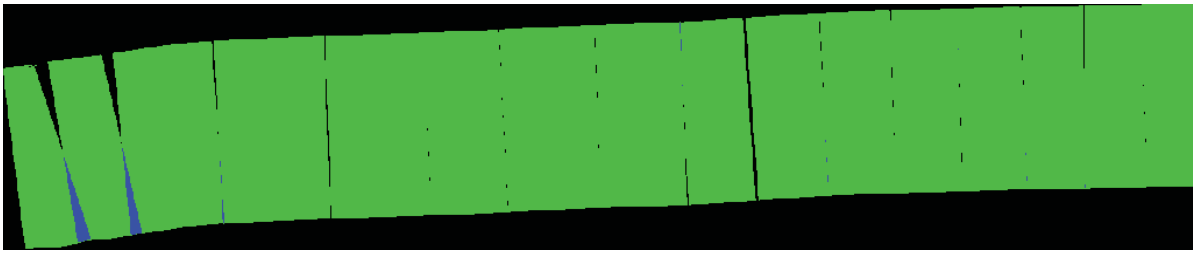

Figure 3.20.1. FISE_SW_ADD2 survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively.

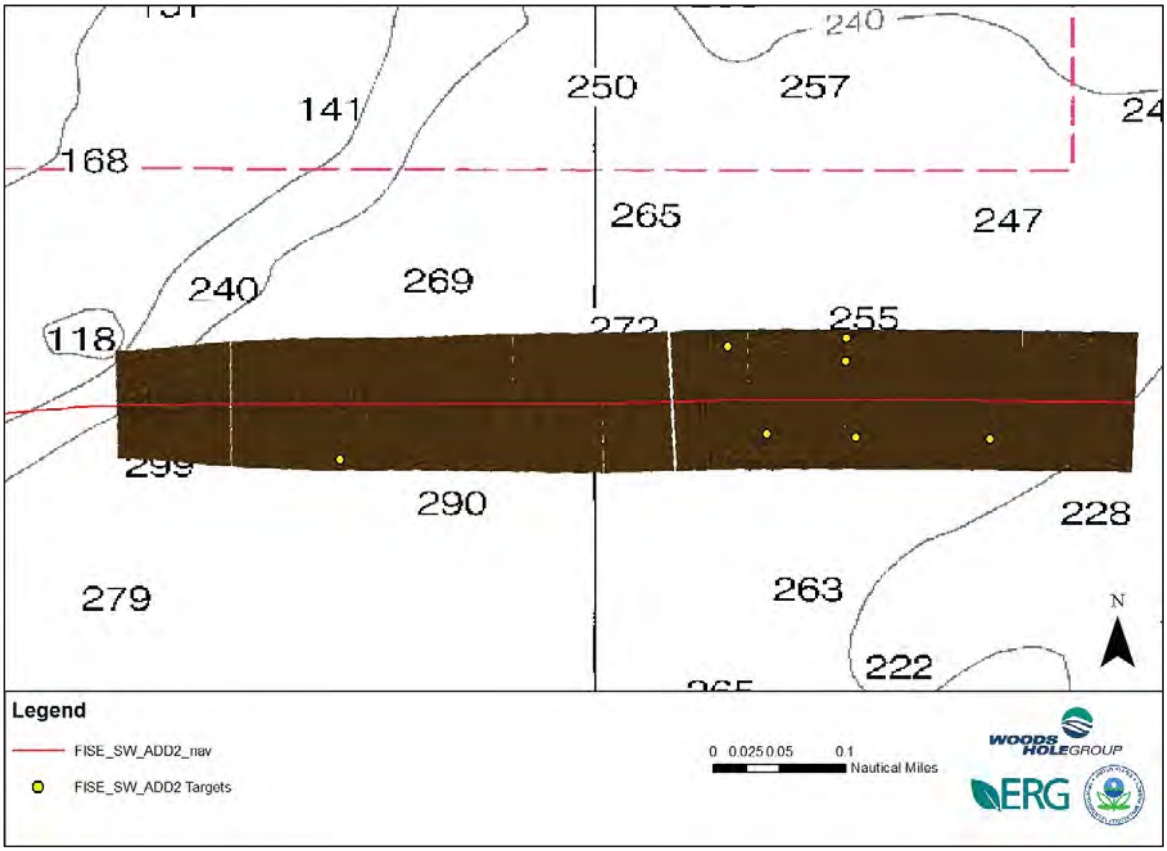

Figure 3.20.2. FISE_SW_ADD2 mosaic with navigation lines and targets.

Figure 3.20.3. FISE_SW_ADD2 target examples: boulder (L), rock outcrop/geological (R).

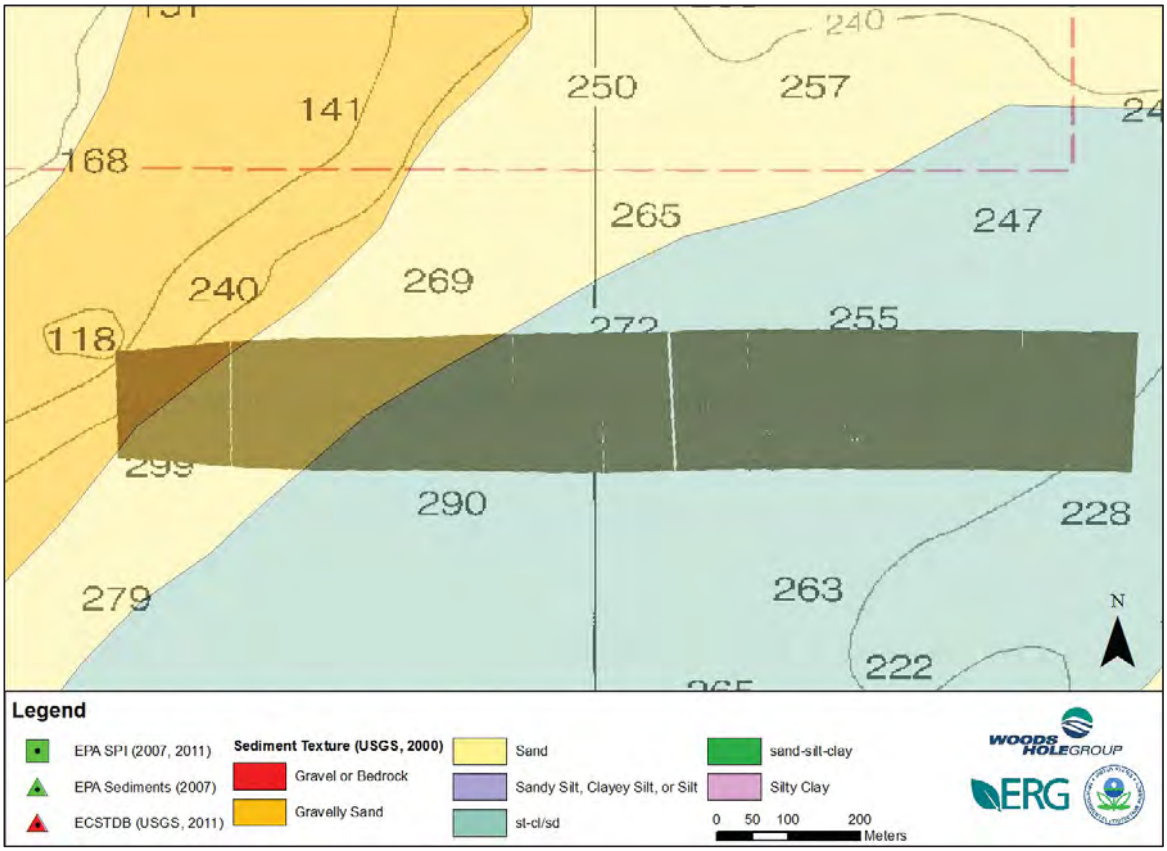

Figure 3.20.4. FISE_SW_ADD2 mosaic with supplemental data to assist with interpretation.

3.21 FISE_NEW

3.21.1 Mosaic Overview

Project location FISE_NEW is located approximately 4.5 km southeast of Fishers Island, NY and 17.8 km northwest of Montauk Point, NY (Figure 3.1.4). Approximately ¾ of the total area of FISE_NEW overlaps with project location Eastern_LIS_EastHole_Master beginning in the south. Depth varies between 27 and 99 meters in this area. Figure 3.21.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Sixty (60) side-scan sonar XTF files were imported for this project location. One (1) file was rejected for QA reasons, and one (1) file was trimmed of data (Table 3.21.1). Data coverage is presented in Figure 3.21.1. The project area was surveyed at approximately 0% over1ap in data coverage but one line has 100% overlap. Side-scan data covered 4.45 million sq. meters.

Table 3.21.1. FISE_NEW processing statistics used in SonarWiz 5.

FISE_NEW	
# XTF files	60
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4
Nadir Threshold	8
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	98 of 100
# Tracklines trimmed	1
Tracklines trimmed	FISE_NEW070717095800
# Tracklines removed/hidden	1
Tracklines removed/hidden	FISE_NEW070717083100

3.21.2 Target Summary

Twelve (12) unique targets and three (3) features were identified at FISE_NEW using specific descriptions. Targets were assigned to six classifications, with the number of targets assigned to each classification given in parentheses: bathy slope reflection (1), boulder (1), boulder area/field (2), debris pile (4), trawl/anchor mark (2), or unidentified/other (2). Targets were evenly distributed in the project area. Trawl/anchor marks were outlined as a feature along the entire northern border of FISE_NEW, and a large curvilinear bathy slope reflection was highlighted as a feature in the center of the project area. A third feature outlining a field of debris pile was located in the southeast. Targets and features are compiled in Appendix T. Targets are indicated on Figure 3.21.2 and example target images are indicated in Figure 3.21.3.

3.21.3 Seafloor Classification & Geological Interpretation

The seafloor at FISE_NEW is composed of a medium intensity backscatter material. A curved bathymetry slope reflection is defined by varying higher and lower intensity backscatter where depth increases rapidly in the center of the survey area. Trawl marks cover the northern portion of the survey area. EPA bottom samples located within the central, deepest part of the survey area were described as organic silty clay with varying percentages of sand. USGS bottom samples collected to the east outside of the survey area were described as a range from silty sand to clayey silt (USGS, 2011). No SPI images were provided within the survey area. USGS modeled seafloor classification describes the bottom dominated by sand, with silty/clayey sand in the deepest, central area and gravelly sand in the east half where depth is shallowest (USGS, 2000). Figure 3.21.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned two classes to the study area. However, the primary class covers nearly 100% of the project area and the secondary class, which is only evident along the edges of survey tracklines, is so minimal that the total area it occupies is negligible. The survey resolution was not able to resolve the increase in the percentage of fine-grain sediment that would go along with the increase in depth at the center of the survey area. Side-scan sonar and supplemental data suggest the seafloor at FISE_NEW is composed of sand with varying degrees of finer and coarser material as depth varies. SonarWiz 5 bottom classifications are located in Appendix Z.

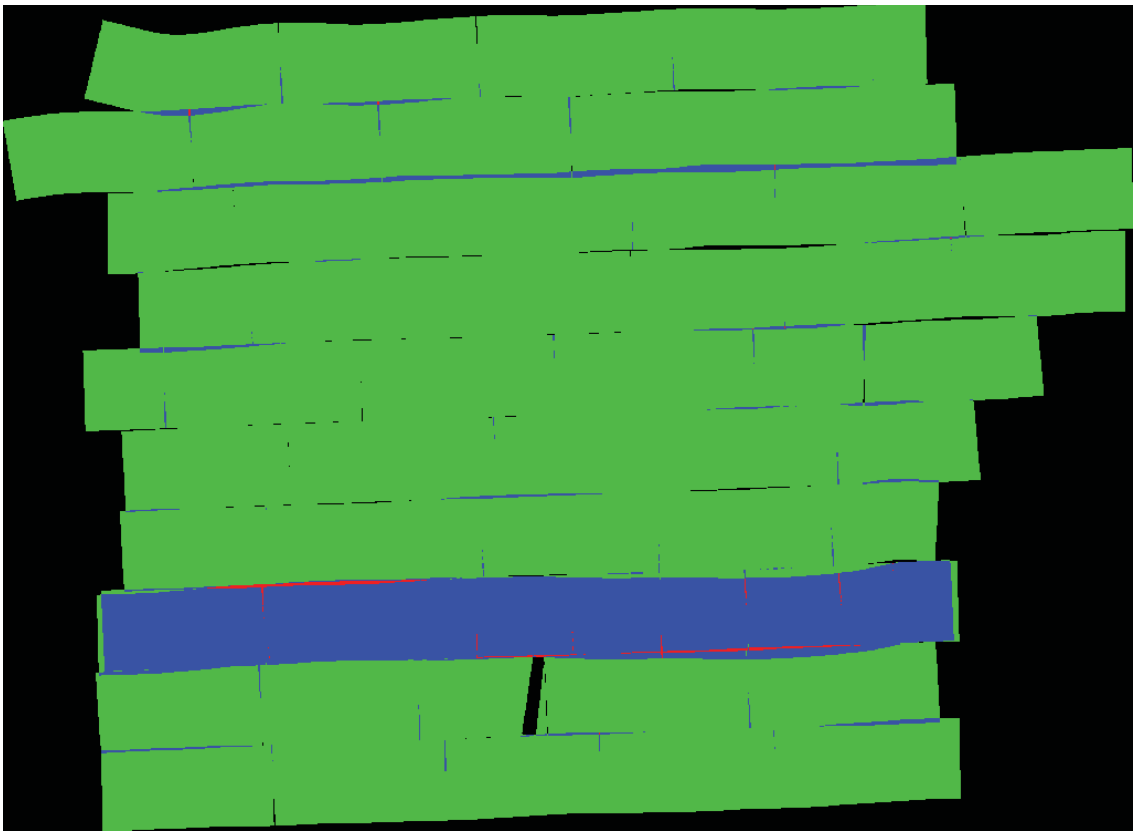

Figure 3.21.1. FISE_NEW survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively.

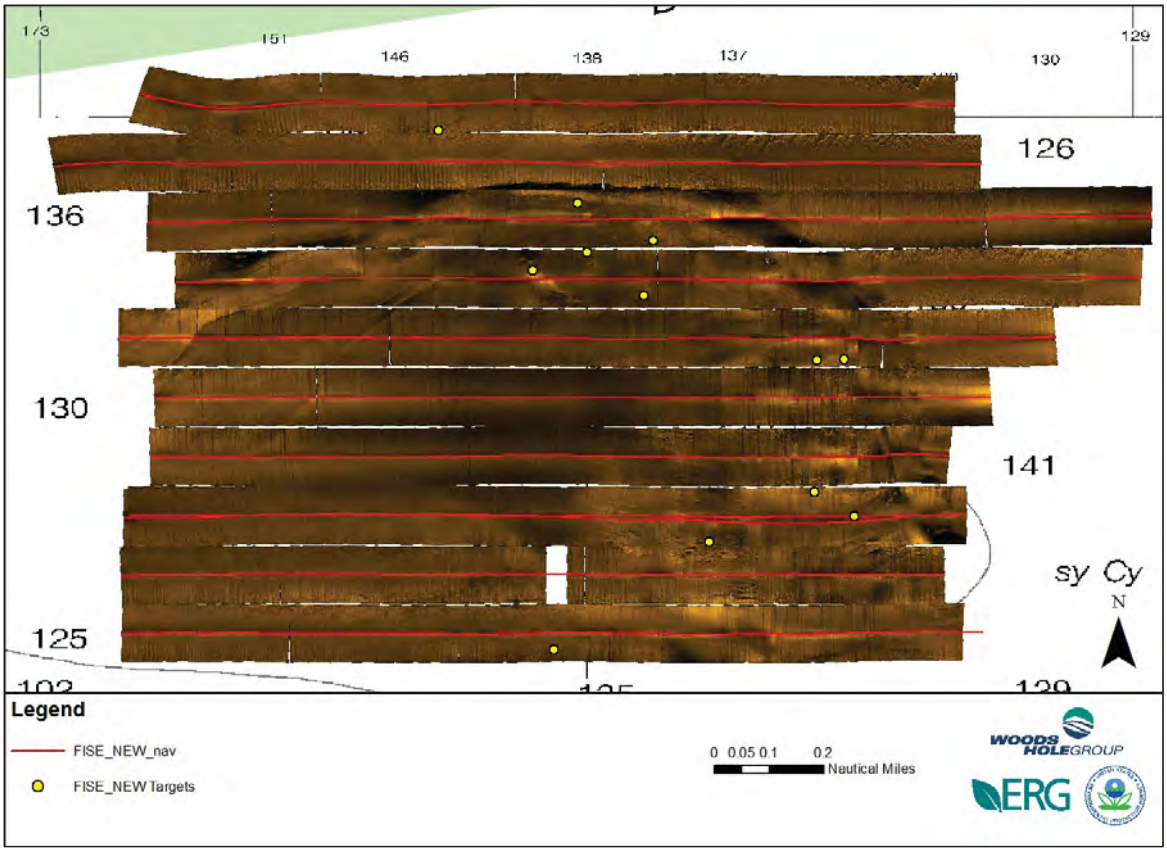

Figure 3.21.2. FISE_NEW mosaic with navigation lines and targets.

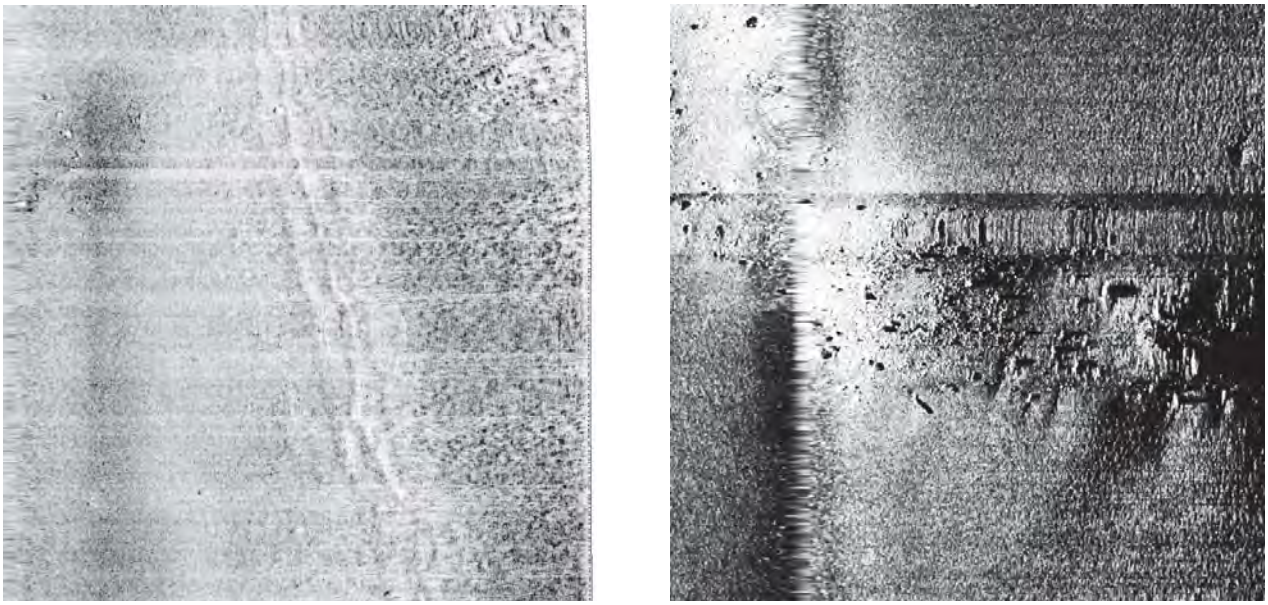

Figure 3.21.3. FISE_NEW target examples: bathy slope reflection (L), debris pile (R).

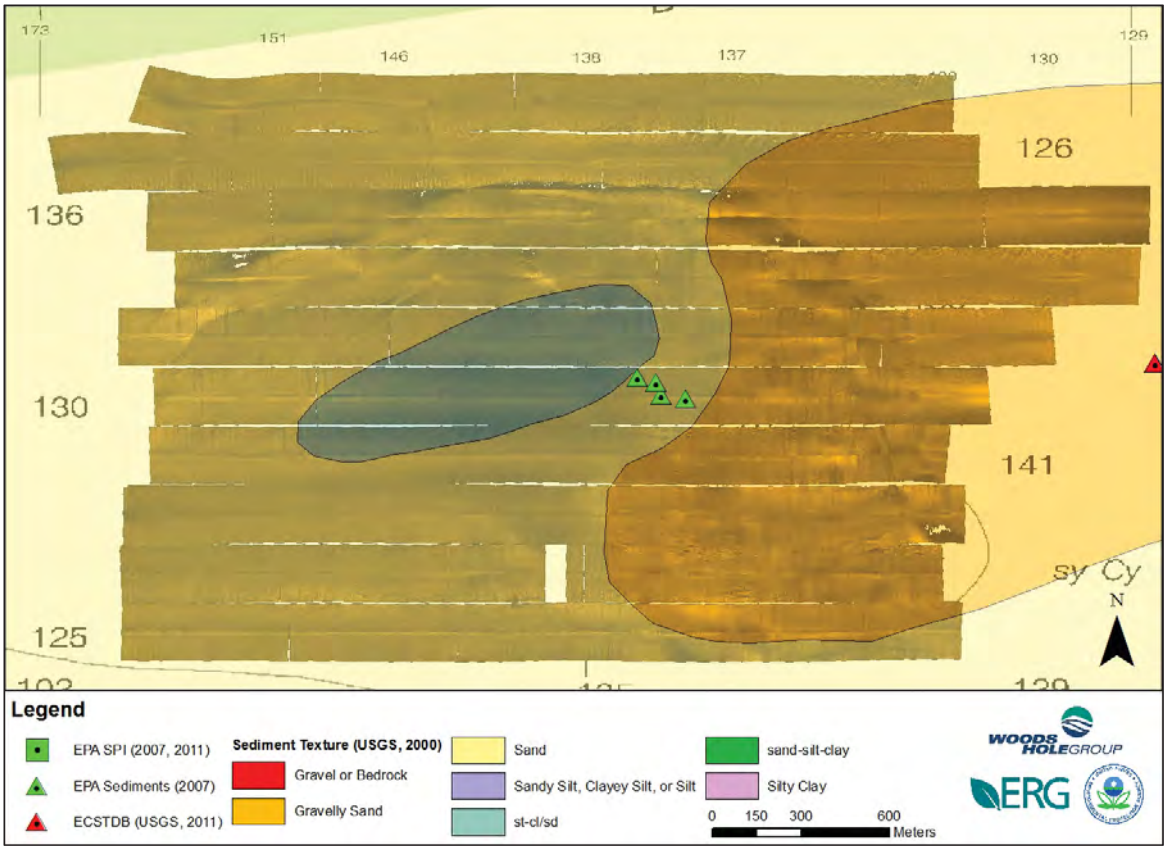

Figure 3.21.4. FISE_NEW mosaic with supplemental data to assist with interpretation.

3.22 FISE_OLD_2009

3.22.1 Mosaic Overview

Project location FISE_OLD_2009 is located approximately 1.5 km east of Fisher's Island, NY and 5 km southwest of Watch Hill Point, RI (Figure 3.1.4). Project location Eastern_LIS_Fishers_Master overlaps with the western half of FISE_OLD_2009. Depth varies between 23 and 73 meters in this area. Figure 3.22.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Ninety-two (92) side-scan sonar XTF files were imported for this project location. Two (2) files were rejected for QA reasons, and three (3) files were trimmed of data (Table 3.22.1). Data coverage is presented in Figure 3.22.1. The project area was surveyed at approximately 0% over1ap in data coverage but certain lines have 100% overlap. Side-scan data covered 5.23 million sq. meters.

Table 3.22.1. FISE_OLD_2009 processing statistics used in SonarWiz 5.

FISE_OLD_2009	
# XTF files	92
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4
Nadir Threshold	6 to 8
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	98 of 100
# Tracklines trimmed	3
Tracklines trimmed	FISE_OLD070717000200
	FISE_OLD070716232600
	FISE_OLD070717031700
# Tracklines removed/hidden	2
Tracklines removed/hidden	FISE_OLD070717032100
	FISE_OLD070717023800

3.22.2 Target Summary

Thirteen (13) unique targets and three (3) features were identified at FISE_OLD_2009 using specific descriptions. Targets were assigned to six classifications, with the number of targets assigned to each classification given in parentheses: bedforms (1), boulder (3), boulder area/field (1), fishing gear – trap/buoy (2), trawl/anchor mark (3), unidentified/other (3). There were three features outlined: a small feature of bedforms in the west-central; a small feature of trawl/anchor marks in the east; and a large field of debris piles from the center to the northeast corner. Targets and features are compiled in

Appendix T. Targets are indicated on Figure 3.22.2 and an example target image is indicated in Figure 3.22.3.

3.22.3 Seafloor Classification & Geological Interpretation

The seafloor at FISE_OLD_2009 is composed of a medium intensity backscatter material defined by fields of debris piles. A field of debris piles occupies the central to northeast corner of the survey area, with bedforms in the west of the survey area as evidence that sediment transport occurs at this site. Several EPA bottom samples in the west were described as sandy silt with varying percentages of clay. No SPI images were provided in the survey area. USGS modeled seafloor classification describes the entire survey area as sand (USGS, 2000). Figure 3.22.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned one class to the study area. The Classification function was unable to separately classify the field of debris piles from the surrounding sandy bottom. SonarWiz 5 bottom classifications are located in Appendix Z.

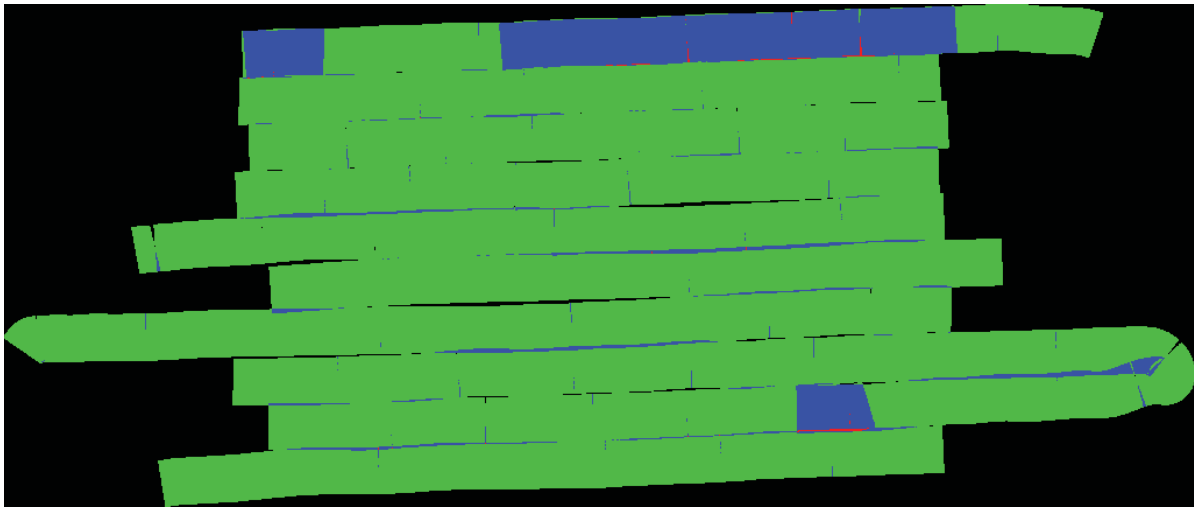

Figure 3.22.1. FISE_OLD_2009 survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively.

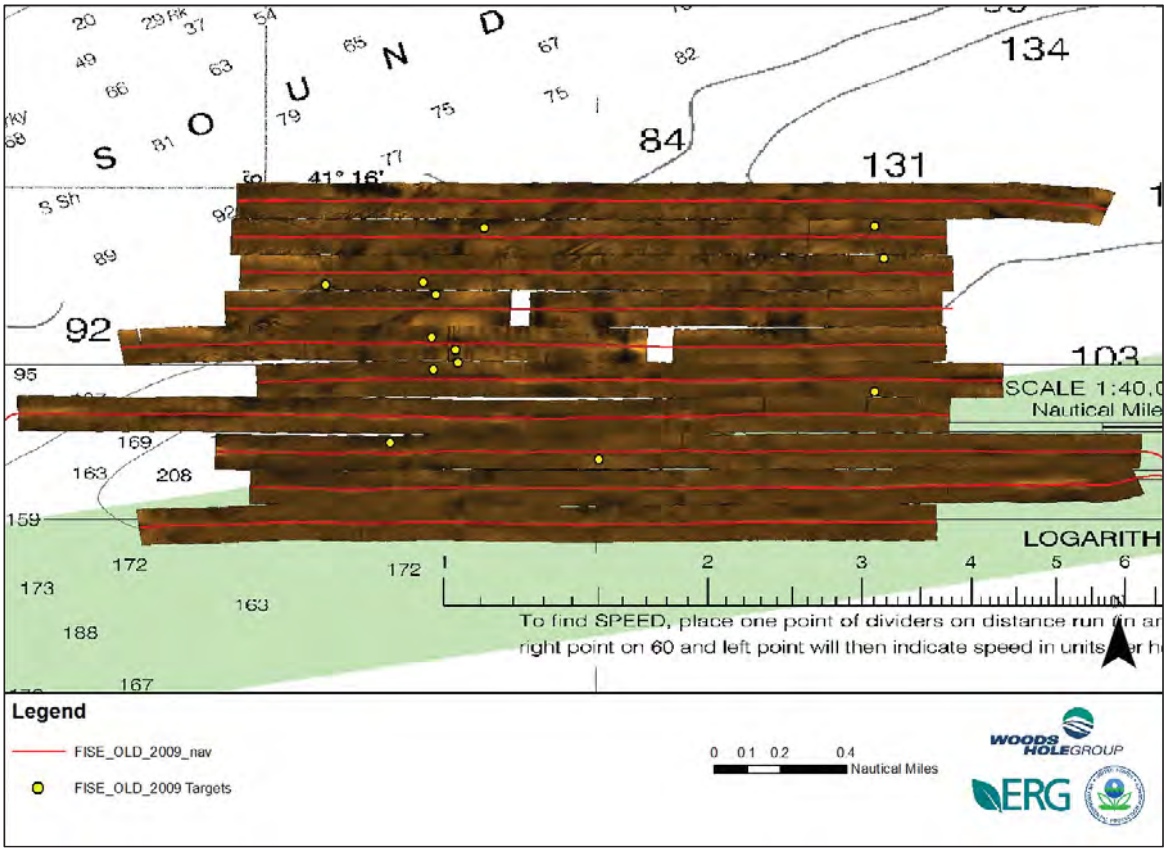

Figure 3.22.2. FISE_OLD_2009 mosaic with navigation lines and targets.

Figure 3.22.3. FISE_OLD_2009 target example: fishing gear – trap/buoy.

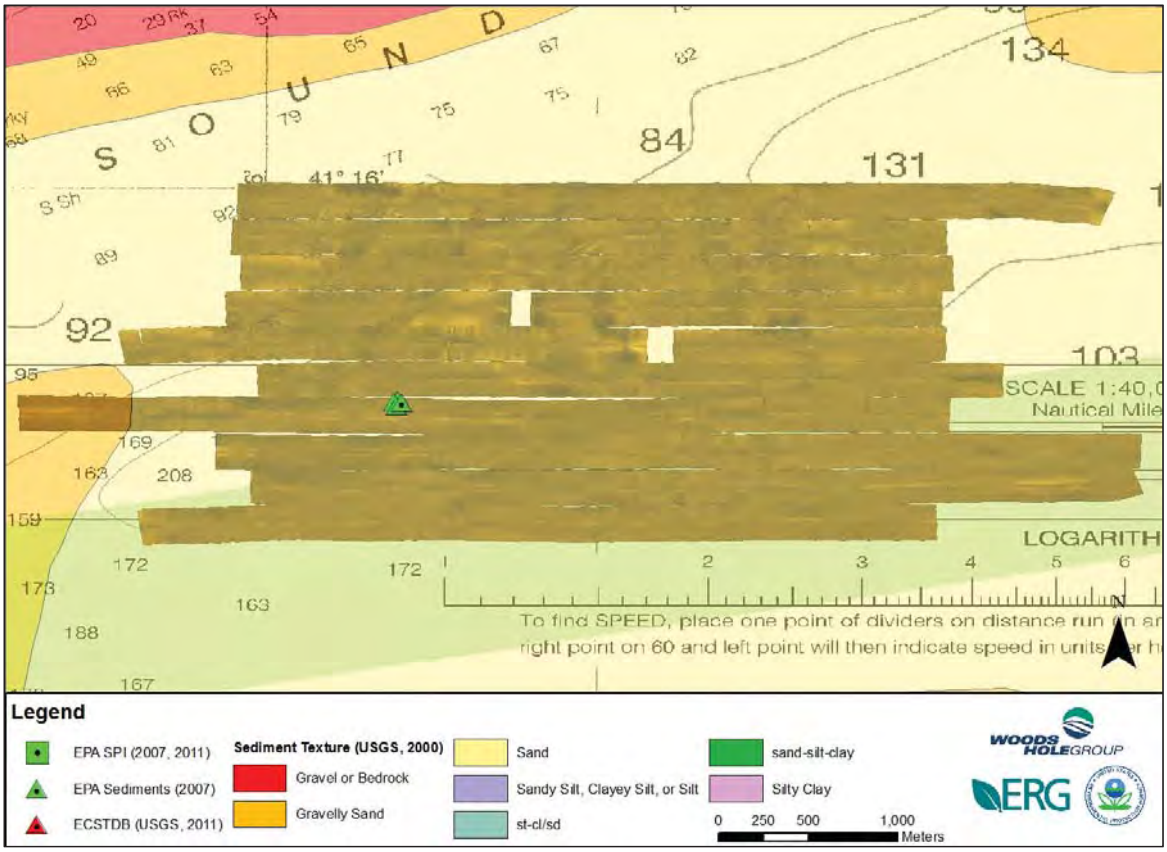

Figure 3.22.4. FISE_OLD_2009 mosaic with supplemental data to assist with interpretation.

3.23 NLDN_REF_ADD

3.23.1 Mosaic Overview

Project location NLDN_REF_ADD is located approximately 6 km south of New London Harbor, CT and 1.5 km west of Fishers Island (Figure 3.1.3). Project locations NLDN_REF and NLDN_ACT overlap with this site. The New London disposal site (active) overlaps the site slightly in the west. Depth varies between 12 and 27 meters in this area. Figure 3.23.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Forty (40) side-scan sonar XTF files were imported for this project location. Two (2) files were rejected for QA reasons, and three (3) files were trimmed of data (Table 3.23.1). Data coverage is presented in Figure 3.23.1. The project area was surveyed at approximately 0-100% over1ap in data coverage, depending in location. Side-scan data covered 2.09 million sq. meters.

Table 3.23.1. NLDN_REF_ADD processing statistics used in SonarWiz 5.

NLDN_REF_ADD	
# XTF files	40
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4
Nadir Threshold	8 to 10
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	98 of 100
# Tracklines trimmed	3
Tracklines trimmed	NLDN_REF_ADD070718042000
	NLDN_REF_ADD070718050200
	NLDN_REF_ADD070718055300
# Tracklines removed/hidden	2
Tracklines removed/hidden	NLDN_REF_ADD070718042400
	NLDN_REF_ADD070718042800

3.23.2 Target Summary

Thirty-nine (39) unique targets and one (1) feature were identified at NLDN_REF_ADD using specific descriptions. Targets were assigned to six classifications, with the number of targets assigned to each classification given in parentheses: bathy slope reflection (1), boulder (1), boulder area/field (5), debris pile (5), fishing gear – trap/buoy (11), or unidentified/other (16). Targets are evenly distributed in the project area, with most identified as fishing gear – trap/buoy located in the central area. A feature identifying a

field of debris piles extends from the southeast corner to the center of the project area. Targets and features are compiled in Appendix T. Targets are indicated on Figure 3.23.2 and example target images are indicated in Figure 3.23.3.

3.23.3 Seafloor Classification & Geological Interpretation

The seafloor at NLDN_REF_ADD is composed of a medium intensity backscatter material with a dispersed field of debris piles in the center to southeast corner. No bottom samples were provided within the survey area, but several bottom samples were collected 0.2 km to the north of the survey area by the EPA. These bottom samples were described as silty clay and clayey silt. No SPI images were provided in the survey area. USGS modeled seafloor classification has two sediment types bisecting the survey area: sand in the western half and silty/clayey sand in the eastern half. Backscatter intensity increases slightly towards the western edge of the survey area and darkens towards the east (USGS, 2000). Figure 3.23.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned one class to the study area. This is in agreement with the sonar data and supplemental data which show that the seafloor is dominated by sand with varying percentages of silt/clay. SonarWiz 5 bottom classifications are located in Appendix Z.

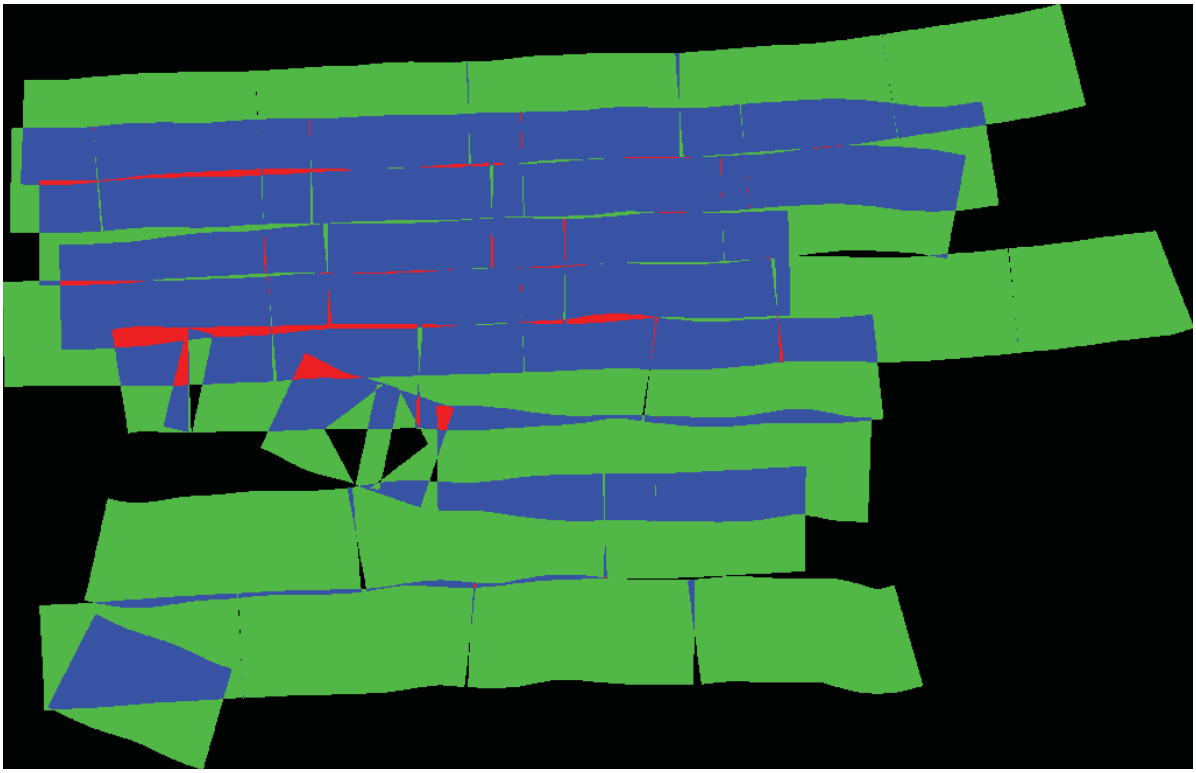

Figure 3.23.1. NLDN_REF_ADD survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively. The color red represents area with 300% coverage.

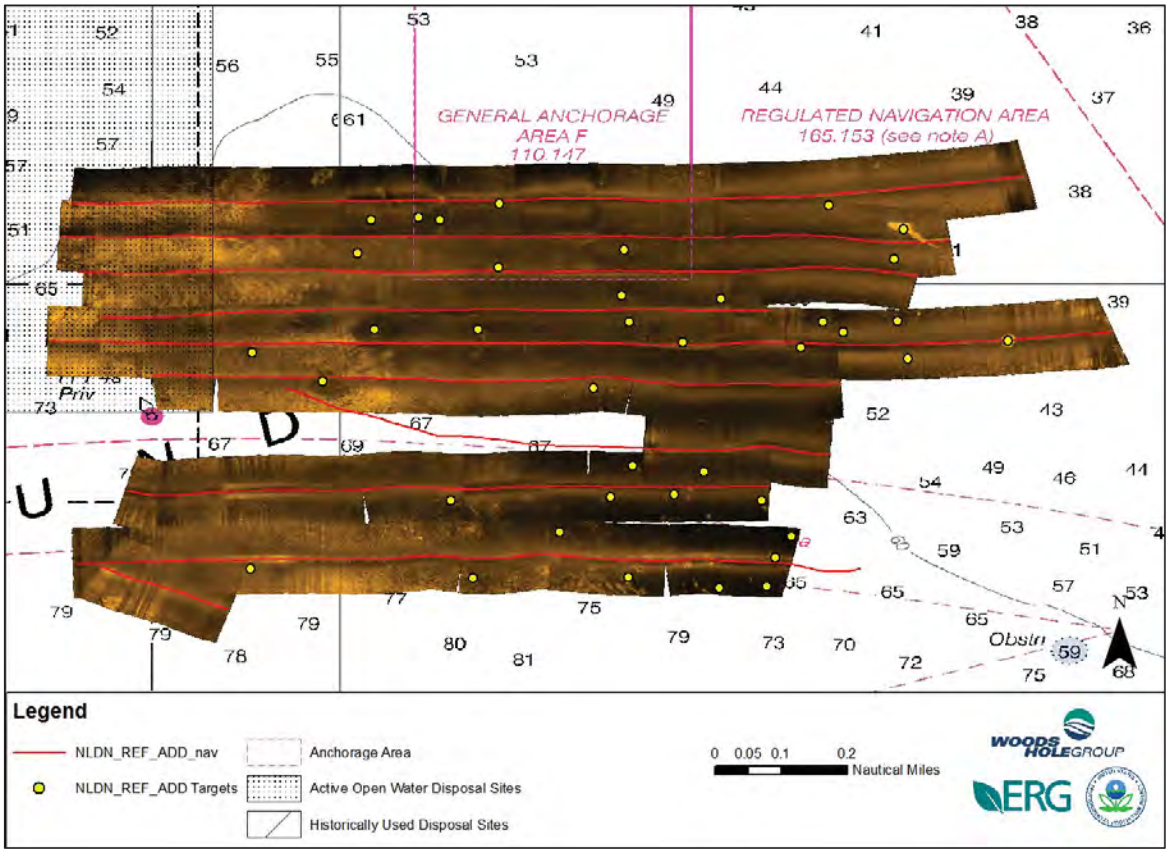

Figure 3.23.2. NLDN_REF_ADD mosaic with navigation lines and targets.

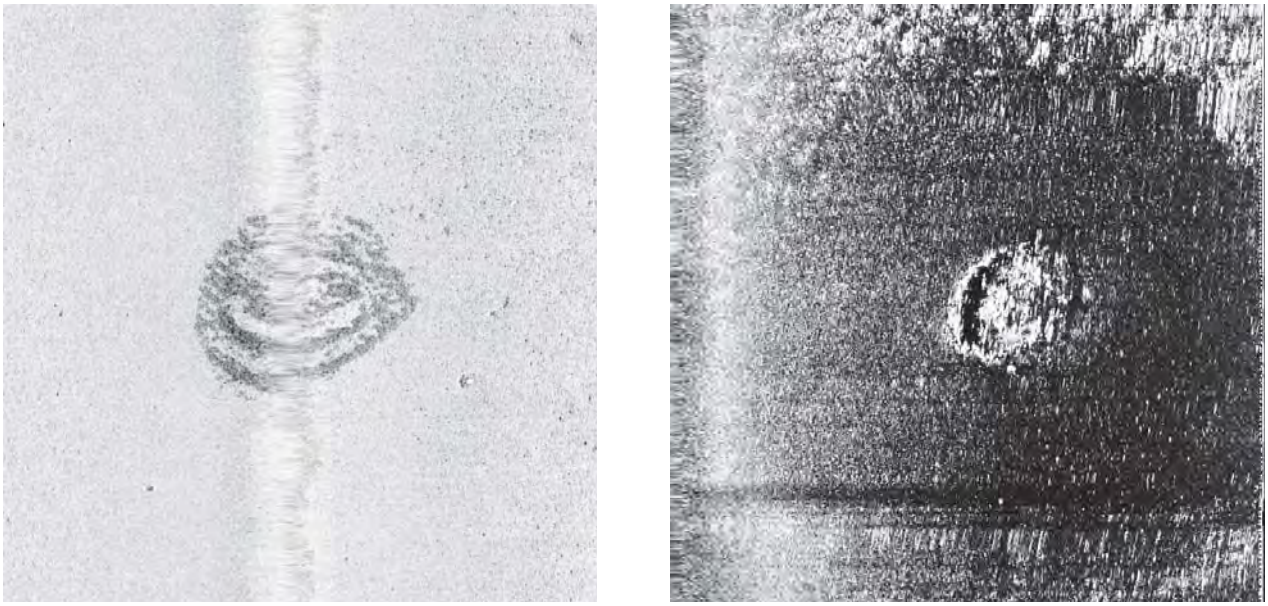

Figure 3.23.3. NLDN_REF_ADD target examples: unidentified/other (L), debris pile (R).

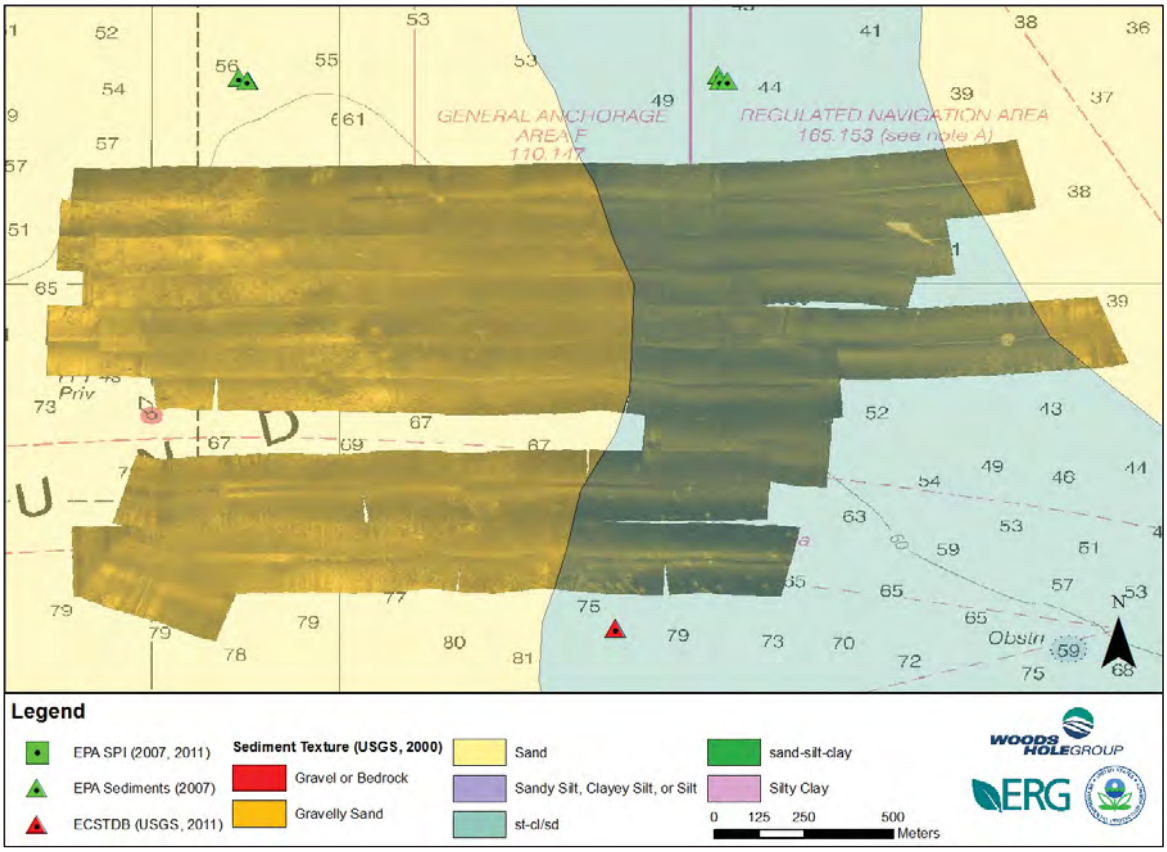

Figure 3.23.4. NLDN_REF_ADD mosaic with supplemental data to assist with interpretation.

3.24 NLDN_REF

3.24.1 Mosaic Overview

Project location NLDN_REF is located approximately 6.5 km west of Fishers Island, NY and 6.5 km south of New London Harbor, CT (Figure 3.1.3). Project locations NLDN_REF_ADD and NLDN_ACT overlap with this site. The New London disposal site (active) overlaps this site in the west. Depth varies between 11 and 21 meters in this area. Figure 3.24.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Fifty-five (55) side-scan sonar XTF files were imported for this project location. Five (5) files were rejected for QA reasons, and nine (9) files were trimmed of data (Table 3.24.1). Data coverage is presented in Figure 3.24.1. The project area was surveyed at approximately 100% over1ap in data coverage. Side-scan data covered 2.64 million sq. meters.

Table 3.24.1. NLDN_REF processing statistics used in SonarWiz 5.

NLDN_REF	
# XTF files	55
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4 to 8
Nadir Threshold	6 to 12
Nadir Blanking Duration	2
Offset Alt (m)	1 to 2
Adjusted display range (m)	98 of 100
# Tracklines trimmed	9
Tracklines trimmed	NLDN_REF070717220200
	NLDN_REF070717232200
	NLDN_REF070717232600
	NLDN_REF070717233000
	NLDN_REF070717235400
	NLDN_REF070717235800
	NLDN_REF070718002600
	NLDN_REF070718003000
	NLDN_REF070718005400
# Tracklines removed/hidden	5
Tracklines removed/hidden	NLDN_REF070717223000
	NLDN_REF070717225800
	NLDN_REF070718001400
	NLDN_REF070718001800
	NLDN_REF070718002200

3.24.2 Target Summary

Twenty-four (24) unique targets and one (1) feature were identified at NLDN_REF using specific descriptions. Targets were assigned to five classifications, with the number of targets assigned to each classification given in parentheses: boulder (2), boulder area/field (1), debris pile (2), fishing gear – trap/buoy (13), or unidentified/other (6). Most targets are within the center of the project area, the majority of which were identified as fishing gear – trap/buoy. A feature outlining the fishing gear – traps/buoys covers an area from the north-center to south-center. Targets and features are compiled in Appendix T. Targets are indicated on Figure 3.24.2 and example target images are indicated in Figure 3.24.3.

3.24.3 Seafloor Classification & Geological Interpretation

The seafloor at NLDN_REF is composed of a medium intensity backscatter material with gradation from slightly higher backscatter in the west to less backscatter in the east. The areas with the highest backscatter fall within the boundary of the New London Disposal Site (active). Depth does not vary greatly in the survey area, suggesting that the change in backscatter is not a natural phenomenon. Three clusters of 2-4 bottom samples were collected by EPA in the west and center of the survey area, and were described as silty clay with varying percentages of sand. There were no SPI images provided in the survey area. USGS modeled seafloor classification has two sediment types in the survey area: sand in the western half and the eastern edge, with silty/clayey sand in the east-central half (USGS, 2000). Figure 3.24.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned two classes to the study area. The primary class covers nearly 100% of the project area and the secondary class is so minimal that the total area it occupies is negligible. This is in agreement with the sonar data and supplemental data, particularly the bottom samples. Classification did not distinguish between the slightly higher and lower backscatter material in the western half of the study area. SonarWiz 5 bottom classifications are located in Appendix Z.

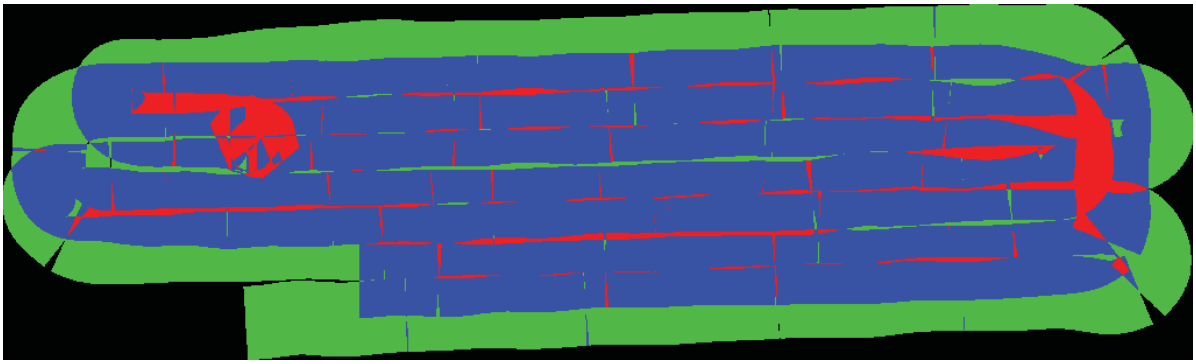

Figure 3.24.1. NLDN_REF survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively. The color red represents area with 300% coverage.

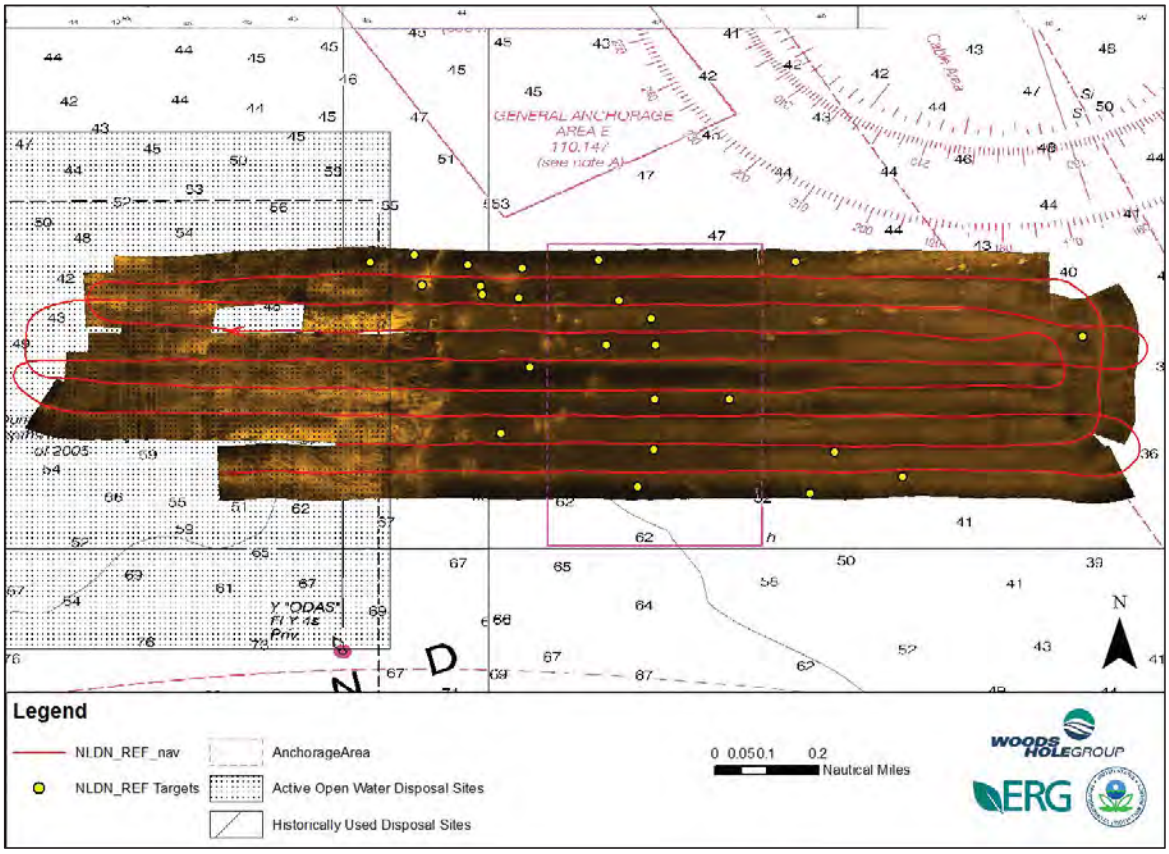

Figure 3.24.2. NLDN_REF mosaic with navigation lines and targets.

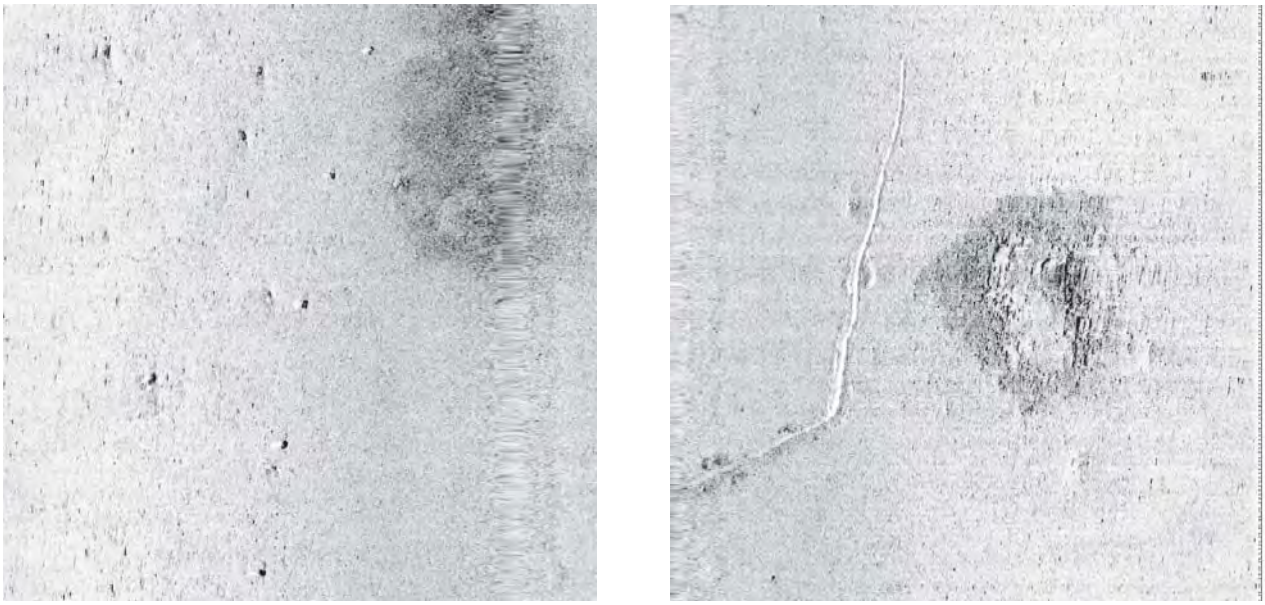

Figure 3.24.3. NLDN_REF target examples: fishing gear – trap/buoy (L), debris pile with adjacent trawl/anchor mark (R).

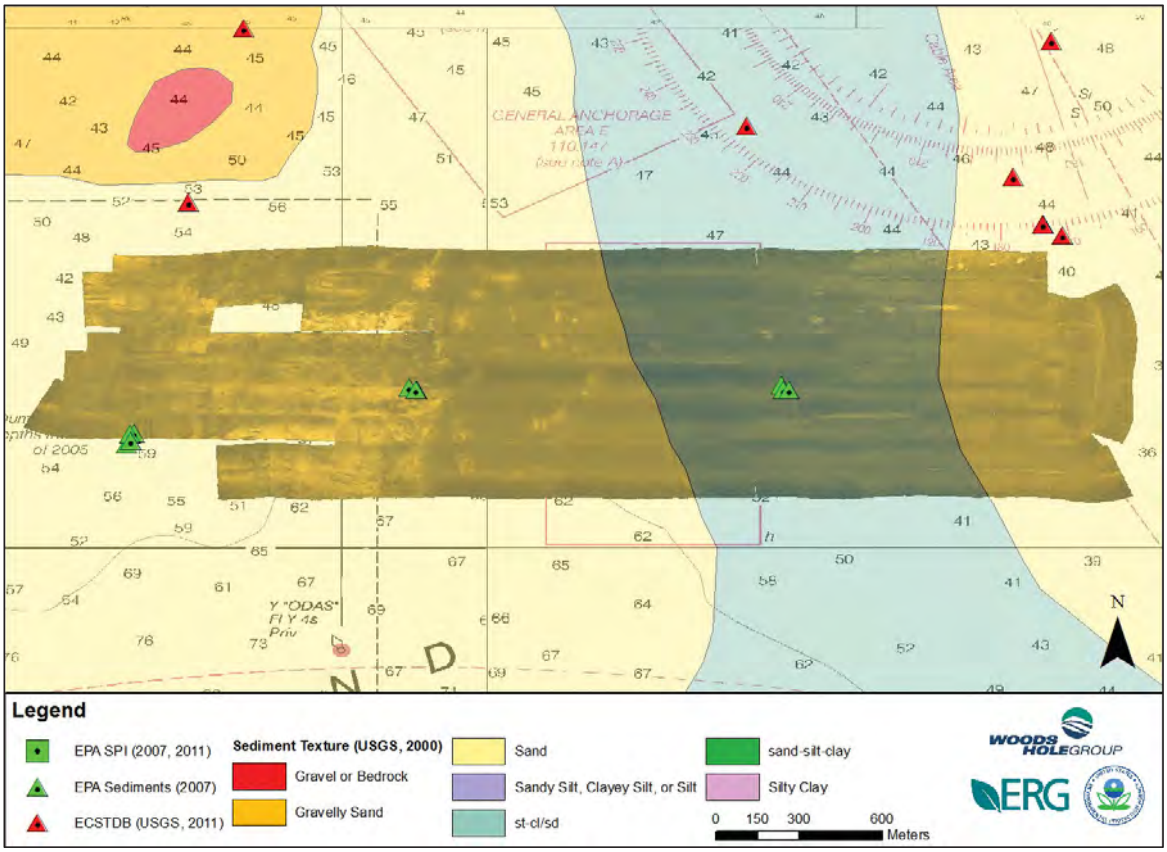

Figure 3.24.4. NLDN_REF mosaic with supplemental data to assist with interpretation.

3.25 CSDS_ACT

3.25.1 Mosaic Overview

Project location CSDS_ACT is located approximately 7.2 km north of Rocky Point, NY and 4.7 km southeast of Cornfield Point, CT. The Cornfield Shoals disposal site (active) is located entirely within the project area. Depth varies between 27 and 58 meters in this area. Figure 3.25.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Sixty-one (61) side-scan sonar XTF files were imported for this project location. One (1) file was rejected for QA reasons, and four (4) files were trimmed of data (Table 3.25.1). Data coverage is presented in Figure 3.25.1. The project area was surveyed at approximately 0% over1ap in data coverage. Side-scan data covered 4.87 million sq. meters.

Table 3.25.1. CSDS_ACT processing statistics used in SonarWiz 5.

CSDS_ACT	
# XTF files	61
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4 to 25
Nadir Threshold	6 to 14
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	98 of 100
# Tracklines trimmed	4
Tracklines trimmed	CSDS_ACT070716060300
	CSDS_ACT070716063000
	CSDS_ACT070716090000
	CSDS_ACT070716104900
# Tracklines removed/hidden	1
Tracklines removed/hidden	CSDS_ACT070716103700

3.25.2 Target Summary

Sixteen (16) unique targets and four (4) features were identified at CSDS_ACT using specific descriptions. Targets were assigned to two classifications, with the number of targets assigned to each classification given in parentheses: bedforms (3) or debris pile (13). Nearly all targets were identified in the center area of the project area. A feature outlining bedforms was located in the north and extended the width of the project area, and two other features outlining bedforms were in center and west-center of the project area. A feature describing a field of debris piles was located in the south-center of the

project area. Targets and features are compiled in Appendix T. Targets are indicated on Figure 3.25.2 and an example target image is indicated in Figure 3.25.3.

3.25.3 Seafloor Classification & Geological Interpretation

The seafloor at CSDS_ACT is composed of a medium intensity backscatter material defined by large expanses of bedforms, which cover most of the north and western parts of the survey area. A field of debris piles is located in the south-center of the survey area, and is defined by a distribution of objects with higher backscatter intensity and data shadow. The presence of debris is expected, since the survey areas falls within the Cornfield Shoals disposal site (active). Five bottom samples were provided by the EPA within the survey area, located in the north-center, and were described as sand with silt and shell hash, with one including gravel. There were no SPI images provided in the survey area. The USGS modeled seafloor classification shows a general trend of sediment fining towards the northwest: areas of gravel in the southeast grade to sand, then again to silty/clayey sand and finally sandy clay/silt in the northeast (USGS, 2000). The majority of the site was characterized as gravelly sand. Figure 3.25.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned two classes to the study area. The primary class covers nearly 100% of the project area and the secondary class, which is only evident near the edges of tracklines, is so minimal that the total area it occupies is negligible. The Classification function did not distinguish the field of debris piles from the surrounding seafloor. SonarWiz 5 bottom classifications are located in Appendix Z.

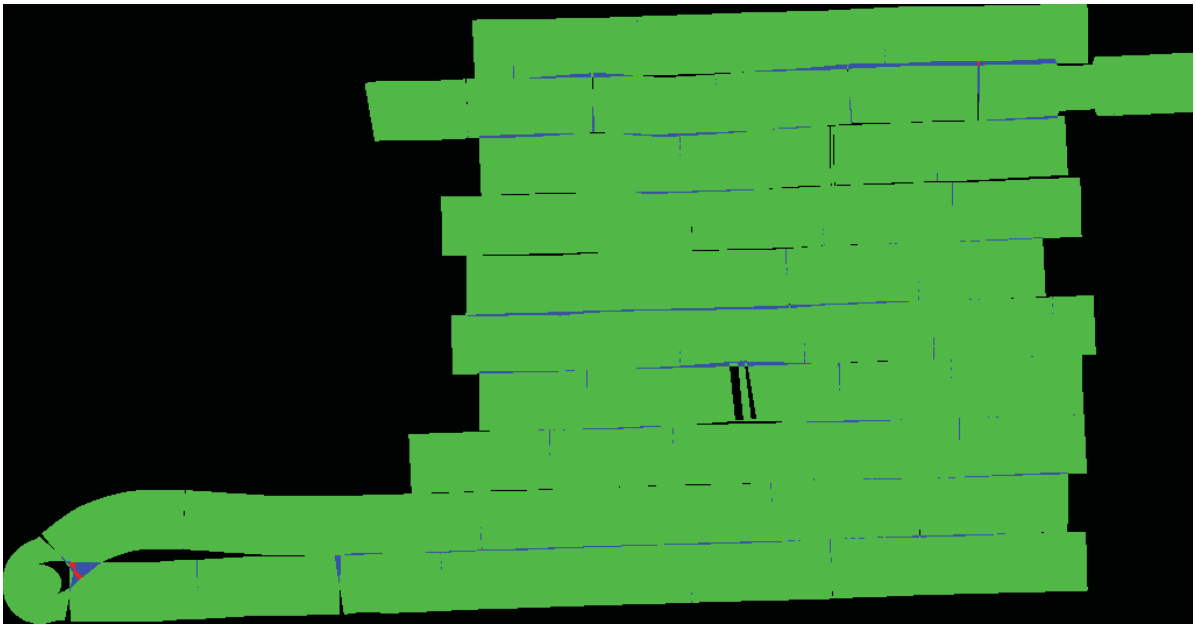

Figure 3.25.1. CSDS_ACT survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively.

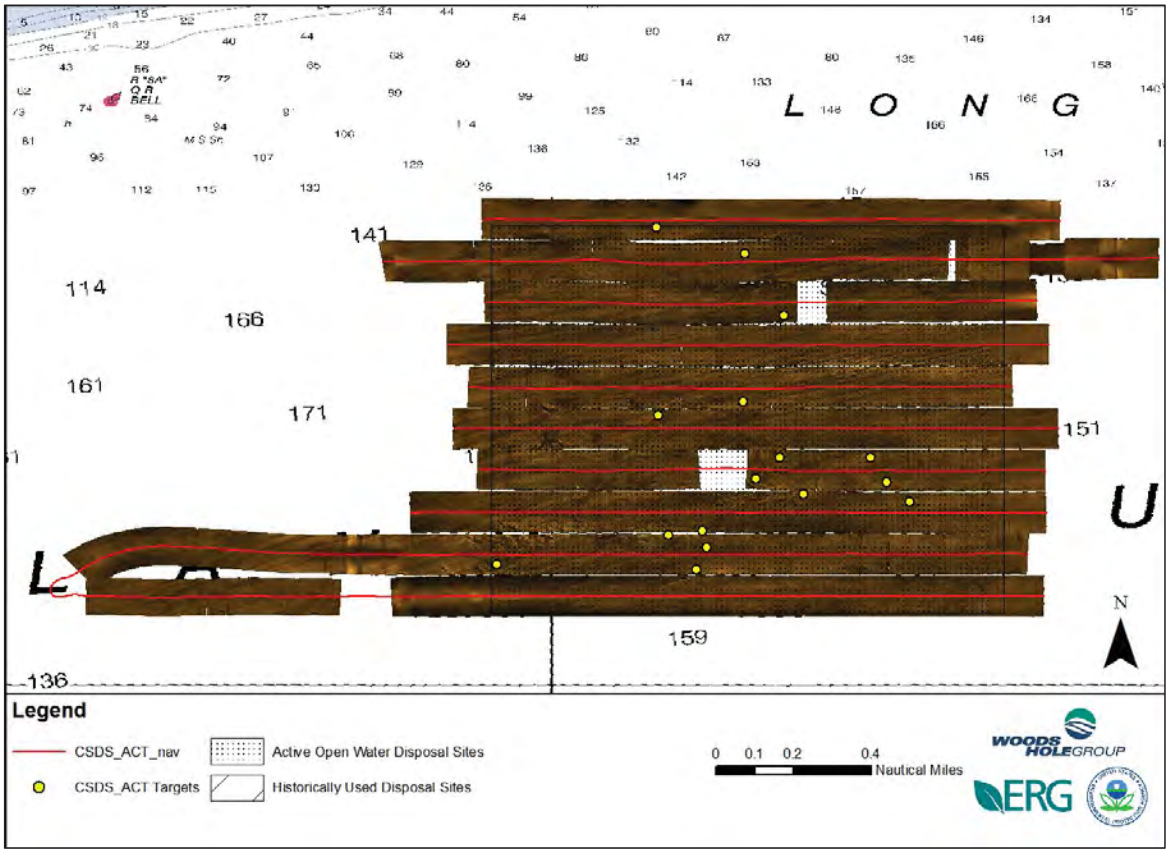

Figure 3.25.2. CSDS_ACT mosaic with navigation lines and targets.

Figure 3.25.3. CSDS_ACT target example: debris pile.

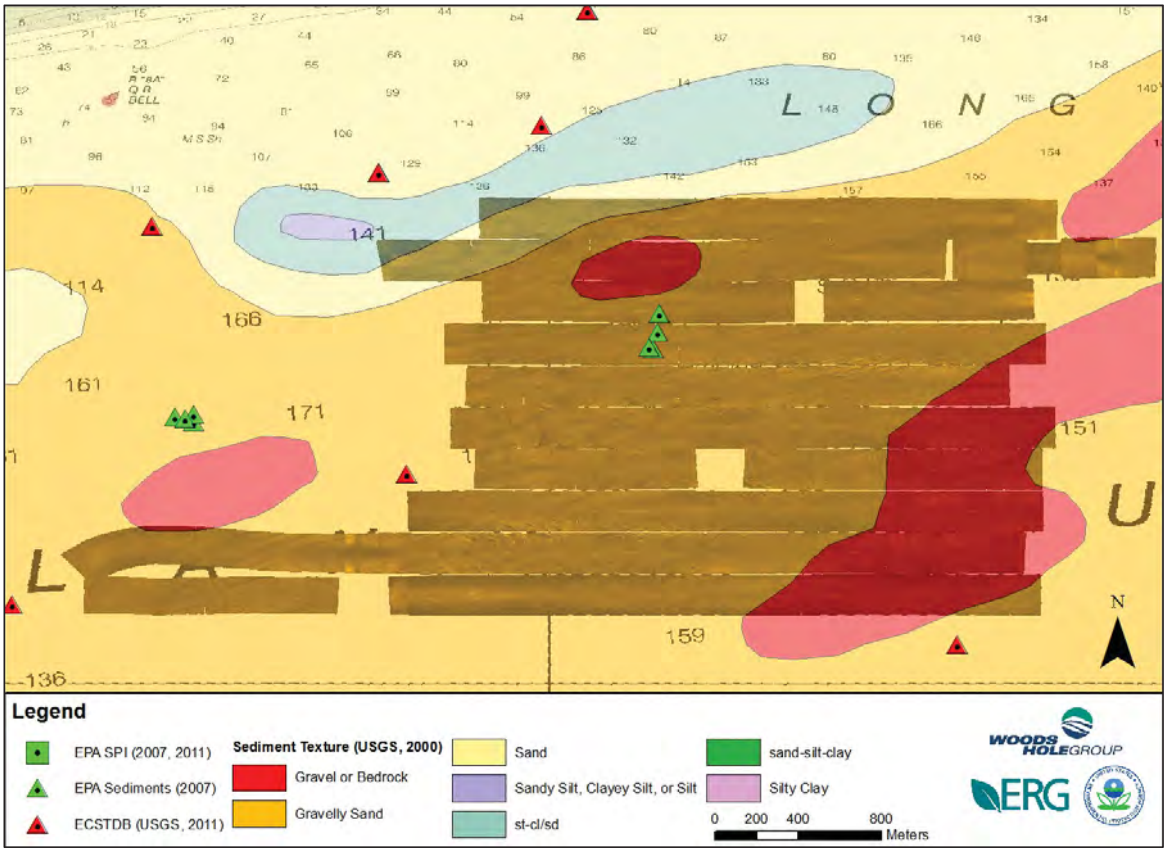

Figure 3.25.4. CSDS_ACT mosaic with supplemental data to assist with interpretation.

3.26 CSDS_ADD

3.26.1 Mosaic Overview

Project location CSDS_ADD is located approximately 4.7 km north of Rocky Point, NY and 7 km southeast of Cornfield Point, CT (Figure 3.1.3). Depth varies between 30 and 43 meters in this area. Figure 3.26.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Sixty-three (63) side-scan sonar XTF files were imported for this project location. Three (3) files were rejected for QA reasons, and two (2) files were trimmed of data (Table 3.26.1). Data coverage is presented in Figure 3.26.1. The project area was surveyed at approximately 0% over1ap in data coverage. Side-scan data covered 5.57 million sq. meters.

Table 3.26.1. CSDS_ADD processing statistics used in SonarWiz 5.

CSDS_ADD	
# XTF files	63
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4
Nadir Threshold	3 to 8
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	98 of 100
# Tracklines trimmed	2
Tracklines trimmed	CSDS_ADD070716121400
	CSDS_ADD070716140200
# Tracklines removed/hidden	3
Tracklines removed/hidden	CSDS_ADD070716121800
	CSDS_ADD070716133000
	CSDS_ADD070716143800

3.26.2 Target Summary

Three (3) unique targets and one (1) feature were identified at CSDS_ADD using specific descriptions. Targets were assigned to two classifications, with the number of targets assigned to each classification given in parentheses: bathy slope reflection (1) or unidentified/other (2). The target identifying bathy slope reflections shows a series of linear features that cast no shadow and run perpendicular to the inclination of the majority of bedforms. The feature identifying bedforms encompasses the entire project area. Targets and features are compiled in Appendix T. Targets are indicated on Figure 3.26.2 and an example target image is indicated in Figure 3.26.3.

3.26.3 Seafloor Classification & Geological Interpretation

The seafloor at CSDS_ADD is composed of a medium intensity backscatter material defined by large expanses of bedforms. Bedforms are sand waves and trough distance between successive waves ranges from approximately 2 to 50 m, indicating significant sediment transport occurs at this site. Two bottom samples were collected in the center and southeast corners of the survey area by USGS, described as gravelly sediment and gravel, respectively. Several other bottom samples outside the survey area were described as sand or gravelly sediment. There were no SPI images provided within the survey area. The USGS modeled seafloor classification describes the general area as dominantly gravelly sand with small areas of sand and gravel apart from one another. Figure 3.26.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned two classes to the study area. The primary class covers 100% of the project area, since the secondary class, which responds to data shadows caused by bedforms, does not represent an actual change in seafloor reflectivity. Based on the side-scan sonar and supplemental data, CSDS_ADD is composed of one bottom type. SonarWiz 5 bottom classifications are located in Appendix Z.

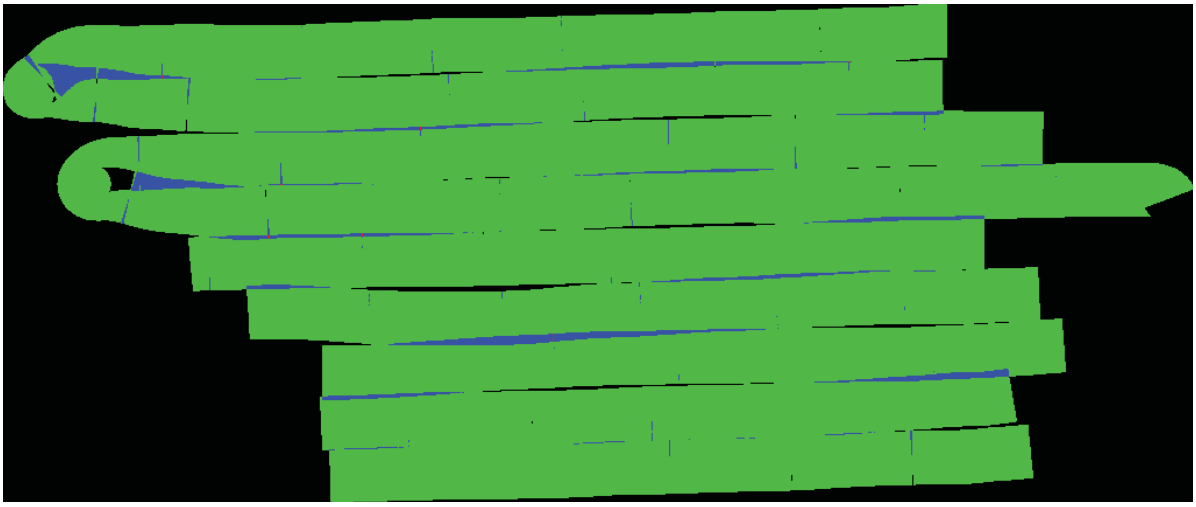

Figure 3.26.1. CSDS_ADD survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively.

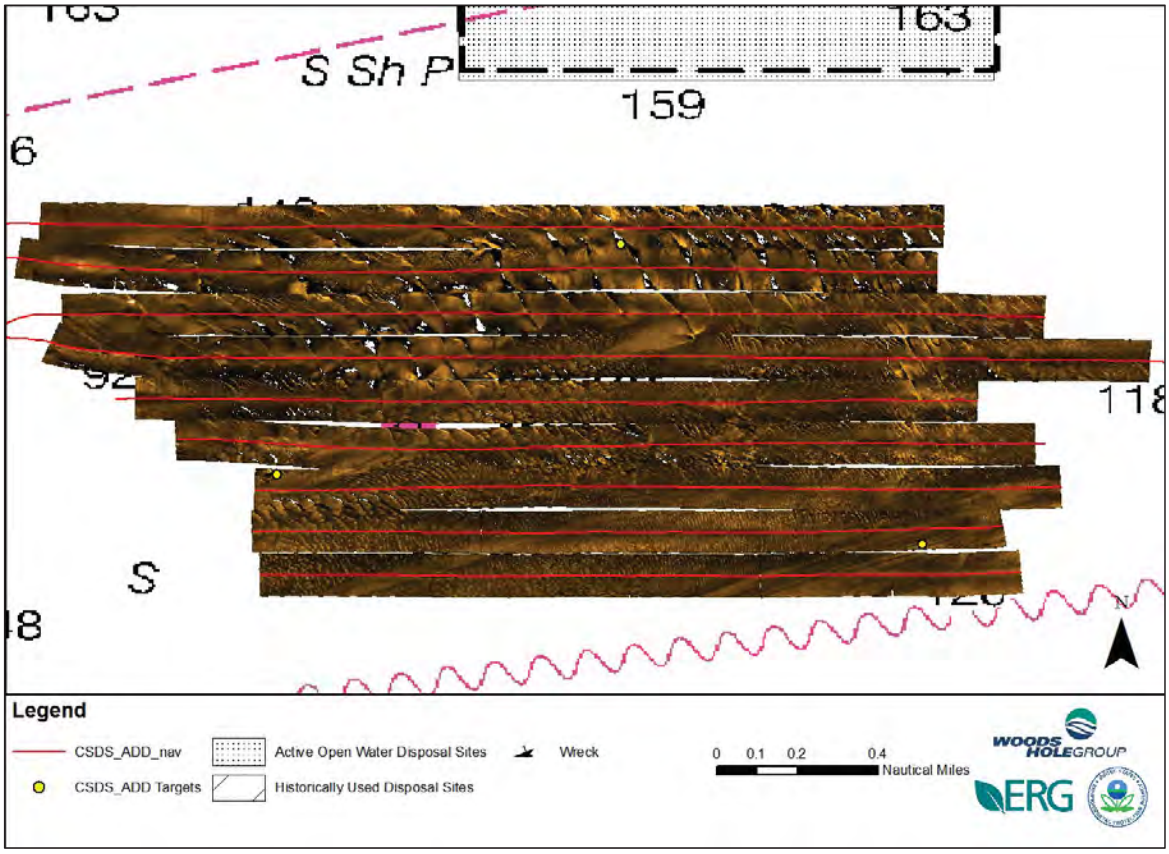

Figure 3.26.2. CSDS_ADD mosaic with navigation lines and targets.

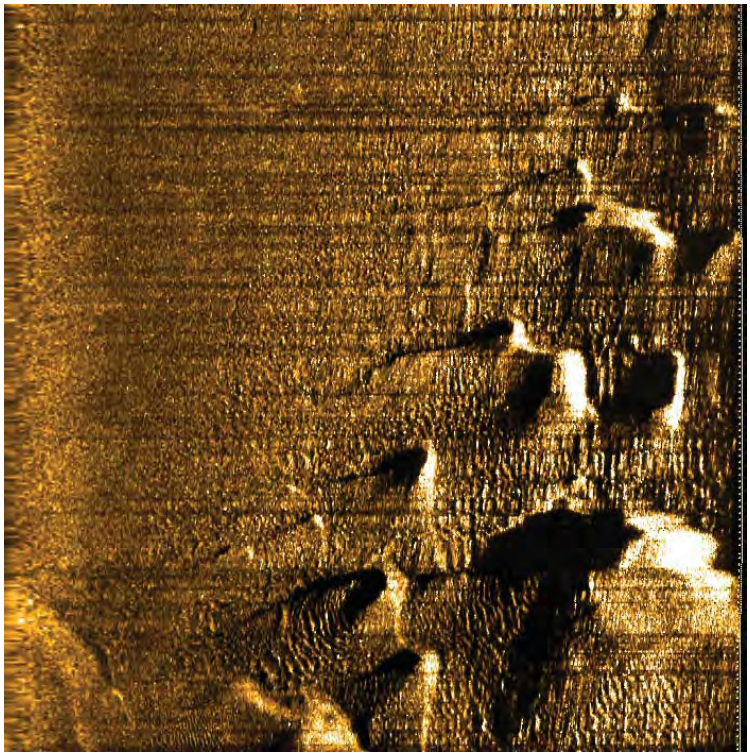

Figure 3.26.3. CSDS_ADD target example: bedforms.

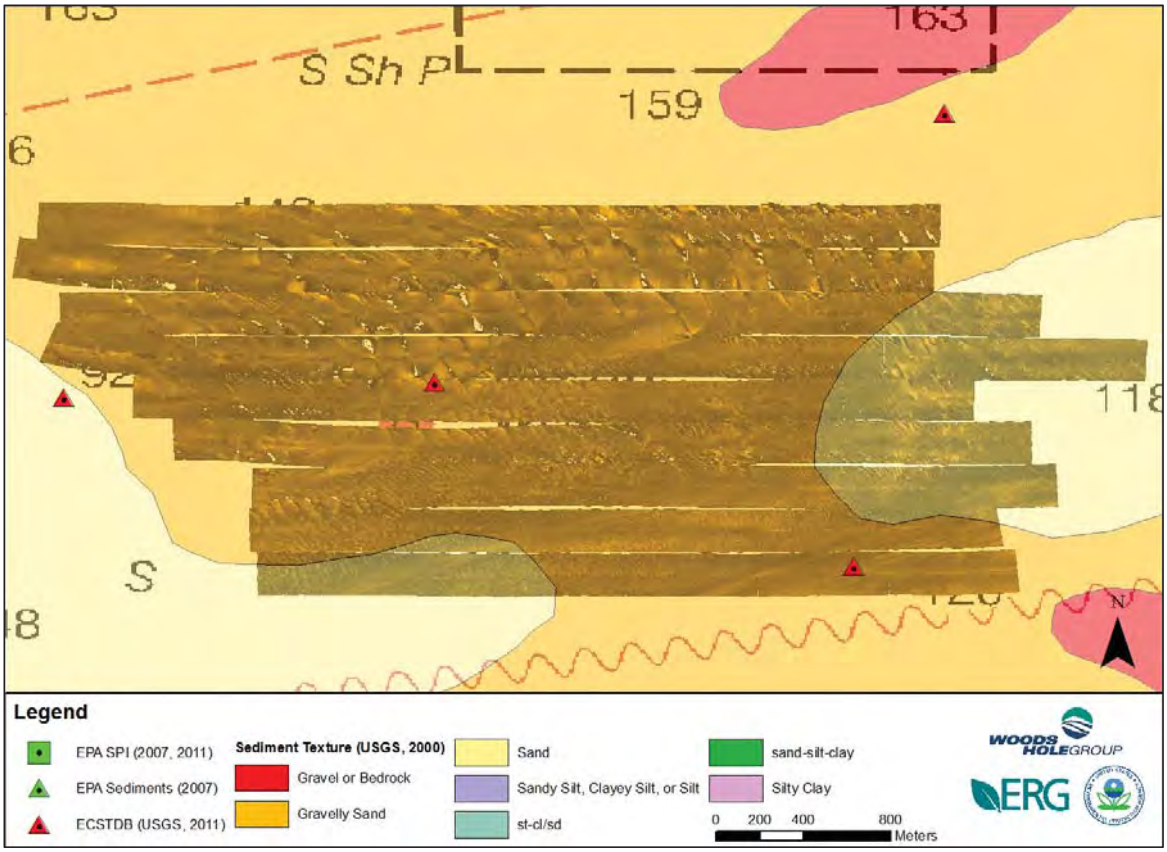

Figure 3.26.4. CSDS_ADD mosaic with supplemental data to assist with interpretation.

3.27 NTDS_NEW

3.27.1 Mosaic Overview

Project location NTDS_NEW is located approximately 6 km southeast of Niantic Harbor, CT and 5.9 km northeast of Plum Island, NY (Figure 3.1.3). Project locations Eastern_LIS_Niantic_Master, FISEHOLE6, NTDS_HIST and ELIS14 overlap with this site. The Niantic Bay disposal site (historical) lies to the west of this site. Depth varies between 18 and 72 meters in this area. Figure 3.27.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

One hundred ten (110) side-scan sonar XTF files were imported for this project location. Zero (0) files were rejected for QA reasons, and eight (8) files were trimmed of data (Table 3.27.1). Data coverage is presented in Figure 3.27.1. The project area was surveyed at approximately 0-200% over1ap in data coverage, depending on location. Side-scan data covered 4.65 million sq. meters.

Table 3.27.1. NTDS_NEW processing statistics used in SonarWiz 5.

NTDS_NEW	
# XTF files	110
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4 to 10
Nadir Threshold	4 to 8
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	98 of 100
# Tracklines trimmed	8
Tracklines trimmed	NTDS_NEW070716010100
	NTDS_NEW070716020300
	NTDS_NEW070717152900
	NTDS_NEW070717161000
	NTDS_NEW070717170300
	NTDS_NEW070717195700
	NTDS_NEW070717171100
	NTDS_NEW070717192700
	NTDS_NEW070716000200
# Tracklines removed/hidden	0
Tracklines removed/hidden	N/A

3.27.2 Target Summary

Fourteen (14) unique targets and one (1) feature were identified at NTDS_NEW using specific descriptions. Targets were assigned to four classifications, with the number of targets assigned to each classification given in parentheses: boulder (1), debris pile (9), rock outcrop/geological (2), or unidentified/other (2). All targets were identified in the northwest corner of the project area. One feature describing a field of debris piles occupies the southern half of the project area. Targets and features are compiled in Appendix T. Targets are indicated on Figure 3.27.2 and example target images are indicated in Figure 3.27.3.

3.27.3 Seafloor Classification & Geological Interpretation

The seafloor at NTDS_NEW is composed of a medium intensity backscatter material with large areas of higher intensity backscatter and shadows, particularly in the southern half of the survey area. The field of higher backscatter material fall within an area described as a field of debris piles, but rock outcrops/geological features could be present within the area as well. The seafloor on the northern half of the survey area is more homogeneous, with fewer variations in backscatter intensity. Two USGS bottom samples were collected in the far north and south, described as gravelly sediment and gravel, respectively (USGS, 2011). Adjacent USGS bottom samples outside the survey area were described as gravelly sediment, gravel and boulders (USGS, 2011). EPA bottom samples from the center of the survey area were described as silty sand and medium sand with stones. One SPI image provided by EPA, located 1 km to the west of the survey area, showed the bottom as coarse sand overlain with shells and shell hash. The USGS modeled seafloor classification is majority gravelly sand, with small areas of gravel in the south, with an area of sand in the north-center (USGS, 2000). Figure 3.27.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned three classes to the study area. The primary class (blue) covers nearly 100% of the project area and the secondary class (red) is occurs mostly where data shadows occur, making it a false classification of bottom type. The tertiary class (yellow) covers a negligible area and corresponds to areas near a data shadow only. The Classification function was not able to effectively separate the more rocky southern half and the more homogenous northern half. SonarWiz 5 bottom classifications are located in Appendix Z.

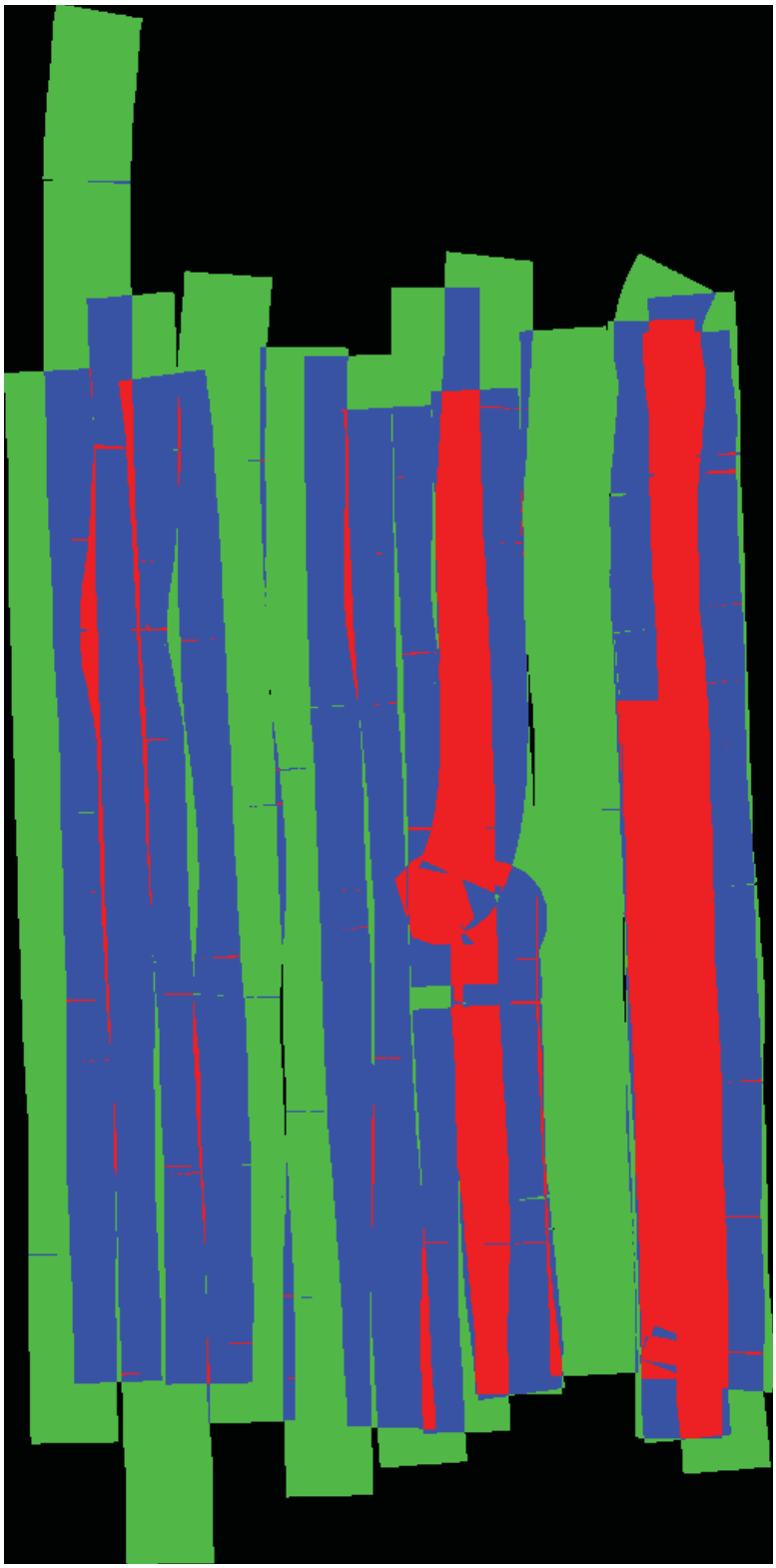

Figure 3.27.1. NTDS_NEW survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively. The color red represents area with 300% coverage.

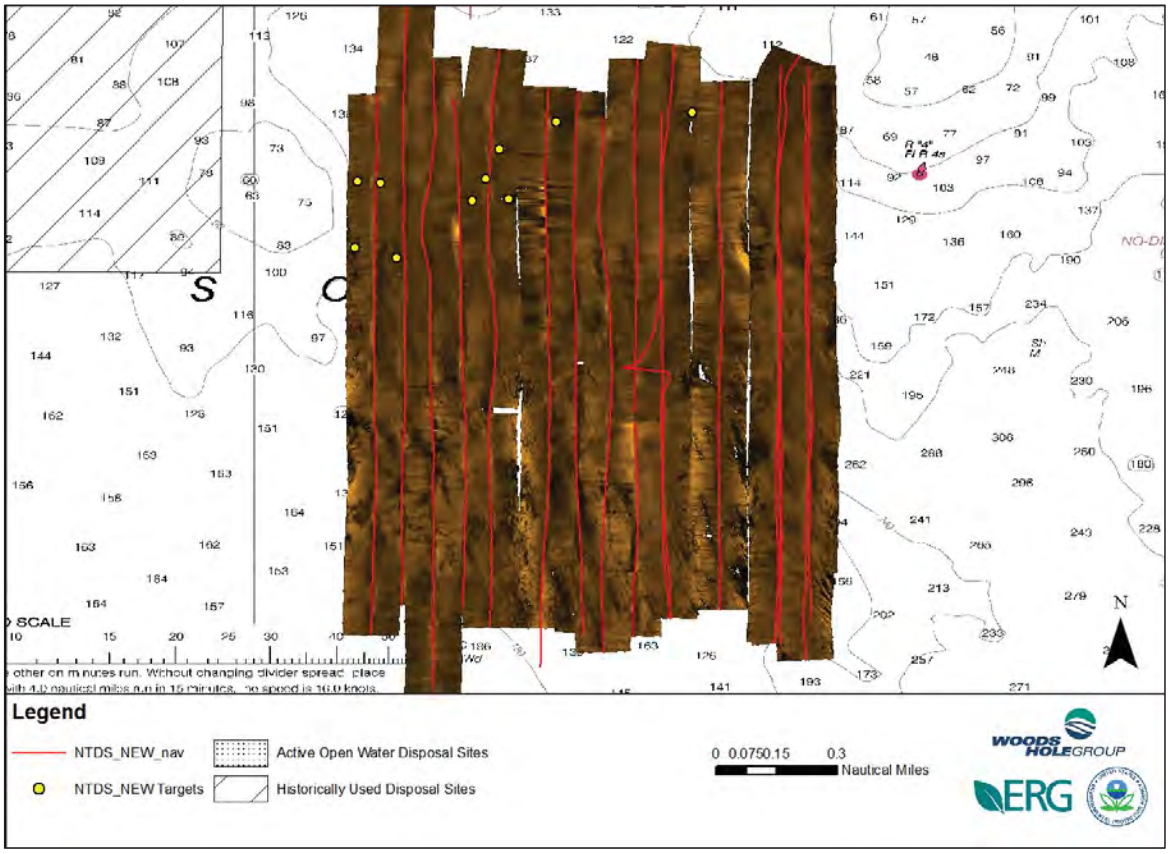

Figure 3.27.2. NTDS_NEW mosaic with navigation lines and targets.

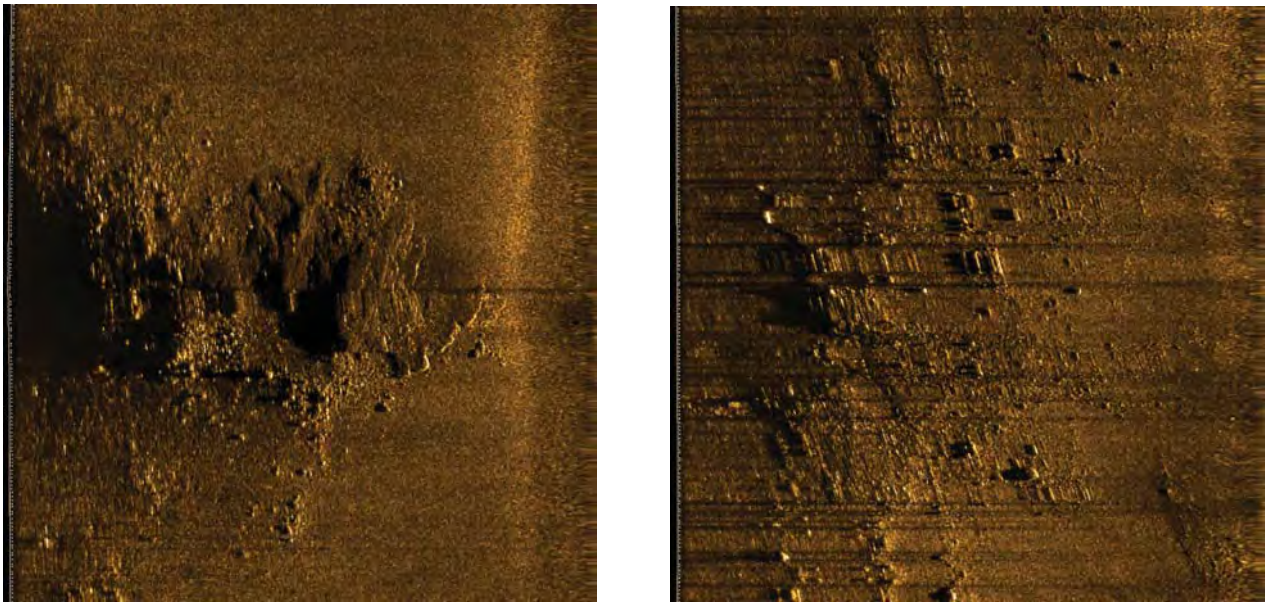

Figure 3.27.3. NTDS_NEW target examples: rock outcrop/geological (L), debris pile (R).

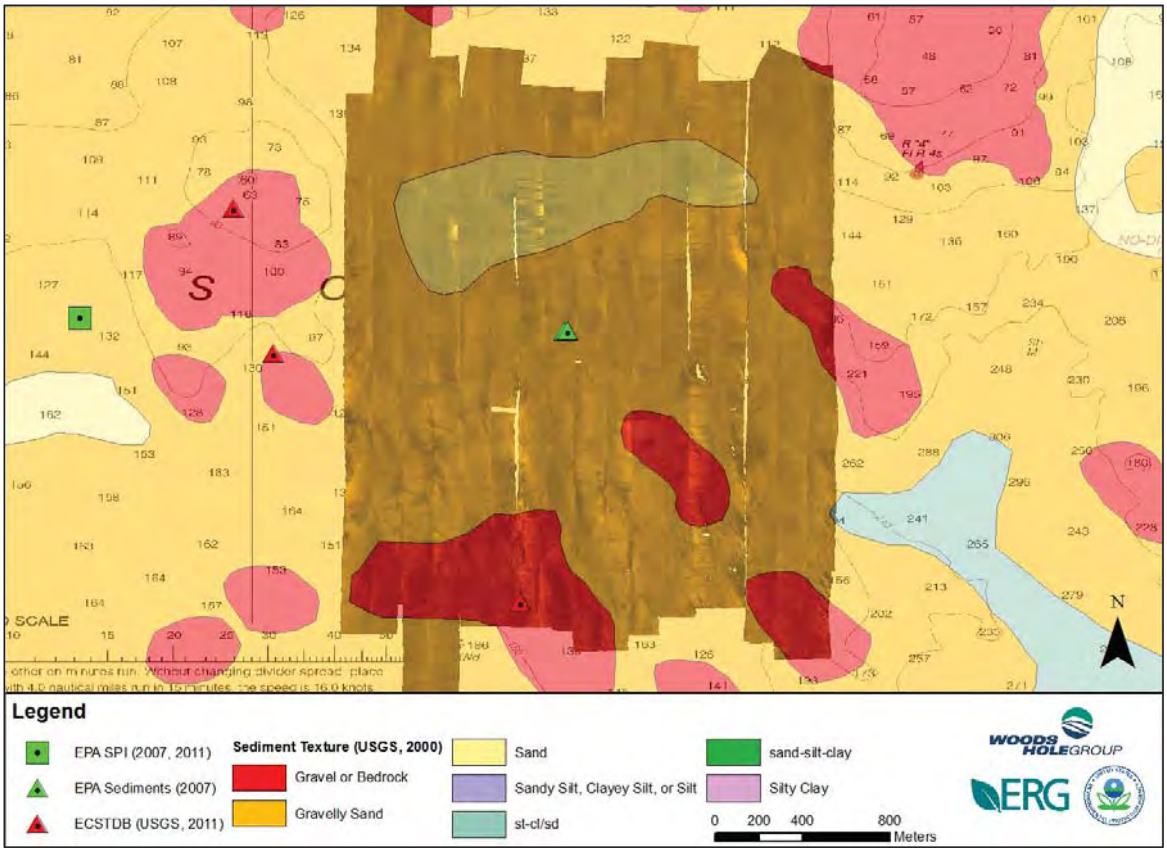

Figure 3.27.4. NTDS_NEW mosaic with supplemental data to assist with interpretation.

3.28 NTDS_HIST

3.28.1 Mosaic Overview

Project location NTDS_HIST is located approximately 5 km south of Niantic Harbor, CT and 7.4 km north of Plum Island, NY (Figure 3.1.3). Project locations ELIS13, ELIS14, FISEHOLE6, NTDS_NEW and Eastern_LIS_Niantic_Master overlap with this site. The majority of the Niantic Bay disposal site (historical) lies within the project area. Depth varies between 15 and 49 meters in this area. Figure 3.28.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Eighty-nine (89) side-scan sonar XTF files were imported for this project location. Three (3) files were rejected for QA reasons, and five (5) files were trimmed of data (Table 3.28.1). Data coverage is presented in Figure 3.28.1. The project area was surveyed at approximately 0% over1ap in data coverage, though a few lines have 50-100% overlap. Side-scan data covered 5.45 million sq. meters.

Table 3.28.1. NTDS_HIST processing statistics used in SonarWiz 5.

NTDS_HIST	
# XTF files	89
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4
Nadir Threshold	8
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	98 of 100
# Tracklines trimmed	5
Tracklines trimmed	NTDS_HIST070715130100
	NTDS_HIST070715135700
	NTDS_HIST070715130900
	NTDS_HIST070715132900
	NTDS_HIST070715140500
# Tracklines removed/hidden	3
Tracklines removed/hidden	NTDS_HIST070715131300
	NTDS_HIST070715132500
	NTDS_HIST070715140100

3.28.2 Target Summary

Forty-four (44) unique targets and three (3) features were identified at NTDS_HIST using specific descriptions. Targets were assigned to seven classifications, with the number of targets assigned to each classification given in parentheses: bedforms (6), boulder (1),

boulder area/field (2), debris pile (22), field of debris pile (5), rock outcrop/geological (2), or unidentified/other (6). Targets identified as debris piles were located throughout the project area, mainly clustered in the central and north-central. Three features outlining fields of debris piles are located in the central, north-central and east. Targets and features are compiled in Appendix T. Targets are indicated on Figure 3.28.2 and example target images are indicated in Figure 3.28.3.

3.28.3 Seafloor Classification & Geological Interpretation

The seafloor at NTDS_HIST is composed of a medium intensity backscatter material with intermittent fields of debris piles. Fields of debris piles were located in the north, center and southeast corner of the survey area. Seven bottom samples were collected by USGS within the survey area, with descriptions ranging from sand to gravelly sediment to boulders (USGS, 2011). USGS bottom samples were evenly distributed around the northern half of the survey area. Five bottom samples provided by the EPA in the center of the survey area were described with varying percentages of sand and silt with shell hash. One SPI image provided by EPA, located 0.3 km to the south of the survey area, showed the bottom as coarse sand overlain with shells and shell hash. The USGS modeled seafloor classification is a complex mix of gravel, gravelly sand and sand, with gravelly sand being the dominant member (USGS, 2000). The bottom sediment shows a general trend of fining towards the north. Figure 3.28.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned three classes to the study area. However, the primary class covers nearly 100% of the project area and the secondary and tertiary classes occupy negligible area and are only observed near the edges of tracklines, most likely making them artifacts. Based on the side-scan sonar and supplemental data, it is believed the seafloor at NTDS_HIST is composed of sand with varying percentages of coarse material (shells, gravel, boulders etc.). SonarWiz 5 bottom classifications are located in Appendix Z.

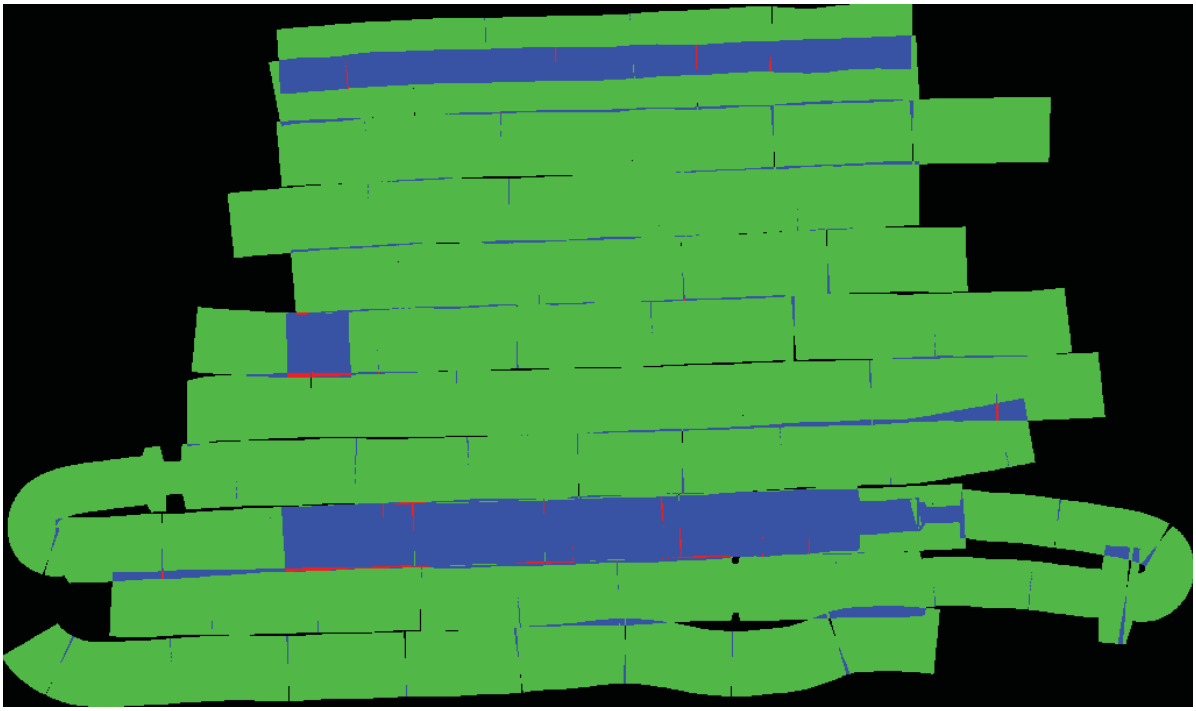

Figure 3.28.1. NTDS_HIST survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively.

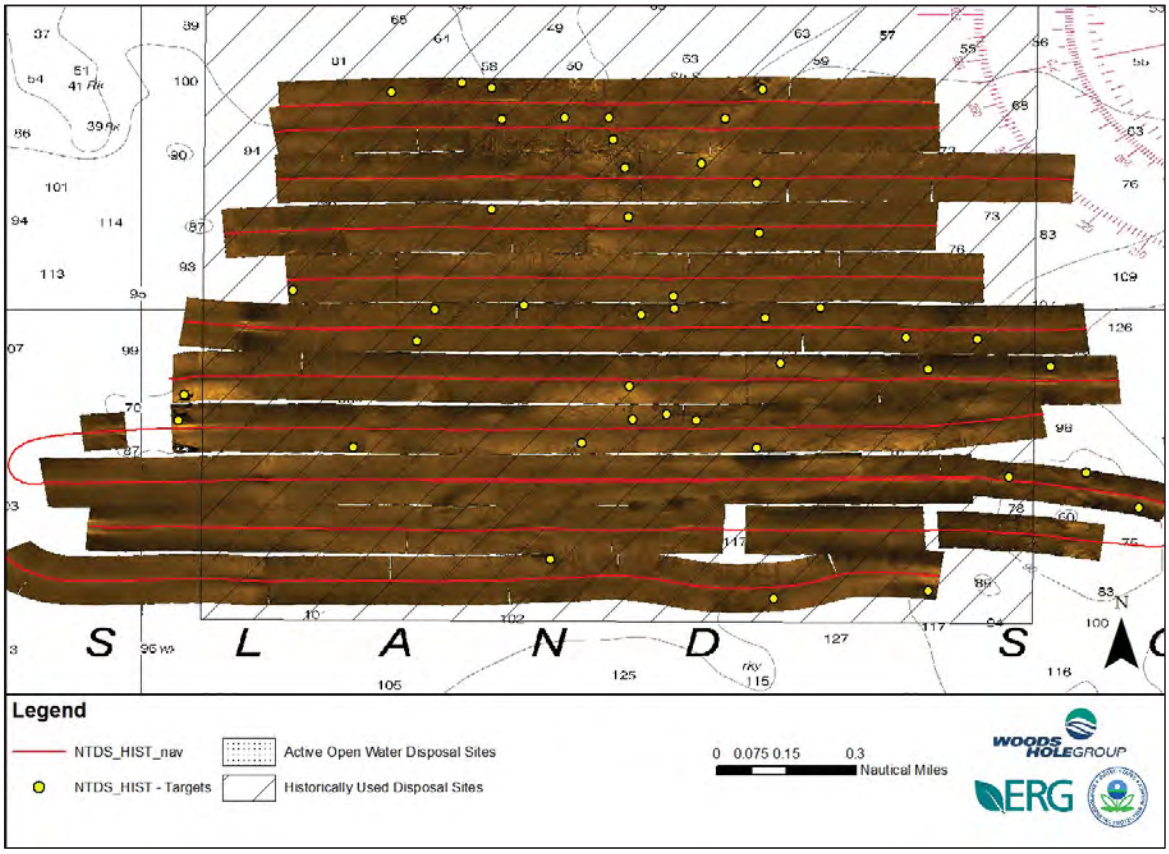

Figure 3.28.2. NTDS_HIST mosaic with navigation lines and targets.

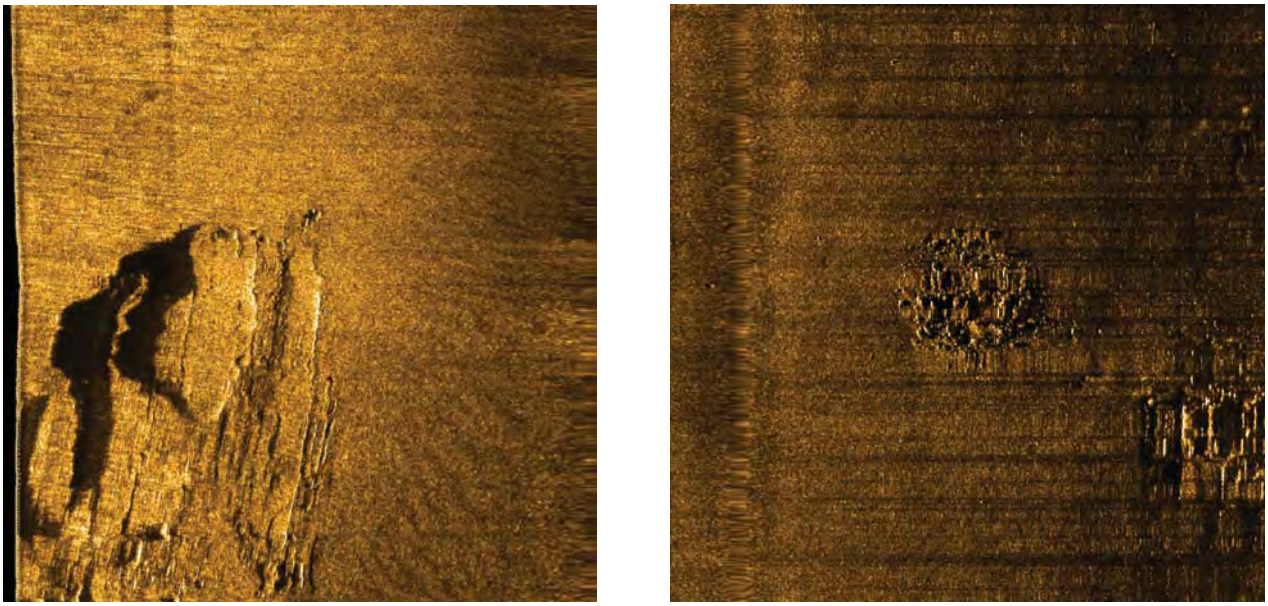

Figure 3.28.3. ELIS16 target examples: rock outcrop/geological (L), debris pile (R).

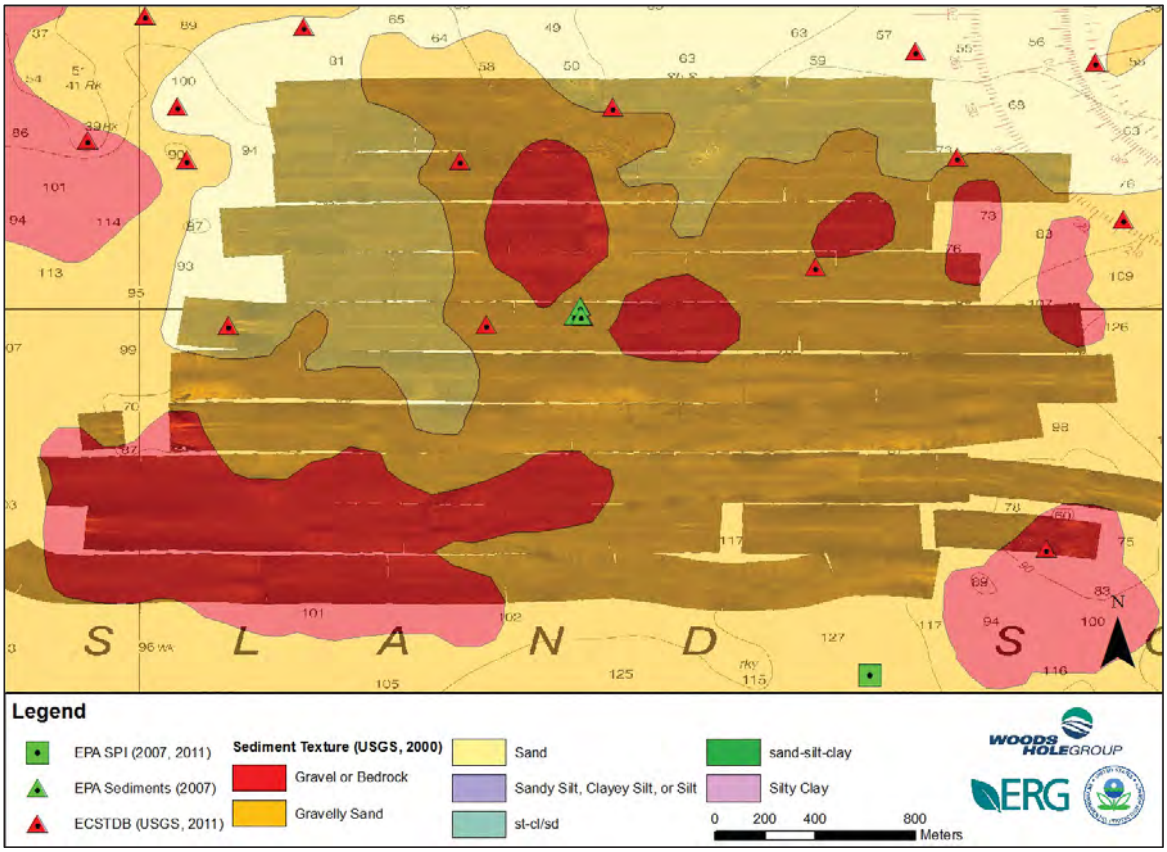

Figure 3.28.4. NTDS_HIST mosaic with supplemental data to assist with interpretation.

3.29 NLDN_ACT

3.29.1 Mosaic Overview

Project location NLDN_ACT is located approximately 2.9 km west of Fishers Island, NY and 5 km south of New London Harbor, CT (Figure 3.1.3). Project locations NLDN_REF, NLDN_REF_ADD and ELIS12 overlap with this site. The entirety of the New London Disposal Site (active) is within the project area. Depth varies between 12 and 52 meters in this area. Figure 3.29.2 plots the survey lines navigated to collect the side-scan sonar data at this specific location.

Sixty-four (64) side-scan sonar XTF files were imported for this project location. Two (2) files were rejected for QA reasons, and three (3) files were trimmed of data (Table 3.29.1). Data coverage is presented in Figure 3.29.1. The project area was surveyed at approximately 0% over1ap in data coverage but two tracklines have 100% overlap. Side-scan data covered 4.20 million sq. meters.

Table 3.29.1. NLDN_ACT processing statistics used in SonarWiz 5.

NLDN_ACT	
# XTF files	64
Navigation/layback imbedded in sonar data?	No
Nadir Blanking dist (m)	4
Nadir Threshold	8
Nadir Blanking Duration	2
Offset Alt (m)	1
Adjusted display range (m)	98 of 100
# Tracklines trimmed	3
Tracklines trimmed	NLDN_ACT070714192300
	NLDN_ACT070715072600
	NLDN_ACT070715080100
# Tracklines removed/hidden	2
Tracklines removed/hidden	NLDN_ACT070714100900
	NLDN_ACT070714183900

3.29.2 Target Summary

Thirty (30) unique targets and one (1) feature were identified at NLDN_ACT using specific descriptions. Targets were assigned to eight classifications, with the number of targets assigned to each classification given in parentheses: bedforms (3), boulder (1), boulder area/field (1), debris pile (9), fishing gear - trap/buoy (5), rock outcrop/geological (1), unidentified/other (9), or wreck (1). Targets are evenly distributed around the project area and targets of similar type are not clustered together. The wreck is located in the

southwest of the project area and is identified on NOAA charts. The feature is located in the southwest and outlines an area identified as unknown/other, due to its distinct difference in sonar backscatter compared to adjacent bottom and its lack of shadow. This feature is only visible when beam angle correction filters are not enabled and may be fine-grain sediment from dredging that absorbs more sonar energy than the adjacent, harder bottom. Targets and features are compiled in Appendix T. Targets are indicated on Figure 3.29.2 and example target images are indicated in Figure 3.29.3.

3.29.3 Seafloor Classification & Geological Interpretation

The seafloor at NLDN_ACT is composed of a medium intensity backscatter material that contains patches of variable backscatter intensity. The variable backscatter does not appear to be related to objects on the seafloor or topography because there are no shadows associated with the change, which would be expected. A feature of much lower intensity backscatter is located in the southwest corner, which appears as a noticeably darker area on the seafloor (see section 3.29.2 for identification). Three bottom samples collected by the USGS were described as gravelly sediment (in the west) and silty sand (in the north) (USGS, 2011). There were no SPI images provided within in the survey area. The USGS modeled seafloor classification shows sand as the dominant sediment type, with small areas of gravelly sand in the southwest corner and northern edge (USGS, 2000). Grain size appears to increase to the north towards shore. Figure 3.29.4 shows the mosaic with supplemental interpretative data.

The Classification function in SonarWiz 5 assigned three classes to the study area. The primary class covers approximately 75% of the total area, and is prevalent throughout the survey area. The secondary class covers the remaining 25% and was assigned to areas with slightly higher intensity backscatter. The tertiary class is negligible in size and frequency. The lower intensity backscatter feature was not identified as a unique class by the Classification function. According to the side-scan sonar and supplemental data, the seafloor at NLDN_ACT appears to be predominantly sand. SonarWiz 5 bottom classifications are located in Appendix Z.

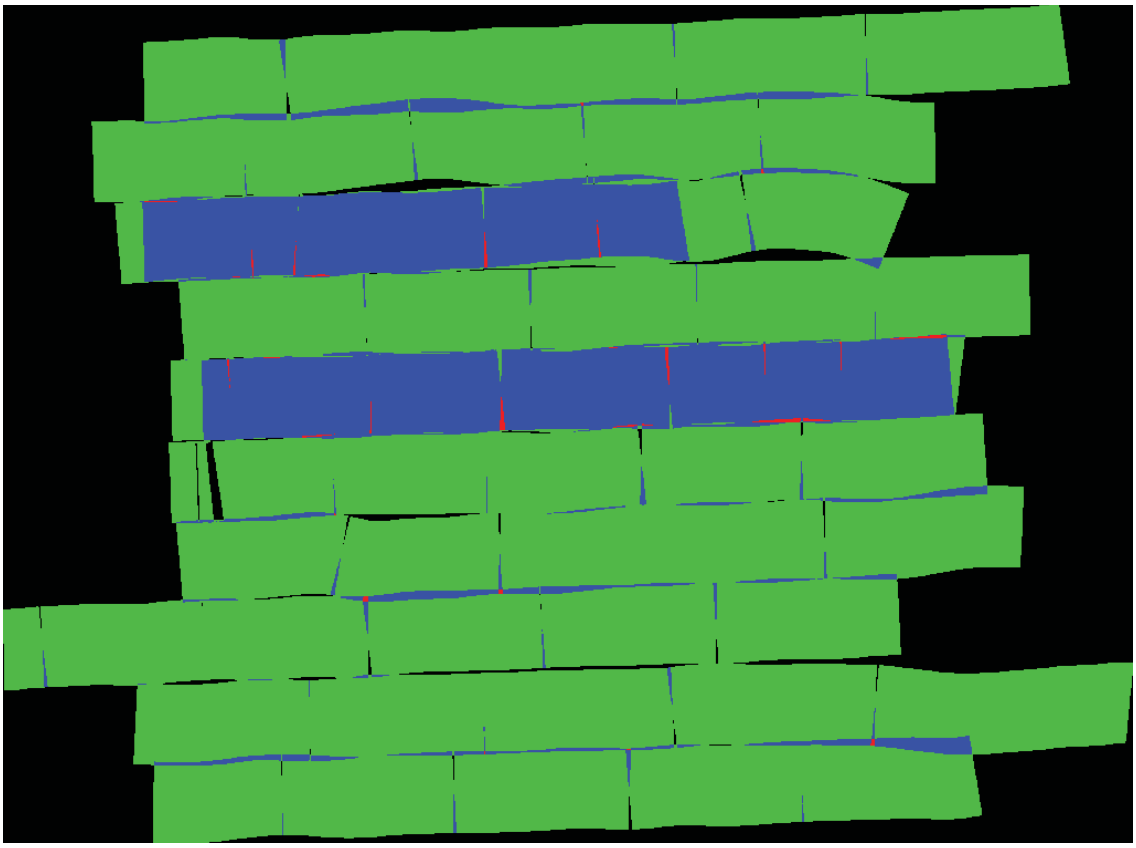

Figure 3.29.1. NLDN_ACT survey data coverage. The green and blue colors indicate survey area with 100% coverage (0% overlap) and 200% coverage (100% overlap), respectively.

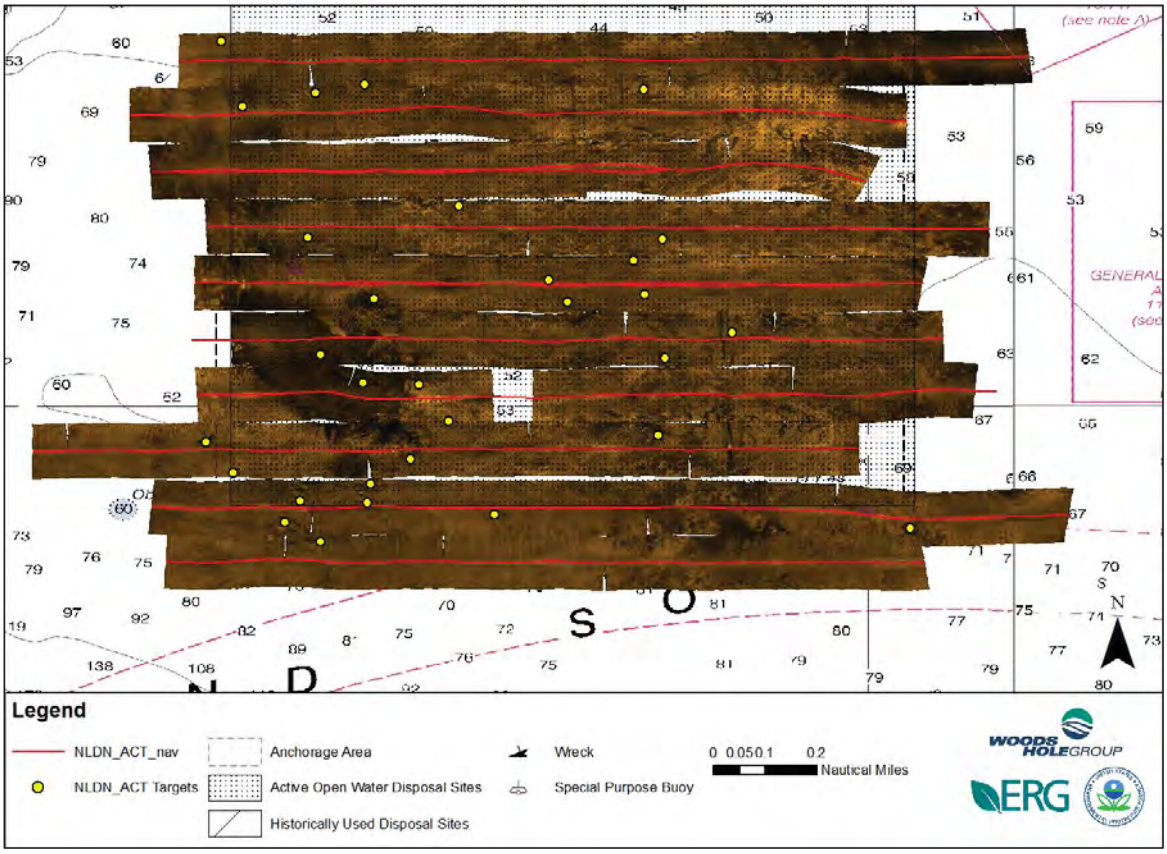

Figure 3.29.2. NLDN_ACT mosaic with navigation lines and targets.

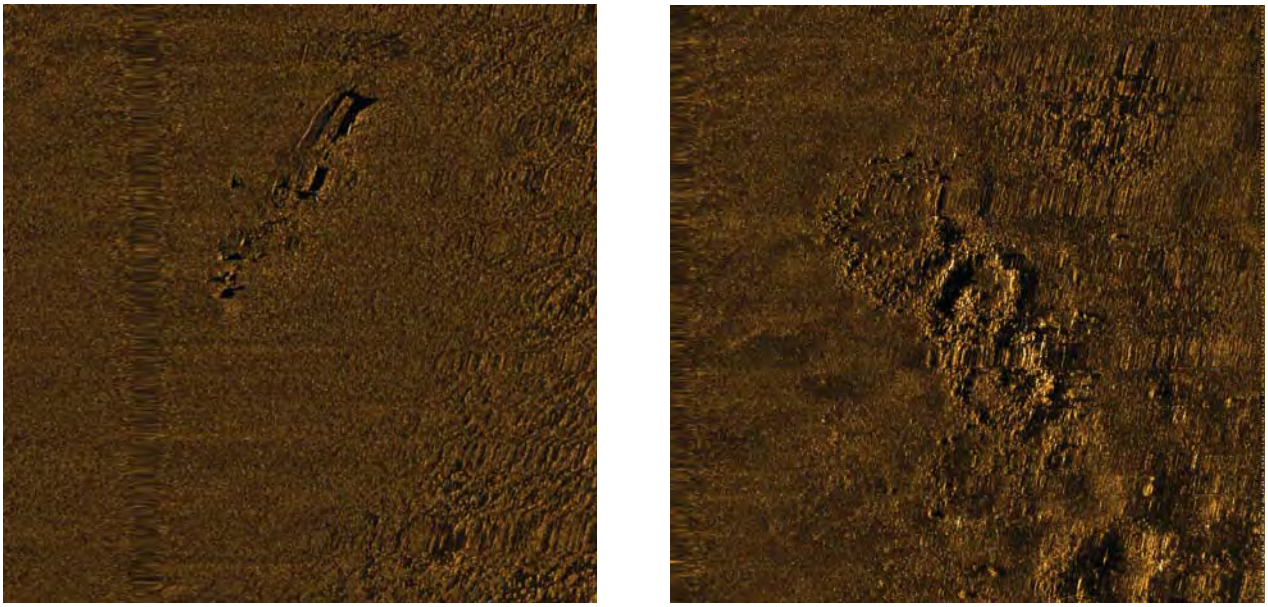

Figure 3.29.3. NLDN_ACT target examples: wreck (L), debris pile (R).

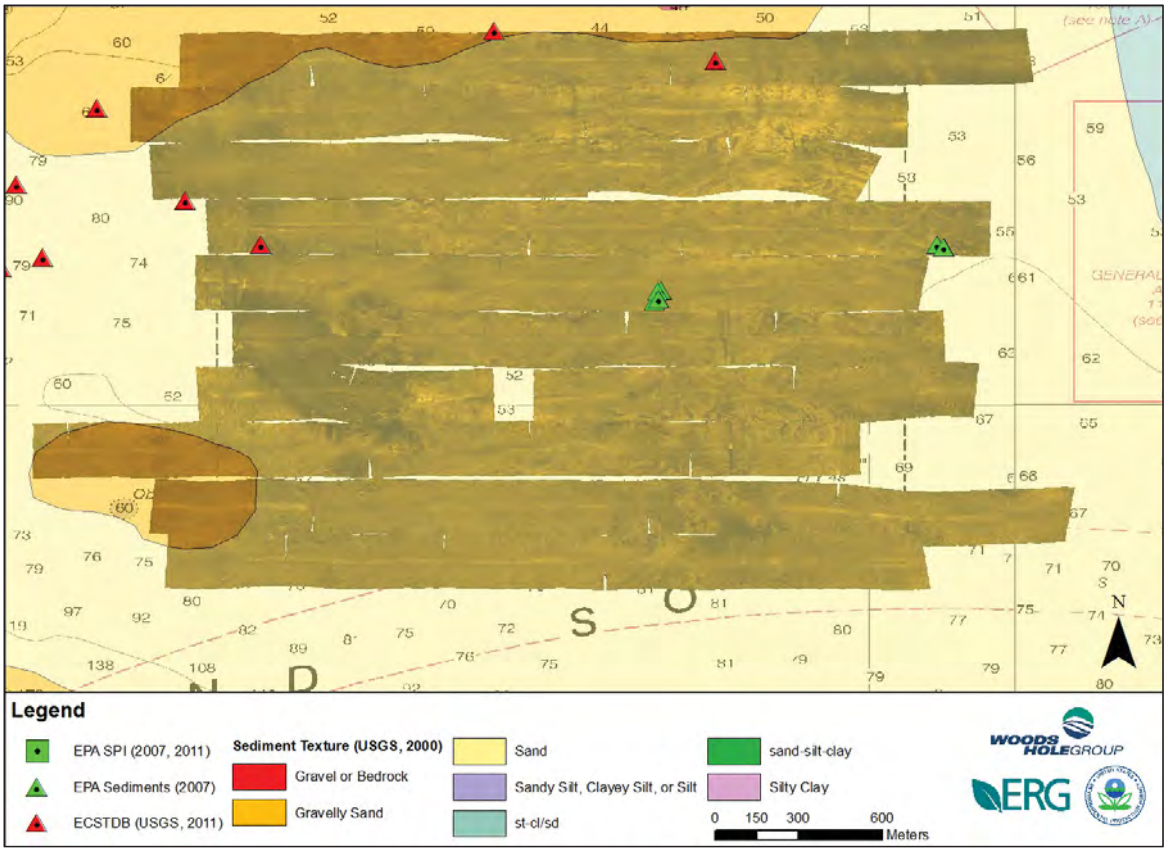

Figure 3.29.4. NLDN_ACT mosaic with supplemental data to assist with interpretation.

4.0 QA/QC DISCUSSION

4.1 DATA COVERAGE

In some survey areas there are gaps in quality data coverage that are manifested as holes or "holidays" in the mosaic image. There are many reasons for a data gap, but we have listed the potential leading causes below:

- In some circumstances, the vessel had to navigate off a survey transect/line to avoid an object, such as a navigation buoy in the path of the survey vessel, which resulted in a gap in data coverage. Examples of these data gaps are exhibited by the linear holidays in the mosaic for NLDN_REF_ADD2 and Eastern_LIS_EastHole_Master (Figures3.23.2 and 3.18.2).

- At some sites, data was collected as a cursory overview, focused on covering a larger area with less coverage or overlap. This was due to an EPA plan to collect overlap coverage during multiple data collection events. In cases where overlap was not planned, small navigational movements resulted in data gaps. Since the data collection occurred over a multi-year effort, some mosaics were planned without overlap. This is not true for all mosaics, but it is the cause for most of the linear data gaps. An example of these data gaps is exhibited by the 6MILE10 mosaic (Figure 3.7.2).

- As indicated by EPA field notes, occasional equipment malfunctions by the side-scan sonar or support equipment caused areas of data loss, which is represented in mosaics as a spatial gap in coverage. The mosaic FALKNER8 exhibits this occurrence (Figure 3.9.2). In addition, excessive equipment movement during accent, decent, or turns may cause poor quality in data. All data recorded for turns were removed from the mosaics. The mosaic for NLDN_REF exhibits this occurrence (Figure 3.24.2).

4.2 NAVIGATION

All side-scan sonar data files used to create the mosaics and identify targets for this report have not been corrected for navigation offsets and towfish layback. The identified targets provided in Appendix T contain a minimum geographic position offset of 50 meters. Revised geographic positions of targets, for a select number of sites, have been provided to the EPA as separate files. The geographic offset of targets has no impact on the side-scan sonar backscatter intensity and general characterization of the mosaics provided herein, especially in consideration of the large scale of these areas with respect to the error estimate.

4.3 TARGET COLOR SCALES

While all mosaics were created using the Klein color scale referenced in Figure 2.1.1, identification of targets was performed using both the Klein scale and a monochrome grey scale. The color scale variation was dependent on the professional preference of the technician who identified the targets. The grey scale is similar to the Klein scale, but

with the color white on one end of the spectrum, and black on the other. In this case, the color scale was inverted and low backscatter was represented by white, and high backscatter represented by black.

5.0 SUMMARY

The Woods Hole Group was contracted by ERG to process side-scan sonar data collected by the EPA R1 in eastern Long Island Sound. In total, data from 28 side-scan sonar survey sites were processed, mosaicked, cataloged for targets, and geomorphologically characterized. This work was performed to support EPA Region 1 in the process of conducting the studies necessary for part of an Environmental Impact Statement (EIS) for eastern Long Island Sound.

6.0 REFERENCES

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Woods Hole Group, 2014. Quality Assurance Project Plan, Side-scan Sonar Data Processing and Mosaicking, Long Island Sound. USEPA Contract No. EP-C-09-020. ERG Subcontract No. OCPD-020/7. January 15, 2014.

APPENDIX M

M.1 DESCRIPTION

Appendix M is a compilation of the electronic data deliverables associated with the georeferenced side-scan mosaic images for the 28 sites in ELIS. The mosaic images are provided in GEOTIFF format; these files and their supporting data files are organized by survey site and provided in self-titled file folder directories. The supporting data files for each mosaic contain the spatial metadata for each site, or are used for display purposes by ESRI ArcGIS software.

Each site directory contains a mosaic image (.tif extension) with "-M" appended to the filename, which is the final mosaic image with Beam Angle Correction (BAC) and Automatic Gain Correction (AGC) filters enabled. Most project locations also include a mosaic image with "-EGN" appended to the filename, these are mosaic images with the Empirical Gain Normalization (EGN) filter enabled. All directories, except four (ELIS16, ELIS15, FALKNER8, and FISE_SW_ADD2), contain EGN mosaics; EGN mosaics images were not created for these sites because it did not improve the ability to interpret the seafloor.

The file folder structure for Appendix M and the subdirectories is depicted in Figure M1. The files structure of each site folder is depicted in Figure M2.All data files are included with the report summary report on the EPA R1 portable hard drive.

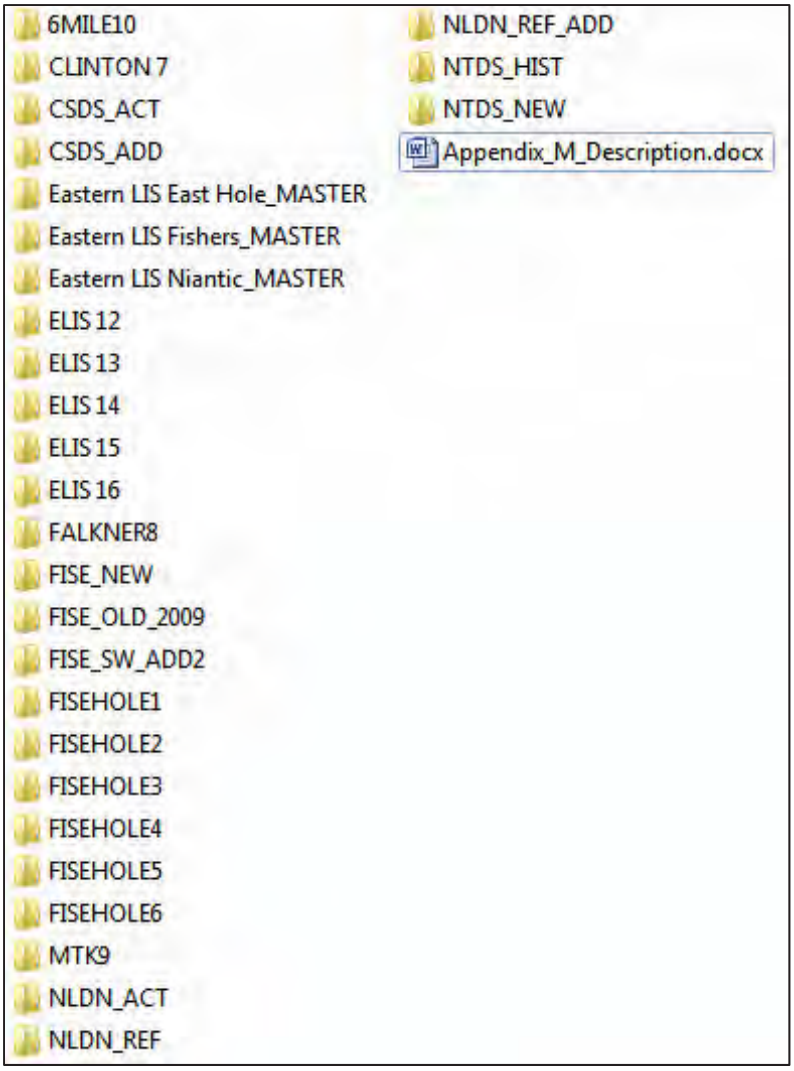

Figure M1. Directory structure of Appendix M

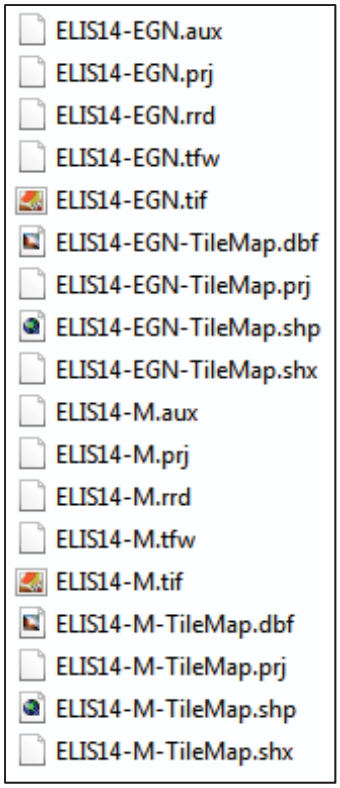

Figure M2 Example of the file structure for each site.

APPENDIX T

T.1 DESCRIPTION

Appendix T is a compilation of the electronic data deliverables associated with the seafloor target and feature identification for the 28 sites in ELIS. These files and their supporting data files are organized by survey site and provided in self-titled file folder directories. The supporting data files are used for display purposes by ESRI ArcGIS software.

All targets for each project location are summarized in a GIS-compatible shapefile (.shp file extension), but each feature polygon is present as a separate shapefile. A comma-delimited text file (.csv file extension) summarizes all the target metadata. Two images with .jpg extension are included for each target identified on the seafloor: 1) the target as it appears on the sonar line without any modification, and 2) an image with visual settings adjusted to assist with identification ("_adj" appended to file name). The adjusted images show the final visual settings that the data technician used to identify the target, and do not reflect how the target appears on the sonar line in the mosaic images. While all mosaics were created using the Klein color scale, identification of targets was performed using both the Klein scale and a monochrome grey scale. The color scale variation was dependent on the professional preference of the technician who identified the targets. None of the images in Appendix T are geo-referenced. For some project locations there is a folder named "Deleted" that contains jpeg images of targets that were removed from the project for QA reasons. Project locations that have no targets or features identified (e.g. FALKNER8) still have a subdirectory in Appendix T, but the folder contains a text file explaining that either no targets or features were identified.

The file folder structure for Appendix T and the subdirectories is depicted in Figure T1. The file structure of each site folder is depicted in Figure T2. All data files are included with the report summary report on the EPA R1 portable hard drive.

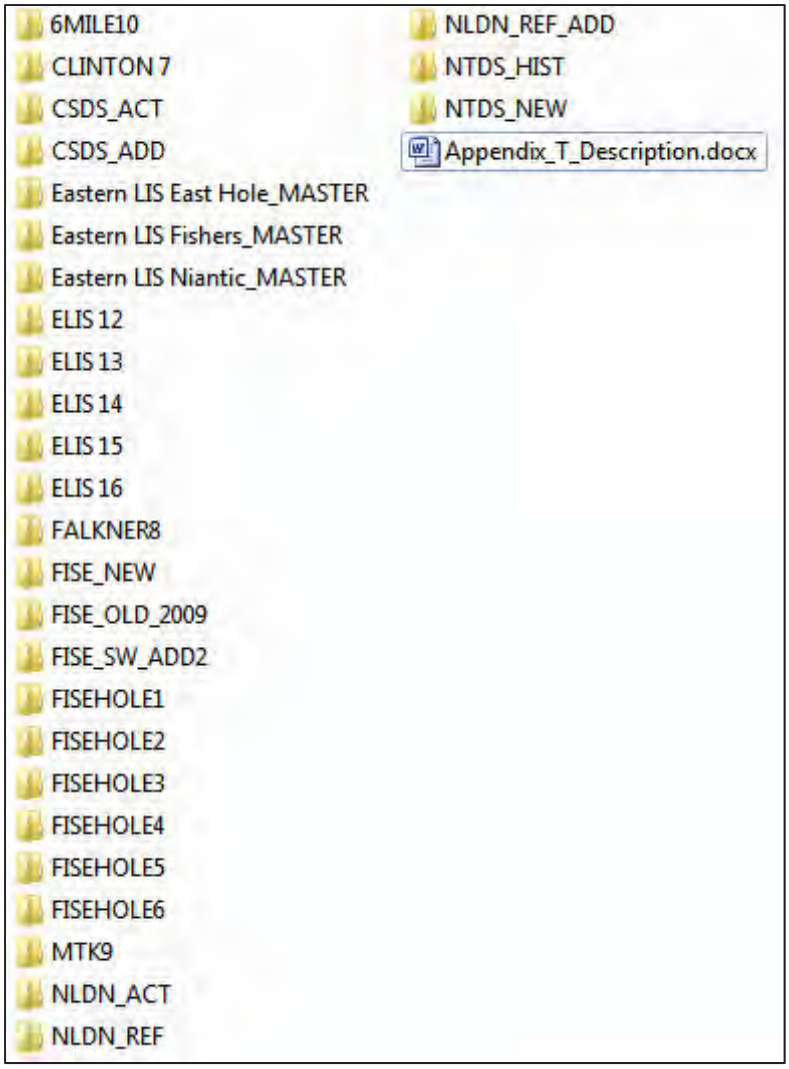

Figure T1. Directory structure of Appendix T.

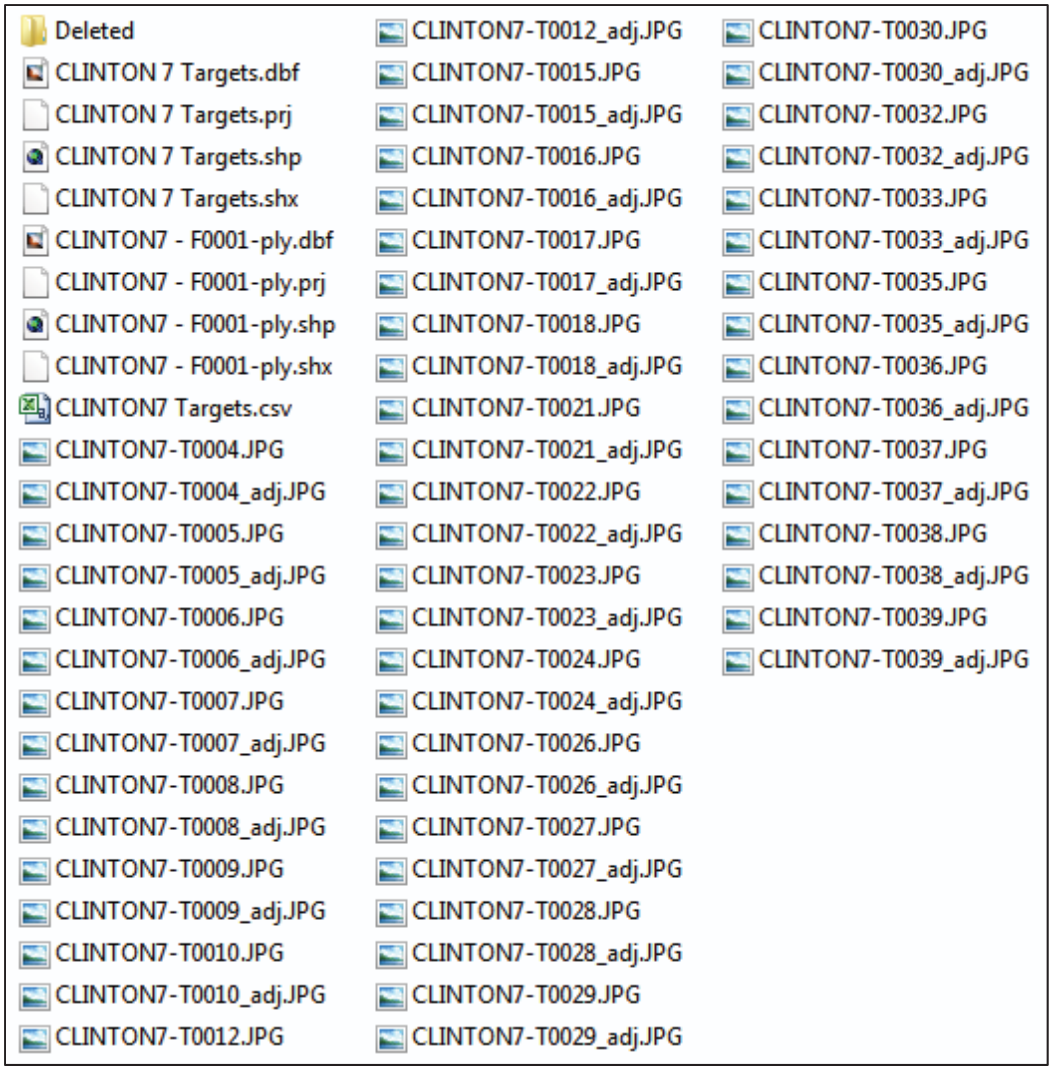

Figure T2. Example of the file structure for each site.

APPENDIX Z

Z.1 DESCRIPTION

Appendix Z is a compilation of the electronic data deliverables associated with the georeferenced seafloor classification images for the 28 sites in ELIS. The classification images are provided in GEOTIFF format; these files and their supporting data files are organized by survey site and provided in self-titled file folder directories. The supporting data files are used for display purposes by ESRI ArcGIS software.

GEOTIFF images (.tif extension) are included for each project location. For most sites there is a single GEOTIFF image and the associated supporting files. However, some project locations had their classification split into several images due to SonarWiz 5 functionality. For example, project location Eastern_LIS_Niantic_Master contained 825 side-scan sonar files and required twelve (12) images to classify the entire survey area. For project locations that required more than one GEOTIFF image, the text "_XofY" was appended to filenames, where Y is the total number of images required and X is between 1 and Y.

The file folder structure for Appendix Z and the subdirectories is depicted in Figure Z1. The file structure of each site folder is depicted in Figure Z2. All data files are included with the report summary report on the EPA R1 portable hard drive.

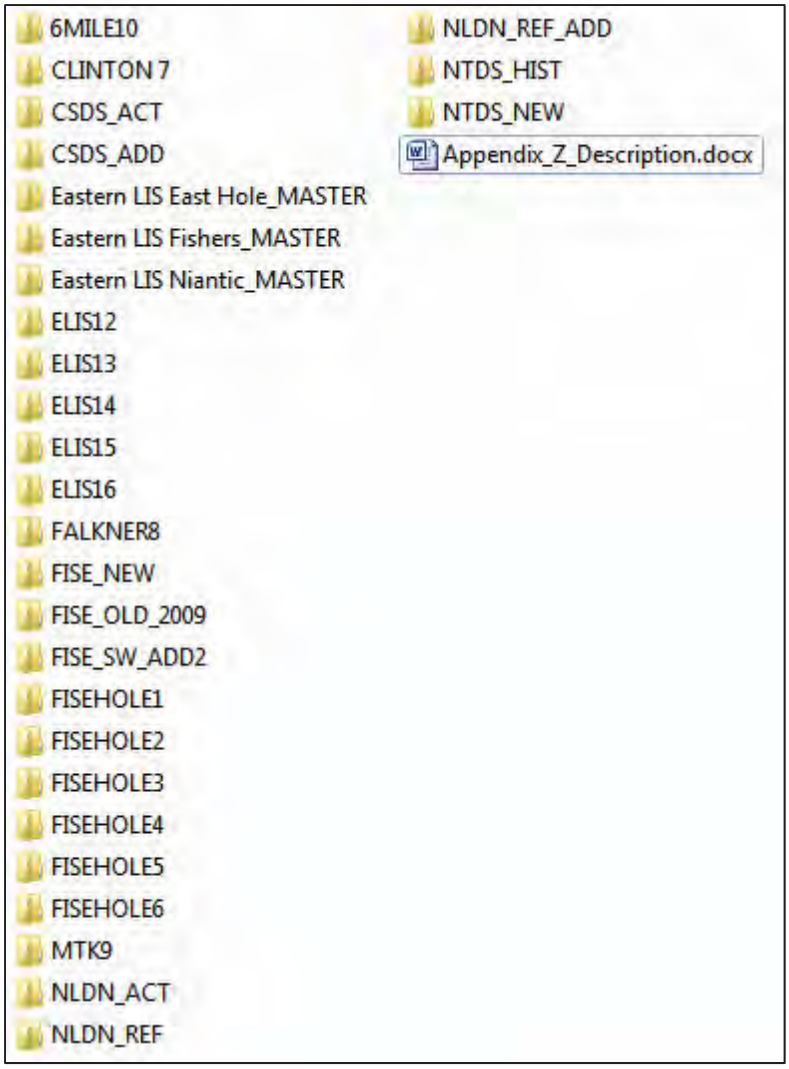

Figure Z1. Directory structure of Appendix Z.

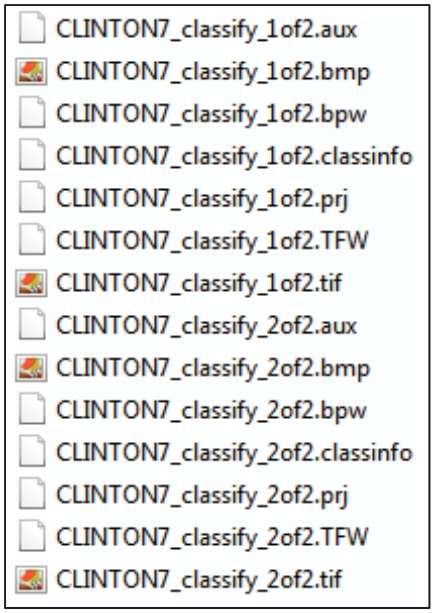

Figure Z2. Example of the file structure for each site.

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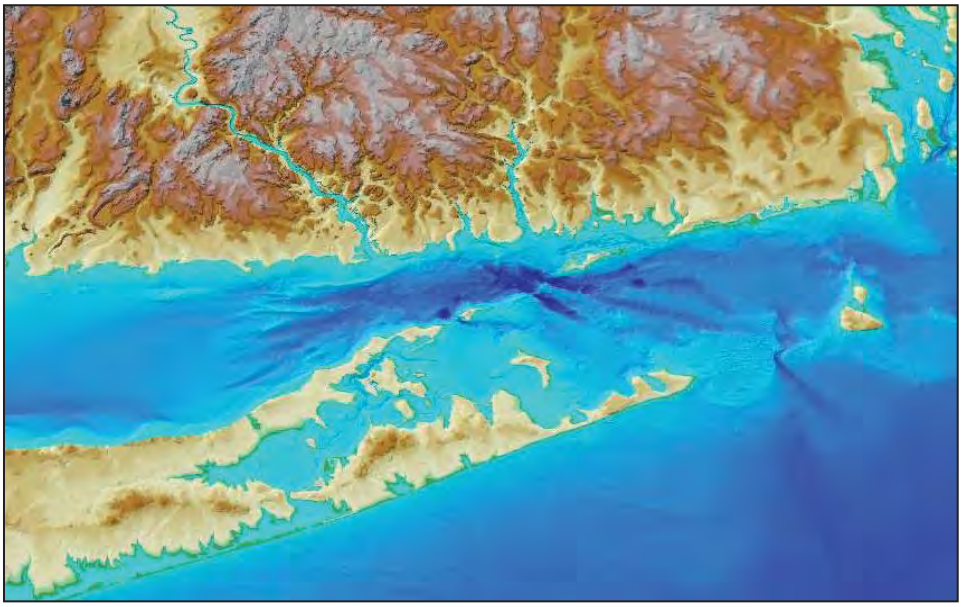
Supplemental Environmental Impact Statement for the Designation of Dredged Material Disposal Site(s) in Eastern Long Island Sound, Connecticut and New York

APPENDIX E

Biological Characterization of the Eastern Long Island Sound Dredged Material Disposal Sites



Prepared for: **NAVFAC Mid Atlantic**

and

United States Environmental Protection Agency

Prepared by: **Tetra Tech**

May 2014

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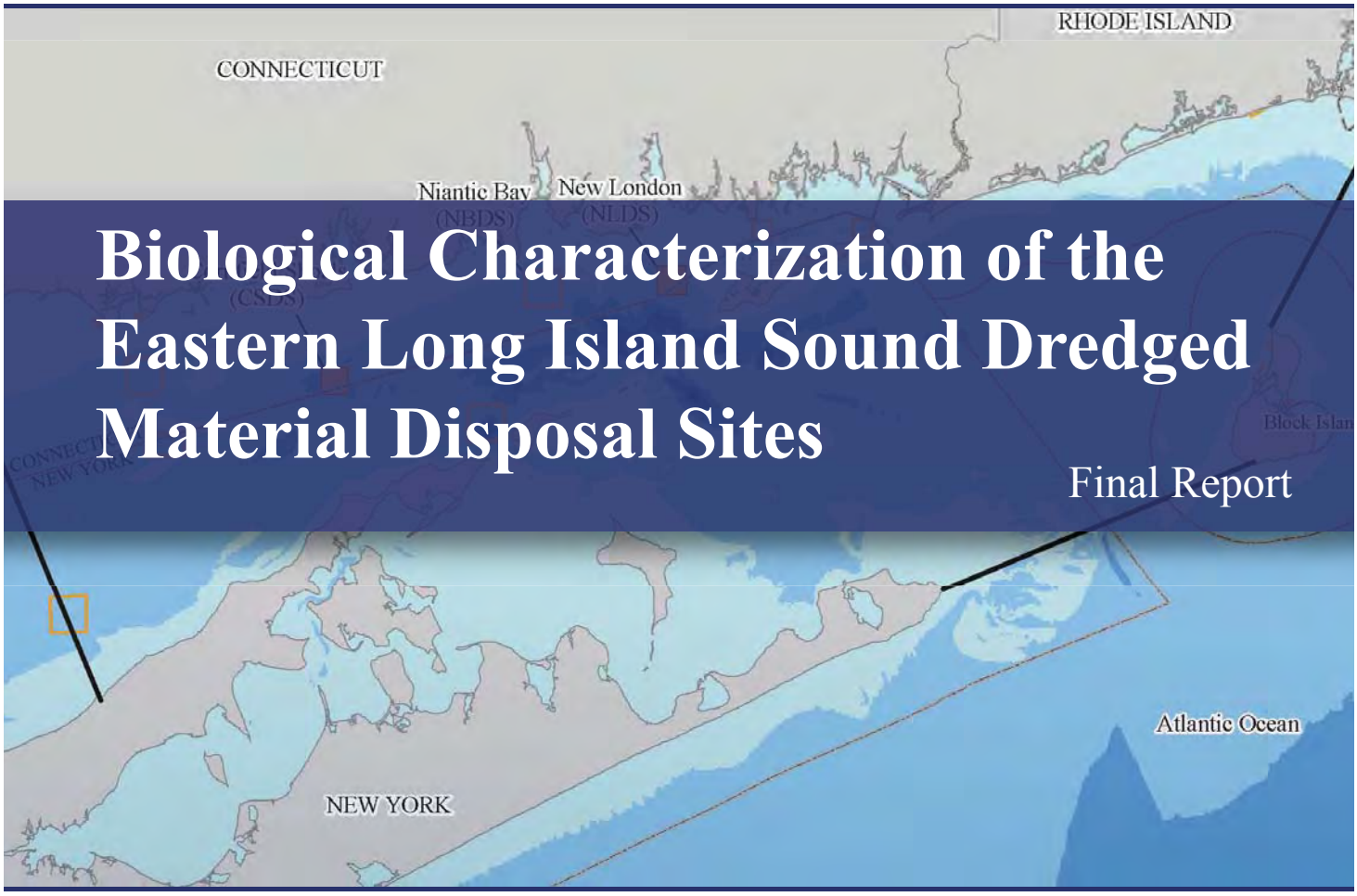
NAVFAC Atlantic Biological Resource Services

Contract: N62470-08-D-1008; Task Order: WE11

30 May 2014



Biological Characterization of the Eastern Long Island Sound Dredged Material Disposal Sites

Final Report

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RECOMMENDED CITATION:

Tetra Tech, Inc. 2014. Biological Characterization of the Eastern Long Island Sound Dredged Material Disposal Sites. Final Report. Task Order N62470-08-D-1008-WE11. Prepared For Naval Facilities Engineering Command Mid-Atlantic and U.S. Environmental Protection Agency by Tetra Tech, Inc., May 2014.

LIST OF ACRONYMS

CEQ	Council on Environmental Quality
CPUE	catch per unit effort
CSDS	Cornfield Shoals Dredged Material Disposal Site
CT DEEP	Connecticut Department of Energy and Environmental Protection
CWA	Clean Water Act
DAMOS	disposal area monitoring system
DO	dissolved oxygen
EFH	essential fish habitat
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FMP	Fishery Management Plan
GIS	geographic information system
GPS	global positioning system
LIS	Long Island Sound
MPRSA	Marine Protection, Research and Sanctuaries Act
NAVFAC	Naval Facilities Engineering Command
Navy	U.S. Department of the Navy
NBDS	Niantic Bay Historic Dredged Material Disposal Site
NEPA	National Environmental Policy Act
NLDS	New London Dredged Material Disposal Site
NOAA	National Oceanic and Atmospheric Administration
OSV	Oceanographic Survey Vessel
psu	practical salinity units
QAPP	Quality Assurance Project Plan
RIM	Regional Implementation Manual
SAP	Sampling and Analysis Plan
SEIS	Supplemental Environmental Impact Statement
TOC	total organic carbon
USACE	United States Army Corps of Engineers
UTM	Universal Transverse Mercator
ZSF	Zone of Siting Feasibility

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1 INTRODUCTION

Tetra Tech has developed this report for biological and environmental studies through Naval Facilities Engineering Command (NAVFAC) Atlantic contract N62470-08-D-1008. The report will support the U.S. Environmental Protection Agency (EPA) and the U.S. Department of the Navy (Navy) in preparation of a Supplemental Environmental Impact Statement (SEIS) for the potential designation of one or more dredged material disposal sites in eastern Long Island Sound. The need for open-water dredged material disposal sites was evaluated in a 2009 report by the U.S. Army Corps of Engineers (USACE), New England District, which identified the future needs for dredging of navigational projects and navigation-dependent facilities in Long Island Sound in Connecticut, New York, and in Washington County, Rhode Island (USACE 2009).

Long Island Sound, a semi-enclosed estuary, is an important economic resource for both commercial and recreational fishermen. The region is occupied by more than 100 fish species; only a portion of which are considered year-round residents. Many migrate through the area in response to seasonal variations in water temperature and access to spawning and nursery grounds in the shallow estuaries and rivers that lead into Long Island Sound. Additionally, the variety of depths, salinities, and substrate attracts diverse fish species. The Long Island Sound (LIS) Trawl Survey, conducted by the State of Connecticut Department of Energy and Environmental Protection (CT DEEP), has collected fish abundance and diversity data since 1984. An annual Biomass Index (i.e., the average weight of fish per tow) has not shown a trend up or down, indicating a stable ecosystem (LISS 2012). Individual species abundance has been subject to changes, however. Since 1985, for example, winter flounder abundance has decreased, while scup abundance has increased (LISS 2012). Although the fish assemblages exhibit interannual variation, Long Island Sound continues to support many fish populations.

Certain species of shellfish also constitute some of the key commercial and recreational fishery resources in nearshore areas of Long Island Sound. Important bivalve mollusk resources include the bay scallop, eastern oyster, hard clam, softshell clam, and surfclam. The bay scallop is primarily found in the eastern part of Long Island Sound, especially Peconic Bay. Since bay scallops survive naturally for only 18 to 22 months, recruitment failure of even one spawning event may severely impact populations. Drastic declines in abundance, particularly attributed to “brown tide” algal blooms from 1985 to 1987, have prompted efforts to restore bay scallops (Wenczel et al. 1994). This commercially important shellfish, historically generating more than $1 million in harvesting, is slowly recovering (Tettelbach and Smith 2009). The oyster and clam industries have fluctuated over the past century, due to pollution, disease, and weather. Currently, harvests of oyster and clam are stable or increasing (LISS 2012). The American lobster population experienced a die-off in 1999 due to abiotic stressors coupled with disease (LISS 2012). Recruitment failure now hinders the rebuilding of the stock, and numbers remain low. Other important invertebrate resources in Long Island Sound include the horseshoe crab, squid, and conch (whelk). With the exception of lobster and longfin squid, commercially and recreationally important shellfish resources of Long Island Sound occur near shore.

A previous study by Tetra Tech (Tetra Tech Inc. 2013a) reviewed literature published since 2009 that was relevant to this project. Using a list of comprehensive key words, 191 documents were identified and summarized in a literature review, with 14 of particular relevance. All documents, both peer-reviewed and grey literature, were considered for support of this biological characterization in order to reflect the most current and accepted knowledge available. This literature is integrated throughout the report.

The purpose of this study is to characterize the fisheries industry, fisheries abundance, diversity and locations, and benthic species associated with areas in eastern Long Island Sound considered for open-water placement of dredged material. This was achieved through physical and biological sampling, as well as a survey of local fishermen. Benthic sampling, which characterized parameters such as infaunal diversity and grain size, was conducted on active or historic dredged material disposal sites and at nearby off-site locations. Fish trawls, which were used to identify the diversity and biomass of local fish species, covered a broader area in eastern Long Island Sound. Similarly, the fishing activity survey included all areas in eastern Long Island Sound, and not just areas around current or historic dredged material disposal sites. The data in this report will be used by the EPA in support of the preparation of an SEIS that will consider the potential designation of one or more dredged material disposal sites in the waters of eastern Long Island Sound, under Section 102 of the Marine Protection, Research and Sanctuaries Act (MPRSA), and 40 CFR 230.80 of the regulations of the EPA under Section 404 of the Clean Water Act (CWA).

1.1 Project Description and Location

This project will support the SEIS process by providing information on the physical and biological environment of eastern Long Island Sound. This study provides a biological characterization of two active dredged material disposal sites (New London and Cornfield Shoals Dredged Material Disposal Sites [NLDS and CSDS, respectively]) and a historic site (Niantic Bay Historic Dredged Material Disposal Site [NBDS]). Historic dredged material disposal sites are identified as having a disposal event of dredged material as described and recorded by USACE, New England District. Additionally, off-site reference areas outside of the active and historic sites were sampled. The EPA previously screened 11 historic and active sites for more in-depth characterization; the areas chosen for sampling were considered a priority.

Studies referenced in the SEIS will be consistent with the provisions of Section 102 (c) of the MPRSA and 40 CFR Parts 228.5, 228.6, 230.80, Section 404 of the CWA, Section 404(b)(1) guidelines, National Environmental Policy Act (NEPA) and the Council on Environmental Quality (CEQ) regulations. Tetra Tech completed the sampling associated with the biological characterization of these sites as outlined below. The key focus sites for this study were CSDS, NLDS, and NBDS, which are shown in Figure 1 (Northeast Ocean Data Portal Working Group 2014).

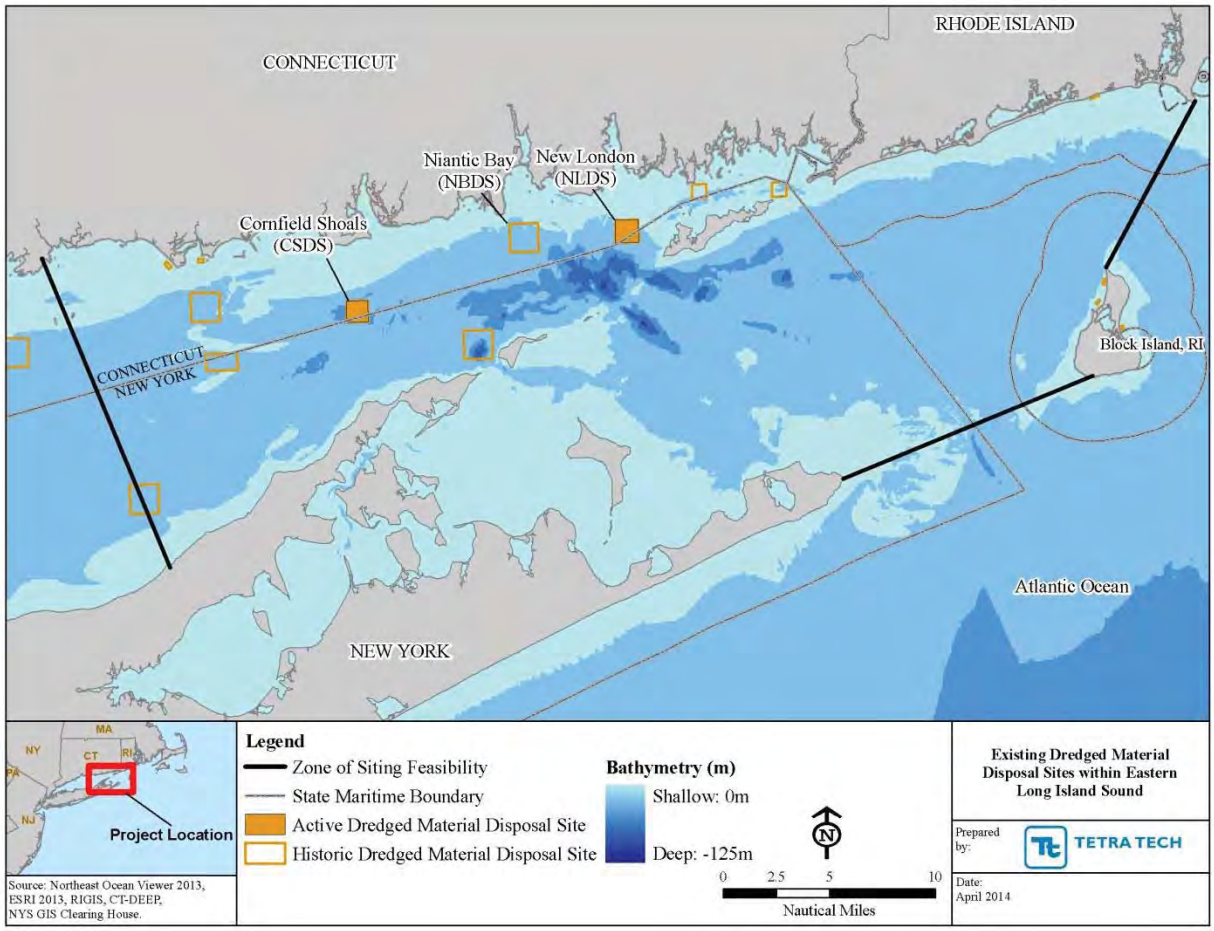

Figure 1: Existing Dredged Material Disposal Sites within Eastern Long Island Sound

The Zone of Siting Feasibility (ZSF) is a comprehensive area considered for dredged material disposal site designation, which encompasses a range of reasonable alternatives (EPA 2004). In identifying the ZSF, the EPA evaluates locations that are economical and practical relative to dredging operations. These factors are presented in further detail in the EPA's manual for site designation (EPA 1986). The EPA, with the cooperation of USACE, U.S. Fish and Wildlife Service, and the National Marine Fisheries Service, developed the ZSF for the evaluation of Long Island Sound dredged material disposal sites in 1999. The ZSF was further modified in 2002 to differentiate the western and central region from the eastern region, which was subsequently evaluated separately. Dredged material disposal sites in central and western Long Island Sound have been analyzed in an Environmental Impact Statement (EIS [EPA 2004]); an SEIS is currently under development for the eastern region. This SEIS will include in-depth information about physical properties, type of site (e.g., dispersive or non-dispersive), and past disposal activities for each historic or active dredged material disposal site that is considered for potential site designation. Some of this information is currently available through the USACE Disposal Area Monitoring System (DAMOS) (USACE 2014). For this biological characterization, parameters such as depth, sediment composition, and biological resources are summarized for each active or historic dredged material disposal site, as well as off-site reference areas.

1.2 Objectives

In support of the EPA's SEIS preparation, the objectives of this eastern Long Island Sound biological characterization included collecting benthic and fish data at priority sites: three of the eastern Long Island Sound active or historic dredged material disposal sites—Cornfield Shoals, New London, and Niantic Bay (historic)—plus additional off-site reference areas between New London and Niantic Bay. This included obtaining information around each site, as well as the identification of locations to serve as reference areas for future monitoring efforts.

The Sampling and Analysis Plan (SAP) describes data collection methods for fisheries, benthic, and toxicity testing (Tetra Tech Inc. 2013c). The benthic and toxicity testing were conducted as described further in the Quality Assurance Project Plan (QAPP) (Tetra Tech Inc. 2013b), while the fisheries data were collected by CT DEEP trawls and a fishing activity survey. Information on finfish abundances was collected by CT DEEP's annual LIS Trawl Survey, with a subset of their tows occurring near the dredged material disposal sites. Additional data on the status of fisheries resources in eastern Long Island Sound were gathered by administering a questionnaire to eastern Long Island Sound fishermen, particularly commercial lobstermen (see Appendix F). Since biological samples could not be obtained from lobsters due to their low abundance, trends in this fishery were characterized using both qualitative and quantitative data provided by fishermen, collected by a fishing activity questionnaire. Qualitative and quantitative data were collected for benthic organisms at each area and analyzed by Tetra Tech. In addition, existing technical reports and literature, such as those created by the U.S. Geological Society and the USACE DAMOS program (USACE 2014), were referenced for comparison. This study characterizes the biological resources which include the benthic, finfish, and shellfish resources of eastern Long Island Sound.

1.3 Previous Investigations

The EPA, with the support of USACE, evaluated sites in Long Island Sound as part of an EIS to designate one or more dredged material disposal sites in western and central Long Island Sound under section 102(c) of the MPRSA and in accordance with the NEPA and CEQ Regulations (40 CFR 1500 et. seq.). The purpose of the EIS was to evaluate the current sites used in western and central Long Island Sound, as well as other sites, for possible designation as dredged material disposal sites and to investigate the means for managing dredged material (EPA 2004).

In the earlier years of that study, data were collected sound-wide and included the eastern portion of Long Island Sound. The methods, work plans, and analyses of the current study all followed a similar approach as the central and western Long Island Sound EIS (as applicable), since the initial EIS sampling effort was presented and accepted by agencies, the public, and other stakeholders.

In 1999, a questionnaire (ENSR 2001b), completed by fishermen, was used by as a part of the Long Island Sound Dredged Material Disposal EIS (EPA 2004). Following a massive die-off in 1999, lobster fishing activities were significantly affected throughout the Sound, although the western portion experienced the greatest decrease in lobster abundance. The fixed-gear (i.e., pots and traps) lobster fishery was dominant in Long Island Sound in the years before the die-off, with more than 800 active commercial lobstermen in 1998. The survey implemented in 1999 received feedback about effort and trends from 20 fishermen from throughout Long Island Sound. For an updated comparison, another fishing activity survey, specific to eastern Long Island Sound, was implemented in 2013 as a part of this current study. This report describes the results of that survey.

2 METHODS

Data were collected from both field sampling and survey responses. Benthic grabs and fish trawls were achieved through two separate efforts, which are summarized in this introduction and described in more detail in the subsequent sections. The benthic survey was conducted by Tetra Tech biologists in coordination with a local fishing vessel captained by a fully-licensed commercial fisherman/lobsterman. During field sampling efforts, Tetra Tech held a Scientific Collecting Permit (#SC-13004) from the State of Connecticut to authorize the collection of benthic organisms for this study within the Connecticut waters of eastern Long Island Sound. All benthic sampling was conducted in accordance with the quality objectives and protocols specified in the SAP and the QAPP developed for this project (Tetra Tech Inc. 2013b, c). The methods, procedures, quality assurance, and quality control measures are fully described in those documents. Briefly, 45 sites were sampled for benthic parameters. These sites were identified by location (on or off of a dredged material disposal site) and by importance (priority or randomized). From these collected samples, measurements were made, including infaunal diversity and wet-weight biomass, organic carbon content, and grain size distribution.

Fisheries data for this report were collected in a separate effort. CT DEEP biologists provided the fish data as part of the ongoing LIS trawl survey. In addition to standard trawl sites, CT DEEP scientists collected trawl samples (fish and shellfish) from sites specifically selected for this study. This resulted in several trawl locations closer to dredged material disposal sites. Fish identification, abundance, wet-weight biomass, and lengths were then provided to Tetra Tech biologists for analysis and inclusion in this report. For an annual comprehensive report covering all of CT DEEP's trawl locations in Long Island Sound, see Gottschall and Pacileo (2012) or CT DEEP (2014).

Sampling stations for both benthic grabs and fish trawls were targeted and identified using the vessel's onboard global positioning system (GPS) navigation system and a Trimble Juno® Series handheld GPS unit, as a backup. Positioning data were uploaded as GPS points using the Universal Transverse Mercator (UTM), NAD-83, Connecticut State Plane Coordinate System. Sampling locations were mapped using ESRI ArcGIS v9.3.

To supplement the biological data and gain a better understanding of fisheries resources, especially the American lobster, a fishing activity survey was also implemented by Tetra Tech biologists. This survey focused exclusively on eastern LIS, but collected information from a variety of fisheries (commercial, charter/party boat, and recreational). In either electronic or hard-copy form, the anonymous survey was distributed to fishermen through fishing associations, public forums, and word-of-mouth.

2.1 FIELD SAMPLING

Field sampling was conducted in accordance with the quality objectives and protocols specified in the QAPP developed for this project. A summary of all field samples collected is provided in Table 1.

Table 1: Summary of Field Sampling Effort

Sites	Benthic Grabs 16–18 July 2013		Fish Trawl (Conducted by CT DEEP LIS Trawl Survey) 10–13 June 2013	
	# of Stations	Number and Type of Samples	# of Stations	Data Collected
NLDS	6 on-site (1 in triplicate)	8 TOC and grain size; 8 infauna; 1 toxicity	1 on-site trawl station	Species composition; length; weight
NBDS	8 on-site (1 in triplicate)	10 TOC and grain size; 10 infauna; 1 toxicity	1 on-site trawl station	Species composition; length; weight
CSDS	1 on-site (in triplicate)	3 TOC and grain size; 3 infauna; 1 toxicity	1 on-site trawl station	Species composition; length; weight
Off-site	30 off-site (none in triplicate)	30 TOC and grain size; 30 infauna; 1 toxicity	3 off-site trawl stations	Species composition; length; weight
Total	**45 grab sites**	**51 TOC and grain size; 51 infauna; 4 toxicity**	**6 trawl sites**	**6 trawl hauls**

Note: LIS = Long Island Sound; CT DEEP = Connecticut Department of Energy and Environmental Protection; TOC = total organic carbon

2.1.1 Benthic Grabs

Sediment samples for benthic organism identification, grain size, total organic carbon (TOC), and toxicity testing were collected using a Van Veen grab sampler (0.1 m^2). The sampling strategy was designed to provide an overall characterization of the infaunal community and sedimentary regimes at the dredged material disposal sites. The original sampling plan included collecting individual samples from three in-site stations and two nearby reference stations from each area. The site-specific stations were located within 200 meters (m) of the target site boundaries.

Benthic samples were collected aboard the F/V *Hostile Waters* by four Tetra Tech field biologists, the vessel captain, and one crewmember from 16–18 July 2013. The Van Veen grab was deployed from the capstan head and block on the F/V *Hostile Waters*. Upon retrieval, the grab was examined for acceptability in accordance with the QAPP (i.e., at least 50 percent full with no surface washout). Samples for TOC and grain size analysis were collected from the top 2 cm of sediment prior to any manipulation. Raw sediment was transferred to a pre-labeled 16 oz. polyethylene screw-top jar. When collected, toxicity samples were also stored in sealed 1-gallon plastic bags before sieving the sample. All screw-top lids were secured and sealed with electrical tape, and bags were double-bagged and secured with cable ties to prevent leakage. All unprocessed samples were stored and shipped on ice in coolers. The remaining sediments were then sieved to retain only the larger sediments and organisms.

A total of 45 separate sites were sampled, 21 of which were considered “Priority” (labeled as “P-XXX” and represented by circles in Figures 2 and 3). Priority sites were chosen by the EPA based on previous sampling coordinated by the EPA and USACE, and conducted aboard the OSV *Bold*. Therefore, the effort for the current sampling event was not evenly distributed, because some sites warranted more sampling than others. Eleven priority sites were located within one of three current or historic dredged material disposal sites (five in New London [NLDS], five in Niantic Bay [NBDS], and one in Cornfield Shoals [CSDS]; Table 2; Figure 2; Figure 3); ten priority sites were located off-site of a dredged material disposal site. Random sites (labeled as “R-XXX” and represented by triangles in Figure 2) were chosen by a geographic

information systems (GIS) specialist by generating random points within a constraining polygon around the sample area. Three priority sites, one within each dredged material disposal site, had triplicate grabs taken for benthic infauna, grain size, and TOC analysis (sites P003, P011, and P018). Samples analyzed specifically for toxicity levels were collected at four sites: one within each active or historic dredged material disposal site (sites P003, P011, and P018) and one off-site, located outside of a dredged material disposal site (site R024). These sites used in sediment toxicity tests are identified in Figures 2 and 3 by an asterisk.

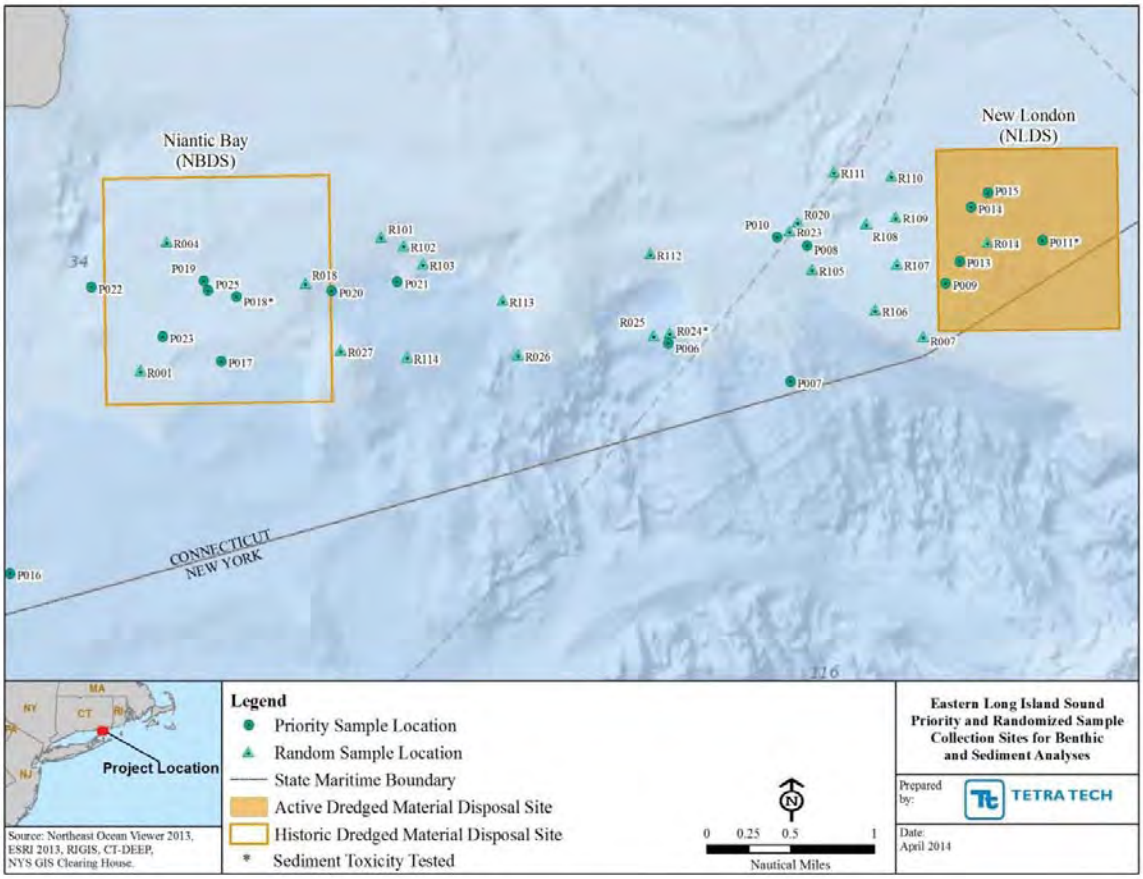

Figure 2: Eastern Long Island Sound Priority and Randomized Sample Collection Sites for Benthic and Sediment Analyses at New London Dredged Material Disposal Site (NLDS), Niantic Bay Historic Dredged Material Disposal Site (NBDS), and Off-site

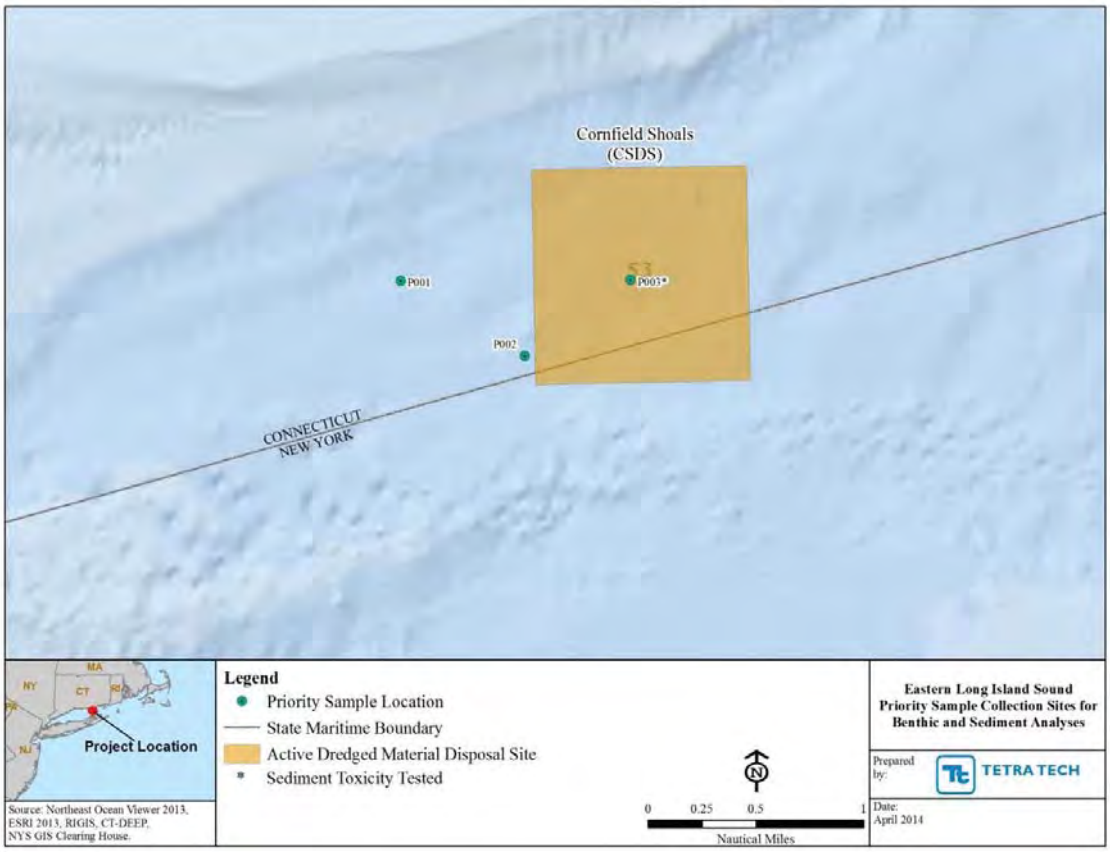

Figure 3: Eastern Long Island Sound Priority Sample Collection Sites for Benthic and Sediment Analyses at Cornfield Shoals Dredged Material Disposal Site (CSDS) and Off-site

Table 2: Coordinates of Sampling Locations and Samples Collected

Site ID[1]	Date	Latitude (N)	Longitude (W)	Benthic infauna	TOC and grain size	Toxicity
New London Dredged Material Disposal Site (NLDS)						
P009 (NL-6)	16 July 2013	41.266	72.087	X	X	
P011[2]	16 July 2013	41.270	72.074	X	X	X
P013	16 July 2013	41.268	72.085	X	X	
P014	16 July 2013	41.273	72.083	X	X	
P015	16 July 2013	41.275	72.081	X	X	
R014	16 July 2013	41.270	72.081	X	X	
Niantic Bay Historic Dredged Material Disposal Site (NBDS)						
P017 (NT-26)	17 July 2013	41.260	72.182	X	X	
P018[2] (NT-25)	17 July 2013	41.266	72.180	X	X	X
P019 (NT-22)	17 July 2013	41.268	72.185	X	X	
P023	17 July 2013	41.262	72.190	X	X	
P025	17 July 2013	41.267	72.184	X	X	
R001	17 July 2013	41.259	72.193	X	X	
R004	17 July 2013	41.272	72.190	X	X	
R018	17 July 2013	41.267	72.171	X	X	
Cornfield Shoals Dredged Material Disposal Site (CSDS)						
P003[2] (CSDS-16)	17 July 2013	41.211	72.359	X	X	X
Off-site						
P001 (CSDS29-REF2)	17 July 2013	41.211	72.383	X	X	
P002 (CSDS23-REF4)	17 July 2013	41.205	72.370	X	X	
P006 (NL-8)	18 July 2013	41.261	72.123	X	X	
P007 (NL-12)	18 July 2013	41.256	72.107	X	X	
P008 (NL-3)	16 July 2013	41.270	72.105	X	X	
P010 (NL-2)	16 July 2013	41.271	72.109	X	X	
P016 (NT-19)	17 July 2013	41.239	72.211	X	X	
P020 (NT-37)	17 July 2013	41.266	72.168	X	X	
P021 (NT-38)	18 July 2013	41.267	72.159	X	X	
P022	17 July 2013	41.267	72.200	X	X	
R007	18 July 2013	41.261	72.090	X	X	
R020	16 July 2013	41.272	72.106	X	X	
R023	16 July 2013	41.271	72.107	X	X	
R024	18 July 2013	41.262	72.123	X	X	X
R025	18 July 2013	41.261	72.125	X	X	
R026	17 July 2013	41.260	72.143	X	X	
R027	17 July 2013	41.260	72.167	X	X	
R101	17 July 2013	41.272	72.161	X	X	

Site ID[1]	Date	Latitude (N)	Longitude (W)	Benthic infauna	TOC and grain size	Toxicity
R102	17 July 2013	41.271	72.158	X	X	
R103	17 July 2013	41.269	72.156	X	X	
R105	18 July 2013	41.268	72.104	X	X	
R106	18 July 2013	41.263	72.096	X	X	
R107	18 July 2013	41.268	72.093	X	X	
R108	18 July 2013	41.272	72.097	X	X	
R109	18 July 2013	41.273	72.093	X	X	
R110	18 July 2013	41.277	72.094	X	X	
R111	18 July 2013	41.277	72.101	X	X	
R112	18 July 2013	41.269	72.126	X	X	
R113	18 July 2013	41.265	72.145	X	X	
R114	18 July 2013	41.260	72.158	X	X	

[1]EPA IDs from previous surveys in parentheses; [2]Triplicate samples collected at sampling location.

Sieving was accomplished by placing sediment in the bottom of a sieve bucket with a 500 micron-mesh bottom; the bucket was then partially submerged in a wash tub. The bucket was agitated in such a manner that the finest sediment rinsed away through the sieve, leaving behind the benthic fauna, and larger materials (i.e., gravel, organisms, etc.) as the filtered sample. Once the entire contents of the Van Veen were processed in this manner, the filtered sample was transferred to a cloth bag and preserved with 10 percent buffered formalin in a 5-gallon bucket. In addition to the standard exterior label, a waterproof paper interior label was included inside each sample bag with the same information as the exterior label. The sieved, preserved samples were labeled and stored at ambient temperature prior to shipment.

TOC and grain size samples were shipped to Tetra Tech's geotechnical lab in Orlando, Florida. Toxicity samples were shipped to Tetra Tech's toxicology lab in Owings Mills, Maryland. Sieved samples for benthic infaunal identification were shipped to EcoAnalysts in Moscow, Idaho.

2.1.2 Water Quality

Water quality data were collected in conjunction with the benthic sampling. *In-situ* water quality parameters were measured near the bottom, middle, and top of the water column from representative areas where sediment grabs were obtained, using a YSI 6920 sonde and water quality meter equilibrated at each site. These data provide a characterization of the ambient water quality conditions of the water column to which benthic organisms are exposed. Within each area (NLDS, NBDS, CSDS, and off-site), measured parameters included temperature, specific conductance, dissolved oxygen (DO), pH, and turbidity. The cable for the sonde was marked at 1-m depth intervals and was lowered to the appropriate measurement depth, where readings were recorded after DO readings stabilized.

2.1.3 Fish Trawls

Fish were collected as part of the CT DEEP Long Island Sound Trawl Survey. This survey encompasses an area from Pawcatuck to Greenwich, Connecticut and includes waters from 5 to 46 m deep in both Connecticut and New York state waters. Typically, Long Island Sound is surveyed in the spring, from April

through June, and during the fall, from September through October. The sites for this project were surveyed during June 2013 in Connecticut waters: four on 10 June, one on 12 June, and one on 13 June (Table 3). This somewhat temporal spacing was a consequence of schedule; however, since all trawls were conducted within three days, it is not expected that fish assemblages would change drastically within this time frame. Trawl stations were designated from the randomly selected stations to best represent similar habitat conditions for that general site area. All sampling protocols and methods are described in detail within the most recent LIS trawl survey report (Gottschall and Pacileo 2012). A trawl net was towed through one station at each of the three active or historic dredged material disposal sites (tows AC2013001, AC2013003, and AC2013006 at NLDS, NBDS, and CSDS, respectively), plus an additional three tows off-site (tows AC2013002, AC2013004, and AC2013005) for a total of six tows (Table 3; Figure 4). Since fishes are highly mobile, tows in close proximity were considered representative of conditions on dredged material disposal sites; therefore, the on-site tows are not directly transecting sites. The selection was performed in consultation with the resource scientists of CT DEEP to ensure proper representation of the stations selected for this study aligned with their pre-selected locations. Actual trawl locations may have been adjusted in the field, taking weather, tides, and fixed fishing gear into consideration; however, CT DEEP crews strived to remain as close as possible to pre-determined trawl coordinates. For each trawl, CT DEEP employed the following naming convention: "AC" denotes a trawl specific to this project, followed by the year and the sequence number. For graphical simplicity, only the last digit of the site ID was used in Figure 4 (e.g., AC2013001 is represented as 1). Additional trawls conducted by CT DEEP as part of their annual LIS trawl survey (i.e., not specifically for this study) follow a different naming convention, with "SP" denoting spring and "FA" denoting fall. These are followed by the year and trawl sequence number. Station information for the entire trawl survey, including location, tow duration, water quality, and haul data, can be found in Gottschall and Pacileo (2012).

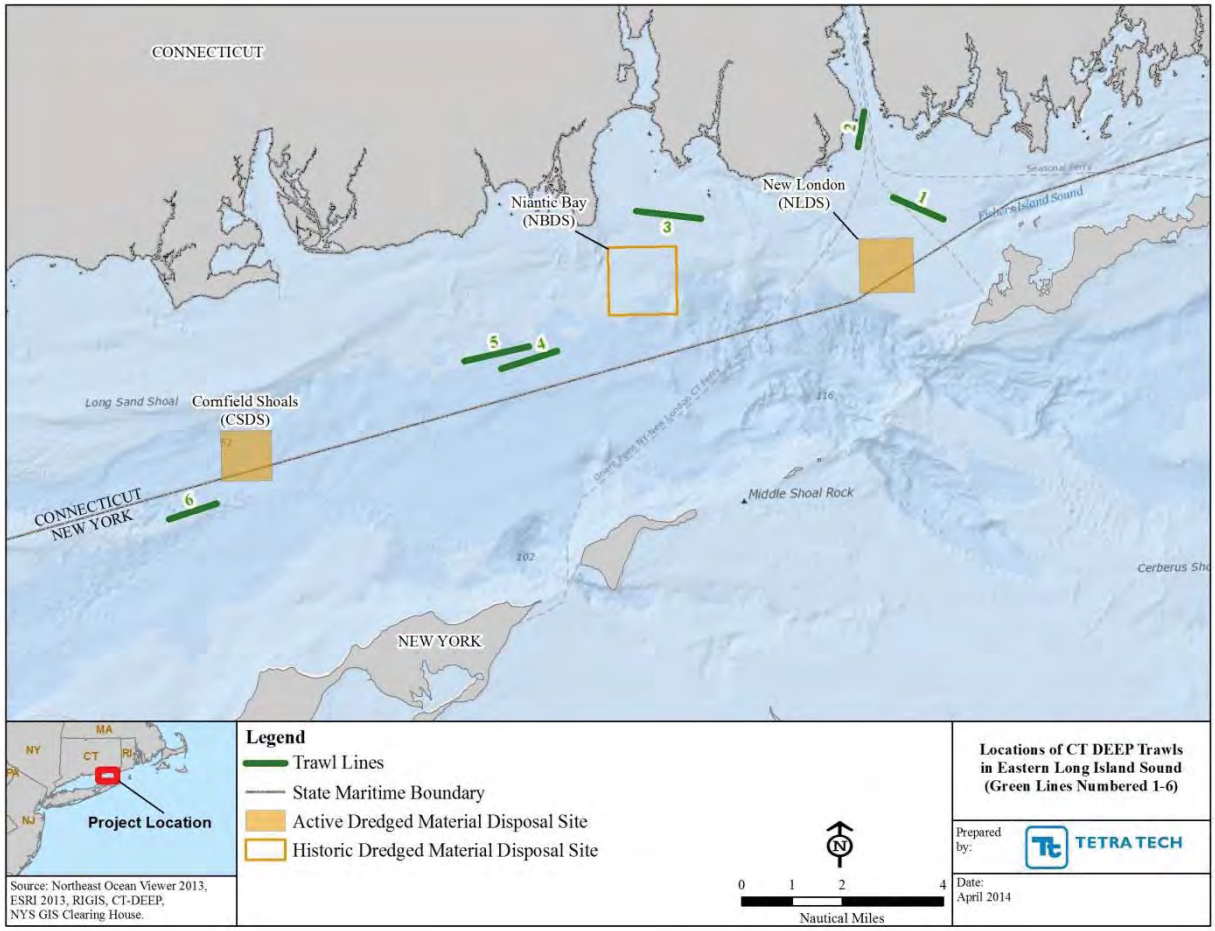

Figure 4: Locations of Connecticut Department of Energy and Environmental Protection (CT DEEP) Trawls in Eastern Long Island Sound (Green Lines Numbered 1–6)

The survey's otter trawl was towed from the 23.3 m (76.5 ft.) R/V *Connecticut* for 30 minutes at approximately 3.5 knots, depending on the tide. The trawl net was a Wilcox 14.0 m (46.0 ft) high-rise net (two seam) with steel "V" type doors. Each tow was approximately 2 miles in length. Upon completion of the tow, the catch was funneled through the sorting table and categorized by species. Catch data were obtained for each of the six tows. Additional gear specifications and methods are described in the LIS trawl survey report (Gottschall and Pacileo 2012).

Consistent with previous LIS studies at these sites and CT DEEP reports, winter flounder (*Pseudopleuronectes americanus*), scup (*Stenotomus chrysops*), bluefish (*Pomatomus saltatrix*), and striped bass (*Morone saxatilis*) were chosen as the primary species of interest (ENSR 2000). The windowpane flounder (*Scophthalmus aquosus*) and striped searobin (*Prionotus evolans*) were considered secondary species of interest. Finfish, lobsters, and squid were counted and weighed in aggregate (to the nearest 0.1 kg) by species with a precision marine-grade scale (30 kg, +/- 10 g capacity).

Table 3: Connecticut Department of Energy and Environmental Protection (CT DEEP) Trawl Times and Locations for Fish Surveys

Tow ID	Date	Time (start)	Duration (min)	Latitude (N)	Longitude (W)	Location (NLDS, NBDS, CSDS, off-site)
AC2013001	10 June 2013	0854	30	411755	720435	NLDS
AC2013003	10 June 2013	1258	30	411711	720904	NBDS
AC2013006	13 June 2013	0806	30	411141	722377	CSDS
AC2013002	10 June 2013	1048	30	411965	720510	Off-site
AC2013004	10 June 2013	1437	30	411470	721274	Off-site
AC2013005	12 June 2013	0731	30	411480	721372	Off-site

2.2 Laboratory Analysis

Benthic sampling was conducted in accordance with the quality objectives and protocols specified in the SAP and QAPP developed for this project that was approved by the EPA. The laboratory protocols were followed under the guidance of the Regional Implementation Manual (RIM), developed by the EPA and USACE (2004). Taxonomic identification was conducted by experts that specialize in the regional benthic infauna. The analysis of each sample and methods used is summarized in the following sections.

2.2.1 Sediment Toxicity

To measure the toxicity of sediments, a 10-day toxicity test was completed using unfiltered sediment collected from four benthic grabs in eastern Long Island Sound from each dredged material disposal site and off-site (Sites P011, P018, P003, and R024; Figure 2 and 3). Sediment samples were collected using a Van Veen grab, then transferred to sealed plastic bags and stored on ice before and during shipment. The Tetra Tech Ecological Testing Facility in Owings Mills, Maryland received the sediment samples on 22 July 2013. The complete methods used in the toxicity test are included in Appendix C. In summary, sediment samples were homogenized and inspected for fauna (if found, organisms were removed). Two test organisms, *Leptocheirus plumulosus* and *Americamysis bahia*, were then exposed to the sediment for a period of 10 days, after which final survival was measured. *L. plumulosus*, measuring 2–4 mm, were put into containers with artificial seawater of 19.4 practical salinity units (psu) at densities of 20 organisms per container, with five replicates. *A. bahia*, 1–5 days of age, were stocked in 25–30 psu salinity at ten organisms per container, with five replicates. Additional control samples were also maintained with identical conditions (e.g., species density, salinity, replicates), to determine organism quality and verify that the laboratory methods did not affect survival. Control sediment was from the Boardman River in Michigan. Survival of 90 percent or greater within the control sample was required to validate the acceptability of the test. This control test verified that organisms were of good health and could survive in laboratory conditions. Therefore, any significant decrease in survival in test (i.e., Long Island Sound) sediment, either from dredged material disposal sites or off-site reference areas, could be attributed to sediment toxicity rather than confounding factors.

2.2.2 Total Organic Carbon (TOC) and Grain Size

Grain size and TOC samples were analyzed by Tetra Tech's Ardaman Laboratory in Orlando, Florida. Grain size samples were analyzed according to method D422, "Particle-Size Analysis of Soils," using sieve analysis (Tetra Tech 2013c). These methods require sifting the sediment samples through progressively smaller, nested sieves. Results were determined by dividing the post-drying weight of material retained

by each sieve by the total post-drying weight of the sample. Size ranges for each category were as follows: gravel was retained on the No. 4 sieve (0.185"); coarse sand passed through the No. 4 sieve and was retained in the No. 10 sieve (0.078"); medium sand passed through the No. 10 sieve and was retained in the No. 40 sieve (0.0164"); fine sand passed through the No. 40 sieve and was retained in the No. 200 sieve (0.0029"); silt and clay passed through the No. 200 sieve. Sediment samples were analyzed for TOC in accordance with the SAP developed for this project (Tetra Tech 2013c) and as reported in Appendix B. TOC results were reported as percent organic content. Water content was also measured and reported as percent water content.

2.2.3 Benthic Infauna

Benthic macroinvertebrate samples were identified by EcoAnalysts in Moscow, Idaho. Individual organisms were picked from each sample, sorted into major taxonomic categories, then further identified by lowest practical taxonomic unit and enumerated. The picking, sorting, and taxonomic identification processes were subject to quality control checks by laboratory staff. Planktonic fauna and colonial epifauna were not included in the raw data files. Data were recorded electronically and taxa were coded with the relevant National Oceanographic Data Center code. Calculations based on species (e.g., diversity, evenness, and number of species) included only those taxa identified to species level.

During previous studies conducted at dredged material disposal sites in Long Island Sound, in support of the site designation EIS (ENSR 2002), a new species in the polychaete worm family Cirratulidae were discovered (Battelle 2003). To ensure that the current taxonomic identification of these worms is consistent with those made for previous studies, the most up-to-date taxonomic references were used for this region. Additional technical documents used for reference and background information were obtained from the DAMOS website (USACE 2014).

2.3 Data Analysis

Characteristics and patterns within the benthic data were investigated using several different parameters. Species richness (R) is the overall number of species. To measure diversity, the Shannon Diversity Index (H') was calculated as:

$$H' = -\sum_{i=1}^{R} p_i \ln p_i$$

where p_i is the proportion of an individual species relative to the total species abundance. Greater values of H' correspond to higher diversity. This diversity index can then be used to look at relative abundances of different species, or evenness. Pielou's evenness index,

$$J' = \frac{H'}{H'_{max}}$$

estimates the evenness of different species. H'_{max} is the maximum value of H', equivalent to the natural log of R (where R = total number of species). J' ranges from 0 to 1, with low values representing greater variation between species and high values indicative of more even abundances. A community with similar abundances of various species is considered more even and will have a J' value approaching 1. Statistical comparisons of benthic and finfish data among sites were tested using a two-tailed t-test. All statistical tests used a significance level of $\alpha = 0.05$.

2.4 Fishing Activity Survey

The fishing survey included 22 questions that focused on topics that were similar to the information collected by the 2001 survey (ENSR 2001b). The goal was to generate the greatest response rate of fishermen while ensuring their anonymity. Questions focused on fishing activity by area and season; information was also gathered on trends in catches, such as size, health, and bycatch, observed by fishermen (full survey in Appendix F). The map included in the survey was developed by the EPA and a Tetra Tech fisheries biologist. Within the ZSF, 13 areas (labeled A-M) were delineated based on state boundaries and geographic features, with a conscious effort to avoid overlap with regulatory boundaries (e.g., state or federal management areas). These smaller areas provided a finer spatial scale on which to identify fishing patterns. This survey was offered in several formats, namely website link, phone, social media, and hard copy, in order to generate the greatest response rate. Names, vessels, and contact information were not required; however, individuals had the opportunity to voluntarily identify themselves. The 2001 questionnaire was implemented as a phone survey, relying almost exclusively on unsolicited “cold” calls. The current study used an online survey tool (FluidSurveys), so that a link could be distributed via email or social media (e.g., fishing message boards, electronic newsletters, and websites). A hard copy of the survey, which included the same questions, was also offered by mail to be returned to a Tetra Tech fisheries biologist. The same fisheries biologist's direct line was also available to assist respondents with completing the survey over the phone or to provide additional information. Respondents could choose the most convenient of the response options, leading to an increased response rate. The survey was available for 37 days, from 25 November to 31 December 2013.

Before and during the survey period, fishermen were contacted to encourage participation. Networking efforts included a Tetra Tech biologist attending the executive board meeting of the Southern New England Fishing and Lobster Association in Stonington, Connecticut. The input of commercial, charter, and recreational fishermen was solicited primarily through fishing associations. Multiple associations distributed survey information, including the electronic link and hard copy surveys (Table 4). Often, the cooperation of one organization or individual led to the inclusion of more groups, so the effort to reach out to the fishing community continued throughout the open survey period. Survey data were then analyzed to better understand areas of both biological and socioeconomic importance within eastern Long Island Sound. Initially, any responses that were irrelevant or that contained insufficient information were omitted (e.g., surveys that were not completed beyond the first five questions were excluded).

For analysis, data were organized by relation to the fishing industry (commercial, charter/party boat, and recreational). Commercial fishing data were then further divided by target species (lobster, mollusk, and finfish) due to the substantial differences in gear, location, and seasonality. The charter/party boat industry and the recreational fishery both identified rod and reel as the primary gear type and almost exclusively targeted finfish; therefore, these two categories were not split further. Overall averages (i.e., for all survey respondents regardless of fishery type) were determined using a weighted mean, to account for varying sample sizes of each fishery category.

Table 4: Network Efforts and 2013 Fishing Activity Survey Participation

Individual contacted	Organization	First contacted	Method of contact	Fishermen reached/result
President/lobsterman	Rhode Island Lobstermen's Association	08 November	Emailed; called	75 members; sent 25 hard copies and link
Liaison	Long Island Commercial Fishing Association	08 November	Facebook message; called	Sent 50 hard copies and 40 postcards; link posted on Facebook page; information shared to multiple contacts in industry and regional FMCs
President/lobsterman	Connecticut Commercial Lobstermen's Association	13 November	Called	No response
President/lobsterman	Southern New England Fisherman and Lobsterman Association	13 November	Called	25 members; attended executive board meeting (~12 fishermen); left 25 hard-copy surveys and 10 postcards
Liaison	Commercial Fisheries Center of Rhode Island	20 November	Emailed	Forwarded info to Executive Committee and Commercial Fisheries Center of Rhode Island
President/charter boat captain	Rhode Island Party and Charter Boat Association	20 November	Emailed; called	70 members; sent 20 hard copies and link; meeting held 17 December
Two members/charter boat captains	Mid-Atlantic Fisheries Management Council	26 November	Emailed both individuals	No response from either individual
President/charter boat captain	Connecticut Charter and Party Boat Association	02 December	Called	35 members; sent 20 hard copies and link; meeting held 12 December
President/fisherman	Rhode Island Saltwater Anglers Association	02 December	Called	Sent link electronically
Members	Long Island Fishing Charters	04 December	Emailed individuals	Link sent electronically to 20 individuals
Finfish and crustacean biologist	New York State Department of Environmental Conservation	10 December	Emailed; called	Distributed link electronically to about 13,000 contacts
President	Rhode Island Fishermen's Alliance	11 December	Called	200 members (~75% fishermen); link distributed in weekly newsletter
Liaison	Viking Fleet charter/party boat fleet (NY)	11 December	Emailed	Distributed link electronically
NEFMC/captain	Frances Fleet charter/party boat fleet (RI)	11 December	Emailed	No response
Elected board member	East Hampton Fisheries Committee	11 December	Emailed	Circulated link to Fisheries Committee and local fishermen
President/fisherman	Rhode Island Commercial Fishermen's Association	11 December	Called	Missed calls; no response to last two calls

Individual contacted	Organization	First contacted	Method of contact	Fishermen reached/result
Member/captain	North Fork Captains Association; Montauk Boatman's Association	11 December	Called	20 members; sent link electronically
Public fishery forum	Noreast.com	11 December	Posted survey online	Over 1,000 views; fishermen of all types
Member/captain	Anonymous	06 December	Called in	Completed online survey
Member/captain	Anonymous	09 December	Called in	Completed online survey
Captain	Anonymous	11 December	Called in	Completed online survey
Commercial charter fisherman	Anonymous	13 December	Called in	Completed online survey
Lobsterman	Anonymous	18 December	Called in	Completed hard-copy survey
Fisherman	Anonymous	19 December	Called in	Completed online survey
Fisherman	Anonymous	23 December	Called in	Completed online survey

3 RESULTS

Results from the sampling effort in eastern Long Island Sound are summarized below. For the Benthic sampling effort, sediment descriptions are provided in Table 5. Grain size, water quality, and benthic infauna abundance are summarized in Tables 6, 7, and 8, respectively. Datasheets used in the field are included in Appendix A. Detailed results of TOC, grain size, toxicity, and infauna diversity are further presented by area. For information pertaining to dredged material disposal activities and monitoring programs, refer to USACE's DAMOS website (USACE 2014). Results of the fish trawl survey, executed by CT DEEP, are also included within this section. Additional detail and historic data from the annual LIS trawl survey are kept up to date by CT DEEP (2014). Finally, the fishing activity survey results are included at the end of this section.

Table 5: Site Location and Sediment Description for Benthic Sampling in Eastern Long Island Sound

Site ID	Date	Depth (ft.)	Description
New London Dredged Material Disposal Site (NLDS)			
P009	16 July 2013	61.8	Light brown to black clayey sand with trace shell
P011a	16 July 2013	59.1	Light brown to brown silty sand with shell
P011b	16 July 2013	59.1	Light brown to brown silty sand with shell and trace roots
P011c	16 July 2013	59.1	Light brown to brown sand with silt, shell and trace roots
P013	16 July 2013	66.3	Brown to black clay with sand and trace roots and shell
P014	16 July 2013	61.4	Gray sandy clay with trace shell and roots
P015	16 July 2013	59.3	Brown to dark gray clayey sand with shell
R014	16 July 2013	61.9	Gray to light brown clayey sand with shell
Niantic Bay Historic Dredged Material Disposal Site (NBDS)			
P017	17 July 2013	123.0	Orangey-brown clayey sand with shell and trace roots
P018a	17 July 2013	109.0	Light brown to brown sand with gravel and shell
P018b	17 July 2013	109.0	Light brown to brown sand with shell
P018c	17 July 2013	105.0	Light brown to brown sand with shell
P019	17 July 2013	92.0	Light brown to brown sand with silt and shell
P023	17 July 2013	88.7	Light brown to brown sand with gravel and shell
P025	17 July 2013	92.1	Light brown to brown sand with shell and trace roots
R001	17 July 2013	100.0	Light brown to brown sand with shell
R004	17 July 2013	84.0	Light brown to brown sand with shell and trace roots
R018	17 July 2013	54.2	Light brown to brown sand with gravel and shell
Cornfield Shoals Dredged Material Disposal Site (CSDS)			
P003a	17 July 2013	178.0	Light brown to brown sand with gravel, shell and trace roots
P003b	17 July 2013	158.0	Light brown to brown sand with silt and gravel and shell and trace roots
P003c	17 July 2013	157.0	Light brown to brown sand with silt, shell and trace roots
Off-site			
P001	17 July 2013	178.0	Light brown to brown sand with shell and roots
P002	17 July 2013	171.0	Light brown to brown sand with silt and shell
P006	18 July 2013	143.0	Light brown to brown sand with silt, shell and trace roots
P007	18 July 2013	115.0	Light brown to brown gravel (shell) with sand; live shells removed from sand
P008	16 July 2013	65.7	Dark gray to light brown clayey sand with shell and trace roots
P010	16 July 2013	66.8	Light brown to brown sand with silt, shell and trace roots
P016	17 July 2013	132.0	Light brown to brown sand with gravel and shell
P020	17 July 2013	95.1	Light brown to gray clayey sand with shell

Site ID	Date	Depth (ft.)	Description
P021	18 July 2013	105.0	Light brown to brown clayey sand with shell and trace roots
P022	17 July 2013	87.9	Light brown to brown sand with silt and shell
R007	18 July 2013	78.9	Light brown to dark gray clayey sand with shell
R020	16 July 2013	71.6	Light brown to brown sand with silt, shell and trace roots
R023	16 July 2013	69.3	Light brown to brown sand with silt, shell and trace roots
R024	18 July 2013	119.0	Light brown to brown clayey sand with gravel and shell
R025	18 July 2013	144.0	Orangeish-brown to dark gray clayey sand with shell and trace roots
R026	17 July 2013	140.0	Light brown to dark gray sand with silt and gravel and shell
R027	17 July 2013	93.5	Light brown to brown sand with clay and gravel and shell
R101	17 July 2013	69.1	Light brown to brown sand with clay, shell and trace roots
R102	17 July 2013	81.1	Brown sand with trace shell
R103	17 July 2013	112.0	Light brown to brown gravel with clay and sand and trace roots
R105	18 July 2013	69.0	Light brown to brown clayey sand with shell
R106	18 July 2013	67.3	Light brown to brown sand with silt and shell
R107	18 July 2013	59.6	Light brown to brown clayey sand with gravel and shell and trace roots
R108	18 July 2013	89.5	Light brown to brown clayey sand with shell
R109	18 July 2013	80.3	Brown clayey sand with shell
R110	18 July 2013	66.3	Brown clayey sand with shell
R111	18 July 2013	69.4	Brown clayey sand with shell
R112	18 July 2013	69.6	Light brown to brown sand with shell
R113	18 July 2013	101.0	Brown sand with silt and shell
R114	18 July 2013	161.0	Light brown to brown sand with clay and shell

Individual grab characteristics are described in the following sections, but Table 6 and Figure 5 summarize average conditions for all sites by area. Medium sand dominated the grabs from NBDS, CSDS, and off-site. NLDS, however, was dominated by silt and clay. Complete grain size and organic content data are included in Appendix B.

Table 6: Average Grain Size and Organic Content of Sediment Samples Collected within Eastern Long Island Sound

Grab Location	Organic Content (%)	Water Content (%)	Particle-size Distribution (from dry mass)					
			Sample Dry Mass (grams)	Gravel-size (%)	Sand-size (%)			Silt- & Clay-size (%)
					Coarse	Medium	Fine	
NLDS	2.7	59.4	263.9	9.1	5.5	22.2	29.2	34.1
NBDS	0.6	23.5	421.5	18.5	14.6	48.8	13.4	4.7
CSDS	0.6	25.0	354.7	23.7	9.2	46.3	15.8	5.0
Off-site	1.0	32.5	336.1	16.4	8.7	37.3	27.0	10.6

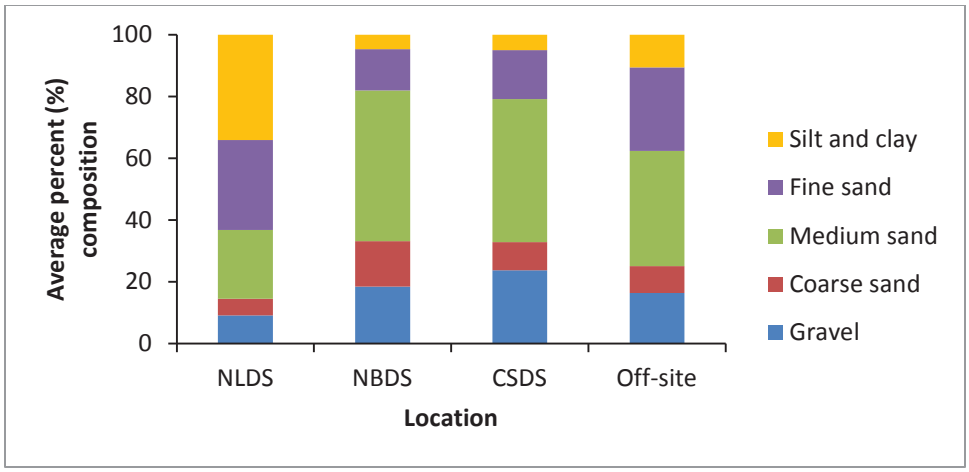

Figure 5: Average Percentage of Sediment Type for Each Location

Water quality parameters were measured at the surface, middle, and bottom of the water column within each dredged material disposal site, as well as two off-site stations (Table 7). These values represent the expected conditions of eastern Long Island Sound: mild stratification with the bottom layer containing the denser (i.e., colder and saltier) water. Since the water quality meter used was not capable of taking actual salinity readings, conductivity was used as a surrogate to represent ionic concentrations. Like salinity, greater values of conductivity indicate greater ion concentration. Conductivity measured in the field was used to calculate salinity, reported in Table 7. Temperature decreased with depth, while salinity and DO increased with depth. Based on these data, a slight pycnocline (i.e., density gradient) existed during sampling efforts. Mixing was expected between the top and bottom layers, though, which ensures adequate levels of nutrients and oxygen throughout the water column. Since most marine life requires DO concentrations of at least 5 mg/L, the entire water column appears to provide sufficient oxygen for organisms. During benthic sampling, the study area did not have any oxygen issues (e.g., hypoxia or anoxia). Temperature and salinity data collected by CT DEEP during fish trawls for this study show similar results (Section 3.5.1).

Table 7: Water Column Measurements (Surface, Middle, and Bottom) for All Sites, Collected with a YSI 6920 during Benthic Sampling, July 2013

Site	Date	Depth (ft)	Surface				Middle				Bottom			
			Temp (°C)	Salinity (psu)	DO (mg/L)	pH	Temp (°C)	Salinity (psu)	DO (mg/L)	pH	Temp (°C)	Salinity (psu)	DO (mg/L)	pH
NLDS	19 July 2013	59.0	19.50	28.1	6.85	8.21	19.56	29.5	6.72	8.19	19.37	28.9	6.66	8.19
NBDS	19 July 2013	70.0	19.45	28.2	7.19	8.18	18.58	29.7	6.91	8.17	18.51	30.0	6.84	8.16
CSDS	19 July 2013	149.0	19.82	29.8	7.94	8.19	19.25	29.7	7.40	8.16	19.14	28.8	7.29	8.17
Off-site A	19 July 2013	81.0	19.42	28.9	7.09	8.22	18.42	30.9	6.74	8.18	17.37	32.2	6.51	8.14
Off-site B	19 July 2013	71.0	19.58	29.0	6.99	8.22	19.20	29.9	6.75	8.19	17.50	31.4	6.52	8.15

The benthic samples collected during this survey exhibited a high degree of taxonomic diversity (see Appendix D for full results). Sampling intensity varied by site, with eight sites at NLDS, ten at NBDS, three at CSDS, and 30 off-site. The total number of individuals, biomass, and species richness is affected by numbers of sample sites; all other parameters are standardized for comparison. At all sites, the top three phyla with the highest number of individuals were Annelida, Arthropoda, and Mollusca, with the remaining seven phyla representing less than 3 percent of the infaunal composition at any given site (Table 8). In NLDS, NBDS, and CSDS, arthropods were the most numerically dominant taxa, making up between 35 and 45 percent of all individuals. Off-site grabs were dominated by annelids, which made up almost 38 percent of all individuals. The average density of individuals per grab (i.e., total individuals/number of samples) were similar among all four sites, ranging from the lowest of 528 (NBDS) to 693 (CSDS), with NLDS and off-site densities intermediate at 615 and 625, respectively.

Table 8: Abundance of Individuals by Phyla for All Sites

Phylum	NLDS		NBDS		CSDS		Off-site	
	Total	% of individuals	Total	% of individuals	Total	% of individuals	Total	% of individuals
Annelida	2,039	41.43	1,413	26.77	618	29.70	7,120	37.95
Arthropoda	2,215	45.01	1,980	37.51	745	35.80	6,125	32.65
Mollusca	611	12.42	1,735	32.87	656	31.52	5,153	27.47
Nemertea	33	0.67	54	1.02	55	2.64	160	0.85
Echinodermata	22	0.45	90	1.71	3	0.14	143	0.76
Cnidaria	0	0.00	2	0.04	3	0.14	46	0.25
Sipuncula	1	0.02	3	0.06	0	0.00	10	0.05
Platyhelminthes	0	0.00	0	0.00	1	0.05	3	0.02
Phoronida	0	0.00	0	0.00	0	0.00	1	0.01
Chordata	0	0.00	1	0.02	0	0.00	0	0.00
Average density (individuals per grab)	615		528		693		625	
Species Richness	208		196		115		282	
Species Diversity (H')	3.297		2.934		2.851		2.753	
Pielou's Evenness (J')	0.754		0.714		0.675		0.696	
Number of samples (n)	8		10		3		30	

In addition to abundance, wet-weight biomass (in mg), was determined for major taxa represented in each benthic grab. These results are summarized in Table 9 as weight and percent of total. For all sites, mollusks contributed the most biomass, from about 82 percent in off-site grabs to 96 percent at CSDS. Crustaceans and polychaetes had the next highest biomass by taxa; however, they made up a relatively low proportion of the samples compared to phylum Mollusca. Within-site comparisons of diversity, as well as species-specific abundances, are provided in the following sections.

Table 9: Biomass of All Samples Collected Within Each Dredged Material Disposal Site and Off-site

Taxa	NLDS		NBDS		CSDS		Off-site	
	Weight (mg)	% of total	Weight (mg)	% of total	Weight (mg)	% of total	Weight (mg)	% of total
Mollusca	90,464	84.55	102,293	92.29	24,993	96.09	160,570	82.09
Crustacea	12,101	11.31	4,516	4.07	326	1.25	20,592	10.53
Polychaeta	4,323	4.04	2,247	2.03	643	2.47	12,222	6.25
Echinodermata	35	0.03	1,514	1.37	12	0.05	1,986	1.02
Cnidaria	0	0.00	225	0.20	110	0.42	701	0.36
Other taxa[1]	66	0.06	46	0.04	35	0.13	202	0.10
Total	**106,989**		**110,841**		**26,010**		**195,602**	

[1]Other taxa include nemerteans, sipunculids, echiurids, ascidians, urochordates, lophophorates, and Platyhelminthes.

3.1 New London Dredged Material Disposal Site (NLDS)

3.1.1 Station Characteristics

Within the New London Dredged Material Disposal Site (NLDS), six sites were targeted for benthic grabs, with one site sampled in triplicate, for a total of eight benthic samples: P011 (triplicate samples), R014, P014, P015, P013, and P009. All eight samples were analyzed for benthic infauna, TOC, and grain size. P011 sediment was also used in a 10-day toxicity test. The DAMOS program has additional data on NLDS characteristics from previous monitoring studies (USACE 2014).

3.1.2 Benthic Habitat and Sediment Types

In addition to descriptive observations (Table 5), each benthic grab at NLDS was characterized by particle size. Table 10 includes site-by-site organic content (or TOC), water content, sample mass, and particle size distributions for all benthic grabs within NLDS. These are represented graphically in Figure 6.

Table 10: Grain Size and Organic Content of Sediment Samples Collected within New London Dredged Material Disposal Site (NLDS)

Grab Sample	Organic Content (%)	Water Content (%)	Particle-size Distribution (from dry mass)					
			Sample Dry Mass (grams)	Gravel-size (%)	Sand-size (%)			Silt- & Clay-size (%)
					Coarse	Medium	Fine	
P009	3.8	79.6	154.83	5.3	4.6	17.9	34.1	38.1
P011a	1.5	30.8	406.15	16.2	7.2	31	35.7	9.9
P011b	1.5	32.9	321.09	16.7	6.2	24.3	40.4	12.4
P011c	1.2	28.9	383.02	10.4	7.0	34.8	39.5	8.3
P013	6.2	124.9	116.36	3.1	1.1	3.8	11.5	80.5
P014	3.7	85.1	165.48	1.7	2.8	9.1	22.1	64.3
P015	1.2	33.0	323.58	5.5	7.3	39.3	31.6	16.3
R014	1.9	60.1	240.34	14.0	7.4	17.2	18.3	43.1
Average	**2.7**	**59.4**	**263.9**	**9.1**	**5.5**	**22.2**	**29.2**	**34.1**

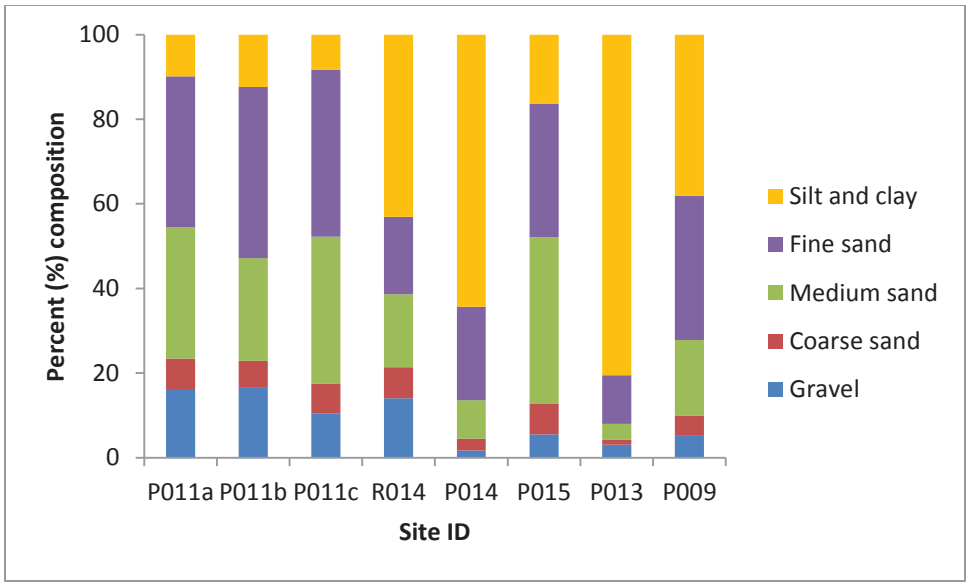

Figure 6: Percentage of Sediment Type for Each Benthic Grab within New London Dredged Material Disposal Site (NLDS)

Of the eight benthic grabs analyzed, five were dominated by sand-size particles, while three were dominated by silt- and clay-size particles (Figure 6). Where sand-size particles were dominant, medium and fine sand, not coarse sand, made up most of the sample. On average, NLDS grabs consisted of approximately 57 percent sand, 34 percent silt and clay, and 9 percent gravel. Organic content ranged from 1.2 to 6.2 percent, averaging 2.6 percent.

3.1.3 Sediment Toxicity

A toxicity test was conducted using sediment collected at site P011 (See Appendix C). As required, the test was validated by a greater than 90 percent survival of organisms in control sediment. *L. plumulosus* experienced a mean survival of 96 percent. Mean survival of *A. bahia* was 82 percent.

3.1.4 Benthic Infauna

The results of benthic infauna analysis are summarized in Table 11. The number of individuals collected in one benthic grab with NLDS ranged from 259 at site R014 to 875 at site P011b, with an average of 617 individuals. Two sites, P014 and R014, both had 60 species identified, which were the fewest. The greatest species richness was 100, which occurred at both site P011c and P015. Species richness, denoted as R, was 208 for the NLDS. Diversity indices ranged from 2.840 to 3.761. The most diverse sample was P011c; the least diverse was P014. The average Shannon diversity index was 3.297. The three most abundant species were two amphipods, *Ampelisca* sp. and *Ampelisca vadorum*, and the polychaete *Ampharete cf. lindstroemi*.

Table 11: Total Individuals, Species, and Diversity Indices for Benthic Samples Collected within New London Dredged Material Disposal Site (NLDS)

Sample ID	Total individuals	Species richness (R)	Diversity index (H')	Pielou's evenness (J')
P009	733	92	3.089	0.683
P011a	511	65	3.147	0.754
P011b	875	94	3.474	0.765
P011c	752	100	3.761	0.817
P013	634	73	3.044	0.709
P014	396	60	2.840	0.694
P015	772	100	3.801	0.825
R014	259	60	3.218	0.786
Average	**617**	**208**[1]	**3.297**	**0.754**

[1]This value represents total species richness for the site; it is not an average.

3.2 Off-site Area Surrounding Bartlett Reef/Goshen Point/The Race

3.2.1 Station Characteristics

Off-site areas adjacent and intermediate to the dredged material disposal sites were sampled. Off-site areas were sampled with 30 benthic grabs at 30 sites (i.e., no triplicate samples were taken at off-site grab locations). All 30 samples were analyzed for benthic infauna, TOC, and grain size. Sediment from site R024 was submitted to a 10-day toxicity test.

3.2.2 Benthic Habitat and Sediment Types

In addition to descriptive characterizations (Table 5), each benthic grab conducted off-site was characterized by particle size. Table 12 includes site-by-site organic content (or TOC), water content, sample mass, and particle size distributions for all off-site benthic grabs. These are represented graphically in Figure 7.

Table 12: Grain Size and Organic Content of Sediment Samples Collected Off-site of Dredged Material Disposal Sites

Grab Sample	Organic Content (%)	Water Content (%)	Particle-size Distribution (from dry mass)					
			Sample Dry Mass (grams)	Gravel-size (%)	Sand-size (%)			Silt- & Clay-size (%)
					Coarse	Medium	Fine	
P001	0.4	22.6	360.15	25.8	16.9	43.3	12.2	1.8
P002	0.5	22.1	388.45	14.5	15.3	56.8	7.3	6.1
P006	1.1	29.0	301.53	8.6	15.7	50.8	13.6	11.3
P007	1.9	33.5	77.72	74.9	8.0	10.9	3.0	3.2
P008	1.4	40.9	208.05	4.6	5.9	23.8	48.4	17.3
P010	1.0	36.3	294.99	4.3	5.2	26.6	55.1	8.8
P016	0.4	20.3	428.21	29.3	7.6	48.3	11.8	3.0
P020	1.4	36.2	272.71	9.3	6.4	37.5	29.8	17.0
P021	1.1	34.9	282.47	4.3	7.1	47.1	28.7	12.8
P022	0.5	22.6	430.09	24.6	13.7	41.2	15.2	5.3
R007	1.7	52.3	233.20	4.8	5.5	23.1	41.6	25.0
R020	0.8	33.7	377.29	3.2	4.4	26.0	59.1	7.3

Grab Sample	Organic Content (%)	Water Content (%)	Particle-size Distribution (from dry mass)					
			Sample Dry Mass (grams)	Gravel-size (%)	Sand-size (%)			Silt- & Clay-size (%)
					Coarse	Medium	Fine	
R023	1.5	42.5	278.57	5.1	5.6	23.0	56.9	9.4
R024	0.9	30.7	434.61	27.7	13.2	31.5	14.1	13.5
R025	1.3	41.1	315.47	11.2	5.8	28.6	29.0	25.4
R026	1.2	36.9	264.29	29.7	15.6	35.1	9.8	9.8
R027	0.8	23.5	418.68	31.7	12.9	43.2	3.6	8.6
R101	0.5	19.6	464.91	19.8	18.3	44.1	12.5	5.3
R102	0.2	25.0	237.60	0.1	2.0	95.8	1.4	0.7
R103	1.0	19.2	539.20	64.2	5.1	13.0	8.5	9.2
R105	1.3	42.8	287.89	6.1	4.9	28.8	44.0	16.2
R106	0.7	34.2	388.06	7.3	7.4	41.5	37.3	6.5
R107	1.3	32.1	369.77	19.8	8.1	32.8	28.3	11.0
R108	1.3	40.6	321.78	7.3	2.6	25.2	49.8	15.1
R109	1.4	37.1	345.04	11.0	4.6	19.8	48.0	16.6
R110	0.9	32.8	296.57	4.8	5.3	29.4	48.5	12.0
R111	1.8	42.0	313.72	10.8	7.0	24.9	37.1	20.2
R112	0.6	26.2	436.98	3.5	19.3	64.3	11.1	1.8
R113	0.7	34.4	389.90	5.5	5.4	56.2	23.7	9.2
R114	1.1	30.7	325.54	19.0	5.9	46.1	20.8	8.2
Average	**1.0**	**32.5**	**336.10**	**16.4**	**8.7**	**37.3**	**27.0**	**10.6**

Figure 7: Percentage of Sediment Type for Each Benthic Grab Off-site

In areas adjacent to dredged material disposal sites, 30 off-site benthic sites were sampled. Of these, 28 benthic grabs were dominated by sand-size particles, while only two were dominated by gravel-size particles (Table 12). On average, off-site grabs consisted of approximately 73 percent sand, 16 percent gravel, and 11 percent silt and clay. Organic content ranged from 0.2 to 1.9 percent and averaged 1.0 percent.

3.2.3 Sediment Toxicity

The 10-day toxicity test for the off-site area was run with the sediment sample from site R024 (See Appendix C). The test was validated by a greater than 90 percent survival of organisms in control sediment. The species *L. plumulosus* had an average survival of 94 percent. Mean survival of *A. bahia* was 88 percent.

3.2.4 Benthic Infauna

Results from benthic grabs collected off-site of dredged material disposal sites were quite variable (Table 13). Site R102 had the fewest individuals, only 52, as well as the fewest number of species, 12. The greatest number of individuals at any one site was 3,905 at site P016. This site also had 104 identified species, the most of any off-site sample. On average, however, a sample contained 626 individuals. The species richness for the off-site area was 282. The lowest diversity index of 1.320 was reflected by site R110. The highest diversity index of 3.652 belonged to site R027. The mean diversity index for off-site samples was 2.753. At off-site locations, the three most abundant species were two bivalves, *Anadara transversa* and *Crassinella lunulata*, as well as the barnacle *Sessilia* spp.

Table 13: Total Individuals, Species, and Diversity Indices for Benthic Samples Collected off site

Sample ID	Total individuals	Species richness (R)	Diversity index (H')	Pielou's evenness (J')
P001	2,121	66	2.390	0.570
P002	134	32	2.654	0.766
P006	866	65	2.931	0.702
P007	1,874	78	2.326	0.534
P008	703	91	3.392	0.752
P010	312	43	2.820	0.750
P016	3,905	104	2.609	0.562
P020	397	60	3.068	0.749
P021	395	61	2.818	0.685
P022	398	48	2.173	0.561
R007	433	58	2.694	0.663
R020	416	53	3.057	0.770
R023	467	66	3.344	0.798
R024	575	69	3.227	0.762
R025	764	73	3.123	0.728
R027	215	61	3.652	0.888
R101	349	68	3.231	0.766
R102	52	12	1.602	0.645
R103	721	71	2.452	0.575
R104	600	62	2.830	0.686
R105	320	65	3.200	0.767
R106	245	58	3.457	0.851
R107	187	47	3.050	0.792
R108	548	43	2.142	0.569

Sample ID	Total individuals	Species richness (R)	Diversity index (H')	Pielou's evenness (J')
R109	439	33	1.422	0.407
R110	419	33	1.320	0.378
R111	331	61	3.115	0.758
R112	59	21	2.679	0.880
R113	135	32	2.870	0.828
R114	396	54	2.939	0.737
Average	**626**	**282**[1]	**2.753**	**0.696**

[1]This value represents total species richness for the site; it is not an average.

3.3 Niantic Bay Historic Dredged Material Disposal Site (NBDS)

3.3.1 Station Characteristics

The Niantic Bay Historic Dredged Material Disposal Site (NBDS) was sampled at eight sites, one of which was sampled in triplicate. Therefore, ten sediment samples were collected: R004, P019, P025, P023, R001, P017, P018 (triplicate samples), and R018. All ten samples were analyzed for benthic infauna, TOC, and grain size. P018 sediment was used in a 10-day toxicity test.

3.3.2 Benthic Habitat and Sediment Types

In addition to descriptive characterizations (Table 5), each benthic grab at NBDS was characterized by particle size. Table 14 includes site-by-site organic content (or TOC), water content, sample mass, and particle size distributions for all benthic grabs within NBDS. These are represented graphically in Figure 8.

Table 14: Grain Size and Organic Content of Sediment Samples Collected within Niantic Bay Historic Dredged Material Disposal Site (NBDS)

Grab Sample	Organic Content (%)	Water Content (%)	Particle-size Distribution (from dry mass)					
			Sample Dry Mass (grams)	Gravel-size (%)	Sand-size (%)			Silt- & Clay-size (%)
					Coarse	Medium	Fine	
P017	0.9	29.1	433.23	17.7	14.8	45.4	9.1	13.0
P018a	0.6	23.1	259.52	25.1	11.6	49.7	10.1	3.5
P018b	0.4	19.8	430.78	25.3	13.0	47.9	10.8	3.0
P018c	0.6	22.9	388.13	18.4	14.7	54.9	8.2	3.8
P019	0.8	28.1	456.66	13.4	13.5	41.3	23.7	8.1
P023	0.4	19.0	510.07	20.9	25.1	39.7	10.8	3.5
P025	0.7	25.6	444.78	12.0	12.3	48.9	22.3	4.5
R001	0.4	19.6	543.99	16.9	13.1	53.7	14.2	2.1
R004	0.5	23.1	459.46	6.4	15.3	60.0	15.0	3.3
R018	0.4	25.1	288.51	28.8	13.0	46.7	9.6	1.9
Average	**0.6**	**23.5**	**421.5**	**18.5**	**14.6**	**48.8**	**13.4**	**4.7**

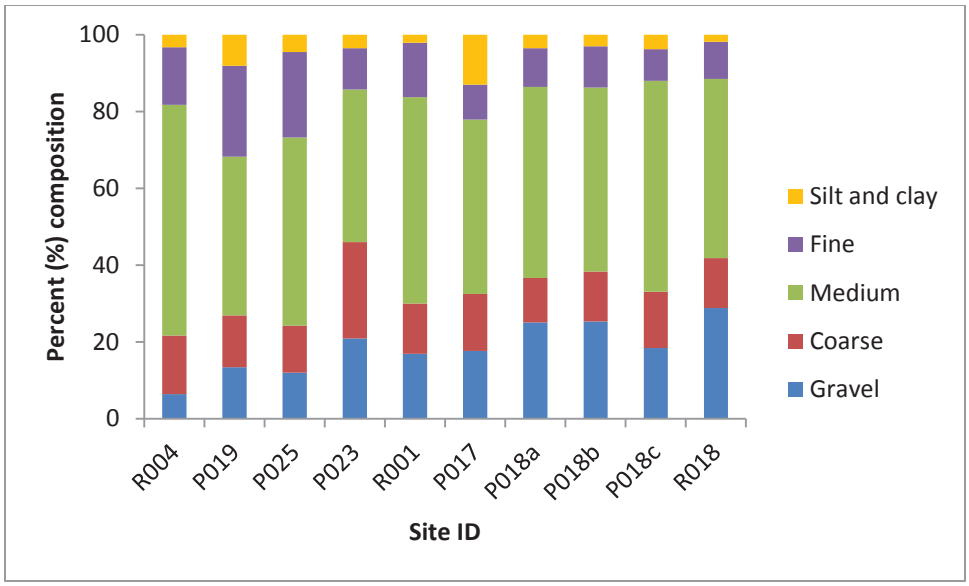

Figure 8: Percentage of Sediment Type for Each Benthic Grab within Niantic Bay Historic Dredged Material Disposal Site (NBDS)

Niantic Bay was sampled at eight sites, one of which was sampled in triplicate, yielding ten total benthic samples. All ten of these samples were dominated by sand-size particles (Table 14). More specifically, the dominant sand-size particle for all NBDS samples was in the medium sand-size category. When averaged, NBDS grabs consisted of approximately 77 percent sand, 19 percent gravel, and 5 percent silt and clay. Organic content ranged from 0.4 to 0.9 percent and averaged 0.6 percent.

3.3.3 Sediment Toxicity

The sediment from site P018 in NBDS was tested using the 10-day toxicity test (See Appendix C). Since organisms in the control sediment realized greater than 90 percent survival, the test was validated. Mean survival of *L. plumulosus* was 98 percent. Survival of *A. bahia* averaged 92 percent.

3.3.4 Benthic Infauna

A summary of the benthic infauna found in NBDS samples is provided in Table 15. The average number of individuals collected at a site within NBDS was 529. The maximum number of individuals collected was 837, at site P017. The fewest number of individuals collected was 134 at site R004. The total number of species in a sample ranged from 30 at site R004 to 86 at site P018b. The species richness for these ten samples in NBDS was 196. Diversity indices ranged from a minimum of 1.991 at site R018 to a maximum of 3.595 at site P018b. The average diversity index, however, was 2.934. The three most abundant species at NBDS were the bivalve *Crassinella lunulata*, the amphipod *Ampelisca vadorum*, and the barnacle *Sessillia* spp.

Table 15: Total Individuals, Species, and Diversity Indices for Benthic Samples Collected in Niantic Bay Historic Dredged Material Disposal Site (NBDS)

Sample ID	Total individuals	Species richness (R)	Diversity index (H')	Pielou's evenness (J')
P017	837	79	3.127	0.716
P018a	505	85	3.730	0.840
P018b	680	86	3.595	0.807
P018c	574	71	3.080	0.723
P019	502	57	2.271	0.562
P023	610	62	2.815	0.682
P025	741	65	2.773	0.664
R001	436	56	3.464	0.861
R004	134	30	2.498	0.734
R018	267	37	1.991	0.551
Average	**529**	**196**[1]	**2.934**	**0.714**

[1]This value represents total species richness for the site; it is not an average.

3.4 Cornfield Shoals Dredged Material Disposal Site (CSDS)

3.4.1 Station Characteristics

One site was sampled by triplicate benthic grabs within the Cornfield Shoals Dredged Material Disposal Site (CSDS). Therefore, three sediment samples were collected from site P003. All three samples were analyzed for benthic infauna, TOC, and grain size. Sediment from P003 was also used in a 10-day toxicity test. USACE's DAMOS program has additional data and reports regarding CSDS from previous sampling efforts (USACE 2014).

3.4.2 Benthic Habitat and Sediment Types

In addition to descriptive characterizations (Table 5), each benthic grab at CSDS was characterized by particle size. Table 16 includes site-by-site organic content (or TOC), water content, sample mass, and particle size distributions for all benthic grabs within CSDS. These are represented graphically in Figure 9.

Table 16: Grain Size and Organic Content of Sediment Samples Collected within Cornfield Shoals Dredged Material Disposal Site (CSDS)

Grab Sample	Organic Content (%)	Water Content (%)	Particle-size Distribution (from dry mass)					
			Sample Dry Mass (grams)	Gravel-size (%)	Sand-size (%)			Silt- & Clay-size (%)
					Coarse	Medium	Fine	
P003a	0.6	22.4	410.09	33.5	5.7	41	15.3	4.5
P003b	0.6	24.5	386.84	24.7	10.4	44.4	14.9	5.6
P003c	0.7	28.1	267.11	12.9	11.4	53.5	17.2	5.0
Average	**0.6**	**25.0**	**354.7**	**23.7**	**9.2**	**46.3**	**15.8**	**5.0**

Figure 9: Percentage of Sediment Type for Each Benthic Grab within Cornfield Shoals Dredged Material Disposal Site (CSDS)

Cornfield Shoals Dredged Material Disposal Site was sampled at one site, in triplicate, for a total of three benthic samples. All of the CSDS samples were dominated by sand-size particles (Table 16). More specifically, the dominant sand-size particle for all CSDS samples was categorized as medium sand-size. When averaged, these benthic grabs consisted of approximately 71 percent sand, 24 percent gravel, and 5 percent silt and clay. Organic content ranged from 0.6 to 0.7 percent, with an average of 0.6 percent.

3.4.3 Sediment Toxicity

The sediment sample from site P003 in CSDS was subjected to a 10-day toxicity test. The test was validated by a greater than 90 percent survival of organisms in control sediment. *L. plumulosus* experienced a mean survival of 98 percent. Survival of *A. bahia* was an average of 92 percent.

3.4.4 Benthic Infauna

Table 17 includes a summary of benthic infauna characteristics of the three CSDS samples. Sample P003a had 665 individuals, the fewest, while P003b had the greatest at 1,136 individuals. The average number of individuals was 893 per sample. The total species found ranged from 62 in P003b to 71 in P003c, with a total species richness of 115. The diversity index was greatest for P003c and least for P003b; the average was 2.851. At CSDS, the three most abundant taxa were the bivalve mussel *Mytilus edulis*, the amphipod *Corophiidae* spp., and the bivalve clam *Anadara transversa*.

Table 17: Total Individuals, Species, and Diversity Indices for Benthic Samples Collected in Cornfield Shoals Dredged Material Disposal Site (CSDS)

Sample ID	Total individuals	Species richness (R)	Diversity index (H')	Pielou's evenness (J')
P003a	665	70	3.206	0.755
P003b	1,136	62	2.099	0.509
P003c	879	71	3.247	0.762
Average	**893**	**115**[1]	**2.851**	**0.675**

[1]This value represents total species richness for the site; it is not an average.

3.5 Fish Survey

3.5.1 Site Characteristics

Water quality data were collected at the surface and bottom of each trawl site in eastern Long Island Sound from 10 to 13 June 2013 (Table 18; Figure 4). Similar to the measurements made during the benthic sampling, these data suggest that there is mild vertical stratification in the water column. Strong stratification precludes exchange between top and bottom layers. Since temperatures are within roughly 1°C from surface to bottom, however, it appears that mixing does occur occasionally. As found during benthic sampling, the abiotic conditions of the water column appear to be suitable for most marine organisms, with no major water quality issues. One anomaly in these measurements is apparent at site AC2013002. At this area off-site, the surface salinity was measured as 18.3 psu. Based on this measurement and the location of the trawl, it is evident that the trawl occurred in the Thames River Estuary. Due to different abiotic conditions at this particular site, trawl data were considered carefully since salinity and thermal tolerance might restrict certain species' distributions.

Table 18: Water Quality Parameters Measured at Trawl Stations

Site ID	Date	Location (NLDS, NBDS, CSDS, off-site)	Depth (ft)	Surface			Bottom		
				Temp (°C)	Salinity (psu)	Sp. Cond. (mS/m)	Temp (°C)	Salinity (psu)	Sp. Cond. (mS/m)
AC2013001	10 June 2013	NLDS	40.7	15.0	27.6	34.66	13.9	30.8	37.37
AC2013003	10 June 2013	NBDS	38.4	15.2	27.7	34.26	14.2	30.0	36.63
AC2013006	13 June 2013	CSDS	110.9	15.5	27.7	35.23	14.2	29.7	36.43
AC2013002	10 June 2013	Off-site	28.2	15.9	18.3	24.90	14.3	30.0	36.73
AC2013004	10 June 2013	Off-site	123.4	14.6	29.7	36.73	13.9	30.6	37.05
AC2013005	12 June 2013	Off-site	116.5	14.7	26.0	31.13	14.1	30.2	36.85

3.5.2 Catch Composition

3.5.2.1 Trawls On Dredged Material Disposal Sites

Three trawls were conducted near active or historic dredged material disposal sites (Figure 4). NLDS was sampled by trawl AC2013001, NBDS by AC2013003, and CSDS by AC2013006. Species occurrence and abundance for each site is presented in Table 19. Field data sheets are included in Appendix E.

Of trawls on dredged material disposal sites, NLDS had the greatest number of individuals, while NBDS had the greatest biomass (i.e., weight). CSDS had the lowest number and biomass of fish. From all sites

combined, scup was the most abundant species. For the NLDS and NBDS trawls, the most abundant fish by weight was scup, composing greater than 50 percent of the catch by weight. Winter skate made up more than 35 percent of the CSDS trawl and was the most abundant species by weight. The primary target species were scup, striped bass, winter flounder, and bluefish. Scup was present in all three trawls. These fish dominated the NLDS and NBDS catches at 55 and 59.5 percent, respectively, but was less abundant at CSDS at only 8.4 percent. Striped bass were absent at NLDS, and only one individual was caught at each of NBDS and CSDS. Winter flounder was present in all three trawls but at relatively low abundance; the greatest proportion of biomass was 3.2 percent at NLDS. No bluefish were caught at NLDS or NBDS; only one bluefish, which made up 3.6 percent of the catch weight, was caught at CSDS. Secondary target species, striped searobin and windowpane flounder, were not present at NLDS or NBDS but were caught at CSDS. Two striped searobin comprised 1.3 percent of the biomass, and 11 windowpane flounder made up 4.1 percent of the catch. The invasive red algae *Heterosiphonia japonica* from Japan was present in all three trawls at these sample sites.

Table 19: Catch Composition of Trawls On New London, Niantic Bay (Historic), and Cornfield Shoals Dredged Material Disposal Sites (NLDS, NBDS, CSDS)

Common name	Species	AC2013001 (NLDS)			AC2013003 (NBDS)			AC2013006 (CSDS)		
		Count	Weight (kg)	Percent composition	Count	Weight (kg)	Percent composition	Count	Weight (kg)	Percent composition
scup[1]	*Stenotomus chrysops*	676	61.6	55.0	444	76.4	59.5	17	4.5	8.4
striped bass[1]	*Morone saxatilis*	--	--	--	1	3.2	2.5	1	3.4	6.4
winter flounder[1]	*Pseudopleuronectes americanus*	13	3.6	3.2	2	0.4	0.3	1	0.3	0.6
bluefish[1]	*Pomatomus saltatrix*	--	--	--	--	--	--	1	1.9	3.6
striped searobin[2]	*Prionotus evolans*	--	--	--	--	--	--	2	0.7	1.3
windowpane flounder[2]	*Scophthalmus aquosus*	--	--	--	--	--	--	11	2.2	4.1
Asian red algae	*Heterosiphonia japonica*	NA[3]	8.8	7.9	NA[3]	23.9	18.6	NA[3]	0.2	0.4
longfin squid	*Loligo pealeii*	433	22.3	19.9	130	4.9	3.8	5	0.3	0.6
winter skate	*Leucoraja ocellata*	--	--	--	--	--	--	17	19	35.6
little skate	*Leucoraja erinacea*	10	5.2	4.6	1	0.4	0.3	19	12	22.5
spider crab	*Libinia emarginata*	NA[3]	5.9	5.3	NA[3]	3.4	2.6	NA[3]	0.2	0.4
kelp	*Laminaria* spp.	NA[3]	0.6	0.5	NA[3]	7	5.5	--	--	--
smooth dogfish	*Mustelus canis*	--	--	--	--	--	--	2	5.6	10.5
tautog	*Tautoga onitis*	1	1.8	1.6	2	2.4	1.9	--	--	--
mixed algae species	*Algae* spp.	NA[3]	0.7	0.6	NA[3]	2.9	2.3	NA[3]	0.1	0.2
northern searobin	*Prionotus carolinus*	--	--	--	--	--	--	15	2.2	4.1
boring sponge	*Cliona celata*	--	--	--	NA[3]	1.5	1.2	--	--	--
American lobster	*Homarus americanus*	5	1.2	1.1	--	--	--	--	--	--
summer flounder	*Paralichthys dentatus*	--	--	--	1	0.9	0.7	--	--	--
ulva	*Ulva lactuca*	NA[3]	0.1	0.1	NA[3]	0.7	0.5	NA[3]	0.1	0.2

Common name	Species	AC2013001 (NLDS)			AC2013003 (NBDS)			AC2013006 (CSDS)		
		Count	Weight (kg)	Percent composition	Count	Weight (kg)	Percent composition	Count	Weight (kg)	Percent composition
fourspot flounder	*Paralichthys oblongus*	--	--	--	--	--	--	2	0.4	0.8
butterfish	*Peprilus triacanthus*	3	0.1	0.1	1	0.1	0.1	--	--	--
bay anchovy	*Anchoa mitchilli*	--	--	--	1	0.1	0.1	--	--	--
squid eggs	*Loligo pealeii* eggs	--	--	--	NA[3]	0.1	0.1	--	--	--
rock crab	*Cancer irroratus*	--	--	--	NA[3]	0.1	0.1	--	--	--
flat claw hermit crab	*Pagurus pollicaris*	--	--	--	--	--	--	NA[3]	0.1	0.2
rockweed, fucus	*Fucus* spp.	--	--	--	--	--	--	NA[3]	0.1	0.2
Total		**1,141**	**111.9**	**100.0**	**583**	**128.4**	**100.0**	**93**	**53.3**	**100.0**

[1]Primary targeted species; [2]Secondary targeted species; [3]Counts not obtained, only weights.

3.5.2.2 Trawls Off-site of Dredged Material Disposal Sites

In addition to the three trawls conducted within dredged material disposal sites, three trawls were made in off-site areas near dredged material disposal sites (Figure 4). Trawl AC2013002 was conducted near NLDS. Trawls AC2013004 and AC2013005 occurred in an area between NBDS and CSDS. Field data sheets are included in Appendix E.

Overall, AC2013005 had the greatest number and biomass of fish compared to trawls both on and off of dredged material disposal sites. The most abundant fish by weight was scup at two of the three sites, 29.7 percent of the catch at AC2013002 and 26.7 percent at AC2013004; smooth dogfish was most abundant at AC2013005, constituting 28 percent of the catch weight (Table 20). Of the primary target species, scup and winter flounder were present in all three trawls, striped bass was only present in one trawl, and bluefish was not present in any of the three trawls. At AC2013005, the high frequency of smooth dogfish drove down the percent composition of scup. Therefore, scup abundance was comparable among all three sites, even though the percent composition varied. Winter flounder abundance was relatively consistent among trawls, making up between 2.1 and 2.6 percent of total biomass. Only one individual striped bass was caught; it occurred at site AC2013002. No bluefish were caught in off-site trawl tows. Striped searobin and windowpane flounder were caught in all three tows. Striped searobin abundance was relatively similar, ranging from 0.2 to 0.9 percent of the total biomass. Windowpane flounder abundance was slightly more variable, ranging from 0.7 to 7.2 percent of biomass caught. Similar to trawls on dredged material disposal sites, all trawls conducted off of a dredged material disposal site contained the non-native Asian red algae *Heterosiphonia japonica*.

Table 20: Catch Composition of Trawls Off-site

Common name	Species	AC2013002			AC2013004			AC2013005		
		Count	Weight (kg)	Percent composition	Count	Weight (kg)	Percent composition	Count	Weight (kg)	Percent composition
scup[1]	*Stenotomus chrysops*	165	16	29.7	292	32.9	26.7	209	20.5	11.6
striped bass[1]	*Morone saxatilis*	1	8.7	16.1	--	--	--	--	--	--
winter flounder[1]	*Pseudopleuronectes americanus*	3	1.4	2.6	10	3.2	2.6	13	3.7	2.1
windowpane flounder[2]	*Scophthalmus aquosus*	1	0.4	0.7	14	3	2.4	62	12.7	7.2
striped searobin[2]	*Prionotus evolans*	1	0.5	0.9	4	0.8	0.6	1	0.3	0.2
smooth dogfish	*Mustelus canis*	--	--	--	6	16.8	13.6	16	49.5	28.0
northern searobin	*Prionotus carolinus*	--	--	--	214	14.6	11.9	351	26.3	14.9
little skate	*Leucoraja erinacea*	2	1.3	2.4	36	19.7	16.0	35	16.8	9.5
spiny dogfish	*Squalus acanthias*	--	--	--	1	3.9	3.2	5	21.4	12.1
winter skate	*Leucoraja ocellata*	--	--	--	10	11.9	9.7	5	5.1	2.9
longfin squid	*Loligo pealeii*	147	6	11.1	59	4.3	3.5	78	4.8	2.7
Asian red algae	*Heterosiphonia japonica*	NA[3]	7.8	14.5	NA[3]	5	4.1	NA[3]	1.2	0.7
summer flounder	*Paralichthys dentatus*	6	3.4	6.3	1	0.8	0.6	3	5.9	3.3
black sea bass	*Centropristis striata*	3	0.5	0.9	14	2	1.6	15	2.4	1.4
spider crab	*Libinia emarginata*	NA[3]	2	3.7	NA[3]	0.7	0.6	--	--	--
fourspot flounder	*Paralichthys oblongus*	--	--	--	11	1.8	1.5	6	0.9	0.5
kelp	*Laminaria* spp.	NA[3]	2.3	4.3	NA[3]	0.3	0.2	NA[3]	0.1	0.1
clearnose skate	*Raja eglanteria*	--	--	--	--	--	--	1	1.9	1.1
bluecrab	*Callinectes sapidus*	8	1.4	2.6	--	--	--	--	--	--
silver hake	*Merluccius bilinearis*	--	--	--	10	0.7	0.6	9	0.7	0.4
spot	*Leiostomus xanthurus*	--	--	--	--	--	--	20	1.4	0.8
mixed algae species	*Algae* spp.	NA[3]	0.8	1.5	--	--	--	NA[3]	0.2	0.1
spotted hake	*Urophycis regia*	--	--	--	4	0.2	0.2	14	0.6	0.3

Common name	Species	AC2013002			AC2013004			AC2013005		
		Count	Weight (kg)	Percent composition	Count	Weight (kg)	Percent composition	Count	Weight (kg)	Percent composition
American lobster	*Homarus americanus*	2	0.6	1.1	--	--	--	--	--	--
ulva	*Ulva lactuca*	NA[3]	0.2	0.4	NA[3]	0.3	0.2	NA[3]	0.1	0.1
flat claw hermit crab	*Pagurus pollicaris*	--	--	--	NA[3]	0.1	0.1	NA[3]	0.2	0.1
lion's mane jellyfish	*Cyanea capillata*	4	0.2	0.4	--	--	--	--	--	--
red hake	*Urophycis chuss*	--	--	--	2	0.1	0.1	1	0.1	0.1
bay anchovy	*Anchoa mitchilli*	9	0.1	0.2	--	--	--	--	--	--
butterfish	*Peprilus triacanthus*	3	0.1	0.2	--	--	--	--	--	--
Atlantic herring	*Clupea harengus*	1	0.1	0.2	--	--	--	--	--	--
common slipper shell	*Crepidula fornicata*	NA[3]	0.1	0.2	--	--	--	--	--	--
rock crab	*Cancer irroratus*	--	--	--	NA[3]	0.1	0.1	--	--	--
moon snail egg case	*Naticidae* spp.	--	--	--	--	--	--	NA[3]	0.1	0.1
Total		**356**	**53.9**	**100.0**	**688**	**123.2**	**100.0**	**844**	**176.9**	**100.0**

[1]Primary targeted species; [2]Secondary targeted species; [3]Counts not obtained, only weights.

3.5.3 LOBSTERS

Although lobsters were not a target species, they are of particular interest due to decreasing abundance in southern New England, including Long Island Sound. Five lobsters were collected by a single trawl on a dredged material disposal site, all at NLDS site AC2013001. Two additional lobsters were collected by a single trawl off-site, both in AC2013002. In addition to obtaining lengths, CT DEEP biologists also recorded information on biological condition (Table 21). After observation, all collected organisms were released back into Long Island Sound.

Table 21: Biological Parameters of Lobsters Collected by Connecticut Department of Energy and Environmental Protection (CT DEEP) Trawls

Site ID	Sex	Length (mm)	Egg Development	Shell hardness	Crusher claw	Pincher claw	Condition	Shell disease
AC2013001 (NLDS)	M	72.7	None	Hard	Bud	Present	Alive	None
AC2013001 (NLDS)	F	58.8	None	Hard	Small	Present	Alive	None
AC2013001 (NLDS)	F	70.7	None	New hard shell	Present	Present	Alive	None
AC2013001 (NLDS)	M	67.4	None	Hard	Present	Present	Alive	11–50% covered
AC2013001 (NLDS)	M	69.7	None	Hard	Present	Present	Alive	None
AC2013002 (Off-site)	F	70.3	None	Hard	Present	Present	Alive	None
AC2013002 (Off-site)	M	54.4	None	Hard	Present	Present	Alive	None

3.5.4 SPECIES LENGTH DISTRIBUTIONS

Of the six targeted species, only three were in high enough abundance to produce meaningful length frequency graphs (raw data and additional lengths may be found in Appendix E). Striped bass, bluefish, and striped searobin were caught by the trawl infrequently, so there were not enough length measurements to infer demographic trends. The two on-site striped bass were 655 and 665 mm; the single off-site individual was 905 mm. The single bluefish caught was on-site, measuring 537 mm in length. The two on-site striped searobin were 285 and 295 mm; the five off-site striped searobin ranged from 225 to 275 mm. Scup, winter flounder, and windowpane flounder had high enough abundance that length distributions could be used to investigate demographic structuring. Due to the variability in effort and sample size, however, statistical comparisons were not feasible; the results below should be interpreted as trends rather than statistical differences.

There is a relatively strong trimodal pattern in scup lengths. Two peaks are evident at 110 and 170 mm, with a third, more gradual peak at 230 for on-site trawls and 270 for off-site trawls (Figure 10). Scup collected both on and off of dredged material disposal sites displayed the same overall length frequency pattern.

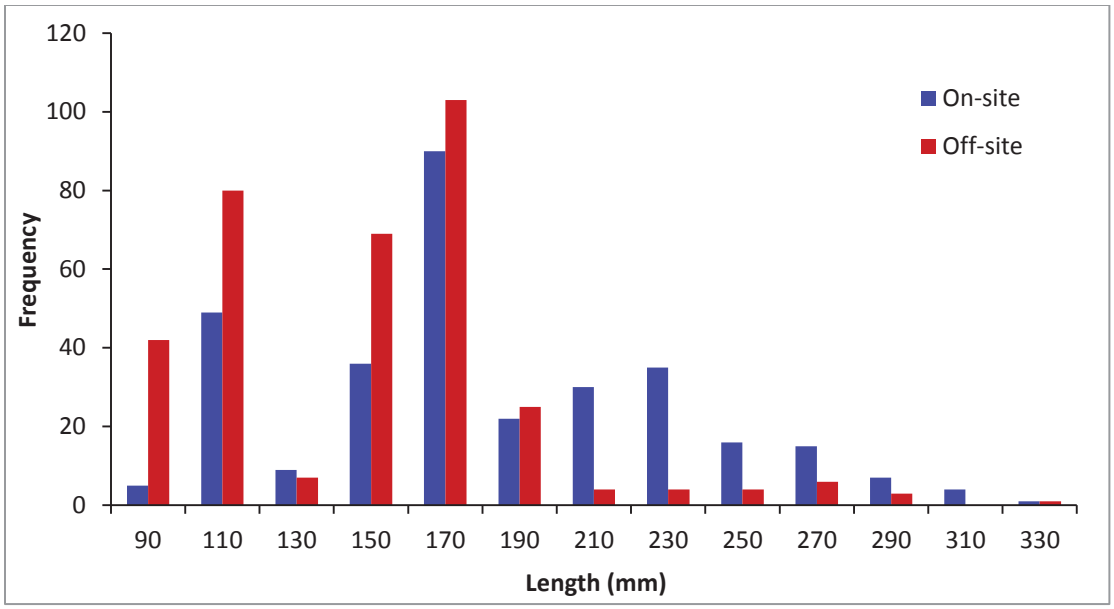

Figure 10: Length Frequency Distribution for Scup On and Off Dredged Material Disposal Sites

Winter flounder had a range of lengths, from 145 to 405 mm (Figure 11). The frequency of each length is spread fairly evenly, with only a slight increase at 245 mm for off-site trawls and at 225 and 305 mm for on-site trawls. No strong difference in length pattern between on- and off-site tows is evident, however.

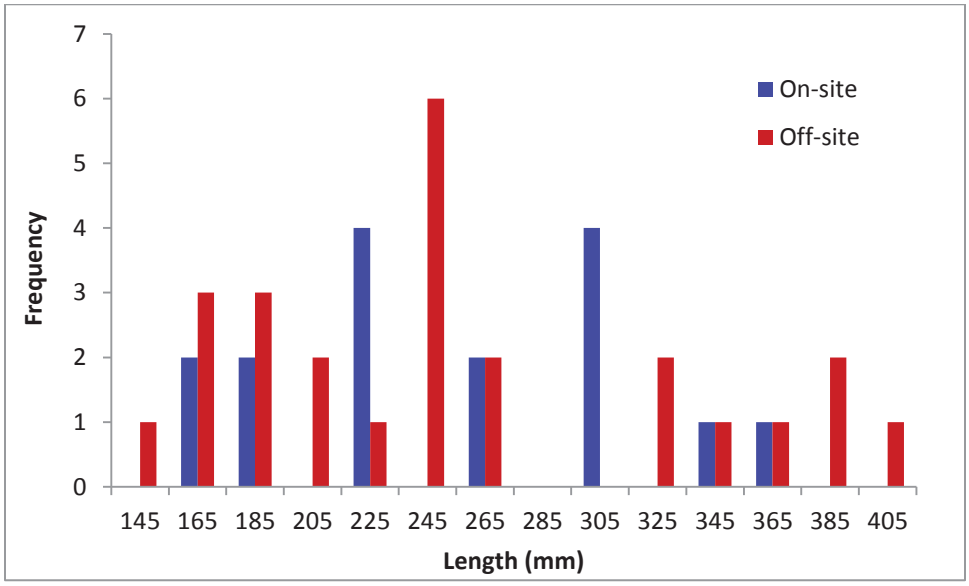

Figure 11: Length Frequency Distribution for Winter Flounder On and Off Dredged Material Disposal Sites

Windowpane flounder showed a strong unimodal length distribution (Figure 12), with a peak at 265 mm for both on- and off-site trawls. Since more windowpane flounder were collected off-site, the pattern is more defined than on-site tows, with a notable increase around 225 mm, peak at 265 mm, and a steady decrease to 325 mm. Windowpane flounder collected on dredged material disposal sites have a similar, though dampened pattern, likely due to fewer total individuals.

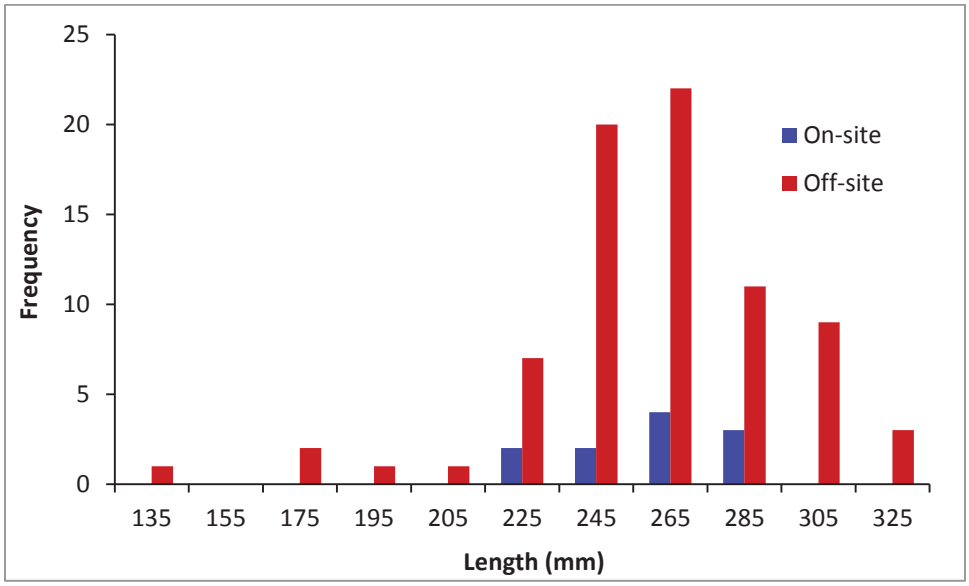

Figure 12: Length Frequency Distribution for Windowpane Flounder On and Off Dredged Material Disposal Sites

3.6 Statistical Comparisons

3.6.1 Benthic Habitat and Infauna

Diversity, as measured by the Shannon Diversity Index (H'), was averaged for all benthic grabs on and off a dredged material disposal site. When the diversity indices of on-site grabs were compared with those of off-site grabs using a two-tailed t-test, on-site diversity was higher, though the difference was just below statistical significance ($P = 0.057$, $\alpha = 0.05$; Table 22). Therefore, benthic infaunal diversity was marginally higher in dredged material disposal sites relative to intermediate sites adjacent to dredged material disposal sites.

Pielou's evenness (J') estimates the relative abundance of benthic infauna (i.e., more similar abundances correlate to greater evenness). Evenness for on-site samples was not significantly different than off-site samples ($P = 0.401$, $\alpha = 0.05$; Table 22) when tested with a two-tailed t-test.

Table 22: Average Diversity (H') of Benthic Grabs On and Off Dredged Material Disposal Sites

Parameter	On-site	Off-site	P-value
Average diversity (H')	3.060	2.753	0.056924
Average evenness (J')	0.724	0.696	0.401414

3.6.2 Finfish Abundance

The sampling effort of this biological characterization was variable among sites, therefore statistical comparisons among dredged material disposal sites were not be performed. By combining the three on-site tows and the three off-site tows, however, statistical tests could be run to identify differences in abundance on and off of a dredged material disposal site. No significant difference was evident in species abundance between targeted species collected on and off dredged material disposal sites (two-

tailed, equal variance t-test with a significance level of 0.05; all P > 0.323, α = 0.05; Table 23). Figure 13 illustrates the percent of the catch composed by different targeted species resulting from trawls conducted on and off dredged material disposal sites.

Table 23: Average Percent Composition of Targeted Species from Trawls Located On and Off Dredged Material Disposal Sites

Targeted species		Average % Composition		P-value
		On-site	Off-site	
Primary	scup	41.0	22.7	0.348
	winter flounder	1.4	2.4	0.323
	striped bass	4.4	16.1	0.692
	bluefish	3.6	0.0	0.374
Secondary	windowpane flounder	4.1	3.5	0.430
	striped searobin	1.3	0.6	0.783

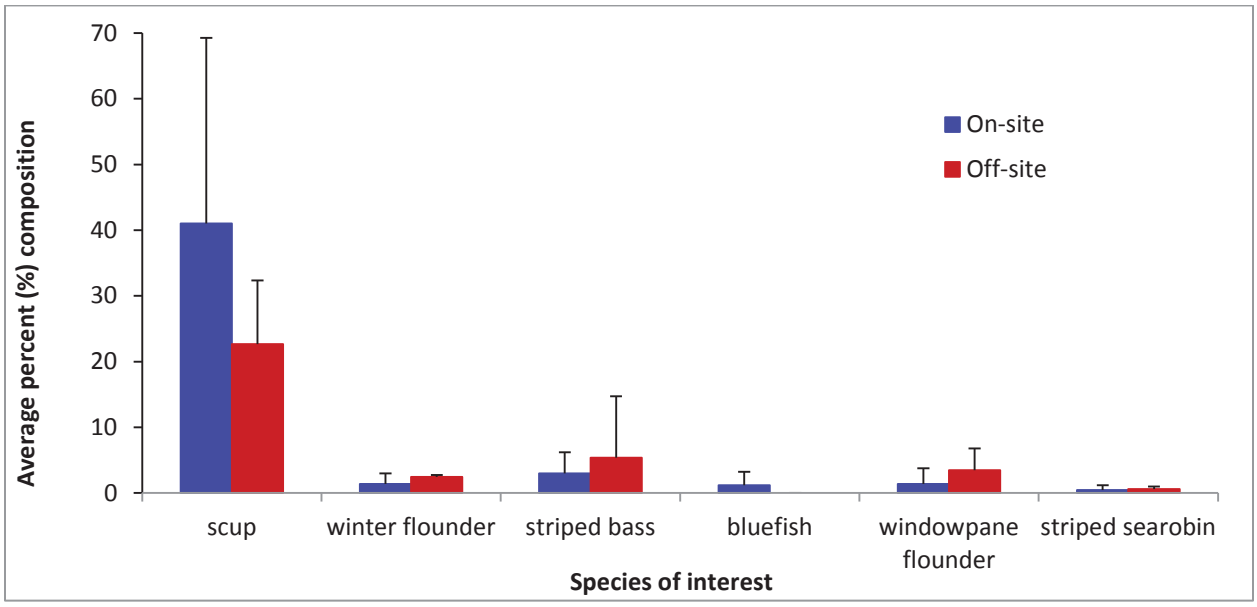

Figure 13: Comparison of Average Percent Composition of Targeted Species between Trawls Conducted On and Off Dredged Material Disposal Sites

A proportional measure of abundance is catch per unit effort (CPUE). The total number of fish (count) per trawl is standardized by time of tow, which was 30 minutes for each. The CPUE was then averaged across sites, for trawls conducted on and off dredged material disposal sites (Table 24). Abundance, as estimated by CPUE, did not differ between sites located on and off dredged material disposal sites.

Table 24: Average Catch per Unit Effort (CPUE) for Targeted Species On and Off Dredged Material Disposal Sites

Targeted species		Average CPUE		P-value
		On-site	Off-site	
Primary	scup	8.19	7.40	0.919
	winter flounder	0.18	0.29	0.530
	striped bass	0.02	0.01	0.519
	bluefish	0.01	0.00	0.374
Secondary	windowpane flounder	0.12	0.86	0.309
	striped searobin	0.02	0.07	0.329

3.7 Fishing Activity Survey

Over the approximately 5 weeks that the fishing activity survey was available to fishermen, 440 individuals visited the survey website and 10 individuals mailed in hard copies. Of these, 45 did not fill out a single question and 160 had insufficient information (less than five questions answered); these 205 respondents were excluded from further analysis. Six additional surveys were omitted due to irrelevance, because they were not completed by a fisherman. Therefore, 229 surveys were considered relevant and useful (Table 25), and only those responses were carried forward in the analysis of fishing activity in eastern Long Island Sound. As outlined in Section 2.4, results were analyzed in five groups, based on fishery type:

- Commercial lobster
- Commercial mollusk
- Commercial finfish
- Charter/party boat
- Recreational

Commercial results were delineated by target species (lobster, mollusk, and finfish), while charter/party and recreational fishing were analyzed separately. The recreational fishing industry had the highest number of respondents; however, a variety of fishermen participated, with the dominant fisheries in eastern Long Island Sound well-represented. Data are presented here as catch observations, spatial and temporal variation in fishing effort, and the relation of fishing activity to active and historic dredged material disposal sites.

3.7.1 Fishing Trends

A summary of the results of the survey is presented in Table 25, but notable results are highlighted in the following paragraphs. Each value in Table 25 represents the percentage of fishermen that chose a particular answer. Not all respondents completed every question, so the percentages may be calculated from a value less than n, the total number of participants. Due to the use of whole percentage values, a few categories do not sum to exactly 100 percent. Detailed results are included in Appendix G.

On average, the commercial and charter/party boat industries had more years of experience than recreational fishermen; at least 50 percent of commercial and 60 percent of charter/party boat fishermen had more than 30 years of experience, while only 35 percent of recreational fishermen have been fishing that long. Of all 229 fishermen that responded to the survey, 90 percent actively fished in 2013. Conflicting opinions regarding abundance of target species were found among the five fishery types. In the lobster and mollusk commercial industries, 40 percent indicated a decrease in quantity. The

majority (60 percent) of lobstermen cited no change in abundance. Out of the 19 commercial fishermen targeting finfish, 69 percent noted an increase in abundance. In contrast, 68 percent of charter/party boat fishermen and 69 percent of recreational fishermen thought abundance of their target species has decreased. The minority (0 to 40 percent) of all commercial fishermen felt that target species size has decreased. The charter/party boat and recreational responses were almost in exact agreement with each other, but differed from the commercial industry opinions. More than half (55 percent) of both the charter/party boat and recreational fishermen thought the size of their target species has decreased. Despite the somewhat variable input regarding location, the majority (between 58 and 100 percent) of each fishery has not changed fishing grounds. The majority of all groups thought the health of the catch had not changed or had improved. Between 18 and 40 percent of fishermen thought target species health has declined. The only group that has not observed a change in bycatch composition is mollusk fishermen, who encounter various crab species. Of the other groups, between 20 and 70 percent has noticed a change in bycatch. A couple of groups cited more scup, black sea bass, and dogfish as bycatch, but some also claimed that more selective gear has decreased the overall quantity of non-target species.

Table 25: Results Summary of Fishing Activity Survey for Eastern Long Island Sound[1]

Fishing activity parameter		Commercial			Charter/party	Recreational	Overall[2]
		Lobsters	Mollusks	Finfish			
Number of participants (n)		8	6	19	30	166	229
Length of activity	≤ 30 yrs	50%	50%	26%	40%	65%	58%
	> 30 yrs	50%	50%	74%	60%	35%	42%
Current activity	Active	75%	100%	100%	100%	88%	90%
	Not active	25%	0%	0%	0%	12%	10%
Shift in target species	Yes	14%	67%	53%	40%	37%	39%
	No	86%	33%	47%	60%	63%	61%
	Reason for changing target species	Regulations	Pollution effect on lobsters; market demand	Regulations; market demand; abundance	Regulations; seasonality; abundance; quality	Regulations; seasonality; abundance; sport	--
Quantity	No change	60%	40%	23%	23%	14%	18%
	Increase	0%	20%	69%	9%	17%	20%
	Decrease	40%	40%	8%	68%	69%	62%
Size	No change	80%	40%	38%	23%	24%	27%
	Increase	20%	20%	46%	23%	20%	23%
	Decrease	0%	40%	15%	55%	55%	49%
Location	No change	100%	80%	58%	81%	71%	72%
	Increase	0%	0%	33% (in H, I, J, K, L)	14% (in I, J)	6% (in I, J, K, M)	9%
	Decrease	0%	20% (in F, G)	8% (in L)	5% (in G)	23% (in B, E, F, G, I, L, M)	19%
Gender composition	No change	100%	100%	100%	74%	85%	86%
	Increase in males	0%	0%	0%	26%	10%	11%
	Increase in females	0%	0%	0%	0%	6%	4%

Fishing activity parameter		Commercial			Charter/party	Recreational	Overall[2]
		Lobsters	Mollusks	Finfish			
Health of catch	No change	40%	60%	64%	61%	78%	73%
	Improved	20%	0%	18%	13%	9%	10%
	Poorer	40%	40%	18%	26%	13%	17%
Bycatch	No change	80%	100%	30%	73%	56%	58%
	Change	20%	0%	70%	27%	44%	42%
	Observations	More scup, black sea bass, dogfish	Mostly spider crabs, rock crabs, green crabs	Less bycatch overall; more black sea bass and mid-Atlantic species; less lobsters	Greater quantity and size of dogfish, bluefish, sea robins; more blowfish and weakfish	Less bycatch overall; more scup, bluefish, sea robin, sculpin, black sea bass (especially juveniles), spiny dogfish; fewer blue claw crabs	--
Gear fouling	No change	75%	50%	56%	100%	81%	80%
	Fouling	25%	50%	44%	0%	19%	20%
	Reasons	Weather	Weather; seaweed	Weather; *H. japonica*; vandalism	NA	Snags; vandalism	--

[1]Due to rounding to whole numbers, some categories may not sum to exactly 100%; [2]Averages calculated using a weighted mean to account for different sample sizes.

A variety of finfish species are targeted by members of the commercial, charter/party boat, and recreational industries, though at different intensities (Table 26). Each percentage represents the relative frequency that each finfish is targeted out of all identified species. The most highly sought-after finfish by commercial fishermen are summer flounder and tautog, each targeted 18 percent of the time. In general, the commercial industry focuses its effort more evenly across species, though not necessarily on more species. Charter/party boats target striped bass at a higher frequency than any other species (29 percent); summer flounder are the next-highest target species (15 percent). Recreational fishermen are the least balanced, with much of their effort focused on only a few species. Of all target species, summer flounder and striped bass are each targeted 28 percent of the time by recreational fishermen. As summarized in Table 26, the reason for shifting target species may explain slight differences in target finfish by these three different industries. While respondents in all groups cited regulations as a driving determinant, commercial fishermen are understandably more influenced by market demands. Charter/party boat and recreational fishermen both mentioned seasonal fluctuations in species abundance as a motivating factor for choosing target species. Only recreational fishermen identified personal preferences, such as a harder challenge or better taste, as reasons for shifting target species.

Table 26: Finfish Species Most Targeted by Eastern Long Island Sound Fisheries Based on a Fishing Survey

Target finfish[1]	Relative targeted effort		
	Commercial	Charter/party	Recreational
summer flounder	18%	15%	28%
striped bass[2]	11%	29%	28%
bluefish[2]	5%	14%	14%
tautog	18%	14%	11%
scup	11%	12%	7%
black sea bass	13%	8%	3%
false albacore	--	--	2%
all local fish	5%	5%	<1%
mollusks	3%	--	2%
weakfish	--	--	1%
lobster	--	2%	1%
squid	5%	--	
blowfish (pufferfish)	--	--	<1%
kingfish	--	--	<1%
shark	--	--	<1%
Spanish mackerel	--	--	<1%
winter flounder[2]	--	--	<1%
tilefish	--	2%	--
tuna	--	2%	--
butterfish	3%	--	--
Whiting/silver hake (*Merluccius* spp.)	3%	--	--
Atlantic herring	3%	--	--
Atlantic mackerel	3%	--	--

[1]Fish common names as reported in survey; [2]Targeted species in current study's finfish trawls

3.7.2 Spatial and Temporal Trends in Fishing Effort

A strong seasonal trend in fishing effort is apparent for all fishery groups. With the exception of the commercial mollusk fishery, all other groups have peak activity in the summer (Figure 14). Commercial lobstermen increase fishing effort in March, dropping off again in September. Commercial finfish, charter/party boat, and recreational fishermen have a similar trend, but it is temporally offset relative to lobstermen. For these three groups, activity increases in May and does not drop off until November. Commercial mollusk fishermen have a different seasonal pattern altogether. While there is a slight increase in fishing activity from May to September, the greatest effort occurs in November.

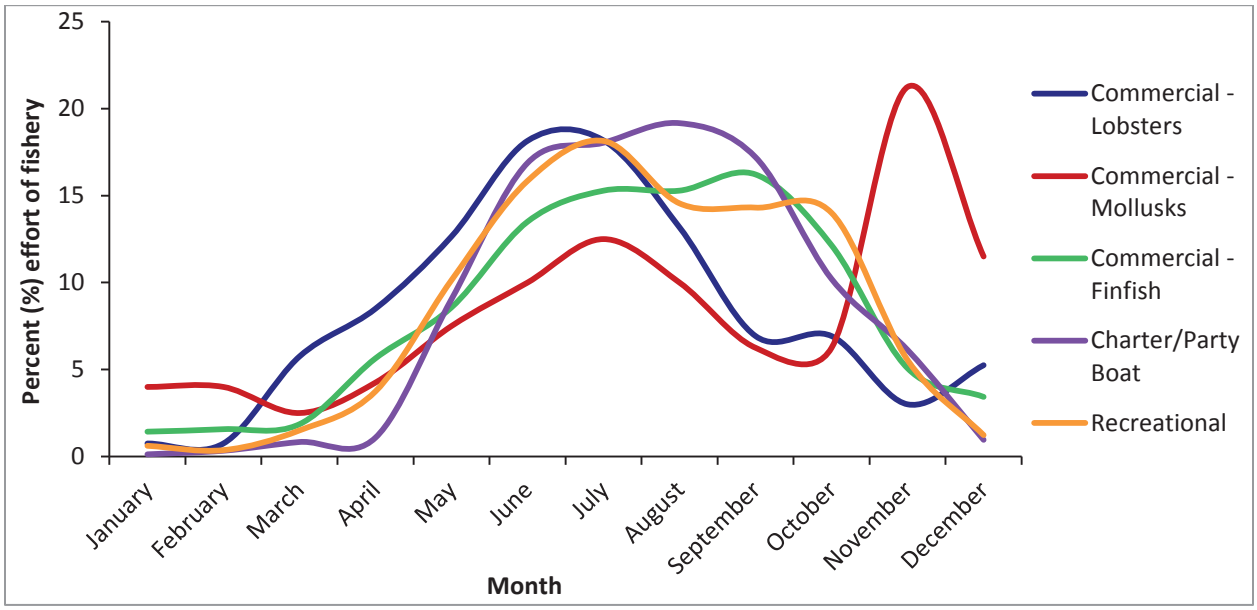

Figure 14: Fishing Effort by Month for Eastern Long Island Sound Fisheries, Based on Fishing Survey

To further characterize fishing activity spatially, effort was described for 13 distinct areas in eastern Long Island Sound. These areas, labeled A-M, are not based on management areas, but some borders do follow state lines. See the figures below for location of these areas. The yellow line demarking fishing area boundaries used in the survey may obscure portions of state maritime boundaries, which are identified in Figure 1. Of the 229 fishermen that participated in the survey, 199 respondents (or 87 percent) identified which areas they frequented each season (spring, summer, fall, and winter). These data were compiled to find high-use areas by season for each fishery type. The patterns for each fishery are summarized below, along with the corresponding figure that depicts the spatiotemporal trends in fishing effort.

- Commercial lobstermen identified 10 of the 13 areas as fishing grounds, 7 of which are active year-round. The most frequented areas is L, followed by I. Most commercial lobster activity occurs in the summer, and the least is in the winter. Of the western portion of the study area (areas A, B, E, F, G), there is little overall activity, with a slight increase in A and F during the summer (Figure 15).
- Commercial mollusk fishermen have the most concentrated effort, utilizing only 7 of the 13 areas of eastern Long Island Sound. Area G is fished most extensively, with nearby F and H also experiencing high use. Fall is the season of highest activity; minimal fishing occurs in the winter (Figure 16).

- Commercial finfishermen use nearly every area year-round; however, seasonal and geographical trends are still apparent. Area I is most frequented by finfishermen, but other eastern areas (H, J, K, L, and M) are also common fishing grounds. The western portion of the area of interest has the least fishing activity. Effort is almost evenly spread between spring, summer, and fall, but it drops substantially in the winter (Figure 17).
- The charter/party boat industry identified fishing grounds in each of the areas of eastern Long Island Sound. The most highly used area is H, with I and M also fished often. In general, the western portion has lower activity than the eastern portion. Seasonally, summer and fall have the highest activity. There is very little charter/party boat fishing in the winter, with no fishing in most areas (Figure 18).
- Recreational fishing is the most evenly spread both spatially and temporally than any other fishery type. Each of the 13 areas supports recreational fishing every season of the year. Areas E, F, G, H, and I have the highest activity, while B, C, and D have the lowest. Summer and fall are the most common times to fish, and winter has the least fishing (Figure 19).

Each of the following figures (Figures 15 through 19) uses the same color convention, with purples and blues representing less effort and oranges and reds representing more effort. Each fishery group is presented individually, but comparisons may be made between figures. This scale extends from the minimum amount of effort (0.2 percent) to the maximum (11.8 percent) across all five groups. Each figure includes a color scale for reference. Full results are included in Appendix G.

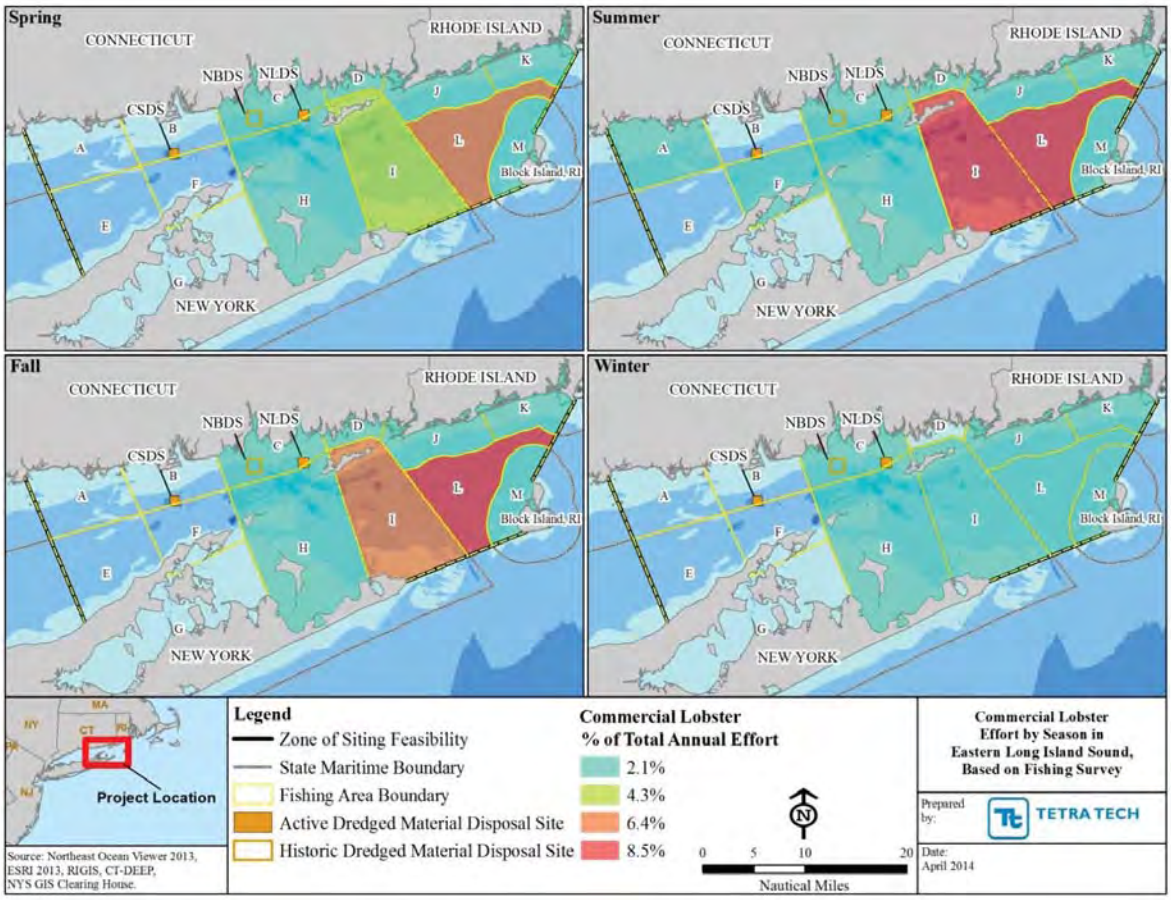

Figure 15: Commercial Lobster Effort by Season in Eastern Long Island Sound, Based on Fishing Survey

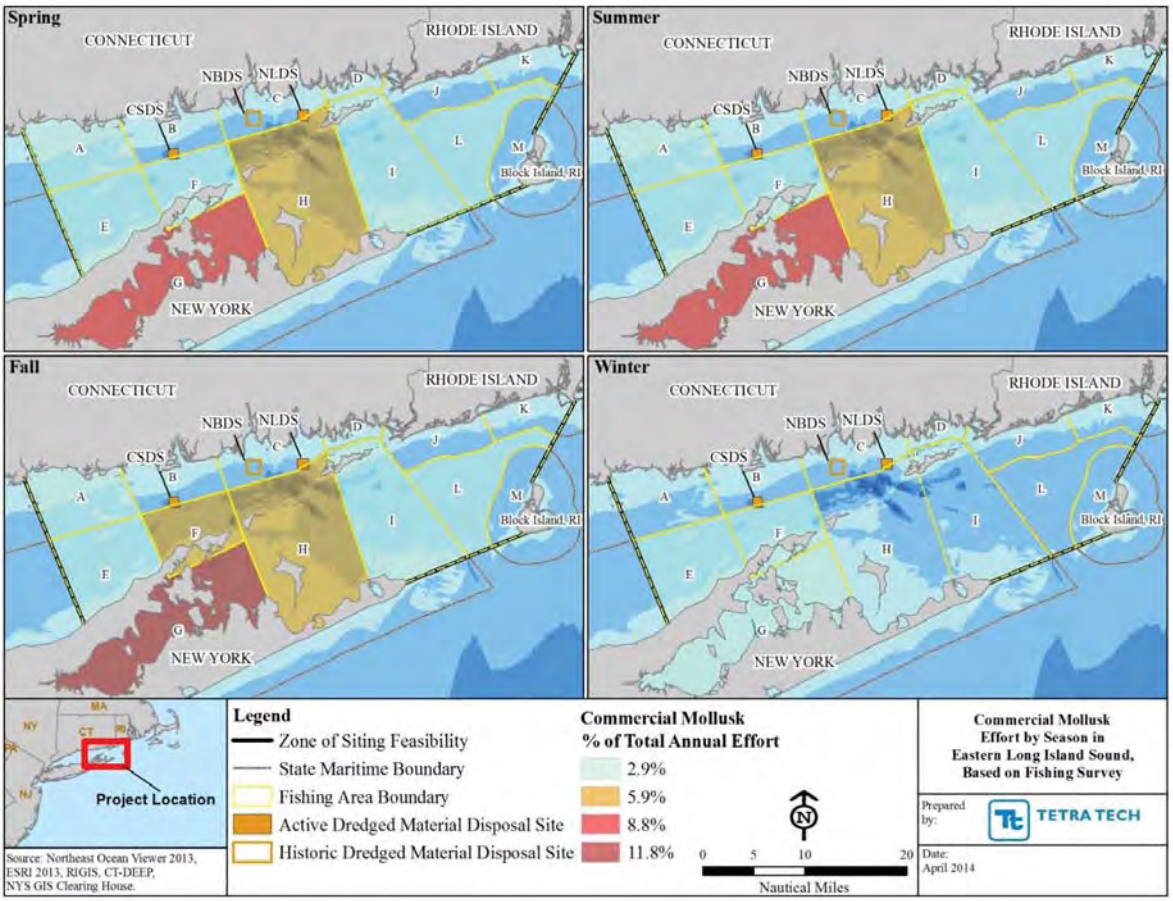

Figure 16: Commercial Mollusk Effort by Season in Eastern Long Island Sound, Based on Fishing Survey

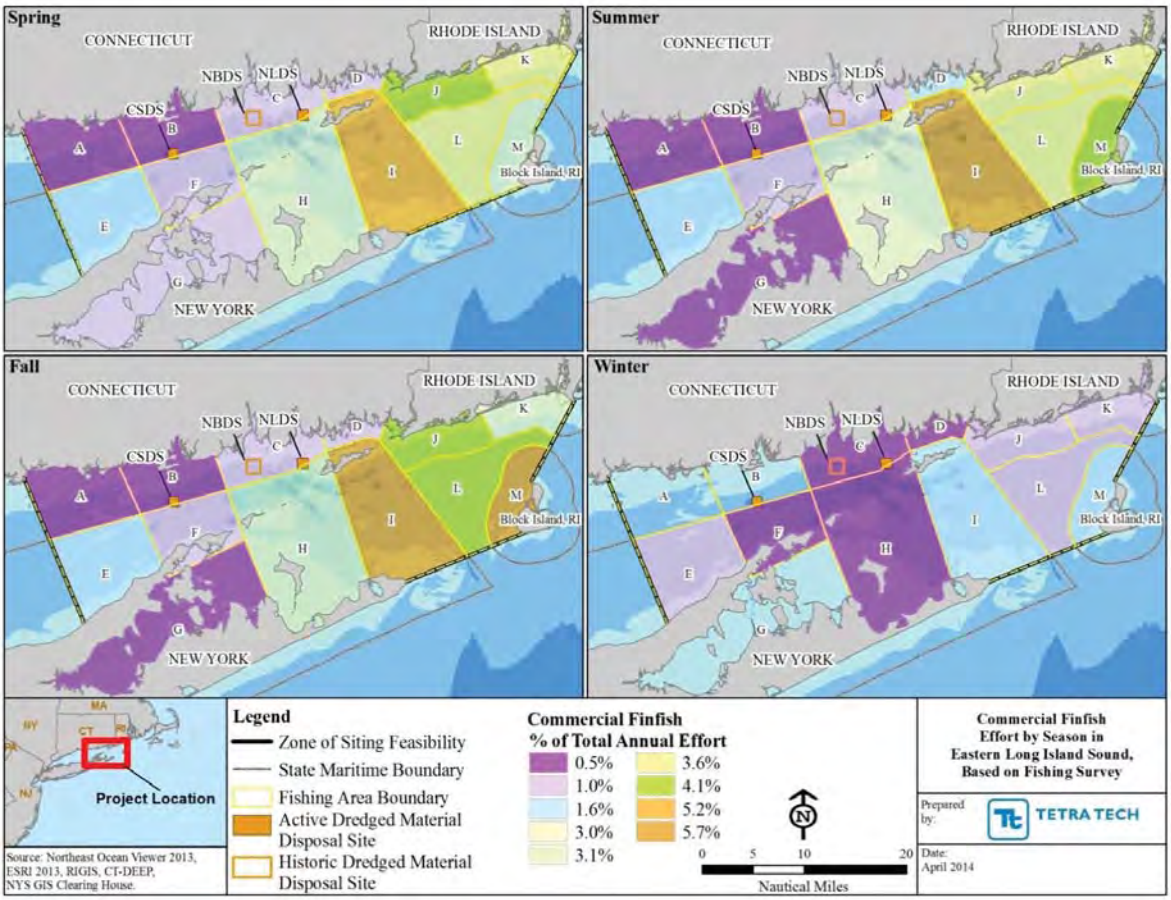

Figure 17: Commercial Finfish Effort by Season in Eastern Long Island Sound, Based on Fishing Survey

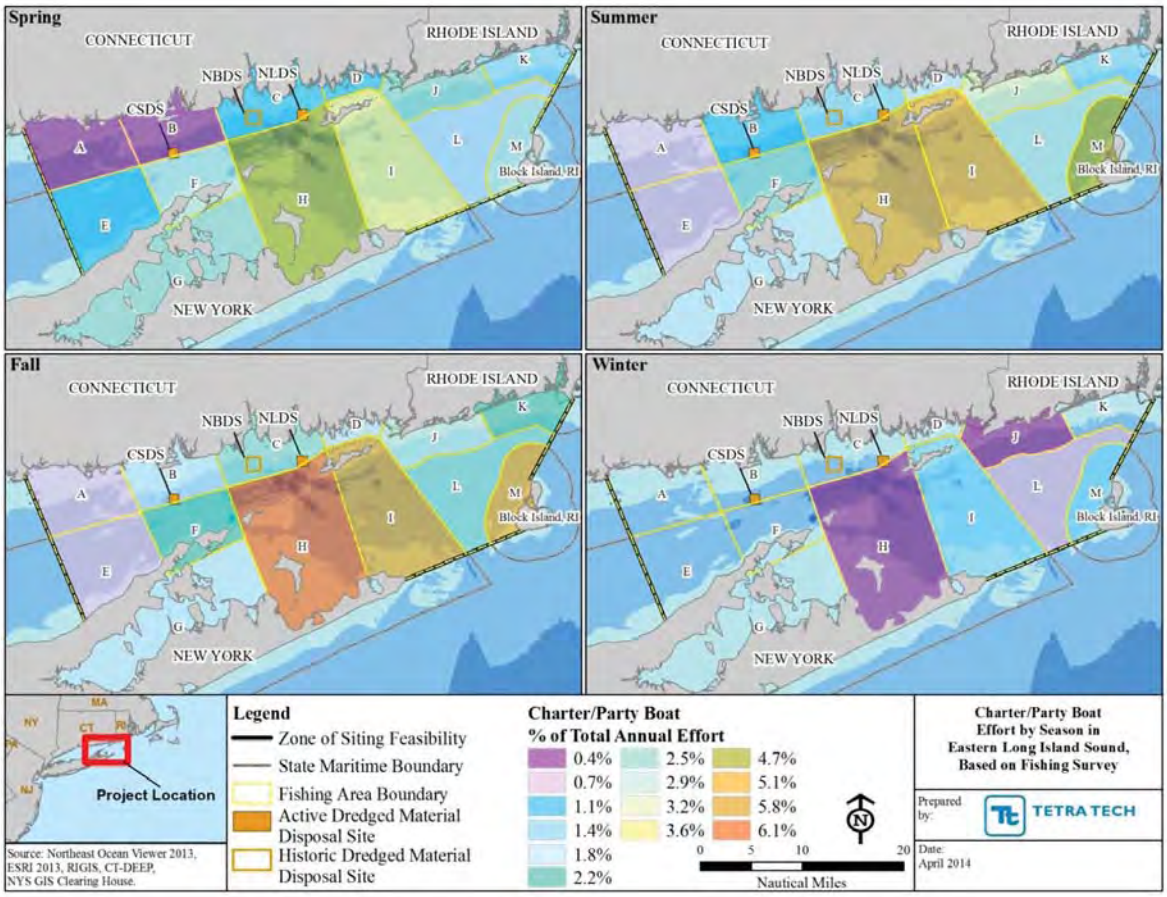

Figure 18: Charter/Party Boat Effort by Season in Eastern Long Island Sound, Based on Fishing Survey

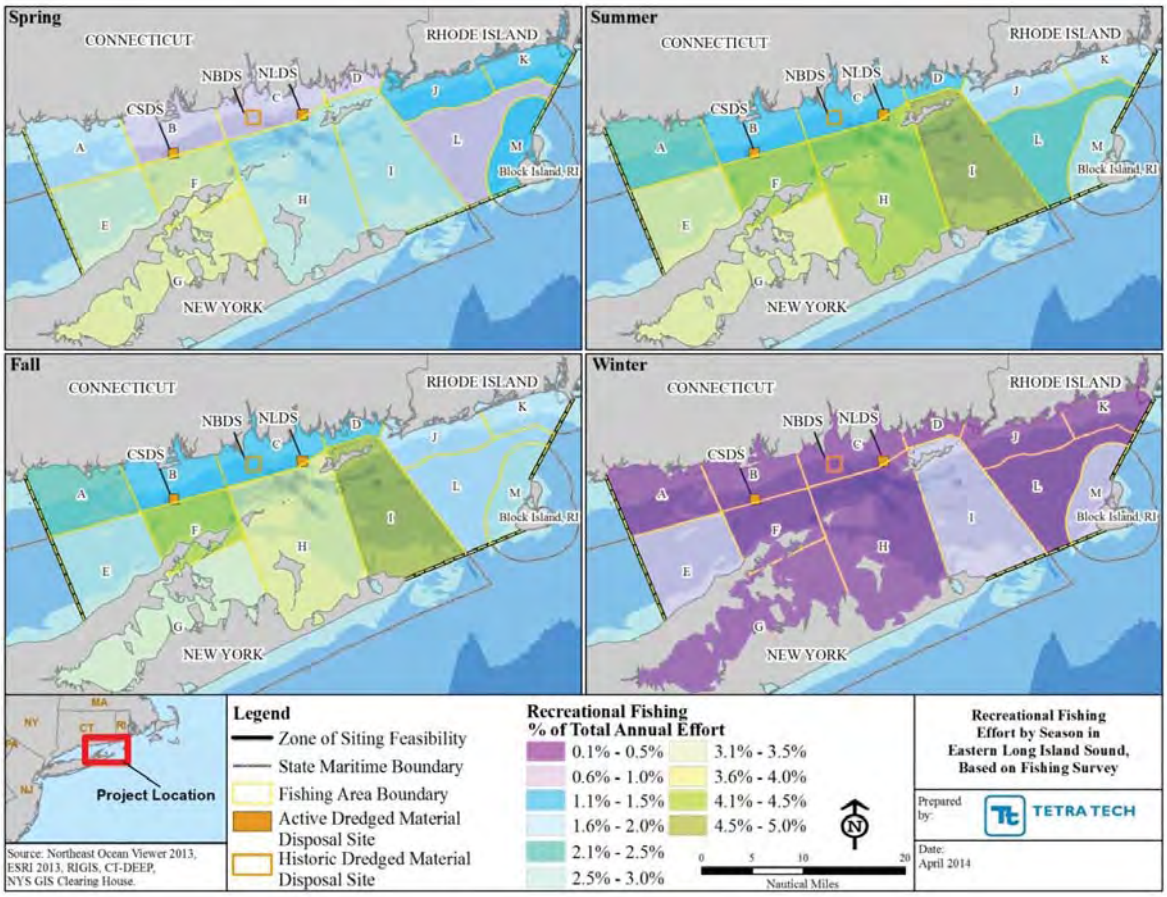

Figure 19: Recreational Fishing Effort by Season in Eastern Long Island Sound, Based on Fishing Survey

3.7.3 Fishing near Dredged Material Disposal Sites

On average, only 6 percent of surveyed fishermen fish near dredged material disposal sites (1 percent regularly; 5 percent occasionally; Table 27). Many (44 percent) were unsure whether their fishing grounds were near a dredged material disposal site at all. Only four commercial lobstermen provided information regarding fishing near dredged material disposal sites. Of these, one individual (25 percent) did not know whether the fishing grounds was within 0.5 nautical miles of a dredged material disposal site. The other three (75 percent) do not fish near sites. None of the commercial mollusk fishermen knew if they fished near a site. One commercial fisherman who switched target species from lobster to finfish to shellfish mariculture identified "New London [dredged material disposal site]" as a regular fishing ground. This particular fisherman has noticed that more mid-Atlantic species are found near dredged material disposal sites. The majority of commercial finfishermen do not fish near dredged material disposal sites, and a quarter of those surveyed did not know. Two charter/party boat fishermen occasionally fish near dredged material disposal sites; one near New London, the other near Old Saybrook, Connecticut. Old Saybrook is geographically closest to Niantic Bay Historic Dredged Material Disposal Site, but it is not clear whether this is the dredged material disposal site referenced. No difference in catch was reported for Old Saybrook, but an increase in catch was observed at the New London Dredged Material Disposal Site. Just over half of charter/party boat fishermen do not fish near sites, and 36 percent were unsure. Four recreational fishermen occasionally fish near dredged material disposal sites. One fisherman historically fished the New London Dredged Material Disposal Site for winter flounder and scup and believed that, “site activity improves fishing quality.” Another recreational fisherman who fished near New London felt that flounder are “all gone,” but that scup were “highly abundant.” A different recreational fisherman fished near dredged material disposal sites near Narragansett Harbor, Block Island Port, and New York bight (beyond the eastern Long Island Sound study area) but did not identify any changes in catch in these areas.

Table 27: Fishing Trends near Dredged Material Disposal Sites in Eastern Long Island Sound

Fishing activity parameter		Commercial			Charter/ party boat	Recreational	Overall
		Lobsters	Mollusks	Finfish			
Dredged material disposal site proximity	Regular fishing	0%	0%	8%	0%	0%	1%
	Occasional fishing	0%	0%	0%	9%	5%	5%
	No fishing	75%	0%	67%	55%	48%	50%
	Unsure	25%	100%	25%	36%	47%	44%
	Locations[1]	NA	NA	NLDS	NLDS, Old Saybrook	NLDS; Narragansett Harbor; Block Island Port; NY Bight; Hudson River, NY	--

Note: NLDS indicates the New London Dredged Material Disposal Site

[1]Of the 6 percent of all fishermen that fish near dredged material disposal sites, locations were provided by very few and therefore often correspond to one individual's feedback.

4 DISCUSSION

Results of the benthic and finfish sampling are summarized in Table 28. In general, the results are consistent with previous studies, indicating a stable marine benthic community both within and outside of the dredged material disposal sites. The ambient water quality data are consistent with healthy abiotic conditions. For benthic and finfish characteristics, no significant differences were found between samples collected on dredged material disposal sites and samples collected off-site (areas adjacent to dredged material disposal sites).

Water quality issues often have a variety of sources and can vary interannually. The water characteristics of Long Island Sound have been found to fluctuate with levels of the Connecticut River plume (Ackleson and O'Donnell 2011). One of the most detrimental water quality problems is low oxygen, or hypoxia, which occurs when DO concentrations drop below 2 mg/L (in extreme cases, no oxygen, or anoxia results). Hypoxia may be caused by many factors that often act synergistically; in particular, stratification, nutrient loading, and water exchange can decrease DO, with non-linear effects on the local ecosystem (Zhang et al. 2010). Since LIS is semi-enclosed, with freshwater input and potential nutrient loading, this ecosystem is susceptible to hypoxic conditions. Since 1987, the area affected by hypoxia has fluctuated dramatically (LISS 2012). In 2012, an area of 289 square miles was affected, with hypoxic conditions lasting 80 days, 23 days more than average (LISS 2012). Relative to the western and central basins of Long Island Sound, the eastern basin has the best overall water quality, attributed to current-driven mixing (LISS 2012). Although it has been found that most marine animals need at least 5 mg/L of DO, this may not be as limiting as previously believed. Some marine species, like weakfish (*Cynoscion regalis*), are capable of tolerating DO concentrations as low as 2 mg/L, only displaying avoidance behavior of water with 1 mg/L DO (Stierhoff et al. 2009). Many species may be able to survive hypoxic conditions in Long Island Sound. During the sampling efforts of this study, however, low oxygen was not apparent.

4.1 BENTHIC CHARACTERISTICS

Sediment characterization of Long Island Sound, especially in the context of dredged material disposal sites, has been described in several different studies. The Millstone Power Station has conducted sampling in eastern Long Island Sound near the power plant and at a reference site located approximately five nautical miles from NBDS since 1976. The long time-series of this dataset offers a unique insight into local conditions over time. Among the parameters studied, the Millstone studies have observed sediment characteristics, benthic infauna, and fish abundance. Increased grain size was evident at Millstone's thermal discharge sites due to scouring (Dominion Resources Services Inc. 2006). Natural variation in sediment composition was observed at the reference site, but overall, silt and clay made up 12.4 and 5.5 percent of the sediment in June and September, respectively, with a significant decrease in mean grain size over a 33-year period (Dominion Resources Services Inc. 2013). In the present study, mean silt and clay composition ranged from 4.7 to 34.1 percent among the three dredged material disposal sites and off-site areas. NBDS, the site nearest to the Millstone study, had an average of about 5 percent silt and clay, which is similar to the Millstone reference site. Sediment samples were collected as part of a benthic analysis of Long Island Sound conducted by ENSR (2002); results of eastern Long Island Sound will be discussed here. At CSDS, both active and reference sites were dominated by sand-size particles, which is consistent with the findings of this study (i.e., 46 percent of CSDS sediment was medium-size sand). In about half of the samples collected in the NLDS, fine particles dominated; the other half was dominated by sand-size particles. There were almost no particles categorized as gravel. These findings are consistent with the current finding of silt and clay comprising the majority of NLDS sediment. A different study conducted by AECOM (2009) to monitor the effects and recovery of dredged

material disposal at NLDS found that on-site and reference samples were remarkably similar, with thick layers of brown sand. One site that was recently used for deposition was quite different, though, with irregular topography and clumps of shell or clay. These different characteristics are likely more representative of the dredged material source than local sediment. Since NLDS is an active dredged material disposal site, sediment is not expected to be homogeneous, which was reflected in the high variation among samples collected within the site. Relative to previous investigations, sediment characteristics have not drastically changed, with sand and fine particles dominating eastern Long Island Sound.

Total organic content, or TOC, of Long Island Sound sediment generally increases with decreasing grain size. Previous studies found values ranging from 0.02 to 1.05 percent at CSDS, which is inclusive of the values measured in this study (ENSR 2002). TOC at NLDS was measured between 0.70 and 2.69 percent in 2002 (ENSR 2002); current values (1.2–6.2 percent) are somewhat higher overall than these measurements. NLDS had the highest TOC values of any of the sites sampled in this study. As concluded in other studies, sites with smaller grain size were correlated with higher TOC content. Survival challenges with two model organisms during 10-day sediment toxicity testing suggest that sediment in Long Island Sound does not pose a health threat to benthic infauna.

Benthic infauna at Millstone showed evidence of long-term successional development (Dominion Resources Services Inc. 2013), with most sites dominated by annelids; the reference site was comprised of 48 percent annelids. In samples collected off-site in the current study, Annelida was the most abundant phylum; however, the most abundant species in off-site samples were two mollusks and one arthropod. The site of thermal discharge at Millstone was dominated by the mollusk *Mytilus edulis*, an epifaunal organism. NBDS, which is located near the Millstone plant, had an abundance of arthropods, but a bivalve was the single most abundant species. Another study (ENSR 2002) found that the dominant phylum at CSDS was Annelida in February and Arthropoda in July. Although Arthropoda was the most abundant phyla at CSDS in this study, the mussel *Mytilus edulis* was the most abundant species. At NLDS, arthropods were the most abundant taxon (ENSR 2002), similar to this study. NLDS, which had the highest percent composition of silt/clay and fine sand, was dominated by tube-dwelling amphipods (*Ampelisca* spp.) that prefer fine sand and muddy bottoms. These amphipods were also found in high number at NBDS, though primarily in two samples (P019 and P025) within close proximity of each other, both of which had the highest fine sand and silt/clay composition. The three areas dominated by medium sand particles (NBDS, CSDS, and off-site) had a higher occurrence of bivalves and barnacles. A benthic quality index developed by the Long Island Sound Study (2012) indicates that in the eastern basin, the conditions are 75 percent “good,” and 25 percent “poor,” which is better than the western basin but worse than the central basin.

The Millstone reference sites had both the lowest total individuals (2,058) and fewest number of taxa (107), which had significantly decreased since 1980. None of the four sites have displayed species richness (R) greater than 150 since sampling began in 1979 (Dominion Resources Services Inc. 2013). In the present study, three of the four sites exhibited species richness values bordering or exceeding 200. In comparison to the previous studies, species richness was notably higher in the present study. Species diversity, indexed by H', at CSDS has been recorded between 2.60 and 4.68, with higher values corresponding to samples taken from active disposal areas (ENSR 2002). Current estimates for CSDS range from 2.099 to 3.247, slightly less than the 2002 study. Diversity indices, or H', for NLDS have been estimated between 2.68 to 4.77 (ENSR 2002), a range that encompasses the values currently found in this study. Areas in central Long Island Sound have been recorded with diversity indices ranging from 3.0 to 3.6 and evenness indices between 0.6 and 0.7 (EPA 2004); both of these parameters are close to

estimates calculated in the current study. Overall, diversity is relatively high with sufficient evenness in all sampled areas in eastern Long Island Sound, which is in agreement with previous studies. Although patterns may change interannually, the current benthic community appears to be well-developed and diverse.

Table 28: Summary of Benthic Characteristics and Finfish Abundance

Parameter	NLDS	NBDS	CSDS	Off-site
Number of samples	8	10	3	30
Average grain size	34% silt/clay, 29% fine, 22% medium, 9% gravel, 6% coarse	49% medium, 19% gravel, 15% coarse, 13% fine, 5% silt/clay	46% medium, 24% gravel, 16% fine, 9% coarse, 5% silt/clay	37% medium, 27% fine, 16% gravel, 11% silt/clay, 9% coarse
Total organic content	1.2–6.2%	0.4–0.9%	0.6–0.7%	0.2–1.9%
Abundance (individuals/sample)	259–875 (2,590–8,750/m^2)	134–837 (1,340–8,370/m^2)	665–1,136 (6,650–11,360/m^2)	52–3,905 (520–39,050/m^2)
Species richness	208	196	115	282
Species diversity (H')	2.840 – 3.761	1.991 – 3.595	2.099 – 3.247	1.320 – 3.652
Pielou's evenness (J')	0.683 – 0.825	0.551 – 0.861	0.509 – 0.762	0.378 – 0.888
Dominant phyla	Arthropoda, Annelida, Mollusca	Arthropoda, Mollusca, Annelida	Arthropoda, Mollusca, Annelida	Annelida, Arthropoda, Mollusca
Dominant finfish and % abundance	Scup (48.5%), *Heterosiphonia japonica* (11.2%), long-finned squid (9.4%)			Scup (19.6%), smooth dogfish (18.7%), northern searobin (11.6%)

4.2 Fisheries Patterns

Finfish abundance in eastern Long Island Sound has fluctuated for many species, due to many factors, some yet unidentified. The CT DEEP (previously CT DEP) has been conducting trawl surveys in Long Island Sound since 1984. The data from these surveys were organized and analyzed by ENSR in a 2001 report. The most current data from the CT DEEP trawl survey (Gottschall and Pacileo 2012) are also incorporated into this discussion. Generally, the western and central basins had significantly higher finfish abundance compared to the eastern portion. This may be due to western and central Long Island Sound having more mud habitat, which is known to support greater fish densities (ENSR 2001a). Strong currents and irregular bathymetry in the eastern basin limits the ability to sample spatially random areas and results in the higher frequency of trawls in the coastal areas of Connecticut. Based on the available data, ENSR (2001a) concluded that all of the eastern Long Island Sound areas had low CPUE and less species richness compared to the central and western portions. Specific patterns for several species of interest are presented here.

In eastern Long Island Sound, essential fish habitat (EFH) has been designated for 38 managed species (Table 29). These data were compiled from the National Oceanic and Atmospheric Administration's

(NOAA's) *Guide to Essential Fish Habitat Designations in the Northeastern United States* (http://www.nero.noaa.gov/hcd/webintro.html; accessed 3 February 2014). This guide summarizes designated EFH in 10-minute by 10-minute squares, so EFH in any of the squares within the area of interest (Figure 1) was included in Table 29 and described by life stage. Of these, 12 were caught in the finfish trawls conducted by CT DEEP. Many of these species, as well as the early life history stages of all species, would not be susceptible to the bottom otter trawl gear type, however, so the presence or absence of a species in the trawl is not necessarily indicative of whether the animal inhabits eastern Long Island Sound.

Table 29: Essential Fish Habitat Designations within Eastern Long Island Sound

Species	Eggs	Larvae	Juveniles	Adults	Occurrence in Present Study
Atlantic salmon *(Salmo salar)*			X	X	
Atlantic cod *(Gadus morhua)*	X	X	X	X	
haddock *(Melanogrammus aeglefinus)*		X			
pollock *(Pollachius virens)*			X	X	
whiting/silver hake *(Merluccius bilinearis)*	X	X	X	X	X
red hake *(Urophycis chuss)*	X	X	X	X	X
witch flounder *(Glyptocephalus cynoglossus)*	X	X			
winter flounder *(Pseudopleuronectes americanus)* [1]	X	X	X	X	X
yellowtail flounder *(Limanda ferruginea)*	X	X	X	X	
windowpane flounder *(Scophthalmus aquosus)*[1]	X	X	X	X	X
American plaice *(Hippoglossoides platessoides)*			X	X	
summer flounder *(Paralichthys dentatus)*		X	X	X	X
ocean pout *(Macrozoarces americanus)*	X	X	X	X	
Atlantic sea herring *(Clupea harengus)*			X	X	X
monkfish *(Lophius americanus)*	X	X	X	X	
bluefish *(Pomatomus saltatrix)* [1]	X		X	X	X
Atlantic butterfish *(Peprilus triacanthus)*		X			X
Atlantic mackerel *(Scomber scombrus)*	X	X	X	X	
scup *(Stenotomus chrysops)* [1]	X	X	X	X	X
black sea bass *(Centropristis striata)*	NA		X	X	X
king mackerel *(Scomberomorus cavalla)*	X	X	X	X	
Spanish mackerel *(Scomberomorus maculatus)*	X	X	X	X	
skipjack tuna *(Katsuwonus pelamis)*				X	
bluefin tuna *(Thunnus thynnus)*			X	X	
cobia *(Rachycentron canadum)*	X	X	X	X	
longfin squid *(Loligo pealeii)*	NA	NA	X	X	X
shortfin squid *(Illex illecebrosus)*	NA	NA			
surf clam *(Spisula solidissima)*	NA	NA	X		
ocean quahog *(Artica islandica)*	NA	NA	X	X	
spiny dogfish *(Squalus acanthias)*	NA	NA	X	X	X

Species	Eggs	Larvae	Juveniles	Adults	Occurrence in Present Study
blue shark (*Prionace glauca)*	NA	X	X	X	
dusky shark *(Carcharhinus obscurus)*	NA	X	X		
sandbar shark *(Carcharhinus plumbeus)*	NA	X	X	X	
sand tiger shark *(Carcharias taurus)*	NA	X			
white shark *(Carcharodon carcharias)*	NA		X		
tiger shark *(Galeocerdo cuvieri)*	NA		X		
shortfin mako shark *(Isurus oxyrinchus)*	NA	X	X		
common thresher shark *(Alopias vulpinus)*	NA	X	X	X	

Note: NA indicates that this lifestage does not exist for the species or EFH has not been designated
[1]Targeted species in current study's fish trawls

To characterize biological activity in eastern Long Island Sound, the feedback of fishermen was critical to the overall success of the fishing survey. Regardless of opinion or industry, the fishing activity survey appeared to be well-received. It is difficult to estimate a response rate, since it is unknown how many fishermen were exposed to the survey. To increase survey availability, respondents were encouraged to distribute the survey freely. Despite an occasional reluctance, the majority of the industry was receptive to participating in and distributing the survey among fishermen. Most respondents recognized the importance of their input. The ability to supplement biological data with fishing patterns was accomplished through the cooperation of fishing groups and individuals.

Since each of the six tows had the same effort (30 minutes), catches from the three tows on-site can be compared with the three tows off-site. Abundance, or the number of individuals, was about the same (1,817 on-site; 1,888 off-site). Biomass was higher in off-site tows, likely due to a high occurrence of smooth dogfish in one trawl. Length distributions on and off dredged material disposal sites did not exhibit any clear patterns. It appeared that a greater proportion of large scup were present in trawls on dredged material disposal sites. Windowpane flounder had a greater proportion of large fish off-site, though. Winter flounder did not have a discernible pattern, and the other targeted species had too low of abundance to make any inferences. Based on the catch composition and lengths of fish collected in the CT DEEP trawls, there is no clear difference between fish assemblages on and off dredged material disposal sites.

Scup were caught often in the CT DEEP surveys. The eastern basin yielded lower catches of scup during the fall than western areas; however, some areas had high abundances in the spring. These fish move seasonally, from offshore in the winter to inshore in the summer. With the adoption of a Fishery Management Plan (FMP) in 1996, measures were put in place to effectively manage the scup resource. As defined by NOAA's National Marine Fisheries Service, a fish stock is considered overfished if its biomass is depleted below a level needed to achieve maximum sustainable yield. Overfishing occurs if the fishing mortality (i.e., harvest) exceeds the rate needed to reach the maximum sustainable yield. In 2009, the scup stock was deemed rebuilt, meaning the previously overfished stock had recovered to levels that support maximum sustainable yield; therefore, the most recent stock assessment in 2012 concluded that the stock was not overfished and overfishing was not occurring (Mid-Atlantic Fishery Management Council 2013b). In both the spring 2012 CT DEEP data and the current study, scup were the most abundant species. In this study, only the Cornfield Shoals Dredged Material Disposal Site had a notably low abundance of scup, which also had a high abundance of little and winter skates. Scup spawn once a year in the summer, which explains the trimodal length frequency diagram (Figure 10); as each

year-class matures and grows, a distinct peak forms. Therefore, at least three year-classes were collected by CT DEEP for this survey. Males and females become sexually mature at 2 years, which corresponds to about 16 cm (160 mm). Of the measured scup, the first peak at 110 mm is likely age-0 fish, just before their first birthday. The following, highest peak at 170 mm represents fish turning 2 years of age and reproducing for the first time. The last, smaller peak (230 mm) would be composed of fish 3 or more years old. Scup are targeted more often by commercial and charter/party boat fishermen than the recreational industry.

Winter flounder abundances have decreased since 1992, and though they are broadly distributed throughout the Sound, the eastern basin had the lowest catches. Data from 2010 indicated that the southern New England and mid-Atlantic stock was overfished (i.e., biomass level below maximum sustainable yield) but that overfishing was not occurring (i.e., fishing mortality did not exceed levels needed to rebuild the stock) (Atlantic States Marine Fisheries Commission 2013c). Winter flounder, one of this study's primary targeted species and of high commercial importance, was also studied by Dominion Resources Services Inc. (2006) during their investigation of the ecological impacts of the Millstone Power Station. Historically, there was a decline in stock abundances after the early 1980s, presumably due to low recruitment, warmer winter temperatures, and increased fisheries exploitation. In a follow-up study, Dominion Resources Services Inc. (2013) found that abundance decreased further, though larval abundance was greater in Niantic Bay relative to Niantic River, suggesting Long Island Sound may be more important to reproductive success than estuaries. This species has a seasonal migration that is the reverse of many of the other species found in Long Island Sound. Winter flounder overwinter in the inshore bays and estuaries, then migrate offshore during the summer months. Consequently, the relatively low abundance in this study's trawl survey may be a result of preferred offshore habitat in June. Sexual maturity is reached at 2 to 3 years of age, or 20 to 25 cm (200–250 mm). Based on fish length, most of the winter flounder collected in this survey were sexually mature. The somewhat protracted spawning period may also explain why a distinct peak for each year-class is not evident (Figure 11). Since winter flounder were scarce, though, there may simply be insufficient length data to discern a pattern. Winter flounder were only identified by recreational fishermen as a target species, and at low rates.

Three striped bass were collected in three different tows throughout eastern Long Island Sound for this study. Striped bass stocks have been deemed recovered as of 1995, following strict regulations in the mid-1980s. The most recent assessment from 2013 found that the stock is not overfished nor is overfishing occurring (Atlantic States Marine Fisheries Commission 2013a). This increase in abundance since the 1980s is also reflected in the CT DEEP survey. Since spawning occurs in freshwater between April and June, it is possible that adult fish were not yet using habitat in eastern Long Island Sound during this trawl survey. Juvenile striped bass (<20 cm) often disperse to low salinity habitat in non-natal estuaries (Able et al. 2012) before growing and moving into the main estuary and ocean. From Plum Island Estuary, Massachusetts, sub-adult striped bass migrate south in the fall, with about half stopping in Long Island Sound, and the other half continuing on to the Delaware Estuary (Mather et al. 2010). Two adults that were collected on a dredged material disposal site in this study were estimated to be approximately 6 years of age; one that was collected off-site was likely 10 years of age. Sexual maturity is reached between 2 and 4 years for males and 5 to 8 for females, so the 6-year-old individuals may or may not have been sexually mature. This anadromous fish is the most sought-after species by charter/party boat and recreational fishermen.

Bluefish primarily occur in eastern Long Island Sound seasonally, moving through the Mid-Atlantic Bight during their summer spawning period, though larger fish may reside there year-round. The bluefish

stock is considered rebuilt, with both commercial and recreational fishermen under-harvesting the stock (Atlantic States Marine Fisheries Commission 2013b). Since the start of the survey, bluefish catch per tow varied, with a higher frequency of age-0 fish than age-1+. In 2012, approximately thirteen age-0 and one age-1+ bluefish per tow were caught, with greater biomass during the fall sampling period. Therefore, the finfish trawl sampling effort in this study had below average abundance of bluefish, but that could be due, at least in part, to their seasonal migration restricting them from Long Island Sound until later in the summer. To determine age class, CT DEEP uses 30 cm as the length to partition age-0 and age-1+ bluefish (CT DEEP 2012). Using this to determine age, the single bluefish collected in the westernmost tow of this study, measured at 537 mm fork length (53.7 cm), is considered older than 1 year of age. Bluefish are the third-most targeted finfish by both charter/party boat and recreational fishermen.

Both secondary targeted species, windowpane flounder and striped searobin, were among the top 10 most abundant species in the CT DEEP Long Island Sound survey in 2012, comprising 2.2 and 1.9 percent of the total catch, respectively. However, ENSR (2001a) found that the highest catches of these two species occurred in western Long Island Sound. In this study, both species occurred at low densities, except windowpane flounder in tow AC2013005. In this tow, 62 fish made up over 7 percent of the catch. This was also the one tow with an above-average occurrence of smooth dogfish, which is unexpected since dogfish are a common predator of this flounder species. Split spawning occurs for windowpane flounder in the spring and fall; since only one peak is evident in the length frequency graph (Figure 12), other cohorts may have been excluded by the size or speed of the trawl net. The average age at maturity for striped searobin is 221 mm fork length, for both males and females (McEachran and Davis 1970). Therefore, most, if not all, of the collected individuals (225–295 mm) were sexually mature. Neither windowpane flounder nor striped searobin were specifically mentioned as a target species in the fishing activity questionnaire.

Commercial finfishermen rely heavily on eastern portions of Long Island Sound, while charter/party boat and recreational fishermen frequent the central to southwestern portions. Interestingly, commercial fishermen were the only group in which the majority felt that the quantity of their target species had increased over time; all other fishery groups felt abundance of their target species had not been changing or had been decreasing. All finfish groups listed summer flounder and striped bass as important target species, but commercial fishermen were alone in identifying black sea bass and tautog among their most-targeted species. Although tautog are currently characterized as overfished (Atlantic States Marine Fisheries Commission 2011), the black sea bass stock was considered rebuilt in 2009 and is at 102 percent of the necessary spawning stock biomass for maximum sustainable yield (Atlantic States Marine Fisheries Commission 2009, Mid-Atlantic Fishery Management Council 2013a). This recent increase in abundance may have influenced many of the fishermen targeting black sea bass to report greater numbers.

Shellfish fisheries patterns display a slightly different spatial and temporal pattern than that for finfish. The three most abundant shellfish species collected by on-site trawls were longfin squid, spider crab, and lobster. For off-site trawls, they were longfin squid, spider crab, and blue crab. The trawl data are not likely to fully complement the survey data for the commercial shellfish fishermen, because of gear effects. Many fishermen use pots, traps, or dredges to target shellfish, especially for animals that reside below the sediment surface. Based on the CT DEEP trawl survey in all of Long Island Sound, lobster abundance has been below average for the last decade (Gottschall and Pacileo 2012; Figure 20). In the six eastern Long Island Sound trawls included in this study, lobsters were only collected in the eastern-most trawls, toward the highly used commercial lobster grounds in the eastern portion of the survey

area (Figure 15). Since trawls did not collect any lobsters and commercial fishermen do not use the area, the western portion (areas A, B, E, F, and G) may be suboptimal lobster habitat. In addition to habitat usage, the overall low abundance of lobsters in this study may be due to the decreasing population abundance throughout the Sound. Based on feedback from the fishing activity survey, the eastern portion of the study area is important to the lobster fishery, while the southwestern portion is used frequently by the commercial mollusk industry. Commercial mollusk fishermen were the only group that did not report peak fishing effort in the summer; rather, they focused their efforts in the fall. Many shellfish areas in New York waters, where the commercial mollusk fishery is focused, have seasonal closures from May to October or November (New York State Department of Environmental Conservation 2014), so mollusk fishermen may increase their effort when the areas reopen in the fall.

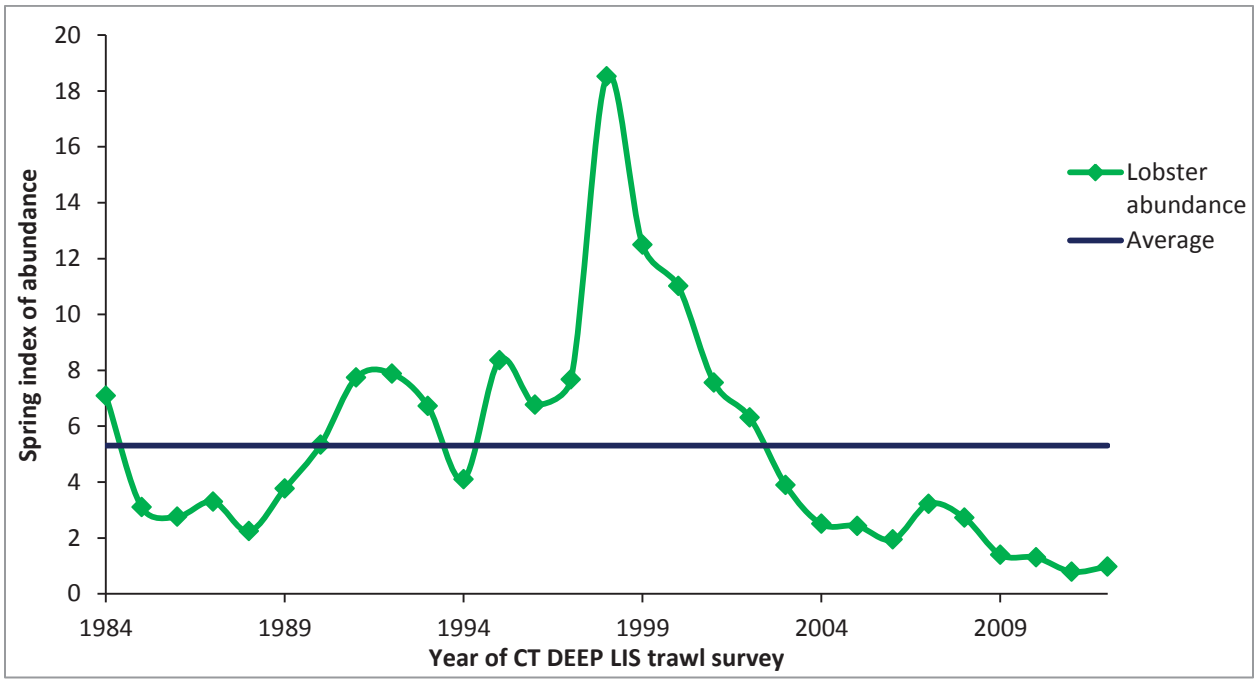

Figure 20: Spring Index of Abundance for Lobster, Based on the CT DEEP LIS Trawl Survey

Fishing near dredged material disposal sites was infrequent, regardless of the fishery type. Half of all respondents do not fish near dredged material disposal sites at all and a large percentage of them (44 percent) were unsure. Since these individuals are not seeking out these specific dredged material disposal site areas, it is unlikely that they would frequent them by chance. Only a small portion (6 percent total) fished near a dredged material disposal site occasionally or regularly. The NLDS was the only dredged material disposal site included in the current study that was explicitly mentioned by fishermen who fished close to such sites. NBDS and CSDS do not appear to attract fishermen. Since few of the questionnaire's respondents fished near dredged material disposal sites, feedback on the effect of dredged material disposal sites on fishing activity was limited. The few that did identify changes in catch near a dredged material disposal site mentioned an increase in mid-Atlantic species, as well as an overall increase in catch quantity. Based strictly on those fishermen that commented on changes in catch near dredged material disposal sites, the only negative observation was that flounders were "all gone;" all other responses were neutral or positive. It may be assumed that this one particular fisherman's response was regarding the most sought-after flatfish, summer flounder (Table 26). If this is the case,

however, the observation contradicts the increase in summer flounder abundance observed over the last decade; a recent stock assessment from 2011 found that the summer flounder stock had reached its biomass target in 2010 (Northeast Fisheries Science Center 2011).

One recurring comment throughout the survey was a greater incidence of warmer-water species. This observation has been substantiated by years of catch data. More than 20 years of CT DEEP's trawl data were compared to 32 years of water temperature data by Howell and Auster (2012). Bottom water temperature significantly increased over this time period. With it, fish assemblages shifted from cold-adapted to warm-adapted species. Northern fish like windowpane flounder, winter flounder, red hake, and little skate have shown declining numbers, while southern fish like scup, butterfish, summer flounder, and black sea bass have proliferated (Benson 2012). The 2012 Long Island Sound trawl survey caught pinfish (*Lagodon rhomboids*) for the first time in two fall trawls (Gottschall and Pacileo 2012). This warm-water species tolerates water temperatures from 10°F to 35°F and are generally found in more southern waters (Ohs et al. 2011). Fish assemblages have already undergone alterations in response to increased water temperatures, as evidenced by trawl catch composition and fishery target species. This increase in water temperature may further stress cold-water species, increasing susceptibility to disease or parasites, or driving populations offshore.

4.3 Disease and Toxicity

The American lobster may be particularly vulnerable to environmental changes, such as warmer water. Shell disease was first documented in 1992 and increased dramatically after 1999. This increase in shell disease was concurrent with temperatures regularly exceeding 20°C, a pattern that was not evident before the mid-1990s. Shell disease results in bacterial growth that weakens the lobster's shell, with a simultaneous attack on the immune system. Molting can get rid of shell disease, but under the same stressful environmental conditions, the animals easily become re-infected. Eastern Long Island Sound has had the highest incidence of the disease relative to the central and western basins, with rates ranging from a low of 14.4 percent in 2008 to a high of 35.5 percent in 2002 (Giannini and Howell 2010). Though shell disease incidence has remained elevated since 1999, the most recent estimates from 2009 show a slight decrease in occurrence from 2002-2007 levels, with 22 percent of lobsters affected by the disease (Giannini and Howell 2010). Disease severity has been linked to poor immune systems (Homerding et al. 2012), but it does not appear to result from metal contamination (LeBlanc and Prince 2012). The disease is more common in egg-bearing females, with up to 92.1 percent showing signs of shell disease in 2002 (Giannini and Howell 2010). In addition to this biological affliction, there is some evidence that lobsters are beginning to spawn offshore in deeper waters, which may negatively affect recruitment rates. Larvae released offshore are transported away from historic nursery sites in Long Island Sound estuaries, resulting in higher losses at sea or settlement in more northern areas (Bell 2010). Environmental changes, rather than fishing pressure, have been implicated in the decline of the southern New England stock of American lobster (Bell 2010). Decreased health, coupled with recruitment failure, has likely contributed to the relatively few commercial lobstermen still actively fishing, as well as low abundances, both apparent in the current study.

From 1988 to 2010, chemical contaminants from land, air, and water have collectively decreased by 86 percent within Long Island Sound (LISS 2012). This decline has been attributed to toxic chemical bans, tighter regulations, and less manufacturing, which has led to the recovery of several species, including the osprey (LISS 2012). Contaminants still threaten marine and coastal organisms, however. Bluefish, an important recreational species, has been found with levels of mercury high enough to pose a risk to human health (Szczebak and Taylor 2011). In fact, bioaccumulation is correlated to bluefish length,

because as these fish grow, they prey on larger food items with more mercury. Both summer and winter flounders have exhibited bioaccumulation of mercury as well, with evidence that mercury is transferred through the food web (Payne and Taylor 2010). Therefore, some of the largest fishes (and most sought-after by fishermen) often contain the highest contaminant concentrations. Not only can contaminants like mercury pose a risk to human health, but they may also decrease the fitness of an organism. The saltmarsh sparrow, an endangered coastal bird, has been observed with mercury levels that may reduce nesting success (LISS 2012). As previously stated, contaminant levels have decreased overall, however, with many beneficial results. Levels of contaminants such as metals, dioxins, and pesticides were low enough in shellfish that 2,500 acres of LIS shellfish areas were reopened in 2011 after 40 years (LISS 2011). Although some organisms continue to be affected by contaminants, the health of Long Island Sound has improved, resulting in the recovery of several species.

As discussed in Sections 3.1 to 3.4, the 10-day sediment toxicity testing completed for this study resulted in survival rates ranging from 82 to 92 percent of *A. bahia* and 94 to 98 percent of *L. plumulosus*, suggesting that the toxicity of sediments within the disposal sites is not a major concern for survival of benthic organisms.

4.4 Site-Specific Trends

The NLDS is distinguished by the high proportion of silt and clay sediment. Likewise, NLDS samples have slightly elevated organic content. Species density varied substantially from site to site, with a minimum of 30 in NBDS and a maximum of 3,905 in an off-site grab. Since the variation occurs within all of the sites sampled, there is not one particular site or area that shows a notable trend in species density. Species richness was highest off-site where the greatest number of grabs occurred, which is supported by species-area relationships in marine ecosystems (Valiela 1995, Neigel 2003). Diversity, indexed by H', was also somewhat variable, but was relatively high. No one site had significantly different diversity. Off-site samples were dominated by annelids, while all others had arthropods as the dominant taxon. On a species-specific basis, however, the fine-grained NLDS contained more tube-dwelling amphipods compared with the other three medium-grained sites, which had more barnacles and bivalves. Based on average abundance by biomass, scup was greatest both on and off dredged material disposal sites, however it occurred in different percentages. Off-site, scup made up about 20 percent of the catch, while it made up almost 50 percent of on-site trawls.

4.5 Comparisons Among Sites

In general, the sediment composition was consistent with expectations, and similar between dredged material disposal sites and off-site areas. Based on the grain size analysis of this study, the areas sampled in eastern Long Island Sound were primarily made up of medium-size sand. This type of sand often provides habitat for many marine invertebrates, but does not support seagrasses in the open-water habitat of the study area due to minimal light penetration to the ocean bottom. Likewise, no evidence of hardbottom or livebottom in the sampled area of eastern Long Island Sound was found. Organic content was relatively low across all sites, with the highest TOC at NLDS, which coincides with a high proportion of silt and clay. The number of individuals per sample ranged from 30 to 875 for on-site benthic grabs, and ranged from 52 to 3,905 for off-site grabs. Only three of the off-site grabs attained more than 1,000 individuals per sample; the average was 626. This is comparable to the averages of NLDS (617), NBDS (529), and CSDS (893). Species richness was higher than expected based on previous measurements (Dominion Resources Services Inc. 2013), which indicates a diverse infaunal community. Diversity indices were marginally significant between samples collected on and off dredged material disposal sites, with H' increased on-site. Based on H', benthic infauna species diversity is greater on a

dredged material disposal site relative to adjacent areas. Arthropods dominated on-site samples, while annelids were the majority taxon for off-site samples. However, Arthropoda, Mollusca, and Annelida were almost equally abundant across sample sites. Therefore, no difference between taxa was apparent between grabs on and off dredged material disposal sites. Toxicity of the sediment to two organisms was not different among eastern Long Island Sound sites, and none of the field sites resulted in differential survival when compared to survival in control sediment.

A variety of organisms were brought up in the trawls conducted in eastern Long Island Sound. Scup, one of the primary targeted species, was the most abundant species by weight for both on- and off-site tows. The only targeted fish, either primary or secondary, that did not appear in both areas was the bluefish, which was absent from off-site tows. CPUEs, which are proportional to population abundances, did not differ significantly between catches on and off of dredged material disposal sites for targeted species of interest (scup, striped bass, winter flounder, bluefish, striped searobin, and windowpane flounder).

Overall, eastern Long Island Sound is dominated by medium sand that supports a healthy, diverse group of benthic organisms. Dredged material disposal sites do not appear to be correlated to changes in fish or benthic infauna abundance or habitat alterations; rather, local processes seem to dictate differences between samples and sites. Finfish abundance is presumably greatly influenced by seasonal movements of many species, including some of the target species of this study, such as scup, winter flounder, and bluefish. For all of the five fishery groups, the majority of fishing activity was concentrated in the eastern and southwestern portions of the Sound. The northwest portion of the study area appeared to have the least fishing activity. Eastern Long Island Sound provides important habitat for many benthic and fish species, as well as fishing opportunities for many commercial fishermen and recreational anglers.

5 REFERENCES

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APPENDIX A – FIELD DATA SHEETS; BENTHIC SAMPLING

WATER QUALITY - 7/19/2013

SITE	TIME	DEPTH	TEMP	COND mS/cm	DO	DO%	pH	REMARKS
CSDS SURF	0605	149	19.82	41.37	7.94	99.6%	8.19	NIANTIC EBB
MID			19.25	40.74	7.40	93.7%	8.16	
BOTTOM			19.14	39.46	7.29	91.6%	8.17	
NIANTIC SURF	0730	70	19.45	38.99	7.19	90.5%	8.18	
MID			18.58	40.07	6.91	85.9%	8.17	
BOT			18.51	40.41	6.84	85.1%	8.16	
R028 SURF	0745	81	19.42	39.86	7.09	89.5%	8.22	
MID			18.42	41.40	6.74	84.1%	8.18	
BOT			17.37	42.00	6.51	79.7%	8.14	
R1R2 SURF	0755	71	19.58	40.11	6.99	88.6%	8.22	
MID			19.20	40.96	6.75	85.5%	8.19	
BOT			17.50	41.17	6.52	79.6%	8.15	
NLDS SURF	0810	59	19.50	38.94	6.85	86.5%	8.21	mS/cm = 4.5 [illegible]
MID			19.56	40.78	6.72	85.4%	8.19	mS/cm
BOT			19.37	39.77	6.66	84.1%	8.19	DONE - 09:00

TETRA TECH

Benthics, Sheet 1 of 7

Project: LIS Benthics **Date:** 7/16/13 **Vessel:** Hostile Waters **Location:** LIS New London Interim Disposal Site

Crew: BD, DA, TG, LR + BoBo + T-Bone **Grab Type:** Van Veen **Calibration:** N/A

Weather Conditions: Sunny, warm, humid (80's)

Additional Notes P011 - triplicate sample collected; P011 toxicity sample collected
59+ ft is min depth for sampling

Site/Station ID	Time	GPS?	Depth ~~(m)~~ (ft)	% Full	Penetration?	Water Overlay?	Even Surface?	Sediment Description (color, odor, texture)	~~RPD~~ Pictures	TOC	Grain Size	# of #	
P011a	~~0910~~ 1210	✓	59.1	50	yes	yes	yes	sand w/shell hash	NO	✓	✓	1	Bag
P011b	1225		59.1	50	yes	yes	yes	sand w/shell hash	NO	✓	✓	1	Bag
P011c	1230		59.1	75	yes	yes	yes	sand w/shell hash	NO	✓	✓	1	Bag
P014	1245	✓	61.9	50	yes	yes	yes	sand w/shell hash	NO	✓	✓	1	Bag
P014	12:50	✓	61.4	50	yes	yes	yes	silty clay	NO	✓	✓	1	Bag
P015	1308	✓	59.3	50	yes	yes	yes	sand w/shell hash	NO	✓	✓	1	Bag
P013	1330	✓	66.3	50	yes	yes	yes	sandy, silt, clay	NO	✓	✓	1	Bag
P009	1351	✓	61.8	50	yes	yes	yes	silty clay	NO	✓	✓	1	
~~P007~~	~~1412~~		~~98.2~~		✓	✓							
P008	1422	✓	65.7 ~~65.7~~	75	yes	yes	yes	sand	NO	✓	✓	1	BAG
P010	1442	✓	71.6	50	yes	yes	yes	sand	NO	✓	✓	1	BAG

Additional Notes Troubleshoot problems w/ Van Veen collection of sediment - moved in shore; went back to marina to get a swivel, which solved grab issue. Regrouped @ P011 @ 1200 noon.
P009 + ~~P007~~ = 2 25% grabs to generate 50% total
P008 = 25% + 50% grabs to generate 75% total

WE11_Benthic_DataSheet 4/3/2013

∴ 10 samples 8 sites

TETRA TECH

Benthics, Sheet 2 of 7

Project: Long Island Benthics **Date:** 7/16/19 **Vessel:** Hostile Waters **Location:** LI Sound

Crew: BD, TG, DA, CR **Grab Type:** Van Veen **Calibration:** N/A

Weather Conditions: Sunny, hot (90's)

Additional Notes

Site/Station ID	Time	GPS?	Depth (m)	% Full	Penetration?	Water Overlay?	Even Surface?	Sediment Description (color, odor, texture)	~~RPD~~	TOC	Grain Size	# of #
R023	1500	✓	69.3	50%	yes	yes	yes	Sand		✓	✓	1
~~R028~~ R018	1516	✓	66.8	50%	yes	yes	yes	Sand		✓	✓	1
Additional Notes	END SAMPLING FOR DAY @ 1540											

Bag Bag

2 samples
2 sites

TETRA TECH

Benthics, Sheet 3 of 7

Project: LIS Benthics **Date:** 07/17/13 **Vessel:** F/V Hostile Waters **Location:** eastern LIS

Crew: DA, BD, LR, JG, Capt Bob + Tyler **Grab Type:** Van Veen **Calibration:** n/a

Weather Conditions: Sunny + hot (high 80s), no wind

Additional Notes

Site/Station ID	Time	GPS?	Depth (m)	% Full	Penetration?	Water Overlay?	Even Surface?	Sediment Description (color, odor, texture)	Pic ~~RPD~~	TOC	Grain Size	# of #	
P00 1	0902	✓	178	50	Yes	Yes	Yes	Sandy w/hash	X	✓	✓	1	Bag
P00 2	0925	✓	171	50	Yes	Yes	Yes	Sand few pebbles	X	✓	✓	1	Bag
~~P00 2b~~													
~~P00 2c~~													
P003a	1015	✓	178	50	Yes	Yes	Yes	Sand + pebbles	X	✓	✓	1	Bag
P003b	1030	✓	158	50	Yes	Yes	Yes	Sand + gravel	X	✓	✓	1	Bag
P003c	1056	✓	157	50	Yes	Yes	Yes	Sand + hash	X	✓	✓	1	Bag
P016	1154	✓	132	50	Yes	Yes	Yes	Sand few pebbles	X	✓	✓	1	Bag
P022	1215	✓	87.9	50	Yes	Yes	Yes	Sand + hash	X	✓	✓	1	Bag
P004	1226	✓	84.0	75	Yes	Yes	Yes	Sand + hash	X	✓	✓	1	Bag
P019	1241	✓	92.0	75	Yes	Yes	Yes	Sand few pebbles	X	✓	✓	1	Bag

Additional Notes - Triplicates + toxicity samples collected at site P003.

9 samples
7 sites

TETRA TECH

Benthics, Sheet 4 of 7

Project: LIS Benthics **Date:** 07/17/13 **Vessel:** F/V Hostile Waters **Location:** eastern LIS

Crew: DA, BD, LR, TG, Capt Bob, Tyler **Grab Type:** Van Veen **Calibration:** n/a

Weather Conditions: Hot & Sunny, no wind

Additional Notes

Site/Station ID	Time	GPS?	Depth (m)	% Full	Penetration?	Water Overlay?	Even Surface?	Sediment Description (color, odor, texture)	Pic ~~RPD~~	TOC	Grain Size	# of #	
P025	1252	✓	92.1	75	Yes	Yes	Yes	Sand, few hash	X	✓	✓	1	Bag
P023	1318	✓	88.7	50	Yes	Yes	Yes	Sand, few pebbles	X	✓	✓	1	Bag
R001	1330	✓	100	75	Yes	Yes	Yes	Sand	X	✓	✓	1	Bag
P017	1347	✓	123	50	Yes	Yes	Yes	Sand, lighter color	X	✓	✓	1	Bag
P018a	1404	✓	109	50	Yes	Yes	Yes	Sand & hash	X	✓	✓	1	Bag
P018b	1410	✓	109	50	Yes	Yes	Yes	Sand	X	✓	✓	1	Bag
P018c	1415	✓	105	75	Yes	Yes	Yes	Sand few hash	X	✓	✓	1	Bag
R018	1432	✓	84.2	50	Yes	Yes	Yes	Sand few pebbles	X	✓	✓	1	Bag
P020	1447	✓	95.1	50	Yes	Yes	Yes	Clay & Sand	X	✓	✓	1	Bag
R027	1502	✓	93.5	50	Yes	Yes	Yes	Sand	X	✓	✓	1	Bag
~~R021~~		✓	100										

Additional Notes

10 samples
8 sites

TETRA TECH

Project: LIS Benthics **Date:** 07/17/13 **Vessel:** F/V Hostile Waters **Location:** eastern LIS

Crew: DA, BD, LR, TG, Capt Bobby Tyler **Grab Type:** Van Veen **Calibration:** n/a

Weather Conditions: Hot + Sunny, light breeze

Additional Notes

Site/Station ID	Time	GPS?	Depth (m)	% Full	Penetration?	Water Overlay?	Even Surface?	Sediment Description (color, odor, texture)	Pic ~~RPD~~	TOC	Grain Size	# of #	
R101	1608	✓	69.1	50	Yes	Yes	Yes	Sand	X	✓	✓	1	Bag
R102	1618	✓	81.1	90	Yes	Yes	Yes	Sand	X	✓	✓	1	Bag
R103	1630	✓	112	50	Yes	Yes	Yes	Sand + gravel	X	✓	✓	1	Bag
R104	1645	✓	140	50	Yes	Yes	Yes	Sand & mud	X	✓	✓	1	Bag
→ R026													
Additional Notes	- end of sampling @ 1700												

4 Samples
4 sites

TETRA TECH

Project: LIS Benthics **Date:** 07/18/13 **Vessel:** F/V Hostile Waters **Location:** eastern LIS

Crew: DABD, LR, TG, Capt Bob, Tyler **Grab Type:** Van Veen **Calibration:** n/a

Weather Conditions: Sunny + hot (mid 80s), light breeze

Additional Notes

Site/Station ID	Time	GPS?	Depth (m)	% Full	Penetration?	Water Overlay?	Even Surface?	Sediment Description (color, odor, texture)	PIC ~~RPD~~	TOC	Grain Size	# of #	
P007	0737	✓	115	50	Yes	Yes	Yes	Gravel hash	X	✓	✓	1	Bag
P006	0757	✓	143	50	Yes	Yes	Yes	Sand hash	X	✓	✓	1	Bag
R025	0814	✓	144	50	Yes	Yes	Yes	Sand few hash	X	✓	✓	1	Bag
R024	0821	✓	119	50	Yes	Yes	Yes	Sand few hash	X	✓	✓	1	Bag
R105	0850	✓	69.0	50	Yes	Yes	Yes	Sand clay	X	✓	✓	1	Bag
R106	0902	✓	67.3	50	Yes	Yes	Yes	Sand hash	X	✓	✓	1	Bag
R007	0911	✓	78.9	50	Yes	Yes	Yes	Sand hash	X	✓	✓	1	Bag
R107	0925	✓	59.6	50	Yes	Yes	Yes	Sand few hash	X	✓	✓	1	Bag
R108	0948	✓	89.5	50	Yes	Yes	Yes	Sand few hash	X	✓	✓	1	Bag
R109	0956	✓	80.3	50	Yes	Yes	Yes	Sand few hash	X	✓	✓	1	Bag
R110	1008	✓	66.3	50	Yes	Yes	Yes	Sand some clay	X	✓	✓	1	Bag
Additional Notes	- Toxicity collected at R024												

11 samples
11 sites

TETRA TECH

Project: LIS Benthics **Date:** 07/18/13 **Vessel:** F/V Hostile Waters **Location:** eastern LIS

Crew: DA, BD, LR, TG, Capt Bob + Tyler **Grab Type:** Van Veen **Calibration:** n/a

Weather Conditions: Hot + sunny (high 80s), light breeze

Additional Notes

Site/Station ID	Time	GPS?	Depth (m)	% Full	Penetration?	Water Overlay?	Even Surface?	Sediment Description (color, odor, texture)	Pic ~~RPD~~	TOC	Grain Size	# of #	
R111	1022	✓	69.4	50	Yes	Yes	Yes	Sand, gravel	X	✓	✓	1	Bag
R112	1043	✓	69.6	100	Yes	Yes	Yes	Sand, some muck	X	✓	✓	1	Bag
~~R113~~		✓											
R021	1311	✓	105	50	Yes	Yes	Yes	Sand, some hash	X	✓	✓	1	Bag
R113	1321	✓	101	50	Yes	Yes	Yes	Sand, few hash	X	✓	✓	1	Bag
R114	1412	✓	161	50	Yes	Yes	Yes	Sand, gravel	X	✓	✓	1	Bag
~~R026~~		✓	114										

Additional Notes - R026: not able to obtain sample with grab

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APPENDIX B – RAW LABORATORY DATA; GRAIN SIZE AND TOC

Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

September 20, 2013
File Number 13-13-0083

Tetra Tech Inc.
889 Elm St.
Manchester, NH 03101

Attention: Brian Dresser

Subject: Laboratory Testing Services, Eastern Long Island Sound, Biological and Environmental Studies to Support the Environmental Protection Agency and the US Navy in Preparation of a Supplemental Environmental Impact Statement

Gentlemen:

As requested, laboratory testing has been completed on fifty-one benthic sediment grab samples received on July 23, 2013.
Each sample was homogenized and specimens obtained for determination of particle-size distribution, organic content and water content by the following test methods:

- Particle-size distribution was determined using sieve analyses in general accordance with ASTM Standard D422 "Particle-Size Analysis of Soils".
- Organic content was determined in general accordance with ASTM Standard D 2974 "Moisture, Ash, and Organic Matter of Peat and Other Organic Soils" using Method C.
- Water content was determined in general accordance with ASTM Standard D2216 "Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass" using method B and an oven temperature of 107°C.

The test results are presented on the attached Particle-Size Analysis Test Reports. The percent gravel-size particles (≥2.00 mm [U.S. Standard No. 10 sieve]) and sand-size particles (<2.00 mm and ≥0.063 mm [U.S. Standard No. 230 sieve]) as defined in the scope of services using the Udden-Wentworth grain-size scale for siliciclastic sediment is listed on Table 1. The particle-size analysis test reports show gravel-size particles as ≥4.75 mm (U.S. Standard No. 4 sieve) in accordance with ASTM Standard D422.

The test samples were reported to be from the client-specified designations herein. The test results are indicative of only the specimens that were actually tested. The test results presented are based upon accepted industry practice as well as the test method(s) listed.

Please contact us if you have any questions about the test results or require additional information.

Very truly yours,
ARDAMAN & ASSOCIATES, INC.

Thomas S. Ingra, P.E.
Laboratory Director
Florida License No. 31987

Table 1

PARTICLE-SIZE DISTRIBUTION TEST RESULTS

Sample No.	Group Symbol	Organic Content (%)	Soil-Fraction (% dry mass)		
			Gravel (≥2.00 mm)	Sand (2.00-0.063 mm)	Silt/Clay (<0.063 mm)
P001	SP	0.4	25.8	72.4	1.8
P002	SP-SM	0.5	14.5	79.4	6.1
P003A	SP	0.6	33.5	62.0	4.5
P003B	SP-SM	0.6	24.7	69.7	5.6
P003C	SP-SM	0.7	12.9	82.1	5.0
P006	SP-SM	1.1	8.6	80.1	11.3
P007	GW	1.9	74.9	21.9	3.2
P008	SC	1.4	4.6	78.1	17.3
P009	SC	3.8	5.3	56.6	38.1
P010	SP-SM	1.0	4.3	86.9	8.8
P011A	SM	1.5	16.2	73.9	9.9
P011B	SM	1.5	16.7	70.9	12.4
P011C	SP-SM	1.2	10.4	81.3	8.3
P013	CL or CH	6.2	3.1	16.4	80.5
P014	CL or CH	3.7	1.7	34.0	64.3
P015	SC	1.2	5.5	78.2	16.3
P016	SP	0.4	29.3	67.7	3.0
P017	SC	0.9	17.7	69.3	13.0
P018A	SP	0.6	25.1	71.4	3.5
P018B	SP	0.4	25.3	71.7	3.0
P018C	SP	0.6	18.4	77.8	3.8
P019	SP-SM	0.8	13.4	78.5	8.1
P020	SC	1.4	9.3	73.7	17.0
P021	SC	1.1	4.3	82.9	12.8
P022	SP-SM	0.5	24.6	70.1	5.3
P023	SP	0.4	20.9	75.6	3.5
P025	SP	0.7	12.0	83.5	4.5
R001	SP	0.4	16.9	81.0	2.1
R004	SP	0.5	6.4	90.3	3.3
R007	SC	1.7	4.8	70.2	25.0
R014	SC	1.9	14.0	42.9	43.1
R018	SP	0.4	28.8	69.3	1.9
R020	SP-SM	0.8	3.2	89.5	7.3
R023	SP-SM	1.5	5.1	85.5	9.4
R024	SC	0.9	27.7	58.8	13.5
R025	SC	1.3	11.2	63.4	25.4
R026	SW-SM	1.2	29.7	60.5	9.8
R027	SP-SC	0.8	31.7	59.7	8.6
R101	SP-SC	0.5	19.8	74.9	5.3
R102	SP	0.2	0.1	99.2	0.7
R103	GP-GC	1.0	64.2	26.6	9.2
R105	SC	1.3	6.1	77.7	16.2
R106	SP-SM	0.7	7.3	86.2	6.5
R107	SC	1.3	19.8	69.2	11.0
R108	SC	1.3	7.3	77.6	15.1
R109	SC	1.4	11.0	72.4	16.6
R110	SC	0.9	4.8	83.2	12.0
R111	SC	1.8	10.8	69.0	20.2
R112	SP	0.6	3.5	94.7	1.8
R113	SP-SM	0.7	5.5	85.3	9.2
R-114	SP-SC	1.1	19.0	72.8	8.2

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/25/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P001**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P001
SAMPLE DESCRIPTION: Light brown to brown sand with shell and roots (SP)
$C_u = 4.9$; $C_c = 0.7$

TEST PROCEDURES

ASTM Standard D422:
☒ Sieve Analysis
☐ Hydrometer Analysis
☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

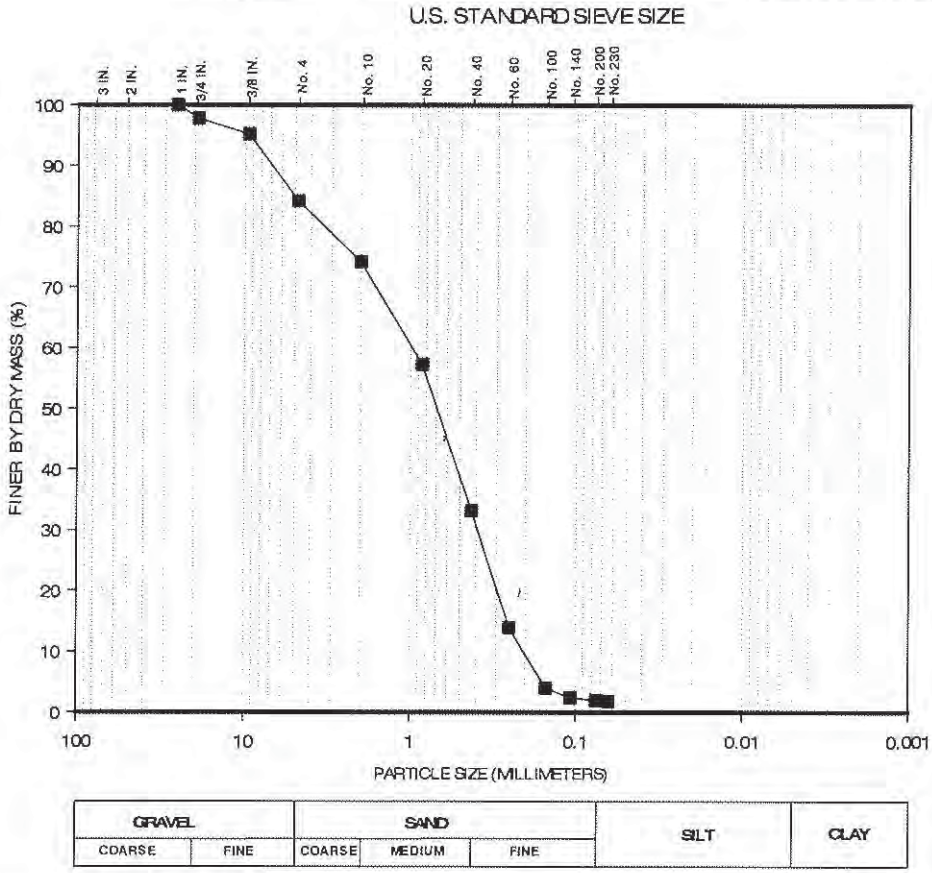
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 22.6
Mass Dry Solids (grams): 360.15

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.4
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	97.8	95.2	84.2	74.2	57.3	33.2	14.0	4.0	2.4	2.0	1.8	-	-	-

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Checked By: TM Date: 09/20/13

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Coarse - No.10 - No.20
Med - No.20 - No.60
Fine - No.60 - No.200

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/25/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P002**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P002
SAMPLE DESCRIPTION: Light brown to brown sand with silt and shell (SP-SM)
$C_u = 3.9$; $C_c = 1.6$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

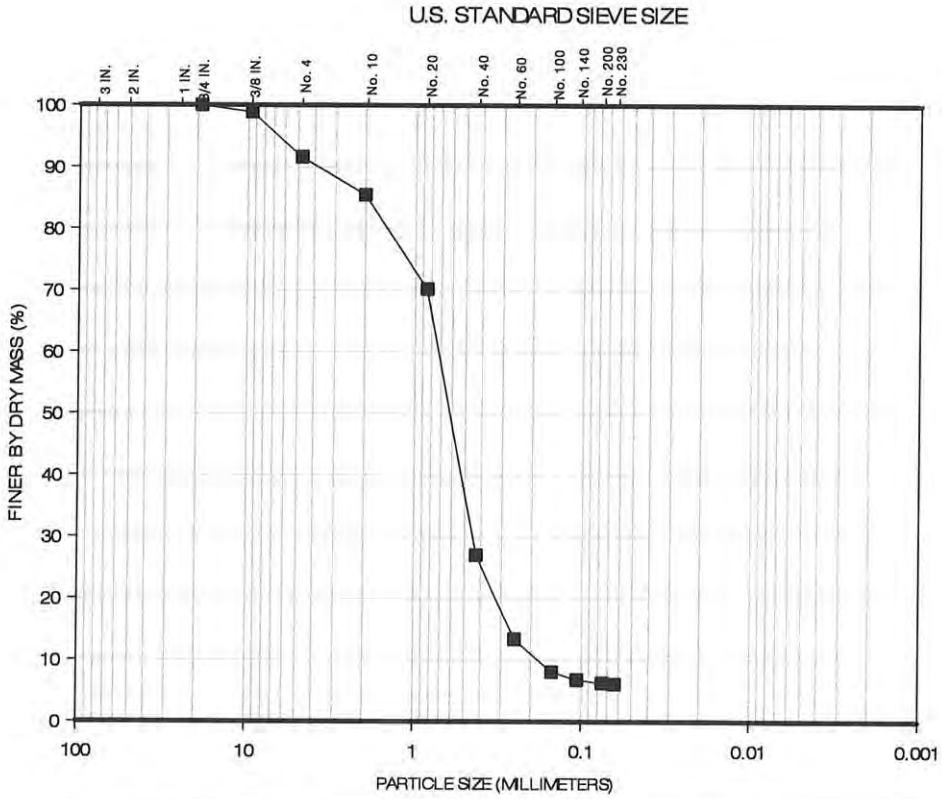
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 22.1
Mass Dry Solids (grams): 388.45

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.5
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	98.9	91.6	85.5	70.2	27.0	13.4	8.1	6.8	6.3	6.1	-	-	-

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Checked By: _____ Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/25/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P003A**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P003A
SAMPLE DESCRIPTION: Light brown to brown sand with gravel, shell and trace roots (SP)
$C_u = 4.8$; $C_c = 0.7$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

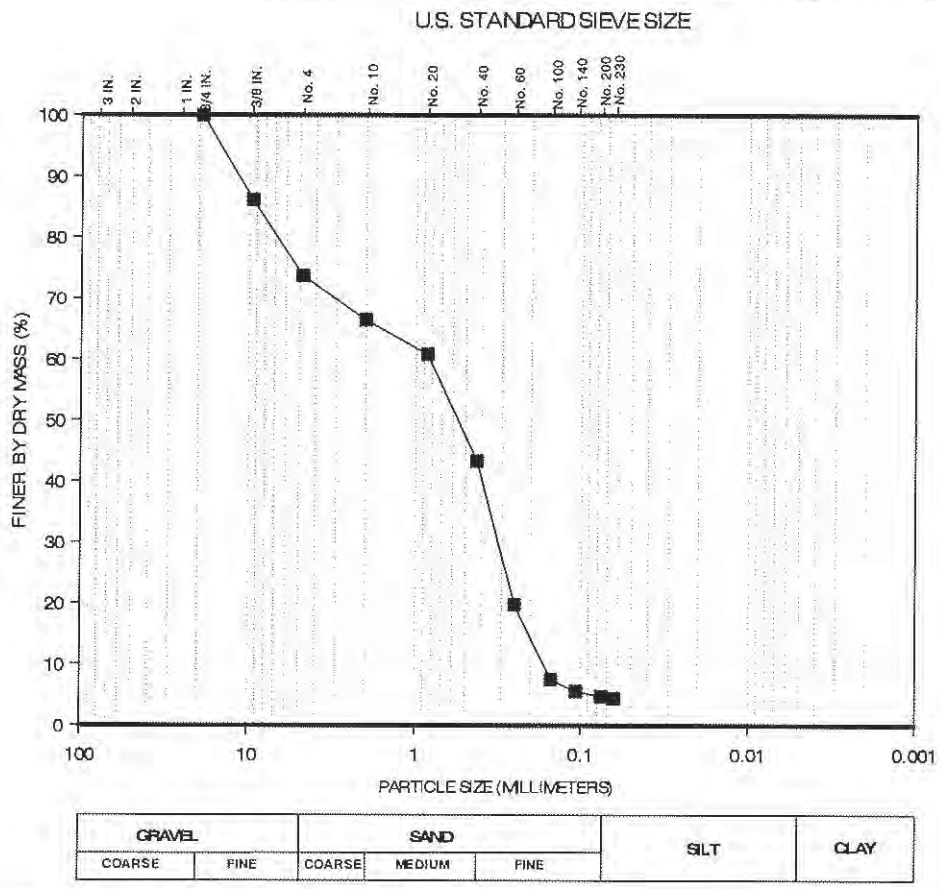
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 22.4
Mass Dry Solids (grams): 410.09

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.6
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	86.2	73.7	66.5	60.8	43.3	19.8	7.5	5.6	4.8	4.5	-	-	-

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Checked By: [illegible] Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/25/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P003B**
BORING: _____ SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P003B
SAMPLE DESCRIPTION: Light brown to brown sand with silt and gravel and shell and trace roots (SP-SM)
$C_u = 4.3$; $C_c = 0.8$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

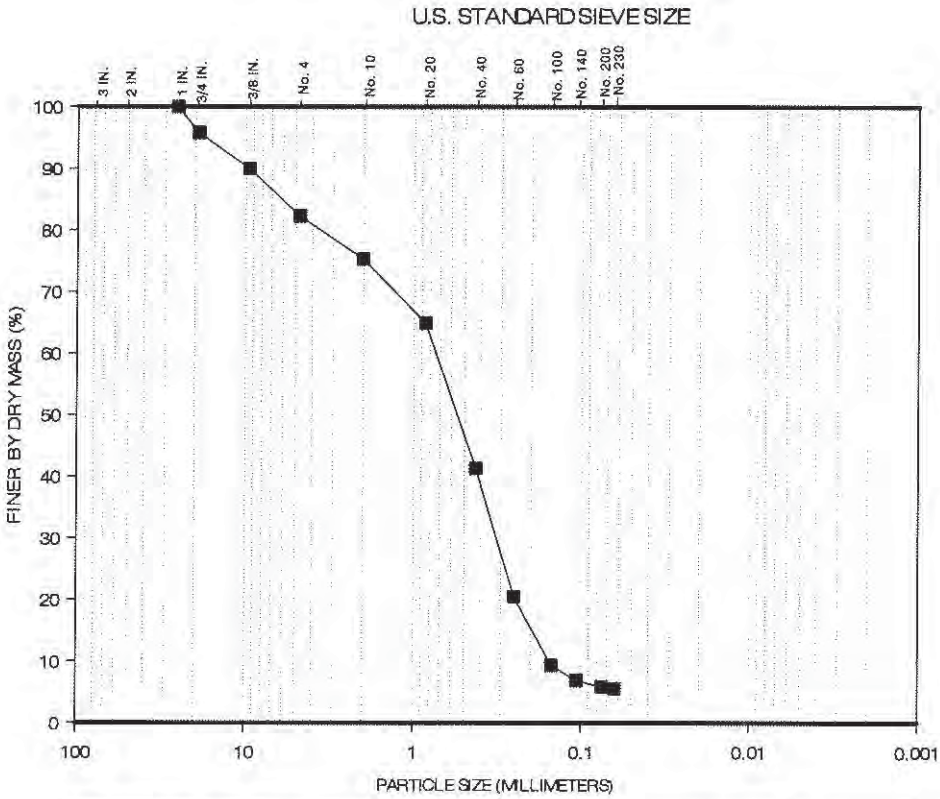
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 24.5
Mass Dry Solids (grams): 386.84

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.6
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	95.8	90.0	82.3	75.3	64.9	41.3	20.5	9.4	6.9	5.9	5.6	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/25/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P003C**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P003C
SAMPLE DESCRIPTION: Light brown to brown sand with silt, shell and trace roots (SP-SM)
$C_u = 3.4$; $C_c = 0.9$

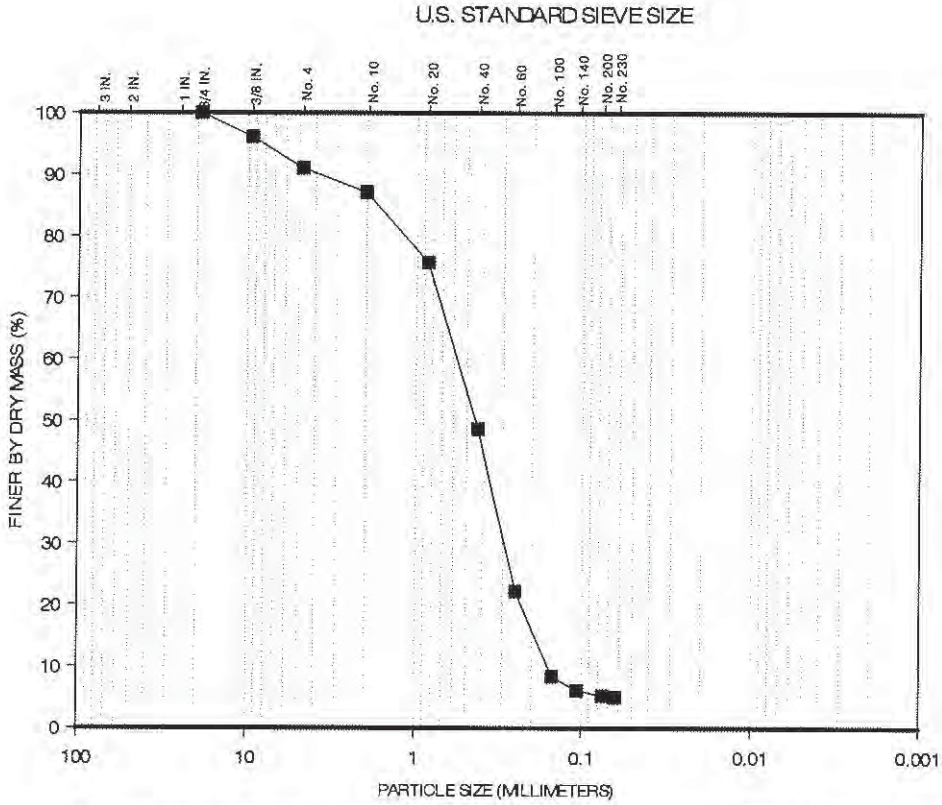
TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____
Dispersion Device: ☐ Apparatus A ☐ Apparatus B
Dispersion Period (hours): _____

Water Content (%): 28.1
Mass Dry Solids (grams): 267.11
G_s: - ☐ Assumed ☐ Measured
Organic Content (%): 0.7
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	96.1	91.0	87.1	75.7	48.6	22.2	8.4	6.1	5.3	5.0	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/25/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P006**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P006
SAMPLE DESCRIPTION: Light brown to brown sand with silt, shell and trace roots (SP-SM)

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

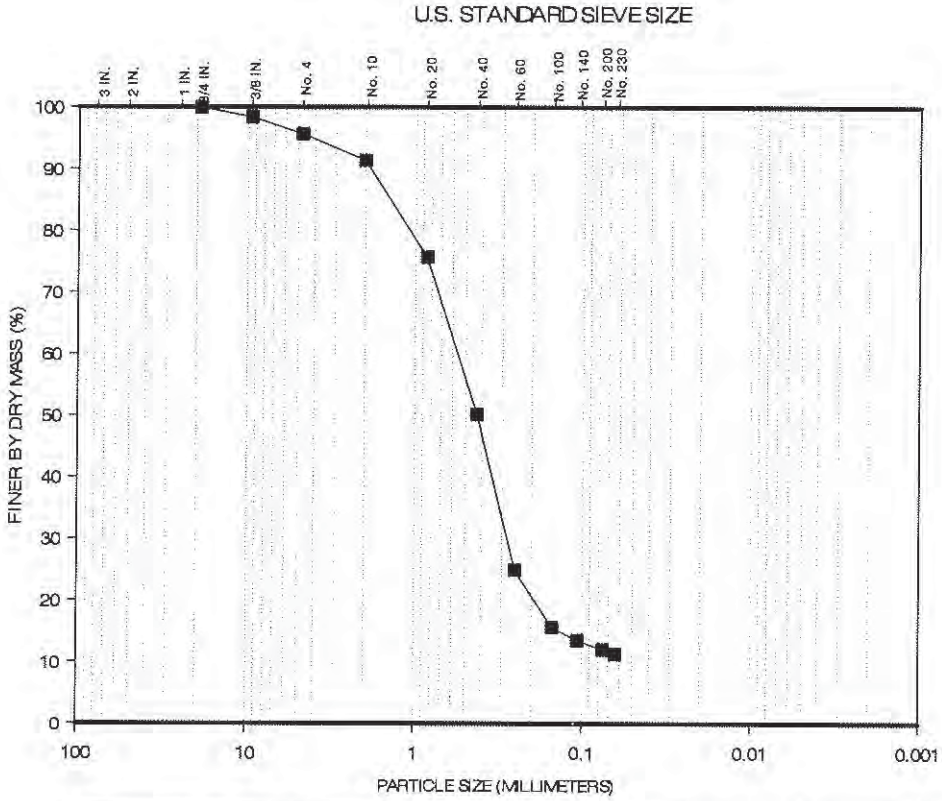
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 39.0
Mass Dry Solids (grams): 301.53

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.1
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	98.4	95.7	91.4	75.7	50.2	24.9	15.6	13.5	12.0	11.3	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/25/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: P007
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P007
SAMPLE DESCRIPTION: Light brown to brown gravel (shell) with sand (GW) $C_u = 25$; $C_c = 2.1$. Live shells were removed from sample.

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

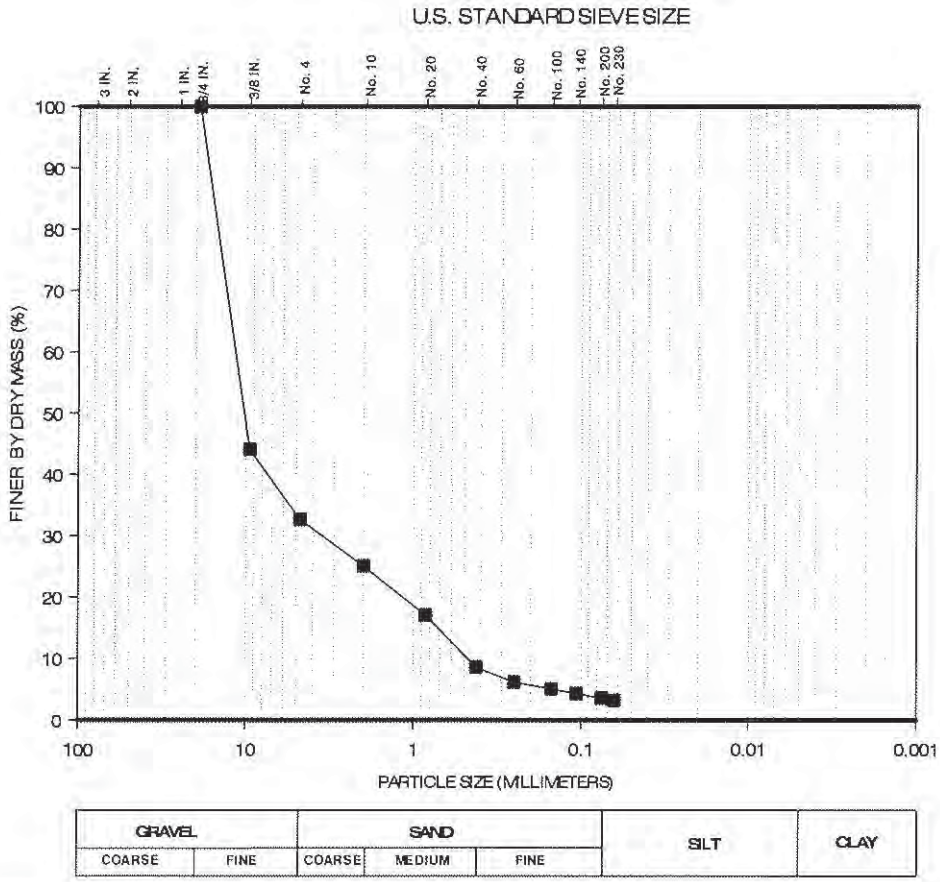
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 33.5
Mass Dry Solids (grams): 77.72

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.9
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	44.1	32.7	25.1	17.1	8.6	6.2	5.1	4.3	3.6	3.2	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/25/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P008**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P008
SAMPLE DESCRIPTION: Dark gray to light brown clayey sand with shell and trace roots (SC)

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

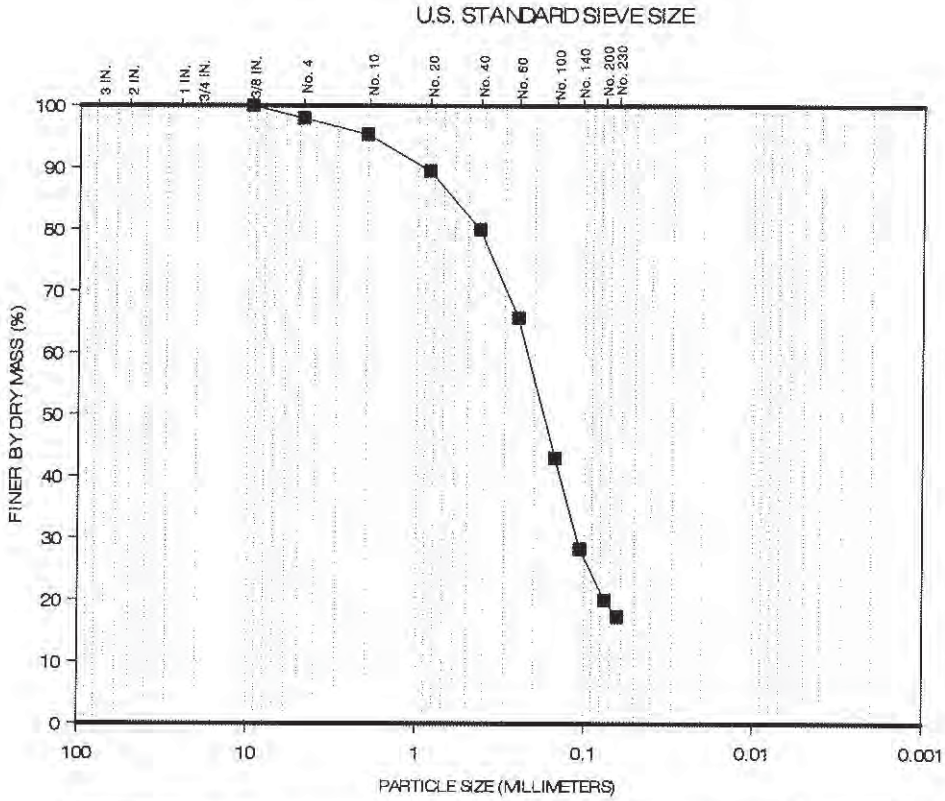
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 40.9
Mass Dry Solids (grams): 208.05

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.4
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	100	98.0	95.4	89.5	80.0	65.7	43.0	28.3	20.0	17.3	-	-	-

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Checked By: _____ Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/25/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P009**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P009
SAMPLE DESCRIPTION: Light brown to black clayey sand with trace shell (SC)

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

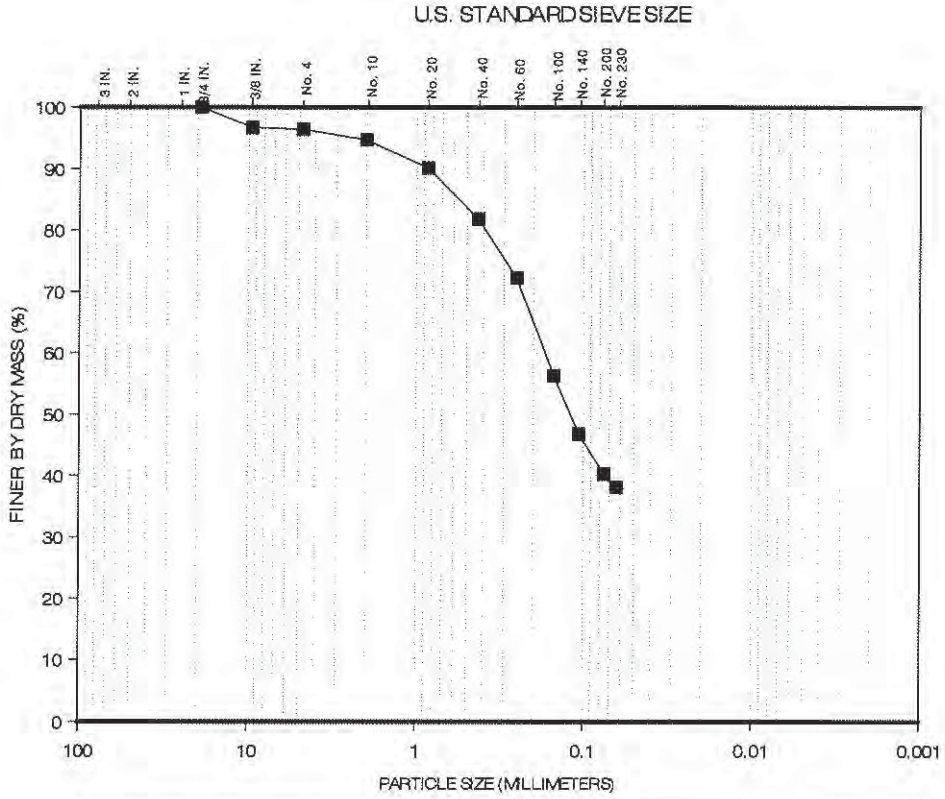
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 79.6
Mass Dry Solids (grams): 154.83

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 3.8
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	96.7	96.4	94.7	90.1	81.8	72.2	56.3	46.8	40.3	38.1	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/25/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P010**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P010
SAMPLE DESCRIPTION: Light brown to brown sand with silt, shell and trace roots (SP-SM)
$C_u = 3.4$; $C_c = 1.5$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

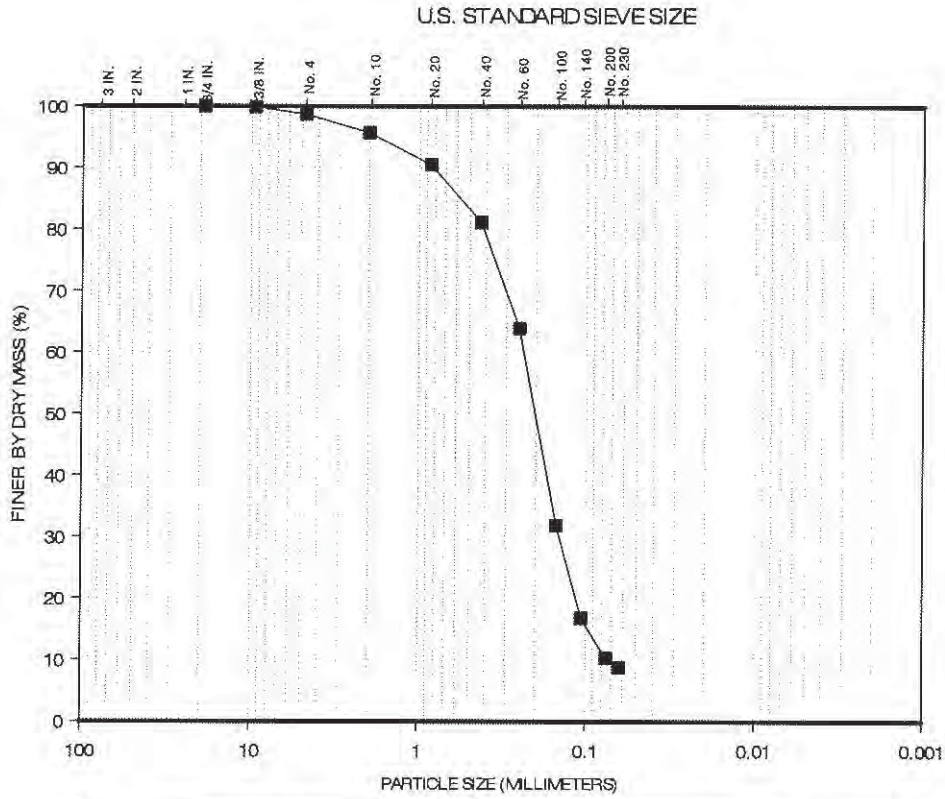
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 36.3
Mass Dry Solids (grams): 294.99

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.0
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	99.9	98.7	95.7	90.5	81.1	63.9	31.9	16.8	10.3	8.8	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/25/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P011A**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P011A
SAMPLE DESCRIPTION: Light brown to brown silty sand with shell (SM)
C_u = 5.3; C_c = 0.9

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

Dispersion Device: ☐ Apparatus A ☐ Apparatus B

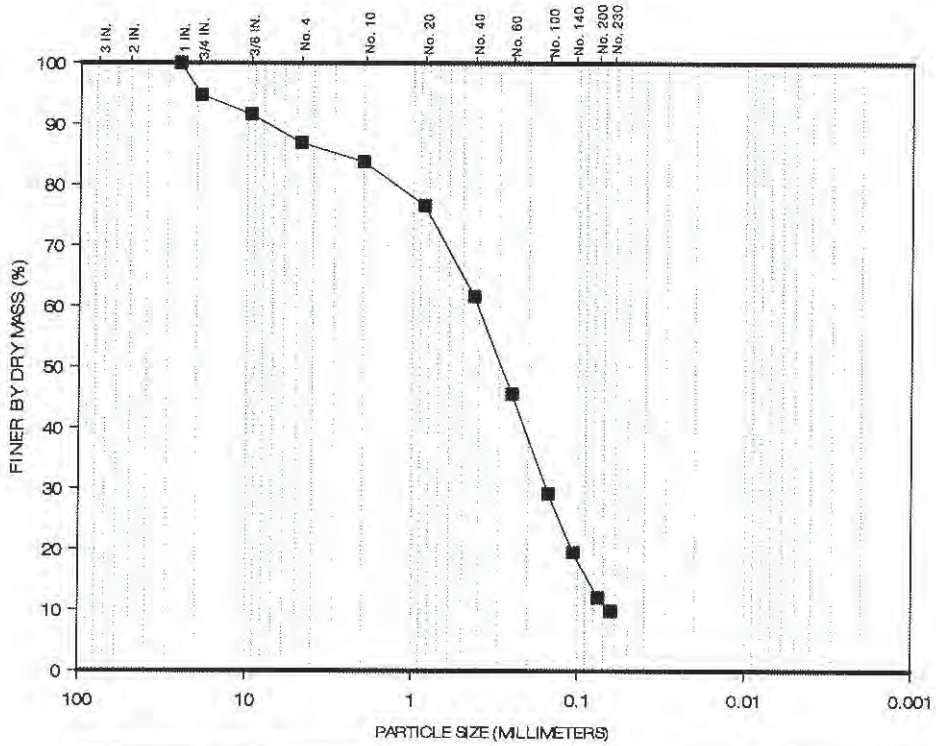
Dispersion Period (hours): _____

Water Content (%): 30.8
Mass Dry Solids (grams): 406.15

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.5
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]

U.S. STANDARD SIEVE SIZE



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	94.8	91.6	86.9	83.8	76.6	61.6	45.6	29.2	19.5	12.1	9.9	-	-	-

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Checked By: [illegible] Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/25/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P011B**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P011B
SAMPLE DESCRIPTION: Light brown to brown silty sand with shell and trace roots (SM)

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

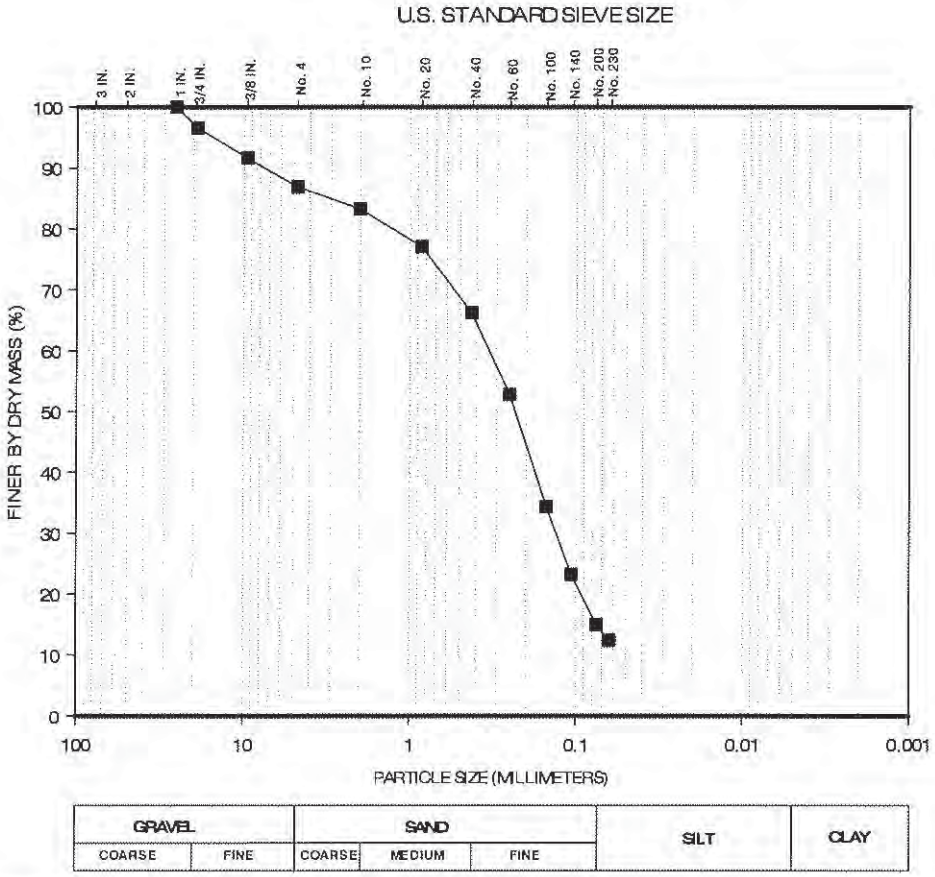
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 32.9
Mass Dry Solids (grams): 321.09

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.5
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	96.6	91.7	86.9	83.3	77.1	66.2	52.8	34.4	23.2	15.0	12.4	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/25/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P011C**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P011C
SAMPLE DESCRIPTION: Light brown to brown sand with silt, shell and trace roots (SP-SM)
$C_u = 5.1$; $C_c = 0.9$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

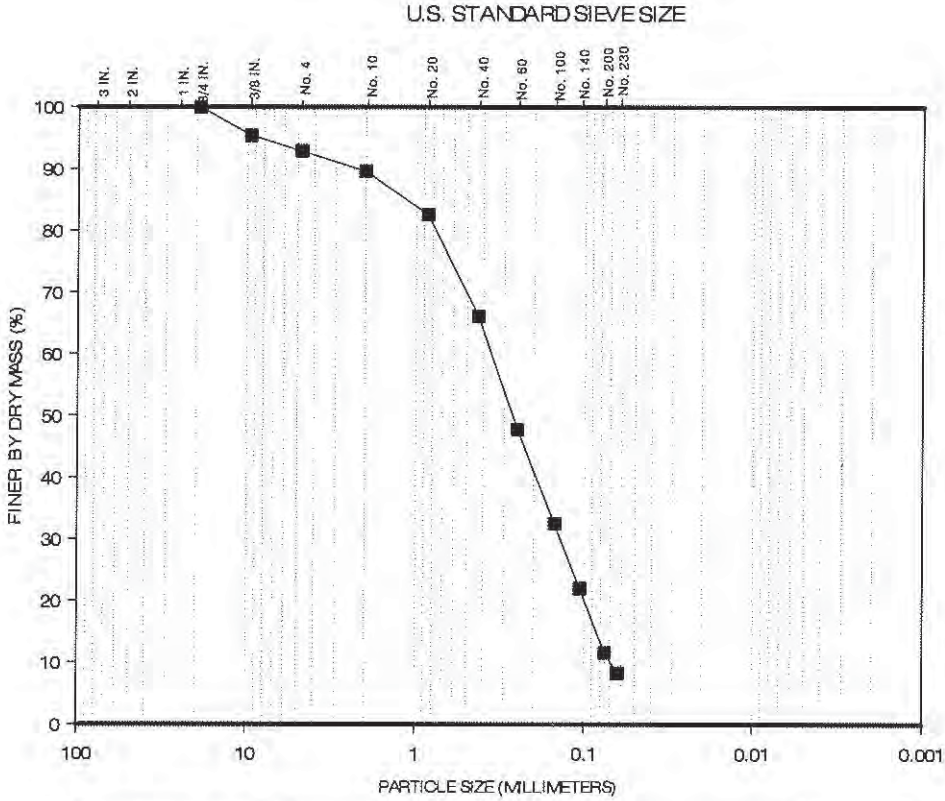
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 28.9
Mass Dry Solids (grams): 383.02

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.2
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	95.4	92.9	89.6	82.6	66.1	47.8	32.5	22.0	11.6	8.3	-	-	-

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Checked By: [signature] Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/25/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P013**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P013
SAMPLE DESCRIPTION: Brown to black clay with sand and trace roots and shell

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

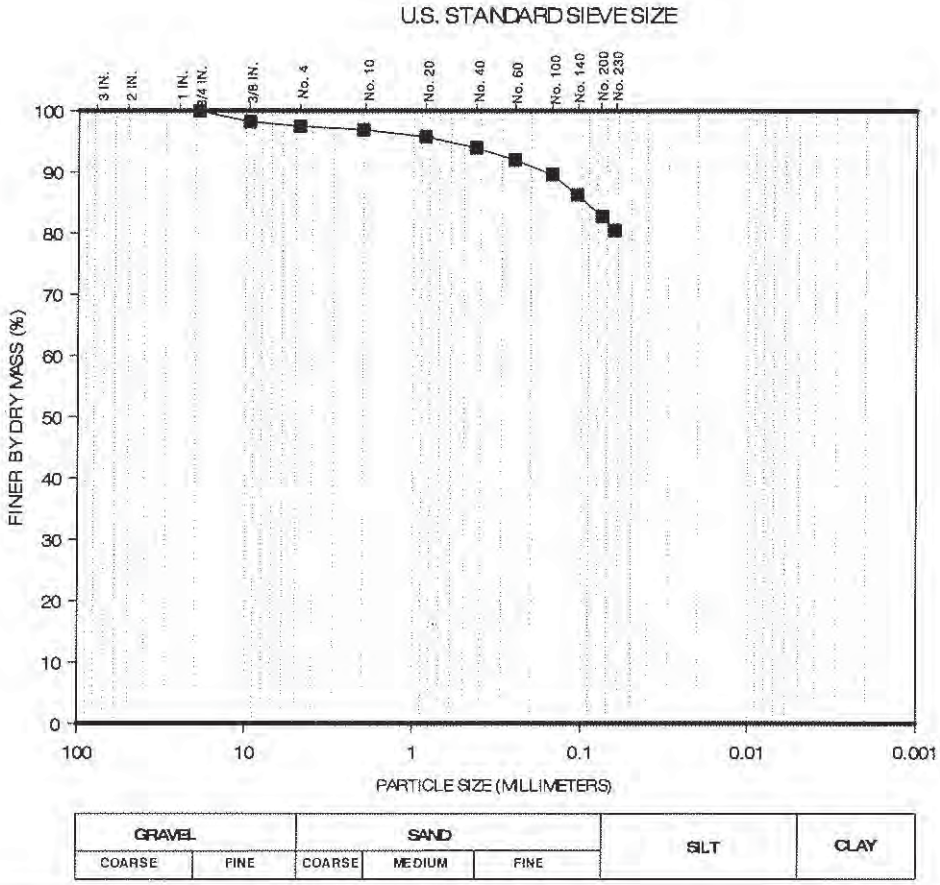
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 124.9
Mass Dry Solids (grams): 116.36

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 6.2
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	98.2	97.5	96.9	95.8	94.0	92.0	89.6	86.3	82.8	80.5	-	-	-

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Checked By: [signature] Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/25/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P014**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P014
SAMPLE DESCRIPTION: Gray sandy clay with trace shell and roots

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

Dispersion Device: ☐ Apparatus A ☐ Apparatus B

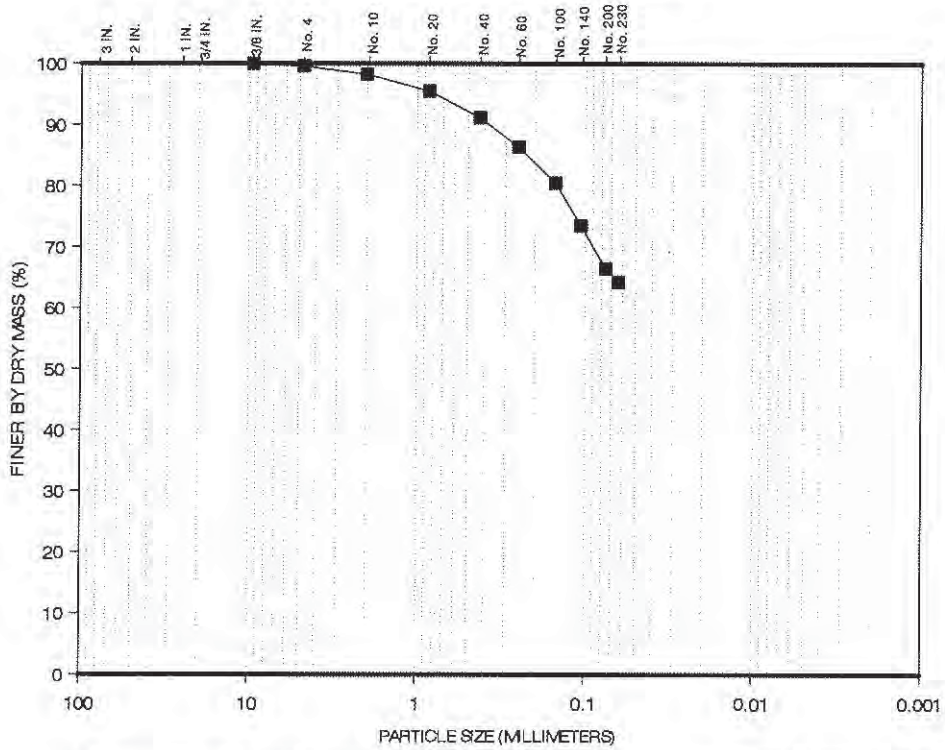
Dispersion Period (hours): _____

Water Content (%): 85.1
Mass Dry Solids (grams): 165.48

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 3.7
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]

U.S. STANDARD SIEVE SIZE



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	100	99.6	98.3	95.5	91.2	86.4	80.5	73.5	66.5	64.3	-	-	-

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Checked By: M Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/25/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P015**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P015
SAMPLE DESCRIPTION: Brown to dark gray clayey sand with shell (SC)

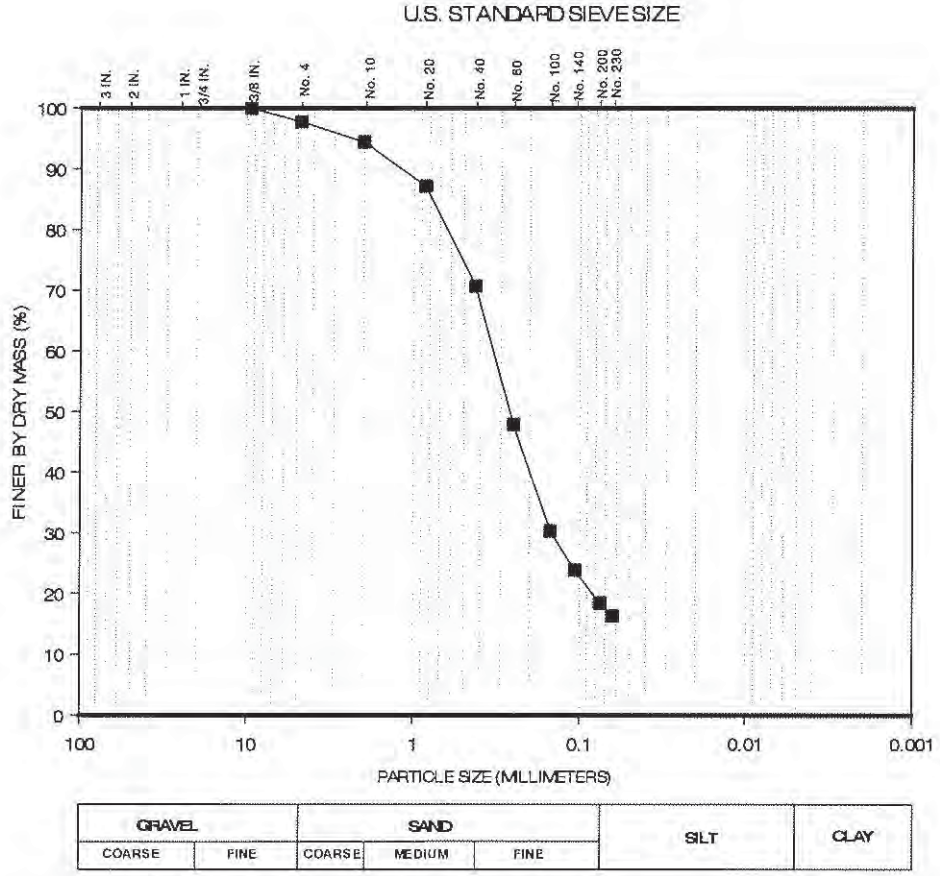
TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other:

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other
Dispersion Device: ☐ Apparatus A ☐ Apparatus B
Dispersion Period (hours):

Water Content (%): 33.0
Mass Dry Solids (grams): 323.58
G_s: - ☐ Assumed ☐ Measured
Organic Content (%): 1.2
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	100	97.8	94.5	87.2	70.7	47.9	30.4	23.9	18.5	16.3	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/25/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P016**
BORING: -
SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P016
SAMPLE DESCRIPTION: Light brown to brown sand with gravel and shell (SP)
$C_u = 3.9$; $C_c = 0.7$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

Dispersion Device: ☐ Apparatus A ☐ Apparatus B

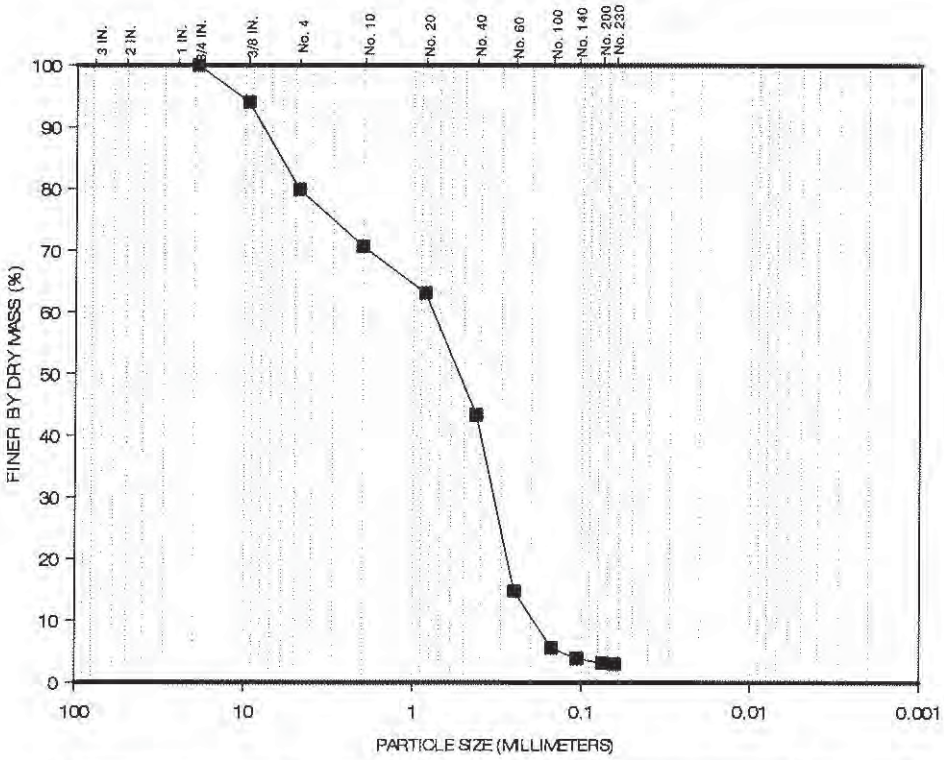
Dispersion Period (hours): _____

Water Content (%): 20.3
Mass Dry Solids (grams): 428.21

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.4
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]

U.S. STANDARD SIEVE SIZE



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	94.1	79.9	70.7	63.1	43.4	14.8	5.6	3.9	3.2	3.0	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/25/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P017**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P017
SAMPLE DESCRIPTION: Orangish-brown clayey sand with shell and trace roots (SC)

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

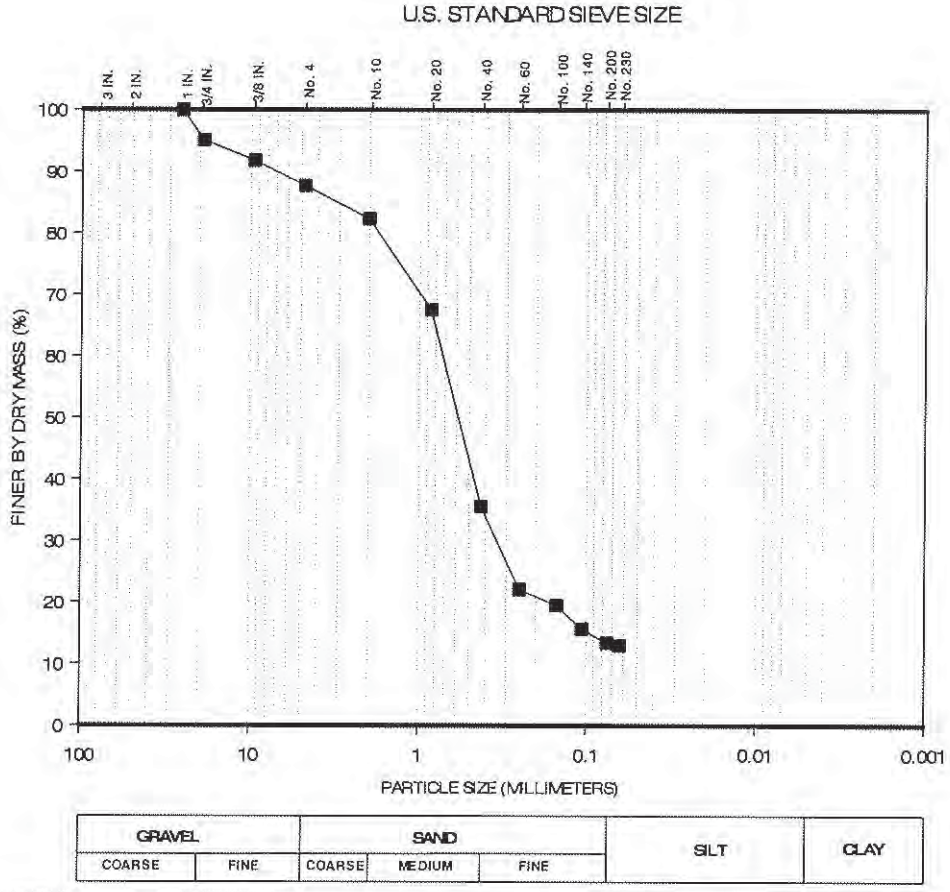
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 29.1
Mass Dry Solids (grams): 433.23

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.9
ASTM Standard D2974
Method C [Loss on ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	95.1	91.8	87.7	82.3	67.5	35.6	22.1	19.5	15.7	13.4	13.0	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P018A**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P018A
SAMPLE DESCRIPTION: Light brown to brown sand with gravel and shell (SP)
$C_u = 3.8$; $C_c = 0.8$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

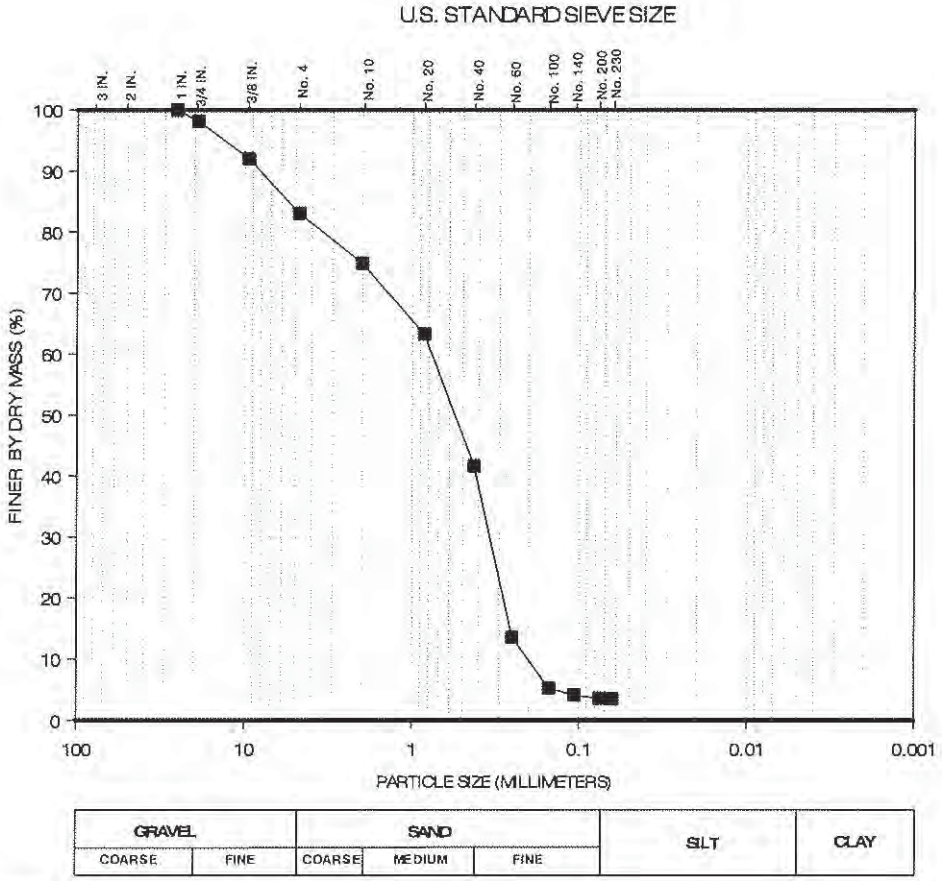
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 23.1
Mass Dry Solids (grams): 259.52

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.6
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	98.2	92.1	83.1	74.9	63.3	41.7	13.6	5.3	4.1	3.6	3.5	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P018B**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P018B
SAMPLE DESCRIPTION: Light brown to brown sand with shell (SP)
$C_u = 4.0$; $C_c = 0.7$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

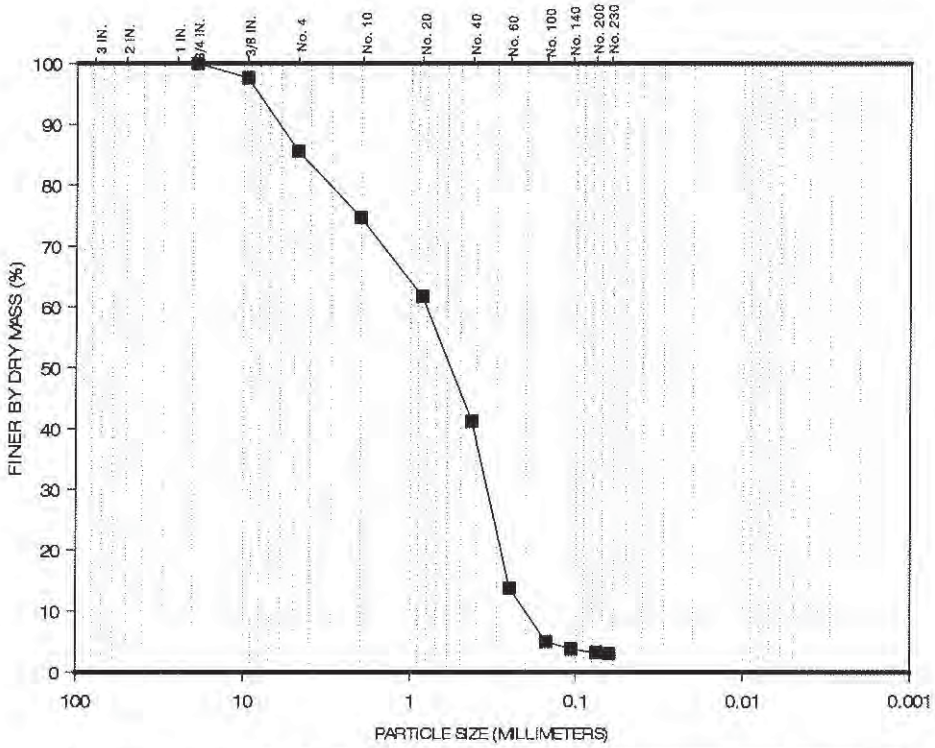
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 19.8
Mass Dry Solids (grams): 430.78

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.4
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	97.7	85.6	74.7	61.7	41.2	13.8	5.0	3.8	3.2	3.0	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P018C**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P018C
SAMPLE DESCRIPTION: Light brown to brown sand with shell (SP)
$C_u = 3.4$; $C_c = 0.9$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

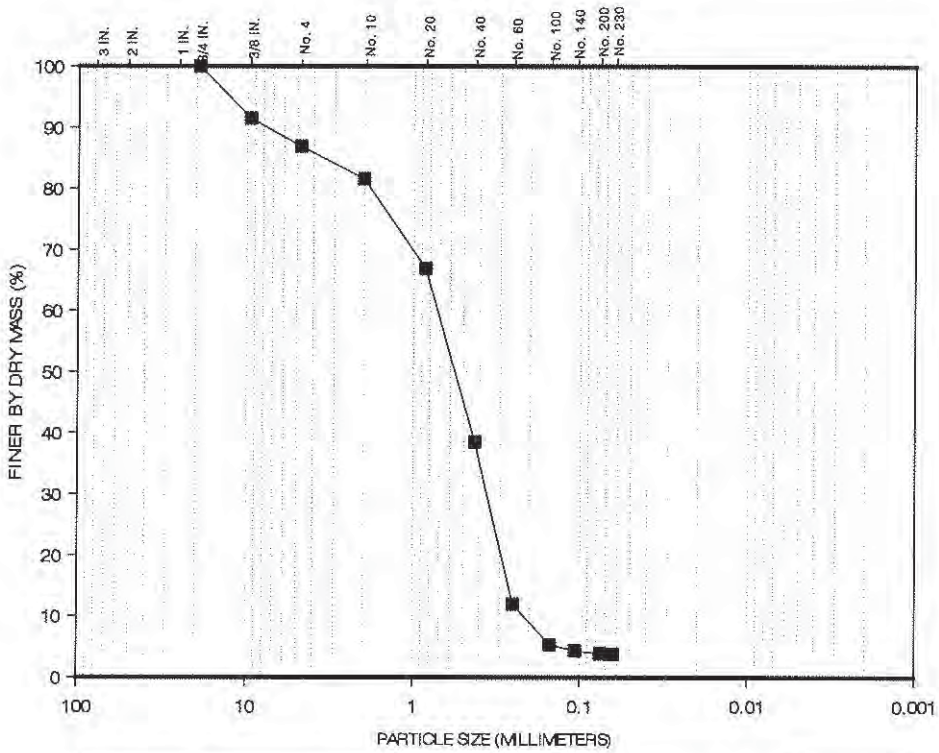
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 22.9
Mass Dry Solids (grams): 388.13

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.6
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	91.5	86.9	81.6	66.9	38.5	12.0	5.4	4.4	3.9	3.8	-	-	-

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Checked By: JM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P019**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P019
SAMPLE DESCRIPTION: Light brown to brown sand with silt and shell (SP-SM)
$C_u = 5.0$; $C_c = 1.5$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

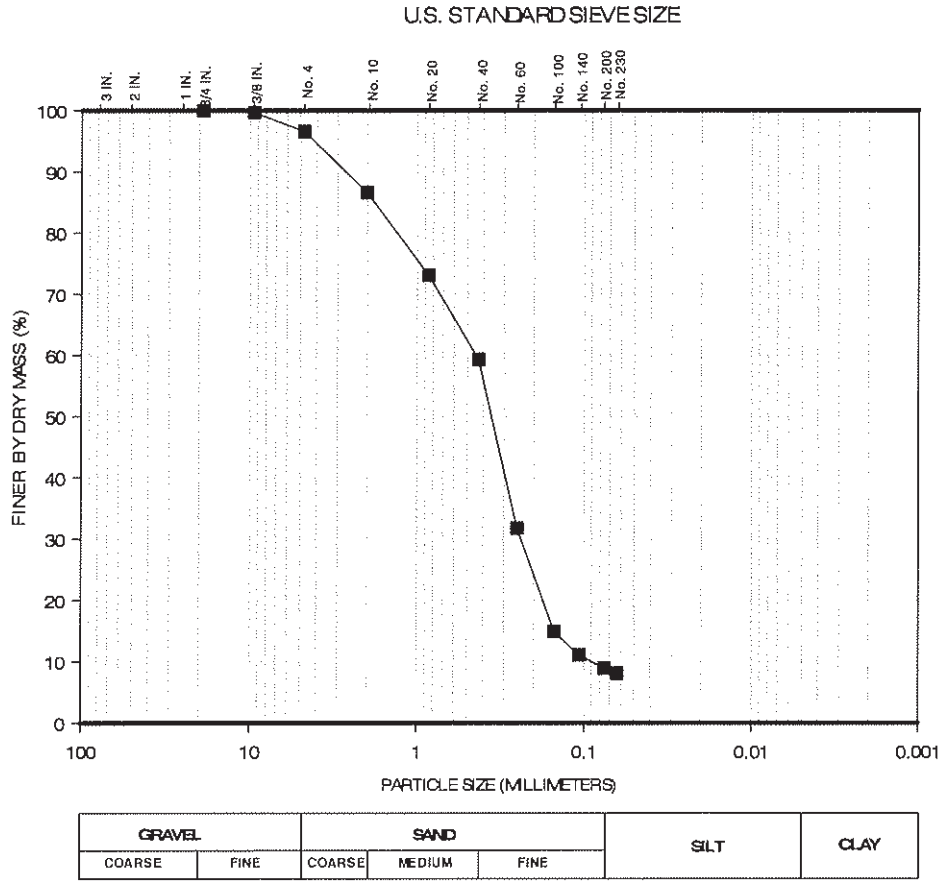
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 28.1
Mass Dry Solids (grams): 456.66

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.8
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	99.7	96.6	86.6	73.1	59.3	31.8	14.9	11.1	8.9	8.1	-	-	-

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Checked By: TW Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P020**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P020
SAMPLE DESCRIPTION: Light brown to gray clayey sand with shell (SC)

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

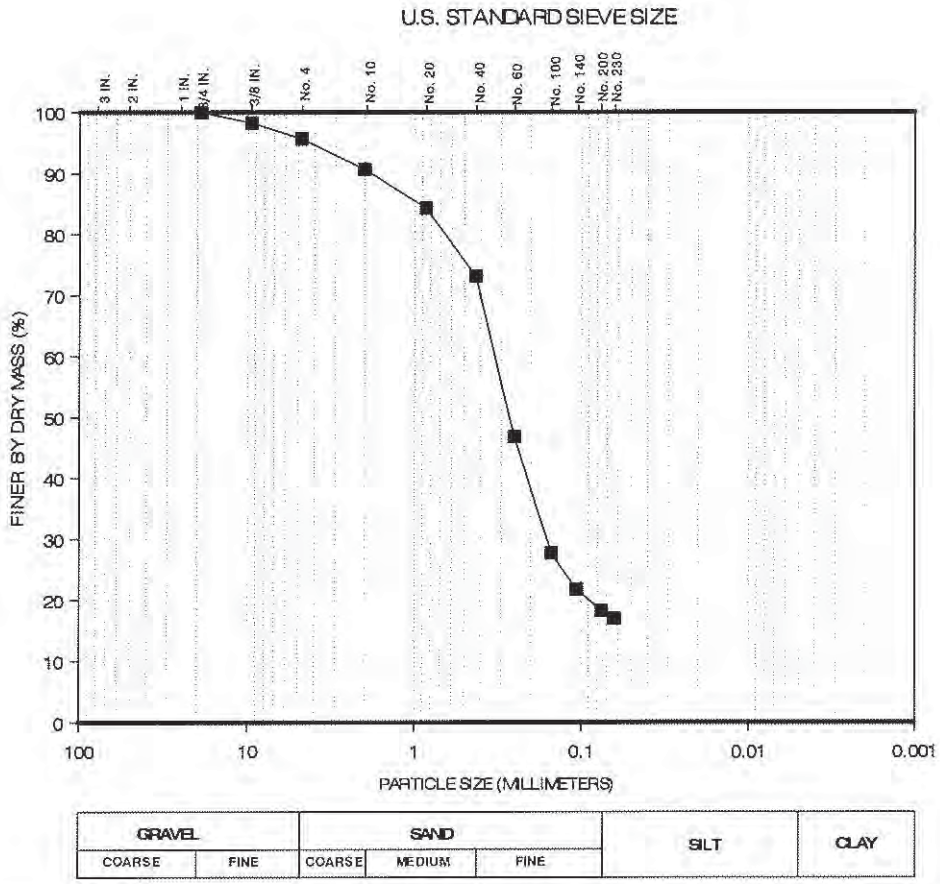
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 36.2
Mass Dry Solids (grams): 272.71

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.4
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	98.3	95.7	90.7	84.3	73.1	46.8	27.7	21.8	18.3	17.0	-	-	-

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Checked By: _____ Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P021**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P021
SAMPLE DESCRIPTION: Light brown to brown clayey sand with shell and trace roots (SC)

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

Dispersion Device: ☐ Apparatus A ☐ Apparatus B

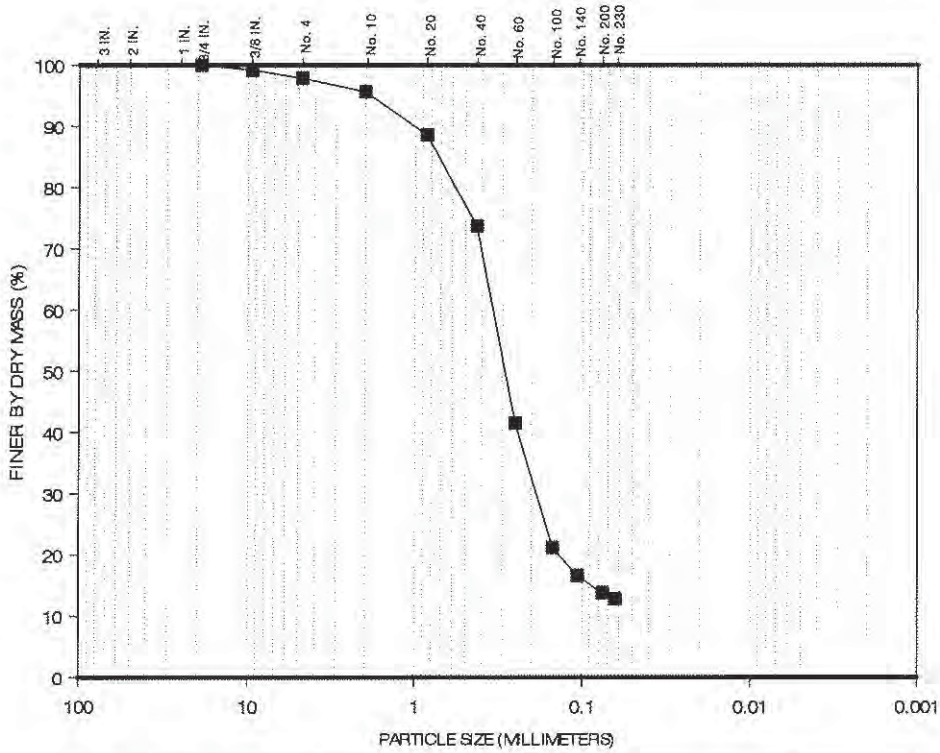
Dispersion Period (hours): _____

Water Content (%): 34.9
Mass Dry Solids (grams): 282.47

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.1
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]

U.S. STANDARD SIEVE SIZE



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	99.2	97.9	95.7	88.6	73.7	41.5	21.2	16.6	13.8	12.8	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P022**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P022
SAMPLE DESCRIPTION: Light brown to brown sand with silt and shell (SP-SM)
C_u = 4.7; C_c = 0.7

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

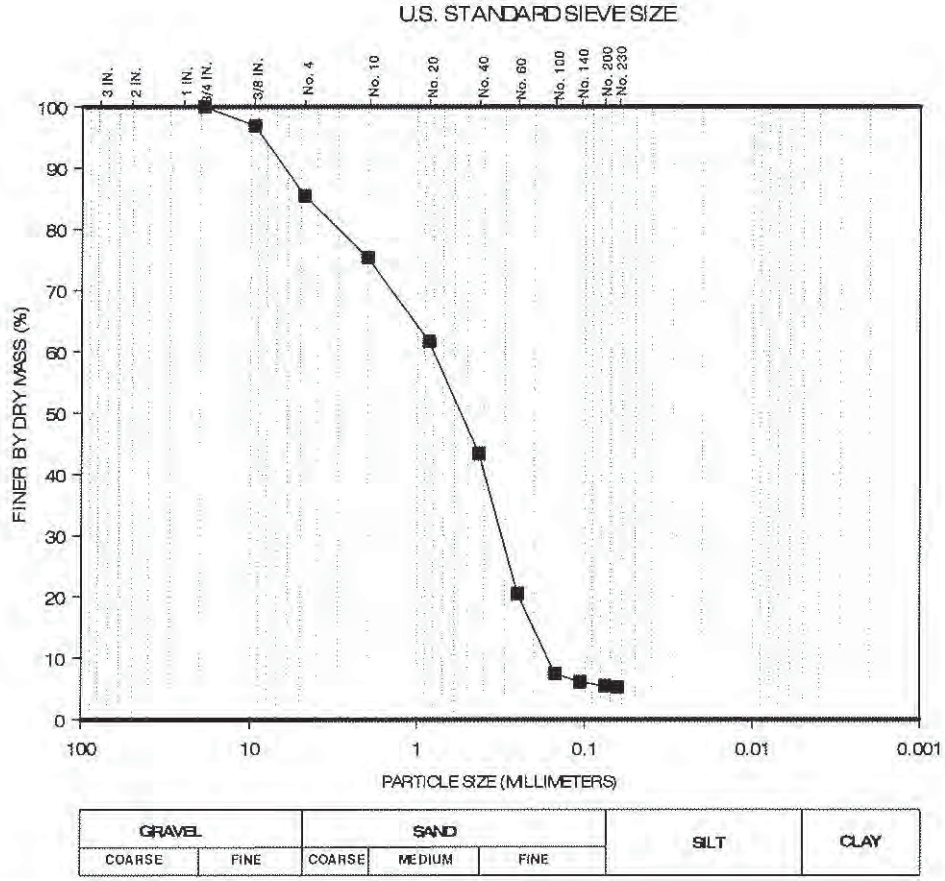
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 22.6
Mass Dry Solids (grams): 430.09

G_s: _____ ☐ Assumed ☐ Measured

Organic Content (%): 0.5
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	96.9	85.5	75.4	61.7	43.4	20.5	7.5	6.1	5.5	5.3	-	-	-

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Checked By: M Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P023**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P023
SAMPLE DESCRIPTION: Light brown to brown sand with gravel and shell (SP)
$C_u = 5.5$; $C_c = 0.6$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

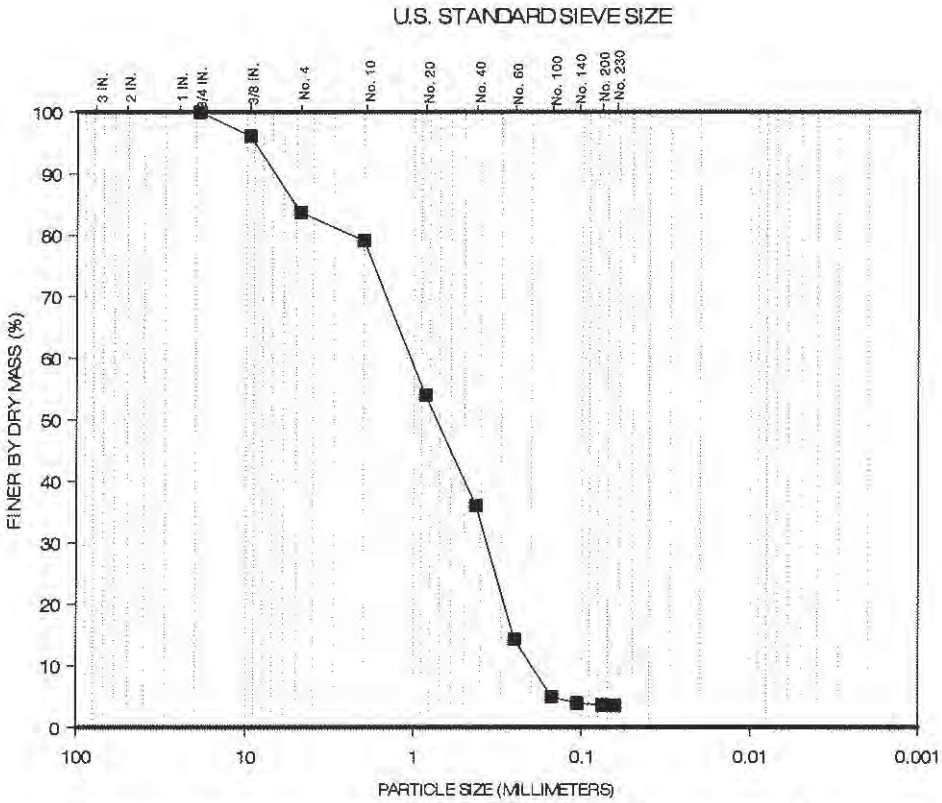
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 19.0
Mass Dry Solids (grams): 510.07

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.4
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	96.1	83.7	79.1	54.0	36.0	14.3	4.9	3.9	3.6	3.5	-	-	-

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Checked By: JM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **P025**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/P025
SAMPLE DESCRIPTION: Light brown to brown sand with shell and trace roots (SP)
$C_u = 2.9$; $C_c = 1.1$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

Dispersion Device: ☐ Apparatus A ☐ Apparatus B

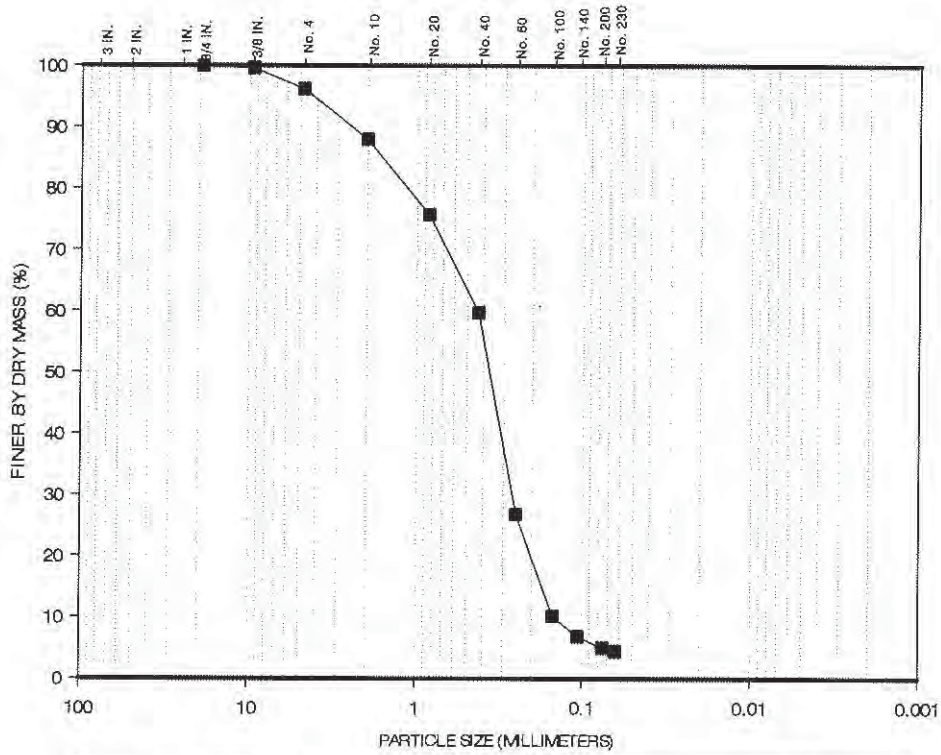
Dispersion Period (hours): _____

Water Content (%): 25.6
Mass Dry Solids (grams): 444.78

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.7
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]

U.S. STANDARD SIEVE SIZE



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	99.6	96.2	88.0	75.7	59.7	26.8	10.2	6.9	5.0	4.5	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R001**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R001
SAMPLE DESCRIPTION: Light brown to brown sand with shell (SP)
$C_u = 3.3$; $C_c = 0.9$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

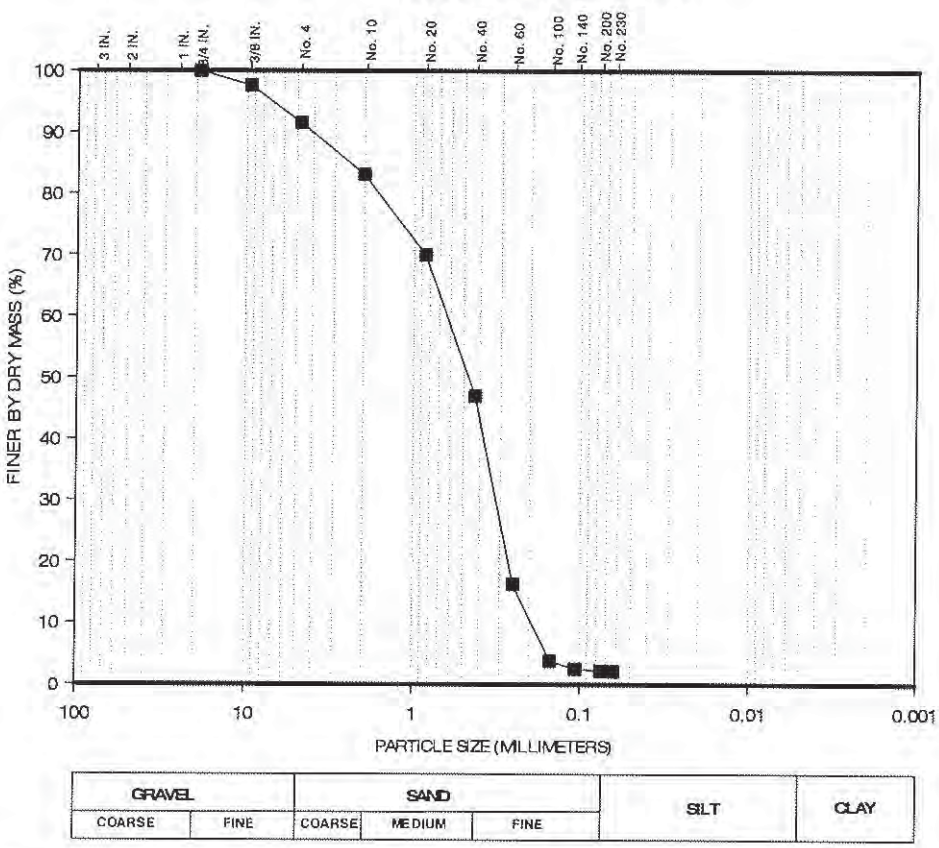
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 19.6
Mass Dry Solids (grams): 543.99

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.4
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	97.6	91.5	83.1	70.0	47.0	16.3	3.8	2.5	2.2	2.1	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R004**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R004
SAMPLE DESCRIPTION: Light brown to brown sand with shell and trace roots (SP)
$C_u = 3.1$; $C_c = 1.4$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

Dispersion Device: ☐ Apparatus A ☐ Apparatus B

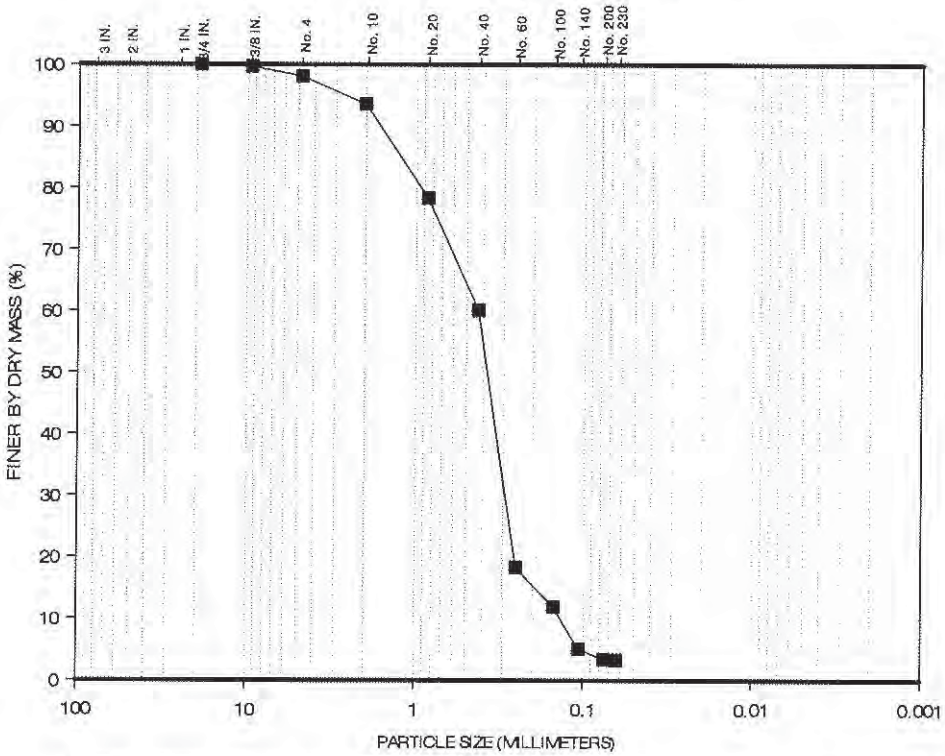
Dispersion Period (hours): _____

Water Content (%): 23.1
Mass Dry Solids (grams): 459.46

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.5
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]

U.S. STANDARD SIEVE SIZE



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	99.7	98.1	93.6	78.3	60.1	18.3	11.9	5.1	3.4	3.3	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R007**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R007
SAMPLE DESCRIPTION: Light brown to dark gray clayey sand with shell (SC)

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

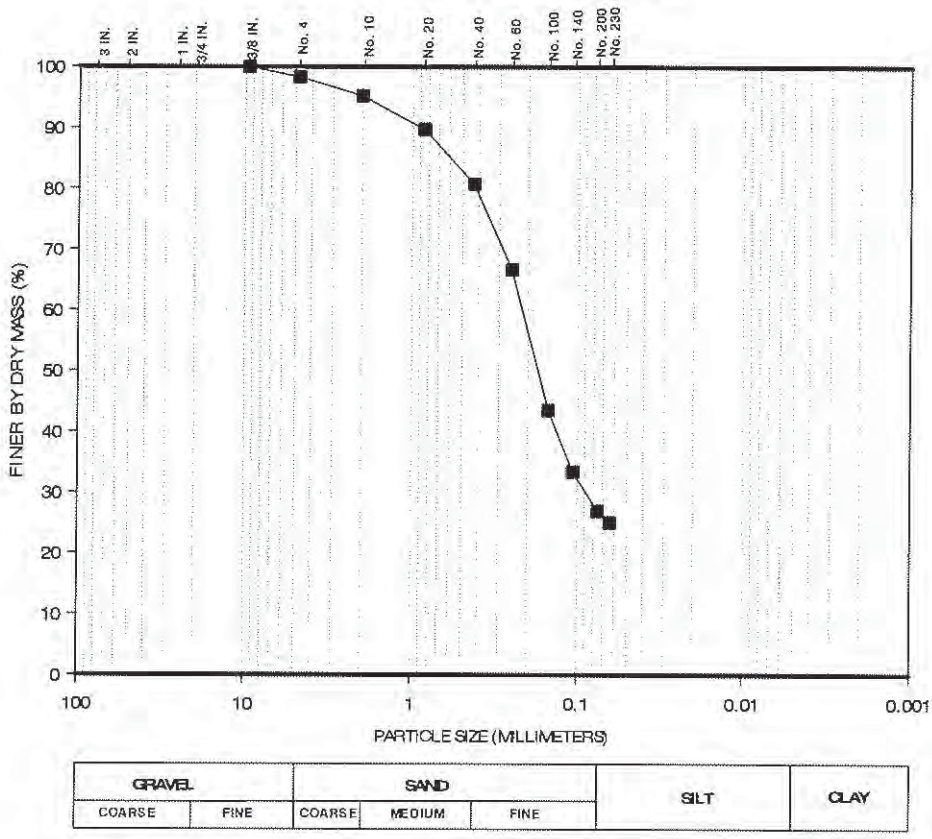
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 52.3
Mass Dry Solids (grams): 233.20

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.7
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	100	98.3	95.2	89.7	80.7	66.6	43.5	33.4	26.9	25.0	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R014**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R014
SAMPLE DESCRIPTION: Gray to light brown clayey sand with shell (SC)

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

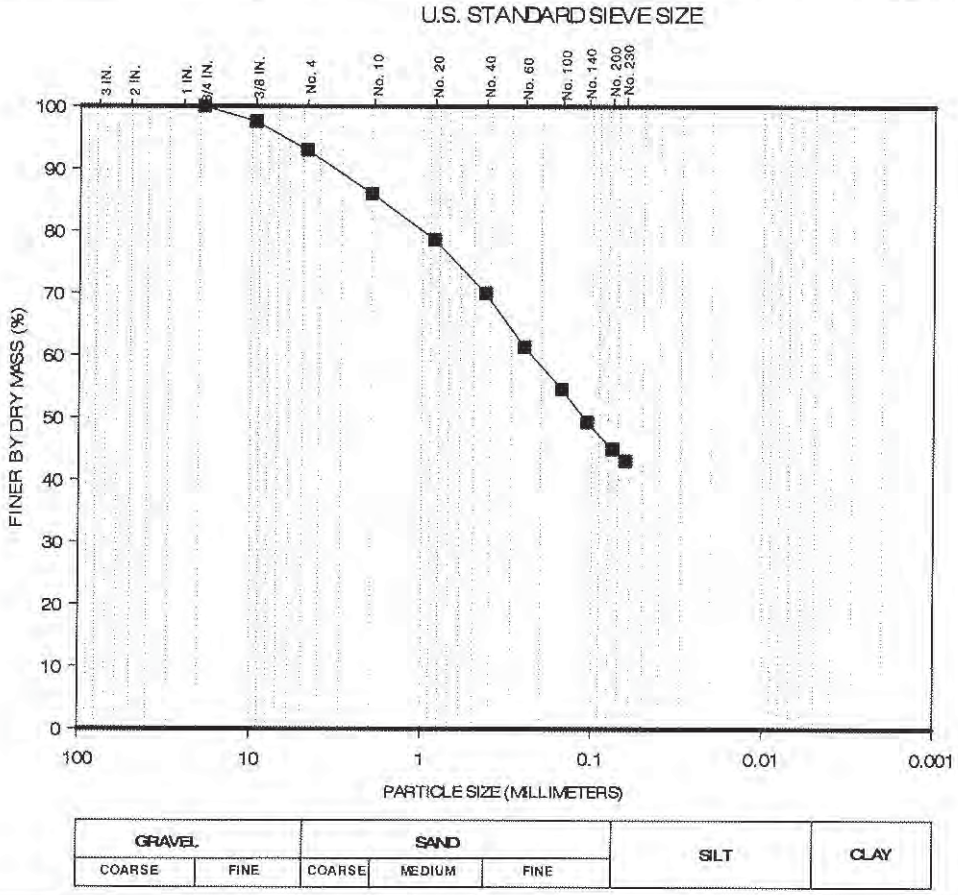
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 60.1
Mass Dry Solids (grams): 240.34

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.9
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	97.6	93.0	86.0	78.6	70.0	61.4	54.6	49.3	45.0	43.1	-	-	-

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Checked By: [illegible] Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R018**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R018
SAMPLE DESCRIPTION: Light brown to brown sand with gravel and shell (SP)
C_u = 4.1; C_c = 0.6

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other_____

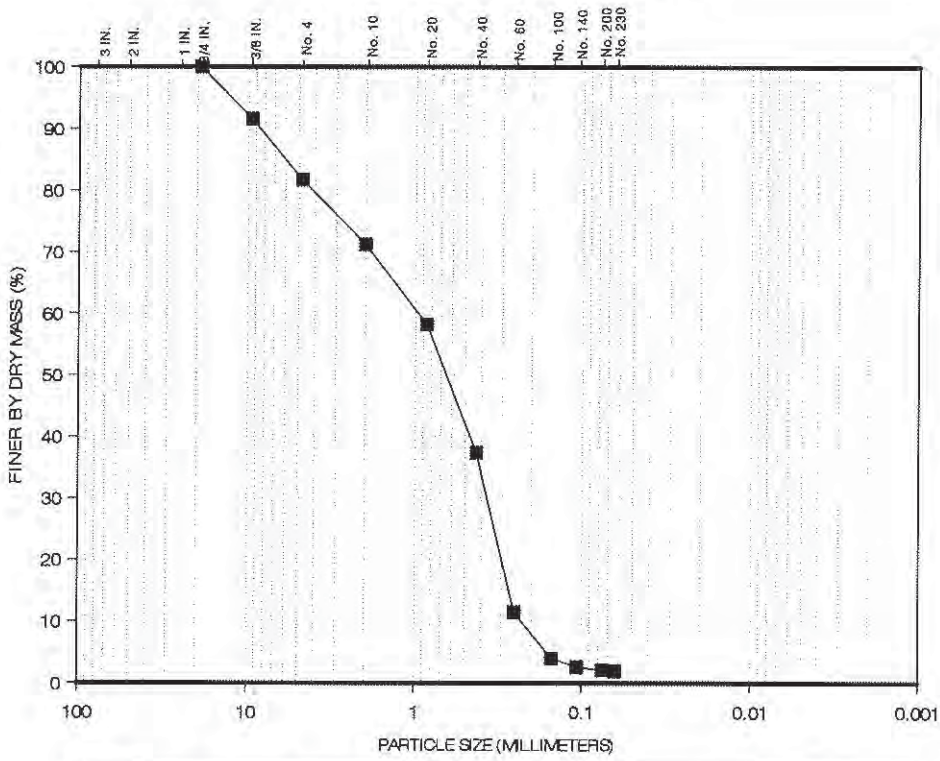
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 25.1
Mass Dry Solids (grams): 288.51

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.4
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	91.6	81.7	71.2	58.2	37.4	11.5	4.0	2.6	2.1	1.9	-	-	-

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Checked By: _____ Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R020**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R020
SAMPLE DESCRIPTION: Light brown to brown sand with silt, shell and trace roots (SP-SM)
$C_u = 2.9$; $C_c = 1.4$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

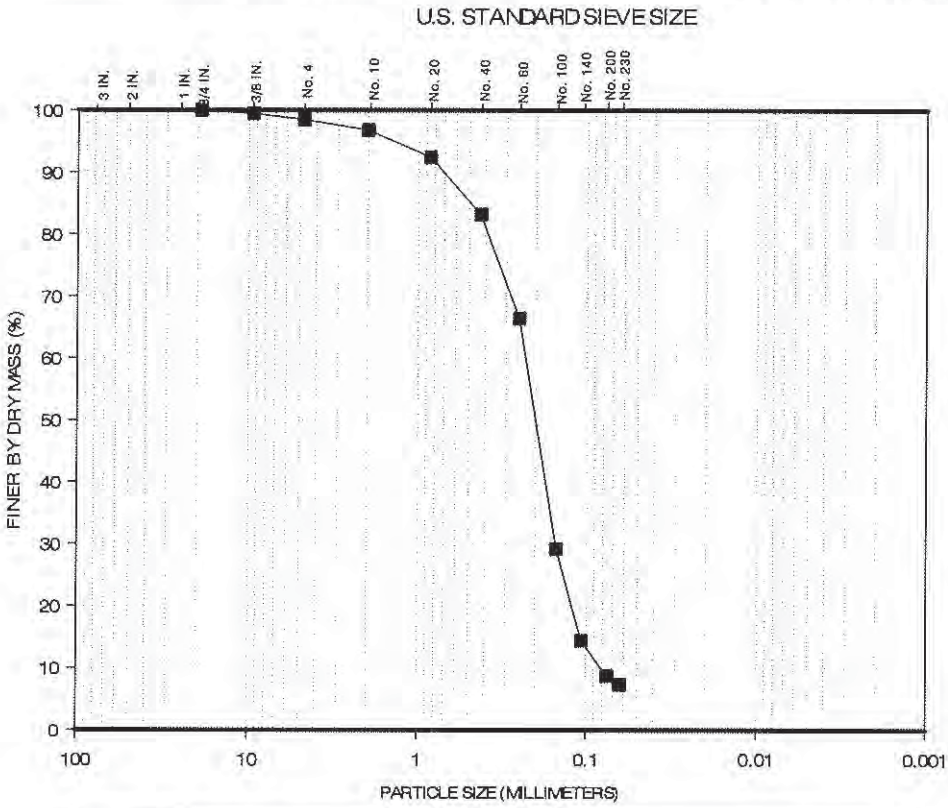
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 33.7
Mass Dry Solids (grams): 377.29

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.8
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	99.5	98.5	96.8	92.4	83.2	66.4	29.2	14.4	8.7	7.3	-	-	-

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Checked By: JM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R023**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R023
SAMPLE DESCRIPTION: Light brown to brown sand with silt, shell and trace roots (SP-SM)
$C_u = 3.3$; $C_c = 1.4$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

Dispersion Device: ☐ Apparatus A ☐ Apparatus B

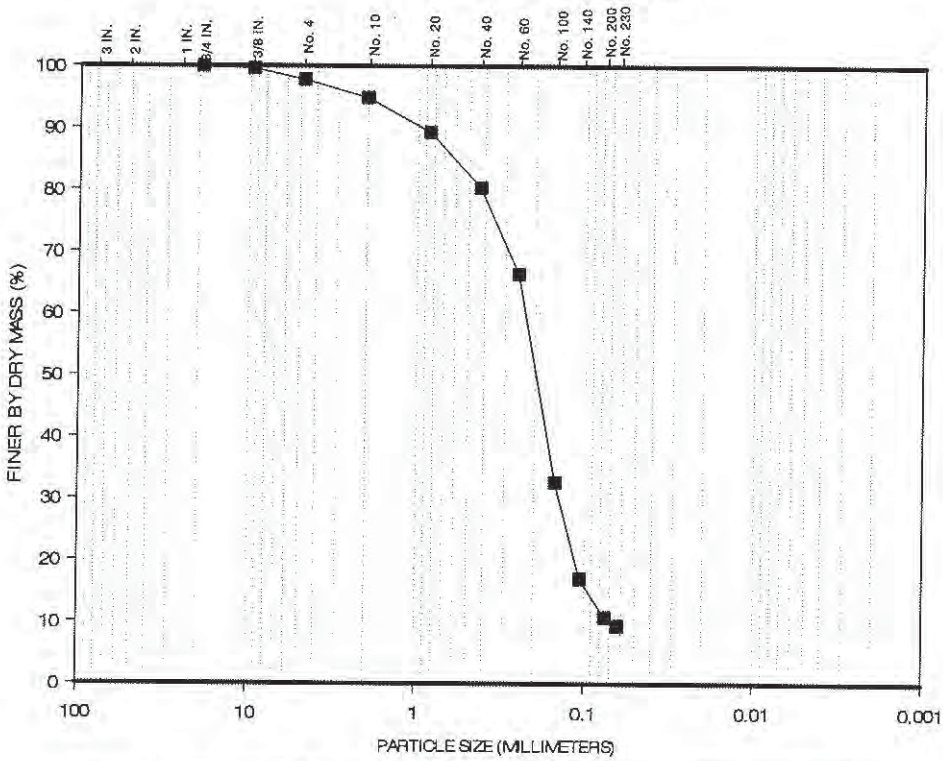
Dispersion Period (hours): _____

Water Content (%): 42.5
Mass Dry Solids (grams): 278.57

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.5
ASTM Standard D2974
Method C (Loss on Ignition at 440°C)

U.S. STANDARD SIEVE SIZE



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	99.6	97.8	94.9	89.3	80.3	66.3	32.6	17.0	10.8	9.4	-	-	-

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Checked By: JM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R024**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R024
SAMPLE DESCRIPTION: Light brown to brown clayey sand with gravel and shell (SC)

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

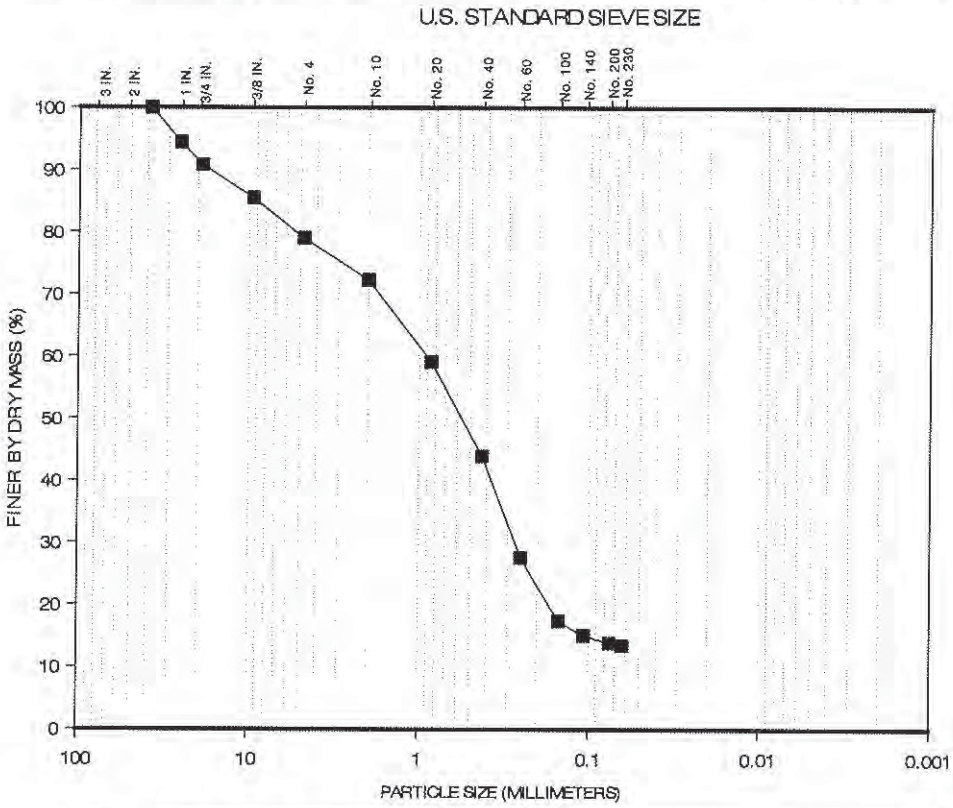
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 30.7
Mass Dry Solids (grams): 434.61

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.9
ASTM Standard D2974
Method C [Loss on ignition at 440°C]



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis													Hydrometer Analysis		
Gravel-Size					Sand-Size								Silt-Size	Clay-Size	
					Coarse	Medium		Fine							
1 1/2"	1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	94.4	90.8	85.5	79.0	72.3	59.1	43.9	27.6	17.4	15.1	13.9	13.5	-	-	-

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Checked By: TW Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R025**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R025
SAMPLE DESCRIPTION: Orangish-brown to dark gray clayey sand with shell and trace roots (SC)

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

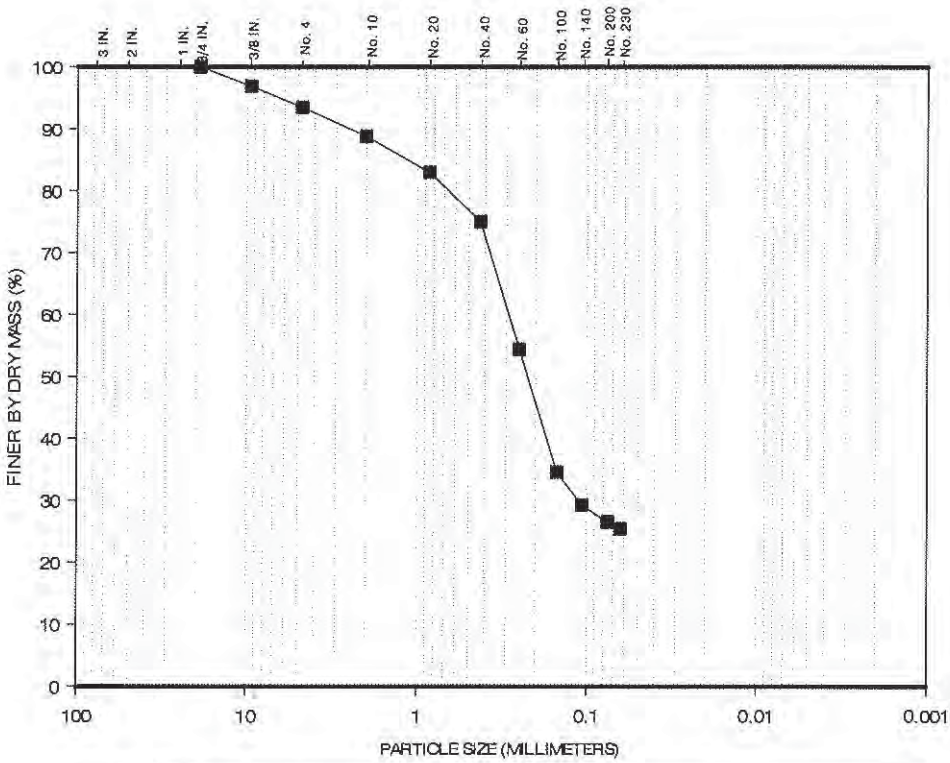
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 41.1
Mass Dry Solids (grams): 315.47

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.3
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	96.9	93.5	88.8	83.0	75.0	54.4	34.6	29.3	26.5	25.4	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R026**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R026
SAMPLE DESCRIPTION: Light brown to dark gray sand with silt and gravel and shell (SW-SM)
C_u = 16; C_c = 1.6

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

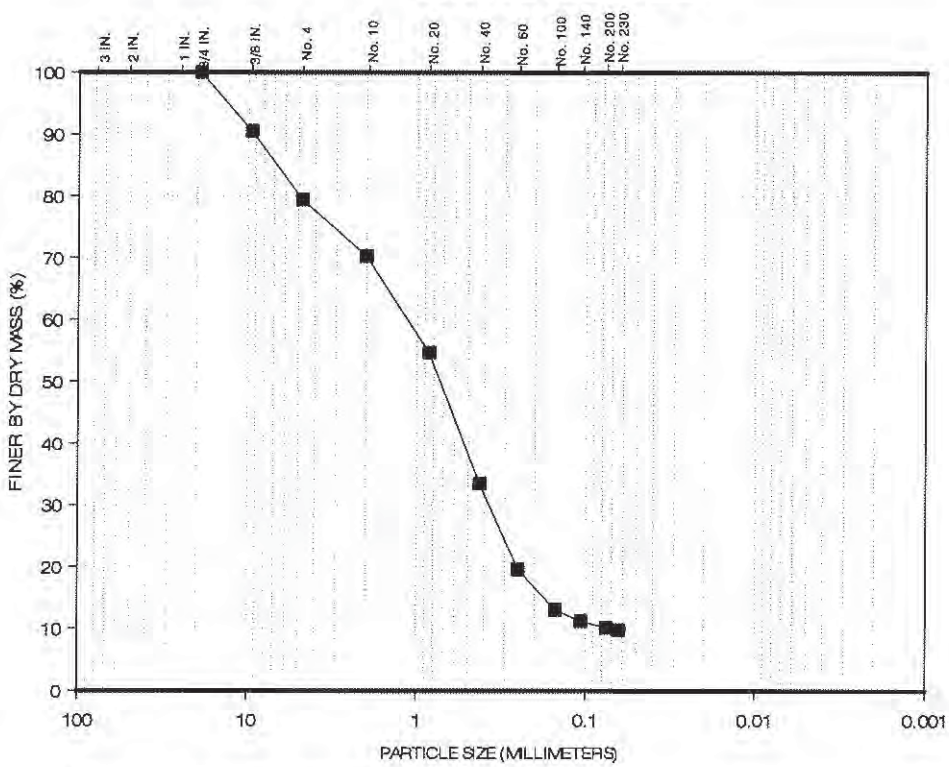
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 36.9
Mass Dry Solids (grams): 264.29

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.2
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	90.5	79.4	70.3	54.7	33.5	19.6	13.1	11.3	10.2	9.8	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R027**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R027
SAMPLE DESCRIPTION: Light brown to brown sand with clay and gravel and shell (SP-SC)
C_u = 14; C_c = 0.7

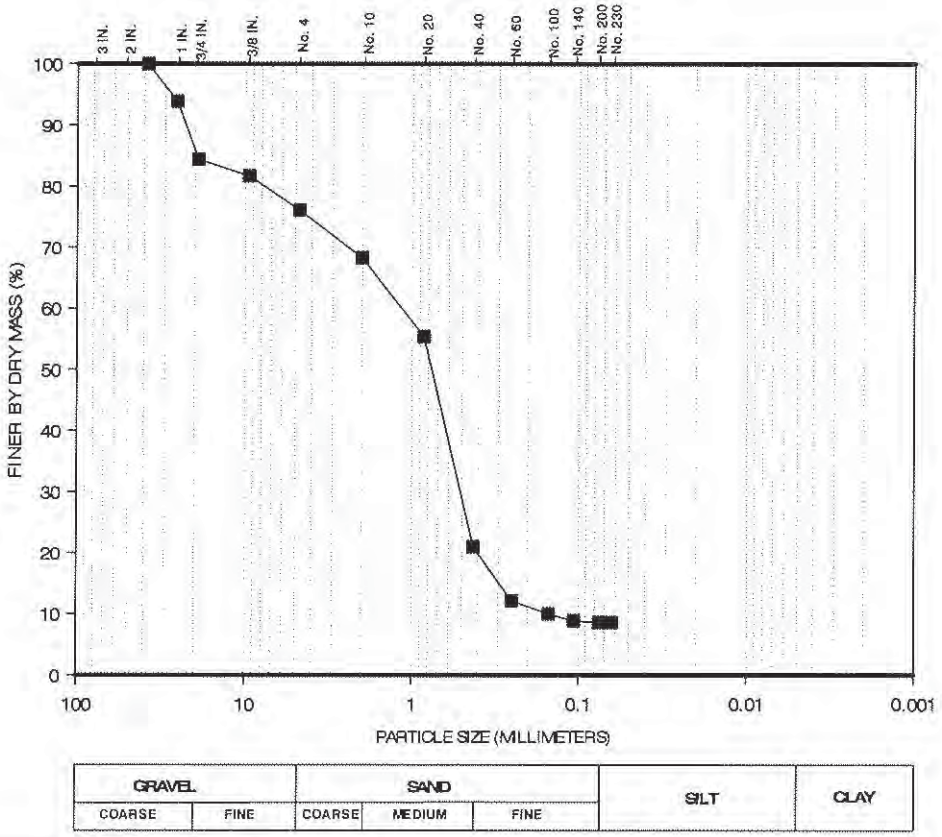
TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____
Dispersion Device: ☐ Apparatus A ☐ Apparatus B
Dispersion Period (hours): _____

Water Content (%): 23.5
Mass Dry Solids (grams): 418.68
G_s: - ☐ Assumed ☐ Measured
Organic Content (%): 0.8
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis													Hydrometer Analysis		
Gravel-Size					Sand-Size								Silt-Size	Clay-Size	
					Coarse	Medium		Fine							
1½"	1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	93.9	84.4	81.7	76.1	68.3	55.4	21.0	12.2	10.0	8.9	8.6	8.6	-	-	-

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Checked By: M Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R101**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R101
SAMPLE DESCRIPTION: Light brown to brown sand with clay, shell and trace roots (SP-SC)
$C_u = 4.8$; $C_c = 1.0$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

Dispersion Device: ☐ Apparatus A ☐ Apparatus B

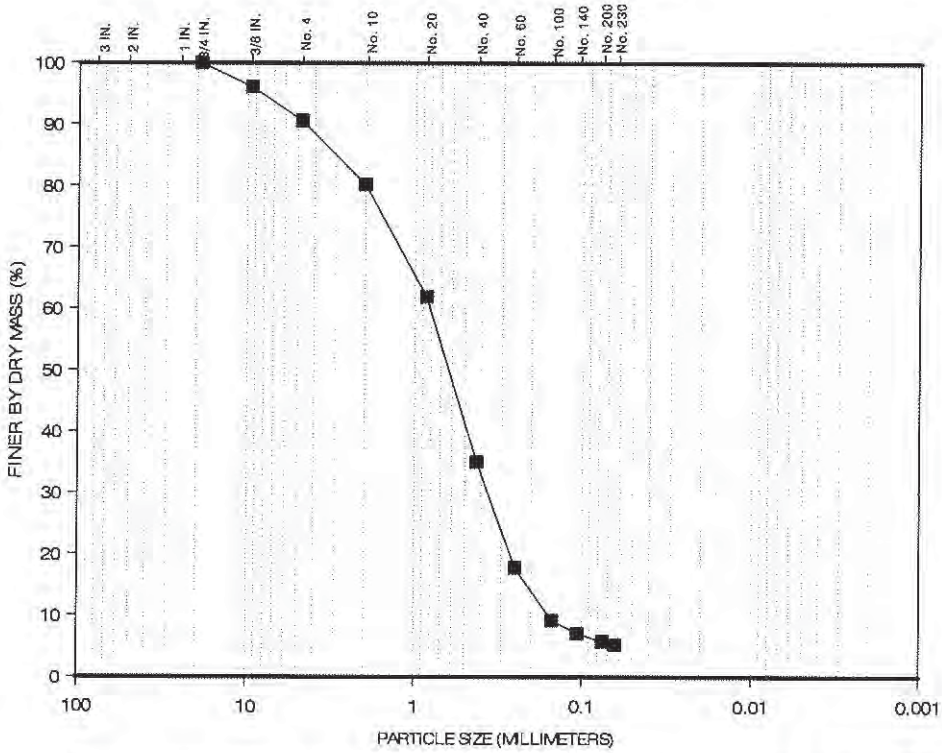
Dispersion Period (hours): _____

Water Content (%): 19.6
Mass Dry Solids (grams): 464.91

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.5
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]

U.S. STANDARD SIEVE SIZE



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	96.1	90.6	80.2	61.9	35.0	17.8	9.2	7.1	5.8	5.3	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R102**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R102
SAMPLE DESCRIPTION: Brown sand with trace shell (SP)
$C_u = 1.9$; $C_c = 1.0$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

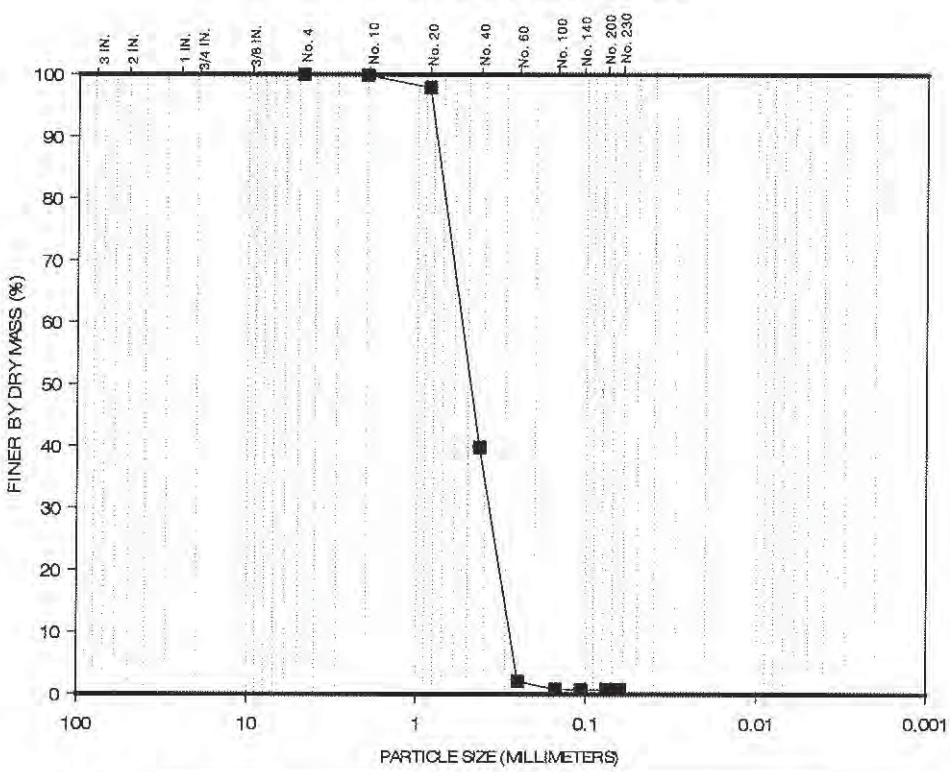
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 25.0
Mass Dry Solids (grams): 237.60

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.2
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	100	100	99.9	97.9	39.8	2.1	0.8	0.7	0.7	0.7	-	-	-

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Checked By: _____ Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R103**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R103
SAMPLE DESCRIPTION: Light brown to brown gravel with clay and sand and trace roots (GP-GC)
C_u = 130; C_c = 0.6

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

Dispersion Device: ☐ Apparatus A ☐ Apparatus B

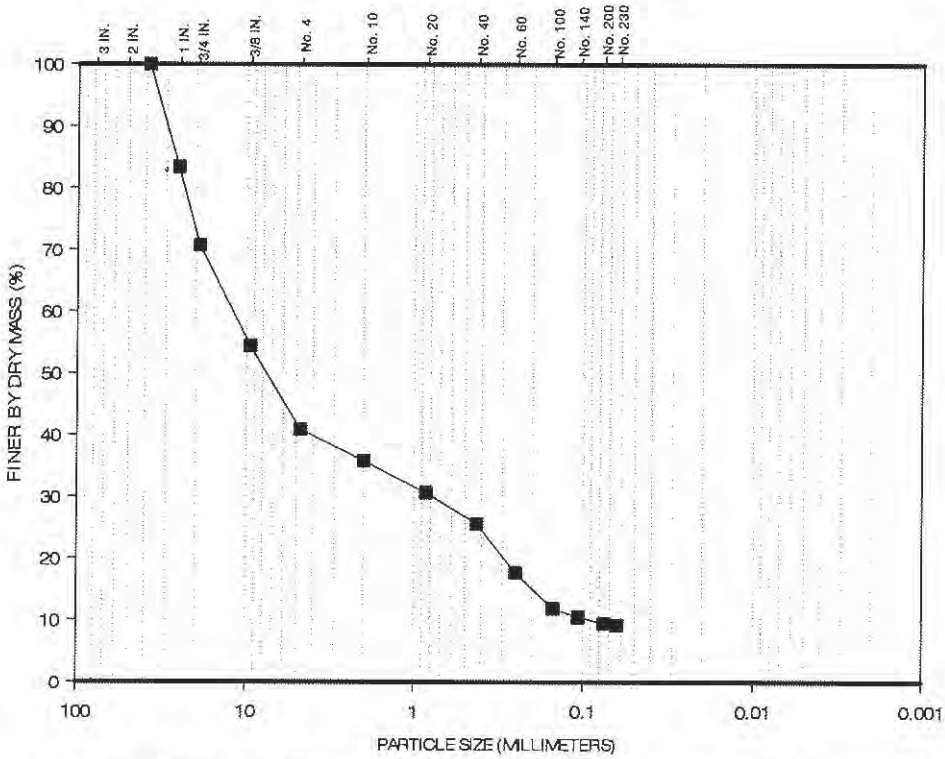
Dispersion Period (hours): _____

Water Content (%): 19.2
Mass Dry Solids (grams): 539.20

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.0
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]

U.S. STANDARD SIEVE SIZE



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis													Hydrometer Analysis		
Gravel-Size					Sand-Size								Silt-Size	Clay-Size	
					Coarse	Medium		Fine							
1½"	1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	83.4	70.7	54.4	40.9	35.8	30.7	25.6	17.7	11.9	10.5	9.5	9.2	-	-	-

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Checked By: [signature] Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R105**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R105
SAMPLE DESCRIPTION: Light brown to brown clayey sand with shell (SC)

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

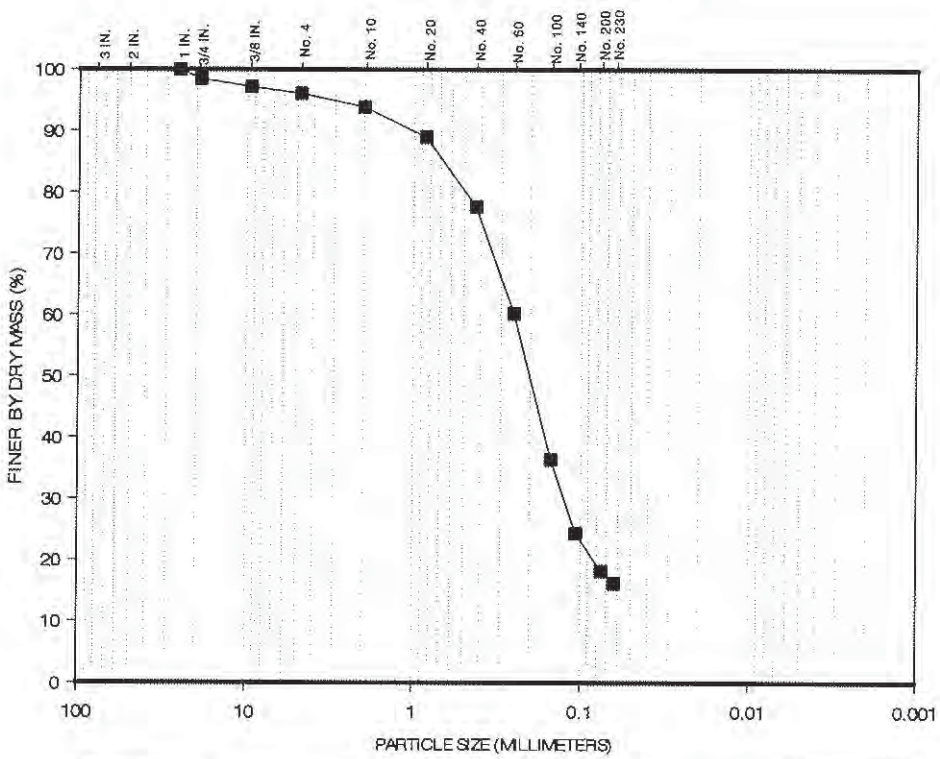
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 42.8
Mass Dry Solids (grams): 287.89

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.3
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	98.5	97.2	96.1	93.9	89.0	77.6	60.2	36.4	24.4	18.2	16.2	-	-	-

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Checked By: [signature] Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R106**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R106
SAMPLE DESCRIPTION: Light brown to brown sand with silt and shell (SP-SM)
$C_u = 3.3$; $C_c = 0.9$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

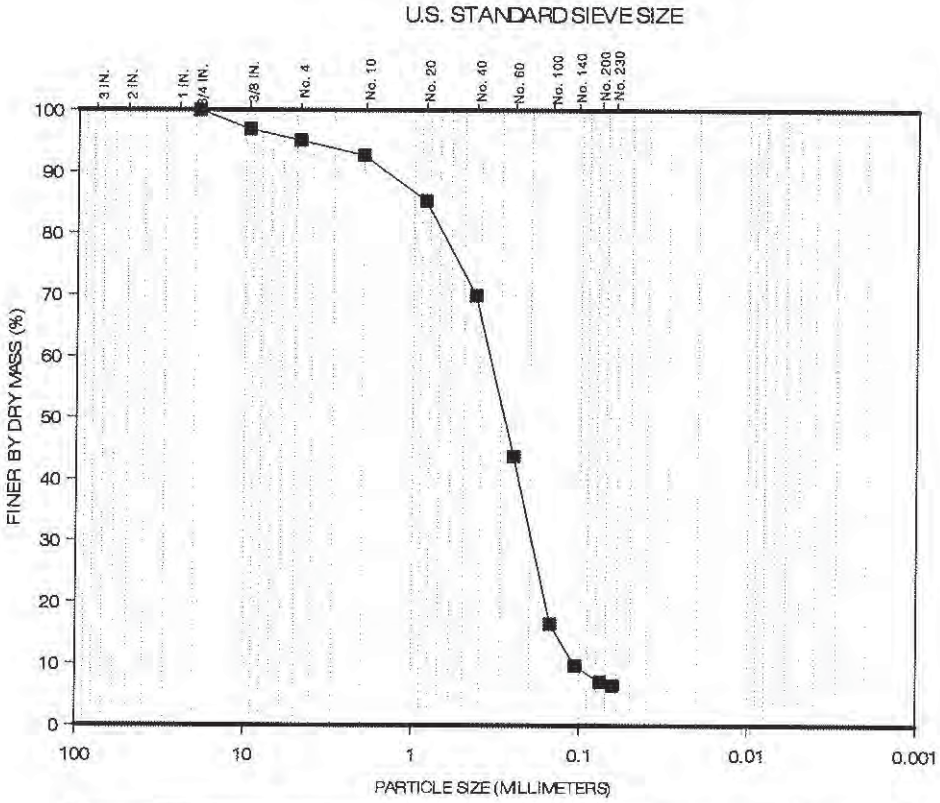
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 34.2
Mass Dry Solids (grams): 388.06

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.7
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	96.9	95.1	92.7	85.3	69.9	43.8	16.5	9.7	7.1	6.5	-	-	-

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Checked By: M Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R107**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R107
SAMPLE DESCRIPTION: Light brown to brown clayey sand with gravel and shell and trace roots (SC)

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

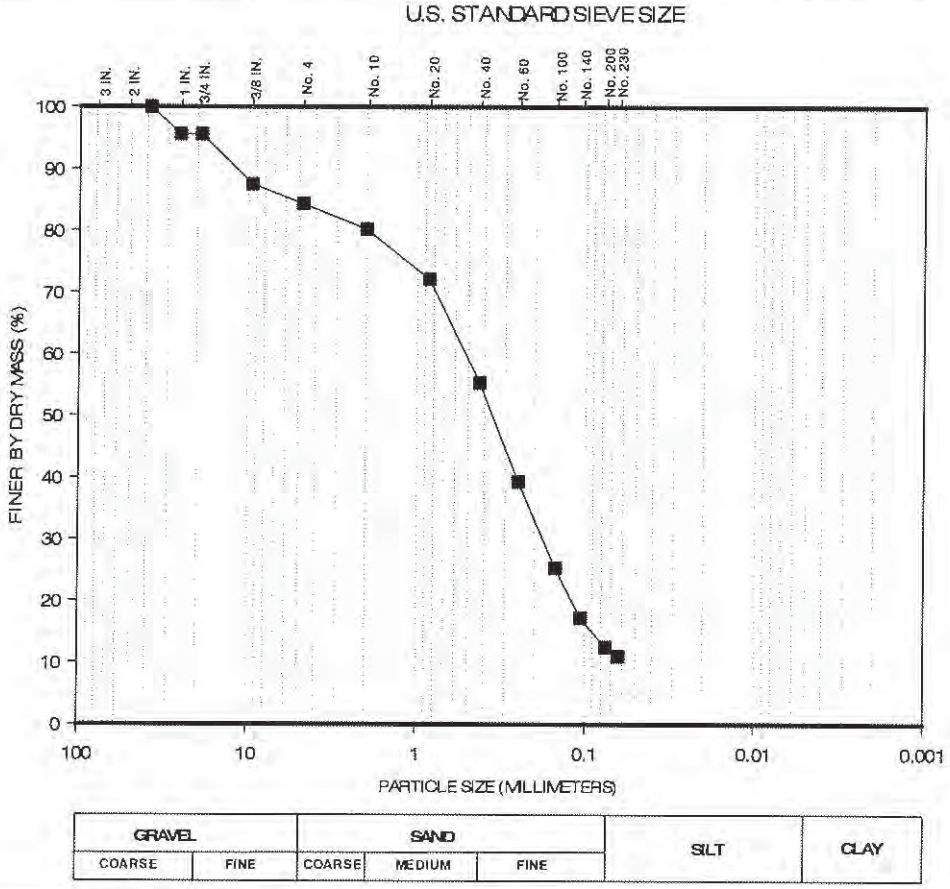
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 32.1
Mass Dry Solids (grams): 369.77

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.3
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



Percent Finer (dry mass basis)

Sieve Analysis													Hydrometer Analysis		
Gravel-Size					Sand-Size								Silt-Size	Clay-Size	
					Coarse	Medium		Fine							
1½"	1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	95.6	95.6	87.5	84.3	80.2	72.1	55.3	39.3	25.3	17.2	12.5	11.0	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R108**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R108
SAMPLE DESCRIPTION: Light brown to brown clayey sand with shell (SC)

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

Dispersion Device: ☐ Apparatus A ☐ Apparatus B

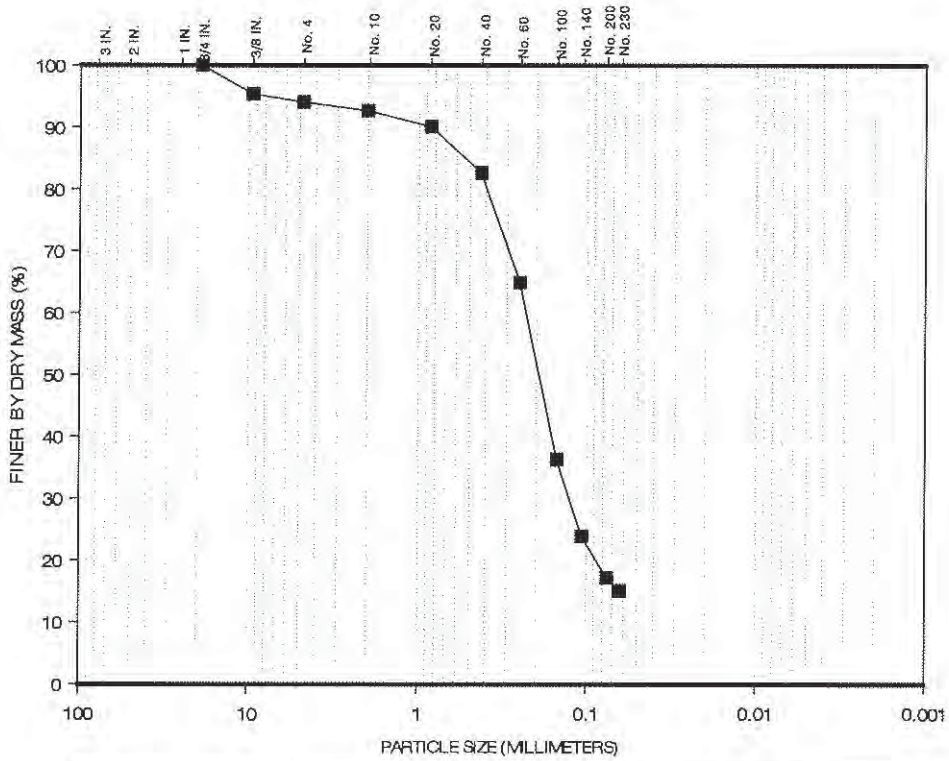
Dispersion Period (hours): _____

Water Content (%): 40.6
Mass Dry Solids (grams): 321.78

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.3
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]

U.S. STANDARD SIEVE SIZE



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	95.4	94.1	92.7	90.1	82.6	64.9	36.3	23.9	17.2	15.1	-	-	-

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Checked By: _____ Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R109**
BORING: -
SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R109
SAMPLE DESCRIPTION: Brown clayey sand with shell (SC)

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

Dispersion Device: ☐ Apparatus A ☐ Apparatus B

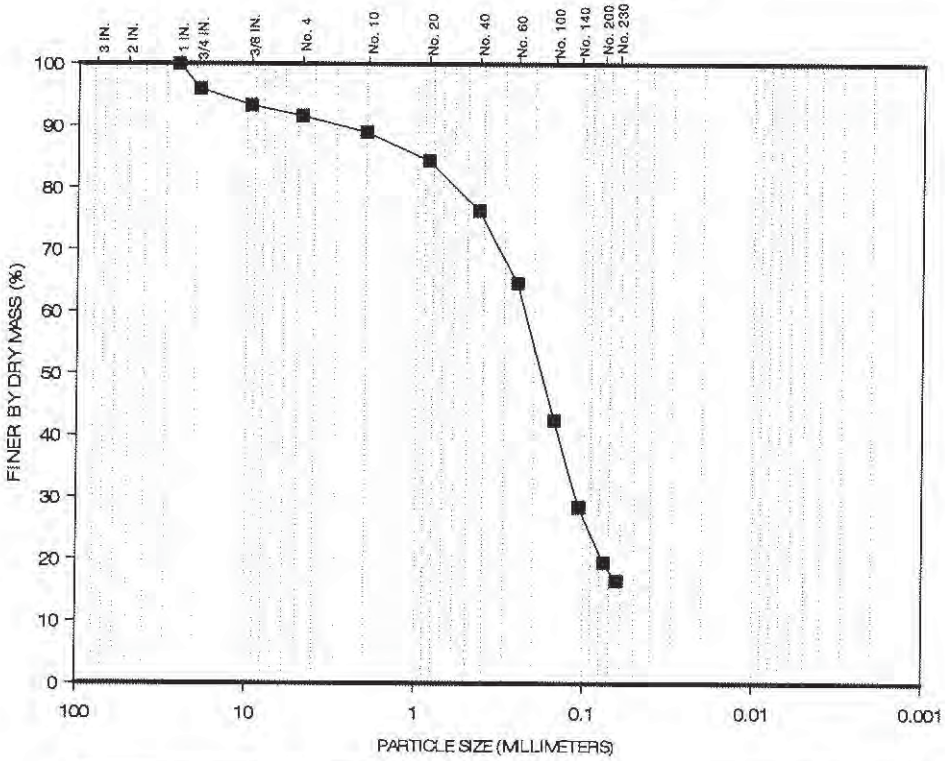
Dispersion Period (hours): _____

Water Content (%): 37.1
Mass Dry Solids (grams): 345.04

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.4
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]

U.S. STANDARD SIEVE SIZE



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	96.0	93.3	91.6	89.0	84.4	76.3	64.6	42.5	28.5	19.5	16.6	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R110**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R110
SAMPLE DESCRIPTION: Brown clayey sand with shell (SC)

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

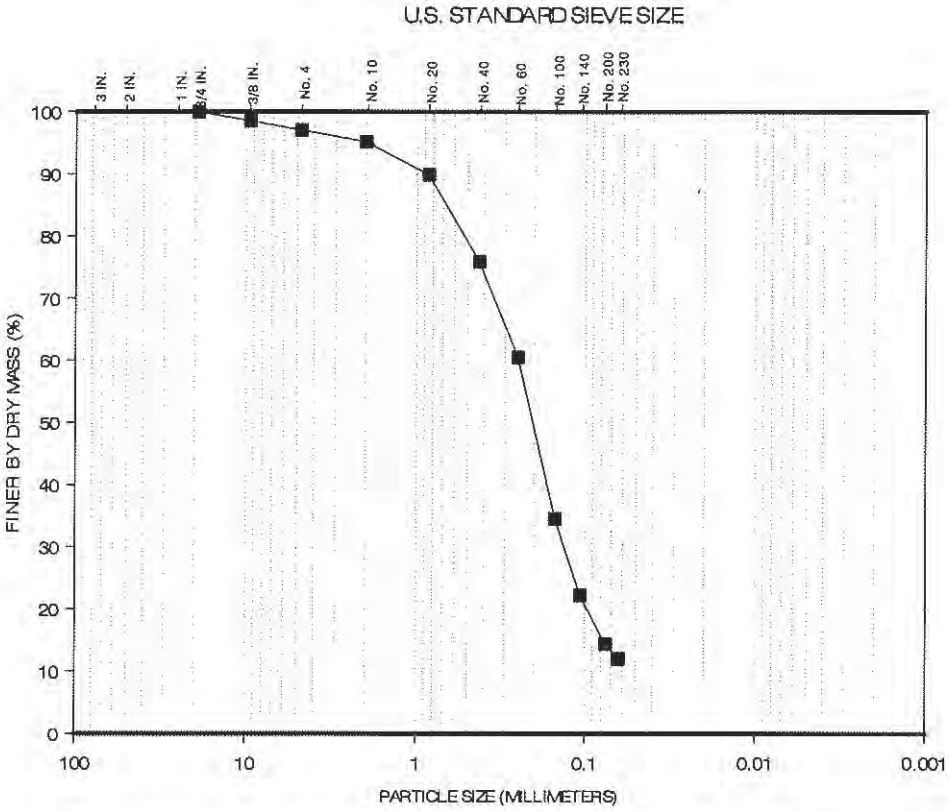
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 32.8
Mass Dry Solids (grams): 396.57

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.9
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	98.6	97.1	95.2	89.9	75.9	60.5	34.5	22.2	14.4	12.0	-	-	-

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Checked By: [signature] Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R111**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R111
SAMPLE DESCRIPTION: Brown clayey sand with shell (SC)

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

Dispersion Device: ☐ Apparatus A ☐ Apparatus B

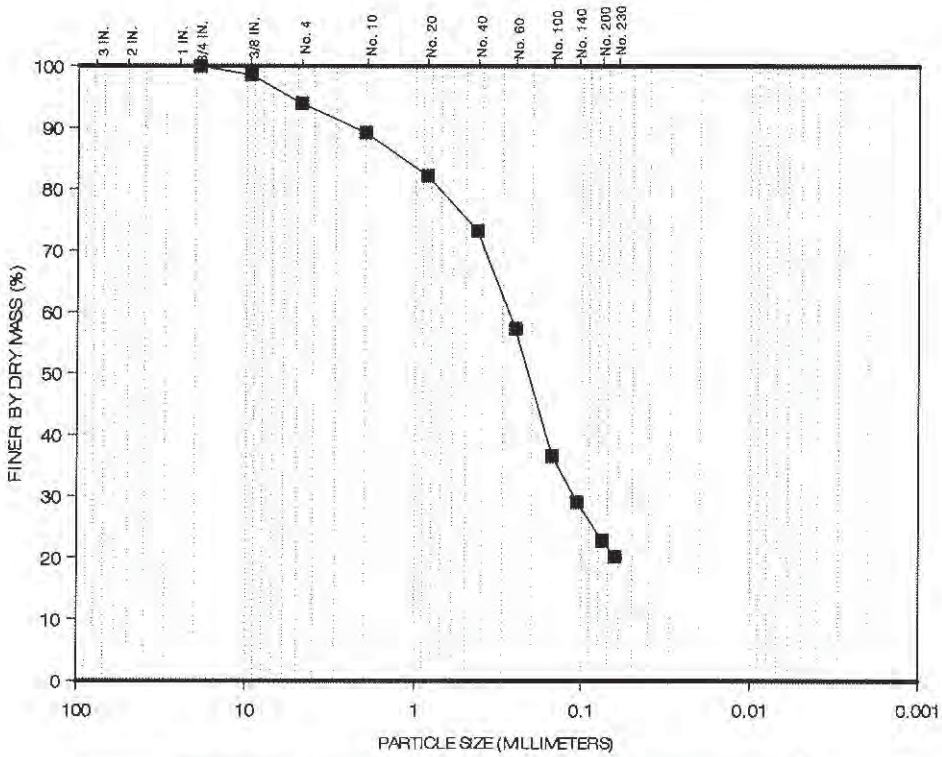
Dispersion Period (hours): _____

Water Content (%): 42.0
Mass Dry Solids (grams): 313.72

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 1.8
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]

U.S. STANDARD SIEVE SIZE



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	98.6	94.0	89.2	82.2	73.2	57.3	36.6	29.1	22.8	20.2	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R112**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R112
SAMPLE DESCRIPTION: Light brown to brown sand with shell (SP)
$C_u = 2.0$; $C_c = 1.0$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

Dispersion Device: ☐ Apparatus A ☐ Apparatus B

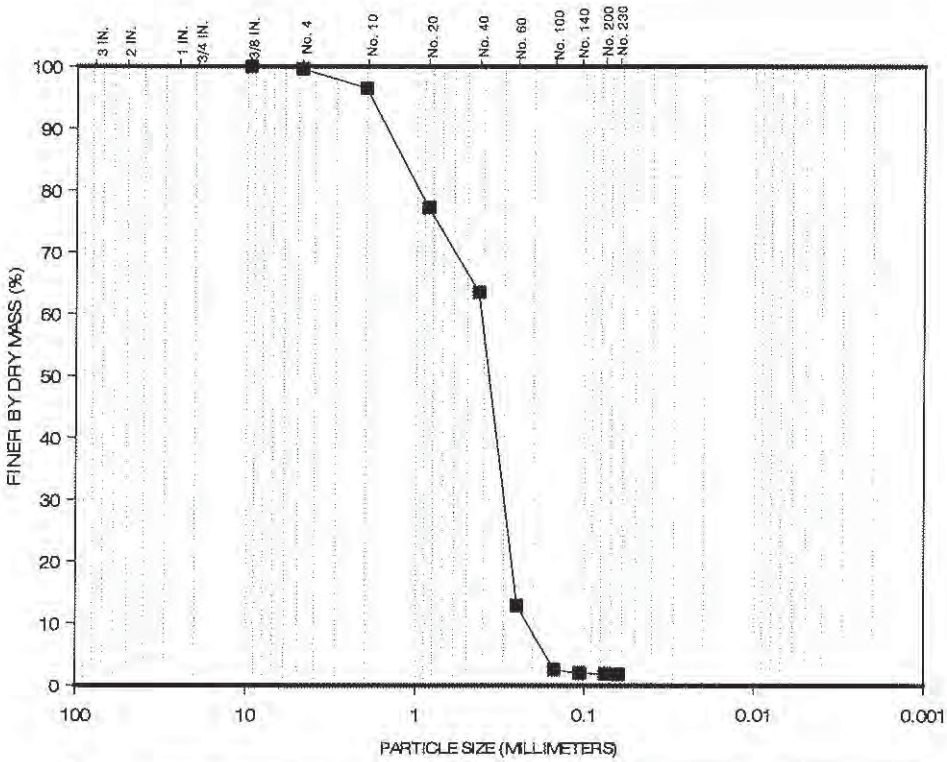
Dispersion Period (hours): _____

Water Content (%): 26.2
Mass Dry Solids (grams): 436.98

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.6
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]

U.S. STANDARD SIEVE SIZE



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	100	99.6	96.5	77.2	63.5	12.9	2.6	2.0	1.9	1.8	-	-	-

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Checked By: TM Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R113**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R113
SAMPLE DESCRIPTION: Brown sand with silt and shell (SP-SM)
$C_u = 4.5$; $C_c = 0.6$

TEST PROCEDURES

ASTM Standard D422:
- ☒ Sieve Analysis
- ☐ Hydrometer Analysis
- ☐ Sieve and Hydrometer Analysis

☐ ASTM Standard D6913 Sieve Analysis
☐ Other: _____

Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other _____

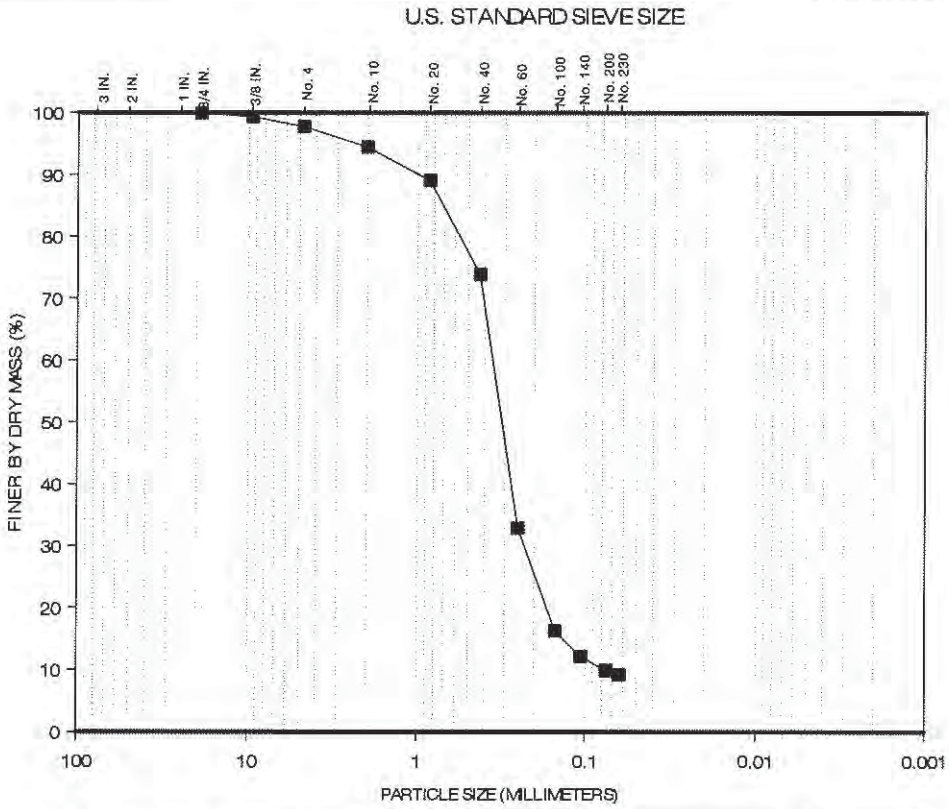
Dispersion Device: ☐ Apparatus A ☐ Apparatus B

Dispersion Period (hours): _____

Water Content (%): 34.4
Mass Dry Solids (grams): 389.90

G_s: - ☐ Assumed ☐ Measured

Organic Content (%): 0.7
ASTM Standard D2974
Method C [Loss on Ignition at 440°C]



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	99.4	97.8	94.5	89.1	73.9	32.9	16.3	12.2	9.9	9.2	-	-	-

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Checked By: [illegible] Date: 09/20/13

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
PARTICLE-SIZE ANALYSIS TEST REPORT

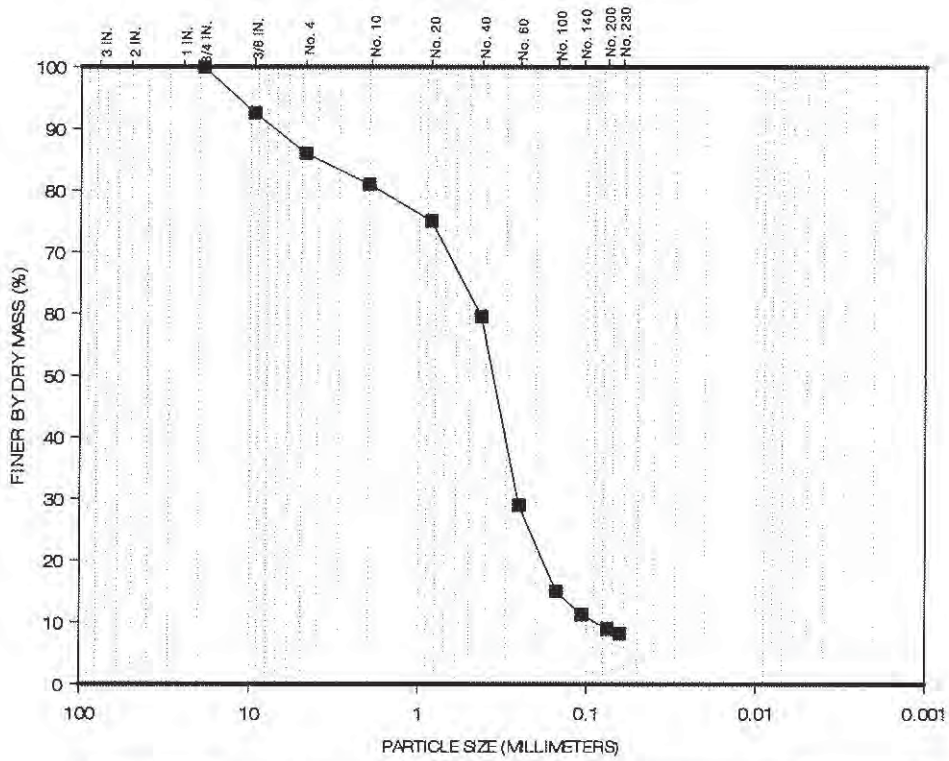
CLIENT: Tetra Tech NUS
PROJECT: Eastern Long Island Sound
FILE NO.: 13-13-0083

DATE SAMPLE RECEIVED: 07/24/13
DATE TEST SET-UP: 07/26/13
DATE REPORTED: 09/20/13

INCOMING SAMPLE NO.: **R114**
BORING: - SAMPLE: -
DEPTH: - ☐ ft; ☐ m
LABORATORY IDENTIFICATION: 0083/R114
SAMPLE DESCRIPTION: Light brown to brown sand with clay and shell (SP-SC)
$C_u = 5.1$; $C_c = 1.8$

TEST PROCEDURES

ASTM Standard D422: ☒ Sieve Analysis ☐ Hydrometer Analysis ☐ Sieve and Hydrometer Analysis ☐ ASTM Standard D6913 Sieve Analysis ☐ Other:	Dispersant Type: ☐ Sodium Hexametaphosphate ☐ Other Dispersion Device: ☐ Apparatus A ☐ Apparatus B Dispersion Period (hours):	Water Content (%): 30.7 Mass Dry Solids (grams): 325.54 G_s: ☐ Assumed ☐ Measured Organic Content (%): 1.1 ASTM Standard D2974 Method C [Loss on Ignition at 440°C]



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Percent Finer (dry mass basis)

Sieve Analysis												Hydrometer Analysis		
Gravel-Size				Sand-Size								Silt-Size	Clay-Size	
				Coarse	Medium		Fine							
1"	3/4"	3/8"	No.4	No.10	No.20	No.40	No.60	No.100	No.140	No.200	No. 230	0.005 mm	0.002 mm	0.001 mm
100	100	92.6	86.0	81.0	75.1	59.6	29.0	15.0	11.3	9.0	8.2	-	-	-

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Checked By: TM Date: 09/20/13

APPENDIX C – RAW LABORATORY DATA; SEDIMENT TOXICITY

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Results of 10 day Sediment Toxicity Tests with *Leptocheirus plumulosus* and *Americamysis bahia* for Long Island Sound Dredge Disposal Sites

Report #BRF/ETF13-024

Submitted to:
Mr. Brian Dresser
Tetra Tech, Inc.
889 Elm St.
Manchester, NH 03101
Phone: (603)-314-0756

Prepared by:
Tetra Tech, Inc.
400 Red Brook Boulevard, Suite 200
Owings Mills, Maryland 21117

September 30, 2013

SUMMARY

CLIENT: USEPA and NAVFAC

TEST FACILITY: Eastern Long Island Sound

TEST MATERIAL: Sediment from 4 sites, plus control

DATE(S) COLLECTED: July 16 - 18, 2013

DATE(S) RECEIVED: July 23, 2013

COLLECTED BY: Brian Dresser, Tetra Tech, Inc.

CONTROL/DILUTION WATER: Artificial Seawater

TYPE OF TEST(S): 10-Day Sediment Toxicity using *Leptocheirus plumulosus*
10-Day Sediment Toxicity using *Americamysis bahia*

TEST DATE(S): *Leptocheirus plumulosus*: August 27 – September 7, 2013
July 29 – August 9, 2013
Americamysis bahia: September 9 – 20, 2013

TEST RESULTS:

TABLE 1. SUMMARY OF TEST RESULTS

Site	Species	**Mean % Survival**
Control	*L. plumulosus*	97
P003		98
P018		99
R024		94
P011		96
Control	*A. bahia*	90
P003		92
P018		92
R024		88
P011		82

MATERIALS AND METHODS

TEST MATERIAL

One gallon of sediment for each of 4 sites was collected by Tetra Tech personnel between July 16 and 18. Samples were held at <6° C from July 18 until shipping on July 22. The samples were transported in one gallon plastic ziploc bags on ice to Tetra Tech's Ecological Testing Facility. Upon arrival, the sample identification, collection date and time were recorded on the sample chain-of-custody sheet (see Appendix A Chain-of-Custody). Temperature of sediment was recorded upon arrival by measuring the temperature blank (water) packed with sediment. Temperature was < 6° C and was recorded on the chain-of-custody sheet.

CONTROL/DILUTION WATER

The control/dilution water used for the *Leptocheirus plumulosus* 10-day sediment toxicity test was artificial seawater with a salinity of 19.4 ppt. The control/dilution water used for the *Americamysis bahia* 10-day sediment toxicity test was artificial seawater with a salinity of 28.5 ppt.

TEST ORGANISMS/AGE

Leptocheirus plumlosus, 2 – 4 millimeters in length, were obtained from ABS (Aquatic BioSystems Inc.) and Chesapeake Cultures. *Americamysis bahia*, 1 day old, were obtained from Chesapeake Cultures. All organisms appeared healthy and disease free.

TEST METHODS

Samples were thoroughly homogenized in the lab in a stainless steel bowl with a Teflon spoon. During homogenization, the sediments were inspected for indigenous organisms. If any were found, they were removed.

USEPA. 1991. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, 4th Ed. EPA/600/4-90/027.

ASTM. 1994. E1367-92. Standard guide for conducting 10-day static sediment toxicity tests with marine and estuarine amphipods. Annual Book of ASTM Standards, Vol. 11.04. American Society for Testing and Materials, Philadelphia, PA.

Tetra Tech Standard Operating Procedure TT-BRF/TX-SOP-O-054. 10-day Sediment Toxicity Test Using *Leptocheirus plumulosus*. Created May 22, 2012. (Internal document prepared by Tetra Tech, Inc.)

TEST CONDITIONS

A summary of the test conditions for the *L. plumolsus* 10-day sediment toxicity test is on page 4 (Table 2) and *A. bahia* is on page 5 (Table 3).

AERATION OF TEST

As per the method, slow aeration was provided one day prior to test organisms being loaded into test chambers for both *L. plumulosus* and *A. bahia*. Dissolved oxygen levels were sufficient after the addition of aeration.

MODIFICATIONS TO PROTOCOLS

None.

COMMENTS CONCERNING TEST

Due to control mortality greater than 10%, the 10-day sediment toxicity testing with *L. plumulosus* was repeated with a new batch of organisms and different control sediment. Control survival in the subsequent round of testing was greater than 90%.

TABLE 2. Summary of Test Conditions for *Leptocheirus plumulosus* 10-day Whole Sediment Toxicity Test.

PARAMETER	CONDITIONS
1. Test type	10-Day Survival
2. Test duration	10 Days
3. Temperature	25°C ± 1°C daily mean temperature, 25 ± 3°C instantaneous temperature
4. Light quality	Wide-spectrum fluorescent lights
5. Light intensity	~ 100-1000 lux
6. Photoperiod	24-h light
7. Test chamber size	1000 mL high-form lipless beaker
8. Sediment volume	175 mL
9. Overlying water volume	800 mL
10. Renewal of overlying water	None
11. Length of test organisms:	2 – 4 mm (no mature males or females)
12. No. organisms per test chamber	20
13. No. replicate chambers per sample	5
14. No. organisms per sample	100
15. Feeding regime	None
16. Test chamber cleaning	None
17. Aeration	Slow aeration was provided as per USEPA guidelines.
18. Overlying water	Artificial Seawater (19.4 ppt)
19. Overlying water quality	Temperature and DO daily; ph, ammonia, salinity on Day 2 and Day 8
20. Endpoint	Survival
21. Sampling and sample holding requirements	Samples used within 8 weeks of receipt. Samples stored in the dark at 4°C in sealed containers with no air space.
22. Sample volume required	one gallon
23. Test acceptability	Minimum mean control survival of 90%.

TABLE 3. Summary of Test Conditions for *Americamysis bahia* 10-day Whole Sediment Toxicity Test.

PARAMETER		CONDITIONS
1.	Test type	10-Day Survival
2.	Test duration	10 Days
3.	Temperature	25°C ± 1°C daily mean temperature, 25 ± 3°C instantaneous temperature
4.	Light quality	Wide-spectrum fluorescent lights
5.	Light intensity	~ 100-1000 lux
6.	Photoperiod	16-h light: 8-h dark
7.	Test chamber size	1000 mL high-form lipless beaker
8.	Sediment volume	175 mL
9.	Overlying water volume	800 mL
10.	Renewal of overlying water	None
11.	Age of test organisms:	1 – 5 days
12.	No. organisms per test chamber	10
13.	No. replicate chambers per sample	5
14.	No. organisms per sample	50
15.	Feeding regime	Fed <24-hour old *Artemia* nauplii daily
16.	Test chamber cleaning	None
17.	Aeration	Slow aeration was provided as per USEPA guidelines.
18.	Overlying water	Artificial Seawater (25-30‰)
19.	Overlying water quality	Temperature, pH and DO daily; ammonia, salinity on Day 1 and Day 9
20.	Endpoint	Survival
21.	Sampling and sample holding requirements	Samples used within 8 weeks of receipt. Samples stored in the dark at 4°C in sealed containers with no air space.
22.	Sample volume required	one gallon
23.	Test acceptability	Minimum mean control survival of 90%.

RESULTS

OVERLYING WATER PHYSICAL/CHEMICAL RESULTS

The physical/chemical results of the overlying water including ammonia, dissolved oxygen, pH, temperature, and salinity, are summarized in Tables 4 and 5. See Appendix B Laboratory Bench Sheets for all physicochemical data.

LEPTOCHEIRUS PLUMULOSUS RESULTS

Leptocheirus plumulosus survival in site sediments ranged between 94% (R024) to 99% (P018). There was no significant difference in the survival of any site with respect to the controls. The results of the statistical analyses, along with significance levels, are included in Table C-1 in Appendix C Statistical Analyses.

AMERICAMYSIS BAHIA RESULTS

Americamysis bahia survival in site sediments ranged between 82% (P011) to 92% (P003 and P018). There was no significant difference in the survival of any site with respect to the controls. The results of the statistical analyses, along with significance levels, are included in Table C-2 in Appendix C Statistical Analyses.

COMMENTS CONCERNING TEST RESULTS

Test acceptability criteria were met for *L. plumulosus* and *A. bahia* for these tests as evidenced by >90% survival in the controls.

QUALITY ASSURANCE/QUALITY CONTROL

Reference toxicant test data are included in Appendix D Quality Assurance/Quality Control. Results indicate all organisms were responding appropriately.

TABLE 4. SUMMARY OF WATER QUALITY AND TEST DATA FOR *L. plumulosus* 10-DAY SEDIMENT TOXICITY TEST

Client: USEPA and NAVFAC		
Experiment ID: Tt01684, Tt01688 – Tt01691	Start Test	8-27-13
Sample Tested: Eastern Long Island Sound	End Test	9-7-13

RESULTS
(including water quality before organisms were loaded)

WATER CHEMISTRY ANALYSIS (RANGE)					
Site	Salinity (ppt)	D.O. (mg/L)	pH	Temp. (°C) Instantaneous	Ammonia (mg/L)
Control	17.5 – 19.6	7.2 – 8.4	7.3 – 7.4	23.7 – 26.5	1.1 – 3.3
P003	19.9 – 22.7	7.6 – 8.8	7.8	23.7 – 26.5	0.3 – 0.7
P018	20.0 – 22.1	7.1 – 8.8	7.9 – 8.0	23.7 – 26.5	1.7 – 4.7
P011	20.3 – 22.4	7.7 – 9.0	8.0	23.7 – 26.5	0.1 – 0.4
R024	20.0 – 22.1	7.7 – 8.7	8.0	23.7 – 26.5	0.1 – 2.7

TABLE 5. SUMMARY OF WATER QUALITY AND TEST DATA FOR *A. bahia* 10-DAY SEDIMENT TOXICITY TEST

Client: USEPA and NAVFAC		
Experiment ID: Tt01711, Tt01713 - Tt01716	Start Test	9-09-13
Sample Tested: Eastern Long Island Sound	End Test	9-20-13

RESULTS
(including water quality before organisms were loaded)

WATER CHEMISTRY ANALYSIS (RANGE)					
Site	Salinity (ppt)	D.O. (mg/L)	pH	Temp. (°C) Instantaneous	Ammonia (mg/L)
Control	28.5 – 30.3	7.1 – 8.5	7.6 – 8.1	23.9 – 26.1	0.5 – 4.4
P003	30.1 – 35.1	7.3 – 9.2	7.9 – 8.3	23.9 – 26.1	0.1 – 0.4
P018	30.8 – 34.5	7.3 – 9.3	7.9 – 8.2	23.9 – 26.1	0.5 – 2.1
P011	30.5 – 33.1	7.4 – 9.1	7.6 – 8.2	23.9 – 26.1	0.7 – 4.1
R024	30.5 – 33.0	6.9 – 9.3	7.7 – 8.1	23.9 – 26.1	1.0 – 1.7

A. CHAIN OF CUSTODY

Chain of Custody Form
WE11 - Eastern Long Island Sound, Dredged Disposal Sites

Project	LIS BENTHIC	Date	7/19
Client	NAVY/EPA	Location	LIS
Sampler		Report to	DRESSER

	Sample ID	Date	Time	Grab/Comp	Container	Media	Preservative	Analysis Required							Remarks
1	P003	↓		G	BAG	SED	N/A	✓							OK
2	P018	↓		↓	↓	↓	↓	✓							OK
3	R024	↓		↓	↓	↓	↓	✓							OK
4	P011	↓		↓	↓	↓	↓	✓							OK
5															
6															
7															
8															
9															
10															
11															
12															
15															

Relinquished by	BRIAN DRESSER	Date 7/22	Received by	FED EX	Date 7/22	Destination:
Signature	[signature]	Time	Signature		Time	Tt Owings Mills
Relinquished by		Date	Received by		Date	
Signature		Time	Signature		Time	
Relinquished by		Date	Received by		Date	
Signature		Time	Signature		Time	Page 1 of 1

Received 7/23/13 09:45 temp: 3.7°C [signature]

Figure 7: Chain of Custody Form

B. LABORATORY BENCH SHEETS

Page 1 of 1

L. PLUMULOSUS 10-DAY SEDIMENT TOXICITY BENCH SHEET

Test #: TT01684

Test #: TT01684

Sample ID: Broad Man River Control

Organism Source: Chesapeake

Organism Batch #: 0026

Organism Size: 2-4mm

Laboratory ID: TT

Client/Project: LFS

Sediment Volume (mL): ~~80~~ BS 175

Water Volume (mL): ~~475~~ BS 800

Dilution Water (Batch #): 501

Sediment Load Date/Time: 8/27/13 1010

Organism Load Date/Time: 8/28/13 0230

Test End Date/Time: 9/7/13 0920

Corresponding Control Test #: TE01684

Day	Replicate 1	Replicate 2	Replicate 3	Replicate 4	Replicate 5	Analyst	Time	Observations	Temp (°C)	DO (mg/L)	Salinity (‰)	NH_3 (mg/L)	pH	Analyst	Time
0	20	20	20	20	20	BS	1230		23.9	7.5				BS	1020
1									23.8	8.3				BS	0910
2									23.9	8.6	17.5	1.1	7.4	BS	0950
3									23.7	8.4				BS	1050
4									23.7	7.7				PTS	1030
5									23.7	7.7				PTS	1155
6								26.1	~~23.7~~ BS 9/3/13	8.3				BS	1000
7									26.5	8.3				BS	0850
8									25.3	7.2	19.6	3.3	7.5	BS	1250
9									25.4	7.4				BS	0900
10	19	19	20	20	19	BS	0920		25.6	8.0				BS	1370

Final Mean Percent Survial: $\frac{\text{\# Surviving}}{\text{\# Exposed}} \times 100 =$ ~~74~~ 97 % BS

Tetra Tech, Inc.
Ecological Testing Facility

Data Checked and Approved: JF

2013

L. PLUMULOSUS 10-DAY SEDIMENT TOXICITY BENCH SHEET

Test #: TT01688

Test #: TT01688

Laboratory ID: TT

Sediment Load Date/Time: 8/27/13 1012

Sample ID: P003

Client/Project: LIS

Organism Load Date/Time: 8/28/13 1310

Organism Source: Chesapeake

Sediment Volume (mL): 175

Test End Date/Time: 9/7/13 1040

Organism Batch #: 0026

Water Volume (mL): 800

Corresponding Control Test #: TE01684

Organism Size: 2-4mm

Dilution Water (Batch #): 501

Day	Replicate 1	2	3	4	5	Analyst	Time	Observations	Temp (°C)	DO (mg/L)	Salinity (‰)	NH_3 (mg/L)	pH	Analyst	Time
0	20	20	20	20	20	BS	1310		23.9	8.1				BS	1020
1									23.8	8.2				BS	0910
2									23.9	8.4	19.9	0.7	7.8	BS	0950
3									23.7	8.3				BS	1050
4									23.7	7.6				PTS	1030
5									23.7	8.2				PTS	1155
6								26.1	~~23.9~~ 25 9/3/13	8.1				BS	1000
7									26.5	7.9				BS	0850
8									25.3	8.5	22.7	0.3	7.8	PS	1250
9									25.4	7.8				BS	0900
10	20	20	18	20	20	PTS	1040		25.6	7.8				BS	1340

Final Mean Percent Survial: $\frac{\text{\# Surviving}}{\text{\# Exposed}}$ x100 = 98 %

Tetra Tech, Inc.
Ecological Testing Facility

Data Checked and Approved: JF

2013

L. PLUMULOSUS 10-DAY SEDIMENT TOXICITY BENCH SHEET

Test #: TT01689

Test #: TT01689

Laboratory ID: TT

Sediment Load Date/Time: 8/27/13 1015

Sample ID: P018

Client/Project: LTS

Organism Load Date/Time: 8/28/13 1345

Organism Source: Chesapeake

Sediment Volume (mL): 175

Test End Date/Time: 09/07/13 1425

Organism Batch #: 0026

Water Volume (mL): 800

Corresponding Control Test #: TT01684

Organism Size: 2-4mm

Dilution Water (Batch #): 501

Day	Replicate 1	Replicate 2	Replicate 3	Replicate 4	Replicate 5	Analyst	Time	Observations	Temp (°C)	DO (mg/L)	Salinity (‰)	NH_3 (mg/L)	pH	Analyst	Time
0	20	20	20	20	20	BS	1345		23.9	8.3				BS	1020
1									23.8	8.3				BS	0910
2									23.9	8.7	20.0	1.7	7.9	BS	0950
3									23.7	8.8				BS	1050
4									23.7	7.1				BTS	1030
5									23.7	7.8				BTS	1155
6								261	BS 9/3/13 ~~23.9~~	8.1				BS	1000
7									26.5	8.0				BS	0850
8									25.3	8.8	22.1	4.7	8.0	BS	1250
9									25.4	7.8				BS	0900
10	19	20	20	20	20	BS	1425		25.6	7.8				BS	1340

Final Mean Percent Survial: $\frac{\text{\# Surviving}}{\text{\# Exposed}} \times 100 =$ 99 %

Tetra Tech, Inc.
Ecological Testing Facility

Data Checked and Approved: JF

2013

L. PLUMULOSUS 10-DAY SEDIMENT TOXICITY BENCH SHEET

Test #: TT01690

Test #: TT01690

Laboratory ID: TT

Sediment Load Date/Time: 8/27/13 1018

Sample ID: 8011

Client/Project: LTS

Organism Load Date/Time: 8/28/13 1325

Organism Source: Chesapeake

Sediment Volume (mL): 175

Test End Date/Time: 9/07/13 1000

Organism Batch #: 0026

Water Volume (mL): 800

Corresponding Control Test #: TT01684

Organism Size: 2-4 mm

Dilution Water (Batch #): 501

Day	Replicate 1	2	3	4	5	Analyst	Time	Observations	Temp (°C)	DO (mg/L)	Salinity (‰)	NH_3 (mg/L)	pH	Analyst	Time
0	20	20	20	20	20	BS	1325		23.9	8.3				BS	1020
1									23.8	8.3				BS	0910
2									23.9	8.7	20.3	0.4	8.0	BS	0950
3									23.7	8.8				BS	1050
4									23.7	7.8				BTB	1030
5									23.7	8.3				BTB	1155
6								26.1	9/7/13 BS ~~23.9~~	8.0				BS	1000
7									26.5	8.1				BS	0850
8									25.3	9.0	22.4	0.1	8.0	BS	1250
9									25.4	7.7				BS	0900
10	20	20	19	19	18	BTB	1000		25.6	7.9				BS	1380

Final Mean Percent Survial: $\frac{\text{\# Surviving}}{\text{\# Exposed}} \times 100 =$ 96 %

Tetra Tech, Inc.
Ecological Testing Facility

Data Checked and Approved: JF

2013

L. PLUMULOSUS 10-DAY SEDIMENT TOXICITY BENCH SHEET

Test #: TT01691

Test #: TT01691
Laboratory ID: TT
Sediment Load Date/Time: 8/27/13 1020
Sample ID: R024
Client/Project: LIS
Organism Load Date/Time: 8/28/13 1345
Organism Source: Chesapeake
Sediment Volume (mL): 175
Test End Date/Time: 9/7/13 1405
Organism Batch #: 0026
Water Volume (mL): 800
Corresponding Control Test #: TT01684
Organism Size: 2-4mm
Dilution Water (Batch #): 501

Day	Replicate 1	2	3	4	5	Analyst	Time	Observations	Temp (°C)	DO (mg/L)	Salinity (‰)	NH_3 (mg/L)	pH	Analyst	Time
0	20	20	20	20	20	BS	1345		23.9	8.3				BS	1020
1									23.8	8.4				BS	0910
2									23.9	8.6	20.0	2.7	8.0	BS	0950
3									23.7	8.7				BS	1050
4									23.7	8.0				BS	1030
5									23.7	8.3				BS	1155
6								26.1	~~23.9~~ 9/3/13 BS	8.0				BS	1000
7									26.5	8.1				BS	0850
8									25.3	8.3	22.1	0.1	8.0	BS	1250
9									25.4	7.7				BS	0900
10	20	19	20	18	17	BS	1405		25.6	7.9				BS	1340

Final Mean Percent Survial: $\frac{\text{\# Surviving}}{\text{\# Exposed}} \times 100 =$ 94 %

L. PLUMULOSUS 10-DAY SEDIMENT TOXICITY BENCH SHEET

Test #: TT01669

Test #: TT01669
Laboratory ID: TT
Sediment Load Date/Time: 7/29/13 1225
Sample ID: Control
Client/Project: LJS
Organism Load Date/Time: 7/30/13 1300
Organism Source: ABS
Sediment Volume (mL): 175
Test End Date/Time: 8/9/13 0910
Organism Batch #: 0023
Water Volume (mL): 800
Corresponding Control Test #: TT01669
Organism Size: 2-4mm
Dilution Water (Batch #): 493

Day	Replicate 1	2	3	4	5	Analyst	Time	Observations	Temp (°C)	DO (mg/L)	Salinity (‰)	NH_3 (mg/L)	pH	Analyst	Time
0	20	20	20	20	20	BS	1300		24.7	7.9				BS	1000
1									24.4	7.3				BS	1100
2									24.6	8.2	21.6	5.0	8.0	BS	1350
3									24.9	7.7				BS	0915
4									25.0	8.6				BS	1015
5									25.5	7.9				BS	1540
6									25.0	7.6				BS	0935
7									25.0	8.2				BS	0925
8									25.0	8.2	23.0	7.0	7.5	BS	1240
9									24.9	8.5				BS	1330
10	12	12	15	14	15	BS	0910		24.9	8.6				BS	1600

Final Mean Percent Survial: $\frac{\text{\# Surviving}}{\text{\# Exposed}}$ x100 = 68 %

-Test invalid due to control mortality > 10%.

Tetra Tech, Inc.
Ecological Testing Facility

Data Checked ~~and Approved~~: JF 9/26/13 JF
Data reviewed but not approved; invalid

2013

Page 1 of 1

L. PLUMULOSUS 10-DAY SEDIMENT TOXICITY BENCH SHEET

Test #: TT01670

Test #: TT01670

Laboratory ID: TT

Sediment Load Date/Time: 7/29/13 1205

Sample ID: P003

Client/Project:

Organism Load Date/Time: 7/30/13 1100

Organism Source: ABS

Sediment Volume (mL): 175

Test End Date/Time: 8/9/13 1300

Organism Batch #: 0023

Water Volume (mL): 800

Corresponding Control Test #: TT01669

Organism Size: 2-4mm

Dilution Water (Batch #):

Day	Replicate 1	2	3	4	5	Analyst	Time	Observations	Temp (°C)	DO (mg/L)	Salinity (‰)	NH_3 (mg/L)	pH	Analyst	Time
0	20	20	20	20	20	BS	1100		24.7	7.8				BS	1000
1									24.4	7.7				PS	1100
2									24.6	8.2	21.8	1.3	7.9	BS	1350
3									24.9	7.7				PS	0915
4									25.0	8.0				BS	1015
5									25.5	8.2				PS	1540
6									25.0	7.8				BS	0935
7									25.0	8.9				PS	0925
8									25.0	8.5	21.5	0.2	7.5	BS	1240
9									24.9	8.6				BS	1330
10	17	18	16	14	16	BS	1300		24.9	8.7				BS	1600

Final Mean Percent Survial: $\frac{\text{\# Surviving}}{\text{\# Exposed}}$ x100 = 81 %

-Test invalid due to control mortality > 10%.

Tetra Tech, Inc.
Ecological Testing Facility

Data Checked ~~and Approved:~~ JF SF 9/24/13

Data reviewed but not approved; test invalid!

2013

L. PLUMULOSUS 10-DAY SEDIMENT TOXICITY BENCH SHEET

Test #: TT01671

Test #: TT01671
Laboratory ID: TT
Sediment Load Date/Time: 7/29/13 1100
Sample ID: P018
Client/Project:
Organism Load Date/Time: 7/30/13 1210
Organism Source: ABS
Sediment Volume (mL): 175
Test End Date/Time: 08/09/13 1100
Organism Batch #: 0023
Water Volume (mL): 800
Corresponding Control Test #: TT01669
Organism Size: 2-4mm
Dilution Water (Batch #):

Day	Replicate 1	2	3	4	5	Analyst	Time	Observations	Temp (°C)	DO (mg/L)	Salinity (‰)	NH_3 (mg/L)	pH	Analyst	Time
0	20	20	20	20	20	BS	1210		24.7	7.9				BS	1000
1									24.4	~~8.075~~ BS 7/31/13				BS	1100
2									24.6	8.2	21.2	2.0	7.9	BS	1350
3									24.9	8.0				BS	0915
4									25.0	8.0				BS	1015
5									25.5	8.2				BS	1540
6									25.0	7.8				BS	0935
7									25.0	9.2				BS	0925
8									25.0	8.9	21.1	0.4	7.5	BS	1240
9									24.9	8.5				BS	1330
10	19	12	17	18	17	BS	1100		24.9	8.7				BS	1600

Final Mean Percent Survial: $\frac{\text{\# Surviving}}{\text{\# Exposed}}$ x100 = 83 %

Test invalid due to control mortality >10%.

Tetra Tech, Inc.
Ecological Testing Facility

Data Checked ~~and Approved~~: JF 9/26/13 JF

reviewed but not approved; test invalid.

2013

L. PLUMULOSUS 10-DAY SEDIMENT TOXICITY BENCH SHEET

Test #: TT01672

Test #: TT01672
Laboratory ID: TT
Sediment Load Date/Time: 7/29/13 1200
Sample ID: R024
Client/Project:
Organism Load Date/Time: 7/30/13 1300
Organism Source: ABS
Sediment Volume (mL): 175
Test End Date/Time: 08/09/13 1055
Organism Batch #: 0023
Water Volume (mL): 800
Corresponding Control Test #: TT01669
Organism Size: 2-4mm
Dilution Water (Batch #):

Day	Replicate 1	Replicate 2	Replicate 3	Replicate 4	Replicate 5	Analyst	Time	Observations	Temp (°C)	DO (mg/L)	Salinity (‰)	NH_3 (mg/L)	pH	Analyst	Time
0	20	20	20	20	20	BS	1300		24.7	8.0				BS	1000
1									24.4	7.8				PS	1100
2									24.6	8.2	21.4	2.0	7.9	BS	1350
3									24.9	7.7				PS	0915
4									25.0	7.9				BS	1015
5									25.5	8.6				PS	1540
6									25.0	7.9				BS	0935
7									25.0	8.3				PS	0925
8									25.0	8.7	22.1	0.7	7.7	BS	1240
9									24.9	8.3				BS	1330
10	BS 8/8/13 ~~10~~ 16	BS 8/8/13 ~~12~~ 14	8/8/13 ~~5~~ 18	BS 8/8/13 ~~14~~ 11	BS 8/8/13 ~~15~~ 13	BS	~~0910~~ BS 8/8/13 1055		24.6	8.6				BS	1600

Final Mean Percent Survial: $\frac{\text{\# Surviving}}{\text{\# Exposed}}$ x100 = 74 %

TEST INVALID Due to Control Mortality >10%.

Tetra Tech, Inc.
Ecological Testing Facility

Data Checked ~~and Approved~~: JF 9/26/13 JF
Data reviewed but not approved; invalid.

2013

L. PLUMULOSUS 10-DAY SEDIMENT TOXICITY BENCH SHEET

Test #: TT01673

Test #: TT01673

Laboratory ID: TT

Sediment Load Date/Time: 7/29/13 1215

Sample ID: P011

Client/Project:

Organism Load Date/Time: 7/30/13 1300

Organism Source: ABS

Sediment Volume (mL): 175

Test End Date/Time: 08/09/13 1410

Organism Batch #: 0023

Water Volume (mL): 800

Corresponding Control Test #: TT01669

Organism Size: 2-4mm

Dilution Water (Batch #):

Day	Replicate 1	2	3	4	5	Analyst	Time	Observations	Temp (°C)	DO (mg/L)	Salinity (‰)	NH_3 (mg/L)	pH	Analyst	Time
0	20	20	20	20	20	BS	1300		24.7	7.8				BS	1000
1									24.4	8.4				BS	1100
2									24.6	8.3	21.4	2.2	7.9	BS	1350
3									24.9	7.7				BS	0915
4									25.0	7.8				BS	1015
5									25.5	8.6				BS	1540
6									25.0	8.1				BS	0935
7									25.0	8.0				BS	0925
8									25.0	8.4	23.0	0.4	7.8	BS	1240
9									24.9	8.5				BS	1330
10	17	BS 8/9/13 8 / 20	15	15	16	BS	1410		24.9	8.5				BS	1600

Final Mean Percent Survial: $\frac{\text{\# Surviving}}{\text{\# Exposed}} \times 100 =$ 83 %

TEST INVALID Due to CONTROL MORTALITY >10%

Tetra Tech, Inc.
Ecological Testing Facility

Data Checked ~~and Approved~~: SF 9/26/13 SF

Data reviewed but not approved; test invalid.

2013

Weight Data for *L. plumulosus* Larval Survival and Growth

Test ID: TT61669-TT61673
Start Date (MMDDYYY): 7/29/13
End Date (MMDDYYY): 7/30/13
Drying Temp: 60°C
Drying Time (HH:MM): 24hrs
Weighing Date (MMDDYYY): 7/31/13
Analyst: B
Client: LFS

Concentration	Replicate	A Weight of boat (mg)	B Dry Weight of foil and organisms (mg)	B-A Total Dry Weight of organisms (mg)	C Number of organisms	(B-A)/C Mean Dry Weight of organisms (mg)	Remarks
1669	1	~~1188.3~~ 1181.5	1186.7	5.2	12	0.43	
	2	1175.4	1180.4	5.0	12	0.42	Avg. = 0.482
	3	1186.2	1194.4	8.2	15	0.55	
	4	1188.3	1195.1	6.8	14	0.49	
	5	1171.1	1178.9	7.8	15	0.52	
1670	1	1175.2	1178.8	3.6	17	0.21	
	2	1179.8	1184.1	4.9	18	0.27	
	3	1172.4	1178.4	6.0	16	0.38	Avg. = 0.432
	4	1187.8	1197.9	10.1	14	0.72	
	5	1173.0	1182.3	9.3	16	0.58	
1671	1	1174.7	1185.4	10.7	19	0.56	
	2	1174.0	1180.5	6.5	12	0.54	
	3	1192.2	1202.9	10.7	17	0.63	Avg. = 0.544
	4	1173.6	1181.0	7.4	18	0.41	
	5	1169.1	1178.9	9.8	17	0.58	
1672	1	1165.9	1176.6	10.7	18	0.59	
	2	1163.2	1171.5	8.3	14	0.59	
	3	1176.8	1181.6	4.8	18	0.27	Avg. = 0.422
	4	1173.5	1177.4	3.9	11	0.35	
	5	1179.9	1184.0	4.1	13	0.31	
1673	1	1180.3	1185.2	4.9	17	0.29	
	2	1172.5	1177.8	5.3	20	0.27	
	3	1193.1	1197.3	4.2	15	0.28	Avg. = 0.314
	4	1188.0	1194.6	6.6	15	0.44	
	5	1171.6	1176.3	4.7	16	0.29	
Blanks	A						
	B						

TEST INVALID DUE TO CONTROL MORTALITY >10%

Tetra Tech, Inc.
Ecological Testing Facility

Data Checked ~~and Approved~~ 9/26/13 SF SF
Data reviewed but not approved; test invalid

2013

Test #: TT01711

Laboratory ID: TT

Sediment Load Date/Time: 9/9/13 1322

Sample ID: Boardman Control

Client/Project: LTS

Organism Load Date/Time: 9/10/13 1410

Species/Source: Chesapeake Ampelisca

Sediment Volume (mL): 175

Test End Date/Time: 9/20/13 0910

Organism Batch #: 0031

Water Volume (mL): 800

Corresponding Control Test #: TT01711

Organism Age: 1 day

Dilution Water (Batch #): 505

Day	Replicate 1	2	3	4	5	Analyst	Time	Comments	Temp (°C)	DO (mg/L)	Salinity (‰)	NH_3 (mg/L)	pH	Analyst	Time
0	10	10	10	10	10	BS	1410		25.1	7.4	28.5	0.5	7.8	BS	1035
1									26.1	7.7	28.5	0.7	8.1	BS	0950
2									25.6	7.5		–	7.6	BS	0950
3									23.9	7.3		–	7.7	BS	1020
4									25.2	7.5		–	7.6	BS	1010
5									25.8	7.5		–	7.7	BS	1120
6									25.9	7.6		–	7.8	BS	0850
7									26.0	7.6		–	7.9	BS	1050
8									25.8	8.4		–	8.0	BS	0945
9									24.2	8.0	30.3	~~0.4~~ 4.4	8.1	BS	1300
10	10	9	8	9	9	BS	0910		24.1	8.5		–	7.9	BS	1410

Final Mean Percent Survial: $\frac{\text{\# Surviving}}{\text{\# Exposed}} \times 100 =$ 90 %

Data checked and QC'd: JF

Test #: TT01713

Laboratory ID: TE

Sediment Load Date/Time: 9/9/13 1325

Sample ID: R024

Client/Project: LIS

Organism Load Date/Time: 9/10/13 1412

Species/Source: Chesapeake Abahia

Sediment Volume (mL): 175

Test End Date/Time: 9/20/13 1020

Organism Batch #: 0031

Water Volume (mL): 800

Corresponding Control Test #: ~~TE01712~~ TT01711 PS 9/27/13

Organism Age: 1 day

Dilution Water (Batch #): 505

Day	Replicate 1	2	3	4	5	Analyst	Time	Comments	Temp (°C)	DO (mg/L)	Salinity (‰)	NH_3 (mg/L)	pH	Analyst	Time
0	10	10	10	10	10	PS	1412		25.1	7.9	31.4	~~8.0~~ 1.7 BS 9/10/13	8.0	BS	1035
1									26.1	7.8	30.5	1.0	8.1	BS	0950
2									25.6	7.6		–	7.7	BS	0950
3									23.9	7.4		–	7.8	BS	1020
4									25.2	7.7		–	7.8	BS	1010
5									25.8	7.9		–	7.9	BS	1120
6									25.9	6.9		–	7.9	BS	0850
7									26.0	7.2		–	7.7	BS	1050
8									25.8	7.2		–	7.9	PTS	0945
9									24.2	8.2	33.0	ND	8.1	PTS	1300
10	7	9	9	10	9	PS	1020		24.1	9.3		–	8.1	PTS	1410

Final Mean Percent Survial: $\frac{\text{\# Surviving}}{\text{\# Exposed}}$ x100 = 88 %

Data checked and QC'd: JF

1 of 1

Test #: TT01714

Laboratory ID: TT

Sediment Load Date/Time: 9/9/13 1332

Sample ID: P003

Client/Project: LIS

Organism Load Date/Time: 9/10/13 1412

Species/Source: Chesapeake A. bahia

Sediment Volume (mL): 175

Test End Date/Time: 9/20/13 1047

Organism Batch #: 0031

Water Volume (mL): 800

Corresponding Control Test #: ~~TT01712~~ TT01711 PS 9/27/13

Organism Age: 1 day

Dilution Water (Batch #): SOS

Day	Replicate 1	2	3	4	5	Analyst	Time	Comments	Temp (°C)	DO (mg/L)	Salinity (‰)	NH_3 (mg/L)	pH	Analyst	Time
0	10	10	10	10	10	PS	1412		25.1	8.3	31.3	0.1	8.1	BS	1035
1									26.1	7.7	30.1	0.4	8.2	BS	0950
2									25.6	7.6		–	7.9	BS	0950
3									23.9	7.4		–	8.0	BS	1020
4									25.2	7.3		–	8.0	BS	1010
5									25.8	7.9		–	7.9	BS	1120
6									25.9	7.0		–	7.9	BS	0850
7									26.0	7.3		–	8.0	BS	1050
8									25.8	8.6		–	8.3	BS	0945
9									24.2	8.7	35.1	0.1	8.1	BS	1300
10	9	10	8	9	10	PS	1047		24.1	9.2		–	8.1	BS	1410

Final Mean Percent Survial: $\frac{\text{\# Surviving}}{\text{\# Exposed}}$ x100 = 92 %

Data checked and QC'd: JF

Test #: TT01715

Laboratory ID: TT

Sediment Load Date/Time: 9/9/13 1337

Sample ID: P018

Client/Project: LTS

Organism Load Date/Time: 9/10/13 1325

Species/Source: Chesapeake A. bahia

Sediment Volume (mL): 175

Test End Date/Time: 9/20/13 1250

Organism Batch #: 0031

Water Volume (mL): 800

Corresponding Control Test #: ~~TT01712~~ PS 9/27/13 TT01714

Organism Age: 1 day

Dilution Water (Batch #): 505

Day	Replicate 1	2	3	4	5	Analyst	Time	Comments	Temp (°C)	DO (mg/L)	Salinity (‰)	NH_3 (mg/L)	pH	Analyst	Time
0	10	10	10	10	10	PS	1325		25.1	8.6	31.8	2.1	8.1	BS	1035
1									26.1	7.8	30.9	0.7	8.2	BS	0950
2									25.6	7.8		–	8.0	BS	0950
3									27.7	7.4		–	8.1	BS	1020
4									25.2	7.3		–	8.0	BS	1010
5									25.8	7.9		–	8.1	BS	1020
6									25.9	7.4		–	8.1	BS	0850
7									26.0	7.6		–	8.0	BS	1050
8									25.8	7.3		–	8.0	BTS	0945
9									24.2	8.0	34.5	0.5	7.9	BTS	1300
10	9	9	9	9	10	BS	1250		24.1	9.3		–	8.2	BTS	1410

Final Mean Percent Survial: $\frac{\text{\# Surviving}}{\text{\# Exposed}} \times 100 =$ 92 %

Data checked and QC'd: JP

Test #: TT01716

Laboratory ID: Tt

Sediment Load Date/Time: 9/9/13 1340

Sample ID: P011

Client/Project: LIS

Organism Load Date/Time: 9/10/13 1320

Species/Source: Chesapeake Alabia

Sediment Volume (mL): 175

Test End Date/Time: 09/20/13 1226

Organism Batch #: 0031

Water Volume (mL): 800

Corresponding Control Test #: ~~TT01712~~ TT01711 PS 9/27/13

Organism Age: 1 day

Dilution Water (Batch #): 505

Day	Replicate 1	2	3	4	5	Analyst	Time	Comments	Temp (°C)	DO (mg/L)	Salinity (‰)	NH_3 (mg/L)	pH	Analyst	Time
0	10	10	10	10	10	PS	1320		25.1	8.6	31.1	0.7	8.1	BS	1035
1									26.1	7.9	30.5	2.3	8.1	BS	0930
2									25.6	7.9		–	8.0	BS	0950
3									23.9	7.4		–	8.1	BO	1020
4									25.2	7.5		–	8.1	BS	1010
5									25.8	7.7		–	8.1	BS	1020
6									25.9	7.4		–	8.1	BS	0850
7									26.0	7.8		–	8.1	BS	1050
8									25.8	8.1		–	8.2	PTS	0945
9									24.2	8.3	33.1	4.1	7.6	PTS	1300
10	10	7	8	8	8	PS	1226		24.1	9.1		–	8.2	PTS	1410

Final Mean Percent Survial: $\frac{\text{\# Surviving}}{\text{\# Exposed}}$ x100 = 82 %

Data checked and QC'd: JF

1 of 1

C. STATISTICAL ANALYSIS

Table C-1. Summary of statistical analysis of survival for 10-Day Eastern Long Island Sound sediment test using *L. plumulosus*. Highlighted cells are significant at p<0.05.

	Duncan test; Variable: Survival (Spreadsheet1) Marked differences are significant at p < .05000				
Sample ID	Control (M=19.6)	P003 (M=19.6)	P011 (M=19.4)	P018 (M=19.4)	R024 (M=18.8)
Control		1.000000	0.747415	0.739414	0.212427
P003	1.000000		0.739414	0.724180	0.203659
P011	0.747415	0.739414		1.000000	0.295674
P018	0.739414	0.724180	1.000000		0.322202
R024	0.212427	0.203659	0.295674	0.322202	

Table C-2. Summary of statistical analysis of survival for 10-Day Eastern Long Island Sound sediment test using *A. bahia*. Highlighted cells are significant at p<0.05.

	Duncan test; Variable: Ab Survival (LIS Survival Data) Marked differences are significant at p < .05000				
Sample ID	Control (M=9.0)	P003 (M=9.2)	P011 (M=8.2)	P018 (M=9.2)	R024 (M=8.8)
Control		0.736141	0.184561	0.720736	0.720736
P003	0.736141		0.117574	1.000000	0.514881
P011	0.184561	0.117574		0.110576	0.289582
P018	0.720736	1.000000	0.110576		0.501576
R024	0.720736	0.514881	0.289582	0.501576	

D. QUALITY ASSURANCE/QUALITY CONTROL

CETIS Summary Report

Report Date:	03 Sep-13 13:54 (p 1 of 2)
Test Code:	Ref00497 | 03-7901-9299

Americamysis 96-h Acute Survival Test — **Tetra Tech, Inc.**

Batch ID:	16-6823-0670	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	29 Aug-13 13:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	30 ppt Saltwater
Ending Date:	02 Sep-13 12:30	**Species:**	Americamysis bahia (Atlantic Mysid)	**Brine:**	Instant Ocean
Duration:	95h	**Source:**	Chesapeake	**Age:**	3d

Sample ID:	10-8651-8267	**Code:**	40C2F3FB	**Client:**	Tetra Tech
Sample Date:	29 Aug-13 13:25	**Material:**	Potassium chloride	**Project:**	Reference Toxicant
Receive Date:		**Source:**	Reference Toxicant		
Sample Age:	N/A	**Station:**			

Point Estimate Summary

Analysis ID	Endpoint	Level	gm/L	95% LCL	95% UCL	TU	Method
20-7721-9751	48h Survival Rate	EC5	0.5128	0.359	0.5323		Linear Interpolation (ICPIN)
		EC10	0.5385	0.4985	0.5569		
		EC15	0.5641	0.5264	0.5815		
		EC20	0.5897	0.5543	0.6062		
		EC25	0.6154	0.5821	0.6308		
		EC40	0.6923	0.6657	0.7046		
		EC50	0.7436	0.7214	0.7538		
17-9466-0514	96h Survival Rate	EC5	0.5128	0.359	0.5323		Linear Interpolation (ICPIN)
		EC10	0.5385	0.4985	0.5569		
		EC15	0.5641	0.5264	0.5815		
		EC20	0.5897	0.5543	0.6062		
		EC25	0.6154	0.5821	0.6308		
		EC40	0.6923	0.6657	0.7046		
		EC50	0.7436	0.7214	0.7538		

48h Survival Rate Summary

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	1	1	1	1	1	0	0	0.0%	0.0%
0.125		4	1	1	1	1	1	0	0	0.0%	0.0%
0.25		4	1	1	1	1	1	0	0	0.0%	0.0%
0.5		4	0.975	0.9563	0.9937	0.9	1	0.025	0.05	5.13%	2.5%
1		4	0	0	0	0	0	0	0		100.0%
2		4	0	0	0	0	0	0	0		100.0%

96h Survival Rate Summary

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	1	1	1	1	1	0	0	0.0%	0.0%
0.125		4	1	1	1	1	1	0	0	0.0%	0.0%
0.25		4	1	1	1	1	1	0	0	0.0%	0.0%
0.5		4	0.975	0.9563	0.9937	0.9	1	0.025	0.05	5.13%	2.5%
1		4	0	0	0	0	0	0	0		100.0%
2		4	0	0	0	0	0	0	0		100.0%

Americamysis 96-h Acute Survival Test — **Tetra Tech, Inc.**

48h Survival Rate Detail

Conc-gm/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	1	1
0.125		1	1	1	1
0.25		1	1	1	1
0.5		1	1	0.9	1
1		0	0	0	0
2		0	0	0	0

96h Survival Rate Detail

Conc-gm/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	1	1
0.125		1	1	1	1
0.25		1	1	1	1
0.5		1	1	0.9	1
1		0	0	0	0
2		0	0	0	0

CETIS Measurement Report

Americamysis 96-h Acute Survival Test — **Tetra Tech, Inc.**

Batch ID:	16-6823-0670	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	29 Aug-13 13:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	30 ppt Saltwater
Ending Date:	02 Sep-13 12:30	**Species:**	Americamysis bahia (Atlantic Mysid)	**Brine:**	Instant Ocean
Duration:	95h	**Source:**	Chesapeake	**Age:**	3d

Sample ID:	10-8651-8267	**Code:**	40C2F3FB	**Client:**	Tetra Tech
Sample Date:	29 Aug-13 13:25	**Material:**	Potassium chloride	**Project:**	Reference Toxicant
Receive Date:		**Source:**	Reference Toxicant		
Sample Age:	N/A	**Station:**			

Final Dissolved Oxygen-mg/L

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	2	7.25	6.987	7.513	6.7	7.8	0.55	0.7778	10.73%	0
0.125		2	7.25	7.035	7.465	6.8	7.7	0.45	0.6364	8.78%	0
0.25		2	7.3	7.156	7.444	7	7.6	0.3	0.4243	5.81%	0
0.5		2	7.45	7.235	7.665	7	7.9	0.45	0.6364	8.54%	0
1		1	7.4			7.4	7.4	0	0	0.0%	0
2		1	7.5			7.5	7.5	0	0	0.0%	0
Overall		10	7.358			6.7	7.9				0 (0%)

Initial Dissolved Oxygen-mg/L

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	2	7.4	7.209	7.591	7	7.8	0.4	0.5657	7.64%	0
0.125		2	7.45	7.235	7.665	7	7.9	0.45	0.6364	8.54%	0
0.25		2	7.55	7.335	7.765	7.1	8	0.45	0.6364	8.43%	0
0.5		2	7.65	7.435	7.865	7.2	8.1	0.45	0.6364	8.32%	0
1		1	8			8	8	0	0	0.0%	0
2		1	8			8	8	0	0	0.0%	0
Overall		10	7.675			7	8.1				0 (0%)

Final pH-Units

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	2	8	7.952	8.048	7.9	8.1	0.1	0.1414	1.77%	0
0.125		2	8.1	8.052	8.148	8	8.2	0.1	0.1414	1.75%	0
0.25		2	8.1	8.099	8.101	8.1	8.1	0	0	0.0%	0
0.5		2	8.05	8.026	8.074	8	8.1	0.05001	0.07073	0.88%	0
1		1	7.9			7.9	7.9	0	0	0.0%	0
2		1	7.9			7.9	7.9	0	0	0.0%	0
Overall		10	8.008			7.9	8.2				0 (0%)

Initial pH-Units

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	2	7.95	7.926	7.974	7.9	8	0.04999	0.0707	0.89%	0
0.125		2	8	8	8	8	8	0	0	0.0%	0
0.25		2	8.1	8.099	8.101	8.1	8.1	0	0	0.0%	0
0.5		2	8.1	8.099	8.101	8.1	8.1	0	0	0.0%	0
1		1	8.1			8.1	8.1	0	0	0.0%	0
2		1	8.2			8.2	8.2	0	0	0.0%	0
Overall		10	8.075			7.9	8.2				0 (0%)

Final Salinity-ppt

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	2	35.9	35.85	35.95	35.8	36	0.09987	0.1412	0.39%	0
0.125		2	37.35	37.33	37.37	37.3	37.4	0.04996	0.07065	0.19%	0
0.25		2	33.9	33.8	34	33.7	34.1	0.2001	0.2829	0.83%	0
0.5		2	35.55	35.29	35.81	35	36.1	0.55	0.7778	2.19%	0
1		1	32.6			32.6	32.6	0	0	0.0%	0
2		1	33.6			33.6	33.6	0	0	0.0%	0
Overall		10	34.82			32.6	37.4				0 (0%)

Americamysis 96-h Acute Survival Test — **Tetra Tech, Inc.**

Initial Salinity-ppt

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	2	30.05	29.93	30.17	29.8	30.3	0.25	0.3536	1.18%	0
0.125		2	30.05	29.93	30.17	29.8	30.3	0.25	0.3536	1.18%	0
0.25		2	30.2	30.1	30.3	30	30.4	0.2	0.2828	0.94%	0
0.5		2	30.45	30.43	30.47	30.4	30.5	0.04998	0.07069	0.23%	0
1		1	30.9			30.9	30.9	0	0	0.0%	0
2		1	32			32	32	0	0	0.0%	0
Overall		10	30.61			29.8	32				0 (0%)

Final Temperature-°C

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	2	25.55	25.48	25.62	25.4	25.7	0.15	0.2121	0.83%	0
0.125		2	25.55	25.48	25.62	25.4	25.7	0.15	0.2121	0.83%	0
0.25		2	25.55	25.48	25.62	25.4	25.7	0.15	0.2121	0.83%	0
0.5		2	25.55	25.48	25.62	25.4	25.7	0.15	0.2121	0.83%	0
1		1	24.8			24.8	24.8	0	0	0.0%	0
2		1	24.8			24.8	24.8	0	0	0.0%	0
Overall		10	25.3			24.8	25.7				0 (0%)

Initial Temperature-°C

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	2	25.25	25.03	25.47	24.8	25.7	0.45	0.6364	2.52%	0
0.125		2	25.25	25.03	25.47	24.8	25.7	0.45	0.6364	2.52%	0
0.25		2	25.25	25.03	25.47	24.8	25.7	0.45	0.6364	2.52%	0
0.5		2	25.25	25.03	25.47	24.8	25.7	0.45	0.6364	2.52%	0
1		1	24.8			24.8	24.8	0	0	0.0%	0
2		1	24.8			24.8	24.8	0	0	0.0%	0
Overall		10	25.1			24.8	25.7				0 (0%)

Americamysis 96-h Acute Survival Test — **Tetra Tech, Inc.**

Final Dissolved Oxygen-mg/L

Conc-gm/L	Control Type	1	2
0	Dilution Water	6.7	7.8
0.125		6.8	7.7
0.25		7	7.6
0.5		7	7.9
1		7.4	
2		7.5	

Initial Dissolved Oxygen-mg/L

Conc-gm/L	Control Type	1	2
0	Dilution Water	7.8	7
0.125		7.9	7
0.25		8	7.1
0.5		8.1	7.2
1		8	
2		8	

Final pH-Units

Conc-gm/L	Control Type	1	2
0	Dilution Water	7.9	8.1
0.125		8	8.2
0.25		8.1	8.1
0.5		8	8.1
1		7.9	
2		7.9	

Initial pH-Units

Conc-gm/L	Control Type	1	2
0	Dilution Water	7.9	8
0.125		8	8
0.25		8.1	8.1
0.5		8.1	8.1
1		8.1	
2		8.2	

Final Salinity-ppt

Conc-gm/L	Control Type	1	2
0	Dilution Water	35.8	36
0.125		37.3	37.4
0.25		34.1	33.7
0.5		36.1	35
1		32.6	
2		33.6	

Initial Salinity-ppt

Conc-gm/L	Control Type	1	2
0	Dilution Water	29.8	30.3
0.125		29.8	30.3
0.25		30	30.4
0.5		30.4	30.5
1		30.9	
2		32	

Americamysis 96-h Acute Survival Test — **Tetra Tech, Inc.**

Final Temperature-°C

Conc-gm/L	Control Type	1	2
0	Dilution Water	25.7	25.4
0.125		25.7	25.4
0.25		25.7	25.4
0.5		25.7	25.4
1		24.8	
2		24.8	

Initial Temperature-°C

Conc-gm/L	Control Type	1	2
0	Dilution Water	24.8	25.7
0.125		24.8	25.7
0.25		24.8	25.7
0.5		24.8	25.7
1		24.8	
2		24.8	

ACUTE TOXICITY TEST BENCH SHEET

Test #: Pe80497

START Date/Time (MMDDYYYY HH:MM): 8/29/13 1325

FINISH Date/Time (MMDDYYYY HH:MM): 9/2/13 1230

Dilution Water: ~~Lobo0581~~ PS 8/29/13 Lobo0502

Test Substance: KCl

Client/Project: Tetra Tech

Species/Source: A. bahia Chesapeake

Concentration & Replicate		Number alive/hour of test					# alive / # exposed (percent survival)	Comments
Units: ~~mg~~ g/L PS 8/29/13		Start	24	48	72	96		
0	A	10	10	10	10	10	100	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
0.125	A	10	10	10	10	10	100	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
0.25	A	10	10	10	10	10	100	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
0.5	A	10	10	10	10	10	97.5	
	B	10	10	~~8~~ 10 PS 8/31/13	~~9~~ 10 PTS 9/1/13	10		
	C	10	10	~~8~~ 9 PS 8/31/13	~~8~~ 9 PTS 9/1/13	9		
	D	10	10	10	10	10		
1	A	10	0				0	
	B	10	0					
	C	10	0					
	D	10	0					
2	A	10	0				0	
	B	10	0			PS 8/30/13		
	C	10	0					
	D	10	0					PS 9/3/13
ANALYST		PS	PS	PS	PTS	PTS		
TIME		1325	1057	1111	1105	1230		

Tetra Tech, Inc.
Ecological Testing Facility

Data Checked and Approved: JF

ACUTE MARINE TOXICITY CHEMISTRY BENCH SHEET Test #: R6800497

START Date/Time (MMDDYYYY HH:MM): 8/29/13 1325

FINISH Date/Time (MMDDYYYY HH:MM): 9/2/13 1230

Dilution Water: ~~Lab00501~~ BS 8/29/13 Lab00502

Test Substance: KCl

Client/Project: Tetra Tech

Species/Source: A. bahia Chesapeake

Test Conc. Units: g/L	Chemical Parameters	Hour of Test 0	48 before	48 After	96	Comments
0	Salinity (‰)	29.8	35.8	30.3	36.0	
	DO (mg/L)	7.8	6.7	7.0	7.8	
	pH (su)	7.9	7.9	8.0	8.2	
	Temp (°C)	24.8	25.7	25.7	25.4	
0.125	Salinity (‰)	29.8	37.3	30.3	37.4	
	DO (mg/L)	7.9	6.8	7.0	7.7	
	pH (su)	8.0	8.0	8.0	8.2	
	Temp (°C)	24.8	25.7	25.7	25.4	
0.25	Salinity (‰)	30.0	34.1	30.4	33.7	
	DO (mg/L)	8.0	7.0	7.1	7.6	
	pH (su)	8.1	8.1	8.1	8.1	
	Temp (°C)	24.8	25.7	25.7	25.4	
0.5	Salinity (‰)	30.4	36.1	30.5	35.0	
	DO (mg/L)	8.1	7.0	7.2	7.9	
	pH (su)	8.1	8.0	8.1	8.1	
	Temp (°C)	24.8	25.7	25.7	25.4	
1	Salinity (‰)	30.9	32.6 *			
	DO (mg/L)	8.0	7.4 *			
	pH (su)	8.1	7.9 *			
	Temp (°C)	24.8	24.8 *		BS 8/30/13	
2	Salinity (‰)	32.0	33.6 *			
	DO (mg/L)	8.0	7.5 *			
	pH (su)	8.2	7.9 *			PS
	Temp (°C)	24.8	24.8 *			9/3/13
Analyst		PS	BS / BS	BS	BTS	
Time Analyzed		1335	1000 / 1035	1115	1235	

* Taken at 24 hour 100% mortality

Tetra Tech, Inc.
Ecological Testing Facility

Data Checked and Approved: JF

2013

Toxicity Test Procedure Check Sheet

Date 8/29/13

Test ID Number Re800497

Type of Test Chamber plastic bowl

Number of replicates per concentration 4

Specify vessel type and volume used to measure and deliver effluent and dilutent to test chambers _____

Graduated Cylinder(s) _____ Pipet(s) _____

Volumetric Flask(s) 2L, 1L Other _____

Specify materials used to place the test organisms into the test chambers Mesh

Test ID Number	Loading QC Initials
Re800497	KS

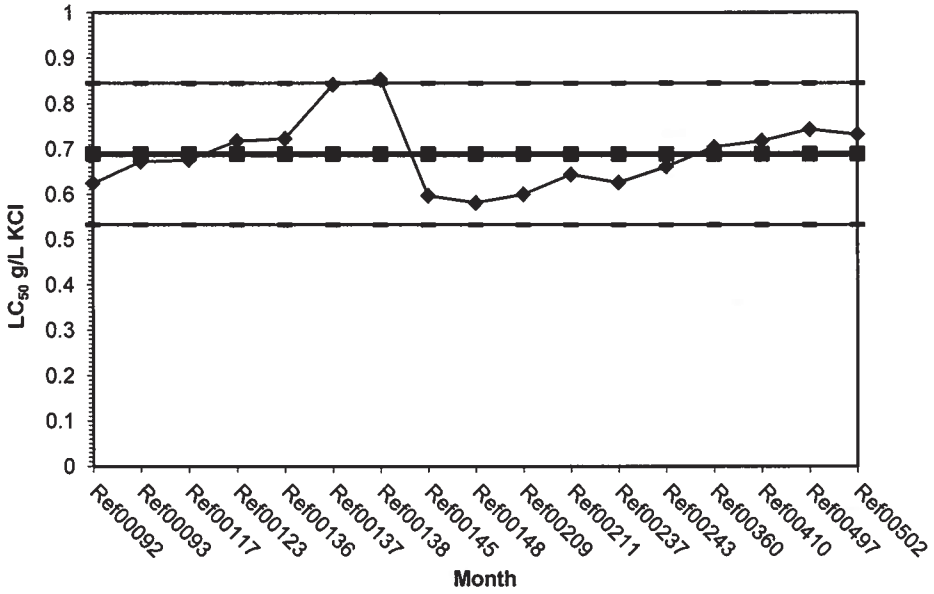
Specify below the number of milliliters (mls) of diluent and effluent measured out per concentration in this test.

Treatment Concentration	Working Stock Solution	Diluent	Total Volume
0	0	1000	1000
0.125	1000	1000	2000
0.25	1000	1000	2000
0.5	1000	1000	2000
1	1000	1000	2000
2	2000	0	2000
			KS 8/29/13

Aeration	Screened Animal Enclosures	Photoperiod
Yes or No	Not used	dark 8 hr / light 16hr
Time Began: _____	Used	other _____

Exposure Chamber	Feeding Schedule
Total Vessel Capacity 500mL	Not fed _____
Test Solution volume 250mL	Fed Daily X
	Other _____
	Type of food Artemia

A. bahia Reference Toxicant 96-h LC_{50} Data for KCl (g/L)



Test Log #	Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD	
Ref00092	10/17/06	0.6240	0.6892	0.6110	0.5329	0.7673	0.8454	
Ref00093	10/24/06	0.6720	0.6892	0.6110	0.5329	0.7673	0.8454	
Ref00117	09/20/07	0.6760	0.6892	0.6110	0.5329	0.7673	0.8454	
Ref00123	10/22/07	0.7180	0.6892	0.6110	0.5329	0.7673	0.8454	
Ref00136	04/18/08	0.7230	0.6892	0.6110	0.5329	0.7673	0.8454	
Ref00137	04/22/08	0.8420	0.6892	0.6110	0.5329	0.7673	0.8454	
Ref00138	04/29/08	0.8530	0.6892	0.6110	0.5329	0.7673	0.8454	
Ref00145	07/08/08	0.5969	0.6892	0.6110	0.5329	0.7673	0.8454	
Ref00148	07/29/08	0.5813	0.6892	0.6110	0.5329	0.7673	0.8454	
Ref00209	01/21/10	0.6000	0.6892	0.6110	0.5329	0.7673	0.8454	
Ref00211	02/04/10	0.6440	0.6892	0.6110	0.5329	0.7673	0.8454	CONTROL FAILURE
Ref00237	06/16/10	0.6260	0.6892	0.6110	0.5329	0.7673	0.8454	CONTROL FAILURE
Ref00243	06/23/10	0.6610	0.6892	0.6110	0.5329	0.7673	0.8454	
Ref00360	08/23/11	0.7046	0.6892	0.6110	0.5329	0.7673	0.8454	
Ref00410	09/28/12	0.7183	0.6892	0.6110	0.5329	0.7673	0.8454	
Ref00497	08/29/13	0.7436	0.6892	0.6110	0.5329	0.7673	0.8454	
Ref00502	09/10/13	0.7321	0.6892	0.6110	0.5329	0.7673	0.8454	

Mean	0.6892
SD	0.0781
CV%	11.3380

CETIS Summary Report

Americamysis 96-h Acute Survival Test — **Tetra Tech, Inc.**

Batch ID:	05-2573-1363	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	10 Sep-13 12:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	30 ppt Saltwater
Ending Date:	14 Sep-13 12:05	**Species:**	Americamysis bahia (Atlantic Mysid)	**Brine:**	Instant Ocean
Duration:	95h	**Source:**	Chesapeake	**Age:**	2d

Sample ID:	02-4953-4677	**Code:**	EDF98D5	**Client:**	Tetra Tech
Sample Date:	10 Sep-13 12:45	**Material:**	Potassium chloride	**Project:**	Reference Toxicant
Receive Date:		**Source:**	Reference Toxicant		
Sample Age:	N/A	**Station:**			

Point Estimate Summary

Analysis ID	Endpoint	Level	gm/L	95% LCL	95% UCL	TU	Method
18-5009-6650	48h Survival Rate	EC5	0.1071	0.03571	0.7562		Linear Interpolation (ICPIN)
		EC10	0.5221	0.4867	0.5483		
		EC15	0.5487	0.5152	0.5734		
		EC20	0.5752	0.5438	0.5985		
		EC25	0.6018	0.5723	0.6236		
		EC40	0.6814	0.6578	0.6988		
		EC50	0.7345	0.7148	0.749		
20-7819-3006	96h Survival Rate	EC5	0.09375	0.04375	0.7507		Linear Interpolation (ICPIN)
		EC10	0.5179	0.4893	0.538		
		EC15	0.5446	0.5177	0.5636		
		EC20	0.5714	0.546	0.5893		
		EC25	0.5982	0.5744	0.615		
		EC40	0.6786	0.6595	0.692		
		EC50	0.7321	0.7163	0.7433		

48h Survival Rate Summary

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	1	1	1	1	1	0	0	0.0%	0.0%
0.125		4	0.925	0.8892	0.9608	0.8	1	0.04787	0.09574	10.35%	7.5%
0.25		4	0.95	0.9284	0.9716	0.9	1	0.02887	0.05774	6.08%	5.0%
0.5		4	0.95	0.9284	0.9716	0.9	1	0.02887	0.05774	6.08%	5.0%
1		4	0	0	0	0	0	0	0		100.0%
2		4	0	0	0	0	0	0	0		100.0%

96h Survival Rate Summary

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	1	1	1	1	1	0	0	0.0%	0.0%
0.125		4	0.925	0.8892	0.9608	0.8	1	0.04787	0.09574	10.35%	7.5%
0.25		4	0.925	0.9063	0.9437	0.9	1	0.025	0.05	5.41%	7.5%
0.5		4	0.95	0.9284	0.9716	0.9	1	0.02887	0.05774	6.08%	5.0%
1		4	0	0	0	0	0	0	0		100.0%
2		4	0	0	0	0	0	0	0		100.0%

Americamysis 96-h Acute Survival Test — **Tetra Tech, Inc.**

48h Survival Rate Detail

Conc-gm/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	1	1
0.125		0.8	0.9	1	1
0.25		1	0.9	0.9	1
0.5		1	1	0.9	0.9
1		0	0	0	0
2		0	0	0	0

96h Survival Rate Detail

Conc-gm/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	1	1
0.125		0.8	0.9	1	1
0.25		1	0.9	0.9	0.9
0.5		1	1	0.9	0.9
1		0	0	0	0
2		0	0	0	0

CETIS Measurement Report

Americamysis 96-h Acute Survival Test — **Tetra Tech, Inc.**

Batch ID:	05-2573-1363	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	10 Sep-13 12:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	30 ppt Saltwater
Ending Date:	14 Sep-13 12:05	**Species:**	Americamysis bahia (Atlantic Mysid)	**Brine:**	Instant Ocean
Duration:	95h	**Source:**	Chesapeake	**Age:**	2d

Sample ID:	02-4953-4677	**Code:**	EDF98D5	**Client:**	Tetra Tech
Sample Date:	10 Sep-13 12:45	**Material:**	Potassium chloride	**Project:**	Reference Toxicant
Receive Date:		**Source:**	Reference Toxicant		
Sample Age:	N/A	**Station:**			

Final Dissolved Oxygen-mg/L

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	2	7.2	7.152	7.248	7.1	7.3	0.1	0.1414	1.96%	0
0.125		2	7.25	7.178	7.322	7.1	7.4	0.15	0.2121	2.93%	0
0.25		2	7.35	7.326	7.374	7.3	7.4	0.04999	0.0707	0.96%	0
0.5		2	7.4	7.352	7.448	7.3	7.5	0.1	0.1414	1.91%	0
1		1	7.3			7.3	7.3	0	0	0.0%	0
2		1	7.5			7.5	7.5	0	0	0.0%	0
Overall		10	7.333			7.1	7.5				0 (0%)

Initial Dissolved Oxygen-mg/L

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	2	7.9	7.756	8.044	7.6	8.2	0.3	0.4243	5.37%	0
0.125		2	8.15	8.03	8.27	7.9	8.4	0.25	0.3535	4.34%	0
0.25		2	8.1	8.004	8.196	7.9	8.3	0.2	0.2828	3.49%	0
0.5		2	8.05	8.026	8.074	8	8.1	0.05001	0.07073	0.88%	0
1		1	8.3			8.3	8.3	0	0	0.0%	0
2		1	8.2			8.2	8.2	0	0	0.0%	0
Overall		10	8.117			7.6	8.4				0 (0%)

Final pH-Units

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	2	7.85	7.826	7.874	7.8	7.9	0.05	0.07071	0.9%	0
0.125		2	7.95	7.926	7.974	7.9	8	0.04999	0.0707	0.89%	0
0.25		2	7.95	7.926	7.974	7.9	8	0.04999	0.0707	0.89%	0
0.5		2	8	8	8	8	8	0	0	0.0%	0
1		1	8.1			8.1	8.1	0	0	0.0%	0
2		1	8.2			8.2	8.2	0	0	0.0%	0
Overall		10	8.008			7.8	8.2				0 (0%)

Initial pH-Units

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	2	8.05	8.026	8.074	8	8.1	0.05001	0.07073	0.88%	0
0.125		2	8.15	8.126	8.174	8.1	8.2	0.05001	0.07073	0.87%	0
0.25		2	8.15	8.126	8.174	8.1	8.2	0.05001	0.07073	0.87%	0
0.5		2	8.2	8.2	8.2	8.2	8.2	0	0	0.0%	0
1		1	8.2			8.2	8.2	0	0	0.0%	0
2		1	8.2			8.2	8.2	0	0	0.0%	0
Overall		10	8.158			8	8.2				0 (0%)

Final Salinity-ppt

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	2	33.25	33.18	33.32	33.1	33.4	0.1499	0.2119	0.64%	0
0.125		2	32.85	32.68	33.02	32.5	33.2	0.35	0.4949	1.51%	0
0.25		2	32.25	31.89	32.61	31.5	33	0.75	1.061	3.29%	0
0.5		2	33	32.81	33.19	32.6	33.4	0.4	0.5656	1.71%	0
1		1	32.2			32.2	32.2	0	0	0.0%	0
2		1	32.3			32.3	32.3	0	0	0.0%	0
Overall		10	32.64			31.5	33.4				0 (0%)

Americamysis 96-h Acute Survival Test — **Tetra Tech, Inc.**

Initial Salinity-ppt

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	2	30.65	30.58	30.72	30.5	30.8	0.15	0.2121	0.69%	0
0.125		2	30.8	30.7	30.9	30.6	31	0.2	0.2829	0.92%	0
0.25		2	30.85	30.73	30.97	30.6	31.1	0.25	0.3536	1.15%	0
0.5		2	31.15	31.08	31.22	31	31.3	0.15	0.2121	0.68%	0
1		1	31.9			31.9	31.9	0	0	0.0%	0
2		1	32.8			32.8	32.8	0	0	0.0%	0
Overall		10	31.36			30.5	32.8				0 (0%)

Final Temperature-°C

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	2	25.4	25.3	25.5	25.2	25.6	0.2	0.2829	1.11%	0
0.125		2	25.4	25.3	25.5	25.2	25.6	0.2	0.2829	1.11%	0
0.25		2	25.4	25.3	25.5	25.2	25.6	0.2	0.2829	1.11%	0
0.5		2	25.4	25.3	25.5	25.2	25.6	0.2	0.2829	1.11%	0
1		1	26.1			26.1	26.1	0	0	0.0%	0
2		1	26.1			26.1	26.1	0	0	0.0%	0
Overall		10	25.63			25.2	26.1				0 (0%)

Initial Temperature-°C

Conc-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	2	25.35	25.23	25.47	25.1	25.6	0.25	0.3536	1.4%	0
0.125		2	25.35	25.23	25.47	25.1	25.6	0.25	0.3536	1.4%	0
0.25		2	25.35	25.23	25.47	25.1	25.6	0.25	0.3536	1.4%	0
0.5		2	25.35	25.23	25.47	25.1	25.6	0.25	0.3536	1.4%	0
1		1	25.1			25.1	25.1	0	0	0.0%	0
2		1	25.1			25.1	25.1	0	0	0.0%	0
Overall		10	25.27			25.1	25.6				0 (0%)

Final Dissolved Oxygen-mg/L

Conc-gm/L	Control Type	1	2
0	Dilution Water	7.1	7.3
0.125		7.1	7.4
0.25		7.3	7.4
0.5		7.3	7.5
1		7.3	
2		7.5	

Initial Dissolved Oxygen-mg/L

Conc-gm/L	Control Type	1	2
0	Dilution Water	8.2	7.6
0.125		8.4	7.9
0.25		8.3	7.9
0.5		8.1	8
1		8.3	
2		8.2	

Final pH-Units

Conc-gm/L	Control Type	1	2
0	Dilution Water	7.8	7.9
0.125		7.9	8
0.25		7.9	8
0.5		8	8
1		8.1	
2		8.2	

Initial pH-Units

Conc-gm/L	Control Type	1	2
0	Dilution Water	8.1	8
0.125		8.2	8.1
0.25		8.2	8.1
0.5		8.2	8.2
1		8.2	
2		8.2	

Final Salinity-ppt

Conc-gm/L	Control Type	1	2
0	Dilution Water	33.4	33.1
0.125		33.2	32.5
0.25		33	31.5
0.5		33.4	32.6
1		32.2	
2		32.3	

Initial Salinity-ppt

Conc-gm/L	Control Type	1	2
0	Dilution Water	30.8	30.5
0.125		31	30.6
0.25		31.1	30.6
0.5		31.3	31
1		31.9	
2		32.8	

Americamysis 96-h Acute Survival Test — **Tetra Tech, Inc.**

Final Temperature-°C

Conc-gm/L	Control Type	1	2
0	Dilution Water	25.6	25.2
0.125		25.6	25.2
0.25		25.6	25.2
0.5		25.6	25.2
1		26.1	
2		26.1	

Initial Temperature-°C

Conc-gm/L	Control Type	1	2
0	Dilution Water	25.1	25.6
0.125		25.1	25.6
0.25		25.1	25.6
0.5		25.1	25.6
1		25.1	
2		25.1	

ACUTE MARINE TOXICITY CHEMISTRY BENCH SHEET

Test #: REF00502

START Date/Time (MMDDYYYY HH:MM): 9/10/13 1245

FINISH Date/Time (MMDDYYYY HH:MM): 9/14/13 1205

Dilution Water: LAB 00505

Test Substance: KCl

Client/Project: Tetra Tech

Species/Source: A. bahia Chesapeake

Test Conc. Units: g/L	Chemical Parameters	Hour of Test: 0	48 Before	48 After	96	Comments
0	Salinity (‰)	30.8	33.4	30.5	33.1	
	DO (mg/L)	8.2	7.1	7.6	7.3	
	pH (su)	8.1	7.8	8.0	7.9	
	Temp (°C)	25.1	25.6	25.6	25.2	
0.125	Salinity (‰)	31.0	33.2	30.6	32.5	
	DO (mg/L)	8.4	7.1	7.9	7.4	
	pH (su)	8.2	7.9	8.1	8.0	
	Temp (°C)	25.1	25.6	25.6	25.2	
0.25	Salinity (‰)	31.1	33.0	30.6	31.5	
	DO (mg/L)	8.3	7.3	7.9	7.4	
	pH (su)	8.2	7.9	8.1	8.0	
	Temp (°C)	25.1	25.6	25.6	25.2	
0.5	Salinity (‰)	31.3	33.4	31.0	32.6	
	DO (mg/L)	8.1	7.3	8.0	7.5	
	pH (su)	8.2	8.0	8.2	8.0	
	Temp (°C)	25.1	25.6	25.6	25.2	
1	Salinity (‰)	31.9	32.2			
	DO (mg/L)	8.3	7.3			
	pH (su)	8.2	8.1			
	Temp (°C)	25.1	26.1			
2	Salinity (‰)	32.8	32.3			
	DO (mg/L)	8.2	7.5			
	pH (su)	8.2	8.2			RS 9/12/13
	Temp (°C)	25.1	26.1			
Analyst		RS	RS / RS	RS	RS	
Time Analyzed		1100	0840 / 0840	0955	1210	

taken at 24 hour 100% mortality

Tetra Tech, Inc.
Ecological Testing Facility

Data Checked and Approved: JF

Toxicity Test Procedure Check Sheet

Date 09/10/13

Test ID Number REF00502

Type of Test Chamber 1L beaker

Number of replicates per concentration 4

Specify vessel type and volume used to measure and deliver effluent and dilutent to test chambers

Graduated Cylinder(s)_____ Pipet(s)_____

Volumetric Flask(s) ✗ Other_____

Specify materials used to place the test organisms into the test chambers mesh

Test ID Number	Loading QC Initials
REF00502	PTS

Specify below the number of milliliters (mls) of diluent and effluent measured out per concentration in this test.

Treatment Concentration	Working Stock Solution	Diluent	Total Volume
0	0	1000	1000
0.125	1000	1000	2000
0.25	1000	1000	2000
0.5	1000	1000	2000
1	1000	1000	2000
2	2000	0	2000
			PS 9/20/13

Exposure Chamber	Feeding Schedule
Total Vessel Capacity 1L	Not fed_____
Test Solution volume 975	Fed Daily ✗
	Other_____
	Type of food_____

Aeration	Screened Animal Enclosures	Photoperiod
Yes or (No)	(Not used)	(dark 8 hr / light 16hr)
Time Began:_____	Used	other_____

ACUTE TOXICITY TEST BENCH SHEET

Test #: Ref00502

START Date/Time (MMDDYYYY HH:MM): 9/10/13 1045

FINISH Date/Time (MMDDYYYY HH:MM): 9/14/13 1205

Dilution Water: Lab00505

Test Substance: KCl

Client/Project: Tetra Tech

Species/Source: A. bahia Chesapeake

Concentration & Replicate		Number alive/hour of test					# alive / # exposed (percent survival)	Comments
Units: g/L		Start	24	48	72	96		
0	A	10	10	10	10	10	100	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
0.125	A	10	10	8	8	8	92.5	
	B	10	10	9	9	9		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
0.25	A	10	10	10	10	10	92.5	
	B	10	10	9	9	9		
	C	10	10	9	9	9		
	D	10	10	10	10	9		
0.5	A	10	10	10	10	10	95	
	B	10	10	10	10	10		
	C	10	9	9	9	9		
	D	10	10	9	9	9		
1	A	10	0	0	0	0	0	
	B	10	0	0	0	0		
	C	10	0	0	0	0		
	D	10	0	0	0	0		
2	A	10	0	0	0	0	0	
	B	10	0	0	0	0		
	C	10	0	0	0	0		
	D	10	0	0	0	0		
ANALYST		BS	BS	BS	BS	BS		
TIME		1245	0839	0940	1302	1205		

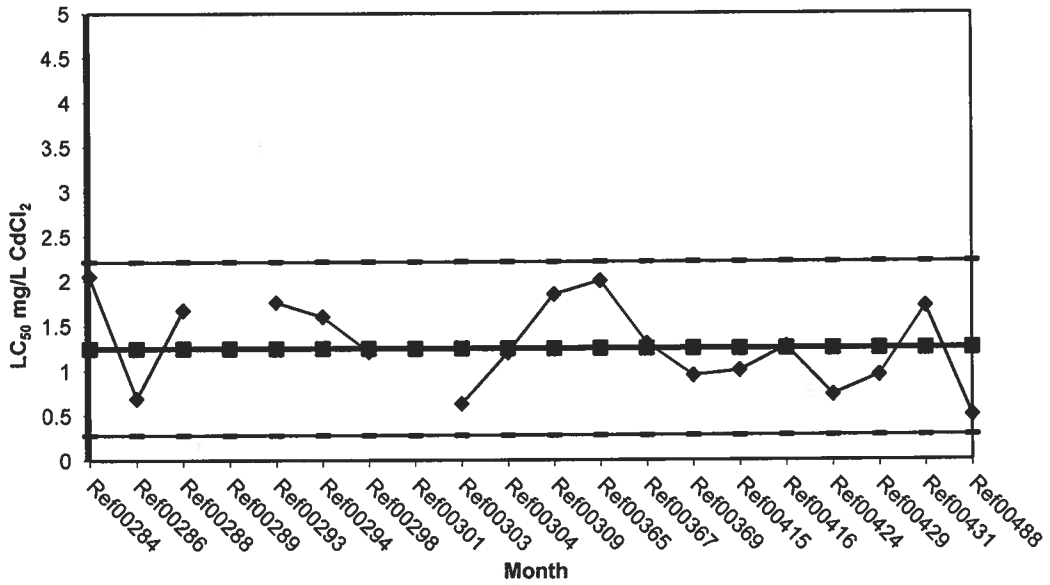
RS 9/26/13

Tetra Tech, Inc.
Ecological Testing Facility

Data Checked and Approved: JF

2013

L. plumulosus Reference Toxicant 96-h LC_{50} Data for $CdCl_2$ (mg/L)



Test Log #	Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
Ref00284	09/22/10	2.0480	1.2471	0.7635	0.2799	1.7307	2.2143
Ref00286	09/28/10	0.6888	1.2471	0.7635	0.2799	1.7307	2.2143
Ref00288	10/06/10	1.6720	1.2471	0.7635	0.2799	1.7307	2.2143
Ref00289	10/13/10	1.2080	1.2471	0.7635	0.2799	1.7307	2.2143
Ref00293	10/20/10	1.7600	1.2471	0.7635	0.2799	1.7307	2.2143
Ref00294	10/22/10	1.6000	1.2471	0.7635	0.2799	1.7307	2.2143
Ref00298	10/27/10	1.2080	1.2471	0.7635	0.2799	1.7307	2.2143
Ref00301	10/29/10	0.6792	1.2471	0.7635	0.2799	1.7307	2.2143
Ref00303	11/05/10	0.6304	1.2471	0.7635	0.2799	1.7307	2.2143
Ref00304	11/05/10	1.2000	1.2471	0.7635	0.2799	1.7307	2.2143
Ref00309	11/12/10	1.8480	1.2471	0.7635	0.2799	1.7307	2.2143
Ref00365	10/12/11	2.0000	1.2471	0.7635	0.2799	1.7307	2.2143
Ref00367	10/18/11	1.3000	1.2471	0.7635	0.2799	1.7307	2.2143
Ref00369	10/25/11	0.9440	1.2471	0.7635	0.2799	1.7307	2.2143
Ref00415	10/09/12	1.0000	1.2471	0.7635	0.2799	1.7307	2.2143
Ref00416	11/12/12	1.2660	1.2471	0.7635	0.2799	1.7307	2.2143
Ref00424	11/07/12	0.7300	1.2471	0.7635	0.2799	1.7307	2.2143
Ref00429	11/13/12	0.9484	1.2471	0.7635	0.2799	1.7307	2.2143
Ref00431	11/20/12	1.7110	1.2471	0.7635	0.2799	1.7307	2.2143
Ref00488	07/30/13	0.5000	1.2471	0.7635	0.2799	1.7307	2.2143

Mean	1.2471
SD	0.4836
CV%	38.7777

CETIS Summary Report

Report Date: 13 Aug-13 08:44 (p 1 of 1)
Test Code: Ref00488 | 01-1959-2411

Leptocheirus 96-h Acute Survival Test — Tetra Tech, Inc.

Batch ID:	03-0842-1774	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	30 Jul-13 10:55	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	20 ppt Saltwater
Ending Date:	03 Aug-13 10:07	**Species:**	Leptocheirus plumulosus	**Brine:**	
Duration:	95h	**Source:**	Aquatic Research Organisms, NH	**Age:**	

Sample ID:	12-6472-1588	**Code:**	4B621EB4	**Client:**	Tetra Tech
Sample Date:	30 Jul-13 10:55	**Material:**	Cadmium chloride	**Project:**	Reference Toxicant
Receive Date:		**Source:**	Reference Toxicant		
Sample Age:	N/A	**Station:**			

Batch Note: Organism size: 2-4mm

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
20-2250-9046	96h Survival Rate	EC5	0.25	N/A	0.375		Linear Interpolation (ICPIN)
		EC10	0.2778	0.1667	0.4167		
		EC15	0.3056	0.1833	0.4583		
		EC20	0.3333	0.2	0.5		
		EC25	0.3611	0.2167	0.5417		
		EC40	0.4444	0.2667	0.6667		
		EC50	0.5	0.3	1.167		

96h Survival Rate Summary

Conc-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	2	1	1	1	1	1	0	0	0.0%	0.0%
0.25		2	0.95	0.9236	0.9764	0.9	1	0.05	0.07071	7.44%	5.0%
0.5		2	0.5	0.4472	0.5528	0.4	0.6	0.1	0.1414	28.28%	50.0%
1		2	0.15	0.07079	0.2292	0	0.3	0.15	0.2121	141.4%	85.0%
2		2	0.1	0.1	0.1	0.1	0.1	0	0	0.0%	90.0%
4		2	0	0	0	0	0	0	0		100.0%

96h Survival Rate Detail

Conc-mg/L	Control Type	Rep 1	Rep 2
0	Dilution Water	1	1
0.25		1	0.9
0.5		0.4	0.6
1		0.3	0
2		0.1	0.1
4		0	0

Analyst: PS QA: JF

CETIS Measurement Report

Leptocheirus 96-h Acute Survival Test — Tetra Tech, Inc.

Batch ID:	03-0842-1774	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	30 Jul-13 10:55	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	20 ppt Saltwater
Ending Date:	03 Aug-13 10:07	**Species:**	Leptocheirus plumulosus	**Brine:**	
Duration:	95h	**Source:**	Aquatic Research Organisms, NH	**Age:**	

Sample ID:	12-6472-1588	**Code:**	4B621EB4	**Client:**	Tetra Tech
Sample Date:	30 Jul-13 10:55	**Material:**	Cadmium chloride	**Project:**	Reference Toxicant
Receive Date:		**Source:**	Reference Toxicant		
Sample Age:	N/A	**Station:**			

Batch Note: Organism size: 2-4mm

Dissolved Oxygen-mg/L

Conc-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	3	7.8	7.698	7.902	7.5	8.1	0.1732	0.3	3.85%	0
0.25		3	7.733	7.663	7.804	7.5	7.9	0.1202	0.2082	2.69%	0
0.5		3	7.833	7.748	7.918	7.6	8.1	0.1453	0.2517	3.21%	0
1		3	7.8	7.698	7.902	7.5	8.1	0.1732	0.3	3.85%	0
2		3	7.867	7.758	7.975	7.5	8.1	0.1856	0.3215	4.09%	0
4		3	7.9	7.753	8.047	7.4	8.2	0.2517	0.4359	5.52%	0
Overall		18	7.822			7.4	8.2				0 (0%)

pH-Units

Conc-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	3	7.467	7.389	7.545	7.2	7.6	0.1333	0.2309	3.09%	0
0.25		3	7.567	7.458	7.675	7.2	7.8	0.1856	0.3215	4.25%	0
0.5		3	7.667	7.558	7.775	7.3	7.9	0.1856	0.3215	4.19%	0
1		3	7.733	7.636	7.831	7.4	7.9	0.1667	0.2887	3.73%	0
2		3	7.767	7.689	7.845	7.5	7.9	0.1333	0.2309	2.97%	0
4		3	7.833	7.763	7.904	7.6	8	0.1202	0.2082	2.66%	0
Overall		18	7.672			7.2	8				0 (0%)

Salinity-ppt

Conc-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	3	20.6	20.22	20.98	19.3	21.4	0.6557	1.136	5.51%	0
0.25		3	20.47	20.12	20.81	19.3	21.2	0.5897	1.021	4.99%	0
0.5		3	20.1	19.86	20.34	19.3	20.7	0.4163	0.7211	3.59%	0
1		3	20.43	20.07	20.79	19.3	21.4	0.6119	1.06	5.19%	0
2		3	20.17	19.94	20.39	19.4	20.6	0.3844	0.6658	3.3%	0
4		3	20.2	20	20.4	19.6	20.8	0.3464	0.6	2.97%	0
Overall		18	20.33			19.3	21.4				0 (0%)

Temperature-°C

Conc-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	3	24.77	24.7	24.84	24.6	25	0.1202	0.2082	0.84%	0
0.25		3	24.77	24.7	24.84	24.6	25	0.1202	0.2082	0.84%	0
0.5		3	24.77	24.7	24.84	24.6	25	0.1202	0.2082	0.84%	0
1		3	24.77	24.7	24.84	24.6	25	0.1202	0.2082	0.84%	0
2		3	24.77	24.7	24.84	24.6	25	0.1202	0.2082	0.84%	0
4		3	24.77	24.7	24.84	24.6	25	0.1202	0.2082	0.84%	0
Overall		18	24.77			24.6	25				0 (0%)

Leptocheirus 96-h Acute Survival Test

Tetra Tech, Inc.

Dissolved Oxygen-mg/L

Conc-mg/L	Control Type	1	2	3
0	Dilution Water	7.8	8.1	7.5
0.25		7.9	7.8	7.5
0.5		8.1	7.8	7.6
1		8.1	7.8	7.5
2		8	8.1	7.5
4		8.1	8.2	7.4

pH-Units

Conc-mg/L	Control Type	1	2	3
0	Dilution Water	7.2	7.6	7.6
0.25		7.2	7.7	7.8
0.5		7.3	7.8	7.9
1		7.4	7.9	7.9
2		7.5	7.9	7.9
4		7.6	8	7.9

Salinity-ppt

Conc-mg/L	Control Type	1	2	3
0	Dilution Water	19.3	21.1	21.4
0.25		19.3	21.2	20.9
0.5		19.3	20.3	20.7
1		19.3	20.6	21.4
2		19.4	20.5	20.6
4		19.6	20.2	20.8

Temperature-°C

Conc-mg/L	Control Type	1	2	3
0	Dilution Water	24.7	24.6	25
0.25		24.7	24.6	25
0.5		24.7	24.6	25
1		24.7	24.6	25
2		24.7	24.6	25
4		24.7	24.6	25

ACUTE TOXICITY TEST BENCH SHEET

Test #: RE F00988

START Date/Time (MMDDYYYY HH:MM): 7/30/13 1055

FINISH Date/Time (MMDDYYYY HH:MM): 8/3/13 1007

Dilution Water: 20 ppt Salt water

Test Substance: $CdCl_2$

Client/Project: TT

Species/Source: L. plumulosus

Concentration & Replicate		Number alive/hour of test					# alive / # exposed (percent survival)	Comments
Units: mg/L		Start	24	48	72	96		
0	A	10	10	10	10	10	100	
	B	10	10	10	10	10		
	C							
	D					BS 8/12/13		
0.25	A	10	10	10	10	10	95	
	B	10	10	9	9	9		
	C							
	D					BS 8/12/13		
0.5	A	10	10	8	5	4	50	
	B	10	10	9	7	6		
	C							
	D					BS 8/12/13		
1	A	10	10	10	7	3	15	
	B	10	10	9	8	0		
	C							
	D					BS 8/12/13		
2	A	10	9	7	4	1	10	
	B	10	10	9	4	BS 8/12/13 1		
	C							
	D					BS 8/12/13		
4	A	10	10	5	4	0	0	
	B	10	10	6	3	0		
	C							
	D					BS 8/12/13		BS 8/12/13
ANALYST		BS	BS	BS	BS	BS		
TIME		1055	1045	1249	0900	1007		

ACUTE MARINE TOXICITY CHEMISTRY BENCH SHEET

Test #: REF007846

START Date/Time (MMDDYYYY HH:MM): 7/30/13 1055

FINISH Date/Time (MMDDYYYY HH:MM): 8/3/13 1007

Dilution Water: 20 ppt salt water

Test Substance: CdCl2

Client/Project: TT

Species/Source: L. plumulosus

Test Conc. Units mg/L	Chemical Parameters	Hour of Test 0	48	96		Comments
0	Salinity (‰)	19.3	21.1	21.4		
	DO (mg/L)	7.8	8.1	7.5		
	pH (su)	7.2	7.6	7.6		
	Temp (°C)	24.7	24.6	25.0		
0.25	Salinity (‰)	19.3	21.2	20.9		
	DO (mg/L)	7.9	7.8	7.5		
	pH (su)	7.2	7.7	7.8		
	Temp (°C)	24.7	24.6	25.0		
0.5	Salinity (‰)	19.3	20.3	20.7		
	DO (mg/L)	8.1	7.8	7.6		
	pH (su)	7.3	7.8	7.9		
	Temp (°C)	24.7	24.6	25.0		
1	Salinity (‰)	19.3	20.6	21.4		
	DO (mg/L)	8.1	7.8	7.5		
	pH (su)	7.4	7.9	7.9		
	Temp (°C)	24.7	24.8	25.0		
2	Salinity (‰)	19.4	20.5	20.6		
	DO (mg/L)	8.0	8.1	7.5		
	pH (su)	7.5	7.9	7.9		
	Temp (°C)	24.7	24.6	25.0		
4	Salinity (‰)	19.6	20.2	20.8		
	DO (mg/L)	8.1	8.2	7.4		
	pH (su)	7.6	8.0	7.9		BS
	Temp (°C)	24.7	24.6	25.0		8/2/13
Analyst		BS	BS	BS		
Time Analyzed		1320	1305	1015		

Data Checked and Approved: JF

Toxicity Test Procedure Check Sheet

Date 7/30/13

Test ID Number REF00488

Type of Test Chamber 1L beaker

Number of replicates per concentration 2

Specify vessel type and volume used to measure and deliver effluent and dilutent to test chambers_____

Graduated Cylinder(s)_____ Pipet(s)_____

Volumetric Flask(s) 4L, 2L Other_____

Specify materials used to place the test organisms into the test chambers disposable pipet

Test ID Number	Loading QC Initials
REF00488	PS

Specify below the number of milliliters (mls) of diluent and effluent measured out per concentration in this test.

Treatment Concentration	Working Stock Solution	Diluent	Total Volume
0	0	2000	2000
0.25	2000	2000	4000
0.5	2000	2000	4000
1	2000	2000	4000
2	2000	2000	4000
4	4000	0	4000
			PS 8/12/13

Aeration	Screened Animal Enclosures	Photoperiod
(Yes) or No	(Not used)	dark 8 hr / light 16hr
Time Began:_____	Used	other 24h dark

Exposure Chamber

Total Vessel Capacity 1L

Test Solution volume 1L

Feeding Schedule

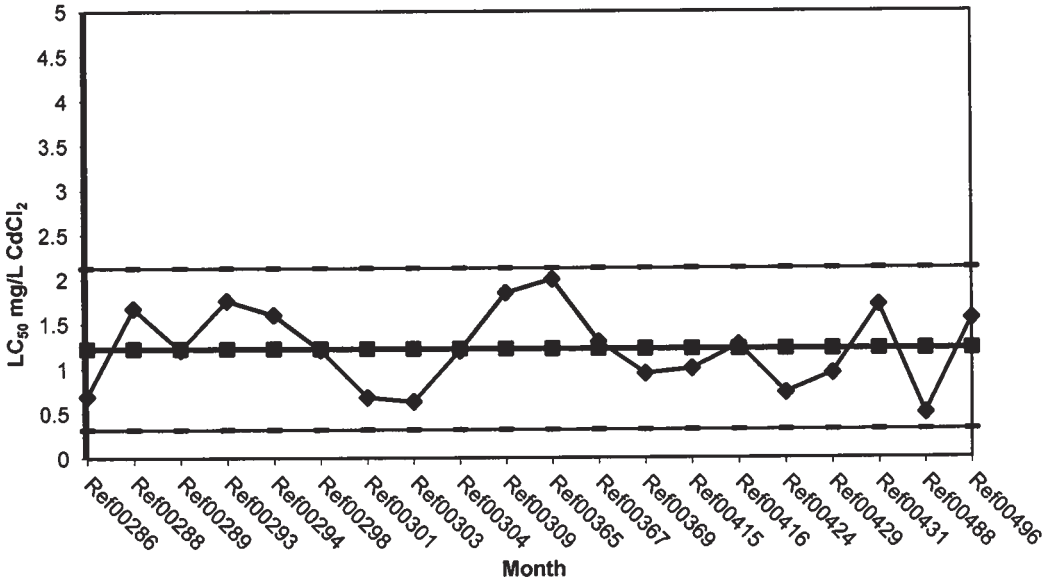
Not fed X

Fed Daily_____

Other_____

Type of food_____

L. plumulosus Reference Toxicant 96-h LC_{50} Data for $CdCl_2$ (mg/L)



Test Log #	Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
Ref00286	09/28/10	0.6888	1.2225	0.7703	0.3181	1.6747	2.1269
Ref00288	10/06/10	1.6720	1.2225	0.7703	0.3181	1.6747	2.1269
Ref00289	10/13/10	1.2080	1.2225	0.7703	0.3181	1.6747	2.1269
Ref00293	10/20/10	1.7600	1.2225	0.7703	0.3181	1.6747	2.1269
Ref00294	10/22/10	1.6000	1.2225	0.7703	0.3181	1.6747	2.1269
Ref00298	10/27/10	1.2080	1.2225	0.7703	0.3181	1.6747	2.1269
Ref00301	10/29/10	0.6792	1.2225	0.7703	0.3181	1.6747	2.1269
Ref00303	11/05/10	0.6304	1.2225	0.7703	0.3181	1.6747	2.1269
Ref00304	11/05/10	1.2000	1.2225	0.7703	0.3181	1.6747	2.1269
Ref00309	11/12/10	1.8480	1.2225	0.7703	0.3181	1.6747	2.1269
Ref00365	10/12/11	2.0000	1.2225	0.7703	0.3181	1.6747	2.1269
Ref00367	10/18/11	1.3000	1.2225	0.7703	0.3181	1.6747	2.1269
Ref00369	10/25/11	0.9440	1.2225	0.7703	0.3181	1.6747	2.1269
Ref00415	10/09/12	1.0000	1.2225	0.7703	0.3181	1.6747	2.1269
Ref00416	11/12/12	1.2660	1.2225	0.7703	0.3181	1.6747	2.1269
Ref00424	11/07/12	0.7300	1.2225	0.7703	0.3181	1.6747	2.1269
Ref00429	11/13/12	0.9484	1.2225	0.7703	0.3181	1.6747	2.1269
Ref00431	11/20/12	1.7110	1.2225	0.7703	0.3181	1.6747	2.1269
Ref00488	07/30/13	0.5000	1.2225	0.7703	0.3181	1.6747	2.1269
Ref00496	08/28/13	1.5560	1.2225	0.7703	0.3181	1.6747	2.1269

Mean	1.2225
SD	0.4522
CV%	36.9903

CETIS Summary Report

Leptocheirus 96-h Acute Survival Test — **Tetra Tech, Inc.**

Batch ID:	12-4776-5080	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	28 Aug-13 12:15	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	20 ppt Saltwater
Ending Date:	01 Sep-13	**Species:**	Leptocheirus plumulosus	**Brine:**	
Duration:	84h	**Source:**	Chesapeake	**Age:**	

Sample ID:	03-2246-7032	**Code:**	133874D8	**Client:**	Tetra Tech
Sample Date:	28 Aug-13 12:15	**Material:**	Cadmium chloride	**Project:**	Reference Toxicant
Receive Date:		**Source:**	Reference Toxicant		
Sample Age:	N/A	**Station:**			

Batch Note: Organism size: 2-4mm

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
17-4464-0406	48h Survival Rate	EC5	2.4	1.8	4.8		Linear Interpolation (ICPIN)
		EC10	2.8	1.6	7.6		
		EC15	3.2	1.4	N/A		
		EC20	3.6	1.2	N/A		
		EC25	4	1	N/A		
		EC40	>4	N/A	N/A		
		EC50	>4	N/A	N/A		
09-4495-6127	96h Survival Rate	EC5	0.3	0.2429	0.4333		Linear Interpolation (ICPIN)
		EC10	0.35	0.2357	0.6167		
		EC15	0.4	0.2286	2.8		
		EC20	0.45	0.2214	3.031		
		EC25	1	N/A	1.762		
		EC40	1.333	0.8	2		
		EC50	1.556	0.9333	2.19		

48h Survival Rate Summary

Conc-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	2	1	1	1	1	1	0	0	0.0%	0.0%
0.25		2	1	1	1	1	1	0	0	0.0%	0.0%
0.5		2	1	1	1	1	1	0	0	0.0%	0.0%
1		2	1	1	1	1	1	0	0	0.0%	0.0%
2		2	1	1	1	1	1	0	0	0.0%	0.0%
4		2	0.75	0.6708	0.8292	0.6	0.9	0.15	0.2121	28.28%	25.0%

96h Survival Rate Summary

Conc-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	2	1	1	1	1	1	0	0	0.0%	0.0%
0.25		2	1	1	1	1	1	0	0	0.0%	0.0%
0.5		2	0.7	0.6472	0.7528	0.6	0.8	0.1	0.1414	20.2%	30.0%
1		2	0.8	0.7472	0.8528	0.7	0.9	0.1	0.1414	17.68%	20.0%
2		2	0.25	0.2236	0.2764	0.2	0.3	0.05	0.07071	28.28%	75.0%
4		2	0.35	0.2708	0.4292	0.2	0.5	0.15	0.2121	60.61%	65.0%

Leptocheirus 96-h Acute Survival Test

Tetra Tech, Inc.

48h Survival Rate Detail

Conc-mg/L	Control Type	Rep 1	Rep 2
0	Dilution Water	1	1
0.25		1	1
0.5		1	1
1		1	1
2		1	1
4		0.6	0.9

96h Survival Rate Detail

Conc-mg/L	Control Type	Rep 1	Rep 2
0	Dilution Water	1	1
0.25		1	1
0.5		0.6	0.8
1		0.7	0.9
2		0.2	0.3
4		0.2	0.5

CETIS Measurement Report

Leptocheirus 96-h Acute Survival Test — **Tetra Tech, Inc.**

Batch ID:	12-4776-5080	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	28 Aug-13 12:15	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	20 ppt Saltwater
Ending Date:	01 Sep-13	**Species:**	Leptocheirus plumulosus	**Brine:**	
Duration:	84h	**Source:**	Chesapeake	**Age:**	

Sample ID:	03-2246-7032	**Code:**	133874D8	**Client:**	Tetra Tech
Sample Date:	28 Aug-13 12:15	**Material:**	Cadmium chloride	**Project:**	Reference Toxicant
Receive Date:		**Source:**	Reference Toxicant		
Sample Age:	N/A	**Station:**			

Batch Note: Organism size: 2-4mm

Dissolved Oxygen-mg/L

Conc-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	3	7.667	7.569	7.764	7.5	8	0.1667	0.2887	3.77%	0
0.25		3	7.833	7.755	7.911	7.7	8.1	0.1333	0.2309	2.95%	0
0.5		3	8	7.883	8.117	7.8	8.4	0.2	0.3464	4.33%	0
1		3	8	7.883	8.117	7.8	8.4	0.2	0.3464	4.33%	0
2		3	7.967	7.896	8.037	7.8	8.2	0.1202	0.2082	2.61%	0
4		3	7.9	7.899	7.901	7.9	7.9	0	0	0.0%	0
Overall		18	7.894			7.5	8.4				0 (0%)

pH-Units

Conc-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	3	7.833	7.725	7.942	7.6	8.2	0.1856	0.3215	4.1%	0
0.25		3	7.833	7.748	7.918	7.6	8.1	0.1453	0.2517	3.21%	0
0.5		3	7.767	7.747	7.786	7.7	7.8	0.03334	0.05774	0.74%	0
1		3	7.867	7.796	7.937	7.7	8.1	0.1202	0.2082	2.65%	0
2		3	7.867	7.796	7.937	7.7	8.1	0.1202	0.2082	2.65%	0
4		3	7.967	7.896	8.037	7.8	8.2	0.1202	0.2082	2.61%	0
Overall		18	7.856			7.6	8.2				0 (0%)

Salinity-ppt

Conc-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	3	19.5	19.09	19.91	18.2	20.6	0.7	1.212	6.22%	0
0.25		3	19.23	18.93	19.54	18.2	19.9	0.5239	0.9074	4.72%	0
0.5		3	19.37	19.07	19.66	18.4	20.1	0.5044	0.8737	4.51%	0
1		3	19.13	18.95	19.32	18.5	19.5	0.318	0.5508	2.88%	0
2		3	20	19.49	20.51	18.4	21.4	0.8718	1.51	7.55%	0
4		3	19.27	19.01	19.52	18.4	19.8	0.4372	0.7572	3.93%	0
Overall		18	19.42			18.2	21.4				0 (0%)

Temperature-°C

Conc-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Dilution Water	3	23.83	23.79	23.87	23.7	23.9	0.06665	0.1154	0.48%	0
0.25		3	23.83	23.79	23.87	23.7	23.9	0.06665	0.1154	0.48%	0
0.5		3	23.83	23.79	23.87	23.7	23.9	0.06665	0.1154	0.48%	0
1		3	23.83	23.79	23.87	23.7	23.9	0.06665	0.1154	0.48%	0
2		3	23.83	23.79	23.87	23.7	23.9	0.06665	0.1154	0.48%	0
4		3	23.83	23.79	23.87	23.7	23.9	0.06665	0.1154	0.48%	0
Overall		18	23.83			23.7	23.9				0 (0%)

Leptocheirus 96-h Acute Survival Test — **Tetra Tech, Inc.**

Dissolved Oxygen-mg/L

Conc-mg/L	Control Type	1	2	3
0	Dilution Water	7.5	7.5	8
0.25		7.7	7.7	8.1
0.5		7.8	7.8	8.4
1		7.8	7.8	8.4
2		7.9	7.8	8.2
4		7.9	7.9	7.9

pH-Units

Conc-mg/L	Control Type	1	2	3
0	Dilution Water	7.6	7.7	8.2
0.25		7.6	7.8	8.1
0.5		7.7	7.8	7.8
1		7.7	7.8	8.1
2		7.7	7.8	8.1
4		7.8	7.9	8.2

Salinity-ppt

Conc-mg/L	Control Type	1	2	3
0	Dilution Water	18.2	19.7	20.6
0.25		18.2	19.6	19.9
0.5		18.4	19.6	20.1
1		18.5	19.4	19.5
2		18.4	20.2	21.4
4		18.4	19.6	19.8

Temperature-°C

Conc-mg/L	Control Type	1	2	3
0	Dilution Water	23.9	23.9	23.7
0.25		23.9	23.9	23.7
0.5		23.9	23.9	23.7
1		23.9	23.9	23.7
2		23.9	23.9	23.7
4		23.9	23.9	23.7

Page 1 of 3

ACUTE TOXICITY TEST BENCH SHEET

Test #: RE500496

START Date/Time (MMDDYYYY HH:MM): 8/28/13 1215

FINISH Date/Time (MMDDYYYY HH:MM): 9/1/13 1130

Dilution Water: 20 ppt Saltwater

Test Substance: $CdCl_2$

Client/Project: Tetra Tech

Species/Source: L. plumulosus Chesapeake

Concentration & Replicate		Number alive/hour of test					# alive / # exposed (percent survival)	Comments
Units: mg/L		Start	24	48	72	96		
0	A	10	10	10	10	10	100	
	B	10	10	10	10	10		
	C							
	D					BS 9/3/13		
0.25	A	10	10	10	10	10	100	
	B	10	10	10	10	10		
	C							
	D					BS 9/3/13		
0.5	A	10	10	10	10	6	70	
	B	10	10	10	8	8		
	C							
	D					BS 9/3/13		
1	A	10	10	10	9	7	80	
	B	10	10	10	9	9		
	C							
	D					BS 9/3/13		
2	A	10	10	10	5	2	25	
	B	10	10	10	6	3		
	C							
	D					BS 9/3/13		
4	A	10	10	6	2	2	35	
	B	10	10	9	6	5		BS 9/3/13
	C							
	D					BS 9/3/13		
ANALYST		BS	BS	BS	BS	BS		
TIME		1215	0920	1010	1020	~~1230~~ 1130 BS 9/1/13		

Tetra Tech, Inc.
Ecological Testing Facility

Data Checked and Approved: JF

2013

ACUTE MARINE TOXICITY CHEMISTRY BENCH SHEET Test #: R850496

START Date/Time (MMDDYYYY HH:MM): 8/28/13 1215

FINISH Date/Time (MMDDYYYY HH:MM): 9/1/13 1130

Dilution Water: 20ppt Saltwater

Test Substance: $CdCl_2$

Client/Project: Tetra Tech

Species/Source: L. plumulosus Chesapeake

Test Conc. Units mg/L	Chemical Parameters	Hour of Test 0	48	96		Comments
0	Salinity (‰)	18.2	19.7	20.6		
	DO (mg/L)	7.5	7.5	8.0		
	pH (su)	7.6	7.7	8.2		
	Temp (°C)	23.9	23.9	23.7		
0.25	Salinity (‰)	18.2	19.6	19.9		
	DO (mg/L)	7.7	7.7	8.1		
	pH (su)	7.6	7.8	8.1		
	Temp (°C)	23.9	23.9	23.7		
0.5	Salinity (‰)	18.4	19.6	20.1		
	DO (mg/L)	7.8	7.8	8.4		
	pH (su)	7.7	7.8	7.8		
	Temp (°C)	23.9	23.9	23.7		
1	Salinity (‰)	18.5	19.4	19.5		
	DO (mg/L)	7.8	7.8	8.4		
	pH (su)	7.7	7.8	8.1		
	Temp (°C)	23.9	23.9	23.7		
2	Salinity (‰)	18.4	20.2	21.4		
	DO (mg/L)	7.9	7.8	8.2		
	pH (su)	7.7	7.8	8.1		
	Temp (°C)	23.9	23.9	23.7		
4	Salinity (‰)	18.4	19.6	19.8		
	DO (mg/L)	7.9	7.9	7.9		BS 9/3/13
	pH (su)	7.8	7.9	8.2		
	Temp (°C)	23.9	23.9	23.7		
Analyst		BS	BS	~~1215~~ BS		
Time Analyzed		1240	1010	1215		

Tetra Tech, Inc.
Ecological Testing Facility

Data Checked and Approved: JF 9/1/13

Toxicity Test Procedure Check Sheet

Date 8/28/13

Test ID Number Pe500496

Type of Test Chamber 1L beaker

Number of replicates per concentration 2

Specify vessel type and volume used to measure and deliver effluent and dilutent to test chambers

Graduated Cylinder(s) Pipet(s)

Volumetric Flask(s) 2L Other

Specify materials used to place the test organisms into the test chambers transfer pipette

Test ID Number	Loading QC Initials
Pe500496	BS

Specify below the number of milliliters (mls) of diluent and effluent measured out per concentration in this test.

Treatment Concentration	Working Stock Solution	Diluent	Total Volume
0	0L	2L	2L
0.25	2L	0L	2L
0.5	2L	0L	2L
1	2L	0L	2L
2	2L	0L	2L
4	2L	0L	2L
			PK 8/28/13

Exposure Chamber

Total Vessel Capacity 1L

Test Solution volume 1L

Feeding Schedule

Not fed X

Fed Daily

Other

Type of food

Aeration	Screened Animal Enclosures	Photoperiod
Yes or No	Not used	dark 8 hr / light 16hr
Time Began:	Used	other 24hr dark

APPENDIX D – RAW LABORATORY DATA; BENTHIC INFAUNA (Excel Spreadsheet; Provided as Electronic Copy Only)

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APPENDIX E – FIELD DATA SHEETS; TRAWL SAMPLING

Initials: Recorder: JB
Lab Check: [illegible]
Data Entry: SH A B

CONNECTICUT MARINE TRAWL SURVEY
TOW INFO DATA AND PHYSICAL DATA

SAMPLE #: AC2013 01
Other Sample #: AC201301

(Tow # of Day): 1

DATE: 06 / 10 / 2013

SITE (strata): 1740 (T2)

		PART A	PART B
TIME START (military):		8:54	
DURATION (minutes):		30	
NAV. DATA:	START	8:54:18	
	STOP	9:24:21	

METER	YSI M30 ✓	CTD ___	OTHER ___
LAT	41 ° 17 55		
LONG	72 ° 04 35		
DEPTH	ft: 40.7	m: 12.4	

	@ 1m	@ 11.9 m
TEMP (C)	15.0	13.1
SAL	27.6	30.8
COND	34.66	37.37

LENGTH OF WIRE 200'

	START A		STOP A
LAT	41 ° 17.56	**LAT**	__ ° __.__
LONG	72 ° 04.31	**LONG**	__ ° __.__
	START B		**STOP B**
LAT	41 ° 17.10	**LAT**	__ ° __.__
LONG	72 ° 03.01	**LONG**	__ ° __.__

WEATHER CONDITIONS/QC COMMENTS:

NET # C

QC CHECK FOR SALINITY **SCALE CAL. USING** _____ **kg STD. WT.**

Sal. Stan.	YSI	Diff	Pre-Cal. Wt.	Cal. Fit Values	Post-Cal. Wt.	Temp. Log. Deployed?: _____ Temp.:

FILL OUT IF SITE MOVED, TOW IS SHORT, OR IN PARTS:

Original Site:		Why moved:		(P, H, U)
Original Strata:		Gear Interaction:		(PV, PE, RI)
Attempts:		Pots:		(A, I, U)
Parts:		Number of Pots:		(P#, T#)

CREW: (list if first tow of day): Deb, Rodney, Jacque, Wes, John, Eric, Martha, Sara H (volunteer)

P: Pots, H: Hangs, U: Unknown
PV: pots visible, PE: pots entangled, RI: recently informed
A: Active, I: Inactive, U: Unknown
P1, P2, etc. for pots; T1, T2, etc, for trawls

COMMENTS: ACOE/EPA tows

Recorder: [illegible]
Lab check: [illegible]
Data entry: [illegible]

SPRING SURVEY-TOTAL COUNT / WEIGHT

SAMPLE #: AC2013 01 (tow # of day: 1) DATE: 6/10/13 SITE #: 17-40

Species	# Counted / Meas / to Lab / Scales	Total	Weights	Total
BKF	1m	1	1.8	1.8
BLF				
PGY (15-18 cm)	[198+180+99+53m] + m=10.0	676	18.1+11.3+12.6+19.7-0.1 BUT check	61.6
(9-14 cm)	[78+52m] + 16m m=2.5			
SFL				
STB				
WKF				
WFL	13m	13	3.6	3.6
ALW				
ASD				
BUT	3m	3	0.1	0.1
FSF				
LSK	10m	10	5.2	5.2
NSR				
RCK				
RED				
SMD				
SPH				
SSR				
WHI				
WPF				
WSK				

TO LAB / COMMENTS:

Recorder: [illegible]
Lab check: [illegible]
Data entry: ____

INVERTEBRATE / ALGAE COUNTS AND WEIGHTS

SAMPLE#: AC2013 01 (tow # of day: 1) DATE: 6/10/13 SITE#: 17-40 [illegible]

SPECIES	COUNT	TOT CNT	WEIGHT	TOT WT
ALGAE, MIXED (ALG)	no count		0.7	0.7
KELP (KLP)	no count		0.6	0.6
ULVA (ULV)	no count		0.1	0.1
BUSHY BRYOZOA (BBI)	no count			
CRABS, ROCK (RCR)	no count			
BLUE (BCR)				
LADY (LCR)	no count			
F.C. HERMIT (HER)	no count			
SPIDER (SPI)	no count		5.9	5.9
HORSESHOE (HOR)				
MUD (BMC)	no count			
LION'S MANE (JEL)				
LOBSTER (LOB)	5m	5	1.2	1.2
MANTIS SHRIMP (MAN)				
N. MOON SHELL (NMS)	no count m=10.56			
SQUID, LONG-FINNED (SQI)	391+1+41m	433	22.3	22.3
STARFISH (STF)	no count			
WHELK, CHANNEL (CHW)				
KNOBBED (KNW)				
HSA (fresh)	—	—	8.8	8.8

TO LAB, COMMENTS: ____

Recorder: JS
Error check: EW
Data Entry: B, JS

SAMPLE #: AC201301 (Tow # of day: 1) **DATE:** 6/10/13 **SITE:** 17-40

WFL | LSK | BKF | SQ1

m=10.56

m=10.56

(13) (10) (1) (4)

Recorder: MD
Error check: [illegible]
Data Entry:

SAMPLE #: AC201301 (Tow # of day: 1) **DATE:** 6/10/13 **SITE:** 17-40 B; JS

LEN	PGY				LEN	BUT		LEN
1					1			1
2					2			2
3					3			3
4					4			4
5					5			5
6					6			6
7					7			7
8					8			8
9			1		9			9
10	XXXX		9		10	/	1	10
11	XXXXXXXXXXXXXX		26		11			11
12	XXXXX		11		12	X	2	12
13	XX		4		13			13
14			1		14			14
15	XX		5		15			15
16	XXXXXX		15		16			16
17	XXXXXXXXXXX		23		17			17
18	XXXX		10		18			18
19	XXXXX		11		19			19
20					20			20
21					21			21
22			1		22			22
23					23			23
24	XX		4		24			24
25					25			25
26					26			26
27					27			27
28					28			28
29					29			29
30					30			30
31					31			31
32					32			32
33					33			33
34					34			34
35					35			35
36					36			36
37					37			37
38					38			38
39					39			39
40					40			40
41					41			41
42					42			42
43					43			43
44					44			44
45					45			45
46					46			46
47					47			47
48					48			48
49					49			49
50					50			50

subsample 9-14

subsample 15-18

M=2.5

52

53

M=10.0

3

16

M=1.0

Recorder: Deb
Lab check: ____
Data entry: ____

LISTS Lobster Measurement Data Sheet

Sample: AC2013-001 Date: 6/10/13 Site: 17-40

Measured: 5 # Counted: Ø Total: 5

Deb

	V-notch	Sex	Length	Egg Bearing		Shell Disease	Shell Condition	Cull Status		Con-dition
	V/R Females Only	Male / Female	(mm)	Color G B T	Comp 0 - 4	0 - 3	Hardness H N S R	Crusher P M B S	Pincher P M B S	Alive Dead
1		M	72.7					B		
2		F	58.8					S		
3		F	70.7				N			
4		M	67.4			2				
5		M	69.7							
6										
7										
8										
9										
10										
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

Initials: Recorder: Deb
Lab Check: E.V.
Data Entry: A SH
B I.

CONNECTICUT MARINE TRAWL SURVEY
TOW INFO DATA AND PHYSICAL DATA

SAMPLE #: AC2013-002
Other Sample #: AC2013-002

(Tow # of Day): 2

DATE: 06/10/2013

SITE (strata): 18-40 (T1)

		PART A	PART B
TIME START (military):		10:48	11:34
DURATION (minutes):		~24 1/2	25 1/2
NAV. DATA:	START	10:47:45	11:34:02
	STOP	10:52 *	11:59:21

30 min total

METER	YSI M30 X	CTD___	OTHER___		
LAT	41° 19 .65				
LONG	72° 05 .10				
DEPTH	ft: 28.3	m: 8.63			
	@ 1m		@ 08.1 m		
TEMP (C)	15.9		14.3		
SAL	18.3		30.0		
COND	24.90		36.73		
LENGTH OF WIRE	150'				

	START A		**STOP A**
LAT	41° 19.27	**LAT**	41° 18.57
LONG	72° 05.04	**LONG**	72° 05.25
	START B		**STOP B**
LAT	__° __.__	**LAT**	__° __.__
LONG	__° __.__	**LONG**	__° __.__

WEATHER CONDITIONS/QC COMMENTS:

NET #

QC CHECK FOR SALINITY **SCALE CAL. USING** _____ **kg STD. WT.**

Sal. Stan.	YSI	Diff	Pre-Cal. Wt.	Cal. Fit Values	Post-Cal. Wt.	Temp. Log. Deployed?: _____ Temp.:

FILL OUT IF SITE MOVED, TOW IS SHORT, OR IN PARTS:

Original Site:		Why moved:		(P, H, U)
Original Strata:		Gear Interaction:	PE	(PV, PE, RI)
Attempts:		Pots:		(A, I, U)
Parts:		Number of Pots:		(P#, T#)

CREW: (list if first tow of day):

P: Pots, H: Hangs, U: Unknown
PV: pots visible, PE: pots entangled, RI: recently informed
A: Active, I: Inactive, U: Unknown
P1, P2, etc. for pots; T1, T2, etc, for trawls

COMMENTS:

they were more in channel
Project O trawled close by a just before us.
Lost GPS data feed for NavLogfile ~ Reconnected @ 10:49:45
No buoy lines
* Conch pots set blind — on both doors & line across
also one ghost lob. pot : slipped lines off both doors
but then it curled around codend & we had to cut : lots of drag

Popped a float on net feel due to excessive temperature, 17/50; had to wind: double bolles in net,

Recorder: JB
Lab check: ____
Data entry: ____

SPRING SURVEY-TOTAL COUNT / WEIGHT

SAMPLE #: AC2013-002 (tow # of day: 2) DATE: 6/10/13 SITE #: 18-40 B:55

Species	# Counted / Meas / to Lab / Scales	Total	Weights	Total
BKF				
BLF				
PGY	15-19cm (70c + 52m) + 43m all m=2.35	165	16.0	16.0
SFL	6	6	3.4	3.4
STB	1	1	8.7	8.7
WKF				
WFL	3	3	1.4	1.4
ALW				
ASD				
BUT	3	3	0.1	0.1
FSF				
LSK	2	2	1.3	1.3
NSR				
RCK				
RED				
SMD				
SPH				
SSR	1	1	0.5	0.5
WHI				
WPF	1	1	0.4	0.4
WSK				
BSB	3	3	0.5	0.5
ATH	1	1	0.1	0.1
BAT	9	9	0.1	0.1

TO LAB / COMMENTS: ____

Recorder: JB
Lab check: L.V.
Data entry: ____

INVERTEBRATE / ALGAE COUNTS AND WEIGHTS

SAMPLE#: AC2013-002 (tow # of day: 3) DATE: 6/10/13 SITE#: 18-40 B.TS

SPECIES	COUNT	TOT CNT	WEIGHT	TOT WT
ALGAE, MIXED (ALG)	no count		0.4 + 0.4	0.8
KELP (KLP)	no count		2.3	2.3
ULVA (ULV)	no count		0.2	0.2
BUSHY BRYOZOA (BBI)	no count			
CRABS, ROCK (RCR)	no count			
BLUE (BCR)	8	8	1.4	1.4
LADY (LCR)	no count			
F.C. HERMIT (HER)	no count			
SPIDER (SPI)	no count		2.0	2.0
HORSESHOE (HOR)				
MUD (BMC)	no count			
LION'S MANE (JEL)	4	4	0.2	0.2
LOBSTER (LOB)	2	2	0.6	0.6
MANTIS SHRIMP (MAN)	4.74			
N. MOON SHELL (NMS)	no count (m=4.7)	✓		
SQUID, LONG-FINNED (SQI)	116c + 31m	147	6.0	6.0
STARFISH (STF)	no count			
WHELK, CHANNEL (CHW)				
KNOBBED (KNW)				
CSL	—	—	0.1	0.1
HSA	—	—	1.0 + 6.8	7.8

TO LAB, COMMENTS: UNK AL 6 inch (Gracilaria??)
Algae < 0.1 kg

Recorder: MND
Error check: LW.
Data Entry:

SAMPLE #: AC2013-002 (Tow # of day: 2) **DATE:** 6/10/13 **SITE:** 18-40

B: 55

LEN	PGY			ATH	LEN	SSR	LSK	WPF	LEN
1					1				1
2					2				2
3					3				3
4					4				4
5					5				5
6					6				6
7					7				7
8					8				8
9				1	9				9
10				9	10				10
11				21	11				11
12				8	12				12
13				1	13				13
14					14				14
15				6	15				15
16				13	16				16
17				22	17				17
18				9	18				18
19				2	19				19
20				1	20				20
21					21				21
22					22				22
23					23				23
24					24				24
25				1	25			1	25
26				1	26				26
27					27	1			27
28					28				28
29					29				29
30					30				30
31					31				31
32					32				32
33					33				33
34					34				34
35					35				35
36					36				36
37					37				37
38					38				38
39					39				39
40					40				40
41					41				41
42					42				42
43					43		1		43
44					44		1		44
45					45				45
46					46				46
47					47				47
48					48				48
49					49				49
50					50				50

m=1.0 (PGY, ATH)

40 (PGY)

52 (ATH)

subsample 15-19 =2.35

m=1.0 (PGY)

3 (PGY)

1 (WPF)

2 (LSK)

Recorder: MD
Error check: 1.0.
Data Entry:

SAMPLE #: AC2013-002 (Tow # of day: 2) **DATE:** 6/10/13 **SITE:** 18-40 B'S

LEN	BSB				LEN				LEN
1					1				1
2					2				2
3					3				3
4					4				4
5					5				5
6					6				6
7					7				7
8					8				8
9					9				9
10					10				10
11					11				11
12					12				12
13					13				13
14					14				14
15					15				15
16					16				16
17					17				17
18					18				18
19					19				19
20					20				20
21					21				21
22					22				22
23					23				23
24	3				24				24
25					25				25
26					26				26
27					27				27
28					28				28
29					29				29
30					30				30
31					31				31
32					32				32
33					33				33
34					34				34
35					35				35
36					36				36
37					37				37
38					38				38
39					39				39
40					40				40
41					41				41
42					42				42
43					43				43
44					44				44
45					45				45
46					46				46
47					47				47
48					48				48
49					49				49
50					50				50

Recorder: DS
Error check: _____
Data Entry: _____

SAMPLE #: AC2013-002 (Tow # of day: 2) **DATE:** 6/10/13 **SITE:** 18-40

LEN	STB 50	SFL	WFL	Bay	LEN	BUT	SQI	LEN
1					1			1
2					2			2
3					3		3	3
4					4		2	4
5				4	5	2	5	5
6				2	6			6
7				2	7		2	7
8					8			8
9					9			9
10					10		2	10
11					11		2	11
12					12	1	2	12
13					13		2	13
14					14		3	14
15					15			15
16			1	1	16			16
17					17		2	17
18					18			18
19					19			19
20					20			20
21					21			21
22					22		1	22
23					23			23
24					24			24
25					25			25
26					26			26
27					27			27
28					28			28
29					29			29
30					30			30
31					31			31
32					32			32
33			1	2	33			33
34					34			34
35		1	2		35			35
36					36			36
37		1	1		37			37
38					38			38
39		1	1		39			39
40	1	1	2		40			40
41					41			41
42					42			42
43					43			43
44					44			44
45					45			45
46					46			46
47					47			47
48					48			48
49					49			49
50					50			50
	1	6	3	9		3	31	

Recorder: JB
Lab check: ____
Data entry: ____

LISTS Lobster Measurement Data Sheet

Sample: AC2013-002 Date: 6/10/13 Site: A18-40

Measured: 2 (Tague) # Counted: Ø Total: 2

	V-notch	Sex	Length	Egg Bearing		Shell Disease	Shell Condition	Cull Status		Con-dition
	V/R Females Only	Male / Female	(mm)	Color G B T	Comp 0 - 4	0 - 3	Hardness H N S R	Crusher P M B S	Pincher P M B S	Alive Dead
1		F	70.3							
2		M	54.4							
3										
4										
5										
6										
7										
8										
9										
10										
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

Initials: Recorder: JB
Lab Check: L.U.
Data Entry: A SH
B JJ

CONNECTICUT MARINE TRAWL SURVEY
TOW INFO DATA AND PHYSICAL DATA

SAMPLE #: AC2013-003
Other Sample #: AC2013-003

(Tow # of Day): 3

DATE: 06 / 10 / 2013

SITE (strata): 17-38 (T2)

		PART A	PART B
TIME START (military):		12:58	
DURATION (minutes):		30	
NAV. DATA:	START	12:58:29	
	STOP	13:28:32	

METER	YSI M30 ✓	CTD ___	OTHER ___
LAT	41 ° 17 . 11		
LONG	72 ° 09 . 04		
DEPTH	ft: 38.4	m: 11.7	

	@ 1m	@ 11.2m
TEMP (C)	15.2	14.2
SAL	27.7	30.0
COND	34.26	36.63

LENGTH OF WIRE 200'

	START A		**STOP A**
LAT	41 ° 17.21	**LAT**	__ ° __.__
LONG	72 ° 09.40	**LONG**	__ ° __.__

	START B		**STOP B**
LAT	41 ° 17.39	**LAT**	__ ° __.__
LONG	72 ° 11.10	**LONG**	__ ° __.__

WEATHER CONDITIONS/QC COMMENTS:

Overcast
<1' chop < 10 kts E

NET # C

QC CHECK FOR SALINITY **SCALE CAL. USING** _____ **kg STD. WT.**

Sal. Stan.	YSI	Diff	Pre-Cal. Wt.	Cal. Fit Values	Post-Cal. Wt.	Temp. Log. Deployed?: _____ Temp.:
				19	22.68	

FILL OUT IF SITE MOVED, TOW IS SHORT, OR IN PARTS:

Original Site:		Why moved:		(P, H, U)
Original Strata:		Gear Interaction:	PV	(PV, PE, RI)
Attempts:		Pots:		(A, I, U)
Parts:		Number of Pots:		(P#, T#)

CREW: (list if first tow of day):

P: Pots, H: Hangs, U: Unknown
PV: pots visible, PE: pots entangled, RI: recently informed
A: Active, I: Inactive, U: Unknown
P1, P2, etc. for pots; T1, T2, etc, for trawls

COMMENTS: Pots visible along our tow path. had to tow a tad South.

Recorder: [illegible]
Lab check: [illegible]
Data entry: ____
B:JS

SPRING SURVEY-TOTAL COUNT / WEIGHT

SAMPLE #: AC2013-003 (tow # of day: 3) **DATE:** 6/10/13 **SITE #:** 17-38

Species	# Counted / Meas / to Lab / Scales	Total	Weights	Total
BKF	2m	2	2.4	2.4
BLF				
PGY (15-19 cm)	[76+78+1+48+26+24+74m] + 18m + 99m (m=1.0) (m=1.0) (m=4.42)	444 ✓	14.1+14.4+12.5+15.5+8.9+11.0	76.4
SFL	1m	1	0.9	0.9
STB	1m	1	3.2	3.2
WKF				
WFL	2m	2	0.4	0.4
ALW				
ASD				
BUT	1m	1	0.1	0.1
FSF				
LSK	1m	1	0.4	0.4
NSR				
RCK				
RED				
SMD				
SPH				
SSR				
WHI				
WPF				
WSK				
BAY	1m	1	0.1	0.1

TO LAB / COMMENTS: _____

Recorder: [illegible]
Lab check: ____
Data entry: ____

INVERTEBRATE / ALGAE COUNTS AND WEIGHTS

SAMPLE#: AC2013-003 (tow # of day: 3) DATE: 6/10/13 SITE#: 17-38 B:J

SPECIES	COUNT	TOT CNT	WEIGHT	TOT WT
ALGAE, MIXED (ALG) *	no count	~~gracilaria~~ pics	0.2 + 0.3 + 2.4	2.9
KELP (KLP)	no count		3.5 + 3.3 + 0.2	7.0
ULVA (ULV)	no count		0.7	0.7
BUSHY BRYOZOA (BBI)	no count			
CRABS, ROCK (RCR)	no count		0.1	0.1
BLUE (BCR)				
LADY (LCR)	no count			
F.C. HERMIT (HER)	no count			
SPIDER (SPI)	no count		2.1 + 1.3	3.4
HORSESHOE (HOR)				
MUD (BMC)	no count			
LION'S MANE (JEL)				
LOBSTER (LOB)				
MANTIS SHRIMP (MAN)				
N. MOON SHELL (NMS)	no count			
SQUID, LONG-FINNED (SQI)	60 + 70 m m=1.86	130	4.9	4.9
STARFISH (STF)	no count			
WHELK, CHANNEL (CHW)				
KNOBBED (KNW)				
(fresh) HSA	—		14.0 + 1.0 + 6.5 + 2.4	23.9
BOR	—		1.5	1.5
Sq. EGG	—		0.1	0.1

TO LAB, COMMENTS: * Took pics & samples

Recorder: SH+J
Error check: [illegible]
Data Entry:

SAMPLE #: AC2013-003 (Tow # of day: 3) **DATE:** 6/10/13 **SITE:** 17-38 B/JJ

LEN	STB+SD	SFL	BKF	WFL	LEN	LSK	BUT	~~S~~	LEN
1					1				1
2					2				2
3					3				3
4					4				4
5					5				5
6					6				6
7					7				7
8					8				8
9					9				9
10					10				10
11					11				11
12					12				12
13					13				13
14					14		✓		14
15					15				15
16	1				16				16
17					17				17
18				✓ 1	18				18
19					19				19
20	1				20				20
21					21				21
22					22				22
23					23				23
24					24				24
25					25				25
26					26				26
27				1	27				27
28					28				28
29					29				29
30					30				30
31					31				31
32			1		32				32
33					33				33
34					34				34
35					35				35
36					36				36
37					37	✓ 1			37
38					38				38
39					39				39
40					40				40
41					41				41
42					42				42
43					43				43
44		✓ 1	✓ 1		44				44
45					45				45
46					46				46
47					47				47
48					48				48
49					49				49
50					50				50
		1	2	2		1	1		

Recorder: Sarah
Error check: E.V.
Data Entry: ________

SAMPLE #: AC2013-003 (Tow # of day: 3) **DATE:** 6/10/13 **SITE:** 17-38 11:55

SQI

LEN	Count
3	2
4	11
5	5
6	6
7	3
8	3
9	3
10	6
11	11
12	7
13	3
14	2
15	4
16	2
18	1
22	1

m=1.86

70

Recorder: JB
Error check: K.W.
Data Entry:

SAMPLE #: AC2013-003 (Tow # of day: 3) **DATE:** 6/10/13 **SITE:** 17-38 B:55

LEN	PGY				LEN	BAY				LEN
1					1					1
2					2					2
3					3					3
4					4					4
5					5					5
6					6	\		1		6
7					7					7
8					8					8
9	\			1	9					9
10	X			2	10					10
11	X X X			5	11					11
12	X X X			6	12					12
13	X			3	13					13
14					14					14
15	X X			5	15					15
16	X X X X			10	16					16
17	X X X X X X X X X X X X			26	17					17
18	X X X X X X X X X X X X			27	18					18
19	X X X			6	19					19
20	X X			3	20					20
21	X X			4	21					21
22	X X X X X X X X X X X X			24	22					22
23	X X X X X X X X X X X			23	23					23
24	X X X X			8	24					24
25	X X X X			8	25					25
26	X X X X			8	26					26
27	X X X			7	27					27
28	X X X			6	28					28
29	X X			3	29					29
30	X			2	30					30
31	X			2	31					31
32	\			1	32					32
33	\			1	33					33
34					34					34
35					35					35
36					36					36
37					37					37
38					38					38
39					39					39
40					40					40
41					41					41
42					42					42
43					43					43
44					44					44
45					45					45
46					46					46
47					47					47
48					48					48
49					49					49
50					50					50

111

.6 sample

.11

mc 1.0

mc 10

10

mc 4.42

99

mc 1.0

Initials: Recorder: E.U.
Lab Check: [illegible]
Data Entry: [illegible]
A:54

SP2013-81

CONNECTICUT MARINE TRAWL SURVEY
TA AND PHYSICAL DATA

AC2013-004
(Tow # of Day): 4

DATE: 06/10/2013

SITE (strata): 14-37 (T4)

	PART A	PART B
TIME START (military):	14:37	
DURATION (minutes):	30	
NAV. DATA: START	14:37:03	
STOP	15:07:05	

METER	YSI M30 ✓	CTD ___	OTHER ___
LAT	41° 14 .70		
LONG	72° 12 .74		
DEPTH	ft: 123.4	m: 37.6	

	@ 1m	@ 37.1m
TEMP (C)	14.6	13.9
SAL	29.7	30.6
COND	36.73	37.05

LENGTH OF WIRE 650 ft.

	START A		STOP A
LAT	41° 14.64	LAT	__° __.__
LONG	72° 13.26	LONG	__° __.__
	START B		**STOP B**
LAT	41° 14.31	LAT	__° __.__
LONG	72° 14.74	LONG	__° __.__

WEATHER CONDITIONS/QC COMMENTS:

NET #

QC CHECK FOR SALINITY SCALE CAL. USING _____ kg STD. WT.

Sal. Stan.	YSI	Diff	Pre-Cal. Wt.	Cal. Fit Values	Post-Cal. Wt.	Temp. Log. Deployed?: _____ Temp.:
	26.9			7	22.68	

FILL OUT IF SITE MOVED, TOW IS SHORT, OR IN PARTS:

Original Site:		Why moved:		(P, H, U)
Original Strata:		Gear Interaction:		(PV, PE, RI)
Attempts:		Pots:		(A, I, U)
Parts:		Number of Pots:		(P#, T#)

CREW: (list if first tow of day):

P: Pots, H: Hangs, U: Unknown
PV: pots visible, PE: pots entangled, RI: recently informed
A: Active, I: Inactive, U: Unknown
P1, P2, etc. for pots; T1, T2, etc, for trawls

COMMENTS:

Recorder: JB
Lab check: LV.
Data entry: A ASH B JJ

SPRING SURVEY-TOTAL COUNT / WEIGHT

SAMPLE #: SP2013-081 (tow # of day: 4) DATE: 06/10/13 SITE #: 14-37

Species	# Counted / Meas / to Lab / Scales	Total	Weights	Total
BKF				
~~BLF~~	(15-20cm)			
PGY	(158c + 69m + 6sc + 9sc + 46m + 13sc) m=3.11	292 ✓	14.5 + 18.4	32.9
SFL	1	1	0.8	0.8
STB				
WKF				
WFL	10	10	3.2	3.2
ALW				
ASD				
BUT				
FSF	11	11	1.8	1.8
LSK	36 m=5.22	36 ✓	19.7	19.7
NSR	65c + 108c + 41m	214	10.7 + 4.5 - 0.6 (SSR) JB	~~15.8~~ 14.1
RCK				
RED	2	2	0.1	0.1
SMD	6	6	16.8	16.8
SPH	4	4	0.2	0.2
SSR	1c + 3m m=1.33	4	0.6 + 0.2 est (for 1c) (+)	~~0.6~~ 0.8
WHI	10	10	0.7	0.7
WPF	14	14	3.0	3.0
WSK	10	10	11.9	11.9
SPD	1	1	No weight 3.9 est L/W *	?3.9
DSB	14	14	2.0	2.0

TO LAB / COMMENTS: 19 PGY scales ✓ L.V.

* est wt from NMFS-NE-171 length wt relationship for SPD

(+) ave Kg/SSR ≅ 0.2
also, L/W (wilk) was same

Recorder: JB
Lab check: [illegible]
Data entry: A B

INVERTEBRATE / ALGAE COUNTS AND WEIGHTS

SAMPLE#: SP2013-081 (tow # of day: 4) DATE: 06/10/13 SITE#: 14-37

SPECIES	COUNT	TOT CNT	WEIGHT	TOT WT
ALGAE, MIXED (ALG)	no count			
KELP (KLP)	no count		0.3	0.3
ULVA (ULV)	no count		0.3	0.3
BUSHY BRYOZOA (BBI)	no count			
CRABS, ROCK (RCR)	no count		0.1	0.1
BLUE (BCR)				
LADY (LCR)	no count			
F.C. HERMIT (HER)	no count		0.1	0.1
SPIDER (SPI)	no count		0.7	0.7
HORSESHOE (HOR)				
MUD (BMC)	no count			
LION'S MANE (JEL)				
LOBSTER (LOB)				
MANTIS SHRIMP (MAN)				
N. MOON SHELL (NMS)	no count			
SQUID, LONG-FINNED (SQI)	43c + 16m (m=369)	59	4.3	4.3
STARFISH (STF)	no count			
WHELK, CHANNEL (CHW)				
KNOBBED (KNW)				
HSA	—	—	5.0	5.0

TO LAB, COMMENTS: * HYDROID ON POLY PRO STRANDS (PIC)

Recorder: JJ
Error check: LU
Data Entry: A
B JS

SAMPLE #: SP2013-081 (Tow # of day: 4) **DATE:** 06/10/13 **SITE:** 14-37

LEN	SSR	WPF	WFL	~~SRI~~	LEN	LSK		~~WSKT~~	LEN
1					1				1
2					2				2
3					3				3
4					4				4
5					5				5
6					6				6
7					7				7
8					8				8
9					9				9
10					10				10
11					11				11
12					12				12
13					13				13
14					14				14
15			\	1	15				15
16					16		\		16
17					17				17
18		\	1		18				18
19	m=133				19				19
20					20				20
21			X	2	21				21
22	\ 1				22				22
23	\ 1				23				23
24	\	X X \ 5	\	1	24				24
25	\ 1	\ 1	X	2	25				25
26		\ 1	\	1	26	\	1		26
27		X \ 3			27	\	1		27
28		X 2			28	\	1		28
29					29	\	1		29
30					30				30
31					31				31
32		\ 1			32				32
33					33				33
34			\	1	34	\	1		34
35					35				35
36			\	1	36				36
37					37				37
38					38				38
39			\	1	39				39
40					40				40
41					41	\	1		41
42					42	X X	4		42
43					43	X X	3		43
44					44	X X X X X	10		44
45					45	X	2		45
46					46	X X	4		46
47					47	X X	4		47
48					48	X \	3		48
49					49				49
50					50				50
	3	14	10				36		

Recorder: TS
Error check: [illegible]
Data Entry:

SAMPLE #: SP2013-081 (Tow # of day: 4) **DATE:** 06/10/13 **SITE:** 14-37 B75

WHI FSF PGY

LEN					LEN				LEN
1					1				1
2					2				2
3					3				3
4					4				4
5					5				5
6					6				6
7					7				7
8					8				8
9					9				9
10			X X X X X X		10	12			10
11			X X X X X X X X X X		11	20			11
12			X X X X		12	8			12
13			X		13	1			13
14	X	1	X		14	2			14
15			X X X		15	5			15
16			X X X X X X X X X X		16	21			16
17	X	1	X X X X X X X X X X		17	20			17
18			X X X X X X X X		18	15			18
19	X X	3	X X X		19	5			19
20	X	1	X		20	3			20
21	X	1	X	1	21	1			21
22	X	2			22				22
23		X		2 X	23	2			23
24	X	1			24				24
25		X		2	25	3			25
26		X		2	26				26
27		X X		3	27				27
28					28				28
29					29				29
30					30				30
31					31				31
32		X		1	32				32
33					33				33
34					34				34
35					35				35
36					36				36
37					37				37
38					38				38
39					39				39
40					40				40
41					41				41
42					42				42
43					43				43
44					44				44
45					45				45
46					46				46
47					47				47
48					48				48
49					49				49
50					50				50

m=1.0

43

m=3.11

69

m=1.0

10 11

Recorder: [illegible]
Error check: [illegible]
Data Entry: A
B JJ

SAMPLE #: SP2013-081 (Tow # of day: 4) **DATE:** 06/10/13 **SITE:** 14-37

LEN	SFL	SPH	BSB		LEN	NSR →		RED	LEN
1					1				1
2					2				2
3					3				3
4					4				4
5					5				5
6					6				6
7					7				7
8					8				8
9					9		1		9
10					10				10
11					11				11
12					12	X	2		12
13					13	X	3		13
14		1			14	X	2		14
15					15	X	3		15
16		1			16				16
17			1		17				17
18		1	1		18			1	18
19		1			19				19
20			XX 4		20	XX	4	1	20
21			X 1		21	XX	4		21
22		4	X 2		22	XXXX	9		22
23			X 2		23	X	1		23
24			X 1		24	X	2		24
25			X 2		25				25
26					26	XXX	6	2	26
27					27	X	2		27
28					28				28
29			14		29	X	2		29
30					30				30
31					31				31
32					32				32
33					33		11		33
34					34				34
35					35				35
36					36	m=5.22			36
37					37				37
38					38				38
39					39				39
40					40				40
41					41				41
42					42				42
43					43				43
44					44				44
45					45				45
46	1				46				46
47					47				47
48					48				48
49					49				49
50	1				50				50

Recorder: [illegible]
Error check: [illegible]
Data Entry: _____

SAMPLE #: SP2013-081 (Tow # of day: 4) **DATE:** 6/10/13 **SITE:** 14-37

SQ1

LEN				LEN				LEN
1				1				1
2				2				2
3				3				3
4				4				4
5				5				5
6				6				6
7				7				7
8				8				8
9		1		9				9
10				10				10
11		4		11				11
12		3		12				12
13		1		13				13
14				14				14
15		1		15				15
16		1		16				16
17				17				17
18		1		18				18
19		1		19				19
20		2		20				20
21				21				21
22				22				22
23		1		23				23
24				24				24
25				25				25
26				26				26
27				27				27
28		16		28				28
29				29				29
30				30				30
31				31				31
32				32				32
33				33				33
34				34				34
35				35				35
36				36				36
37				37				37
38				38				38
39				39				39
40				40				40
41				41				41
42				42				42
43				43				43
44				44				44
45				45				45
46				46				46
47				47				47
48				48				48
49				49				49
50				50				50

n=3.69

SPP: SPD

LIS TRAWL SURVEY
DOGFISH MEASUREMENT SHEET

Recorder: _____
Error Check: L.U.
Data Entry: A
B TS

SAMPLE #: SP2013-081 (Tow # of day: 4) DATE: 6/10/13 SITE: 14-37

MALE

LEN		LEN		LEN	
1		51		101	
2		52		102	
3		53		103	
4		54		104	
5		55		105	
6		56		106	
7		57		107	
8		58		108	
9		59		109	
10		60		110	
11		61		111	
12		62		112	
13		63		113	
14		64		114	
15		65		115	
16		66		116	
17		67		117	
18		68		118	
19		69		119	
20		70		120	
21		71		121	
22		72		122	
23		73		123	
24		74		124	
25		75		125	
26		76		126	
27		77		127	
28		78		128	
29		79		129	
30		80		130	
31		81		131	
32		82		132	
33		83		133	
34		84		134	
35		85		135	
36		86		136	
37		87		137	
38		88		138	
39		89		139	
40		90		140	
41		91		141	
42		92		142	
43		93		143	
44		94		144	
45		95		145	
46		96		146	
47		97		147	
48		98		148	
49		99		149	
50		100		150	

FEMALE

LEN		LEN		LEN	
1		51		101	
2		52		102	
3		53		103	
4		54		104	
5		55		105	
6		56		106	
7		57		107	
8		58		108	
9		59		109	
10		60		110	
11		61		111	
12		62		112	
13		63		113	
14		64		114	
15		65		115	
16		66		116	
17		67		117	
18		68		118	
19		69		119	
20		70		120	
21		71		121	
22		72		122	
23		73		123	
24		74		124	
25		75		125	
26		76		126	
27		77		127	
28		78		128	
29		79		129	
30		80		130	
31		81		131	
32		82		132	
33		83		133	
34		84		134	
35		85		135	
36		86		136	
37		87		137	
38		88		138	
39		89		139	
40		90		140	
41		91		141	
42		92		142	
43		93		143	
44		94		144	
45		95		145	
46		96		146	
47		97		147	
48		98		148	
49		99		149	
50		100		150	

1

SPP: SMD

LIS TRAWL SURVEY
DOGFISH MEASUREMENT SHEET

Recorder: [illegible]
Error Check:
Data Entry:

SAMPLE #: SP2013-081 (Tow # of day: 4) DATE: 6/10/13 SITE: 14-37

MALE

LEN		LEN		LEN	
1		51		101	
2		52		102	
3		53		103	
4		54		104	
5		55		105	
6		56		106	
7		57		107	
8		58		108	
9		59		109	
10		60		110	
11		61		111	
12		62		112	
13		63		113	
14		64		114	
15		65		115	
16		66		116	
17		67		117	
18		68		118	
19		69		119	
20		70		120	
21		71		121	
22		72		122	
23		73		123	
24		74		124	
25		75		125	
26		76		126	
27		77		127	
28		78		128	
29		79		129	
30		80		130	
31		81		131	
32		82		132	
33		83		133	
34		84		134	
35		85		135	
36		86		136	
37		87		137	
38		88		138	
39		89		139	
40		90		140	
41		91		141	
42		92		142	
43		93		143	
44		94		144	
45		95		145	
46		96		146	
47		97		147	
48		98		148	
49		99		149	
50		100		150	

FEMALE

LEN		LEN		LEN	
1		51		101	
2		52		102	
3		53		103	
4		54		104	
5		55		105	
6		56		106	
7		57		107	
8		58		108	
9		59		109	
10		60		110	
11		61		111	
12		62		112	
13		63		113	
14		64		114	
15		65		115	
16		66		116	
17		67		117	
18		68		118	
19		69		119	
20		70		120	
21		71		121	
22		72		122	
23		73		123	
24		74		124	
25		75		125	
26		76		126	
27		77		127	
28		78		128	
29		79		129	
30		80		130	
31		81		131	
32		82		132	
33		83		133	
34		84		134	
35		85		135	
36		86		136	
37		87		137	
38		88		138	
39		89		139	
40		90		140	
41		91		141	
42		92		142	
43		93		143	
44		94		144	
45		95		145	
46		96		146	
47		97		147	
48		98		148	
49		99		149	
50		100		150	

Recorder: J
Error Check: K.W.
Data Entry: A BJS

LIS TRAWL SURVEY
LARGE FISH MEASUREMENT SHEET

SAMPLE #: SP2013-081 (Tow # of day: 4) **DATE:** 6/10/13 **SITE:** 14-37

SPECIES: WSF (101)

1					51					101	
2					52					102	
3					53					103	
4					54					104	
5					55	\			1	105	
6					56	\			1	106	
7					57					107	
8					58					108	
9					59					109	
10					60					110	
11					61					111	
12					62	\			1	112	
13					63					113	
14					64					114	
15					65	\			1	115	
16					66					116	
17					67	\			1	117	
18					68					118	
19					69					119	
20					70					120	
21					71					121	
22					72					122	
23					73					123	
24					74					124	
25					75					125	
26					76					126	
27					77					127	
28					78					128	
29					79					129	
30					80					130	
31					81					131	
32					82					132	
33					83					133	
34					84					134	
35					85					135	
36					86					136	
37	\			1	87					137	
38					88					138	
39					89					139	
40					90					140	
41					91					141	
42	\			1	92					142	
43					93					143	
44	\			1	94					144	
45	\			1	95					145	
46	\			1	96					146	
47					97					147	
48					98					148	
49					99					149	
50					100					150	

SPECIES:

1					51					101	
2					52					102	
3					53					103	
4					54					104	
5					55					105	
6					56					106	
7					57					107	
8					58					108	
9					59					109	
10					60					110	
11					61					111	
12					62					112	
13					63					113	
14					64					114	
15					65					115	
16					66					116	
17					67					117	
18					68					118	
19					69					119	
20					70					120	
21					71					121	
22					72					122	
23					73					123	
24					74					124	
25					75					125	
26					76					126	
27					77					127	
28					78					128	
29					79					129	
30					80					130	
31					81					131	
32					82					132	
33					83					133	
34					84					134	
35					85					135	
36					86					136	
37					87					137	
38					88					138	
39					89					139	
40					90					140	
41					91					141	
42					92					142	
43					93					143	
44					94					144	
45					95					145	
46					96					146	
47					97					147	
48					98					148	
49					99					149	
50					100					150	

SP2013082

Initials: Recorder: KV
Lab Check: [illegible]
Data Entry: _____

B 55

MARINE TRAWL SURVEY
TA AND PHYSICAL DATA

SAMPLE #: SP2013-082
Other Sample #: AC20130005

(Tow # of Day): 1

DATE: 06 / 12 / 2013

SITE (strata): 1436 (T4)

	PART A	PART B
TIME START (military):	07:31	
DURATION (minutes):	30 min	
NAV. DATA: START	07:31:10	
STOP	08:01:13	

METER	YSI M30 ✓	CTD ___	OTHER ___
LAT	41° 14.80		
LONG	72° 13.72		
DEPTH	ft: 116.5'	m: 35.5	

	@ 1m	@ 35.0m
TEMP (C)	14.7	14.1
SAL	26.0	30.3
COND	31.13	36.85

LENGTH OF WIRE 600'

	START A		STOP A
LAT	41° 14.75	LAT	41° 14.48
LONG	72° 14.00	LONG	72° 15.70

	START B		STOP B
LAT	__° __.__	LAT	__° __.__
LONG	__° __.__	LONG	__° __.__

WEATHER CONDITIONS/QC COMMENTS:

NET # "C"

QC CHECK FOR SALINITY SCALE CAL. USING _____ kg STD. WT.

Sal. Stan.	YSI	Diff	Pre-Cal. Wt.	Cal. Fit Values	Post-Cal. Wt.	Temp. Log. Deployed?: _____ Temp.:
	26.8			2.12	22.68	

FILL OUT IF SITE MOVED, TOW IS SHORT, OR IN PARTS:

Original Site:		Why moved:		(P, H, U)
Original Strata:		Gear Interaction:		(PV, PE, RI)
Attempts:		Pots:		(A, I, U)
Parts:		Number of Pots:		(P#, T#)

CREW: (list if first tow of day):

P: Pots, H: Hangs, U: Unknown
PV: pots visible, PE: pots entangled, RI: recently informed
A: Active, I: Inactive, U: Unknown
P1, P2, etc. for pots; T1, T2, etc, for trawls

COMMENTS:

Recorder: JB
Lab check: K.W.
Data entry: ____

SPRING SURVEY-TOTAL COUNT / WEIGHT

SAMPLE #: Sp2013-082 (tow # of day: 1) DATE: 6/12/13 SITE #: 14-36

Species	# Counted / Meas / to Lab / Scales	Total	Weights	Total
BKF				
BLF				
PGY	<15 m=2.1 (44c + 5sc + 35m) 15-20 m=1.67 (46c + 6sc + 63m) >20 (4m + 6sc)	209 ✓	20.5	20.5
SFL	15c + 2m	3	5.9	5.9
STB				
WKF				
WFL	13	13	3.7	3.7
ALW				
ASD				
BUT				
FSF	6	6	0.9	0.9
LSK	35	35 ✓	16.8	16.8
NSR	257c + 54c + 40m m=8.78	351	12.4 + 13.9	26.3
RCK				
RED	1	1	0.1	0.1
SMD	16	16	19.7 + 20.2 + 9.6	49.5
SPH	14	14	0.6	0.6
SSR	1	1	0.3	0.3
WHI	9	9	0.7	0.7
WPF	62	62	12.7	12.7
WSK	5	5	5.1	5.1
SPD	5	5	21.4	21.4
CNS	1	1	1.9	1.9
BSB	~~14~~ 15m	~~14~~ 15	2.4	2.4
SPT	20	20	1.4	1.4

TO LAB / COMMENTS: 1 SFL scall
17 PGY scale

Recorder: JB
Lab check: ____
Data entry: ____

INVERTEBRATE / ALGAE COUNTS AND WEIGHTS

SAMPLE#: Sp2013-082 (tow # of day: 1) DATE: 6/12/2013 SITE#: 14-36/35

SPECIES	COUNT	TOT CNT	WEIGHT	TOT WT
ALGAE, MIXED (ALG)	no count		0.2	0.2
KELP (KLP)	no count		0.1	0.1
ULVA (ULV)	no count		0.1	0.1
BUSHY BRYOZOA (BBI)	no count			
CRABS, ROCK (RCR)	no count			
BLUE (BCR)				
LADY (LCR)	no count			
F.C. HERMIT (HER)	no count		0.2	0.2
SPIDER (SPI)	no count			
HORSESHOE (HOR)				
MUD (BMC)	no count			
LION'S MANE (JEL)				
LOBSTER (LOB)				
MANTIS SHRIMP (MAN)				
N. MOON SHELL (NMS)	no count			
SQUID, LONG-FINNED (SQI)	78	78	4.8	4.8
STARFISH (STF)	no count			
WHELK, CHANNEL (CHW)				
KNOBBED (KNW)				
MSE	~~0.1~~		0.1	0.1
HSA	~~1.2~~		1.2	1.2

LAB, COMMENTS: ____

Recorder: JS
Error check: G.M
Data Entry:

SAMPLE #: Sp2013-092 (Tow # of day: 1) **DATE:** 6/12/13 **SITE:** 14-36

LEN	WSK	TSC	LSK	BSB	LEN	SFL	TSC	RED	LEN
1					1				1
2					2				2
3					3				3
4					4				4
5		1			5		1		5
6					6				6
7					7				7
8					8				8
9					9				9
10					10				10
11					11				11
12					12				12
13		1			13				13
14					14				14
15				1	15				15
16				1	16			1	16
17				1	17				17
18				1	18				18
19				3	19				19
20				3	20				20
21				5	21				21
22					22				22
23					23				23
24					24				24
25			1		25				25
26			3	1	26				26
27			1		27				27
28					28				28
29			1		29				29
30					30				30
31					31				31
32			1		32				32
33					33				33
34			1		34				34
35					35				35
36					36				36
37			1		37				37
38					38				38
39	1				39				39
40					40				40
41			2		41				41
42			2		42	1			42
43			5		43				43
44	1		5		44				44
45			3		45				45
46			5		46				46
47	1		1		47				47
48					48				48
49					49				49
50			2		50				50
	5	35	15				1	2	1

Recorder: _____
Error check: _____
Data Entry: _____

SAMPLE #: SP2013-082 (Tow # of day: 1) **DATE:** 6/12/2013 **SITE:** 14-36

SPH WHI SQI

LEN			
1			
2			
3			
4			1
5			1
6			2
7			2
8			
9			7
10			14
11			9
12			14
13	1		5
14	2		7
15	2		
16	1		5
17		1	
18	2	2	6
19	4	1	1
20	2	1	
21		2	2
22		1	
23			
24		1	2
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			
41			
42			
43			
44			
45			
46			
47			
48			
49			
50			

78

(14) (9)

Recorder: SW
Error check: S.W.
Data Entry: _____

SAMPLE #: SD2013-082 (Tow # of day: 1) **DATE:** 6/12/2013 **SITE:** 14-36 B/55

LEN	WFL	CNS	WPF		LEN	FSF	SSR		LEN
1					1				1
2					2				2
3					3				3
4					4				4
5		68 cm			5				5
6					6				6
7					7				7
8					8				8
9		1			9				9
10					10				10
11					11				11
12					12				12
13				1	13				13
14					14				14
15					15				15
16	2				16				16
17					17				17
18	1			1	18				18
19	2			1	19				19
20				1	20		1		20
21					21				21
22	1				22				22
23				7	23				23
24	2			5	24		1	1	24
25	1			8	25		1		25
26				12	26				26
27	1			6	27			1	27
28				4	28		1		28
29				5	29				29
30				4	30				30
31				5	31		1		31
32				2	32		1		32
33					33				33
34					34				34
35					35				35
36	1				36				36
37					37				37
38	1				38				38
39			62		39	6			39
40	1				40				40
41					41				41
42					42				42
43					43				43
44					44				44
45	13				45				45
46					46				46
47					47				47
48					48				48
49					49				49
50					50				50

Recorder: S.U
Error check: [illegible]
Data Entry: [illegible]

SAMPLE #: SP2013-082 (Tow # of day: 1) **DATE:** 6/12/13 **SITE:** 14-36

LEN	N/SR		SPT		LEN	PGY			LEN
1					1				1
2					2				2
3					3				3
4					4				4
5					5				5
6					6				6
7					7				7
8					8				8
9					9	X		3	9
10					10	X		13	10
11					11	X		16	11
12	X	3			12	X		3	12
13	X	12			13				13
14	X	4			14			35	14
15	X	2	X	9	15	X		5	15
16			X	6	16	X		15	16
17		1	X	4	17	X		19	17
18				1	18	X		15	18
19					19	X		8	19
20					20			1	20
21	X	4			21				21
22	X	6			22				22
23	X	5			23				23
24		1			24				24
25		1			25				25
26		1			26		1		26
27					27				27
28					28	X	2		28
29					29		1		29
30					30				30
31					31				31
32					32				32
33					33				33
34					34				34
35					35				35
36					36				36
37					37				37
38					38				38
39					39				39
40					40				40
41					41				41
42					42				42
43					43				43
44					44				44
45					45				45
46					46				46
47					47				47
48					48				48
49					49				49
50					50				50

Sub sample <14 cm
m=2.1

sub sample 15-20 cm
m=1.67

63

20

40

m=8.78

4

m=1.0

SPP: SMD

LIS TRAWL SURVEY
DOGFISH MEASUREMENT SHEET

Recorder: E.L.
Error Check: A.V.
Data Entry: _____

SAMPLE #: Sp2013-082 (Tow # of day: 1) DATE: 6/12/13 SITE: 14-36

B; JS

MALE

LEN		LEN		LEN	
1		51		101	
2		52		102	2
3		53		103	1
4		54		104	
5		55		105	
6		56		106	
7		57		107	
8		58		108	
9		59		109	
10		60		110	
11		61		111	
12		62	1	112	
13		63		113	
14		64		114	
15		65		115	
16		66		116	
17		67		117	
18		68		118	
19		69		119	
20		70		120	
21		71		121	
22		72		122	
23		73		123	
24		74		124	
25		75		125	
26		76		126	
27		77		127	
28		78		128	
29		79		129	
30		80		130	
31		81		131	
32		82		132	
33		83		133	
34		84		134	
35		85		135	
36		86		136	
37		87		137	
38		88		138	
39		89		139	
40		90		140	
41		91		141	
42		92		142	
43		93	1	143	
44		94	1	144	
45		95	1	145	
46		96	1	146	
47		97	1	147	
48		98		148	
49		99		149	
50		100	2	150	

FEMALE

LEN		LEN		LEN	
1		51	1	101	
2		52		102	
3		53		103	
4		54		104	
5		55		105	
6		56		106	
7		57		107	
8		58		108	
9		59		109	1
10		60		110	
11		61		111	
12		62		112	
13		63		113	
14		64		114	
15		65		115	
16		66	1	116	
17		67		117	
18		68		118	
19		69		119	
20		70		120	
21		71		121	
22		72		122	1
23		73		123	
24		74		124	
25		75		125	
26		76		126	
27		77		127	
28		78		128	
29		79		129	
30		80		130	
31		81		131	
32		82		132	
33		83		133	
34		84		134	
35		85		135	
36		86		136	
37		87		137	
38		88		138	
39		89		139	
40		90		140	
41		91		141	
42		92		142	
43		93		143	
44		94		144	
45	110	95		145	
46		96		146	
47		97		147	
48		98		148	
49		99		149	
50		100		150	

SPP: SPD

LIS TRAWL SURVEY
DOGFISH MEASUREMENT SHEET

Recorder: E.W
Error Check: CV
Data Entry:

SAMPLE #: SP2013-082 (Tow # of day: 1) DATE: 6/12/13 SITE: 14-36

MALE

LEN		LEN		LEN	
1		51		101	
2		52		102	
3		53		103	
4		54		104	
5		55		105	
6		56		106	
7		57		107	
8		58		108	
9		59		109	
10		60		110	
11		61		111	
12		62		112	
13		63		113	
14		64		114	
15		65		115	
16		66		116	
17		67		117	
18		68		118	
19		69		119	
20		70		120	
21		71		121	
22		72		122	
23		73		123	
24		74		124	
25		75		125	
26		76		126	
27		77		127	
28		78		128	
29		79		129	
30		80		130	
31		81		131	
32		82		132	
33		83		133	
34		84		134	
35		85		135	
36		86		136	
37		87		137	
38		88		138	
39		89		139	
40		90		140	
41		91		141	
42		92		142	
43		93		143	
44		94		144	
45		95		145	
46		96		146	
47		97		147	
48		98		148	
49		99		149	
50		100		150	

FEMALE

LEN		LEN		LEN	
1		51		101	
2		52		102	
3		53		103	
4		54		104	
5		55		105	
6		56		106	
7		57		107	
8		58		108	
9		59		109	
10		60		110	
11		61		111	
12		62		112	
13		63		113	
14		64		114	
15		65		115	
16		66		116	
17		67		117	
18		68		118	
19		69		119	
20		70		120	
21		71		121	
22		72		122	
23		73		123	
24		74		124	
25		75		125	
26		76		126	
27		77		127	
28		78		128	
29		79		129	
30		80		130	
31		81		131	
32		82		132	
33		83		133	
34		84		134	
35		85		135	
36		86		136	
37		87		137	
38		88	1	138	
39		89		139	
40		90		140	
41		91		141	
42		92		142	
43		93		143	
44		94		144	
45		95	2	145	
46		96	2	146	
47		97		147	
48		98		148	
49		99	5	149	
50		100		150	

Initials: Recorder: MD
Lab Check: [illegible]
Data Entry: [illegible]

SP2013083

Also: AC2013006

T MARINE TRAWL SURVEY
ATA AND PHYSICAL DATA

Other Sample #: _____

(Tow # of Day): 1

DATE: 06/13/2013

SITE (strata): 1133 (S4) *

	PART A	PART B
TIME START (military):	0733	08:06
DURATION (minutes):	5	30
NAV. DATA: B START	07:33:58	08:06:40
STOP	07:38:53	08:37:07

METER	YSI M30 ✓	CTD___ OTHER___
LAT	41° 11.41	
LONG	72° 23.77	
DEPTH	ft: 111	m: 33.8

	@ 1m	@ 33.3m
TEMP (C)	15.5	14.2
SAL	27.7	29.7
COND	35.23	36.43
LENGTH OF WIRE	600'	"B" @ 500'

	START A		STOP A
LAT	__° __.__	LAT	__° __.__
LONG	__° __.__	LONG	__° __.__

	START B		STOP B
LAT	41° 11.75	LAT	41° 11.45
LONG	72° 23.29	LONG	72° 23.55

WEATHER CONDITIONS/QC COMMENTS:

NET # "C"

QC CHECK FOR SALINITY SCALE CAL. USING _____ kg STD. WT.

Sal. Stan.	YSI	Diff	Pre-Cal. Wt.	Cal. Fit Values	Post-Cal. Wt.	Temp. Log. Deployed?: _____ Temp.:
26.86	26.8			14	22.68	

FILL OUT IF SITE MOVED, TOW IS SHORT, OR IN PARTS:

Original Site:	0830	Why moved:	SPA Tow displacement	(P, H, U)
Original Strata:	S4	Gear Interaction:		(PV, PE, RI)
Attempts:		Pots:		(A, I, U)
Parts:		Number of Pots:		(P#, T#)

CREW: (list if first tow of day):
Kurt, Rodney, Wes, Eric, Martha, John

P: Pots, H: Hangs, U: Unknown
PV: pots visible, PE: pots entangled, RI: recently informed
A: Active, I: Inactive, U: Unknown
P1, P2, etc. for pots; T1, T2, etc, for trawls

COMMENTS: Site 0830 moved from selected site list to 1133 for cooperative EPA / HIS Dumpsites Study - See AC2013001 - AC2013006

0738 - stopped tow - caught on dunes
→ now towing "083b" - this is our 4th attempt (2 yesterday) Hitting Dum
Scrap part "A" - No Time (5min) 2/2 TOW
Rename Tow file to SP2013083_scrap

Recorder: KV
Lab check: A.W.
Data entry: A.W.

SPRING SURVEY-TOTAL COUNT / WEIGHT

SAMPLE #: SP2013083 AC2013006 (tow # of day: 1) DATE: 6/13/13 SITE #: 11 33 B JS

Species	# Counted / Meas / to Lab / Scales	Total	Weights	Total
BKF				
BLF	1 lab	1	1.85	1.9
PGY	4m + 13lab	17	4.31 +0.1 +0.1	4.5
SFL				
STB	1m	1	3.35	3.4
WKF				
WFL	1m	1	0.28	0.3
ALW				
ASD				
BUT				
FSF	2m	2	0.40	0.4
LSK	19m	19	11.99	12.0
NSR	15m	15	2.18	2.2
RCK				
RED				
SMD	2m	2	5.6	5.6
SPH				
SSR	2m	2	0.71	0.7
WHI				
WPF	11m	11	2.24	2.2
WSK	17m	17	19.0	19.0

TO LAB / COMMENTS: 1 BLF
13 PGY A.W.

Recorder: KG
Lab check: KU
Data entry: A:SW

INVERTEBRATE / ALGAE COUNTS AND WEIGHTS

SAMPLE#: SP2013083 (tow # of day: 1) DATE: 6/13/13 SITE#: 1133 BT

SPECIES	COUNT	TOT CNT	WEIGHT	TOT WT
ALGAE, MIXED (ALG)	no count		0.1	0.1
KELP (KLP)	no count			
ULVA (ULV)	no count		0.1	0.1
BUSHY BRYOZOA (BBI)	no count			
CRABS, ROCK (RCR)	no count			
BLUE (BCR)				
LADY (LCR)	no count			
F.C. HERMIT (HER)	no count		0.1	0.1
SPIDER (SPI)	no count		0.23	0.2
HORSESHOE (HOR)				
MUD (BMC)	no count			
LION'S MANE (JEL)				
LOBSTER (LOB)				
MANTIS SHRIMP (MAN)				
N. MOON SHELL (NMS)	no count			
SQUID, LONG-FINNED (SQI)	5 m	5	0.29	0.3
STARFISH (STF)	no count			
WHELK, CHANNEL (CHW)				
KNOBBED (KNW)				
HSA			0.2	0.2
FUC			0.1	0.1

TO LAB, COMMENTS:

Recorder: JS
Error check: E.W.
Data Entry: A: E.W. B: JS

SAMPLE #: SP2013-083 (Tow # of day: 1) **DATE:** 6/13/13 **SITE:** 11-33

LEN	SMD	STB	PGY	LSK	LEN	WFL	SQT	FSF	LEN
1					1				1
2					2				2
3					3				3
4					4				4
	97M	65cm							
5					5				5
6					6				6
7					7				7
8					8				8
9					9				9
	96M								
10					10				10
11					11				11
12					12	XX	4		12
13					13		1		13
14					14				14
15					15				15
16					16				16
17		\	1		17				17
18		\	1		18				18
19					19				19
20		\	1		20				20
21					21				21
22					22				22
23					23				23
24					24				24
25					25				25
26					26		\	1	26
27		\	1		27	\	1		27
28					28				28
29					29				29
30					30				30
31					31		\	1	31
32					32				32
33					33				33
34					34				34
35					35				35
36					36				36
37					37				37
38					38				38
39					39				39
40					40				40
41				X 2	41				41
42					42				42
43				X 2	43				43
44				XX\ 5	44				44
45				XX\ 5	45				45
46				X 2	46				46
47					47				47
48				X 1	48				48
49				X 2	49				49
50					50				50
	2	1	4	19		1	5	2	

Recorder:
Error check:
Data Entry:

SAMPLE #: SP2013-083 (Tow # of day: 1) **DATE:** 6/13/13 **SITE:** 11-33

SSR

LEN				LEN				LEN
1				1				1
2				2				2
3				3				3
4				4				4
5				5				5
6				6				6
7				7				7
8				8				8
9				9				9
10				10				10
11				11				11
12				12				12
13				13				13
14				14				14
15				15				15
16				16				16
17				17				17
18				18				18
19				19				19
20				20				20
21				21				21
22				22				22
23				23				23
24				24				24
25				25				25
26				26				26
27				27				27
28			1	28				28
29				29				29
30				30				30
31				31				31
32				32				32
33				33				33
34				34				34
35				35				35
36				36				36
37				37				37
38				38				38
39				39				39
40				40				40
41				41				41
42				42				42
43				43				43
44				44				44
45				45				45
46				46				46
47				47				47
48				48				48
49				49				49
50				50				50

2

Recorder: MD
Error check: [illegible]
Data Entry: [illegible]

SAMPLE #: SP2013-083 (Tow # of day: 1) **DATE:** 6/13/13 **SITE:** 11-33

LEN	NSK	450	NPF	NSK	LEN
1		1			1
2					2
3		1			3
4		1			4
5					5
6					6
7		1			7
8					8
9				1	9
10		1			10
11		1		2	11
12					12
13					13
14				1	14
15					15
16					16
17					17
18					18
19		1			19
20					20
21				2	21
22		1	1		22
23			1		23
24			1	1	24
25			1	1	25
26				1	26
27			4	1	27
28			3	2	28
29				1	29
30				1	30
31					31
32				1	32
33					33
34					34
35	2				35
36	1				36
37					37
38					38
39					39
40	1				40
41					41
42	1				42
43	2				43
44					44
45					45
46					46
47					47
48	2				48
49					49
50					50

11

15

17

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APPENDIX F – FISHING ACTIVITY SURVEY

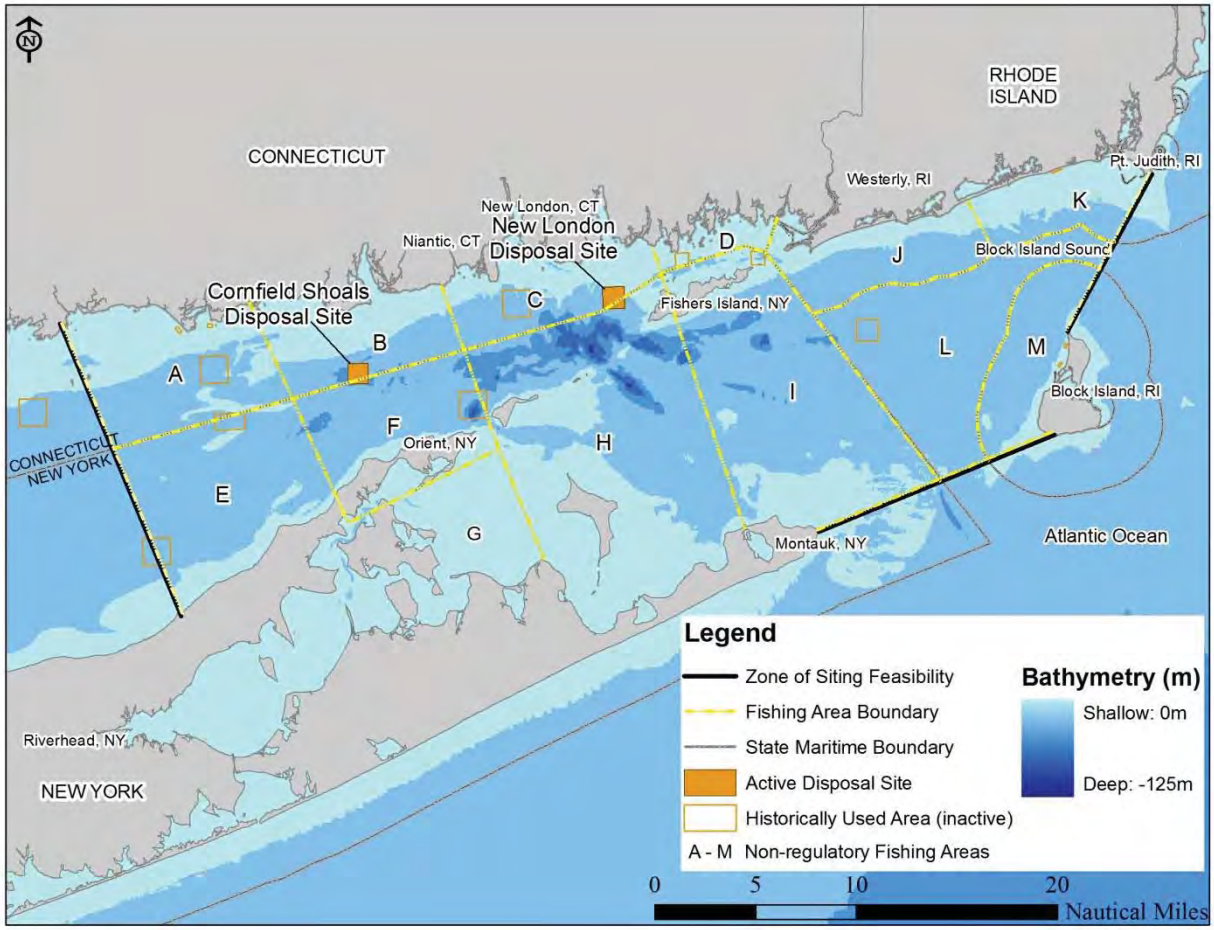
Eastern Long Island Sound Fishing Activities Survey

Fall/Winter 2013

Tetra Tech, Inc. is requesting your assistance to help us investigate the locations and activities of commercial and recreational fishing in eastern Long Island, Block Island, and Rhode Island Sounds. Your **anonymous** answers, along with other fisheries and biological data, will be used to evaluate fishery use in these areas. This data will be used to characterize fisheries and lobster habitat in support of the U.S. Environmental Protection Agency's (EPA's) preparation of a Supplemental Environmental Impact Statement (SEIS) for the potential designation of one or more dredged material disposal sites in eastern Long Island Sound. Any information we receive will remain confidential (i.e., not associated with specific fishermen or vessel names). We appreciate hearing about your experiences whether you are currently fishing or not. **Thank you** in advance for your time and for your candid responses.

Questions:

1. What is your occupation or relationship to the fishing industry?
    a. Commercial fisherman or lobsterman
    b. Recreational fisherman
    c. Charter boat operator
    d. Other (Please specify): _____
2. How long have you been fishing in Long Island Sound? (Choose one.)
    a. 0–5 years
    b. 5–15 years
    c. 15–30 years
    d. 30+ years
3. Have you actively fished during 2013?
    a. Yes
    b. No; the last year I actively fished was: _____
4. Which species do you (or did you) primarily target?
    a. Lobster
    b. Scup
    c. Flounder
    d. Tautog
    e. Mollusks (e.g., clams, scallops, mussels, conch)
    f. Other (Please specify): _____
5. Throughout your career, have you shifted your target species?
    a. No.
    b. Yes.
        i. From what species to what species?:_____
        ii. Why (e.g., market demand, decreased catch/quality)?: _____
        iii. When did you make this shift?: _____
6. Please refer to the map on the following page to answer part a and b. Note that the grey lines represent the boundaries of state waters. The areas delineated by dashed yellow lines (labeled with the letters A–M) have been generated for the sole purpose of identifying locations, and do not represent official fishing areas.



a. In the following table, please indicate what gear you use in each area during each season. Please write in **Active** (e.g., trawl, dredge, purse seine), **Passive** (e.g., gillnets, longline), **Pots/traps**, or **specify** a different gear type in each relevant box. (Fill in all that apply.)

Area	Spring	Summer	Fall	Winter
A				
B				
C				
D				
E				
F				
G				
H				
I				
J				
K				
L				
M				

b. In which areas do you expend less than 25 percent of your overall fishing effort? (Choose all that apply.)

i. A
ii. B
iii. C
iv. D
v. E
vi. F
vii. G
viii. H
ix. I
x. J
xi. K
xii. L
xiii. M

7. When do you fish? (Indicate the percent of your fishing effort applied by month.)

Month	**Percent Effort**
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	

8. During which months do you **not** have gear in the water?

Month	**Select**
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	
I fish year-round	

9. How many other fishermen actively fish in the area where you spend the majority of your time fishing? (Choose one.)
    a. 0–3
    b. 3–10
    c. 10+
10. If you use **active** gear, how long do you fish your gear before emptying your net?
    a. <30 minutes
    b. 30-90 minutes
    c. >90 minutes
11. Has this trawl time changed over your fishing career?
    a. No, the trawl time has not changed.
    b. Yes, trawl time has increased.
    c. Yes, trawl time has decreased.
12. If you use **passive** gear, in a typical set, how long does the gear remain in the water? (Choose one.)
    a. <1 day
    b. 1–3 days
    c. 4–7 days
    d. 7–14 days
    e. 14+ days
13. If you use **pots** or **traps**, do you use warp (lines connecting pots) to haul out your gear? (Choose one.)
    a. Yes
    b. No
    c. Sometimes
14. Throughout your career, have you noticed any of the following changes in catches of your *target species* (as identified in question 4)?
    a. Quantity: (Choose one.)
        i. No change.
        ii. Yes – increase.
        iii. Yes – decrease.
    b. Size: (Choose one.)
        i. No change.
        ii. Yes – increase.
        iii. Yes – decrease.
    c. Location: (Provide detail if applicable.)
        i. No change.
        ii. Fishing effort has diminished in this area (specify): _____
        iii. Fishing effort has increased in this area (specify): _____
    d. Change in gender composition of catch: (Choose one.)
        i. No change
        ii. Proportion of females has increased
        iii. Proportion of males has increased
    e. Health of catch: (Choose one.)
        i. No change
        ii. Health has improved
        iii. Health is poorer
15. What species do you see in your bycatch, and in what percentage? (Please specify. For example, 60% butterfish, 25% spider crabs, 15% scup)_____

16. What changes have you noticed in the composition of your bycatch (e.g., changes in quantity, quality, and/or size of various species)? (Choose one and provide detail if applicable.)
    a. No change.
    b. Bycatch composition has changed in the following ways (specify):
    _____
17. If you have experienced gear fouling, how and when (seasonally or annually) has it occurred? (Choose one and provide detail if applicable.)
    a. I have not had any gear fouling.
    b. Fouling has occurred in the following ways: _____
18. Have you noticed any changes in the frequency of needing to clean your gear?
    a. No change.
    b. Yes – increase.
    c. Yes – decrease.
19. Do you fish within 0.5 nautical miles (nm) of the center of an existing dredged material disposal site? (Choose one.)
    a. Yes, regularly, near (specify site name): _____
    b. Yes, occasionally, near (specify site name): _____
    c. No.
    d. I don't know.
20. What have you noticed about species diversity in your catch within 0.5 nm of the center of a dredged material disposal site?
    a. I do not fish near disposal sites.
    b. I have not noticed a difference in fishing near dredged material disposal sites.
    c. Other (specify): _____
21. Please provide any additional information or suggestions that you think might be helpful:

    _____
    _____
    _____
    _____
    _____
22. **Optional.** If you would like to speak with us further regarding fishing activity in eastern Long Island Sound or regarding our findings, please call Deena Anderson, a Tetra Tech biologist, at **(603) 314-0760** between 9:00 a.m. and 5:00 p.m. Monday through Friday or by email: **Deena.Anderson@tetratech.com**. If you prefer to be contacted, include your contact information (phone or email) below:

    _____

APPENDIX G – FISHING ACTIVITY SURVEY RESULTS
(Excel Spreadsheet; Provided as Electronic Copy Only)

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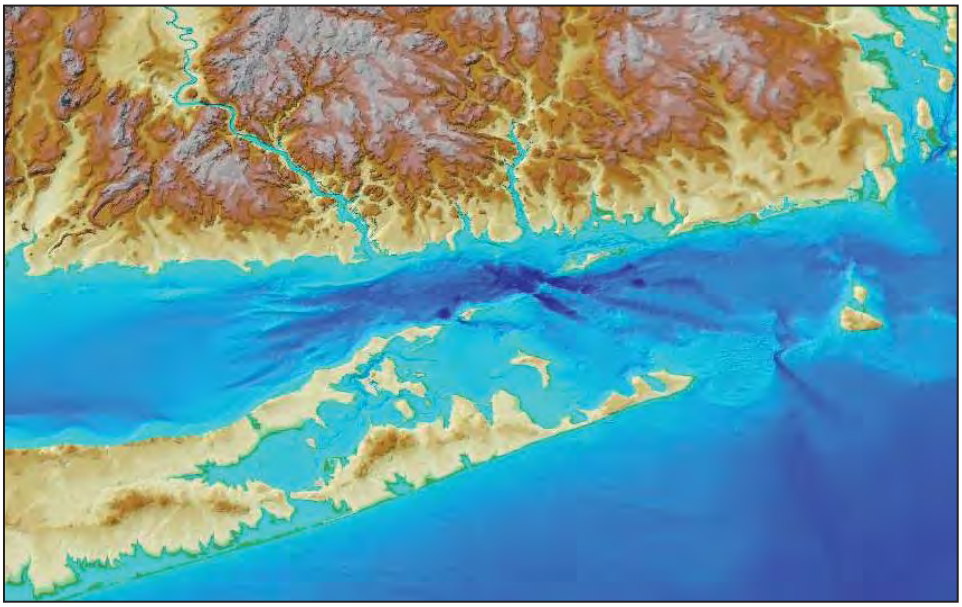
Supplemental Environmental Impact Statement for the Designation of Dredged Material Disposal Site(s) in Eastern Long Island Sound, Connecticut and New York

APPENDIX F

Disposal Area Monitoring System – DAMOS: Data Summary Report of the New London Disposal Site and Vicinity Sediment Profile and Plan-View Imaging Survey



Prepared for: **United States Army Corps of Engineers**

US Army Corps of Engineers ®
New England District

Prepared by: **DAMOSVision**

DAMOSVision
A Small Business Joint Venture

March 2015

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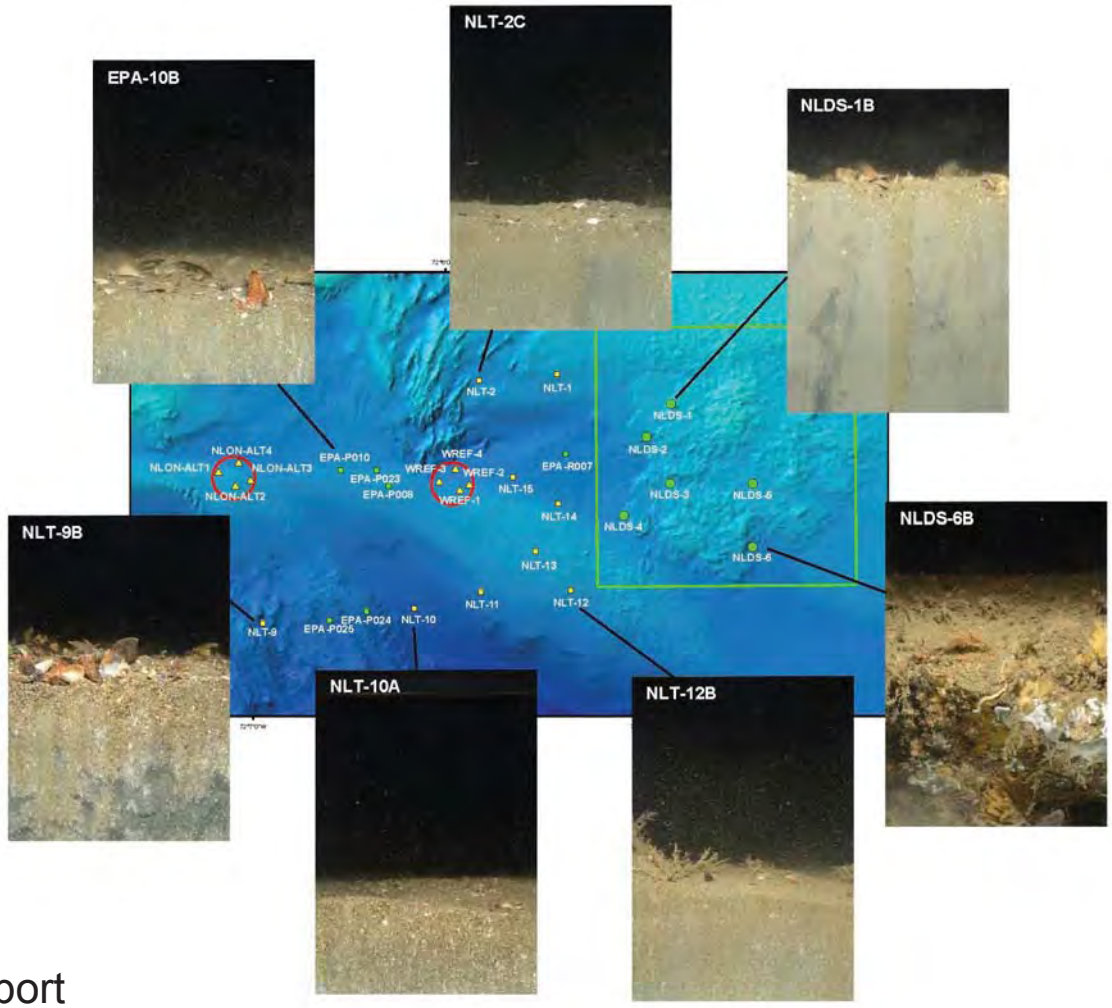
Data Summary Report: New London Disposal Site and Vicinity Sediment-Profile and Plan-View Imaging Survey September 2014

Disposal Area Monitoring System DAMOS



DAMOS
DISPOSAL AREA MONITORING SYSTEM

Data Summary Report
2015-01
March 2015

US Army Corps of Engineers®
New England District

This report should be cited as:

Carey, D. A.; Bellagamba Fucile, E. 2015. Data Summary Report of the New London Disposal Site and Vicinity Sediment-Profile and Plan-View Imaging Survey, September 2014. U.S. Army Corps of Engineers, New England District, Concord, MA, 45 pp.

Note on units of this report: As a scientific data summary, information and data are presented in the metric system. However, given the prevalence of English units in the dredging industry of the United States, conversions to English units are provided for general information in Section 1. A table of common conversions can be found in Appendix A.

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LIST OF ACRONYMS

aRPD	apparent redox potential discontinuity
CAD	confined aquatic disposal
CLDS	Central Long Island Sound
CSDS	Cornfield Shoals
DAMOS	Disposal Area Monitoring System
DGPS	differential global positioning system
ELIS	Eastern Long Island Sound
EPA	Environmental Protection Agency
GIS	graphic information system
GPS	global positioning system
JPEG	Joint Photographic Experts Group
NBDS	Niantic Bay Disposal Site
NLDS	New London Disposal Site
NAE	New England District
NEF	Nikon Electronic Format
ODMDS	Ocean Dredged Material Disposal Sites
PV	plan-view
RGB	red green blue (file format)
SBAS	satellite-based differential corrections
SEIS	Supplemental Environmental Impact Statement
SHP	shapefile or geospatial data file
SOP	Standard Operating Procedures
SPI	sediment-profile imaging
TIF	tagged image file
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
WLDS	Western Long Island Sound

1.0 INTRODUCTION

A sediment-profile (SPI) and plan-view (PV) imaging survey was conducted at the New London Disposal Site (NLDS) and within an area extending west of NLDS to, and including, the historic Niantic Bay Disposal Site (NBDS). This SPI/PV survey took place in September 2014 as part of the U.S. Army Corps of Engineers (USACE) New England District (NAE) Disposal Area Monitoring System (DAMOS) Program. DAMOS is a comprehensive monitoring and management program designed and conducted to address environmental concerns surrounding the placement of dredged material at aquatic disposal sites throughout the New England region. An introduction to the DAMOS Program, NLDS, and NBDS, including brief descriptions of previous dredged material disposal and site monitoring activities, is provided below.

1.1 Overview of the DAMOS Program

The DAMOS Program features a tiered management protocol designed to ensure that any potential adverse environmental impacts associated with dredged material disposal are promptly identified and addressed (Germano et al. 1994). For over 35 years, the DAMOS Program has collected and evaluated disposal site data throughout New England. Based on these data, patterns of physical, chemical, and biological responses of seafloor environments to dredged material disposal activity have been documented (Fredette and French 2004).

DAMOS monitoring surveys fall into two general categories: confirmatory studies and focused studies. Confirmatory studies are designed to test hypotheses related to expected physical and ecological response patterns following placement of dredged material on the seafloor at established, active disposal sites. The data collected and evaluated during these studies provide answers to strategic management questions in determining the next step in the disposal site management process. Focused studies are periodically undertaken within the DAMOS Program to evaluate inactive or historical disposal sites and contribute to the development of dredged material placement and capping techniques. The resulting information from DAMOS surveys is used to guide the management of disposal activities at existing sites, plan for use of future sites, and evaluate the long term status of historic sites. The 2014 NLDS/NBDS investigation was a focused study designed as a reconnaissance survey in support of the Environmental Protection Agency's (EPA) Supplemental Environmental Impact Statement (SEIS) for designating one or more regional dredged material disposal sites in Eastern Long Island Sound (ELIS).

Two primary goals of DAMOS confirmatory monitoring surveys are to document the physical location and stability of dredged material placed into the aquatic environment and to evaluate the biological recovery of the benthic community following placement of dredged material. Several survey techniques are employed in order to characterize these responses to dredged material placement. Sequential acoustic monitoring surveys (including bathymetric, acoustic backscatter, and side-scan sonar data collection) are performed to characterize the height and spread of discrete dredged material deposits or mounds created at open water sites as well as the accumulation/consolidation of dredged material into confined aquatic disposal (CAD) cells. Sediment-profile imaging (SPI) and plan-view underwater camera photography, referred to as plan-view (PV) imaging, surveys are performed to provide further physical characterization of the material and to support evaluation of seafloor (benthic) habitat conditions and recovery over

time. Each type of data collection activity is conducted periodically at disposal sites, and the conditions found after a defined period of disposal activity are compared with the long-term data set at a specific site to determine the next step in the disposal site management process (Germano et al. 1994). Focused DAMOS monitoring surveys may also feature additional types of data collection activities as deemed appropriate to achieve specific survey objectives, such as sub-bottom profiling, towed video, sediment coring, or grab sampling.

1.2 Overview of EPA's Preparation of an SEIS for ELIS

Currently there are four dredged material disposal sites in Long Island Sound: Western Long Island Sound (WLDS), Central Long Island Sound (CLDS), Cornfield Shoals (CSDS), and New London (NLDS). WLDS and CLDS were designated for long-term use by the Environmental Protection Agency (EPA) as Ocean Dredged Material Disposal Sites (ODMDSs) on June 5, 2005. CSDS and NLDS sites were selected by USACE for short-term use and are due to close on December 16, 2016. As these two eastern sites are slated to close, the EPA posted a Notice of Intent on 4 October 2012 to prepare a Supplemental Environmental Impact Statement (SEIS) to evaluate the potential designation of one or more new ODMDSs to serve the eastern Long Island Sound region.

1.3 Introduction to the New London Disposal Site, Historic Niantic Bay Disposal Site, and the General Survey Area

NLDS is an active open-water dredged material disposal site located 5.4 km (3.1 nmi) south of Eastern Point, Groton, Connecticut (Figure 1-1) centered at 41º16.306´ N, 72º 04.571´ W (NAD 83). Water depths range from 13.4 m (43 ft) to 24.3 m (79 ft) at its deepest point (AECOM 2009).

NBDS is an inactive historical disposal site that has not been used since likely 1972 (per notes from 1990 from Dr. Thomas Fredette, former DAMOS Program Manager). The center of the site is located approximately 2.6 km (1.4 nmi) southeast of Black Point, Niantic, Connecticut, and is being examined as a potential location for disposal site alternatives (Figure 1-1).

The area surveyed between these two disposal sites includes a wide range of depths and zones of apparent active sediment transport. The SEIS is considering sites deeper than 18 m in the vicinity of major shipping corridors and lanes and may consider sites shallower than 18 m that are more remote from transportation corridors. The areas surveyed were selected to represent water depths at, or deeper than, the water depths of NLDS.

1.4 Previous NLDS Monitoring Surveys

The most recent survey at NLDS was conducted in July/August 2007 (AECOM 2009). Historic and previous dredged material disposal activity and monitoring events are summarized in AECOM (2009).

1.5 Recent Dredged Material Disposal Activity at NLDS

Since the July/August 2007 survey approximately 20,000 cy (15,290 m^3) of dredged material has been disposed of at NLDS.

1.6 2014 Survey Objectives

The objective of this survey was to use SPI/PV imaging to define the physical characteristics of surficial sediment and to assess the benthic community status of selected areas within NLDS and over an area extending 7 km west up to and including the historic NBDS.

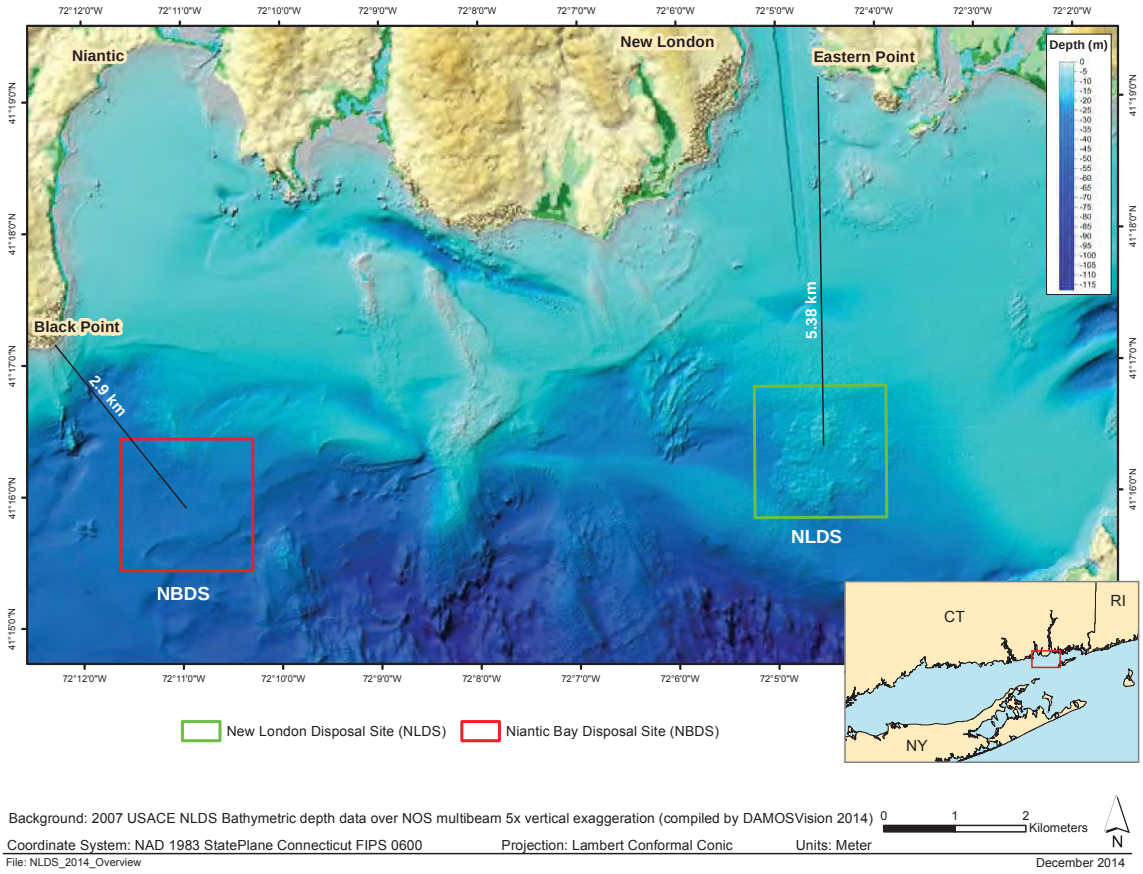


Figure 1-1. Location of NLDS and NBDS

2.0 METHODS

The September 2014 survey at NLDS, NBDS and the area between the two sites was conducted by a team of investigators from DAMOSVision (CR Environmental and Germano & Associates) aboard the 45-foot F/V *Florence*. The SPI/PV survey was conducted on 16-17 September 2014. An overview of the methods used to collect, process, and analyze the survey data is provided below. Detailed Standard Operating Procedures (SOPs) for data collection and processing are available in Carey et al. (2013).

2.1 Navigation and On-Board Data Acquisition

Navigation for the survey was accomplished using a Trimble AG132 Differential Global Positioning System (DGPS) capable of receiving satellite-based differential corrections (SBAS) and U.S. Coast Guard (USCG) Beacon corrections. The DGPS system was interfaced to a laptop computer running HYPACK® hydrographic survey software.

The focus was to accurately occupy pre-established SPI survey target locations. HYPACK® continually recorded vessel position and DGPS satellite quality and provided a steering display for the vessel captain to navigate to the pre-established targets.

Station target locations were entered into HYPACK® and viewed with a heads up display by the ship's captain. When the vessel approached the center of the target location, the winch operator began the process of lowering the camera to the seafloor. The camera was lifted over the starboard side using a Pullmaster winch and boom, and then transferred to a stern gallows frame and trawl winch. The trawl winch lowered the camera to the seafloor. When the winch wire went slack, the deck hand signaled the winch operator and navigator to stop the winch and electronically record the vessel's position. Each replicate camera position was electronically recorded and linked to the SPI log by station number and replicate with a time stamp and position.

2.2 Sediment-Profile and Plan-View Imaging Survey

Sediment-profile imaging (SPI) and plan-view (PV) imaging are monitoring techniques used to provide data on the physical characteristics of the seafloor and the status of the benthic biological community.

2.2.1 Sediment-Profile Imaging

Sediment-profile imaging (SPI) involves deploying an underwater camera system to photograph a cross section of the sediment-water interface. In the 2014 survey at NLDS/NBDS, high-resolution SPI images were acquired using a Nikon® D7100 digital single-lens reflex camera mounted inside an Ocean Imaging® Model 3731 pressure housing system. The pressure housing sat atop a wedge-shaped prism with a front faceplate and a back mirror. The mirror was mounted at a 45° angle to reflect the profile of the sediment-water interface. As the prism penetrated the seafloor, a trigger activated a time-delay circuit that fired an internal strobe to obtain a cross-sectional image of the upper 15–20 cm of the sediment column (Figure 2-1).

The camera remained on the seafloor for approximately 20 seconds to ensure that a successful image had been obtained. Details of the camera settings for each digital image are available in the associated parameters file embedded in each electronic image file. For this survey, the ISO-equivalent was set at 640, shutter speed was 1/250, f-stop was f9, and storage was in compressed raw Nikon Electronic Format (NEF) files (approximately 20 MB each). Electronic files were converted to high-resolution JPEG (8-bit) format files (3264 × 4928 pixels) using Nikon Capture® NX2 software (Version 2.2.7).

Test exposures of the Kodak® Color Separation Guide (Publication No. Q-13) were made on deck at the beginning and end of the survey to verify that all internal electronic systems were working to design specifications and to provide a color standard against which final images could be checked for proper color balance. After deployment of the camera at each station, the frame counter was checked to ensure that the requisite number of replicates had been obtained. In addition, a prism penetration depth indicator on the camera frame was checked to verify that the optical prism had actually penetrated the bottom to a sufficient depth. If images were missed or the penetration depth was insufficient, the camera frame stop collars were adjusted and/or weights were added or removed, and additional replicate images were taken. Changes in prism weight amounts, the presence or absence of mud doors, and frame stop collar positions were recorded for each replicate image.

Each image was assigned a unique time stamp in the digital file attributes by the camera's data logger and cross-checked with the time stamp in the navigational system's computer data file. In addition, the field crew kept redundant written sample logs. Images were downloaded periodically to verify successful sample acquisition and/or to assess what type of sediment/depositional layer was present at a particular station. Digital image files were renamed with the appropriate station names immediately after downloading as a further quality assurance step.

2.2.2 Plan-View Imaging

An Ocean Imaging® Model DSC16000 plan-view underwater camera (PV) system with two Ocean Imaging® Model 400-37 Deep Sea Scaling lasers mounted to the DSC16000 was attached to the sediment-profile camera frame and used to collect plan-view photographs of the seafloor surface; both SPI and PV images were collected during each "drop" of the system. The PV system consisted of a Nikon D-7000 encased in an aluminum housing, a 24 VDC autonomous power pack, a 500 W strobe, and a bounce trigger. A weight was attached to the bounce trigger with a stainless steel cable so that the weight hung below the camera frame; the scaling lasers projected two red dots that are separated by a constant distance (26 cm) regardless of the field-of-view of the PV system, which can be varied by increasing or decreasing the length of the trigger wire. As the camera apparatus was lowered to the seafloor, the weight attached to the bounce trigger contacted the seafloor prior to the camera frame hitting the bottom and triggered the PV camera (Figure 2-1). Details of the camera settings for each digital image are available in the associated parameters file embedded in each electronic image file; for this survey, the ISO-equivalent was set at 640 on the first survey day and then changed to 400 on the second survey day due to overexposure because of shell hash. The additional camera settings used were as follows: shutter speed 1/20, f14, white balance set to flash, color mode set to

Adobe RGB, sharpening set to none, noise reduction off, and storage in compressed raw NEF files (approximately 20 MB each). Electronic files were converted to high-resolution JPEG (8-bit) format files (3264 × 4928 pixels) using Nikon Capture® NX2 software.

Prior to field operations, the internal clock in the digital PV system was synchronized with the GPS navigation system and the SPI camera. Each PV image acquired was assigned a time stamp in the digital file and redundant notations in the field and navigation logs. Throughout the survey, PV images were downloaded at the same time as the SPI images after collection and evaluated for successful image acquisition and image clarity.

The ability of the PV system to collect usable images was dependent on the clarity of the water column. Water conditions at NLDS allowed a trigger wire length of 45 to 53 cm, resulting in an area of bottom visualization approximately 60 cm × 40 cm in size.

2.2.3 SPI and PV Survey Planning

For the NLDS/NBDS survey, a total of 60 SPI/PV stations were planned; 6 stations within NLDS, 11 stations within NBDS, 27 transect stations in the area between the two sites, and 4 stations in each of four reference areas (Figure 2-2).

Survey planning included stations at which prior EPA monitoring was performed. All 6 of the NLDS stations were original EPA stations; 8 of the 11 NBDS stations were original EPA stations and 12 of the 26 transect stations were also originally EPA stations. The reference stations and the newly added stations at NBDS and the transect area were chosen by consultation with EPA, the DAMOS Program Manager, Steve Wolf and senior scientist Drew Carey of DAMOSVision (Figures 2-3, 2-4, and 2-5).

The eastern reference stations (NLON-REF and E-REF) and WREF stations were randomly located within standard reference areas utilized by DAMOS (AECOM 2009). NLON-ALT stations were randomly selected within a reference area chosen as a potential future reference area. The northern and southern transects were selected to provide a profile of conditions between the two disposal sites (Figure 2-2).

Table 2-1 provides the original EPA Site Station ID numbers paired with the 2014 survey's Station ID numbers and target locations.

2.2.4 SPI and PV Data Collection

The SPI/PV survey was conducted at NLDS/NBDS on 16-17 September 2014 aboard the F/V *Florence*. At each station, the vessel was positioned at the target coordinates and the camera was deployed within a defined station tolerance of 10 m. Four replicate SPI and PV images were collected at each of the stations (Figures 2-3, 2-4, and 2-5; Appendix B). The three replicates with the best quality images from each station were chosen for analysis (Appendix C).

The DGPS described above was interfaced to HYPACK® software via laptop serial ports to provide a method to locate and record target sampling locations. Throughout the survey, the HYPACK® data acquisition system received DGPS data. The incoming data stream was

digitally integrated and stored on the PC's hard drive. Actual SPI/PV sampling locations were recorded as target files using this system.

2.2.5 SPI and PV Data Analysis

Computer-aided analysis of the resulting images provided a set of standard measurements to allow comparisons between different locations and different surveys. The DAMOS Program has successfully used this technique for over 30 years to map the distribution of disposed dredged material and to monitor benthic recolonization at disposal sites.

Following completion of data collection, the digital images were analyzed using Adobe Photoshop® CS 5 Version 12.1. Images were first adjusted in Adobe Photoshop® to expand the available pixels to their maximum light and dark threshold range. Linear and areal measurements were recorded as number of pixels and converted to scientific units using the Kodak® Color Separation Guide for measurement calibration. Detailed results of all SPI and PV image analyses are presented in Appendix C.

2.2.5.1 SPI Data Analysis

Analysis of each SPI image was performed to provide measurement of the following standard set of parameters:

Sediment Type–The sediment grain size major mode and range were estimated visually from the images using a grain size comparator at a similar scale. Results were reported using the phi scale. Conversion to other grain size scales is provided in Appendix D. The presence and thickness of disposed dredged material were also assessed by inspection of the images.

Penetration Depth–The depth to which the camera penetrated into the seafloor was measured to provide an indication of the sediment density or bearing capacity. The penetration depth can range from a minimum of 0 cm (i.e., no penetration on hard substrata) to a maximum of 20 cm (full penetration on very soft substrata).

Surface Boundary Roughness–Surface boundary roughness is a measure of the vertical relief of features at the sediment-water interface in the sediment-profile image. Surface boundary roughness was determined by measuring the vertical distance between the highest and lowest points of the sediment-water interface. The surface boundary roughness (sediment surface relief) measured over the width of sediment-profile images typically ranges from 0 to 4 cm, and may be related to physical structures (e.g., ripples, rip-up structures, mud clasts) or biogenic features (e.g., burrow openings, fecal mounds, foraging depressions). Biogenic roughness typically changes seasonally and is related to the interaction of bottom turbulence and bioturbational activities.

Apparent Redox Potential Discontinuity (aRPD) Depth–The aRPD depth provides a measure of the integrated time history of the balance between near-surface oxygen conditions and biological reworking of sediments. Sediment particles exposed to oxygenated waters oxidize and lighten in color to brown or light gray. As the particles are buried or moved down by biological activity, they are exposed to reduced oxygen concentrations in subsurface pore waters and their oxic

coating slowly reduces, changing color to dark gray or black. When biological activity is high, the aRPD depth increases; when it is low or absent, the aRPD depth decreases. The aRPD depth was measured by assessing color and reflectance boundaries within the images.

Infaunal Successional Stage–Infaunal successional stage is a measure of the biological community inhabiting the seafloor. Current theory holds that organism-sediment interactions in fine-grained sediments follow a predictable sequence of development after a major disturbance (such as dredged material disposal), and this sequence has been divided subjectively into three stages (Rhoads and Germano 1982, 1986). Successional stage was assigned by assessing which types of species or organism-related activities were apparent in the images.

Additional components of the SPI analysis included calculation of means and ranges for the parameters listed above and mapping of means of replicate values from each station. Station means were calculated from three replicates from each station and used in statistical analysis.

2.2.5.2 PV Data Analysis

The PV images provided a much larger field-of-view than the SPI images and provided valuable information about the landscape ecology and sediment topography in the area where the pinpoint "optical core" of the sediment profile was taken. Unusual surface sediment layers, textures, or structures detected in any of the sediment-profile images can be interpreted in light of the larger context of surface sediment features; i.e., is a surface layer or topographic feature a regularly occurring feature and typical of the bottom in this general vicinity or just an isolated anomaly? The scale information provided by the underwater lasers allows for accurate density counts (number per square meter) of attached epifaunal colonies, sediment burrow openings, or larger macrofauna or fish which may have been missed in the sediment-profile cross section. Information on sediment transport dynamics and bedform wavelength were also available from PV image analysis. Analysts calculated the image size and field-of-view and noted sediment type; recorded the presence of bedforms, burrows, tubes, tracks, trails, epifauna, mud clasts, and debris; and included descriptive comments (Appendix C).

2.3 NLDS Substrata Characteristics

In order to provide an integrated characterization of the seafloor substrata in the vicinity of the New London Disposal Site and Niantic Bay Disposal Site the results of SPI and PV imagery was used to define five broad habitat types (Table 2-2).

Table 2-1.

NLDS Target SPI/PV Station IDs/Locations

LOCATION	STATION ID	Original EPA Site ID	EASTING[1]	NORTHING[1]	LATITUDE[2]	LONGITUDE[2]
NEW LONDON DISPOSAL SITE LOCATIONS						
New London	NLDS 1	NL015	360852	201668	41° 16.500'	72° 4.860'
New London	NLDS 2	NL014	360686	201444	41° 16.380'	72° 4.980'
New London	NLDS 3	NLR014	360856	201112	41° 16.200'	72° 4.860'
New London	NLDS 4	NL013	360522	200888	41° 16.080'	72° 5.100'
New London	NLDS 5	NL011	361442	201117	41° 16.200'	72° 4.440'
New London	NLDS 6	NLP009	361446	200673	41° 15.960'	72° 4.440'
NIANTIC BAY DISPOSAL SITE LOCATIONS						
Niantic	NBDS 1	NTP017	352401	199941	41° 15.600'	72° 10.920'
Niantic	NBDS 2	NTP018	352564	200609	41° 15.960'	72° 10.800'
Niantic	NBDS 3	NTP018	352143	200828	41° 16.080'	72° 11.100'
Niantic	NBDS 4	NTP023	351729	200159	41° 15.720'	72° 11.400'
Niantic	NBDS 5	NTP025	352228	200717	41° 16.020'	72° 11.040'
Niantic	NBDS 6	NTR001	351479	199824	41° 15.540'	72° 11.580'
Niantic	NBDS 7	NTR004	351721	201269	41° 16.320'	72° 11.400'
Niantic	NBDS 8	NTR018	353317	200725	41° 16.020'	72° 10.260'
New Niantic	NBDS 9	-	353104	201281	41° 16.321'	72° 10.410'
New Niantic	NBDS 10	-	352918	199856	41° 15.552'	72° 10.550'
New Niantic	NBDS 11	-	351413	200759	41° 16.045'	72° 11.623'
EPA TRANSECT STATIONS						
EPA Transect Reference	EPA-P006	Refp006	357344	200086	41° 15.660'	72° 7.380'
EPA Transect Reference	EPA-P008	Refp008	358845	201097	41° 16.200'	72° 6.300'
EPA Transect Reference	EPA-P010	Refp010	358509	201206	41° 16.260'	72° 6.540'
EPA Transect Reference	EPA-P020	Refp020	353569	200615	41° 15.960'	72° 10.080'
EPA Transect Reference	EPA-P021	Refp021	354323	200731	41° 16.020'	72° 9.540'
EPA Transect Reference	EPA-P023	Refp023	358760	201207	41° 16.260'	72° 6.360'
EPA Transect Reference	EPA-P024	Refp024	358684	200207	41° 15.720'	72° 6.420'
EPA Transect Reference	EPA-P025	Refp025	357344	200086	41° 15.660'	72° 7.380'
EPA Transect Reference	EPA-P026	Refp026	357176	200085	41° 15.660'	72° 7.500'

LOCATION	STATION ID	Original EPA Site ID	EASTING[1]	NORTHING[1]	LATITUDE[2]	LONGITUDE[2]
EPA Transect Reference	EPA-P027	Refp027	355669	199963	41° 15.600'	72° 8.580'
EPA Transect Reference	EPA-R007	Refr007	360100	201329	41° 16.320'	72° 5.400'
EPA Transect Reference	EPA-R024	Refr024	353658	199950	41° 15.600'	72° 10.020'
NEW TRANSECT STATIONS						
New Transect Reference	NLT 1	-	360052	201892	41° 16.624'	72° 5.431'
New Transect Reference	NLT 2	-	359488	201848	41° 16.603'	72° 5.835'
New Transect Reference	NLT 3	-	356723	200925	41° 16.115'	72° 7.821'
New Transect Reference	NLT 4	-	356022	200792	41° 16.047'	72° 8.323'
New Transect Reference	NLT 5	-	355046	200683	41° 15.991'	72° 9.022'
New Transect Reference	NLT 6	-	354363	199922	41° 15.583'	72° 9.515'
New Transect Reference	NLT 7	-	354994	199941	41° 15.590'	72° 9.063'
New Transect Reference	NLT 8	-	356142	200002	41° 15.619'	72° 8.241'
New Transect Reference	NLT 9	-	357942	200125	41° 15.679'	72° 6.952'
New Transect Reference	NLT 10	-	359030	200225	41° 15.728'	72° 6.172'
New Transect Reference	NLT 11	-	359499	200342	41° 15.790'	72° 5.836'
New Transect Reference	NLT 12	-	360144	200354	41° 15.794'	72° 5.374'
New Transect Reference	NLT 13	-	359895	200635	41° 15.946'	72° 5.550'
New Transect Reference	NLT 14	-	360050	200972	41° 16.128'	72° 5.438'
New Transect Reference	NLT 15	-	359738	201161	41° 16.231'	72° 5.660'
NLDS REFERENCE AREA STATIONS						
NE-REF	NE-REF 1	-	362910	201970	41° 16.654'	72° 3.384'
NE-REF	NE-REF 2	-	362832	202080	41° 16.714'	72° 3.440'
NE-REF	NE-REF 3	-	362939	202098	41° 16.724'	72° 3.363'
NE-REF	NE-REF 4	-	363006	202060	41° 16.703'	72° 3.315'
NLON REF	NLON REF 1	-	364970	201976	41° 16.649'	72° 1.909'
NLON REF	NLON REF 2	-	364787	201997	41° 16.661'	72° 2.040'
NLON REF	NLON REF 3	-	364889	201907	41° 16.612'	72° 1.967'
NLON REF	NLON REF 4	-	364893	202073	41° 16.702'	72° 1.963'
NLON-ALT EPA	NLON-ALT 1	-	357631	201201	41° 16.261'	72° 7.168'

LOCATION	STATION ID	Original EPA Site ID	EASTING[1]	NORTHING[1]	LATITUDE[2]	LONGITUDE[2]
NLON-ALT EPA	NLON-ALT 2	-	357753	201102	41° 16.207'	72° 7.082'
NLON-ALT EPA	NLON-ALT 3	-	357860	201138	41° 16.226'	72° 7.005'
NLON-ALT EPA	NLON-ALT 4	-	357776	201262	41° 16.294'	72° 7.064'
WREF	WREF 1	-	359347	201065	41° 16.181'	72° 5.941'
WREF	WREF 2	-	359425	201108	41° 16.204'	72° 5.884'
WREF	WREF 3	-	359202	201132	41° 16.218'	72° 6.044'
WREF	WREF 4	-	359326	201227	41° 16.268'	72° 5.955'

Notes
1. Grid coordinates are Connecticut State Plane FIPS 0600 (NAD83), in meters
2. Geographic coordinates are WGS84 degrees decimal minutes

Table 2-2.

Substrata Habitat Types

Substratum	Characteristics	Habitat	Sediment transport
Rock	Hard bottom, boulders or large cobbles.	Dominated by encrusting organisms: sponges, hydroids, algae, anemones and mobile epifauna	Assumed to be eroded ridges of glacial till or drift. Some periodic settlement of fines as drape over rock surfaces.
Shell	Layer of disarticulated shells: common mussel (*Mytilus*), slipper shell (*Crepidula*), cockles (*Cerastoderma*) and clams (*Ensis, Spisula, Mercenaria*).	Surface layer of clean shells and pebbles on coarse to fine sand. Infauna in layer of coarse shell hash overlying fine sand and silt. Some encrusting organisms on pebbles.	Assumed to be area of active strong near-bed currents moving shells (absence of epifaunal growth).
Mobile sand	Fine sand with bedforms, isolated shells and pebbles.	Active infauna including acorn worms (*Saccoglossus*), deep burrowing polychaetes. Some resistant epifauna on shells or isolated pebbles.	Assumed to be area of moderate near-bed currents sufficient to periodically move sand in bedload.
Transitional	Surface with shell layer and mud drape.	Epifauna on shell layer and infaunal burrowing organisms.	Episodic transport of shell alternating with deposition.
Depositional	Very fine sand or silt with no bedforms. Some isolated shells and pebbles	Dominated by deep burrowing infauna and some encrusting organisms (hydroids, bryozoans, anemones) on hard surfaces	Assumed to be low near-bed currents with very infrequent storm transport of surface sediment.

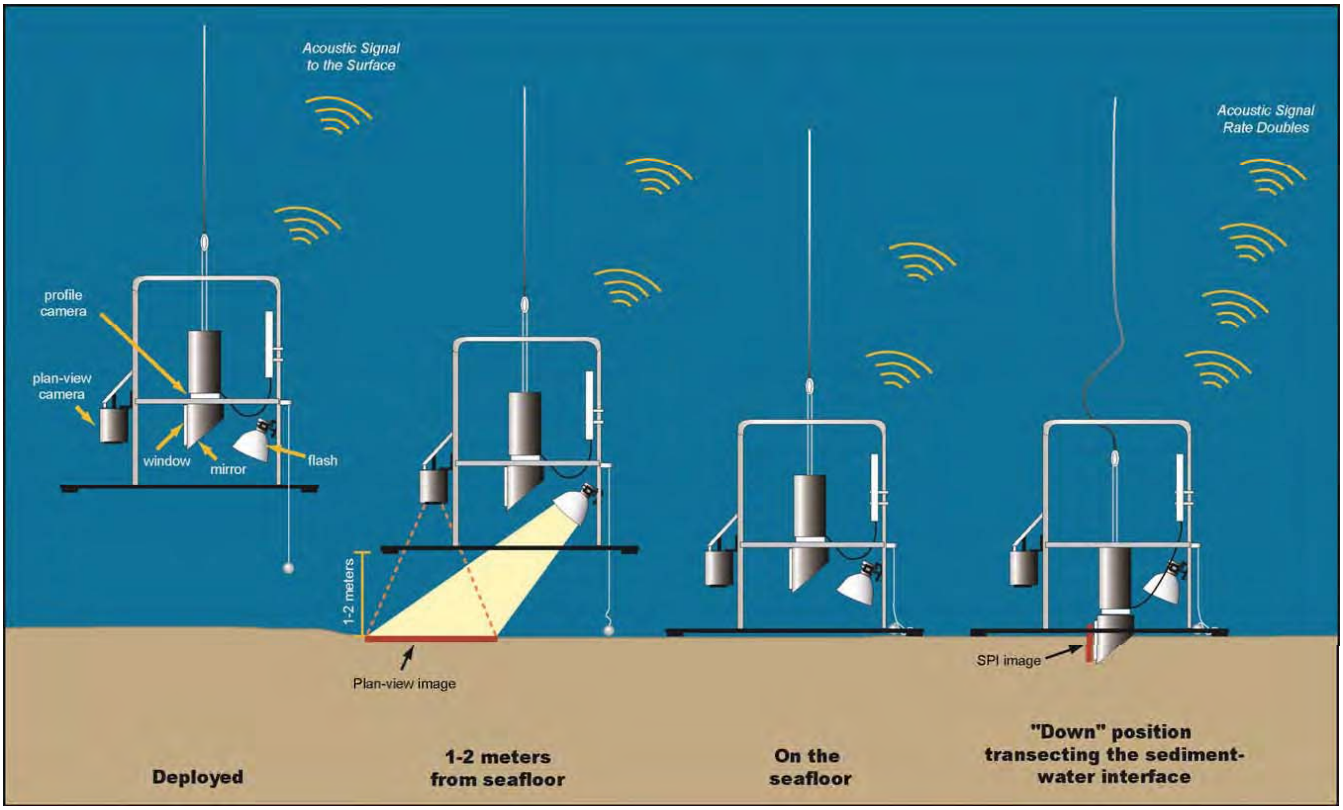


Figure 2-1. Schematic diagram of the SPI/PV camera deployment

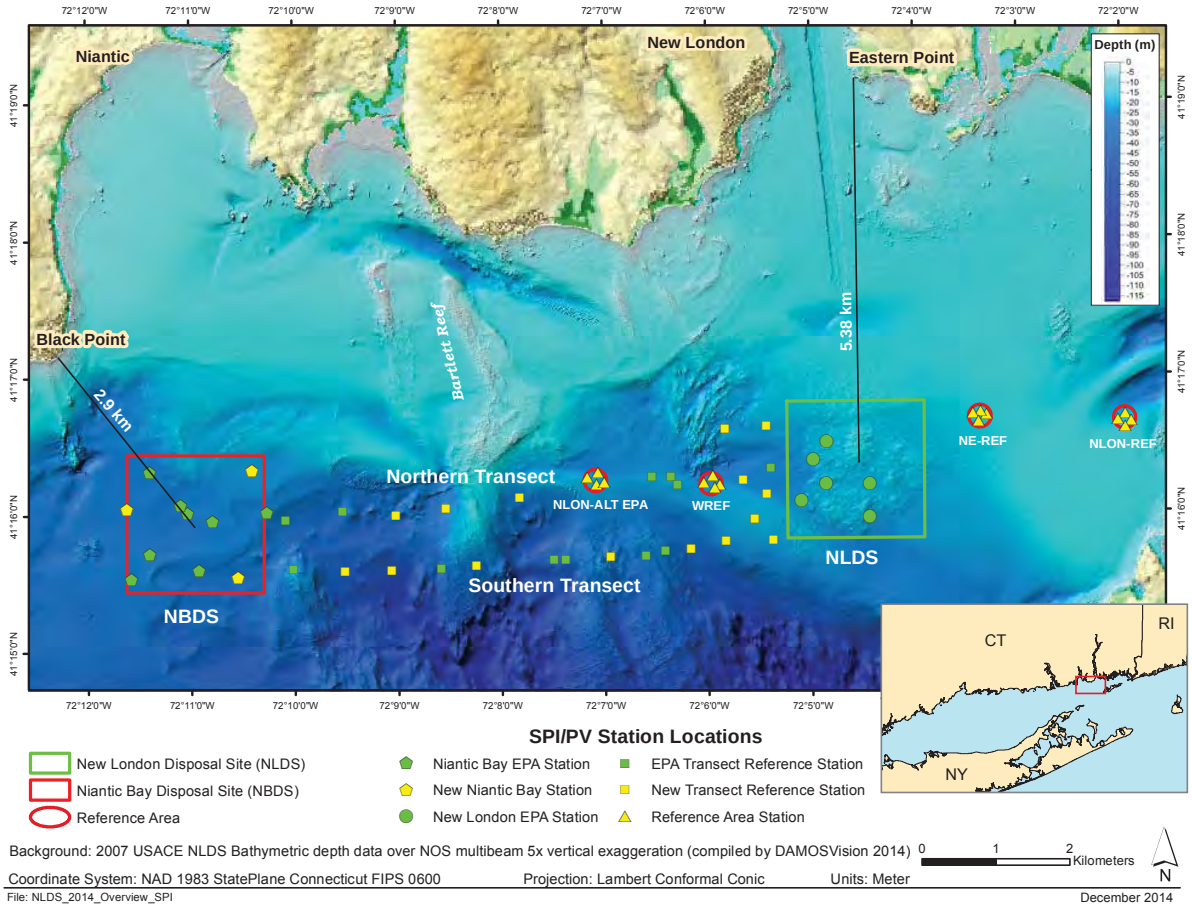


Figure 2-2. Actual SPI/PV station locations at NLDS, NBDS, transects, and reference areas

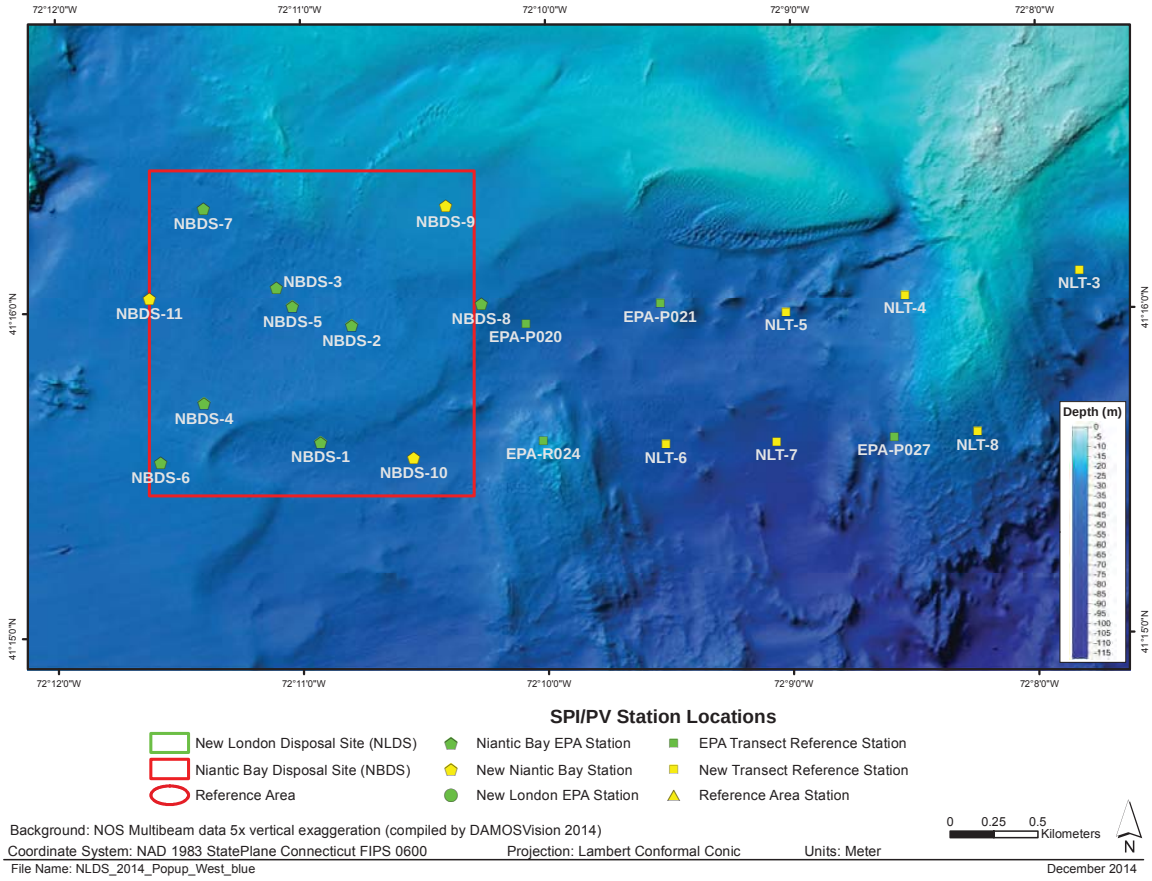


Figure 2-3. Actual SPI/PV station locations and names at NBDS and the western section of the transects

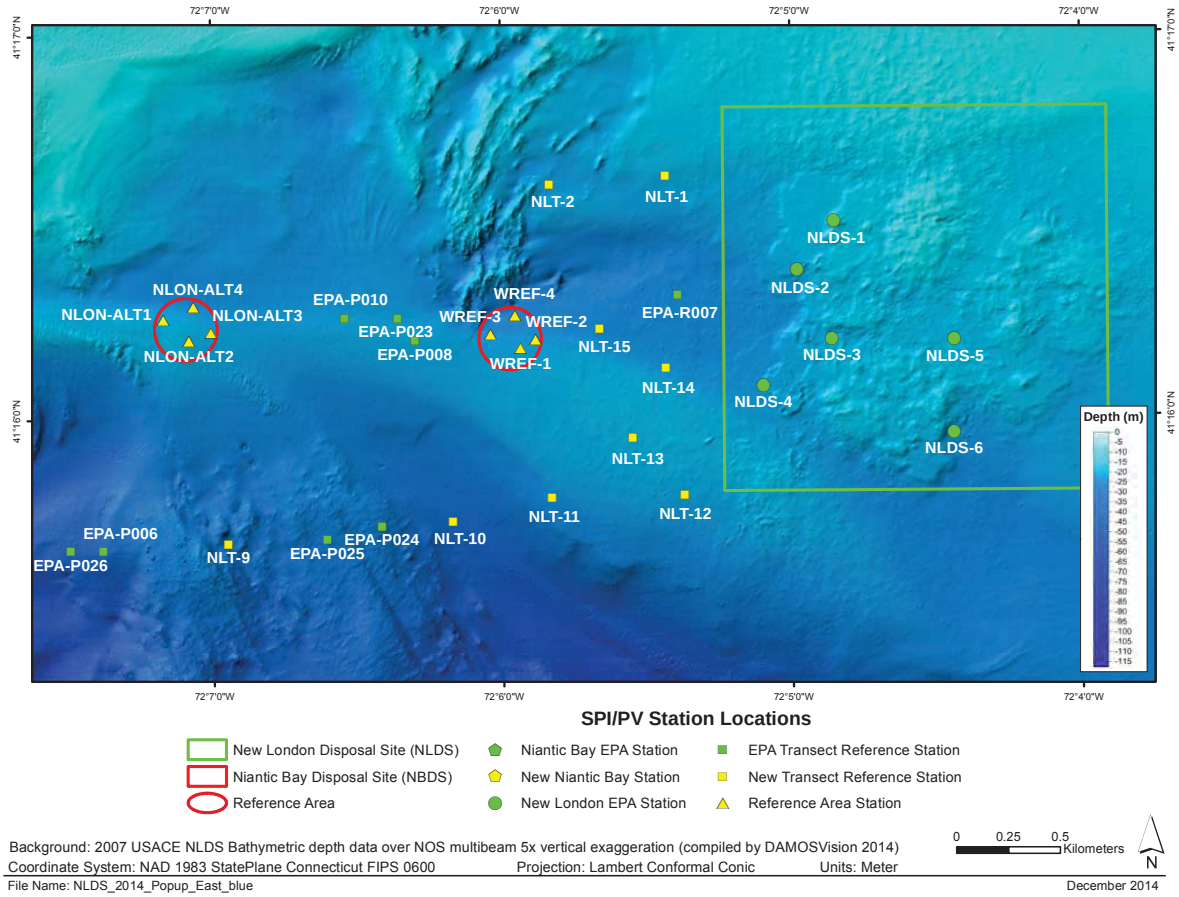


Figure 2-4. Actual SPI/PV station locations and names at NLDS, the eastern section of the transects, and the central reference areas

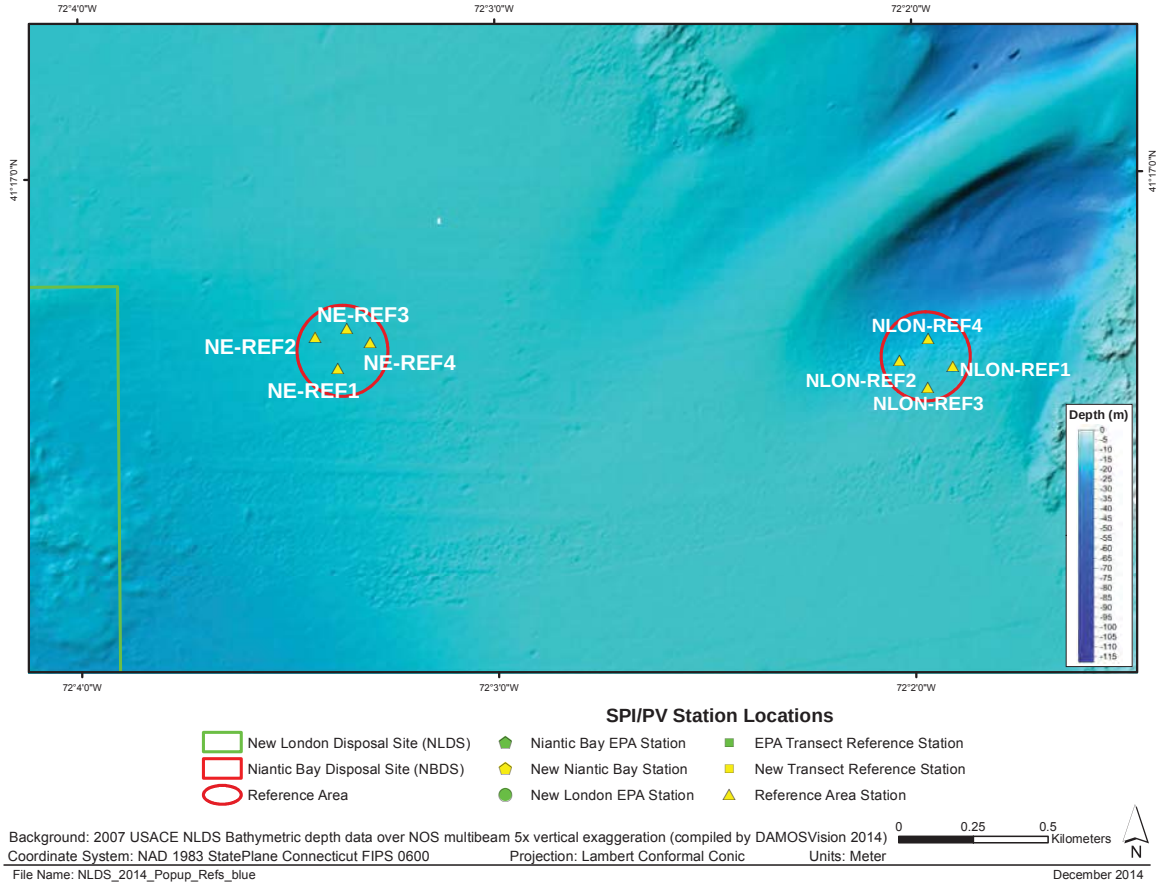


Figure 2-5. Actual SPI/PV station locations at the eastern-most reference areas

3.0 RESULTS

3.1 Sediment-Profile and Plan-View Imaging

The primary purpose of the SPI/PV survey at NLDS/NBDS was to characterize the physical features of the surface sediment throughout the study area and to assess the status of benthic recolonization within the disposal site. A total of 60 SPI/PV stations were occupied; 6 stations within NLDS, 11 stations within NBDS, 27 transect stations in the area between the two sites, and 4 stations in each of four reference areas (NLON-ALT, WREF, NE-REF, and NLON-REF).

A station summary of some measured parameters can be found in Table 3-1 with a complete set of results in Appendix C.

3.1.1 Eastern Reference Areas (NE-REF, and NLON-REF)

Physical Sediment Characteristics

The eastern reference areas were primarily very fine sand (4 to 3 phi) but some replicates had evidence of silt layers beneath the surface (Figure 3-1 and Appendix C). NE-REF had fine (3 to 2 phi) and very fine sand with no evidence of sediment transport, which was classified as a depositional substratum (Figure 3-2). NLON-REF had very fine sand with evidence of sediment transport, which was classified as mobile sand substratum (fine sand with bedforms, isolated shells and pebbles; assumed to be area of moderate near-bed currents sufficient to periodically move sand in bedload). However, several replicates had silt (>4 phi) below the very fine sand and clearly had experienced periods of deposition (Appendix C). The difference between the reference areas was illustrated by the relative penetration depths of the camera (Figure 3-3; NLON-REF mean 5.3 cm and NE-REF mean of 9.1 cm).

Biological Conditions

The eastern reference areas had typical shallow water estuarine infaunal characteristics (burrows, bioturbation, and deep aRPDs) and numerous epifaunal scavenging organisms (Appendix C). Common infaunal deposit feeders in fine sand habitats of eastern Long Island Sound include numerous polychaetes and *Saccoglossus kowalewskyi*, an enteropneust that deposits a distinctive fecal coil on the surface. *Saccoglossus* is typically found in mobile sand habitats in eastern Long Island Sound and more quiescent habitats in the Gulf of Maine. Another typical infaunal organism, *Chaetopterus variopedatus* forms a thick parchment tube in the sediment and pumps water through the tube. Both *Saccoglossus* coils and *Chaetopterus* tubes were found at NLON-REF but not at NE-REF (Appendix C). NE-REF had large burrow openings and polychaetes visible below the sediment-water interface.

All stations at the eastern reference areas had at least one replicate with evidence of Stage 3 equilibrium conditions (*Saccoglossus* coils are one type of such evidence, Figure 3-4). The mean aRPD for all stations at NLON-REF was 3.6 cm and for NE-REF, 4.6 cm (Figure 3-5).

3.1.2 New London Disposal Site Stations

Physical Sediment Characteristics

The NLDS stations were located in areas that received dredged material over many years and are typical of conditions seen there (AECOM 2009, Carey et al. 2013). The surface sediments consisted of fine to medium sand overlying silt (Figure 3-6). In one case, there was a large rock that prevented grain size assessment with SPI but the PV images clearly showed a surface layer of sand (Appendix C). The surface layer had clear evidence of sediment transport and lag deposits (shells and pebbles) but the shells were covered with a thin layer of silt ('mud drape'). As a result, the substrate was classified as transitional (Figure 3-7). In this case, the presence of consolidated silt underneath a surface layer of fine to medium sand, shells and silt layers, indicated periodic sediment transport sufficient to move unconsolidated fine sand but not enough to move shells and silt. The camera penetration depth was a clear indicator of the presence of soft dredged material below the surface of fine sand; penetration depths ranged from 0 (rock) to 18.8 cm (Figure 3-8).

Biological Conditions

The sediments at NLDS were heavily bioturbated with numerous burrows and evidence of subsurface feeding (Appendix C). The shell lag and pebbles had encrusting and attached epifauna, further evidence that the shells do not move frequently. All of the stations that could be measured had evidence of Stage 3 equilibrium conditions (feeding voids and burrows, Figure 3-9). The mean aRPD for all stations at NLDS was 3.1 cm (Figure 3-10).

3.1.3 Northern and Southern Transect Stations, Including the Central Reference Areas (NLON-ALT, and WREF)

Physical Sediment Characteristics

The northern and southern transects were selected to provide a profile of conditions between the two disposal sites. As such, the physical conditions along the transects covered a wide range. Both transects crossed north-south oriented boulder ridges and a southeast-northwest oriented sand ridge (Figure 2-2). One of the ridges is an extension of Bartlett Reef and these ridges are likely part of a complex of glaciolacustrine systems in Long Island Sound representing deltaic and ice-marginal deposits (Figure 2-2 and Stone et al. 2005). Between the ridges the seafloor deepens and forms small erosional basins. The two central reference areas had four random stations each and conditions were quite similar within them. WREF has been used routinely for assessment of NLDS disposal activities, NLON-ALT has not. WREF had consistent shelly fine sand over silt (3 to 2/ >4 phi) while NLON-ALT was primarily shelly fine sand with some underlying silt and a visible mud drape over the shells (Figure 3-6). WREF had clear evidence of sediment transport features and was classified as mobile sand while NLON-ALT appeared to be more transitional with mud deposits and epifauna (Figure 3-7). These results suggested that the two reference areas are similar to NLDS: experiencing periodic bottom stress capable of moving sand or shell particles, but also periods of quiescent conditions that allow deposition of

silt. The camera penetration depth measurements indicated that WREF was softer than NLON-ALT with a mean penetration depth of 7.6 cm compared to 4.8 cm (Figure 3-8).

The northern transect included stations previously sampled by EPA and newly selected stations to provide a characterization of a corridor connecting the central reference stations to the two disposal sites (Figure 2-2). Station grain sizes ranged from fine sand to medium sand over silt, with several indeterminate stations due to hard bottom or shells (Figures 3-6 and 3-11). The southern transect stations were chosen to link the existing EPA stations to a corridor between the two disposal sites (Figure 2-2). Station grain sizes ranged from very fine sand to gravel over silt (Figures 3-6 and 3-11). The northern transect stations in the east (near NLDS) were all mobile sand or transitional substrata, consistent with the two reference areas (Figure 3-7). The northern transect stations in the west (near NBDS) were a mix of coarse shells on the margins of ridges; mobile sand and transitional in the deeper basin (Figure 3-12). The southern transect stations in the east were mobile sand or transitional up to a resistant hard ridge with rock and shells (Figure 3-7). The southern transect stations in the west were rock and shells over another hard ridge and then transitional in the basin to rock on another hard ridge at the eastern edge of NBDS (Figure 3-12). Camera penetration depths varied widely along the northern transect from 0 to 9.2 cm and along the southern transect from 0 to 10.9 cm (Figure 3-8 and 3-13).

Biological Conditions

The sediments at WREF and NLON-ALT were bioturbated with some evidence of subsurface feeding (Appendix C). The shell lag and pebbles had encrusting and attached epifauna, further evidence that the shells do not move frequently. All of the stations that could be measured had evidence of Stage 3 equilibrium conditions at WREF, and evidence of mostly Stage 2 at NLON-ALT (Figure 3-9). The mean aRPD for all stations at WREF was 3.6 cm and at NLON-ALT only one station had a measurable aRPD due to layers of shell on the surface (Figure 3-10).

Along both transects the presence of shells (*Mytilus* and *Crepidula*) and rock surfaces provided substrata for many epifaunal organisms (sponges, anemones, bryozoans, hydroids, and barnacles). In the softer sediments within the basins, there was evidence of burrowing organisms and, in places, large numbers of *Crepidula* shells. The aRPD values in the northern transect ranged from 2.9 to 6.5 cm and in the southern transect ranged from 2.0 to 4.7 cm (Figures 3-10 and 3-14).

3.1.4 Niantic Bay Disposal Site Stations

Physical Sediment Characteristics

The NBDS stations were located in an area that had not received dredged material in many years; despite the history of the site, no dredged material was detected in the stations sampled. The southeast triangular portion of the site (Stations 1, 2, 6, 8 and 10) had a surface layer of coarse shells overlying fine and very fine sand (Figure 3-11). The presence of the shell layer appears to be a lag deposit overlying sand and was classified as shell substratum (Figure 3-12). In the northwest triangular portion of the site (Stations 3, 4, 5, 7, 9 and 11) the surface layer had fewer shells and fine sand (Figure 3-11). In this area the surface layer had clear evidence of sediment

transport; as a result, the substrate was classified as mobile sand (Figure 3-12). In both cases, there was evidence of active bedload transport sufficient to move unconsolidated fine sand and periodically enough to move shells (shells had some evidence of epifauna but appeared to be fairly clean). The camera penetration depth was a clear indicator of the relative distribution of compacted sand and shells; mean penetration depths were 5.1 cm in the southeast and 6.5 cm in the northwest (Figure 3-13). Stations 1 and 10 in the southeast had more fine sand and silt below the surface and deeper penetration; Station 5 had compacted sand and very limited penetration (Figure 3-13).

Biological Conditions

The mobile sand and shelly substrata had relatively little evidence of biological activity: some signs of bioturbation and epifaunal organisms on shells. These substrata are typically inhabited by highly mobile epifauna, and some infauna that are adapted to moving surface layers (but without fine sediment content there was little evidence of burrows or aRPDs). Only one replicate had evidence of Stage 3 (Station 4B); again a typical result in coarse sediments where Stage 2 evidence (shallow burrowing, lack of anoxic subsurface sediments) is most common (Figure 3-15). The aRPDs were indeterminate in six of the eleven stations; the mean aRPD was 3.1 cm (Figure 3-14).

Table 3-1.

Summary of Substratum and Grain Size Major Mode (averaged across replicates)

Location	Station	Substratum	Grain Size Major Mode
NLDS	NLDS 1	Transitional	3 to 2/ >4
	NLDS 2	Transitional	3 to 2/ >4
	NLDS 3	Transitional	2 to 1/ >4
	NLDS 4	Transitional	3 to 2/ >4
	NLDS 5	Transitional	3 to 2/ >4
	NLDS 6	Transitional	ind
	EPA P006	Shell	3 to 2/ >4
	EPA P008	Transitional	3 to 2/ >4
	EPA P010	Transitional	3 to 2/ >4
	EPA P020	Shell	3 to 2/ >4
	EPA P021	Mobile Sand	2 to 1/ >4
	EPA P023	Transitional	3 to 2/ >4
	EPA P024	Rock	< 1 / >4
	EPA P025	Shell	1 to 0
	EPA P026	Shell	3 to 2/ >4
	EPA P027	Shell	1 to 0
	EPA R007	Mobile Sand	3 to 2
	EPA R024	Rock	ind
NBDS	NBDS 1	Shell	2 to 1/ >4
	NBDS 2	Shell	2 to 1

Location	Station	Substratum	Grain Size Major Mode
	NBDS 3	Mobile Sand	3 to 2
	NBDS 4	Mobile Sand	3 to 2
	NBDS 5	Mobile Sand	3 to 2
	NBDS 6	Shell	3 to 2
	NBDS 7	Mobile Sand	3 to 2
	NBDS 8	Shell	3 to 2
	NBDS 9	Mobile Sand	3 to 2
	NBDS 10	Shell	3 to 2
	NBDS 11	Mobile Sand	3 to 2
New Transect	NLT 1	Transitional	3 to 2/ >4
	NLT 2	Mobile Sand	3 to 2/ >4
	NLT 3	Shell	ind
	NLT 4	Shell	ind
	NLT 5	Transitional	2 to 1/ >4
	NLT 6	Transitional	2 to 1/ >4
	NLT 7	Transitional	3 to 2
	NLT 8	Rock	ind
	NLT 9	Shell	2 to 1/ >4
	NLT 10	Mobile Sand	1 to 2
	NLT 11	Mobile Sand	3 to 2/ >4
	NLT 12	Mobile Sand	3 to 2/ >4
	NLT 13	Mobile Sand	3 to 2/ >4
	NLT 14	Transitional	3 to 2/ >4
	NLT 15	Mobile Sand	3 to 2/ >4
Reference Areas	WREF 1	Mobile Sand	3 to 2/ >4
	WREF 2	Mobile Sand	3 to 2/ >4
	WREF 3	Mobile Sand	3 to 2/ >4
	WREF 4	Mobile Sand	3 to 2/ >4
	NLON ALT1	Transitional	3 to 2
	NLON ALT2	Transitional	3 to 2
	NLON ALT3	Transitional	3 to 2
	NLON ALT4	Transitional	3 to 2/ >4
	NLON REF1	Mobile Sand	4 to 3
	NLON REF2	Mobile Sand	4 to 3
	NLON REF3	Mobile Sand	4 to 3
	NLON REF4	Mobile Sand	4 to 3/ >4
	NE REF1	Depositional	3 to 2
	NE REF2	Depositional	4 to 3
	NE REF3	Depositional	4 to 3
	NE REF4	Depositional	4 to 3

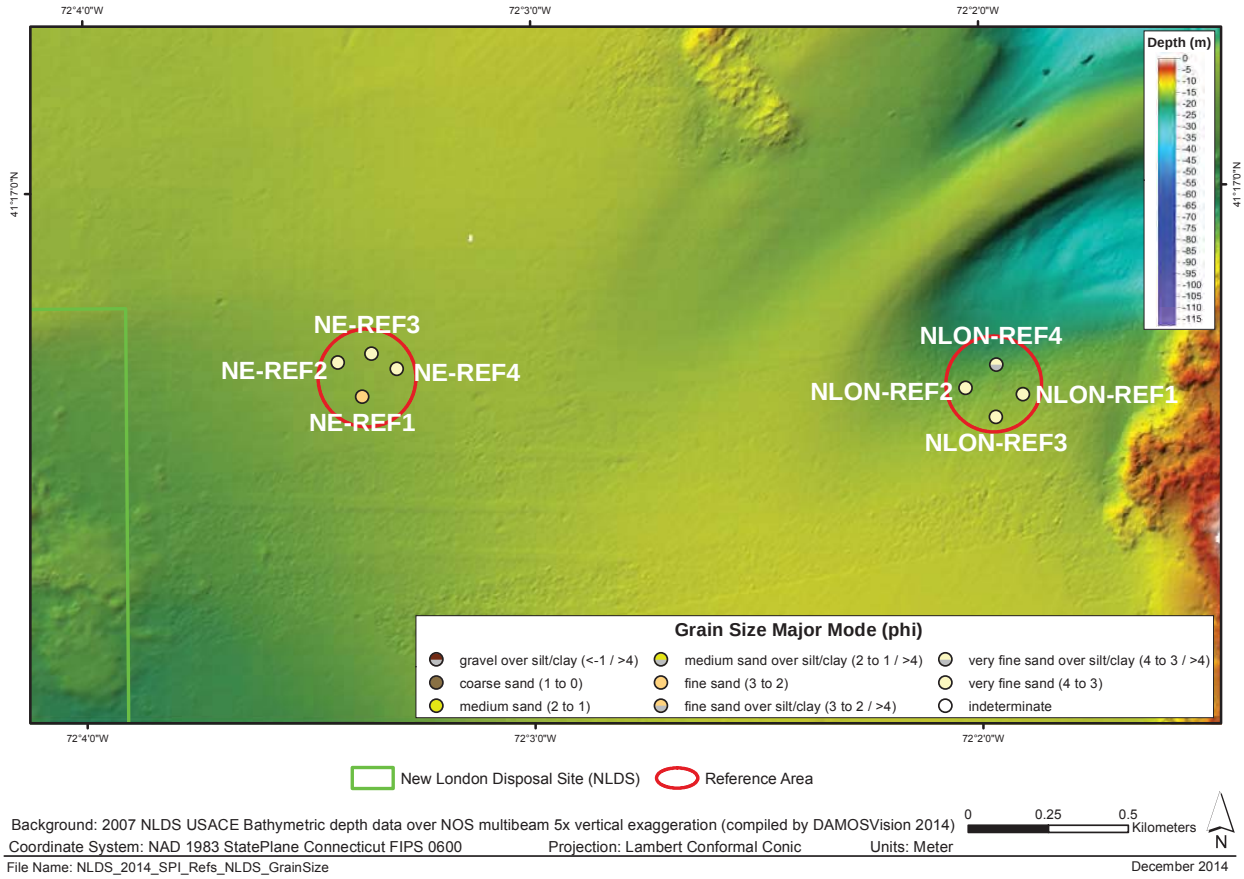
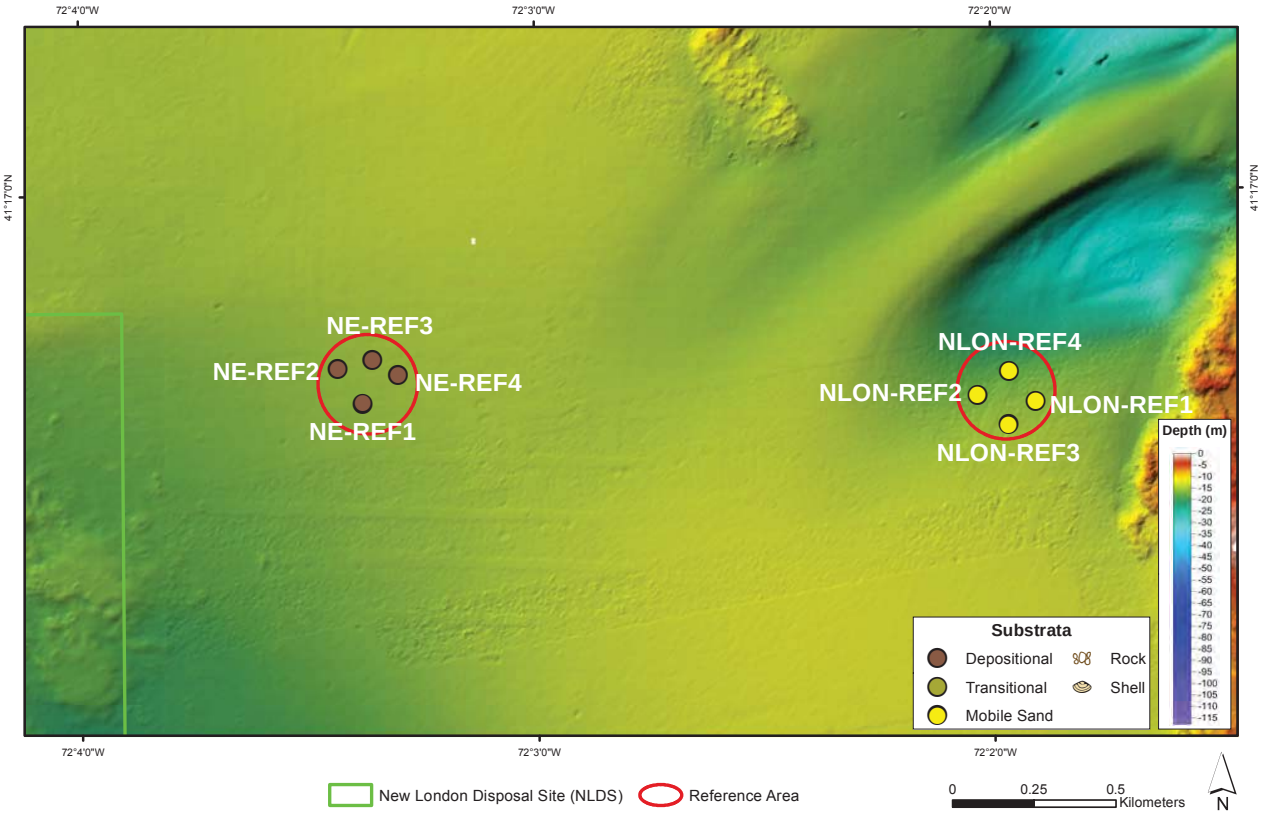


Figure 3-1. Sediment grain size major mode (phi units) at the eastern-most reference areas



Background: 2007 NLDS USACE Bathymetric depth data over NOS multibeam 5x vertical exaggeration (compiled by DAMOSVision 2014)
Coordinate System: NAD 1983 StatePlane Connecticut FIPS 0600 Projection: Lambert Conformal Conic Units: Meter
File Name: NLDS_2014_SPI_REfs_NBDS_5x_spectrum_substrata March 2015

Figure 3-2. Substrata characteristics at the eastern-most reference areas

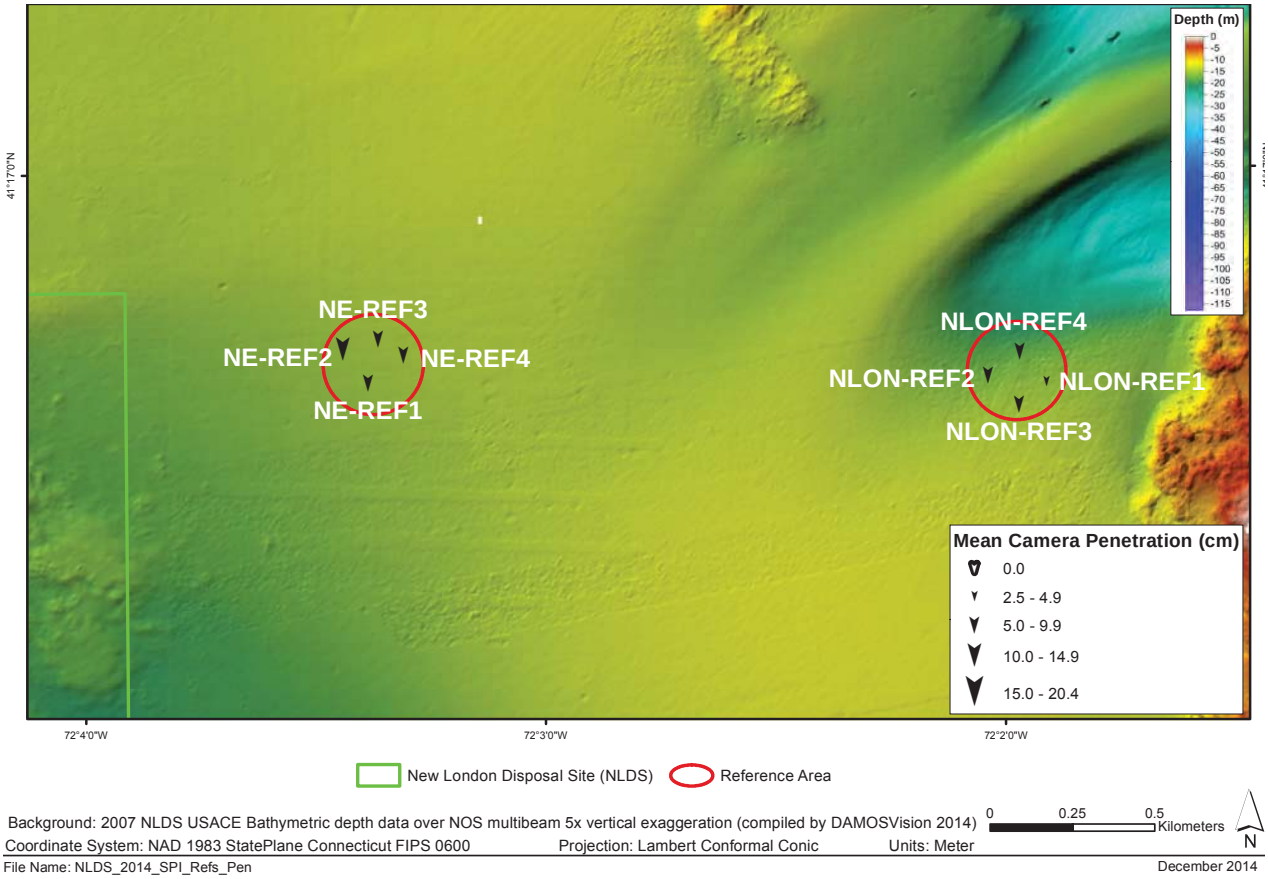
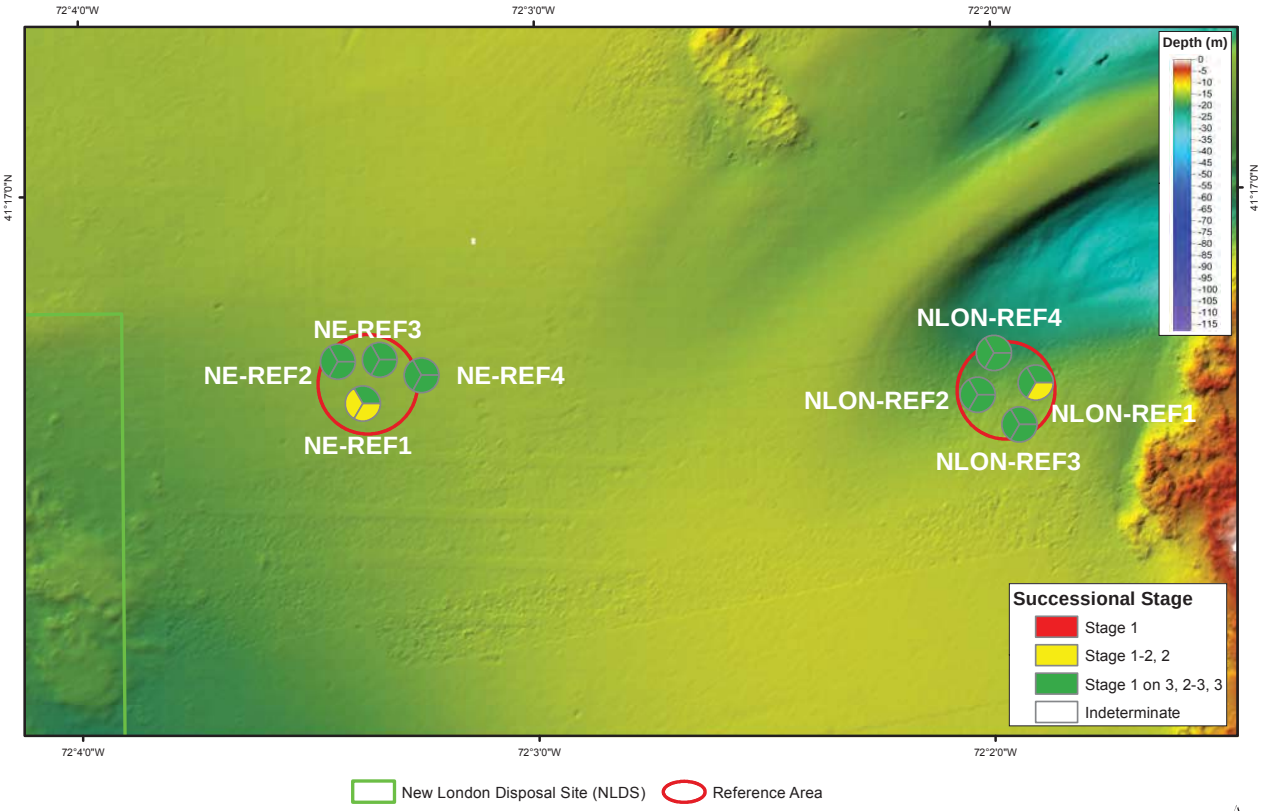


Figure 3-3. Camera penetration depths at the eastern-most reference areas



Background: 2007 NLDS USACE Bathymetric depth data over NOS multibeam 5x vertical exaggeration (compiled by DAMOSVision 2014)
Coordinate System: NAD 1983 StatePlane Connecticut FIPS 0600 Projection: Lambert Conformal Conic Units: Meter
0 0.25 0.5 Kilometers
N
File Name: NLDS_2014_SPI_Refs_SS
December 2014

Figure 3-4. Successional stage at the eastern-most reference areas

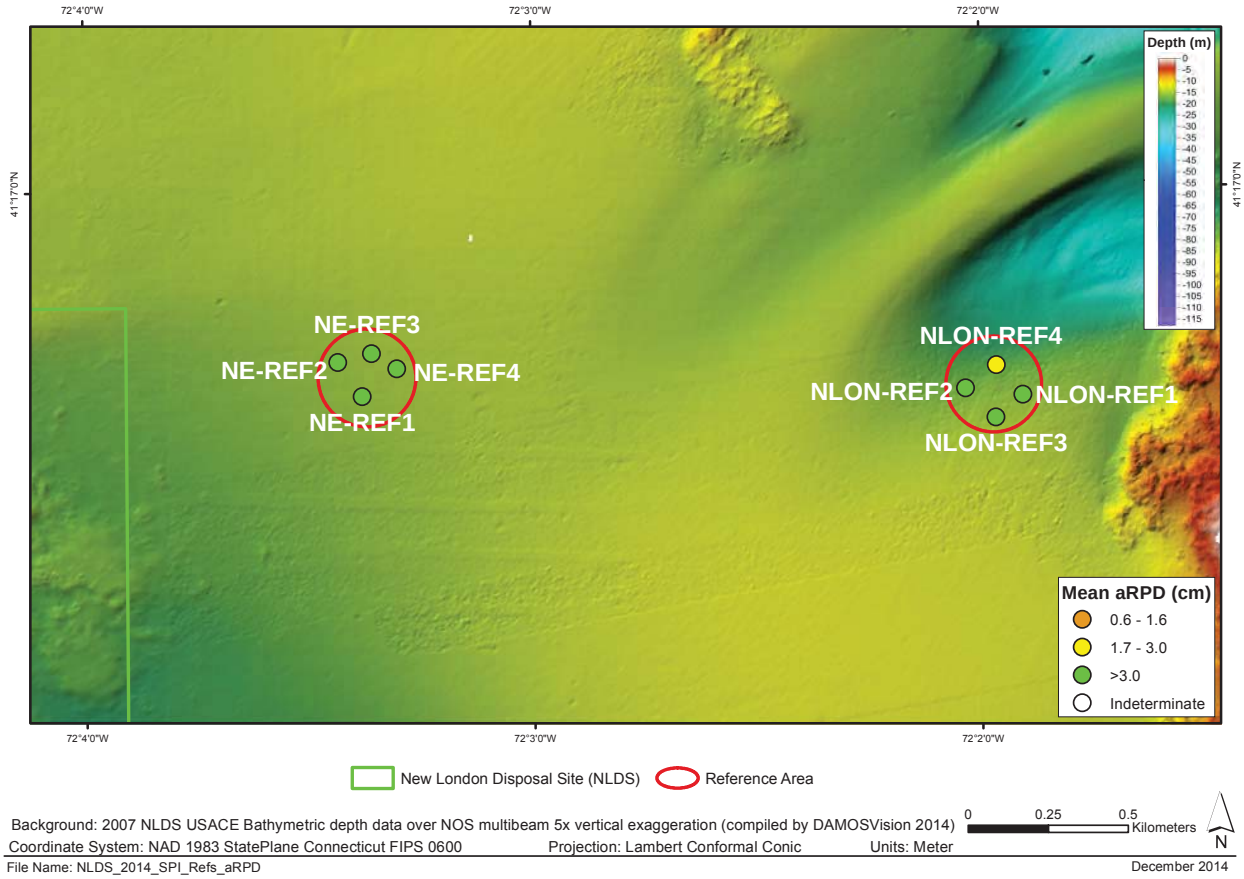
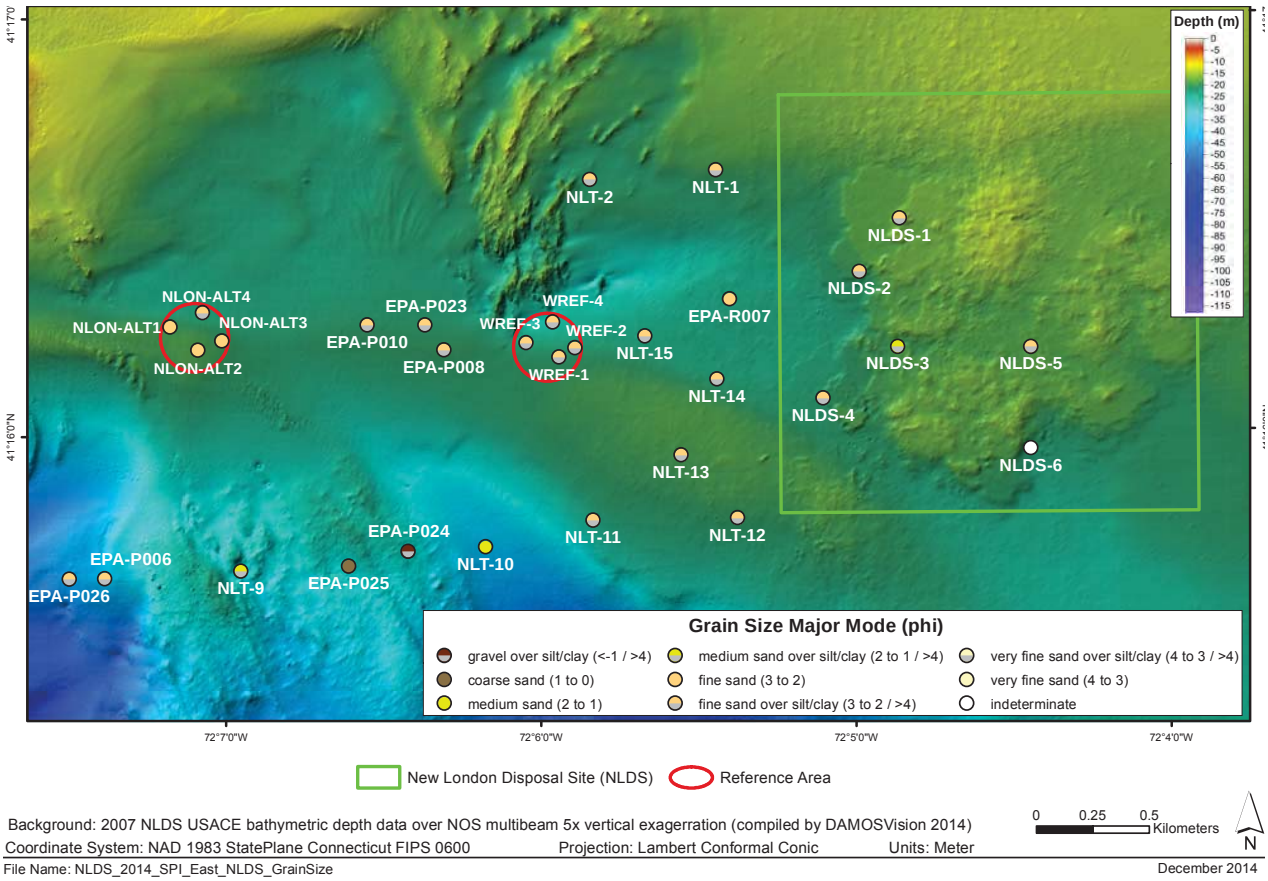
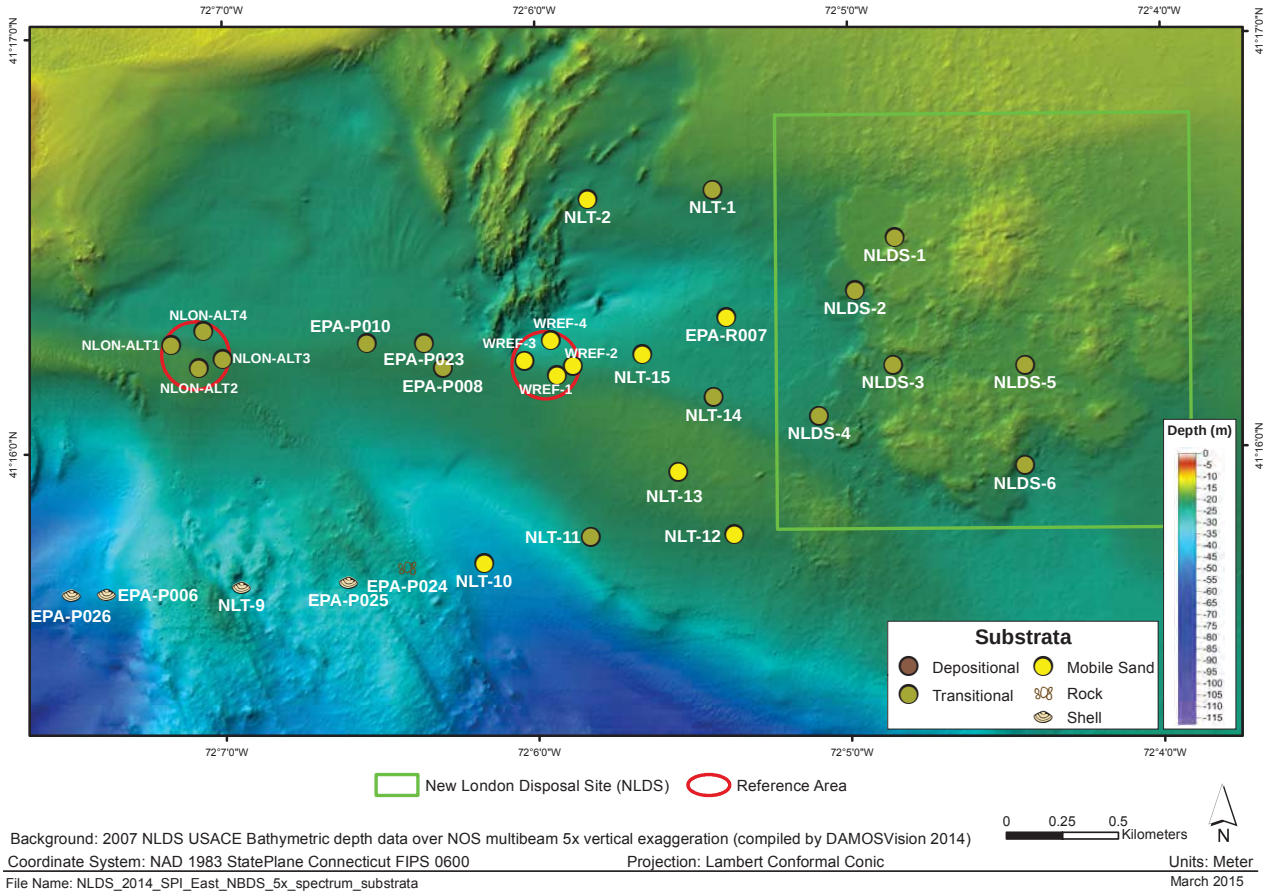


Figure 3-5. Apparent Redox Potential Discontinuity (aRPD) at the eastern-most reference areas



Background: 2007 NLDS USACE bathymetric depth data over NOS multibeam 5x vertical exagerration (compiled by DAMOSVision 2014)
Coordinate System: NAD 1983 StatePlane Connecticut FIPS 0600 Projection: Lambert Conformal Conic Units: Meter
File Name: NLDS_2014_SPI_East_NLDS_GrainSize December 2014

Figure 3-6. Sediment grain size major mode (phi units) within NLDS, the eastern transect stations, and the central reference areas



Background: 2007 NLDS USACE Bathymetric depth data over NOS multibeam 5x vertical exaggeration (compiled by DAMOSVision 2014)
Coordinate System: NAD 1983 StatePlane Connecticut FIPS 0600 Projection: Lambert Conformal Conic Units: Meter
File Name: NLDS_2014_SPI_East_NBDS_5x_spectrum_substrata March 2015

Figure 3-7. Substrata characteristics within NLDS, the eastern transect stations, and the central reference areas

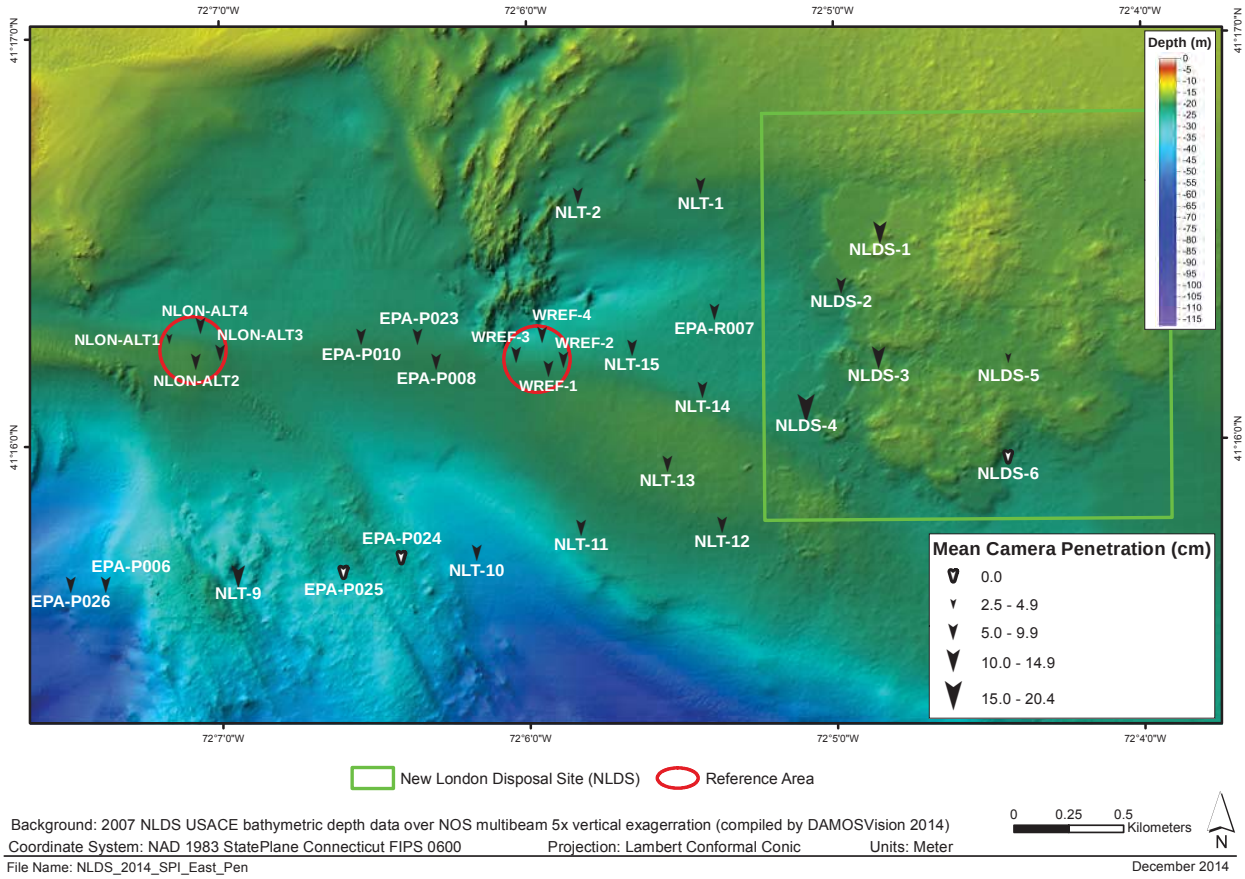
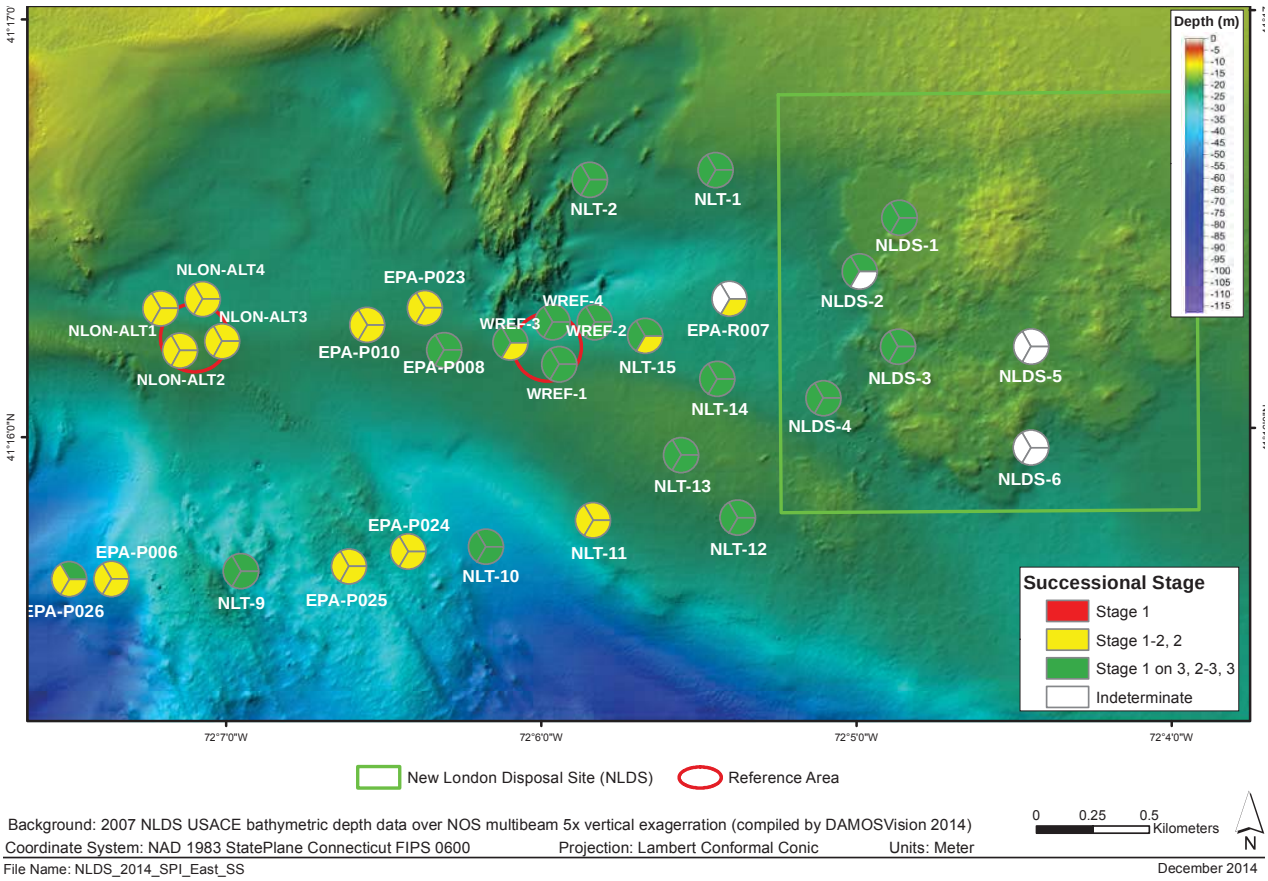
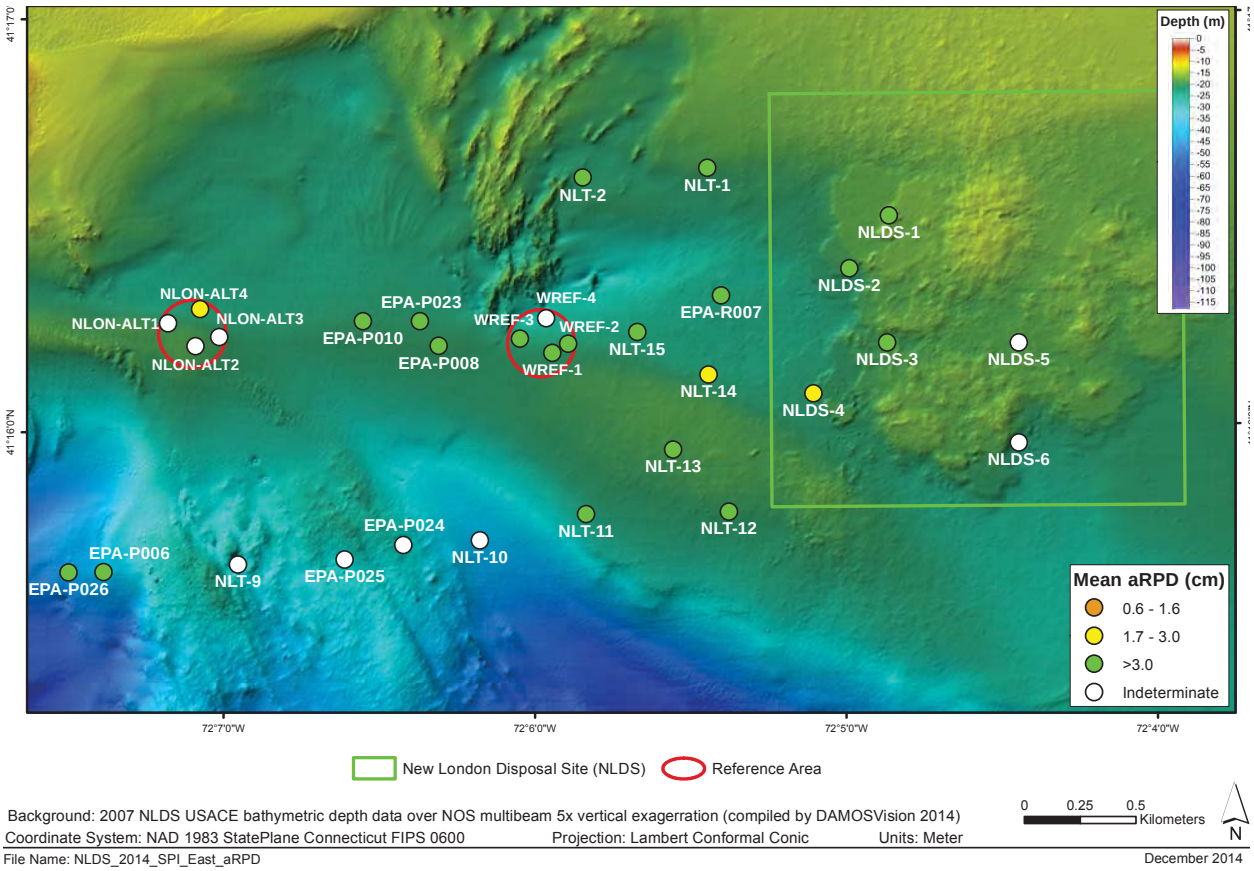


Figure 3-8. Camera penetration depths within NLDS, the eastern transect stations, and the central reference areas



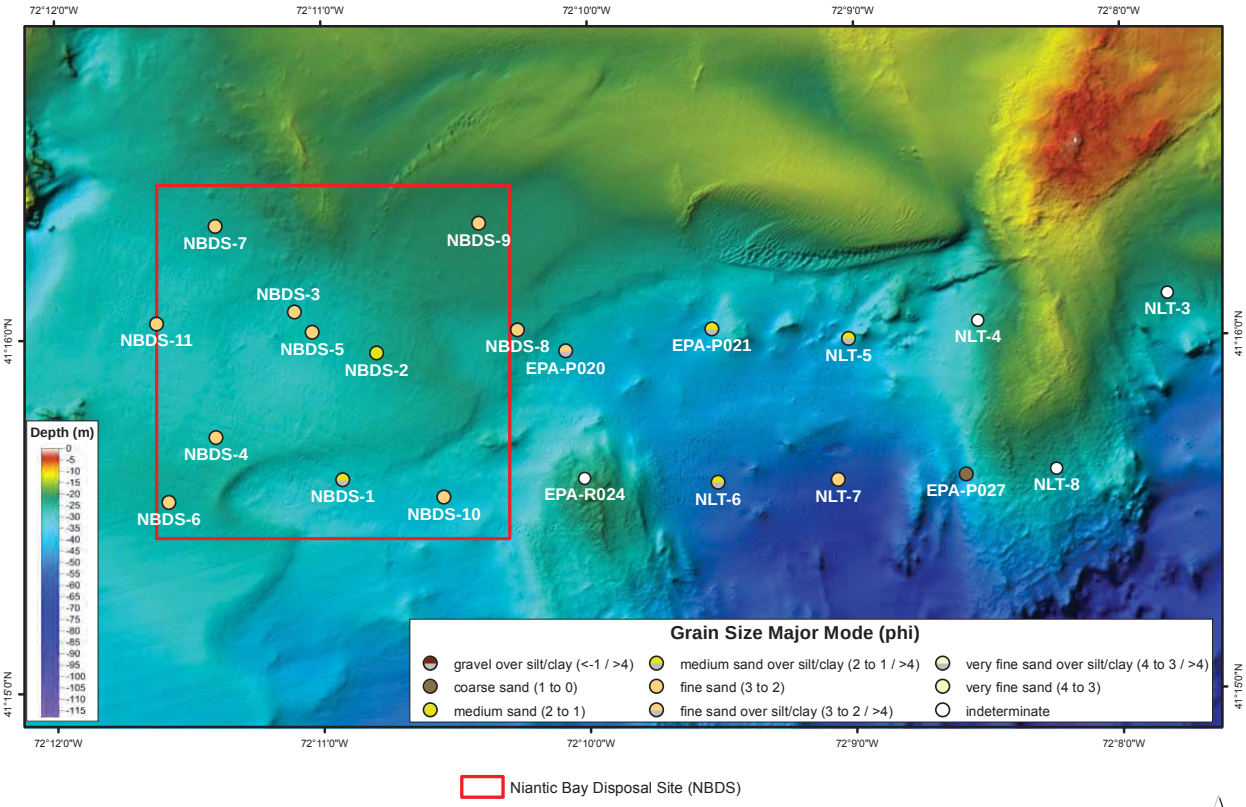
Background: 2007 NLDS USACE bathymetric depth data over NOS multibeam 5x vertical exagerration (compiled by DAMOSVision 2014)
Coordinate System: NAD 1983 StatePlane Connecticut FIPS 0600 Projection: Lambert Conformal Conic Units: Meter
File Name: NLDS_2014_SPI_East_SS December 2014

Figure 3-9. Successional stage within NLDS, the eastern transect stations, and the central reference areas



Background: 2007 NLDS USACE bathymetric depth data over NOS multibeam 5x vertical exagerration (compiled by DAMOSVision 2014)
Coordinate System: NAD 1983 StatePlane Connecticut FIPS 0600 Projection: Lambert Conformal Conic Units: Meter
File Name: NLDS_2014_SPI_East_aRPD December 2014

Figure 3-10. Apparent Redox Potential Discontinuity (aRPD) within NLDS, the eastern transect stations, and the central reference areas



Background: NOS multibeam data 5x vertical exaggeration (compiled by DAMOSVision 2014)
Coordinate System: NAD 1983 StatePlane Connecticut FIPS 0600 Projection: Lambert Conformal Conic Units: Meter
File Name: NLDS_2014_SPI_West_NBDS_GrainSize December 2014

Figure 3-11. Sediment grain size major mode (phi units) at stations within NBDS and the western transect stations

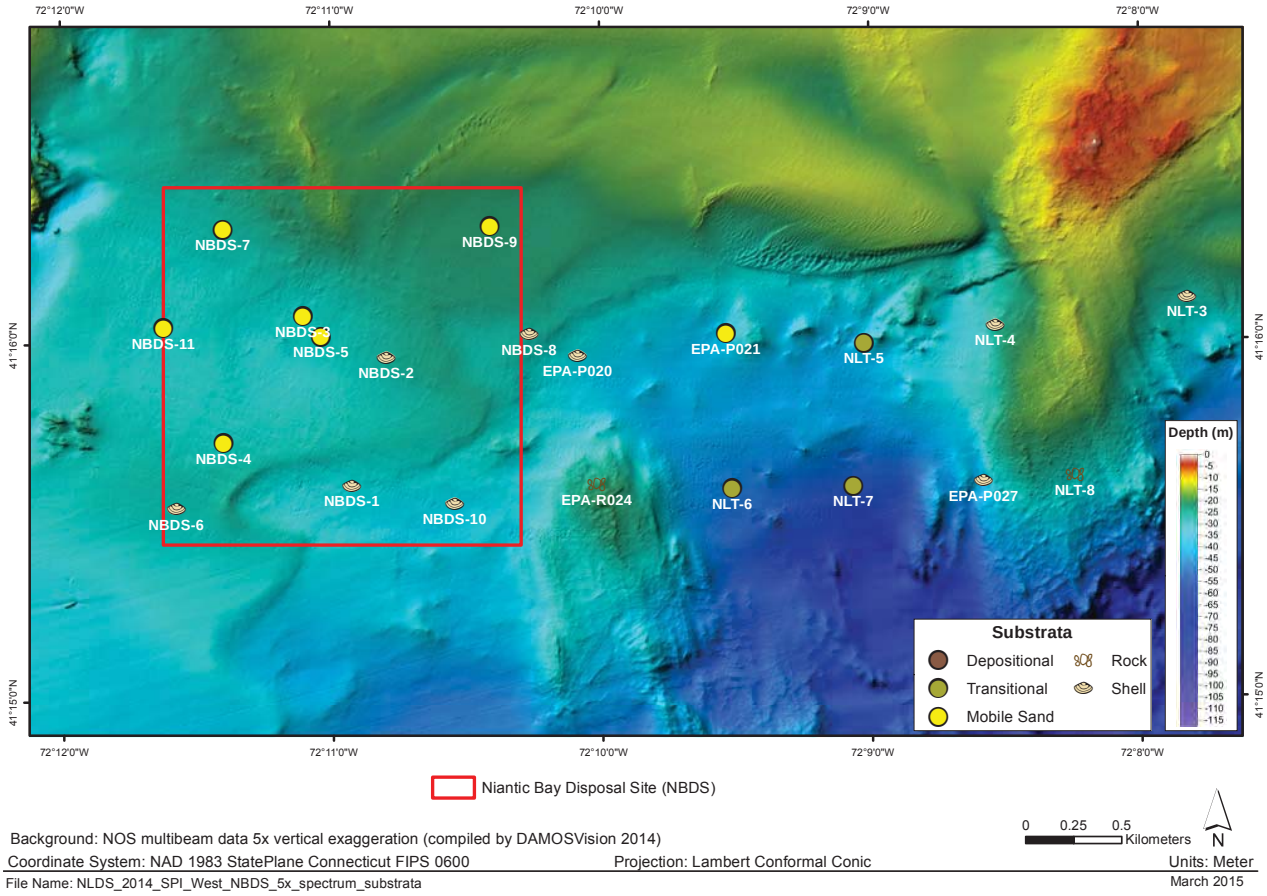
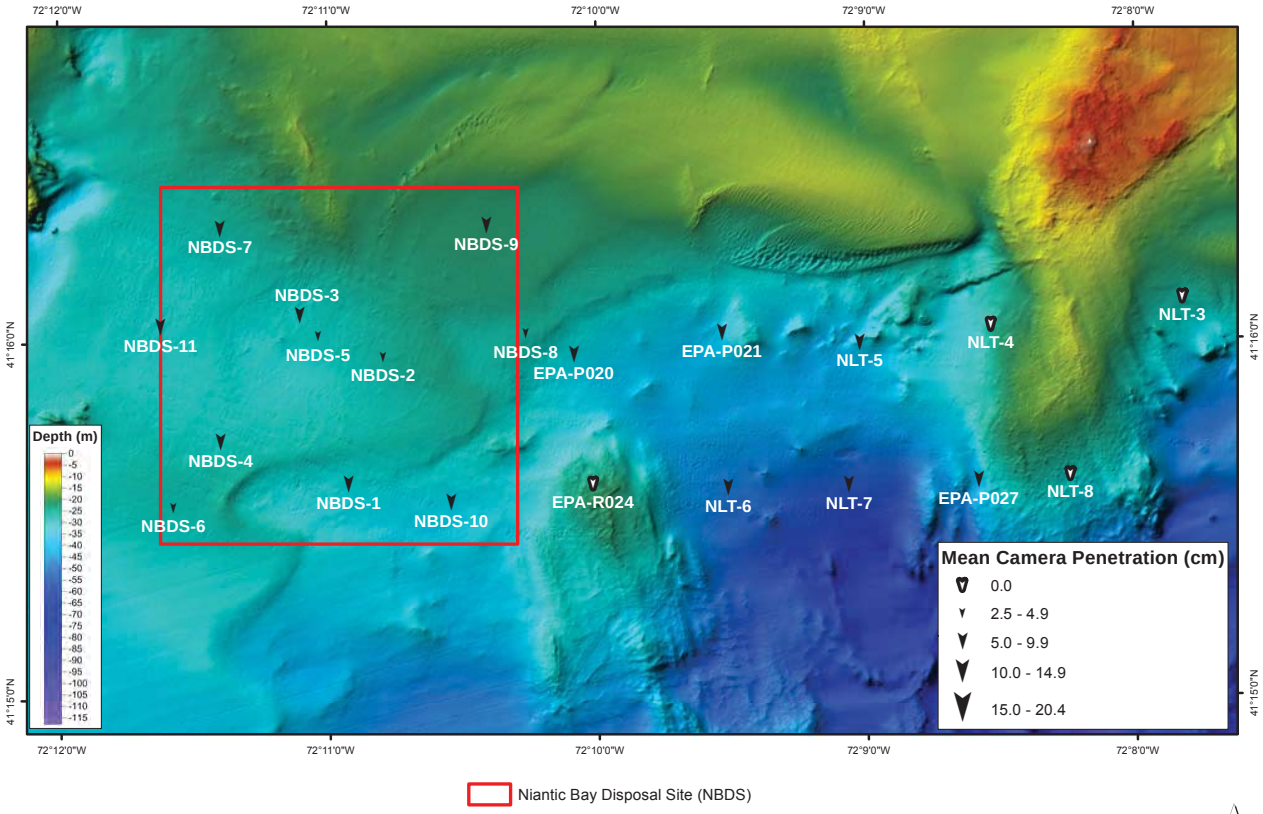
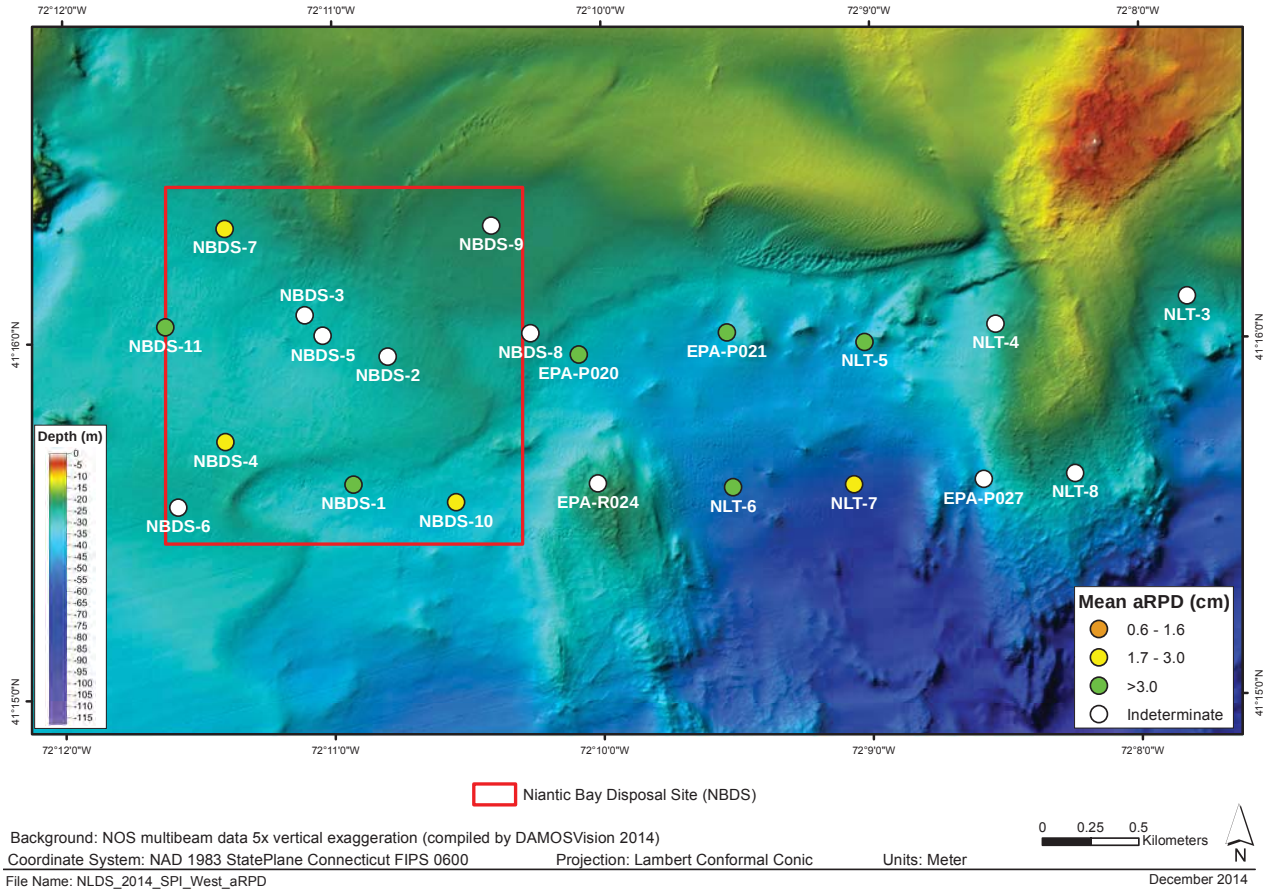


Figure 3-12. Substrata characteristics at stations within NBDS and the western transect stations



Background: NOS multibeam data 5x vertical exaggeration (compiled by DAMOSVision 2014)
Coordinate System: NAD 1983 StatePlane Connecticut FIPS 0600 Projection: Lambert Conformal Conic Units: Meter
File Name: NLDS_2014_SPI_West_Pen December 2014

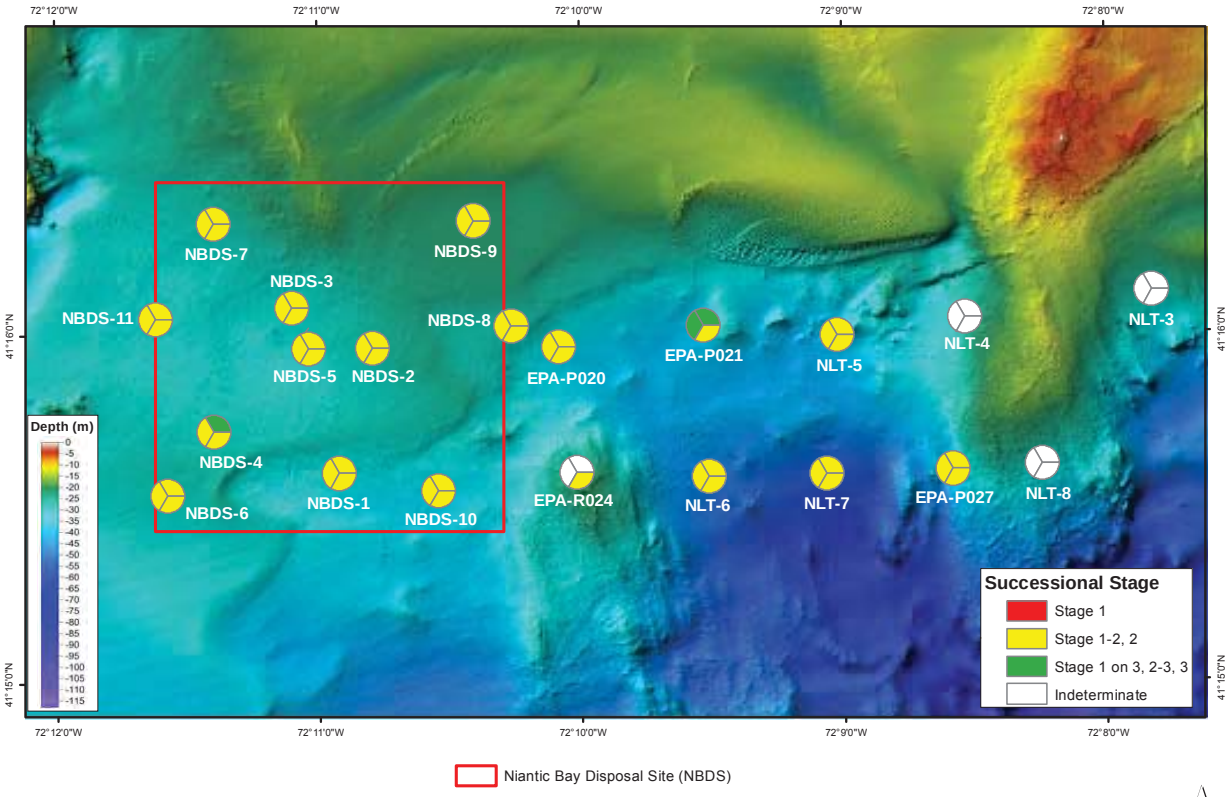
Figure 3-13. Camera penetration depths at stations within NBDS and the western transect stations



Niantic Bay Disposal Site (NBDS)

Background: NOS multibeam data 5x vertical exaggeration (compiled by DAMOSVision 2014)
Coordinate System: NAD 1983 StatePlane Connecticut FIPS 0600 Projection: Lambert Conformal Conic Units: Meter
0 0.25 0.5 Kilometers
N
File Name: NLDS_2014_SPI_West_aRPD
December 2014

Figure 3-14. Apparent Redox Potential Discontinuity (aRPD) at stations within NBDS and the western transect stations



Background: NOS multibeam data 5x vertical exaggeration (compiled by DAMOSVision 2014)
Coordinate System: NAD 1983 StatePlane Connecticut FIPS 0600 Projection: Lambert Conformal Conic Units: Meter
File Name: NLDS_2014_SPI_West_SS December 2014

Figure 3-15. Successional stage at stations within NBDS and the western transect stations areas

4.0 SUMMARY

The SPI/PV survey obtained images of cross-sections of the sediment-water interface and plan-view images of the seafloor surface. The results included estimated grain-size information, evidence of sediment transport conditions, biological characteristics, and the effects of biological activity. SPI and PV can detect some conspicuous species but are primarily used to infer process from patterns of sedimentological and biological processes (Germano et al. 2011, Carey et al. 2014). The observed textures and patterns in the seafloor surface and subsurface provided evidence of the recent history of physical and biological processes that is relevant to management decisions (i.e., dredged material placement).

The SPI/PV survey characterized the physical characteristics of selected stations by measuring properties visible in SPI images (grain size major mode, penetration depth, boundary roughness, mud clasts), and observations from both SPI and PV images (sediment layers, sediment transport features). The biological assessment utilized the standard SPI biological assessment (Germano et al. 2011) to generate measured parameters (aRPD, feeding voids, methane, successional stage) and included additional observations from SPI and PV images on infauna, epifauna and traces of biological activity). Representative images for each reference area, transect, and disposal site illustrated the range of sediment conditions sampled during the survey (Figures 4-1, 4-2, 4-3).

In order to provide an integrated characterization of the seafloor, the results of physical and biological characterization from SPI and PV imagery was used to define five broad habitat types (Table 2-2). Seafloor habitats can be defined for many different scales but for this study represented distinctive bottom types of substrata and associated organisms within eastern Long Island Sound. These were defined based on visual characteristics and are not intended to correlate one to one with national standards or Long Island Sound Study (LISS) habitat mapping schemes (Auster et al. 2009, Shumchenia et al. 2014). The purpose was to allow specific areas of eastern Long Island Sound to be related to bottom stress modeling results. However, the general types described had a one to many relationship to the LISS approach (Table 4-1). The results could be cross-walked to the Coastal and Marine Ecological Classification Standard (CMECS) with additional analysis, but the simple habitat types are sufficient to assess suitability of areas for potential disposal sites (FGDC 2012).

The habitat types: rock and shells are expected to correlate with modeled or measured bottom stress values above the critical shear stress for transport of consolidated fine materials. The mobile sand habitat is expected to correlate with modeled or measured bottom stress values above the critical shear stress for bedload transport of sand particles. The transitional and depositional habitats are expected to correlate with modeled or measured bottom stress values below the value for transport of unconsolidated fine particles. Open water disposal sites are generally placed in habitats with relatively fine sediments below the wave base that experience transitional or depositional conditions.

Table 4-1.

Cross-walk of Substrata to LISS Habitats (Auster et al. 2009)

Seascape: Fishers Island Sound						
Subsystem: Deep Subtidal						
Substratum	**Characteristics**	**Habitat**	**Sediment transport**	**Class**	**Subclass**	**Secondary Subclass and Modifiers**
Rock	Hard bottom, boulders or large cobbles.	Dominated by encrusting organisms: sponges, hydroids, algae, anemones and mobile epifauna.	Assumed to be eroded ridges of glacial till or drift. Some periodic settlement of fines as drape over rock surfaces.	Moraine or Boulder reef	Boulder	Boulder and pebble pavements
Shell	Layer of disarticulated shells: common mussel (*Mytilus*), slipper shell (*Crepidula*), cockles (*Cerastoderma*) and clams (*Ensis, Spisula, Mercenaria*).	Surface layer of clean shells and pebbles on coarse to fine sand. Infauna in layer of coarse shell hash overlying fine sand and silt. Some encrusting organisms on pebbles.	Assumed to be area of active strong near-bed currents moving shells (absence of epifaunal growth).	Moraine, Boulder reef or Sand dunes	Pebble	Biogenic deposit of coarse shells and epifauna
Mobile Sand	Fine sand with bedforms, isolated shells and pebbles.	Active infauna including acorn worms (*Saccoglossus*), deep burrowing polychaetes. Some resistant epifauna on shells or isolated pebbles.	Assumed to be area of moderate near-bed currents sufficient to periodically move sand in bedload.	Sand dunes or Sand bar	Sand	Sand dune, small asymmetrical ripples and arcuate ripples
Transitional	Surface with shell layer and mud drape.	Epifauna on shell layer and infaunal burrowing organisms.	Episodic transport of shell alternating with deposition.	Basin, Sand bar or Artificial structure	Mixed sediments	Lag deposits of shell and pebbles with epifauna and mud; dredged material
Depositional	Very fine sand or silt with no bedforms. Some isolated shells and pebbles.	Dominated by deep burrowing infauna and some encrusting organisms (hydroids, bryozoans, anemones) on hard surfaces.	Assumed to be low near-bed currents with very infrequent storm transport of surface sediment.	Mud fields	Mud	Lobster burrow; infaunal community

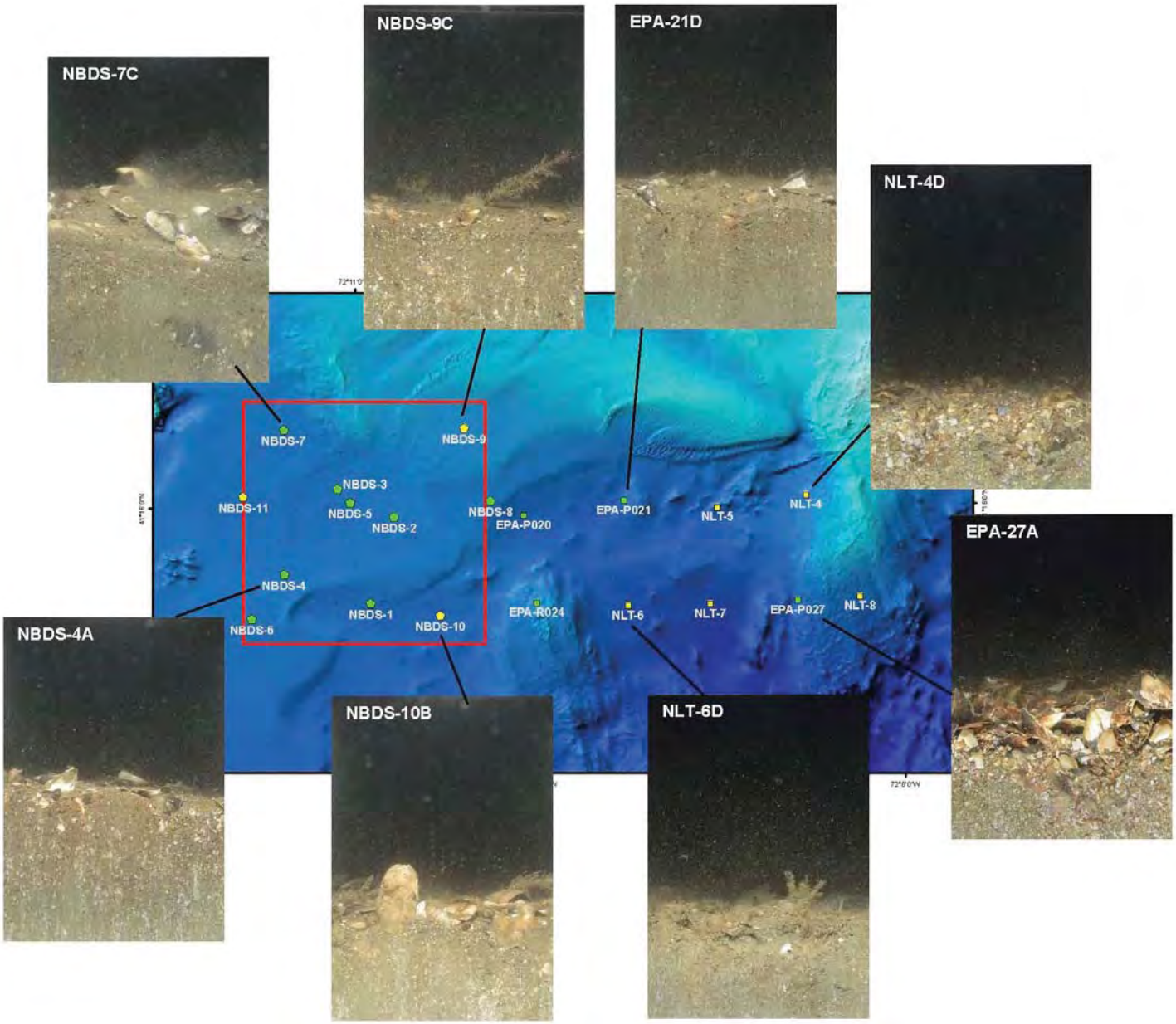


Figure 4-1. Representative images from western part of the study area

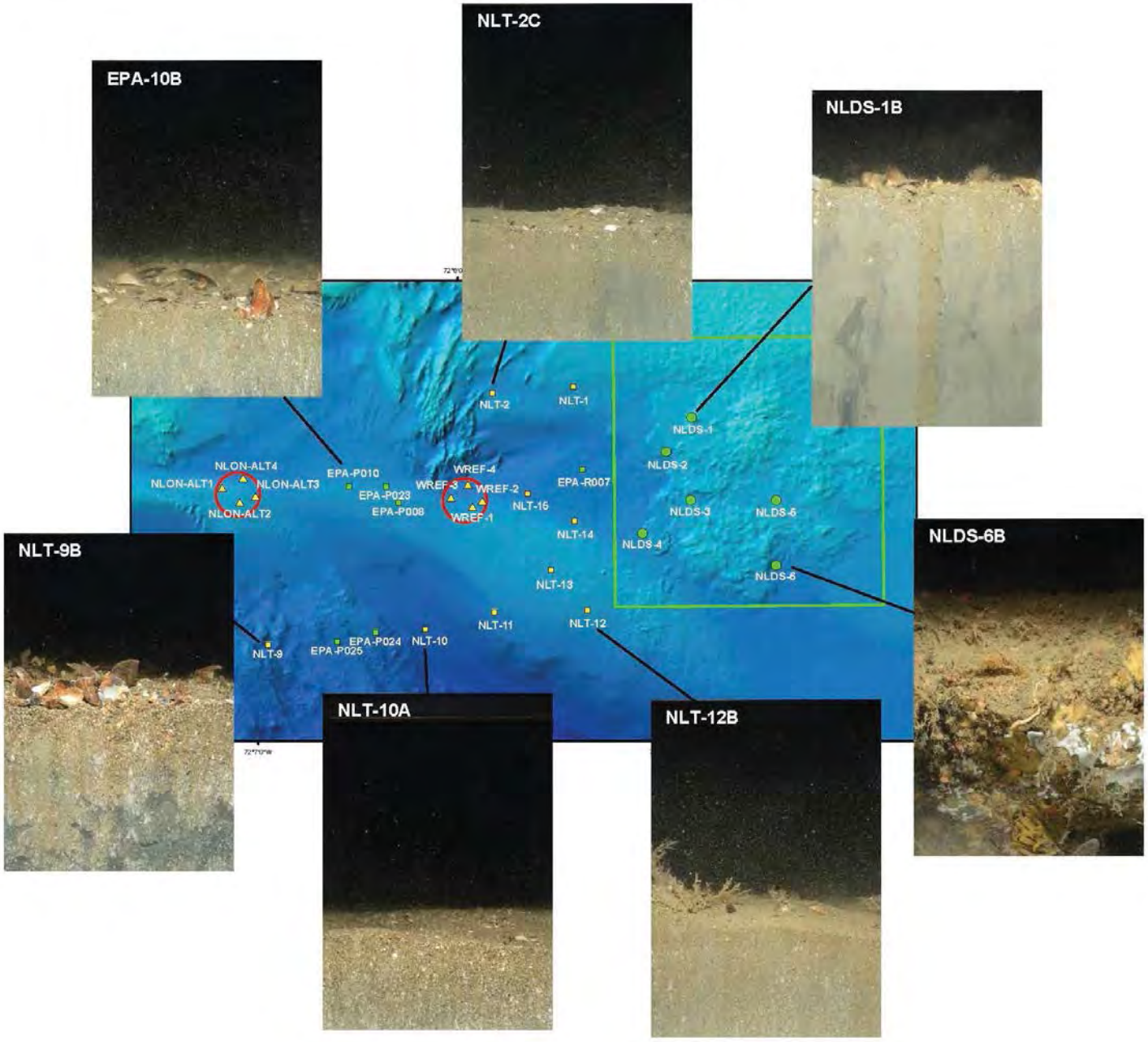


Figure 4-2. Representative images from eastern part of the study area

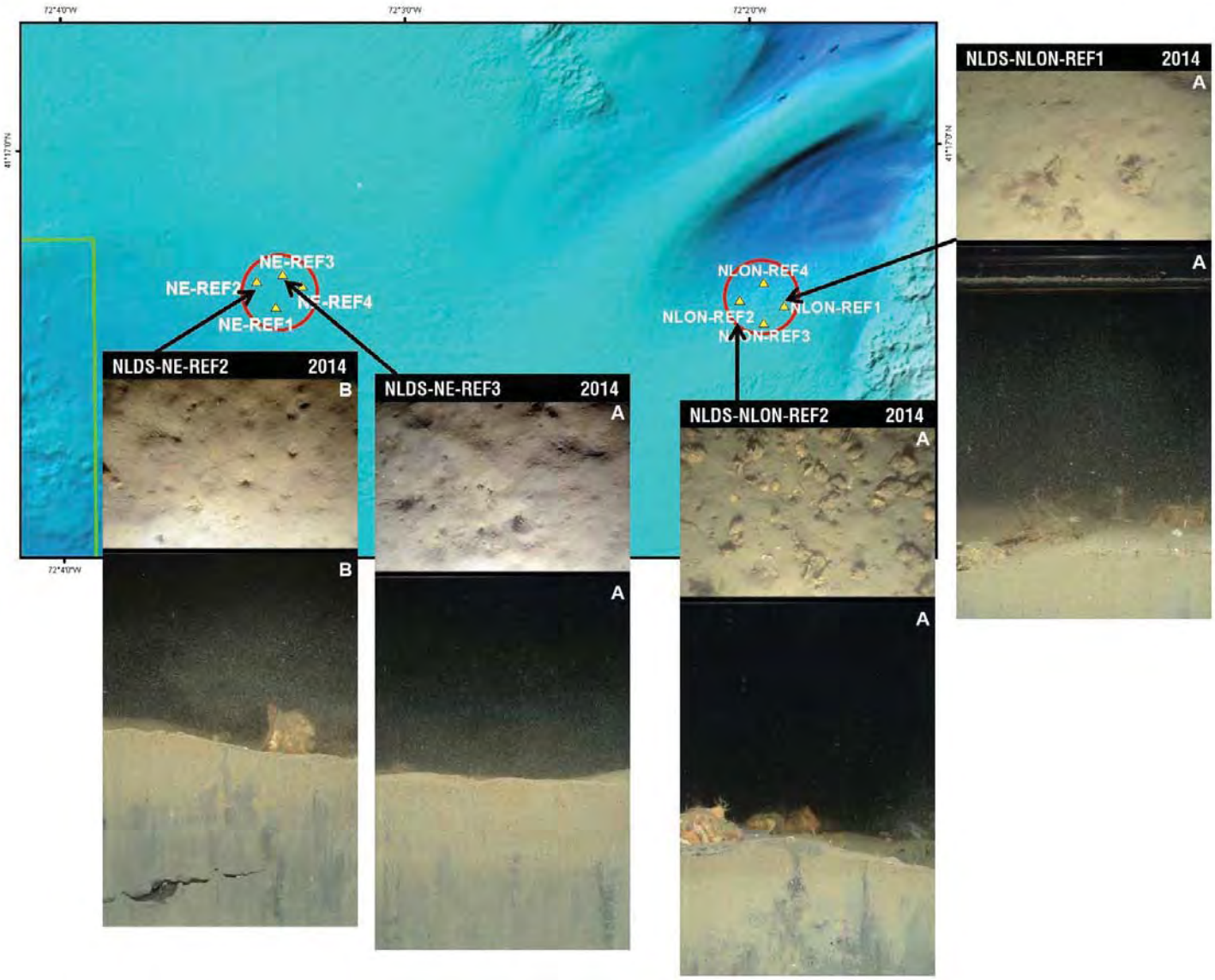


Figure 4-3. Representative images from eastern-most reference areas

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6.0 DATA TRANSMITTAL

Data transmittal to support this data report will be provided as a separate deliverable for inclusion in a Technical Support Notebook. The data submittal will include:

- Report figures and associated files, including an ArcGIS geo-database
- Raw NEF and adjusted SPI/PV images
- SPI/PV Field log, station location, and analysis tables
- Pop-up and pull-out image files

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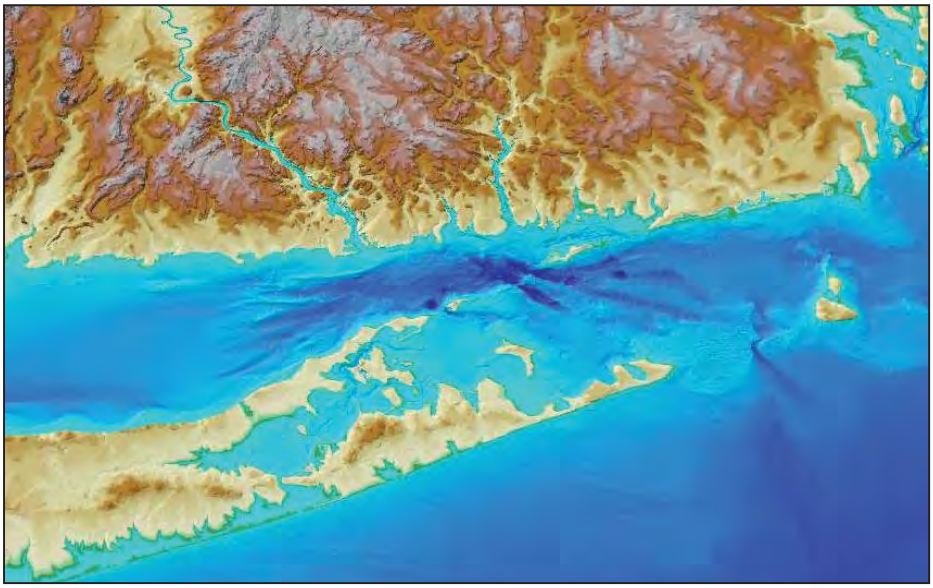
Supplemental Environmental Impact Statement for the Designation of Dredged Material Disposal Site(s) in Eastern Long Island Sound, Connecticut and New York

APPENDIX G

Physical and Chemical Properties of Sediments in Eastern Long Island Sound



Prepared for: **United States Environmental Protection Agency**

Sponsored by: **Connecticut Department of Transportation**

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and

University of Connecticut

December 2015

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Supplemental Environmental Impact Statement for the Designation of Dredged Material Disposal Site(s) in Eastern Long Island Sound, Connecticut and New York

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PHYSICAL AND CHEMICAL PROPERTIES OF SEDIMENTS EASTERN LONG ISLAND SOUND

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Acronyms and Abbreviations

cm	centimeter(s)
COC	Chain of Custody
CO_2	Carbon dioxide
CSDS	Cornfield Shoals Disposal Site
CTD	Conductivity/temperature/depth sensor
CTDEEP	Connecticut Department of Energy and Environmental Protection
CTDOT	Connecticut Department of Transportation
CVAF	Cold Vapor Atomic Fluorescence
cy	cubic yards
DAMOS	Disposal Area Monitoring System
DW	Dry weight
ECD	Electron capture detection
EIS	Environmental Impact Statement
ELIS	Eastern Long Island Sound
ERL	Effects Range Low (NOAA sediment quality guideline value)
ERM	Effect Range Median (NOAA sediment quality guideline value)
GC	Gas chromatography
GC/MS-SIM	Gas chromatography/mass spectroscopy - selective ion monitoring
Hg	mercury
km	kilometer(s)
km^2	square kilometer(s)
LIS	Long Island Sound
m	meter(s)
m^2	square meter(s)
m^3	cubic kilometers
MDL	Method detection limit
NAD83	North Atlantic Datum of 1983

NBDS	Niantic Bay Disposal Site
NEPA	National Environmental Policy Act
NLDS	New London Disposal Site
nm	nanometer(s)
nmi	nautical mile(s)
nmi^2	square nautical mile(s)
NOAA	National Oceanic and Atmospheric Administration
QAPP	Quality Assurance Project Plan
PAH(s)	Polycyclic aromatic hydrocarbon(s)
PCB(s)	Polychlorinated biphenyl(s)
RIM	Regional Implementation Manual
RL	Reporting limit
RFD	Relative percent difference
SEIS	Supplemental Environmental Impact Statement
SOP	Standard Operating Procedure
TOC	Total organic carbon
UCONN	University of Connecticut
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USGS	United Stated Geological Survey
WGS84	World Geodetic System of 1984
ZSF	Zone of siting feasibility (Area established by the USEPA for the potential designation of one or more dredged material disposal sites)

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EXECUTIVE SUMMARY

This report provides an analysis of the physical and chemical characteristics of the sediments at three alternative dredged material disposal sites in eastern Long Island Sound. The assessment is part of the Supplemental Environmental Impact Statement (SEIS) process for the designation of dredged material disposal sites in the eastern Long Island Sound region. The SEIS will supplement the Environmental Impact Statement (EIS) for the designation of dredged material disposal sites in the Western and Central Long Island Sound, completed in 2004. The SEIS is prepared by the U.S. Environmental Protection Agency (USEPA), and supported by the Connecticut Department of Transportation (CTDOT).

Sediment samples were collected within and around three alternative sites that were selected for more detailed analysis in the SEIS. These sites were New London, consisting of the active New London Disposal Site (NLDS) and two areas to the west; Niantic Bay, consisting of the historically used Niantic Bay Disposal Site (NBDS) and an area to the east; and Cornfield Shoals, consisting of the active Cornfield Shoals Disposal Site (CSDS). Sediment samples were collected at a total of 35 stations in February 2015. Samples were analyzed for physical and chemical properties, consisting of grain size, total organic carbon, metals, polycyclic aromatic hydrocarbon (PAHs), pesticides, and polychlorinated biphenyls (PCBs).

The predominant mean grain size throughout all three alternative sites was medium to fine sand. Grain sizes at individual stations were more variable at the NLDS, reflecting the disposal of dredged material from various sources. The TOC content was below 1% in most samples from the three Alternatives, with generally higher concentrations at the NLDS.

Metal concentrations analyzed at the three Alternatives were generally low. None of the metal concentrations at any of the 35 stations exceeded the NOAA "Effects Range Median" (ERM)[1] guideline values for any of the analyzed metals. Samples from two stations slightly exceeded the NOAA "Effects Range Low" (ERL)[2] guideline value for copper; these two stations were located in the NLDS.

Concentrations of organic compounds (PAHs, pesticides, PCBs) were low or often not detected. None of the individual samples were above the ERM values for any organic compound. Two samples located at the NLDS exceeded ERL values for some compounds. One station was above the ERL value for multiple PAHs and the sum of the pesticides DDD+DDE+DDT. Another station was above the ERL value for DDT and total PCBs.

[1] The ERM is indicative of concentrations above which adverse biological effects frequently occur.

[2] The ERL is indicative of concentrations below which adverse biological effects rarely occur.

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1.0 INTRODUCTION

In 2005, the USEPA designated the western and central Long Island Sound dredged material disposal sites, following the preparation of an EIS (USEPA and USACE, 2004a). The two disposal sites in eastern Long Island Sound, Cornfield Shoals and New London, are scheduled to close in December 2016. The USEPA is in the process of preparing a Supplemental EIS (SEIS) for the potential designation of one or more disposal sites needed to serve the eastern Long Island Sound region. The SEIS is being prepared in accordance with Section 102(c) of the Marine Protection Research and Sanctuaries Act (MPRSA; also referred to as Ocean Dumping Act [ODA]) of 1972.

This report describes the physical and chemical properties of surface sediments collected at three alternative sites in eastern Long Island Sound. These three sites (New London, Niantic Bay, and Cornfield Shoals) were identified as part of the screening process during the preparation of the SEIS (see Chapter 3 of the SEIS for details). The three sites are located within a Zone of Siting Feasibility (ZSF) (Figure 1). The ZSF is defined as the area established by the USEPA for the potential designation of one or more dredged material disposal sites. The ZSF includes the following boundaries:

- *West:* Line drawn between Mulberry Point, Connecticut (near Guilford, Connecticut) to Mattituck Point, New York.
- *South:* Line drawn between Montauk, New York, to Block Island, Rhode Island.
- *East:* Line drawn between Block Island to Point Judith, Rhode Island.
- The shorelines of the States of Connecticut, New York, and Rhode Island, connecting the lines listed above.

Each of the three alternative sites is described in more detail below. Sediments at each site were collected for the analysis of grain size and the concentration of total organic carbon, metals, and organic compounds. Organic compounds consisted of polycyclic aromatic hydrocarbons (PAHs), pesticides, and polychlorinated biphenyls (PCBs).

1.1 New London Alternative

The New London Alternative is a rectangular area with the dimensions 2.5 x 1 nautical miles (nmi), or 4.6 x 1.9 kilometer (km) (Figure 3; Table 1). Its boundary encompasses three areas: the active New London dredged material disposal site (NLDS) and two areas adjacent to the NLDS to the west (referred to hereafter as 'Site NL-Wa' and 'Site NL-Wb').

- ***NLDS:*** The NLDS is located in the eastern part of the New London Alternative along the New York-Connecticut state boundary. It has a area of one square nautical mile (nmi^2), or 3.4 square kilometers (km^2), centered at 41°16.306' N, 72°04.571' W (NAD83). Water depths at the NLDS range from 46 to 79 feet (14 to 24 m); the site is deepest at its southern boundary. Since 1982, approximately 3.5 million cubic yards (cy) (2.6 million m^3) of dredged material have been disposed at the site (USEPA, 2015a). In addition, approximately 5.4 million cy (4.1 million m^3) were disposed at the NLDS between 1955 and 1976 (Oceanic Society, 1982, which cited the CTDEEP and NYSDEC as sources for

the dredged material disposal information). Sediments at the site consists of fine sand and silt and clay (*e.g.*, AECOM, 2009; Tetra Tech 2014). Much of the surface sediment at the site consists of placed dredged material.

- ***Site NL-Wa:*** Site NL-Wa is located in the mid-section of the New London Alternative. This square site has an area of 1 nmi^2 (3.4 km^2). The site consists of mostly sandy areas, but also a shallow area of boulders and rocks in the north (WHG, 2014). Overall, water depths at the site range from approximately 45 feet (14 m) in the boulder area in the north to over 100 feet (30 m) in the south.

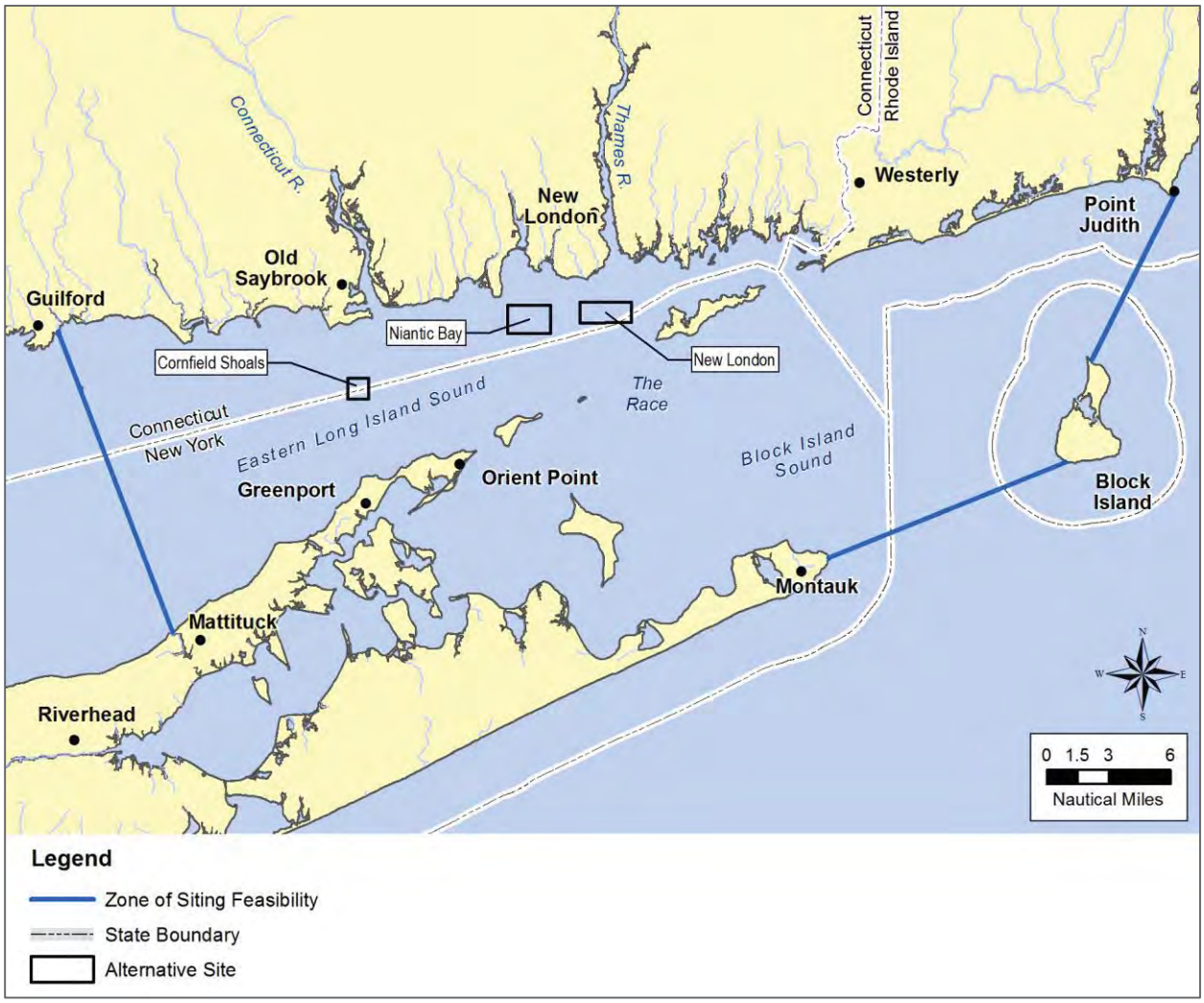

Figure 1. Zone of Siting Feasibility and the three alternative sites.

- ***Site NL-Wb:*** Site NL-Wb is located in the western part of the New London Alternative. It is a rectangular area, 0.5 nmi (0.9 km) wide and 1 nmi (1.8 km) long, or 0.5 nmi^2 (1.7 km^2). The site consists of an extension of the sandy area of Site NL-Wa. The southwestern corner of Site NL-Wb contains an area of bedrock and boulders, as well as some sand waves

(WHG, 2014). Overall, water depths at the entire site range from approximately 59 feet (18 m) in the north to 100 feet (30 m) in the south.

1.2 Niantic Bay Alternative

The Niantic Bay Alternative is located south of Niantic Bay, Connecticut, between the Connecticut and Thames Rivers. The Alternative is a rectangular area with the dimensions 2.1 x 1.33 nmi (3.9 x 2.5 km) (Figure 3; Table 1). The boundary of the Niantic Bay Alternative encompasses two areas, as follows:

- ***NBDS:*** The NBDS is located in the western part of the Niantic Bay Alternative. It has an area of 1.33 x 1.33 nmi (2.5 x 2.5 km), or 1.8 nmi^2 (6.2 km^2). This site was used historically for the disposal of dredged materials between 1969 and 1972 when a total of 176,000 cy (135,000 m^3) of dredged material was disposed at this location (Oceanic Society, 1982), but is not an active disposal site (USACE, 2014). Water depths at the site range from approximately 50 to 120 feet (15 to 37 m). Sediments at the site consist of sand to the north and northwest and mostly gravelly sediment with patches of gravel in the remainder of the area. The dominant size fraction in the sediments at the site is sand (Tetra Tech, 2014). The site contains a boulder area in the north-central part of the site (Poppe et al., 1998) and scour depressions in the south.

- ***Site NB-E:*** Site NB-E is located in the eastern part of the Niantic Bay Alternative. It has a rectangular area of 0.75 x 1.35 nmi, or 1 nmi^2 (3.4 km^2). Water depths at Site NB-E range from 43 feet (13 m) in the north to 230 feet (70 m) in the southeast. Surface sediments at the site are generally similar to sediments at the NBDS. The southwestern corner of Site NB-E contains a bedrock area, which is an extension of an exposed area of bedrock to the south of the site.

1.3 Cornfield Shoal Alternative

The boundary of the Cornfield Shoals Alternative (Figure 4; Table 1) is identical to the active Cornfield Shoals dredged material disposal site (CSDS). The CSDS is located 3.3 nmi (6.1 km) south of Cornfield Point in Old Saybrook, Connecticut. It has a square of 1 nmi^2 (3.4 km^2) and is centered at 41° 12.6858' N, 72° 21.4914' W (NAD83). An estimated 1.2 million cy (0.95 million m^3) were disposed at the site between 1960 and 1976 (Oceanic Society, 1982), and an additional 1.7 million cy (1.3 million m^3) were disposed between 1982 and 2013 (USEPA, 2015a). The site has a water depth of approximately 150 feet (46 m). The predominant topographic features are a sandy bottom and bedforms oriented in an east-west direction (Poppe et al., 2013).

2.0 METHODOLOGY

2.1 Sampling Stations

Sediment samples were collected at a total of 35 stations, following the preparation of a Quality Assurance Project Plan (QAPP) in February 2015. Station locations are summarized in Table 1 and shown in Figures 2 to 4, superimposed on water depth information obtained by the USGS and the National Oceanic and Atmospheric Administration (NOAA) (Poppe et al., 2011). Coordinates and other site information for each station are presented in Table 2. The sampling density was random, consisting of a grid that covered each alternative site; previous disposal of dredged material was not considered in the selection of the sampling stations. In addition, reference stations were added outside of the alternative sites. Reference stations are designed to provide information about the sediments in areas that have not received dredged material, for purposes of comparison with the sediment quality at the adjacent alternative site.

For the New London Alternative, 18 stations were sampled, including three reference stations (Table 2). For the Niantic Bay Alternative, 11 stations were sampled, including three reference stations. For the Cornfield Shoals Alternative, 6 stations were sampled, including one reference station. Several of the reference stations coincide with reference stations used by the USACE's Disposal Area Monitoring System (DAMOS) program.

Sampling was performed by staff from the University of Connecticut (UCONN) over three days (February 24, 25, and 27, 2015). Sampling was not performed on February 26, 2015 due to poor weather conditions. Kay Howard-Strobel was the project manager and was responsible for the sampling effort including coordinating logistics for use of the UCONN research vessel. She served as the Chief Scientist on the UCONN research vessel and ensured quality control in the field for collection of the sediment samples. The 76-foot long vessel (*R/V Connecticut*) used for this sampling was outfitted with sediment coring equipment and a differential GPS navigation system.

Table 1. Summary of Sediment Sampling Stations

Site	Number of Stations	Station ID[1]
NLDS	8	L-13 to L-18
NL-Wa	4	L-19, L-20, L21, L-21, L, 25
NL-Wb	3	L-26 to L-28
Reference stations east of NLDS	3	L-22 to L-24
NBDS	5	L-31 to L-35
NB-E	3	L36 to L-38
Reference far east of NBDS	2	L-39 to L-40
Reference station west of NBDS	1	L-41
CSDS	5	L-51 to L-55
Reference station west of CSDS	1	L-56
Total Stations	**35**	

[1] Coordinates and water depths are listed in Table 2.

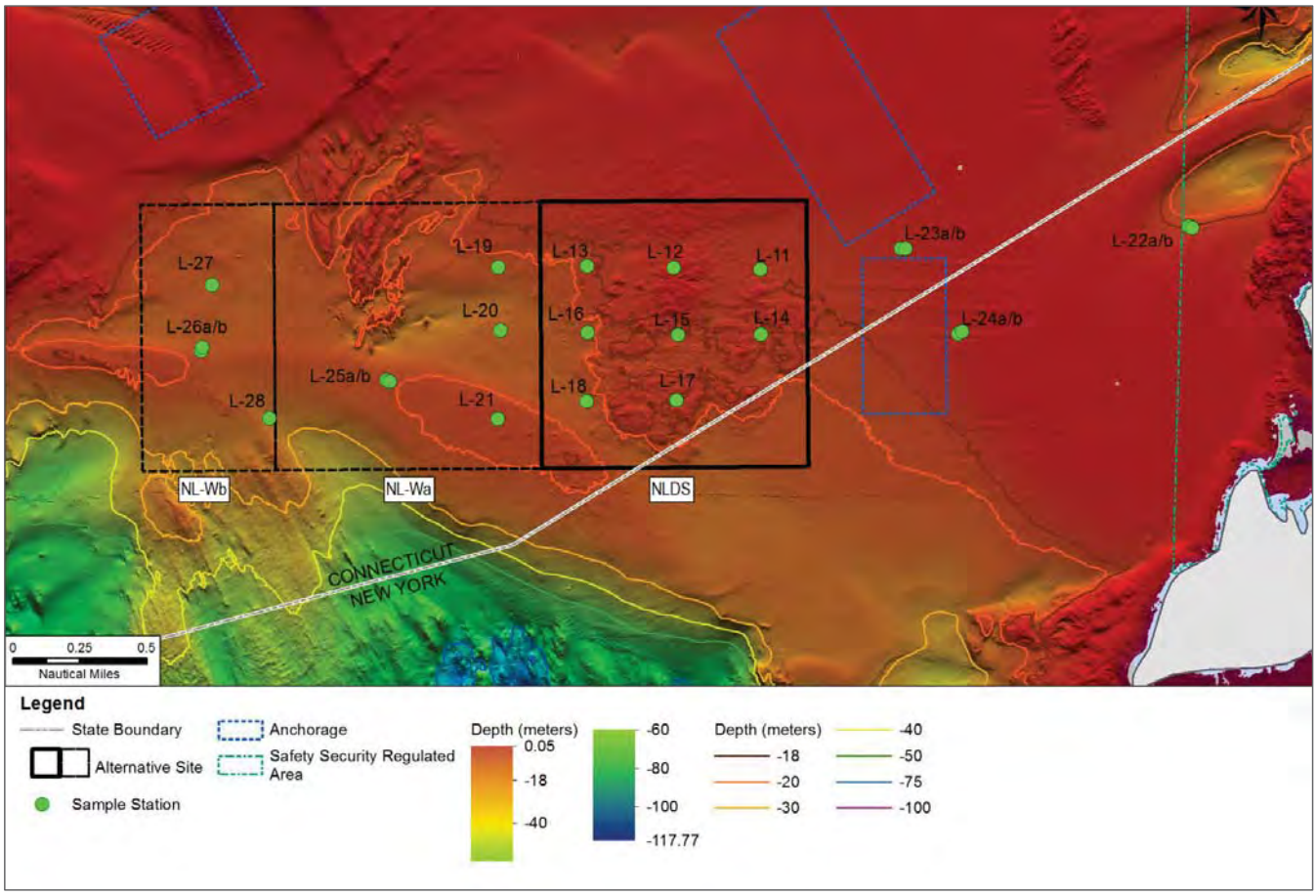

Figure 2. Sediment sampling stations for the New London Alternative. The background represents water depth (Poppe et al., 2011).

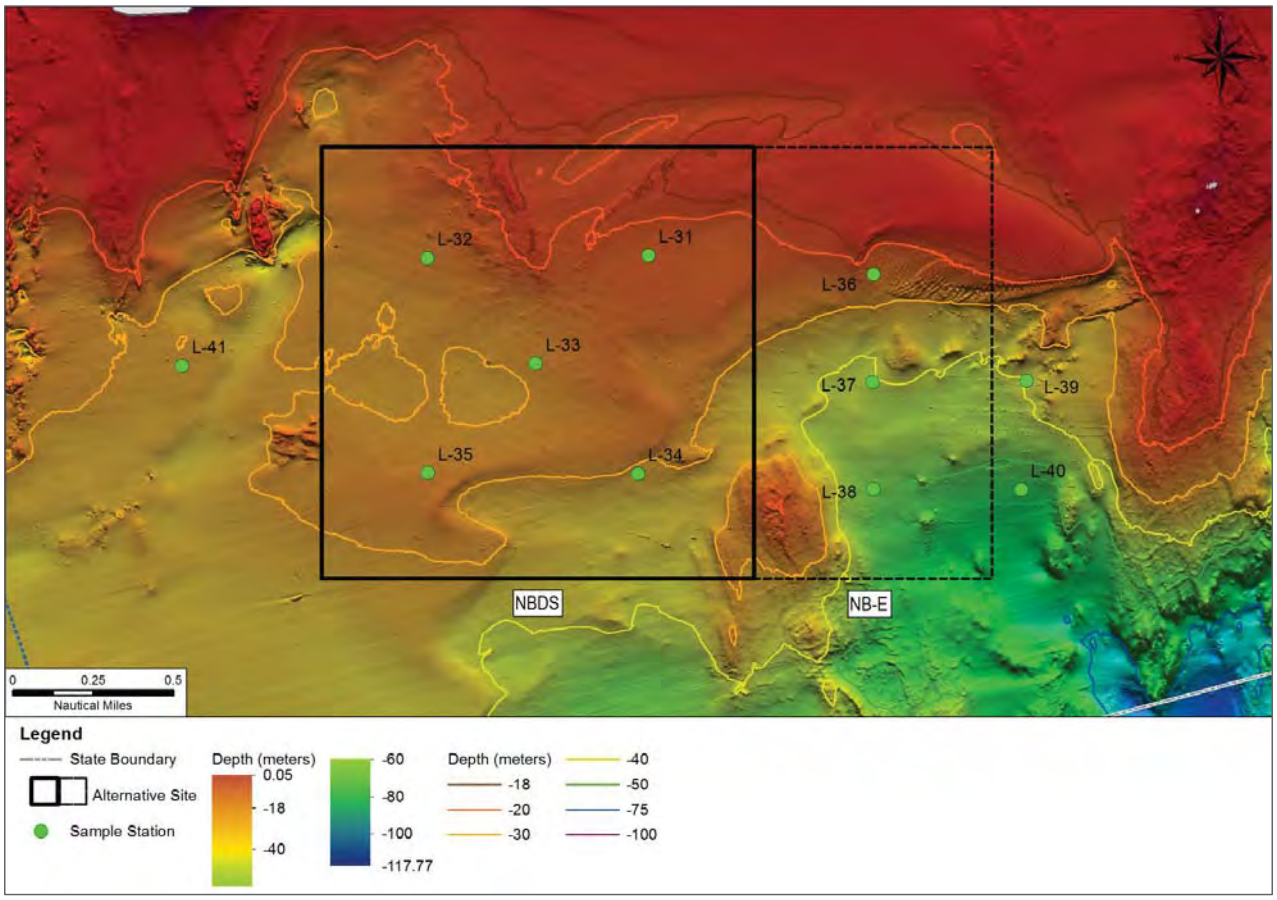

Figure 3. Sediment sampling stations for the Niantic Bay Alternative. The background represents water depth (Poppe et al., 2011).

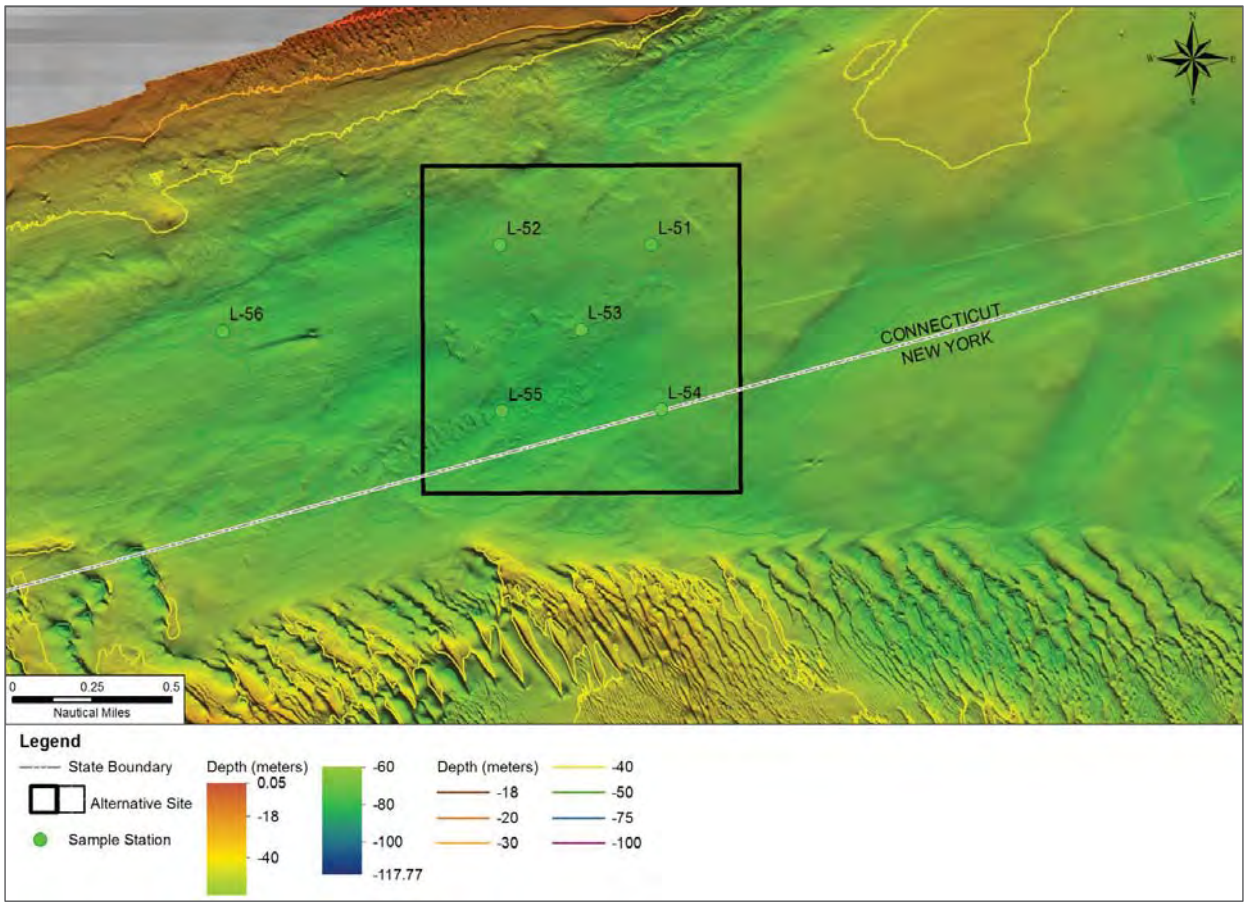

Figure 4. Sediment sampling stations for the Cornfield Shoals Alternative. The background represents water depth (Poppe et al., 2011).

Table 2. Coordinates of sediment sampling stations

Site	Station ID	Latitude	Longitude	**Water Depth** (m) (relative to Mean Low Low Water)	**Grab Attempts** [1]
		WGS84/NAD83 datum			
NLDS	L-11	41° 16.5467	-72° 04.1381	17.7	1
	L-12	41° 16.5547	-72° 04.5697	14.2	1
	L-13	41° 16.5632	-72° 05.0014	18.0	1
	L-14	41° 16.3030	-72° 04.1396	18.1	1
	L-15	41° 16.3023	-72° 04.5518	18.0	2
	L-16	41° 16.3149	-72° 05.0021	21.0	1
	L-17	41° 16.0587	-72° 04.5608	17.5	1
	L-18	41° 16.0568	-72° 05.0096	20.3	1
NL-Wa	L-19	41° 16.5626	-72° 5.44446	21.2	1
	L-20	41° 16.3253	-72° 05.4364	23.5	1
	L-21	41° 15.9931	-72° 05.4536	18.5	1
	L-25a	41° 16.1419	-72° 06.0044	20.2	1
	L-25b	41° 16.1358	-72° 05.9884	20.0	1
NL-Wb	L-26a	41° 16.2570	-72° 06.9272	23.1	1
	L-26b	41° 16.2707	-72° 06.9199	23.1	1
	L-27	41° 16.5019	-72° 06.8698	23.5	1
	L-28	41° 16.0010	-72° 06.5972	27.0	1
Reference East of NLDS	L-22a	41° 16.6957	-72° 02.0039	18.1	1
	L-22b	41° 16.6880	-72° 01.9873	18.3	1
	L-23a	41° 16.6204	-72° 03.4375	15.1	1
	L-23b	41° 16.6190	-72° 03.4175	14.4	1
	L-24a	41° 16.2998	-72° 03.1554	14.2	1
	L-24b	41° 16.3078	-72° 03.1363	14.0	1
NBDS	L-31	41° 16.3407	-72° 10.5096	23.3	1
	L-32	41° 16.3372	-72° 11.4243	26.8	1
	L-33	41° 16.0043	-72° 10.9795	29.3	1
	L-34	41° 15.6572	-72° 10.5586	32.4	1
	L-35	41° 15.6641	-72° 11.4278	28.1	1
NL-E	L-36	41° 16.2768	-72° 09.5793	24.0	1
	L-37	41° 15.9380	-72° 09.5855	42.0	1
	L-38	41° 15.6034	-72° 09.5857	49.8	1
Reference far-east of NBDS	L-39	41° 15.9407	-72° 08.9495	41.2	1
	L-40	41° 15.5991	-72° 08.9739	59.7	1
Ref west of NBDS	L-41	41° 16.0043	-72° 12.4435	31.4	1

Table 2. Coordinates of sediment sampling stations

Site	Station ID	Latitude	Longitude	Water Depth (m) (relative to Mean Low Low Water)	Grab Attempts [1]
		WGS84/NAD83 datum			
CSDS	L-51	41° 12.9421	-72° 21.1976	50.3	1
	L-52	41° 12.9424	-72° 21.8286	51.8	1
	L-53	41° 12.6826	-72° 21.4918	54.3	1
	L-54	41° 12.4380	-72° 21.1592	54.3	1
	L-55	41° 12.4355	-72° 21.8247	59.1	1
Ref. west of CSDS	L-56	41° 12.6841	-72° 22.9867	51.8	1

[1] Most samples were collected in one attempt. At one station, a second attempt was required as sediment was lost due to gravel or another obstruction on the seafloor that prevented closure of the sediment sampler.

2.2 Sampling Methods

Sediment samples for chemistry analyses were collected using a stainless steel Smith-MacIntyre grab sampler (Figure 5), a standard bottom grab used on oceanographic research vessels (USEPA, 2001). The grab sampler typically penetrates 15 cm into the bottom sediments, sampling a 0.1 m^2 area with a total volume of approximately16 liters.

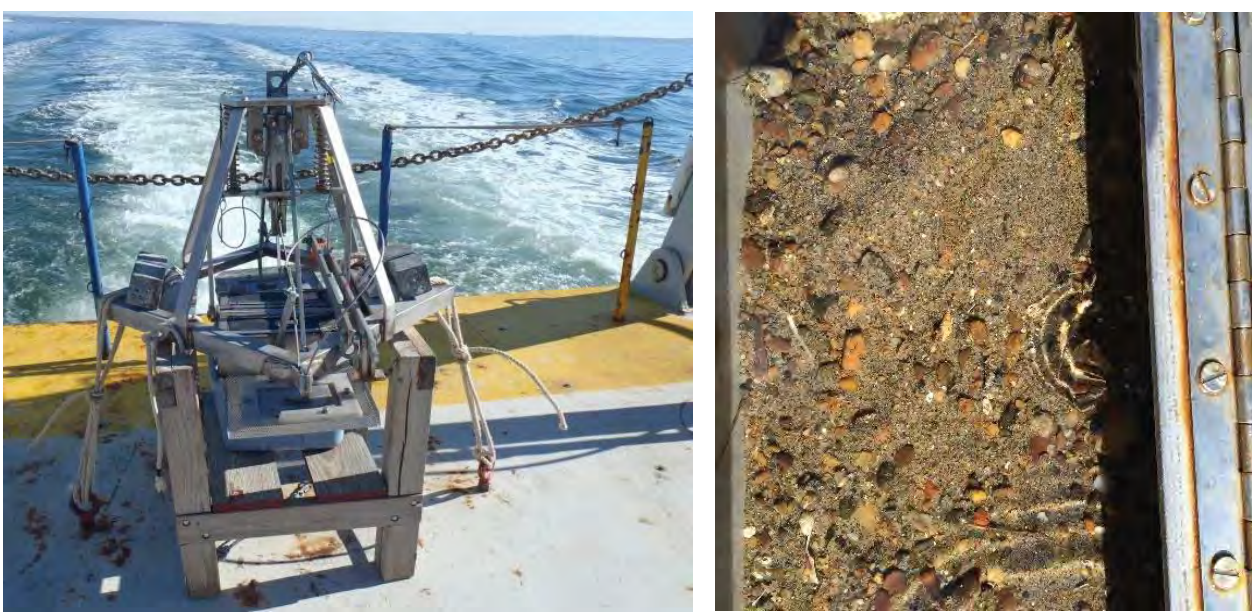

Figure 5. (left) Smith-MacIntyre grab sampler on the stern of the *R/V Connecticut*; (right) bottom sediment grab from Station L-55, Cornfield Shoals Disposal Site.

For each station and sample, the Chief Scientist and staff recorded the following information in a field log: date and time, coordinates, sample number, contracted lab label number, observed grain size, depth, sea state, and weather conditions (see Appendix 1). Each sample was inspected for signs of leakage and for overfilling. The jaws of the sampler had to be fully closed and the top of the sediment had to be below the level of the opening doors. The Chief Scientist made the final decision regarding acceptability of all grab samples, and the overall condition of the grab sample.

Each grab sample was emptied into a clean stainless steel container, homogenized with a stainless steel spoon, and then scooped into pre-labeled sample jars with that spoon. Between samples, the grab sampler, spoons, and containers were thoroughly cleaned with high-pressure sea water and a brush, and then rinsed with de-ionized water.

2.3 Sample Handling and Custody

Sample jars for chemical analyses consisted of be pre-cleaned eight ounce (250 ml) amber glass jars with Teflon screwed caps. Sediment containers for grain size and total organic carbon (TOC), and percent moisture consisted of pre-cleaned plastic eight ounce (250 ml) jars with Teflon screw caps.

Bottles were not filled to the top, to allow for expansion when frozen. The bottles and the containers were wiped clean and rinsed with deionized water. All bottles were labeled, secured with tape, individually bagged, and placed immediately in a cooler on ice following procedures in the Regional Implementation Manual (RIM) (USEPA and USACE, 2004b).

At the end of each sampling survey day, samples were relinquished to the contracted laboratory with Chain of Custody (COC) forms in accordance with RIM guidance. The COCs are included within Appendices 2 and 3. The contracted laboratory was Alpha Analytical, located in Mansfield, Massachusetts.

2.4 Sample Analyses

Samples were extracted and analyzed within two weeks, which was well within the holding times for the various analytes. Holding times were specified in the QAPP for this project. Analytical methods and the standard operating procedures (SOPs) that were followed by Alpha Analytical are summarized below.

- ***Metals*** *(Method 6020A; SOP 2137):* Metals were analyzed by Inductively Coupled Plasma – Mass Spectrometry. Based on this method, the sample is first digested in acid, and then nebulized to an aerosol. The resulting aerosol is transported to the plasma torch by argon gas; the ions produced in the plasma are sorted according to their mass-to-charge ratios and quantified with a channel electron multiplier.

- ***Mercury*** *(Method 7474; SOP 2143)**:*** Total mercury was analyzed by Cold Vapor Atomic Fluorescence (CVAF). Based on this method, the sample is digested in an acidic, oxidizing solution to convert all forms of mercury to inorganic Hg (II). CVAF is based on fluorescence of radiation at 253.7 nm by mercury vapor. The oxidized mercury is reduced to insoluble elemental mercury, aerated as a vapor, and detected with an atomic fluorescence

spectrometer. Fluorescence is measured as a function of mercury concentration based on peak height measured.

- ***Polycyclic Aromatic Hydrocarbons (PAHs) and Polychlorinated Biphenyl (PCB) congeners***[3] *(Method 8270D; SOP 2157)**:*** These analytes were extracted using methylene chloride. Based on this method, the extract is cleaned up using silica gel and concentrated, an internal standard is added and then the extract is analyzed by gas chromatograph/mass spectrometer with selective ion monitoring mode (GC/MS-SIM). The target analytes are resolved on GC and detected using a mass selective detector. Concentrations are determined using mean relative response factors from a multi-level calibration curve. Response factors for target analytes and surrogate compounds are determined relative to the internal standards.

- ***Pesticides*** *(Method 8081B; SOP 2158)**:*** Samples analyzed for pesticides were extracted with methylene chloride. Based on this method, the extract is cleaned up using silica gel and concentrated, an internal standard is added and then the extract is copper cleaned to remove sulfur and is then analyzed on a GC which is fitted with two capillary columns for differing polarities each employing separate detectors. The analytes are resolved on each column and detected using an electron capture detector. Concentrations are calculated from the electron capture detection (ECD) response using internal or external standard techniques. Identification of multiple peak components is made by comparison to analytical standards.

- ***Grain size*** *(Method ASTM 422-63; SOP 2183)**:*** Sediment samples were analyzed using the sieve method for the following grain sizes: gravel, coarse sand, medium sand, fine sand, and fines (silt+clay).

- ***Total organic carbon (TOC)*** *(Method 9060A; SOP 2182)**:*** TOC was measured using a carbonaceous analyzer. This instrument converts the organic carbon to carbon dioxide (CO_2) by catalytic combustion. The CO_2 formed is then measured directly by a thermal conductivity detector. The amount of CO_2 in a sample is directly proportional to the concentration of carbonaceous material in the sample.

The data reports from Alpha Analytical are provided in Appendix 2 (for samples collected on February 24 and 25, 2015) and Appendix 3 (for samples collected on February 27, 2015). These data reports include method detection limits (MDLs) and reporting limits (RLs) for the various analyses, as applicable.

[3] A PCB congener is a single, unique well-defined chemical compound in the PCB category. The name of a congener specifies the total number of chlorine substituents and the position of each chlorine.

3.0 QUALITY CONTROL

3.1 Quality Control Measures

As specified in the QAPP from February 2015, quality control measures were taken in the field and in the laboratory.

- ***Field quality control:*** Measures samples that are field duplicates (or split samples) and replicates to evaluate field variability. For the field duplicate, one person filled the second bottle with the same homogenized sample used to fill the first bottle. There were a total of two duplicate samples; these samples were "blind" to the laboratory, meaning that sample containers had different sample numbers. Specifically, sample L-61 was a duplicate of the sample at Station L-15; sample L-62 was a duplicate of the sample at Station L-53 (see Table 2).

- ***Laboratory quality control:*** Laboratory quality control measures followed the laboratory's SOPs. For each batch of up to 20 samples the following was performed: a matrix spike and sample duplicates to evaluate precision; a laboratory control sample, or standard, to evaluate accuracy; a method blank to evaluate contamination in the laboratory; surrogates to evaluate percent recovery; and a matrix spike to evaluate percent recovery. A method detection limit study is performed annually by the laboratory.

Acceptance criteria are listed in Table 3; they reflect the laboratories SOPs for the various analyses (*e.g.*, for percent recoveries of surrogates). Typical surrogate recovery criteria are 30% to 150%.

3.2 Data Quality Review

3.2.1 Field Work

All field stations were sampled as planned; stations shown in Figures 2 to 4 are the actual locations sampled in the field. Only one station required two attempts for a successful grab (*i.e.*, Station L-15 at the NLDS). Date, time, coordinates, sample number, contracted laboratory label number, observed grain size, depth, sea state, and weather conditions were recorded in the field note book (Appendix 1).

3.2.2 Data Quality Control

The USEPA Project Manager reviewed the quality control information from the contracted laboratory (Alpha Analytical) for acceptability with the requirements of the Regional Implementation Manual (USEPA and USACE, 2004b). The data reports from the laboratory provided the quality assurance data and batch information (see Appendices 2 and 3). The Chain-of-Custody forms, sample processing, and sample transport were provided as part of that package. Samples were analyzed according to specified holding times, methods, and detection limits as outlined in the QAPP for the project. Upon completion of the data quality control review, the USEPA Project Manager and QA Manager determined that these data are acceptable for use as supporting information for the Eastern Long Island Sound SEIS.

Table 3. Quality Control Activities and Performance Criteria.

Data Quality Indicators	QC Sample and/or Activity Used to Assess Measurement Performance	Measurement Performance Criteria
Precision-Field	One field duplicate field sample for every 20 samples.	Relative percent difference (RPD) ≤ 100%
Precision-Lab and Field Matrix Spike	Matrix spike duplicates.	RPD ≤ 75%
Accuracy/Bias-Lab	Laboratory control sample. Method blanks. Sample surrogate recovery.	Acceptable percent recovery in SOP less than Reporting Limit. Acceptable percent recovery in SOP.
Comparability	Compare to historical data, to reference site data and to project-specific data, using same methods as specified in RIM (USEPA and USACE, 2004b)	Must use RIM-specified methods. Deviation from SOPs should be communicated and approved.
Limit of Quantitation	Method detection limit study. Five point calibration.	Method detection limit must be three to five times less than reporting (quantitation) limit. Lowest calibration standard should equal reporting limit specified in RIM.
Completeness	Data Completeness Check	>90% of samples analyzed
Representativeness	Compare to tested dredged material and to navigational positioning	Navigational position will be verified to ensure that the sample is within the existing disposal sites in eastern LIS (CSDS, NLDS) and other locations in eastern LIS.

4.0 RESULTS

4.1. Data Tables

Data obtained during this study are provided in Tables 4 to 11; the legend is provided by the box below. These tables list the data contained in the two full data reports from the laboratory (Appendices 2 and 3). Table 12 presents summary statistics for areas with related stations (see Table 1). Mean and maximum values are presented for grain size, TOC, metals, PCBs, and PAHs. Data for pesticides were not summarized as there were only very few samples with any detected pesticide concentrations.

Legend for Tables 4 to 12	
12.1	***Size fractions of sand:*** For grain size analyses of sand, three sand fractions (coarse sand, medium sand, fine sand) are reported, in addition to the sum (*i.e.*, the total sand fraction). Boxes with the three sand fractions are highlighted in this pink color.
--	***No detection of metals and organic compounds:*** Mark within a data box if a chemical analysis resulted in "No detection" for a specific metal or organic compound.
3.3	NOAA guideline value "Effects Range Low" (ERL). Concentrations that exceeded the ERL are also flagged within the data tables.
5.6	NOAA guideline value "Effects Range Medium" (ERM). None of the data exceeded the ERM.

Analytical results for metals and organic compounds can be compared to Effects Range Low (ERL) and Effects Range Median (ERM) values, developed by NOAA as a screening tool to estimate the relative degree of contamination (Long et al., 1995; Buchman, 1999). However, these guideline values should not be used to infer causality because of the inherent variability and uncertainty of the approach. These values are based upon data primarily of marine sediment chemistry paired with sediment toxicity bioassay data (USEPA, 2015b). To calculate an ERL value for a given analyte, concentration data obtained from studies are ranked from lowest to highest concentrations. The ERL value is indicative of concentrations below which adverse biological effects rarely occur. The ERM value is indicative of concentrations above which adverse biological effects frequently occur.

4.2 Grain Size and Total Organic Carbon

Consistent with data from the USGS (Poppe et al., 2000) and also with sediment grain size data obtained by Tetra Tech (2014), the mean grain size throughout all three Alternatives was medium to fine sand, although grain sizes were more variable within the NLDS (Tables 4, 5 and 12). The TOC concentration was below 1% in most samples from the three alternative sites, with generally higher concentrations at the NLDS reflecting the disposed dredged material at this site.

Table 4. Grain Size, Total Organic Carbon, and Total Metals at the New London Alternative

			Grain Size (%)						TOC (%)				Metals (mg/kg/ dry weight)							
Alternative	**Area**	**Station ID**	Gravel	Coarse Sand	Medium Sand	Fine Sand	Sand (sum)	Fines (Silt+clay)	Replicate 1	Replicate 2	Mean	**Total Solids (%)**	Chromium, Total	Copper, Total	Lead, Total	Nickel, Total	Zinc, Total	Arsenic, Total	Cadmium, Total	Mercury, Total
New London	NLDS	L-11	2.8	2.3	11.2	36.1	49.6	47.6	1.3	1.1	1.2	64.0	14.90	8.08	6.56	8.85	32.4	3.72	0.10	0.03
	NLDS	L-12	7.8	5.1	10.0	50.7	65.8	26.4	1.3	1.2	1.3	63.4	17.00	12.00	10.60	8.04	49.8	2.79	0.06	0.03
	NLDS	L-13	0.0	1.0	8.3	42.4	51.7	48.3	1.5	1.9	1.7	52.2	17.40	44.80	20.80	8.81	52.9	3.60	0.26	0.14
	NLDS	L-14	9.0	4.4	12.4	41.9	58.7	32.3	2.8	2.7	2.7	68.7	11.10	19.10	11.30	7.72	37.1	2.69	0.06	0.02
	NLDS	L-15	51.4	3.9	15.2	24.5	43.6	5.0	0.2	0.3	0.3	65.6	6.42	4.50	7.20	4.68	24.1	2.23	0.04	--
	NLDS	L-16	0.9	2.2	12.1	41.6	55.9	43.2	1.7	1.6	1.6	53.9	28.30	40.50	43.30	20.80	150.0	7.72	0.18	0.05
	NLDS	L-17	1.9	6.2	33.9	51.6	91.7	6.4	1.5	1.3	1.4	71.6	6.31	4.79	6.01	4.09	16.2	1.66	0.04	--
	NLDS	L-18	1.2	1.9	4.9	13.8	20.6	78.2	3.6	3.4	3.5	56.0	23.10	12.80	6.64	15.50	44.7	5.68	0.11	--
	NL-Wa	L-19	1.9	1.5	12.9	67.2	81.6	16.5	0.4	0.5	0.5	72.2	7.79	4.68	5.50	4.43	23.1	2.16	0.03	0.02
	NL-Wa	L-20	2.3	1.2	16.8	67.2	85.2	12.5	0.3	0.3	0.3	74.0	6.88	3.83	5.16	4.14	19.3	1.73	0.03	--
	NL-Wa	L-21	4.5	3.7	20.7	55.9	80.3	15.2	0.8	0.9	0.9	70.3	8.22	5.11	7.64	4.91	21.0	2.08	0.04	0.02
	Ref East	L-22A	0.0	0.1	1.1	67.1	68.3	31.7	0.5	0.5	0.5	64.4	10.00	6.04	6.13	5.72	31.2	2.22	0.07	0.02
	Ref East	L-22B	2.6	0.2	1.1	69.8	71.1	26.3	0.5	0.5	0.5	67.4	9.20	5.17	5.41	5.28	26.1	1.89	0.05	0.02
	Ref East	L-23A	0.0	0.2	1.2	62.6	64.0	36.0	0.6	0.5	0.5	67.9	13.80	10.80	10.00	7.80	37.6	3.06	0.09	0.04
	Ref East	L-23B	0.0	0.2	8.7	72.7	81.6	18.4	0.4	0.4	0.4	68.0	12.20	7.88	7.96	6.83	34.0	2.50	0.07	0.02
	Ref East	L-24A	0.0	0.1	0.2	71.5	71.8	28.3	0.4	0.4	0.4	70.2	10.60	6.12	6.84	5.96	29.6	2.03	0.06	0.02
	Ref East	L-24B	0.0	0.1	0.1	74.0	74.2	25.8	0.4	0.4	0.4	68.0	9.78	5.85	6.59	5.62	29.3	2.46	0.08	--
	NL-Wa	L-25A	0.4	2.7	16.9	69.6	89.2	10.4	0.6	0.4	0.5	72.2	6.34	3.30	4.48	3.82	17.2	1.89	0.04	0.02
	NL-Wa	L-25B	2.0	2.9	19.2	67.6	89.7	8.3	0.5	0.4	0.5	72.6	5.88	3.03	4.10	3.70	16.8	2.23	--	--
	NL-Wb	L-26A	1.2	2.9	9.3	63.9	76.1	22.7	1.2	1.0	1.1	65.4	11.00	6.50	7.76	6.64	32.1	2.79	0.05	0.02
	NL-Wb	L-26B	2.5	4.6	10.3	69.2	84.1	13.4	1.7	1.3	1.5	67.0	6.62	3.50	4.69	4.06	21.2	1.98	--	--
	NL-Wb	L-27	2.6	0.8	9.2	72.0	82.0	15.4	0.4	0.5	0.5	71.6	11.00	5.80	7.24	6.84	38.8	3.78	0.07	--
	NL-Wb	L-28	2.4	4.8	17.0	67.4	89.2	8.4	0.8	0.7	0.8	72.6	5.42	2.66	4.38	3.19	18.7	2.32	0.05	--
												ERL	81	37	46.7	20.9	150	8.2	1.2	0.15
												ERM	370	270	218	51.6	410	70	9.6	0.71

Table 5. Grain Size, Total Organic Carbon, and Total Metals at the Niantic Bay and Cornfield Shoals Alternatives

			Grain Size (%)						TOC (%)				Metals (mg/kg/ dry weight)							
Alternative	**Area**	**Station ID**	Gravel	Coarse Sand	Medium Sand	Fine Sand	Sand (sum)	Fines (Silt+clay)	Replicate 1	Replicate 2	Mean	**Total Solids (%)**	Chromium, Total	Copper, Total	Lead, Total	Nickel, Total	Zinc, Total	Arsenic, Total	Cadmium, Total	Mercury, Total
Niantic Bay	NBDS	L-31	4.4	4.9	20.8	54.7	80.4	15.2	0.6	0.6	0.6	74.0	6.28	3.20	4.28	4.19	20.1	2.35	--	--
	NBDS	L-32	2.3	5.0	34.7	54.1	93.8	3.9	0.3	0.4	0.3	77.6	6.70	2.85	5.07	4.04	26.8	2.71	--	--
	NBDS	L-33	4.5	9.7	24.5	46.4	80.6	14.9	1.0	1.0	1.0	69.6	7.23	4.75	5.44	4.75	21.7	2.22	0.03	--
	NBDS	L-34	23.1	15.8	34.5	22.7	73.0	3.9	1.2	1.3	1.3	77.4	2.71	1.78	2.77	3.04	9.2	2.14	--	--
	NBDS	L-35	11.0	16.4	32.0	34.5	82.9	6.1	1.0	1.1	1.1	73.7	3.49	2.01	2.83	2.97	11.7	2.15	--	--
	NB-E	L-36	4.8	7.3	27.1	49.3	83.7	11.5	0.6	0.6	0.6	75.0	5.27	3.28	3.60	3.36	15.3	2.28	--	--
	NB-E	L-37	8.5	3.9	18.8	54.0	76.7	14.8	1.0	1.2	1.1	71.1	9.67	5.82	6.30	5.97	29.8	3.36	0.05	0.02
	NB-E	L-38	10.8	4.4	18.7	57.1	80.2	9.0	0.6	0.7	0.7	73.0	8.23	3.78	5.69	4.66	27.9	3.07	--	--
	Ref East	L-39	1.9	4.5	18.7	58.5	81.7	16.4	1.2	1.5	1.3	70.8	6.98	3.69	5.08	4.32	21.9	2.17	0.03	--
	Ref East	L-40	9.0	9.0	24.1	43.6	76.7	14.3	1.8	2.0	1.9	65.7	7.66	4.17	5.90	5.48	27.3	3.91	--	--
	Ref West	L-41	7.5	9.2	26.8	46.8	82.8	9.7	0.6	0.6	0.6	75.3	6.10	3.39	4.24	4.08	20.2	3.06	0.03	--
Cornfield Shoals	CSDS	L-51	5.8	12.8	50.5	28.6	91.9	2.3	0.2	0.2	0.2	79.4	3.86	2.02	2.99	5.02	14.0	2.72	--	--
	CSDS	L-52	19.3	12.6	29.1	36.7	78.4	2.3	0.1	0.2	0.2	81.3	4.38	2.50	3.03	5.33	17.9	2.22	--	--
	CSDS	L-53	28.1	9.2	21.7	13.1	44.0	27.9	0.9	1.0	1.0	61.8	15.50	19.10	12.00	8.02	57.4	3.38	0.11	0.06
	CSDS	L-54	6.5	10.2	49.5	27.9	87.6	5.9	0.4	0.4	0.4	78.6	6.58	3.25	4.55	6.61	22.4	2.29	--	--
	CSDS	L-55	13.1	14.7	48.7	20.6	84.0	2.9	0.1	0.2	0.1	80.4	4.56	2.18	2.93	4.54	13.9	2.15	--	--
	Ref West	L-56	13.2	6.3	21.4	23.2	50.9	35.9	0.3	0.3	0.3	69.9	18.40	14.70	8.09	18.60	47.4	5.22	0.06	--
Dupl. of Stn L-15		L-61	27.9	5.3	22.8	36.6	64.7	7.4	0.4	0.3	0.3	71.2	9.14	4.76	5.15	5.02	18.9	2.92	--	--
Dupl. of Stn L-53		L-62	27.0	10.1	25.2	14.3	49.6	23.4	1.4	1.2	1.3	63.3	16.90	20.40	12.10	8.41	69.5	3.41	0.11	0.05
												ERL	81	37	46.7	20.9	150	8.2	1.2	0.15
												ERM	370	270	218	51.6	410	70	9.6	0.71

Table 6. Polycyclic Aromatic Hydrocarbon (PAHs) at the New London Alternative

			PAHs - Low mol. weight (LMW) (µg/kg DW)						**PAHs - High molecular weight (HMW)** (µg/kg dry weight)										**Summary** (µg/kg DW)		
Alternative	**Area**	**Station ID**	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene	**Total LMW PAHs**	**Total HMW PAHs**	**Total PAHs**
New London	NLDS	L-11	12.3	--	--	--	14.2	--	33.1	42	23.3	32	49.9	41	36.5	30	--	30.2	27	318	345
	NLDS	L-12	--	--	--	--	14.2	--	30.6	33.3	19.5	21.9	24.8	23	22.8	16.5	--	17	14	209	224
	NLDS	L-13	87.3	32.5	84.4	174	1,450	288	1,640	1,320	591	586	553	458	571	414	73.1	381	2,116	6,587	8,703
	NLDS	L-14	9.6	10.3	--	--	26.1	9.54	71	78.5	46.3	55	48.8	44	49.5	33	--	31.2	56	457	513
	NLDS	L-15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NLDS	L-16	--	38.6	--	--	25.5	11.9	54.4	84.7	50.5	59.9	75.6	66.3	90.4	60.6	13.7	53.5	76	610	686
	NLDS	L-17	--	--	--	--	--	--	13.6	16.6	--	--	--	--	--	--	--	--	--	30	30
	NLDS	L-18	--	--	--	--	10.2	--	29.8	41.2	19.4	22.2	19.2	16.8	19.2	11.5	--	12.6	10	192	202
	NL-Wa	L-19	--	--	--	--	41.7	16	118	95.7	66.7	67	62	50	57.2	39.7	--	33.8	58	590	648
	NL-Wa	L-20	--	--	--	--	--	--	--	14.9	--	--	--	--	--	--	--	--	--	15	15
	NL-Wa	L-21	--	--	--	--	17.7	--	50.6	61.5	42	43.6	32.5	38.9	42	23.2	--	24.1	18	358	376
	Ref East	L-22A	--	--	--	--	13	--	33.4	34.2	17.6	22.4	22.4	18.5	19.1	14.2	--	15.4	13	197	210
	Ref East	L-22B	--	--	--	--	25	14.8	68.7	92.5	40.5	42.6	25.4	37.4	43.5	24.3	--	24.5	40	399	439
	Ref East	L-23A	--	--	--	--	12.9	--	49.3	77.7	52.2	56.8	45.5	41.1	60.5	35.2	7.75	38.2	13	464	477
	Ref East	L-23B	--	--	--	--	18.3	8.21	39.4	46.8	32.2	35.6	31.3	28.8	35.5	24	--	23.3	27	297	323
	Ref East	L-24A	--	--	--	--	--	--	23.4	25.4	14.4	16.6	18.4	16.8	15.9	--	--	--	--	131	131
	Ref East	L-24B	--	--	7.49	8.41	80.8	15	106	89.6	43.6	46.7	45	37.9	42.8	32.3	--	29.5	112	473	585
	NL-Wa	L-25A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NL-Wa	L-25B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NL-Wb	L-26A	--	--	--	--	10.2	--	26.5	27.8	15.3	20.6	18.3	21	19.2	15.8	--	15.2	10	180	190
	NL-Wb	L-26B	--	--	--	--	13.2	--	12.9	13.3	--	8.46	8.8	--	7.2	--	--	--	13	51	64
	NL-Wb	L-27	--	--	--	--	--	--	--	15.1	--	--	--	--	--	--	--	--	--	15	15
	NL-Wb	L-28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
		ERL	160	44	16	19	240	85.3	600	665	261	384			430		63.4		552	1,700	4,022
		ERM	2,100	640	500	540	1,500	1,100	5,100	2,600	1,600	2,800			1,600		260		3,160	9,600	44,792

Table 7. Polycyclic Aromatic Hydrocarbon (PAHs) at the Niantic Bay and Cornfield Shoals Alternatives

			PAHs - Low mol. weight (LMW) (µg/kg DW)						**PAHs - High molecular weight (HMW)** (µg/kg dry weight)										**Summary** (µg/kg DW)		
Alternative	**Area**	**Station ID**	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene	**Total LMW PAHs**	**Total HMW PAHs**	**Total PAHs**
Niantic Bay	NBDS	L-31	--	--	--	--	--	12.6	--	12.9	--	--	--	--	--	--	--	--	13	13	26
	NBDS	L-32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NBDS	L-33	--	--	--	--	--	--	14.7	16.6	9.76	12.4	12.3	11.7	12.3	10.4	--	9.98	--	110	110
	NBDS	L-34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NBDS	L-35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NB-E	L-36	--	--	--	--	--	--	13.1	15.4	--	--	--	--	--	--	--	--	--	29	29
	NB-E	L-37	--	--	--	--	23.3	44.6	93.1	130	87.8	88.4	44.4	60.6	74.1	35.9	--	33.2	68	648	715
	NB-E	L-38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref East	L-39	--	--	--	--	--	--	--	15.2	--	--	--	--	--	--	--	--	--	15	15
	Ref East	L-40	--	--	--	--	--	--	8.06	9.45	--	7.92	--	--	--	--	--	--	--	25	25
	Ref West	L-41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cornfield Shoals	CSDS	L-51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CSDS	L-52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CSDS	L-53	--	11.6	--	--	47.6	8.84	115	105	47.1	62.2	64.3	63.2	60	51.4	9.33	48.3	68	626	694
	CSDS	L-54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CSDS	L-55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref West	L-56	--	--	--	--	--	--	9.42	9.92	--	--	--	--	--	--	--	--	--	19	19
Dupl. of Stn L-15		L-61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dupl. of Stn L-53		L-62	--	19.6	--	--	72.1	15.1	191	172	93.1	113	131	96.7	110	93.3	18	88.7	107	1,107	1,214
		ERL	160	44	16	19	240	85.3	600	665	261	384			430		63.4		552	1,700	4,022
		ERM	2,100	640	500	540	1,500	1,100	5,100	2,600	1,600	2,800			1,600		260		3,160	9,600	44,792

Table 8. Pesticides at the New London Alternative

			Pesticides (µg/kg dry weight)																		
Alternative	**Area**	**Station ID**	Hexachlorobenzene	Lindane (gamma BHC)	Heptachlor	Aldrin	Oxychlordane	Heptachlor epoxide	trans-Chlordane	cis-Chlordane	Endosulfan I	trans-Nonachlor	4,4-DDE	Dieldrin	Endrin	Endosulfan II	cis-Nonachlor	4,4-DDD	4,4-DDT	Methoxychlor	Toxaphene
New London	NLDS	L-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NLDS	L-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NLDS	L-13	--	--	--	--	5.27	--	--	--	--	--	0.561	--	--	--	--	0.607	0.528	--	--
	NLDS	L-14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NLDS	L-15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NLDS	L-16	--	--	--	--	1.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NLDS	L-17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.48	--	--
	NLDS	L-18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.526	--	--	--
	NL-Wa	L-19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NL-Wa	L-20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NL-Wa	L-21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref East	L-22A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref East	L-22B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref East	L-23A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref East	L-23B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref East	L-24A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref East	L-24B	1.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NL-Wa	L-25A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NL-Wa	L-25B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NL-Wb	L-26A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NL-Wb	L-26B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NL-Wb	L-27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NL-Wb	L-28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
		ERL											2.2	0.02				2	1		
		ERM											27	8				20	7		

Table 9. Pesticides at the Niantic Bay and Cornfield Shoals Alternatives

			Pesticides (µg/kg dry weight)																		
Alternatives	**Area**	**Station ID**	Hexachlorobenzene	Lindane (gamma BHC)	Heptachlor	Aldrin	Oxychlordane	Heptachlor epoxide	trans-Chlordane	cis-Chlordane	Endosulfan I	trans-Nonachlor	4,4-DDE	Dieldrin	Endrin	Endosulfan II	cis-Nonachlor	4,4-DDD	4,4-DDT	Methoxychlor	Toxaphene
Niantic Bay	NBDS	L-31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NBDS	L-32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NBDS	L-33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NBDS	L-34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NBDS	L-35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NB-E	L-36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NB-E	L-37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NB-E	L-38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref	L-39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref	L-40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref	L-41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cornfield Shoals	CSDS	L-51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CSDS	L-52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CSDS	L-53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CSDS	L-54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CSDS	L-55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref	L-56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dupl. of L-15		L-61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dupl. of L-53		L-62	--	--	--	--	0.91	--	--	--	--	--	0.437	--	--	--	--	--	0.454	--	--
		ERL											2.2	0.02				2	1		
		ERM											27	8				20	7		

Table 10. PCBs at the New London Alternative

			PCBs (µg/kg dry weight)																						
Alternative	**Area**	**Station ID**	Cl2-BZ#8	Cl3-BZ#18	Cl3-BZ#28	Cl4-BZ#44	Cl4-BZ#49	Cl4-BZ#52	Cl4-BZ#66	Cl5-BZ#87	Cl5-BZ#101	Cl5-BZ#105	Cl5-BZ#118	Cl6-BZ#128	Cl6-BZ#138	Cl6-BZ#153	Cl7-BZ#170	Cl7-BZ#180	Cl7-BZ#183	Cl7-BZ#184	Cl7-BZ#187	Cl8-BZ#195	Cl9-BZ#206	Cl10-BZ#209	**Total PCBs**
New London	NLDS	L-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NLDS	L-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NLDS	L-13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NLDS	L-14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NLDS	L-15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NLDS	L-16	--	--	--	--	--	--	--	--	--	--	--	--	1.00	--	--	--	--	--	--	--	--	--	1.0
	NLDS	L-17	--	--	--	--	--	--	--	--	--	--	--	--	7.45	7.27	9.93	17.8	4.06	--	7.37	2.00	--	--	55.9
	NLDS	L-18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NL-Wa	L-19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NL-Wa	L-20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NL-Wa	L-21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref East	L-22A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref East	L-22B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref East	L-23A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref East	L-23B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref East	L-24A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref East	L-24B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NL-Wa	L-25A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NL-Wa	L-25B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NL-Wb	L-26A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NL-Wb	L-26B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NL-Wb	L-27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NL-Wb	L-28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
		ERL																							22.7
		ERM																							180.0

Table 11. PCBs at the Niantic Bay and Cornfield Shoals Alternatives

			PCBs (µg/kg dry weight)																						
Alternative	**Area**	**Station ID**	Cl2-BZ#8	Cl3-BZ#18	Cl3-BZ#28	Cl4-BZ#44	Cl4-BZ#49	Cl4-BZ#52	Cl4-BZ#66	Cl5-BZ#87	Cl5-BZ#101	Cl5-BZ#105	Cl5-BZ#118	Cl6-BZ#128	Cl6-BZ#138	Cl6-BZ#153	Cl7-BZ#170	Cl7-BZ#180	Cl7-BZ#183	Cl7-BZ#184	Cl7-BZ#187	Cl8-BZ#195	Cl9-BZ#206	Cl10-BZ#209	**Total PCBs**
Niantic Bay	NBDS	L-31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NBDS	L-32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NBDS	L-33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NBDS	L-34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NBDS	L-35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NB-E	L-36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NB-E	L-37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NB-E	L-38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref East	L-39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref East	L-40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref West	L-41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cornfield Shoals	CSDS	L-51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CSDS	L-52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CSDS	L-53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CSDS	L-54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CSDS	L-55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Ref West	L-56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dupl. of Stn L-15		L-61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dupl. of Stn L-53		L-62	--	--	--	--	--	--	--	--	--	--	--	--	0.98	--	--	--	--	--	--	--	--	--	1.0
		ERL																							22.7
		ERM																							180.0

Table 12. Statistics of Grain Size and Chemical Constituent for subareas for the three Alternative

Alternatives	Areas	Station IDs	Statistics	Grain Size (%)						TOC (%)	Metals (mg/kg/ dry weight)								PAHs[1] (µg/kg/ dry DW)			Total PCBs (µg/kg dry weight)
				Gravel	Coarse Sand	Medium Sand	Fine Sand	Sand (sum)	Fines (Silt+clay)		Chromium, Total	Copper, Total	Lead, Total	Nickel, Total	Zinc, Total	Arsenic, Total	Cadmium, Total	Mercury, Total	Total LMW PAHs	Total HMW PAHs	Total PAHs	
New London	NLDS	L-11 to L-18	Mean	9.4	3.4	13.5	37.8	54.7	35.9	1.7	15.57	18.32	14.05	9.81	50.9	3.76	0.10	0.04	287	1,050	1,338	--
			Max	51.4	6.2	33.9	51.6	91.7	78.2	3.5	28.30	44.80	43.30	20.80	150.0	7.72	0.26	0.14	2,116	6,587	8,703	55.9
	NLDS - farfield (= NL-Wa [east])	L-19 to L-21	Mean	2.9	2.1	16.8	63.4	82.4	14.7	0.5	7.63	4.54	6.10	4.49	21.1	1.99	0.04	0.02	25	321	346	--
			Max	4.5	3.7	20.7	67.2	85.2	16.5	0.9	8.22	5.11	7.64	4.91	23.1	2.16	0.04	0.02	58	590	648	--
	NLDS - Ref. (East)	L-22 to L-24	Mean	0.4	0.2	2.1	69.6	71.8	27.8	0.4	10.93	6.98	7.16	6.20	31.3	2.36	0.07	0.02	34	327	361	--
			Max	2.6	0.2	8.7	74.0	81.6	36.0	0.5	13.80	10.80	10.00	7.80	37.6	3.06	0.09	0.04	112	473	585	--
	NLDS - Ref. (West)	L-25 to L-28	Mean	1.9	3.1	13.7	68.3	85.1	13.1	0.8	7.71	4.13	5.44	4.71	24.1	2.50	0.04	0.02	4	38	42	--
			Max	2.6	4.8	19.2	72.0	89.7	22.7	1.5	11.00	6.50	7.76	6.84	38.8	3.78	0.07	0.02	13	180	190	--
	NL-Wa	L-19 to L-21, L-25	Mean	2.2	2.4	17.3	65.5	85.2	12.6	0.5	7.02	3.99	5.38	4.20	19.5	2.02	0.03	0.02	19	241	260	--
			Max	4.5	3.7	20.7	69.6	89.7	16.5	0.9	8.22	5.11	7.64	4.91	23.1	2.23	0.04	0.02	58	590	648	--
	NL-Wa (west)	L-25a, L-25b	Mean	1.2	2.8	18.1	68.6	89.5	9.4	0.5	6.11	3.17	4.29	3.76	17.0	2.06	0.03	0.02	--	--	--	--
	NL-Wb	L-26 to L-28	Mean	2.2	3.3	11.5	68.1	82.9	15.0	1.0	8.51	4.62	6.02	5.18	27.7	2.72	0.05	0.02	5	46	51	--
			Max	2.6	4.8	17.0	72.0	89.2	22.7	1.5	11.00	6.50	7.76	6.84	38.8	3.78	0.07	0.02	13	180	190	--
Niantic Bay	NBDS	L-31 to L-35	Mean	9.1	10.4	29.3	42.5	82.1	8.8	0.8	5.28	2.92	4.08	3.80	17.9	2.31	0.03	0.02	3	25	27	--
			Max	23.1	16.4	34.7	54.7	93.8	15.2	1.3	7.23	4.75	5.44	4.75	26.8	2.71	0.03	0.02	13	110	110	--
	NBDS - Ref. (East)	L-36 to L-40	Mean	7.0	5.8	21.5	52.5	79.8	13.2	1.1	7.56	4.15	5.31	4.76	24.4	2.96	0.03	0.02	14	143	157	--
			Max	10.8	9.0	27.1	58.5	83.7	16.4	1.9	9.67	5.82	6.30	5.97	29.8	3.91	0.05	0.02	68	648	715	--
	NB-E	L-36 to L-38	Mean	8.0	5.2	21.5	53.5	80.2	11.8	0.8	7.72	4.29	5.20	4.66	24.3	2.90	0.03	0.02	23	225	248	--
			Max	10.8	7.3	27.1	57.1	83.7	14.8	1.1	9.67	5.82	6.30	5.97	29.8	3.36	0.05	0.02	68	648	715	--
	Ref. - East of NB-E	L39, L-40	Mean	5.5	6.8	21.4	51.1	79.2	15.4	1.6	7.32	3.93	5.49	4.90	24.6	3.04	0.03	0.02	--	20	20	--
	NBDS - Ref. (West)	L-41		7.5	9.2	26.8	46.8	82.8	9.7	0.6	6.10	3.39	4.24	4.08	20.2	3.06	0.03	0.02	--	--	--	--
Cornf. Shoals	CSDS	L-51 to L-55	Mean	14.6	11.9	39.9	25.4	77.2	8.3	0.4	6.98	5.81	5.10	5.90	25.1	2.55	0.04	0.02	14	125	139	--
			Max	28.1	14.7	50.5	36.7	91.9	27.9	1.0	15.50	19.10	12.00	8.02	57.4	3.38	0.11	0.06	68	626	694	--
	CSDS - Ref. (West)	L-56		13.2	6.3	21.4	23.2	50.9	35.9	0.3	18.40	14.70	8.09	18.60	47.4	5.22	0.06	0.02	--	19	19	--
			ERL	81	37	46.7	20.9	150	8.2	1.2	0.15	552	1,700	4,022	22.7							
			ERM	370	270	218	51.6	410	70	9.6	0.71	3,160	9,600	44,792	180							

Ref. = Reference

[1] For individual PAHs without detection, a concentration of zero was assumed for averaging.

4.2.1 New London Alternative

The predominant grain size within the New London Alternative was fine sand. Sediments were on average finer-grained within the NLDS than in areas outside of the NLDS. Specifically, at the NLDS, the mean sand content (all sand fractions) was 55%, while the mean sand content at areas outside the NLDS ranged from 72% to 90% (Table 12). The mean silt and clay content at the NLDS was 36%, which was approximately 2 to 3 times higher than the average silt and clay content in areas west of the NLDS; however, the mean silt and clay content at the NLDS was similar to the reference area to the east of the NLDS. The highest silt and clay content was measured at Station L-18 (78%), which was located in the area of the NLDS that had been receiving most of the dredged material in the previous decade (AECOM, 2009; Figure 6).

The TOC concentrations at stations within and around the New London Alternative were similar to the pattern observed in the grain size data, with higher TOC concentrations in finer-grained sediments. The mean TOC concentrations measured at the NLDS was 1.7%, which was several about 2 to 4 times higher than the mean TOC concentrations at all the other areas. The highest TOC concentration was measured at Station L-18 with 3.5%.

4.2.2 Niantic Bay Alternative

The mean grain size within the NBDS and surrounding sampling locations was sand at approximately 80%, with fine sand being the largest fraction (Table 12). The silt and clay content was low, with a mean ranging between 4% and 15%. None of the individual samples for the Niantic Bay Alternative had a silt and clay content higher than 16%.

The TOC concentrations at stations in the Niantic Bay Alternative were generally below 1%, with the exception of two stations to the east of Site NL-E (Stations L-39 and L-40); the mean TOC concentration at these two stations was 1.5%.

4.2.3 Cornfield Shoals Alternative

The predominant grain size within the CSDS and in the reference area was also sand, with medium sand being the largest fraction. The mean silt and clay content was 8.3% for the five stations within the CSDS, but varied considerably between the stations. At the center of the CSDS, the silt and clay content was 28% (Station L-51), which was significantly higher than the silt and clay content at the other four stations within the CSDS (range of 2 to 6%). The silt and clay content (36%) at the reference station, located 0.6 nmi (1.1 km) to the west of the CSDS, was similar to the silt and clay content at the center of the CSDS.

The TOC concentration in the sample from the center of the CSDS was 1.0%. Sediments at other sampling stations within the CSDS as well as the reference areas contained less than 0.5% TOC.

4.3 Metals

Metal concentrations analyzed at the three alternative sites were low (Tables 4, 5, and 12).

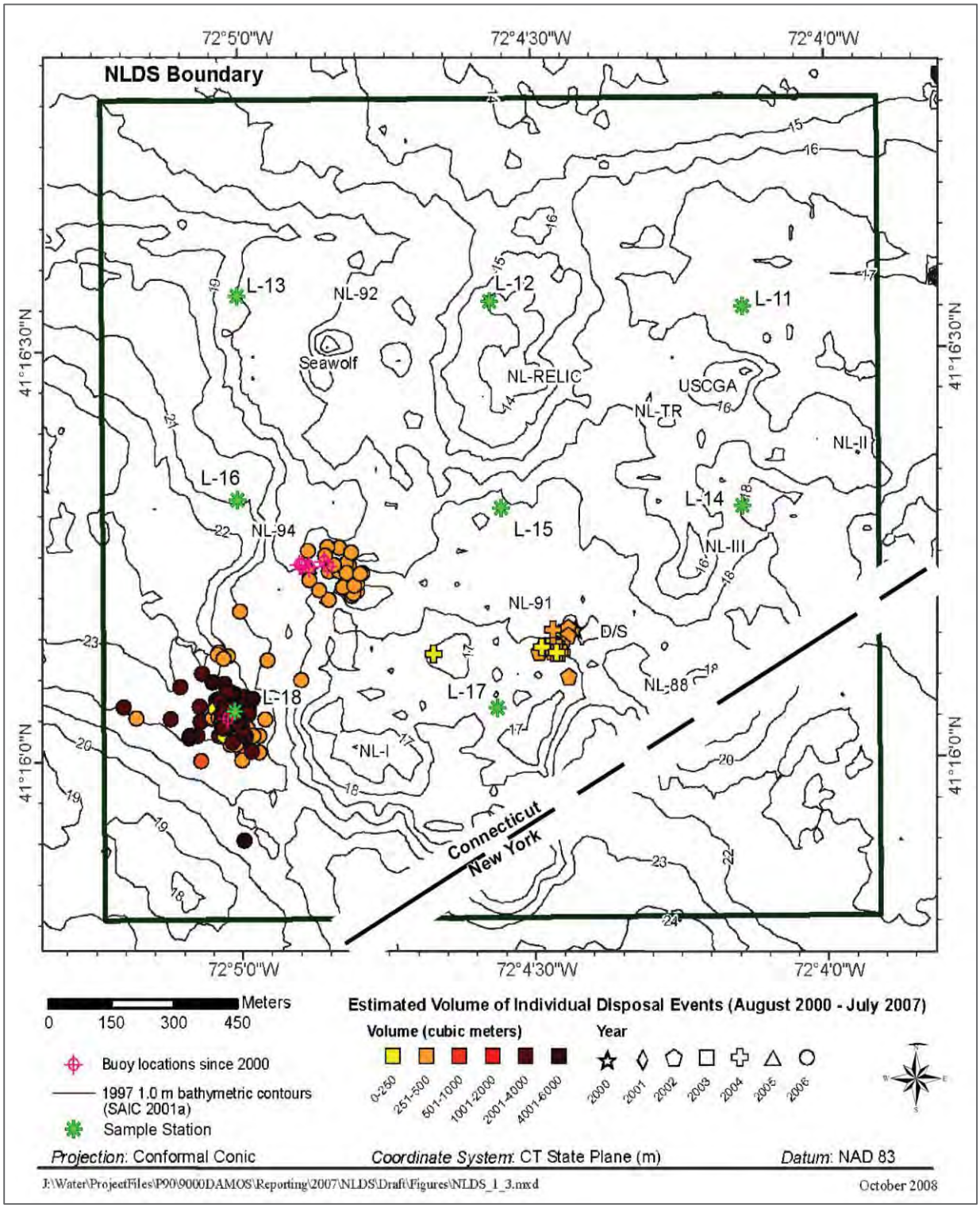

Figure 6. Sediment sampling stations of the 2015 survey at the New London Disposal Site (green asterisks, and station number L-__), superimposed on the bathymetry from July 2007 along with reported August 2000 through July 2007 dredged material disposal locations (from AECOM, 2009; the AECOM report includes details on dredged material volumes and disposal mounds).

4.3.1 New London Alternative

None of the metal concentrations at any of the stations collected for the New London Alternative exceeded the ERM values. Only two individual samples exceeded the ERL values for any analyzed metal. Specifically, the copper concentration at Station L-13 in the northwestern part of the NLDS was 45 mg/kg; the copper concentration in Station L-16 was 41 mg/kg. These concentrations were slightly above the ERL value for copper of 37 mg/kg, but well below the ERM value of 270 mg/kg.

None of the mean metal concentrations exceeded the ERL value at any site within the New London Alternative. Mean concentrations for most metals were roughly 50% lower within Sites NL-Wa/b than within Site NLDS (Table 12), reflecting background conditions since Sites NL-Wa and NL-Wb have not received dredged material. This includes the three stations from the eastern part of Site NL-Wa (Stations L-19 to L-21) located just to the west of the NLDS, which suggests that dredged material is contained within the NLDS.

Metals concentrations in the reference area to the east of the NLDS were slightly higher than at Sites NL-Wa and NL-Wb.

4.3.2 Niantic Bay Alternative

None of the metal concentrations at any of the stations collected for the Niantic Bay Alternative exceeded the ERM or ERL values. Concentrations were consistently low. Mean metal concentrations between the NBDS and areas outside were similar.

4.3.3 Cornfield Shoals Alternative

None of the metal concentrations at any of the stations collected for the Cornfield Shoals Alternative exceeded the ERM or ERL values. Concentrations were consistently low. Metal concentrations at Station L-53 were higher (although still well below the ERL value) than at the four other stations within the CSDS, reflecting disposal activity in the center in the past (ENSR, 2005). This observation is consistent with the higher silt and clay content at Station L-53 (28%), compared to the low silt and clay content at the four other stations (mean of 3.5%).

4.4 Polycyclic Aromatic Hydrocarbons (PAHs)

Sediments were analyzed for 16 PAHs. PAHs were grouped into low molecular weight (LMW) PAHs and high molecular weight (HMW). In general, PAHs were low or often not detected (Tables 6 and 7). For the New London Alternative, the mean Total PAH concentrations were highest at the NLDS. For the Cornfield Shoals Alternative, Total PAH concentrations were higher in the center of the CSDS than at the other stations within the CSDS. There was no specific trend for the Niantic Bay Alternative.

The mean LMW, HMW, or Total PAHs concentrations did not exceed the ERM or ERL values in any of the various areas of the three Alternatives. No individual sample exceeded the ERM value; only one sample (Station L-13 within the NLDS) exceeded the ERL value for multiple compounds

(acenaphthene, fluorine, phenanthrene, anthracene, fluoranthene, pyrene, benza(a)anthracene, chrysene, benzo(a)pyrene, and dibenz(a,h)anthracene), as well as the ERL values for LMW, HMW, and Total PAHs, suggesting evidence of past dredged material disposal. PAHs in recently disposed dredged material (Station L-18; Figure 6) were well below the ERL values.

4.5 Pesticides

The sediment samples collected at the alternative sites were analyzed for 19 pesticides (Tables 8 and 9). Pesticides were only detected above the analytical reporting limit at six stations (4 stations at the NLDS, one station at the off-site area to the east of the New London Alternative, and one station at the CSDS). None of the detected concentrations exceeded the ERM values. Only two NLDS samples slightly exceeded ERL values: in Sample L-13, the concentration for the sum of DDD, DDE, and DDT of 1.70 µg/kg slightly exceeded the ERL value of 1.58 µg/kg; in Sample L-17, the DDT concentration of 1.48 µg/kg slightly exceeded the ERL value of 1 µg/kg.

4.6 Polychlorinated Biphenyls (PCBs)

The surface sediment collected during the 2015 sediment chemistry survey was analyzed for 22 PCB congeners. PCBs were only detected above the analytical reporting limit at three stations (two at the NLDS, and one at the CSDS) (Tables 10 and 11). None of the detected concentrations exceeded the ERM value for total PCBs. Only the total PCB concentration in Sample L-17 (55.9 µg/kg), located at the NLDS, exceeded the ERL value (22.7 µg/kg).

5.0 SUMMARY

Sediment samples were collected within and around the three alternative sites analyzed in the SEIS (New London, Niantic Bay, and Cornfield Shoals). Sediment samples were collected at a total of 35 stations in February 24-27, 2015. Samples were analyzed for physical and chemical properties, which included grain size, TOC, metals, PAHs, pesticides, and PCBs.

Sediments at the New London Alternative consisted primarily of fine sand, consistent with dredged material disposal at the NLDS (which is part of the New London Alternative). TOC and chemical concentrations were higher in the sediment at the NLDS than in other areas of the New London Alternative (*i.e.*, at Sites NL-Wa and NL-Wb) or at the Niantic Bay and Cornfield Shoals Alternatives. Two samples from the NLDS exceeded the ERL for copper, and one sample each exceeded the ERLs for PAHs, pesticides, and PCBs; however, none of the samples exceeded any ERM values.

Sediments at the Niantic Bay and Cornfield Shoals Alternatives were medium to fine grained. None of the metals or organic compound concentrations exceeded the ERL or ERM values.

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Appendix 1

FIELD NOTES

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24 FEB 2015

RV CT

ELIS SEDIMENT SURVEY

Kay, Alejandro, Dan, Marco, Frantz

EST

0920 u/w for CSDS L56

wx forecast < 5kt N

1 ft seas

tide rising (flood + 1hr)

ADCP started (0906 hrs)

GRAB PINGER = 39kHz

1-1-1-1

24 FEB 2015

TIME: 1122 EST
STATION ID: L56
COORDINATES: 41 12.6041 72 22.9867
SAMPLE ID: L56
ALPHA LAB LABEL: L56
DEPTH: 51.8m, 170'
SEA STATE: FLAT, <1'
WX: SUNNY, COLD
TIDE: FLOODING
GRAB CONDITION: GOOD ON 1st ATTEMPT
OBSERVED GRAIN SIZE:
SEE SAND COARSE, RED MUD W/ DEPTH

SEDIMENT TEXTURE/ODOR:
NO ODOR, SANDY SIZE, COBBLE, GRAVEL, COARSE SAND.
FINE COMPACTED MUD BELOW

CTD TIME: 1133, CAST 1.HEX
CTD DEPTH: 51
CTD COORDS: DP-Same
NISKIN TIME: 1140
NISKIN DEPTH: 51
NISKIN COORDS: DP-Same

24 FEB 2015

TIME: 1201 EST
STATION ID: L55
COORDINATES: 41 12.4355, 72 21.8247
SAMPLE ID: L55
ALPHA LAB LABEL: L55
DEPTH: 59.1m, 194'
SEA STATE: FLAT
WX: SUNNY, COLD
TIDE: FLOODING
GRAB CONDITION: GOOD, ON 1st ATTEMPT
OBSERVED GRAIN SIZE: COARSE SAND, WELL MIXED - HOMOGENOUS

SEDIMENT TEXTURE/ODOR:
NO ODOR COARSE SAND THROUGHOUT - SHELL HASH

CTD TIME 1211, CAST 2.HEX
CTD DEPTH 59
CTD COORDS DP-Same
NISKIN TIME: 1217
NISKIN DEPTH: 59
NISKIN COORDS: DP-Same

24 FEB 2015

TIME: 1235 EST
STATION ID: L54
COORDINATES: 41 12.4380, 72 21.1592
SAMPLE ID: L54
ALPHA LAB LABEL: L54
DEPTH: 54.3m, 178'
SEA STATE: FLAT, < 1'
WX: SUNNY, WINDS < 5KTS
TIDE: FLOODING
GRAB CONDITION: GOOD ON 1st ATTEMPT
OBSERVED GRAIN SIZE:
Homogenous medium to coarse sand
SEDIMENT TEXTURE/ODOR:
no odor - sandy, shell hash throughout, some gravel

CTD TIME: 1240, CAST 3. 1HER
CTD DEPTH: 54
CTD COORDS: DP - Same
NISKIN TIME: 1245
NISKIN DEPTH: 54
NISKIN COORDS: DP - Same

24 FEB 2015

TIME: 1301 EST
STATION ID: L53 - DUP HERE
COORDINATES: 41 12.6826, 72 21.4918
SAMPLE ID: L53, L62
ALPHA LAB LABEL: L62 ← time noted 14:35 for blind dup
DEPTH: 54.3m, 178'
SEA STATE: < 1', flat
WX: SUNNY, WIND < 5 KTS
TIDE: FLOODING
GRAB CONDITION: GOOD ON 1st ATTEMPT
OBSERVED GRAIN SIZE:
Sfc - coarse sand w/ slipper shells, oyster shell, 1m sfc - black sand under
SEDIMENT TEXTURE/ODOR:
sfc coarse sand shell, muddy under layer, slight odor - rotten egg, black magnetite...
CTD TIME: 1310, CAST 4. 1HER
CTD DEPTH: 54
CTD COORDS: DP - Same
NISKIN TIME: 1316
NISKIN DEPTH: 54
NISKIN COORDS: DP - Same

24 FEB 2014

TIME: 1352 EST
STATION ID: L52
COORDS: 41 12.9424, 72 21.8286
SAMPLE ID: L52
ALPHA LAB LABEL:
DEPTH: 51.8m, 170'
SEA STATE: <1', Flat
WX: PARTLY SUNNY, LIGHT BREEZE
TIDE: FLOODING
GRAB CONDITION: GOOD ON 1st TRY
OBSERVED GRAIN SIZE: MED-COARSE SAND W/ SHELL HASH, SOME GRAVEL, COBBLES
SEDIMENT TEXTURE/ODOR
NO ODOR, HOMOGENEOUS MED-COARSE SAND.

CTD TIME: 1358, CAST6. HEX
CTD DEPTH:
CTD COORDS:
NISKIN TIME: 1406
NISKIN DEPTH:
NISKIN COORDS:

24 FEB 2014

TIME: 1420 EST
STATION ID: L51
COORDS: 41 12.9421, 72 21.1946
SAMPLE ID: L51
ALPHA LAB LABEL:
DEPTH: 50.3m, 165'
SEA STATE: <1', Flat
WX: Partly Sunny, light breeze
TIDE: END OF FLOOD
GRAB CONDITION: GOOD ON 1st TRY
OBS GRAIN SIZE:
MED-COARSE SAND, HOMOGENEOUS, SHELL HASH, PEBBLES, COBBLE, GRAVEL
SEDIMENT TEXTURE/ODOR
NO ODOR, MED-COARSE SAND

CTD TIME: 1426, CAST6. HEX
CTD DEPTH:
CTD COORDS
NISKIN TIME: 1430
NISKIN DEPTH:
NISKIN COORDS.

24 Feb 2015

1430 Completed last station @ CSDS.

1433 u/w AP.
1610 STOP ADCP.
1615 back @ AP.

Alpha Labs courier is already here.

1633 Relinquish samples to Alpha Labs.

26 Feb 2015

RV CT
Dan, Kay, Marco, Frank

for EPA Sed survey @ Niantic Bay Disposal Site.

ESI

0820 u/w NBDS, station L41

~ 0825 ADCP on

26 FEB 2015

TIME 0933 EST
STATION ID: L41
COORDS: 41 16.0043, 72 12.4435
SAMP ID. L41
ALPHA ID: L41
DEPTH: 31.4m
SEA STATE: 1-2'
WX: OVERCAST, WIND NE 10-15KTS
TIDE: EBB
GRAB CONDITION: GOOD ON 1st ATTEMPT
OBSERVED GRAIN SIZE
Med. fine sand - shell hash
some gravel & pebbles
SEDIMENT TEXTURE/ODOR
no odor

CTD TIME 0935, CAST 7.1TEX
CTD DEPTH 31.4
CTD COORDS DP - Same
NISKIN TIME 0942
NISKIN DEPTH 31.4
NISKIN COORDS DP - SAME

26 FEB 2015

TIME 1005 EST
STATION ID: L32
COORDS: 41 16.3772 72 11.4234
SAMP ID: L32
ALPHA ID: L32
DEPTH: 26.8m
SEA STATE: 1-2'
WX: OVERCAST, WIND 10-15KTS
TIDE: END OF EBB
GRAB CONDITION: GOOD ON 1st ATTEMPT
OBS GRAIN SIZE:
Sandy shelly, MED-COARSE
SANDS, gravel
SED TEXTURE/ODOR:
no odor

CTD TIME: NOT TAKEN
CTD DEPTH:
CTD COORDS:
NISKIN TIME: NOT TAKEN
NISKIN DEPTH:
NISKIN COORDS:

26 FEB 2015

TIME: 1019 EST
STATION ID L35
COORDS: 41 15.6641 72 11.4278
SAMPLE ID: L35
ALPHA ID: L35
DEPTH: 28.1 m
SEA STATE: 1-2'
WX: OVERCAST, NE 10-15 KTS
TIDE: END OF EBB
GRAB CONDITION: GOOD on 1st try
OBS GRAIN SIZE:
Med Sand, w/ shell hash

SEDIMENT TEXTURE/ODOR
NO ODOR

CTD TIME NOT TAKEN
CTD DEPTH
CTD COORDS
NISKIN TIME NOT TAKEN
NISKIN DEPTH
NISKIN COORDS

26 FEB 2015

TIME: 1035 EST
STATION ID: L33
COORDS: 41 16.0443 72 10.9795
SAMPLE ID: L33
ALPHA LAB ID: L33
DEPTH: 29.3 m
SEA STATE: 1-2'
WX: OVERCAST, NE 10-15 KTS
TIDE: ALMOST SLACK LOW
GRAB CONDITION: Good on 1st attempt
OBS GRAIN SIZE:
Med-Coarse Sand, Shell hash, some mud
SEDIMENT TEXTURE/ODOR
NO ODOR

CTD TIME 1038, CAST 8.HEX
CTD DEPTH 29.3 m
CTD COORDS DP - Same
NISKIN TIME 1042
NISKIN DEPTH 29.3 m
NISKIN COORDS DP - Same

26 FEB 2015

TIME 1150 EST
STATION ID: L31
COORDS: 41 16.3407 72 10.5096
SAMPLE ID: L31
ALPHA ID: L31
DEPTH: 23.3m
SEA STATE: 1-2'
WX OVERCAST, NE 10-15 KTS
TIDE: START OF FLOOD
GRAB: CONDITION: GOOD ON 1st TRY
OBS GRAIN SIZE:
med-fine sand, shell hash
some mud
SED TEXTURE/ODOR:
no odor

CTD TIME NOT TAKEN
CTD DEPTH
CTD COORDS
NISKIN TIME NOT TAKEN
NISKIN DEPTH
NISKIN COORDS

26 FEB 2015

TIME: 1119 EST
STATION ID: L34 41 15.6572,
SAMPLE ID: L34 72 10.5586
ALPHA LAB ID: L34
DEPTH 32.4m
SEA STATE: 1-2'
WX: OVERCAST, NE 10-15 KTS
TIDE: FLOOD
GRAB CONDITION: GOOD ON 1st ATTEMPT
OBS GRAIN SIZE:
Much coarser sand, large shells: shell hash, pebbles, gravel
SED TEXTURE/ODOR:
no odor

CTD TIME NOT TAKEN
CTD DEPTH
CTD COORDS
NISK TIME NOT TAKEN
NISK DEPTH
NISK COORDS

26 FEB 2015

TIME: 1135 EST
STATION ID: L36
COORDS: 41 16.2768 72 09.5793
SAMPLE ID: L36
ALPHA LAB ID: L36
DEPTH: 24 M
SEA STATE: 1-2'
WX: OVERCAST, NE 10-15 KTS
TIDE: FLOOD
GRAB CONDITION GOOD ON 1ST TRY
OBS GRAIN SIZE:
SHELLY, COARSE - MED SAND
SOME MUD POCKETS
SEDIMENT TEXTURE/ODOR
NO ODOR

CTD TIME: NOT TAKEN
CTD DEPTH:
CTD COORDS:
NISKIN TIME: NOT TAKEN
NISKIN DEPTH:
NISKIN COORDS:

26 FEB 2015

TIME 1236 EST
STATION ID: L37
COORDS: 41 15.9380 72 09.5855
SAMPLE ID: L37
ALPHA LAB ID: L37
DEPTH 42 M
SEA STATE 1-2'
WX OVERCAST, 15 KTS, NE
TIDE: FLOOD
GRAB CONDITION GOOD ON 1ST TRY
OBS GRAIN SIZE:
MED SAND, HOMOGENOUS
SHELL HASH
SEDIMENT TEXTURE/ODOR
NO ODOR

CTD TIME: 1247, CAST 9. HER
CTD DEPTH: 42 m
CTD COORDS: DP - SAME
NISKIN TIME: 1254
NISKIN DEPTH: 42 m
NISKIN COORDS: DP SAME

26 FEB 2015

TIME 1306 EST
STATION ID: L38
COORDS: 41 15.6034 72 09.5857
SAMPLE ID: L38
ALPHA LAB ID: L38
DEPTH 49.8m
SEA STATE 1-2'
WX: OVERCAST, LIGHT SNOW, 15KTS, NE
TIDE: FLOOD
GRAB CONDITION: GOOD ON 1ST TRY
OBS GRAIN SIZE:
MED-COARSE SAND, W MUD
SHELL HASH
SEDIMENT TEXTURE/ODOR:
NO ODOR

CTD TIME: NOT TAKEN
CTD DEPTH:
CTD COORDS:
NISK TIME: NOT TAKEN
NISK DEPTH:
NISK COORDS:

26 FEB 2015

TIME 1330 EST
STATION ID: L40
COORDS: 41 15.5991 72 08.9739
SAMPLE ID: L40
ALPHA LAB ID: L40
DEPTH: 59.7m
SEA STATE: 1-2'
WX: OVERCAST, LIGHT SNOW, NE 15KTS
TIDE: FLOOD
GRAB CONDITION: GOOD ON 1ST ATTEMPT
OBS GRAIN SIZE:
finer sand w/ mud &
fine shell hash.
SED TEXTURE/ODOR:
NO ODOR

CTD TIME: NOT TAKEN
CTD DEPTH:
CTD COORDS:
NISK TIME: NOT TAKEN
NISK DEPTH:
NISK COORDS:

26 FEB 2015

TIME: 1345 EST
STATION ID: L39
COORDS: 41 15.9407 72 08.9495
SAMPLE ID: L39
ALPHA LAB ID: L39
DEPTH: 41.2m
SEA STATE: 1-2'
WX: OVERCAST, LIGHT SNOW, 10-15 KTS, NE
TIDE: FLOOD
GRAB CONDITION: GOOD ON 1st ATTEMPT
OBS GRAIN SIZE
fine sand w/ mud + fine white shell hash
SEDIMENT TEXTURE/ODOR
NO ODOR

CTD TIME: 1351, CAST ID. HEX
CTD DEPTH. 41.2
CTD COORDS: DP. Same
MISK TIME: 1358
MISK DEPTH. 41.2
MISK COORDS: DP. Same

26 FEB 2014

TIME: 1424 EST
STATION ID: L26A
COORDS: 41 16.2570 72 06.9272
SAMPLE ID: L26A
ALPHA LAB ID: L26A
DEPTH: 23.1m
SEA STATE: 1-2'
WX: OVERCAST, LIGHT SNOW, 10-15 KTS NE
TIDE: FLOOD
GRAB CONDITION: GOOD ON FIRST TRY
OBS GRAIN SIZE:
FINE SAND, LIGHT SFL, ONTOP OF TRACK MUDS
SEDIMENT TEXTURE/ODOR:
No odor

CTD TIME: NOT TAKEN
CTD DEPTH:
CTD COORDS:
MISK TIME: NOT TAKEN
MISK DEPTH:
MISK COORDS:

26 Feb 2015

TIME: 1430 EST
STATION ID: L26B
COORDS: 41 16.2707 72 06.9199
SAMPLE ID: L26B
ALPHA LAB ID: L26B
DEPTH: 23.1 m
SEA STATE: 1-2'
WX: OVERCAST, LIGHT SNOW, 10-15 KTS NE
TIDE: FLOOD
GRAB CONDITION: GOOD ON 1ST ATTEMPT
OBS GRAIN SIZE:
FINE SAND, LIGHT COLOR ON SFC
MUD UNDERNEATH, FINE SHELL HASH
SEDIMENT TEXTURE/ODOR
NO ODOR

CTD TIME: NOT TAKEN
CTD DEPTH:
CTD COORDS:
NISK TIME: NOT TAKEN
NISK DEPTH:
NISK COORDS:

26 FEB 2015

1440 U/W Aversy Pt
ADCP off (1532)
1515 back @ AP.

1630 RELINQUISH Samples
to Alpha Labs.

Rite in the Rain

27 FEB 2015

RV CT
MARLO, KIM, ALEJANDRO,
DAN, FRANK

EST

0830 v/w for L27

0834 ADCP on

27 FEB 2015

TIME: 0908 EST
STATION ID: L27
COORDS: 41 16.5019 72 06.8698
SAMPLE ID: L27
ALPHA LAB ID: L27
DEPTH: 23.5 M
SEA STATE: <1'
WX: SUNNY, 10KT N, COLD
DOE: EBBING
GRABS CONDITION: GOOD ON 1ST ATTEMPT
OBS GRAIN SIZE:
FINE SAND & MUD, DARK

SEDIMENT TEXTURE/ODOR:
no odor

CTD TIME: not taken
CTD DEPTH:
CTD COORDS:
NISKIN TIME: not taken
NISKIN DEPTH:
NISKIN COORDS:

27 FEB 2015

TIME: 0921 EST
STATION ID: L28
COORDS: 41 16.0010, 72 06.5972
SAMPLE ID: L28
ALPHA LAB ID: L28
DEPTH: 27m
SEA STATE: <1'
WX: <10 KTS, N, SUNNY, COLD
TIDE: EBBING
GRAB CONDITION: GOOD ON 1ST TRY
OBS GRAIN SIZE:
fine sandy mud, homogenous
fine shell hash
SED TEXTURE/ODOR:
no odor

CTD TIME: 0922, CAST 11. HEX
CTD DEPTH: 27m
CTD COORDS: DP - Same
NISK TIME: 0934
NISK DEPTH: 27m
NISK COORDS: DP - Same

27 FEB 2015

TIME: 0948 EST
STATION ID: L25A
COORDS: 41 16.1419 72 06.0044
SAMPLE ID: L25A
ALPHA LAB ID: L25A
DEPTH: 20.2 m
SEA STATE: <1'
WX: SUNNY
TIDE: EBBB
GRAB CONDITION: GOOD ON 1ST TRY
OBS GRAIN SIZE:
fine sandy mud homogenous,
some shell hash
SED TEXTURE/ODOR:
no odor

CTD TIME: not taken
CTD DEPTH:
CTD COORDS:
NISK TIME: not taken
NISK DEPTH:
NISK COORDS:

27 FEB 2015

TIME: 1000 EST
STATION ID: L25B
COORDS: 42 16.1358 72 05.9884
SAMPLE ID: L25B
ALPHA LAB ID: L25B
DEPTH: 20m
SEA STATE: <1'
WX: SUNNY, COLD
TIDE: EBB
GRAB CONDITION: GOOD ON FIRST TRY
OBS GRAIN SIZE:
MUDDY SAND, HOMOGENOUS
DK GRAY
SED TEXTURE/ODOR:
LITTLE ODOR

CTD TIME not taken
CTD DEPTH:
CTD COORDS:
NISK TIME: not taken
NISK DEPTH:
NISK COORDS:

27 FEB 2015

TIME: 1012 EST
STATION ID: L21
COORDS: 41 15.9931 72 05.4536
SAMPLE ID: L21
ALPHA LAB ID: L21
DEPTH: 18.5m
SEA STATE: <1'
WX: SUNNY, LIGHT BREEZE, COLD
TIDE: EBB
GRAB CONDITION: GOOD, 1ST TRY
OBS GRAIN SIZE:
MUDDY SAND, DK GRAY/BLACK
PIECE OF DRIFTWOOD, SHELL HASH
SED TEXTURE/ODOR:
LITTLE ODOR

CTD TIME: not taken
CTD DEPTH:
CTD COORDS:
NISK TIME: not taken
NISK DEPTH:
NISK COORDS:

27 FEB 2015

TIME: 1025 EST
STATION ID: L20
COORDS: 41 16.3253 72 05.4364
SAMPLE ID: L20
ALPHA LAB ID: L20
DEPTH: 23.5m
SEA STATE: <1'
WX: SUNNY, <10KTS
TIDE:
GRAB CONDITION: GOOD, FIRST ATTEMPT
OBS GRAIN SIZE:
very fine sandy mud,
dk gray, some pockets o mud
SED TEXTURE/ODOR:
no odor

CTD TIME: 1027, CAST 12-HEX
CTD DEPTH: 23.5
CTD COORD: DP-Same
NISK TIME: 1034
NISK DEPTH: 23.5
NISK COORD: DP-Same

27 FEB 2015

TIME: 1043 EST
STATION ID: L19
COORDS: 41 16.5626 72 05.4451
SAMPLE ID: L19
ALPHA LAB ID: L19
DEPTH: 21.2m
SEA STATE: <1'
WX: <10KTS, SUNNY
TIDE:
GRAB CONDITION: GOOD, FIRST ATTEMPT
OBS GRAIN SIZE:
SANDY MUD, FINE GRAINED
DK GRAY
SED TEXTURE/ODOR:
no odor

CTD TIME: not taken
CTD DEPTH:
CTD COORDS:
NISK TIME: not taken
NISK DEPTH:
NISK COORDS:

27 FEB 2015

TIME: 1055 EST
STATION ID: L13
COORDS: 41 16.5632, 7205.0014
SAMPLE ID: L13
ALPHA LAB ID: L13
DEPTH: 18.0 m
SEA STATE: < 1'
WX: < 10 KTS, SUNNY, COLD
TIDE: EBB
GRAB CONDITION: GOOD ON FIRST TRY
OBS GRAIN SIZE:
DK BLACK, MUD, VERY LITTLE SAND,
SED TEXTURE/ODOR:
STRONG ROTTEN EGG ODOR

CTD TIME: not taken
CTD DEPTH:
CTD COORDS:
NISK TIME: not taken
NISK DEPTH:
NISK COORDS:

TIME: 1109 EST
STATION ID: L16
COORDS: 41 16.3143, 7205.0021
SAMPLE ID: L16
ALPHA LAB ID: L16
DEPTH: 21 m
SEA STATE: < 1'
WX: 5-10 KTS, NORTH, SUNNY, COLD
TIDE: EBB
GRAB CONDITION: GOOD ON 1ST TRY
OBS GRAIN SIZE:
MUD, BLACK, STICKY
LOBSTER BAIT
SED TEXTURE/ODOR:
SLIGHT ROTTEN EGG ODOR

CTD TIME: not taken
CTD DEPTH:
CTD COORDS:
NISK TIME: not taken
NISK DEPTH:
NISK COORDS:

27 FEB 2015

TIME: 1122 EST
STATION ID: L18
COORDS: 41 16.0568 72.05.0096
SAMPLE ID: L18
ALPHA LAB ID: L18
DEPTH: 20.3M
SEA STATE: <1'
WX: SUNNY, <10KT BREEZE, COLD
TIDE: EBBING
GRAB CONDITION: GOOD ON FIRST TRY
OBS GRAIN SIZE:
MUD, DK BROWN, STICKY
SHELLS, → DARKER
SED TEXTURE/ODOR:
LIGHT ROTTEN EGG ODOR

CTD TIME: not taken
CTD DEPTH:
CTD COORDS:
NISK TIME: not taken
NISK DEPTH:
NISK COORDS:

27 FEB 2015

TIME: 1139 EST
STATION ID: L17
COORDS: 41 16.0587 72 04.5608
SAMPLE ID: L17
ALPHA LAB ID: L17
DEPTH: 17.5M
SEA STATE: <1'
WX: SUNNY, <10KTS, COLD
TIDE: SLACKING
GRAB CONDITION: GOOD ON 1ST TRY
OBS GRAIN SIZE:
MUDDY SAND, SHELL HASH
MINIMAL, FAIRLY HOMOGENOUS
SED TEXTURE/ODOR:
NO ODOR

CTD TIME: not taken
CTD DEPTH:
CTD COORDS:
NISK TIME: not taken
NISK DEPTH:
NISK COORDS:

27 FEB 2015

TIME: 1153 EST
STATION ID: L15
COORDS: 41 16.3023, 72 04.5518
SAMPLE ID: L15, L61
ALPHA LAB ID: L15, L61 2345 TIME
DEPTH: 18.0 m
SEA STATE: ~1'
WX: SUNNY 10-12 KT, N, COLD
TIDE: SLACK BEFORE FLOOD
GRAB CONDITION: GOOD AFTER 2nd ATTEMPT
OBS GRAIN SIZE:
MUDDY SAND, W/ PEBBLES COBBLE
SED TEXTURE ODOR:
NO ODOR

CTD TIME: 1157, CAST13.HEX
CTD DEPTH: 18 m
CTD COORD: DP - Same
NISK TIME: 1200
NISK DEPTH: 18 m
NISK COORD: DP - Same

27 FEB 2015

TIME: 1258 EST
STATION ID: L12
COORDS: 41 16.5547 72 04.5697
SAMPLE ID: L12
ALPHA LAB ID: L12
DEPTH: 14.2 m
SEA STATE: 1-2'
WX: 10-12 KT N WIND, COLD
TIDE: FLOODING
GRAB CONDITION: GOOD ON 1st ATTEMPT
OBS GRAIN SIZE:
SANDY MUD, LOTS of LARGE SHELL, DK BLK
SED TEXTURE/ODOR:
NO ODOR

CTD: not taken
CTD:
CTD:
NISK: not taken
NISK:
NISK:

27 FEB 2015

TIME: 1308 EST
STATION ID: L-11
COORDS: 41 16.5467 72 04.1381
SAMPLE ID: L-11
ALPHA LAB ID: L-11
DEPTH: 17.7m
SEA STATE: 1-2'
WX: 10-15 KTS, PARTLY SUNNY, COLD
TIDE: FLOOD
GRAB CONDITION: GOOD ON 1st ATTEMPT
OBS GRAIN SIZE:
STICKY, BLACK MUD, SOME SAND
SED TEXTURE/ODOR:
NO ODOR

CTD TIME: NOT TAKEN
CTD DEPTH:
CTD COORDS:
NISK TIME: NOT TAKEN
NISK DEPTH:
NISK COORDS:

27 FEB 2015

TIME: 1319 EST
STATION ID: L-14
COORDS: 41 16.3030 72 04.1396
SAMPLE ID: L-14
ALPHA LAB ID: L-14
DEPTH: 19.1 m
SEA STATE: 1-2'
WX: N WIND - 10-15 KTS, COLD, PTLY SUN
TIDE: FLOOD
GRAB CONDITION: GOOD ON 1st ATTEMPT
OBS GRAIN: VERY FINE LIGHT BROWN SAND ON BLACK STICKY MUD
SED TEXTURE/ODOR:
SLIGHT ODOR

CTD TIME: not taken
CTD DEPTH:
CTD COORDS:
NISK TIME: not taken
NISK DEPTH:
NISK COORDS:

Rite in the Rain

27 FEB 2015

TIME: 1335 EST
STATION ID: L23 A
COORDS 41 16.6204 72 03.4375
SAMPLE ID: L23A
ALPHA LAB ID: L23A
DEPTH: 15.1 m
SEA STATE: 1-2'
WX SUNNY, COLD, 10-15 KTS
TIDE: FLOOD
GRAB CONDITION: GOOD ON 1ST ATTEMPT
OBS GRAIN SIZE:
MED SANDY VENEER ON STICKY BLACK MUD
SED TEXTURE/ODOR:
SLIGHT ODOR

CTD TIME: not taken
CTD DEPTH:
CTD COORDS:
NISK TIME: not taken
NISK DEPTH:
NISK COORDS:

27 FEB 2015

TIME: 1345 EST
STATION ID: L23B
COORDS: 41 16.6190 72 03.4175
SAMPLE ID: L23B
ALPHA LAB ID: L23B 30m to E
DEPTH: 14.4 m
SEA STATE: 1-2'
WX: SUNNY, COLD, 10-15 kts N
TIDE: FLOOD
GRAB CONDITION: GOOD ON 1ST ATTEMPT
OBS GRAIN SIZE: MED-COARSE
SAND ON STICKY BLACK MUD

SED TEXTURE/ODOR:
SLIGHT ODOR

CTD TIME: not taken
CTD DEPTH:
CTD COORDS:
NISK TIME: not taken
NISK DEPTH:
NISK COORDS:

27 Feb 2015

TIME: 1358 EST
STATION ID: L24A
COORDS: A1 16.2998 72 03.1554
SAMPLE ID: L24A
ALPHA LAB ID: L24A
DEPTH: 14.2 m
SEA STATE: 1-2'
WX: NORTH WIND, 10-15 KTS, SUNNY
TIDE: FLOOD
GRAB CONDITION: GOOD ON 1ST ATTEMPT
OBS GRAIN SIZE:
STICKY BLACK MUD

SED TEXTURE/ODOR:
NO OBVIOUS ODOR
TUBE WORM

CTD TIME: 1400, CAST 14. HEX
CTD DEPTH: 14.2
CTD COORDS: DP-Same
NISK TIME: 1403
NISK DEPTH: 14.2
NISK COORDS: DP-Same

27 Feb 2015

TIME: 1412 EST
STATION ID: L24B
COORDS: A1 16.3078 72 03.1363
SAMPLE ID: L24B
ALPHA LAB ID: L24B
DEPTH: 14.0 m
SEA STATE: 1-2'
WX: 10-15 KTS OUT OF NORTH, SUNNY
TIDE: FLOOD
GRAB CONDITION: GOOD ON 1ST ATTEMPT
OBS GRAIN SIZE:
STICKY BLACK MUD - HUGE TUBE WORMS
SED TEXTURE:
NO OBVIOUS ODOR

CTD TIME: not taken
CTD DEPTH:
CTD COORDS:
NISK TIME: not taken
NISK DEPTH:
NISK COORDS:

27 Feb 2015

TIME: 1430 EST
STATION ID: 22A
COORDS: 41 16.6957, 72 02.0039
SAMPLE ID: 22A
ALPHA LAB ID 22A
DEPTH: 18.1m
SEA STATE: 1-2'
WX: 10-15KTS OUT O NORTH, COLD
TIDE: FLOOD
GRAB CONDITION: GOOD ON 1ST ATTEMPT
OBS GRAIN SIZE:
LOTS OF LARGE SHELL MATERIAL (CREPID?)
ON FINE STICKY MUD, DK GRAY
SED TEXTURE / ODOR
NO ODOR

CTD TIME: 1433, CAST IS 1.14EK
CTD DEPTH: 18.1
CTD COORDS: DP - SAME
NISK TIME: 1435
NISK DEPTH: 18.1
NISK COORDS: DP - SAME

27 Feb 2015

TIME: 1443 EST
STATION ID: 22B
COORDS: 41 16.6880, 72 01.9873
SAMPLE ID: 22B
ALPHA LAB ID: 22B
DEPTH: 18.3m
SEA STATE: 1-2'
WX: 10-15KTS, NORTH WIND, PTLY SUNNY
TIDE: FLOOD
GRAB CONDITION: GOOD ON 1ST ATTEMPT
OBS GRAIN SIZE MOMY
LARGE CREPID: SCALLOP
SHELLS ON FINE STICKY MUD
SED TEXTURE / ODOR
NO ODOR

CTD TIME: not taken
CTD DEPTH:
CTD COORDS:
NISK TIME: not taken
NISK DEPTH:
NISK COORDS:

27 FEB 2015

~1440 v/w for ELIS buoy

1500 @ ELIS buoy. covered in ice
1530 back @ AP.
1600 ADCP off.

1638 relinquish samples to
Aurora Cornich

Rite in the Rain

Appendix 2

LABORATORY REPORT A: SAMPLING ON FEBRUARY 24 AND 25

(including Chain of Custody forms)

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ANALYTICAL REPORT

Lab Number:	L1503503
Client:	University of Connecticut 1080 Shennecossett Road Marine Sciences Dept Groton, CT 06340
ATTN:	James O'Donnell
Phone:	(401) 932-5703
Project Name:	LIS-USACOE RIM DREDGE
Project Number:	Not Specified
Report Date:	03/16/15

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: NY (11627), CT (PH-0141), NH (2206), NJ NELAP (MA015), RI (LAO00299), ME (MA00030), PA (68-02089), VA (460194), LA NELAP (03090), FL (E87814), TX (T104704419), WA (C954), USFWS (Permit #LE2069641), USDA (Permit #P330-11-00109), US Army Corps of Engineers.

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1503503-01	L-56	SEDIMENT	EASTERN LONG ISLAND SOUND	02/24/15 11:22	02/24/15
L1503503-02	L-55	SEDIMENT	EASTERN LONG ISLAND SOUND	02/24/15 12:01	02/24/15
L1503503-03	L-54	SEDIMENT	EASTERN LONG ISLAND SOUND	02/24/15 12:35	02/24/15
L1503503-04	L-53	SEDIMENT	EASTERN LONG ISLAND SOUND	02/24/15 13:01	02/24/15
L1503503-05	L-52	SEDIMENT	EASTERN LONG ISLAND SOUND	02/24/15 13:52	02/24/15
L1503503-06	L-51	SEDIMENT	EASTERN LONG ISLAND SOUND	02/24/15 14:20	02/24/15
L1503503-07	L-62	SEDIMENT	EASTERN LONG ISLAND SOUND	02/24/15 14:35	02/24/15
L1503503-08	L41	SEDIMENT	EASTERN LONG ISLAND SOUND	02/25/15 09:33	02/26/15
L1503503-09	L32	SEDIMENT	EASTERN LONG ISLAND SOUND	02/25/15 10:05	02/26/15
L1503503-10	L35	SEDIMENT	EASTERN LONG ISLAND SOUND	02/25/15 10:19	02/26/15
L1503503-11	L33	SEDIMENT	EASTERN LONG ISLAND SOUND	02/25/15 10:35	02/26/15
L1503503-12	L31	SEDIMENT	EASTERN LONG ISLAND SOUND	02/25/15 11:00	02/26/15
L1503503-13	L34	SEDIMENT	EASTERN LONG ISLAND SOUND	02/25/15 11:19	02/26/15
L1503503-14	L36	SEDIMENT	EASTERN LONG ISLAND SOUND	02/25/15 11:35	02/26/15
L1503503-15	L37	SEDIMENT	EASTERN LONG ISLAND SOUND	02/25/15 12:36	02/26/15
L1503503-16	L38	SEDIMENT	EASTERN LONG ISLAND SOUND	02/25/15 13:06	02/26/15
L1503503-17	L40	SEDIMENT	EASTERN LONG ISLAND SOUND	02/25/15 13:30	02/26/15
L1503503-18	L39	SEDIMENT	EASTERN LONG ISLAND SOUND	02/25/15 13:45	02/26/15
L1503503-19	L26A	SEDIMENT	EASTERN LONG ISLAND SOUND	02/25/15 14:24	02/26/15
L1503503-20	L26B	SEDIMENT	EASTERN LONG ISLAND SOUND	02/25/15 14:30	02/26/15

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503
Project Number: Not Specified **Report Date:** 03/16/15

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503
Project Number: Not Specified **Report Date:** 03/16/15

Case Narrative (continued)

Report Submission
This report replaces the one issued on March 11, 2015. The report was amended to correct the grain size results.

Semivolatile Organics
PAHs and PCBs by GC/MS-SIM
Sample L1503503-01 was inadvertently spiked with twice the concentration of internal standard for Cl2-BZ#15-C13 and CL17BZ#180-C13. The concentration was adjusted on the quanitiation report in order to perform an accurate calculation of the sample results. This is evident in on the quanitation report in the data deliverable package as well as on Form 8 of the CLP-package.

The WG766025-6 Laboratory Duplicate RPD, performed on L1503503-07, is outside the acceptance criteria for several compounds. The elevated RPDs have been attributed to the non-homogeneous nature of the sample utilized as the sample duplicate.

The standard reference material (SRM) WG766025-7 has elevated detection limits due to the dilution required by the elevated concentrations of target compounds in the sample.

Pesticides
The Pesticide analysis was performed utilizing dual column confirmation with the higher of the two values reported. If the relative percent difference (RPD) was above the acceptance criteria the compound is reported with a "P" qualifier. Technical judgment was employed in the case of an observed interference. In the case that interference was observed on one column, the lower value is reported and qualified with an "I".

The opening continuing calibration standard WG766870-1, associated with samples L1503503-01 through -06, WG766032-1, -2 and -3, had the response for Hexachlorobenzene (15.2%D-column B) and alpha-Chlordane (19.7%D-column B) outside the individual acceptance criteria but within method allowance, therefore no further action was taken.

Case Narrative (continued)

The continuing calibration standard WG766870-2, which is the closing standard for samples L1503503-01 through -06, WG766032-1, -2 and -3 and the opening standard for samples L1503503-08 through -12, had the response for alpha-Chlordane (18.2%D-column B) outside the individual acceptance criteria but within method allowance, therefore no further action was taken.

The closing continuing calibration standard WG766870-3, associated with samples L1503503-08 through -12, had the response for alpha-Chlordane (18.1%D-column B) outside the individual acceptance criteria but within method allowance, therefore no further action was taken.

The closing continuing calibration standard WG766870-5, associated with samples L1503503-13 through -20, -07, WG766032-5,-6 and -7D, had the response for gamma-BHC (15.1%D-column A), Aldrin (15.3%D-column A) and 4,4'-DDD (16.5%D-column A) outside the individual acceptance criteria but within method allowance, therefore no further action was taken.

The opening continuing calibration standard WG766870-6, associated with sample WG766032-4, had the response for gamma-BHC (15.4%D-column A), Aldrin (15.3%D-column A) and 4,4'-DDD (15.7%D-column A) outside the individual acceptance criteria but within method allowance, therefore no further action was taken.

The closing continuing calibration standard WG766870-7, associated with sample WG766032-4, had the response for gamma-BHC (16.4%D-column A), Aldrin (16.5%D-column A) and Dieldrin (15.1%D-column A) outside the individual acceptance criteria but within method allowance, therefore no further action was taken.

The performance evaluation mixture (PEM) (R7447821-1) was inadvertently analyzed after the continuing calibration standard (WG766870-1) after instrument maintenance was performed. The breakdown was within criteria for the PEM and the all of the monitored compounds were within acceptance criteria for the associated standard WG766870-1, therefore no further action was taken.

The standard reference material (SRM) WG766032-7 had the compound trans-Nonachlor recovered above

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503
Project Number: Not Specified **Report Date:** 03/16/15

Case Narrative (continued)

the acceptance criteria at 316% due to matrix interference. All other monitored compounds were recovered within acceptance criteria. In addition the SRM has elevated detection limits due to the dilution required by the elevated concentrations of non-target compounds in the sample.

Total Organic Carbon

Samples L1503503-02, -05: The Sample Replicate RPD is outside the acceptance criteria of 30%. A double-burn re-analysis was performed with confirming results. The results of the original analysis are reported. The elevated RPD has been attributed to the non-homogeneous nature of the sample.

The WG766621-4/-5 MS/MSD recoveries for Total Organic Carbon (Rep1 - 60%/65%) and (Rep2 - 136%), performed on L1503503-07, are outside the 75-125% acceptance criteria, possibly due to sample matrix. The associated SRM recoveries are within criteria indicating the sample batch was in control, and all sample results were accepted.

Grain Size Analysis

The WG766710-1 Laboratory Duplicate RPD, performed on L1503503-07, is outside the acceptance criteria for Percent Total Gravel (38%) and Percent Total Fines (29%). The elevated RPD has been attributed to the non-homogeneous nature of the sample utilized for the laboratory duplicate.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Cynthia McQueen

Title: Technical Director/Representative Date: 03/16/15

ORGANICS

SEMIVOLATILES

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-01	Date Collected:	02/24/15 11:22
Client ID:	L-56	Date Received:	02/24/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/05/15 23:23	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/05/15
Percent Solids:	70%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	6.68	--	1
Acenaphthylene	ND		ug/kg	6.68	--	1
Acenaphthene	ND		ug/kg	6.68	--	1
Fluorene	ND		ug/kg	6.68	--	1
Phenanthrene	ND		ug/kg	6.68	--	1
Anthracene	ND		ug/kg	6.68	--	1
Fluoranthene	9.42		ug/kg	6.68	--	1
Pyrene	9.92		ug/kg	6.68	--	1
Benz(a)anthracene	ND		ug/kg	6.68	--	1
Chrysene	ND		ug/kg	6.68	--	1
Benzo(b)fluoranthene	ND		ug/kg	6.68	--	1
Benzo(k)fluoranthene	ND		ug/kg	6.68	--	1
Benzo(a)pyrene	ND		ug/kg	6.68	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	6.68	--	1
Dibenz(a,h)anthracene	ND		ug/kg	6.68	--	1
Benzo(ghi)perylene	ND		ug/kg	6.68	--	1
Cl2-BZ#8	ND		ug/kg	0.668	--	1
Cl3-BZ#18	ND		ug/kg	0.668	--	1
Cl3-BZ#28	ND		ug/kg	0.668	--	1
Cl4-BZ#44	ND		ug/kg	0.668	--	1
Cl4-BZ#49	ND		ug/kg	0.668	--	1
Cl4-BZ#52	ND		ug/kg	0.668	--	1
Cl4-BZ#66	ND		ug/kg	0.668	--	1
Cl5-BZ#87	ND		ug/kg	0.668	--	1
Cl5-BZ#101	ND		ug/kg	0.668	--	1
Cl5-BZ#105	ND		ug/kg	0.668	--	1
Cl5-BZ#118	ND		ug/kg	0.668	--	1
Cl6-BZ#128	ND		ug/kg	0.668	--	1
Cl6-BZ#138	ND		ug/kg	0.668	--	1
Cl6-BZ#153	ND		ug/kg	0.668	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-01 Date Collected: 02/24/15 11:22

Client ID: L-56 Date Received: 02/24/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.668	--	1
Cl7-BZ#180	ND		ug/kg	0.668	--	1
Cl7-BZ#183	ND		ug/kg	0.668	--	1
Cl7-BZ#184	ND		ug/kg	0.668	--	1
Cl7-BZ#187	ND		ug/kg	0.668	--	1
Cl8-BZ#195	ND		ug/kg	0.668	--	1
Cl9-BZ#206	ND		ug/kg	0.668	--	1
Cl10-BZ#209	ND		ug/kg	0.668	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	81		30-150
Pyrene-d10	85		30-150
Benzo(b)fluoranthene-d12	83		30-150
DBOB	84		30-150
BZ 198	77		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-02	Date Collected:	02/24/15 12:01
Client ID:	L-55	Date Received:	02/24/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/05/15 23:55	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/05/15
Percent Solids:	80%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	11.4	--	1
Acenaphthylene	ND		ug/kg	11.4	--	1
Acenaphthene	ND		ug/kg	11.4	--	1
Fluorene	ND		ug/kg	11.4	--	1
Phenanthrene	ND		ug/kg	11.4	--	1
Anthracene	ND		ug/kg	11.4	--	1
Fluoranthene	ND		ug/kg	11.4	--	1
Pyrene	ND		ug/kg	11.4	--	1
Benz(a)anthracene	ND		ug/kg	11.4	--	1
Chrysene	ND		ug/kg	11.4	--	1
Benzo(b)fluoranthene	ND		ug/kg	11.4	--	1
Benzo(k)fluoranthene	ND		ug/kg	11.4	--	1
Benzo(a)pyrene	ND		ug/kg	11.4	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	11.4	--	1
Dibenz(a,h)anthracene	ND		ug/kg	11.4	--	1
Benzo(ghi)perylene	ND		ug/kg	11.4	--	1
Cl2-BZ#8	ND		ug/kg	1.14	--	1
Cl3-BZ#18	ND		ug/kg	1.14	--	1
Cl3-BZ#28	ND		ug/kg	1.14	--	1
Cl4-BZ#44	ND		ug/kg	1.14	--	1
Cl4-BZ#49	ND		ug/kg	1.14	--	1
Cl4-BZ#52	ND		ug/kg	1.14	--	1
Cl4-BZ#66	ND		ug/kg	1.14	--	1
Cl5-BZ#87	ND		ug/kg	1.14	--	1
Cl5-BZ#101	ND		ug/kg	1.14	--	1
Cl5-BZ#105	ND		ug/kg	1.14	--	1
Cl5-BZ#118	ND		ug/kg	1.14	--	1
Cl6-BZ#128	ND		ug/kg	1.14	--	1
Cl6-BZ#138	ND		ug/kg	1.14	--	1
Cl6-BZ#153	ND		ug/kg	1.14	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-02 Date Collected: 02/24/15 12:01

Client ID: L-55 Date Received: 02/24/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.14	--	1
Cl7-BZ#180	ND		ug/kg	1.14	--	1
Cl7-BZ#183	ND		ug/kg	1.14	--	1
Cl7-BZ#184	ND		ug/kg	1.14	--	1
Cl7-BZ#187	ND		ug/kg	1.14	--	1
Cl8-BZ#195	ND		ug/kg	1.14	--	1
Cl9-BZ#206	ND		ug/kg	1.14	--	1
Cl10-BZ#209	ND		ug/kg	1.14	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	84		30-150
Pyrene-d10	90		30-150
Benzo(b)fluoranthene-d12	88		30-150
DBOB	87		30-150
BZ 198	83		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-03	Date Collected:	02/24/15 12:35
Client ID:	L-54	Date Received:	02/24/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 00:28	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/05/15
Percent Solids:	79%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	11.9	--	1
Acenaphthylene	ND		ug/kg	11.9	--	1
Acenaphthene	ND		ug/kg	11.9	--	1
Fluorene	ND		ug/kg	11.9	--	1
Phenanthrene	ND		ug/kg	11.9	--	1
Anthracene	ND		ug/kg	11.9	--	1
Fluoranthene	ND		ug/kg	11.9	--	1
Pyrene	ND		ug/kg	11.9	--	1
Benz(a)anthracene	ND		ug/kg	11.9	--	1
Chrysene	ND		ug/kg	11.9	--	1
Benzo(b)fluoranthene	ND		ug/kg	11.9	--	1
Benzo(k)fluoranthene	ND		ug/kg	11.9	--	1
Benzo(a)pyrene	ND		ug/kg	11.9	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	11.9	--	1
Dibenz(a,h)anthracene	ND		ug/kg	11.9	--	1
Benzo(ghi)perylene	ND		ug/kg	11.9	--	1
Cl2-BZ#8	ND		ug/kg	1.19	--	1
Cl3-BZ#18	ND		ug/kg	1.19	--	1
Cl3-BZ#28	ND		ug/kg	1.19	--	1
Cl4-BZ#44	ND		ug/kg	1.19	--	1
Cl4-BZ#49	ND		ug/kg	1.19	--	1
Cl4-BZ#52	ND		ug/kg	1.19	--	1
Cl4-BZ#66	ND		ug/kg	1.19	--	1
Cl5-BZ#87	ND		ug/kg	1.19	--	1
Cl5-BZ#101	ND		ug/kg	1.19	--	1
Cl5-BZ#105	ND		ug/kg	1.19	--	1
Cl5-BZ#118	ND		ug/kg	1.19	--	1
Cl6-BZ#128	ND		ug/kg	1.19	--	1
Cl6-BZ#138	ND		ug/kg	1.19	--	1
Cl6-BZ#153	ND		ug/kg	1.19	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-03 Date Collected: 02/24/15 12:35

Client ID: L-54 Date Received: 02/24/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.19	--	1
Cl7-BZ#180	ND		ug/kg	1.19	--	1
Cl7-BZ#183	ND		ug/kg	1.19	--	1
Cl7-BZ#184	ND		ug/kg	1.19	--	1
Cl7-BZ#187	ND		ug/kg	1.19	--	1
Cl8-BZ#195	ND		ug/kg	1.19	--	1
Cl9-BZ#206	ND		ug/kg	1.19	--	1
Cl10-BZ#209	ND		ug/kg	1.19	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	82		30-150
Pyrene-d10	90		30-150
Benzo(b)fluoranthene-d12	88		30-150
DBOB	87		30-150
BZ 198	82		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-04	Date Collected:	02/24/15 13:01
Client ID:	L-53	Date Received:	02/24/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 01:01	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/05/15
Percent Solids:	62%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	7.65	--	1
Acenaphthylene	11.6		ug/kg	7.65	--	1
Acenaphthene	ND		ug/kg	7.65	--	1
Fluorene	ND		ug/kg	7.65	--	1
Phenanthrene	47.6		ug/kg	7.65	--	1
Anthracene	8.84		ug/kg	7.65	--	1
Fluoranthene	115		ug/kg	7.65	--	1
Pyrene	105		ug/kg	7.65	--	1
Benz(a)anthracene	47.1		ug/kg	7.65	--	1
Chrysene	62.2		ug/kg	7.65	--	1
Benzo(b)fluoranthene	64.3		ug/kg	7.65	--	1
Benzo(k)fluoranthene	63.2		ug/kg	7.65	--	1
Benzo(a)pyrene	60.0		ug/kg	7.65	--	1
Indeno(1,2,3-cd)Pyrene	51.4		ug/kg	7.65	--	1
Dibenz(a,h)anthracene	9.33		ug/kg	7.65	--	1
Benzo(ghi)perylene	48.3		ug/kg	7.65	--	1
Cl2-BZ#8	ND		ug/kg	0.765	--	1
Cl3-BZ#18	ND		ug/kg	0.765	--	1
Cl3-BZ#28	ND		ug/kg	0.765	--	1
Cl4-BZ#44	ND		ug/kg	0.765	--	1
Cl4-BZ#49	ND		ug/kg	0.765	--	1
Cl4-BZ#52	ND		ug/kg	0.765	--	1
Cl4-BZ#66	ND		ug/kg	0.765	--	1
Cl5-BZ#87	ND		ug/kg	0.765	--	1
Cl5-BZ#101	ND		ug/kg	0.765	--	1
Cl5-BZ#105	ND		ug/kg	0.765	--	1
Cl5-BZ#118	ND		ug/kg	0.765	--	1
Cl6-BZ#128	ND		ug/kg	0.765	--	1
Cl6-BZ#138	ND		ug/kg	0.765	--	1
Cl6-BZ#153	ND		ug/kg	0.765	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-04 Date Collected: 02/24/15 13:01

Client ID: L-53 Date Received: 02/24/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.765	--	1
Cl7-BZ#180	ND		ug/kg	0.765	--	1
Cl7-BZ#183	ND		ug/kg	0.765	--	1
Cl7-BZ#184	ND		ug/kg	0.765	--	1
Cl7-BZ#187	ND		ug/kg	0.765	--	1
Cl8-BZ#195	ND		ug/kg	0.765	--	1
Cl9-BZ#206	ND		ug/kg	0.765	--	1
Cl10-BZ#209	ND		ug/kg	0.765	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	85		30-150
Pyrene-d10	88		30-150
Benzo(b)fluoranthene-d12	87		30-150
DBOB	92		30-150
BZ 198	91		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-05	Date Collected:	02/24/15 13:52
Client ID:	L-52	Date Received:	02/24/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 01:34	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/05/15
Percent Solids:	81%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	10.6	--	1
Acenaphthylene	ND		ug/kg	10.6	--	1
Acenaphthene	ND		ug/kg	10.6	--	1
Fluorene	ND		ug/kg	10.6	--	1
Phenanthrene	ND		ug/kg	10.6	--	1
Anthracene	ND		ug/kg	10.6	--	1
Fluoranthene	ND		ug/kg	10.6	--	1
Pyrene	ND		ug/kg	10.6	--	1
Benz(a)anthracene	ND		ug/kg	10.6	--	1
Chrysene	ND		ug/kg	10.6	--	1
Benzo(b)fluoranthene	ND		ug/kg	10.6	--	1
Benzo(k)fluoranthene	ND		ug/kg	10.6	--	1
Benzo(a)pyrene	ND		ug/kg	10.6	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	10.6	--	1
Dibenz(a,h)anthracene	ND		ug/kg	10.6	--	1
Benzo(ghi)perylene	ND		ug/kg	10.6	--	1
Cl2-BZ#8	ND		ug/kg	1.06	--	1
Cl3-BZ#18	ND		ug/kg	1.06	--	1
Cl3-BZ#28	ND		ug/kg	1.06	--	1
Cl4-BZ#44	ND		ug/kg	1.06	--	1
Cl4-BZ#49	ND		ug/kg	1.06	--	1
Cl4-BZ#52	ND		ug/kg	1.06	--	1
Cl4-BZ#66	ND		ug/kg	1.06	--	1
Cl5-BZ#87	ND		ug/kg	1.06	--	1
Cl5-BZ#101	ND		ug/kg	1.06	--	1
Cl5-BZ#105	ND		ug/kg	1.06	--	1
Cl5-BZ#118	ND		ug/kg	1.06	--	1
Cl6-BZ#128	ND		ug/kg	1.06	--	1
Cl6-BZ#138	ND		ug/kg	1.06	--	1
Cl6-BZ#153	ND		ug/kg	1.06	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-05 Date Collected: 02/24/15 13:52

Client ID: L-52 Date Received: 02/24/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.06	--	1
Cl7-BZ#180	ND		ug/kg	1.06	--	1
Cl7-BZ#183	ND		ug/kg	1.06	--	1
Cl7-BZ#184	ND		ug/kg	1.06	--	1
Cl7-BZ#187	ND		ug/kg	1.06	--	1
Cl8-BZ#195	ND		ug/kg	1.06	--	1
Cl9-BZ#206	ND		ug/kg	1.06	--	1
Cl10-BZ#209	ND		ug/kg	1.06	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	85		30-150
Pyrene-d10	90		30-150
Benzo(b)fluoranthene-d12	89		30-150
DBOB	89		30-150
BZ 198	83		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-06	Date Collected:	02/24/15 14:20
Client ID:	L-51	Date Received:	02/24/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 02:07	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/05/15
Percent Solids:	79%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	10.6	--	1
Acenaphthylene	ND		ug/kg	10.6	--	1
Acenaphthene	ND		ug/kg	10.6	--	1
Fluorene	ND		ug/kg	10.6	--	1
Phenanthrene	ND		ug/kg	10.6	--	1
Anthracene	ND		ug/kg	10.6	--	1
Fluoranthene	ND		ug/kg	10.6	--	1
Pyrene	ND		ug/kg	10.6	--	1
Benz(a)anthracene	ND		ug/kg	10.6	--	1
Chrysene	ND		ug/kg	10.6	--	1
Benzo(b)fluoranthene	ND		ug/kg	10.6	--	1
Benzo(k)fluoranthene	ND		ug/kg	10.6	--	1
Benzo(a)pyrene	ND		ug/kg	10.6	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	10.6	--	1
Dibenz(a,h)anthracene	ND		ug/kg	10.6	--	1
Benzo(ghi)perylene	ND		ug/kg	10.6	--	1
Cl2-BZ#8	ND		ug/kg	1.06	--	1
Cl3-BZ#18	ND		ug/kg	1.06	--	1
Cl3-BZ#28	ND		ug/kg	1.06	--	1
Cl4-BZ#44	ND		ug/kg	1.06	--	1
Cl4-BZ#49	ND		ug/kg	1.06	--	1
Cl4-BZ#52	ND		ug/kg	1.06	--	1
Cl4-BZ#66	ND		ug/kg	1.06	--	1
Cl5-BZ#87	ND		ug/kg	1.06	--	1
Cl5-BZ#101	ND		ug/kg	1.06	--	1
Cl5-BZ#105	ND		ug/kg	1.06	--	1
Cl5-BZ#118	ND		ug/kg	1.06	--	1
Cl6-BZ#128	ND		ug/kg	1.06	--	1
Cl6-BZ#138	ND		ug/kg	1.06	--	1
Cl6-BZ#153	ND		ug/kg	1.06	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-06 Date Collected: 02/24/15 14:20

Client ID: L-51 Date Received: 02/24/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.06	--	1
Cl7-BZ#180	ND		ug/kg	1.06	--	1
Cl7-BZ#183	ND		ug/kg	1.06	--	1
Cl7-BZ#184	ND		ug/kg	1.06	--	1
Cl7-BZ#187	ND		ug/kg	1.06	--	1
Cl8-BZ#195	ND		ug/kg	1.06	--	1
Cl9-BZ#206	ND		ug/kg	1.06	--	1
Cl10-BZ#209	ND		ug/kg	1.06	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	85		30-150
Pyrene-d10	88		30-150
Benzo(b)fluoranthene-d12	90		30-150
DBOB	94		30-150
BZ 198	86		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-07	Date Collected:	02/24/15 14:35
Client ID:	L-62	Date Received:	02/24/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 03:36	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/05/15
Percent Solids:	63%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	7.86	--	1
Acenaphthylene	19.6		ug/kg	7.86	--	1
Acenaphthene	ND		ug/kg	7.86	--	1
Fluorene	ND		ug/kg	7.86	--	1
Phenanthrene	72.1		ug/kg	7.86	--	1
Anthracene	15.1		ug/kg	7.86	--	1
Fluoranthene	191		ug/kg	7.86	--	1
Pyrene	172		ug/kg	7.86	--	1
Benz(a)anthracene	93.1		ug/kg	7.86	--	1
Chrysene	113		ug/kg	7.86	--	1
Benzo(b)fluoranthene	131		ug/kg	7.86	--	1
Benzo(k)fluoranthene	96.7		ug/kg	7.86	--	1
Benzo(a)pyrene	110		ug/kg	7.86	--	1
Indeno(1,2,3-cd)Pyrene	93.3		ug/kg	7.86	--	1
Dibenz(a,h)anthracene	18.0		ug/kg	7.86	--	1
Benzo(ghi)perylene	88.7		ug/kg	7.86	--	1
Cl2-BZ#8	ND		ug/kg	0.786	--	1
Cl3-BZ#18	ND		ug/kg	0.786	--	1
Cl3-BZ#28	ND		ug/kg	0.786	--	1
Cl4-BZ#44	ND		ug/kg	0.786	--	1
Cl4-BZ#49	ND		ug/kg	0.786	--	1
Cl4-BZ#52	ND		ug/kg	0.786	--	1
Cl4-BZ#66	ND		ug/kg	0.786	--	1
Cl5-BZ#87	ND		ug/kg	0.786	--	1
Cl5-BZ#101	ND		ug/kg	0.786	--	1
Cl5-BZ#105	ND		ug/kg	0.786	--	1
Cl5-BZ#118	ND		ug/kg	0.786	--	1
Cl6-BZ#128	ND		ug/kg	0.786	--	1
Cl6-BZ#138	0.978		ug/kg	0.786	--	1
Cl6-BZ#153	ND		ug/kg	0.786	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-07 Date Collected: 02/24/15 14:35

Client ID: L-62 Date Received: 02/24/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.786	--	1
Cl7-BZ#180	ND		ug/kg	0.786	--	1
Cl7-BZ#183	ND		ug/kg	0.786	--	1
Cl7-BZ#184	ND		ug/kg	0.786	--	1
Cl7-BZ#187	ND		ug/kg	0.786	--	1
Cl8-BZ#195	ND		ug/kg	0.786	--	1
Cl9-BZ#206	ND		ug/kg	0.786	--	1
Cl10-BZ#209	ND		ug/kg	0.786	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	84		30-150
Pyrene-d10	87		30-150
Benzo(b)fluoranthene-d12	86		30-150
DBOB	89		30-150
BZ 198	89		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-08	Date Collected:	02/25/15 09:33
Client ID:	L41	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 06:53	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/05/15
Percent Solids:	75%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	13.2	--	1
Acenaphthylene	ND		ug/kg	13.2	--	1
Acenaphthene	ND		ug/kg	13.2	--	1
Fluorene	ND		ug/kg	13.2	--	1
Phenanthrene	ND		ug/kg	13.2	--	1
Anthracene	ND		ug/kg	13.2	--	1
Fluoranthene	ND		ug/kg	13.2	--	1
Pyrene	ND		ug/kg	13.2	--	1
Benz(a)anthracene	ND		ug/kg	13.2	--	1
Chrysene	ND		ug/kg	13.2	--	1
Benzo(b)fluoranthene	ND		ug/kg	13.2	--	1
Benzo(k)fluoranthene	ND		ug/kg	13.2	--	1
Benzo(a)pyrene	ND		ug/kg	13.2	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	13.2	--	1
Dibenz(a,h)anthracene	ND		ug/kg	13.2	--	1
Benzo(ghi)perylene	ND		ug/kg	13.2	--	1
Cl2-BZ#8	ND		ug/kg	1.32	--	1
Cl3-BZ#18	ND		ug/kg	1.32	--	1
Cl3-BZ#28	ND		ug/kg	1.32	--	1
Cl4-BZ#44	ND		ug/kg	1.32	--	1
Cl4-BZ#49	ND		ug/kg	1.32	--	1
Cl4-BZ#52	ND		ug/kg	1.32	--	1
Cl4-BZ#66	ND		ug/kg	1.32	--	1
Cl5-BZ#87	ND		ug/kg	1.32	--	1
Cl5-BZ#101	ND		ug/kg	1.32	--	1
Cl5-BZ#105	ND		ug/kg	1.32	--	1
Cl5-BZ#118	ND		ug/kg	1.32	--	1
Cl6-BZ#128	ND		ug/kg	1.32	--	1
Cl6-BZ#138	ND		ug/kg	1.32	--	1
Cl6-BZ#153	ND		ug/kg	1.32	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-08 Date Collected: 02/25/15 09:33

Client ID: L41 Date Received: 02/26/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.32	--	1
Cl7-BZ#180	ND		ug/kg	1.32	--	1
Cl7-BZ#183	ND		ug/kg	1.32	--	1
Cl7-BZ#184	ND		ug/kg	1.32	--	1
Cl7-BZ#187	ND		ug/kg	1.32	--	1
Cl8-BZ#195	ND		ug/kg	1.32	--	1
Cl9-BZ#206	ND		ug/kg	1.32	--	1
Cl10-BZ#209	ND		ug/kg	1.32	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	83		30-150
Pyrene-d10	87		30-150
Benzo(b)fluoranthene-d12	86		30-150
DBOB	90		30-150
BZ 198	87		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-09	Date Collected:	02/25/15 10:05
Client ID:	L32	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 07:26	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/05/15
Percent Solids:	78%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	12.3	--	1
Acenaphthylene	ND		ug/kg	12.3	--	1
Acenaphthene	ND		ug/kg	12.3	--	1
Fluorene	ND		ug/kg	12.3	--	1
Phenanthrene	ND		ug/kg	12.3	--	1
Anthracene	ND		ug/kg	12.3	--	1
Fluoranthene	ND		ug/kg	12.3	--	1
Pyrene	ND		ug/kg	12.3	--	1
Benz(a)anthracene	ND		ug/kg	12.3	--	1
Chrysene	ND		ug/kg	12.3	--	1
Benzo(b)fluoranthene	ND		ug/kg	12.3	--	1
Benzo(k)fluoranthene	ND		ug/kg	12.3	--	1
Benzo(a)pyrene	ND		ug/kg	12.3	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	12.3	--	1
Dibenz(a,h)anthracene	ND		ug/kg	12.3	--	1
Benzo(ghi)perylene	ND		ug/kg	12.3	--	1
Cl2-BZ#8	ND		ug/kg	1.23	--	1
Cl3-BZ#18	ND		ug/kg	1.23	--	1
Cl3-BZ#28	ND		ug/kg	1.23	--	1
Cl4-BZ#44	ND		ug/kg	1.23	--	1
Cl4-BZ#49	ND		ug/kg	1.23	--	1
Cl4-BZ#52	ND		ug/kg	1.23	--	1
Cl4-BZ#66	ND		ug/kg	1.23	--	1
Cl5-BZ#87	ND		ug/kg	1.23	--	1
Cl5-BZ#101	ND		ug/kg	1.23	--	1
Cl5-BZ#105	ND		ug/kg	1.23	--	1
Cl5-BZ#118	ND		ug/kg	1.23	--	1
Cl6-BZ#128	ND		ug/kg	1.23	--	1
Cl6-BZ#138	ND		ug/kg	1.23	--	1
Cl6-BZ#153	ND		ug/kg	1.23	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-09 Date Collected: 02/25/15 10:05

Client ID: L32 Date Received: 02/26/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.23	--	1
Cl7-BZ#180	ND		ug/kg	1.23	--	1
Cl7-BZ#183	ND		ug/kg	1.23	--	1
Cl7-BZ#184	ND		ug/kg	1.23	--	1
Cl7-BZ#187	ND		ug/kg	1.23	--	1
Cl8-BZ#195	ND		ug/kg	1.23	--	1
Cl9-BZ#206	ND		ug/kg	1.23	--	1
Cl10-BZ#209	ND		ug/kg	1.23	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	81		30-150
Pyrene-d10	85		30-150
Benzo(b)fluoranthene-d12	86		30-150
DBOB	94		30-150
BZ 198	86		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-10	Date Collected:	02/25/15 10:19
Client ID:	L35	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 07:59	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/05/15
Percent Solids:	74%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	13.0	--	1
Acenaphthylene	ND		ug/kg	13.0	--	1
Acenaphthene	ND		ug/kg	13.0	--	1
Fluorene	ND		ug/kg	13.0	--	1
Phenanthrene	ND		ug/kg	13.0	--	1
Anthracene	ND		ug/kg	13.0	--	1
Fluoranthene	ND		ug/kg	13.0	--	1
Pyrene	ND		ug/kg	13.0	--	1
Benz(a)anthracene	ND		ug/kg	13.0	--	1
Chrysene	ND		ug/kg	13.0	--	1
Benzo(b)fluoranthene	ND		ug/kg	13.0	--	1
Benzo(k)fluoranthene	ND		ug/kg	13.0	--	1
Benzo(a)pyrene	ND		ug/kg	13.0	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	13.0	--	1
Dibenz(a,h)anthracene	ND		ug/kg	13.0	--	1
Benzo(ghi)perylene	ND		ug/kg	13.0	--	1
Cl2-BZ#8	ND		ug/kg	1.30	--	1
Cl3-BZ#18	ND		ug/kg	1.30	--	1
Cl3-BZ#28	ND		ug/kg	1.30	--	1
Cl4-BZ#44	ND		ug/kg	1.30	--	1
Cl4-BZ#49	ND		ug/kg	1.30	--	1
Cl4-BZ#52	ND		ug/kg	1.30	--	1
Cl4-BZ#66	ND		ug/kg	1.30	--	1
Cl5-BZ#87	ND		ug/kg	1.30	--	1
Cl5-BZ#101	ND		ug/kg	1.30	--	1
Cl5-BZ#105	ND		ug/kg	1.30	--	1
Cl5-BZ#118	ND		ug/kg	1.30	--	1
Cl6-BZ#128	ND		ug/kg	1.30	--	1
Cl6-BZ#138	ND		ug/kg	1.30	--	1
Cl6-BZ#153	ND		ug/kg	1.30	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-10 Date Collected: 02/25/15 10:19

Client ID: L35 Date Received: 02/26/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.30	--	1
Cl7-BZ#180	ND		ug/kg	1.30	--	1
Cl7-BZ#183	ND		ug/kg	1.30	--	1
Cl7-BZ#184	ND		ug/kg	1.30	--	1
Cl7-BZ#187	ND		ug/kg	1.30	--	1
Cl8-BZ#195	ND		ug/kg	1.30	--	1
Cl9-BZ#206	ND		ug/kg	1.30	--	1
Cl10-BZ#209	ND		ug/kg	1.30	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	81		30-150
Pyrene-d10	86		30-150
Benzo(b)fluoranthene-d12	86		30-150
DBOB	93		30-150
BZ 198	83		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-11	Date Collected:	02/25/15 10:35
Client ID:	L33	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 08:32	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/05/15
Percent Solids:	70%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	7.00	--	1
Acenaphthylene	ND		ug/kg	7.00	--	1
Acenaphthene	ND		ug/kg	7.00	--	1
Fluorene	ND		ug/kg	7.00	--	1
Phenanthrene	ND		ug/kg	7.00	--	1
Anthracene	ND		ug/kg	7.00	--	1
Fluoranthene	14.7		ug/kg	7.00	--	1
Pyrene	16.6		ug/kg	7.00	--	1
Benz(a)anthracene	9.76		ug/kg	7.00	--	1
Chrysene	12.4		ug/kg	7.00	--	1
Benzo(b)fluoranthene	12.3		ug/kg	7.00	--	1
Benzo(k)fluoranthene	11.7		ug/kg	7.00	--	1
Benzo(a)pyrene	12.3		ug/kg	7.00	--	1
Indeno(1,2,3-cd)Pyrene	10.4		ug/kg	7.00	--	1
Dibenz(a,h)anthracene	ND		ug/kg	7.00	--	1
Benzo(ghi)perylene	9.98		ug/kg	7.00	--	1
Cl2-BZ#8	ND		ug/kg	0.700	--	1
Cl3-BZ#18	ND		ug/kg	0.700	--	1
Cl3-BZ#28	ND		ug/kg	0.700	--	1
Cl4-BZ#44	ND		ug/kg	0.700	--	1
Cl4-BZ#49	ND		ug/kg	0.700	--	1
Cl4-BZ#52	ND		ug/kg	0.700	--	1
Cl4-BZ#66	ND		ug/kg	0.700	--	1
Cl5-BZ#87	ND		ug/kg	0.700	--	1
Cl5-BZ#101	ND		ug/kg	0.700	--	1
Cl5-BZ#105	ND		ug/kg	0.700	--	1
Cl5-BZ#118	ND		ug/kg	0.700	--	1
Cl6-BZ#128	ND		ug/kg	0.700	--	1
Cl6-BZ#138	ND		ug/kg	0.700	--	1
Cl6-BZ#153	ND		ug/kg	0.700	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-11 Date Collected: 02/25/15 10:35

Client ID: L33 Date Received: 02/26/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.700	--	1
Cl7-BZ#180	ND		ug/kg	0.700	--	1
Cl7-BZ#183	ND		ug/kg	0.700	--	1
Cl7-BZ#184	ND		ug/kg	0.700	--	1
Cl7-BZ#187	ND		ug/kg	0.700	--	1
Cl8-BZ#195	ND		ug/kg	0.700	--	1
Cl9-BZ#206	ND		ug/kg	0.700	--	1
Cl10-BZ#209	ND		ug/kg	0.700	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	81		30-150
Pyrene-d10	85		30-150
Benzo(b)fluoranthene-d12	84		30-150
DBOB	88		30-150
BZ 198	81		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-12	Date Collected:	02/25/15 11:00
Client ID:	L31	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 09:05	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/05/15
Percent Solids:	74%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	12.6	--	1
Acenaphthylene	ND		ug/kg	12.6	--	1
Acenaphthene	ND		ug/kg	12.6	--	1
Fluorene	ND		ug/kg	12.6	--	1
Phenanthrene	ND		ug/kg	12.6	--	1
Anthracene	ND		ug/kg	12.6	--	1
Fluoranthene	ND		ug/kg	12.6	--	1
Pyrene	12.9		ug/kg	12.6	--	1
Benz(a)anthracene	ND		ug/kg	12.6	--	1
Chrysene	ND		ug/kg	12.6	--	1
Benzo(b)fluoranthene	ND		ug/kg	12.6	--	1
Benzo(k)fluoranthene	ND		ug/kg	12.6	--	1
Benzo(a)pyrene	ND		ug/kg	12.6	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	12.6	--	1
Dibenz(a,h)anthracene	ND		ug/kg	12.6	--	1
Benzo(ghi)perylene	ND		ug/kg	12.6	--	1
Cl2-BZ#8	ND		ug/kg	1.26	--	1
Cl3-BZ#18	ND		ug/kg	1.26	--	1
Cl3-BZ#28	ND		ug/kg	1.26	--	1
Cl4-BZ#44	ND		ug/kg	1.26	--	1
Cl4-BZ#49	ND		ug/kg	1.26	--	1
Cl4-BZ#52	ND		ug/kg	1.26	--	1
Cl4-BZ#66	ND		ug/kg	1.26	--	1
Cl5-BZ#87	ND		ug/kg	1.26	--	1
Cl5-BZ#101	ND		ug/kg	1.26	--	1
Cl5-BZ#105	ND		ug/kg	1.26	--	1
Cl5-BZ#118	ND		ug/kg	1.26	--	1
Cl6-BZ#128	ND		ug/kg	1.26	--	1
Cl6-BZ#138	ND		ug/kg	1.26	--	1
Cl6-BZ#153	ND		ug/kg	1.26	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-12 Date Collected: 02/25/15 11:00

Client ID: L31 Date Received: 02/26/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.26	--	1
Cl7-BZ#180	ND		ug/kg	1.26	--	1
Cl7-BZ#183	ND		ug/kg	1.26	--	1
Cl7-BZ#184	ND		ug/kg	1.26	--	1
Cl7-BZ#187	ND		ug/kg	1.26	--	1
Cl8-BZ#195	ND		ug/kg	1.26	--	1
Cl9-BZ#206	ND		ug/kg	1.26	--	1
Cl10-BZ#209	ND		ug/kg	1.26	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	82		30-150
Pyrene-d10	85		30-150
Benzo(b)fluoranthene-d12	85		30-150
DBOB	90		30-150
BZ 198	85		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-13	Date Collected:	02/25/15 11:19
Client ID:	L34	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 09:39	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/09/15
Percent Solids:	77%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	11.2	--	1
Acenaphthylene	ND		ug/kg	11.2	--	1
Acenaphthene	ND		ug/kg	11.2	--	1
Fluorene	ND		ug/kg	11.2	--	1
Phenanthrene	ND		ug/kg	11.2	--	1
Anthracene	ND		ug/kg	11.2	--	1
Fluoranthene	ND		ug/kg	11.2	--	1
Pyrene	ND		ug/kg	11.2	--	1
Benz(a)anthracene	ND		ug/kg	11.2	--	1
Chrysene	ND		ug/kg	11.2	--	1
Benzo(b)fluoranthene	ND		ug/kg	11.2	--	1
Benzo(k)fluoranthene	ND		ug/kg	11.2	--	1
Benzo(a)pyrene	ND		ug/kg	11.2	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	11.2	--	1
Dibenz(a,h)anthracene	ND		ug/kg	11.2	--	1
Benzo(ghi)perylene	ND		ug/kg	11.2	--	1
Cl2-BZ#8	ND		ug/kg	1.12	--	1
Cl3-BZ#18	ND		ug/kg	1.12	--	1
Cl3-BZ#28	ND		ug/kg	1.12	--	1
Cl4-BZ#44	ND		ug/kg	1.12	--	1
Cl4-BZ#49	ND		ug/kg	1.12	--	1
Cl4-BZ#52	ND		ug/kg	1.12	--	1
Cl4-BZ#66	ND		ug/kg	1.12	--	1
Cl5-BZ#87	ND		ug/kg	1.12	--	1
Cl5-BZ#101	ND		ug/kg	1.12	--	1
Cl5-BZ#105	ND		ug/kg	1.12	--	1
Cl5-BZ#118	ND		ug/kg	1.12	--	1
Cl6-BZ#128	ND		ug/kg	1.12	--	1
Cl6-BZ#138	ND		ug/kg	1.12	--	1
Cl6-BZ#153	ND		ug/kg	1.12	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-13 Date Collected: 02/25/15 11:19

Client ID: L34 Date Received: 02/26/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.12	--	1
Cl7-BZ#180	ND		ug/kg	1.12	--	1
Cl7-BZ#183	ND		ug/kg	1.12	--	1
Cl7-BZ#184	ND		ug/kg	1.12	--	1
Cl7-BZ#187	ND		ug/kg	1.12	--	1
Cl8-BZ#195	ND		ug/kg	1.12	--	1
Cl9-BZ#206	ND		ug/kg	1.12	--	1
Cl10-BZ#209	ND		ug/kg	1.12	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	84		30-150
Pyrene-d10	87		30-150
Benzo(b)fluoranthene-d12	87		30-150
DBOB	91		30-150
BZ 198	83		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-14	Date Collected:	02/25/15 11:35
Client ID:	L36	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 10:12	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/05/15
Percent Solids:	75%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	13.1	--	1
Acenaphthylene	ND		ug/kg	13.1	--	1
Acenaphthene	ND		ug/kg	13.1	--	1
Fluorene	ND		ug/kg	13.1	--	1
Phenanthrene	ND		ug/kg	13.1	--	1
Anthracene	ND		ug/kg	13.1	--	1
Fluoranthene	13.1		ug/kg	13.1	--	1
Pyrene	15.4		ug/kg	13.1	--	1
Benz(a)anthracene	ND		ug/kg	13.1	--	1
Chrysene	ND		ug/kg	13.1	--	1
Benzo(b)fluoranthene	ND		ug/kg	13.1	--	1
Benzo(k)fluoranthene	ND		ug/kg	13.1	--	1
Benzo(a)pyrene	ND		ug/kg	13.1	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	13.1	--	1
Dibenz(a,h)anthracene	ND		ug/kg	13.1	--	1
Benzo(ghi)perylene	ND		ug/kg	13.1	--	1
Cl2-BZ#8	ND		ug/kg	1.31	--	1
Cl3-BZ#18	ND		ug/kg	1.31	--	1
Cl3-BZ#28	ND		ug/kg	1.31	--	1
Cl4-BZ#44	ND		ug/kg	1.31	--	1
Cl4-BZ#49	ND		ug/kg	1.31	--	1
Cl4-BZ#52	ND		ug/kg	1.31	--	1
Cl4-BZ#66	ND		ug/kg	1.31	--	1
Cl5-BZ#87	ND		ug/kg	1.31	--	1
Cl5-BZ#101	ND		ug/kg	1.31	--	1
Cl5-BZ#105	ND		ug/kg	1.31	--	1
Cl5-BZ#118	ND		ug/kg	1.31	--	1
Cl6-BZ#128	ND		ug/kg	1.31	--	1
Cl6-BZ#138	ND		ug/kg	1.31	--	1
Cl6-BZ#153	ND		ug/kg	1.31	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-14 Date Collected: 02/25/15 11:35

Client ID: L36 Date Received: 02/26/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.31	--	1
Cl7-BZ#180	ND		ug/kg	1.31	--	1
Cl7-BZ#183	ND		ug/kg	1.31	--	1
Cl7-BZ#184	ND		ug/kg	1.31	--	1
Cl7-BZ#187	ND		ug/kg	1.31	--	1
Cl8-BZ#195	ND		ug/kg	1.31	--	1
Cl9-BZ#206	ND		ug/kg	1.31	--	1
Cl10-BZ#209	ND		ug/kg	1.31	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	83		30-150
Pyrene-d10	86		30-150
Benzo(b)fluoranthene-d12	86		30-150
DBOB	89		30-150
BZ 198	83		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-15	Date Collected:	02/25/15 12:36
Client ID:	L37	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 10:45	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/05/15
Percent Solids:	71%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	13.5	--	1
Acenaphthylene	ND		ug/kg	13.5	--	1
Acenaphthene	ND		ug/kg	13.5	--	1
Fluorene	ND		ug/kg	13.5	--	1
Phenanthrene	23.3		ug/kg	13.5	--	1
Anthracene	44.6		ug/kg	13.5	--	1
Fluoranthene	93.1		ug/kg	13.5	--	1
Pyrene	130		ug/kg	13.5	--	1
Benz(a)anthracene	87.8		ug/kg	13.5	--	1
Chrysene	88.4		ug/kg	13.5	--	1
Benzo(b)fluoranthene	44.4		ug/kg	13.5	--	1
Benzo(k)fluoranthene	60.6		ug/kg	13.5	--	1
Benzo(a)pyrene	74.1		ug/kg	13.5	--	1
Indeno(1,2,3-cd)Pyrene	35.9		ug/kg	13.5	--	1
Dibenz(a,h)anthracene	ND		ug/kg	13.5	--	1
Benzo(ghi)perylene	33.2		ug/kg	13.5	--	1
Cl2-BZ#8	ND		ug/kg	1.35	--	1
Cl3-BZ#18	ND		ug/kg	1.35	--	1
Cl3-BZ#28	ND		ug/kg	1.35	--	1
Cl4-BZ#44	ND		ug/kg	1.35	--	1
Cl4-BZ#49	ND		ug/kg	1.35	--	1
Cl4-BZ#52	ND		ug/kg	1.35	--	1
Cl4-BZ#66	ND		ug/kg	1.35	--	1
Cl5-BZ#87	ND		ug/kg	1.35	--	1
Cl5-BZ#101	ND		ug/kg	1.35	--	1
Cl5-BZ#105	ND		ug/kg	1.35	--	1
Cl5-BZ#118	ND		ug/kg	1.35	--	1
Cl6-BZ#128	ND		ug/kg	1.35	--	1
Cl6-BZ#138	ND		ug/kg	1.35	--	1
Cl6-BZ#153	ND		ug/kg	1.35	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-15 Date Collected: 02/25/15 12:36

Client ID: L37 Date Received: 02/26/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.35	--	1
Cl7-BZ#180	ND		ug/kg	1.35	--	1
Cl7-BZ#183	ND		ug/kg	1.35	--	1
Cl7-BZ#184	ND		ug/kg	1.35	--	1
Cl7-BZ#187	ND		ug/kg	1.35	--	1
Cl8-BZ#195	ND		ug/kg	1.35	--	1
Cl9-BZ#206	ND		ug/kg	1.35	--	1
Cl10-BZ#209	ND		ug/kg	1.35	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	84		30-150
Pyrene-d10	87		30-150
Benzo(b)fluoranthene-d12	87		30-150
DBOB	91		30-150
BZ 198	84		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-16	Date Collected:	02/25/15 13:06
Client ID:	L38	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 11:18	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/05/15
Percent Solids:	73%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	13.4	--	1
Acenaphthylene	ND		ug/kg	13.4	--	1
Acenaphthene	ND		ug/kg	13.4	--	1
Fluorene	ND		ug/kg	13.4	--	1
Phenanthrene	ND		ug/kg	13.4	--	1
Anthracene	ND		ug/kg	13.4	--	1
Fluoranthene	ND		ug/kg	13.4	--	1
Pyrene	ND		ug/kg	13.4	--	1
Benz(a)anthracene	ND		ug/kg	13.4	--	1
Chrysene	ND		ug/kg	13.4	--	1
Benzo(b)fluoranthene	ND		ug/kg	13.4	--	1
Benzo(k)fluoranthene	ND		ug/kg	13.4	--	1
Benzo(a)pyrene	ND		ug/kg	13.4	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	13.4	--	1
Dibenz(a,h)anthracene	ND		ug/kg	13.4	--	1
Benzo(ghi)perylene	ND		ug/kg	13.4	--	1
Cl2-BZ#8	ND		ug/kg	1.34	--	1
Cl3-BZ#18	ND		ug/kg	1.34	--	1
Cl3-BZ#28	ND		ug/kg	1.34	--	1
Cl4-BZ#44	ND		ug/kg	1.34	--	1
Cl4-BZ#49	ND		ug/kg	1.34	--	1
Cl4-BZ#52	ND		ug/kg	1.34	--	1
Cl4-BZ#66	ND		ug/kg	1.34	--	1
Cl5-BZ#87	ND		ug/kg	1.34	--	1
Cl5-BZ#101	ND		ug/kg	1.34	--	1
Cl5-BZ#105	ND		ug/kg	1.34	--	1
Cl5-BZ#118	ND		ug/kg	1.34	--	1
Cl6-BZ#128	ND		ug/kg	1.34	--	1
Cl6-BZ#138	ND		ug/kg	1.34	--	1
Cl6-BZ#153	ND		ug/kg	1.34	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-16 Date Collected: 02/25/15 13:06

Client ID: L38 Date Received: 02/26/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.34	--	1
Cl7-BZ#180	ND		ug/kg	1.34	--	1
Cl7-BZ#183	ND		ug/kg	1.34	--	1
Cl7-BZ#184	ND		ug/kg	1.34	--	1
Cl7-BZ#187	ND		ug/kg	1.34	--	1
Cl8-BZ#195	ND		ug/kg	1.34	--	1
Cl9-BZ#206	ND		ug/kg	1.34	--	1
Cl10-BZ#209	ND		ug/kg	1.34	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	75		30-150
Pyrene-d10	80		30-150
Benzo(b)fluoranthene-d12	79		30-150
DBOB	83		30-150
BZ 198	80		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-17	Date Collected:	02/25/15 13:30
Client ID:	L40	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 11:50	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/05/15
Percent Solids:	66%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	7.26	--	1
Acenaphthylene	ND		ug/kg	7.26	--	1
Acenaphthene	ND		ug/kg	7.26	--	1
Fluorene	ND		ug/kg	7.26	--	1
Phenanthrene	ND		ug/kg	7.26	--	1
Anthracene	ND		ug/kg	7.26	--	1
Fluoranthene	8.06		ug/kg	7.26	--	1
Pyrene	9.45		ug/kg	7.26	--	1
Benz(a)anthracene	ND		ug/kg	7.26	--	1
Chrysene	7.92		ug/kg	7.26	--	1
Benzo(b)fluoranthene	ND		ug/kg	7.26	--	1
Benzo(k)fluoranthene	ND		ug/kg	7.26	--	1
Benzo(a)pyrene	ND		ug/kg	7.26	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	7.26	--	1
Dibenz(a,h)anthracene	ND		ug/kg	7.26	--	1
Benzo(ghi)perylene	ND		ug/kg	7.26	--	1
Cl2-BZ#8	ND		ug/kg	0.726	--	1
Cl3-BZ#18	ND		ug/kg	0.726	--	1
Cl3-BZ#28	ND		ug/kg	0.726	--	1
Cl4-BZ#44	ND		ug/kg	0.726	--	1
Cl4-BZ#49	ND		ug/kg	0.726	--	1
Cl4-BZ#52	ND		ug/kg	0.726	--	1
Cl4-BZ#66	ND		ug/kg	0.726	--	1
Cl5-BZ#87	ND		ug/kg	0.726	--	1
Cl5-BZ#101	ND		ug/kg	0.726	--	1
Cl5-BZ#105	ND		ug/kg	0.726	--	1
Cl5-BZ#118	ND		ug/kg	0.726	--	1
Cl6-BZ#128	ND		ug/kg	0.726	--	1
Cl6-BZ#138	ND		ug/kg	0.726	--	1
Cl6-BZ#153	ND		ug/kg	0.726	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-17 Date Collected: 02/25/15 13:30

Client ID: L40 Date Received: 02/26/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.726	--	1
Cl7-BZ#180	ND		ug/kg	0.726	--	1
Cl7-BZ#183	ND		ug/kg	0.726	--	1
Cl7-BZ#184	ND		ug/kg	0.726	--	1
Cl7-BZ#187	ND		ug/kg	0.726	--	1
Cl8-BZ#195	ND		ug/kg	0.726	--	1
Cl9-BZ#206	ND		ug/kg	0.726	--	1
Cl10-BZ#209	ND		ug/kg	0.726	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	76		30-150
Pyrene-d10	80		30-150
Benzo(b)fluoranthene-d12	78		30-150
DBOB	85		30-150
BZ 198	76		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-18	Date Collected:	02/25/15 13:45
Client ID:	L39	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 12:23	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/05/15
Percent Solids:	71%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	14.1	--	1
Acenaphthylene	ND		ug/kg	14.1	--	1
Acenaphthene	ND		ug/kg	14.1	--	1
Fluorene	ND		ug/kg	14.1	--	1
Phenanthrene	ND		ug/kg	14.1	--	1
Anthracene	ND		ug/kg	14.1	--	1
Fluoranthene	ND		ug/kg	14.1	--	1
Pyrene	15.2		ug/kg	14.1	--	1
Benz(a)anthracene	ND		ug/kg	14.1	--	1
Chrysene	ND		ug/kg	14.1	--	1
Benzo(b)fluoranthene	ND		ug/kg	14.1	--	1
Benzo(k)fluoranthene	ND		ug/kg	14.1	--	1
Benzo(a)pyrene	ND		ug/kg	14.1	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	14.1	--	1
Dibenz(a,h)anthracene	ND		ug/kg	14.1	--	1
Benzo(ghi)perylene	ND		ug/kg	14.1	--	1
Cl2-BZ#8	ND		ug/kg	1.41	--	1
Cl3-BZ#18	ND		ug/kg	1.41	--	1
Cl3-BZ#28	ND		ug/kg	1.41	--	1
Cl4-BZ#44	ND		ug/kg	1.41	--	1
Cl4-BZ#49	ND		ug/kg	1.41	--	1
Cl4-BZ#52	ND		ug/kg	1.41	--	1
Cl4-BZ#66	ND		ug/kg	1.41	--	1
Cl5-BZ#87	ND		ug/kg	1.41	--	1
Cl5-BZ#101	ND		ug/kg	1.41	--	1
Cl5-BZ#105	ND		ug/kg	1.41	--	1
Cl5-BZ#118	ND		ug/kg	1.41	--	1
Cl6-BZ#128	ND		ug/kg	1.41	--	1
Cl6-BZ#138	ND		ug/kg	1.41	--	1
Cl6-BZ#153	ND		ug/kg	1.41	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-18 Date Collected: 02/25/15 13:45

Client ID: L39 Date Received: 02/26/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.41	--	1
Cl7-BZ#180	ND		ug/kg	1.41	--	1
Cl7-BZ#183	ND		ug/kg	1.41	--	1
Cl7-BZ#184	ND		ug/kg	1.41	--	1
Cl7-BZ#187	ND		ug/kg	1.41	--	1
Cl8-BZ#195	ND		ug/kg	1.41	--	1
Cl9-BZ#206	ND		ug/kg	1.41	--	1
Cl10-BZ#209	ND		ug/kg	1.41	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	79		30-150
Pyrene-d10	84		30-150
Benzo(b)fluoranthene-d12	83		30-150
DBOB	87		30-150
BZ 198	83		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-19	Date Collected:	02/25/15 14:24
Client ID:	L26A	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 12:56	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/05/15
Percent Solids:	65%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	7.18	--	1
Acenaphthylene	ND		ug/kg	7.18	--	1
Acenaphthene	ND		ug/kg	7.18	--	1
Fluorene	ND		ug/kg	7.18	--	1
Phenanthrene	10.2		ug/kg	7.18	--	1
Anthracene	ND		ug/kg	7.18	--	1
Fluoranthene	26.5		ug/kg	7.18	--	1
Pyrene	27.8		ug/kg	7.18	--	1
Benz(a)anthracene	15.3		ug/kg	7.18	--	1
Chrysene	20.6		ug/kg	7.18	--	1
Benzo(b)fluoranthene	18.3		ug/kg	7.18	--	1
Benzo(k)fluoranthene	21.0		ug/kg	7.18	--	1
Benzo(a)pyrene	19.2		ug/kg	7.18	--	1
Indeno(1,2,3-cd)Pyrene	15.8		ug/kg	7.18	--	1
Dibenz(a,h)anthracene	ND		ug/kg	7.18	--	1
Benzo(ghi)perylene	15.2		ug/kg	7.18	--	1
Cl2-BZ#8	ND		ug/kg	0.718	--	1
Cl3-BZ#18	ND		ug/kg	0.718	--	1
Cl3-BZ#28	ND		ug/kg	0.718	--	1
Cl4-BZ#44	ND		ug/kg	0.718	--	1
Cl4-BZ#49	ND		ug/kg	0.718	--	1
Cl4-BZ#52	ND		ug/kg	0.718	--	1
Cl4-BZ#66	ND		ug/kg	0.718	--	1
Cl5-BZ#87	ND		ug/kg	0.718	--	1
Cl5-BZ#101	ND		ug/kg	0.718	--	1
Cl5-BZ#105	ND		ug/kg	0.718	--	1
Cl5-BZ#118	ND		ug/kg	0.718	--	1
Cl6-BZ#128	ND		ug/kg	0.718	--	1
Cl6-BZ#138	ND		ug/kg	0.718	--	1
Cl6-BZ#153	ND		ug/kg	0.718	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-19 Date Collected: 02/25/15 14:24

Client ID: L26A Date Received: 02/26/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.718	--	1
Cl7-BZ#180	ND		ug/kg	0.718	--	1
Cl7-BZ#183	ND		ug/kg	0.718	--	1
Cl7-BZ#184	ND		ug/kg	0.718	--	1
Cl7-BZ#187	ND		ug/kg	0.718	--	1
Cl8-BZ#195	ND		ug/kg	0.718	--	1
Cl9-BZ#206	ND		ug/kg	0.718	--	1
Cl10-BZ#209	ND		ug/kg	0.718	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	74		30-150
Pyrene-d10	78		30-150
Benzo(b)fluoranthene-d12	78		30-150
DBOB	81		30-150
BZ 198	75		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-20	Date Collected:	02/25/15 14:30
Client ID:	L26B	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 13:29	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/05/15
Percent Solids:	67%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	7.09	--	1
Acenaphthylene	ND		ug/kg	7.09	--	1
Acenaphthene	ND		ug/kg	7.09	--	1
Fluorene	ND		ug/kg	7.09	--	1
Phenanthrene	13.2		ug/kg	7.09	--	1
Anthracene	ND		ug/kg	7.09	--	1
Fluoranthene	12.9		ug/kg	7.09	--	1
Pyrene	13.3		ug/kg	7.09	--	1
Benz(a)anthracene	ND		ug/kg	7.09	--	1
Chrysene	8.46		ug/kg	7.09	--	1
Benzo(b)fluoranthene	8.80		ug/kg	7.09	--	1
Benzo(k)fluoranthene	ND		ug/kg	7.09	--	1
Benzo(a)pyrene	7.20		ug/kg	7.09	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	7.09	--	1
Dibenz(a,h)anthracene	ND		ug/kg	7.09	--	1
Benzo(ghi)perylene	ND		ug/kg	7.09	--	1
Cl2-BZ#8	ND		ug/kg	0.709	--	1
Cl3-BZ#18	ND		ug/kg	0.709	--	1
Cl3-BZ#28	ND		ug/kg	0.709	--	1
Cl4-BZ#44	ND		ug/kg	0.709	--	1
Cl4-BZ#49	ND		ug/kg	0.709	--	1
Cl4-BZ#52	ND		ug/kg	0.709	--	1
Cl4-BZ#66	ND		ug/kg	0.709	--	1
Cl5-BZ#87	ND		ug/kg	0.709	--	1
Cl5-BZ#101	ND		ug/kg	0.709	--	1
Cl5-BZ#105	ND		ug/kg	0.709	--	1
Cl5-BZ#118	ND		ug/kg	0.709	--	1
Cl6-BZ#128	ND		ug/kg	0.709	--	1
Cl6-BZ#138	ND		ug/kg	0.709	--	1
Cl6-BZ#153	ND		ug/kg	0.709	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-20 Date Collected: 02/25/15 14:30

Client ID: L26B Date Received: 02/26/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.709	--	1
Cl7-BZ#180	ND		ug/kg	0.709	--	1
Cl7-BZ#183	ND		ug/kg	0.709	--	1
Cl7-BZ#184	ND		ug/kg	0.709	--	1
Cl7-BZ#187	ND		ug/kg	0.709	--	1
Cl8-BZ#195	ND		ug/kg	0.709	--	1
Cl9-BZ#206	ND		ug/kg	0.709	--	1
Cl10-BZ#209	ND		ug/kg	0.709	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	72		30-150
Pyrene-d10	76		30-150
Benzo(b)fluoranthene-d12	76		30-150
DBOB	76		30-150
BZ 198	71		30-150

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 03/05/15 20:38
Analyst: CM

Extraction Method: EPA 3570
Extraction Date: 03/04/15 09:30
Cleanup Method: EPA 3630
Cleanup Date: 03/05/15

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-20 Batch: WG766025-1					
Naphthalene	ND		ug/kg	5.00	--
Acenaphthylene	ND		ug/kg	5.00	--
Acenaphthene	ND		ug/kg	5.00	--
Fluorene	ND		ug/kg	5.00	--
Phenanthrene	ND		ug/kg	5.00	--
Anthracene	ND		ug/kg	5.00	--
Fluoranthene	ND		ug/kg	5.00	--
Pyrene	ND		ug/kg	5.00	--
Benz(a)anthracene	ND		ug/kg	5.00	--
Chrysene	ND		ug/kg	5.00	--
Benzo(b)fluoranthene	ND		ug/kg	5.00	--
Benzo(k)fluoranthene	ND		ug/kg	5.00	--
Benzo(a)pyrene	ND		ug/kg	5.00	--
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	5.00	--
Dibenz(a,h)anthracene	ND		ug/kg	5.00	--
Benzo(ghi)perylene	ND		ug/kg	5.00	--
Cl2-BZ#8	ND		ug/kg	0.500	--
Cl3-BZ#18	ND		ug/kg	0.500	--
Cl3-BZ#28	ND		ug/kg	0.500	--
Cl4-BZ#44	ND		ug/kg	0.500	--
Cl4-BZ#49	ND		ug/kg	0.500	--
Cl4-BZ#52	ND		ug/kg	0.500	--
Cl4-BZ#66	ND		ug/kg	0.500	--
Cl5-BZ#87	ND		ug/kg	0.500	--
Cl5-BZ#101	ND		ug/kg	0.500	--
Cl5-BZ#105	ND		ug/kg	0.500	--
Cl5-BZ#118	ND		ug/kg	0.500	--
Cl6-BZ#128	ND		ug/kg	0.500	--
Cl6-BZ#138	ND		ug/kg	0.500	--

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 03/05/15 20:38
Analyst: CM

Extraction Method: EPA 3570
Extraction Date: 03/04/15 09:30
Cleanup Method: EPA 3630
Cleanup Date: 03/05/15

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-20 Batch: WG766025-1					
Cl6-BZ#153	ND		ug/kg	0.500	--
Cl7-BZ#170	ND		ug/kg	0.500	--
Cl7-BZ#180	ND		ug/kg	0.500	--
Cl7-BZ#183	ND		ug/kg	0.500	--
Cl7-BZ#184	ND		ug/kg	0.500	--
Cl7-BZ#187	ND		ug/kg	0.500	--
Cl8-BZ#195	ND		ug/kg	0.500	--
Cl9-BZ#206	ND		ug/kg	0.500	--
Cl10-BZ#209	ND		ug/kg	0.500	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	84		30-150
Pyrene-d10	90		30-150
Benzo(b)fluoranthene-d12	92		30-150
DBOB	97		30-150
BZ 198	91		30-150

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503503

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 Batch: WG766025-2 WG766025-3								
Naphthalene	88		84		50-120	5		30
Acenaphthylene	87		82		50-120	6		30
Acenaphthene	88		84		50-120	5		30
Fluorene	88		83		50-120	6		30
Phenanthrene	93		91		50-120	2		30
Anthracene	83		76		50-120	9		30
Fluoranthene	90		88		50-120	2		30
Pyrene	86		85		50-120	1		30
Benz(a)anthracene	90		90		50-120	0		30
Chrysene	88		87		50-120	1		30
Benzo(b)fluoranthene	96		97		50-120	1		30
Benzo(k)fluoranthene	97		94		50-120	3		30
Benzo(a)pyrene	86		82		50-120	5		30
Indeno(1,2,3-cd)Pyrene	90		91		50-120	1		30
Dibenz(a,h)anthracene	91		91		50-120	0		30
Benzo(ghi)perylene	89		90		50-120	1		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503503

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 Batch: WG766025-2 WG766025-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	85		82		30-150
Pyrene-d10	88		87		30-150
Benzo(b)fluoranthene-d12	89		90		30-150

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503503

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 Batch: WG766025-8 WG766025-9								
Cl2-BZ#8	89		93		50-120	4		30
Cl3-BZ#18	86		88		50-120	2		30
Cl3-BZ#28	91		95		50-120	4		30
Cl4-BZ#44	91		96		50-120	5		30
Cl4-BZ#49	87		92		50-120	6		30
Cl4-BZ#52	88		92		50-120	4		30
Cl4-BZ#66	90		94		50-120	4		30
Cl5-BZ#87	91		95		50-120	4		30
Cl5-BZ#101	89		93		50-120	4		30
Cl5-BZ#105	89		94		50-120	5		30
Cl5-BZ#118	86		91		50-120	6		30
Cl6-BZ#128	88		92		50-120	4		30
Cl6-BZ#138	91		94		50-120	3		30
Cl6-BZ#153	88		92		50-120	4		30
Cl7-BZ#170	93		96		50-120	3		30
Cl7-BZ#180	87		90		50-120	3		30
Cl7-BZ#183	89		93		50-120	4		30
Cl7-BZ#184	91		95		50-120	4		30
Cl7-BZ#187	90		93		50-120	3		30
Cl8-BZ#195	86		91		50-120	6		30
Cl9-BZ#206	88		90		50-120	2		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503503

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 Batch: WG766025-8 WG766025-9								
Cl10-BZ#209	84		88		50-120	5		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
DBOB	90		96		30-150
BZ 198	85		89		30-150

Matrix Spike Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified
Lab Number: L1503503
Report Date: 03/16/15

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG766025-10 WG766025-11 QC Sample: L1503503-07 Client ID: L-62												
Cl2-BZ#8	ND	77.7	65.9	85		68.8	88		50-120	4		30
Cl3-BZ#18	ND	77.7	63.0	81		66.0	85		50-120	5		30
Cl3-BZ#28	ND	77.7	67.7	87		70.4	90		50-120	4		30
Cl4-BZ#44	ND	77.7	69.4	89		72.6	93		50-120	5		30
Cl4-BZ#49	ND	77.7	65.8	85		68.9	88		50-120	5		30
Cl4-BZ#52	ND	77.7	67.0	86		69.6	89		50-120	4		30
Cl4-BZ#66	ND	77.7	69.5	90		72.1	93		50-120	4		30
Cl5-BZ#87	ND	77.7	69.9	90		72.5	93		50-120	4		30
Cl5-BZ#101	ND	77.7	68.7	89		71.6	92		50-120	4		30
Cl5-BZ#105	ND	77.7	69.1	89		72.4	93		50-120	5		30
Cl5-BZ#118	ND	77.7	67.7	87		70.8	91		50-120	4		30
Cl6-BZ#128	ND	77.7	68.3	88		71.8	92		50-120	5		30
Cl6-BZ#138	0.978	77.7	69.9	89		73.7	93		50-120	5		30
Cl6-BZ#153	ND	77.7	69.0	89		72.0	92		50-120	4		30
Cl7-BZ#170	ND	77.7	73.5	95		76.4	98		50-120	4		30
Cl7-BZ#180	ND	77.7	67.9	87		70.4	90		50-120	4		30
Cl7-BZ#183	ND	77.7	68.3	88		72.1	93		50-120	5		30
Cl7-BZ#184	ND	77.7	69.6	90		72.7	93		50-120	4		30
Cl7-BZ#187	ND	77.7	69.6	90		72.9	94		50-120	5		30
Cl8-BZ#195	ND	77.7	68.7	89		72.0	92		50-120	5		30
Cl9-BZ#206	ND	77.7	68.8	89		72.3	93		50-120	5		30

Matrix Spike Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503503

Report Date: 03/16/15

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG766025-10 WG766025-11 QC Sample: L1503503-07 Client ID: L-62												
Cl10-BZ#209	ND	77.7	66.8	86		70.6	91		50-120	6		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
BZ 198	92		95		30-150
DBOB	92		94		30-150

Matrix Spike Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified
Lab Number: L1503503
Report Date: 03/16/15

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG766025-4 WG766025-5 QC Sample: L1503503-07 Client ID: L-62												
Naphthalene	ND	384	302	79		321	83		50-120	6		30
Acenaphthylene	19.6	384	297	72		317	77		50-120	7		30
Acenaphthene	ND	384	295	77		316	82		50-120	7		30
Fluorene	ND	384	299	78		321	83		50-120	7		30
Phenanthrene	72.1	384	362	76		384	81		50-120	6		30
Anthracene	15.1	384	298	74		314	77		50-120	5		30
Fluoranthene	191	384	444	66		462	70		50-120	4		30
Pyrene	172	384	420	65		435	68		50-120	4		30
Benz(a)anthracene	93.1	384	368	72		398	79		50-120	8		30
Chrysene	113	384	371	67		398	74		50-120	7		30
Benzo(b)fluoranthene	131	384	417	75		436	79		50-120	4		30
Benzo(k)fluoranthene	96.7	384	359	68		396	77		50-120	10		30
Benzo(a)pyrene	110	384	381	71		411	78		50-120	8		30
Indeno(1,2,3-cd)Pyrene	93.3	384	374	73		395	78		50-120	5		30
Dibenz(a,h)anthracene	18.0	384	322	79		347	85		50-120	7		30
Benzo(ghi)perylene	88.7	384	354	69		379	75		50-120	7		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	76		79		30-150
Benzo(b)fluoranthene-d12	77		81		30-150

Matrix Spike Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503503

Report Date: 03/16/15

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG766025-4 WG766025-5 QC Sample: L1503503-07 Client ID: L-62												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
Pyrene-d10	78		83		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG766025-6 QC Sample: L1503503-07 Client ID: L-62						
Naphthalene	ND	ND	ug/kg	NC		30
Acenaphthylene	19.6	10.8	ug/kg	**58**	Q	30
Acenaphthene	ND	ND	ug/kg	NC		30
Fluorene	ND	ND	ug/kg	NC		30
Phenanthrene	72.1	38.2	ug/kg	**61**	Q	30
Anthracene	15.1	9.64	ug/kg	**44**	Q	30
Fluoranthene	191	104	ug/kg	**59**	Q	30
Pyrene	172	101	ug/kg	**52**	Q	30
Benz(a)anthracene	93.1	47.6	ug/kg	**65**	Q	30
Chrysene	113	67.2	ug/kg	**51**	Q	30
Benzo(b)fluoranthene	131	64.3	ug/kg	**68**	Q	30
Benzo(k)fluoranthene	96.7	63.9	ug/kg	**41**	Q	30
Benzo(a)pyrene	110	60.9	ug/kg	**57**	Q	30
Indeno(1,2,3-cd)Pyrene	93.3	52.8	ug/kg	**55**	Q	30
Dibenz(a,h)anthracene	18.0	9.23	ug/kg	**64**	Q	30
Benzo(ghi)perylene	88.7	48.9	ug/kg	**58**	Q	30
Cl2-BZ#8	ND	ND	ug/kg	NC		30
Cl3-BZ#18	ND	ND	ug/kg	NC		30
Cl3-BZ#28	ND	ND	ug/kg	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG766025-6 QC Sample: L1503503-07 Client ID: L-62					
Cl4-BZ#44	ND	ND	ug/kg	NC	30
Cl4-BZ#49	ND	ND	ug/kg	NC	30
Cl4-BZ#52	ND	ND	ug/kg	NC	30
Cl4-BZ#66	ND	ND	ug/kg	NC	30
Cl5-BZ#87	ND	ND	ug/kg	NC	30
Cl5-BZ#101	ND	ND	ug/kg	NC	30
Cl5-BZ#105	ND	ND	ug/kg	NC	30
Cl5-BZ#118	ND	ND	ug/kg	NC	30
Cl6-BZ#128	ND	ND	ug/kg	NC	30
Cl6-BZ#138	0.978	0.825	ug/kg	17	30
Cl6-BZ#153	ND	ND	ug/kg	NC	30
Cl7-BZ#170	ND	ND	ug/kg	NC	30
Cl7-BZ#180	ND	ND	ug/kg	NC	30
Cl7-BZ#183	ND	ND	ug/kg	NC	30
Cl7-BZ#184	ND	ND	ug/kg	NC	30
Cl7-BZ#187	ND	ND	ug/kg	NC	30
Cl8-BZ#195	ND	ND	ug/kg	NC	30
Cl9-BZ#206	ND	ND	ug/kg	NC	30
Cl10-BZ#209	ND	ND	ug/kg	NC	30

Lab Duplicate Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG766025-6 QC Sample: L1503503-07 Client ID: L-62					

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	84		85		30-150
Pyrene-d10	87		88		30-150
Benzo(b)fluoranthene-d12	86		87		30-150
DBOB	89		94		30-150
BZ 198	89		89		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503
Project Number: Not Specified **Report Date:** 03/16/15

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG766025-7

Parameter	% Recovery	Qual	QC Criteria
Phenanthrene	54		40-140
Fluoranthene	56		40-140
Pyrene	47		40-140
Benz(a)anthracene	52		40-140
Chrysene	67		40-140
Benzo(b)fluoranthene	54		40-140
Benzo(k)fluoranthene	103		40-140
Benzo(a)pyrene	45		40-140
Indeno(1,2,3-cd)Pyrene	60		40-140
Dibenz(a,h)anthracene	96		40-140
Benzo(ghi)perylene	56		40-140
Cl2-BZ#8	54		40-140
Cl3-BZ#18	62		40-140
Cl3-BZ#28	42		40-140
Cl4-BZ#44	62		40-140
Cl4-BZ#49	55		40-140
Cl4-BZ#52	58		40-140
Cl4-BZ#66	50		40-140
Cl5-BZ#87	65		40-140
Cl5-BZ#101	62		40-140
Cl5-BZ#105	66		40-140
Cl5-BZ#118	58		40-140
Cl6-BZ#128	104		40-140
Cl6-BZ#138	71		40-140
Cl6-BZ#153	50		40-140
Cl7-BZ#170	63		40-140
Cl7-BZ#180	52		40-140
Cl7-BZ#183	60		40-140
Cl7-BZ#187	58		40-140
Cl9-BZ#206	69		40-140
Cl10-BZ#209	62		40-140
2-Methylnaphthalene-d10 (Surrogate)	64		30-150
Pyrene-d10 (Surrogate)	65		30-150
Benzo(b)fluoranthene-d12 (Surrogate)	63		30-150
DBOB (Surrogate)	60		30-150
BZ 198 (Surrogate)	66		30-150

PESTICIDES

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-01	Date Collected:	02/24/15 11:22
Client ID:	L-56	Date Received:	02/24/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/05/15 23:16	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/05/15
Percent Solids:	70%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.668	--	1	A
gamma-BHC	ND		ug/kg	0.334	--	1	A
Heptachlor	ND		ug/kg	0.334	--	1	A
Aldrin	ND		ug/kg	0.334	--	1	A
Heptachlor epoxide	ND		ug/kg	0.668	--	1	B
Oxychlordane	ND		ug/kg	0.668	--	1	B
trans-Chlordane	ND		ug/kg	0.334	--	1	A
Endosulfan I	ND		ug/kg	0.334	--	1	A
cis-Chlordane	ND		ug/kg	0.334	--	1	A
trans-Nonachlor	ND		ug/kg	0.334	--	1	A
4,4'-DDE	ND		ug/kg	0.334	--	1	A
Dieldrin	ND		ug/kg	0.334	--	1	A
Endrin	ND		ug/kg	0.334	--	1	A
Endosulfan II	ND		ug/kg	0.334	--	1	A
4,4'-DDD	ND		ug/kg	0.334	--	1	A
cis-Nonachlor	ND		ug/kg	0.334	--	1	A
4,4'-DDT	ND		ug/kg	0.334	--	1	A
Methoxychlor	ND		ug/kg	3.34	--	1	A
Toxaphene	ND		ug/kg	16.8	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	68		30-150	A
BZ 198	81		30-150	A
DBOB	65		30-150	B
BZ 198	82		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-02	Date Collected:	02/24/15 12:01
Client ID:	L-55	Date Received:	02/24/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/05/15 23:48	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/05/15
Percent Solids:	80%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.14	--	1	A
gamma-BHC	ND		ug/kg	0.572	--	1	A
Heptachlor	ND		ug/kg	0.572	--	1	A
Aldrin	ND		ug/kg	0.572	--	1	A
Heptachlor epoxide	ND		ug/kg	1.14	--	1	B
Oxychlordane	ND		ug/kg	1.14	--	1	B
trans-Chlordane	ND		ug/kg	0.572	--	1	A
Endosulfan I	ND		ug/kg	0.572	--	1	A
cis-Chlordane	ND		ug/kg	0.572	--	1	A
trans-Nonachlor	ND		ug/kg	0.572	--	1	A
4,4'-DDE	ND		ug/kg	0.572	--	1	A
Dieldrin	ND		ug/kg	0.572	--	1	A
Endrin	ND		ug/kg	0.572	--	1	A
Endosulfan II	ND		ug/kg	0.572	--	1	A
4,4'-DDD	ND		ug/kg	0.572	--	1	A
cis-Nonachlor	ND		ug/kg	0.572	--	1	A
4,4'-DDT	ND		ug/kg	0.572	--	1	A
Methoxychlor	ND		ug/kg	5.72	--	1	A
Toxaphene	ND		ug/kg	28.7	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	64		30-150	A
BZ 198	79		30-150	A
DBOB	62		30-150	B
BZ 198	80		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-03	Date Collected:	02/24/15 12:35
Client ID:	L-54	Date Received:	02/24/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 00:21	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/05/15
Percent Solids:	79%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.19	--	1	A
gamma-BHC	ND		ug/kg	0.596	--	1	A
Heptachlor	ND		ug/kg	0.596	--	1	A
Aldrin	ND		ug/kg	0.596	--	1	A
Heptachlor epoxide	ND		ug/kg	1.19	--	1	B
Oxychlordane	ND		ug/kg	1.19	--	1	B
trans-Chlordane	ND		ug/kg	0.596	--	1	A
Endosulfan I	ND		ug/kg	0.596	--	1	A
cis-Chlordane	ND		ug/kg	0.596	--	1	A
trans-Nonachlor	ND		ug/kg	0.596	--	1	A
4,4'-DDE	ND		ug/kg	0.596	--	1	A
Dieldrin	ND		ug/kg	0.596	--	1	A
Endrin	ND		ug/kg	0.596	--	1	A
Endosulfan II	ND		ug/kg	0.596	--	1	A
4,4'-DDD	ND		ug/kg	0.596	--	1	A
cis-Nonachlor	ND		ug/kg	0.596	--	1	A
4,4'-DDT	ND		ug/kg	0.596	--	1	A
Methoxychlor	ND		ug/kg	5.96	--	1	A
Toxaphene	ND		ug/kg	29.9	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	55		30-150	A
BZ 198	79		30-150	A
DBOB	53		30-150	B
BZ 198	80		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-04	Date Collected:	02/24/15 13:01
Client ID:	L-53	Date Received:	02/24/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 00:53	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/05/15
Percent Solids:	62%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.765	--	1	A
gamma-BHC	ND		ug/kg	0.382	--	1	A
Heptachlor	ND		ug/kg	0.382	--	1	A
Aldrin	ND		ug/kg	0.382	--	1	A
Heptachlor epoxide	ND		ug/kg	0.765	--	1	B
Oxychlordane	ND		ug/kg	0.765	--	1	B
trans-Chlordane	ND		ug/kg	0.382	--	1	A
Endosulfan I	ND		ug/kg	0.382	--	1	A
cis-Chlordane	ND		ug/kg	0.382	--	1	A
trans-Nonachlor	ND		ug/kg	0.382	--	1	A
4,4'-DDE	ND		ug/kg	0.382	--	1	A
Dieldrin	ND		ug/kg	0.382	--	1	A
Endrin	ND		ug/kg	0.382	--	1	A
Endosulfan II	ND		ug/kg	0.382	--	1	A
4,4'-DDD	ND		ug/kg	0.382	--	1	A
cis-Nonachlor	ND		ug/kg	0.382	--	1	A
4,4'-DDT	ND		ug/kg	0.382	--	1	A
Methoxychlor	ND		ug/kg	3.82	--	1	A
Toxaphene	ND		ug/kg	19.2	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	60		30-150	A
BZ 198	81		30-150	A
DBOB	57		30-150	B
BZ 198	83		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-05	Date Collected:	02/24/15 13:52
Client ID:	L-52	Date Received:	02/24/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 01:25	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/05/15
Percent Solids:	81%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.06	--	1	A
gamma-BHC	ND		ug/kg	0.531	--	1	A
Heptachlor	ND		ug/kg	0.531	--	1	A
Aldrin	ND		ug/kg	0.531	--	1	A
Heptachlor epoxide	ND		ug/kg	1.06	--	1	B
Oxychlordane	ND		ug/kg	1.06	--	1	B
trans-Chlordane	ND		ug/kg	0.531	--	1	A
Endosulfan I	ND		ug/kg	0.531	--	1	A
cis-Chlordane	ND		ug/kg	0.531	--	1	A
trans-Nonachlor	ND		ug/kg	0.531	--	1	A
4,4'-DDE	ND		ug/kg	0.531	--	1	A
Dieldrin	ND		ug/kg	0.531	--	1	A
Endrin	ND		ug/kg	0.531	--	1	A
Endosulfan II	ND		ug/kg	0.531	--	1	A
4,4'-DDD	ND		ug/kg	0.531	--	1	A
cis-Nonachlor	ND		ug/kg	0.531	--	1	A
4,4'-DDT	ND		ug/kg	0.531	--	1	A
Methoxychlor	ND		ug/kg	5.31	--	1	A
Toxaphene	ND		ug/kg	26.7	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	59		30-150	A
BZ 198	80		30-150	A
DBOB	55		30-150	B
BZ 198	82		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-06	Date Collected:	02/24/15 14:20
Client ID:	L-51	Date Received:	02/24/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 01:58	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/05/15
Percent Solids:	79%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.06	--	1	A
gamma-BHC	ND		ug/kg	0.530	--	1	A
Heptachlor	ND		ug/kg	0.530	--	1	A
Aldrin	ND		ug/kg	0.530	--	1	A
Heptachlor epoxide	ND		ug/kg	1.06	--	1	B
Oxychlordane	ND		ug/kg	1.06	--	1	B
trans-Chlordane	ND		ug/kg	0.530	--	1	A
Endosulfan I	ND		ug/kg	0.530	--	1	A
cis-Chlordane	ND		ug/kg	0.530	--	1	A
trans-Nonachlor	ND		ug/kg	0.530	--	1	A
4,4'-DDE	ND		ug/kg	0.530	--	1	A
Dieldrin	ND		ug/kg	0.530	--	1	A
Endrin	ND		ug/kg	0.530	--	1	A
Endosulfan II	ND		ug/kg	0.530	--	1	A
4,4'-DDD	ND		ug/kg	0.530	--	1	A
cis-Nonachlor	ND		ug/kg	0.530	--	1	A
4,4'-DDT	ND		ug/kg	0.530	--	1	A
Methoxychlor	ND		ug/kg	5.30	--	1	A
Toxaphene	ND		ug/kg	26.6	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	63		30-150	A
BZ 198	78		30-150	A
DBOB	59		30-150	B
BZ 198	79		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-07	Date Collected:	02/24/15 14:35
Client ID:	L-62	Date Received:	02/24/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/09/15 21:14	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/05/15
Percent Solids:	63%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.786	--	1	A
gamma-BHC	ND		ug/kg	0.393	--	1	A
Heptachlor	ND		ug/kg	0.393	--	1	A
Aldrin	ND		ug/kg	0.393	--	1	A
Heptachlor epoxide	ND		ug/kg	0.786	--	1	B
Oxychlordane	0.908		ug/kg	0.786	--	1	B
trans-Chlordane	ND		ug/kg	0.393	--	1	A
Endosulfan I	ND		ug/kg	0.393	--	1	A
cis-Chlordane	ND		ug/kg	0.393	--	1	A
trans-Nonachlor	ND		ug/kg	0.393	--	1	A
4,4'-DDE	0.437	IP	ug/kg	0.393	--	1	B
Dieldrin	ND		ug/kg	0.393	--	1	A
Endrin	ND		ug/kg	0.393	--	1	A
Endosulfan II	ND		ug/kg	0.393	--	1	A
4,4'-DDD	ND		ug/kg	0.393	--	1	A
cis-Nonachlor	ND		ug/kg	0.393	--	1	A
4,4'-DDT	0.454	IP	ug/kg	0.393	--	1	A
Methoxychlor	ND		ug/kg	3.93	--	1	A
Toxaphene	ND		ug/kg	19.7	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	80		30-150	A
BZ 198	79		30-150	A
DBOB	68		30-150	B
BZ 198	81		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-08	Date Collected:	02/25/15 09:33
Client ID:	L41	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 06:17	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/05/15
Percent Solids:	75%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.32	--	1	A
gamma-BHC	ND		ug/kg	0.659	--	1	A
Heptachlor	ND		ug/kg	0.659	--	1	A
Aldrin	ND		ug/kg	0.659	--	1	A
Heptachlor epoxide	ND		ug/kg	1.32	--	1	B
Oxychlordane	ND		ug/kg	1.32	--	1	B
trans-Chlordane	ND		ug/kg	0.659	--	1	A
Endosulfan I	ND		ug/kg	0.659	--	1	A
cis-Chlordane	ND		ug/kg	0.659	--	1	A
trans-Nonachlor	ND		ug/kg	0.659	--	1	A
4,4'-DDE	ND		ug/kg	0.659	--	1	A
Dieldrin	ND		ug/kg	0.659	--	1	A
Endrin	ND		ug/kg	0.659	--	1	A
Endosulfan II	ND		ug/kg	0.659	--	1	A
4,4'-DDD	ND		ug/kg	0.659	--	1	A
cis-Nonachlor	ND		ug/kg	0.659	--	1	A
4,4'-DDT	ND		ug/kg	0.659	--	1	A
Methoxychlor	ND		ug/kg	6.59	--	1	A
Toxaphene	ND		ug/kg	33.1	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	60		30-150	A
BZ 198	70		30-150	A
DBOB	50		30-150	B
BZ 198	72		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-09	Date Collected:	02/25/15 10:05
Client ID:	L32	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 06:50	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/05/15
Percent Solids:	78%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.23	--	1	A
gamma-BHC	ND		ug/kg	0.614	--	1	A
Heptachlor	ND		ug/kg	0.614	--	1	A
Aldrin	ND		ug/kg	0.614	--	1	A
Heptachlor epoxide	ND		ug/kg	1.23	--	1	B
Oxychlordane	ND		ug/kg	1.23	--	1	B
trans-Chlordane	ND		ug/kg	0.614	--	1	A
Endosulfan I	ND		ug/kg	0.614	--	1	A
cis-Chlordane	ND		ug/kg	0.614	--	1	A
trans-Nonachlor	ND		ug/kg	0.614	--	1	A
4,4'-DDE	ND		ug/kg	0.614	--	1	A
Dieldrin	ND		ug/kg	0.614	--	1	A
Endrin	ND		ug/kg	0.614	--	1	A
Endosulfan II	ND		ug/kg	0.614	--	1	A
4,4'-DDD	ND		ug/kg	0.614	--	1	A
cis-Nonachlor	ND		ug/kg	0.614	--	1	A
4,4'-DDT	ND		ug/kg	0.614	--	1	A
Methoxychlor	ND		ug/kg	6.14	--	1	A
Toxaphene	ND		ug/kg	30.8	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	62		30-150	A
BZ 198	76		30-150	A
DBOB	59		30-150	B
BZ 198	79		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-10	Date Collected:	02/25/15 10:19
Client ID:	L35	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 07:22	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/05/15
Percent Solids:	74%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.30	--	1	A
gamma-BHC	ND		ug/kg	0.650	--	1	A
Heptachlor	ND		ug/kg	0.650	--	1	A
Aldrin	ND		ug/kg	0.650	--	1	A
Heptachlor epoxide	ND		ug/kg	1.30	--	1	B
Oxychlordane	ND		ug/kg	1.30	--	1	B
trans-Chlordane	ND		ug/kg	0.650	--	1	A
Endosulfan I	ND		ug/kg	0.650	--	1	A
cis-Chlordane	ND		ug/kg	0.650	--	1	A
trans-Nonachlor	ND		ug/kg	0.650	--	1	A
4,4'-DDE	ND		ug/kg	0.650	--	1	A
Dieldrin	ND		ug/kg	0.650	--	1	A
Endrin	ND		ug/kg	0.650	--	1	A
Endosulfan II	ND		ug/kg	0.650	--	1	A
4,4'-DDD	ND		ug/kg	0.650	--	1	A
cis-Nonachlor	ND		ug/kg	0.650	--	1	A
4,4'-DDT	ND		ug/kg	0.650	--	1	A
Methoxychlor	ND		ug/kg	6.50	--	1	A
Toxaphene	ND		ug/kg	32.6	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	59		30-150	A
BZ 198	74		30-150	A
DBOB	54		30-150	B
BZ 198	78		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-11	Date Collected:	02/25/15 10:35
Client ID:	L33	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 07:55	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/05/15
Percent Solids:	70%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.700	--	1	A
gamma-BHC	ND		ug/kg	0.350	--	1	A
Heptachlor	ND		ug/kg	0.350	--	1	A
Aldrin	ND		ug/kg	0.350	--	1	A
Heptachlor epoxide	ND		ug/kg	0.700	--	1	B
Oxychlordane	ND		ug/kg	0.700	--	1	B
trans-Chlordane	ND		ug/kg	0.350	--	1	A
Endosulfan I	ND		ug/kg	0.350	--	1	A
cis-Chlordane	ND		ug/kg	0.350	--	1	A
trans-Nonachlor	ND		ug/kg	0.350	--	1	A
4,4'-DDE	ND		ug/kg	0.350	--	1	A
Dieldrin	ND		ug/kg	0.350	--	1	A
Endrin	ND		ug/kg	0.350	--	1	A
Endosulfan II	ND		ug/kg	0.350	--	1	A
4,4'-DDD	ND		ug/kg	0.350	--	1	A
cis-Nonachlor	ND		ug/kg	0.350	--	1	A
4,4'-DDT	ND		ug/kg	0.350	--	1	A
Methoxychlor	ND		ug/kg	3.50	--	1	A
Toxaphene	ND		ug/kg	17.6	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	62		30-150	A
BZ 198	75		30-150	A
DBOB	56		30-150	B
BZ 198	79		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-12	Date Collected:	02/25/15 11:00
Client ID:	L31	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/06/15 08:27	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/05/15
Percent Solids:	74%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.26	--	1	A
gamma-BHC	ND		ug/kg	0.633	--	1	A
Heptachlor	ND		ug/kg	0.633	--	1	A
Aldrin	ND		ug/kg	0.633	--	1	A
Heptachlor epoxide	ND		ug/kg	1.26	--	1	B
Oxychlordane	ND		ug/kg	1.26	--	1	B
trans-Chlordane	ND		ug/kg	0.633	--	1	A
Endosulfan I	ND		ug/kg	0.633	--	1	A
cis-Chlordane	ND		ug/kg	0.633	--	1	A
trans-Nonachlor	ND		ug/kg	0.633	--	1	A
4,4'-DDE	ND		ug/kg	0.633	--	1	A
Dieldrin	ND		ug/kg	0.633	--	1	A
Endrin	ND		ug/kg	0.633	--	1	A
Endosulfan II	ND		ug/kg	0.633	--	1	A
4,4'-DDD	ND		ug/kg	0.633	--	1	A
cis-Nonachlor	ND		ug/kg	0.633	--	1	A
4,4'-DDT	ND		ug/kg	0.633	--	1	A
Methoxychlor	ND		ug/kg	6.33	--	1	A
Toxaphene	ND		ug/kg	31.8	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	61		30-150	A
BZ 198	75		30-150	A
DBOB	55		30-150	B
BZ 198	79		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-13	Date Collected:	02/25/15 11:19
Client ID:	L34	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/09/15 16:55	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/09/15
Percent Solids:	77%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.12	--	1	A
gamma-BHC	ND		ug/kg	0.561	--	1	A
Heptachlor	ND		ug/kg	0.561	--	1	A
Aldrin	ND		ug/kg	0.561	--	1	A
Heptachlor epoxide	ND		ug/kg	1.12	--	1	B
Oxychlordane	ND		ug/kg	1.12	--	1	B
trans-Chlordane	ND		ug/kg	0.561	--	1	A
Endosulfan I	ND		ug/kg	0.561	--	1	A
cis-Chlordane	ND		ug/kg	0.561	--	1	A
trans-Nonachlor	ND		ug/kg	0.561	--	1	A
4,4'-DDE	ND		ug/kg	0.561	--	1	A
Dieldrin	ND		ug/kg	0.561	--	1	A
Endrin	ND		ug/kg	0.561	--	1	A
Endosulfan II	ND		ug/kg	0.561	--	1	A
4,4'-DDD	ND		ug/kg	0.561	--	1	A
cis-Nonachlor	ND		ug/kg	0.561	--	1	A
4,4'-DDT	ND		ug/kg	0.561	--	1	A
Methoxychlor	ND		ug/kg	5.61	--	1	A
Toxaphene	ND		ug/kg	28.2	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	88		30-150	A
BZ 198	87		30-150	A
DBOB	85		30-150	B
BZ 198	84		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-14	Date Collected:	02/25/15 11:35
Client ID:	L36	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/09/15 17:27	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/05/15
Percent Solids:	75%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.31	--	1	A
gamma-BHC	ND		ug/kg	0.657	--	1	A
Heptachlor	ND		ug/kg	0.657	--	1	A
Aldrin	ND		ug/kg	0.657	--	1	A
Heptachlor epoxide	ND		ug/kg	1.31	--	1	B
Oxychlordane	ND		ug/kg	1.31	--	1	B
trans-Chlordane	ND		ug/kg	0.657	--	1	A
Endosulfan I	ND		ug/kg	0.657	--	1	A
cis-Chlordane	ND		ug/kg	0.657	--	1	A
trans-Nonachlor	ND		ug/kg	0.657	--	1	A
4,4'-DDE	ND		ug/kg	0.657	--	1	A
Dieldrin	ND		ug/kg	0.657	--	1	A
Endrin	ND		ug/kg	0.657	--	1	A
Endosulfan II	ND		ug/kg	0.657	--	1	A
4,4'-DDD	ND		ug/kg	0.657	--	1	A
cis-Nonachlor	ND		ug/kg	0.657	--	1	A
4,4'-DDT	ND		ug/kg	0.657	--	1	A
Methoxychlor	ND		ug/kg	6.57	--	1	A
Toxaphene	ND		ug/kg	33.0	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	65		30-150	A
BZ 198	78		30-150	A
DBOB	60		30-150	B
BZ 198	82		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-15	Date Collected:	02/25/15 12:36
Client ID:	L37	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/09/15 18:00	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/05/15
Percent Solids:	71%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.35	--	1	A
gamma-BHC	ND		ug/kg	0.674	--	1	A
Heptachlor	ND		ug/kg	0.674	--	1	A
Aldrin	ND		ug/kg	0.674	--	1	A
Heptachlor epoxide	ND		ug/kg	1.35	--	1	B
Oxychlordane	ND		ug/kg	1.35	--	1	B
trans-Chlordane	ND		ug/kg	0.674	--	1	A
Endosulfan I	ND		ug/kg	0.674	--	1	A
cis-Chlordane	ND		ug/kg	0.674	--	1	A
trans-Nonachlor	ND		ug/kg	0.674	--	1	A
4,4'-DDE	ND		ug/kg	0.674	--	1	A
Dieldrin	ND		ug/kg	0.674	--	1	A
Endrin	ND		ug/kg	0.674	--	1	A
Endosulfan II	ND		ug/kg	0.674	--	1	A
4,4'-DDD	ND		ug/kg	0.674	--	1	A
cis-Nonachlor	ND		ug/kg	0.674	--	1	A
4,4'-DDT	ND		ug/kg	0.674	--	1	A
Methoxychlor	ND		ug/kg	6.74	--	1	A
Toxaphene	ND		ug/kg	33.8	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	71		30-150	A
BZ 198	85		30-150	A
DBOB	66		30-150	B
BZ 198	87		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-16	Date Collected:	02/25/15 13:06
Client ID:	L38	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/09/15 18:32	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/05/15
Percent Solids:	73%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.34	--	1	A
gamma-BHC	ND		ug/kg	0.669	--	1	A
Heptachlor	ND		ug/kg	0.669	--	1	A
Aldrin	ND		ug/kg	0.669	--	1	A
Heptachlor epoxide	ND		ug/kg	1.34	--	1	B
Oxychlordane	ND		ug/kg	1.34	--	1	B
trans-Chlordane	ND		ug/kg	0.669	--	1	A
Endosulfan I	ND		ug/kg	0.669	--	1	A
cis-Chlordane	ND		ug/kg	0.669	--	1	A
trans-Nonachlor	ND		ug/kg	0.669	--	1	A
4,4'-DDE	ND		ug/kg	0.669	--	1	A
Dieldrin	ND		ug/kg	0.669	--	1	A
Endrin	ND		ug/kg	0.669	--	1	A
Endosulfan II	ND		ug/kg	0.669	--	1	A
4,4'-DDD	ND		ug/kg	0.669	--	1	A
cis-Nonachlor	ND		ug/kg	0.669	--	1	A
4,4'-DDT	ND		ug/kg	0.669	--	1	A
Methoxychlor	ND		ug/kg	6.69	--	1	A
Toxaphene	ND		ug/kg	33.6	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	79		30-150	A
BZ 198	79		30-150	A
DBOB	75		30-150	B
BZ 198	82		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-17	Date Collected:	02/25/15 13:30
Client ID:	L40	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/09/15 19:05	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/05/15
Percent Solids:	66%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.726	--	1	A
gamma-BHC	ND		ug/kg	0.363	--	1	A
Heptachlor	ND		ug/kg	0.363	--	1	A
Aldrin	ND		ug/kg	0.363	--	1	A
Heptachlor epoxide	ND		ug/kg	0.726	--	1	B
Oxychlordane	ND		ug/kg	0.726	--	1	B
trans-Chlordane	ND		ug/kg	0.363	--	1	A
Endosulfan I	ND		ug/kg	0.363	--	1	A
cis-Chlordane	ND		ug/kg	0.363	--	1	A
trans-Nonachlor	ND		ug/kg	0.363	--	1	A
4,4'-DDE	ND		ug/kg	0.363	--	1	A
Dieldrin	ND		ug/kg	0.363	--	1	A
Endrin	ND		ug/kg	0.363	--	1	A
Endosulfan II	ND		ug/kg	0.363	--	1	A
4,4'-DDD	ND		ug/kg	0.363	--	1	A
cis-Nonachlor	ND		ug/kg	0.363	--	1	A
4,4'-DDT	ND		ug/kg	0.363	--	1	A
Methoxychlor	ND		ug/kg	3.63	--	1	A
Toxaphene	ND		ug/kg	18.2	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	68		30-150	A
BZ 198	70		30-150	A
DBOB	63		30-150	B
BZ 198	73		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-18	Date Collected:	02/25/15 13:45
Client ID:	L39	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/09/15 19:37	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/05/15
Percent Solids:	71%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.41	--	1	A
gamma-BHC	ND		ug/kg	0.703	--	1	A
Heptachlor	ND		ug/kg	0.703	--	1	A
Aldrin	ND		ug/kg	0.703	--	1	A
Heptachlor epoxide	ND		ug/kg	1.41	--	1	B
Oxychlordane	ND		ug/kg	1.41	--	1	B
trans-Chlordane	ND		ug/kg	0.703	--	1	A
Endosulfan I	ND		ug/kg	0.703	--	1	A
cis-Chlordane	ND		ug/kg	0.703	--	1	A
trans-Nonachlor	ND		ug/kg	0.703	--	1	A
4,4'-DDE	ND		ug/kg	0.703	--	1	A
Dieldrin	ND		ug/kg	0.703	--	1	A
Endrin	ND		ug/kg	0.703	--	1	A
Endosulfan II	ND		ug/kg	0.703	--	1	A
4,4'-DDD	ND		ug/kg	0.703	--	1	A
cis-Nonachlor	ND		ug/kg	0.703	--	1	A
4,4'-DDT	ND		ug/kg	0.703	--	1	A
Methoxychlor	ND		ug/kg	7.03	--	1	A
Toxaphene	ND		ug/kg	35.3	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	68		30-150	A
BZ 198	78		30-150	A
DBOB	67		30-150	B
BZ 198	78		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-19	Date Collected:	02/25/15 14:24
Client ID:	L26A	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/09/15 20:09	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/05/15
Percent Solids:	65%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.718	--	1	A
gamma-BHC	ND		ug/kg	0.359	--	1	A
Heptachlor	ND		ug/kg	0.359	--	1	A
Aldrin	ND		ug/kg	0.359	--	1	A
Heptachlor epoxide	ND		ug/kg	0.718	--	1	B
Oxychlordane	ND		ug/kg	0.718	--	1	B
trans-Chlordane	ND		ug/kg	0.359	--	1	A
Endosulfan I	ND		ug/kg	0.359	--	1	A
cis-Chlordane	ND		ug/kg	0.359	--	1	A
trans-Nonachlor	ND		ug/kg	0.359	--	1	A
4,4'-DDE	ND		ug/kg	0.359	--	1	A
Dieldrin	ND		ug/kg	0.359	--	1	A
Endrin	ND		ug/kg	0.359	--	1	A
Endosulfan II	ND		ug/kg	0.359	--	1	A
4,4'-DDD	ND		ug/kg	0.359	--	1	A
cis-Nonachlor	ND		ug/kg	0.359	--	1	A
4,4'-DDT	ND		ug/kg	0.359	--	1	A
Methoxychlor	ND		ug/kg	3.59	--	1	A
Toxaphene	ND		ug/kg	18.0	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	55		30-150	A
BZ 198	63		30-150	A
DBOB	53		30-150	B
BZ 198	63		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-20	Date Collected:	02/25/15 14:30
Client ID:	L26B	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/04/15 09:30
Analytical Date:	03/09/15 20:42	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/05/15
Percent Solids:	67%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	1.48		ug/kg	0.709	--	1	B
gamma-BHC	ND		ug/kg	0.355	--	1	A
Heptachlor	ND		ug/kg	0.355	--	1	A
Aldrin	ND		ug/kg	0.355	--	1	A
Heptachlor epoxide	ND		ug/kg	0.709	--	1	B
Oxychlordane	ND		ug/kg	0.709	--	1	B
trans-Chlordane	ND		ug/kg	0.355	--	1	A
Endosulfan I	ND		ug/kg	0.355	--	1	A
cis-Chlordane	ND		ug/kg	0.355	--	1	A
trans-Nonachlor	ND		ug/kg	0.355	--	1	A
4,4'-DDE	ND		ug/kg	0.355	--	1	A
Dieldrin	ND		ug/kg	0.355	--	1	A
Endrin	ND		ug/kg	0.355	--	1	A
Endosulfan II	ND		ug/kg	0.355	--	1	A
4,4'-DDD	ND		ug/kg	0.355	--	1	A
cis-Nonachlor	ND		ug/kg	0.355	--	1	A
4,4'-DDT	ND		ug/kg	0.355	--	1	A
Methoxychlor	ND		ug/kg	3.55	--	1	A
Toxaphene	ND		ug/kg	17.8	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	77		30-150	A
BZ 198	75		30-150	A
DBOB	74		30-150	B
BZ 198	76		30-150	B

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 03/05/15 21:39
Analyst: SF

Extraction Method: EPA 3570
Extraction Date: 03/04/15 09:30
Cleanup Method: EPA 3630
Cleanup Date: 03/05/15

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 01-20 Batch: WG766032-1						
Hexachlorobenzene	ND		ug/kg	1.00	--	A
gamma-BHC	ND		ug/kg	0.500	--	A
Heptachlor	ND		ug/kg	0.500	--	A
Aldrin	ND		ug/kg	0.500	--	A
trans-Chlordane	ND		ug/kg	0.500	--	A
Endosulfan I	ND		ug/kg	0.500	--	A
cis-Chlordane	ND		ug/kg	0.500	--	A
trans-Nonachlor	ND		ug/kg	0.500	--	A
4,4'-DDE	ND		ug/kg	0.500	--	A
Dieldrin	ND		ug/kg	0.500	--	A
Endrin	ND		ug/kg	0.500	--	A
Endosulfan II	ND		ug/kg	0.500	--	A
4,4'-DDD	ND		ug/kg	0.500	--	A
cis-Nonachlor	ND		ug/kg	0.500	--	A
4,4'-DDT	ND		ug/kg	0.500	--	A
Methoxychlor	ND		ug/kg	5.00	--	A
Toxaphene	ND		ug/kg	25.1	--	A
Heptachlor epoxide	ND		ug/kg	1.00	--	B
Oxychlordane	ND		ug/kg	1.00	--	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	64		30-150	A
BZ 198	82		30-150	A
DBOB	59		30-150	B
BZ 198	84		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503503

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-20 Batch: WG766032-2 WG766032-3									
Hexachlorobenzene	57		61		50-120	7		30	A
gamma-BHC	71		74		50-120	4		30	A
Heptachlor	68		71		50-120	4		30	A
Aldrin	68		71		50-120	4		30	A
trans-Chlordane	73		77		50-120	5		30	A
Endosulfan I	71		76		50-120	7		30	A
cis-Chlordane	72		75		50-120	4		30	A
trans-Nonachlor	75		78		50-120	4		30	A
4,4'-DDE	83		89		50-120	7		30	A
Dieldrin	72		79		50-120	9		30	A
Endrin	71		75		50-120	5		30	A
4,4'-DDD	82		85		50-120	4		30	A
cis-Nonachlor	72		76		50-120	5		30	A
4,4'-DDT	70		78		50-120	11		30	A
Methoxychlor	68		76		50-120	11		30	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503503

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-20 Batch: WG766032-2 WG766032-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	59		60		30-150	A
BZ 198	81		85		30-150	A
DBOB	52		56		30-150	B
BZ 198	82		84		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503503

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-20 Batch: WG766032-2 WG766032-3									
Heptachlor epoxide	65		69		50-120	6		30	B
Oxychlordane	67		70		50-120	4		30	B
Endosulfan II	66		71		50-120	7		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	59		60		30-150	A
BZ 198	81		85		30-150	A
DBOB	52		56		30-150	B
BZ 198	82		84		30-150	B

Matrix Spike Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG766032-4 WG766032-5 QC Sample: L1503503-07 Client ID: L-62													
Hexachlorobenzene	ND	77.7	71.0	91		70.3	90		50-120	1		30	A
gamma-BHC	ND	77.7	76.2	98		82.1	105		50-120	7		30	A
Heptachlor	ND	77.7	71.5	92		73.0	94		50-120	2		30	A
Aldrin	ND	77.7	75.9	98		79.9	102		50-120	5		30	A
Heptachlor epoxide	ND	77.7	68.6	88		74.9	96		50-120	9		30	B
Oxychlordane	0.908	77.7	71.1	90		76.0	96		50-120	7		30	B
trans-Chlordane	ND	77.7	76.8	99		81.2	104		50-120	6		30	A
Endosulfan I	ND	77.7	74.9	96		78.4	101		50-120	5		30	A
cis-Chlordane	ND	77.7	76.4	98		79.9	102		50-120	4		30	A
trans-Nonachlor	ND	77.7	77.2	99		80.8	104		50-120	5		30	A
4,4'-DDE	0.437	77.7	75.9	97		83.2	106		50-120	9		30	B
Dieldrin	ND	77.7	76.6	99		78.7	101		50-120	3		30	A
Endrin	ND	77.7	73.9	95		77.1	99		50-120	4		30	A
Endosulfan II	ND	77.7	63.9	82		67.4	86		50-120	5		30	B
4,4'-DDD	ND	77.7	81.2	105		89.9	115		50-120	10		30	A
cis-Nonachlor	ND	77.7	71.4	92		75.3	97		50-120	5		30	A
4,4'-DDT	0.454	77.7	64.4	82		70.7	90		50-120	9		30	A
Methoxychlor	ND	77.7	65.2	84		68.8	88		50-120	5		30	A

Serial_No:03161510:55

Matrix Spike Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503503

Report Date: 03/16/15

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG766032-4 WG766032-5 QC Sample: L1503503-07 Client ID: L-62												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	90		94		30-150	A
DBOB	90		94		30-150	A
BZ 198	84		91		30-150	B
DBOB	84		89		30-150	B

Lab Duplicate Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG766032-6 QC Sample: L1503503-07 Client ID: L-62							
Hexachlorobenzene	ND	ND	ug/kg	NC		30	A
gamma-BHC	ND	ND	ug/kg	NC		30	A
Heptachlor	ND	ND	ug/kg	NC		30	A
Aldrin	ND	ND	ug/kg	NC		30	A
Heptachlor epoxide	ND	ND	ug/kg	NC		30	B
Oxychlordane	0.908	ND	ug/kg	NC		30	B
trans-Chlordane	ND	ND	ug/kg	NC		30	A
Endosulfan I	ND	ND	ug/kg	NC		30	A
cis-Chlordane	ND	ND	ug/kg	NC		30	A
trans-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDE	0.437	ND	ug/kg	NC		30	B
Dieldrin	ND	ND	ug/kg	NC		30	A
Endrin	ND	ND	ug/kg	NC		30	A
Endosulfan II	ND	ND	ug/kg	NC		30	A
4,4'-DDD	ND	ND	ug/kg	NC		30	A
cis-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDT	0.454	ND	ug/kg	NC		30	A
Methoxychlor	ND	ND	ug/kg	NC		30	A
Toxaphene	ND	ND	ug/kg	NC		30	A

Lab Duplicate Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits

RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG766032-6 QC Sample: L1503503-07 Client ID: L-62

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	80		85		30-150	A
BZ 198	79		80		30-150	A
DBOB	68		73		30-150	B
BZ 198	81		81		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG766032-7

Parameter	% Recovery	Qual	QC Criteria
Hexachlorobenzene	56		40-140
cis-Chlordane	78		40-140
trans-Nonachlor	316	Q	40-140
DBOB (Surrogate)	47		30-150
DBOB (Surrogate)	49		30-150
BZ 198 (Surrogate)	60		30-150
BZ 198 (Surrogate)	134		30-150

METALS

Project Name: LIS-USACOE RIM DREDGE
Lab Number: L1503503
Project Number: Not Specified
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-01
Date Collected: 02/24/15 11:22
Client ID: L-56
Date Received: 02/24/15
Sample Location: EASTERN LONG ISLAND SOUND
Field Prep: Not Specified
Matrix: Sediment
Percent Solids: 70%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	5.22		mg/kg	0.069	--	2	03/03/15 11:34	03/04/15 15:10	EPA 3050B	1,6020A	PD
Cadmium, Total	0.062		mg/kg	0.028	--	2	03/03/15 11:34	03/04/15 15:10	EPA 3050B	1,6020A	PD
Chromium, Total	18.4		mg/kg	0.278	--	2	03/03/15 11:34	03/04/15 15:10	EPA 3050B	1,6020A	PD
Copper, Total	14.7		mg/kg	0.278	--	2	03/03/15 11:34	03/04/15 15:10	EPA 3050B	1,6020A	PD
Lead, Total	8.09		mg/kg	0.083	--	2	03/03/15 11:34	03/04/15 15:10	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.017	--	5	03/03/15 11:33	03/06/15 11:14	EPA 7474	1,7474	PD
Nickel, Total	18.6		mg/kg	0.139	--	2	03/03/15 11:34	03/04/15 15:10	EPA 3050B	1,6020A	PD
Zinc, Total	47.4		mg/kg	1.39	--	2	03/03/15 11:34	03/04/15 15:10	EPA 3050B	1,6020A	PD

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503503
Project Number:	Not Specified	**Report Date:**	03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-02	Date Collected:	02/24/15 12:01
Client ID:	L-55	Date Received:	02/24/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	80%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.15		mg/kg	0.057	--	2	03/03/15 11:34	03/04/15 15:12	EPA 3050B	1,6020A	PD
Cadmium, Total	ND		mg/kg	0.023	--	2	03/03/15 11:34	03/04/15 15:12	EPA 3050B	1,6020A	PD
Chromium, Total	4.56		mg/kg	0.228	--	2	03/03/15 11:34	03/04/15 15:12	EPA 3050B	1,6020A	PD
Copper, Total	2.18		mg/kg	0.228	--	2	03/03/15 11:34	03/04/15 15:12	EPA 3050B	1,6020A	PD
Lead, Total	2.93		mg/kg	0.069	--	2	03/03/15 11:34	03/04/15 15:12	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.015	--	5	03/03/15 11:33	03/06/15 11:17	EPA 7474	1,7474	PD
Nickel, Total	4.54		mg/kg	0.114	--	2	03/03/15 11:34	03/04/15 15:12	EPA 3050B	1,6020A	PD
Zinc, Total	13.9		mg/kg	1.14	--	2	03/03/15 11:34	03/04/15 15:12	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE
Lab Number: L1503503
Project Number: Not Specified
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-03
Client ID: L-54
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment
Percent Solids: 79%

Date Collected: 02/24/15 12:35
Date Received: 02/24/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.29		mg/kg	0.055	--	2	03/03/15 11:34	03/04/15 15:13	EPA 3050B	1,6020A	PD
Cadmium, Total	ND		mg/kg	0.022	--	2	03/03/15 11:34	03/04/15 15:13	EPA 3050B	1,6020A	PD
Chromium, Total	6.58		mg/kg	0.221	--	2	03/03/15 11:34	03/04/15 15:13	EPA 3050B	1,6020A	PD
Copper, Total	3.25		mg/kg	0.221	--	2	03/03/15 11:34	03/04/15 15:13	EPA 3050B	1,6020A	PD
Lead, Total	4.55		mg/kg	0.066	--	2	03/03/15 11:34	03/04/15 15:13	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.015	--	5	03/03/15 11:33	03/06/15 11:19	EPA 7474	1,7474	PD
Nickel, Total	6.61		mg/kg	0.111	--	2	03/03/15 11:34	03/04/15 15:13	EPA 3050B	1,6020A	PD
Zinc, Total	22.4		mg/kg	1.11	--	2	03/03/15 11:34	03/04/15 15:13	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-04 Date Collected: 02/24/15 13:01

Client ID: L-53 Date Received: 02/24/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Matrix: Sediment

Percent Solids: 62%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.38		mg/kg	0.075	--	2	03/03/15 11:34	03/04/15 15:17	EPA 3050B	1,6020A	PD
Cadmium, Total	0.109		mg/kg	0.030	--	2	03/03/15 11:34	03/04/15 15:17	EPA 3050B	1,6020A	PD
Chromium, Total	15.5		mg/kg	0.300	--	2	03/03/15 11:34	03/04/15 15:17	EPA 3050B	1,6020A	PD
Copper, Total	19.1		mg/kg	0.300	--	2	03/03/15 11:34	03/04/15 15:17	EPA 3050B	1,6020A	PD
Lead, Total	12.0		mg/kg	0.090	--	2	03/03/15 11:34	03/04/15 15:17	EPA 3050B	1,6020A	PD
Mercury, Total	0.062		mg/kg	0.018	--	5	03/03/15 11:33	03/06/15 11:22	EPA 7474	1,7474	PD
Nickel, Total	8.02		mg/kg	0.150	--	2	03/03/15 11:34	03/04/15 15:17	EPA 3050B	1,6020A	PD
Zinc, Total	57.4		mg/kg	1.50	--	2	03/03/15 11:34	03/04/15 15:17	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE
Lab Number: L1503503
Project Number: Not Specified
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-05
Date Collected: 02/24/15 13:52
Client ID: L-52
Date Received: 02/24/15
Sample Location: EASTERN LONG ISLAND SOUND
Field Prep: Not Specified
Matrix: Sediment
Percent Solids: 81%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.22		mg/kg	0.059	--	2	03/03/15 11:34	03/04/15 15:18	EPA 3050B	1,6020A	PD
Cadmium, Total	ND		mg/kg	0.024	--	2	03/03/15 11:34	03/04/15 15:18	EPA 3050B	1,6020A	PD
Chromium, Total	4.38		mg/kg	0.236	--	2	03/03/15 11:34	03/04/15 15:18	EPA 3050B	1,6020A	PD
Copper, Total	2.50		mg/kg	0.236	--	2	03/03/15 11:34	03/04/15 15:18	EPA 3050B	1,6020A	PD
Lead, Total	3.03		mg/kg	0.071	--	2	03/03/15 11:34	03/04/15 15:18	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.015	--	5	03/03/15 11:33	03/06/15 11:24	EPA 7474	1,7474	PD
Nickel, Total	5.33		mg/kg	0.118	--	2	03/03/15 11:34	03/04/15 15:18	EPA 3050B	1,6020A	PD
Zinc, Total	17.9		mg/kg	1.18	--	2	03/03/15 11:34	03/04/15 15:18	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-06 Date Collected: 02/24/15 14:20

Client ID: L-51 Date Received: 02/24/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Matrix: Sediment

Percent Solids: 79%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.72		mg/kg	0.056	--	2	03/03/15 11:34	03/04/15 15:19	EPA 3050B	1,6020A	PD
Cadmium, Total	ND		mg/kg	0.023	--	2	03/03/15 11:34	03/04/15 15:19	EPA 3050B	1,6020A	PD
Chromium, Total	3.86		mg/kg	0.225	--	2	03/03/15 11:34	03/04/15 15:19	EPA 3050B	1,6020A	PD
Copper, Total	2.02		mg/kg	0.225	--	2	03/03/15 11:34	03/04/15 15:19	EPA 3050B	1,6020A	PD
Lead, Total	2.99		mg/kg	0.068	--	2	03/03/15 11:34	03/04/15 15:19	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.015	--	5	03/03/15 11:33	03/06/15 11:27	EPA 7474	1,7474	PD
Nickel, Total	5.02		mg/kg	0.112	--	2	03/03/15 11:34	03/04/15 15:19	EPA 3050B	1,6020A	PD
Zinc, Total	14.0		mg/kg	1.12	--	2	03/03/15 11:34	03/04/15 15:19	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE
Lab Number: L1503503
Project Number: Not Specified
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-07
Date Collected: 02/24/15 14:35
Client ID: L-62
Date Received: 02/24/15
Sample Location: EASTERN LONG ISLAND SOUND
Field Prep: Not Specified
Matrix: Sediment
Percent Solids: 63%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.41		mg/kg	0.072	--	2	03/03/15 11:34	03/04/15 15:21	EPA 3050B	1,6020A	PD
Cadmium, Total	0.110		mg/kg	0.029	--	2	03/03/15 11:34	03/04/15 15:21	EPA 3050B	1,6020A	PD
Chromium, Total	16.9		mg/kg	0.287	--	2	03/03/15 11:34	03/04/15 15:21	EPA 3050B	1,6020A	PD
Copper, Total	20.4		mg/kg	0.287	--	2	03/03/15 11:34	03/04/15 15:21	EPA 3050B	1,6020A	PD
Lead, Total	12.1		mg/kg	0.086	--	2	03/03/15 11:34	03/04/15 15:21	EPA 3050B	1,6020A	PD
Mercury, Total	0.054		mg/kg	0.019	--	5	03/03/15 11:33	03/06/15 11:29	EPA 7474	1,7474	PD
Nickel, Total	8.41		mg/kg	0.144	--	2	03/03/15 11:34	03/04/15 15:21	EPA 3050B	1,6020A	PD
Zinc, Total	69.5		mg/kg	1.44	--	2	03/03/15 11:34	03/04/15 15:21	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE
Lab Number: L1503503
Project Number: Not Specified
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-08
Date Collected: 02/25/15 09:33
Client ID: L41
Date Received: 02/26/15
Sample Location: EASTERN LONG ISLAND SOUND
Field Prep: Not Specified
Matrix: Sediment
Percent Solids: 75%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.06		mg/kg	0.058	--	2	03/03/15 11:34	03/04/15 15:27	EPA 3050B	1,6020A	PD
Cadmium, Total	0.033		mg/kg	0.023	--	2	03/03/15 11:34	03/04/15 15:27	EPA 3050B	1,6020A	PD
Chromium, Total	6.10		mg/kg	0.233	--	2	03/03/15 11:34	03/04/15 15:27	EPA 3050B	1,6020A	PD
Copper, Total	3.39		mg/kg	0.233	--	2	03/03/15 11:34	03/04/15 15:27	EPA 3050B	1,6020A	PD
Lead, Total	4.24		mg/kg	0.070	--	2	03/03/15 11:34	03/04/15 15:27	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.015	--	5	03/03/15 11:33	03/06/15 11:44	EPA 7474	1,7474	PD
Nickel, Total	4.08		mg/kg	0.116	--	2	03/03/15 11:34	03/04/15 15:27	EPA 3050B	1,6020A	PD
Zinc, Total	20.2		mg/kg	1.16	--	2	03/03/15 11:34	03/04/15 15:27	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE
Lab Number: L1503503
Project Number: Not Specified
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-09
Date Collected: 02/25/15 10:05
Client ID: L32
Date Received: 02/26/15
Sample Location: EASTERN LONG ISLAND SOUND
Field Prep: Not Specified
Matrix: Sediment
Percent Solids: 78%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.71		mg/kg	0.061	--	2	03/03/15 11:34	03/04/15 15:28	EPA 3050B	1,6020A	PD
Cadmium, Total	ND		mg/kg	0.024	--	2	03/03/15 11:34	03/04/15 15:28	EPA 3050B	1,6020A	PD
Chromium, Total	6.70		mg/kg	0.243	--	2	03/03/15 11:34	03/04/15 15:28	EPA 3050B	1,6020A	PD
Copper, Total	2.85		mg/kg	0.243	--	2	03/03/15 11:34	03/04/15 15:28	EPA 3050B	1,6020A	PD
Lead, Total	5.07		mg/kg	0.073	--	2	03/03/15 11:34	03/04/15 15:28	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.015	--	5	03/03/15 11:33	03/06/15 11:47	EPA 7474	1,7474	PD
Nickel, Total	4.04		mg/kg	0.122	--	2	03/03/15 11:34	03/04/15 15:28	EPA 3050B	1,6020A	PD
Zinc, Total	26.8		mg/kg	1.22	--	2	03/03/15 11:34	03/04/15 15:28	EPA 3050B	1,6020A	PD

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503503
Project Number:	Not Specified	**Report Date:**	03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-10	Date Collected:	02/25/15 10:19
Client ID:	L35	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	74%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.15		mg/kg	0.065	--	2	03/03/15 11:34	03/04/15 15:32	EPA 3050B	1,6020A	PD
Cadmium, Total	ND		mg/kg	0.026	--	2	03/03/15 11:34	03/04/15 15:32	EPA 3050B	1,6020A	PD
Chromium, Total	3.49		mg/kg	0.258	--	2	03/03/15 11:34	03/04/15 15:32	EPA 3050B	1,6020A	PD
Copper, Total	2.01		mg/kg	0.258	--	2	03/03/15 11:34	03/04/15 15:32	EPA 3050B	1,6020A	PD
Lead, Total	2.83		mg/kg	0.078	--	2	03/03/15 11:34	03/04/15 15:32	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.015	--	5	03/03/15 11:33	03/06/15 11:49	EPA 7474	1,7474	PD
Nickel, Total	2.97		mg/kg	0.129	--	2	03/03/15 11:34	03/04/15 15:32	EPA 3050B	1,6020A	PD
Zinc, Total	11.7		mg/kg	1.29	--	2	03/03/15 11:34	03/04/15 15:32	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-11 Date Collected: 02/25/15 10:35

Client ID: L33 Date Received: 02/26/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Matrix: Sediment

Percent Solids: 70%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.22		mg/kg	0.064	--	2	03/03/15 11:34	03/04/15 15:33	EPA 3050B	1,6020A	PD
Cadmium, Total	0.031		mg/kg	0.026	--	2	03/03/15 11:34	03/04/15 15:33	EPA 3050B	1,6020A	PD
Chromium, Total	7.23		mg/kg	0.256	--	2	03/03/15 11:34	03/04/15 15:33	EPA 3050B	1,6020A	PD
Copper, Total	4.75		mg/kg	0.256	--	2	03/03/15 11:34	03/04/15 15:33	EPA 3050B	1,6020A	PD
Lead, Total	5.44		mg/kg	0.077	--	2	03/03/15 11:34	03/04/15 15:33	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.016	--	5	03/03/15 11:33	03/06/15 11:51	EPA 7474	1,7474	PD
Nickel, Total	4.75		mg/kg	0.128	--	2	03/03/15 11:34	03/04/15 15:33	EPA 3050B	1,6020A	PD
Zinc, Total	21.7		mg/kg	1.28	--	2	03/03/15 11:34	03/04/15 15:33	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE
Lab Number: L1503503
Project Number: Not Specified
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-12
Date Collected: 02/25/15 11:00
Client ID: L31
Date Received: 02/26/15
Sample Location: EASTERN LONG ISLAND SOUND
Field Prep: Not Specified
Matrix: Sediment
Percent Solids: 74%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.35		mg/kg	0.064	--	2	03/03/15 11:34	03/04/15 15:35	EPA 3050B	1,6020A	PD
Cadmium, Total	ND		mg/kg	0.026	--	2	03/03/15 11:34	03/04/15 15:35	EPA 3050B	1,6020A	PD
Chromium, Total	6.28		mg/kg	0.255	--	2	03/03/15 11:34	03/04/15 15:35	EPA 3050B	1,6020A	PD
Copper, Total	3.20		mg/kg	0.255	--	2	03/03/15 11:34	03/04/15 15:35	EPA 3050B	1,6020A	PD
Lead, Total	4.28		mg/kg	0.077	--	2	03/03/15 11:34	03/04/15 15:35	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.016	--	5	03/03/15 11:33	03/06/15 11:54	EPA 7474	1,7474	PD
Nickel, Total	4.19		mg/kg	0.127	--	2	03/03/15 11:34	03/04/15 15:35	EPA 3050B	1,6020A	PD
Zinc, Total	20.1		mg/kg	1.27	--	2	03/03/15 11:34	03/04/15 15:35	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE
Lab Number: L1503503
Project Number: Not Specified
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-13
Date Collected: 02/25/15 11:19
Client ID: L34
Date Received: 02/26/15
Sample Location: EASTERN LONG ISLAND SOUND
Field Prep: Not Specified
Matrix: Sediment
Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.14		mg/kg	0.057	--	2	03/03/15 11:34	03/04/15 15:36	EPA 3050B	1,6020A	PD
Cadmium, Total	ND		mg/kg	0.023	--	2	03/03/15 11:34	03/04/15 15:36	EPA 3050B	1,6020A	PD
Chromium, Total	2.71		mg/kg	0.229	--	2	03/03/15 11:34	03/04/15 15:36	EPA 3050B	1,6020A	PD
Copper, Total	1.78		mg/kg	0.229	--	2	03/03/15 11:34	03/04/15 15:36	EPA 3050B	1,6020A	PD
Lead, Total	2.77		mg/kg	0.069	--	2	03/03/15 11:34	03/04/15 15:36	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.015	--	5	03/03/15 11:33	03/06/15 11:56	EPA 7474	1,7474	PD
Nickel, Total	3.04		mg/kg	0.114	--	2	03/03/15 11:34	03/04/15 15:36	EPA 3050B	1,6020A	PD
Zinc, Total	9.16		mg/kg	1.14	--	2	03/03/15 11:34	03/04/15 15:36	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE
Lab Number: L1503503
Project Number: Not Specified
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-14
Date Collected: 02/25/15 11:35
Client ID: L36
Date Received: 02/26/15
Sample Location: EASTERN LONG ISLAND SOUND
Field Prep: Not Specified
Matrix: Sediment
Percent Solids: 75%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.28		mg/kg	0.061	--	2	03/03/15 11:34	03/04/15 15:37	EPA 3050B	1,6020A	PD
Cadmium, Total	ND		mg/kg	0.024	--	2	03/03/15 11:34	03/04/15 15:37	EPA 3050B	1,6020A	PD
Chromium, Total	5.27		mg/kg	0.242	--	2	03/03/15 11:34	03/04/15 15:37	EPA 3050B	1,6020A	PD
Copper, Total	3.28		mg/kg	0.242	--	2	03/03/15 11:34	03/04/15 15:37	EPA 3050B	1,6020A	PD
Lead, Total	3.60		mg/kg	0.073	--	2	03/03/15 11:34	03/04/15 15:37	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.016	--	5	03/03/15 11:33	03/06/15 11:59	EPA 7474	1,7474	PD
Nickel, Total	3.36		mg/kg	0.121	--	2	03/03/15 11:34	03/04/15 15:37	EPA 3050B	1,6020A	PD
Zinc, Total	15.3		mg/kg	1.21	--	2	03/03/15 11:34	03/04/15 15:37	EPA 3050B	1,6020A	PD

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503503
Project Number:	Not Specified	**Report Date:**	03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-15	Date Collected:	02/25/15 12:36
Client ID:	L37	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	71%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.36		mg/kg	0.068	--	2	03/03/15 11:34	03/04/15 15:38	EPA 3050B	1,6020A	PD
Cadmium, Total	0.051		mg/kg	0.027	--	2	03/03/15 11:34	03/04/15 15:38	EPA 3050B	1,6020A	PD
Chromium, Total	9.67		mg/kg	0.270	--	2	03/03/15 11:34	03/04/15 15:38	EPA 3050B	1,6020A	PD
Copper, Total	5.82		mg/kg	0.270	--	2	03/03/15 11:34	03/04/15 15:38	EPA 3050B	1,6020A	PD
Lead, Total	6.30		mg/kg	0.081	--	2	03/03/15 11:34	03/04/15 15:38	EPA 3050B	1,6020A	PD
Mercury, Total	0.019		mg/kg	0.017	--	5	03/03/15 11:33	03/06/15 12:01	EPA 7474	1,7474	PD
Nickel, Total	5.97		mg/kg	0.135	--	2	03/03/15 11:34	03/04/15 15:38	EPA 3050B	1,6020A	PD
Zinc, Total	29.8		mg/kg	1.35	--	2	03/03/15 11:34	03/04/15 15:38	EPA 3050B	1,6020A	PD

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503503
Project Number:	Not Specified	**Report Date:**	03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-16	Date Collected:	02/25/15 13:06
Client ID:	L38	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	73%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.07		mg/kg	0.064	--	2	03/03/15 11:34	03/04/15 15:40	EPA 3050B	1,6020A	PD
Cadmium, Total	ND		mg/kg	0.026	--	2	03/03/15 11:34	03/04/15 15:40	EPA 3050B	1,6020A	PD
Chromium, Total	8.23		mg/kg	0.256	--	2	03/03/15 11:34	03/04/15 15:40	EPA 3050B	1,6020A	PD
Copper, Total	3.78		mg/kg	0.256	--	2	03/03/15 11:34	03/04/15 15:40	EPA 3050B	1,6020A	PD
Lead, Total	5.69		mg/kg	0.077	--	2	03/03/15 11:34	03/04/15 15:40	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.017	--	5	03/03/15 11:33	03/06/15 12:09	EPA 7474	1,7474	PD
Nickel, Total	4.66		mg/kg	0.128	--	2	03/03/15 11:34	03/04/15 15:40	EPA 3050B	1,6020A	PD
Zinc, Total	27.9		mg/kg	1.28	--	2	03/03/15 11:34	03/04/15 15:40	EPA 3050B	1,6020A	PD

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503503
Project Number:	Not Specified	**Report Date:**	03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-17	Date Collected:	02/25/15 13:30
Client ID:	L40	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	66%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.91		mg/kg	0.066	--	2	03/03/15 11:34	03/04/15 15:41	EPA 3050B	1,6020A	PD
Cadmium, Total	ND		mg/kg	0.027	--	2	03/03/15 11:34	03/04/15 15:41	EPA 3050B	1,6020A	PD
Chromium, Total	7.66		mg/kg	0.265	--	2	03/03/15 11:34	03/04/15 15:41	EPA 3050B	1,6020A	PD
Copper, Total	4.17		mg/kg	0.265	--	2	03/03/15 11:34	03/04/15 15:41	EPA 3050B	1,6020A	PD
Lead, Total	5.90		mg/kg	0.079	--	2	03/03/15 11:34	03/04/15 15:41	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.017	--	5	03/03/15 11:33	03/06/15 12:11	EPA 7474	1,7474	PD
Nickel, Total	5.48		mg/kg	0.132	--	2	03/03/15 11:34	03/04/15 15:41	EPA 3050B	1,6020A	PD
Zinc, Total	27.3		mg/kg	1.32	--	2	03/03/15 11:34	03/04/15 15:41	EPA 3050B	1,6020A	PD

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503503
Project Number:	Not Specified	**Report Date:**	03/16/15

SAMPLE RESULTS

Lab ID:	L1503503-18	Date Collected:	02/25/15 13:45
Client ID:	L39	Date Received:	02/26/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	71%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.17		mg/kg	0.070	--	2	03/03/15 11:34	03/04/15 15:42	EPA 3050B	1,6020A	PD
Cadmium, Total	0.033		mg/kg	0.028	--	2	03/03/15 11:34	03/04/15 15:42	EPA 3050B	1,6020A	PD
Chromium, Total	6.98		mg/kg	0.280	--	2	03/03/15 11:34	03/04/15 15:42	EPA 3050B	1,6020A	PD
Copper, Total	3.69		mg/kg	0.280	--	2	03/03/15 11:34	03/04/15 15:42	EPA 3050B	1,6020A	PD
Lead, Total	5.08		mg/kg	0.084	--	2	03/03/15 11:34	03/04/15 15:42	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.016	--	5	03/03/15 11:33	03/06/15 12:14	EPA 7474	1,7474	PD
Nickel, Total	4.32		mg/kg	0.140	--	2	03/03/15 11:34	03/04/15 15:42	EPA 3050B	1,6020A	PD
Zinc, Total	21.9		mg/kg	1.40	--	2	03/03/15 11:34	03/04/15 15:42	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE
Lab Number: L1503503
Project Number: Not Specified
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-19
Date Collected: 02/25/15 14:24
Client ID: L26A
Date Received: 02/26/15
Sample Location: EASTERN LONG ISLAND SOUND
Field Prep: Not Specified
Matrix: Sediment
Percent Solids: 65%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.79		mg/kg	0.072	--	2	03/03/15 11:34	03/04/15 15:43	EPA 3050B	1,6020A	PD
Cadmium, Total	0.053		mg/kg	0.029	--	2	03/03/15 11:34	03/04/15 15:43	EPA 3050B	1,6020A	PD
Chromium, Total	11.0		mg/kg	0.288	--	2	03/03/15 11:34	03/04/15 15:43	EPA 3050B	1,6020A	PD
Copper, Total	6.50		mg/kg	0.288	--	2	03/03/15 11:34	03/04/15 15:43	EPA 3050B	1,6020A	PD
Lead, Total	7.76		mg/kg	0.087	--	2	03/03/15 11:34	03/04/15 15:43	EPA 3050B	1,6020A	PD
Mercury, Total	0.024		mg/kg	0.018	--	5	03/03/15 11:33	03/06/15 12:16	EPA 7474	1,7474	PD
Nickel, Total	6.64		mg/kg	0.144	--	2	03/03/15 11:34	03/04/15 15:43	EPA 3050B	1,6020A	PD
Zinc, Total	32.1		mg/kg	1.44	--	2	03/03/15 11:34	03/04/15 15:43	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-20 Date Collected: 02/25/15 14:30

Client ID: L26B Date Received: 02/26/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Matrix: Sediment

Percent Solids: 67%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.98		mg/kg	0.067	--	2	03/03/15 11:34	03/04/15 15:47	EPA 3050B	1,6020A	PD
Cadmium, Total	ND		mg/kg	0.027	--	2	03/03/15 11:34	03/04/15 15:47	EPA 3050B	1,6020A	PD
Chromium, Total	6.62		mg/kg	0.266	--	2	03/03/15 11:34	03/04/15 15:47	EPA 3050B	1,6020A	PD
Copper, Total	3.50		mg/kg	0.266	--	2	03/03/15 11:34	03/04/15 15:47	EPA 3050B	1,6020A	PD
Lead, Total	4.69		mg/kg	0.080	--	2	03/03/15 11:34	03/04/15 15:47	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.017	--	5	03/03/15 11:33	03/06/15 12:19	EPA 7474	1,7474	PD
Nickel, Total	4.06		mg/kg	0.133	--	2	03/03/15 11:34	03/04/15 15:47	EPA 3050B	1,6020A	PD
Zinc, Total	21.2		mg/kg	1.33	--	2	03/03/15 11:34	03/04/15 15:47	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-20 Batch: WG765760-1										
Arsenic, Total	ND		mg/kg	0.050	--	2	03/03/15 11:34	03/04/15 15:08	1,6020A	PD
Cadmium, Total	ND		mg/kg	0.020	--	2	03/03/15 11:34	03/04/15 15:08	1,6020A	PD
Chromium, Total	ND		mg/kg	0.200	--	2	03/03/15 11:34	03/04/15 15:08	1,6020A	PD
Copper, Total	ND		mg/kg	0.200	--	2	03/03/15 11:34	03/04/15 15:08	1,6020A	PD
Lead, Total	ND		mg/kg	0.060	--	2	03/03/15 11:34	03/04/15 15:08	1,6020A	PD
Nickel, Total	ND		mg/kg	0.100	--	2	03/03/15 11:34	03/04/15 15:08	1,6020A	PD
Zinc, Total	ND		mg/kg	1.00	--	2	03/03/15 11:34	03/04/15 15:08	1,6020A	PD

Prep Information

Digestion Method: EPA 3050B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-20 Batch: WG765768-1										
Mercury, Total	ND		mg/kg	0.013	--	5	03/03/15 11:33	03/06/15 11:09	1,7474	PD

Prep Information

Digestion Method: EPA 7474

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503503

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-20 Batch: WG765760-2 SRM Lot Number: A2METSPIKE								
Arsenic, Total	92		-		75-125	-		20
Cadmium, Total	97		-		75-125	-		20
Chromium, Total	103		-		75-125	-		20
Copper, Total	100		-		75-125	-		20
Lead, Total	104		-		75-125	-		20
Nickel, Total	101		-		75-125	-		20
Zinc, Total	91		-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-20 Batch: WG765768-2 SRM Lot Number: HPHGAF								
Mercury, Total	90		-		80-120	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG765760-4 WG765760-5 QC Sample: L1503503-07 Client ID: L-62												
Arsenic, Total	3.41	295	284	95		277	92		75-125	2		20
Cadmium, Total	0.110	148	140	95		133	89		75-125	5		20
Chromium, Total	16.9	295	328	105		325	103		75-125	1		20
Copper, Total	20.4	295	316	100		310	97		75-125	2		20
Lead, Total	12.1	295	291	94		294	94		75-125	1		20
Nickel, Total	8.41	295	270	88		305	100		75-125	12		20
Zinc, Total	69.5	295	328	88		340	91		75-125	4		20
Total Metals - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG765768-4 WG765768-5 QC Sample: L1503503-07 Client ID: L-62												
Mercury, Total	0.054	0.914	0.845	86		0.871	89		80-120	3		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG765760-3 QC Sample: L1503503-07 Client ID: L-62						
Arsenic, Total	3.41	3.67	mg/kg	7		20
Cadmium, Total	0.110	0.120	mg/kg	9		20
Chromium, Total	16.9	17.8	mg/kg	5		20
Copper, Total	20.4	22.0	mg/kg	8		20
Lead, Total	12.1	13.2	mg/kg	9		20
Nickel, Total	8.41	8.83	mg/kg	5		20
Zinc, Total	69.5	78.1	mg/kg	12		20
Total Metals - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG765768-3 QC Sample: L1503503-07 Client ID: L-62						
Mercury, Total	0.054	0.056	mg/kg	3		20

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG765760-6

Parameter	% Recovery	Qual	QC Criteria
Arsenic, Total	101		81-120
Cadmium, Total	105		82-118
Chromium, Total	102		79-120
Copper, Total	105		81-119
Lead, Total	105		81-118
Nickel, Total	107		82-118
Zinc, Total	105		80-120

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG765768-6

Parameter	% Recovery	Qual	QC Criteria
Mercury, Total	90		71-129

INORGANICS
&
MISCELLANEOUS

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-01
Client ID: L-56
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/24/15 11:22
Date Received: 02/24/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.324		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	0.299		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	13.2		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	6.30		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	21.4		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	23.2		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	35.9		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	69.9		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	30.1		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-02
Client ID: L-55
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/24/15 12:01
Date Received: 02/24/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.109		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	0.165		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	13.1		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	14.7		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	48.7		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	20.6		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	2.90		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	80.4		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	19.6		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-03
Client ID: L-54
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/24/15 12:35
Date Received: 02/24/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.378		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	0.449		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	6.50		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	10.2		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	49.5		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	27.9		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	5.90		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	78.6		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	21.4		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-04
Client ID: L-53
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/24/15 13:01
Date Received: 02/24/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.935		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	0.980		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	28.1		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	9.20		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	21.7		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	13.1		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	27.9		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	61.8		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	38.2		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-05
Client ID: L-52
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/24/15 13:52
Date Received: 02/24/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.129		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	0.220		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	19.3		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	12.6		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	29.1		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	36.7		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	2.30		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	81.3		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	18.7		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-06
Client ID: L-51
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/24/15 14:20
Date Received: 02/24/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.224		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	0.214		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	5.80		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	12.8		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	50.5		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	28.6		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	2.30		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	79.4		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	20.6		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-07
Client ID: L-62
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/24/15 14:35
Date Received: 02/24/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.41		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	1.17		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	27.0		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	10.1		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	25.2		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	14.3		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	23.4		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	63.3		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	36.7		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-08
Client ID: L41
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/25/15 09:33
Date Received: 02/26/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.593		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	0.583		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	7.50		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	9.20		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	26.8		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	46.8		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	9.70		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	75.3		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	24.7		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-09
Client ID: L32
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/25/15 10:05
Date Received: 02/26/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.300		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	0.355		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	2.30		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	5.00		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	34.7		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	54.1		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	3.90		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	77.6		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	22.4		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-10
Client ID: L35
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/25/15 10:19
Date Received: 02/26/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.02		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	1.14		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	11.0		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	16.4		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	32.0		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	34.5		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	6.10		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	73.7		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	26.3		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-11
Client ID: L33
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/25/15 10:35
Date Received: 02/26/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.993		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	0.969		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	4.50		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	9.70		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	24.5		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	46.4		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	14.9		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	69.6		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	30.4		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-12
Client ID: L31
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/25/15 11:00
Date Received: 02/26/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.563		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	0.602		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	4.40		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	4.90		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	20.8		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	54.7		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	15.2		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	74.0		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	26.0		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-13
Client ID: L34
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/25/15 11:19
Date Received: 02/26/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.21		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	1.32		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	23.1		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	15.8		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	34.5		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	22.7		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	3.90		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	77.4		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	22.6		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-14
Client ID: L36
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/25/15 11:35
Date Received: 02/26/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.552		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	0.583		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	4.80		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	7.30		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	27.1		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	49.3		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	11.5		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	75.0		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	25.0		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-15
Client ID: L37
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/25/15 12:36
Date Received: 02/26/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.00		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	1.16		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	8.50		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	3.90		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	18.8		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	54.0		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	14.8		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	71.1		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	28.9		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-16
Client ID: L38
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/25/15 13:06
Date Received: 02/26/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.597		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	0.731		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	10.8		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	4.40		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	18.7		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	57.1		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	9.00		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	73.0		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	27.0		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-17
Client ID: L40
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/25/15 13:30
Date Received: 02/26/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.81		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	2.00		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	9.00		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	9.00		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	24.1		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	43.6		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	14.3		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	65.7		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	34.3		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-18
Client ID: L39
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/25/15 13:45
Date Received: 02/26/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.15		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	1.48		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	1.90		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	4.50		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	18.7		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	58.5		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	16.4		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	70.8		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	29.2		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-19
Client ID: L26A
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/25/15 14:24
Date Received: 02/26/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.23		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	0.985		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	1.20		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	2.90		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	9.30		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	63.9		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	22.7		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	65.4		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	34.6		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503503-20
Client ID: L26B
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/25/15 14:30
Date Received: 02/26/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.67		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	1.30		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	2.50		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Coarse Sand	4.60		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Medium Sand	10.3		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Fine Sand	69.2		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
% Total Fines	13.4		%	0.100	NA	1	-	03/06/15 00:00	12,D422	SE
General Chemistry - Mansfield Lab										
Solids, Total	67.0		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC
Moisture	33.0		%	0.100	--	1	-	03/03/15 12:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab for sample(s): 01-20 Batch: WG766621-1										
Total Organic Carbon (Rep1)	ND		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM
Total Organic Carbon (Rep2)	ND		%	0.010	--	1	-	03/05/15 10:37	1,9060	CM

Matrix Spike Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG766621-4 WG766621-5 QC Sample: L1503503-07 Client ID: L-62												
Total Organic Carbon (Rep1)	1.41	1.28	2.18	**60**	Q	2.06	**65**	Q	75-125	6		25
Total Organic Carbon (Rep2)	1.17	1.24	2.23	86		2.48	**136**	Q	75-125	11		25

Lab Duplicate Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG765813-1 QC Sample: L1503503-20 Client ID: L26B						
Solids, Total	67.0	67.6	%	1		10
Moisture	33	32.4	%	2		10
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG766621-3 QC Sample: L1503503-07 Client ID: L-62						
Total Organic Carbon (Rep1)	1.41	1.12	%	23		25
Total Organic Carbon (Rep2)	1.17	1.07	%	9		25
Grain Size Analysis - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG766710-1 QC Sample: L1503503-07 Client ID: L-62						
% Total Gravel	27.0	39.6	%	**38**	Q	20
% Coarse Sand	10.1	9.00	%	12		20
% Medium Sand	25.2	21.3	%	17		20
% Fine Sand	14.3	12.6	%	13		20
% Total Fines	23.4	17.5	%	**29**	Q	20

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503503

Project Number: Not Specified **Report Date:** 03/16/15

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG766621-2

Parameter	% Recovery	Qual	QC Criteria
Total Organic Carbon (Rep1)	111		75-125
Total Organic Carbon (Rep2)	118		75-125

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Reagent H2O Preserved Vials Frozen on: NA

Cooler Information Custody Seal

Cooler	
A	Absent
B	Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1503503-01A	Glass 250ml/8oz unpreserved	A	N/A	2.8	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-01B	Plastic 8oz unpreserved for Grai	A	N/A	2.8	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503503-02A	Glass 250ml/8oz unpreserved	A	N/A	2.8	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-02B	Plastic 8oz unpreserved for Grai	A	N/A	2.8	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()

*Values in parentheses indicate holding time in days

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1503503-03A	Glass 250ml/8oz unpreserved	A	N/A	2.8	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-03B	Plastic 8oz unpreserved for Grai	A	N/A	2.8	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503503-04A	Glass 250ml/8oz unpreserved	A	N/A	2.8	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-04B	Plastic 8oz unpreserved for Grai	A	N/A	2.8	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503503-05A	Glass 250ml/8oz unpreserved	A	N/A	2.8	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-05B	Plastic 8oz unpreserved for Grai	A	N/A	2.8	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()

*Values in parentheses indicate holding time in days

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1503503-06A	Glass 250ml/8oz unpreserved	A	N/A	2.8	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-06B	Plastic 8oz unpreserved for Grai	A	N/A	2.8	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503503-07A	Glass 250ml/8oz unpreserved	A	N/A	2.8	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-07B	Plastic 8oz unpreserved for Grai	A	N/A	2.8	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503503-08A	Glass 250ml/8oz unpreserved	B	N/A	3.9	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-08B	Plastic 8oz unpreserved for Grai	B	N/A	3.9	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()

*Values in parentheses indicate holding time in days

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1503503-09A	Glass 250ml/8oz unpreserved	B	N/A	3.9	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-09B	Plastic 8oz unpreserved for Grai	B	N/A	3.9	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503503-10A	Glass 250ml/8oz unpreserved	B	N/A	3.9	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-10B	Plastic 8oz unpreserved for Grai	B	N/A	3.9	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503503-11A	Glass 250ml/8oz unpreserved	B	N/A	3.9	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-11B	Plastic 8oz unpreserved for Grai	B	N/A	3.9	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()

*Values in parentheses indicate holding time in days

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1503503-12A	Glass 250ml/8oz unpreserved	B	N/A	3.9	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-12B	Plastic 8oz unpreserved for Grai	B	N/A	3.9	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503503-13A	Glass 250ml/8oz unpreserved	B	N/A	3.9	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-13B	Plastic 8oz unpreserved for Grai	B	N/A	3.9	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503503-14A	Glass 250ml/8oz unpreserved	B	N/A	3.9	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-14B	Plastic 8oz unpreserved for Grai	B	N/A	3.9	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()

*Values in parentheses indicate holding time in days

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1503503-15A	Glass 250ml/8oz unpreserved	B	N/A	3.9	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-15B	Plastic 8oz unpreserved for Grai	B	N/A	3.9	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503503-16A	Glass 250ml/8oz unpreserved	B	N/A	3.9	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-16B	Plastic 8oz unpreserved for Grai	B	N/A	3.9	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503503-17A	Glass 250ml/8oz unpreserved	B	N/A	3.9	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-17B	Plastic 8oz unpreserved for Grai	B	N/A	3.9	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()

*Values in parentheses indicate holding time in days

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503503
Report Date: 03/16/15

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1503503-18A	Glass 250ml/8oz unpreserved	B	N/A	3.9	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-18B	Plastic 8oz unpreserved for Grai	B	N/A	3.9	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503503-19A	Glass 250ml/8oz unpreserved	B	N/A	3.9	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-19B	Plastic 8oz unpreserved for Grai	B	N/A	3.9	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503503-20A	Glass 250ml/8oz unpreserved	B	N/A	3.9	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503503-20B	Plastic 8oz unpreserved for Grai	B	N/A	3.9	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()

*Values in parentheses indicate holding time in days

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503503
Project Number:	Not Specified	**Report Date:**	03/16/15

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NI	- Not Ignitable.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
C	- Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
D	- Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
E	- Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

Report Format: Data Usability Report

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503503
Project Number:	Not Specified	**Report Date:**	03/16/15

Data Qualifiers

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the reporting limit (RL) for the sample.

Report Format: Data Usability Report

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503503
Project Number:	Not Specified	**Report Date:**	03/16/15

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

12 Annual Book of ASTM Standards. (American Society for Testing and Materials) ASTM International.

30 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WPCF. 18th Edition. 1992.

105 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997 in conjunction with NOAA Technical Memorandum NMFS-NWFSC-59: Extraction, Cleanup and GC/MS Analysis of Sediments and Tissues for Organic Contaminants, March 2004 and the Determination of Pesticides and PCBs in Water and Oil/Sediment by GC/MS: Method 680, EPA 01A0005295, November 1985.

LIMITATION OF LIABILITIES

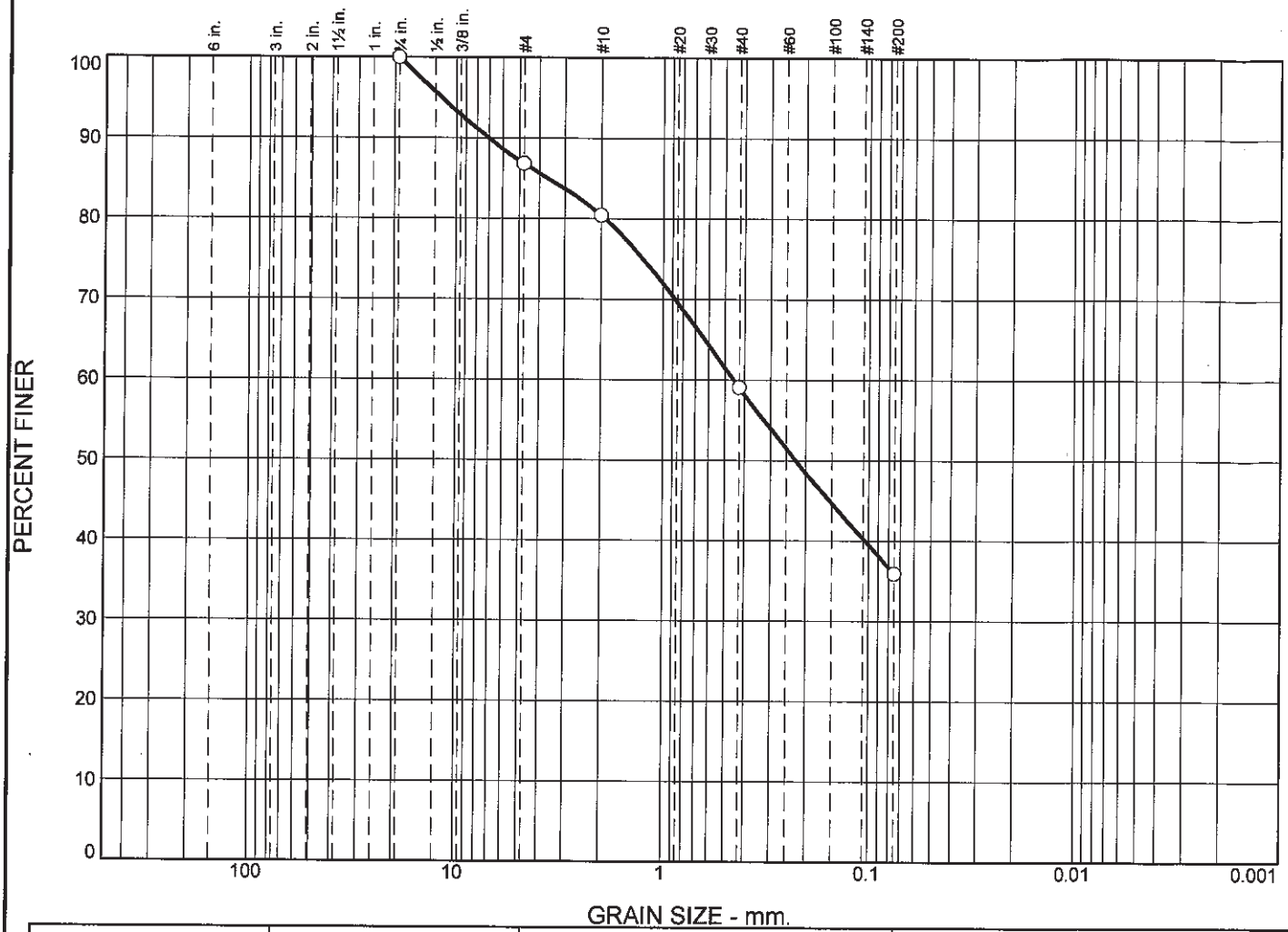
Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

ASTM D422-63

GRAIN SIZE ANALYSIS

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	13.2	6.3	21.4	23.2	35.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			3.6361	0.4519	0.2238					

	Material Description	USCS	AASHTO
○			

Project No. **Client:**
Project:

○ **Source of Sample:** L-56 **Sample Number:** L1503503-01

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L-56

Sample Number: L1503503-01

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 113.56
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
113.56	0.00	0.75	0.00	0.00	100.0
		#4	14.94	0.00	86.8
		#10	7.25	0.00	80.5
		#40	24.28	0.00	59.1
		#200	26.30	0.00	35.9

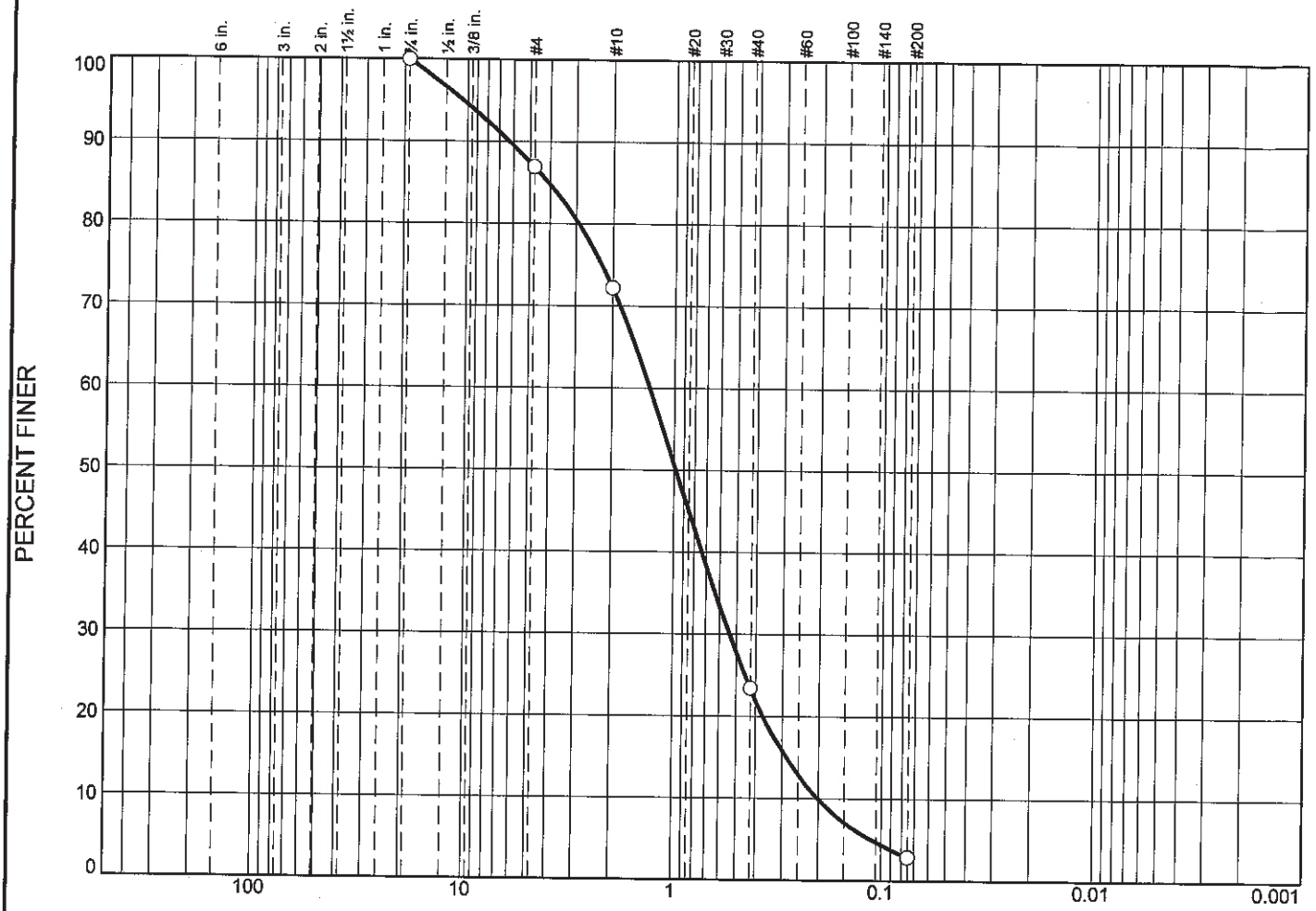
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	13.2	13.2	6.3	21.4	23.2	50.9			35.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.2238	0.4519	1.9077	3.6361	6.9999	11.7887

Fineness Modulus
2.01

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	13.1	14.7	48.7	20.6	2.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			4.0647	1.3147	0.9774	0.5365	0.2854	0.2013	1.09	6.53

	Material Description	USCS	AASHTO
○		SW	

Project No. **Client:**
Project:

○ **Source of Sample:** L-55 **Sample Number:** L1503503-02

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L-55
Sample Number: L1503503-02
USCS Classification: SW

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 132.93
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
132.93	0.00	0.75	0.00	0.00	100.0
		#4	17.37	0.00	86.9
		#10	19.55	0.00	72.2
		#40	64.83	0.00	23.5
		#200	27.38	0.00	2.9

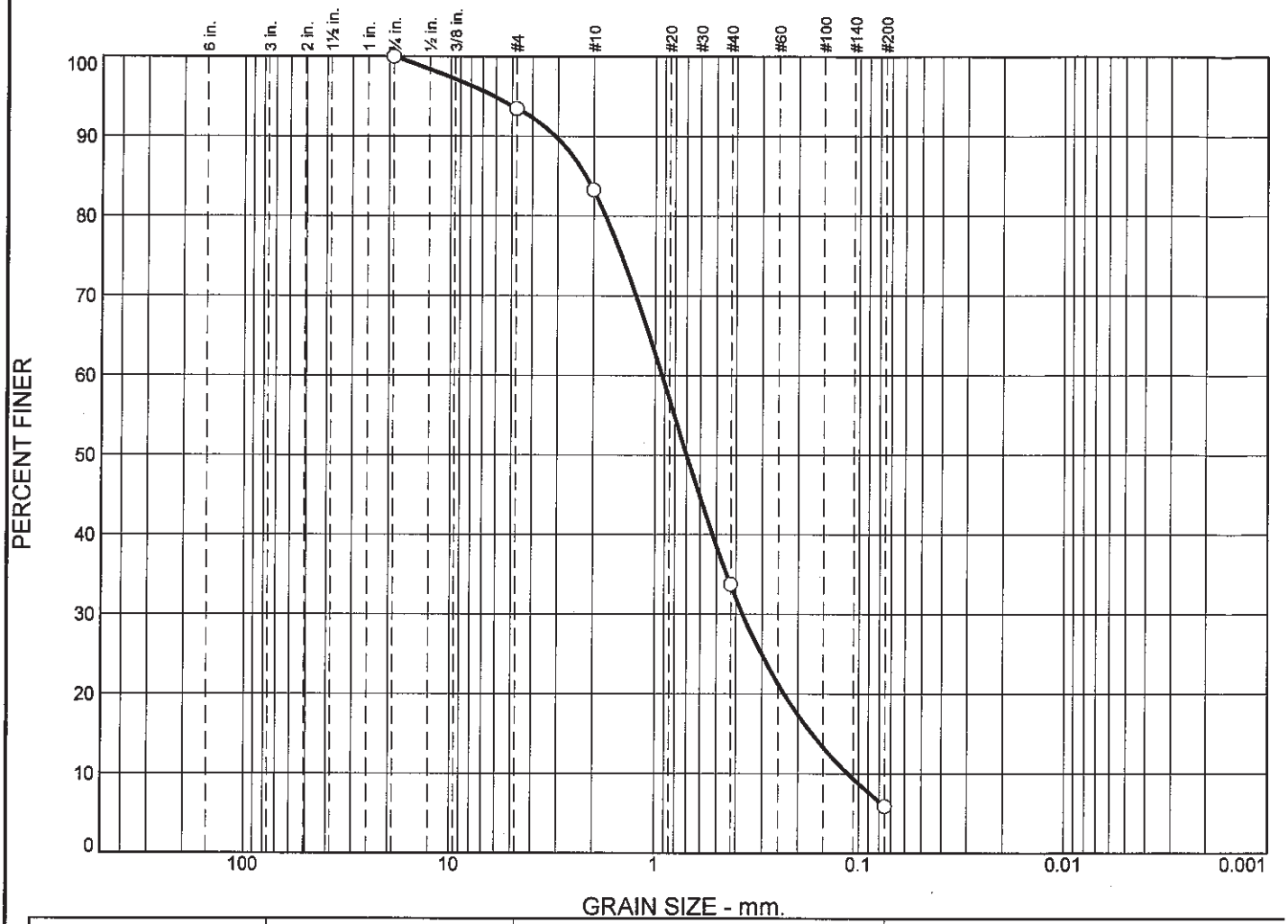
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	13.1	13.1	14.7	48.7	20.6	84.0			2.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.2013	0.2854	0.3679	0.5365	0.9774	1.3147	2.9065	4.0647	6.2447	10.4991

Fineness Modulus	C_u	C_c
3.30	6.53	1.09

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	6.5	10.2	49.5	27.9	5.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			2.1799	0.9231	0.6971	0.3700	0.1698	0.1127	1.32	8.19

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** L-54 **Sample Number:** L1503503-03

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L-54

Sample Number: L1503503-03

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 122.67
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
122.67	0.00	0.75	0.00	0.00	100.0
		#4	7.99	0.00	93.5
		#10	12.53	0.00	83.3
		#40	60.71	0.00	33.8
		#200	34.21	0.00	5.9

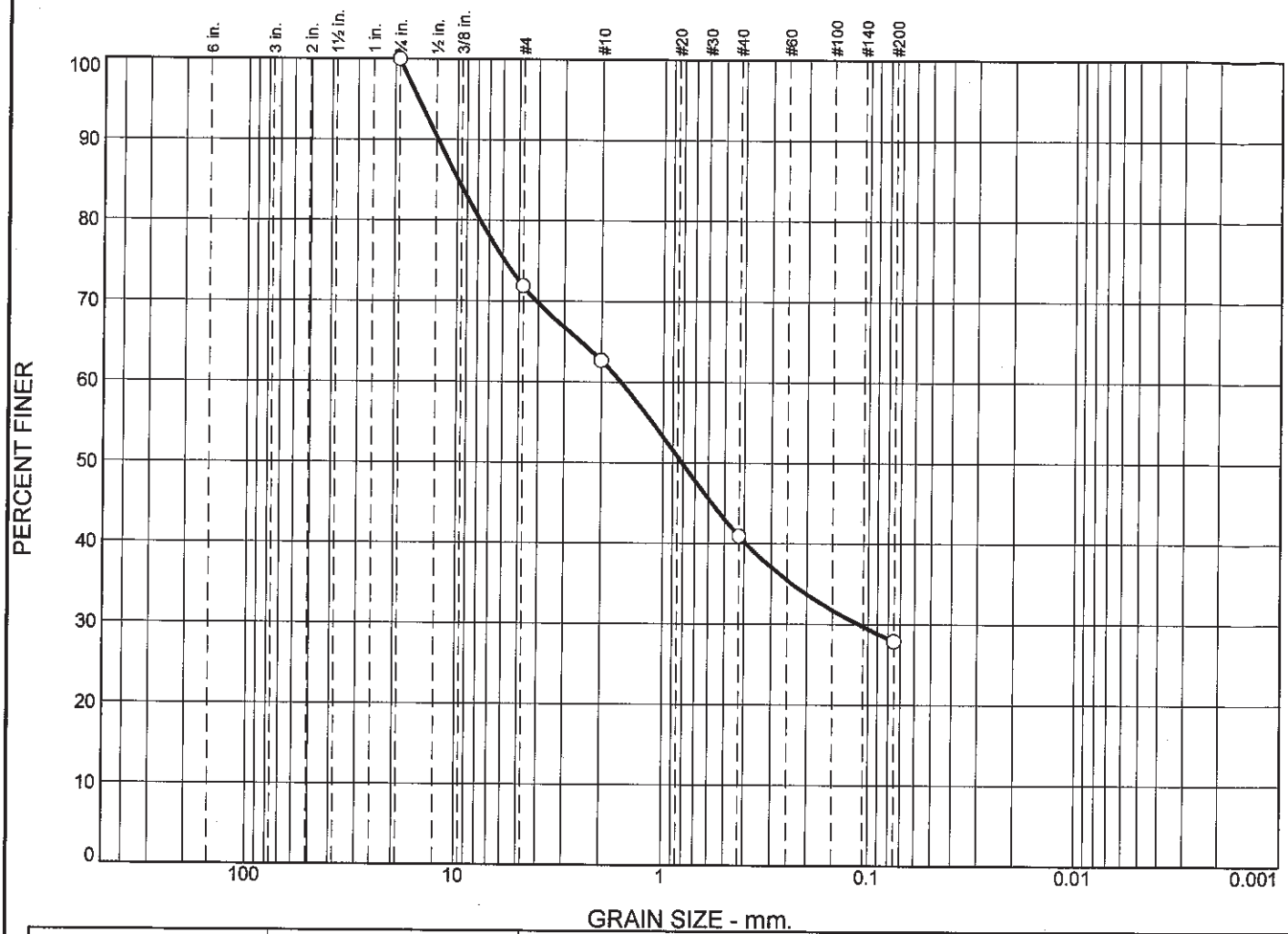
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	6.5	6.5	10.2	49.5	27.9	87.6			5.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1127	0.1698	0.2330	0.3700	0.6971	0.9231	1.7396	2.1799	3.0790	6.1482

Fineness Modulus	C_u	C_c
2.71	8.19	1.32

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	28.1	9.2	21.7	13.1	27.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			9.8846	1.6048	0.8072	0.1113				

	Material Description	USCS	AASHTO
○			

Project No. **Client:**
Project:

○ **Source of Sample:** L-53 **Sample Number:** L1503503-04

Remarks:

Alpha Analytical

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L-53

Sample Number: L1503503-04

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 121.38
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
121.38	0.00	0.75	0.00	0.00	100.0
		#4	34.12	0.00	71.9
		#10	11.17	0.00	62.7
		#40	26.37	0.00	41.0
		#200	15.84	0.00	27.9

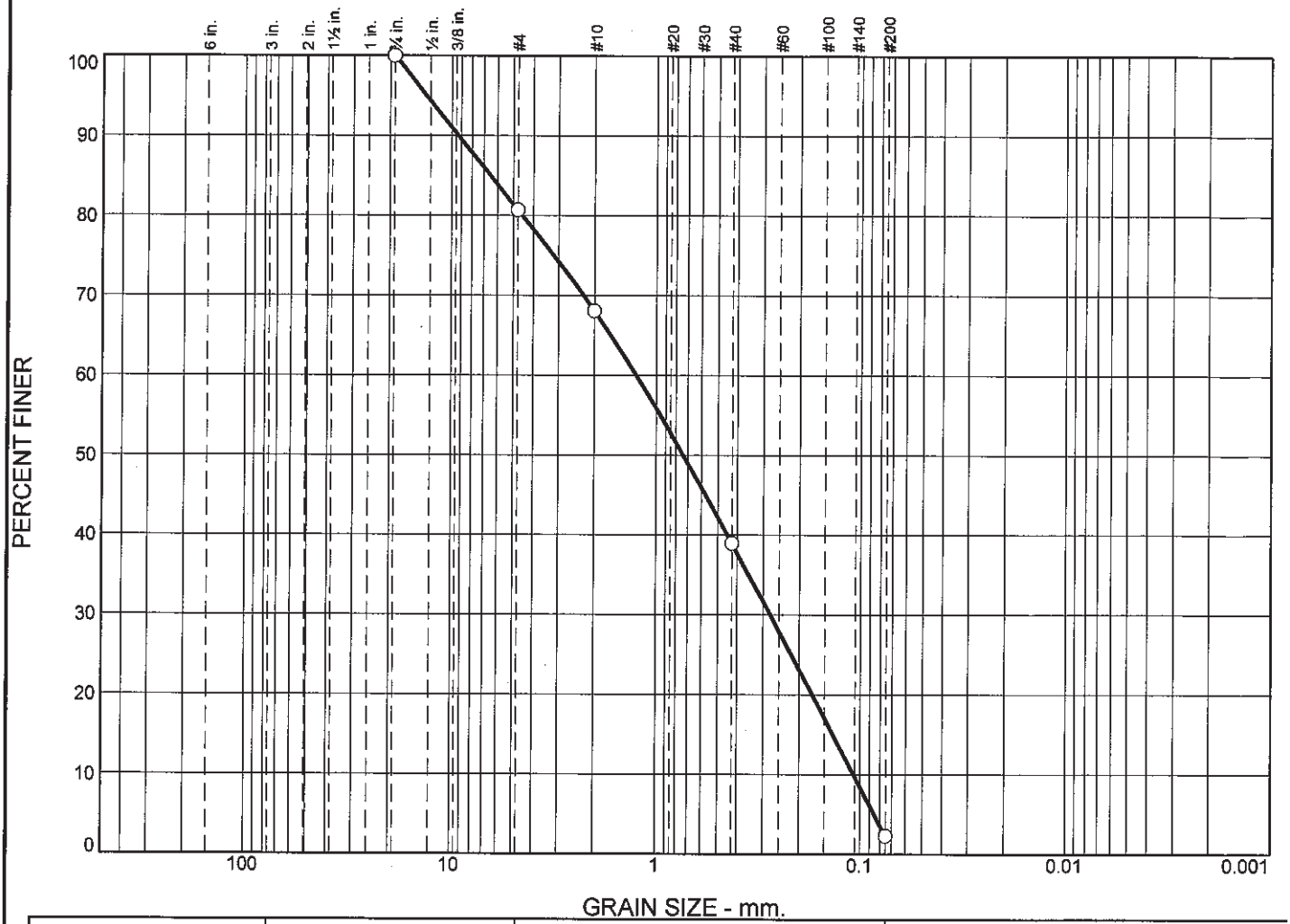
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	28.1	28.1	9.2	21.7	13.1	44.0			27.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1113	0.8072	1.6048	7.7365	9.8846	12.4008	15.4042

Fineness Modulus
3.09

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	19.3	12.6	29.1	36.7	2.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			6.4732	1.2456	0.7342	0.2760	0.1358	0.1074	0.57	11.59

Material Description	USCS	AASHTO
○	SP	

Project No. **Client:**
Project:

○ **Source of Sample:** L-52 **Sample Number:** L1503503-05

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L-52
Sample Number: L1503503-05
USCS Classification: SP

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 129.60
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
129.60	0.00	0.75	0.00	0.00	100.0
		#4	25.01	0.00	80.7
		#10	16.35	0.00	68.1
		#40	37.74	0.00	39.0
		#200	47.51	0.00	2.3

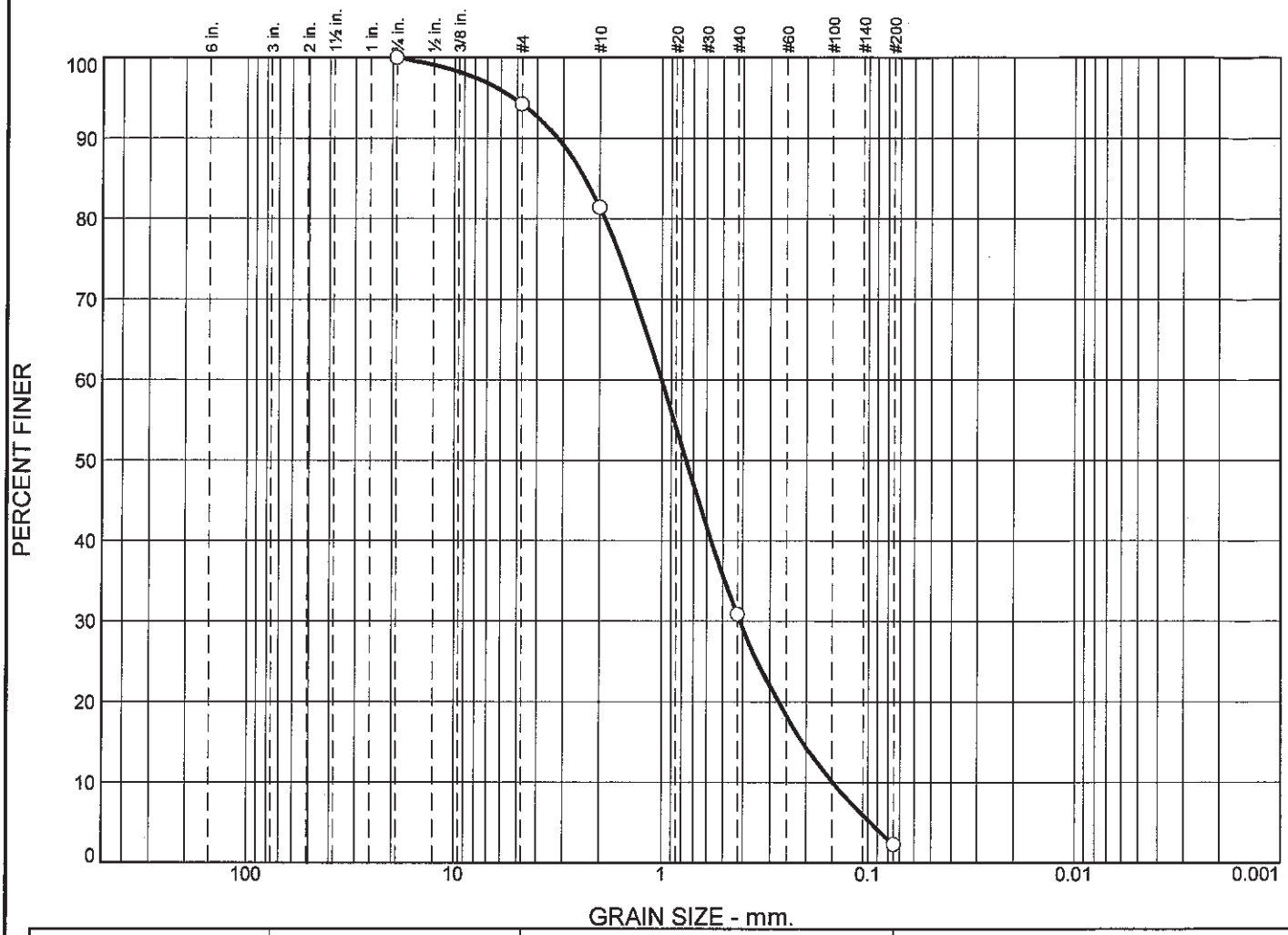
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	19.3	19.3	12.6	29.1	36.7	78.4			2.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1074	0.1358	0.1718	0.2760	0.7342	1.2456	4.5157	6.4732	9.2774	13.2946

Fineness Modulus	C_u	C_c
3.04	11.59	0.57

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	5.8	12.8	50.5	28.6	2.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			2.3533	1.0004	0.7567	0.4121	0.2080	0.1485	1.14	6.73

Material Description	USCS	AASHTO
○	SW	

Project No. **Client:**
Project:

○ **Source of Sample:** L-51 **Sample Number:** L1503503-06

Remarks:

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L-51
Sample Number: L1503503-06
USCS Classification: SW

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 134.22
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
134.22	0.00	0.75	0.00	0.00	100.0
		#4	7.74	0.00	94.2
		#10	17.16	0.00	81.4
		#40	67.88	0.00	30.9
		#200	38.38	0.00	2.3

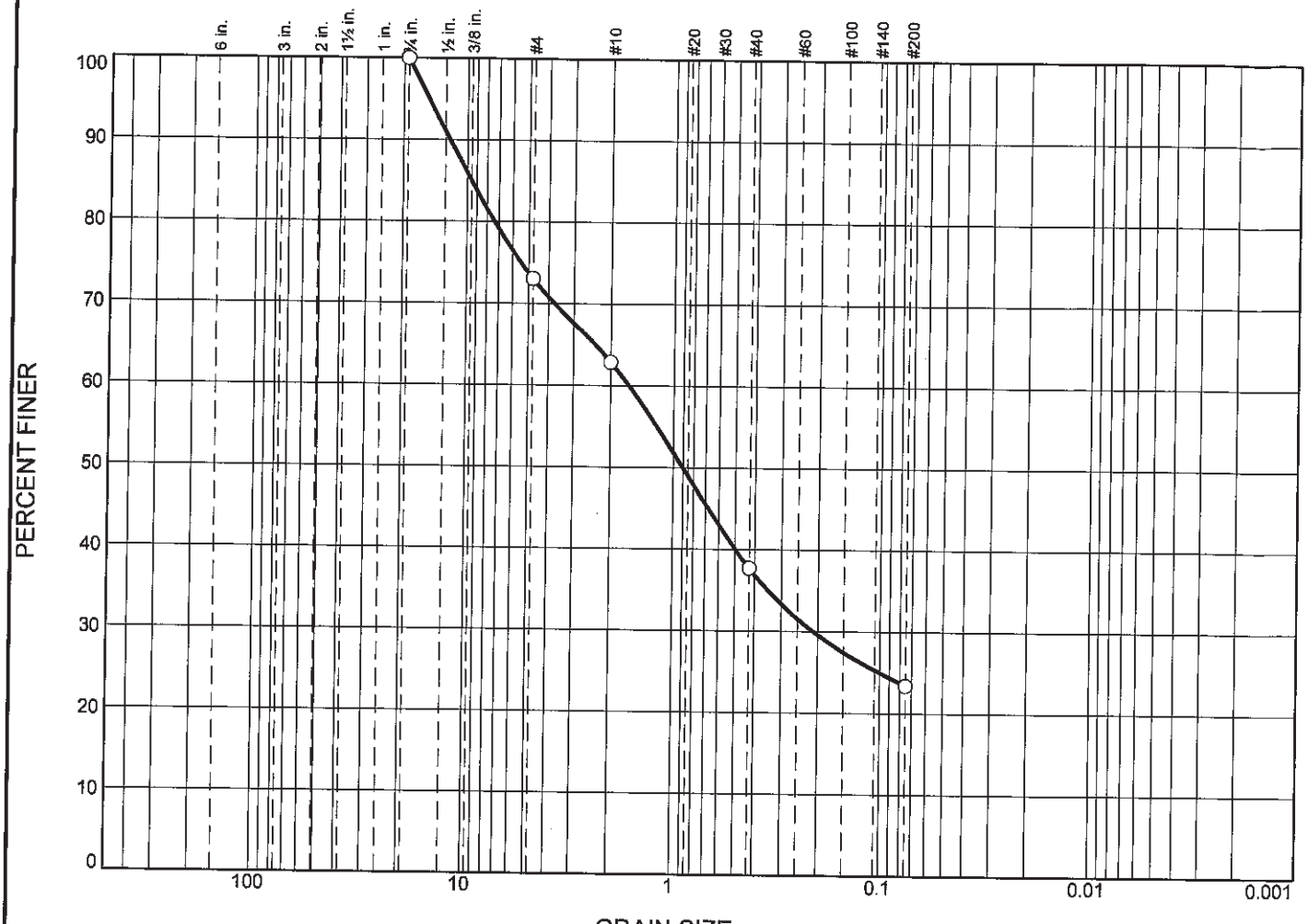
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	5.8	5.8	12.8	50.5	28.6	91.9			2.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1485	0.2080	0.2724	0.4121	0.7567	1.0004	1.8863	2.3533	3.1867	5.2380

Fineness Modulus	C_u	C_c
2.83	6.73	1.14

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	27.0	10.1	25.2	14.3	23.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			9.4965	1.6327	0.8984	0.2102				

Material Description	USCS	AASHTO
○		

Project No. **Client:**
Project:

○ **Source of Sample:** L-62 **Sample Number:** L1503503-07

Remarks:

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L-62

Sample Number: L1503503-07

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 88.56
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
88.56	0.00	0.75	0.00	0.00	100.0
		#4	23.88	0.00	73.0
		#10	9.00	0.00	62.9
		#40	22.28	0.00	37.7
		#200	12.67	0.00	23.4

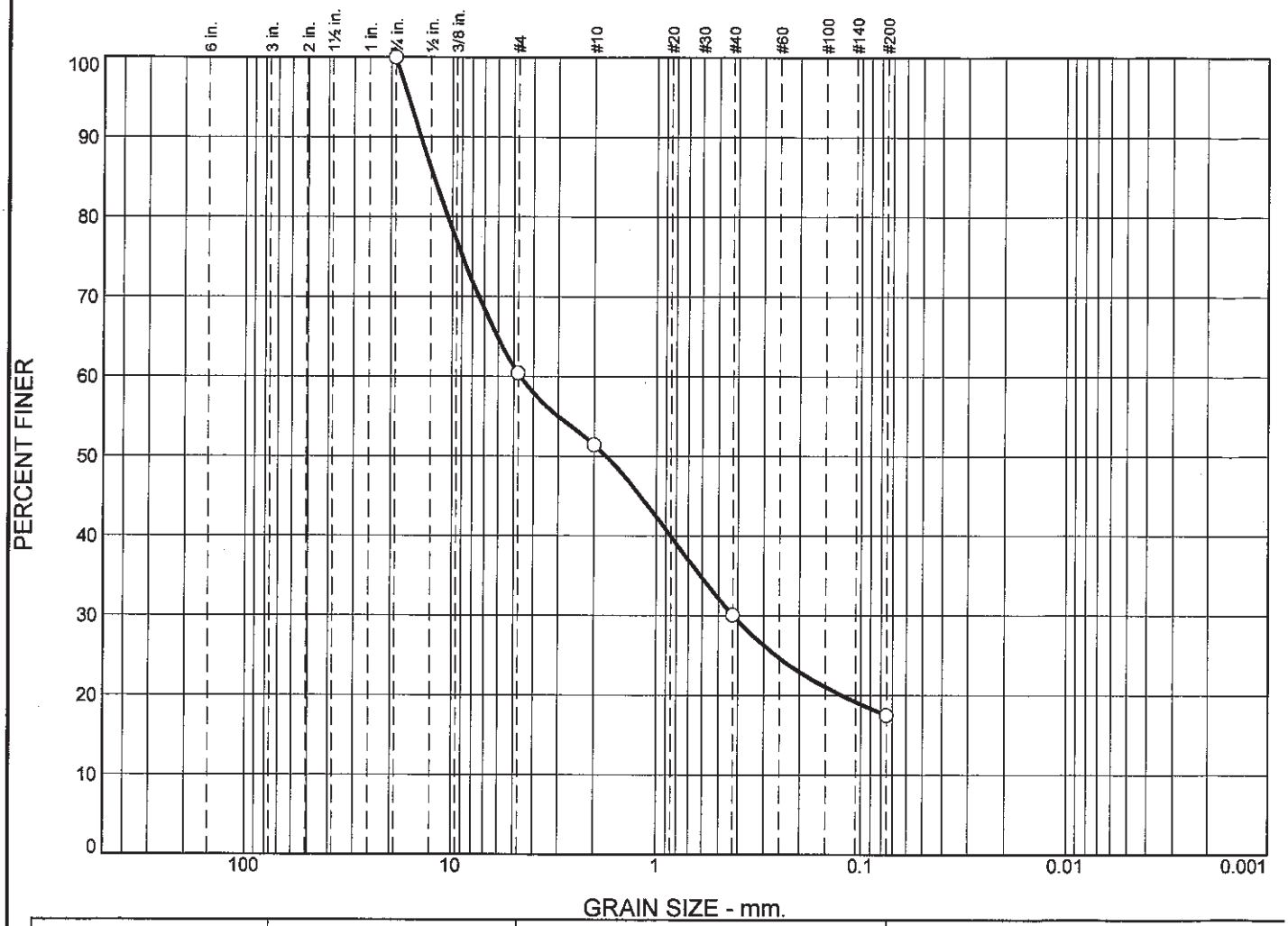
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	27.0	27.0	10.1	25.2	14.3	49.6			23.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.2102	0.8984	1.6327	7.3206	9.4965	12.0809	15.2065

Fineness Modulus
3.18

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	39.6	9.0	21.3	12.6	17.5	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			12.2505	4.6253	1.7499	0.4220				

Material Description	USCS	AASHTO
○		

Project No. **Client:**
Project:

○ **Source of Sample:** L-62 **Sample Number:** WG766710-1

Remarks:

Alpha Analytical

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L-62

Sample Number: WG766710-1

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 92.86
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
92.86	0.00	0.75	0.00	0.00	100.0
		#4	36.75	0.00	60.4
		#10	8.35	0.00	51.4
		#40	19.82	0.00	30.1
		#200	11.69	0.00	17.5

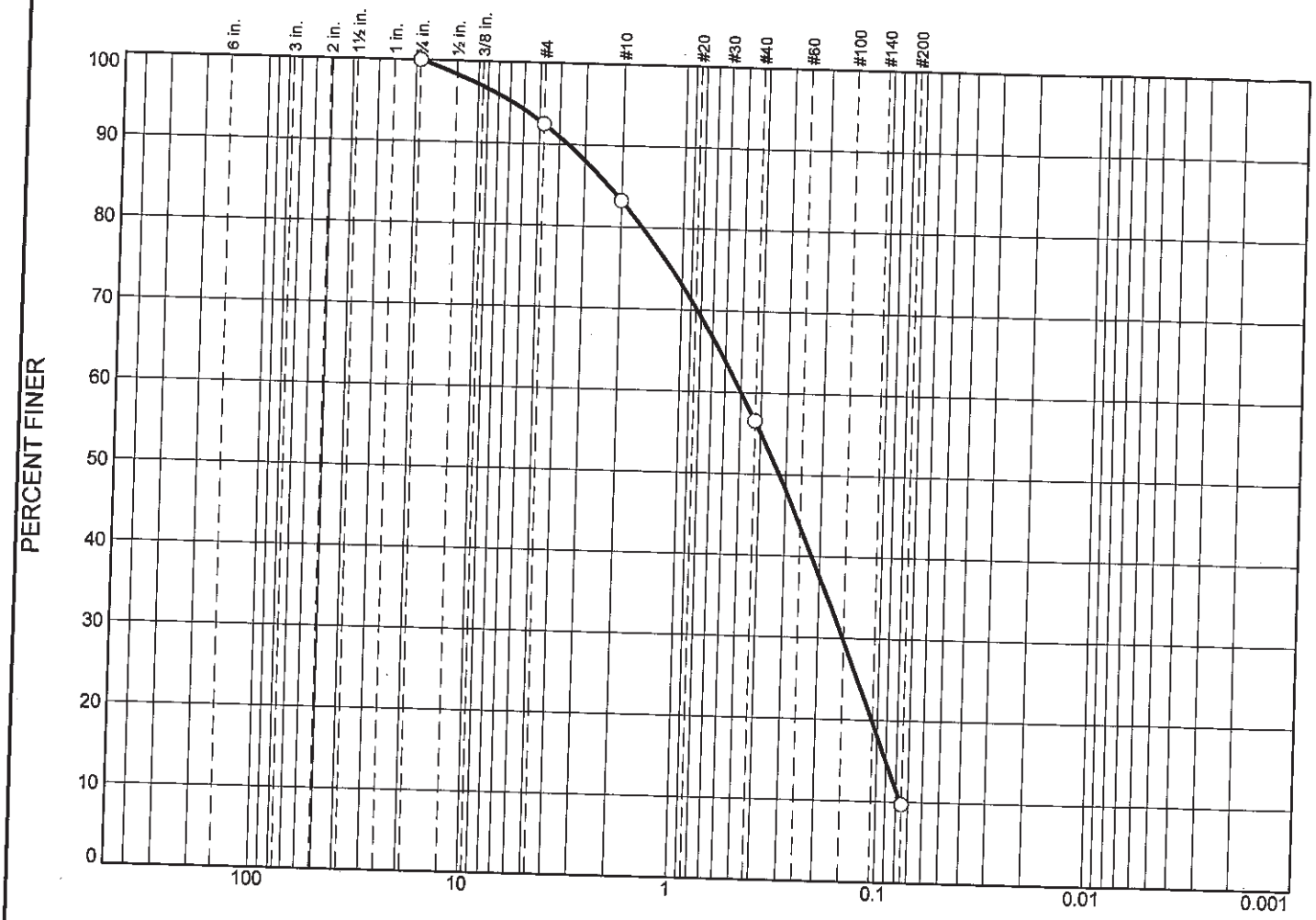
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	39.6	39.6	9.0	21.3	12.6	42.9			17.5

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1243	0.4220	1.7499	4.6253	10.4790	12.2505	14.2352	16.4816

Fineness Modulus
3.83

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	7.5	9.2	26.8	46.8	9.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			2.2985	0.4978	0.3218	0.1514	0.0899	0.0758	0.61	6.57

	Material Description	USCS	AASHTO
○			

Project No. **Client:**
Project:

○ **Source of Sample:** L41 **Sample Number:** L1503503-08

Remarks:

Alpha Analytical

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L41

Sample Number: L1503503-08

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 125.62
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
125.62	0.00	0.75	0.00	0.00	100.0
		#4	9.47	0.00	92.5
		#10	11.56	0.00	83.3
		#40	33.56	0.00	56.5
		#200	58.86	0.00	9.7

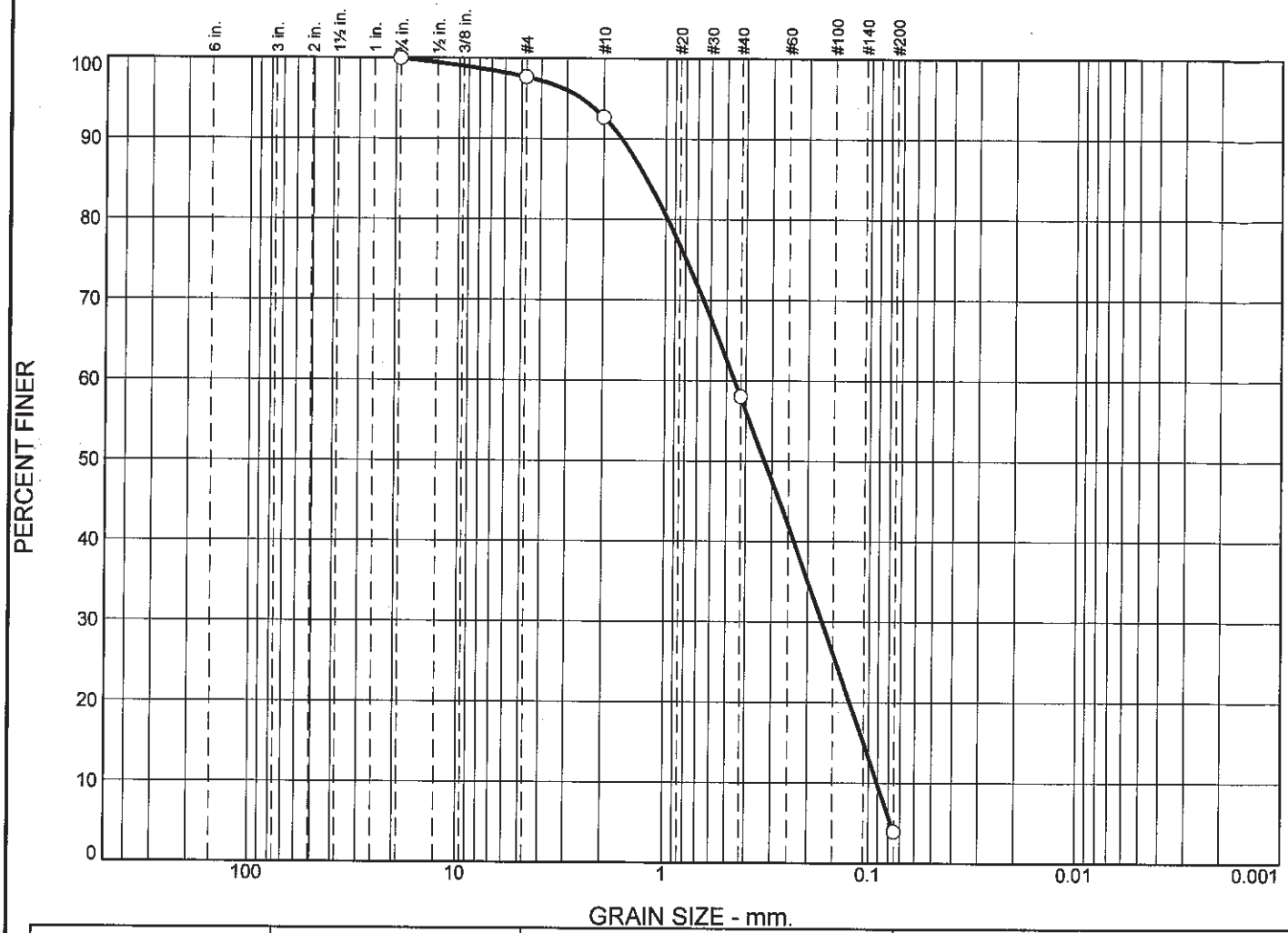
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	7.5	7.5	9.2	26.8	46.8	82.8			9.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0758	0.0899	0.1068	0.1514	0.3218	0.4978	1.5689	2.2985	3.6170	6.7385

Fineness Modulus	C_u	C_c
2.08	6.57	0.61

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.3	5.0	34.7	54.1	3.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.2283	0.4546	0.3240	0.1695	0.1058	0.0906	0.70	5.02

	Material Description	USCS	AASHTO
○		SP	

Project No. **Client:**
Project:

○ **Source of Sample:** L32 **Sample Number:** L1503503-09

Remarks:

Alpha Analytical

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L32
Sample Number: L1503503-09
USCS Classification: SP

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 119.69
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
119.69	0.00	0.75	0.00	0.00	100.0
		#4	2.79	0.00	97.7
		#10	5.93	0.00	92.7
		#40	41.50	0.00	58.0
		#200	64.77	0.00	3.9

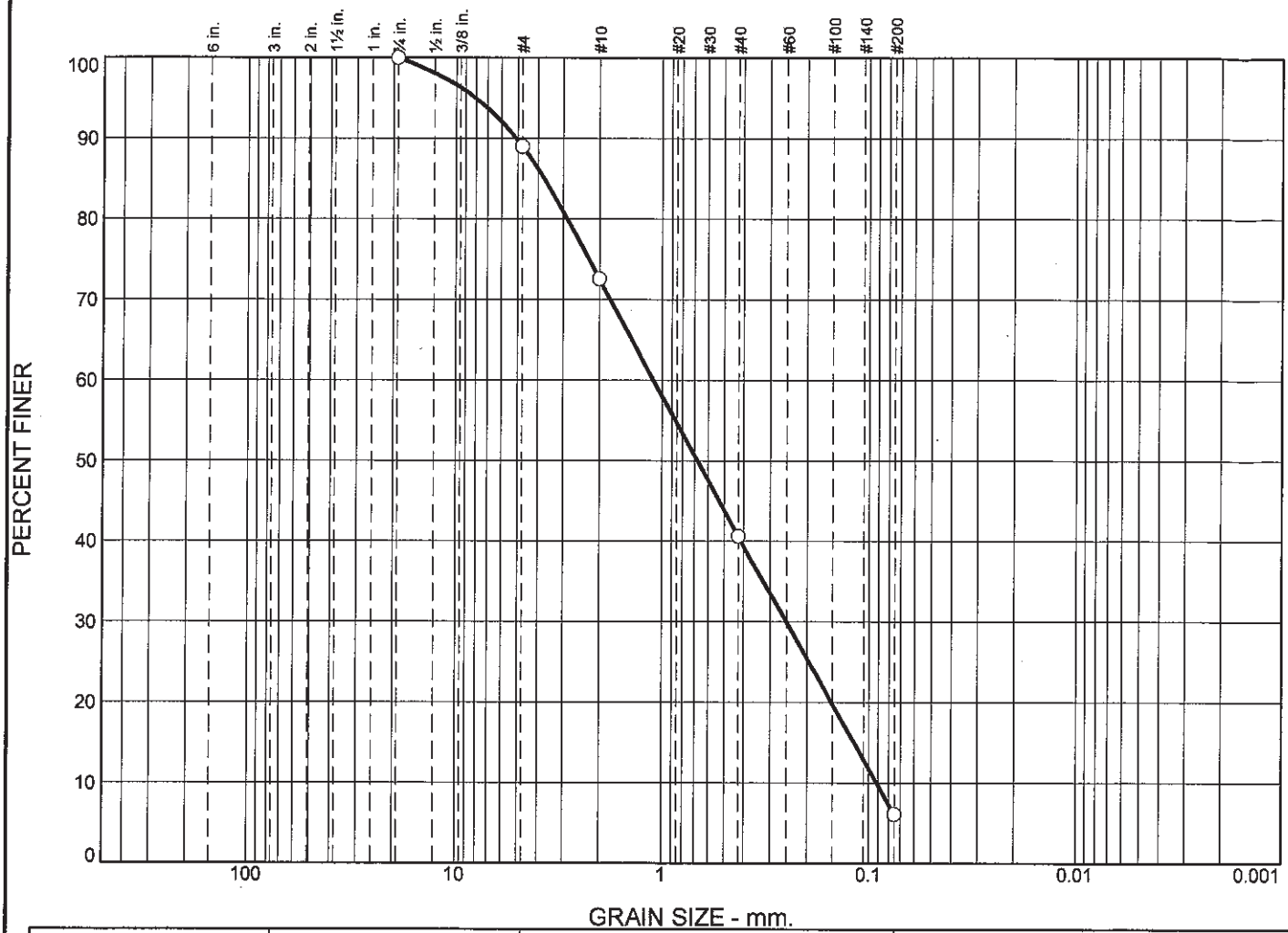
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.3	2.3	5.0	34.7	54.1	93.8			3.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0906	0.1058	0.1237	0.1695	0.3240	0.4546	0.9714	1.2283	1.6335	2.5516

Fineness Modulus	C_u	C_c
1.83	5.02	0.70

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	11.0	16.4	32.0	34.5	6.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			3.7187	1.0950	0.6738	0.2504	0.1176	0.0913	0.63	11.99

	Material Description	USCS	AASHTO
○			

Project No. **Client:**
Project:

○ **Source of Sample:** L35 **Sample Number:** L1503503-10

Remarks:

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L35

Sample Number: L1503503-10

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 127.73
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
127.73	0.00	0.75	0.00	0.00	100.0
		#4	14.02	0.00	89.0
		#10	21.01	0.00	72.6
		#40	40.81	0.00	40.6
		#200	44.08	0.00	6.1

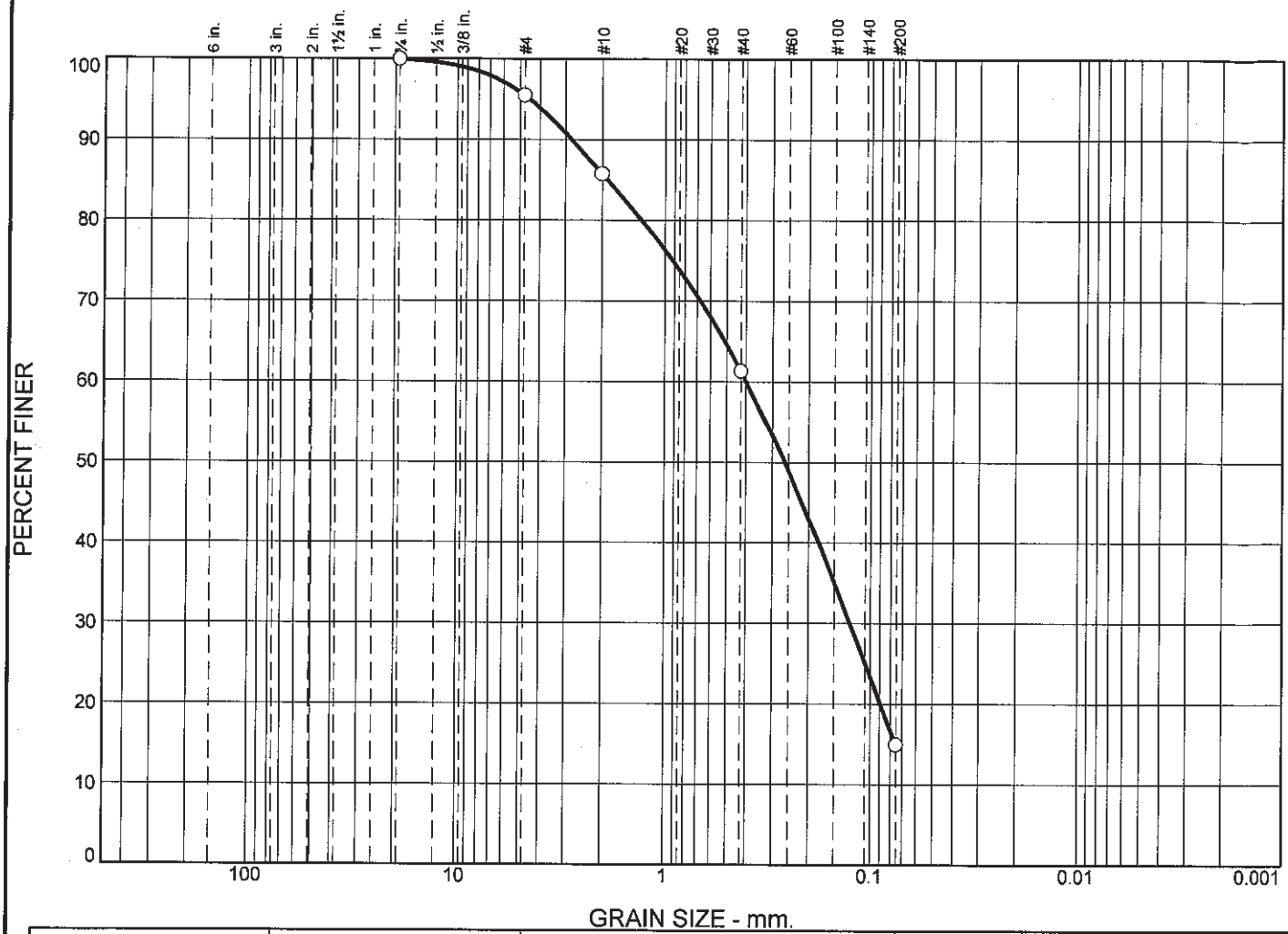
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	11.0	11.0	16.4	32.0	34.5	82.9			6.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0913	0.1176	0.1514	0.2504	0.6738	1.0950	2.8615	3.7187	5.0858	8.0318

Fineness Modulus	C_u	C_c
2.76	11.99	0.63

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	4.5	9.7	24.5	46.4	14.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.8844	0.3990	0.2607	0.1253	0.0752			

	Material Description	USCS	AASHTO
○			

Project No. **Client:**
Project:

○ **Source of Sample:** L33 **Sample Number:** L1503503-11

Remarks:

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L33

Sample Number: L1503503-11

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 114.48
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
114.48	0.00	0.75	0.00	0.00	100.0
		#4	5.16	0.00	95.5
		#10	11.13	0.00	85.8
		#40	27.96	0.00	61.3
		#200	53.13	0.00	14.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	4.5	4.5	9.7	24.5	46.4	80.6			14.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0752	0.0890	0.1253	0.2607	0.3990	1.2932	1.8844	2.7970	4.4801

Fineness Modulus
1.82

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	4.4	4.9	20.8	54.7	15.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.0674	0.2879	0.2057	0.1134				

	Material Description	USCS	AASHTO
○			

Project No. **Client:**
Project:

○ **Source of Sample:** L31 **Sample Number:** L1503503-12

Remarks:

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L31

Sample Number: L1503503-12

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 118.70
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
118.70	0.00	0.75	0.00	0.00	100.0
		#4	5.20	0.00	95.6
		#10	5.84	0.00	90.7
		#40	24.73	0.00	69.9
		#200	64.86	0.00	15.2

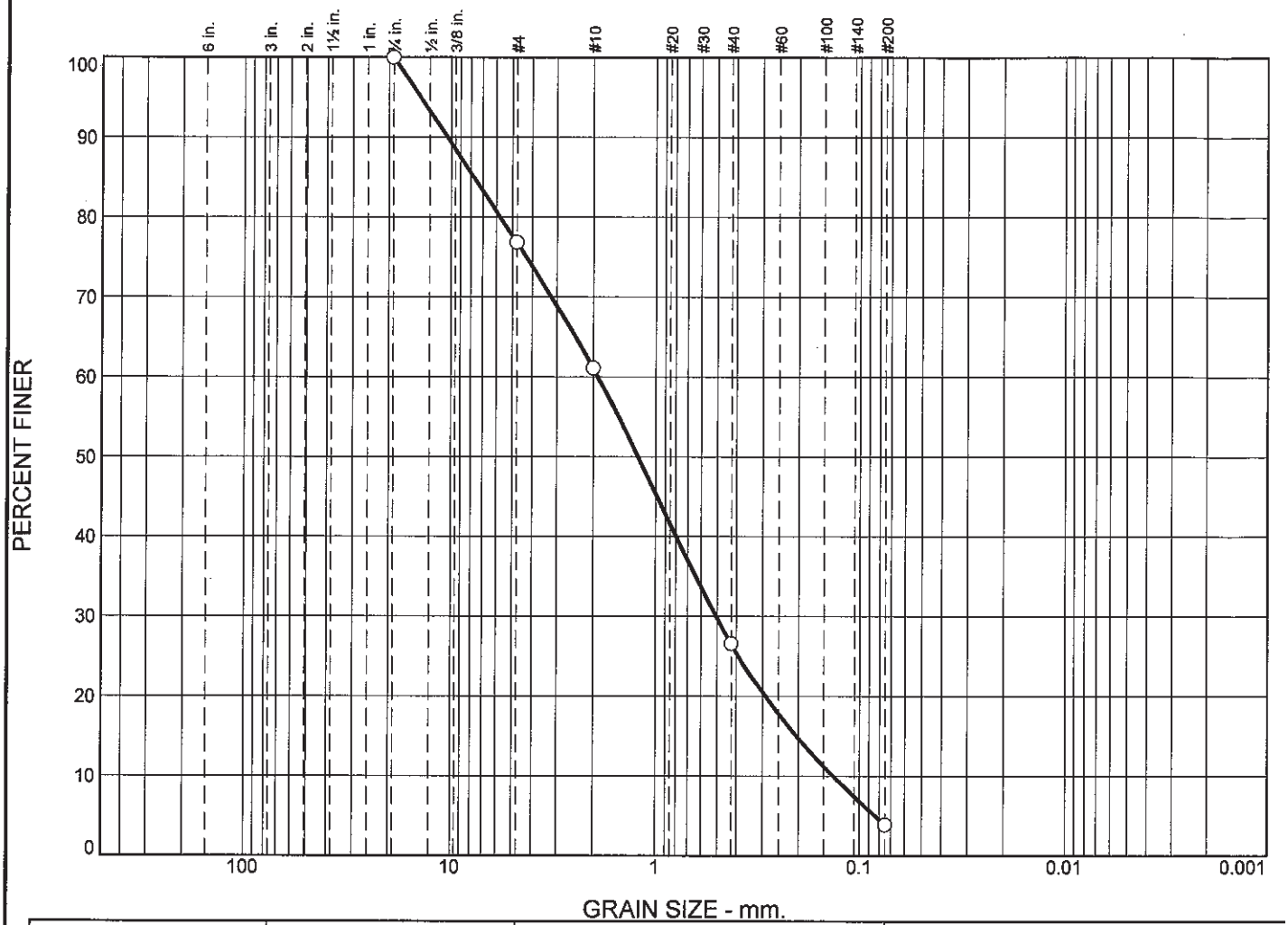
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	4.4	4.4	4.9	20.8	54.7	80.4			15.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0857	0.1134	0.2057	0.2879	0.7308	1.0674	1.8215	4.1422

Fineness Modulus
1.51

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	23.1	15.8	34.5	22.7	3.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			7.7136	1.8969	1.2138	0.5040	0.2039	0.1345	1.00	14.10

Material Description	USCS	AASHTO
○	SP	

Project No. **Client:**

Project:

○ **Location:** L34 **Sample Number:** L1503503-13

Remarks:

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L34
Sample Number: L1503503-13
USCS Classification: SP

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 121.20
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
121.20	0.00	0.75	0.00	0.00	100.0
		#4	28.04	0.00	76.9
		#10	19.10	0.00	61.1
		#40	41.81	0.00	26.6
		#200	27.52	0.00	3.9

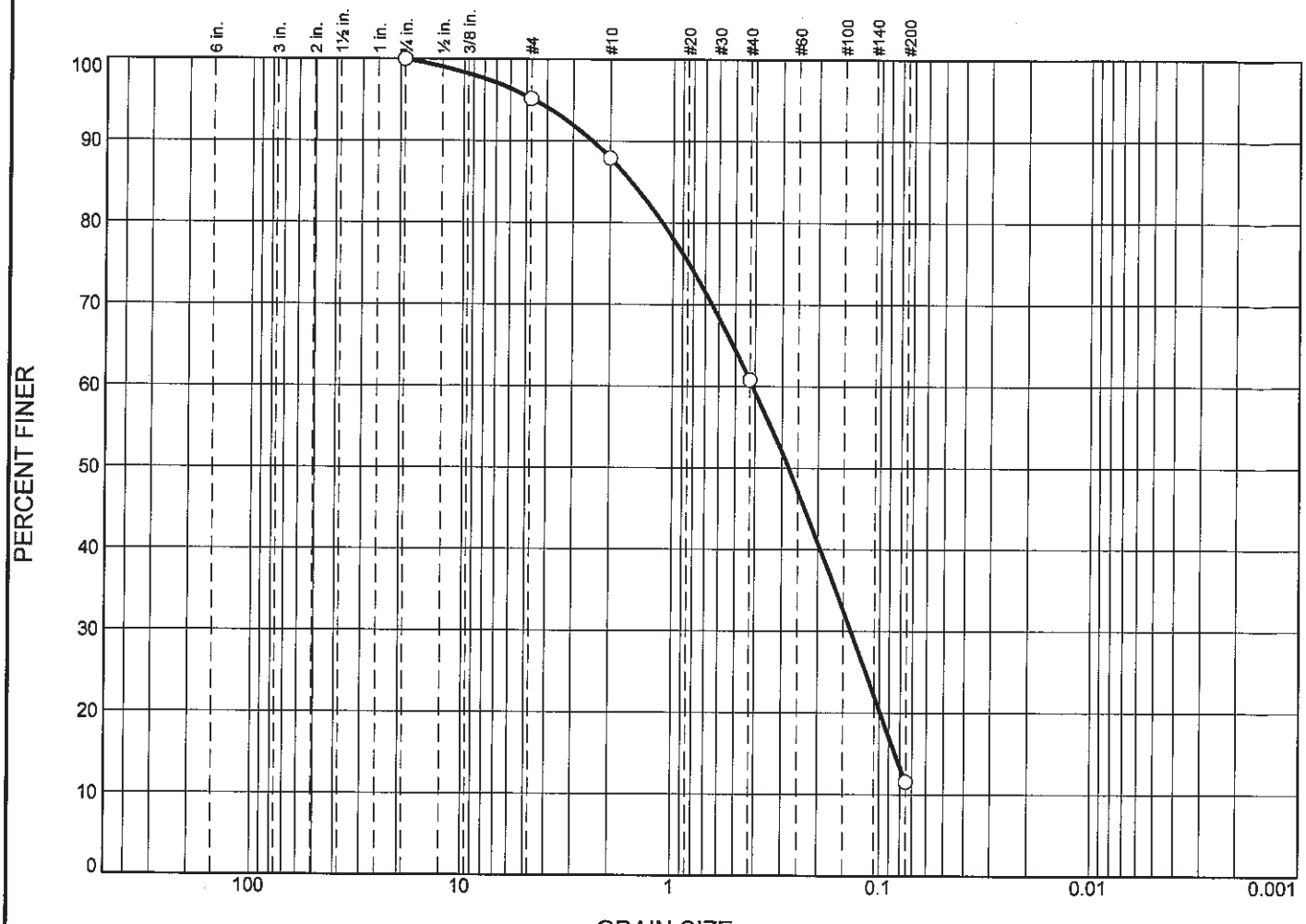
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	23.1	23.1	15.8	34.5	22.7	73.0			3.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1345	0.2039	0.2896	0.5040	1.2138	1.8969	5.7220	7.7136	10.4163	14.0824

Fineness Modulus	C_u	C_c
3.55	14.10	1.00

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	4.8	7.3	27.1	49.3	11.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.5766	0.4112	0.2775	0.1375	0.0840			

Material Description	USCS	AASHTO
○		

Project No. **Client:**
Project:

○ **Source of Sample:** L36 **Sample Number:** L1503503-14

Remarks:

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L36

Sample Number: L1503503-14

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 132.90
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
132.90	0.00	0.75	0.00	0.00	100.0
		#4	6.39	0.00	95.2
		#10	9.65	0.00	87.9
		#40	36.07	0.00	60.8
		#200	65.46	0.00	11.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	4.8	4.8	7.3	27.1	49.3	83.7			11.5

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0840	0.0988	0.1375	0.2775	0.4112	1.1197	1.5766	2.4292	4.5977

Fineness Modulus
1.83

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	8.5	3.9	18.8	54.0	14.8	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.3524	0.2966	0.2101	0.1150	0.0754			

Material Description	USCS	AASHTO
○		

Project No. **Client:**
Project:

○ **Source of Sample:** L37 **Sample Number:** L1503503-15

Remarks:

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L37

Sample Number: L1503503-15

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 150.64
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
150.64	0.00	0.75	0.00	0.00	100.0
		#4	12.76	0.00	91.5
		#10	5.94	0.00	87.6
		#40	28.30	0.00	68.8
		#200	81.34	0.00	14.8

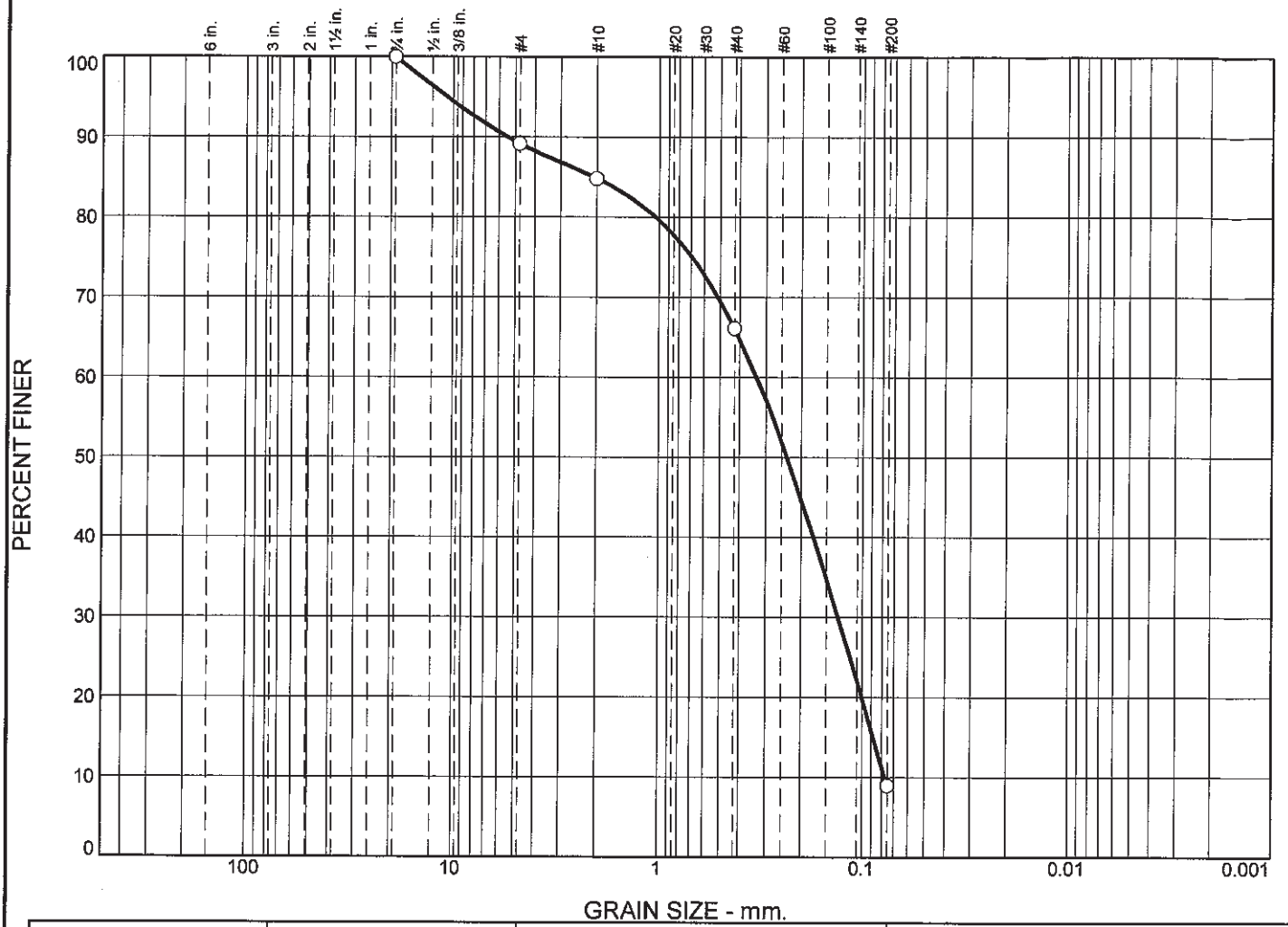
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	8.5	8.5	3.9	18.8	54.0	76.7			14.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0754	0.0867	0.1150	0.2101	0.2966	0.8246	1.3524	3.3538	8.9082

Fineness Modulus
1.66

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	10.8	4.4	18.7	57.1	9.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			2.0693	0.3314	0.2350	0.1311	0.0878	0.0771	0.67	4.30

Material Description	USCS	AASHTO
○		

Project No. **Client:**
Project:

○ **Source of Sample:** L38 **Sample Number:** L1503503-16

Remarks:

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L38

Sample Number: L1503503-16

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 116.11
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
116.11	0.00	0.75	0.00	0.00	100.0
		#4	12.58	0.00	89.2
		#10	5.05	0.00	84.8
		#40	21.71	0.00	66.1
		#200	66.36	0.00	9.0

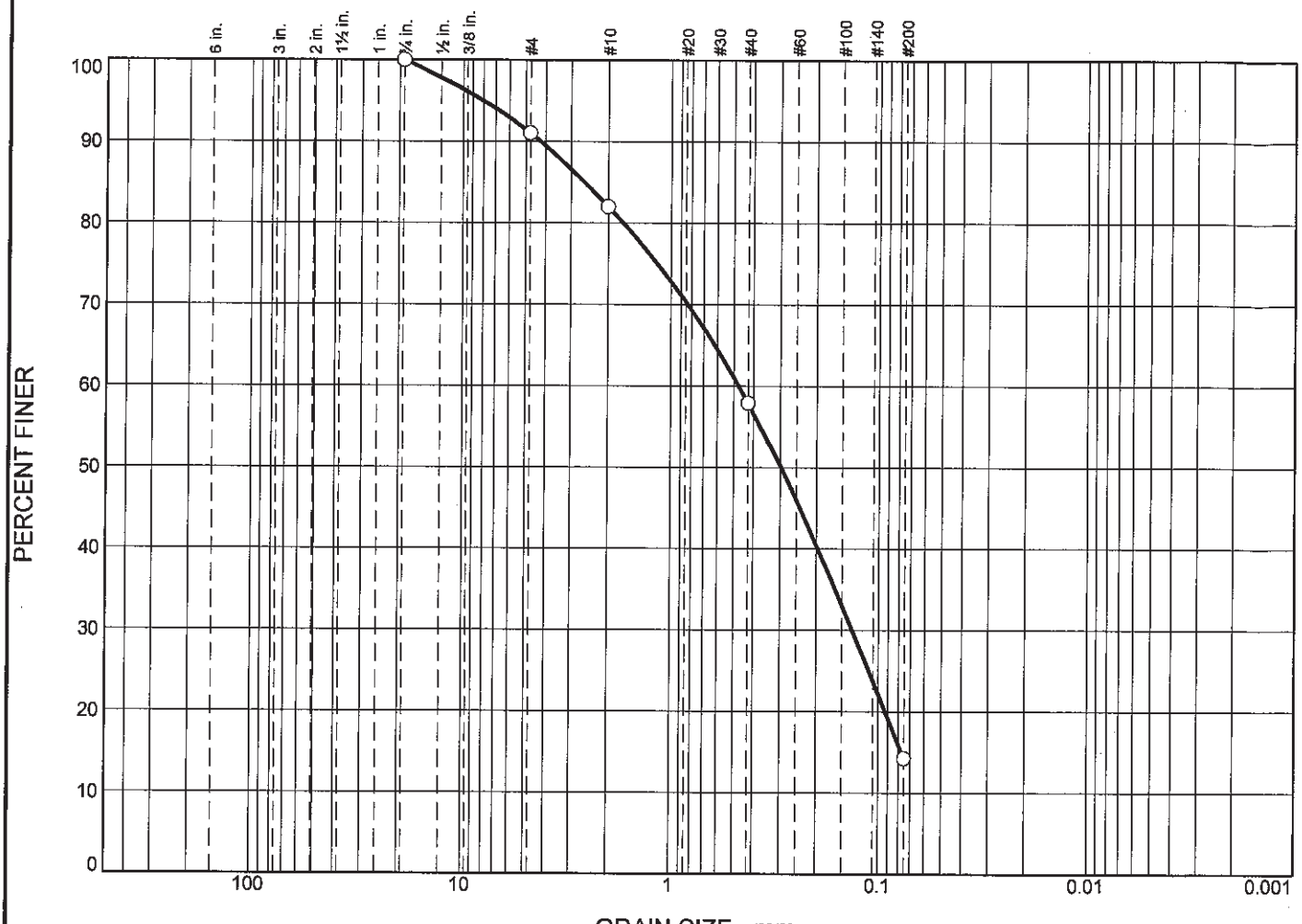
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	10.8	10.8	4.4	18.7	57.1	80.2			9.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0771	0.0878	0.1002	0.1311	0.2350	0.3314	1.0383	2.0693	5.4518	10.6819

Fineness Modulus	C_u	C_c
1.85	4.30	0.67

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	9.0	9.0	24.1	43.6	14.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			2.5912	0.4715	0.2958	0.1336	0.0770			

	Material Description	USCS	AASHTO
○			

Project No. **Client:**
Project:

○ **Source of Sample:** L40 **Sample Number:** L1503503-17

Remarks:

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L40

Sample Number: L1503503-17

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 106.71
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
106.71	0.00	0.75	0.00	0.00	100.0
		#4	9.57	0.00	91.0
		#10	9.63	0.00	82.0
		#40	25.71	0.00	57.9
		#200	46.57	0.00	14.3

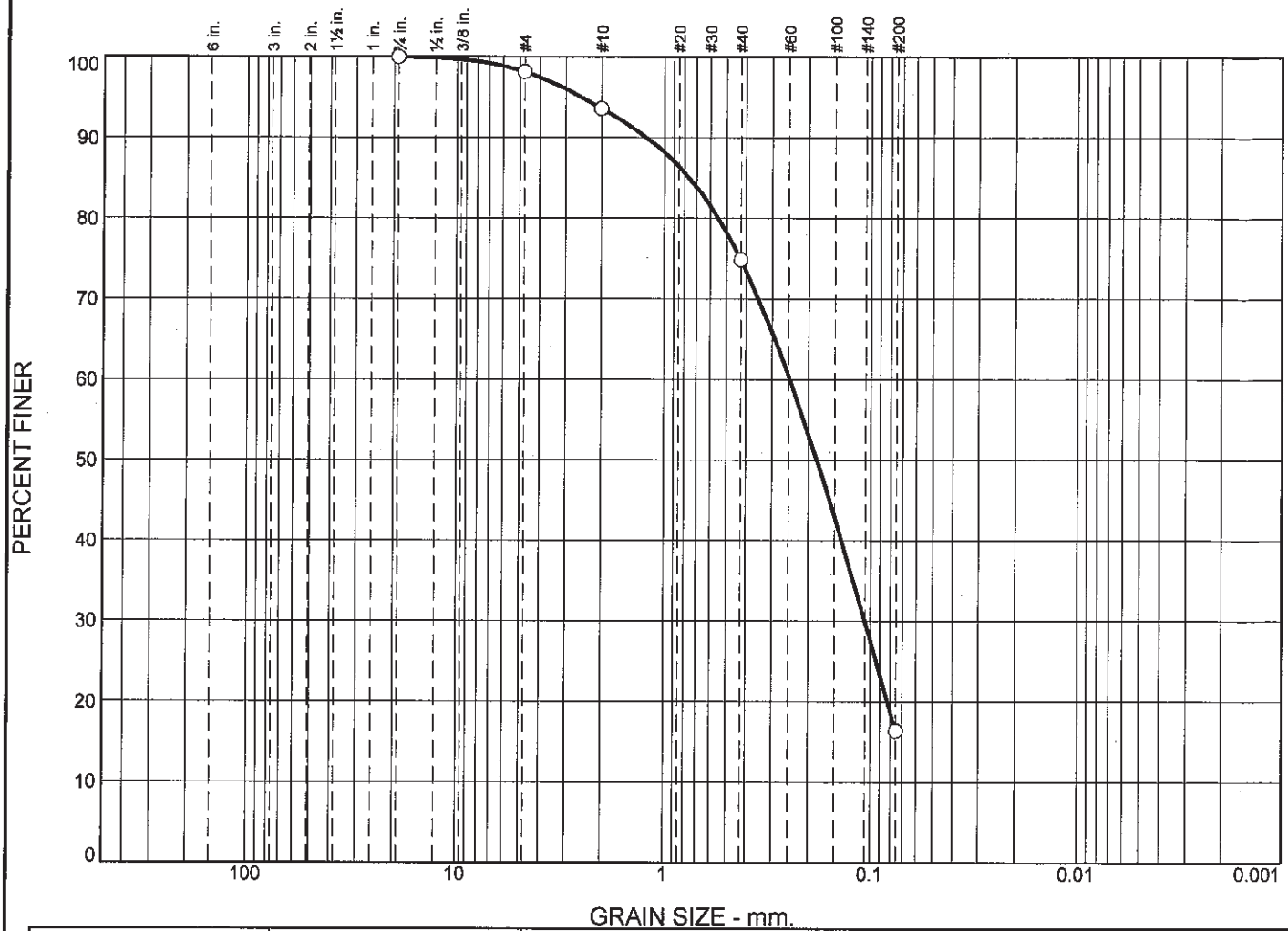
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	9.0	9.0	9.0	24.1	43.6	76.7			14.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0770	0.0924	0.1336	0.2958	0.4715	1.6969	2.5912	4.2309	8.0276

Fineness Modulus
2.06

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.9	4.5	18.7	58.5	16.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.7583	0.2460	0.1821	0.1062				

	Material Description	USCS	AASHTO
○			

Project No. **Client:**
Project:

○ **Source of Sample:** L39 **Sample Number:** L1503503-18

Remarks:

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L39

Sample Number: L1503503-18

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 116.42
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
116.42	0.00	0.75	0.00	0.00	100.0
		#4	2.16	0.00	98.1
		#10	5.32	0.00	93.6
		#40	21.76	0.00	74.9
		#200	68.08	0.00	16.4

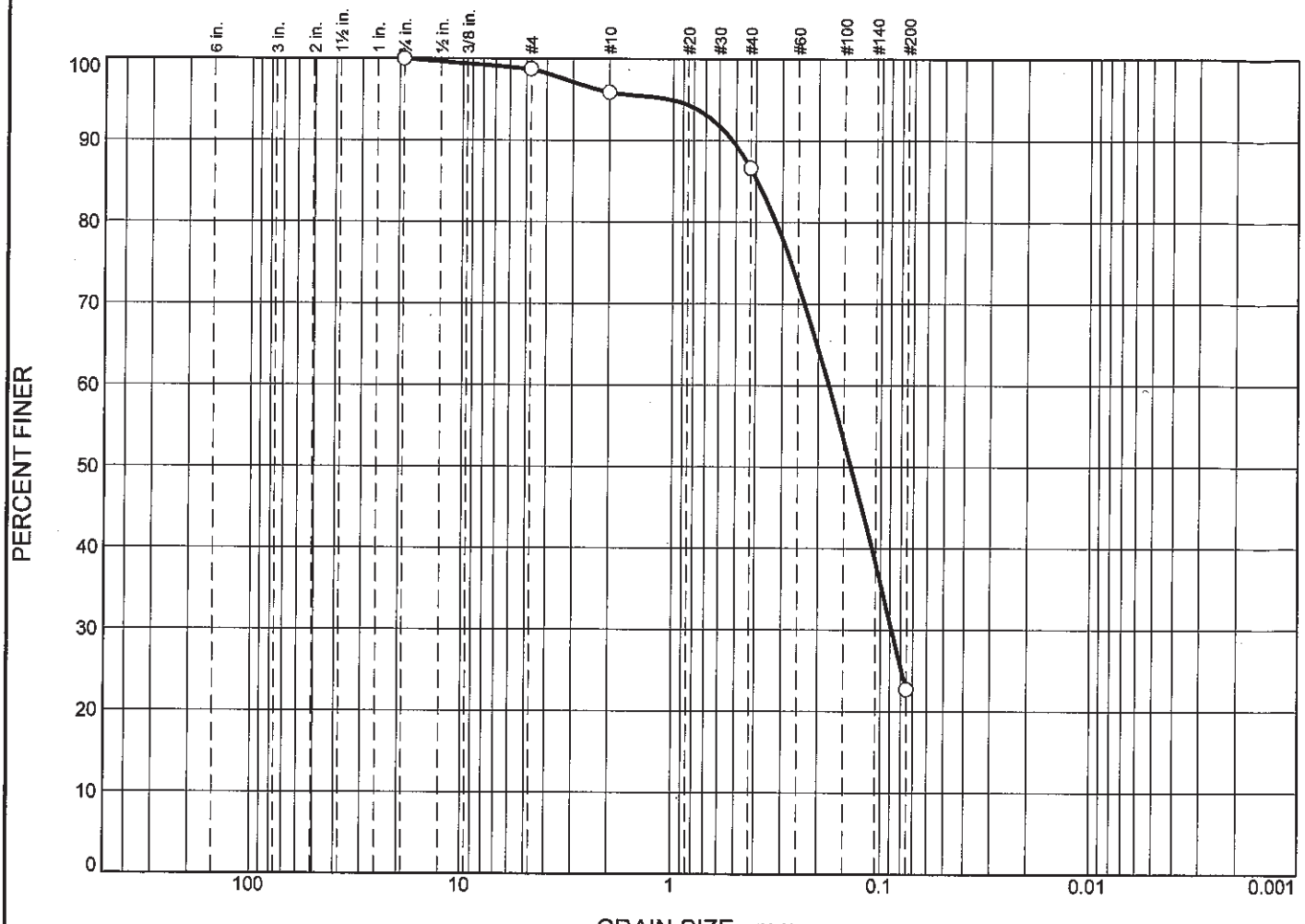
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.9	1.9	4.5	18.7	58.5	81.7			16.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0822	0.1062	0.1821	0.2460	0.5482	0.7583	1.2157	2.5177

Fineness Modulus
1.27

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.2	2.9	9.3	63.9	22.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.3926	0.1772	0.1386	0.0880				

	Material Description	USCS	AASHTO
○			

Project No. **Client:**
Project:

○ **Source of Sample:** L26A **Sample Number:** L1503503-19

Remarks:

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L26A

Sample Number: L1503503-19

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 109.08
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
109.08	0.00	0.75	0.00	0.00	100.0
		#4	1.34	0.00	98.8
		#10	3.13	0.00	95.9
		#40	10.10	0.00	86.6
		#200	69.73	0.00	22.7

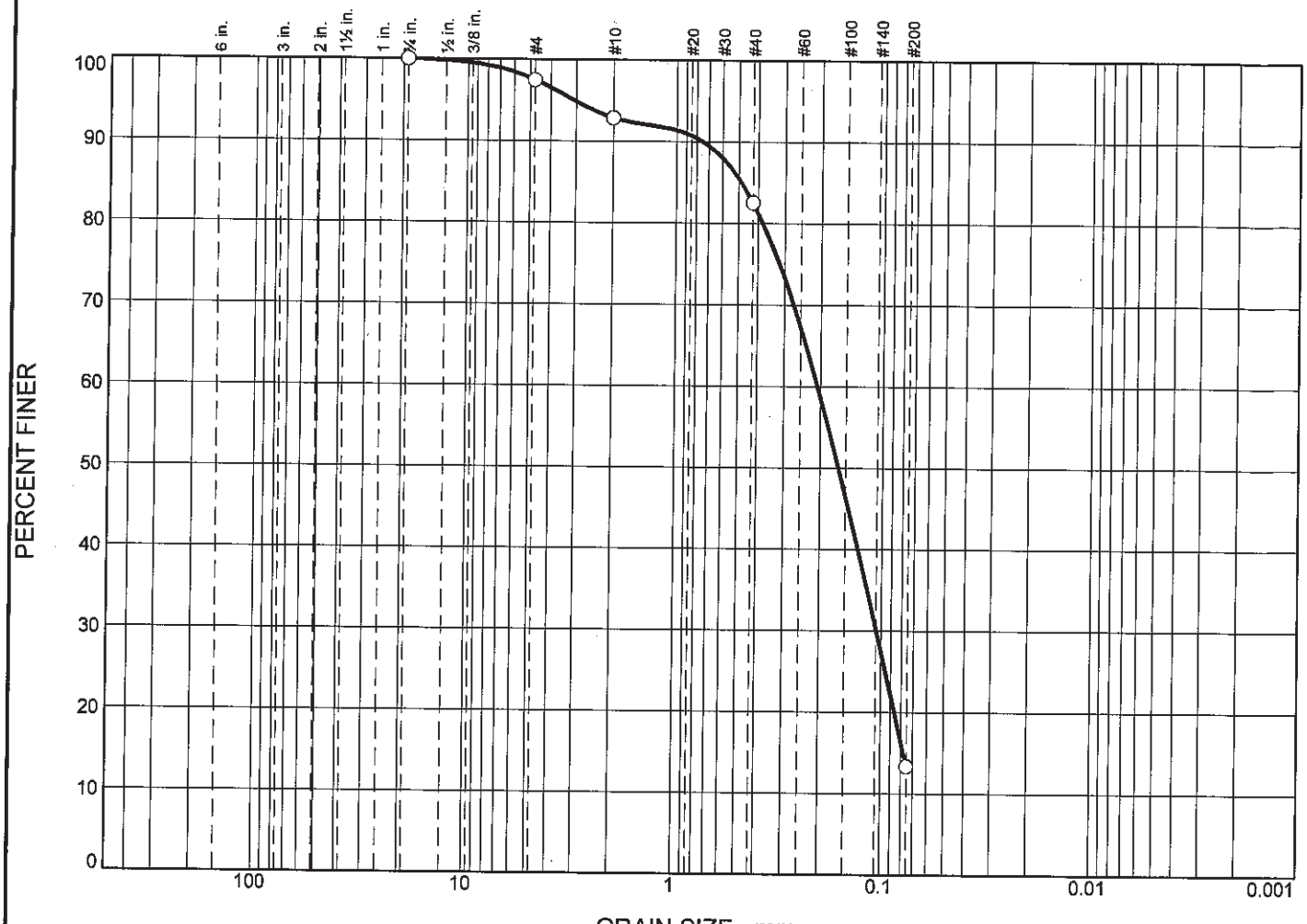
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.2	1.2	2.9	9.3	63.9	76.1			22.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0880	0.1386	0.1772	0.3206	0.3926	0.5194	1.0213

Fineness Modulus
0.87

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.5	4.6	10.3	69.2	13.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.4832	0.2060	0.1622	0.1053	0.0775			

	Material Description	USCS	AASHTO
○			

Project No. **Client:**
Project:

○ **Source of Sample:** L26B **Sample Number:** L1503503-20

Remarks:

Alpha Analytical

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L26B

Sample Number: L1503503-20

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 110.62
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
110.62	0.00	0.75	0.00	0.00	100.0
		#4	2.79	0.00	97.5
		#10	5.11	0.00	92.9
		#40	11.38	0.00	82.6
		#200	76.55	0.00	13.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.5	2.5	4.6	10.3	69.2	84.1			13.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0775	0.0858	0.1053	0.1622	0.2060	0.3796	0.4832	0.7465	3.0788

Fineness Modulus
1.10

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	Yes
4. Was the SAP approved by the New England District?	
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	
7. Were the correct stations sampled (include the precision of the navigation method used)?	
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	Yes
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	No – see Narrative
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	No – see Narrative
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No –see Narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	Yes
19. Were surrogate recoveries within the required acceptance criteria?	Yes

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270D

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	YES		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	YES		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	YES		Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	YES		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	YES	In House Limits 40%-140%	In Data Package
Method Blank	No target analytes > RL	YES		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	YES		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	NO	Acenaphthylene (58%), Phenanthrene (61%), Anthracene (44%), Fluoranthene (59%), Pyrene (52%), Benz(a)anthracene (65%), Chrysene (51%), Benzo(b)fluoranthene (68%), Benzo(k)fluoranthene (41%), Benzo(a)pyrene (57%), Indeno(1,2,3-cd)pyrene (55%), Dibenz(a,h)anthracene (64%), Benzo(ghi)perylene (58%).	In Data Package
Surrogate Recoveries	Calculate % recovery (30 to	YES		In Data Package

	150% recovery)			
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	YES		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	No	ICAL 10554: 4,4'-DDT Quadratic fit-column A ICAL 10776: 4,4'-DDE Quadratic fit-column A; 4,4'-DDT Quadratic fit-column A&B, Methoxychlor Quadratic fit-column B	Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No	WG766870-1, opening for L1503503-01 through -06, WG766032-1,-2 and -3: Hexachlorobenzene @ 15.2%-column B, alpha-Chlordane @ 19.7%-column B WG766870-2, closing for L1503503-01 through 06, WG766032-1,-2,-3 and opening for L1503503-08 through -12: -alpha-Chlordane @ 18.2%-column B WG766870-3, closing for L1503503-08 through -12: alpha-Chlordane @ 18.1%-column B WG766870-5, closing for L1503503-13 through -20 and -07, WG766870-5 and -6: gamma-BHC @ 15.1%-column A, Aldrin @ 15.3%-column A, 4,4'-DDD @16.5%-column A	Retained at Lab

			WG766870-6, opening for sample WG766870-4: gamma-BHC @ 15.4%-column A, Aldrin @ 15.4% -column A, Dieldrin @ 15.3 % -column A, 4,4'-DDD@ 15.7% -column A WG766870-7, closing for sample WG766032-4: gamma-BHC @ 16.4%-column A, Aldrin @ 16.5%-column A, Dieldrin @ 15.1%-column A	
Standard Reference Materials	Within the limits provided by vendor	No	SRM WG766032-7, Trans-nonachlor @ 316%	In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270D

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	YES		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	YES		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	YES		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	YES		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	YES	In House limits 40%-140%	In Data Package
Method Blank	No target analytes > RL	YES		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	YES		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	YES		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	YES		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly	Yes		Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	Yes		Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	No	Results >3x IDL noted, on file at lab	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)	No	L1503503-07: Total gravel = 38% Total Fines = 29%	In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

Certification Information

Last revised December 16, 2014

The following analytes are not included in our NELAP Scope of Accreditation:

Westborough Facility
EPA 524.2: Acetone, 2-Butanone (Methyl ethyl ketone (MEK)), Tert-butyl alcohol, 2-Hexanone, Tetrahydrofuran, 1,3,5-Trichlorobenzene, 4-Methyl-2-pentanone (MIBK), Carbon disulfide, Diethyl ether.
EPA 8260C: 1,2,4,5-Tetramethylbenzene, 4-Ethyltoluene, Iodomethane (methyl iodide), Methyl methacrylate, Azobenzene.
EPA 8270D: 1-Methylnaphthalene, Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 625: 4-Chloroaniline, 4-Methylphenol.
SM4500: Soil: Total Phosphorus, TKN, NO2, NO3.
EPA 9071: Total Petroleum Hydrocarbons, Oil & Grease.

Mansfield Facility
EPA 8270D: Biphenyl.
EPA 2540D: TSS
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

The following analytes are included in our Massachusetts DEP Scope of Accreditation, Westborough Facility:

Drinking Water
EPA 200.8: Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Ni,Se,Tl; **EPA 200.7**: Ba,Be,Ca,Cd,Cr,Cu,Na; **EPA 245.1:** Mercury;
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, Enterolert-QT.**

Non-Potable Water
EPA 200.8: Al,Sb,As,Be,Cd,Cr,Cu,Pb,Mn,Ni,Se,Ag,Tl,Zn;
EPA 200.7: Al,Sb,As,Be,Cd,Ca,Cr,Co,Cu,Fe,Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Sr,Ti,Tl,V,Zn;
EPA 245.1, SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2340B, SM2320B, SM4500CL-E, SM4500F-BC, SM426C, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F,**
EPA 353.2: Nitrate-N**, SM4500NH3-BC-NES, EPA 351.1, SM4500P-E, SM4500P-B, E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, SM14 510AC, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9222D-MF**.

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

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ALPHA ANALYTICAL

Date Rec'd in Lab: 2/26/15

ALPHA Job #: L1503503

Westborough, MA
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA
TEL: 508-822-9300
FAX: 508-822-3288

Project Information

Project Name: LIS - USACoE RIM Dredge

Project Location: Eastern Long Island Sound

Project #:

Project Manager: James O'Donnell, UCONN

ALPHA Quote #: M2015009

Client Information

Client: University of Connecticut

Address: 1080 Shennecossett Road

Groton, CT 06340

Phone: 860-405-9171

Fax:

Email: james.odonnell@uconn.edu

☐ These samples have been Previously analyzed by Alpha

Turn-Around Time

☑ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: MARCH 12 Time: 5:00pm

Report Information

☐ FAX ☒ EMAIL

☐ ADEx ☐ Add'l Deliverables

Data Deliverables

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed Program: Compliant with USACE RIM

Criteria:

Other Project Specific Requirements/Comments/Detection Limits:

ANALYSIS

SAMPLE HANDLING
Filtration
☐ Done
☒ Not Needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date 2015	Collection Time EST	Sample Matrix	Sampler's Initials	Grain Size (ASTM D422)	Total Solids (SM 2540C)	Total Org. Carbon (EPA 9060) 2 reps	Metals (As,Cd,Cr,Cu,Pb,Hg,Ni,Zn)	PAHs (8270D - SIM)	Pesticides (8081B)	PCB Congeners (8270D - SIM)						Sample Specific Comments	TOTAL # BOTTLES
03503.08	L41	2/26	0933	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
09	L32	2/26	1005	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
10	L35	2/26	1019	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
11	L33	2/26	1035	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
12	L31	2/26	1100	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
13	L34	2/26	1119	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
14	L36	2/26	1135	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
15	L37	2/26	1236	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
16	L38	2/26	1306	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
17	L40	2/26	1330	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
					Container Type	P	A	A	A	A	A	A	-	-	-	-	-		
					Preservative	-	-	-	-	-	-	-	-	-	-	-	-		

Relinquished By:	Date/Time	Received By:	Date/Time
[illegible]	2/26/15 1630	[illegible]	2/26/15 1630
[illegible] 2/26/15	1800	[illegible]	2/26/15 1800

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

FORM NO: 01-01(HAL) (rev. 5-JAN-12)

CHAIN OF CUSTODY

PAGE: OF

ALPHA ANALYTICAL

Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193
Mansfield, MA TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab: 2/26/15

ALPHA Job #: L1503503

Project Information

Project Name: LIS - USACoE RIM Dredge

Project Location: Eastern Long Island Sound

Project #:

Project Manager: James O'Donnell, UCONN

ALPHA Quote #: M2015009

Report Information

☐ FAX ☒ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed Program: Compliant with USACE RIM
Criteria:

Client Information

Client: University of Connecticut
Address: 1080 Shennecossett Road
Groton, CT 06340
Phone: 860-405-9171
Fax:
Email: james.odonnell@uconn.edu

☐ These samples have been Previously analyzed by Alpha

Turn-Around Time

☑ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: MARCH 12 Time: 5:00pm

Other Project Specific Requirements/Comments/Detection Limits:

ANALYSIS

SAMPLE HANDLING
Filtration
☐ Done
☒ Not Needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date 2015	Collection Time EST	Sample Matrix	Sampler's Initials	Grain Size (ASTM D422)	Total Solids (SM 2540C)	Total Org. Carbon (EPA 9060) 2 reps	Metals (As,Cd,Cr,Cu,Pb,Hg,Ni,Zn)	PAHs (8270D - SIM)	Pesticides (8081B)	PCB Congeners (8270D - SIM)						Sample Specific Comments	TOTAL # BOTTLES
03503.18	L39	2/26	1345	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
19	L26A	2/26	1424	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
20	L26B	2/26	1430	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
					Container Type	P	A	A	A	A	A	A	-	-	-	-	-		
					Preservative	-	-	-	-	-	-	-	-	-	-	-	-		

Relinquished By:	Date/Time	Received By:	Date/Time
Kathryn Stone	2/26/15 1630	[illegible]	2/26/15 1630
[illegible]	2/26/15 18:18	[illegible]	2/26/15 18:18

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

FORM NO: 01-03(I-NJ) (rev. 5-JAN-12)

CHAIN OF CUSTODY

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ALPHA ANALYTICAL

Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193
Mansfield, MA TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab: 2/24/15

ALPHA Job #: L1503503

Project Information

Project Name: LIS - USACoE RIM Dredge

Project Location: Eastern Long Island Sound

Project #:

Project Manager: James O'Donnell, UCONN

ALPHA Quote #: M2015009

Client Information

Client: University of Connecticut

Address: 1080 Shennecossett Road

Groton, CT 06340

Phone: 860-405-9171

Fax:

Email: james.odonnell@uconn.edu

☐ These samples have been Previously analyzed by Alpha

Turn-Around Time

☑ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: MARCH 10 Time: 5:00pm

Report Information

☐ FAX ☐ ADEx

Data Deliverables

☒ EMAIL ☐ Add'l Deliverables

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed Program: Compliant with USACE RIM

Criteria:

Other Project Specific Requirements/Comments/Detection Limits:

FOR L-62 MS & L-62 MSD, USE SEDIMENT FROM SAME BOTTLE AS FOR SAMPLE L-62.

ANALYSIS

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date 2015	Collection Time EST	Sample Matrix	Sampler's Initials	Grain Size (ASTM D422)	Total Solids (SM 2540C)	Total Org. Carbon (EPA 9060) 2 reps	Metals (As,Cd,Cr,Cu,Pb,Hg,Ni,Zn)	PAHs (8270D - SIM)	Pesticides (8081B)	PCB Congeners (8270D - SIM)						Sample Specific Comments	TOTAL # BOTTLES
03503, 01	L-56	2/24	1122	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
02	L-55	2/24	1201	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
03	L-54	2/24	1235	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
04	L-53	2/24	1301	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
05	L-52	2/24	1352	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
06	L-51	2/24	1420	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
07	L-62	2/24	1435	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
07	L-62 MS	2/24	1435	SE	KHS	☐	☐	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐	SAME BOTTLE AS L-62	0
07	L-62 MSD	2/24	1435	SE	KHS	☐	☐	☐	☑	☑	☑	☑	☐	☐	☐	☐	☐	SAME BOTTLE AS L-62	0
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
					Container Type	P	A	A	A	A	A	A	-	-	-	-	-		
					Preservative	-	-	-	-	-	-	-	-	-	-	-	-		

SAMPLE HANDLING
Filtration
☐ Done
☒ Not Needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

Relinquished By:	Date/Time	Received By:	Date/Time
[illegible]	2/24/15 1633	[illegible]	2/24/15 1633
[illegible]	2/24/15 1807	[illegible]	2/24/15 1807

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

FORM NO: 01-01(I-NJ) (rev. 5-JAN-12)

Appendix 3

LABORATORY REPORT B: SAMPLING ON FEBRUARY 27

(including Chain of Custody forms)

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ANALYTICAL REPORT

Lab Number:	L1503772
Client:	University of Connecticut 1080 Shennecossett Road Marine Sciences Dept Groton, CT 06340
ATTN:	James O'Donnell
Phone:	(401) 932-5703
Project Name:	LIS-USACOE RIM DREDGE
Project Number:	Not Specified
Report Date:	03/16/15

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: NY (11627), CT (PH-0141), NH (2206), NJ NELAP (MA015), RI (LAO00299), ME (MA00030), PA (68-02089), VA (460194), LA NELAP (03090), FL (E87814), TX (T104704419), WA (C954), USFWS (Permit #LE2069641), USDA (Permit #P330-11-00109), US Army Corps of Engineers.

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1503772-01	L27	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 09:08	02/27/15
L1503772-02	L28	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 09:21	02/27/15
L1503772-03	L25A	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 09:48	02/27/15
L1503772-04	L25B	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 10:00	02/27/15
L1503772-05	L21	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 10:12	02/27/15
L1503772-06	L20	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 10:25	02/27/15
L1503772-07	L19	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 10:43	02/27/15
L1503772-08	L13	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 10:55	02/27/15
L1503772-09	L16	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 11:09	02/27/15
L1503772-10	L18	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 11:22	02/27/15
L1503772-11	L17	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 11:39	02/27/15
L1503772-12	L15	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 11:53	02/27/15
L1503772-13	L12	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 12:58	02/27/15
L1503772-14	L11	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 13:08	02/27/15
L1503772-15	L14	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 13:19	02/27/15
L1503772-16	L23A	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 13:35	02/27/15
L1503772-17	L23B	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 13:45	02/27/15
L1503772-18	L24A	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 13:58	02/27/15
L1503772-19	L24B	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 14:12	02/27/15
L1503772-20	L22A	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 14:30	02/27/15
L1503772-21	L22B	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 14:43	02/27/15
L1503772-22	L61	SEDIMENT	EASTERN LONG ISLAND SOUND	02/27/15 23:45	02/27/15

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772
Project Number: Not Specified **Report Date:** 03/16/15

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Case Narrative (continued)

Report Submission

This report replaces the one issued on March 12, 2015. The report was amended to correct grain size analysis results.

Semivolatile Organics

PAHs and PCBs by GC/MS-SIM

The surrogate recovery for sample L1503772-13 is outside the individual acceptance criteria for 2-Methylnaphthalene-d10 (27%), but within the overall method allowances.

The WG766355-4 Standard Reference Material is outside the QC limits for CL3-BZ#28 (33%).

The WG766355-6 /-7MS/MSD RPD(s), associated with samples L1503772-13 through -22, are above the acceptance criteria for Benzo(b)fluoranthene (31%).

Pesticides

The Pesticide analysis was performed utilizing dual column confirmation with the higher of the two values reported. If the relative percent difference (RPD) was above the acceptance criteria the compound is reported with a "P" qualifier. Technical judgment was employed in the case of an observed interference. In the case that interference was observed on one column, the lower value is reported and qualified with an "I".

The laboratory control sample duplicate WG766344-3 recoveries, associated with L1503772-01 through -07, are above the acceptance criteria for 4,4'-DDD (135%) and Methoxychlor (128%); however, the associated samples are non-detect for these target compounds. The LCS recoveries were within criteria therefore no action was required.

The standard reference material (SRM) WG766345-4 had the compound trans-Nonachlor at 270%, and the Surrogate BZ #198 at 169% for Column B, recovered above the acceptance criteria, due to matrix interference. All other monitored compounds and surrogates were recovered within acceptance criteria. In addition the SRM

Case Narrative (continued)

has elevated detection limits due to the dilution required by the elevated concentrations of non-target compounds in the sample.

The continuing calibration standard WG766869-1, associated to samples L1503772-08 through -12 and WG766345-5, had the response for Hexachlorobenzene (15.4%D - column B) and alpha-Chlordane (20.3%D-column B) outside the individual acceptance criteria but within allowance. The compound alpha-Chlordane was not detected above the reporting limit for column A; therefore no further action was taken.

The continuing calibration standard WG766869-2, associated to samples L1503772-08 through -19, WG766345-1, -2, -3 and -5, had the response for Hexachlorobenzene (19.2%D - Column B), Heptachlor (17.6%D-Column B), Heptachlor epoxide (B) (16.3%D-Column B), Oxychlordane (17.8%D-Column B), gamma-Chlordane (16.3%D-Column B), Endosulfan I (16.5%D-Column B), alpha-Chlordane (25.1%D-Column B), trans-Nonachlor (17.5%D-Column B), Endrin (18.6%D-Column B) and Endosulfan II (15.6%D-Column B) outside the individual acceptance criteria but within method allowance. The compound alpha-Chlordane was not detected above the reporting limit for column A; therefore no further action was taken.

The continuing calibration standard WG766869-3, associated to samples L1503772-13 through -22 as well as the associated QC WG766345-1, -2, -3, -4, -6 and -7 had the response for TMX (17.9%D-Column B), Hexachlorobenzene (19.1%D - Column B), Heptachlor (18.3%D-Column B), Heptachlor epoxide (B) (15.6%D-Column B), Oxychlordane (16.8%D-Column B), gamma-Chlordane (15.8%D-Column B), Endosulfan I (15.4%D-Column B), alpha-Chlordane (24.1%D-Column B), trans-Nonachlor (16.1%D-Column B), Endrin (19.4%D-Column B), Methoxychlor (17.4%D-Column B) and DCB (17.2%D-Column B) outside the individual acceptance criteria but within method allowance. The compound alpha-Chlordane was not detected above the reporting limit for column A; therefore no further action was taken.

The continuing calibration standard WG766869-4, associated to samples L1503772-20 through -22, WG766345-4, -6 and -7 had the response for Hexachlorobenzene (15.3%D - Column B), alpha-Chlordane (20.8%D-Column B), Endrin (15.8%D-Column B) and DCB (15.2%D-Column B) outside the individual

Case Narrative (continued)

acceptance criteria but within method allowance. The compound alpha-Chlordane was not detected above the reporting limit for column A; therefore no further action was taken.

The continuing calibration standard WG766869-7, associated to samples L1503772-01 through -07 had the response for gamma-BHC (15.1%D-Column A), Aldrin (15.3%D-Column A) and 4,4'-DDD (16.5%D-Column A) outside the individual acceptance criteria but within method allowance, therefore no further action was taken.

The continuing calibration standard WG766869-8, associated to samples L1503772-01 through -07 had the response for gamma-BHC (15.4%D-Column A), Aldrin (15.4%D-Column A), Dieldrin (15.3%D-Column A) and 4,4'-DDD (15.7%D-Column A) outside the individual acceptance criteria but within method allowance, therefore no further action was taken.

Metals

The CCB has a concentration above the reporting limit for Arsenic. Since the associated sample concentrations are greater than 10x the blank concentration for this analyte, no corrective action is required.

The WG766043-3 Laboratory Duplicate RPD, performed on L1503772-01, is above the acceptance criteria for Cadmium (34%); however, the sample and duplicate results are less than five times the reporting limit. Therefore, the RPD is valid.

The WG766048-3 Laboratory Duplicate RPD, performed on L1503772-22, is outside the acceptance criteria for Arsenic (27%) and Chromium (26%). The elevated RPD has been attributed to the non-homogeneous nature of the sample utilized for the laboratory duplicate.

Total Organic Carbon

The WG767492-4 MS recovery for Total Organic Carbon (Rep2 - 73%), performed on L1503772-10, is outside the 75-125% acceptance criteria, possibly due to sample matrix. The associated SRM recoveries are within criteria indicating the sample batch was in control, and all sample results were accepted.

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503772
Project Number:	Not Specified	**Report Date:**	03/16/15

Case Narrative (continued)

The WG767492-5 MS recovery for Total Organic Carbon (Rep2 - 192%), performed on L1503772-13, is outside the 75-125% acceptance criteria, possibly due to sample matrix. The associated SRM recoveries are within criteria indicating the sample batch was in control, and all sample results were accepted.

The WG767511-5 MSD recovery for Total Organic Carbon (Rep1 - 141%), performed on L1503772-22, is outside the 75-125% acceptance criteria, possibly due to sample matrix. The associated SRM recoveries are within criteria indicating the sample batch was in control, and all sample results were accepted. In addition, the WG767511-4/-5 MS/MSD RPD for Total Organic Carbon (Rep2 - 39%) is above the acceptance criteria.

Grain Size Analysis

The WG767551-1 Laboratory Duplicate RPD, performed on L1503772-01, is outside the acceptance criteria for Percent Total Gravel (119%), Percent Coarse Sand (48%) and Percent Medium Sand (27%). The elevated RPD has been attributed to the non-homogeneous nature of the sample utilized for the laboratory duplicate.

The WG767555-1 Laboratory Duplicate RPD, performed on L1503772-22, is outside the acceptance criteria for Percent Total Gravel (25%). The elevated RPD has been attributed to the non-homogeneous nature of the sample utilized for the laboratory duplicate.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Cynthia McQueen

Title: Technical Director/Representative

Date: 03/16/15

ORGANICS

SEMIVOLATILES

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-01	Date Collected:	02/27/15 09:08
Client ID:	L27	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/06/15 17:58	Cleanup Method:	EPA 3630
Analyst:	JT	Cleanup Date:	03/06/15
Percent Solids:	72%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	13.6	--	1
Acenaphthylene	ND		ug/kg	13.6	--	1
Acenaphthene	ND		ug/kg	13.6	--	1
Fluorene	ND		ug/kg	13.6	--	1
Phenanthrene	ND		ug/kg	13.6	--	1
Anthracene	ND		ug/kg	13.6	--	1
Fluoranthene	ND		ug/kg	13.6	--	1
Pyrene	15.1		ug/kg	13.6	--	1
Benz(a)anthracene	ND		ug/kg	13.6	--	1
Chrysene	ND		ug/kg	13.6	--	1
Benzo(b)fluoranthene	ND		ug/kg	13.6	--	1
Benzo(k)fluoranthene	ND		ug/kg	13.6	--	1
Benzo(a)pyrene	ND		ug/kg	13.6	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	13.6	--	1
Dibenz(a,h)anthracene	ND		ug/kg	13.6	--	1
Benzo(ghi)perylene	ND		ug/kg	13.6	--	1
Cl2-BZ#8	ND		ug/kg	1.36	--	1
Cl3-BZ#18	ND		ug/kg	1.36	--	1
Cl3-BZ#28	ND		ug/kg	1.36	--	1
Cl4-BZ#44	ND		ug/kg	1.36	--	1
Cl4-BZ#49	ND		ug/kg	1.36	--	1
Cl4-BZ#52	ND		ug/kg	1.36	--	1
Cl4-BZ#66	ND		ug/kg	1.36	--	1
Cl5-BZ#87	ND		ug/kg	1.36	--	1
Cl5-BZ#101	ND		ug/kg	1.36	--	1
Cl5-BZ#105	ND		ug/kg	1.36	--	1
Cl5-BZ#118	ND		ug/kg	1.36	--	1
Cl6-BZ#128	ND		ug/kg	1.36	--	1
Cl6-BZ#138	ND		ug/kg	1.36	--	1
Cl6-BZ#153	ND		ug/kg	1.36	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-01 Date Collected: 02/27/15 09:08

Client ID: L27 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.36	--	1
Cl7-BZ#180	ND		ug/kg	1.36	--	1
Cl7-BZ#183	ND		ug/kg	1.36	--	1
Cl7-BZ#184	ND		ug/kg	1.36	--	1
Cl7-BZ#187	ND		ug/kg	1.36	--	1
Cl8-BZ#195	ND		ug/kg	1.36	--	1
Cl9-BZ#206	ND		ug/kg	1.36	--	1
Cl10-BZ#209	ND		ug/kg	1.36	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	48		30-150
Pyrene-d10	53		30-150
Benzo(b)fluoranthene-d12	54		30-150
DBOB	53		30-150
BZ 198	52		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-02	Date Collected:	02/27/15 09:21
Client ID:	L28	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/06/15 18:30	Cleanup Method:	EPA 3630
Analyst:	JT	Cleanup Date:	03/06/15
Percent Solids:	73%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	13.5	--	1
Acenaphthylene	ND		ug/kg	13.5	--	1
Acenaphthene	ND		ug/kg	13.5	--	1
Fluorene	ND		ug/kg	13.5	--	1
Phenanthrene	ND		ug/kg	13.5	--	1
Anthracene	ND		ug/kg	13.5	--	1
Fluoranthene	ND		ug/kg	13.5	--	1
Pyrene	ND		ug/kg	13.5	--	1
Benz(a)anthracene	ND		ug/kg	13.5	--	1
Chrysene	ND		ug/kg	13.5	--	1
Benzo(b)fluoranthene	ND		ug/kg	13.5	--	1
Benzo(k)fluoranthene	ND		ug/kg	13.5	--	1
Benzo(a)pyrene	ND		ug/kg	13.5	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	13.5	--	1
Dibenz(a,h)anthracene	ND		ug/kg	13.5	--	1
Benzo(ghi)perylene	ND		ug/kg	13.5	--	1
Cl2-BZ#8	ND		ug/kg	1.35	--	1
Cl3-BZ#18	ND		ug/kg	1.35	--	1
Cl3-BZ#28	ND		ug/kg	1.35	--	1
Cl4-BZ#44	ND		ug/kg	1.35	--	1
Cl4-BZ#49	ND		ug/kg	1.35	--	1
Cl4-BZ#52	ND		ug/kg	1.35	--	1
Cl4-BZ#66	ND		ug/kg	1.35	--	1
Cl5-BZ#87	ND		ug/kg	1.35	--	1
Cl5-BZ#101	ND		ug/kg	1.35	--	1
Cl5-BZ#105	ND		ug/kg	1.35	--	1
Cl5-BZ#118	ND		ug/kg	1.35	--	1
Cl6-BZ#128	ND		ug/kg	1.35	--	1
Cl6-BZ#138	ND		ug/kg	1.35	--	1
Cl6-BZ#153	ND		ug/kg	1.35	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-02 Date Collected: 02/27/15 09:21

Client ID: L28 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.35	--	1
Cl7-BZ#180	ND		ug/kg	1.35	--	1
Cl7-BZ#183	ND		ug/kg	1.35	--	1
Cl7-BZ#184	ND		ug/kg	1.35	--	1
Cl7-BZ#187	ND		ug/kg	1.35	--	1
Cl8-BZ#195	ND		ug/kg	1.35	--	1
Cl9-BZ#206	ND		ug/kg	1.35	--	1
Cl10-BZ#209	ND		ug/kg	1.35	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	41		30-150
Pyrene-d10	46		30-150
Benzo(b)fluoranthene-d12	48		30-150
DBOB	47		30-150
BZ 198	45		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-03	Date Collected:	02/27/15 09:48
Client ID:	L25A	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/06/15 19:04	Cleanup Method:	EPA 3630
Analyst:	JT	Cleanup Date:	03/06/15
Percent Solids:	72%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	14.2	--	1
Acenaphthylene	ND		ug/kg	14.2	--	1
Acenaphthene	ND		ug/kg	14.2	--	1
Fluorene	ND		ug/kg	14.2	--	1
Phenanthrene	ND		ug/kg	14.2	--	1
Anthracene	ND		ug/kg	14.2	--	1
Fluoranthene	ND		ug/kg	14.2	--	1
Pyrene	ND		ug/kg	14.2	--	1
Benz(a)anthracene	ND		ug/kg	14.2	--	1
Chrysene	ND		ug/kg	14.2	--	1
Benzo(b)fluoranthene	ND		ug/kg	14.2	--	1
Benzo(k)fluoranthene	ND		ug/kg	14.2	--	1
Benzo(a)pyrene	ND		ug/kg	14.2	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	14.2	--	1
Dibenz(a,h)anthracene	ND		ug/kg	14.2	--	1
Benzo(ghi)perylene	ND		ug/kg	14.2	--	1
Cl2-BZ#8	ND		ug/kg	1.42	--	1
Cl3-BZ#18	ND		ug/kg	1.42	--	1
Cl3-BZ#28	ND		ug/kg	1.42	--	1
Cl4-BZ#44	ND		ug/kg	1.42	--	1
Cl4-BZ#49	ND		ug/kg	1.42	--	1
Cl4-BZ#52	ND		ug/kg	1.42	--	1
Cl4-BZ#66	ND		ug/kg	1.42	--	1
Cl5-BZ#87	ND		ug/kg	1.42	--	1
Cl5-BZ#101	ND		ug/kg	1.42	--	1
Cl5-BZ#105	ND		ug/kg	1.42	--	1
Cl5-BZ#118	ND		ug/kg	1.42	--	1
Cl6-BZ#128	ND		ug/kg	1.42	--	1
Cl6-BZ#138	ND		ug/kg	1.42	--	1
Cl6-BZ#153	ND		ug/kg	1.42	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-03 Date Collected: 02/27/15 09:48

Client ID: L25A Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.42	--	1
Cl7-BZ#180	ND		ug/kg	1.42	--	1
Cl7-BZ#183	ND		ug/kg	1.42	--	1
Cl7-BZ#184	ND		ug/kg	1.42	--	1
Cl7-BZ#187	ND		ug/kg	1.42	--	1
Cl8-BZ#195	ND		ug/kg	1.42	--	1
Cl9-BZ#206	ND		ug/kg	1.42	--	1
Cl10-BZ#209	ND		ug/kg	1.42	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	43		30-150
Pyrene-d10	51		30-150
Benzo(b)fluoranthene-d12	52		30-150
DBOB	50		30-150
BZ 198	48		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-04	Date Collected:	02/27/15 10:00
Client ID:	L25B	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/06/15 19:37	Cleanup Method:	EPA 3630
Analyst:	JT	Cleanup Date:	03/06/15
Percent Solids:	73%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	13.8	--	1
Acenaphthylene	ND		ug/kg	13.8	--	1
Acenaphthene	ND		ug/kg	13.8	--	1
Fluorene	ND		ug/kg	13.8	--	1
Phenanthrene	ND		ug/kg	13.8	--	1
Anthracene	ND		ug/kg	13.8	--	1
Fluoranthene	ND		ug/kg	13.8	--	1
Pyrene	ND		ug/kg	13.8	--	1
Benz(a)anthracene	ND		ug/kg	13.8	--	1
Chrysene	ND		ug/kg	13.8	--	1
Benzo(b)fluoranthene	ND		ug/kg	13.8	--	1
Benzo(k)fluoranthene	ND		ug/kg	13.8	--	1
Benzo(a)pyrene	ND		ug/kg	13.8	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	13.8	--	1
Dibenz(a,h)anthracene	ND		ug/kg	13.8	--	1
Benzo(ghi)perylene	ND		ug/kg	13.8	--	1
Cl2-BZ#8	ND		ug/kg	1.38	--	1
Cl3-BZ#18	ND		ug/kg	1.38	--	1
Cl3-BZ#28	ND		ug/kg	1.38	--	1
Cl4-BZ#44	ND		ug/kg	1.38	--	1
Cl4-BZ#49	ND		ug/kg	1.38	--	1
Cl4-BZ#52	ND		ug/kg	1.38	--	1
Cl4-BZ#66	ND		ug/kg	1.38	--	1
Cl5-BZ#87	ND		ug/kg	1.38	--	1
Cl5-BZ#101	ND		ug/kg	1.38	--	1
Cl5-BZ#105	ND		ug/kg	1.38	--	1
Cl5-BZ#118	ND		ug/kg	1.38	--	1
Cl6-BZ#128	ND		ug/kg	1.38	--	1
Cl6-BZ#138	ND		ug/kg	1.38	--	1
Cl6-BZ#153	ND		ug/kg	1.38	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-04 Date Collected: 02/27/15 10:00

Client ID: L25B Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.38	--	1
Cl7-BZ#180	ND		ug/kg	1.38	--	1
Cl7-BZ#183	ND		ug/kg	1.38	--	1
Cl7-BZ#184	ND		ug/kg	1.38	--	1
Cl7-BZ#187	ND		ug/kg	1.38	--	1
Cl8-BZ#195	ND		ug/kg	1.38	--	1
Cl9-BZ#206	ND		ug/kg	1.38	--	1
Cl10-BZ#209	ND		ug/kg	1.38	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	41		30-150
Pyrene-d10	45		30-150
Benzo(b)fluoranthene-d12	45		30-150
DBOB	46		30-150
BZ 198	42		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-05	Date Collected:	02/27/15 10:12
Client ID:	L21	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/06/15 20:10	Cleanup Method:	EPA 3630
Analyst:	JT	Cleanup Date:	03/06/15
Percent Solids:	70%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	14.3	--	1
Acenaphthylene	ND		ug/kg	14.3	--	1
Acenaphthene	ND		ug/kg	14.3	--	1
Fluorene	ND		ug/kg	14.3	--	1
Phenanthrene	17.7		ug/kg	14.3	--	1
Anthracene	ND		ug/kg	14.3	--	1
Fluoranthene	50.6		ug/kg	14.3	--	1
Pyrene	61.5		ug/kg	14.3	--	1
Benz(a)anthracene	42.0		ug/kg	14.3	--	1
Chrysene	43.6		ug/kg	14.3	--	1
Benzo(b)fluoranthene	32.5		ug/kg	14.3	--	1
Benzo(k)fluoranthene	38.9		ug/kg	14.3	--	1
Benzo(a)pyrene	42.0		ug/kg	14.3	--	1
Indeno(1,2,3-cd)Pyrene	23.2		ug/kg	14.3	--	1
Dibenz(a,h)anthracene	ND		ug/kg	14.3	--	1
Benzo(ghi)perylene	24.1		ug/kg	14.3	--	1
Cl2-BZ#8	ND		ug/kg	1.43	--	1
Cl3-BZ#18	ND		ug/kg	1.43	--	1
Cl3-BZ#28	ND		ug/kg	1.43	--	1
Cl4-BZ#44	ND		ug/kg	1.43	--	1
Cl4-BZ#49	ND		ug/kg	1.43	--	1
Cl4-BZ#52	ND		ug/kg	1.43	--	1
Cl4-BZ#66	ND		ug/kg	1.43	--	1
Cl5-BZ#87	ND		ug/kg	1.43	--	1
Cl5-BZ#101	ND		ug/kg	1.43	--	1
Cl5-BZ#105	ND		ug/kg	1.43	--	1
Cl5-BZ#118	ND		ug/kg	1.43	--	1
Cl6-BZ#128	ND		ug/kg	1.43	--	1
Cl6-BZ#138	ND		ug/kg	1.43	--	1
Cl6-BZ#153	ND		ug/kg	1.43	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-05 Date Collected: 02/27/15 10:12

Client ID: L21 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.43	--	1
Cl7-BZ#180	ND		ug/kg	1.43	--	1
Cl7-BZ#183	ND		ug/kg	1.43	--	1
Cl7-BZ#184	ND		ug/kg	1.43	--	1
Cl7-BZ#187	ND		ug/kg	1.43	--	1
Cl8-BZ#195	ND		ug/kg	1.43	--	1
Cl9-BZ#206	ND		ug/kg	1.43	--	1
Cl10-BZ#209	ND		ug/kg	1.43	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	59		30-150
Pyrene-d10	64		30-150
Benzo(b)fluoranthene-d12	64		30-150
DBOB	64		30-150
BZ 198	60		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-06	Date Collected:	02/27/15 10:25
Client ID:	L20	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/06/15 20:43	Cleanup Method:	EPA 3630
Analyst:	JT	Cleanup Date:	03/06/15
Percent Solids:	74%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	13.9	--	1
Acenaphthylene	ND		ug/kg	13.9	--	1
Acenaphthene	ND		ug/kg	13.9	--	1
Fluorene	ND		ug/kg	13.9	--	1
Phenanthrene	ND		ug/kg	13.9	--	1
Anthracene	ND		ug/kg	13.9	--	1
Fluoranthene	ND		ug/kg	13.9	--	1
Pyrene	14.9		ug/kg	13.9	--	1
Benz(a)anthracene	ND		ug/kg	13.9	--	1
Chrysene	ND		ug/kg	13.9	--	1
Benzo(b)fluoranthene	ND		ug/kg	13.9	--	1
Benzo(k)fluoranthene	ND		ug/kg	13.9	--	1
Benzo(a)pyrene	ND		ug/kg	13.9	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	13.9	--	1
Dibenz(a,h)anthracene	ND		ug/kg	13.9	--	1
Benzo(ghi)perylene	ND		ug/kg	13.9	--	1
Cl2-BZ#8	ND		ug/kg	1.39	--	1
Cl3-BZ#18	ND		ug/kg	1.39	--	1
Cl3-BZ#28	ND		ug/kg	1.39	--	1
Cl4-BZ#44	ND		ug/kg	1.39	--	1
Cl4-BZ#49	ND		ug/kg	1.39	--	1
Cl4-BZ#52	ND		ug/kg	1.39	--	1
Cl4-BZ#66	ND		ug/kg	1.39	--	1
Cl5-BZ#87	ND		ug/kg	1.39	--	1
Cl5-BZ#101	ND		ug/kg	1.39	--	1
Cl5-BZ#105	ND		ug/kg	1.39	--	1
Cl5-BZ#118	ND		ug/kg	1.39	--	1
Cl6-BZ#128	ND		ug/kg	1.39	--	1
Cl6-BZ#138	ND		ug/kg	1.39	--	1
Cl6-BZ#153	ND		ug/kg	1.39	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-06 Date Collected: 02/27/15 10:25

Client ID: L20 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.39	--	1
Cl7-BZ#180	ND		ug/kg	1.39	--	1
Cl7-BZ#183	ND		ug/kg	1.39	--	1
Cl7-BZ#184	ND		ug/kg	1.39	--	1
Cl7-BZ#187	ND		ug/kg	1.39	--	1
Cl8-BZ#195	ND		ug/kg	1.39	--	1
Cl9-BZ#206	ND		ug/kg	1.39	--	1
Cl10-BZ#209	ND		ug/kg	1.39	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	44		30-150
Pyrene-d10	49		30-150
Benzo(b)fluoranthene-d12	51		30-150
DBOB	50		30-150
BZ 198	50		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-07	Date Collected:	02/27/15 10:43
Client ID:	L19	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/06/15 21:16	Cleanup Method:	EPA 3630
Analyst:	JT	Cleanup Date:	03/06/15
Percent Solids:	72%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	13.8	--	1
Acenaphthylene	ND		ug/kg	13.8	--	1
Acenaphthene	ND		ug/kg	13.8	--	1
Fluorene	ND		ug/kg	13.8	--	1
Phenanthrene	41.7		ug/kg	13.8	--	1
Anthracene	16.0		ug/kg	13.8	--	1
Fluoranthene	118		ug/kg	13.8	--	1
Pyrene	95.7		ug/kg	13.8	--	1
Benz(a)anthracene	66.7		ug/kg	13.8	--	1
Chrysene	67.0		ug/kg	13.8	--	1
Benzo(b)fluoranthene	62.0		ug/kg	13.8	--	1
Benzo(k)fluoranthene	50.0		ug/kg	13.8	--	1
Benzo(a)pyrene	57.2		ug/kg	13.8	--	1
Indeno(1,2,3-cd)Pyrene	39.7		ug/kg	13.8	--	1
Dibenz(a,h)anthracene	ND		ug/kg	13.8	--	1
Benzo(ghi)perylene	33.8		ug/kg	13.8	--	1
Cl2-BZ#8	ND		ug/kg	1.38	--	1
Cl3-BZ#18	ND		ug/kg	1.38	--	1
Cl3-BZ#28	ND		ug/kg	1.38	--	1
Cl4-BZ#44	ND		ug/kg	1.38	--	1
Cl4-BZ#49	ND		ug/kg	1.38	--	1
Cl4-BZ#52	ND		ug/kg	1.38	--	1
Cl4-BZ#66	ND		ug/kg	1.38	--	1
Cl5-BZ#87	ND		ug/kg	1.38	--	1
Cl5-BZ#101	ND		ug/kg	1.38	--	1
Cl5-BZ#105	ND		ug/kg	1.38	--	1
Cl5-BZ#118	ND		ug/kg	1.38	--	1
Cl6-BZ#128	ND		ug/kg	1.38	--	1
Cl6-BZ#138	ND		ug/kg	1.38	--	1
Cl6-BZ#153	ND		ug/kg	1.38	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-07 Date Collected: 02/27/15 10:43

Client ID: L19 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.38	--	1
Cl7-BZ#180	ND		ug/kg	1.38	--	1
Cl7-BZ#183	ND		ug/kg	1.38	--	1
Cl7-BZ#184	ND		ug/kg	1.38	--	1
Cl7-BZ#187	ND		ug/kg	1.38	--	1
Cl8-BZ#195	ND		ug/kg	1.38	--	1
Cl9-BZ#206	ND		ug/kg	1.38	--	1
Cl10-BZ#209	ND		ug/kg	1.38	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	43		30-150
Pyrene-d10	50		30-150
Benzo(b)fluoranthene-d12	51		30-150
DBOB	50		30-150
BZ 198	48		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-08	Date Collected:	02/27/15 10:55
Client ID:	L13	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/06/15 21:48	Cleanup Method:	EPA 3630
Analyst:	JT	Cleanup Date:	03/06/15
Percent Solids:	52%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	87.3		ug/kg	9.62	--	1
Acenaphthylene	32.5		ug/kg	9.62	--	1
Acenaphthene	84.4		ug/kg	9.62	--	1
Fluorene	174		ug/kg	9.62	--	1
Phenanthrene	1450		ug/kg	9.62	--	1
Anthracene	288		ug/kg	9.62	--	1
Fluoranthene	1640		ug/kg	9.62	--	1
Pyrene	1320		ug/kg	9.62	--	1
Benz(a)anthracene	591		ug/kg	9.62	--	1
Chrysene	586		ug/kg	9.62	--	1
Benzo(b)fluoranthene	553		ug/kg	9.62	--	1
Benzo(k)fluoranthene	458		ug/kg	9.62	--	1
Benzo(a)pyrene	571		ug/kg	9.62	--	1
Indeno(1,2,3-cd)Pyrene	414		ug/kg	9.62	--	1
Dibenz(a,h)anthracene	73.1		ug/kg	9.62	--	1
Benzo(ghi)perylene	381		ug/kg	9.62	--	1
Cl2-BZ#8	ND		ug/kg	0.962	--	1
Cl3-BZ#18	ND		ug/kg	0.962	--	1
Cl3-BZ#28	ND		ug/kg	0.962	--	1
Cl4-BZ#44	ND		ug/kg	0.962	--	1
Cl4-BZ#49	ND		ug/kg	0.962	--	1
Cl4-BZ#52	ND		ug/kg	0.962	--	1
Cl4-BZ#66	ND		ug/kg	0.962	--	1
Cl5-BZ#87	ND		ug/kg	0.962	--	1
Cl5-BZ#101	ND		ug/kg	0.962	--	1
Cl5-BZ#105	ND		ug/kg	0.962	--	1
Cl5-BZ#118	ND		ug/kg	0.962	--	1
Cl6-BZ#128	ND		ug/kg	0.962	--	1
Cl6-BZ#138	ND		ug/kg	0.962	--	1
Cl6-BZ#153	ND		ug/kg	0.962	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-08 Date Collected: 02/27/15 10:55

Client ID: L13 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.962	--	1
Cl7-BZ#180	ND		ug/kg	0.962	--	1
Cl7-BZ#183	ND		ug/kg	0.962	--	1
Cl7-BZ#184	ND		ug/kg	0.962	--	1
Cl7-BZ#187	ND		ug/kg	0.962	--	1
Cl8-BZ#195	ND		ug/kg	0.962	--	1
Cl9-BZ#206	ND		ug/kg	0.962	--	1
Cl10-BZ#209	ND		ug/kg	0.962	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	49		30-150
Pyrene-d10	54		30-150
Benzo(b)fluoranthene-d12	54		30-150
DBOB	55		30-150
BZ 198	56		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-09	Date Collected:	02/27/15 11:09
Client ID:	L16	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/06/15 22:22	Cleanup Method:	EPA 3630
Analyst:	JT	Cleanup Date:	03/06/15
Percent Solids:	54%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.25	--	1
Acenaphthylene	38.6		ug/kg	9.25	--	1
Acenaphthene	ND		ug/kg	9.25	--	1
Fluorene	ND		ug/kg	9.25	--	1
Phenanthrene	25.5		ug/kg	9.25	--	1
Anthracene	11.9		ug/kg	9.25	--	1
Fluoranthene	54.4		ug/kg	9.25	--	1
Pyrene	84.7		ug/kg	9.25	--	1
Benz(a)anthracene	50.5		ug/kg	9.25	--	1
Chrysene	59.9		ug/kg	9.25	--	1
Benzo(b)fluoranthene	75.6		ug/kg	9.25	--	1
Benzo(k)fluoranthene	66.3		ug/kg	9.25	--	1
Benzo(a)pyrene	90.4		ug/kg	9.25	--	1
Indeno(1,2,3-cd)Pyrene	60.6		ug/kg	9.25	--	1
Dibenz(a,h)anthracene	13.7		ug/kg	9.25	--	1
Benzo(ghi)perylene	53.5		ug/kg	9.25	--	1
Cl2-BZ#8	ND		ug/kg	0.925	--	1
Cl3-BZ#18	ND		ug/kg	0.925	--	1
Cl3-BZ#28	ND		ug/kg	0.925	--	1
Cl4-BZ#44	ND		ug/kg	0.925	--	1
Cl4-BZ#49	ND		ug/kg	0.925	--	1
Cl4-BZ#52	ND		ug/kg	0.925	--	1
Cl4-BZ#66	ND		ug/kg	0.925	--	1
Cl5-BZ#87	ND		ug/kg	0.925	--	1
Cl5-BZ#101	ND		ug/kg	0.925	--	1
Cl5-BZ#105	ND		ug/kg	0.925	--	1
Cl5-BZ#118	ND		ug/kg	0.925	--	1
Cl6-BZ#128	ND		ug/kg	0.925	--	1
Cl6-BZ#138	1.00		ug/kg	0.925	--	1
Cl6-BZ#153	ND		ug/kg	0.925	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-09 Date Collected: 02/27/15 11:09

Client ID: L16 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.925	--	1
Cl7-BZ#180	ND		ug/kg	0.925	--	1
Cl7-BZ#183	ND		ug/kg	0.925	--	1
Cl7-BZ#184	ND		ug/kg	0.925	--	1
Cl7-BZ#187	ND		ug/kg	0.925	--	1
Cl8-BZ#195	ND		ug/kg	0.925	--	1
Cl9-BZ#206	ND		ug/kg	0.925	--	1
Cl10-BZ#209	ND		ug/kg	0.925	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	33		30-150
Pyrene-d10	40		30-150
Benzo(b)fluoranthene-d12	41		30-150
DBOB	40		30-150
BZ 198	42		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-10	Date Collected:	02/27/15 11:22
Client ID:	L18	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/08/15 13:30	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/06/15
Percent Solids:	56%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.88	--	1
Acenaphthylene	ND		ug/kg	8.88	--	1
Acenaphthene	ND		ug/kg	8.88	--	1
Fluorene	ND		ug/kg	8.88	--	1
Phenanthrene	10.2		ug/kg	8.88	--	1
Anthracene	ND		ug/kg	8.88	--	1
Fluoranthene	29.8		ug/kg	8.88	--	1
Pyrene	41.2		ug/kg	8.88	--	1
Benz(a)anthracene	19.4		ug/kg	8.88	--	1
Chrysene	22.2		ug/kg	8.88	--	1
Benzo(b)fluoranthene	19.2		ug/kg	8.88	--	1
Benzo(k)fluoranthene	16.8		ug/kg	8.88	--	1
Benzo(a)pyrene	19.2		ug/kg	8.88	--	1
Indeno(1,2,3-cd)Pyrene	11.5		ug/kg	8.88	--	1
Dibenz(a,h)anthracene	ND		ug/kg	8.88	--	1
Benzo(ghi)perylene	12.6		ug/kg	8.88	--	1
Cl2-BZ#8	ND		ug/kg	0.888	--	1
Cl3-BZ#18	ND		ug/kg	0.888	--	1
Cl3-BZ#28	ND		ug/kg	0.888	--	1
Cl4-BZ#44	ND		ug/kg	0.888	--	1
Cl4-BZ#49	ND		ug/kg	0.888	--	1
Cl4-BZ#52	ND		ug/kg	0.888	--	1
Cl4-BZ#66	ND		ug/kg	0.888	--	1
Cl5-BZ#87	ND		ug/kg	0.888	--	1
Cl5-BZ#101	ND		ug/kg	0.888	--	1
Cl5-BZ#105	ND		ug/kg	0.888	--	1
Cl5-BZ#118	ND		ug/kg	0.888	--	1
Cl6-BZ#128	ND		ug/kg	0.888	--	1
Cl6-BZ#138	ND		ug/kg	0.888	--	1
Cl6-BZ#153	ND		ug/kg	0.888	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-10 Date Collected: 02/27/15 11:22

Client ID: L18 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.888	--	1
Cl7-BZ#180	ND		ug/kg	0.888	--	1
Cl7-BZ#183	ND		ug/kg	0.888	--	1
Cl7-BZ#184	ND		ug/kg	0.888	--	1
Cl7-BZ#187	ND		ug/kg	0.888	--	1
Cl8-BZ#195	ND		ug/kg	0.888	--	1
Cl9-BZ#206	ND		ug/kg	0.888	--	1
Cl10-BZ#209	ND		ug/kg	0.888	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	47		30-150
Pyrene-d10	55		30-150
Benzo(b)fluoranthene-d12	55		30-150
DBOB	53		30-150
BZ 198	51		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-11	Date Collected:	02/27/15 11:39
Client ID:	L17	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/08/15 14:03	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/06/15
Percent Solids:	72%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	13.6	--	1
Acenaphthylene	ND		ug/kg	13.6	--	1
Acenaphthene	ND		ug/kg	13.6	--	1
Fluorene	ND		ug/kg	13.6	--	1
Phenanthrene	ND		ug/kg	13.6	--	1
Anthracene	ND		ug/kg	13.6	--	1
Fluoranthene	13.6		ug/kg	13.6	--	1
Pyrene	16.6		ug/kg	13.6	--	1
Benz(a)anthracene	ND		ug/kg	13.6	--	1
Chrysene	ND		ug/kg	13.6	--	1
Benzo(b)fluoranthene	ND		ug/kg	13.6	--	1
Benzo(k)fluoranthene	ND		ug/kg	13.6	--	1
Benzo(a)pyrene	ND		ug/kg	13.6	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	13.6	--	1
Dibenz(a,h)anthracene	ND		ug/kg	13.6	--	1
Benzo(ghi)perylene	ND		ug/kg	13.6	--	1
Cl2-BZ#8	ND		ug/kg	1.36	--	1
Cl3-BZ#18	ND		ug/kg	1.36	--	1
Cl3-BZ#28	ND		ug/kg	1.36	--	1
Cl4-BZ#44	ND		ug/kg	1.36	--	1
Cl4-BZ#49	ND		ug/kg	1.36	--	1
Cl4-BZ#52	ND		ug/kg	1.36	--	1
Cl4-BZ#66	ND		ug/kg	1.36	--	1
Cl5-BZ#87	ND		ug/kg	1.36	--	1
Cl5-BZ#101	ND		ug/kg	1.36	--	1
Cl5-BZ#105	ND		ug/kg	1.36	--	1
Cl5-BZ#118	ND		ug/kg	1.36	--	1
Cl6-BZ#128	ND		ug/kg	1.36	--	1
Cl6-BZ#138	7.45		ug/kg	1.36	--	1
Cl6-BZ#153	7.27		ug/kg	1.36	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-11 Date Collected: 02/27/15 11:39

Client ID: L17 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	9.93		ug/kg	1.36	--	1
Cl7-BZ#180	17.8		ug/kg	1.36	--	1
Cl7-BZ#183	4.06		ug/kg	1.36	--	1
Cl7-BZ#184	ND		ug/kg	1.36	--	1
Cl7-BZ#187	7.37		ug/kg	1.36	--	1
Cl8-BZ#195	2.00		ug/kg	1.36	--	1
Cl9-BZ#206	ND		ug/kg	1.36	--	1
Cl10-BZ#209	ND		ug/kg	1.36	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	42		30-150
Pyrene-d10	47		30-150
Benzo(b)fluoranthene-d12	48		30-150
DBOB	46		30-150
BZ 198	46		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-12	Date Collected:	02/27/15 11:53
Client ID:	L15	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/08/15 14:36	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/06/15
Percent Solids:	66%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	7.61	--	1
Acenaphthylene	ND		ug/kg	7.61	--	1
Acenaphthene	ND		ug/kg	7.61	--	1
Fluorene	ND		ug/kg	7.61	--	1
Phenanthrene	ND		ug/kg	7.61	--	1
Anthracene	ND		ug/kg	7.61	--	1
Fluoranthene	ND		ug/kg	7.61	--	1
Pyrene	ND		ug/kg	7.61	--	1
Benz(a)anthracene	ND		ug/kg	7.61	--	1
Chrysene	ND		ug/kg	7.61	--	1
Benzo(b)fluoranthene	ND		ug/kg	7.61	--	1
Benzo(k)fluoranthene	ND		ug/kg	7.61	--	1
Benzo(a)pyrene	ND		ug/kg	7.61	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	7.61	--	1
Dibenz(a,h)anthracene	ND		ug/kg	7.61	--	1
Benzo(ghi)perylene	ND		ug/kg	7.61	--	1
Cl2-BZ#8	ND		ug/kg	0.761	--	1
Cl3-BZ#18	ND		ug/kg	0.761	--	1
Cl3-BZ#28	ND		ug/kg	0.761	--	1
Cl4-BZ#44	ND		ug/kg	0.761	--	1
Cl4-BZ#49	ND		ug/kg	0.761	--	1
Cl4-BZ#52	ND		ug/kg	0.761	--	1
Cl4-BZ#66	ND		ug/kg	0.761	--	1
Cl5-BZ#87	ND		ug/kg	0.761	--	1
Cl5-BZ#101	ND		ug/kg	0.761	--	1
Cl5-BZ#105	ND		ug/kg	0.761	--	1
Cl5-BZ#118	ND		ug/kg	0.761	--	1
Cl6-BZ#128	ND		ug/kg	0.761	--	1
Cl6-BZ#138	ND		ug/kg	0.761	--	1
Cl6-BZ#153	ND		ug/kg	0.761	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-12 Date Collected: 02/27/15 11:53

Client ID: L15 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.761	--	1
Cl7-BZ#180	ND		ug/kg	0.761	--	1
Cl7-BZ#183	ND		ug/kg	0.761	--	1
Cl7-BZ#184	ND		ug/kg	0.761	--	1
Cl7-BZ#187	ND		ug/kg	0.761	--	1
Cl8-BZ#195	ND		ug/kg	0.761	--	1
Cl9-BZ#206	ND		ug/kg	0.761	--	1
Cl10-BZ#209	ND		ug/kg	0.761	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	37		30-150
Pyrene-d10	43		30-150
Benzo(b)fluoranthene-d12	43		30-150
DBOB	43		30-150
BZ 198	42		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-13	Date Collected:	02/27/15 12:58
Client ID:	L12	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/08/15 15:09	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/06/15
Percent Solids:	63%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	7.93	--	1
Acenaphthylene	ND		ug/kg	7.93	--	1
Acenaphthene	ND		ug/kg	7.93	--	1
Fluorene	ND		ug/kg	7.93	--	1
Phenanthrene	14.2		ug/kg	7.93	--	1
Anthracene	ND		ug/kg	7.93	--	1
Fluoranthene	30.6		ug/kg	7.93	--	1
Pyrene	33.3		ug/kg	7.93	--	1
Benz(a)anthracene	19.5		ug/kg	7.93	--	1
Chrysene	21.9		ug/kg	7.93	--	1
Benzo(b)fluoranthene	24.8		ug/kg	7.93	--	1
Benzo(k)fluoranthene	23.0		ug/kg	7.93	--	1
Benzo(a)pyrene	22.8		ug/kg	7.93	--	1
Indeno(1,2,3-cd)Pyrene	16.5		ug/kg	7.93	--	1
Dibenz(a,h)anthracene	ND		ug/kg	7.93	--	1
Benzo(ghi)perylene	17.0		ug/kg	7.93	--	1
Cl2-BZ#8	ND		ug/kg	0.793	--	1
Cl3-BZ#18	ND		ug/kg	0.793	--	1
Cl3-BZ#28	ND		ug/kg	0.793	--	1
Cl4-BZ#44	ND		ug/kg	0.793	--	1
Cl4-BZ#49	ND		ug/kg	0.793	--	1
Cl4-BZ#52	ND		ug/kg	0.793	--	1
Cl4-BZ#66	ND		ug/kg	0.793	--	1
Cl5-BZ#87	ND		ug/kg	0.793	--	1
Cl5-BZ#101	ND		ug/kg	0.793	--	1
Cl5-BZ#105	ND		ug/kg	0.793	--	1
Cl5-BZ#118	ND		ug/kg	0.793	--	1
Cl6-BZ#128	ND		ug/kg	0.793	--	1
Cl6-BZ#138	ND		ug/kg	0.793	--	1
Cl6-BZ#153	ND		ug/kg	0.793	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-13 Date Collected: 02/27/15 12:58

Client ID: L12 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.793	--	1
Cl7-BZ#180	ND		ug/kg	0.793	--	1
Cl7-BZ#183	ND		ug/kg	0.793	--	1
Cl7-BZ#184	ND		ug/kg	0.793	--	1
Cl7-BZ#187	ND		ug/kg	0.793	--	1
Cl8-BZ#195	ND		ug/kg	0.793	--	1
Cl9-BZ#206	ND		ug/kg	0.793	--	1
Cl10-BZ#209	ND		ug/kg	0.793	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	**27**	Q	30-150
Pyrene-d10	32		30-150
Benzo(b)fluoranthene-d12	32		30-150
DBOB	31		30-150
BZ 198	31		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-14	Date Collected:	02/27/15 13:08
Client ID:	L11	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/08/15 15:42	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/06/15
Percent Solids:	64%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	12.3		ug/kg	7.80	--	1
Acenaphthylene	ND		ug/kg	7.80	--	1
Acenaphthene	ND		ug/kg	7.80	--	1
Fluorene	ND		ug/kg	7.80	--	1
Phenanthrene	14.2		ug/kg	7.80	--	1
Anthracene	ND		ug/kg	7.80	--	1
Fluoranthene	33.1		ug/kg	7.80	--	1
Pyrene	42.0		ug/kg	7.80	--	1
Benz(a)anthracene	23.3		ug/kg	7.80	--	1
Chrysene	32.0		ug/kg	7.80	--	1
Benzo(b)fluoranthene	49.9		ug/kg	7.80	--	1
Benzo(k)fluoranthene	41.0		ug/kg	7.80	--	1
Benzo(a)pyrene	36.5		ug/kg	7.80	--	1
Indeno(1,2,3-cd)Pyrene	30.0		ug/kg	7.80	--	1
Dibenz(a,h)anthracene	ND		ug/kg	7.80	--	1
Benzo(ghi)perylene	30.2		ug/kg	7.80	--	1
Cl2-BZ#8	ND		ug/kg	0.780	--	1
Cl3-BZ#18	ND		ug/kg	0.780	--	1
Cl3-BZ#28	ND		ug/kg	0.780	--	1
Cl4-BZ#44	ND		ug/kg	0.780	--	1
Cl4-BZ#49	ND		ug/kg	0.780	--	1
Cl4-BZ#52	ND		ug/kg	0.780	--	1
Cl4-BZ#66	ND		ug/kg	0.780	--	1
Cl5-BZ#87	ND		ug/kg	0.780	--	1
Cl5-BZ#101	ND		ug/kg	0.780	--	1
Cl5-BZ#105	ND		ug/kg	0.780	--	1
Cl5-BZ#118	ND		ug/kg	0.780	--	1
Cl6-BZ#128	ND		ug/kg	0.780	--	1
Cl6-BZ#138	ND		ug/kg	0.780	--	1
Cl6-BZ#153	ND		ug/kg	0.780	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-14 Date Collected: 02/27/15 13:08

Client ID: L11 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.780	--	1
Cl7-BZ#180	ND		ug/kg	0.780	--	1
Cl7-BZ#183	ND		ug/kg	0.780	--	1
Cl7-BZ#184	ND		ug/kg	0.780	--	1
Cl7-BZ#187	ND		ug/kg	0.780	--	1
Cl8-BZ#195	ND		ug/kg	0.780	--	1
Cl9-BZ#206	ND		ug/kg	0.780	--	1
Cl10-BZ#209	ND		ug/kg	0.780	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	58		30-150
Pyrene-d10	67		30-150
Benzo(b)fluoranthene-d12	66		30-150
DBOB	69		30-150
BZ 198	65		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-15	Date Collected:	02/27/15 13:19
Client ID:	L14	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/08/15 16:16	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/06/15
Percent Solids:	69%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	9.60		ug/kg	7.40	--	1
Acenaphthylene	10.3		ug/kg	7.40	--	1
Acenaphthene	ND		ug/kg	7.40	--	1
Fluorene	ND		ug/kg	7.40	--	1
Phenanthrene	26.1		ug/kg	7.40	--	1
Anthracene	9.54		ug/kg	7.40	--	1
Fluoranthene	71.0		ug/kg	7.40	--	1
Pyrene	78.5		ug/kg	7.40	--	1
Benz(a)anthracene	46.3		ug/kg	7.40	--	1
Chrysene	55.0		ug/kg	7.40	--	1
Benzo(b)fluoranthene	48.8		ug/kg	7.40	--	1
Benzo(k)fluoranthene	44.0		ug/kg	7.40	--	1
Benzo(a)pyrene	49.5		ug/kg	7.40	--	1
Indeno(1,2,3-cd)Pyrene	33.0		ug/kg	7.40	--	1
Dibenz(a,h)anthracene	ND		ug/kg	7.40	--	1
Benzo(ghi)perylene	31.2		ug/kg	7.40	--	1
Cl2-BZ#8	ND		ug/kg	0.740	--	1
Cl3-BZ#18	ND		ug/kg	0.740	--	1
Cl3-BZ#28	ND		ug/kg	0.740	--	1
Cl4-BZ#44	ND		ug/kg	0.740	--	1
Cl4-BZ#49	ND		ug/kg	0.740	--	1
Cl4-BZ#52	ND		ug/kg	0.740	--	1
Cl4-BZ#66	ND		ug/kg	0.740	--	1
Cl5-BZ#87	ND		ug/kg	0.740	--	1
Cl5-BZ#101	ND		ug/kg	0.740	--	1
Cl5-BZ#105	ND		ug/kg	0.740	--	1
Cl5-BZ#118	ND		ug/kg	0.740	--	1
Cl6-BZ#128	ND		ug/kg	0.740	--	1
Cl6-BZ#138	ND		ug/kg	0.740	--	1
Cl6-BZ#153	ND		ug/kg	0.740	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-15 Date Collected: 02/27/15 13:19

Client ID: L14 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.740	--	1
Cl7-BZ#180	ND		ug/kg	0.740	--	1
Cl7-BZ#183	ND		ug/kg	0.740	--	1
Cl7-BZ#184	ND		ug/kg	0.740	--	1
Cl7-BZ#187	ND		ug/kg	0.740	--	1
Cl8-BZ#195	ND		ug/kg	0.740	--	1
Cl9-BZ#206	ND		ug/kg	0.740	--	1
Cl10-BZ#209	ND		ug/kg	0.740	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	48		30-150
Pyrene-d10	55		30-150
Benzo(b)fluoranthene-d12	56		30-150
DBOB	55		30-150
BZ 198	55		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-16	Date Collected:	02/27/15 13:35
Client ID:	L23A	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/08/15 16:49	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/06/15
Percent Solids:	68%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	7.44	--	1
Acenaphthylene	ND		ug/kg	7.44	--	1
Acenaphthene	ND		ug/kg	7.44	--	1
Fluorene	ND		ug/kg	7.44	--	1
Phenanthrene	12.9		ug/kg	7.44	--	1
Anthracene	ND		ug/kg	7.44	--	1
Fluoranthene	49.3		ug/kg	7.44	--	1
Pyrene	77.7		ug/kg	7.44	--	1
Benz(a)anthracene	52.2		ug/kg	7.44	--	1
Chrysene	56.8		ug/kg	7.44	--	1
Benzo(b)fluoranthene	45.5		ug/kg	7.44	--	1
Benzo(k)fluoranthene	41.1		ug/kg	7.44	--	1
Benzo(a)pyrene	60.5		ug/kg	7.44	--	1
Indeno(1,2,3-cd)Pyrene	35.2		ug/kg	7.44	--	1
Dibenz(a,h)anthracene	7.75		ug/kg	7.44	--	1
Benzo(ghi)perylene	38.2		ug/kg	7.44	--	1
Cl2-BZ#8	ND		ug/kg	0.744	--	1
Cl3-BZ#18	ND		ug/kg	0.744	--	1
Cl3-BZ#28	ND		ug/kg	0.744	--	1
Cl4-BZ#44	ND		ug/kg	0.744	--	1
Cl4-BZ#49	ND		ug/kg	0.744	--	1
Cl4-BZ#52	ND		ug/kg	0.744	--	1
Cl4-BZ#66	ND		ug/kg	0.744	--	1
Cl5-BZ#87	ND		ug/kg	0.744	--	1
Cl5-BZ#101	ND		ug/kg	0.744	--	1
Cl5-BZ#105	ND		ug/kg	0.744	--	1
Cl5-BZ#118	ND		ug/kg	0.744	--	1
Cl6-BZ#128	ND		ug/kg	0.744	--	1
Cl6-BZ#138	ND		ug/kg	0.744	--	1
Cl6-BZ#153	ND		ug/kg	0.744	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-16 Date Collected: 02/27/15 13:35

Client ID: L23A Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.744	--	1
Cl7-BZ#180	ND		ug/kg	0.744	--	1
Cl7-BZ#183	ND		ug/kg	0.744	--	1
Cl7-BZ#184	ND		ug/kg	0.744	--	1
Cl7-BZ#187	ND		ug/kg	0.744	--	1
Cl8-BZ#195	ND		ug/kg	0.744	--	1
Cl9-BZ#206	ND		ug/kg	0.744	--	1
Cl10-BZ#209	ND		ug/kg	0.744	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	49		30-150
Pyrene-d10	57		30-150
Benzo(b)fluoranthene-d12	57		30-150
DBOB	56		30-150
BZ 198	57		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-17	Date Collected:	02/27/15 13:45
Client ID:	L23B	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/08/15 17:22	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/06/15
Percent Solids:	68%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	7.38	--	1
Acenaphthylene	ND		ug/kg	7.38	--	1
Acenaphthene	ND		ug/kg	7.38	--	1
Fluorene	ND		ug/kg	7.38	--	1
Phenanthrene	18.3		ug/kg	7.38	--	1
Anthracene	8.21		ug/kg	7.38	--	1
Fluoranthene	39.4		ug/kg	7.38	--	1
Pyrene	46.8		ug/kg	7.38	--	1
Benz(a)anthracene	32.2		ug/kg	7.38	--	1
Chrysene	35.6		ug/kg	7.38	--	1
Benzo(b)fluoranthene	31.3		ug/kg	7.38	--	1
Benzo(k)fluoranthene	28.8		ug/kg	7.38	--	1
Benzo(a)pyrene	35.5		ug/kg	7.38	--	1
Indeno(1,2,3-cd)Pyrene	24.0		ug/kg	7.38	--	1
Dibenz(a,h)anthracene	ND		ug/kg	7.38	--	1
Benzo(ghi)perylene	23.3		ug/kg	7.38	--	1
Cl2-BZ#8	ND		ug/kg	0.738	--	1
Cl3-BZ#18	ND		ug/kg	0.738	--	1
Cl3-BZ#28	ND		ug/kg	0.738	--	1
Cl4-BZ#44	ND		ug/kg	0.738	--	1
Cl4-BZ#49	ND		ug/kg	0.738	--	1
Cl4-BZ#52	ND		ug/kg	0.738	--	1
Cl4-BZ#66	ND		ug/kg	0.738	--	1
Cl5-BZ#87	ND		ug/kg	0.738	--	1
Cl5-BZ#101	ND		ug/kg	0.738	--	1
Cl5-BZ#105	ND		ug/kg	0.738	--	1
Cl5-BZ#118	ND		ug/kg	0.738	--	1
Cl6-BZ#128	ND		ug/kg	0.738	--	1
Cl6-BZ#138	ND		ug/kg	0.738	--	1
Cl6-BZ#153	ND		ug/kg	0.738	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-17 Date Collected: 02/27/15 13:45

Client ID: L23B Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.738	--	1
Cl7-BZ#180	ND		ug/kg	0.738	--	1
Cl7-BZ#183	ND		ug/kg	0.738	--	1
Cl7-BZ#184	ND		ug/kg	0.738	--	1
Cl7-BZ#187	ND		ug/kg	0.738	--	1
Cl8-BZ#195	ND		ug/kg	0.738	--	1
Cl9-BZ#206	ND		ug/kg	0.738	--	1
Cl10-BZ#209	ND		ug/kg	0.738	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	40		30-150
Pyrene-d10	46		30-150
Benzo(b)fluoranthene-d12	47		30-150
DBOB	44		30-150
BZ 198	46		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-18	Date Collected:	02/27/15 13:58
Client ID:	L24A	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/08/15 17:55	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/06/15
Percent Solids:	70%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	13.9	--	1
Acenaphthylene	ND		ug/kg	13.9	--	1
Acenaphthene	ND		ug/kg	13.9	--	1
Fluorene	ND		ug/kg	13.9	--	1
Phenanthrene	ND		ug/kg	13.9	--	1
Anthracene	ND		ug/kg	13.9	--	1
Fluoranthene	23.4		ug/kg	13.9	--	1
Pyrene	25.4		ug/kg	13.9	--	1
Benz(a)anthracene	14.4		ug/kg	13.9	--	1
Chrysene	16.6		ug/kg	13.9	--	1
Benzo(b)fluoranthene	18.4		ug/kg	13.9	--	1
Benzo(k)fluoranthene	16.8		ug/kg	13.9	--	1
Benzo(a)pyrene	15.9		ug/kg	13.9	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	13.9	--	1
Dibenz(a,h)anthracene	ND		ug/kg	13.9	--	1
Benzo(ghi)perylene	ND		ug/kg	13.9	--	1
Cl2-BZ#8	ND		ug/kg	1.39	--	1
Cl3-BZ#18	ND		ug/kg	1.39	--	1
Cl3-BZ#28	ND		ug/kg	1.39	--	1
Cl4-BZ#44	ND		ug/kg	1.39	--	1
Cl4-BZ#49	ND		ug/kg	1.39	--	1
Cl4-BZ#52	ND		ug/kg	1.39	--	1
Cl4-BZ#66	ND		ug/kg	1.39	--	1
Cl5-BZ#87	ND		ug/kg	1.39	--	1
Cl5-BZ#101	ND		ug/kg	1.39	--	1
Cl5-BZ#105	ND		ug/kg	1.39	--	1
Cl5-BZ#118	ND		ug/kg	1.39	--	1
Cl6-BZ#128	ND		ug/kg	1.39	--	1
Cl6-BZ#138	ND		ug/kg	1.39	--	1
Cl6-BZ#153	ND		ug/kg	1.39	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-18 Date Collected: 02/27/15 13:58

Client ID: L24A Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.39	--	1
Cl7-BZ#180	ND		ug/kg	1.39	--	1
Cl7-BZ#183	ND		ug/kg	1.39	--	1
Cl7-BZ#184	ND		ug/kg	1.39	--	1
Cl7-BZ#187	ND		ug/kg	1.39	--	1
Cl8-BZ#195	ND		ug/kg	1.39	--	1
Cl9-BZ#206	ND		ug/kg	1.39	--	1
Cl10-BZ#209	ND		ug/kg	1.39	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	51		30-150
Pyrene-d10	62		30-150
Benzo(b)fluoranthene-d12	64		30-150
DBOB	58		30-150
BZ 198	62		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-19	Date Collected:	02/27/15 14:12
Client ID:	L24B	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/08/15 18:28	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/06/15
Percent Solids:	68%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	7.27	--	1
Acenaphthylene	ND		ug/kg	7.27	--	1
Acenaphthene	7.49		ug/kg	7.27	--	1
Fluorene	8.41		ug/kg	7.27	--	1
Phenanthrene	80.8		ug/kg	7.27	--	1
Anthracene	15.0		ug/kg	7.27	--	1
Fluoranthene	106		ug/kg	7.27	--	1
Pyrene	89.6		ug/kg	7.27	--	1
Benz(a)anthracene	43.6		ug/kg	7.27	--	1
Chrysene	46.7		ug/kg	7.27	--	1
Benzo(b)fluoranthene	45.0		ug/kg	7.27	--	1
Benzo(k)fluoranthene	37.9		ug/kg	7.27	--	1
Benzo(a)pyrene	42.8		ug/kg	7.27	--	1
Indeno(1,2,3-cd)Pyrene	32.3		ug/kg	7.27	--	1
Dibenz(a,h)anthracene	ND		ug/kg	7.27	--	1
Benzo(ghi)perylene	29.5		ug/kg	7.27	--	1
Cl2-BZ#8	ND		ug/kg	0.727	--	1
Cl3-BZ#18	ND		ug/kg	0.727	--	1
Cl3-BZ#28	ND		ug/kg	0.727	--	1
Cl4-BZ#44	ND		ug/kg	0.727	--	1
Cl4-BZ#49	ND		ug/kg	0.727	--	1
Cl4-BZ#52	ND		ug/kg	0.727	--	1
Cl4-BZ#66	ND		ug/kg	0.727	--	1
Cl5-BZ#87	ND		ug/kg	0.727	--	1
Cl5-BZ#101	ND		ug/kg	0.727	--	1
Cl5-BZ#105	ND		ug/kg	0.727	--	1
Cl5-BZ#118	ND		ug/kg	0.727	--	1
Cl6-BZ#128	ND		ug/kg	0.727	--	1
Cl6-BZ#138	ND		ug/kg	0.727	--	1
Cl6-BZ#153	ND		ug/kg	0.727	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-19 Date Collected: 02/27/15 14:12

Client ID: L24B Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.727	--	1
Cl7-BZ#180	ND		ug/kg	0.727	--	1
Cl7-BZ#183	ND		ug/kg	0.727	--	1
Cl7-BZ#184	ND		ug/kg	0.727	--	1
Cl7-BZ#187	ND		ug/kg	0.727	--	1
Cl8-BZ#195	ND		ug/kg	0.727	--	1
Cl9-BZ#206	ND		ug/kg	0.727	--	1
Cl10-BZ#209	ND		ug/kg	0.727	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	51		30-150
Pyrene-d10	59		30-150
Benzo(b)fluoranthene-d12	60		30-150
DBOB	59		30-150
BZ 198	59		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-20	Date Collected:	02/27/15 14:30
Client ID:	L22A	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/08/15 19:01	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/06/15
Percent Solids:	64%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	7.75	--	1
Acenaphthylene	ND		ug/kg	7.75	--	1
Acenaphthene	ND		ug/kg	7.75	--	1
Fluorene	ND		ug/kg	7.75	--	1
Phenanthrene	13.0		ug/kg	7.75	--	1
Anthracene	ND		ug/kg	7.75	--	1
Fluoranthene	33.4		ug/kg	7.75	--	1
Pyrene	34.2		ug/kg	7.75	--	1
Benz(a)anthracene	17.6		ug/kg	7.75	--	1
Chrysene	22.4		ug/kg	7.75	--	1
Benzo(b)fluoranthene	22.4		ug/kg	7.75	--	1
Benzo(k)fluoranthene	18.5		ug/kg	7.75	--	1
Benzo(a)pyrene	19.1		ug/kg	7.75	--	1
Indeno(1,2,3-cd)Pyrene	14.2		ug/kg	7.75	--	1
Dibenz(a,h)anthracene	ND		ug/kg	7.75	--	1
Benzo(ghi)perylene	15.4		ug/kg	7.75	--	1
Cl2-BZ#8	ND		ug/kg	0.775	--	1
Cl3-BZ#18	ND		ug/kg	0.775	--	1
Cl3-BZ#28	ND		ug/kg	0.775	--	1
Cl4-BZ#44	ND		ug/kg	0.775	--	1
Cl4-BZ#49	ND		ug/kg	0.775	--	1
Cl4-BZ#52	ND		ug/kg	0.775	--	1
Cl4-BZ#66	ND		ug/kg	0.775	--	1
Cl5-BZ#87	ND		ug/kg	0.775	--	1
Cl5-BZ#101	ND		ug/kg	0.775	--	1
Cl5-BZ#105	ND		ug/kg	0.775	--	1
Cl5-BZ#118	ND		ug/kg	0.775	--	1
Cl6-BZ#128	ND		ug/kg	0.775	--	1
Cl6-BZ#138	ND		ug/kg	0.775	--	1
Cl6-BZ#153	ND		ug/kg	0.775	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-20 Date Collected: 02/27/15 14:30

Client ID: L22A Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.775	--	1
Cl7-BZ#180	ND		ug/kg	0.775	--	1
Cl7-BZ#183	ND		ug/kg	0.775	--	1
Cl7-BZ#184	ND		ug/kg	0.775	--	1
Cl7-BZ#187	ND		ug/kg	0.775	--	1
Cl8-BZ#195	ND		ug/kg	0.775	--	1
Cl9-BZ#206	ND		ug/kg	0.775	--	1
Cl10-BZ#209	ND		ug/kg	0.775	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	55		30-150
Pyrene-d10	66		30-150
Benzo(b)fluoranthene-d12	66		30-150
DBOB	67		30-150
BZ 198	68		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-21	Date Collected:	02/27/15 14:43
Client ID:	L22B	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/08/15 19:34	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/06/15
Percent Solids:	67%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	7.41	--	1
Acenaphthylene	ND		ug/kg	7.41	--	1
Acenaphthene	ND		ug/kg	7.41	--	1
Fluorene	ND		ug/kg	7.41	--	1
Phenanthrene	25.0		ug/kg	7.41	--	1
Anthracene	14.8		ug/kg	7.41	--	1
Fluoranthene	68.7		ug/kg	7.41	--	1
Pyrene	92.5		ug/kg	7.41	--	1
Benz(a)anthracene	40.5		ug/kg	7.41	--	1
Chrysene	42.6		ug/kg	7.41	--	1
Benzo(b)fluoranthene	25.4		ug/kg	7.41	--	1
Benzo(k)fluoranthene	37.4		ug/kg	7.41	--	1
Benzo(a)pyrene	43.5		ug/kg	7.41	--	1
Indeno(1,2,3-cd)Pyrene	24.3		ug/kg	7.41	--	1
Dibenz(a,h)anthracene	ND		ug/kg	7.41	--	1
Benzo(ghi)perylene	24.5		ug/kg	7.41	--	1
Cl2-BZ#8	ND		ug/kg	0.741	--	1
Cl3-BZ#18	ND		ug/kg	0.741	--	1
Cl3-BZ#28	ND		ug/kg	0.741	--	1
Cl4-BZ#44	ND		ug/kg	0.741	--	1
Cl4-BZ#49	ND		ug/kg	0.741	--	1
Cl4-BZ#52	ND		ug/kg	0.741	--	1
Cl4-BZ#66	ND		ug/kg	0.741	--	1
Cl5-BZ#87	ND		ug/kg	0.741	--	1
Cl5-BZ#101	ND		ug/kg	0.741	--	1
Cl5-BZ#105	ND		ug/kg	0.741	--	1
Cl5-BZ#118	ND		ug/kg	0.741	--	1
Cl6-BZ#128	ND		ug/kg	0.741	--	1
Cl6-BZ#138	ND		ug/kg	0.741	--	1
Cl6-BZ#153	ND		ug/kg	0.741	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-21 Date Collected: 02/27/15 14:43

Client ID: L22B Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.741	--	1
Cl7-BZ#180	ND		ug/kg	0.741	--	1
Cl7-BZ#183	ND		ug/kg	0.741	--	1
Cl7-BZ#184	ND		ug/kg	0.741	--	1
Cl7-BZ#187	ND		ug/kg	0.741	--	1
Cl8-BZ#195	ND		ug/kg	0.741	--	1
Cl9-BZ#206	ND		ug/kg	0.741	--	1
Cl10-BZ#209	ND		ug/kg	0.741	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	55		30-150
Pyrene-d10	61		30-150
Benzo(b)fluoranthene-d12	62		30-150
DBOB	60		30-150
BZ 198	58		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-22	Date Collected:	02/27/15 23:45
Client ID:	L61	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/05/15 11:50
Analytical Date:	03/08/15 20:07	Cleanup Method:	EPA 3630
Analyst:	CM	Cleanup Date:	03/06/15
Percent Solids:	71%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	14.1	--	1
Acenaphthylene	ND		ug/kg	14.1	--	1
Acenaphthene	ND		ug/kg	14.1	--	1
Fluorene	ND		ug/kg	14.1	--	1
Phenanthrene	ND		ug/kg	14.1	--	1
Anthracene	ND		ug/kg	14.1	--	1
Fluoranthene	ND		ug/kg	14.1	--	1
Pyrene	ND		ug/kg	14.1	--	1
Benz(a)anthracene	ND		ug/kg	14.1	--	1
Chrysene	ND		ug/kg	14.1	--	1
Benzo(b)fluoranthene	ND		ug/kg	14.1	--	1
Benzo(k)fluoranthene	ND		ug/kg	14.1	--	1
Benzo(a)pyrene	ND		ug/kg	14.1	--	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	14.1	--	1
Dibenz(a,h)anthracene	ND		ug/kg	14.1	--	1
Benzo(ghi)perylene	ND		ug/kg	14.1	--	1
Cl2-BZ#8	ND		ug/kg	1.41	--	1
Cl3-BZ#18	ND		ug/kg	1.41	--	1
Cl3-BZ#28	ND		ug/kg	1.41	--	1
Cl4-BZ#44	ND		ug/kg	1.41	--	1
Cl4-BZ#49	ND		ug/kg	1.41	--	1
Cl4-BZ#52	ND		ug/kg	1.41	--	1
Cl4-BZ#66	ND		ug/kg	1.41	--	1
Cl5-BZ#87	ND		ug/kg	1.41	--	1
Cl5-BZ#101	ND		ug/kg	1.41	--	1
Cl5-BZ#105	ND		ug/kg	1.41	--	1
Cl5-BZ#118	ND		ug/kg	1.41	--	1
Cl6-BZ#128	ND		ug/kg	1.41	--	1
Cl6-BZ#138	ND		ug/kg	1.41	--	1
Cl6-BZ#153	ND		ug/kg	1.41	--	1

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-22 Date Collected: 02/27/15 23:45

Client ID: L61 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.41	--	1
Cl7-BZ#180	ND		ug/kg	1.41	--	1
Cl7-BZ#183	ND		ug/kg	1.41	--	1
Cl7-BZ#184	ND		ug/kg	1.41	--	1
Cl7-BZ#187	ND		ug/kg	1.41	--	1
Cl8-BZ#195	ND		ug/kg	1.41	--	1
Cl9-BZ#206	ND		ug/kg	1.41	--	1
Cl10-BZ#209	ND		ug/kg	1.41	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	43		30-150
Pyrene-d10	55		30-150
Benzo(b)fluoranthene-d12	57		30-150
DBOB	52		30-150
BZ 198	53		30-150

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 03/06/15 16:18
Analyst: JT

Extraction Method: EPA 3570
Extraction Date: 03/05/15 11:50
Cleanup Method: EPA 3630
Cleanup Date: 03/06/15

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-12 Batch: WG766354-1					
Naphthalene	ND		ug/kg	10.0	--
Acenaphthylene	ND		ug/kg	10.0	--
Acenaphthene	ND		ug/kg	10.0	--
Fluorene	ND		ug/kg	10.0	--
Phenanthrene	ND		ug/kg	10.0	--
Anthracene	ND		ug/kg	10.0	--
Fluoranthene	ND		ug/kg	10.0	--
Pyrene	ND		ug/kg	10.0	--
Benz(a)anthracene	ND		ug/kg	10.0	--
Chrysene	ND		ug/kg	10.0	--
Benzo(b)fluoranthene	ND		ug/kg	10.0	--
Benzo(k)fluoranthene	ND		ug/kg	10.0	--
Benzo(a)pyrene	ND		ug/kg	10.0	--
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	10.0	--
Dibenz(a,h)anthracene	ND		ug/kg	10.0	--
Benzo(ghi)perylene	ND		ug/kg	10.0	--
Cl2-BZ#8	ND		ug/kg	1.00	--
Cl3-BZ#18	ND		ug/kg	1.00	--
Cl3-BZ#28	ND		ug/kg	1.00	--
Cl4-BZ#44	ND		ug/kg	1.00	--
Cl4-BZ#49	ND		ug/kg	1.00	--
Cl4-BZ#52	ND		ug/kg	1.00	--
Cl4-BZ#66	ND		ug/kg	1.00	--
Cl5-BZ#87	ND		ug/kg	1.00	--
Cl5-BZ#101	ND		ug/kg	1.00	--
Cl5-BZ#105	ND		ug/kg	1.00	--
Cl5-BZ#118	ND		ug/kg	1.00	--
Cl6-BZ#128	ND		ug/kg	1.00	--
Cl6-BZ#138	ND		ug/kg	1.00	--

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 03/06/15 16:18
Analyst: JT

Extraction Method: EPA 3570
Extraction Date: 03/05/15 11:50
Cleanup Method: EPA 3630
Cleanup Date: 03/06/15

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-12 Batch: WG766354-1					
Cl6-BZ#153	ND		ug/kg	1.00	--
Cl7-BZ#170	ND		ug/kg	1.00	--
Cl7-BZ#180	ND		ug/kg	1.00	--
Cl7-BZ#183	ND		ug/kg	1.00	--
Cl7-BZ#184	ND		ug/kg	1.00	--
Cl7-BZ#187	ND		ug/kg	1.00	--
Cl8-BZ#195	ND		ug/kg	1.00	--
Cl9-BZ#206	ND		ug/kg	1.00	--
Cl10-BZ#209	ND		ug/kg	1.00	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	50		30-150
Pyrene-d10	55		30-150
Benzo(b)fluoranthene-d12	55		30-150
DBOB	60		30-150
BZ 198	57		30-150

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 03/08/15 11:52
Analyst: CM

Extraction Method: EPA 3570
Extraction Date: 03/05/15 11:50
Cleanup Method: EPA 3630
Cleanup Date: 03/06/15

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 13-22 Batch: WG766355-1					
Naphthalene	ND		ug/kg	10.0	--
Acenaphthylene	ND		ug/kg	10.0	--
Acenaphthene	ND		ug/kg	10.0	--
Fluorene	ND		ug/kg	10.0	--
Phenanthrene	ND		ug/kg	10.0	--
Anthracene	ND		ug/kg	10.0	--
Fluoranthene	ND		ug/kg	10.0	--
Pyrene	ND		ug/kg	10.0	--
Benz(a)anthracene	ND		ug/kg	10.0	--
Chrysene	ND		ug/kg	10.0	--
Benzo(b)fluoranthene	ND		ug/kg	10.0	--
Benzo(k)fluoranthene	ND		ug/kg	10.0	--
Benzo(a)pyrene	ND		ug/kg	10.0	--
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	10.0	--
Dibenz(a,h)anthracene	ND		ug/kg	10.0	--
Benzo(ghi)perylene	ND		ug/kg	10.0	--
Cl2-BZ#8	ND		ug/kg	1.00	--
Cl3-BZ#18	ND		ug/kg	1.00	--
Cl3-BZ#28	ND		ug/kg	1.00	--
Cl4-BZ#44	ND		ug/kg	1.00	--
Cl4-BZ#49	ND		ug/kg	1.00	--
Cl4-BZ#52	ND		ug/kg	1.00	--
Cl4-BZ#66	ND		ug/kg	1.00	--
Cl5-BZ#87	ND		ug/kg	1.00	--
Cl5-BZ#101	ND		ug/kg	1.00	--
Cl5-BZ#105	ND		ug/kg	1.00	--
Cl5-BZ#118	ND		ug/kg	1.00	--
Cl6-BZ#128	ND		ug/kg	1.00	--
Cl6-BZ#138	ND		ug/kg	1.00	--

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 03/08/15 11:52
Analyst: CM

Extraction Method: EPA 3570
Extraction Date: 03/05/15 11:50
Cleanup Method: EPA 3630
Cleanup Date: 03/06/15

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 13-22 Batch: WG766355-1					
Cl6-BZ#153	ND		ug/kg	1.00	--
Cl7-BZ#170	ND		ug/kg	1.00	--
Cl7-BZ#180	ND		ug/kg	1.00	--
Cl7-BZ#183	ND		ug/kg	1.00	--
Cl7-BZ#184	ND		ug/kg	1.00	--
Cl7-BZ#187	ND		ug/kg	1.00	--
Cl8-BZ#195	ND		ug/kg	1.00	--
Cl9-BZ#206	ND		ug/kg	1.00	--
Cl10-BZ#209	ND		ug/kg	1.00	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	62		30-150
Pyrene-d10	68		30-150
Benzo(b)fluoranthene-d12	71		30-150
DBOB	69		30-150
BZ 198	66		30-150

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503772

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-12 Batch: WG766354-2 WG766354-3								
Naphthalene	62		56		50-120	10		30
Acenaphthylene	61		56		50-120	9		30
Acenaphthene	62		57		50-120	8		30
Fluorene	61		56		50-120	9		30
Phenanthrene	62		58		50-120	7		30
Anthracene	61		57		50-120	7		30
Fluoranthene	64		60		50-120	6		30
Pyrene	64		60		50-120	6		30
Benz(a)anthracene	65		62		50-120	5		30
Chrysene	64		61		50-120	5		30
Benzo(b)fluoranthene	66		64		50-120	3		30
Benzo(k)fluoranthene	71		67		50-120	6		30
Benzo(a)pyrene	64		61		50-120	5		30
Indeno(1,2,3-cd)Pyrene	60		57		50-120	5		30
Dibenz(a,h)anthracene	64		61		50-120	5		30
Benzo(ghi)perylene	62		59		50-120	5		30
Cl2-BZ#8	60		56		50-120	7		30
Cl3-BZ#18	58		54		50-120	7		30
Cl3-BZ#28	62		58		50-120	7		30
Cl4-BZ#44	64		59		50-120	8		30
Cl4-BZ#49	62		57		50-120	8		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503772

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-12 Batch: WG766354-2 WG766354-3								
Cl4-BZ#52	60		57		50-120	5		30
Cl4-BZ#66	63		60		50-120	5		30
Cl5-BZ#87	65		60		50-120	8		30
Cl5-BZ#101	63		60		50-120	5		30
Cl5-BZ#105	64		60		50-120	6		30
Cl5-BZ#118	64		60		50-120	6		30
Cl6-BZ#128	62		59		50-120	5		30
Cl6-BZ#138	64		61		50-120	5		30
Cl6-BZ#153	63		59		50-120	7		30
Cl7-BZ#170	64		61		50-120	5		30
Cl7-BZ#180	62		58		50-120	7		30
Cl7-BZ#183	62		60		50-120	3		30
Cl7-BZ#184	64		60		50-120	6		30
Cl7-BZ#187	62		59		50-120	5		30
Cl8-BZ#195	60		57		50-120	5		30
Cl9-BZ#206	61		57		50-120	7		30
Cl10-BZ#209	60		56		50-120	7		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503772

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-12 Batch: WG766354-2 WG766354-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	58		53		30-150
Pyrene-d10	64		60		30-150
Benzo(b)fluoranthene-d12	65		61		30-150
DBOB	62		59		30-150
BZ 198	60		57		30-150

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503772

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 13-22 Batch: WG766355-2 WG766355-3								
Naphthalene	80		68		50-120	16		30
Acenaphthylene	80		69		50-120	15		30
Acenaphthene	80		70		50-120	13		30
Fluorene	79		69		50-120	14		30
Phenanthrene	79		72		50-120	9		30
Anthracene	77		71		50-120	8		30
Fluoranthene	80		74		50-120	8		30
Pyrene	79		72		50-120	9		30
Benz(a)anthracene	82		74		50-120	10		30
Chrysene	80		74		50-120	8		30
Benzo(b)fluoranthene	84		77		50-120	9		30
Benzo(k)fluoranthene	92		84		50-120	9		30
Benzo(a)pyrene	80		75		50-120	6		30
Indeno(1,2,3-cd)Pyrene	80		72		50-120	11		30
Dibenz(a,h)anthracene	81		73		50-120	10		30
Benzo(ghi)perylene	79		73		50-120	8		30
Cl2-BZ#8	81		66		50-120	20		30
Cl3-BZ#18	76		64		50-120	17		30
Cl3-BZ#28	82		69		50-120	17		30
Cl4-BZ#44	84		71		50-120	17		30
Cl4-BZ#49	81		70		50-120	15		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503772

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 13-22 Batch: WG766355-2 WG766355-3								
Cl4-BZ#52	79		67		50-120	16		30
Cl4-BZ#66	83		71		50-120	16		30
Cl5-BZ#87	85		73		50-120	15		30
Cl5-BZ#101	82		72		50-120	13		30
Cl5-BZ#105	82		73		50-120	12		30
Cl5-BZ#118	82		72		50-120	13		30
Cl6-BZ#128	82		72		50-120	13		30
Cl6-BZ#138	83		73		50-120	13		30
Cl6-BZ#153	82		71		50-120	14		30
Cl7-BZ#170	85		74		50-120	14		30
Cl7-BZ#180	80		72		50-120	11		30
Cl7-BZ#183	82		72		50-120	13		30
Cl7-BZ#184	83		72		50-120	14		30
Cl7-BZ#187	81		71		50-120	13		30
Cl8-BZ#195	79		69		50-120	14		30
Cl9-BZ#206	81		69		50-120	16		30
Cl10-BZ#209	78		68		50-120	14		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503772

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 13-22 Batch: WG766355-2 WG766355-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	74		64		30-150
Pyrene-d10	79		72		30-150
Benzo(b)fluoranthene-d12	82		76		30-150
DBOB	83		72		30-150
BZ 198	78		69		30-150

Matrix Spike Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified
Lab Number: L1503772
Report Date: 03/16/15

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 13-22 QC Batch ID: WG766355-6 WG766355-7 QC Sample: L1503772-22 Client ID: L61												
Naphthalene	ND	714	445	62		548	77		50-120	21		30
Acenaphthylene	ND	714	443	62		549	77		50-120	21		30
Acenaphthene	ND	714	451	63		551	77		50-120	20		30
Fluorene	ND	714	471	66		557	78		50-120	17		30
Phenanthrene	ND	714	468	66		571	80		50-120	20		30
Anthracene	ND	714	435	61		549	77		50-120	23		30
Fluoranthene	ND	714	473	66		614	86		50-120	26		30
Pyrene	ND	714	478	67		597	84		50-120	22		30
Benz(a)anthracene	ND	714	482	68		616	86		50-120	24		30
Chrysene	ND	714	483	68		598	84		50-120	21		30
Benzo(b)fluoranthene	ND	714	489	69		667	94		50-120	**31**	Q	30
Benzo(k)fluoranthene	ND	714	514	72		612	86		50-120	17		30
Benzo(a)pyrene	ND	714	462	65		605	85		50-120	27		30
Indeno(1,2,3-cd)Pyrene	ND	714	464	65		533	75		50-120	14		30
Dibenz(a,h)anthracene	ND	714	461	65		582	82		50-120	23		30
Benzo(ghi)perylene	ND	714	460	65		592	83		50-120	25		30
Cl2-BZ#8	ND	143	86.4	61		116	81		50-120	29		30
Cl3-BZ#18	ND	143	84.3	59		111	78		50-120	27		30
Cl3-BZ#28	ND	143	90.6	64		120	84		50-120	28		30
Cl4-BZ#44	ND	143	93.8	66		122	86		50-120	26		30
Cl4-BZ#49	ND	143	90.8	64		119	83		50-120	27		30

Matrix Spike Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified
Lab Number: L1503772
Report Date: 03/16/15

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 13-22 QC Batch ID: WG766355-6 WG766355-7 QC Sample: L1503772-22 Client ID: L61												
Cl4-BZ#52	ND	143	89.2	63		119	83		50-120	29		30
Cl4-BZ#66	ND	143	92.9	65		123	86		50-120	28		30
Cl5-BZ#87	ND	143	96.3	68		126	88		50-120	27		30
Cl5-BZ#101	ND	143	93.1	65		123	86		50-120	28		30
Cl5-BZ#105	ND	143	94.9	67		122	86		50-120	25		30
Cl5-BZ#118	ND	143	93.6	66		122	86		50-120	26		30
Cl6-BZ#128	ND	143	93.8	66		122	86		50-120	26		30
Cl6-BZ#138	ND	143	95.4	67		124	87		50-120	26		30
Cl6-BZ#153	ND	143	93.6	66		122	86		50-120	26		30
Cl7-BZ#170	ND	143	96.6	68		128	90		50-120	28		30
Cl7-BZ#180	ND	143	90.5	63		119	83		50-120	27		30
Cl7-BZ#183	ND	143	93.3	65		121	85		50-120	26		30
Cl7-BZ#184	ND	143	94.4	66		124	87		50-120	27		30
Cl7-BZ#187	ND	143	93.0	65		123	86		50-120	28		30
Cl8-BZ#195	ND	143	89.0	62		121	85		50-120	30		30
Cl9-BZ#206	ND	143	89.1	62		120	84		50-120	30		30
Cl10-BZ#209	ND	143	89.0	62		119	83		50-120	29		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	58		70		30-150

Matrix Spike Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503772

Report Date: 03/16/15

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 13-22 QC Batch ID: WG766355-6 WG766355-7 QC Sample: L1503772-22 Client ID: L61												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
BZ 198	63		83		30-150
Benzo(b)fluoranthene-d12	64		81		30-150
DBOB	65		85		30-150
Pyrene-d10	64		80		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 13-22 QC Batch ID: WG766355-5 QC Sample: L1503772-22 Client ID: L61						
Naphthalene	ND	ND	ug/kg	NC		30
Acenaphthylene	ND	ND	ug/kg	NC		30
Acenaphthene	ND	ND	ug/kg	NC		30
Fluorene	ND	ND	ug/kg	NC		30
Phenanthrene	ND	ND	ug/kg	NC		30
Anthracene	ND	ND	ug/kg	NC		30
Fluoranthene	ND	25.0	ug/kg	NC		30
Pyrene	ND	22.5	ug/kg	NC		30
Benz(a)anthracene	ND	ND	ug/kg	NC		30
Chrysene	ND	ND	ug/kg	NC		30
Benzo(b)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(k)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(a)pyrene	ND	ND	ug/kg	NC		30
Indeno(1,2,3-cd)Pyrene	ND	ND	ug/kg	NC		30
Dibenz(a,h)anthracene	ND	ND	ug/kg	NC		30
Benzo(ghi)perylene	ND	ND	ug/kg	NC		30
Cl2-BZ#8	ND	ND	ug/kg	NC		30
Cl3-BZ#18	ND	ND	ug/kg	NC		30
Cl3-BZ#28	ND	ND	ug/kg	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 13-22 QC Batch ID: WG766355-5 QC Sample: L1503772-22 Client ID: L61					
Cl4-BZ#44	ND	ND	ug/kg	NC	30
Cl4-BZ#49	ND	ND	ug/kg	NC	30
Cl4-BZ#52	ND	ND	ug/kg	NC	30
Cl4-BZ#66	ND	ND	ug/kg	NC	30
Cl5-BZ#87	ND	ND	ug/kg	NC	30
Cl5-BZ#101	ND	ND	ug/kg	NC	30
Cl5-BZ#105	ND	ND	ug/kg	NC	30
Cl5-BZ#118	ND	ND	ug/kg	NC	30
Cl6-BZ#128	ND	ND	ug/kg	NC	30
Cl6-BZ#138	ND	ND	ug/kg	NC	30
Cl6-BZ#153	ND	ND	ug/kg	NC	30
Cl7-BZ#170	ND	ND	ug/kg	NC	30
Cl7-BZ#180	ND	ND	ug/kg	NC	30
Cl7-BZ#183	ND	ND	ug/kg	NC	30
Cl7-BZ#184	ND	ND	ug/kg	NC	30
Cl7-BZ#187	ND	ND	ug/kg	NC	30
Cl8-BZ#195	ND	ND	ug/kg	NC	30
Cl9-BZ#206	ND	ND	ug/kg	NC	30
Cl10-BZ#209	ND	ND	ug/kg	NC	30

Lab Duplicate Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 13-22 QC Batch ID: WG766355-5 QC Sample: L1503772-22 Client ID: L61					

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	43		47		30-150
Pyrene-d10	55		52		30-150
Benzo(b)fluoranthene-d12	57		53		30-150
DBOB	52		54		30-150
BZ 198	53		50		30-150

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772
Project Number: Not Specified **Report Date:** 03/16/15

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG766355-4

Parameter	% Recovery	Qual	QC Criteria
Phenanthrene	52		40-140
Fluoranthene	51		40-140
Pyrene	46		40-140
Benz(a)anthracene	50		40-140
Chrysene	64		40-140
Benzo(b)fluoranthene	53		40-140
Benzo(k)fluoranthene	91		40-140
Benzo(a)pyrene	41		40-140
Indeno(1,2,3-cd)Pyrene	55		40-140
Dibenz(a,h)anthracene	102		40-140
Benzo(ghi)perylene	53		40-140
Cl2-BZ#8	52		40-140
Cl3-BZ#18	55		40-140
Cl3-BZ#28	33	Q	40-140
Cl4-BZ#44	63		40-140
Cl4-BZ#49	55		40-140
Cl4-BZ#52	46		40-140
Cl4-BZ#66	41		40-140
Cl5-BZ#87	58		40-140
Cl5-BZ#101	56		40-140
Cl5-BZ#105	55		40-140
Cl5-BZ#118	52		40-140
Cl6-BZ#128	87		40-140
Cl6-BZ#138	64		40-140
Cl6-BZ#153	46		40-140
Cl7-BZ#170	62		40-140
Cl7-BZ#180	54		40-140
Cl7-BZ#183	51		40-140
Cl7-BZ#187	60		40-140
Cl9-BZ#206	45		40-140
Cl10-BZ#209	48		40-140
2-Methylnaphthalene-d10 (Surrogate)	48		30-150
Pyrene-d10 (Surrogate)	60		30-150
Benzo(b)fluoranthene-d12 (Surrogate)	57		30-150
DBOB (Surrogate)	55		30-150
BZ 198 (Surrogate)	57		30-150

PESTICIDES

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-01	Date Collected:	02/27/15 09:08
Client ID:	L27	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/10/15 01:01	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	72%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.36	--	1	A
gamma-BHC	ND		ug/kg	0.678	--	1	A
Heptachlor	ND		ug/kg	0.678	--	1	A
Aldrin	ND		ug/kg	0.678	--	1	A
Heptachlor epoxide	ND		ug/kg	1.36	--	1	B
Oxychlordane	ND		ug/kg	1.36	--	1	B
trans-Chlordane	ND		ug/kg	0.678	--	1	A
Endosulfan I	ND		ug/kg	0.678	--	1	A
cis-Chlordane	ND		ug/kg	0.678	--	1	A
trans-Nonachlor	ND		ug/kg	0.678	--	1	A
4,4'-DDE	ND		ug/kg	0.678	--	1	A
Dieldrin	ND		ug/kg	0.678	--	1	A
Endrin	ND		ug/kg	0.678	--	1	A
Endosulfan II	ND		ug/kg	0.678	--	1	A
4,4'-DDD	ND		ug/kg	0.678	--	1	A
cis-Nonachlor	ND		ug/kg	0.678	--	1	A
4,4'-DDT	ND		ug/kg	0.678	--	1	A
Methoxychlor	ND		ug/kg	6.78	--	1	A
Toxaphene	ND		ug/kg	34.0	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	77		30-150	A
BZ 198	89		30-150	A
DBOB	75		30-150	B
BZ 198	90		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-02	Date Collected:	02/27/15 09:21
Client ID:	L28	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/10/15 01:34	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	73%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.35	--	1	A
gamma-BHC	ND		ug/kg	0.674	--	1	A
Heptachlor	ND		ug/kg	0.674	--	1	A
Aldrin	ND		ug/kg	0.674	--	1	A
Heptachlor epoxide	ND		ug/kg	1.35	--	1	B
Oxychlordane	ND		ug/kg	1.35	--	1	B
trans-Chlordane	ND		ug/kg	0.674	--	1	A
Endosulfan I	ND		ug/kg	0.674	--	1	A
cis-Chlordane	ND		ug/kg	0.674	--	1	A
trans-Nonachlor	ND		ug/kg	0.674	--	1	A
4,4'-DDE	ND		ug/kg	0.674	--	1	A
Dieldrin	ND		ug/kg	0.674	--	1	A
Endrin	ND		ug/kg	0.674	--	1	A
Endosulfan II	ND		ug/kg	0.674	--	1	A
4,4'-DDD	ND		ug/kg	0.674	--	1	A
cis-Nonachlor	ND		ug/kg	0.674	--	1	A
4,4'-DDT	ND		ug/kg	0.674	--	1	A
Methoxychlor	ND		ug/kg	6.74	--	1	A
Toxaphene	ND		ug/kg	33.8	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	99		30-150	A
BZ 198	112		30-150	A
DBOB	97		30-150	B
BZ 198	112		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-03	Date Collected:	02/27/15 09:48
Client ID:	L25A	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/10/15 02:06	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	72%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.42	--	1	A
gamma-BHC	ND		ug/kg	0.712	--	1	A
Heptachlor	ND		ug/kg	0.712	--	1	A
Aldrin	ND		ug/kg	0.712	--	1	A
Heptachlor epoxide	ND		ug/kg	1.42	--	1	B
Oxychlordane	ND		ug/kg	1.42	--	1	B
trans-Chlordane	ND		ug/kg	0.712	--	1	A
Endosulfan I	ND		ug/kg	0.712	--	1	A
cis-Chlordane	ND		ug/kg	0.712	--	1	A
trans-Nonachlor	ND		ug/kg	0.712	--	1	A
4,4'-DDE	ND		ug/kg	0.712	--	1	A
Dieldrin	ND		ug/kg	0.712	--	1	A
Endrin	ND		ug/kg	0.712	--	1	A
Endosulfan II	ND		ug/kg	0.712	--	1	A
4,4'-DDD	ND		ug/kg	0.712	--	1	A
cis-Nonachlor	ND		ug/kg	0.712	--	1	A
4,4'-DDT	ND		ug/kg	0.712	--	1	A
Methoxychlor	ND		ug/kg	7.12	--	1	A
Toxaphene	ND		ug/kg	35.8	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	80		30-150	A
BZ 198	96		30-150	A
DBOB	78		30-150	B
BZ 198	96		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-04	Date Collected:	02/27/15 10:00
Client ID:	L25B	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/10/15 02:39	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	73%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.38	--	1	A
gamma-BHC	ND		ug/kg	0.690	--	1	A
Heptachlor	ND		ug/kg	0.690	--	1	A
Aldrin	ND		ug/kg	0.690	--	1	A
Heptachlor epoxide	ND		ug/kg	1.38	--	1	B
Oxychlordane	ND		ug/kg	1.38	--	1	B
trans-Chlordane	ND		ug/kg	0.690	--	1	A
Endosulfan I	ND		ug/kg	0.690	--	1	A
cis-Chlordane	ND		ug/kg	0.690	--	1	A
trans-Nonachlor	ND		ug/kg	0.690	--	1	A
4,4'-DDE	ND		ug/kg	0.690	--	1	A
Dieldrin	ND		ug/kg	0.690	--	1	A
Endrin	ND		ug/kg	0.690	--	1	A
Endosulfan II	ND		ug/kg	0.690	--	1	A
4,4'-DDD	ND		ug/kg	0.690	--	1	A
cis-Nonachlor	ND		ug/kg	0.690	--	1	A
4,4'-DDT	ND		ug/kg	0.690	--	1	A
Methoxychlor	ND		ug/kg	6.90	--	1	A
Toxaphene	ND		ug/kg	34.6	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	104		30-150	A
BZ 198	110		30-150	A
DBOB	103		30-150	B
BZ 198	111		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-05	Date Collected:	02/27/15 10:12
Client ID:	L21	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/10/15 03:11	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	70%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.43	--	1	A
gamma-BHC	ND		ug/kg	0.716	--	1	A
Heptachlor	ND		ug/kg	0.716	--	1	A
Aldrin	ND		ug/kg	0.716	--	1	A
Heptachlor epoxide	ND		ug/kg	1.43	--	1	B
Oxychlordane	ND		ug/kg	1.43	--	1	B
trans-Chlordane	ND		ug/kg	0.716	--	1	A
Endosulfan I	ND		ug/kg	0.716	--	1	A
cis-Chlordane	ND		ug/kg	0.716	--	1	A
trans-Nonachlor	ND		ug/kg	0.716	--	1	A
4,4'-DDE	ND		ug/kg	0.716	--	1	A
Dieldrin	ND		ug/kg	0.716	--	1	A
Endrin	ND		ug/kg	0.716	--	1	A
Endosulfan II	ND		ug/kg	0.716	--	1	A
4,4'-DDD	ND		ug/kg	0.716	--	1	A
cis-Nonachlor	ND		ug/kg	0.716	--	1	A
4,4'-DDT	ND		ug/kg	0.716	--	1	A
Methoxychlor	ND		ug/kg	7.16	--	1	A
Toxaphene	ND		ug/kg	35.9	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	79		30-150	A
BZ 198	92		30-150	A
DBOB	77		30-150	B
BZ 198	92		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-06	Date Collected:	02/27/15 10:25
Client ID:	L20	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/10/15 03:43	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	74%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.39	--	1	A
gamma-BHC	ND		ug/kg	0.694	--	1	A
Heptachlor	ND		ug/kg	0.694	--	1	A
Aldrin	ND		ug/kg	0.694	--	1	A
Heptachlor epoxide	ND		ug/kg	1.39	--	1	B
Oxychlordane	ND		ug/kg	1.39	--	1	B
trans-Chlordane	ND		ug/kg	0.694	--	1	A
Endosulfan I	ND		ug/kg	0.694	--	1	A
cis-Chlordane	ND		ug/kg	0.694	--	1	A
trans-Nonachlor	ND		ug/kg	0.694	--	1	A
4,4'-DDE	ND		ug/kg	0.694	--	1	A
Dieldrin	ND		ug/kg	0.694	--	1	A
Endrin	ND		ug/kg	0.694	--	1	A
Endosulfan II	ND		ug/kg	0.694	--	1	A
4,4'-DDD	ND		ug/kg	0.694	--	1	A
cis-Nonachlor	ND		ug/kg	0.694	--	1	A
4,4'-DDT	ND		ug/kg	0.694	--	1	A
Methoxychlor	ND		ug/kg	6.94	--	1	A
Toxaphene	ND		ug/kg	34.8	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	103		30-150	A
BZ 198	111		30-150	A
DBOB	100		30-150	B
BZ 198	110		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-07	Date Collected:	02/27/15 10:43
Client ID:	L19	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/10/15 04:16	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	72%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.38	--	1	A
gamma-BHC	ND		ug/kg	0.692	--	1	A
Heptachlor	ND		ug/kg	0.692	--	1	A
Aldrin	ND		ug/kg	0.692	--	1	A
Heptachlor epoxide	ND		ug/kg	1.38	--	1	B
Oxychlordane	ND		ug/kg	1.38	--	1	B
trans-Chlordane	ND		ug/kg	0.692	--	1	A
Endosulfan I	ND		ug/kg	0.692	--	1	A
cis-Chlordane	ND		ug/kg	0.692	--	1	A
trans-Nonachlor	ND		ug/kg	0.692	--	1	A
4,4'-DDE	ND		ug/kg	0.692	--	1	A
Dieldrin	ND		ug/kg	0.692	--	1	A
Endrin	ND		ug/kg	0.692	--	1	A
Endosulfan II	ND		ug/kg	0.692	--	1	A
4,4'-DDD	ND		ug/kg	0.692	--	1	A
cis-Nonachlor	ND		ug/kg	0.692	--	1	A
4,4'-DDT	ND		ug/kg	0.692	--	1	A
Methoxychlor	ND		ug/kg	6.92	--	1	A
Toxaphene	ND		ug/kg	34.8	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	83		30-150	A
BZ 198	99		30-150	A
DBOB	81		30-150	B
BZ 198	99		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-08	Date Collected:	02/27/15 10:55
Client ID:	L13	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/07/15 00:07	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	52%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.962	--	1	A
gamma-BHC	ND		ug/kg	0.481	--	1	A
Heptachlor	ND		ug/kg	0.481	--	1	A
Aldrin	ND		ug/kg	0.481	--	1	A
Heptachlor epoxide	ND		ug/kg	0.962	--	1	B
Oxychlordane	5.27		ug/kg	0.962	--	1	B
trans-Chlordane	ND		ug/kg	0.481	--	1	A
Endosulfan I	ND		ug/kg	0.481	--	1	A
cis-Chlordane	ND		ug/kg	0.481	--	1	A
trans-Nonachlor	ND		ug/kg	0.481	--	1	A
4,4'-DDE	0.561		ug/kg	0.481	--	1	A
Dieldrin	ND		ug/kg	0.481	--	1	A
Endrin	ND		ug/kg	0.481	--	1	A
Endosulfan II	ND		ug/kg	0.481	--	1	A
4,4'-DDD	0.607		ug/kg	0.481	--	1	B
cis-Nonachlor	ND		ug/kg	0.481	--	1	A
4,4'-DDT	0.528	IP	ug/kg	0.481	--	1	A
Methoxychlor	ND		ug/kg	4.81	--	1	A
Toxaphene	ND		ug/kg	24.1	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	57		30-150	A
BZ 198	73		30-150	A
DBOB	49		30-150	B
BZ 198	77		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-09	Date Collected:	02/27/15 11:09
Client ID:	L16	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/07/15 00:40	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	54%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.925	--	1	A
gamma-BHC	ND		ug/kg	0.462	--	1	A
Heptachlor	ND		ug/kg	0.462	--	1	A
Aldrin	ND		ug/kg	0.462	--	1	A
Heptachlor epoxide	ND		ug/kg	0.925	--	1	B
Oxychlordane	1.49		ug/kg	0.925	--	1	B
trans-Chlordane	ND		ug/kg	0.462	--	1	A
Endosulfan I	ND		ug/kg	0.462	--	1	A
cis-Chlordane	ND		ug/kg	0.462	--	1	A
trans-Nonachlor	ND		ug/kg	0.462	--	1	A
4,4'-DDE	ND		ug/kg	0.462	--	1	A
Dieldrin	ND		ug/kg	0.462	--	1	A
Endrin	ND		ug/kg	0.462	--	1	A
Endosulfan II	ND		ug/kg	0.462	--	1	A
4,4'-DDD	ND		ug/kg	0.462	--	1	A
cis-Nonachlor	ND		ug/kg	0.462	--	1	A
4,4'-DDT	ND		ug/kg	0.462	--	1	A
Methoxychlor	ND		ug/kg	4.62	--	1	A
Toxaphene	ND		ug/kg	23.2	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	65		30-150	A
BZ 198	83		30-150	A
DBOB	58		30-150	B
BZ 198	83		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-10	Date Collected:	02/27/15 11:22
Client ID:	L18	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/07/15 01:12	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	56%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.888	--	1	A
gamma-BHC	ND		ug/kg	0.444	--	1	A
Heptachlor	ND		ug/kg	0.444	--	1	A
Aldrin	ND		ug/kg	0.444	--	1	A
Heptachlor epoxide	ND		ug/kg	0.888	--	1	B
Oxychlordane	ND		ug/kg	0.888	--	1	B
trans-Chlordane	ND		ug/kg	0.444	--	1	A
Endosulfan I	ND		ug/kg	0.444	--	1	A
cis-Chlordane	ND		ug/kg	0.444	--	1	A
trans-Nonachlor	ND		ug/kg	0.444	--	1	A
4,4'-DDE	ND		ug/kg	0.444	--	1	A
Dieldrin	ND		ug/kg	0.444	--	1	A
Endrin	ND		ug/kg	0.444	--	1	A
Endosulfan II	ND		ug/kg	0.444	--	1	A
4,4'-DDD	0.526		ug/kg	0.444	--	1	B
cis-Nonachlor	ND		ug/kg	0.444	--	1	A
4,4'-DDT	ND		ug/kg	0.444	--	1	A
Methoxychlor	ND		ug/kg	4.44	--	1	A
Toxaphene	ND		ug/kg	22.3	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	79		30-150	A
BZ 198	94		30-150	A
DBOB	72		30-150	B
BZ 198	100		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-11	Date Collected:	02/27/15 11:39
Client ID:	L17	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/07/15 01:45	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	72%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.36	--	1	A
gamma-BHC	ND		ug/kg	0.679	--	1	A
Heptachlor	ND		ug/kg	0.679	--	1	A
Aldrin	ND		ug/kg	0.679	--	1	A
Heptachlor epoxide	ND		ug/kg	1.36	--	1	B
Oxychlordane	ND		ug/kg	1.36	--	1	B
trans-Chlordane	ND		ug/kg	0.679	--	1	A
Endosulfan I	ND		ug/kg	0.679	--	1	A
cis-Chlordane	ND		ug/kg	0.679	--	1	A
trans-Nonachlor	ND		ug/kg	0.679	--	1	A
4,4'-DDE	ND		ug/kg	0.679	--	1	A
Dieldrin	ND		ug/kg	0.679	--	1	A
Endrin	ND		ug/kg	0.679	--	1	A
Endosulfan II	ND		ug/kg	0.679	--	1	A
4,4'-DDD	ND		ug/kg	0.679	--	1	A
cis-Nonachlor	ND		ug/kg	0.679	--	1	A
4,4'-DDT	1.48	IP	ug/kg	0.679	--	1	A
Methoxychlor	ND		ug/kg	6.79	--	1	A
Toxaphene	ND		ug/kg	34.1	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	71		30-150	A
BZ 198	101		30-150	A
DBOB	65		30-150	B
BZ 198	102		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-12	Date Collected:	02/27/15 11:53
Client ID:	L15	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/07/15 02:17	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	66%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.761	--	1	A
gamma-BHC	ND		ug/kg	0.381	--	1	A
Heptachlor	ND		ug/kg	0.381	--	1	A
Aldrin	ND		ug/kg	0.381	--	1	A
Heptachlor epoxide	ND		ug/kg	0.761	--	1	B
Oxychlordane	ND		ug/kg	0.761	--	1	B
trans-Chlordane	ND		ug/kg	0.381	--	1	A
Endosulfan I	ND		ug/kg	0.381	--	1	A
cis-Chlordane	ND		ug/kg	0.381	--	1	A
trans-Nonachlor	ND		ug/kg	0.381	--	1	A
4,4'-DDE	ND		ug/kg	0.381	--	1	A
Dieldrin	ND		ug/kg	0.381	--	1	A
Endrin	ND		ug/kg	0.381	--	1	A
Endosulfan II	ND		ug/kg	0.381	--	1	A
4,4'-DDD	ND		ug/kg	0.381	--	1	A
cis-Nonachlor	ND		ug/kg	0.381	--	1	A
4,4'-DDT	ND		ug/kg	0.381	--	1	A
Methoxychlor	ND		ug/kg	3.81	--	1	A
Toxaphene	ND		ug/kg	19.1	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	72		30-150	A
BZ 198	98		30-150	A
DBOB	70		30-150	B
BZ 198	103		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-13	Date Collected:	02/27/15 12:58
Client ID:	L12	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/07/15 06:37	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	63%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.793	--	1	A
gamma-BHC	ND		ug/kg	0.396	--	1	A
Heptachlor	ND		ug/kg	0.396	--	1	A
Aldrin	ND		ug/kg	0.396	--	1	A
Heptachlor epoxide	ND		ug/kg	0.793	--	1	B
Oxychlordane	ND		ug/kg	0.793	--	1	B
trans-Chlordane	ND		ug/kg	0.396	--	1	A
Endosulfan I	ND		ug/kg	0.396	--	1	A
cis-Chlordane	ND		ug/kg	0.396	--	1	A
trans-Nonachlor	ND		ug/kg	0.396	--	1	A
4,4'-DDE	ND		ug/kg	0.396	--	1	A
Dieldrin	ND		ug/kg	0.396	--	1	A
Endrin	ND		ug/kg	0.396	--	1	A
Endosulfan II	ND		ug/kg	0.396	--	1	A
4,4'-DDD	ND		ug/kg	0.396	--	1	A
cis-Nonachlor	ND		ug/kg	0.396	--	1	A
4,4'-DDT	ND		ug/kg	0.396	--	1	A
Methoxychlor	ND		ug/kg	3.96	--	1	A
Toxaphene	ND		ug/kg	19.9	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	60		30-150	A
BZ 198	80		30-150	A
DBOB	54		30-150	B
BZ 198	84		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-14	Date Collected:	02/27/15 13:08
Client ID:	L11	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/07/15 07:09	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	64%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.780	--	1	A
gamma-BHC	ND		ug/kg	0.390	--	1	A
Heptachlor	ND		ug/kg	0.390	--	1	A
Aldrin	ND		ug/kg	0.390	--	1	A
Heptachlor epoxide	ND		ug/kg	0.780	--	1	B
Oxychlordane	ND		ug/kg	0.780	--	1	B
trans-Chlordane	ND		ug/kg	0.390	--	1	A
Endosulfan I	ND		ug/kg	0.390	--	1	A
cis-Chlordane	ND		ug/kg	0.390	--	1	A
trans-Nonachlor	ND		ug/kg	0.390	--	1	A
4,4'-DDE	ND		ug/kg	0.390	--	1	A
Dieldrin	ND		ug/kg	0.390	--	1	A
Endrin	ND		ug/kg	0.390	--	1	A
Endosulfan II	ND		ug/kg	0.390	--	1	A
4,4'-DDD	ND		ug/kg	0.390	--	1	A
cis-Nonachlor	ND		ug/kg	0.390	--	1	A
4,4'-DDT	ND		ug/kg	0.390	--	1	A
Methoxychlor	ND		ug/kg	3.90	--	1	A
Toxaphene	ND		ug/kg	19.6	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	63		30-150	A
BZ 198	77		30-150	A
DBOB	56		30-150	B
BZ 198	78		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-15	Date Collected:	02/27/15 13:19
Client ID:	L14	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/07/15 07:41	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	69%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.740	--	1	A
gamma-BHC	ND		ug/kg	0.370	--	1	A
Heptachlor	ND		ug/kg	0.370	--	1	A
Aldrin	ND		ug/kg	0.370	--	1	A
Heptachlor epoxide	ND		ug/kg	0.740	--	1	B
Oxychlordane	ND		ug/kg	0.740	--	1	B
trans-Chlordane	ND		ug/kg	0.370	--	1	A
Endosulfan I	ND		ug/kg	0.370	--	1	A
cis-Chlordane	ND		ug/kg	0.370	--	1	A
trans-Nonachlor	ND		ug/kg	0.370	--	1	A
4,4'-DDE	ND		ug/kg	0.370	--	1	A
Dieldrin	ND		ug/kg	0.370	--	1	A
Endrin	ND		ug/kg	0.370	--	1	A
Endosulfan II	ND		ug/kg	0.370	--	1	A
4,4'-DDD	ND		ug/kg	0.370	--	1	A
cis-Nonachlor	ND		ug/kg	0.370	--	1	A
4,4'-DDT	ND		ug/kg	0.370	--	1	A
Methoxychlor	ND		ug/kg	3.70	--	1	A
Toxaphene	ND		ug/kg	18.6	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	59		30-150	A
BZ 198	79		30-150	A
DBOB	52		30-150	B
BZ 198	80		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-16	Date Collected:	02/27/15 13:35
Client ID:	L23A	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/07/15 08:14	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	68%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.744	--	1	A
gamma-BHC	ND		ug/kg	0.372	--	1	A
Heptachlor	ND		ug/kg	0.372	--	1	A
Aldrin	ND		ug/kg	0.372	--	1	A
Heptachlor epoxide	ND		ug/kg	0.744	--	1	B
Oxychlordane	ND		ug/kg	0.744	--	1	B
trans-Chlordane	ND		ug/kg	0.372	--	1	A
Endosulfan I	ND		ug/kg	0.372	--	1	A
cis-Chlordane	ND		ug/kg	0.372	--	1	A
trans-Nonachlor	ND		ug/kg	0.372	--	1	A
4,4'-DDE	ND		ug/kg	0.372	--	1	A
Dieldrin	ND		ug/kg	0.372	--	1	A
Endrin	ND		ug/kg	0.372	--	1	A
Endosulfan II	ND		ug/kg	0.372	--	1	A
4,4'-DDD	ND		ug/kg	0.372	--	1	A
cis-Nonachlor	ND		ug/kg	0.372	--	1	A
4,4'-DDT	ND		ug/kg	0.372	--	1	A
Methoxychlor	ND		ug/kg	3.72	--	1	A
Toxaphene	ND		ug/kg	18.7	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	70		30-150	A
BZ 198	89		30-150	A
DBOB	63		30-150	B
BZ 198	90		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-17	Date Collected:	02/27/15 13:45
Client ID:	L23B	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/07/15 08:46	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	68%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.738	--	1	A
gamma-BHC	ND		ug/kg	0.369	--	1	A
Heptachlor	ND		ug/kg	0.369	--	1	A
Aldrin	ND		ug/kg	0.369	--	1	A
Heptachlor epoxide	ND		ug/kg	0.738	--	1	B
Oxychlordane	ND		ug/kg	0.738	--	1	B
trans-Chlordane	ND		ug/kg	0.369	--	1	A
Endosulfan I	ND		ug/kg	0.369	--	1	A
cis-Chlordane	ND		ug/kg	0.369	--	1	A
trans-Nonachlor	ND		ug/kg	0.369	--	1	A
4,4'-DDE	ND		ug/kg	0.369	--	1	A
Dieldrin	ND		ug/kg	0.369	--	1	A
Endrin	ND		ug/kg	0.369	--	1	A
Endosulfan II	ND		ug/kg	0.369	--	1	A
4,4'-DDD	ND		ug/kg	0.369	--	1	A
cis-Nonachlor	ND		ug/kg	0.369	--	1	A
4,4'-DDT	ND		ug/kg	0.369	--	1	A
Methoxychlor	ND		ug/kg	3.69	--	1	A
Toxaphene	ND		ug/kg	18.5	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	76		30-150	A
BZ 198	93		30-150	A
DBOB	69		30-150	B
BZ 198	96		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-18	Date Collected:	02/27/15 13:58
Client ID:	L24A	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/07/15 09:19	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	70%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.39	--	1	A
gamma-BHC	ND		ug/kg	0.694	--	1	A
Heptachlor	ND		ug/kg	0.694	--	1	A
Aldrin	ND		ug/kg	0.694	--	1	A
Heptachlor epoxide	ND		ug/kg	1.39	--	1	B
Oxychlordane	ND		ug/kg	1.39	--	1	B
trans-Chlordane	ND		ug/kg	0.694	--	1	A
Endosulfan I	ND		ug/kg	0.694	--	1	A
cis-Chlordane	ND		ug/kg	0.694	--	1	A
trans-Nonachlor	ND		ug/kg	0.694	--	1	A
4,4'-DDE	ND		ug/kg	0.694	--	1	A
Dieldrin	ND		ug/kg	0.694	--	1	A
Endrin	ND		ug/kg	0.694	--	1	A
Endosulfan II	ND		ug/kg	0.694	--	1	A
4,4'-DDD	ND		ug/kg	0.694	--	1	A
cis-Nonachlor	ND		ug/kg	0.694	--	1	A
4,4'-DDT	ND		ug/kg	0.694	--	1	A
Methoxychlor	ND		ug/kg	6.94	--	1	A
Toxaphene	ND		ug/kg	34.8	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	56		30-150	A
BZ 198	76		30-150	A
DBOB	51		30-150	B
BZ 198	77		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-19	Date Collected:	02/27/15 14:12
Client ID:	L24B	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/07/15 09:51	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	68%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.727	--	1	A
gamma-BHC	ND		ug/kg	0.364	--	1	A
Heptachlor	ND		ug/kg	0.364	--	1	A
Aldrin	ND		ug/kg	0.364	--	1	A
Heptachlor epoxide	ND		ug/kg	0.727	--	1	B
Oxychlordane	ND		ug/kg	0.727	--	1	B
trans-Chlordane	ND		ug/kg	0.364	--	1	A
Endosulfan I	ND		ug/kg	0.364	--	1	A
cis-Chlordane	ND		ug/kg	0.364	--	1	A
trans-Nonachlor	ND		ug/kg	0.364	--	1	A
4,4'-DDE	ND		ug/kg	0.364	--	1	A
Dieldrin	ND		ug/kg	0.364	--	1	A
Endrin	ND		ug/kg	0.364	--	1	A
Endosulfan II	ND		ug/kg	0.364	--	1	A
4,4'-DDD	ND		ug/kg	0.364	--	1	A
cis-Nonachlor	ND		ug/kg	0.364	--	1	A
4,4'-DDT	ND		ug/kg	0.364	--	1	A
Methoxychlor	ND		ug/kg	3.64	--	1	A
Toxaphene	ND		ug/kg	18.2	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	56		30-150	A
BZ 198	73		30-150	A
DBOB	51		30-150	B
BZ 198	74		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-20	Date Collected:	02/27/15 14:30
Client ID:	L22A	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/07/15 12:01	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	64%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.775	--	1	A
gamma-BHC	ND		ug/kg	0.387	--	1	A
Heptachlor	ND		ug/kg	0.387	--	1	A
Aldrin	ND		ug/kg	0.387	--	1	A
Heptachlor epoxide	ND		ug/kg	0.775	--	1	B
Oxychlordane	ND		ug/kg	0.775	--	1	B
trans-Chlordane	ND		ug/kg	0.387	--	1	A
Endosulfan I	ND		ug/kg	0.387	--	1	A
cis-Chlordane	ND		ug/kg	0.387	--	1	A
trans-Nonachlor	ND		ug/kg	0.387	--	1	A
4,4'-DDE	ND		ug/kg	0.387	--	1	A
Dieldrin	ND		ug/kg	0.387	--	1	A
Endrin	ND		ug/kg	0.387	--	1	A
Endosulfan II	ND		ug/kg	0.387	--	1	A
4,4'-DDD	ND		ug/kg	0.387	--	1	A
cis-Nonachlor	ND		ug/kg	0.387	--	1	A
4,4'-DDT	ND		ug/kg	0.387	--	1	A
Methoxychlor	ND		ug/kg	3.87	--	1	A
Toxaphene	ND		ug/kg	19.4	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	54		30-150	A
BZ 198	71		30-150	A
DBOB	48		30-150	B
BZ 198	74		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-21	Date Collected:	02/27/15 14:43
Client ID:	L22B	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/07/15 12:33	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	67%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.741	--	1	A
gamma-BHC	ND		ug/kg	0.370	--	1	A
Heptachlor	ND		ug/kg	0.370	--	1	A
Aldrin	ND		ug/kg	0.370	--	1	A
Heptachlor epoxide	ND		ug/kg	0.741	--	1	B
Oxychlordane	ND		ug/kg	0.741	--	1	B
trans-Chlordane	ND		ug/kg	0.370	--	1	A
Endosulfan I	ND		ug/kg	0.370	--	1	A
cis-Chlordane	ND		ug/kg	0.370	--	1	A
trans-Nonachlor	ND		ug/kg	0.370	--	1	A
4,4'-DDE	ND		ug/kg	0.370	--	1	A
Dieldrin	ND		ug/kg	0.370	--	1	A
Endrin	ND		ug/kg	0.370	--	1	A
Endosulfan II	ND		ug/kg	0.370	--	1	A
4,4'-DDD	ND		ug/kg	0.370	--	1	A
cis-Nonachlor	ND		ug/kg	0.370	--	1	A
4,4'-DDT	ND		ug/kg	0.370	--	1	A
Methoxychlor	ND		ug/kg	3.70	--	1	A
Toxaphene	ND		ug/kg	18.6	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	50		30-150	A
BZ 198	67		30-150	A
DBOB	48		30-150	B
BZ 198	68		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-22	Date Collected:	02/27/15 23:45
Client ID:	L61	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	1,8081B	Extraction Date:	03/05/15 11:50
Analytical Date:	03/07/15 13:06	Cleanup Method:	EPA 3630
Analyst:	SF	Cleanup Date:	03/06/15
Percent Solids:	71%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.41	--	1	A
gamma-BHC	ND		ug/kg	0.704	--	1	A
Heptachlor	ND		ug/kg	0.704	--	1	A
Aldrin	ND		ug/kg	0.704	--	1	A
Heptachlor epoxide	ND		ug/kg	1.41	--	1	B
Oxychlordane	ND		ug/kg	1.41	--	1	B
trans-Chlordane	ND		ug/kg	0.704	--	1	A
Endosulfan I	ND		ug/kg	0.704	--	1	A
cis-Chlordane	ND		ug/kg	0.704	--	1	A
trans-Nonachlor	ND		ug/kg	0.704	--	1	A
4,4'-DDE	ND		ug/kg	0.704	--	1	A
Dieldrin	ND		ug/kg	0.704	--	1	A
Endrin	ND		ug/kg	0.704	--	1	A
Endosulfan II	ND		ug/kg	0.704	--	1	A
4,4'-DDD	ND		ug/kg	0.704	--	1	A
cis-Nonachlor	ND		ug/kg	0.704	--	1	A
4,4'-DDT	ND		ug/kg	0.704	--	1	A
Methoxychlor	ND		ug/kg	7.04	--	1	A
Toxaphene	ND		ug/kg	35.3	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	55		30-150	A
BZ 198	82		30-150	A
DBOB	53		30-150	B
BZ 198	82		30-150	B

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 03/09/15 13:08
Analyst: SF

Extraction Method: EPA 3570
Extraction Date: 03/05/15 11:50
Cleanup Method: EPA 3630
Cleanup Date: 03/06/15

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 01-12 Batch: WG766344-1						
Hexachlorobenzene	ND		ug/kg	1.00	--	A
gamma-BHC	ND		ug/kg	0.500	--	A
Heptachlor	ND		ug/kg	0.500	--	A
Aldrin	ND		ug/kg	0.500	--	A
trans-Chlordane	ND		ug/kg	0.500	--	A
Endosulfan I	ND		ug/kg	0.500	--	A
cis-Chlordane	ND		ug/kg	0.500	--	A
trans-Nonachlor	ND		ug/kg	0.500	--	A
4,4'-DDE	ND		ug/kg	0.500	--	A
Dieldrin	ND		ug/kg	0.500	--	A
Endrin	ND		ug/kg	0.500	--	A
Endosulfan II	ND		ug/kg	0.500	--	A
4,4'-DDD	ND		ug/kg	0.500	--	A
cis-Nonachlor	ND		ug/kg	0.500	--	A
4,4'-DDT	ND		ug/kg	0.500	--	A
Methoxychlor	ND		ug/kg	5.00	--	A
Toxaphene	ND		ug/kg	25.1	--	A
Heptachlor epoxide	ND		ug/kg	1.00	--	B
Oxychlordane	ND		ug/kg	1.00	--	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	95		30-150	A
BZ 198	105		30-150	A
DBOB	92		30-150	B
BZ 198	104		30-150	B

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 03/07/15 04:59
Analyst: SF

Extraction Method: EPA 3570
Extraction Date: 03/05/15 11:50
Cleanup Method: EPA 3630
Cleanup Date: 03/06/15

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 13-22 Batch: WG766345-1						
Hexachlorobenzene	ND		ug/kg	1.00	--	A
gamma-BHC	ND		ug/kg	0.500	--	A
Heptachlor	ND		ug/kg	0.500	--	A
Aldrin	ND		ug/kg	0.500	--	A
trans-Chlordane	ND		ug/kg	0.500	--	A
Endosulfan I	ND		ug/kg	0.500	--	A
cis-Chlordane	ND		ug/kg	0.500	--	A
trans-Nonachlor	ND		ug/kg	0.500	--	A
4,4'-DDE	ND		ug/kg	0.500	--	A
Dieldrin	ND		ug/kg	0.500	--	A
Endrin	ND		ug/kg	0.500	--	A
Endosulfan II	ND		ug/kg	0.500	--	A
4,4'-DDD	ND		ug/kg	0.500	--	A
cis-Nonachlor	ND		ug/kg	0.500	--	A
4,4'-DDT	ND		ug/kg	0.500	--	A
Methoxychlor	ND		ug/kg	5.00	--	A
Toxaphene	ND		ug/kg	25.1	--	A
Heptachlor epoxide	ND		ug/kg	1.00	--	B
Oxychlordane	ND		ug/kg	1.00	--	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	63		30-150	A
BZ 198	79		30-150	A
DBOB	57		30-150	B
BZ 198	83		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503772

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-12 Batch: WG766344-2 WG766344-3									
Hexachlorobenzene	78		86		50-120	10		30	A
gamma-BHC	86		95		50-120	10		30	A
Heptachlor	92		101		50-120	9		30	A
Aldrin	92		102		50-120	10		30	A
trans-Chlordane	100		114		50-120	13		30	A
Endosulfan I	98		113		50-120	14		30	A
cis-Chlordane	98		112		50-120	13		30	A
trans-Nonachlor	100		115		50-120	14		30	A
4,4'-DDE	100		117		50-120	16		30	A
Dieldrin	104		119		50-120	13		30	A
Endrin	100		115		50-120	14		30	A
4,4'-DDD	115		**135**	Q	50-120	16		30	A
cis-Nonachlor	98		114		50-120	15		30	A
4,4'-DDT	98		111		50-120	12		30	A
Methoxychlor	105		**128**	Q	50-120	20		30	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503772

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-12 Batch: WG766344-2 WG766344-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	82		88		30-150	A
BZ 198	102		116		30-150	A
DBOB	78		84		30-150	B
BZ 198	100		111		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503772

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-12 Batch: WG766344-2 WG766344-3									
Heptachlor epoxide	91		102		50-120	11		30	B
Oxychlordane	91		102		50-120	11		30	B
Endosulfan II	94		107		50-120	13		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	82		88		30-150	A
BZ 198	102		116		30-150	A
DBOB	78		84		30-150	B
BZ 198	100		111		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503772

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 13-22 Batch: WG766345-2 WG766345-3									
Hexachlorobenzene	64		64		50-120	0		30	A
gamma-BHC	69		72		50-120	4		30	A
Heptachlor	74		76		50-120	3		30	A
Aldrin	74		75		50-120	1		30	A
trans-Chlordane	81		87		50-120	7		30	A
Endosulfan I	81		86		50-120	6		30	A
cis-Chlordane	80		84		50-120	5		30	A
trans-Nonachlor	83		88		50-120	6		30	A
4,4'-DDE	94		102		50-120	8		30	A
Dieldrin	86		89		50-120	3		30	A
Endrin	80		82		50-120	2		30	A
4,4'-DDD	92		100		50-120	8		30	A
cis-Nonachlor	80		86		50-120	7		30	A
4,4'-DDT	78		84		50-120	7		30	A
Methoxychlor	77		74		50-120	4		30	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503772

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 13-22 Batch: WG766345-2 WG766345-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	66		65		30-150	A
BZ 198	83		89		30-150	A
DBOB	58		57		30-150	B
BZ 198	84		88		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503772

Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 13-22 Batch: WG766345-2 WG766345-3									
Heptachlor epoxide	65		70		50-120	7		30	B
Oxychlordane	67		71		50-120	6		30	B
Endosulfan II	68		69		50-120	1		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	66		65		30-150	A
BZ 198	83		89		30-150	A
DBOB	58		57		30-150	B
BZ 198	84		88		30-150	B

Matrix Spike Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 13-22 QC Batch ID: WG766345-6 WG766345-7 QC Sample: L1503772-22 Client ID: L61													
Hexachlorobenzene	ND	142	83.4	59		93.4	66		50-120	11		30	A
gamma-BHC	ND	142	91.2	64		101	72		50-120	10		30	A
Heptachlor	ND	142	95.7	68		107	76		50-120	11		30	A
Aldrin	ND	142	94.0	66		107	76		50-120	13		30	A
Heptachlor epoxide	ND	142	99.0	70		104	74		50-120	5		30	B
Oxychlordane	ND	142	103	73		109	77		50-120	6		30	B
trans-Chlordane	ND	142	102	72		119	84		50-120	15		30	A
Endosulfan I	ND	142	101	71		115	81		50-120	13		30	A
cis-Chlordane	ND	142	100	71		116	82		50-120	15		30	A
trans-Nonachlor	ND	142	104	74		121	86		50-120	15		30	A
4,4'-DDE	ND	142	116	82		138	98		50-120	17		30	A
Dieldrin	ND	142	103	73		117	83		50-120	13		30	A
Endrin	ND	142	95.8	68		109	77		50-120	13		30	A
Endosulfan II	ND	142	100	71		102	72		50-120	2		30	B
4,4'-DDD	ND	142	115	81		134	95		50-120	15		30	A
cis-Nonachlor	ND	142	99.0	70		116	82		50-120	16		30	A
4,4'-DDT	ND	142	97.6	69		112	79		50-120	14		30	A
Methoxychlor	ND	142	100	71		104	74		50-120	4		30	A

Serial_No:03161510:57

Matrix Spike Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503772

Report Date: 03/16/15

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 13-22 QC Batch ID: WG766345-6 WG766345-7 QC Sample: L1503772-22 Client ID: L61												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	81		88		30-150	A
DBOB	62		66		30-150	A
BZ 198	78		86		30-150	B
DBOB	60		63		30-150	B

Lab Duplicate Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 13-22 QC Batch ID: WG766345-5 QC Sample: L1503772-22 Client ID: L61							
Hexachlorobenzene	ND	ND	ug/kg	NC		30	A
gamma-BHC	ND	ND	ug/kg	NC		30	A
Heptachlor	ND	ND	ug/kg	NC		30	A
Aldrin	ND	ND	ug/kg	NC		30	A
Heptachlor epoxide	ND	ND	ug/kg	NC		30	B
Oxychlordane	ND	ND	ug/kg	NC		30	B
trans-Chlordane	ND	ND	ug/kg	NC		30	A
Endosulfan I	ND	ND	ug/kg	NC		30	A
cis-Chlordane	ND	ND	ug/kg	NC		30	A
trans-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDE	ND	ND	ug/kg	NC		30	A
Dieldrin	ND	ND	ug/kg	NC		30	A
Endrin	ND	ND	ug/kg	NC		30	A
Endosulfan II	ND	ND	ug/kg	NC		30	A
4,4'-DDD	ND	ND	ug/kg	NC		30	A
cis-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDT	ND	ND	ug/kg	NC		30	A
Methoxychlor	ND	ND	ug/kg	NC		30	A
Toxaphene	ND	ND	ug/kg	NC		30	A

Lab Duplicate Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits

RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 13-22 QC Batch ID: WG766345-5 QC Sample: L1503772-22 Client ID: L61

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	55		60		30-150	A
BZ 198	82		71		30-150	A
DBOB	53		56		30-150	B
BZ 198	82		76		30-150	B

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG766345-4

Parameter	% Recovery	Qual	QC Criteria
Hexachlorobenzene	71		40-140
cis-Chlordane	96		40-140
trans-Nonachlor	270	Q	40-140
DBOB (Surrogate)	58		30-150
DBOB (Surrogate)	66		30-150
BZ 198 (Surrogate)	96		30-150
BZ 198 (Surrogate)	169	Q	30-150

METALS

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503772
Project Number:	Not Specified	**Report Date:**	03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-01	Date Collected:	02/27/15 09:08
Client ID:	L27	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	72%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.78		mg/kg	0.067	--	2	03/04/15 15:08	03/06/15 15:12	EPA 3050B	1,6020A	PD
Cadmium, Total	0.069		mg/kg	0.027	--	2	03/04/15 15:08	03/06/15 15:12	EPA 3050B	1,6020A	PD
Chromium, Total	11.0		mg/kg	0.266	--	2	03/04/15 15:08	03/06/15 15:12	EPA 3050B	1,6020A	PD
Copper, Total	5.80		mg/kg	0.266	--	2	03/04/15 15:08	03/06/15 15:12	EPA 3050B	1,6020A	PD
Lead, Total	7.24		mg/kg	0.080	--	2	03/04/15 15:08	03/06/15 15:12	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.016	--	5	03/04/15 15:49	03/06/15 15:07	EPA 7474	1,7474	PD
Nickel, Total	6.84		mg/kg	0.133	--	2	03/04/15 15:08	03/06/15 15:12	EPA 3050B	1,6020A	PD
Zinc, Total	38.8		mg/kg	1.33	--	2	03/04/15 15:08	03/06/15 15:12	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-02 Date Collected: 02/27/15 09:21

Client ID: L28 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Matrix: Sediment

Percent Solids: 73%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.32		mg/kg	0.063	--	2	03/04/15 15:08	03/06/15 15:21	EPA 3050B	1,6020A	PD
Cadmium, Total	0.046		mg/kg	0.025	--	2	03/04/15 15:08	03/06/15 15:21	EPA 3050B	1,6020A	PD
Chromium, Total	5.42		mg/kg	0.253	--	2	03/04/15 15:08	03/06/15 15:21	EPA 3050B	1,6020A	PD
Copper, Total	2.66		mg/kg	0.253	--	2	03/04/15 15:08	03/06/15 15:21	EPA 3050B	1,6020A	PD
Lead, Total	4.38		mg/kg	0.076	--	2	03/04/15 15:08	03/06/15 15:21	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.016	--	5	03/04/15 15:49	03/06/15 15:17	EPA 7474	1,7474	PD
Nickel, Total	3.19		mg/kg	0.126	--	2	03/04/15 15:08	03/06/15 15:21	EPA 3050B	1,6020A	PD
Zinc, Total	18.7		mg/kg	1.26	--	2	03/04/15 15:08	03/06/15 15:21	EPA 3050B	1,6020A	PD

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503772
Project Number:	Not Specified	**Report Date:**	03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-03	Date Collected:	02/27/15 09:48
Client ID:	L25A	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	72%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.89		mg/kg	0.063	--	2	03/04/15 15:08	03/06/15 15:22	EPA 3050B	1,6020A	PD
Cadmium, Total	0.036		mg/kg	0.025	--	2	03/04/15 15:08	03/06/15 15:22	EPA 3050B	1,6020A	PD
Chromium, Total	6.34		mg/kg	0.252	--	2	03/04/15 15:08	03/06/15 15:22	EPA 3050B	1,6020A	PD
Copper, Total	3.30		mg/kg	0.252	--	2	03/04/15 15:08	03/06/15 15:22	EPA 3050B	1,6020A	PD
Lead, Total	4.48		mg/kg	0.076	--	2	03/04/15 15:08	03/06/15 15:22	EPA 3050B	1,6020A	PD
Mercury, Total	0.016		mg/kg	0.016	--	5	03/04/15 15:49	03/06/15 15:20	EPA 7474	1,7474	PD
Nickel, Total	3.82		mg/kg	0.126	--	2	03/04/15 15:08	03/06/15 15:22	EPA 3050B	1,6020A	PD
Zinc, Total	17.2		mg/kg	1.26	--	2	03/04/15 15:08	03/06/15 15:22	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-04 Date Collected: 02/27/15 10:00

Client ID: L25B Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Matrix: Sediment

Percent Solids: 73%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.23		mg/kg	0.067	--	2	03/04/15 15:08	03/06/15 15:23	EPA 3050B	1,6020A	PD
Cadmium, Total	ND		mg/kg	0.027	--	2	03/04/15 15:08	03/06/15 15:23	EPA 3050B	1,6020A	PD
Chromium, Total	5.88		mg/kg	0.267	--	2	03/04/15 15:08	03/06/15 15:23	EPA 3050B	1,6020A	PD
Copper, Total	3.03		mg/kg	0.267	--	2	03/04/15 15:08	03/06/15 15:23	EPA 3050B	1,6020A	PD
Lead, Total	4.10		mg/kg	0.080	--	2	03/04/15 15:08	03/06/15 15:23	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.015	--	5	03/04/15 15:49	03/06/15 15:22	EPA 7474	1,7474	PD
Nickel, Total	3.70		mg/kg	0.134	--	2	03/04/15 15:08	03/06/15 15:23	EPA 3050B	1,6020A	PD
Zinc, Total	16.8		mg/kg	1.34	--	2	03/04/15 15:08	03/06/15 15:23	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-05 Date Collected: 02/27/15 10:12

Client ID: L21 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Matrix: Sediment

Percent Solids: 70%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.08		mg/kg	0.067	--	2	03/04/15 15:08	03/06/15 15:24	EPA 3050B	1,6020A	PD
Cadmium, Total	0.041		mg/kg	0.027	--	2	03/04/15 15:08	03/06/15 15:24	EPA 3050B	1,6020A	PD
Chromium, Total	8.22		mg/kg	0.266	--	2	03/04/15 15:08	03/06/15 15:24	EPA 3050B	1,6020A	PD
Copper, Total	5.11		mg/kg	0.266	--	2	03/04/15 15:08	03/06/15 15:24	EPA 3050B	1,6020A	PD
Lead, Total	7.64		mg/kg	0.080	--	2	03/04/15 15:08	03/06/15 15:24	EPA 3050B	1,6020A	PD
Mercury, Total	0.022		mg/kg	0.017	--	5	03/04/15 15:49	03/06/15 15:25	EPA 7474	1,7474	PD
Nickel, Total	4.91		mg/kg	0.133	--	2	03/04/15 15:08	03/06/15 15:24	EPA 3050B	1,6020A	PD
Zinc, Total	21.0		mg/kg	1.33	--	2	03/04/15 15:08	03/06/15 15:24	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE
Lab Number: L1503772
Project Number: Not Specified
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-06
Date Collected: 02/27/15 10:25
Client ID: L20
Date Received: 02/27/15
Sample Location: EASTERN LONG ISLAND SOUND
Field Prep: Not Specified
Matrix: Sediment
Percent Solids: 74%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.73		mg/kg	0.066	--	2	03/04/15 15:08	03/06/15 15:26	EPA 3050B	1,6020A	PD
Cadmium, Total	0.032		mg/kg	0.027	--	2	03/04/15 15:08	03/06/15 15:26	EPA 3050B	1,6020A	PD
Chromium, Total	6.88		mg/kg	0.265	--	2	03/04/15 15:08	03/06/15 15:26	EPA 3050B	1,6020A	PD
Copper, Total	3.83		mg/kg	0.265	--	2	03/04/15 15:08	03/06/15 15:26	EPA 3050B	1,6020A	PD
Lead, Total	5.16		mg/kg	0.080	--	2	03/04/15 15:08	03/06/15 15:26	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.015	--	5	03/04/15 15:49	03/06/15 15:32	EPA 7474	1,7474	PD
Nickel, Total	4.14		mg/kg	0.132	--	2	03/04/15 15:08	03/06/15 15:26	EPA 3050B	1,6020A	PD
Zinc, Total	19.3		mg/kg	1.32	--	2	03/04/15 15:08	03/06/15 15:26	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE
Lab Number: L1503772
Project Number: Not Specified
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-07
Date Collected: 02/27/15 10:43
Client ID: L19
Date Received: 02/27/15
Sample Location: EASTERN LONG ISLAND SOUND
Field Prep: Not Specified
Matrix: Sediment
Percent Solids: 72%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.16		mg/kg	0.064	--	2	03/04/15 15:08	03/06/15 15:27	EPA 3050B	1,6020A	PD
Cadmium, Total	0.034		mg/kg	0.025	--	2	03/04/15 15:08	03/06/15 15:27	EPA 3050B	1,6020A	PD
Chromium, Total	7.79		mg/kg	0.254	--	2	03/04/15 15:08	03/06/15 15:27	EPA 3050B	1,6020A	PD
Copper, Total	4.68		mg/kg	0.254	--	2	03/04/15 15:08	03/06/15 15:27	EPA 3050B	1,6020A	PD
Lead, Total	5.50		mg/kg	0.076	--	2	03/04/15 15:08	03/06/15 15:27	EPA 3050B	1,6020A	PD
Mercury, Total	0.017		mg/kg	0.016	--	5	03/04/15 15:49	03/06/15 15:35	EPA 7474	1,7474	PD
Nickel, Total	4.43		mg/kg	0.127	--	2	03/04/15 15:08	03/06/15 15:27	EPA 3050B	1,6020A	PD
Zinc, Total	23.1		mg/kg	1.27	--	2	03/04/15 15:08	03/06/15 15:27	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-08 Date Collected: 02/27/15 10:55

Client ID: L13 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Matrix: Sediment

Percent Solids: 52%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.60		mg/kg	0.087	--	2	03/04/15 15:08	03/06/15 15:28	EPA 3050B	1,6020A	PD
Cadmium, Total	0.261		mg/kg	0.035	--	2	03/04/15 15:08	03/06/15 15:28	EPA 3050B	1,6020A	PD
Chromium, Total	17.4		mg/kg	0.348	--	2	03/04/15 15:08	03/06/15 15:28	EPA 3050B	1,6020A	PD
Copper, Total	44.8		mg/kg	0.348	--	2	03/04/15 15:08	03/06/15 15:28	EPA 3050B	1,6020A	PD
Lead, Total	20.8		mg/kg	0.104	--	2	03/04/15 15:08	03/06/15 15:28	EPA 3050B	1,6020A	PD
Mercury, Total	0.139		mg/kg	0.022	--	5	03/04/15 15:49	03/06/15 15:37	EPA 7474	1,7474	PD
Nickel, Total	8.81		mg/kg	0.174	--	2	03/04/15 15:08	03/06/15 15:28	EPA 3050B	1,6020A	PD
Zinc, Total	52.9		mg/kg	1.74	--	2	03/04/15 15:08	03/06/15 15:28	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-09 Date Collected: 02/27/15 11:09

Client ID: L16 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Matrix: Sediment

Percent Solids: 54%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	7.72		mg/kg	0.088	--	2	03/04/15 15:08	03/06/15 15:30	EPA 3050B	1,6020A	PD
Cadmium, Total	0.175		mg/kg	0.035	--	2	03/04/15 15:08	03/06/15 15:30	EPA 3050B	1,6020A	PD
Chromium, Total	28.3		mg/kg	0.353	--	2	03/04/15 15:08	03/06/15 15:30	EPA 3050B	1,6020A	PD
Copper, Total	40.5		mg/kg	0.353	--	2	03/04/15 15:08	03/06/15 15:30	EPA 3050B	1,6020A	PD
Lead, Total	43.3		mg/kg	0.106	--	2	03/04/15 15:08	03/06/15 15:30	EPA 3050B	1,6020A	PD
Mercury, Total	0.053		mg/kg	0.021	--	5	03/04/15 15:49	03/06/15 15:40	EPA 7474	1,7474	PD
Nickel, Total	20.8		mg/kg	0.177	--	2	03/04/15 15:08	03/06/15 15:30	EPA 3050B	1,6020A	PD
Zinc, Total	150		mg/kg	1.77	--	2	03/04/15 15:08	03/06/15 15:30	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-10 Date Collected: 02/27/15 11:22

Client ID: L18 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Matrix: Sediment

Percent Solids: 56%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	5.68		mg/kg	0.086	--	2	03/04/15 15:08	03/06/15 15:33	EPA 3050B	1,6020A	PD
Cadmium, Total	0.109		mg/kg	0.034	--	2	03/04/15 15:08	03/06/15 15:33	EPA 3050B	1,6020A	PD
Chromium, Total	23.1		mg/kg	0.343	--	2	03/04/15 15:08	03/06/15 15:33	EPA 3050B	1,6020A	PD
Copper, Total	12.8		mg/kg	0.343	--	2	03/04/15 15:08	03/06/15 15:33	EPA 3050B	1,6020A	PD
Lead, Total	6.64		mg/kg	0.103	--	2	03/04/15 15:08	03/06/15 15:33	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.021	--	5	03/04/15 15:49	03/06/15 15:42	EPA 7474	1,7474	PD
Nickel, Total	15.5		mg/kg	0.172	--	2	03/04/15 15:08	03/06/15 15:33	EPA 3050B	1,6020A	PD
Zinc, Total	44.7		mg/kg	1.72	--	2	03/04/15 15:08	03/06/15 15:33	EPA 3050B	1,6020A	PD

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503772
Project Number:	Not Specified	**Report Date:**	03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-11	Date Collected:	02/27/15 11:39
Client ID:	L17	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	72%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.66		mg/kg	0.065	--	2	03/04/15 15:08	03/06/15 15:35	EPA 3050B	1,6020A	PD
Cadmium, Total	0.035		mg/kg	0.026	--	2	03/04/15 15:08	03/06/15 15:35	EPA 3050B	1,6020A	PD
Chromium, Total	6.31		mg/kg	0.259	--	2	03/04/15 15:08	03/06/15 15:35	EPA 3050B	1,6020A	PD
Copper, Total	4.79		mg/kg	0.259	--	2	03/04/15 15:08	03/06/15 15:35	EPA 3050B	1,6020A	PD
Lead, Total	6.01		mg/kg	0.078	--	2	03/04/15 15:08	03/06/15 15:35	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.016	--	5	03/04/15 15:49	03/06/15 15:44	EPA 7474	1,7474	PD
Nickel, Total	4.09		mg/kg	0.129	--	2	03/04/15 15:08	03/06/15 15:35	EPA 3050B	1,6020A	PD
Zinc, Total	16.2		mg/kg	1.29	--	2	03/04/15 15:08	03/06/15 15:35	EPA 3050B	1,6020A	PD

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503772
Project Number:	Not Specified	**Report Date:**	03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-12	Date Collected:	02/27/15 11:53
Client ID:	L15	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	66%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.23		mg/kg	0.072	--	2	03/04/15 15:08	03/06/15 15:36	EPA 3050B	1,6020A	PD
Cadmium, Total	0.039		mg/kg	0.029	--	2	03/04/15 15:08	03/06/15 15:36	EPA 3050B	1,6020A	PD
Chromium, Total	6.42		mg/kg	0.288	--	2	03/04/15 15:08	03/06/15 15:36	EPA 3050B	1,6020A	PD
Copper, Total	4.50		mg/kg	0.288	--	2	03/04/15 15:08	03/06/15 15:36	EPA 3050B	1,6020A	PD
Lead, Total	7.20		mg/kg	0.086	--	2	03/04/15 15:08	03/06/15 15:36	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.018	--	5	03/04/15 15:49	03/06/15 15:47	EPA 7474	1,7474	PD
Nickel, Total	4.68		mg/kg	0.144	--	2	03/04/15 15:08	03/06/15 15:36	EPA 3050B	1,6020A	PD
Zinc, Total	24.1		mg/kg	1.44	--	2	03/04/15 15:08	03/06/15 15:36	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-13 Date Collected: 02/27/15 12:58

Client ID: L12 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Matrix: Sediment

Percent Solids: 63%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.79		mg/kg	0.074	--	2	03/04/15 15:08	03/06/15 15:37	EPA 3050B	1,6020A	PD
Cadmium, Total	0.057		mg/kg	0.030	--	2	03/04/15 15:08	03/06/15 15:37	EPA 3050B	1,6020A	PD
Chromium, Total	17.0		mg/kg	0.298	--	2	03/04/15 15:08	03/06/15 15:37	EPA 3050B	1,6020A	PD
Copper, Total	12.0		mg/kg	0.298	--	2	03/04/15 15:08	03/06/15 15:37	EPA 3050B	1,6020A	PD
Lead, Total	10.6		mg/kg	0.089	--	2	03/04/15 15:08	03/06/15 15:37	EPA 3050B	1,6020A	PD
Mercury, Total	0.031		mg/kg	0.019	--	5	03/04/15 15:49	03/06/15 15:49	EPA 7474	1,7474	PD
Nickel, Total	8.04		mg/kg	0.149	--	2	03/04/15 15:08	03/06/15 15:37	EPA 3050B	1,6020A	PD
Zinc, Total	49.8		mg/kg	1.49	--	2	03/04/15 15:08	03/06/15 15:37	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE
Lab Number: L1503772
Project Number: Not Specified
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-14
Date Collected: 02/27/15 13:08
Client ID: L11
Date Received: 02/27/15
Sample Location: EASTERN LONG ISLAND SOUND
Field Prep: Not Specified
Matrix: Sediment
Percent Solids: 64%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.72		mg/kg	0.074	--	2	03/04/15 15:08	03/06/15 15:38	EPA 3050B	1,6020A	PD
Cadmium, Total	0.10		mg/kg	0.030	--	2	03/04/15 15:08	03/06/15 15:38	EPA 3050B	1,6020A	PD
Chromium, Total	14.9		mg/kg	0.298	--	2	03/04/15 15:08	03/06/15 15:38	EPA 3050B	1,6020A	PD
Copper, Total	8.08		mg/kg	0.298	--	2	03/04/15 15:08	03/06/15 15:38	EPA 3050B	1,6020A	PD
Lead, Total	6.56		mg/kg	0.089	--	2	03/04/15 15:08	03/06/15 15:38	EPA 3050B	1,6020A	PD
Mercury, Total	0.027		mg/kg	0.018	--	5	03/04/15 15:49	03/06/15 15:52	EPA 7474	1,7474	PD
Nickel, Total	8.85		mg/kg	0.149	--	2	03/04/15 15:08	03/06/15 15:38	EPA 3050B	1,6020A	PD
Zinc, Total	32.4		mg/kg	1.49	--	2	03/04/15 15:08	03/06/15 15:38	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE
Lab Number: L1503772
Project Number: Not Specified
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-15
Date Collected: 02/27/15 13:19
Client ID: L14
Date Received: 02/27/15
Sample Location: EASTERN LONG ISLAND SOUND
Field Prep: Not Specified
Matrix: Sediment
Percent Solids: 69%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.69		mg/kg	0.066	--	2	03/04/15 15:08	03/06/15 15:40	EPA 3050B	1,6020A	PD
Cadmium, Total	0.060		mg/kg	0.027	--	2	03/04/15 15:08	03/06/15 15:40	EPA 3050B	1,6020A	PD
Chromium, Total	11.1		mg/kg	0.265	--	2	03/04/15 15:08	03/06/15 15:40	EPA 3050B	1,6020A	PD
Copper, Total	19.1		mg/kg	0.265	--	2	03/04/15 15:08	03/06/15 15:40	EPA 3050B	1,6020A	PD
Lead, Total	11.3		mg/kg	0.079	--	2	03/04/15 15:08	03/06/15 15:40	EPA 3050B	1,6020A	PD
Mercury, Total	0.024		mg/kg	0.018	--	5	03/04/15 15:49	03/06/15 15:54	EPA 7474	1,7474	PD
Nickel, Total	7.72		mg/kg	0.132	--	2	03/04/15 15:08	03/06/15 15:40	EPA 3050B	1,6020A	PD
Zinc, Total	37.1		mg/kg	1.32	--	2	03/04/15 15:08	03/06/15 15:40	EPA 3050B	1,6020A	PD

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503772
Project Number:	Not Specified	**Report Date:**	03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-16	Date Collected:	02/27/15 13:35
Client ID:	L23A	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	68%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.06		mg/kg	0.070	--	2	03/04/15 15:08	03/06/15 15:41	EPA 3050B	1,6020A	PD
Cadmium, Total	0.085		mg/kg	0.028	--	2	03/04/15 15:08	03/06/15 15:41	EPA 3050B	1,6020A	PD
Chromium, Total	13.8		mg/kg	0.280	--	2	03/04/15 15:08	03/06/15 15:41	EPA 3050B	1,6020A	PD
Copper, Total	10.8		mg/kg	0.280	--	2	03/04/15 15:08	03/06/15 15:41	EPA 3050B	1,6020A	PD
Lead, Total	10.0		mg/kg	0.084	--	2	03/04/15 15:08	03/06/15 15:41	EPA 3050B	1,6020A	PD
Mercury, Total	0.043		mg/kg	0.017	--	5	03/04/15 15:49	03/06/15 16:02	EPA 7474	1,7474	PD
Nickel, Total	7.80		mg/kg	0.140	--	2	03/04/15 15:08	03/06/15 15:41	EPA 3050B	1,6020A	PD
Zinc, Total	37.6		mg/kg	1.40	--	2	03/04/15 15:08	03/06/15 15:41	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-17 Date Collected: 02/27/15 13:45

Client ID: L23B Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Matrix: Sediment

Percent Solids: 68%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.50		mg/kg	0.071	--	2	03/04/15 15:08	03/06/15 15:42	EPA 3050B	1,6020A	PD
Cadmium, Total	0.069		mg/kg	0.029	--	2	03/04/15 15:08	03/06/15 15:42	EPA 3050B	1,6020A	PD
Chromium, Total	12.2		mg/kg	0.286	--	2	03/04/15 15:08	03/06/15 15:42	EPA 3050B	1,6020A	PD
Copper, Total	7.88		mg/kg	0.286	--	2	03/04/15 15:08	03/06/15 15:42	EPA 3050B	1,6020A	PD
Lead, Total	7.96		mg/kg	0.086	--	2	03/04/15 15:08	03/06/15 15:42	EPA 3050B	1,6020A	PD
Mercury, Total	0.024		mg/kg	0.018	--	5	03/04/15 15:49	03/06/15 16:04	EPA 7474	1,7474	PD
Nickel, Total	6.83		mg/kg	0.143	--	2	03/04/15 15:08	03/06/15 15:42	EPA 3050B	1,6020A	PD
Zinc, Total	34.0		mg/kg	1.43	--	2	03/04/15 15:08	03/06/15 15:42	EPA 3050B	1,6020A	PD

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503772
Project Number:	Not Specified	**Report Date:**	03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-18	Date Collected:	02/27/15 13:58
Client ID:	L24A	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	70%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.03		mg/kg	0.065	--	2	03/04/15 15:08	03/06/15 15:44	EPA 3050B	1,6020A	PD
Cadmium, Total	0.058		mg/kg	0.026	--	2	03/04/15 15:08	03/06/15 15:44	EPA 3050B	1,6020A	PD
Chromium, Total	10.6		mg/kg	0.259	--	2	03/04/15 15:08	03/06/15 15:44	EPA 3050B	1,6020A	PD
Copper, Total	6.12		mg/kg	0.259	--	2	03/04/15 15:08	03/06/15 15:44	EPA 3050B	1,6020A	PD
Lead, Total	6.84		mg/kg	0.078	--	2	03/04/15 15:08	03/06/15 15:44	EPA 3050B	1,6020A	PD
Mercury, Total	0.019		mg/kg	0.017	--	5	03/04/15 15:49	03/06/15 16:07	EPA 7474	1,7474	PD
Nickel, Total	5.96		mg/kg	0.130	--	2	03/04/15 15:08	03/06/15 15:44	EPA 3050B	1,6020A	PD
Zinc, Total	29.6		mg/kg	1.30	--	2	03/04/15 15:08	03/06/15 15:44	EPA 3050B	1,6020A	PD

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503772
Project Number:	Not Specified	**Report Date:**	03/16/15

SAMPLE RESULTS

Lab ID:	L1503772-19	Date Collected:	02/27/15 14:12
Client ID:	L24B	Date Received:	02/27/15
Sample Location:	EASTERN LONG ISLAND SOUND	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	68%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.46		mg/kg	0.071	--	2	03/04/15 15:48	03/06/15 15:55	EPA 3050B	1,6020A	PD
Cadmium, Total	0.081		mg/kg	0.028	--	2	03/04/15 15:48	03/06/15 15:55	EPA 3050B	1,6020A	PD
Chromium, Total	9.78		mg/kg	0.283	--	2	03/04/15 15:48	03/06/15 15:55	EPA 3050B	1,6020A	PD
Copper, Total	5.85		mg/kg	0.283	--	2	03/04/15 15:48	03/06/15 15:55	EPA 3050B	1,6020A	PD
Lead, Total	6.59		mg/kg	0.085	--	2	03/04/15 15:48	03/06/15 15:55	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.017	--	5	03/04/15 15:50	03/09/15 11:16	EPA 7474	1,7474	PD
Nickel, Total	5.62		mg/kg	0.141	--	2	03/04/15 15:48	03/06/15 15:55	EPA 3050B	1,6020A	PD
Zinc, Total	29.3		mg/kg	1.41	--	2	03/04/15 15:48	03/06/15 15:55	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE
Lab Number: L1503772
Project Number: Not Specified
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-20
Date Collected: 02/27/15 14:30
Client ID: L22A
Date Received: 02/27/15
Sample Location: EASTERN LONG ISLAND SOUND
Field Prep: Not Specified
Matrix: Sediment
Percent Solids: 64%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.22		mg/kg	0.072	--	2	03/04/15 15:48	03/06/15 15:56	EPA 3050B	1,6020A	PD
Cadmium, Total	0.070		mg/kg	0.029	--	2	03/04/15 15:48	03/06/15 15:56	EPA 3050B	1,6020A	PD
Chromium, Total	10.0		mg/kg	0.288	--	2	03/04/15 15:48	03/06/15 15:56	EPA 3050B	1,6020A	PD
Copper, Total	6.04		mg/kg	0.288	--	2	03/04/15 15:48	03/06/15 15:56	EPA 3050B	1,6020A	PD
Lead, Total	6.13		mg/kg	0.086	--	2	03/04/15 15:48	03/06/15 15:56	EPA 3050B	1,6020A	PD
Mercury, Total	0.019		mg/kg	0.019	--	5	03/04/15 15:50	03/09/15 11:19	EPA 7474	1,7474	PD
Nickel, Total	5.72		mg/kg	0.144	--	2	03/04/15 15:48	03/06/15 15:56	EPA 3050B	1,6020A	PD
Zinc, Total	31.2		mg/kg	1.44	--	2	03/04/15 15:48	03/06/15 15:56	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-21 Date Collected: 02/27/15 14:43

Client ID: L22B Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Matrix: Sediment

Percent Solids: 67%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.89		mg/kg	0.067	--	2	03/04/15 15:48	03/06/15 15:57	EPA 3050B	1,6020A	PD
Cadmium, Total	0.049		mg/kg	0.027	--	2	03/04/15 15:48	03/06/15 15:57	EPA 3050B	1,6020A	PD
Chromium, Total	9.20		mg/kg	0.267	--	2	03/04/15 15:48	03/06/15 15:57	EPA 3050B	1,6020A	PD
Copper, Total	5.17		mg/kg	0.267	--	2	03/04/15 15:48	03/06/15 15:57	EPA 3050B	1,6020A	PD
Lead, Total	5.41		mg/kg	0.080	--	2	03/04/15 15:48	03/06/15 15:57	EPA 3050B	1,6020A	PD
Mercury, Total	0.020		mg/kg	0.017	--	5	03/04/15 15:50	03/09/15 11:21	EPA 7474	1,7474	PD
Nickel, Total	5.28		mg/kg	0.134	--	2	03/04/15 15:48	03/06/15 15:57	EPA 3050B	1,6020A	PD
Zinc, Total	26.1		mg/kg	1.34	--	2	03/04/15 15:48	03/06/15 15:57	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-22 Date Collected: 02/27/15 23:45

Client ID: L61 Date Received: 02/27/15

Sample Location: EASTERN LONG ISLAND SOUND Field Prep: Not Specified

Matrix: Sediment

Percent Solids: 71%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.92		mg/kg	0.064	--	2	03/04/15 15:48	03/06/15 15:59	EPA 3050B	1,6020A	PD
Cadmium, Total	ND		mg/kg	0.026	--	2	03/04/15 15:48	03/06/15 15:59	EPA 3050B	1,6020A	PD
Chromium, Total	9.14		mg/kg	0.258	--	2	03/04/15 15:48	03/06/15 15:59	EPA 3050B	1,6020A	PD
Copper, Total	4.76		mg/kg	0.258	--	2	03/04/15 15:48	03/06/15 15:59	EPA 3050B	1,6020A	PD
Lead, Total	5.15		mg/kg	0.077	--	2	03/04/15 15:48	03/06/15 15:59	EPA 3050B	1,6020A	PD
Mercury, Total	ND		mg/kg	0.016	--	5	03/04/15 15:50	03/09/15 11:24	EPA 7474	1,7474	PD
Nickel, Total	5.02		mg/kg	0.129	--	2	03/04/15 15:48	03/06/15 15:59	EPA 3050B	1,6020A	PD
Zinc, Total	18.9		mg/kg	1.29	--	2	03/04/15 15:48	03/06/15 15:59	EPA 3050B	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-18 Batch: WG766043-1										
Arsenic, Total	ND		mg/kg	0.050	--	2	03/04/15 15:08	03/06/15 15:09	1,6020A	PD
Cadmium, Total	ND		mg/kg	0.020	--	2	03/04/15 15:08	03/06/15 15:09	1,6020A	PD
Chromium, Total	ND		mg/kg	0.200	--	2	03/04/15 15:08	03/06/15 15:09	1,6020A	PD
Copper, Total	ND		mg/kg	0.200	--	2	03/04/15 15:08	03/06/15 15:09	1,6020A	PD
Lead, Total	ND		mg/kg	0.060	--	2	03/04/15 15:08	03/06/15 15:09	1,6020A	PD
Nickel, Total	ND		mg/kg	0.100	--	2	03/04/15 15:08	03/06/15 15:09	1,6020A	PD
Zinc, Total	ND		mg/kg	1.00	--	2	03/04/15 15:08	03/06/15 15:09	1,6020A	PD

Prep Information

Digestion Method: EPA 3050B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-18 Batch: WG766045-1										
Mercury, Total	ND		mg/kg	0.013	--	5	03/04/15 15:49	03/06/15 15:02	1,7474	PD

Prep Information

Digestion Method: EPA 7474

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 19-22 Batch: WG766048-1										
Arsenic, Total	ND		mg/kg	0.050	--	2	03/04/15 15:48	03/06/15 15:52	1,6020A	PD
Cadmium, Total	ND		mg/kg	0.020	--	2	03/04/15 15:48	03/06/15 15:52	1,6020A	PD
Chromium, Total	ND		mg/kg	0.200	--	2	03/04/15 15:48	03/06/15 15:52	1,6020A	PD
Copper, Total	ND		mg/kg	0.200	--	2	03/04/15 15:48	03/06/15 15:52	1,6020A	PD
Lead, Total	ND		mg/kg	0.060	--	2	03/04/15 15:48	03/06/15 15:52	1,6020A	PD
Nickel, Total	ND		mg/kg	0.100	--	2	03/04/15 15:48	03/06/15 15:52	1,6020A	PD
Zinc, Total	ND		mg/kg	1.00	--	2	03/04/15 15:48	03/06/15 15:52	1,6020A	PD

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

Method Blank Analysis
Batch Quality Control

Prep Information

Digestion Method: EPA 3050B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 19-22 Batch: WG766050-1										
Mercury, Total	ND		mg/kg	0.013	--	5	03/04/15 15:50	03/09/15 11:11	1,7474	PD

Prep Information

Digestion Method: EPA 7474

Lab Control Sample Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified
Lab Number: L1503772
Report Date: 03/16/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-18 Batch: WG766043-2 SRM Lot Number: A2METSPIKE								
Arsenic, Total	88		-		75-125	-		20
Cadmium, Total	85		-		75-125	-		20
Chromium, Total	96		-		75-125	-		20
Copper, Total	90		-		75-125	-		20
Lead, Total	90		-		75-125	-		20
Nickel, Total	86		-		75-125	-		20
Zinc, Total	84		-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 Batch: WG766045-2 SRM Lot Number: HPHGAF								
Mercury, Total	84		-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 19-22 Batch: WG766048-2 SRM Lot Number: A2METSPIKE								
Arsenic, Total	90		-		75-125	-		20
Cadmium, Total	88		-		75-125	-		20
Chromium, Total	97		-		75-125	-		20
Copper, Total	93		-		75-125	-		20
Lead, Total	96		-		75-125	-		20
Nickel, Total	84		-		75-125	-		20
Zinc, Total	85		-		75-125	-		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE

Project Number: Not Specified

Lab Number: L1503772

Report Date: 03/16/15

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 19-22 Batch: WG766050-2 SRM Lot Number: HPHGAF					
Mercury, Total	92	-	80-120	-	20

Matrix Spike Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG766043-4 WG766043-5 QC Sample: L1503772-01 Client ID: L27												
Arsenic, Total	3.78	261	241	91		238	87		75-125	1		20
Cadmium, Total	0.069	130	115	88		114	85		75-125	1		20
Chromium, Total	11.0	261	256	94		258	92		75-125	1		20
Copper, Total	5.80	261	239	89		241	88		75-125	1		20
Lead, Total	7.24	261	222	82		223	80		75-125	0		20
Nickel, Total	6.84	261	225	84		227	82		75-125	1		20
Zinc, Total	38.8	261	253	82		249	78		75-125	2		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG766045-4 WG766045-5 QC Sample: L1503772-01 Client ID: L27												
Mercury, Total	ND	0.801	0.698	87		0.688	87		80-120	1		20
Total Metals - Mansfield Lab Associated sample(s): 19-22 QC Batch ID: WG766048-4 WG766048-5 QC Sample: L1503772-22 Client ID: L61												
Arsenic, Total	2.92	260	228	86		244	91		75-125	7		20
Cadmium, Total	ND	130	112	86		117	88		75-125	4		20
Chromium, Total	9.14	260	255	94		270	98		75-125	6		20
Copper, Total	4.76	260	235	88		253	94		75-125	7		20
Lead, Total	5.15	260	228	86		238	88		75-125	4		20
Nickel, Total	5.02	260	217	82		228	84		75-125	5		20
Zinc, Total	18.9	260	240	85		256	89		75-125	6		20
Total Metals - Mansfield Lab Associated sample(s): 19-22 QC Batch ID: WG766050-4 WG766050-5 QC Sample: L1503772-22 Client ID: L61												
Mercury, Total	ND	0.82	0.766	93		0.736	91		80-120	4		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG766043-3 QC Sample: L1503772-01 Client ID: L27						
Arsenic, Total	3.78	3.30	mg/kg	14		20
Cadmium, Total	0.069	0.049	mg/kg	**34**	Q	20
Chromium, Total	11.0	11.2	mg/kg	2		20
Copper, Total	5.80	5.97	mg/kg	3		20
Lead, Total	7.24	7.39	mg/kg	2		20
Nickel, Total	6.84	6.79	mg/kg	1		20
Zinc, Total	38.8	36.8	mg/kg	5		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG766045-3 QC Sample: L1503772-01 Client ID: L27						
Mercury, Total	ND	ND	mg/kg	NC		20
Total Metals - Mansfield Lab Associated sample(s): 19-22 QC Batch ID: WG766048-3 QC Sample: L1503772-22 Client ID: L61						
Arsenic, Total	2.92	3.84	mg/kg	**27**	Q	20
Cadmium, Total	ND	ND	mg/kg	NC		20
Chromium, Total	9.14	7.06	mg/kg	**26**	Q	20
Copper, Total	4.76	5.30	mg/kg	11		20
Lead, Total	5.15	5.04	mg/kg	2		20
Nickel, Total	5.02	4.95	mg/kg	1		20
Zinc, Total	18.9	18.9	mg/kg	0		20
Total Metals - Mansfield Lab Associated sample(s): 19-22 QC Batch ID: WG766050-3 QC Sample: L1503772-22 Client ID: L61						
Mercury, Total	ND	ND	mg/kg	NC		20

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG766043-7

Parameter	% Recovery	Qual	QC Criteria
Arsenic, Total	95		81-120
Cadmium, Total	96		82-118
Chromium, Total	93		79-120
Copper, Total	95		81-119
Lead, Total	90		81-118
Nickel, Total	96		82-118
Zinc, Total	95		80-120

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG766045-6

Parameter	% Recovery	Qual	QC Criteria
Mercury, Total	90		71-129

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG766048-7

Parameter	% Recovery	Qual	QC Criteria
Arsenic, Total	94		81-120
Cadmium, Total	98		82-118
Chromium, Total	95		79-120
Copper, Total	94		81-119
Lead, Total	94		81-118
Nickel, Total	96		82-118
Zinc, Total	95		80-120

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG766050-6

Parameter	% Recovery	Qual	QC Criteria
Mercury, Total	96		71-129

INORGANICS
&
MISCELLANEOUS

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-01
Client ID: L27
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 09:08
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.448		%	0.010	--	1	-	03/09/15 10:20	1,9060	CM
Total Organic Carbon (Rep2)	0.499		%	0.010	--	1	-	03/09/15 10:20	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	2.60		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	0.800		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	9.20		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	72.0		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	15.4		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	71.6		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	28.4		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-02
Client ID: L28
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 09:21
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.808		%	0.010	--	1	-	03/09/15 12:13	1,9060	CM
Total Organic Carbon (Rep2)	0.720		%	0.010	--	1	-	03/09/15 12:13	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	2.40		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	4.80		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	17.0		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	67.4		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	8.40		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	72.6		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	27.4		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-03
Client ID: L25A
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 09:48
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.555		%	0.010	--	1	-	03/09/15 10:35	1,9060	CM
Total Organic Carbon (Rep2)	0.432		%	0.010	--	1	-	03/09/15 10:35	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	0.400		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	2.70		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	16.9		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	69.6		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	10.4		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	72.2		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	27.8		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-04
Client ID: L25B
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 10:00
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.487		%	0.010	--	1	-	03/09/15 12:28	1,9060	CM
Total Organic Carbon (Rep2)	0.420		%	0.010	--	1	-	03/09/15 12:28	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	2.00		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	2.90		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	19.2		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	67.6		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	8.30		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	72.6		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	27.4		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-05
Client ID: L21
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 10:12
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.848		%	0.010	--	1	-	03/09/15 12:38	1,9060	CM
Total Organic Carbon (Rep2)	0.870		%	0.010	--	1	-	03/09/15 12:38	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	4.50		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	3.70		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	20.7		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	55.9		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	15.2		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	70.3		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	29.7		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-06
Client ID: L20
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 10:25
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.342		%	0.010	--	1	-	03/09/15 11:21	1,9060	CM
Total Organic Carbon (Rep2)	0.318		%	0.010	--	1	-	03/09/15 11:21	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	2.30		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	1.20		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	16.8		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	67.2		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	12.5		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	74.0		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	26.0		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-07
Client ID: L19
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 10:43
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.406		%	0.010	--	1	-	03/09/15 12:43	1,9060	CM
Total Organic Carbon (Rep2)	0.498		%	0.010	--	1	-	03/09/15 12:43	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	1.90		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	1.50		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	12.9		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	67.2		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	16.5		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	72.2		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	27.8		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-08
Client ID: L13
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 10:55
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.45		%	0.010	--	1	-	03/09/15 11:41	1,9060	CM
Total Organic Carbon (Rep2)	1.91		%	0.010	--	1	-	03/09/15 11:41	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	1.00		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	8.30		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	42.4		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	48.3		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	52.2		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	47.8		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-09
Client ID: L16
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 11:09
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.68		%	0.010	--	1	-	03/09/15 12:58	1,9060	CM
Total Organic Carbon (Rep2)	1.61		%	0.010	--	1	-	03/09/15 12:58	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	0.900		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	2.20		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	12.1		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	41.6		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	43.2		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	53.9		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	46.1		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-10
Client ID: L18
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 11:22
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	3.64		%	0.010	--	1	-	03/09/15 13:16	1,9060	CM
Total Organic Carbon (Rep2)	3.44		%	0.010	--	1	-	03/09/15 13:16	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	1.20		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	1.90		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	4.90		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	13.8		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	78.2		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	56.0		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	44.0		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-11
Client ID: L17
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 11:39
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.50		%	0.010	--	1	-	03/09/15 13:51	1,9060	CM
Total Organic Carbon (Rep2)	1.26		%	0.010	--	1	-	03/09/15 13:51	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	1.90		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	6.20		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	33.9		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	51.6		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	6.40		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	71.6		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	28.4		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-12
Client ID: L15
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 11:53
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.243		%	0.010	--	1	-	03/09/15 13:56	1,9060	CM
Total Organic Carbon (Rep2)	0.297		%	0.010	--	1	-	03/09/15 13:56	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	51.4		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	3.90		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	15.2		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	24.5		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	5.00		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	65.6		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	34.4		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-13
Client ID: L12
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 12:58
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.30		%	0.010	--	1	-	03/09/15 14:18	1,9060	CM
Total Organic Carbon (Rep2)	1.23		%	0.010	--	1	-	03/09/15 14:18	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	7.80		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	5.10		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	10.0		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	50.7		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	26.4		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	63.4		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	36.6		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-14
Client ID: L11
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 13:08
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.32		%	0.010	--	1	-	03/09/15 14:38	1,9060	CM
Total Organic Carbon (Rep2)	1.13		%	0.010	--	1	-	03/09/15 14:38	1,9060	CM
Grain Size Analysis - Mansfield Lab										
% Total Gravel	2.80		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	2.30		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	11.2		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	36.1		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	47.6		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	64.0		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	36.0		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-15
Client ID: L14
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 13:19
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.83		%	0.010	--	1	-	03/11/15 09:38	1,9060	JK
Total Organic Carbon (Rep2)	2.65		%	0.010	--	1	-	03/11/15 09:38	1,9060	JK
Grain Size Analysis - Mansfield Lab										
% Total Gravel	9.00		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	4.40		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	12.4		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	41.9		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	32.3		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	68.7		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	31.3		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-16
Client ID: L23A
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 13:35
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.598		%	0.010	--	1	-	03/11/15 09:53	1,9060	JK
Total Organic Carbon (Rep2)	0.477		%	0.010	--	1	-	03/11/15 09:53	1,9060	JK
Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	0.200		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	1.20		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	62.6		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	36.0		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	67.9		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	32.1		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-17
Client ID: L23B
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 13:45
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.391		%	0.010	--	1	-	03/11/15 09:58	1,9060	JK
Total Organic Carbon (Rep2)	0.392		%	0.010	--	1	-	03/11/15 09:58	1,9060	JK
Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	0.200		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	8.70		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	72.7		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	18.4		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	68.0		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	32.0		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-18
Client ID: L24A
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 13:58
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.354		%	0.010	--	1	-	03/11/15 10:08	1,9060	JK
Total Organic Carbon (Rep2)	0.377		%	0.010	--	1	-	03/11/15 10:08	1,9060	JK
Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	ND		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	0.200		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	71.5		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	28.3		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	70.2		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	29.8		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-19
Client ID: L24B
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 14:12
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.399		%	0.010	--	1	-	03/11/15 10:18	1,9060	JK
Total Organic Carbon (Rep2)	0.360		%	0.010	--	1	-	03/11/15 10:18	1,9060	JK
Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	0.100		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	0.100		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	74.0		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	25.8		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	68.0		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	32.0		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-20
Client ID: L22A
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 14:30
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.513		%	0.010	--	1	-	03/11/15 10:39	1,9060	JK
Total Organic Carbon (Rep2)	0.464		%	0.010	--	1	-	03/11/15 10:39	1,9060	JK
Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	0.100		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	1.10		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	67.1		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	31.7		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	64.4		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	35.6		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-21
Client ID: L22B
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 14:43
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.543		%	0.010	--	1	-	03/11/15 10:49	1,9060	JK
Total Organic Carbon (Rep2)	0.456		%	0.010	--	1	-	03/11/15 10:49	1,9060	JK
Grain Size Analysis - Mansfield Lab										
% Total Gravel	2.60		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	0.200		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	1.10		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	69.8		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	26.3		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	67.4		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	32.6		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

SAMPLE RESULTS

Lab ID: L1503772-22
Client ID: L61
Sample Location: EASTERN LONG ISLAND SOUND
Matrix: Sediment

Date Collected: 02/27/15 23:45
Date Received: 02/27/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.356		%	0.010	--	1	-	03/11/15 10:59	1,9060	JK
Total Organic Carbon (Rep2)	0.339		%	0.010	--	1	-	03/11/15 10:59	1,9060	JK
Grain Size Analysis - Mansfield Lab										
% Total Gravel	27.9		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Coarse Sand	5.30		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Medium Sand	22.8		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Fine Sand	36.6		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
% Total Fines	7.40		%	0.100	NA	1	-	03/11/15 00:00	12,D422	JK
General Chemistry - Mansfield Lab										
Solids, Total	71.2		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC
Moisture	28.8		%	0.100	--	1	-	03/04/15 13:00	30,2540G	LC

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab for sample(s): 01-14 Batch: WG767492-1										
Total Organic Carbon (Rep1)	ND		%	0.010	--	1	-	03/09/15 10:09	1,9060	CM
Total Organic Carbon (Rep2)	ND		%	0.010	--	1	-	03/09/15 10:09	1,9060	CM
Total Organic Carbon - Mansfield Lab for sample(s): 15-22 Batch: WG767511-1										
Total Organic Carbon (Rep1)	ND		%	0.010	--	1	-	03/10/15 20:43	1,9060	JK
Total Organic Carbon (Rep2)	ND		%	0.010	--	1	-	03/10/15 20:43	1,9060	JK

Matrix Spike Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-14 QC Batch ID: WG767492-4 QC Sample: L1503772-10 Client ID: L18												
Total Organic Carbon (Rep1)	3.64	1.17	4.67	88		-	-		75-125	-		25
Total Organic Carbon (Rep2)	3.44	2.33	5.14	**73**	Q	-	-		75-125	-		25
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-14 QC Batch ID: WG767492-5 QC Sample: L1503772-13 Client ID: L12												
Total Organic Carbon (Rep1)	1.30	1.55	3.08	115		-	-		75-125	-		25
Total Organic Carbon (Rep2)	1.23	0.918	2.99	**192**	Q	-	-		75-125	-		25
Total Organic Carbon - Mansfield Lab Associated sample(s): 15-22 QC Batch ID: WG767511-4 WG767511-5 QC Sample: L1503772-22 Client ID: L61												
Total Organic Carbon (Rep1)	0.356	1.27	1.68	104		1.58	**141**	Q	75-125	6		25
Total Organic Carbon (Rep2)	0.339	0.942	1.34	106		1.99	100		75-125	**39**	Q	25

Lab Duplicate Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG766077-1 QC Sample: L1503772-20 Client ID: L22A						
Solids, Total	64.4	63.8	%	1		10
Moisture	35.6	36.2	%	2		10
General Chemistry - Mansfield Lab Associated sample(s): 21-22 QC Batch ID: WG766078-1 QC Sample: L1503772-22 Client ID: L61						
Solids, Total	71.2	71.6	%	1		10
Moisture	28.8	28.4	%	1		10
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-14 QC Batch ID: WG767492-3 QC Sample: L1503772-10 Client ID: L18						
Total Organic Carbon (Rep1)	3.64	3.24	%	12		25
Total Organic Carbon (Rep2)	3.44	3.59	%	4		25
Total Organic Carbon - Mansfield Lab Associated sample(s): 15-22 QC Batch ID: WG767511-3 QC Sample: L1503772-22 Client ID: L61						
Total Organic Carbon (Rep1)	0.356	0.294	%	19		25
Total Organic Carbon (Rep2)	0.339	0.344	%	1		25
Grain Size Analysis - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG767551-1 QC Sample: L1503772-01 Client ID: L27						
% Total Gravel	2.60	10.2	%	**119**	Q	20
% Coarse Sand	0.800	1.30	%	**48**	Q	20
% Medium Sand	9.20	7.00	%	**27**	Q	20
% Fine Sand	72.0	66.1	%	9		20
% Total Fines	15.4	15.4	%	0		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Parameter	Native Sample	Duplicate Sample	Units	RPD		RPD Limits
Grain Size Analysis - Mansfield Lab Associated sample(s): 21-22 QC Batch ID: WG767555-1 QC Sample: L1503772-22 Client ID: L61						
% Total Gravel	27.9	35.7	%	**25**	Q	20
% Coarse Sand	5.30	4.50	%	16		20
% Medium Sand	22.8	20.3	%	12		20
% Fine Sand	36.6	33.1	%	10		20
% Total Fines	7.40	6.40	%	14		20

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG767492-2

Parameter	% Recovery	Qual	QC Criteria
Total Organic Carbon (Rep1)	96		75-125
Total Organic Carbon (Rep2)	112		75-125

Project Name: LIS-USACOE RIM DREDGE **Lab Number:** L1503772

Project Number: Not Specified **Report Date:** 03/16/15

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG767511-2

Parameter	% Recovery	Qual	QC Criteria
Total Organic Carbon (Rep1)	105		75-125
Total Organic Carbon (Rep2)	94		75-125

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Reagent H2O Preserved Vials Frozen on: NA

Cooler Information Custody Seal

Cooler	
A	Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1503772-01A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-01B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503772-02A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-02B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()

*Values in parentheses indicate holding time in days

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1503772-03A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-03B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503772-04A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-04B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503772-05A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-05B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()

*Values in parentheses indicate holding time in days

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1503772-06A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-06B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503772-07A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-07B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503772-08A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-08B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()

*Values in parentheses indicate holding time in days

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1503772-09A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-09B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503772-10A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-10B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503772-11A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-11B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()

*Values in parentheses indicate holding time in days

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1503772-12A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-12B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503772-13A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-13B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503772-14A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-14B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()

*Values in parentheses indicate holding time in days

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1503772-15A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-15B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503772-16A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-16B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503772-17A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-17B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()

*Values in parentheses indicate holding time in days

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1503772-18A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-18B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503772-19A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-19B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503772-20A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-20B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()

*Values in parentheses indicate holding time in days

Project Name: LIS-USACOE RIM DREDGE
Project Number: Not Specified

Lab Number: L1503772
Report Date: 03/16/15

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1503772-21A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-21B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()
L1503772-22A	Glass 250ml/8oz unpreserved	A	N/A	4.1	Y	Absent	A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1503772-22B	Plastic 8oz unpreserved for Grai	A	N/A	4.1	Y	Absent	A2-HYDRO-TFINE(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND()

Container Comments

L1503772-02A

L1503772-03A

*Values in parentheses indicate holding time in days

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503772
Project Number:	Not Specified	**Report Date:**	03/16/15

GLOSSARY

Acronyms

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NI - Not Ignitable.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

Report Format: Data Usability Report

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503772
Project Number:	Not Specified	**Report Date:**	03/16/15

Data Qualifiers

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the reporting limit (RL) for the sample.

Report Format: Data Usability Report

Project Name:	LIS-USACOE RIM DREDGE	**Lab Number:**	L1503772
Project Number:	Not Specified	**Report Date:**	03/16/15

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

12 Annual Book of ASTM Standards. (American Society for Testing and Materials) ASTM International.

30 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WPCF. 18th Edition. 1992.

105 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997 in conjunction with NOAA Technical Memorandum NMFS-NWFSC-59: Extraction, Cleanup and GC/MS Analysis of Sediments and Tissues for Organic Contaminants, March 2004 and the Determination of Pesticides and PCBs in Water and Oil/Sediment by GC/MS: Method 680, EPA 01A0005295, November 1985.

LIMITATION OF LIABILITIES

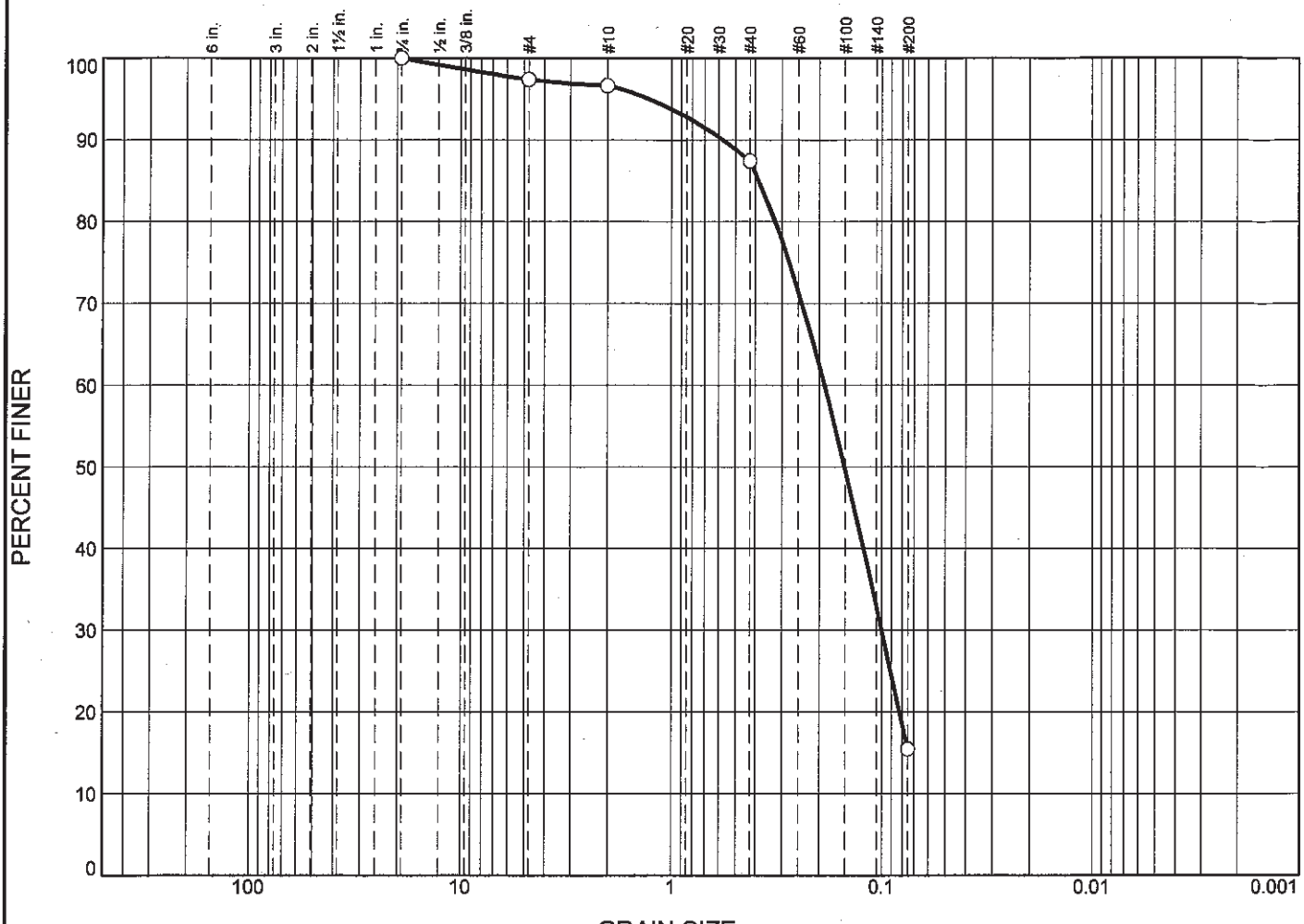
Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

ASTM D422-63

GRAIN SIZE ANALYSIS

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.6	0.8	9.2	72.0	15.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.3840	0.1881	0.1505	0.0998				

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** L27 **Sample Number:** L1503772-01

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L27

Sample Number: L1503772-01

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 91.12
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
91.12	0.00	0.75	0.00	0.00	100.0
		#4	2.38	0.00	97.4
		#10	0.68	0.00	96.6
		#40	8.41	0.00	87.4
		#200	65.58	0.00	15.4

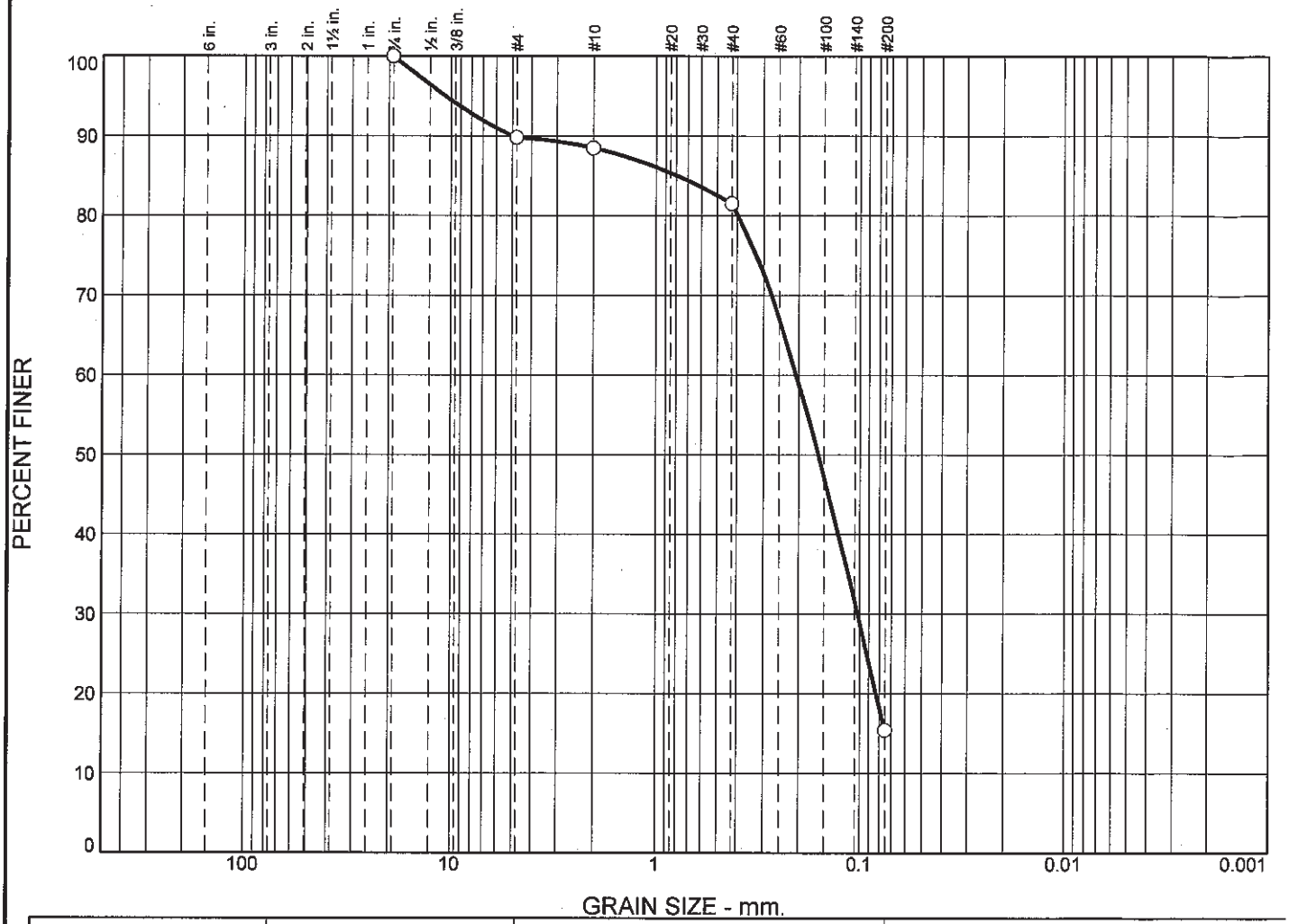
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.6	2.6	0.8	9.2	72.0	82.0			15.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0820	0.0998	0.1505	0.1881	0.3215	0.3840	0.5743	1.2741

Fineness Modulus
0.95

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	10.2	1.3	7.0	66.1	15.4	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.7865	0.2053	0.1601	0.1022				

	Material Description	USCS	AASHTO
○			

Project No. **Client:**
Project:

○ **Source of Sample:** L27 **Sample Number:** WG767551-1

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L27

Sample Number: WG767551-1

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 105.04
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
105.04	0.00	0.75	0.00	0.00	100.0
		#4	10.69	0.00	89.8
		#10	1.41	0.00	88.5
		#40	7.28	0.00	81.5
		#200	69.46	0.00	15.4

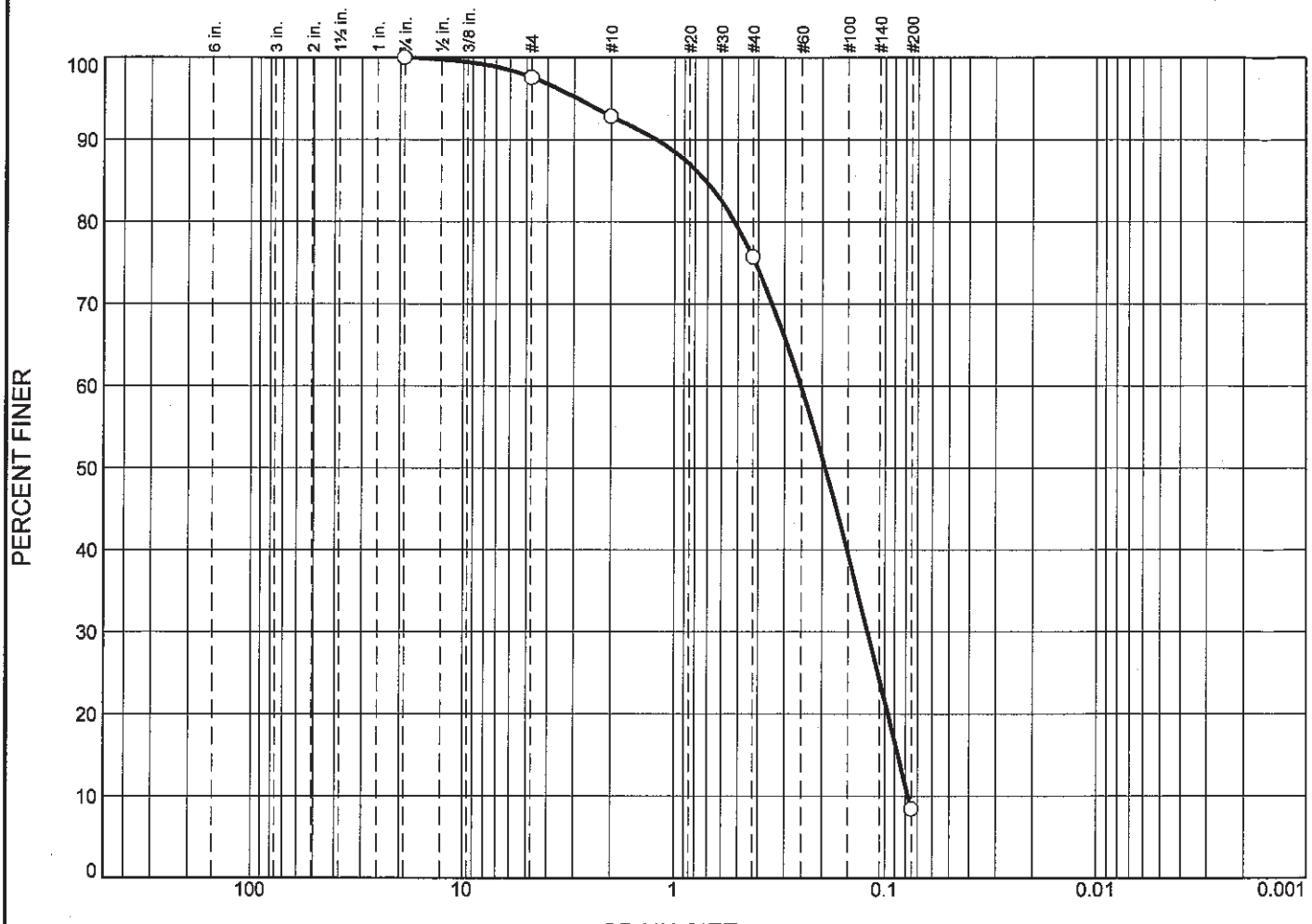
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	10.2	10.2	1.3	7.0	66.1	74.4			15.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0826	0.1022	0.1601	0.2053	0.3945	0.7865	4.9457	10.6475

Fineness Modulus
1.37

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.4	4.8	17.0	67.4	8.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.7118	0.2512	0.1925	0.1202	0.0865	0.0776	0.74	3.24

	Material Description	USCS	AASHTO
○			

Project No. **Client:**
Project:

○ **Source of Sample:** L28 **Sample Number:** L1503772-02

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L28

Sample Number: L1503772-02

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 101.79
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
101.79	0.00	0.75	0.00	0.00	100.0
		#4	2.46	0.00	97.6
		#10	4.83	0.00	92.8
		#40	17.39	0.00	75.8
		#200	68.55	0.00	8.4

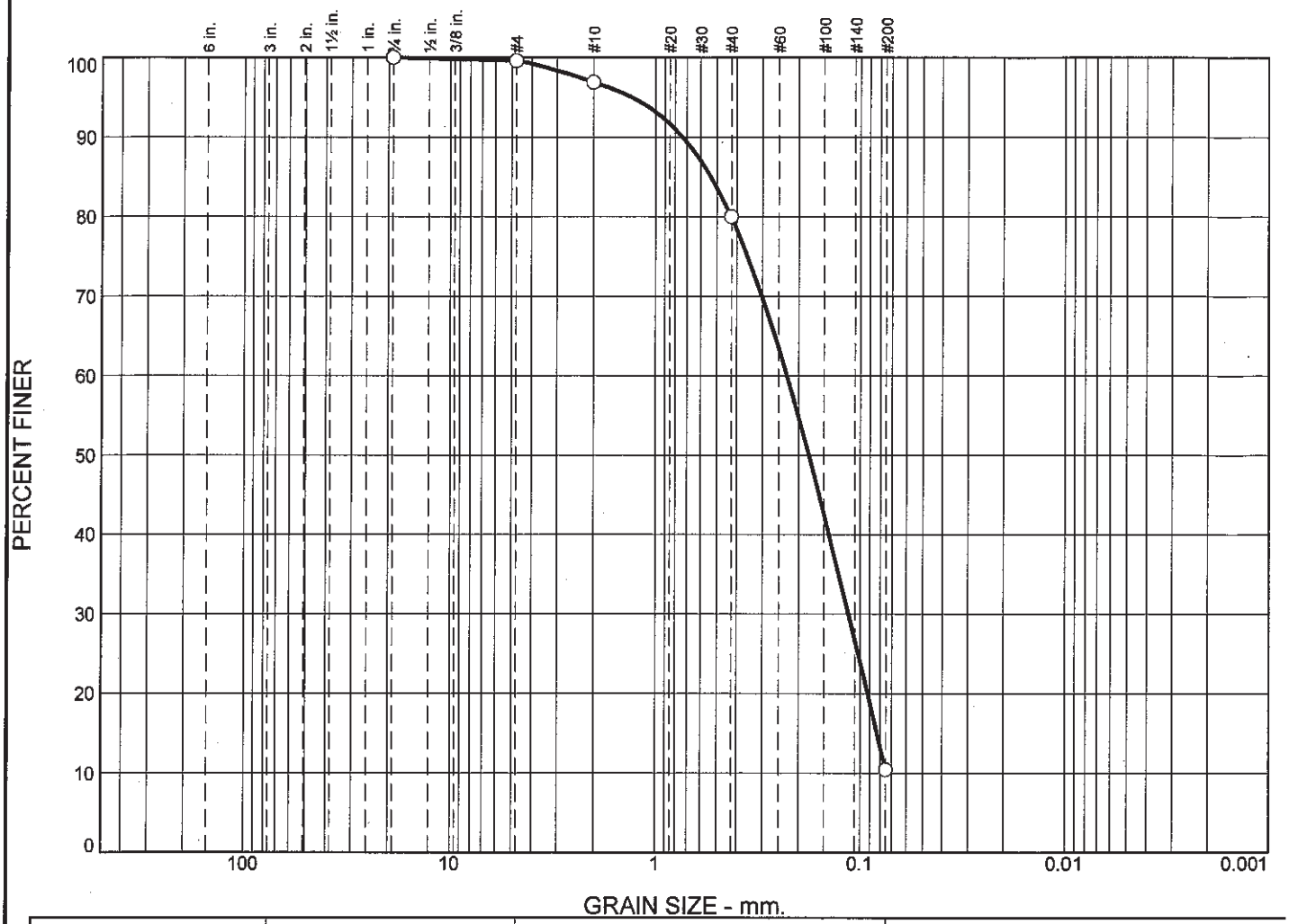
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.4	2.4	4.8	17.0	67.4	89.2			8.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0776	0.0865	0.0964	0.1202	0.1925	0.2512	0.5185	0.7118	1.2184	2.9007

Fineness Modulus	C_u	C_c
1.31	3.24	0.74

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.4	2.7	16.9	69.6	10.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.5342	0.2276	0.1776	0.1134	0.0825			

Material Description	USCS	AASHTO
○		

Project No. **Client:**
Project:

○ **Source of Sample:** L25A **Sample Number:** L1503772-03

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L25A

Sample Number: L1503772-03

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 112.99
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
112.99	0.00	0.75	0.00	0.00	100.0
		#4	0.43	0.00	99.6
		#10	3.11	0.00	96.9
		#40	19.05	0.00	80.0
		#200	78.63	0.00	10.4

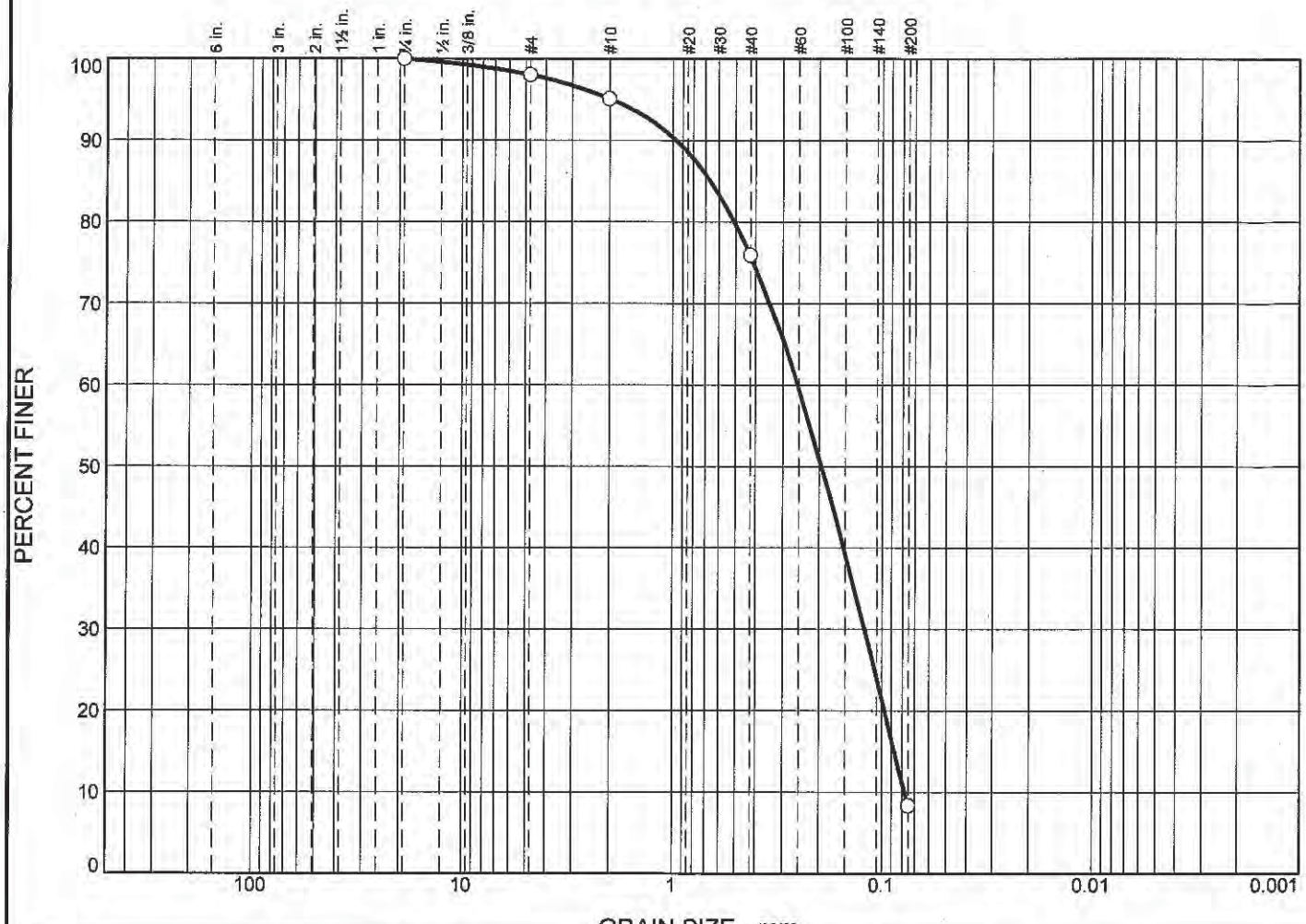
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.4	0.4	2.7	16.9	69.6	89.2			10.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0825	0.0917	0.1134	0.1776	0.2276	0.4249	0.5342	0.7339	1.3099

Fineness Modulus
1.09

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.0	2.9	19.2	67.6	8.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.6598	0.2535	0.1945	0.1210	0.0867	0.0778	0.74	3.26

	Material Description	USCS	AASHTO
○			

Project No. **Client:**
Project:

○ **Source of Sample:** L25B **Sample Number:** L1503772-04

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L25B

Sample Number: L1503772-04

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 104.94
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
104.94	0.00	0.75	0.00	0.00	100.0
		#4	2.06	0.00	98.0
		#10	3.09	0.00	95.1
		#40	20.10	0.00	75.9
		#200	70.93	0.00	8.3

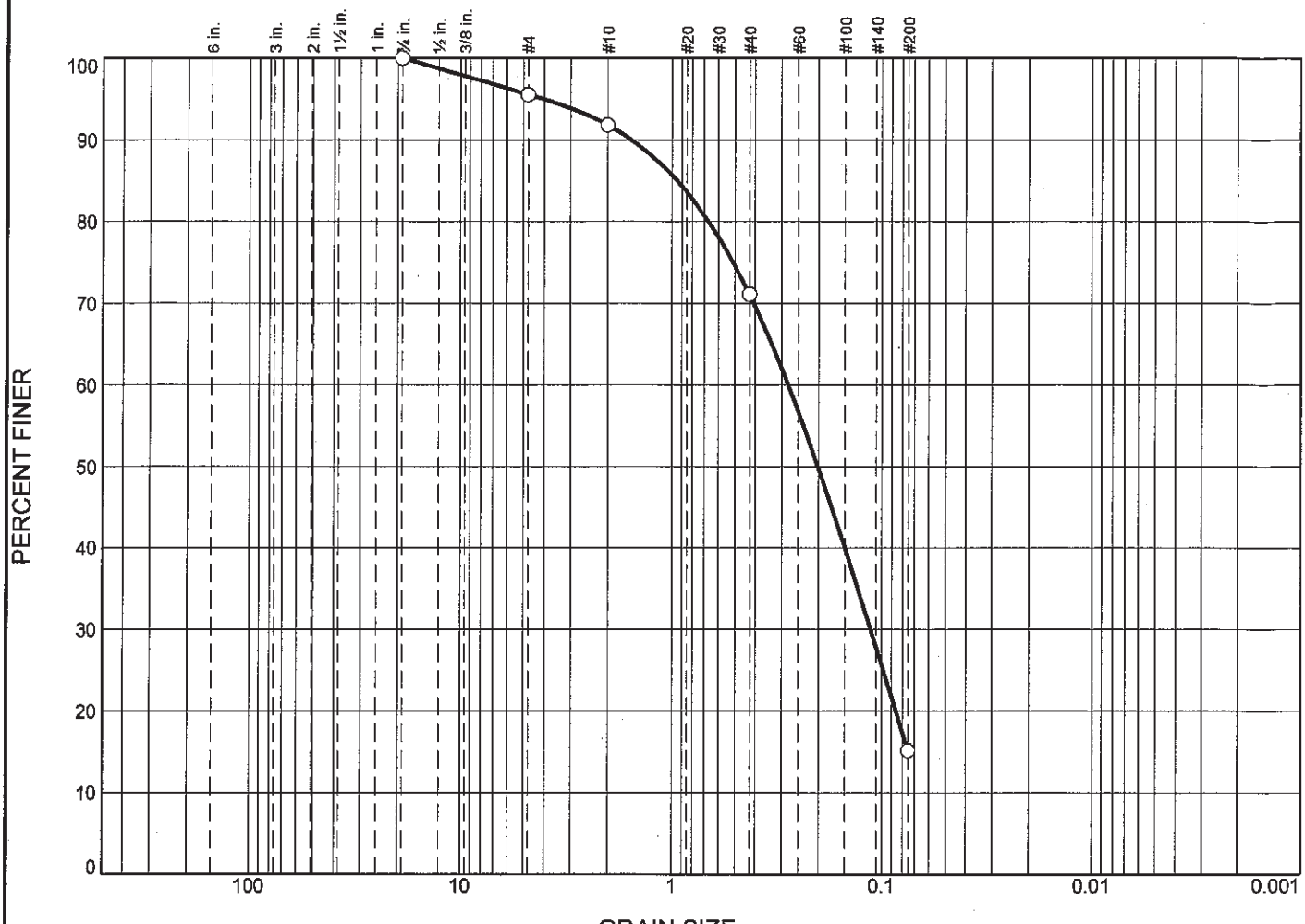
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.0	2.0	2.9	19.2	67.6	89.7			8.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0778	0.0867	0.0968	0.1210	0.1945	0.2535	0.5057	0.6598	0.9632	1.9607

Fineness Modulus	C_u	C_c
1.27	3.26	0.74

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	4.5	3.7	20.7	55.9	15.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.9418	0.2783	0.2010	0.1125				

Material Description	USCS	AASHTO
○		

Project No. **Client:**
Project:

○ **Source of Sample:** L21 **Sample Number:** L1503772-05

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L21

Sample Number: L1503772-05

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 111.02
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
111.02	0.00	0.75	0.00	0.00	100.0
		#4	4.95	0.00	95.5
		#10	4.15	0.00	91.8
		#40	23.00	0.00	71.1
		#200	62.06	0.00	15.2

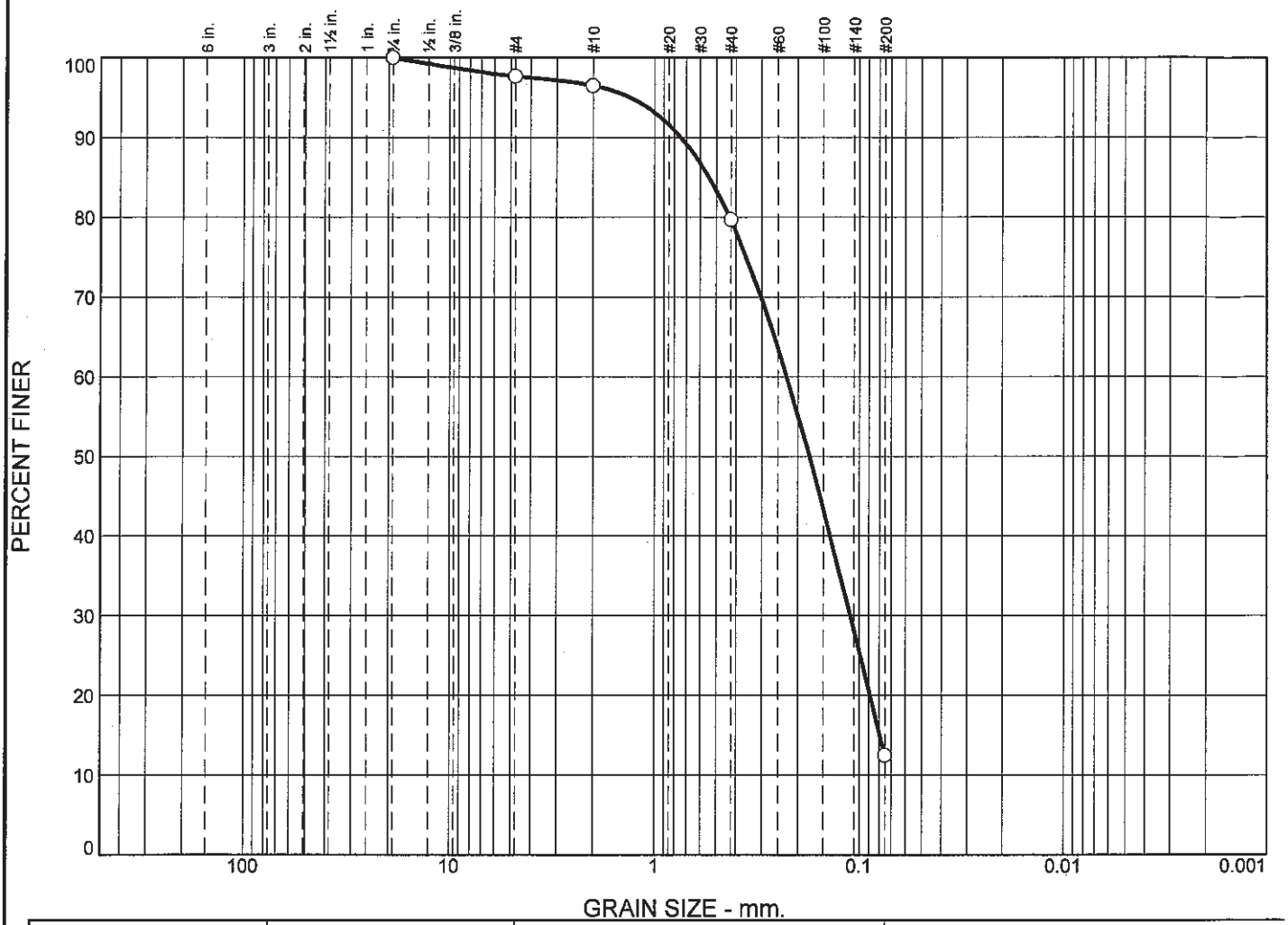
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	4.5	4.5	3.7	20.7	55.9	80.3			15.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0855	0.1125	0.2010	0.2783	0.6673	0.9418	1.5455	4.0512

Fineness Modulus
1.46

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.3	1.2	16.8	67.2	12.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.5417	0.2264	0.1753	0.1102	0.0792			

Material Description	USCS	AASHTO
○		

Project No. **Client:**
Project:

○ **Source of Sample:** L20 **Sample Number:** L1503772-06

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L20

Sample Number: L1503772-06

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 117.97
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
117.97	0.00	0.75	0.00	0.00	100.0
		#4	2.73	0.00	97.7
		#10	1.43	0.00	96.5
		#40	19.74	0.00	79.7
		#200	79.33	0.00	12.5

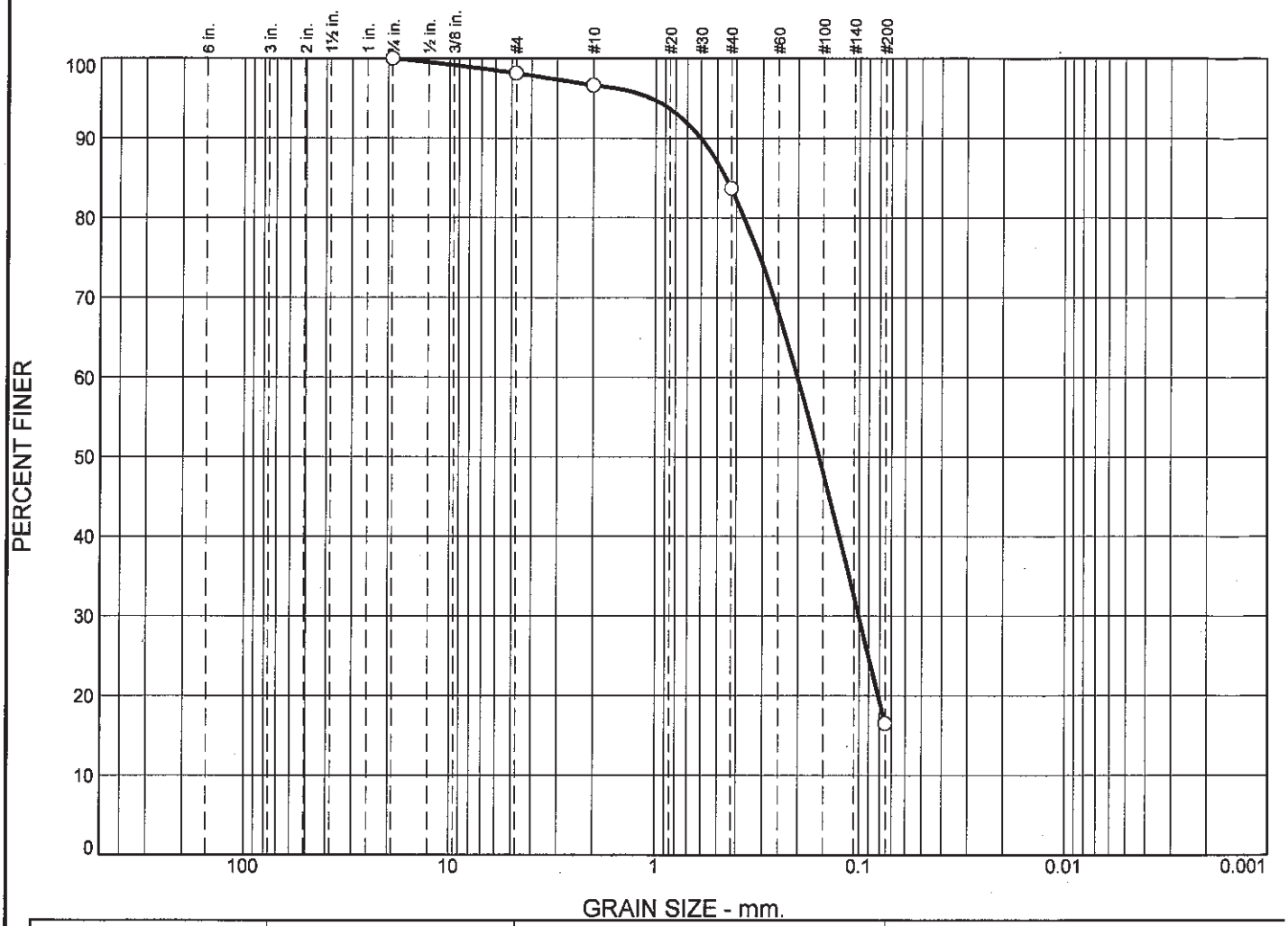
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.3	2.3	1.2	16.8	67.2	85.2			12.5

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0792	0.0883	0.1102	0.1753	0.2264	0.4295	0.5417	0.7433	1.3260

Fineness Modulus
1.12

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.9	1.5	12.9	67.2	16.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.4509	0.2005	0.1569	0.1002				

	Material Description	USCS	AASHTO
○			

Project No. **Client:**
Project:

○ **Source of Sample:** L19 **Sample Number:** L1503772-07

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L19

Sample Number: L1503772-07

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 112.31
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
112.31	0.00	0.75	0.00	0.00	100.0
		#4	2.09	0.00	98.1
		#10	1.68	0.00	96.6
		#40	14.52	0.00	83.7
		#200	75.49	0.00	16.5

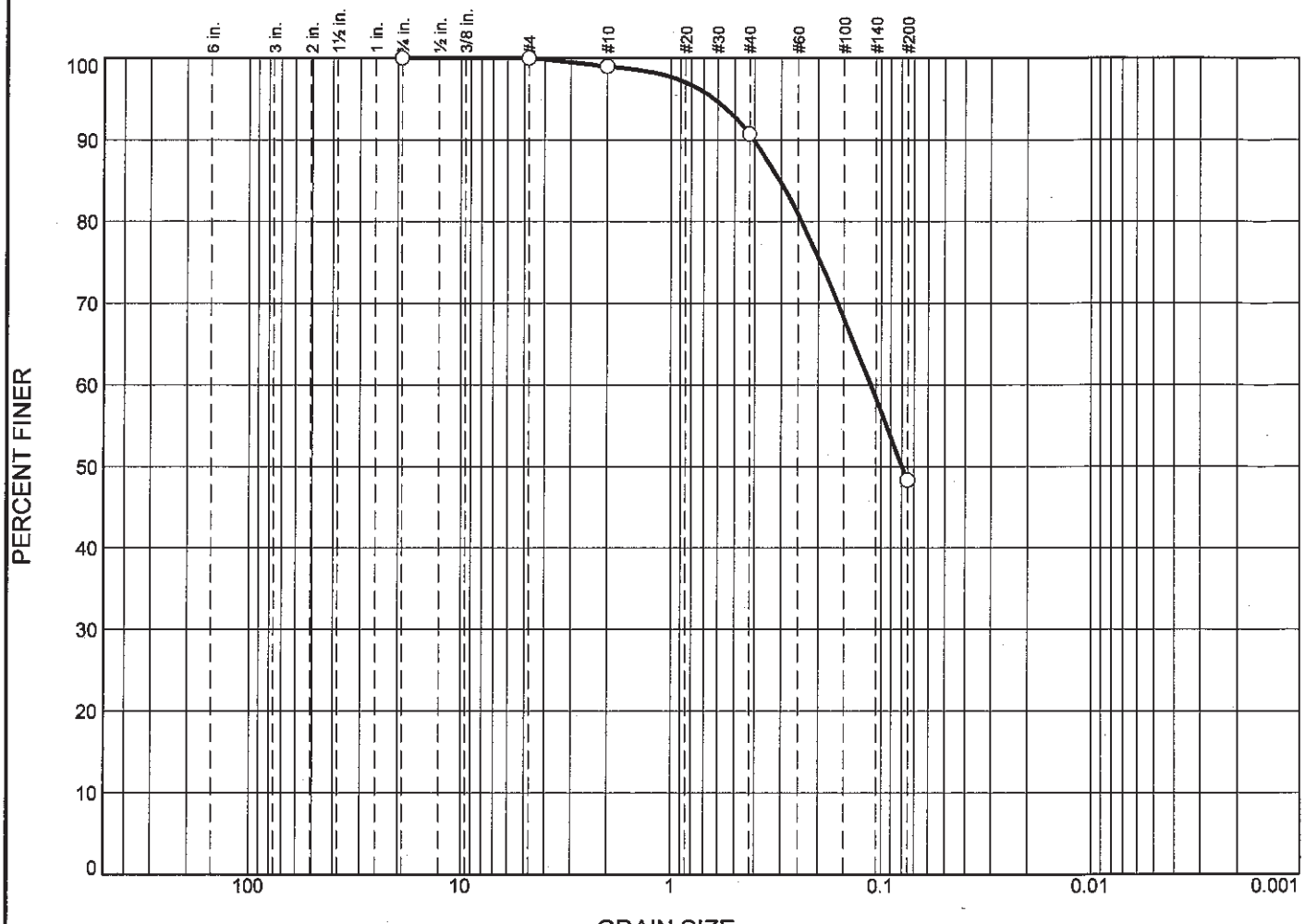
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.9	1.9	1.5	12.9	67.2	81.6			16.5

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0808	0.1002	0.1569	0.2005	0.3655	0.4509	0.6017	1.0546

Fineness Modulus
0.98

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	1.0	8.3	42.4	48.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.3036	0.1118	0.0794					

Material Description	USCS	AASHTO
○		

Project No. **Client:**
Project:

○ **Source of Sample:** L13 **Sample Number:** L1503772-08

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L13

Sample Number: L1503772-08

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 76.52
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
76.52	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.79	0.00	99.0
		#40	6.31	0.00	90.7
		#200	32.46	0.00	48.3

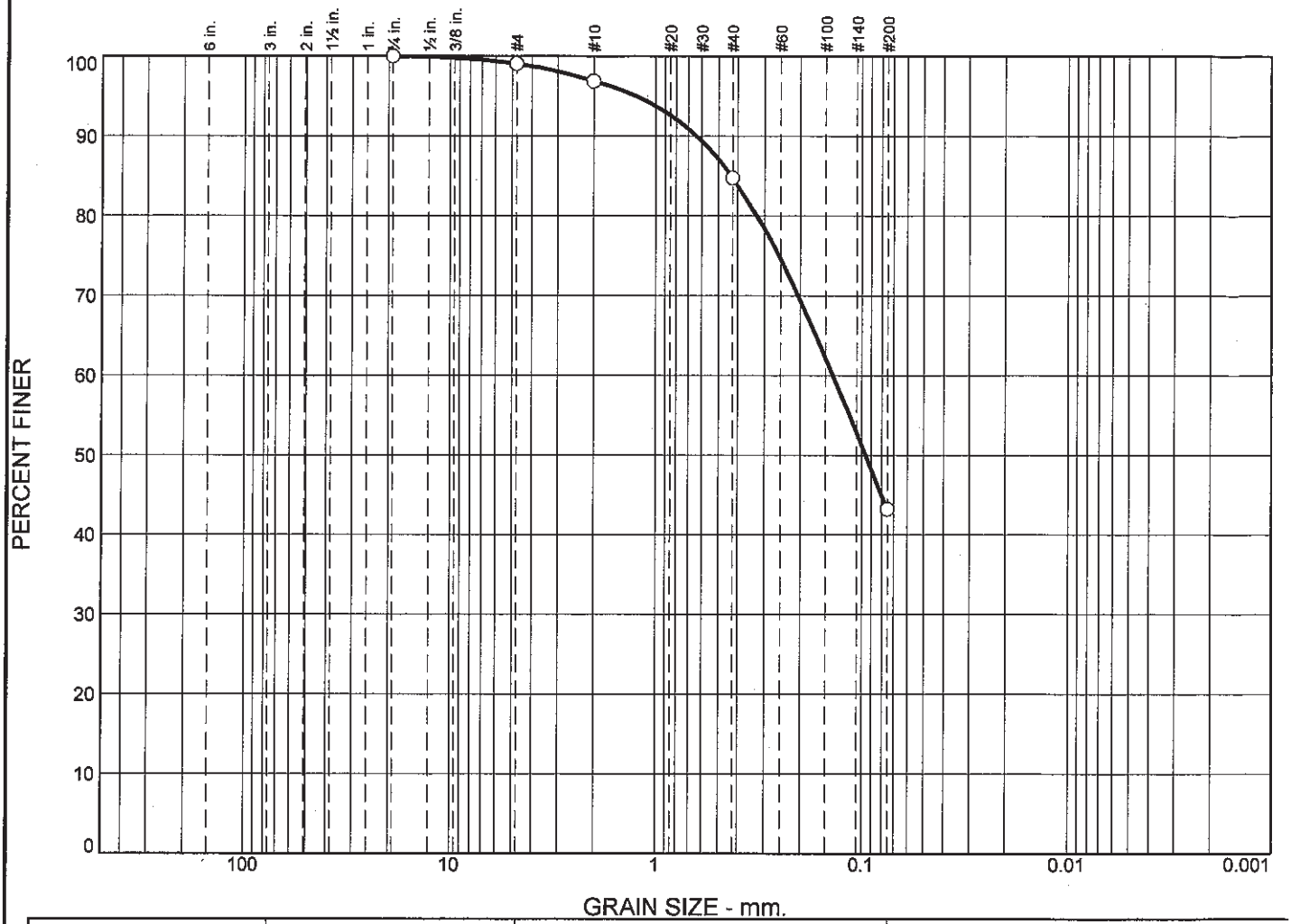
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	1.0	8.3	42.4	51.7			48.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0794	0.1118	0.2398	0.3036	0.4046	0.6243

Fineness Modulus
0.55

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.9	2.2	12.1	41.6	43.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.4311	0.1377	0.0955					

	Material Description	USCS	AASHTO
○			

Project No. **Client:**
Project:

○ **Source of Sample:** L16 **Sample Number:** L1503772-09

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L16

Sample Number: L1503772-09

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 75.56
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
75.56	0.00	0.75	0.00	0.00	100.0
		#4	0.71	0.00	99.1
		#10	1.65	0.00	96.9
		#40	9.14	0.00	84.8
		#200	31.40	0.00	43.2

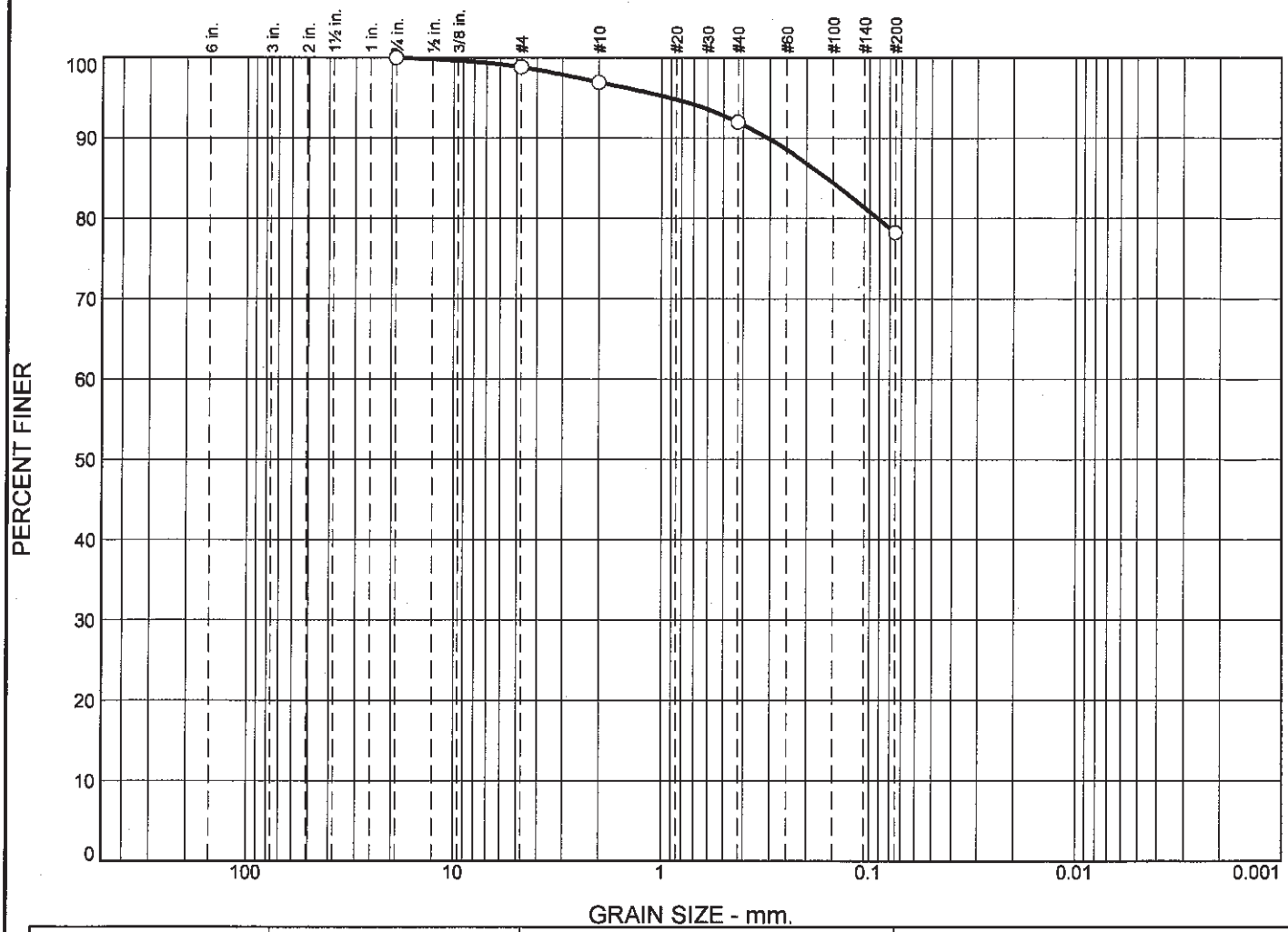
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.9	0.9	2.2	12.1	41.6	55.9			43.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0955	0.1377	0.3234	0.4311	0.6356	1.2462

Fineness Modulus
0.79

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.2	1.9	4.9	13.8	78.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.1594							

	Material Description	USCS	AASHTO
○			

Project No. **Client:**
Project:

○ **Source of Sample:** L18 **Sample Number:** L1503772-10

Remarks:

Alpha Analytical

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L18

Sample Number: L1503772-10

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 93.96
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
93.96	0.00	0.75	0.00	0.00	100.0
		#4	1.09	0.00	98.8
		#10	1.79	0.00	96.9
		#40	4.65	0.00	92.0
		#200	12.92	0.00	78.2

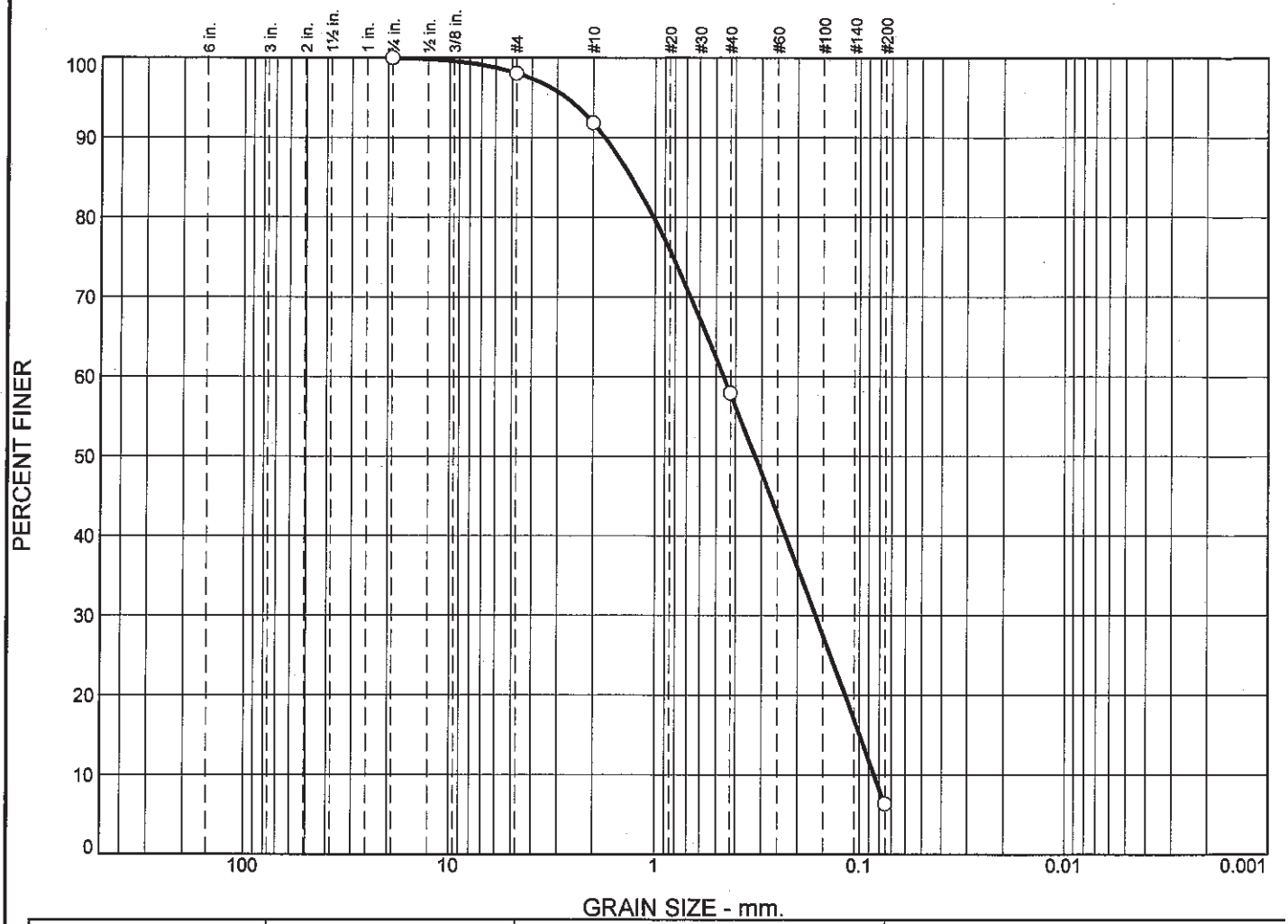
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.2	1.2	1.9	4.9	13.8	20.6			78.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
						0.0909	0.1594	0.3059	0.9071

Fineness Modulus
0.41

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.9	6.2	33.9	51.6	6.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.2974	0.4572	0.3205	0.1627	0.0994	0.0844	0.69	5.42

	Material Description	USCS	AASHTO
○			

Project No. **Client:**
Project:

○ **Source of Sample:** L17 **Sample Number:** L1503772-11

Remarks:

Alpha Analytical

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L17

Sample Number: L1503772-11

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 110.10
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
110.10	0.00	0.75	0.00	0.00	100.0
		#4	2.14	0.00	98.1
		#10	6.83	0.00	91.9
		#40	37.30	0.00	58.0
		#200	56.82	0.00	6.4

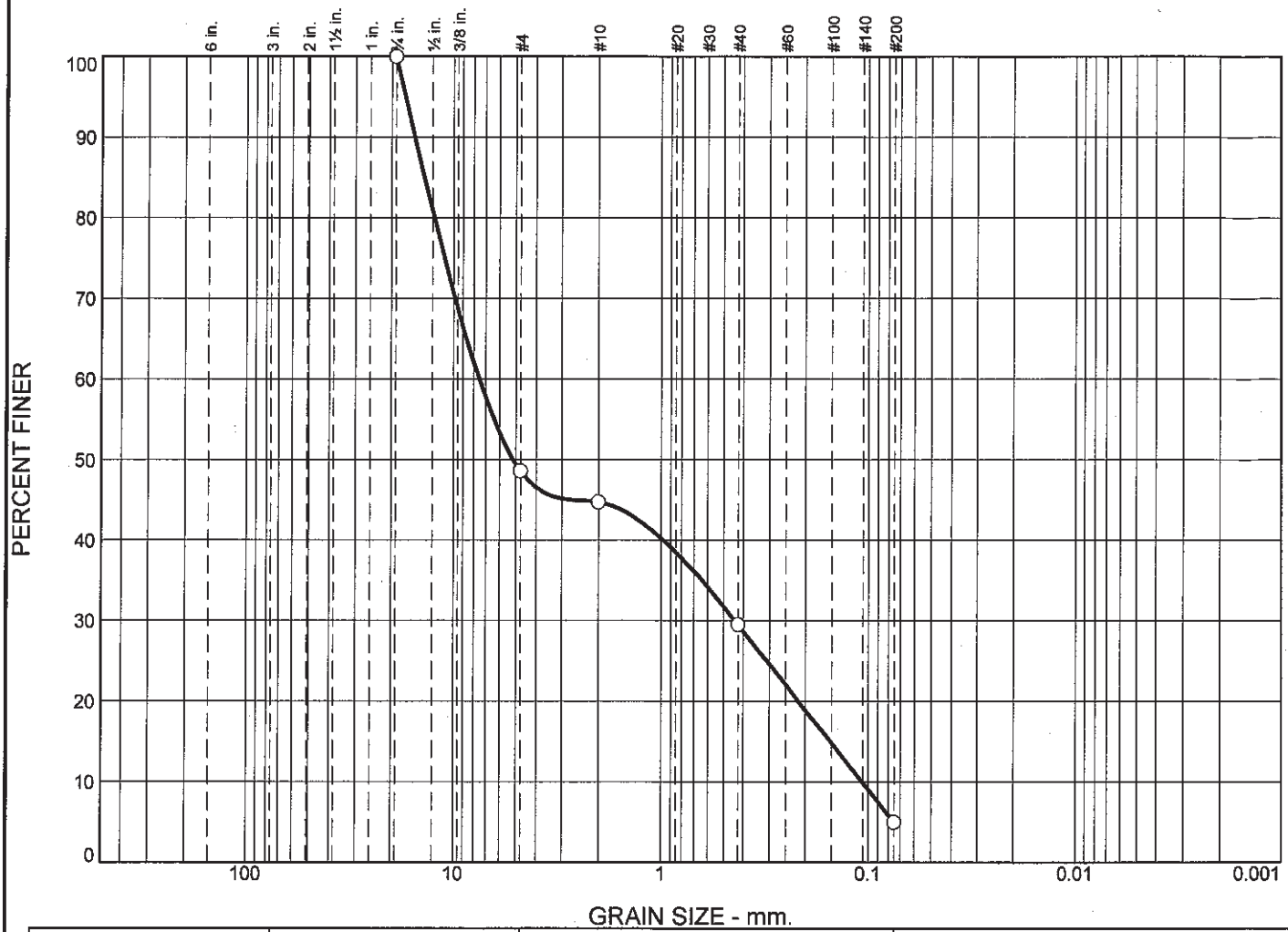
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.9	1.9	6.2	33.9	51.6	91.7			6.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0844	0.0994	0.1170	0.1627	0.3205	0.4572	1.0146	1.2974	1.7459	2.7187

Fineness Modulus	C_u	C_c
1.83	5.42	0.69

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	51.4	3.9	15.2	24.5	5.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			13.8542	7.4880	5.1399	0.4408	0.1517	0.1067	0.24	70.16

Material Description	USCS	AASHTO
○		

Project No. **Client:**
Project:

○ **Source of Sample:** L15 **Sample Number:** L1503772-12

Remarks:

Alpha Analytical

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L15

Sample Number: L1503772-12

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 171.60
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
171.60	0.00	0.75	0.00	0.00	100.0
		#4	88.16	0.00	48.6
		#10	6.66	0.00	44.7
		#40	26.17	0.00	29.5
		#200	42.08	0.00	5.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	51.4	51.4	3.9	15.2	24.5	43.6			5.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1067	0.1517	0.2159	0.4408	5.1399	7.4880	12.4072	13.8542	15.4276	17.1504

Fineness Modulus	C_u	C_c
4.22	70.16	0.24

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	7.8	5.1	10.0	50.7	26.4	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.0618	0.2040	0.1479	0.0829				

Material Description	USCS	AASHTO
○		

Project No. **Client:**
Project:

○ **Source of Sample:** L12 **Sample Number:** L1503772-13

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L12

Sample Number: L1503772-13

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 130.32
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
130.32	0.00	0.75	0.00	0.00	100.0
		#4	10.11	0.00	92.2
		#10	6.71	0.00	87.1
		#40	13.02	0.00	77.1
		#200	66.02	0.00	26.4

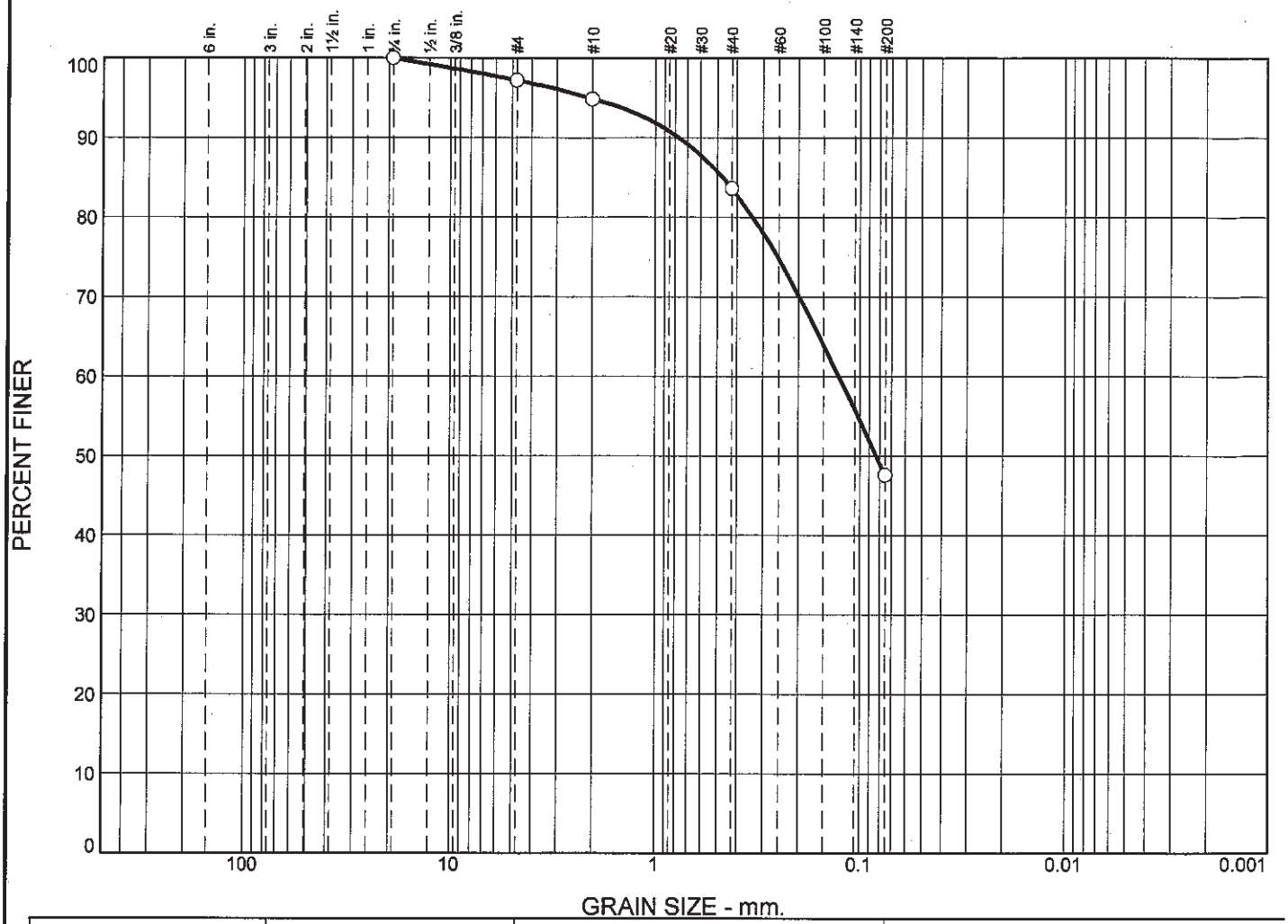
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	7.8	7.8	5.1	10.0	50.7	65.8			26.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0829	0.1479	0.2040	0.5222	1.0618	3.3709	7.4892

Fineness Modulus
1.36

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.8	2.3	11.2	36.1	47.6	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.4701	0.1259	0.0828					

Material Description	USCS	AASHTO
○		

Project No. **Client:**
Project:

○ **Source of Sample:** L11 **Sample Number:** L1503772-14

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L11

Sample Number: L1503772-14

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 95.16
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
95.16	0.00	0.75	0.00	0.00	100.0
		#4	2.66	0.00	97.2
		#10	2.19	0.00	94.9
		#40	10.70	0.00	83.7
		#200	34.32	0.00	47.6

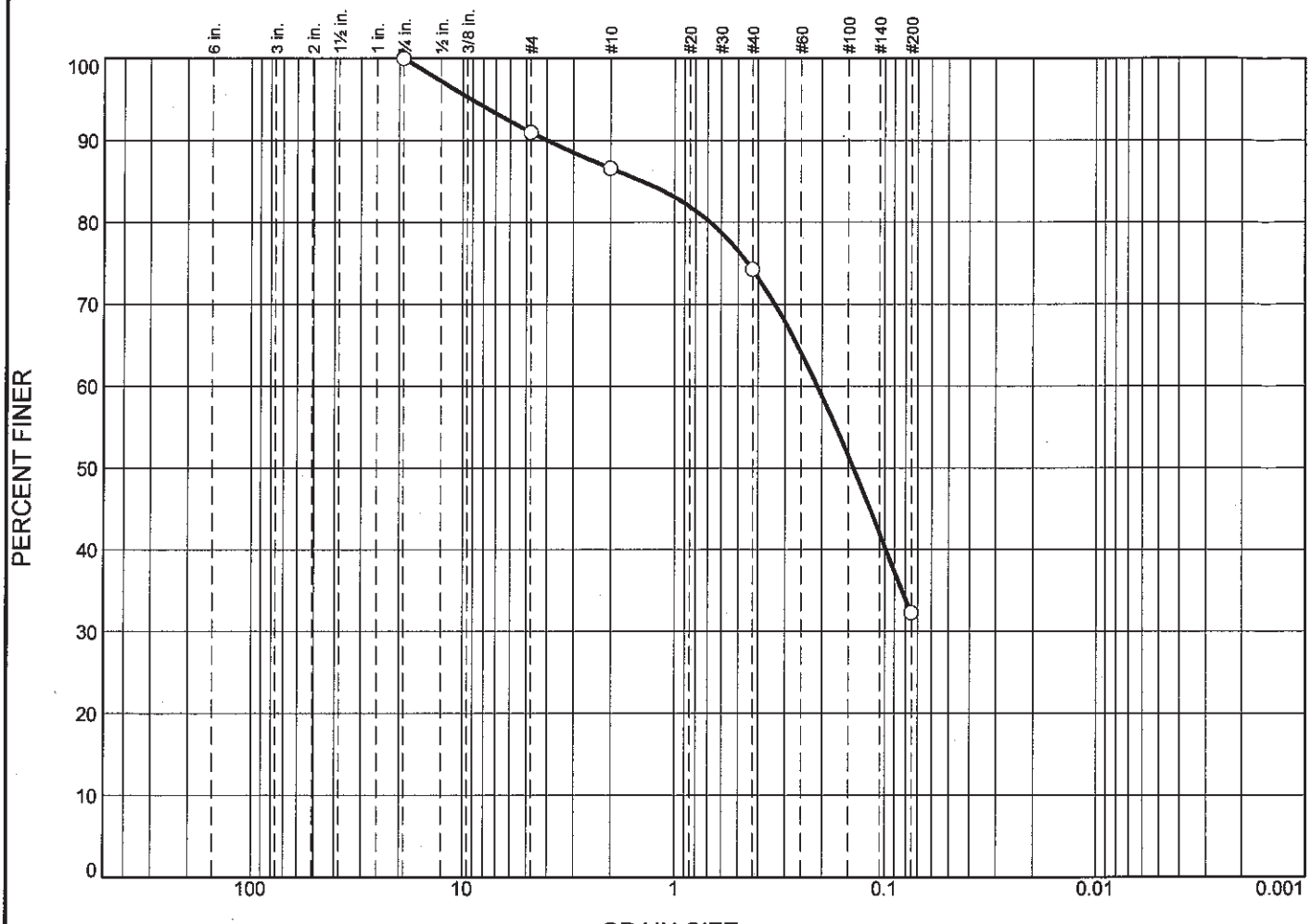
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.8	2.8	2.3	11.2	36.1	49.6			47.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0828	0.1259	0.3344	0.4701	0.7668	2.0609

Fineness Modulus
0.86

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	9.0	4.4	12.4	41.9	32.3	

╳	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.4184	0.2093	0.1414					

Material Description	USCS	AASHTO
○		

Project No. **Client:**
Project:

○ **Source of Sample:** L14 **Sample Number:** L1503772-15

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L14

Sample Number: L1503772-15

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 112.79
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
112.79	0.00	0.75	0.00	0.00	100.0
		#4	10.17	0.00	91.0
		#10	4.96	0.00	86.6
		#40	13.93	0.00	74.2
		#200	47.33	0.00	32.3

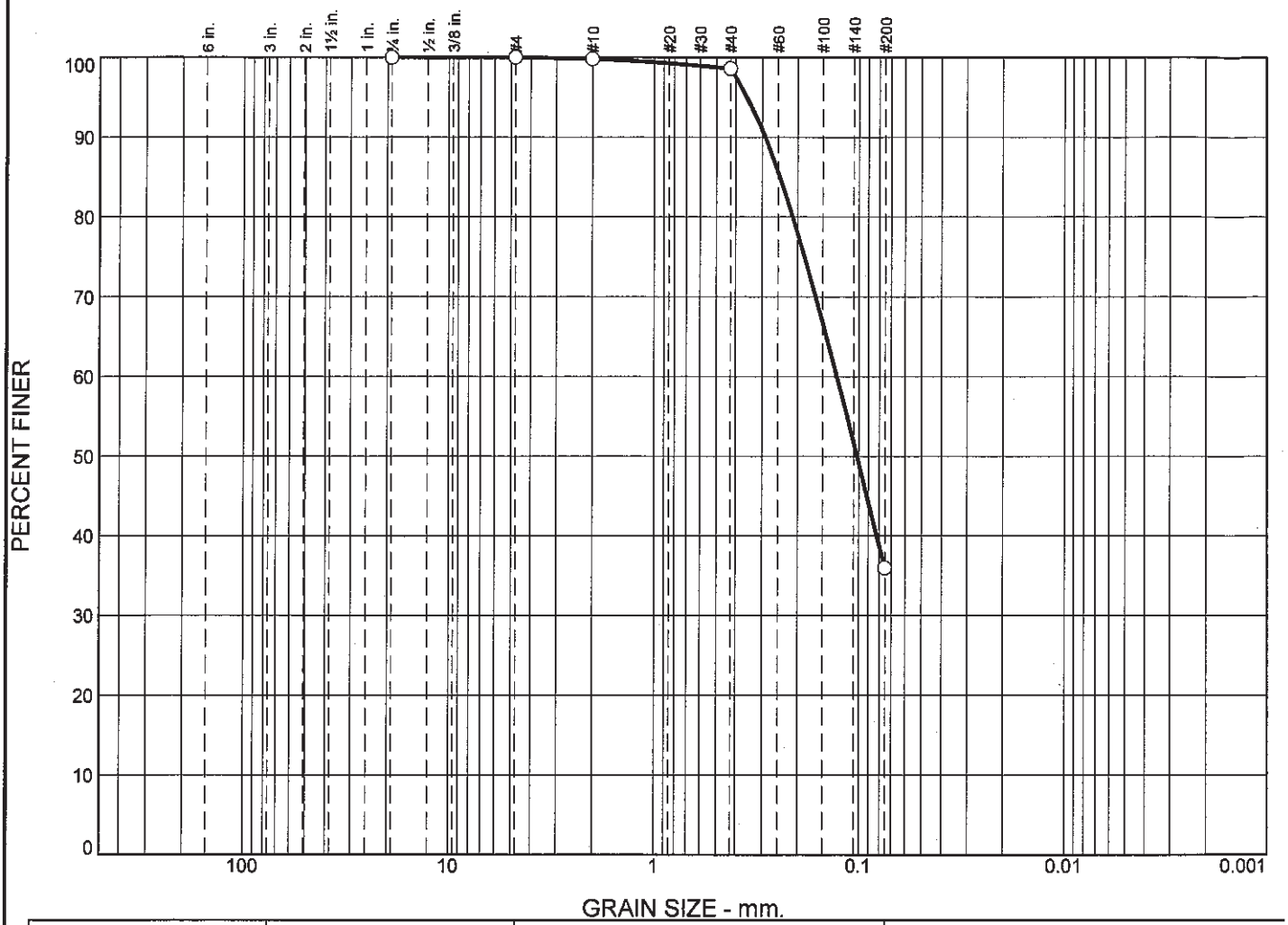
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	9.0	9.0	4.4	12.4	41.9	58.7			32.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1414	0.2093	0.6774	1.4184	3.9803	9.1058

Fineness Modulus
1.44

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.2	1.2	62.6	36.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.2445	0.1276	0.1018					

	Material Description	USCS	AASHTO
○			

Project No. **Client:**
Project:

○ **Source of Sample:** L23A **Sample Number:** L1503772-16

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L23A

Sample Number: L1503772-16

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 109.69
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
109.69	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.20	0.00	99.8
		#40	1.36	0.00	98.6
		#200	68.64	0.00	36.0

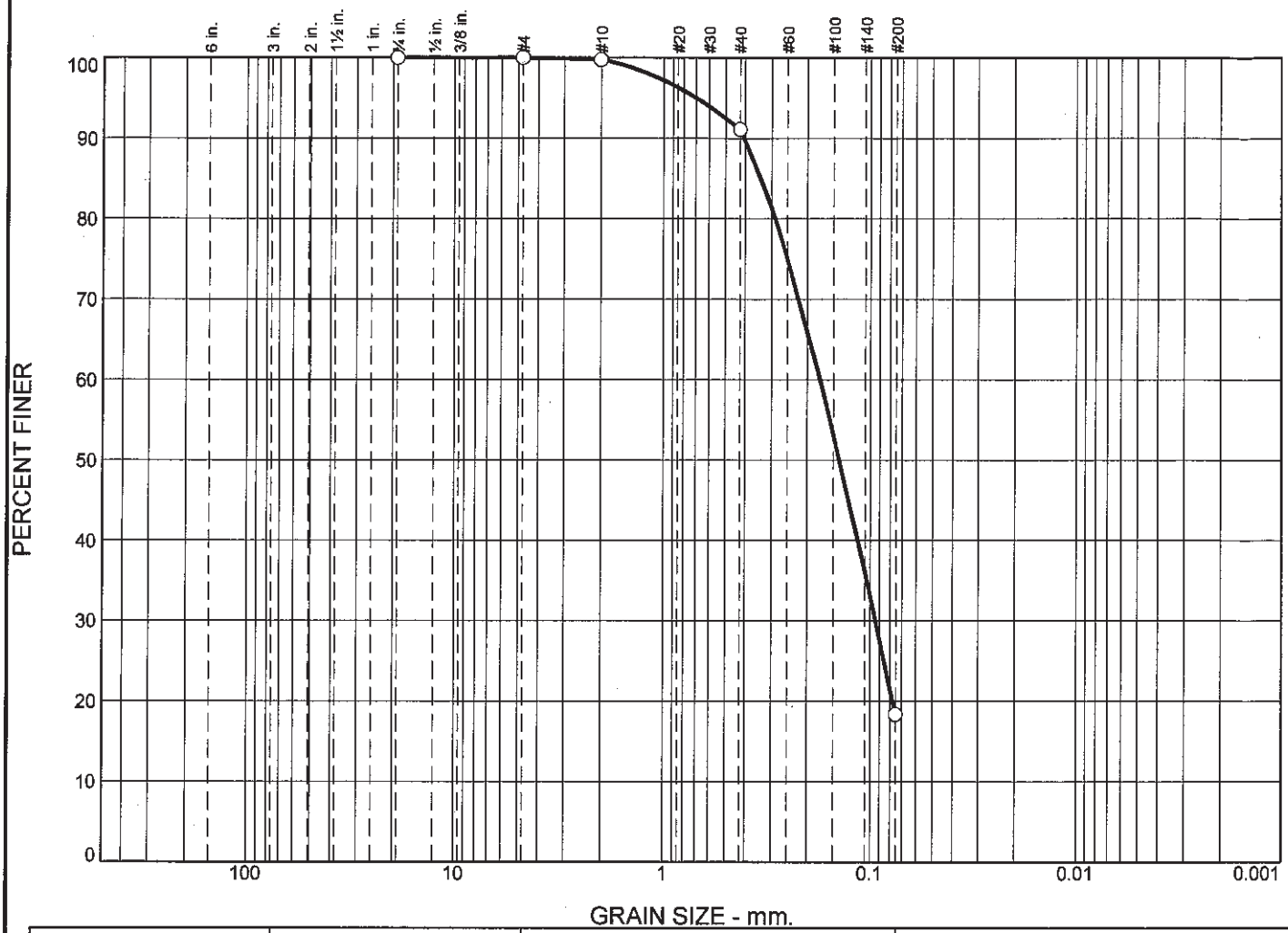
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.2	1.2	62.6	64.0			36.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1018	0.1276	0.2109	0.2445	0.2887	0.3524

Fineness Modulus
0.44

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.2	8.7	72.7	18.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.3359	0.1739	0.1402	0.0939				

Material Description	USCS	AASHTO
○		

Project No. **Client:**
Project:

○ **Source of Sample:** L23B **Sample Number:** L1503772-17

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L23B

Sample Number: L1503772-17

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 105.54
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
105.54	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.25	0.00	99.8
		#40	9.14	0.00	91.1
		#200	76.76	0.00	18.4

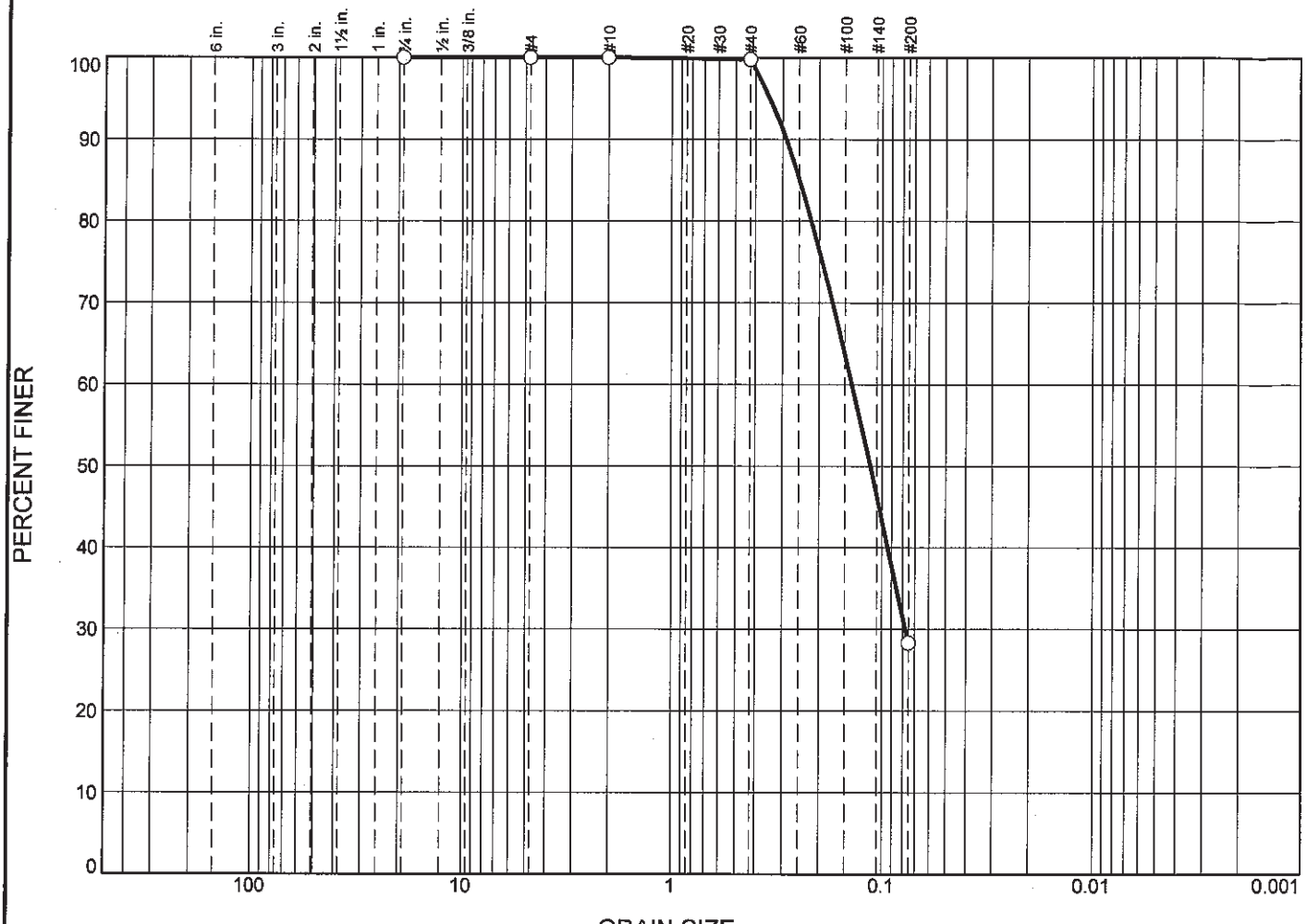
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.2	8.7	72.7	81.6			18.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0774	0.0939	0.1402	0.1739	0.2872	0.3359	0.4050	0.6952

Fineness Modulus
0.74

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.2	71.5	28.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.2483	0.1388	0.1135	0.0774				

Material Description	USCS	AASHTO
○		

Project No. **Client:**
Project:

○ **Source of Sample:** L24A **Sample Number:** L1503772-18

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L24A

Sample Number: L1503772-18

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 112.39
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
112.39	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.25	0.00	99.8
		#200	80.30	0.00	28.3

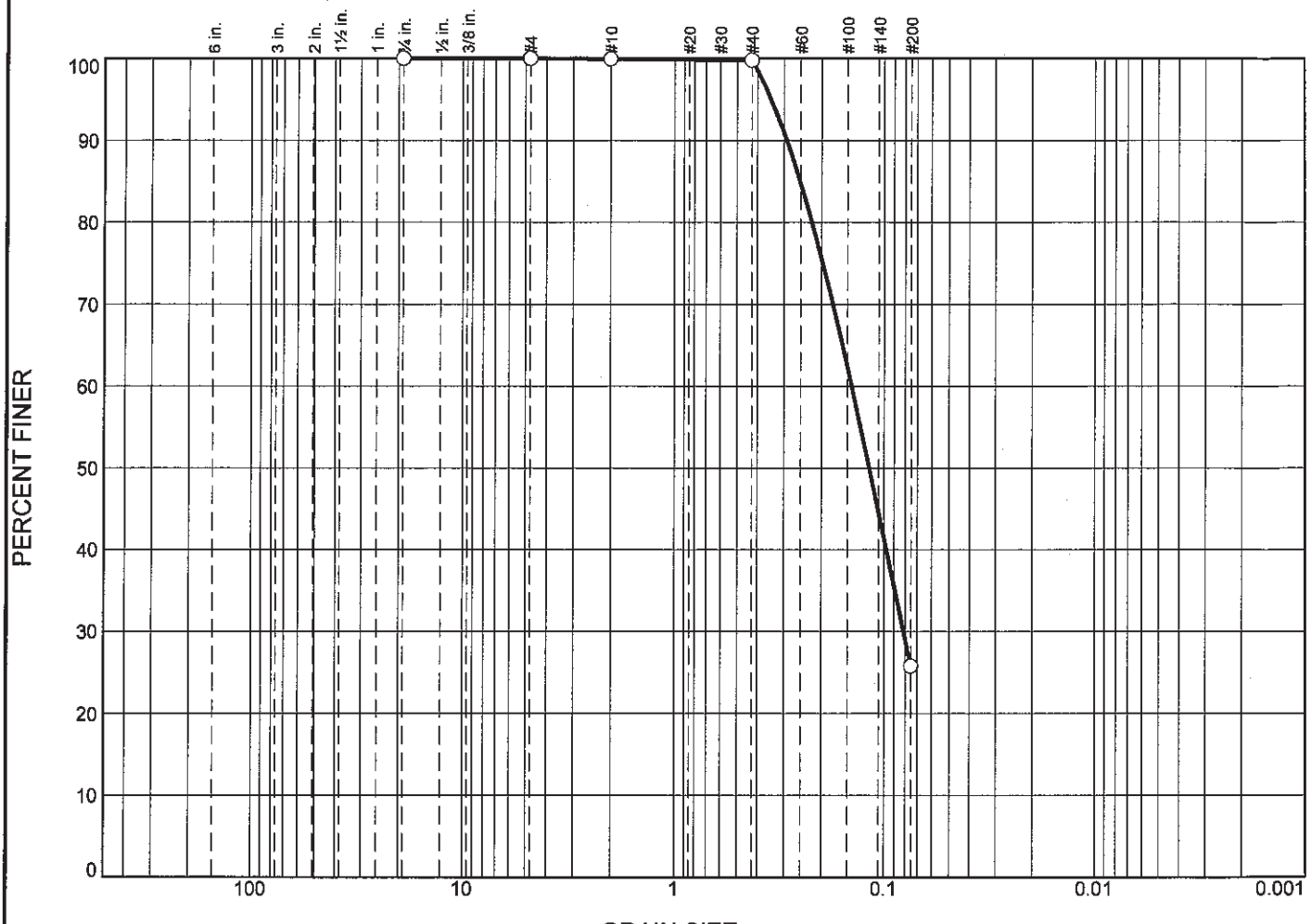
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.2	71.5	71.7			28.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0774	0.1135	0.1388	0.2176	0.2483	0.2876	0.3418

Fineness Modulus
0.45

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	0.1	74.0	25.8	

☒	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.2516	0.1427	0.1174	0.0810				

Material Description	USCS	AASHTO
○		

Project No. **Client:**
Project:

○ **Source of Sample:** L24B **Sample Number:** L1503772-19

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L24B

Sample Number: L1503772-19

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 107.13
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
107.13	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.08	0.00	99.9
		#40	0.15	0.00	99.8
		#200	79.27	0.00	25.8

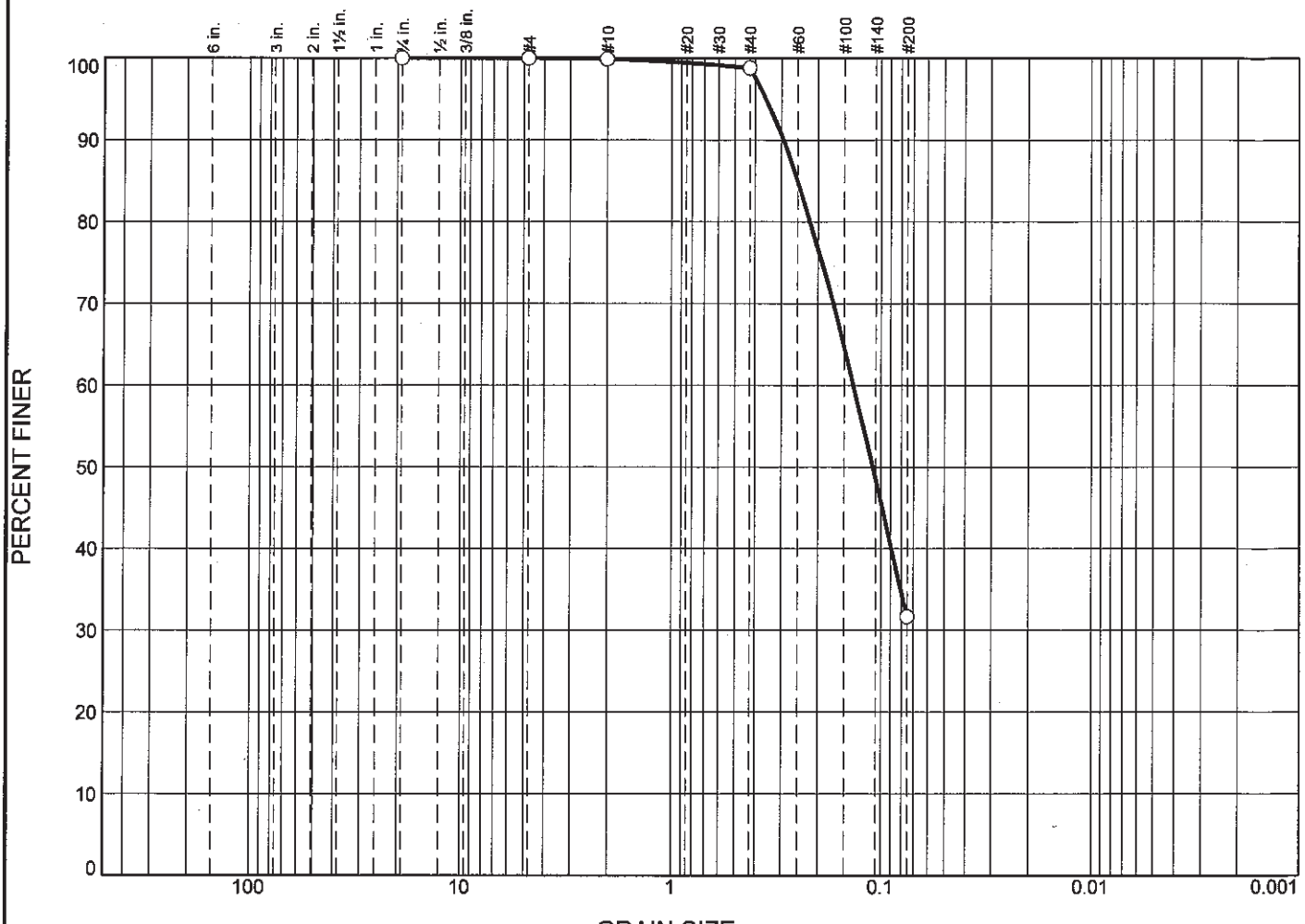
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	0.1	74.0	74.2			25.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0810	0.1174	0.1427	0.2212	0.2516	0.2904	0.3437

Fineness Modulus
0.47

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	1.1	67.1	31.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.2499	0.1349	0.1090					

Material Description	USCS	AASHTO
○		

Project No. **Client:**
Project:

○ **Source of Sample:** L22A **Sample Number:** L1503772-20

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L22A

Sample Number: L1503772-20

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 98.47
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
98.47	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.09	0.00	99.9
		#40	1.10	0.00	98.8
		#200	66.11	0.00	31.7

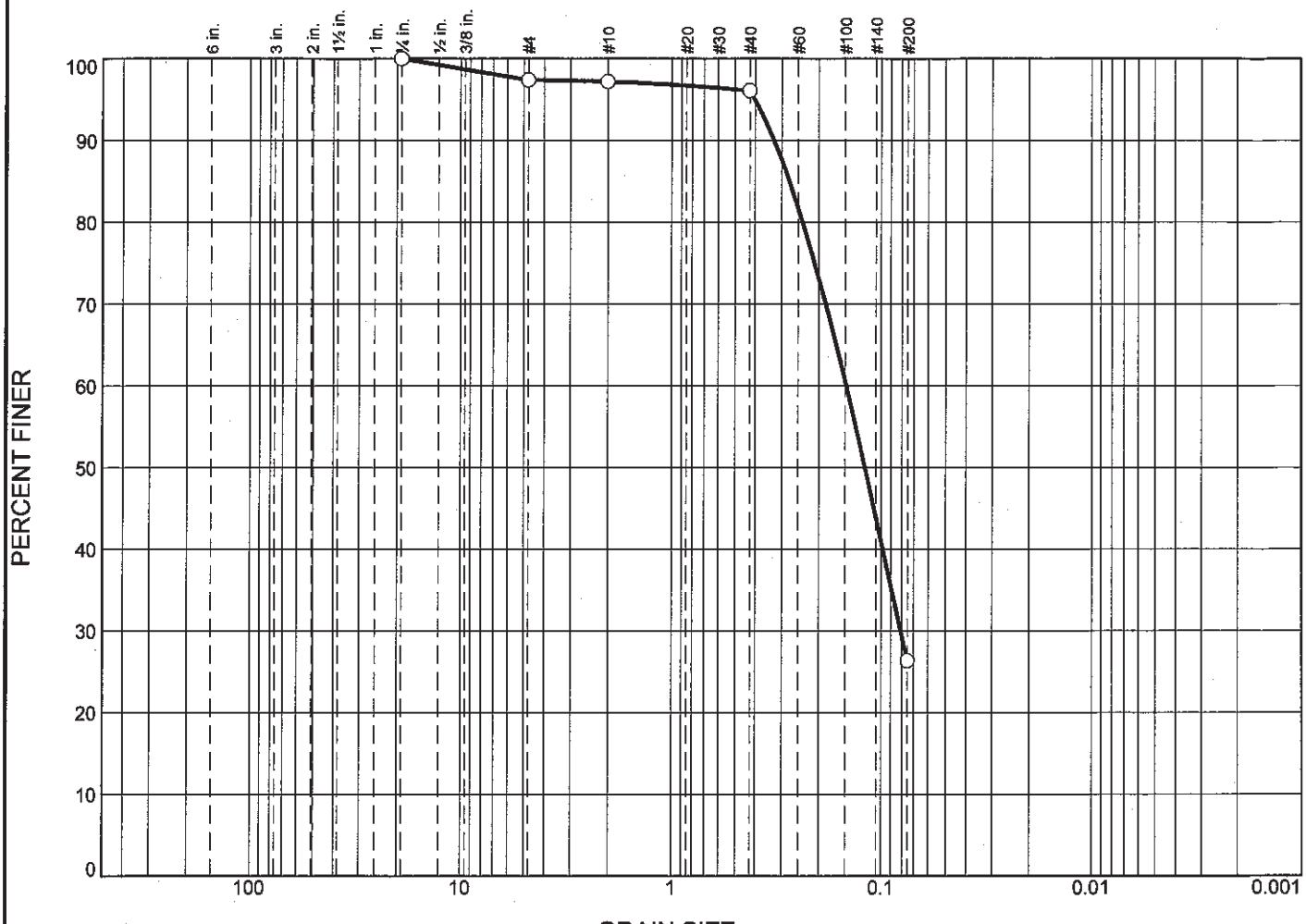
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	1.1	67.1	68.3			31.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1090	0.1349	0.2172	0.2499	0.2925	0.3529

Fineness Modulus
0.46

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.6	0.2	1.1	69.8	26.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.2750	0.1475	0.1197	0.0805				

Material Description	USCS	AASHTO
○		

Project No. **Client:**
Project:

○ **Source of Sample:** L22B **Sample Number:** L1503772-21

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L22B

Sample Number: L1503772-21

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 124.86
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
124.86	0.00	0.75	0.00	0.00	100.0
		#4	3.26	0.00	97.4
		#10	0.23	0.00	97.2
		#40	1.38	0.00	96.1
		#200	87.11	0.00	26.3

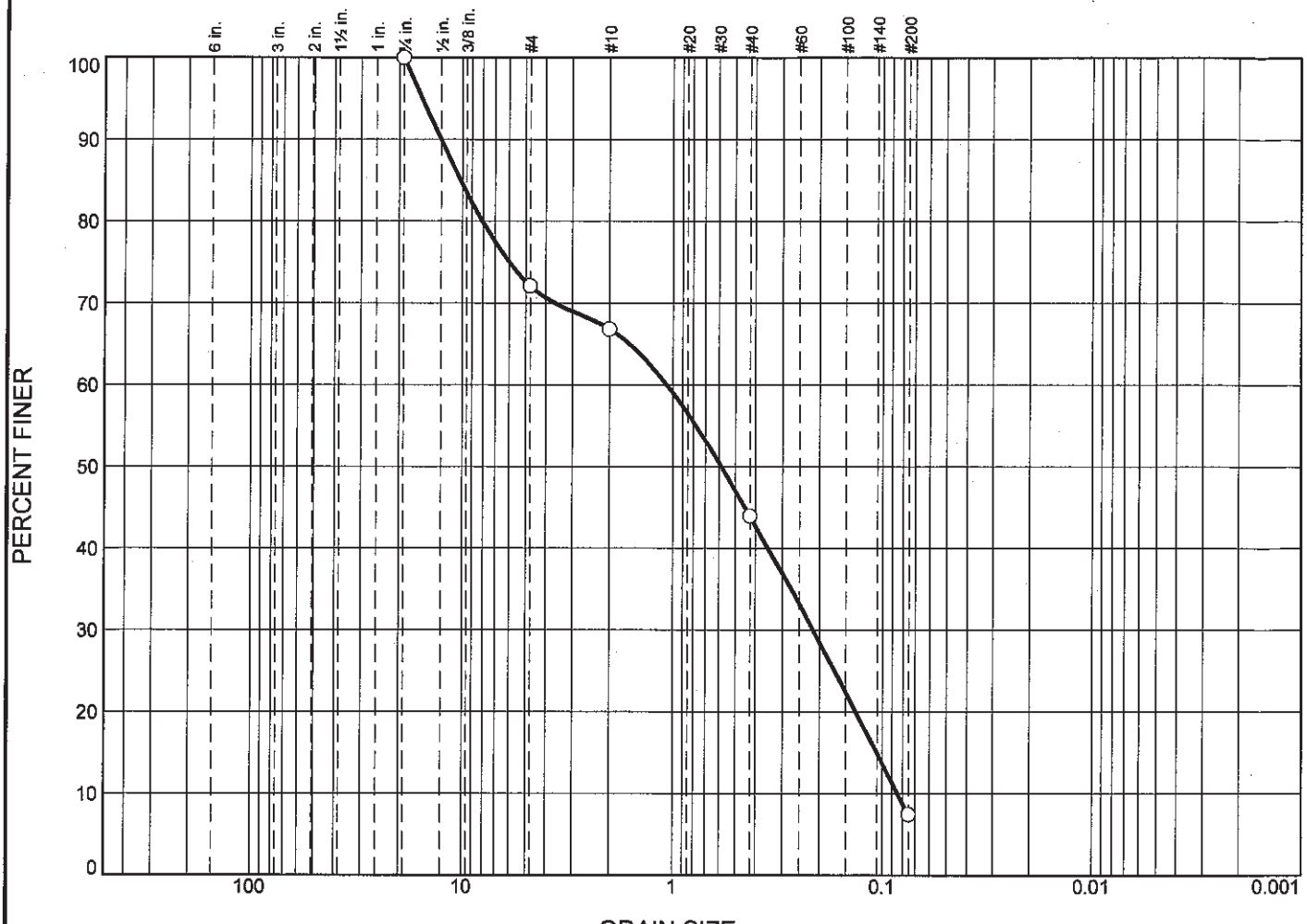
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.6	2.6	0.2	1.1	69.8	71.1			26.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0805	0.1197	0.1475	0.2379	0.2750	0.3248	0.4009

Fineness Modulus
0.65

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	27.9	5.3	22.8	36.6	7.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			10.1903	1.0669	0.5830	0.2140	0.1062	0.0844	0.51	12.64

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** L61 **Sample Number:** L1503772-22

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L61

Sample Number: L1503772-22

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 150.47
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
150.47	0.00	0.75	0.00	0.00	100.0
		#4	41.94	0.00	72.1
		#10	7.98	0.00	66.8
		#40	34.39	0.00	44.0
		#200	54.98	0.00	7.4

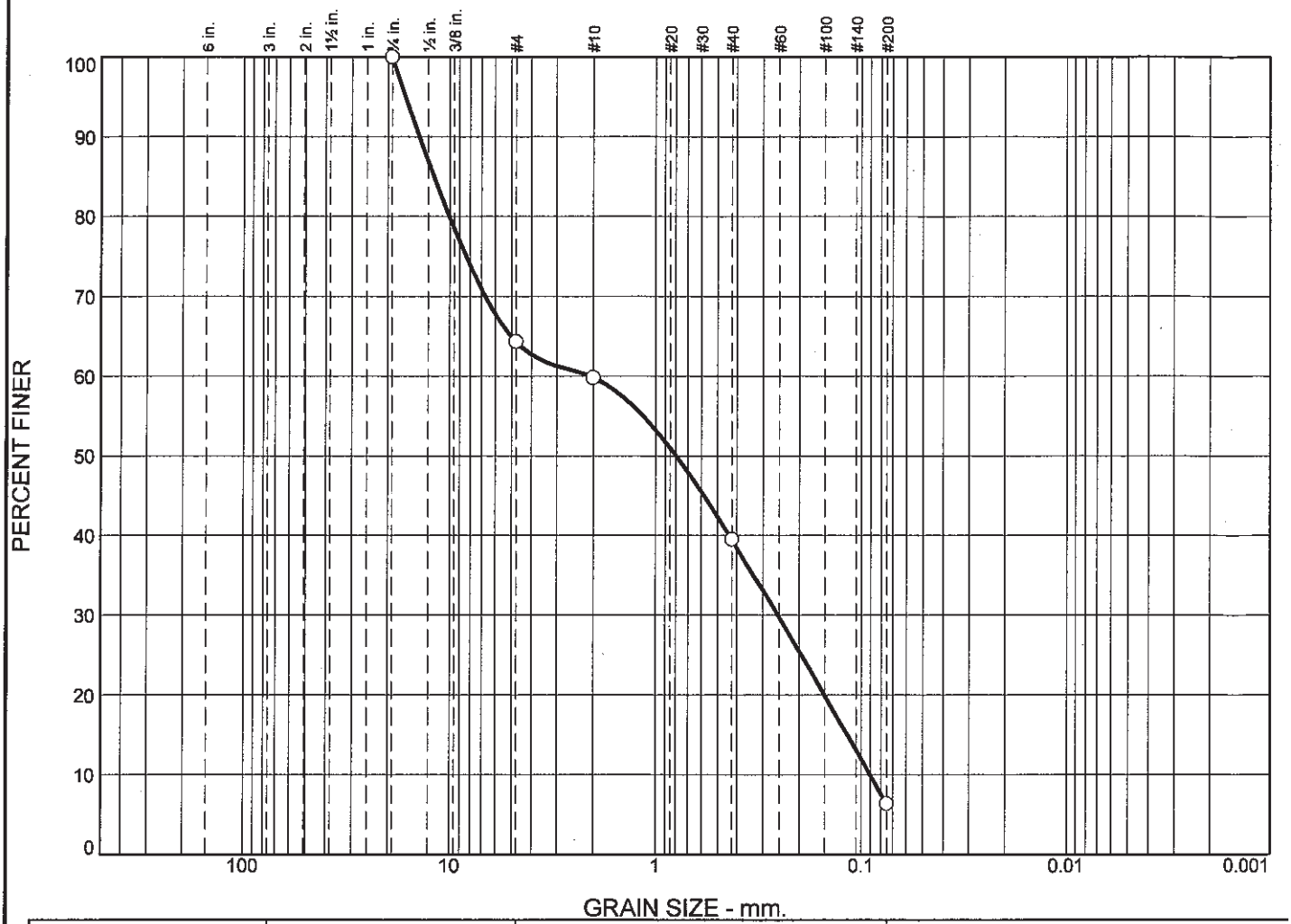
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	27.9	27.9	5.3	22.8	36.6	64.7			7.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0844	0.1062	0.1338	0.2140	0.5830	1.0669	8.0022	10.1903	12.6761	15.5802

Fineness Modulus	C_u	C_c
3.05	12.64	0.51

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	35.7	4.5	20.3	33.1	6.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			11.8872	2.0756	0.7944	0.2532	0.1163	0.0901	0.34	23.03

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** L61 **Sample Number:** WG767555-1

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

3/16/2015

Location: L61

Sample Number: WG767555-1

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 146.17
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
146.17	0.00	0.75	0.00	0.00	100.0
		#4	52.11	0.00	64.3
		#10	6.62	0.00	59.8
		#40	29.66	0.00	39.5
		#200	48.46	0.00	6.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	35.7	35.7	4.5	20.3	33.1	57.9			6.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0901	0.1163	0.1502	0.2532	0.7944	2.0756	10.0182	11.8872	13.9725	16.3352

Fineness Modulus	C_u	C_c
3.43	23.03	0.34

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	Yes
4. Was the SAP approved by the New England District?	
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	
7. Were the correct stations sampled (include the precision of the navigation method used)?	
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	Yes
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	No – see Narrative
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	No – see Narrative
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No –see Narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	Yes
19. Were surrogate recoveries within the required acceptance criteria?	No – see Narrative

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270D

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes	In house limit 40%-140%	In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	No	MS/MSD RPD for Benzo(b)fluoranthene (31%)	In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	No	Sample L1503772-13 recovery out for 2-Methylnaphthalene-d10 (27%)	In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	Yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	No	ICAL 10554: 4,4'-DDT Quadratic fit-column A ICAL 10776: 4,4'-DDE Quadratic fit-column A; 4,4'-DDT Quadratic fit-column A&B, Methoxychlor Quadratic fit-column B	Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No	WG766869-1, opening for L1503772-08 through -12 and WG766345-5: Hexachlorobenzene (15.4%D - column B), alpha-Chlordane (20.3%D-column B) WG766869-2, closing for L1503772-08 through -12 and WG766345-5 and opening for L1503772-13 through -19, WG766345-1, -2 and -3: Hexachlorobenzene (19.2%D - Column B), Heptachlor (17.6%D-Column B), Heptachlor epoxide (B) (16.3%D-Column B), Oxychlordane (17.8%D-Column B), gamma-Chlordane (16.3%D-Column B), Endosulfan I (16.5%D-Column B), alpha-Chlordane (25.1%D-Column B), trans-Nonachlor (17.5%D-Column B), Endrin (18.6%D-Column B), Endosulfan II (15.6%D-Column B)	Retained at Lab

			WG766869-3, closing for L1503772-13 through -19, WG766345-1, -2 and -3 and opening for L1503772-20 through -22, WG766345-4, -6 and -7: TMX (17.9%D-Column B), Hexachlorobenzene (19.1%D - Column B), Heptachlor (18.3%D-Column B), Heptachlor epoxide (B) (15.6%D-Column B), Oxychlordane (16.8%D-Column B), gamma-Chlordane (15.8%D-Column B), Endosulfan I (15.4%D-Column B), alpha-Chlordane (24.1%D-Column B), trans-Nonachlor (16.1%D-Column B), Endrin (19.4%D-Column B), Methoxychlor (17.4%D-Column B), DCB (17.2%D-Column B) WG766869-4, closing for L1503772-20 through -22, WG766345-4, -6 and -7: for Hexachlorobenzene (15.3%D - Column B), alpha-Chlordane (20.8%D-Column B), Endrin (15.8%D-Column B), DCB (15.2%D-Column B) WG766869-7, opening for L1503772-01 through -07: gamma-BHC (15.1%D-Column A), Aldrin (15.3%D-Column A), 4,4'-DDD (16.5%D-Column A) WG766869-8, closing for L1503772-01 through -07: gamma-BHC (15.4%D-Column A), Aldrin (15.4%D-Column A), Dieldrin (15.3%D-Column A), 4,4'-DDD (15.7%D-Column A)	
Standard Reference Materials	Within the limits provided by vendor	No	SRM WG766345-4, trans-Nonachlor @270%	In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to	Yes		In Data Package

	120%; RPD <30%)			
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	No	SRM WG766345-4, BZ #198 @169%	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270D

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	No	SRM WG766355-4 CL3-BZ#28(33%) In house limits - 40-140%	In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly	Yes		Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	Yes		Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	No	Results >3x IDL noted, on file at lab	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	No	WG766043-3=Cadmium (34%); WG766048-3=Arsenic (27%) and Chromium (26%)	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)	No	L1503772-01: % Total gravel = 119% % Coarse sand = 48% % Medium Sand = 27% L1503772-22: % Total gravel = 25%	In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

Certification Information

Last revised December 16, 2014

The following analytes are not included in our NELAP Scope of Accreditation:

Westborough Facility
EPA 524.2: Acetone, 2-Butanone (Methyl ethyl ketone (MEK)), Tert-butyl alcohol, 2-Hexanone, Tetrahydrofuran, 1,3,5-Trichlorobenzene, 4-Methyl-2-pentanone (MIBK), Carbon disulfide, Diethyl ether.
EPA 8260C: 1,2,4,5-Tetramethylbenzene, 4-Ethyltoluene, Iodomethane (methyl iodide), Methyl methacrylate, Azobenzene.
EPA 8270D: 1-Methylnaphthalene, Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 625: 4-Chloroaniline, 4-Methylphenol.
SM4500: Soil: Total Phosphorus, TKN, NO2, NO3.
EPA 9071: Total Petroleum Hydrocarbons, Oil & Grease.

Mansfield Facility
EPA 8270D: Biphenyl.
EPA 2540D: TSS
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

The following analytes are included in our Massachusetts DEP Scope of Accreditation, Westborough Facility:

Drinking Water
EPA 200.8: Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Ni,Se,Tl; **EPA 200.7**: Ba,Be,Ca,Cd,Cr,Cu,Na; **EPA 245.1:** Mercury;
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, Enterolert-QT.**

Non-Potable Water
EPA 200.8: Al,Sb,As,Be,Cd,Cr,Cu,Pb,Mn,Ni,Se,Ag,Tl,Zn;
EPA 200.7: Al,Sb,As,Be,Cd,Ca,Cr,Co,Cu,Fe,Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Sr,Ti,Tl,V,Zn;
EPA 245.1, SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2340B, SM2320B, SM4500CL-E, SM4500F-BC, SM426C, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F,**
EPA 353.2: Nitrate-N**, SM4500NH3-BC-NES, EPA 351.1, SM4500P-E, SM4500P-B, E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, SM14 510AC, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9222D-MF**.

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE OF

ALPHA ANALYTICAL

Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193
Mansfield, MA TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab: 2/27/15

ALPHA Job #: L1503772

Project Information

Project Name: LIS - USACoE RIM Dredge

Project Location: Eastern Long Island Sound

Project #:

Project Manager: James O'Donnell, UCONN

ALPHA Quote #: M2015009

Report Information Data Deliverables

☐ FAX ☒ EMAIL

☐ ADEx ☐ Add'l Deliverables

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed Program: Compliant with USACE RIM

Criteria:

Client Information

Client: University of Connecticut

Address: 1080 Shennecossett Road

Groton, CT 06340

Phone: 860-405-9171

Fax:

Email: james.odonnell@uconn.edu

☐ These samples have been Previously analyzed by Alpha

Turn-Around Time

☑ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: March 13 Time: 5:00pm

Other Project Specific Requirements/Comments/Detection Limits:

ANALYSIS

SAMPLE HANDLING
Filtration
☐ Done
☒ Not Needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date 2015	Collection Time EST	Sample Matrix	Sampler's Initials	Grain Size (ASTM D422)	Total Solids (SM 2540C)	Total Org. Carbon (EPA 9060) 2 reps	Metals (As,Cd,Cr,Cu,Pb,Hg,Ni,Zn)	PAHs (8270D - SIM)	Pesticides (8081B)	PCB Congeners (8270D - SIM)						Sample Specific Comments	TOTAL # BOTTLES
03772-01	L27	2/27	0903	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
-02	L28	2/27	0921	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
-03	L25A	2/27	0948	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
-04	L25B	2/27	1000	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
-05	L21	2/27	1012	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
-06	L20	2/27	1025	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
-07	L19	2/27	1043	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
-08	L13	2/27	1055	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
-09	L16	2/27	1109	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
-10	L18	2/27	1122	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
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					Preservative	-	-	-	-	-	-	-	-	-	-	-	-		

Relinquished By:	Date/Time	Received By:	Date/Time
[illegible]	2/27/15 1638	[illegible]	2/27/15 1638
T. Huddleston	2/27/15 1825	[illegible]	2/27/15 1825

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

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CHAIN OF CUSTODY

PAGE OF

ALPHA ANALYTICAL

Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193
Mansfield, MA TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab: 2/27/15

ALPHA Job #: L1503772

Project Information

Project Name: LIS - USACoE RIM Dredge

Project Location: Eastern Long Island Sound

Project #:

Project Manager: James O'Donnell, UCONN

ALPHA Quote #: M2015009

Client Information

Client: University of Connecticut

Address: 1080 Shennecossett Road

Groton, CT 06340

Phone: 860-405-9171

Fax:

Email: james.odonnell@uconn.edu

☐ These samples have been Previously analyzed by Alpha

Turn-Around Time

☑ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: MARCH 13 Time: 5:00pm

Other Project Specific Requirements/Comments/Detection Limits:

Report Information

☐ FAX ☐ ADEx

Data Deliverables

☒ EMAIL ☐ Add'l Deliverables

Billing Information

☒ Same as Client Info PO #:

Regulatory Requirements/Report Limits

State/Fed Program: Complianht with USACE RIM

Criteria:

ANALYSIS

SAMPLE HANDLING
Filtration
☐ Done
☒ Not Needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date 2015	Collection Time EST	Sample Matrix	Sampler's Initials	Grain Size (ASTM D422)	Total Solids (SM 2540C)	Total Org. Carbon (EPA 9060) 2 reps	Metals (As,Cd,Cr,Cu,Pb,Hg,Ni,Zn)	PAHs (8270D - SIM)	Pesticides (8081B)	PCB Congeners (8270D - SIM)						Sample Specific Comments	TOTAL # BOTTLES
03772-11	L17	2/27	1139	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
-12	L15	2/27	1153	SE	KHS	☐	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
-13	L12	2/27	1258	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
-14	L11	2/27	1308	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
-15	L14	2/27	1319	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
-16	L23A	2/27	1335	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
-17	L23B	2/27	1345	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
-18	L24A	2/27	1358	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
-19	L24B	2/27	1412	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
-20	L22A	2/27	1430	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
					Container Type	P	A	A	A	A	A	A	-	-	-	-	-		
					Preservative	-	-	-	-	-	-	-	-	-	-	-	-		

Relinquished By:	Date/Time	Received By:	Date/Time
Kay Hoover	2/27/15 1630	T. Hudd	2/27/15 1630
T. Hudd	2/27/15 1825	[illegible]	2/27/15 1825

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

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CHAIN OF CUSTODY

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Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193
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Project Location: Eastern Long Island Sound
Project #:
Project Manager: James O'Donnell, UCONN
ALPHA Quote #: M2015009

Turn-Around Time

☐ Standard ☐ Rush (ONLY IF PRE-APPROVED)
Due Date: MARCH 13 Time: 5:00pm

Report Information

☐ FAX ☒ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed Program	Criteria
Complianht with USACE RIM	

Other Project Specific Requirements/Comments/Detection Limits:

FOR L61 MS & L61 MSD USE SAME SED FROM BOTTLE AS FOR L61.

ANALYSIS

SAMPLE HANDLING
Filtration
☐ Done
☒ Not Needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	Grain Size (ASTM D422)	Total Solids (SM 2540C)	Total Org. Carbon (EPA 9060) 2 reps	Metals (As,Cd,Cr,Cu,Pb,Hg,Ni,Zn)	PAHs (8270D - SIM)	Pesticides (8081B)	PCB Congeners (8270D - SIM)						Sample Specific Comments	TOTAL # BOTTLES
03772-21	L22B	2/27	1443	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
-22	L61	2/27	2345	SE	KHS	☑	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐		2
	L61 MS	2/27	2345	SE	KHS	☐	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐	SAME BOTTLE AS L61	0
	L61 MSD	2/27	2345	SE	KHS	☐	☐	☐	☑	☑	☑	☑	☐	☐	☐	☐	☐	SAME BOTT AS L61	0
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
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Container Type						P	A	A	A	A	A	A	-	-	-	-	-		
Preservative						-	-	-	-	-	-	-	-	-	-	-	-		

Relinquished By:	Date/Time	Received By:	Date/Time
Kay Hon St.	2/27/15 1638	T. Rudolph	2/27/15 1638
T. Rudolph	2/27/15 1825		2/27/15 1825

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

FORM NO. 01-01(HA)
(rev. 9-JAN-12)

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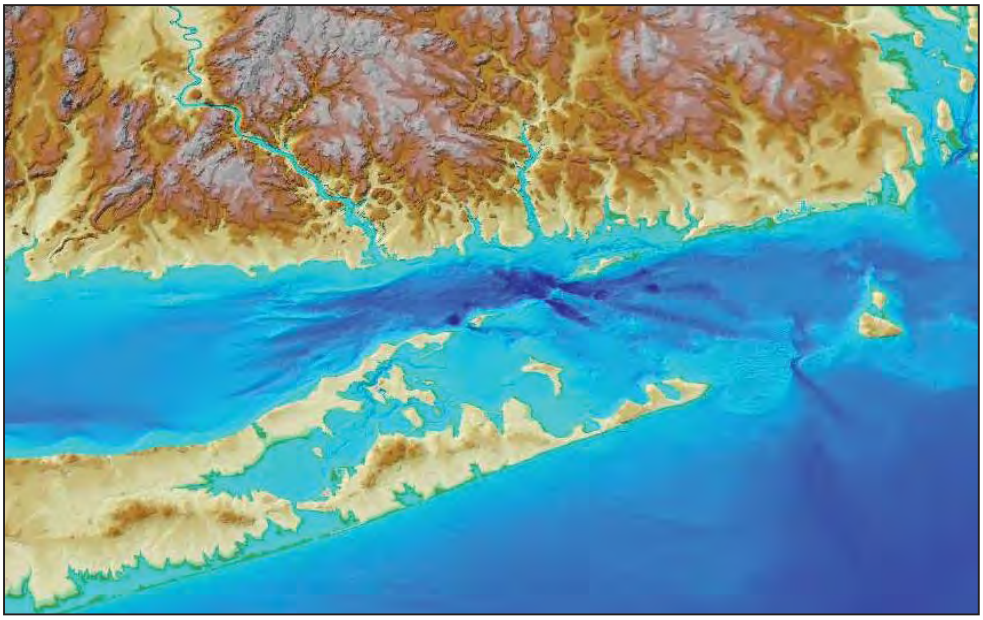
Supplemental Environmental Impact Statement for the Designation of Dredged Material Disposal Site(s) in Eastern Long Island Sound, Connecticut and New York

APPENDIX H

Essential Fish Habitat Assessment



Prepared for: **United States Environmental Protection Agency**

Sponsored by: **Connecticut Department of Transportation**

Prepared by: **Louis Berger**

December 2015

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Supplemental Environmental Impact Statement for the Designation of Dredged Material Disposal Sites in Eastern Long Island Sound, Connecticut and New York

APPENDIX H

ESSENTIAL FISH HABITAT ASSESSMENT

Prepared for:

United States Environmental Protection Agency
5 Post Office Square, Suite 100
Boston, MA 02109

Sponsored by:

Connecticut Department of Transportation
Waterways Administration
2800 Berlin Turnpike
Newington, CT 06131-7546

Prepared by:
Louis Berger
117 Kendrick Street
Needham, MA 02494
(under contract to the University of Connecticut)

December 2015

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Acronyms and Abbreviations

°C	degrees Centigrade
C.F.R.	Code of Federal Regulations
cm	centimeter
CS	Cornfield Shoals (alternative site)
CSDS	Cornfield Shoals Disposal Site
CTDEEP	Connecticut Department of Energy and Environmental Protection
DAMOS	Disposal Area Monitoring System
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
FMC	Fishery Management Councils
FMP	Fishery Management Plan
km	kilometer(s)
km^2	square kilometer(s)
m	meter(s)
mm	millimeter
MPRSA	Marine Protection, Research, and Sanctuaries Act
nmi	nautical mile(s)
nmi^2	square nautical mile(s)
N	North
NB	Niantic Bay (alternative site)
NBDS	Niantic Bay Disposal Site
NL	New London (alternative site)
NLDS	New London Disposal Site
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
ODA	Ocean Dumping Act
ppm	parts per million
ppt	parts per thousand
SAV	Submerged Aquatic Vegetation

SEIS	Supplemental Environmental Impact Statement
SFA	Sustainable Fisheries Act
TL	Total Length
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
W	West
ZSF	Zone of Siting Feasibility

1.0 INTRODUCTION

In 2005, the U.S. Environmental Protection Agency (USEPA) designated the Western and Central Long Island Sound dredged material disposal sites, following the preparation of an EIS (USEPA and USACE, 2004). The two disposal sites in the eastern Long Island Sound, Cornfield Shoals and New London, are scheduled to close in December 2016. The USEPA is in the process of preparing a Supplemental EIS (SEIS) for the potential designation of one or more disposal sites needed to serve the eastern Long Island Sound region (Figures 1 and 2). The SEIS is being prepared in accordance with Section 102(c) of the Marine Protection Research and Sanctuaries Act (MPRSA; also referred to as Ocean Dumping Act [ODA]) of 1972. The USEPA has the responsibility of designating sites under Section 102(c) of the Act and 40 C.F.R. Part 228.4 of its regulations.

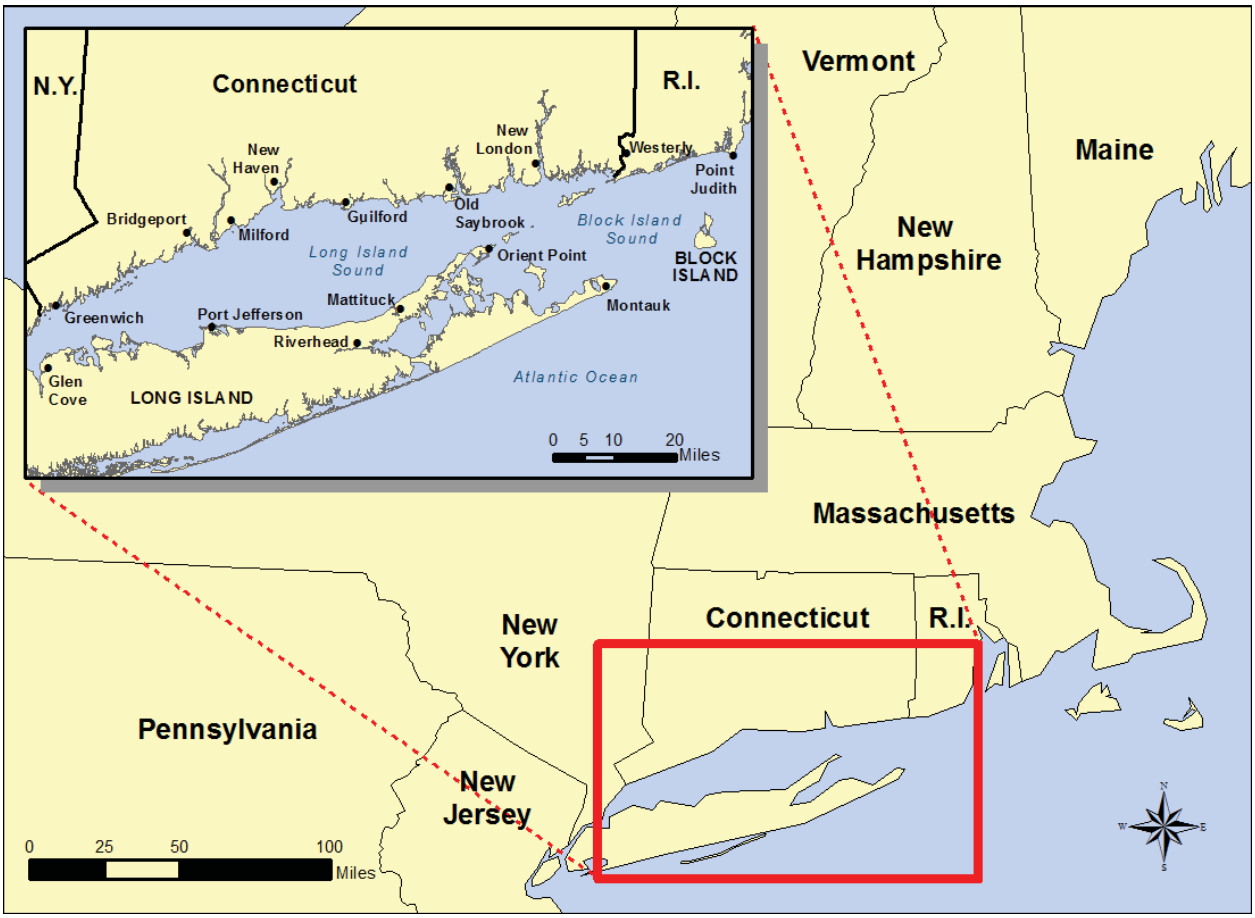

Figure 1. Location of Long Island Sound, an estuary along the Atlantic Ocean.

Many aquatic habitats are critical to the productivity and sustainability of marine fisheries. Essential Fish Habitat (EFH) is defined as "those waters and substrates necessary to fish for spawning, breeding, feeding or growth to maturity (16 U.S.C. 1802(10)) (NOAA, 2004a). The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), as amended by the Sustainable Fisheries Act (SFA) of 1996 (Public Law 104-267), set forth a

mandate for the National Marine Fisheries Service (NMFS), regional Fishery Management Councils (FMCs), and other Federal agencies to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan (FMP). EFH for various species within the affected area for the current project was designated by the New England FMC, Mid-Atlantic FMC, South Atlantic FMC, and the NMFS in the Northeastern United States (NOAA, 2014a).

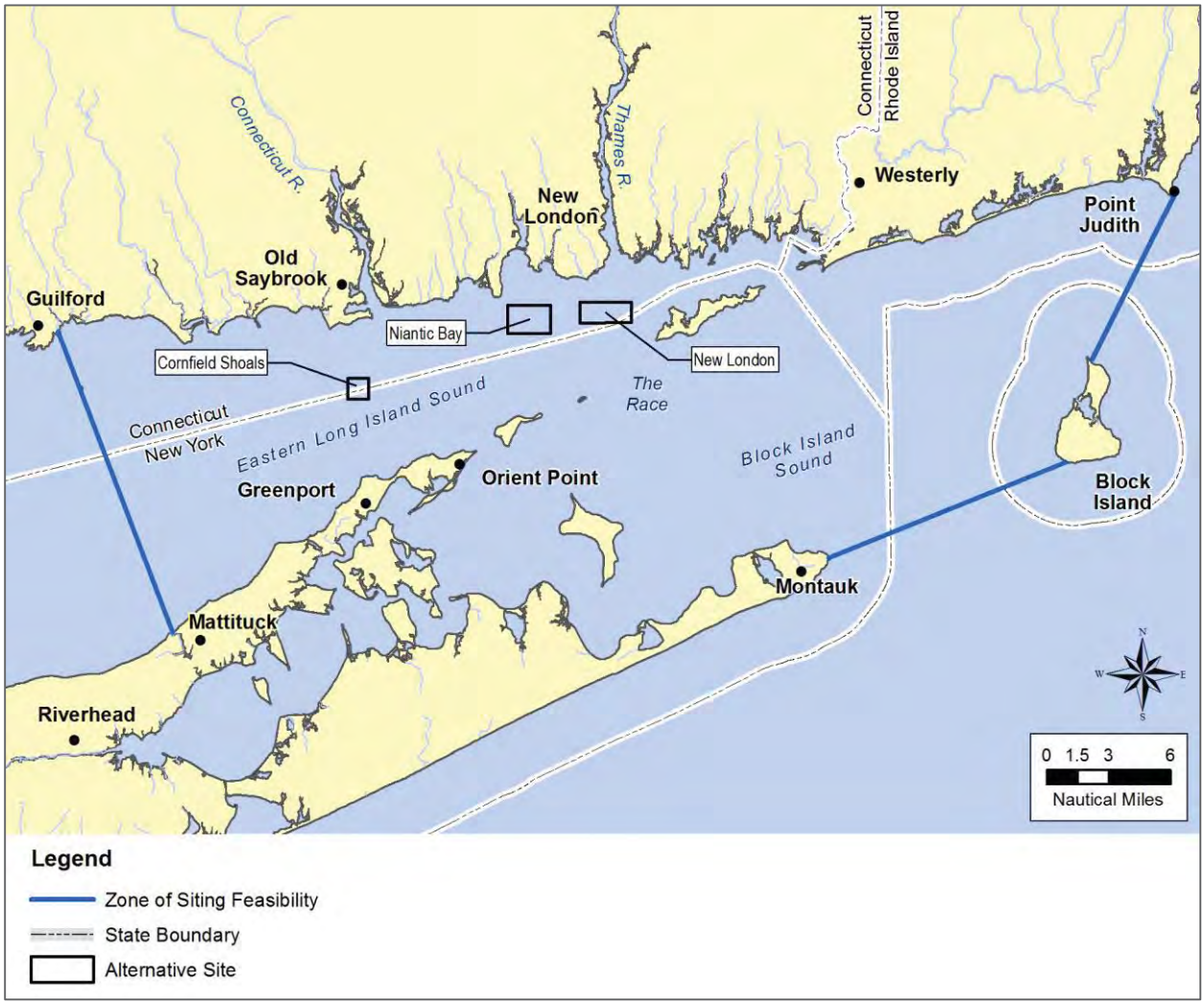

Figure 2. Zone of Siting Feasibility and the three alternative dredged material disposal sites.

While designating a site for dredged material disposal does not have any impacts on EFH, the SEIS must also look at possible impacts associated with this action such as subsequent disposal of dredged material. Such impacts, though short-term, may be possible for particular life stages of some species during and the disposal activity. Therefore, in compliance with Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (1996 amendments), the USEPA is providing this EFH report of the potential effects of designating one or more disposal sites for dredged material in eastern Long Island Sound on EFH. Further evaluation would be

conducted as part of the USACE permitting process for each specific dredged material disposal activity.

The Endangered Species Act of 1973, as amended, requires all federal agencies to consult with the Secretary of the Interior and/or Commerce on all projects and proposals with the potential to impact federally endangered or threatened plants and animals. A discussion of the threatened and endangered species that may be found in the project area is provided in the SEIS in Section 4.13 and the analysis of potential impacts is provided in Section 5.5.8.

Executive Order 13158, Marine Protected Areas requires federal agencies to avoid causing harm to marine protected areas administered by the National Oceanic and Atmospheric Administration's Marine Protected Areas Center. A discussion of the Marine Protected Areas in proximity to the project area is provided in the SEIS in Section 4.15.4 and the analysis of potential impacts is provided in Section 5.5.10.5.

2.0 PROJECT AREA

Three alternative sites have been proposed for the disposal of dredged materials from navigational dredging projects in the eastern Long Island Sound region: New London, Niantic Bay, and Cornfield Shoals (Figure 2). Each of the three alternative sites is described in more detail below (see Chapters 3 and 4 of the SEIS for additional details).

2.1 New London Alternative

The New London Alternative is a rectangular area with the dimensions 2.5 x 1 nautical miles (nmi), or 1.8 x 4.5 kilometer (km) (Figure 3; Table 1). Its boundary encompasses three areas: the active New London dredged material disposal site (NLDS) and two areas to the west of the NLDS (referred to hereafter as 'Site NL-Wa' and 'Site NL-Wb').

- ***NLDS:*** The site is located in the eastern part of the New London Alternative along the New York-Connecticut state boundary. This square site has an area of 1.0 square nautical miles (nmi^2), or 3.4 square kilometer (km^2), centered at 41°16.306' N, 72°04.571' W (NAD 83). Water depths at the NLDS range from 46 to 79 feet (14 to 24 m); the site is deepest at its southern boundary. Since 1982, approximately 3.5 million cubic yards (cy), or 2.6 million cubic meters (m^3), of dredged material have been disposed at the site. In addition, approximately 5.4 million cy (4.1 million m^3) were disposed at the NLDS between 1955 and 1976 (Oceanic Society, 1982). The site consists of predominantly fine sand (see Appendix G of the SEIS).

- ***Site NL-Wa:*** Site NL-Wa is located in the mid-section of the New London Alternative. This square site has an area of 1 nmi^2 (3.4 km^2). The site consists of mostly sandy areas, but also a shallow area of boulders and rocks in the north (WHG, 2014). Overall, water depths at the site range from approximately 45 feet (14 m) in the boulder area in the north to over 100 feet (30 m) in the south.

- ***Site NL-Wb:*** Site NL-Wb is located in the western part of the New London Alternative. It is a rectangular area, 0.5 nmi (0.9 km) wide and 1.0 nmi (1.8 km) long; the total area is 0.5 nmi^2 (1.7 km^2). The site consists of an extension of the sandy area of Site NL-Wa. The southwestern corner of Site NL-Wb contains an area of bedrock and boulders, as well as some sand waves (WHG, 2014). Overall, water depths at the entire site range from approximately 59 feet (18 m) in the north to 100 feet (30 m) in the south.

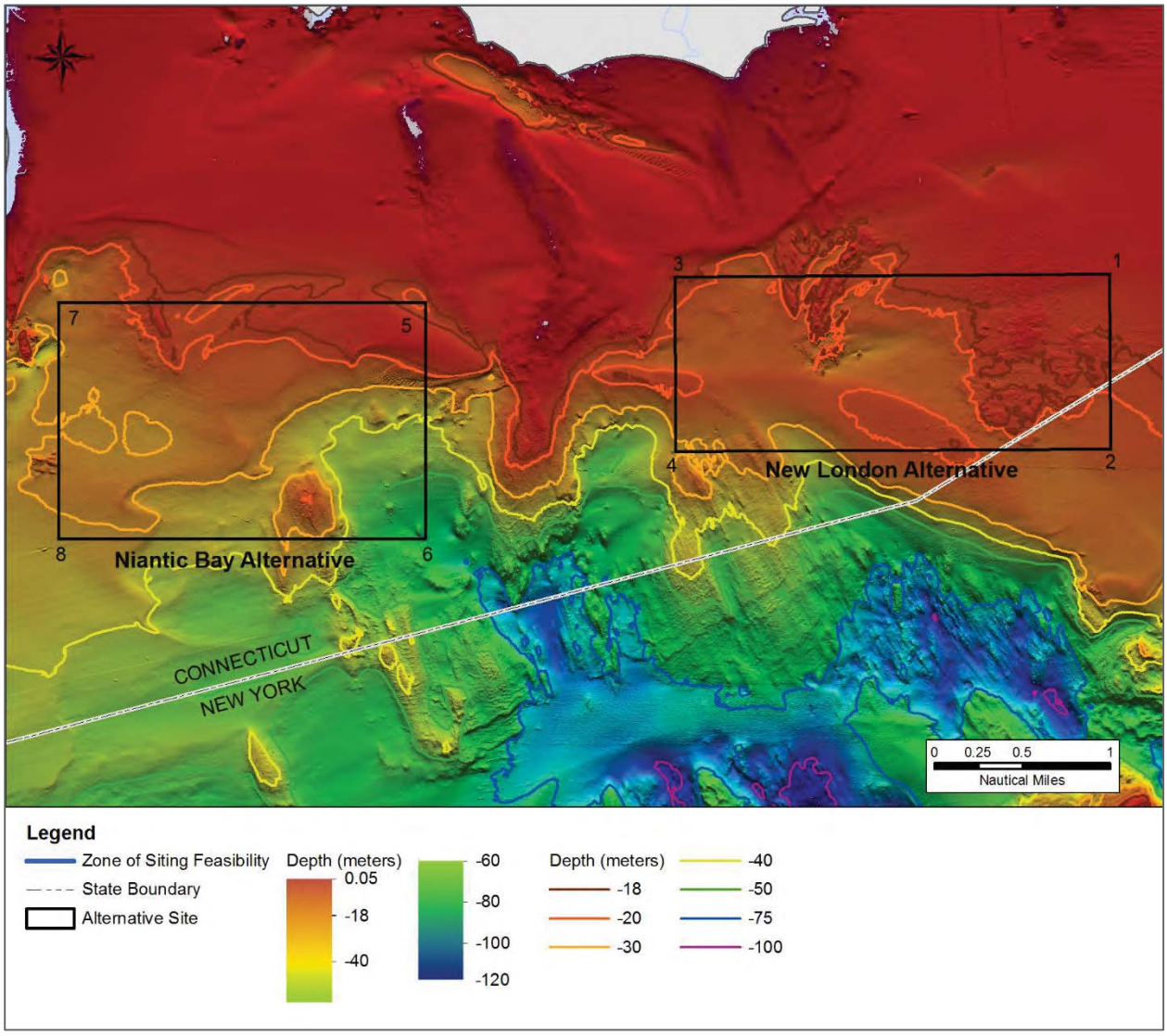

Figure 3. Location of the New London and Niantic Bay Alternatives. Coordinates of corner points are presented in Table 1. (Bathymetric data source: Poppe et al., 2011)

Table 1. Coordinates of Corner Points for the three Alternative Sites

Site	Corners Points	Latitude	Longitude
New London	1	41° 16.81' N	72° 03.91' W
	2	41° 15.81' N	72° 03.91' W
	3	41° 16.81' N	72° 07.22' W
	4	41° 15.81' N	72° 07.22' W
Niantic Bay	5	41° 16.68' N	72° 09.08' W
	6	41° 15.33' N	72° 09.08' W
	7	41° 16.68' N	72° 11.87' W
	8	41° 15.33' N	72° 11.87' W
Cornfield Shoals	15	41° 13.19' N	72° 20.83' W
	16	41° 12.19' N	72° 20.83' W
	17	41° 13.19' N	72° 22.15' W
	18	41° 12.19' N	72° 22.15' W

2.2 Niantic Bay Alternative

The Niantic Bay Alternative is located south of Niantic Bay, Connecticut, between the Connecticut and Thames Rivers. The Alternative is a rectangular area with the dimensions 2.1 x 1.33 nmi (3.9 x 2.5 km) (Figure 3; Table 1). The boundary of the Niantic Bay Alternative encompasses two areas, as follows:

- ***NBDS:*** The NBDS is located in the western part of the Niantic Bay Alternative. The 1.33 x 1.33 nmi (2.5 x 2.5 km) square site has an area of 1.8 nmi^2 (6.2 km^2). This site was used historically for the disposal of dredged materials between 1969 and 1972 when a total of 176,000 cy (135,000 m^3) of dredged material was disposed at this location (Oceanic Society, 1982), but the site is currently not an active disposal site (USACE, 2014). Water depths at the site range from approximately 50 to 120 feet (15 to 37 m). Sediments at the site consist of sand to the north and northwest and mostly gravelly sediment with patches of gravel in the remainder of the area. The dominant size fraction in the sediments at the site is sand. The site contains a boulder area in the north-central part of the site (Poppe et al., 1998) and scour depressions in the south.

- ***Site NB-E:*** Site NB-E is located in the eastern part of the Niantic Bay Alternative. It is a rectangular area, 0.75 nmi wide and 1.35 nmi long; the total area is 1 nmi^2 (3.4 km^2). Water depths at Site NB-E range from 43 feet (13 m) in the north to 230 feet (70 m) in the southeast. Surface sediments at the site are generally similar to sediments at the NBDS. The southwestern corner of Site NB-E contains a bedrock area, which is an extension of an exposed area of bedrock to the south of the site.

2.3 Cornfield Shoal Alternative Site

The boundary of the Cornfield Shoals Alternative (Figure 4; Table 1) is identical to the active Cornfield Shoals dredged material disposal site (CSDS). The CSDS is located 3.3 nm (6.1 km) south of Cornfield Point in Old Saybrook, Connecticut. It is a square 1.0 nmi^2 (3.4 km^2) site centered at 41° 12.6858' N, 72° 21.4914' W (NAD 83). An estimated 1.2 million cy (0.95 million m3) were disposed at the site between 1960 and 1976 (Oceanic Society, 1982), and additional 1.7 million cy (1.3 million m3) between 1982 and 2013 (USEPA, 2015). The water depth is approximately 150 feet (46 m) and the predominant topographic features are a sandy bottom and bedforms oriented in an east-west direction.

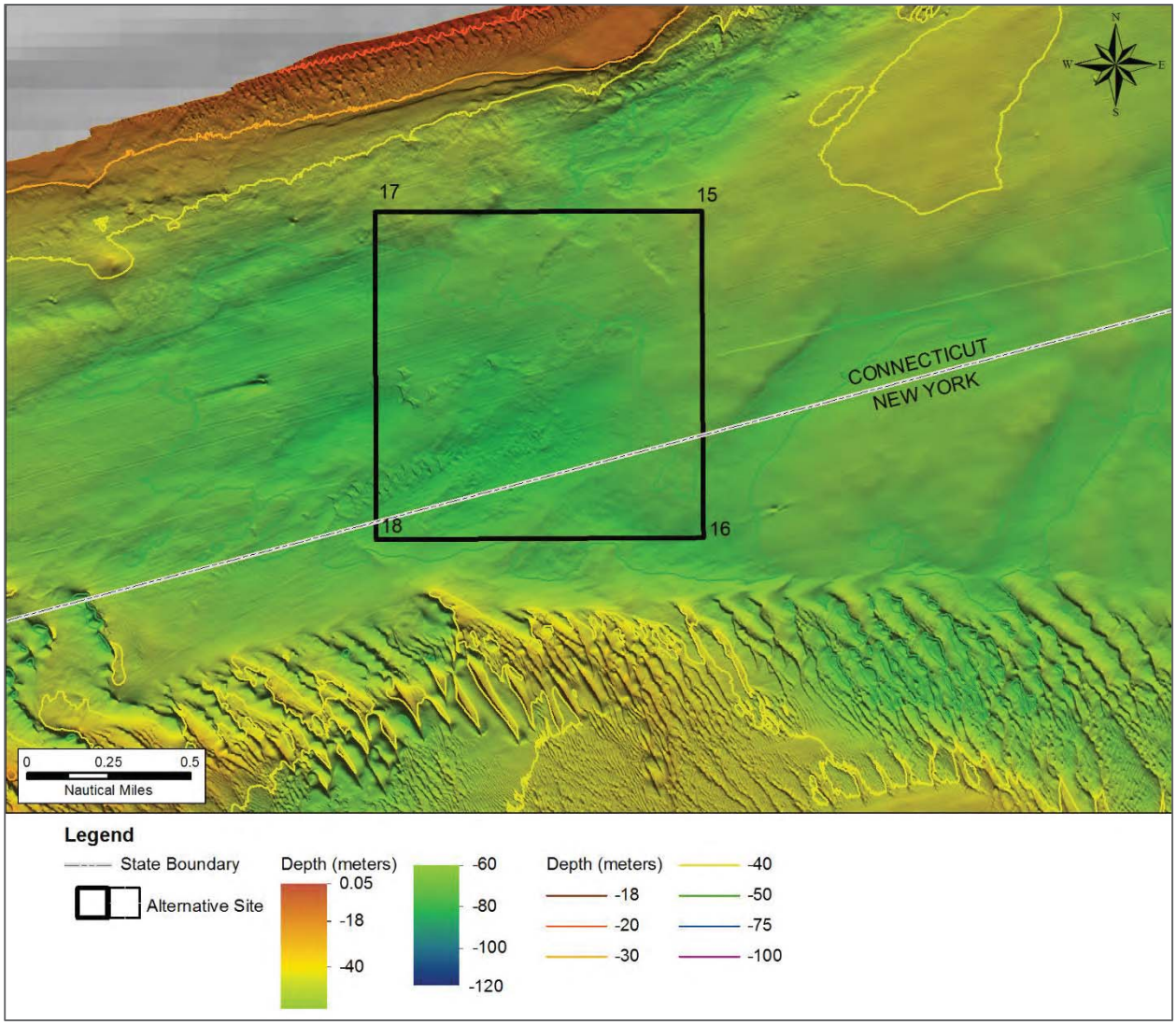

Figure 4. Location of the Cornfield Shoals Alternative. Coordinates of corner points are presented in Table 1. (Bathymetric data source: Poppe et al., 2011)

3.0 ESSENTIAL FISH HABITAT

In eastern Long Island Sound, EFH has been designated for 38 managed species (species with active FMPs). Fifteen of these species have designated EFH within the vicinity of one or more of the alternative sites (Figure 5). These species are summarized in Table 2 and are further described in this section. The data were compiled from the National Oceanic and Atmospheric Administration's Guide to Essential Fish Habitat Designations in the Northeastern United States (NOAA, 2014a). This guide summarizes EFH designated by species and life stage for that species (*i.e.*, eggs, larvae, juveniles, and adults) in 10-minute by 10-minute squares[1] of latitude and longitude (hereafter referred to as just "squares"). Therefore, EFH occurring in any of the 10-minute by 10-minute squares containing the three alternative sites (Figure 5) was included in Table 2 and described by life stage. The Cornfield Shoals alternative site is wholly contained within square 41107220. The Niantic Bay alternative site straddles two squares, 41107210 and 41107200. The New London alternative site is wholly contained in square 41107200.

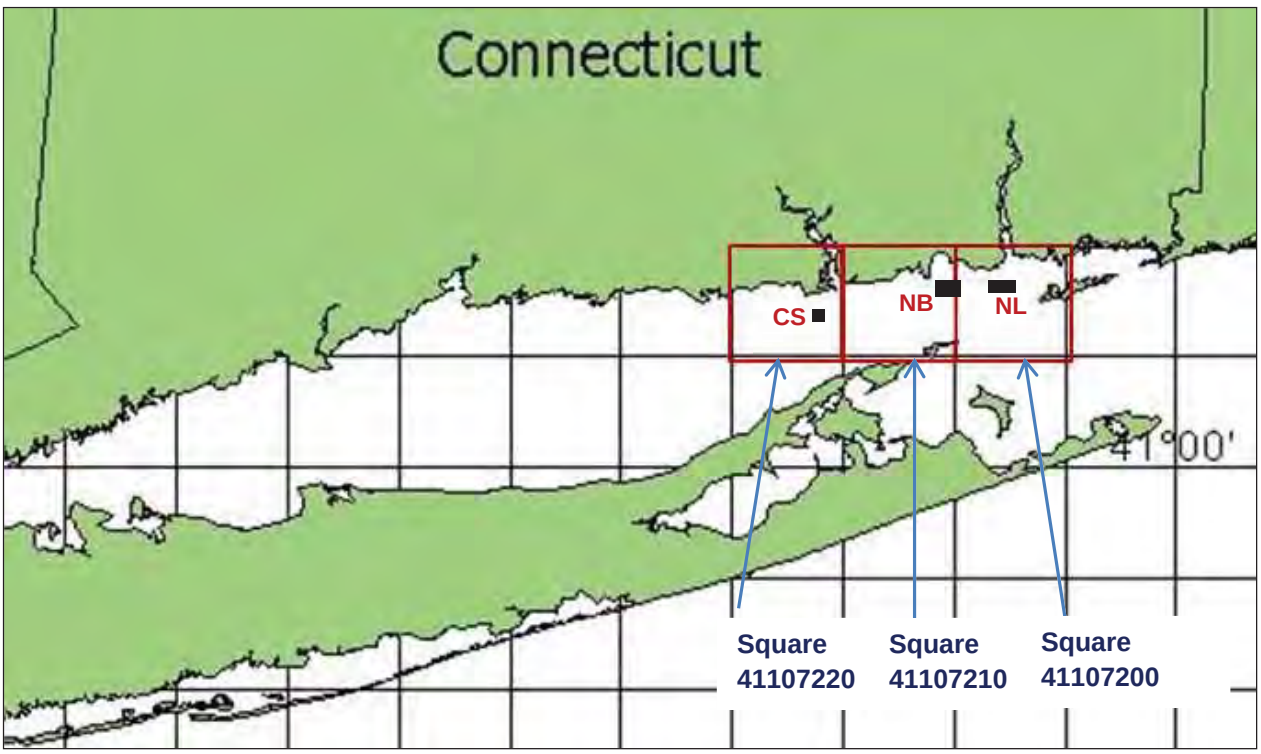

Figure 5. NOAA Fisheries 10 x 10 minute EFH squares (NOAA, 2014a). Included are the three alternative sites: Cornfield Shoals (CS), Niantic Bay (NB), and New London (NL).

[1] Squares are named by their south latitude and east longitude i.e. 41107220 is the 10-minute square bounded along its southern edge by the 41 degree 10 minute latitude line and along its eastern edge by the 72 degree 20 minute longitude line.

Table 2. Designated Essential Fish Habitat by Life Stage occurring at one or more of the Alternative Sites

Species	Eggs	Larvae	Juvenile	Adult
Atlantic salmon (*Salmo salar*)			●	●
Atlantic sea herring (*Clupea harengus*)			●	●
Bluefin tuna (*Thunnus thynnus*)				●
Bluefish (*Pomatomus saltatrix*)			●	●
Cobia (*Rachycentron canadum*)	●	●	●	●
Dusky shark (*Carcharhinus obscurus*)			●	
King mackerel (*Scomberomorus cavalla*)	●	●	●	●
Little skate (*Leucoraja erinacea*)			●	●
Pollock (*Pollachius virens*)			●	●
Red hake (*Urophycis chuss*)	●	●	●	●
Sand tiger shark (*Carcharias taurus*)		●		
Spanish mackerel (*Scomberomorus maculatus*)	●	●	●	●
Windowpane flounder (*Scophthalmus aquosus*)	●	●	●	●
Winter flounder (*Pseudopleuronectes americanus*)	●	●	●	●
Winter skate (*Leucoraja ocellata*)			●	●

Source: NOAA, 2014a

In 2014, a biological characterization of dredged material disposal sites in eastern Long Island Sound was completed (Tetra Tech, 2014). This report compiled data from various sources including fish species abundance data from finfish trawl surveys in Long Island Sound conducted annually by the Connecticut Department of Energy and Environmental Protection (CTDEEP). Of the 15 species with EFH designated in one or more of the alternative sites, Tetra Tech (2014) identified the presence of five species within the alternative sites: bluefish (*Pomatomus saltatrix*), little skate (*Leucoraja erinacea*), windowpane flounder (*Scophthalmus aquosus*), winter flounder (*Pseudopleuonectes americanus*), and winter skate (*Leucoraja ocellata*). However, many of the species, as well as the early life stages (*i.e.,* eggs and larvae) of all species, are not susceptible to being captured by the bottom otter trawl gear type used in the surveys; therefore, the absence of a species or life stage during the surveys does not necessarily indicate that it does not occur at the alternative sites.

Atlantic salmon (*Salmo salar*)

Juveniles: EFH for juvenile Atlantic salmon includes all rivers where Atlantic salmon are currently present along with those bays and estuaries identified by NOAA as supporting Atlantic salmon. Juvenile Atlantic salmon prefer bottom habitats of shallow gravel/cobble riffles

interspersed with deeper riffles and pools in rivers and estuaries. Generally, the following conditions exist where Atlantic salmon parr are found: clean, well-oxygenated fresh water, water temperatures below 25 degrees Celsius (°C), water depths between 10 centimeters (cm) and 61 cm, and water velocities between 30 and 92 cm per second. As they grow, parr transform into smolts. Atlantic salmon smolts require access downstream to make their way to the ocean. Upon entering the sea, "post-smolts" become pelagic and range from Long Island Sound north to the Labrador Sea (NEFMC, 1998a).

Adults: EFH for adult Atlantic salmon includes all rivers where Atlantic salmon are currently present along with those bays and estuaries identified by NOAA as supporting Atlantic salmon adults. For adult Atlantic salmon returning to spawn, EFH consists of habitats with resting and holding pools in rivers and estuaries. Returning Atlantic salmon require access to their natal streams and access to the spawning grounds. Generally, the following conditions exist where returning Atlantic salmon adults are found migrating to the spawning grounds: water temperatures below 22.8°C, and dissolved oxygen above 5 parts per million (ppm). Oceanic adult Atlantic salmon are primarily pelagic and range from the waters of the continental shelf off southern New England north throughout the Gulf of Maine. Adult salmon may be found throughout Long Island Sound during their spawning migration (NEFMC, 1998a).

Designated EFH for juvenile and adult Atlantic salmon includes all three alternative sites. Atlantic salmon would potentially be present at the alternative sites only during migration. Juveniles and adults are mobile nekton species and would likely avoid short-term pulse impacts to habitat. Additionally, any impacts from dredged material disposal activities would be minimized due to imposed restrictions when dredging, and hence disposal, can occur. Generally, dredging is usually prohibited from June 1 through September 30 of any year to protect shellfish populations during their spawning season (CTDEEP, 2013). Additional site-specific restrictions on dredging outside of the June 1 to September 30 timeframe may also apply depending on what fish or shellfish species are present at the dredging site. As a result, disturbance to the migrating Atlantic salmon at the disposal sites during these time periods would be avoided.

Atlantic sea herring (*Clupea harengus*)

Juveniles: EFH for juvenile Atlantic herring includes pelagic waters and bottom habitats in the Gulf of Maine, Georges Bank, southern New England and the middle Atlantic south to Cape Hatteras. Generally, the following conditions exist where Atlantic herring juveniles are found: water temperatures below 10°C, water depths from 49 to 442 feet (15 to 135 m), and a salinity range from 26 to 32 parts per thousand (ppt) (NEFMC, 1998b).

Adults: EFH for adult Atlantic herring includes pelagic waters and bottom habitats in the Gulf of Maine, Georges Bank, southern New England and the middle Atlantic south to Cape Hatteras, North Carolina. Generally, the following conditions exist where Atlantic herring adults are found: water temperatures below 10°C, water depths from 66 to 426 feet (20 to 130 m), and salinities above 28 ppt (NEFMC, 1998b).

Designated EFH for adult Atlantic sea herring includes all three alternative sites, while EFH for juvenile Atlantic sea herring includes the Cornfield Shoals and Niantic Bay alternative sites, but not the New London alternative site. Atlantic sea herring are a mobile, pelagic schooling species which would likely avoid short-term impacts to habitat.

Bluefin tuna (*Thunnus thynnus*)

Adults: EFH for adult bluefin tuna (>145 cm total length [TL]) includes pelagic waters of the Gulf of Maine in waters exceeding 164 feet (50 m) in depth to the exclusive economic zone (EEZ)[2] boundary, including the Great South Channel, then south of Georges Bank to the EEZ boundary. EFH for adult bluefin tuna also includes waters ranging from 164 to 6,560 feet (50 to 2,000 m) in depth offshore from Cape Lookout, North Carolina and pelagic waters from offshore Daytona Beach, Florida, south to Key West from depths of 328 feet (100 m) to the EEZ boundary. Adult bluefin tuna EFH in the Gulf of Mexico extends from offshore Terrebonne Parish, Louisiana, to offshore Galveston, Texas, out to the EEZ boundary in waters exceeding 656 feet (200 m) in depth (NOAA, 2014b).

EFH is designated for the 10-minute by 10-minute square containing the New London alternative site and the Niantic Bay alternative site. Though designated within the 10-minute by 10-minute square, there is no actual EFH within the boundary of New London alternative site as water depths at this site are less than 164 feet (50 m) (NLDS ranges from 46 to 79 feet [14 to 24 m]). For the Niantic Bay alternative site, EFH only exists in the eastern portion of the site where depths range to 230 feet (70 m). Bluefin tuna are a highly migratory pelagic species and could transit the area but would likely avoid or leave the area during disturbance events.

Bluefish (*Pomatomus saltatrix*)

Juveniles: EFH for juvenile bluefish includes pelagic waters over the continental shelf (from the coast out to the limits of the EEZ) from Nantucket Island, Massachusetts, south to Cape Hatteras, North Carolina. South of Cape Hatteras, EFH consists of all pelagic waters over the continental shelf (from the coast out to the eastern wall of the Gulf Stream) through Key West, Florida. Inshore, EFH includes all major estuaries between Penobscot Bay, Maine, and St. Johns River, Florida. Generally, juvenile bluefish occur in North Atlantic estuaries from June through October, in mid-Atlantic estuaries from May through October, and in South Atlantic estuaries from March through December (NOAA, 2014c).

Adults: EFH for adult bluefish covers the same area described for juveniles. Adult bluefish are found in North Atlantic estuaries from June through October, in mid-Atlantic estuaries from April through October, and in South Atlantic estuaries from May through January. Bluefish adults are highly migratory, and distribution varies seasonally and according to the size of the individuals comprising the schools. Bluefish generally prefer salinities greater than 25 ppt (NOAA, 2014c).

Designated EFH for juvenile and adult bluefish includes all three alternative sites. However, bluefish are a highly migratory coastal species and would likely avoid or leave the area during disturbance events.

[2] The EEZ is zone where the U.S. and other coastal nations have jurisdiction over natural resources. For the U.S. it extends no further than 200 nmi from the territorial sea baseline. Under the Magnuson-Stevens Fishery Conservation and Management Act, the term "exclusive economic zone"(EEZ) is defined as having an inner boundary that is coincident with the coastal states' boundary at 3 nmi (except Texas, western Florida and Puerto Rico which claim 9 nmi) and an outer limit that is the same as the EEZ as shown on NOAA charts.

Cobia (*Rachycentron canadum*)

All life stages: Cobia is a coastal migratory pelagic species. EFH for coastal migratory pelagic species includes sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters, from the surf to the shelf break zone, and from the Gulf Stream shoreward, including *Sargassum*. For cobia, EFH also includes high salinity bays, estuaries, and seagrass habitat. In addition, the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse coastal migratory pelagic larvae (NOAA, 2014d).

EFH for cobia occurs for all life stages at all three alternative sites. Cobia is a highly migratory species. If present, juvenile and adult cobia would likely avoid or leave the area during disturbance events and therefore, would not be impacted by the proposed activities. Cobia eggs and larvae have greater potential to be impacted by the disposal of dredged materials at the three alternative sites due to their inability to avoid or leave the area. However, cobia spawn offshore and eggs and larvae are transported by surface currents. The presence of cobia eggs or larvae in any of the alternative sites would be highly seasonal.

Dusky shark (*Carcharhinus obscurus*)

Juveniles: EFH for neonate/early juvenile dusky sharks (up to 115 cm total length [TL]) includes shallow coastal waters, inlets, and estuaries up to the 82 feet (25 m) in depth, from the eastern end of Long Island, New York, south to Cape Lookout, North Carolina. From Cape Lookout south to West Palm Beach, Florida, EFH for neonate/early juvenile dusky sharks extends to water depths of 328 feet (100 m). EFH for late juvenile/subadult dusky sharks (116 to 300 cm TL) includes pelagic waters off the coast of southern New England at depths of 82 to 328 feet (25 to 100 m) as well as shallow coastal waters, inlets and estuaries. EFH for late juvenile/subadult dusky sharks extends as far south as the Dry Tortugas, Florida, to depths of up to 1,640 feet (500 m) (NOAA, 2014e).

Within the project area, designated EFH for juvenile dusky sharks occurs only at the New London alternative site and the eastern portion of the Niantic Bay alternative site. However, dusky sharks are a highly mobile migratory pelagic species. If present, this species would likely avoid or leave the area during disturbance events.

King mackerel (*Scomberomorus cavalla*)

All life stages: King mackerel are a coastal migratory pelagic species. EFH for coastal migratory pelagic species includes sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters, from the surf to the shelf break zone, and from the Gulf Stream shoreward, including *Sargassum* (NOAA, 2014d).

EFH for king mackerel occurs for all life stages at all three alternative sites. King mackerel are a highly migratory species. If present, juveniles and adults would likely avoid or leave the area during disturbance events. Eggs and larvae have greater potential to be impacted by the disposal of dredged materials at the alternative sites due to their inability to avoid or leave the area. However, the presence of eggs or larvae in eastern Long Island Sound is highly seasonal and eggs and larvae are transported by surface currents, making short-term impacts due to the disposal of dredged materials unlikely.

Little skate (*Leucoraja erinacea*)

Juveniles: EFH for juvenile little skates (93 to 102 mm TL) ranges from Maine, south to North Carolina and occurs throughout most of Long Island Sound. EFH for little skates only includes habitats with sandy, gravelly, or mud substrates. Little skates are present in the northwest Atlantic year-round and across the entire range of temperatures for the area (GARFO, 2015; NOAA, 2003a).

Adults: EFH for adult little skates (32 to 62 cm TL) ranges from Maine, south to Chesapeake Bay. Adult little skate EFH occurs throughout most of Long Island Sound, but only includes habitats with sandy, gravelly, or mud substrates (GARFO, 2015; NOAA, 2003a).

EFH for juvenile and adult little skate includes habitats with sandy, gravelly, or mud substrates at the Cornfield Shoals and Niantic Bay alternative sites, but not the New London alternative site. Little skates are a demersal species that feed primarily on benthic invertebrates such as crustaceans, polychaetes, and bivalves (NOAA, 2003a). Direct impacts to little skates are not likely because most juveniles and adults would likely avoid or leave the area during disturbance events for other adjacent, undisturbed suitable habitats. Juveniles and adults could be indirectly impacted due to mortality of benthic prey items. However, this impact would have a short duration and would be followed by a period of increased prey abundance once the placed sediment mound stabilizes and high settlement densities of surface epifauna recolonize the area (Lopez et al., 2014). Additionally, monitoring under the DAMOS program has consistently demonstrated that the benthic communities readily recover after disposal events (*e.g.,* AECOM, 2009). Increased turbidity immediately following dredged material disposal events could also temporarily reduce foraging ability due to decreased visibility in the water column.

Pollock (*Pollachius virens*)

Juveniles: EFH for juvenile pollock includes bottom habitats with aquatic vegetation or a substrate of sand, mud or rocks in the Gulf of Maine and Georges Bank. Generally, juvenile pollock occur in waters with temperatures below 18°C, depths less than 820 feet (250 m), and salinities between 29 and 32 ppt (NEFMC, 1998c).

Adults: Bottom habitats in the Gulf of Maine and Georges Bank and hard bottom habitats (including artificial reefs) off southern New England and the middle Atlantic south to New Jersey. Generally, juvenile pollock occur in waters with temperatures below 14°C, depths from 49 to 1,200 feet (15 to 365 m), and salinities greater than 30 ppt (NEFMC, 1998c).

EFH for juvenile and adult pollock has been designated at the Cornfield Shoals and Niantic Bay alternative sites, but not the New London alternative site. Pollock are a mobile species which may be present throughout the water column. If present, this species would likely avoid or leave the area during disturbance events.

Red hake (*Urophycis chuss*)

Eggs: EFH for red hake eggs includes surface waters of the Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras, North Carolina. Preferred conditions for red hake eggs include sea surface temperatures below

10°C along the inner continental shelf with salinities less than 25 ppt. Hake eggs are most often observed from May through November, with peaks in June and July (NEFMC, 1998d).

Larvae: EFH for larval red hake includes surface waters of the Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras, North Carolina. Preferred conditions for larval red hake include sea surface temperatures below 19°C, water depths less than 656 feet (200 m), and salinity greater than 0.5 ppt. Red hake larvae are most often observed from May through December, with peaks in September and October (NEFMC, 1998d).

Juveniles: EFH for juvenile red hake includes bottom habitats with a substrate of shell fragments, including areas with an abundance of live scallops, in the Gulf of Maine, on Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras, North Carolina. Preferred conditions for juvenile red hake include water temperatures below 16°C, depths less than 328 feet (100 m) and salinities from 31 to 33 ppt (NEFMC, 1998d).

Adults: EFH for adult red hake includes bottom habitats in depressions with a substrate of sand and mud in the Gulf of Maine, on Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras, North Carolina. Preferred conditions for adult red hake include water temperatures below 12°C, depths from 33 to 426 feet (10 to 130 m), and salinities from 33 to 34 ppt (NEFMC, 1998d).

EFH for red hake has been designated for all life stages at the Cornfield Shoals and Niantic Bay alternative sites. At the New London alternative site, EFH has been designated for adult red hake only. Red hake are a demersal species and often forage on benthic infauna and epifauna. There is some potential for red hake mortality due to burial as a result of the proposed action. However, most juveniles and adults would likely avoid or leave the area during disturbance events for other adjacent, undisturbed suitable habitats and therefore, would not be directly impacted by the proposed activities. Juveniles and adults could be indirectly impacted due to mortality of benthic prey items. However, this impact would have a short duration and would be followed by a period of increased prey abundance once the placed sediment mound stabilizes and high settlement densities of surface epifauna recolonize the area (Lopez et al., 2014). Additionally, monitoring under the DAMOS program has consistently demonstrated that the benthic communities readily recover after disposal events (*e.g.,* AECOM, 2009). Increased turbidity immediately following dredged material disposal events could also temporarily reduce foraging ability due to decreased visibility in the water column. Eggs and larvae have greater potential to be impacted by the disposal of dredged materials at the alternative sites due to their inability to avoid or leave the area. However, the presence of eggs or larvae in eastern Long Island Sound is highly seasonal and eggs and larvae are transported by surface currents, making short-term impacts due to the disposal of dredged materials unlikely.

Sand tiger shark (*Carcharias taurus*)

Larvae: EFH for neonate/early juvenile sand tiger sharks (up to 125 cm TL) includes shallow coastal waters from Barnegat Inlet, New Jersey, south to Cape Canaveral, Florida, at depths up to 82 feet (25 m) (NOAA, 2014f).

Within the project area, designated EFH larval sand tiger sharks occurs only at the New London alternative site and at eastern portion of the Niantic Bay alternative site. However, sharks are highly mobile. If present, this species would likely avoid or leave the area during disturbance events.

Spanish mackerel (*Scomberomorus maculatus*)

All life stages: Spanish mackerel are a coastal migratory pelagic species. EFH for coastal migratory pelagic species includes sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters, from the surf to the shelf break zone, and from the Gulf Stream shoreward, including *Sargassum* (NOAA, 2014d).

EFH for Spanish mackerel occurs for all life stages at all three alternative sites. Spanish mackerel are a highly migratory species. If present, juveniles and adults would likely avoid or leave the area during disturbance events. Eggs and larvae have greater potential to be impacted by the disposal of dredged materials at the alternative sites due to their inability to avoid or leave the area. However, the presence of eggs or larvae in eastern Long Island Sound is highly seasonal and eggs and larvae are transported by surface currents, making short-term impacts due to the disposal of dredged materials unlikely.

Windowpane flounder (*Scophthalmus aquosus*)

Eggs: EFH designated for windowpane flounder eggs includes surface waters around the perimeter of the Gulf of Maine, on Georges Bank, southern New England, and the middle Atlantic south to Cape Hatteras, North Carolina, with temperatures less than 20°C and depths less than 230 feet (70 m). Windowpane flounder eggs are often observed from February to November with peaks in May and October in the middle Atlantic and July through August on Georges Bank (NEFMC, 1998e).

Larvae: EFH for windowpane flounder larvae includes pelagic waters around the perimeter of the Gulf of Maine, on Georges Bank, southern New England, and the middle Atlantic south to Cape Hatteras, North Carolina, with temperatures less than 20°C and depths less than 230 feet (70 m). Windowpane flounder larvae are often observed from February to November with peaks in May and October in the middle Atlantic and July through August on Georges Bank (NEFMC, 1998e).

Juveniles: EFH for juvenile windowpane flounder includes bottom habitats with a substrate of mud or fine-grained sand around the perimeter of the Gulf of Maine, on Georges Bank, southern New England, and the middle Atlantic south to Cape Hatteras, North Carolina, with temperatures below 25°C, depths from 3 to 328 feet (1 to 100 m), and salinities greater than 5.5 ppt (NEFMC, 1998e).

Adults: EFH for adult windowpane flounder includes bottom habitats with a substrate of mud or fine-grained sand around the perimeter of the Gulf of Maine, on Georges Bank, southern New England, and the middle Atlantic south to the Virginia-North Carolina border with water temperatures below 26.8°C, depths from 3 to 246 feet (1 to 75 m), and salinities greater than 5.5 ppt (NEFMC, 1998e).

EFH for windowpane flounder has been designated for all life stages at the Cornfield Shoals and Niantic Bay alternative sites, but no windowpane flounder EFH occurs for any life stage at the New London alternative site. Windowpane flounder is a demersal predator species. Therefore, there is some potential for mortality due to burial as a result of the proposed action. However, most juveniles and adults would likely avoid or leave the area during disturbance events. Eggs and larvae have greater potential to be impacted by the disposal of dredged materials at the alternative sites due to their inability to avoid or leave the area. Juveniles and adults could be indirectly impacted due to mortality of benthic prey items. However, this impact would have a short duration and would be followed by a period of increased prey abundance once the placed sediment mound stabilizes and high settlement densities of surface epifauna recolonize the area (Lopez et al., 2014). Additionally, monitoring under the DAMOS program has consistently demonstrated that the benthic communities readily recover after disposal events (*e.g.,* AECOM, 2009). Increased turbidity immediately following dredged material disposal events could also temporarily reduce foraging ability due to decreased visibility in the water column. However, conditions would quickly return to baseline.

Winter flounder (*Pseudopleuronectes americanus*)

Eggs: EFH designated for winter flounder eggs includes bottom habitats with a substrate of sand, muddy sand, mud, and gravel on Georges Bank, the inshore areas of the Gulf of Maine, southern New England, and the middle Atlantic south to the Delaware Bay with water temperatures below 10°C, salinities between 10 and 30 ppt, and depths less than 16 feet (5 m). Winter flounder eggs are often observed from February to June with a peak in April on Georges Bank (NEFMC, 1998f).

Larvae: EFH for larval winter flounder includes pelagic and bottom waters of Georges Bank, the inshore areas of the Gulf of Maine, southern New England, and the middle Atlantic south to the Delaware Bay with temperatures less than 15°C, salinities between 4 and 30 ppt, and water depths less than 19 feet (6 m). Winter flounder larvae are often observed from March to July with peaks in April and May on Georges Bank (NEFMC, 1998f).

Juveniles: EFH for juvenile winter flounder includes bottom habitats with a substrate of mud or fine-grained sand on Georges Bank, the inshore areas of the Gulf of Maine, southern New England, and the middle Atlantic south to the Delaware Bay with water temperatures below 28°C, depths from 0.3 to 33 feet (0.1 to 10 m), and salinities between 5 and 33 ppt. After their first year, juvenile winter flounder typically move to slightly cooler deeper waters (NEFMC, 1998f).

Adults: EFH for adult winter flounder includes estuaries with a substrate of mud, sand, and gravel on Georges Bank, the inshore areas of the Gulf of Maine, southern New England and the middle Atlantic south to the Delaware Bay with temperatures below 25°C, depths from 3 to 328 feet (1 to 100 m), and salinities between 15 and 33 ppt (NEFMC, 1998f).

EFH for winter flounder has been designated for all life stages at the Niantic Bay alternative site only. Winter flounder EFH has not been designated for any life stage at the Cornfield Shoals or New London alternative sites. Winter flounder are a demersal predator species. Therefore, there is some potential mortality due to burial as a result of the proposed action. However, most juveniles and adults would likely avoid or leave the area during disturbance events. Larvae have greater potential to be impacted by the disposal of dredged materials at the alternative sites due to

their inability to avoid or leave the area. Winter flounder have demersal eggs, which could be susceptible to sedimentation or burial. However, impacts to winter flounder eggs would be minimized or avoided by restrictions on when dredging (and hence disposal activities) can occur. Generally, dredging is usually prohibited from June 1 through September 30 of any year to protect shellfish populations during their spawning season (CTDEEP, 2013). Additional site specific restrictions outside of the June 1 to September 30 timeframe may also apply depending on what species are present at the dredging site, including restrictions from February 1 to April 15 if winter flounder are present at the dredging site. Juveniles and adults could be indirectly impacted due to mortality of benthic prey items. However, this impact would have a short duration and would be followed by a period of increased prey abundance once the placed sediment mound stabilizes and the surface epifauna recolonizes the area at high densities (Lopez et al., 2014). Additionally, monitoring under the DAMOS program has consistently demonstrated that the benthic communities readily recover after disposal events (*e.g.,* AECOM, 2009). Increased turbidity immediately following dredged material disposal events could also temporarily reduce foraging ability due to decreased visibility in the water column; however, these conditions would be of short duration and would quickly return to baseline.

Winter skate (*Leucoraja ocellata*)

Juveniles: EFH for juvenile little skates (112 to 127 mm TL) ranges from Maine, south to Cape Hatteras, North Carolina and includes most of Long Island Sound. EFH for winter skates only includes habitats with sandy, gravelly, or mud substrates. Winter skates are present in the northwest Atlantic year-round and across the entire range of temperatures for the area (GARFO, 2015; NOAA, 2003b).

Adults: EFH for adult winter skates (greater than 70 cm TL) ranges from Maine, south to Chesapeake Bay. Adult winter skate EFH occurs throughout most of Long Island Sound, but only includes habitats with sandy, gravelly, or mud substrates (GARFO, 2015; NOAA, 2003b).

EFH for juvenile and adult winter skate includes habitats with sandy, gravelly, or mud substrates at the Cornfield Shoals and Niantic Bay alternative sites, but not the New London alternative site, and is almost identical to EFH designated for the little skate. Like little skates, winter skates are a demersal species which feed primarily on benthic invertebrates including crustaceans, polychaetes, and bivalves (NOAA, 2003b). Direct impacts to winter skates are not likely because most juveniles and adults would likely avoid or leave the area during disturbance events for other adjacent, undisturbed suitable habitats. Juveniles and adults could be indirectly impacted due to mortality of benthic prey items. However, this impact would have a short duration and would be followed by a period of increased prey abundance once the placed sediment mound stabilizes and the surface epifauna recolonizes the area at high densities (Lopez et al., 2014). Additionally, monitoring under the DAMOS program has consistently demonstrated that the benthic communities readily recover after disposal events (*e.g.,* AECOM, 2009). Increased turbidity immediately following dredged material disposal events could also temporarily reduce foraging ability due to decreased visibility in the water column.

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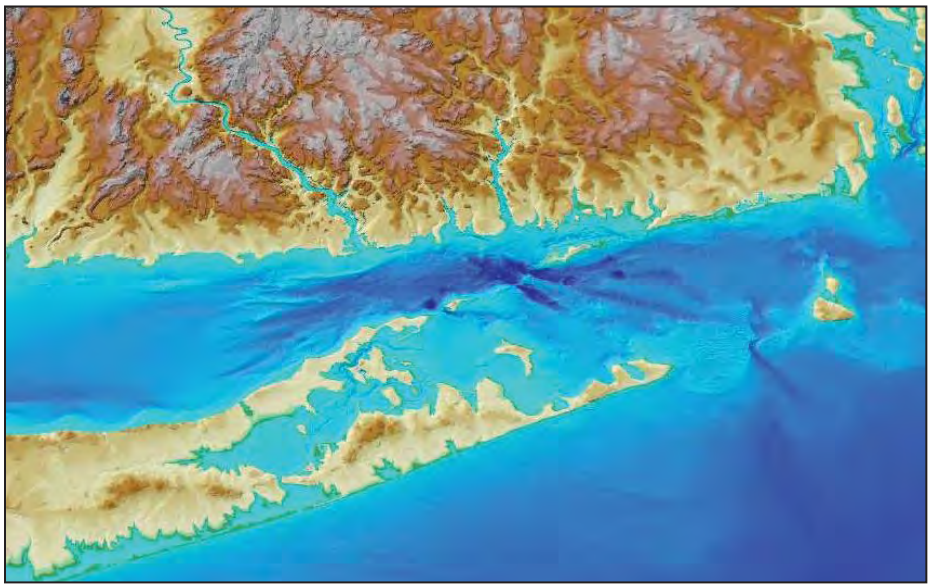
Supplemental Environmental Impact Statement for the Designation of Dredged Material Disposal Sites in Eastern Long Island Sound, Connecticut and New York

APPENDIX I

Site Management and Monitoring Plan for Eastern Long Island Sound Disposal Site



Prepared by: United Stated Army Corps of Engineers

and

United States Environmental Protection Agency

November 2016

The following document is the Site Management and Monitoring Plan (SMMP) for the Eastern Long Island Sound Dredged material disposal site (ELDS).

This document has been developed and agreed to pursuant to the Water Resources Development Act Amendments of 1992 (WRDA 92) and to the Marine Protection, Research, and Sanctuaries Act of 1972 for the management and monitoring of ocean disposal activities, as resources allow, by the U.S. Environmental Protection Agency New England Office, and the U.S. Army Corps of Engineers New England District.

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Acronyms and Keywords

aRPD	Apparent Redox Potential Discontinuity
C.F.R.	Code of Federal Regulations
CLDS	Central Long Island Sound Dredged Material Disposal Site
cm	centimeter(s)
cm/s	centimeter(s) per second
CPUE	Catch per Unit Effort
CSDS	Cornfield Shoals Dredged Material Disposal Site
CT	Connecticut
CTDEEP	Connecticut Department of Energy and Environmental Protection (formerly CTDEP)
CWA	Clean Water Act
cy	cubic yard(s)
CZM	Coastal Zone Management
DAMOS	Disposal Area Monitoring System
DMMP	Dredged Material Management Plan
DQM	Dredging Quality Management
EFH	Essential Fish Habitat
ELDS	Eastern Long Island Sound Dredge Material Disposal Site
ERL	Effects Range – Low
ERM	Effect Range – Median
ESA	Endangered Species Act
FMP	Fisheries Management Plan
ft	foot (feet)
ft/s	foot (feet) per second
ITM	Inland Testing Manual
km	kilometer(s)
km^2	square kilometer(s)
LIS	Long Island Sound
LISS	Long Island Sound Study
m	meter(s)
m/s	meter(s)/second
m^3	cubic meter(s)
µm	micrometer(s)
MPRSA	Marine Protection, Research, and Sanctuaries Act of 1972
NAD83	North American Datum 1983
nmi	nautical mile(s)
nmi^2	square nautical mile(s)
NEPA	National Environmental Policy Act
NLDS	New London Dredged Material Disposal Site (formerly NLDN)
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NY	New York
NYSDEC	New York State Department of Environmental Conservation

QA	Quality Assurance
QAPP	Quality Assurance Project Plan
Pa	Pascal
PAH(s)	Polycyclic Aromatic Hydrocarbon(s)
PCB(s)	Polychlorinated Biphenyl(s)
psu	practical salinity units
PV	Plan-view (photograph taken by a sediment profile system)
RHA	Rivers and Harbors Act
RIM	Regional Implementation Manual
SEIS	Supplemental Environmental Impact Statement
SMMP	Site Management and Monitoring Plan
SPI	Sediment profile imaging
TOC	Total organic carbon
USACE-NAE	U.S. Army Corps of Engineers, New England District
U.S.C.	U.S. Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WLDS	Western Long Island Sound Dredged Material Disposal Site
WRDA	Water Resources Development Act of 1992 (Public Law 102-580)

1.0 INTRODUCTION

Long Island Sound is adjacent to one of the most densely populated and industrialized regions in North America. Long Island forms the southern boundary of the Sound and stretches eastward from New York City to Montauk over a distance of 110 miles (177 km) and has a maximum width of 23 miles (37 km). It has a population of approximately 8 million (2014 census). To the north Connecticut has a population of approximately 3.6 million (2014 census) with the highest population density being found in communities along western and central Long Island Sound, and in the greater Hartford area.

Cargo and petroleum products are shipped through Long Island Sound to and from the New York City area and several ferries traffic people and goods between Long Island and Connecticut. Maintenance of adequate navigation depth in marine terminals, port facilities, and private marinas is vital to the economics of the Long Island Sound region. Both commercial and recreational industries rely on the utility of such areas. To ensure continued use, economic viability and safety of the region's navigational channels and navigation-dependent facilities, periodic dredging must be performed to remove accumulated sediment. The U.S. Army Corps of Engineers New England District (USACE-NAE) estimates that 52.9 million cubic yards (cy) (40.4 million m^3) of material will need to be dredged over the next 30 years in the ports and harbors surrounding Long Island Sound (2015-2045). The dredging needs of the eastern Long Island Sound region are estimated to be 20 million cy (15 million m^3) as of September 15, 2016 (USACE, 2016). The total expected dredging needs for the entire Sound region exceed the capacity of 40 million cy (30 million m^3) available at the two designated sites in the Sound (Central and Western Long Island Sound disposal sites; CLDS and WLDS, respectively) that would remain after the upcoming closure of the New London and Cornfield Shoals disposal sites (NLDS and CSDS, respectively) in December 2016.

Pursuant with the Marine Protection, Research, and Sanctuaries Act (MPRSA; also known as the Ocean Dumping Act) 33 U.S.C. §§ 1401 et seq., the USEPA has selected the Eastern Long Island Sound dredged material disposal site (ELDS) as the preferred alternative to provide for the long-term needs of dredged material disposal for the States of Connecticut and New York (Figure 1). The ELDS is located adjacent to the NLDS.

Prior to use of the ELDS, each project must receive a permit issued by USACE under Section 103 of the MPRSA, 33 U.S.C. § 1413 with concurrence by the USEPA. As discussed further in this Site Management and Monitoring Plan (SMMP), the USACE-NAE will coordinate with resource agencies on an individual project basis, as needed, for Essential Fish Habitat (EFH) under the Magnuson Stevens Act, for threatened and endangered species under the Endangered Species Act (ESA), and for other consultations.

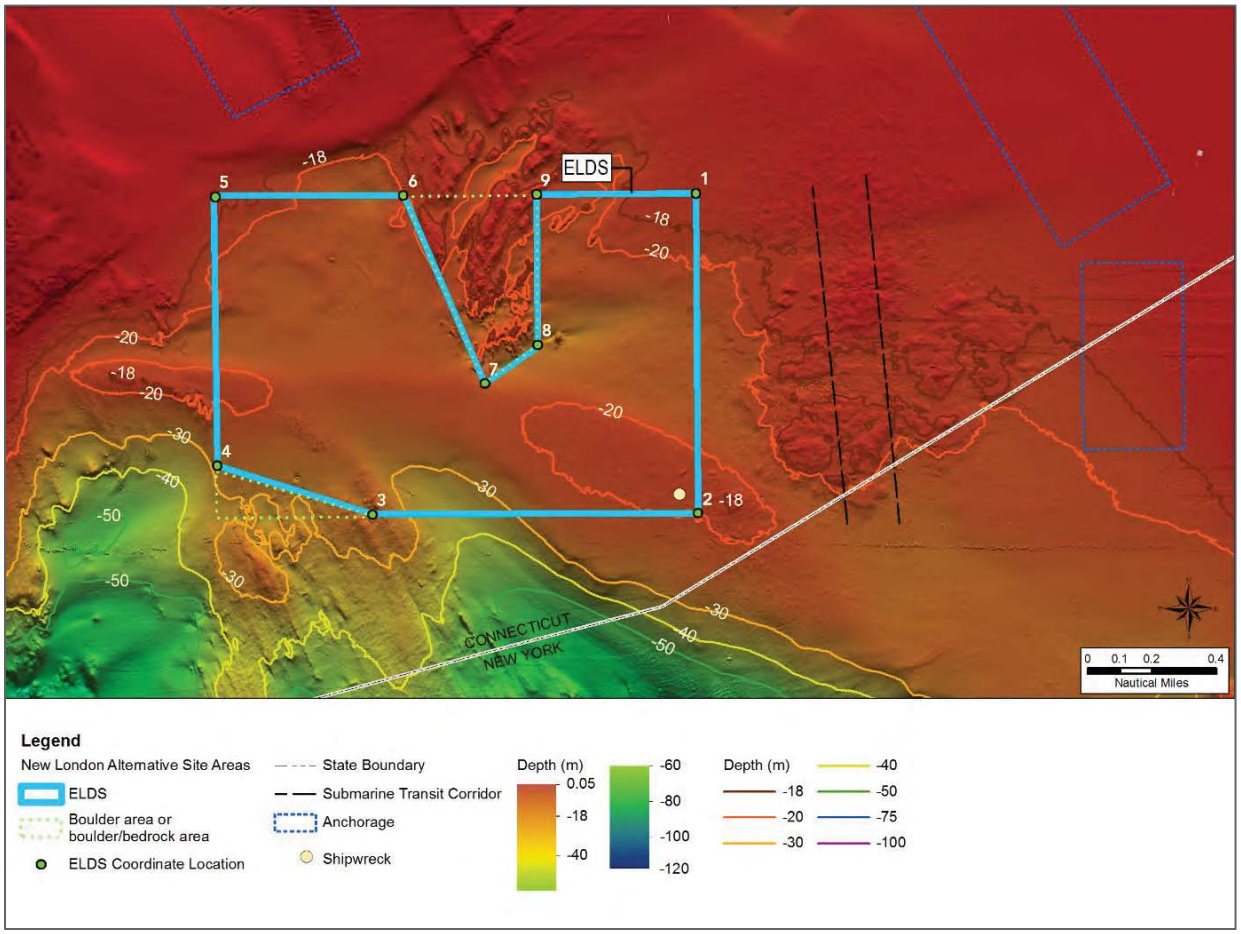

Figure 1. Location of Eastern Long Island Sound Dredged Material Disposal Site (ELDS) (USEPA, 2016).

Management plans for designated ocean dredged material disposal sites are required pursuant to §102(c) of the MPRSA, as amended by §506(a) of the Water Resources Development Act (WRDA) of 1992. In accordance with MPRSA [Section 103(a)] disposal activities at the site "will not unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities." The purpose of this SMMP is to summarize prior site monitoring results and outline a management plan and monitoring program for the ELDS that complies with the requirements of MPRSA.

The SMMP serves as a framework to guide the development of future project-specific sampling and survey plans created under the monitoring program. The data gathered from the monitoring program will be routinely evaluated by USEPA, USACE-NAE, and other agencies such as the National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), and state regulatory agencies (see Section 9.0), to determine whether modifications in site usage, management, testing protocols, or additional monitoring are warranted.

To ensure that ocean dredged material disposal sites are managed to minimize adverse effects of disposal on the marine environment, the MPRSA §102(c) as amended by §506(a) of the WRDA of 1992, requires the completion of a SMMP upon designation of a site [MPRSA Section 102(c)(3)].

MPRSA further requires that a SMMP established for sites like the ELDS includes a schedule for review and revision of the plan to occur not less than 10 years after adoption of the plan, and every 10 years thereafter. Prior to the revision for the ELDS SMMP, USEPA and USACE-NAE will review the plan annually to ensure that the intent of the original procedures and protocols continue to meet the management objectives of the ELDS, and will continue to be used.

The ELDS is located to the southwest of the mouth of Thames River estuary. Specifically, it is located within a 1 x 1.5 nautical mile (nmi) area with two bedrock/boulder areas excluded. The total surface area of this polygon is 1.3 square nautical miles (nmi^2) (4.5 m^2) (Figure 1). The closest points of land to the ELDS are the Harkness Merrill State Park, Waterford, CT, located approximately 1.1 nmi (2.0 km) to the north, and Fishers Island, New York, located approximately 2.3 nmi (4.3 km) to the southeast.

As detailed in the site designation, the ELDS would provide the required capacity for estimated dredging needs while avoiding bedrock areas. Coordinates (NAD83) identified as Points 1-9 in Figure 1 are as follows: (1) 41°16.81′ N., 72°05.23′ W.; (2) 41°15.81′ N., 72°05.23′ W.; (3) 41°15.81′ N., 72°06.58′ W.; (4)41°15.97′ N., 72°07.22′ W; (5) 41°16.81′ N., 72°07.22′ W.; (6) 41°16.81′ N., 72°06.44′ W.; (7) 41°16.22′ N., 72°06.11′ W.; (8) 41°16.34′ N., 72°05.89′ W.; and (9) 41°16.81′ N., 72°05.89′ W.

Water depths within the ELDS range from approximately 45 feet (14 m) in the north to 100 feet (30 m) in the south. The southwest corner of the 1 x 1.5 nmi area (located to the south of Points 3 and 4 in Figure 1) contains a bedrock area and was therefore excluded from the boundaries of the ELDS. Similarly, the bedrock area to the north of the 1 x 1.5 nmi area (located in the center of the area marked by Points 6, 7, 8, and 9) was also excluded from the site boundary of the ELDS (USEPA, 2016).

2.0 REGULATORY FRAMEWORK AND AUTHORITIES

The intent of this SMMP is to provide a management framework and monitoring program that strives to minimize the potential for adverse impacts to the marine environment from dredged material disposal at ELDS. To this end, the SMMP identifies actions, provisions, and practices necessary to manage the operational aspects of dredged material disposal at ELDS. Section 40 C.F.R. § 228.10(a) of the MPRSA requires that the impact of disposal at a designated site be evaluated periodically.

2.1 Management

Management of the disposal site involves: regulating the times, quantity, and physical/ chemical characteristics of dredged material that is disposed at the site; establishing disposal controls, conditions, and requirements; and monitoring the site environment to verify that potential unacceptable conditions which may result in adverse impacts are not occurring from past or continued use of the disposal site and that permit terms are met.

In addition, the plan also incorporates the six requirements for ocean disposal site management plans discussed in MPRSA § 102(c)(3), as amended. These are:

1. Consideration of the quantity of the material to be disposed of at the site, and the presence, nature and bioavailability of the contaminants in the material [§102(c)(3) Section II C];
2. A baseline assessment of conditions at the site [§102(c)(3) Section III];
3. A program for monitoring the site [§102(c)(3) Section IV];
4. Special management conditions or practices to be implemented at each site that are necessary for protection of the environment [§102(c)(3) Section V.A];
5. Consideration of the anticipated use of the site over the long term, including the anticipated closure date for the site, if applicable, and any need for management of the site after closure [§102(c) (3) Section VI];
6. A schedule for review and revision of the plan (which shall not be reviewed and revised less frequently than ten years after adoption of the plan, and every ten years thereafter) [§102(c)(3) Section VII].

40 C.F.R. Section 228.10 requires that a disposal site be periodically assessed based on the available body of pertinent data. Recognizing and correcting any potential unacceptable condition before it causes an adverse impact to the marine environment or presents a navigational hazard to commercial and recreational water-borne vessel traffic is central to this SMMP.

The practices that will be applied to address these management goals at ELDS include coordination among federal and state agencies, testing of material for acceptability for disposal at the site, review of general and specific permit conditions, review of allowable disposal technologies and methods, implementation of inspection, surveillance and enforcement procedures, periodic environmental monitoring at the site and at relevant reference sites for comparative evaluation, and information management and record keeping.

2.2 Monitoring

Section 40 C.F.R. § 228.10(b) specifically requires consideration of the following types of potential effects when evaluating impacts at a disposal site:

- Movement of materials into sanctuaries or onto beaches or shorelines [228.10(b)(1)];

- Movement of materials towards productive fishery or shellfishery areas [228.10(b)(2)];
- Absence from the disposal site of pollutant-sensitive biota characteristic of the general area [228.10(b)(3)];
- Progressive, non-seasonal, changes in water quality or sediment composition at the disposal site when these changes are attributable to materials disposed of at the site [228.10(b)(4)];
- Progressive, non-seasonal, changes in composition or numbers of pelagic, demersal, or benthic biota at or near the disposal site when these changes can be attributed to the effects of materials disposed at the site [228.10(b)(5)];
- Accumulation of material constituents (including without limitation, human pathogens) in marine biota at or near the site (*i.e.*, bioaccumulation [228.10(b)(6)]); and
- Evaluating compliance with CWA or MPRSA permit conditions and conduct enforcement actions where warranted and as appropriate.

The monitoring approach defined in this SMMP focuses on those factors that provide an early indication of potential unacceptable impacts. The plan also incorporates ongoing regional monitoring programs in Long Island Sound that can provide additional information. The identification of unacceptable impacts from dredged material disposal at ELDS will be accomplished in part through comparisons of the monitoring results to historical (*i.e.*, baseline) conditions, and in part through comparison to nearby reference locations.

If site monitoring demonstrates that the disposal activities are causing unacceptable impacts to the marine environment as defined under 40 C.F.R. § Section 228.10(b), the site managers may place appropriate limitations on site usage to reduce the impacts to acceptable levels. Such responses may range from withdrawal of the site's designation; to limitations on the amounts and types of dredged material permitted to be disposed; or to limitations on the specific disposal methods, locations, or schedule.

Any proposal for the open-water disposal of dredged material from a particular project must begin with an examination of the nature of the material. Federal and non-federal projects evaluated under MPRSA are subjected to the same qualitative analysis. In order to be approved for open-water disposal, or most other disposal options, dredged material must be found suitable by applying the tiered testing protocols and evaluating the results.

Material that includes silts, material with high organic content, and other shoal material from harbors and areas with a history of contamination and industrial use are subjected to additional chemical testing to determine the relative likelihood of suitability. For materials exhibiting higher concentrations of contaminants in comparison to reference site values, project proponents may elect not to incur the cost of further testing and investigate non-open-water alternatives such as containment and treatment. For materials with chemical test results that do not exhibit high concentrations of contaminants, or where the project proponents wish to maintain the option of

open-water disposal and other uses, the sediment is subjected to further tests aimed at predicting the biological response to exposure to the material during different phases of the disposal process. These tests are generally described as bioassay (toxicity) testing and bioaccumulation (tissue uptake of contaminants) testing.

The next tier of testing, the toxicity test, consists of exposing test organisms to the dredged material and comparing survivability rates to those of organisms exposed to reference and control materials. Where the dredged material exhibits greater toxicity to benthic test species than the reference sediments (using statistical tests and nationally developed interpretation guidance), project proponents may elect to forgo any further cost of testing for suitability for open-water disposal and seek alternate disposal options. Otherwise, material that exhibits toxicity comparable to the reference sediments shall undergo bioaccumulation testing before any determination on suitability for open-water disposal can be made. In general terms, bioaccumulation involves a long exposure of test organisms to the sediment followed by analysis of their tissues to determine the potential for uptake of contaminants from the dredged material. The test results are evaluated to determine the risk of exposure to ecological and human health.

Dredged material that is determined through these testing protocols to pose no unacceptable risk to the human or ecological health is deemed suitable for open-water disposal. These findings may be accompanied by specific management requirements, such as limitation on disposal rates, to minimize water column concentrations.

2.3 Dredged Material Disposal Authorities

The primary authorities that apply to the disposal of dredged material in the U.S. are the Rivers and Harbors Act of 1899 (RHA), WRDA, CWA, and MPRSA. The RHA regulates dredging and discharge of material in navigable waters and WRDA addresses research and funding in support of specific water resource projects for various needs (*i.e.*, transportation, recreation). It also modifies other Acts, as necessary (*e.g.*, MPRSA).

All dredging, dredged material transport, and disposal must be conducted in compliance with permits issued for these activities. Surveillance and enforcement responsibilities at the disposal site are shared between the USACE-NAE and USEPA with assistance from the U.S. Coast Guard [33 U.S.C. § Sec 1417I]. The permittee is responsible for ensuring compliance with all project conditions including disposal of material at the correct location and within applicable site use restrictions. USEPA has enforcement responsibility under MPRSA. The USEPA and the USACE-NAE will cooperate to ensure effective enforcement of permit violations.

Section 404 of the Clean Water Act (33 U.S.C. § 1344) authorizes the USACE to issue permits for the disposal of dredged materials in the territorial sea, the contiguous zone, and ocean, as long as the material meets guidelines developed by USEPA pursuant to CWA §404(b)(1). USEPA's guidelines are promulgated at 40 C.F.R. Part 230. These guidelines set forth environmental

standards and analytical requirements for use in determining when the USACE should authorize disposal of particular dredged material at a particular location. The USACE regulations governing the issuance of §404 permits are codified at 33 C.F.R. Parts 320-338.

Because Long Island Sound is an estuary, it falls within the geographical jurisdiction of Section 404 of the Clean Water Act as described above. However, in 1980, Congress enacted the "Ambro Amendment," an amendment to the MPRSA requiring that the disposal of dredged material in Long Island Sound from all federal projects and non-federal projects that exceed 25,000 cubic yards (19,114 cubic meters) comply with the MPRSA provisions.

Under Section 103 of MPRSA, the USACE-NAE is assigned permitting responsibility for dredged material, subject to USEPA review and concurrence that the material meets applicable ocean disposal criteria. The USACE-NAE is required to use USEPA-designated open-water disposal sites for dredged material disposal to the maximum extent feasible. If USEPA designated sites are not available, the USACE-NAE may select a site which may be used for two consecutive 5-year periods.

All projects authorized for dredged material disposal at ELDS are required to obtain a current State Water Quality Certificate from the Connecticut Department of Energy and Environmental Protection (CTDEEP) pursuant to Section 401 of the CWA [33 U.S.C., § 1341]. A state water quality certificate is also required for federal disposal projects that receive authorization from the USACE-NAE. To receive certification, the dredged material disposal must be consistent with the provisions of the CWA and the Connecticut Water Quality Standards (Sections 22a-426 through 22a-363f of the Connecticut General Statues – Structures, Dredging, and Fill) and water quality certification is made in conjunction with issuance of a state permit under this statute. In some cases applicants may qualify for authorization under a state Programmatic General Permit, which is a more expedited process (CTDEP, 2001).

3.0 MANAGEMENT PLAN

All dredged material projects using ELDS are subject to CWA Section 404, although private projects larger than 25,000 cubic yards and all federal projects will also be authorized under MPRSA Section 103, as stated in Section 2.0. The site will be managed in a manner that ensures the following site management goals are met:

- Ensure and enforce compliance with permit conditions;
- Minimize loss of sediment from the disposal site;
- Minimize conflicts with other uses of the area;
- Maximize site capacity;
- Minimize environmental impact from sediments disposed at the site; and
- Recognize and correct conditions that could lead to unacceptable impacts.

USEPA and the USACE-NAE will jointly manage ELDS and will also coordinate with the States of Connecticut and New York. The effectiveness of the management approach depends on having efficient planning processes, consistent compliance and enforcement, a robust yet flexible monitoring plan, and an effective communication structure that includes timely receipt and review of information relevant to the site management goals. To this end, the New England Regional Dredge Team meets quarterly and includes participation by the relevant federal and state agencies and standard agenda items of monitoring and compliance at open water sites including ELDS. In addition, USEPA and USACE-NAE have an annual meeting dedicated to the review of monitoring data, setting of monitoring objectives, and scoping of investigations for each open water site.

Management of ELDS will follow an approach adopted for other Long Island Sound disposal sites and will include the following practices:

- Evaluation of the suitability of material for disposal in accordance with the applicable requirements for the specific type of project (*i.e.*, MPRSA and CWA);
- Specification of disposal conditions, location, and timing in permits as appropriate (*e.g.*, disposal will not occur between June 1 and September 30 to ensure that dredging windows for fisheries are met or disposal may be restricted during spring tides to ensure that water quality criteria are not exceeded outside the boundaries of the site);
- Enforcement of all permit conditions;
- Disposal specified to occur at the specified target coordinates (to be determined on an annual basis);
- To ensure compliance, all scows disposing material at the ELDS are required to utilize tracking instrumentation in accordance with the USACE-NAE Dredging Quality Management (DQM) system to allow determination of actual disposal locations;
- Positioning of disposal coordinates are set each year with the intent of minimizing environmental impacts and maximizing long-term site capacity;
- Limiting the buildup of material in height above the bottom such that it is not a hazard to navigation or more likely to be mobilized by storm events;
- Conducting disposal site monitoring in a consistent, systematic manner (Attachment A); and
- Specification of de-designation (*i.e.*, closure) conditions and dates as appropriate [§102(c)(3) Section VII].

3.1 Specific Management Practices

In addition, special management practices may exist at ELDS for individual projects based on site monitoring data and long-term management goals:

- Specification of the dredged material volume that can be disposed at specific locations within the site or the total dredged material volume disposed at the site;
- Modifications to the site designation or to disposal methods, locations, or time of disposal; and
- Requirement for additional monitoring focused on a specific aspect of a project.

40 C.F.R. Section 228.10(c) requires that a disposal site be periodically assessed based on the available body of pertinent data in order to recognize and correct any potential unacceptable condition before it causes an adverse impact to the marine environment or presents a navigational hazard to commercial and recreational water-borne vessel traffic. Both agencies will cooperate to ensure effective enforcement of all disposal requirements. The MPRSA gives authority to USEPA to enforce permit conditions.

The USACE-NAE will provide USEPA with summary information on each project at two stages of the dredging and disposal process. A Summary Information Sheet will be provided when dredging operations begin, and a Summary Report will be submitted when dredging operations have been completed.

The following list represents special conditions that are to be applied to projects using ELDS. These conditions may be modified on a project-by-project basis, based on factual changes (*e.g.*, administrative changes in phone numbers, points of contact) or when deemed necessary as part of the individual permit review process:

- At least ten working days in advance of the start date, the First Coast Guard District, Aids to Navigation Office shall be notified of the location and estimated duration of the dredging and disposal operations.
- At least ten working days in advance of the start date, the Coast Guard Captain of the Port Long Island Sound shall be notified of the location and estimated duration of the dredging and disposal operations.
- The Captain of the Port, Long Island Sound shall be notified at least two hours prior to each departure from the dredging site.
- The DQM system must be operational on each disposal scow and record each disposal event. This information is automatically uploaded to a USACE-NAE database.
- For the initiation of disposal activity and any time disposal operations resume after having ceased for one month or more, the permittee or the permittee's representative must notify the USACE-NAE.

- The permittee must notify the USACE-NAE upon completion of dredging for the season by completing and submitting the form that the USACE-NAE will supply for this purpose.
- Except when directed otherwise by the USACE-NAE, all disposal of dredged material shall adhere to the following: The permittee shall release the dredged material at a specified set of coordinates within the site. All disposal is to occur at the specified target coordinates with the scow moving at minimal speed to maintain steerage (generally less than two knots). The USACE-NAE will provide the target coordinates. Disposal is not permitted if these requirements cannot be met due to weather or sea conditions. In that regard, special attention needs to be given to predicted conditions prior to departing for the disposal site.
- USEPA and the USACE-NAE (and/or their designated representatives) reserve all rights under applicable law to free and unlimited access to and/or inspection of (through permit conditions): 1) the dredging project site including the dredge plant, the towing vessel and scow at any time during the course of the project; 2) any and all records, including logs, reports, memoranda, notes, etc., pertaining to a specific dredging project (federal or non-federal); 3) towing, survey monitoring, and navigation equipment. An example of a scow log is provided in Attachment B.
- If dredged material regulated by a specific permit issued by the USACE or federal authorization is released (due to an emergency situation to safeguard life or property at sea) in locations or in a manner not in accordance with the terms or conditions of the permit or authorization, the master/operator of the towing vessel and/or the Disposal Inspector shall immediately notify the USACE-NAE of the incident, as required by permit. The USACE-NAE shall copy USEPA on such notification no later than the next business day. In addition, both the towing contractor and the USACE-certified disposal inspector shall make a full report of the incident to the USACE-NAE and USEPA within ten days.

3.2 Modifications to the Management Plan

Based on the findings of the monitoring program, modifications to the site use may be required. Corrective measures such as those listed below, but not limited to, will be developed by USEPA and the USACE-NAE.

- Stricter definition and enforcement of disposal permit conditions;
- Implementation of more conservative evaluation procedures on whether sediments proposed for dredging are suitable for open-water disposal;
- Implementation of special management practices to prevent any additional loss of contaminants to the surrounding area;
- Excavation and removal of any unacceptable sediments from the disposal site (an unlikely, worst-case scenario given that the permitting program should exclude such material from the site to begin with, and since excavation could make matters worse by releasing contaminants during the process);

- Closure of the site as an available dredged material disposal area (*i.e.*, to prevent any additional disposal at the site);
- Use of marine mammal observers during disposal operations;
- Establishment of dredging windows; and
- Compliance with EFH under the Magnuson Stevens Act and Endangered Species Act (ESA) concerns.

In addition to management practices for the disposal site and for individual projects, a SMMP must also include a monitoring plan (see Section 6.0). Coordination and outreach should occur on both a regular and as needed basis and include state and federal agencies, scientific experts, and the public. To ensure communications are appropriate and timely, site management activities and monitoring findings will be communicated through a combination of scientific reports and peer-reviewed publications, participation in symposia, and public meetings and fact sheets.

4.0 BASELINE ASSESSMENT

MPRSA 102(c) (3)(A) as amended by WRDA 92 requires that the SMMP include a summary of baseline conditions at the site. Baseline conditions are reported in the Supplemental Environmental Impact Statement (SEIS) for the site designation (USEPA, 2016). This section provides a brief site description and overview of the ELDS; more detailed information is found in the SEIS and in monitoring data from USEPA, CTDEEP, and the Long Island Sound Study (LISS).

4.1 Site Characteristics

Much of the seafloor in eastern Long Island Sound consists of an east-west trending depression with depths ranging from 100 to 200 feet (30 to 60 m). The bottom topography is irregular due to submerged reefs and shoals, exposed bedrock, and scoured areas. Depressions in Long Island Sound formed as a result of erosion of sediment by tidal currents. Shoals are either areas of sediment deposition (such as the Mattituck Sill), or glacial deposits of rocks and boulders.

The ELDS is located immediately adjacent to the NLDS. It is contained within an area referred to in the SEIS as Sites NL-Wa and NL-Wb, which have a combined surface area of 1.5 x 1 nmi. Two bedrock/boulder areas within Sites NL-Wa/b with a total surface area of 0.2 nmi^2 (0.7 km^2) were excluded, resulting in a surface area of 1.3 nmi^2 (4.5 km^2) for the ELDS (Figure 1).

The seafloor of most of Site NL-Wa (*i.e.,* eastern part of the ELDS) is flat, with water depths predominantly between 60 and 100 feet (18 and 30 m) except the southern boundary where depths reach approximately 120 feet (37 m). Predominant depths of Site NL-Wb (*i.e.,* western part of the ELDS) are similar to Site NL-Wa; the site is deepest (approximately 100 feet, or 30 m) at its

southern end adjacent to the southwestern bedrock area. Water depths in the north-central boulder area are shallower and more variable ranging mostly between 45 and 66 feet (14 to 20 m).

4.2 Physical Characteristics

The physical parameters that are important in evaluating the stability of a potential site for dredged material disposal include water elevations, bottom type, currents, waves, and the density structure of the water column, which were studied for the SEIS. Currents directly affect the transport and dispersion of sediment by imparting shear stress to the surface sediments and transporting suspended sediments.

Water Elevations

Long Island Sound in an unusual estuary in that it is connected to the ocean at both ends: at The Race in the east, and through the East River at the west. Because the East River channel is narrow, the tidal variations in water level in the Sound are forced by ocean level fluctuations that propagate through Block Island Sound to The Race. There are several important tidal oscillation periods, and the geometry of the Sound causes the semi-diurnal (approximately two cycles per day) fluctuations to amplify to the western end of the Sound. The largest tidal constituent increases from 1.9 feet (0.58 m) at Lake Montauk Harbor (on the eastern tip of Long Island) to 7.6 feet (2.3 m) at Kings Point, New York (in western Long Island Sound). The various tidal constituents combine to cause spring and neap tides that can raise or lower the level of high and low water, by 0.8 feet (0.25 m) at the Race and by 2 feet (0.61 m) at Kings Point.

Currents, Waves, and Velocity

The magnitude of the tidal currents also varies vertically throughout the water column with stronger currents occurring near the surface. Peak near-surface tidal currents through The Race are typically 3.9 ft/s (1.2 m/s) and can exceed 5.3 ft/s (1.6 m/s) during spring tides (USEPA, 2016). Westward from The Race, tidal current velocities decrease rapidly as Long Island Sound widens. Tidal currents in the western and central basins are typically 0.7 to 1.0 ft/s (0.2 to 0.3 m/s). Near-bottom currents are strongest in eastern Long Island Sound, with peak near-bottom velocities of 2.0 to 2.3 ft/s (0.6 to 0.7 m/s) during spring tides. Near-bottom currents weaken toward western Long Island Sound to only 0.7 ft/s (0.2 m/s).

As part of the physical oceanography study for the SEIS, significant wave heights were calculated from data at seven mooring stations during three seasons (Figure 2). Four mooring stations were located in eastern Long Island Sound (Stations 1, 2, 3, and 7) together with wave measurements at the CLIS buoy. Wave heights in the deeper waters of eastern Long Island Sound are homogenous compared to Block Island Sound where waves are larger and have longer periods. Mean significant wave heights in eastern Long Island Sound are largest in the winter, and maximum wave heights have reached 8 feet (2.5 m).

In recent years, the largest recorded wave heights in Long Island Sound occurred on August 28-30, 2011 (Tropical Storm Irene) and October 28-31, 2012 (Superstorm Sandy). The significant wave heights during these storms peaked at 13 feet (4 m) at the CLIS buoy. The longer wave periods during these unusual storms are important to sediment transport because the depth to which wave motions extend increases with the wave period. During winter storms the dominant wave periods reach up to 5 or 6 seconds (s) in Long Island Sound; during Tropical Storm Irene and Superstorm Sandy, longer wave periods were observed with values reaching 8 seconds (s) at the CLIS buoy.

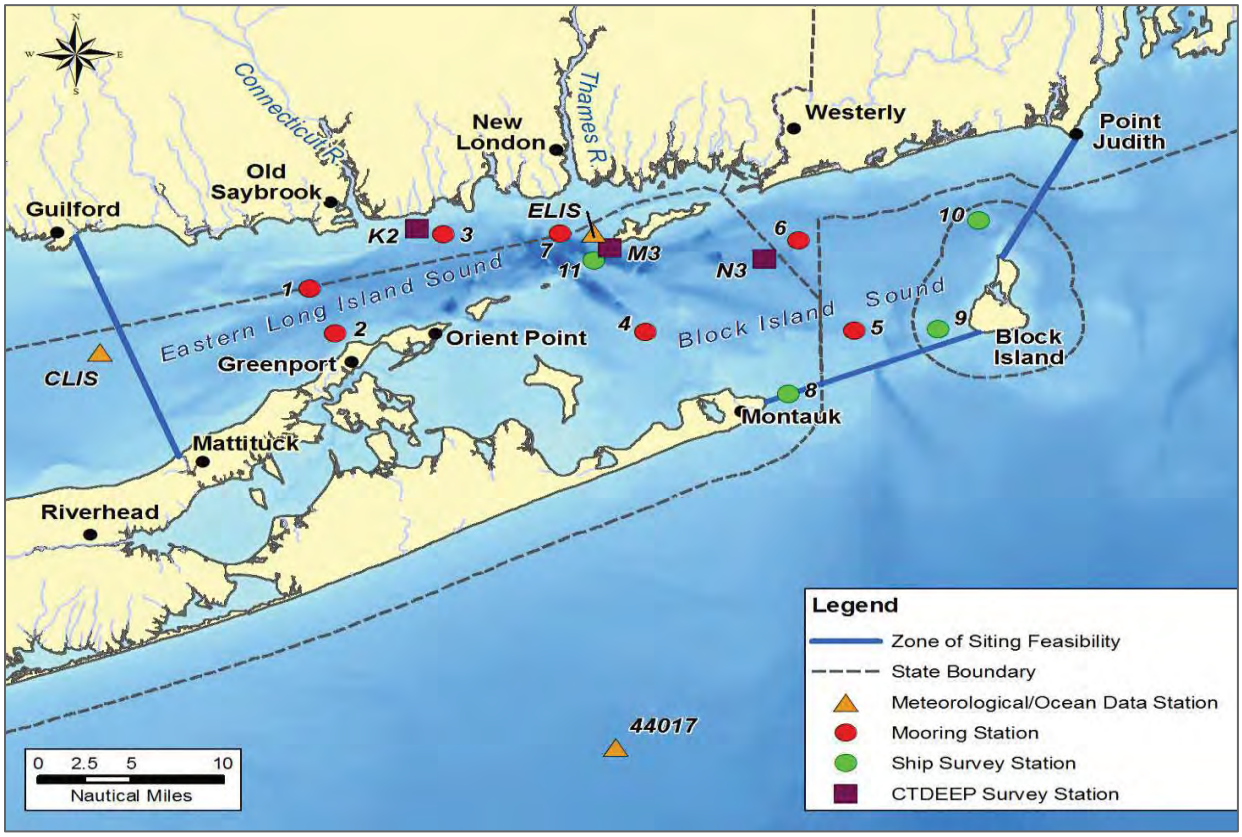

Figure 2. Locations of meteorological/ocean buoys, and mooring and ship survey stations (USEPA, 2016)

Over time, as currents move over a mound, hydraulic forces act on the sediment particles in the form of shear and lift. The response of the particles to these forces is determined by current speed, particle size, shape, density, and any friction or cohesion exerted by adjacent sediment grains.

As part of the physical oceanographic study, the bottom stress was simulated for conditions during Superstorm Sandy (October 28-31, 2012). The extreme value analysis for significant wave heights for summer-fall conditions suggests that this wave height would occur once every 30

years. The maximum sustained (15-minute average) wind speed of 46 knots (23.6 m/s) occurred on October 29, 2012 during Superstorm Sandy.

Stability of dredged material at the sites was assessed using the University of Connecticut's FVCOM model (see Chapter 4.5 of the SEIS) to assess the shear stress on the bottom of the ELDS. The maximum bottom stress values during 2013 were below 0.75 Pascal (Pa) for the ELDS; the maximum bottom stress in the excluded bedrock/boulder area adjacent to the southwestern boundary of the ELDS was calculated with 0.76 Pa. The relatively low maximum bottom stresses at the ELDS are consistent with the observations made by the DAMOS program at the NLDS site which compared pre-storm and post-storm bathymetric surveys and concluded that there was little movement of the dredged sediments due to a major storm (SAIC, 2003). Low bottom stress is also consistent with the topography of the NLDS, which indicates that surface sediments are not reworked by storms and tidal currents (*e.g.*, SAIC, 2004; AECOM, 2009).

Climate change is likely to result in changes to the temperature, water level, and perhaps the salinity and wave climate in Long Island Sound. The magnitude of these changes are not expected to significantly modify the bottom stress magnitudes expected at the proposed disposal sites. Climate change is likely to result in increases in unexpected shoaling of sediments and coastal erosion. In addition, these storms may result in additional dredging needs which may also present opportunities for beneficial use of dredged material.

4.3 Sediment and Water Quality

Sediments were studied as part of three surveys for the SEIS: a 2015 sediment chemistry survey, a 2013 benthic survey, and a 2014 Sediment profile imaging Plan-view survey (SPI/PV; see Sections 6.1 and 6.3 for more detailed descriptions).

Total organic carbon concentrations (TOC) in eastern Long Island Sound sediments in the area between Bartlett Reef and Mattituck Sill are lower than 0.5% in most areas. The mean TOC concentration (based on the 2013 and 2015 surveys) at the ELDS was measured at approximately 1.0% (Table 1). At the NLDS, located immediately to the east of the ELDS the TOC concentration was 2.4%, reflecting in part the disposed dredged material.

The predominant grain size at the ELDS is sand (Table 1). Sediments at the adjacent NLDS are on average finer-grained (due to the disposed dredged material). Specifically, at the ELDS, the mean sand content was measured at 83%. For comparison, the mean sand content at the NLDS was measured as 53%. The mean silt and clay content at the NLDS was 39%, which was 2.8 times higher than the mean silt and clay content at the ELDS (mean of 14%). The highest silt and clay content at all studied stations (*i.e.*, ELDS, NLDS, and offsite stations) was measured at 78% at a station in the NLDS that has received most of the dredged material in the previous decade (AECOM, 2009).

The predominant sediment grain size observed during the 2014 SPI/PV survey throughout most of the ELDS was a fine sand layer overlying silt and clay. These grain sizes were consistent with findings by a more extensive SPI/PV survey conducted in 2007 at the NLDS and at off-site reference stations (AECOM, 2009); they were also consistent with the findings of the 2015 sediment chemistry survey and 2013 benthic survey.

Table 1. Mean Grain Size and TOC Content in Sediment

Site	2015 Sediment Chemistry Survey				2013 Benthic Survey				2014 SPI/PV Survey
	Gravel	Sand	Silt and Clay	Total Organic Carbon	Gravel	Sand	Silt and Clay	Total Organic Carbon	Predominant Grain Size
	Percent				Percent				
ELDS									
NL-Wa	2.2	85.2	12.6	0.5	6.3	79.7	14.0	1.3	Fine sand overlying silt and
NL-Wb	2.2	82.9	15.0	1.0	n/a				Fine sand
Off-site of ELDS									
NLDS	9.4	54.7	35.9	1.7	7.3	50.6	42.1	3.0	Fine sand, overlying silt+clay
Off-site – east of NLDS	0.4	71.8	27.8	0.4	n/a				Very fine sand

Source: USEPA, 2016

Metals, polycyclic aromatic hydrocarbon (PAH), pesticide, and polychlorinated biphenyl (PCB) concentrations were tested during the 2015 sediment chemistry survey (USEPA, 2016). Most concentrations were below the National Oceanic and Atmospheric Administration [NOAA] Effects Range-Low [ERL]; none of the concentrations exceeded the Effects Range-Median [ERM] values.

In order to be determined as suitable for disposal at ELDS, sediment must meet chemical and biological criteria that are defined as protective of water quality. In addition, screening level modeling is performed to further evaluate the potential for water column effects as part of the suitability determination. Given this level of testing, the SMMP does not require specific water column monitoring at the ELDS. Rather, it relies on the National Estuary Program's LISS routine measurements; if issues are identified by this monitoring that indicate a potential relationship to ELDS, then a monitoring plan will be developed consistent with LISS methodologies.

The mean salinity at the ELDS is 30 psu, with monthly mean salinities ranging between approximately 27 and 31 psu (USEPA, 2016). During the physical oceanography study for the SEIS, the highest near-bottom salinity in Long Island Sound occurred consistently near The Race due to the inflow of more saline waters from Block Island Sound. Salinities are slightly lower further west in Long Island Sound due to inflow of freshwater from rivers, particularly the large Connecticut River.

Monthly mean water temperatures at the ELDS vary from approximately 4 to 20ºC with highest temperatures occurring in September and lowest temperatures occurring in March. Water entering from Block Island Sound is slightly cooler than water in Long Island Sound throughout the summer. The southern side of the Long Island Sound had the warmest bottom temperatures in the summer during the physical oceanography study.

The water column in Long Island Sound is well-mixed from fall through late spring, but increased freshwater runoff and increasing water temperatures cause buoyant, warmer water to become layered over more dense, colder water during the summer and early fall. Hypoxic events, prevalent in the summer in the western and central Long Island Sound, do not extend to eastern Long Island Sound. Contaminants analyzed in the water column at the Cornfield Shoals and the Central Long Island Sound sites (CSDS and CLIS, respectively) showed either low concentrations or were not detected.

The circulation pattern in the eastern basin of Long Island Sound ensures that the water is rapidly mixed in both the horizontal and vertical dimensions. Consequently, measurements of water quality parameters (such as salinity, temperature, turbidity, dissolved oxygen) show only subtle variations. The short-term variability and seasonal cycles in runoff and biological productivity are much more substantial factors that affect the water quality in eastern Long Island Sound.

4.4 Bioaccumulation

Project data do not exist for the ELDS, therefore, previous studies were reviewed including clam, worm, and lobster tissue at the NLDS site (USEPA and USACE, 2004a). Most recently, four dredging projects with bioaccumulation data were examined as part of the site designation. Data included worm *(Nereis virens)* and clam *(Macoma nasuta)* bioaccumulation testing and comparisons to risk-based tissue concentrations. The projects evaluated included the Americas Styrenics project (2014), US Coast Guard Academy (2013), Patchogue River Federal Navigation Project (2011), and the North Cove Federal Navigation Project (2003). For all projects no bioaccumulation tissue exceeded FDA Action/Tolerance Levels for protection of human health. In addition, risk model results did not exceed risk values for carcinogenic and non-carcinogenic risks from exposure through the food chain (USEPA, 2016).

4.5 Living Resources

Zooplankton include metazooplankton (organisms larger than 200 micrometers [µm]) and microzooplankton (organisms between 35 and 200 µm in size). Overall, the seasonal patterns in metazooplankton abundances and species composition over the last 60 years seem to be relatively unchanged in Long Island Sound. Specifically, peak abundances during the periods 1952-1953, 2002-2004, and 2008-2009 occurred between April and June of each year; minimum abundances occurred between December and February.

Routinely reported taxa have included the following: Arthropoda (copepods, mysids, crab larvae, amphipods, barnacle nauplii, and cladocerans); Annelida (polychaete larvae); Mollusca (gastropod and bivalve larvae); Echinodermata (sea star larvae); Chordata (*Oikopleura* sp.); Bryozoa; and Chaetognatha (*e.g.*, the arrow worm, *Sagitta elegans*). Copepods accounted for 80 to 90% of the abundances. The seasonal metazooplankton cycles are dominated by the copepods *Acartia hudsonica, Temora longicornis,* and *Pseudocalanus* sp. in winter and spring, and by the copepods *Acartia tonsa, Paracalanus crassirostris,* and *Oithona similis* in the summer and fall.

As for phytoplankton, there is a distinct decreasing gradient in mesozooplankton biomass and abundances from west to east in Long Island Sound. Based on 2002 to 2009 data from the CTDEEP zooplankton monitoring program, the mean annual total mesozooplankton abundance is 4 and 3 times higher in western and central Long Island Sound, respectively, compared to eastern Long Island Sound.

<u>Benthic Community</u>

The benthic community within the ELDS (*i.e.*, Site NL-Wa, Site NL-Wb) and its vicinity (*i.e.,* NLDS, off-site of the NLDS) is primarily made up of the three major taxonomic groups: Annelida, Arthropoda, and Mollusca (USEPA, 2016).

The SPI/PV survey assessed successional stages of the organisms living in the sediment (referred to as 'infauna'). Current theory holds that organism-sediment interactions in fine-grained sediments follow a predictable sequence of development after a major disturbance such as dredged material disposal. This sequence has been subjectively divided into three successional stages (Rhoads and Germano, 1986). A successional stage is assigned by assessing which types of species or organisms-related activities are apparent in a SPI image. Stage I is the initial stage of colonization. Stage III is the most developed stage with a mature community of deposit-feeding infauna.

All of the stations assessed during the 2014 SPI/PV survey at the ELDS and its vicinity were classified as Stage III succession except for the two westernmost stations at Site NL-Wa. Sediments at the NLDS were heavily bioturbated with numerous burrows and evidence of subsurface feeding. The stations were classified as either Stage I on III, Stage II on III, or Stage

III. Stations at NL-Wb exhibited Stage II succession with a fairly dense shell layer. The shell lag and pebbles on the substrate had encrusting and attached epifauna on them suggesting a fairly stable substrate. The apparent redox potential discontinuity (aRPD) depth, a measure of oxygenation in the sediment, at the NLDS ranged from 1.9 to 4.7 cm with a mean of 3.1 cm, indicating good habitat quality. At Site NL-Wa, the aRPDs were at least 2.8 cm at the various stations, also indicating good habitat quality. Conditions were similar at Site WL-Wb; sediments from all four stations were bioturbated with some evidence of subsurface feeding, and the shell lag and pebbles also had encrusting and attached epifauna, suggesting a fairly stable substrate. Reference stations located 1.5 nmi (2.8 km) to the east from the NLDS (*i.e.,* DAMOS monitoring Stations NLON-REF) had evidence of two polychaetes typical of Stage III succession. These organisms were *Saccoglossus kowaleswski* as evidenced by its distinctive fecal coil on the surface, and *Chaetopterus variopedatus* as evidenced by its thick parchment tube in the sediment through which it pumps water. The aRPD at DAMOS monitoring Stations NE-REF (located 0.4 nmi [0.7 km] to the east of the NLDS) ranged from 2.5 to 6.8 cm with a mean of 4.6 cm. At Stations NLON-REF, the aRPD ranged from 2.2 to 4.6 cm with a mean of 3.6 cm. These depths are indications of good habitat quality (USEPA, 2016).

Additional surveys of mounds at the NLDS have shown that the benthic community readily recolonizes, with Stage I/II communities well established as soon as eight months after a disposal event and with historic mounds showing Stage III communities. Surveys also show that benthic communities are similar to those found at off-site reference stations (USEPA, 2016).

Other measure of benthic conditions are the ecological parameters abundance (*i.e.,* total individuals), species richness, diversity, and Pielou's Evenness (*i.e.,* a measure of the distribution of the abundance of the organisms in a sample among the species in that sample). These ecological parameters determined during the 2013 benthic survey indicate that, overall, both Site NL-Wa and the NLDS had relatively good species diversity and were not dominated by just a few species (Table 2). The data from within the NLDS and Site NL-Wa were consistent with observations at locations off-site of the NLDS, although the species richness was slightly lower at off-site stations (USEPA, 2016).

Commercial/Recreational Fish and Shellfish Resources

Long Island Sound, a semi-enclosed estuary, is an important economic resource for both commercial and recreational/sport fishermen. The region is occupied by more than 105 fish species; however, only a few of them are considered year-round residents (Gottschall et al., 2000). Most finfish species such as scup, bluefish, and striped bass migrate through the area in response to seasonal variations in water temperature, salinity, and access to spawning and nursery grounds in Long Island Sound.

Table 2. Ecological Parameters of Benthic Infauna (2013 Benthic Survey)

Site	No. of Samples	Statistics	Total Individuals	Species Richness	Diversity Index	Pielou's Evenness
ELDS						
NL-Wa	11	Minimum	187	33	1.32	0.38
		Maximum	703	91	3.46	0.85
		Mean	**399**		**2.76**	**0.69**
		Total Species Richness		**172**		
Off-site of ELDS						
NLDS	8	Minimum	259	60	2.84	0.68
		Maximum	875	100	3.80	0.83
		Mean	**615**		**3.30**	**0.75**
		Total Species Richness		**208**		
Off-site of NLDS	6	Minimum	59	21	2.33	0.53
		Maximum	1,874	78	3.23	0.88
		Mean	**762**		**2.83**	**0.71**
		Total Species Richness		**154**		

Source: USEPA, 2016

Finfish abundance and distribution show several patterns. The overall abundance of finfishes and the species diversity has remained fairly stable since 1984 (USEPA, 2016). However, western and central Long Island Sound have shown significantly higher abundances compared to eastern Long Island Sound, based on CTDEEP data from 1984 to 2012 (Figure 3). This is likely a result of more extensive mud habitat in western and central Long Island Sound that supports greater fish densities (USEPA and USACE, 2004a). Particularly, the shallow mud and transitional substrates adjacent to the western and central basins in Long Island Sound have the highest average catch per unit effort (CPUE).

In 2013, trawl data were collected in eastern Long Island Sound. The most abundant finfish species present in the vicinity of the ELDS was scup (59% of species caught); scup also had the greatest biomass (55% of species caught). There was no significant difference between the abundance or CPUE near and off of the various sites surveyed for this site designation in eastern Long Island Sound for species of interest identified, namely scup, winter flounder, striped bass, bluefish, windowpane flounder, and striped sea robin (Table 3).

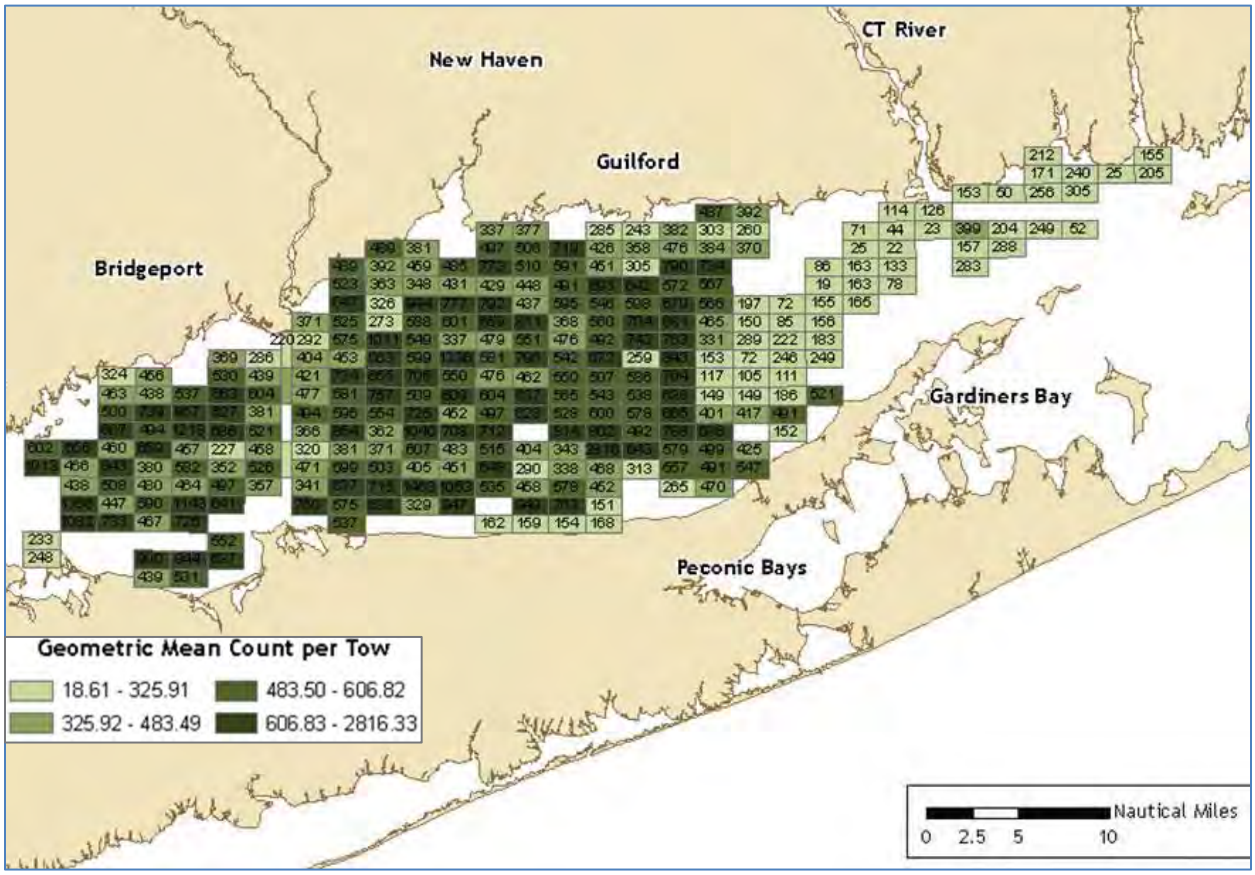

Figure 3. Mean finfish abundance per tow by location during the CTDEEP Long Island Sound Trawl Surveys, 1984-2012 (Source: CTDEEP, unpublished data, August 2013).

Table 3. Average Catch per Unit Effort for Finfish Species of Interest in Eastern Long Island Sound

Species of Interest		Average Catch per Unit Effort (CPUE)		P-value
		Near-site ELDS vicinity	Off-site (West)	
Primary	Scup	8.19	7.40	0.919
	Winter flounder	0.18	0.29	0.530
	Striped bass	0.02	0.01	0.519
	Bluefish	0.01	0.00	0.374
Secondary	Windowpane flounder	0.12	0.86	0.309
	Striped sea robin	0.02	0.07	0.329

Source: USEPA, 2016

Important commercial or recreational bivalve mollusk resources within Long Island Sound include the bay scallop (*Argopecten irradians*), eastern oyster (*Crassostrea virginica*), northern quahog/hard clam (*Mercenaria mercenaria*), softshell clam (*Mya arenaria*), and surf clam (*Spisula solidissima*). Lobster *(Homarus americanus),* longfin squid *(Loligo pealeii)*, horseshoe crab *(Limulus polyphemus),* channeled whelk *(Busycon canaliculatum),* and knobbed whelk *(Busycon carica)*. With the exception of lobster and longfin squid, commercially and recreationally important shellfish resources of Long Island Sound occur in shallow nearshore waters.

Based on the CTDEEP data, lobsters, which were most abundant on muddy substrate, occurred Sound-wide in all seasons prior to 1999, particularly in western and central Long Island Sound. Since then, much of the remnant lobster population has been concentrated in deeper waters of central Long Island Sound and the Race (USEPA, 2016).

Endangered and Threatened Species and Species of Special Concern

An endangered species is one whose overall survival in a particular region or locality is in jeopardy as a result of loss or change in habitat, overall exploitation by man, predation, adverse interspecies competition, or disease. Unless an endangered species receives protective assistance, extinction may occur. Threatened or rare species are those with populations that have become notably decreased because of the development of any number of limiting factors leading to a deterioration of the environment. A species may also be considered as a species of "special concern." These may be any native species for which a welfare concern or risk of endangerment has been documented within a state. Endangered and threatened species are protected under the federal Endangered Species Act, 16 U.S.C. §§ 1531 et seq. and under state law while species listed as "special concern" are protected only by state law.

Endangered and threatened species and species of special concern are discussed in more detail below for mammals, reptiles, fish, and birds. Individual federally listed species and species listed for the States of Connecticut and New York are presented in Table 4.

- ***Marine Mammals:*** Six endangered marine mammals and one species of special concern were identified for the SEIS study area. In general, whales and other marine mammals are not frequently observed in Long Island Sound; however, incidental sightings have resulted in the inclusion of several species on the endangered species list for Connecticut and New York (USEPA, 2016). Marine mammals are not expected to spend significant portions of time within the ELDS and adverse impacts to mammals are not likely to occur.

Table 4. Marine and Coastal Endangered and Threatened Species and Species of Special Concern in Long Island Sound

Common Name	Scientific Name	Status		
		Federal	CT	NY
Marine Mammals				
Blue whale	*Balaenoptera musculus*	E		E
Finback whale	*Balaenoptera physalus*	E		E
Humpback whale	*Megaptera novaeangliae*	E		E
North Atlantic right whale	*Megaptera novaeangliae*	E		E
Sei whale	*Balaenoptera borealis*	E		E
Sperm whale	*Physeter catodon*	E		E
Harbor porpoise	*Phocoena*		SC	SC
Marine Reptiles				
Green sea turtle	*Chelonia mydas*	T	T	T
Hawksbill sea turtle	*Eretmochelys imbricata*	E		E
Kemp's Ridley sea turtle	*Lepidochelys kempii*	E	E	E
Leatherback sea turtle	*Dermochelys coriacea*	E	E	E
Loggerhead sea turtle	*Caretta*	T	T	T
Finfish				
Atlantic seasnail	*Liparis atlanticus*		SC	
Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*	E	E	
Blueback herring	*Alosa aestivalis*		SC	
Radiated shanny	*Ulvaria subbifurcata*		SC	
Sand tiger shark	*Carcharias taurus*		SC	
Shortnose sturgeon	*Acipenser brevirostrum*	E	E	E
Birds				
Alder flycatcher	*Empidonax alnorum*		SC	
American bittern	*Botaurus lentiginosus*		E	SC
American oystercatcher	*Haematopus palliatus*		T	
Bald eagle	*Haliaeetus leucocephalus*		T	T
Black rail	*Laterallus jamaicensis*			E
Black skimmer	*Rynchops niger*			SC
Common loon	*Gavia immer*		SC	SC
Common moorhen	*Gallinula chloropus*		E	
Common nighthawk	*Chordeiles minor*		E	SC
Common tern	*Sterna hirundo*		SC	T
Glossy ibis	*Plegadis falcinellus*		SC	
Grasshopper sparrow	*Ammodramus savannarum*		E	SC
Great egret	*Ardea alba*		T	

Table 4. Marine and Coastal Endangered and Threatened Species and Species of Special Concern in Long Island Sound

Common Name	Scientific Name	Status		
		Federal	CT	NY
Horned lark	*Eremophila alpestris*			SC
King rail	*Rallus elegans*		E	T
Least bittern	*Ixobrychus exilis*		T	T
Least tern	*Sternula antillarum*		T	T
Little blue heron	*Egretta caerulea*		SC	
Northern goshawk	*Accipiter gentilis*		T	SC
Northern harrier	*Circus cyaneus*		T	T
Osprey	*Pandion haliaetus*			SC
Peregrine falcon	*Falco peregrinus*		T	E
Pied-billed grebe	*Podilymbus podiceps*		E	T
Piping plover	*Charadrius melodus*	T	T	E
Red knot	*Calidris canutus rufa*	T		
Roseate tern	*Sterna dougallii*	E	E	E
Saltmarsh sharp-tailed	*Ammodramus caudacutus*		SC	
Seaside sparrow	*Ammodramus maritimus*		T	SC
Snowy egret	*Egretta thula*		T	
Upland sandpiper	*Bartramia longicauda*		E	T
Whip-poor-will	*Caprimulgus vociferous*		SC	SC
Yellow-breasted chat	*Icteria virens*		E	SC
Yellow-crowned night heron	*Nyctanassa violacea*		SC	

Endangered; T = Threatened; SC = Species of Special Concern

Sources: CTDEEP (2015a,b); NYSDEC (2015); USFWS (2015a,b,c,d,e)

- ***Reptiles:*** Sea turtles are the only endangered reptiles noted in the Long Island Sound area. Sea turtles are highly migratory and are often found throughout the world's oceans (NOAA, 1995). Five species of sea turtles as possibly being found in the waters of Long Island Sound. Use of Long Island Sound by turtles appears to be related to the availability of prey, annual migration patterns, and age. The coastal waters of New York provide an important habitat for juvenile Kemp's ridley, green, and loggerhead turtles and adult-sized leatherbacks. Hawksbill turtles are only an incidental visitor to Long Island Sound, therefore Long Island Sound is not considered important habitat to the Hawksbill turtle.

- ***Finfish:*** Two federally listed fish may be located in Long Island Sound, the shortnose sturgeon *(Acipenser brevirostrum)* and the Atlantic sturgeon *(Acipenser oxyrinchus oxyrinchus)*. The shortnose sturgeon is also listed as endangered in both the States of Connecticut and New York. The Atlantic sturgeon is also listed as endangered for the

State of Connecticut. Sturgeon are not expected to be impacted by disposal activities at ELDS as they are highly mobile species.

Shortnose sturgeon occur in the lower Connecticut River from the Holyoke Pool to Long Island Sound. Unlike other anadromous species such as salmon and shad, shortnose sturgeon do not appear to make long-distance offshore migrations. It can be inferred that shortnose sturgeon utilizes portions of Long Island Sound since it is known to spawn in the Connecticut River. Shortnose sturgeon have not been observed in Long Island Sound during CTDEEP trawls since 1984.

Atlantic sturgeon is an anadromous species that lives up to 60 years, reaching lengths up to 14 feet (4 m) and weighing over 800 pounds (363 kilograms). Long Island Sound may be an important feeding or resting area on-the-way to and from spawning areas in the Hudson River because all sizes of Atlantic sturgeon have been seen or captured in the Sound. Atlantic sturgeon have been reported throughout Long Island Sound, but would most likely occur in transit during spawning migrations (CTDEEP, 2015b).

In addition, there are four finfish species of special concern. These include the blueback herring *(Alosa aestivalis),* sand tiger shark *(Carcharias taurus)*, radiated shanny *(Ulvaria subbifurcata),* and Atlantic seasnail *(Liparis atlanticus).*

- ***Birds:*** Long Island Sound is utilized by a wide diversity of marine and coastal birds including both migratory and resident species. Open-water bird species found in Long Island Sound include waterfowl, colonial water birds, and pelagic species. Shorebirds and raptors may occasionally use open-water habitats for foraging or as fly-over during migrations, but are not likely to be present in offshore waters. Thirty-three endangered, threatened, or special status coastal and marine bird species are known to occur in coastal counties of New York and Connecticut and may occur within Long Island Sound. Waterfowl, raptors, and some colonial water bird species may occasionally use the open waters of Long Island Sound for foraging or flyover, but none of the listed species are likely to be present at the ELDS.

As part of the SEIS preparation, USEPA coordinated with USFWS, NMFS, and the States of Connecticut, New York, and Rhode Island. By letters dated August 12, 2016 and August 11, 2016, both NMFS and USFWS, respectively, concurred with USEPA's determination for designating ELDS as a dredged material disposal site and indicated no further consultation under Section 7 of the ESA was required for species under their jurisdictions.

Essential Fish Habitat

In eastern Long Island Sound, EFH has been designated for 38 managed species (species with active federal fisheries management plans (FMPs). Fifteen of these species have designated EFH within the vicinity of eastern Long Island Sound. The data were compiled from the NOAA's Guide to Essential Fish Habitat Designations in the Northeastern United States (NOAA, 2016). This guide summarizes EFH designated by species and life stage for that species (*i.e.*, eggs, larvae, juveniles, and adults) in 10-minute by 10-minute squares of latitude and longitude. The ELDS site is located within square #41107200 (Figure 4).

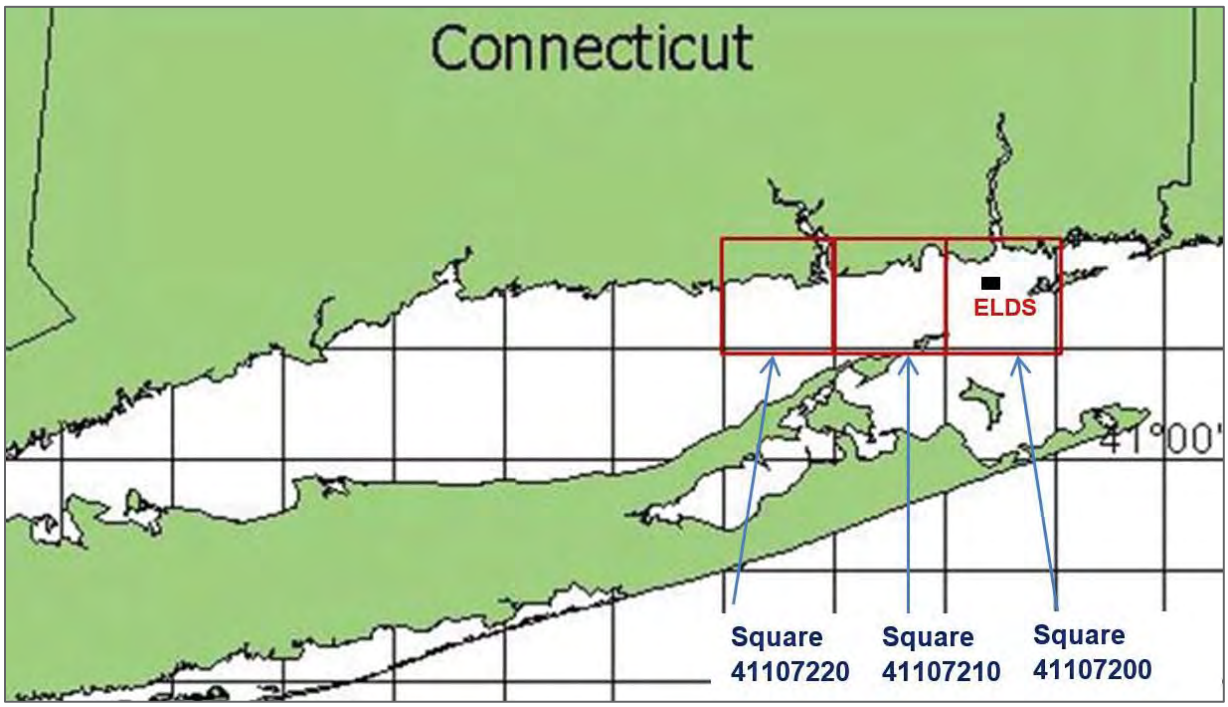

Figure 4. NOAA Fisheries 10 x 10 minute EFH squares (NOAA, 2016).

Within the square that contains the ELDS, EFH has been designated for nine species: Atlantic salmon *(Salmo salar)* (juveniles and adults), Atlantic sea herring *(Clupea harengus)* (adults), bluefish *(Pomatomus saltatrix)* (juveniles and adults), cobia *(Rachycentron canadum)* (all life stages), dusky shark *(Carcharhinus obscurus)* (juveniles), king mackerel *(Scomberomorus cavalla)* (all life stages), red hake *(Urophycis chuss)* (adults), sand tiger shark *(Carcharias taurus)* (larvae), and Spanish mackerel *(Scomberomorus maculatus)* (all life stages).

Impacts to EFH at the ELDS would be temporary and localized, with conditions quickly returning to baseline after each dredged material disposal event. Impacts to EFH would include temporary increases in turbidity, sedimentation, and nutrient availability, as well as a temporary decrease in prey abundance due to burial of benthic prey items, followed by a temporary increase in prey

abundance during site recolonization. Short-term adverse impacts are expected to be minimal. Additionally, monitoring under the DAMOS program has consistently demonstrated that the benthic communities readily recover after disposal events (*e.g.,* AECOM, 2009).

USEPA coordinated with NMFS. By letter dated August 12, 2016, NMFS concurred with USEPA's determination that designating the ELDS as a dredged material disposal site would result in no more than minimal adverse impacts on EFH.

4.6 Cultural Resources

USEPA has consulted with the tribes and CT State Historic Preservation Office. There is one documented submerged wreck within the ELDS area 0.1 nmi west of the NLDS at 41°15.936'N, 72°05.292'W (USEPA, 2016). This wreck is an unknown vessel in 59 feet (18 m) of water and has been classified by NOAA as "submerged/dangerous." No other information regarding this wreck (*e.g.*, age, vessel type) is available. This wreck is recorded in multiple databases. A 164 foot (50 m) foot buffer will be maintained to avoid disposal on top of and in the immediate vicinity of the wreck.

4.7 Site Capacity

The water volume below 59 feet (18 m) at the ELDS is approximately 24 million cy (18 million m^3). After considering slopes of the disposal site, the estimated capacity of the ELDS is 20 million cy (15 million m^3). Disposal has occurred at the NLDS immediately adjacent to the eastern boundary of the ELDS site.

5.0 DISPOSAL HISTORY

The ELDS is located immediately to the west of the NLDS. The ELDS will receive dredged material from federal navigation projects from harbors and channels of dredging centers in eastern Long Island Sound, with numerous smaller harbors in Connecticut and New York contributing to the total disposal volumes.

The USACE keeps a continuous record of use of any disposal site in Long Island Sound (Table 5). At the NLDS, a total of 3.4 million cy (2.6 million m^3) of dredged material has been disposed between 1984 and 2015, although disposal of dredged material in the vicinity of the NLDS likely dates back to at least 1955. The largest volume of material disposed at the NLDS has originated from maintenance and improvement of the U.S. Navy facility in New London, but usage also includes a number of smaller private projects.

Dredged material at the NLDS has been disposed at distinct mounds and managed to maximize site capacity and containment of material. These mounds have been monitored individually through the USACE DAMOS program to assess stability, thickness of dredged material, and

benthic recolonization status relative to previous survey results and in comparison to nearby reference areas.

Table 5. Disposal Volume at the New London Disposal Site (NLDS)

Year	Reported Disposal Volume (cubic yards)		Year	Reported Disposal Volume (cubic yards)
1984 Total	223,689		2000 Total	5,300
1985 Total	374,154		2001 Total	1,995
1986 Total	193,500		2002 Total	11,425
1987 Total	171,245		2003 Total	4,450
1988 Total	91,850		2004 Total	8,000
1989 Total	41,800		2005 Total	8,700
1990 Total	126,222		2006 Total	382,135
1991 Total	65,262		2007 Total	No disposal
1992 Total	79,320		2008 Total	No disposal
1993 Total	21,930		2009 Total	No disposal
1994 Total	7,650		2009-10	3,318
1995 Total	847,325		2010-11	No disposal
1996 Total	504,400		2011-12	No disposal
1997 Total	12,325		2012-13	19,142
1998 Total	7,300		2013-14	No disposal
1999 Total	23,250		2014-15	180,676
Total Volume (1984 to 2015):		**3,416,363**		

Source: USACE, DAMOS program

6.0 MONITORING PROGRAM

The USACE-NAE and USEPA will share responsibility for monitoring of the ELDS site. In addition, monitoring data may be generated by the agencies or through coordination or use of data gathered under other programs. Monitoring data from other agencies (*e.g.*, CTDEEP Trawl Surveys and LISS programs) will be utilized as appropriate to maximize the availability of information at the ELDS.

USEPA has the responsibility for determining that an unacceptable impact has occurred as a result of dredged material disposal at ELDS. However, such determinations will be made in consultation with other agencies and be based on available monitoring data. The data gathered from the monitoring program will be routinely evaluated by USEPA, the USACE-NAE, and other agencies such as the NMFS, USFWS, and state regulatory agencies. USEPA is responsible for determining any modification to site use or de-designation.

6.1 Monitoring Methods

Monitoring surveys at ELDS fall into two general categories: confirmatory studies and focused studies. Confirmatory studies are designed to test hypotheses related to expected physical and ecological response patterns following disposal of dredged material on the seafloor at the active or recently active target locations within ELDS. The data collected and evaluated during these studies provide answers to strategic management questions in determining the next step in the site management process. Focused studies are periodically undertaken within the monitoring program to follow up on any unexpected results from a confirmatory survey (such as slower than expected recolonization following cessation of disposal at a given target location) or to evaluate inactive or historical disposal areas within the site (such as following the passage of a large storm).

The primary monitoring tools for confirmatory surveys are collection of acoustic and imaging data. Acoustic surveys include the collection of bathymetric, backscatter, and side-scan data. The bathymetric data provide measurements of water depth that, when processed, can be used to map the seafloor topography. The mapped data are used to track changes in the size and location of seafloor features. Backscatter and side-scan sonar data provide images that support characterization of surficial topography, sediment texture, and roughness. Backscatter data can be processed into a seamless image with corrections for topography while side-scan sonar data retain a higher resolution image without correction for topography. The comparison of synoptic acoustic data types has the greatest utility for assessment of dredged material disposal.

Sediment-profile imaging (SPI) is a monitoring technique used to provide data on the physical characteristics of the seafloor as well as the status of the benthic biological community. The technique involves deploying an underwater camera system to photograph a cross section of the sediment-water interface. SPI is coupled with a plan-view (PV) camera system to provide imaging of a larger area of the seafloor to aid characterization of the benthic biological community.

In addition to the above techniques, focused surveys may include any of the following:

- Collection of sediment or water samples for laboratory analysis;
- Remotely operated vehicle surveys with camera and sampling capabilities; and
- Additional remote sensing techniques such as sub-bottom profiling

Specifics on monitoring techniques and data processing and analysis can be found in the most recent DAMOS contribution for the NLDS (Carey and Bellagamba Fucile, 2015).

6.2 Material Movement

The following potential effects (as defined in 40 C.F.R. 228.10) are discussed in this section:

- Movement of materials into estuaries or marine sanctuaries or onto oceanfront beaches or shorelines.
- Movement of materials toward productive fishery or shellfishery areas.

The site designation specifies that ELDS is a containment (non-dispersive site); therefore substantive movement of materials out of the site is not expected. Loss of mound material could mean that the material is being lost inappropriately and may potentially impact areas outside of the site.

Bathymetric baseline data for new or modified mounds will be collected after one year of consolidation. Bathymetric surveys of mounds (historic and recently completed) and the entire site will also be performed periodically. Information on mound size and height will be compared with previous data to determine if loss of material has occurred and reported in DAMOS reports and available on the USACE website.

Data from the sediment erosion modeling conducted during the site designation process suggest the location of the ELDS is optimal for mound stability.

Bathymetry will be used to define substantive changes in bathymetry and topography (greater than 0.5 foot [15 cm]). Sediment profile imagery may also be used to evaluate changes in sediment characteristics. The sediment profile imagery can be used to observe layers of material too thin to detect by precision bathymetric methods and can also be used to evaluate if the benthic community in the sediments has been disturbed or is under stress relative to the reference sites. Comparison of sediment profile imagery data from areas of concern to reference areas will be used to determine whether the transported material has a potentially significant adverse biological effect (since it will be assessing benthic community health).

Changes in bathymetry across the mound of more than 0.5 foot (15 cm) or development of large areas of predominately muddy sediments not previously documented may be an indication of substantial transport of material from the site. If such changes are documented, Tier 3 characterization of sediment quality or further characterization of benthic communities may be required. At the NLDS, which has received dredged material, monitoring shows no evidence of substantial movement of materials from the NLDS to adjacent areas. This determination is based on periodic bathymetric surveys of the NLDS that provide a means of comparison of depth changes in the disposal site.

The frequency of monitoring at a given site is driven by the amount of material disposed at the site as well as previous findings and other relevant factors such as the passage of a large storm or

reported issues in the area (Attachment B). Four bathymetric surveys and other monitoring activities were completed at NLDS since 2000 (Table 6). These surveys included a focused survey in 2002 following the passage of a large coastal storm. Although Fishers Island shelters the NLDS from long-fetch easterly and southeasterly winds, it is exposed to the west and southwest. As the October 2002 storm center tracked to the west of the NLDS, a significant southwesterly wind pattern developed. The bathymetric survey performed soon after this storm identified no large-scale changes in the topography of the seafloor at NLDS. The imaging survey did identify the presence of a shell lag deposit at some locations, indicative of small-scale winnowing of the surface sediments. However, the occurrence of advanced successional species, well-developed apparent redox potential discontinuity (aRPD) depths, and the presence of numerous biogenic surface features (*e.g.,* worm tubes, burrows) over the shallower portions of the site provided evidence that there was minimal disturbance of surficial sediment.

Table 6. DAMOS Survey Activities at NLDS since Year 2000

Survey Date	Purpose of Survey	Reference
October 2015	Characterization of the bathymetry and surficial sediment properties of the entire site using multibeam bathymetry	Battelle, data analysis in progress
September 2014	Characterization of the physical and biological conditions over NLDS and associated reference areas using sediment profile and plan view imaging	Carey and Bellagamba Fucile, 2015 (DAMOS Data Report 2015-01)
September 2010	Collection of cores to characterize the vertical distribution of material at a capped mound of dredged material at the site, including a comparison of laboratory analytical methodologies	AECOM, 2012 (DAMOS Contribution No. 189)
June-July 2006	Performance of multibeam bathymetry, imaging, benthic sampling, and coring to assess the recovery and stability of a capped mound at the site	AECOM, 2010 (DAMOS Contribution No. 182)
October 2002	Performance of single beam bathymetry, imaging, and side-scan sonar to evaluate the stability of deposits at NLDS following passage of a large coastal storm	SAIC, 2003 (DAMOS Contribution No. 149)
June 2001	Collections of cores and sediment grabs and performance of imaging to assess the recovery and stability of a capped mound at the site	SAIC, 2004 (DAMOS Contribution No. 152)
August 2000	Performance of single beam bathymetry and imaging survey over the entire site to assess stability and biological recovery of disposal mounds at the site	SAIC, 2001 (DAMOS Contribution No. 133)

6.3 Biological Characteristics

The following potential effects (as defined in 40 C.F.R. 228.10) are discussed in this section:

- Absence from the disposal site of pollution-sensitive biota characteristics of the general area;
- Progressive, non-seasonal, changes in composition or numbers of pelagic, demersal, or benthic biota at or near the disposal site when these changes can be attributed to the effects of materials disposed at the site; and
- Accumulation of material constituents (including without limitation, human pathogens) in marine biota at or near the site.

Overall, based on results from 2001, 2006, and 2014 surveys, the benthic community within the NLDS has recovered to the level of the reference sites. The recovery of a healthy benthic habitat coupled with the testing requirements for material disposed at the site indicate that bioaccumulation potential is not considered significant. This determination was made based on the following information:

As stated in Section 4.3, current theory holds that organism-sediment interactions in fine-grained sediments follow a predictable sequence of development after a major disturbance such as dredged material disposal (Carey and Bellagamba Fucile, 2015). This sequence has been subjectively divided into three successional stages (Rhoads and Germano, 1986). Successional stage is assigned by assessing which types of species or organisms-related activities are apparent in a SPI image. Stage III organisms, the most developed, are deposit-feeding infauna.

Therefore, SPI is a monitoring technique used to provide data on the physical characteristics of the seafloor as well as the status of the benthic biological community. The technique involves an underwater frame/camera system that can photograph a cross-section of the sediment-water interface. Analysis of the resulting images for a standard set of characteristics allows comparison between different locations and different surveys. The DAMOS Program has successfully used SPI for over 25 years. One of the main characteristics described in SPI data is the aRPD depth. This parameter provides a measure of the integrated time history of the balance between near-surface oxygen conditions and biological reworking of sediments (Carey and Bellagamba Fucile, 2015). As biological activity increases, the aRPD depth increases as organisms move sediment particles from the sediment surface down deeper into the sediments. The 2001, 2006, and 2014 surveys all assessed the benthic recolonization over mounds where disposal of dredged material has not occurred for multiple years. Recolonization was complete over these mounds, consistent with expectations based on the standard theory of infaunal succession. There was limited disposal at the site between 2007 and early 2014, but with the increase in disposal for the 2014-15 season and continued disposal in 2015-16, future surveys will be scheduled to assess changes.

6.4 Water and Sediment Quality

Inclusive of 40 C.F.R. 228.10 the following types of potential effects at the disposal site are discussed in this section:

- Progressive, non-seasonal, changes in water quality or sediment composition at the disposal site when these changes are attributable to materials disposed of at the site.

The water quality in Long Island Sound is strongly affected by runoff and discharges from its urban surroundings. The watershed of Long Island Sound has an area of approximately 16,250 square miles (42,100 km^2). The three largest rivers draining into Long Island Sound are, from east to west, the Thames River, Connecticut River, and Housatonic River. The Connecticut River enters the eastern Long Island Sound between Old Saybrook and Old Lyme, Connecticut, covering approximately 75% of the total drainage area. The Thames River enters the eastern Long Island Sound between New London and Groton, Connecticut, covering 9% of the drainage area. Except for selected coastal areas, waters in Long Island Sound are classified as SA waters. The best uses of Class SA waters are shellfishing for market purposes, primary and secondary contact recreation, and fishing.

Turbidity measurements are made in the spring and summer, the most biologically productive seasons in Long Island Sound. CTDEEP has been monitoring turbidity indirectly by measuring water clarity (using a Secchi disk) since June 2000. The average Secchi depth in Long Island Sound is 7.5 feet (2.3 m).

As described in Section 4.3, the predominant grain size within the ELDS is sand. The mean TOC concentration at the ELDS is 1%. Mean metals concentrations were approximately twice as high at the NLDS as at the ELDS, although none of the metal concentrations measured at any station exceeded the NOAA ERM values. Metal concentrations at the three stations from the eastern part of the ELDS (Site NL-Wa), located just to the west of the NLDS, had lower concentrations than stations located within the NLDS, suggesting that dredged material is contained within the NLDS. Stability of the sediment at the disposal mounds was also evidenced by the DAMOS program surveys; the 2006 assessment of surface sediments at the Seawolf Mound found metals concentrations that were similar across the mound and that were consistent with pre-dredge characterization of the disposed material (AECOM, 2010).

Concentrations of pesticides, PCBs and PAHs measured at the ELDS were low and did not exceed the ERM or ERL values. Additionally, surveys at the Seawolf Mound at the NLDS were conducted by the DAMOS program through the collection of 16 vibracores in 2010 (AECOM, 2012). The 2010 survey results indicated that PAH concentrations in the surface sediment (upper 1.7 feet [0.5 m]) were similar across the Seawolf Mound stations and were consistent with pre-dredge characterization of the capping material. Only one sample had a concentration slightly

above the ERL value, but the total PAH concentrations of all individual stations was below the ERL value.

Available data for the Long Island Sound region indicate that sediments in the open waters of Long Island Sound are generally not toxic to benthic organisms. The toxicity tests during the 2013 benthic survey demonstrated that contaminants and physical conditions at the ELDS do not elicit a toxic response to exposed organisms.

In addition, the SEIS evaluated the rate of dilution of the dissolved materials and fine suspended sediments that may remain in the water after disposal operations and the direction of transport, using the circulation model FVCOM. The highest concentrations occur after release. The material was diluted by tidal circulation and moved rapidly. After 12 hours, the diluted concentration was the range of 10^{-7}.

The STFATE predictions of the distribution of the disposed sediment on the seabed show that it is contained within the site and the mound is elongated along the axis of the current. Under mean flow conditions the maximum mound height after disposal from a 3,000 cy scow would be 0.21 feet (6.4 cm); under high flow conditions the maximum height would be 0.18 feet (5.5 cm). STFATE predictions for the amount of material reaching the seafloor show that under both mean and high flow conditions, 99-100% of the sand, silt, and clumps in the scow would reach the seafloor. Most of the clay also reaches the seafloor. Specifically, 83% of the clay is predicted to reach the seafloor during operations under high flow conditions, and 96% of it would reach the seafloor under mean flow conditions.

The longer-term (greater than 100 hours from release) transport and dilution of material in the water column after disposal operations show maximum concentrations in the range of 10^{-7} at locations on the coast of Connecticut, and Fishers Island and the North Fork of Long Island. These values reflect further dilution by a factor of approximately 100 from initial dilution at the site. An exception exists at the west coast of Fishers Island where releases from the ELDS would result in the maximum concentrations of 10^{-6}.

6.5 Quality Assurance

An important part of any monitoring program is a quality assurance (QA) regime to ensure that the monitoring data are reliable.

Relevant laboratories are required to submit Quality Assurance (QA) sheets with all analyses on a project-specific basis. Further details are provided in the Ocean Testing Manual (Green Book; USEPA and USACE, 1991); Inland Testing Manual (ITM; USEPA and USACE, 1998), and the Regional Implementation Manual (RIM; USEPA and USACE, 2004b).

Monitoring activities will be accomplished through a combination of USEPA and USACE-NAE resources (*e.g.,* employees, vessels, laboratories) and contractors. Documentation of QA is

required by both agencies for all monitoring activities (*i.e.*, physical, chemical, and biological sampling and testing). QA is documented in the form of a Quality Assurance Project Plan (QAPP) and/or Monitoring Work Plan. QAPPs are required for all USEPA and USACE-NAE monitoring activities. Analytical methods, detection limits, and QA procedures are contained in the RIM (USEPA and USACE, 2004b).

7.0 ANTICIPATED SITE USE

MPRSA 102(c)(3)(D) and (E) requires that the SMMP includes consideration of the quantity of the material to be disposed at the site, and the presence, nature, and bioavailability of the contaminants in the material as well as the anticipated use of the site over the long term. ELDS is designated to receive dredged material only. No other material may be disposed at the site.

A total volume of 52.9 million cy (40.4 million m^3) is expected to be dredged in Long Island Sound over the next 30 years. Of that, approximately 18.4 million cy (14.1 million m^3) of dredged material are anticipated to be dredged in eastern Long Island Sound; considering a 10% bulking factor, the total estimated volume to be disposed in eastern Long Island Sound is approximately 20 million cy (15 million m^3) (USACE, 2016). Dredged material will come from federal navigation projects with the rest of the volume coming from other facilities in Long Island Sound ((marinas, boatyards, and harbors, and a few large private projects), which is consistent with the pattern of dredging in Long Island Sound over the past 30 years. Sediments projected for disposal are expected to come primarily from maintenance dredging projects, although expansion dredging may be required for deeper draft vessels or from increased commerce in Long Island Sound.

Historically one third of the dredged material volume comes from large projects (>500,000 cy; 382,300 m^3), one third from medium sized projects (200,000 to 500,000 cy; 152,900 to 382,300 m^3), and one third from small projects (<200,000 cy; 152,900 m^3). The sediment properties are expected to be variable although the predominant sediment type will likely be silty material (silts, sandy silts, etc.). In eastern Long Island Sound, approximately 60% of the projected dredged material is fine-grained sediment and 40% of the dredged material is sand.

Dredging and disposal in Long Island Sound has historically been accomplished using a bucket dredge to fill split hull or pocket scows for transport to the disposal site or by using hopper dredges. These types of equipment are expected to be the primary mode of any open-water disposal in Long Island Sound in the future, although disposal is not specifically limited to this equipment.

All projects using the ELDS for disposal must be either permitted or authorized under MPRSA and the CWA (see Section 2.0). The quality of the material will be determined on a project specific basis under the testing requirements necessary to meet open-water disposal requirements of either CWA 404 or MPRSA 103. The quality of the dredged material will be consistent with MPRSA regulations (40 C.F.R. Part 227). National guidance for determining whether dredged material is

acceptable for open-water disposal is provided in the Green Book (USEPA and USACE, 1991), ITM (USEPA and USACE, 1998), and RIM (USEPA and USACE, 2004b). Site capacity will be evaluated and reported by USACE-NAE every three years.

8.0 REVIEW AND REVISION OF THIS PLAN

MPRSA 102 (c)(3)(F) requires that the SMMP include a schedule for review and revision of the SMMP, which shall not be reviewed and revised less frequently than ten years after adoption of the plan, and every ten years thereafter. The USEPA, the USACE-NAE, have agreed to review this plan annually as part of the annual agency planning meeting and coordinate with other state and federal agencies periodically.

9.0 COORDINATION AND OUTREACH

Section 307 of the Coastal Zone Management (CZM) Act of 1972 requires that federal agencies proposing activities within or outside the coastal zone, that affect any land or water use, or natural resource of the coastal zone, ensure that those activities are conducted in a manner which is consistent to the maximum extent practicable, with the enforceable policies of approved State coastal management programs. As part of the National Environmental Policy Act (NEPA) process, USEPA prepared a federal determination of consistency with the Connecticut, New York, and Rhode Island approved Coastal Zone Management Programs in April 2016.

Concurrence regarding the Section 7 of the Endangered Species Act, and the Essential Fish Habitat was obtained during the NEPA process for the SEIS from NMFS and the USFWS (USEPA, 2016). The NMFS and USFWS concurrence confirmed that the selection and use of the ELDS will not adversely affect threatened or endangered species or adversely modify critical habitat. No further consultation will be required and no conservation recommendations will be needed due to the use of ongoing and mutually agreed upon seasonal constraints on disposal operations (June 1 through October 1) as well as the ongoing disposal site monitoring program. The NMFS concurrence will confirmed that the selection and use of ELDS will not adversely affect habitat.

Additionally, a New England Regional Dredging Team has been established. The team is comprised of representatives from USEPA, USACE-NAE, NMFS, USFWS, and representatives from the States of Connecticut, Massachusetts, New York, and Rhode Island. The team meets approximately every six months to discuss management and monitoring of New England dredged material disposal sites. Monitoring activities may be discussed at these meetings, or additional meetings may be coordinated to discuss the SMMP.

The USEPA and the USACE will continue to inform the public. Information about the monitoring program and USACE-NAE monitoring reports is available at the USACE-NAE website: *http://www.nae.USACE.army.mil/Missions/DisposalAreaMonitoringSystem(DAMOS)/DisposalSites/CentralLongIslandSound.aspx*. Information about the ELDS designation and SMMP is available at the USEPA New England Regional Dredged Material Program website: *https://www.epa.gov/ocean-dumping/dredged-material-management-long-island-sound.*

10.0 FUNDING

The costs involved in site management and monitoring will be shared between USEPA the USACE-NAE. This SMMP will be in place until modified or the site is de-designated and closed.

Monitoring programs conducted under other federal (*i.e.*, LISS) and state agencies (*i.e.*, CTDEEP Trawl Survey) will depend solely on funds allocated to the programs by those agencies or other supporting agencies.

The timing of monitoring surveys and other activities will be governed by funding resources, the frequency of disposal at the site, and the results of previous monitoring data.

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ATTACHMENT A: Monitoring Plan

Movement of the Dredged Material	2: Absence of Pollutant-Sensitive Biota	3: Changes in Water Quality	4: Changes in Benthic Health and Diversity	5: Accumulation of Material Constituents in Biota
Baseline taken within 1 year after disposal; entire site bathymetry at 3-4 year intervals	SPI within 1-3 years of disposal and survey of historic mounds once every 5 years.	Annual water quality measured in site vicinity (LISS Monitoring program data)	Annual CTDEEP trawl survey data	Sediment bioaccumulation potential estimated for sediments collected within site and reference areas at least every 5 years.
Mound changes by > 1.0 feet within 5 year interval	Significant differences between site and reference areas	Consistent gradients in measures of long-term water quality changes in vicinity	Significant differences in community composition or abundance from baseline or contiguous areas is found	Significant increase in bioaccumulation potential relative to baseline conditions or reference areas
Bathymetry taken ≤ 2 months after 10-year storm	SPI within 1-3 years of disposal and survey of historic mounds once every 5 years	No additional studies	No additional studies*	No additional studies
Mound changes by > 1.5 feet from last survey	Significant differences between site and reference areas	No additional studies	No additional studies	No additional studies
Bathymetry and sediment survey within 1 km. of site boundary	SPI at site and reference areas; grain size analysis	Water quality measured at site and reference areas	Studies may include measurement of species distribution at site and reference areas	Studies may include the collection of biota from site and reference areas

ATTACHMENT B: Example Scow Log

INSPECTOR'S DAILY REPORT OF DISPOSAL BY SCOW

NOTE: Dredged material volume stated below is approximate and shall not be used for measurement and/or payment.

Permittee _____ Disposal Area _____
Permit/Contract No. _____ Date _____
Project _____ Towboat _____
Dredging Contractor _____ Owner _____

Trip No.	Scow No.	Started From Place	Started From Time	Disposal Time	Returned To Place	Returned To Time	Round Trip Time	Round Trip Dist	Lat/Long Coordinates* Specified	Lat/Long Coordinates* Actual	Dist./Dir. From Buoy

Trip No.	No. of Pockets Loaded	No. of Pockets Dumped	Reason Pocket Not Dumped	Disposal Depth	Disposal Speed	Weather	Sea Conditions/ Visibility	Approx. Volume (CY)	Scow Draft

Comments:

*Check the datum used ___NAD27 ___NAD83. Also note any factors that may affect reliability of navigation instrument and readouts.

Time On	Time Off	Hours On Duty	Reviewed By: Permittee's Representative or, for Corps Projects, Corps' Resident Engineer or Field Inspector
	Total Hours On Duty		

To the District Engineer, U.S. Army Engineer District, New England, Concord, Massachusetts:
I certify that I informed the tug captain of the conditions of the U..S. Army Corps of Engineers permit or contract regarding the distance from the buoy and the speed of the scow during the release of the dredged material. I also informed the captain that failure to comply with these conditions would constitute a violation of the permit and would be reported to the Corps. I certify that this report is correct and that I am not an employee of the dredging or towing firm, or the permittee, nor have I been employed by any of them at any time during the past six months. The approximate volume of dredged material stated on this report is only an estimate. It was made either by me, the dredging or towing contractor, or the Corps of Engineers Resident Engineer of Field Inspector. I do not certify that it correctly states the volume of material dredged.

_____ _____
Signature of Disposal Inspector (Certification No.)

Print Name Here _____

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SAMPLE

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