SEDIMENT CORING CAPABILITIES AND EXPERIENCE

Water Depths	– Up to 60 feet (ft), but works better in <40 ft
Core Depth	– Maximum sediment depth up to ~13 ft
	– Most cores average ~8-9 ft depending on substrate
Core Tube Size	– 3 inches
Positioning	– Typically differential GPS, but can use RTK

CSE uses its proprietary suction-vibracorer to obtain cased borings up to 13 ft long using 3-inch aluminum core tubing. CSE's coring system has been used in over a dozen nourishment sand search studies including:

Nags Head (NC)	~110 borings in 40–70 ft depths	Isle of Palms (SC)	~80 borings in 15-40 ft depths
Bogue Banks (NC)	~150 borings in 30–60 ft depths	Lockwood Folly (NC)	~10 borings in ~10 ft depths
Edisto Beach (SC)	~120 borings in 5–40 ft depths	Hunting Island (SC)	~23 borings in 10-20 ft depths
Bogue Inlet (NC)	~12 borings in 2–25 ft depths	Folly Beach (SC)	~15 borings in 20–35 ft depths

Generally, borings are brought to CSE's office, then are split, digitally photographed to scale, logged by a registered professional geologist, subsampled and stored in plastic tubing.

CSE has conducted thousands of granulometric tests for beach and core samples following modified ASTM procedures. CSE typically tests using 0.25-phi intervals (25 sieves between -4 and +4 phi) and performs quantitative calcium-carbonate analysis via acid burning in dilute HCl. Percent mud analyses are also performed on separate splits by drying, weighing, re-wetting, wet-sieving, re-drying, and weighing the residual (coarse materials retained after mud is washed out). Frequency as well as cumulative frequency curves and detailed statistics (graphical and moment measures) are computed using CSE's custom, grain-size analysis software. CSE performs compatibility analysis using standard methods (overfill ratios) as well as site-specific agency guidelines (eg – NCDCM technical standards for beach fill projects). CSE provides this sample testing service and can seal the results by a registered professional geologist.

CSE typically uses a Lowrance LCX-38cHD for positioning while coring, making necessary tidal adjustments when required; however, CSE has the capability to employ RTK-GPS (Trimble® R-8 GNSS) and a precision echosounder (Odom™ Echotrac CV100) to obtain higher resolution positioning and elevation, without the need for tidal correction.

CSE uses AutoCad® Civil 3D and MatLab® software to produce colored contour maps of grain size, shell content, mud content, and core recovery lengths as needed. Typically, CSE's coring studies are accompanied by detailed bathymetric mapping, which provides 3D models of the sea floor in the area. CSE correlates the topography and the grain-size characteristics to provide potential excavation volumes for dredging projects as well as to define areas which contain material suitable or unsuitable for nourishment purposes.
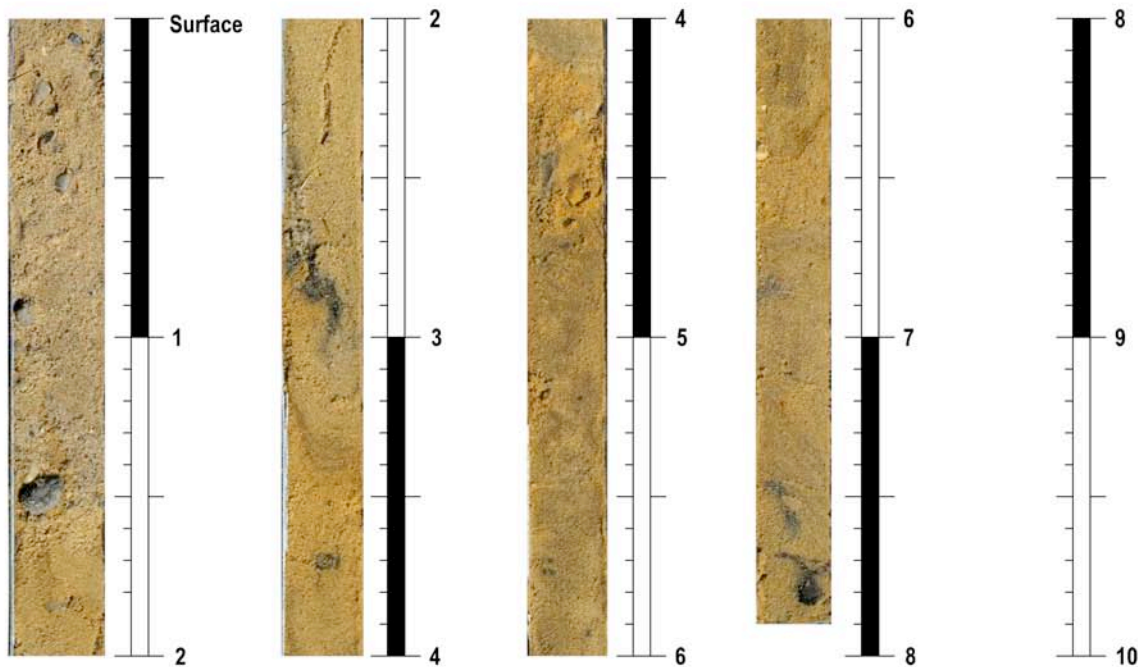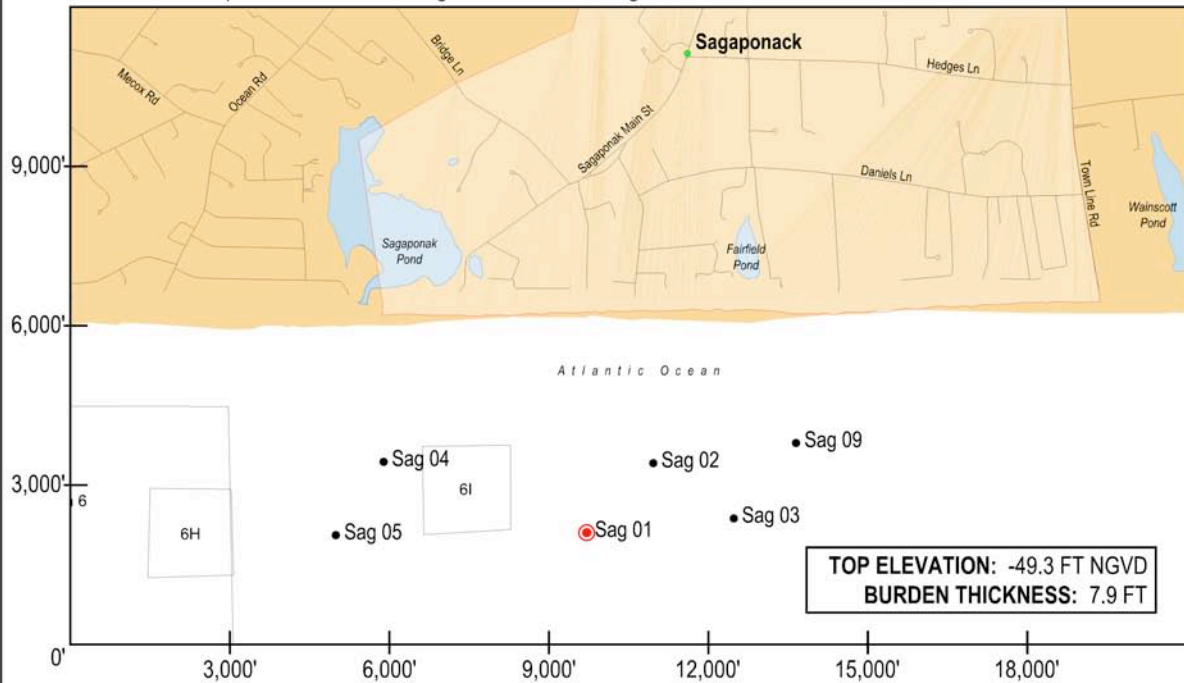
CORE LOG	Coastal Science & Engineering	Sheet **1** of **1**

PROJECT:	2369 – Bridgehampton NY	**COORDINATES:** Northing: 272217.720 Easting: 1462636.830 Grid Datum: **NAD '83**	**HOLE NUMBER:** **SAG-1** (as shown on title drawing and file no.)
LOCALITY:	Offshore Sagaponak Beach		

DATE:	2011-Jul-21	TOP ELEVATION:	**-49.30 ft.** **NAVD '88**	DEVICE DESIGNATION:	**Coastal Science & Engineering**
BORE ANGLE:	90.00°				
BURDEN THICKNESS:	7.9 ft.	BOTTOM ELEVATION:	**-57.20 ft.** **NAVD '88**	BARREL SIZE/TYPE:	3 in. Aluminum
CORE RECOVERY:	7.9 ft. (100.0%)	WATER DEPTH:	**-49.00 ft.** (operational note only)	GEOLOGIST: FIELD TEAM:	**TWK – SC #564** **PAM, TH, DB**

Depth	Lithology	Classification Of Materials (Description)	Sample #	Remarks
1		0.0 to 1.6 ft: Mixed Sand, Gravel, Granules – mixed clean MS and pebbles, tan	S1	S1: 0.0 ft. to 1.6 ft. very pebbly (>30%)
2 3 4		1.6 to 4.1 ft: Medium Sand – MS clean with trace tan pebbles and mud/sand clasts -- 2.8 ft: Mud Clast – mud/sand clast – black mottling	S2	S2: 1.6 ft. to 4.1 ft. good quality to bottom
5 6 7 8		4.3 to 7.9 ft: Medium Sand – MS clean tan w/mottling and trace pebbles -- 6.4 ft: Small Rock – 2cm pebble -- 7.6 ft: Mud Clast – muddy sand – collapsed burrow?	S3	S3: 4.1 ft. to 7.9 ft.
9 10				

OFFSHORE SAND SOURCE - CSE CORE NO. **Sag-01**

CORE LOCATION KEY
Note: All core depths in feet. See core log sheet for additional geotechnical information.

Sagaponack

Mecox Rd · Ocean Rd · Bridge Ln · Sagaponak Main St · Hedges Ln · Daniels Ln · Town Line Rd · Wainscott Pond · Sagaponak Pond · Fairfield Pond

9,000'

6,000'

Atlantic Ocean

3,000'

6

6H

6I

• Sag 04

• Sag 05

◉ Sag 01

• Sag 02

• Sag 09

• Sag 03

TOP ELEVATION: -49.3 FT NGVD
BURDEN THICKNESS: 7.9 FT

0'   3,000'   6,000'   9,000'   12,000'   15,000'   18,000'

Surface   2   4   6   8

1   3   5   7   9

2   4   6   8   10

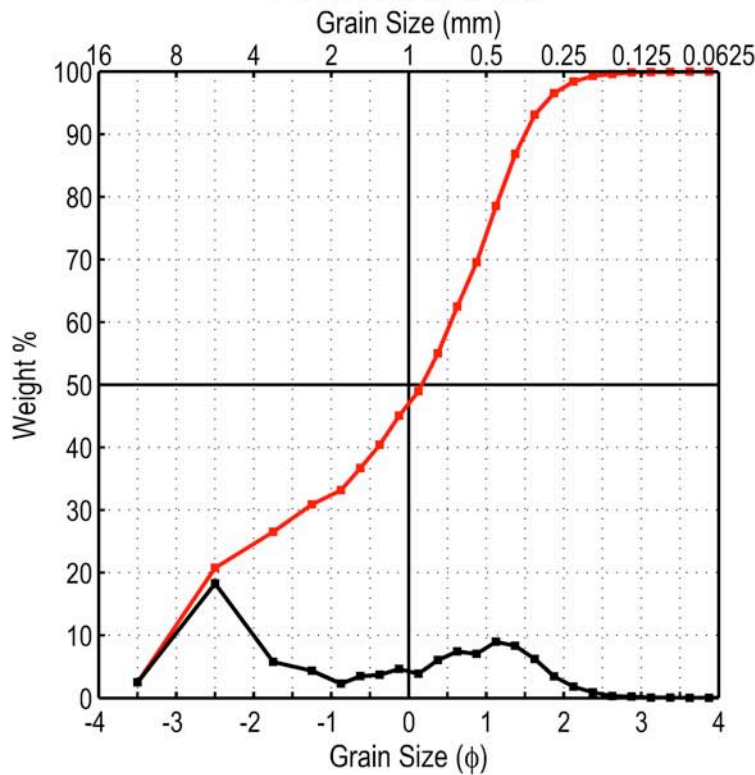| PROJECT TITLE:	PREPARED FOR:	DRAWING TITLE:	SCALE: AS SHOWN	CORE SAG #:
BEACH RESTORATION EROSION CONTROL PROJECT	FIRST COASTAL CORPORATION PO BOX 1212, 4 ARTHUR STREET WESTHAMPTON BEACH, NY 11978	CORE LOG PHOTO MOSAIC	DATE: OCT 2011 DRAWN BY: JJH PROJECT #: 2369	01

Grain Size Distribution

Project	2369 Sag/Bridge
Location	Borrow Areas
Date	Jul 2011
Station	Q1 01 S1
Interval	0 - 3.2ft
Mean	1.120 mm
STD	0.331 mm
Skewness	-0.423
USCS	Wentworth

SP	Very Coarse Sand
Medium Sand	Poorly Sorted
Poorly Graded	Symmetrical
	Platykurtic

Total weight (gram)	103.57
% finer than 4.00 phi	0.00
% coarser than -1.00 phi	30.90
% $CaCO_3$	1.5

Class Limits (ϕ)	Mid Point (ϕ)	Weight (gram)	Weight %	Cumm. Wt %
-3	-3.5	2.61	2.52	2.52
-2	-2.5	18.93	18.28	20.80
-1.5	-1.75	5.96	5.75	26.55
-1	-1.25	4.50	4.34	30.90
-0.75	-0.875	2.37	2.29	33.19
-0.5	-0.625	3.64	3.51	36.70
-0.25	-0.375	3.85	3.72	40.42
0	-0.125	4.81	4.64	45.06
0.25	0.125	4.04	3.90	48.96
0.5	0.375	6.27	6.05	55.02
0.75	0.625	7.73	7.46	62.48
1	0.875	7.33	7.08	69.56
1.25	1.125	9.29	8.97	78.53
1.5	1.375	8.64	8.34	86.87
1.75	1.625	6.45	6.23	93.10
2	1.875	3.56	3.44	96.53
2.25	2.125	1.91	1.84	98.38
2.5	2.375	0.94	0.91	99.29
2.75	2.625	0.33	0.32	99.60
3	2.875	0.24	0.23	99.84
3.25	3.125	0.07	0.07	99.90
3.5	3.375	0.05	0.05	99.95
3.75	3.625	0.03	0.03	99.98
4	3.875	0.02	0.02	100.00
>4.0	4.125	0.00	0.00	100.00

Percentiles

1	-3.500
5	-3.365
16	-2.760
25	-1.950
50	0.170
75	1.025
84	1.290
95	1.765
99	2.295

Moment Measures

	(phi)	(mm)
Mean	-0.163	1.120
Standard Deviation	1.597	0.331
Skewness	-0.423	
Kurtosis	1.940	
Dispersion		
Standard Deviation		
Deviation from Normal		

Graphic Phi Parameters

	Inman 1952	Folk & Ward 1957
Mean	-0.735	-0.433
Standard Deviation	2.025	1.790
Skewness (1)	-0.447	-0.413
Skewness (2)	-0.479	
Kurtosis	0.267	0.707