

APPENDIX 2
CPE-NC INDIVIDUAL BEACH GRANULARMETRIC REPORTS
(Digital Copy Only)

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-11 #01 Dune

Analysis Date: 08-12-15

Analyzed By: TM

Easting (ft): 2,955,448
Northing (ft): 909,238

Coordinate System: North Carolina State Plane
Elevation (ft): 16.8 NAVD 88

USCS: SP
Munsell: Wet - 2.5Y-7/2
Dry - 2.5Y-7/3
Washed - 2.5Y-8/1
Comments:

Dry Weight (g): 100.68
Wash Weight (g): 100.41
Pan Retained (g): 0.02
Sieve Loss (%): 0.19
Fines (%): #200 - 0.49
 #230 - 0.47
Organics (%):
Carbonates (%):
Shell Hash (%):

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.08	0.08	0.08	0.08
4	-2.25	4.76	0.00	0.00	0.08	0.08
5	-2.00	4.00	0.00	0.00	0.08	0.08
7	-1.50	2.83	0.00	0.00	0.08	0.08
10	-1.00	2.00	0.00	0.00	0.08	0.08
14	-0.50	1.41	0.04	0.04	0.12	0.12
18	0.00	1.00	0.35	0.35	0.47	0.47
25	0.50	0.71	3.96	3.93	4.43	4.40
35	1.00	0.50	15.29	15.19	19.72	19.59
45	1.50	0.35	32.21	31.99	51.93	51.58
60	2.00	0.25	34.53	34.30	86.46	85.88
80	2.50	0.18	12.50	12.42	98.96	98.30
120	3.00	0.13	1.09	1.08	100.05	99.38
170	3.50	0.09	0.10	0.10	100.15	99.48
200	3.75	0.07	0.03	0.03	100.18	99.51
230	4.00	0.06	0.02	0.02	100.20	99.53

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.37	1.84	1.48	1.08	0.52
	1.44	0.37	0.55	-0.52	5.48

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-11 #02 TOD

Analysis Date: 08-12-15

Analyzed By: TM

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,955,471	909,247	North Carolina State Plane	11.6 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-6/2 Dry - 2.5Y-7/3 Washed - 2.5Y-8/3	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
98.26	98.04	0.00	0.08	#200 - 0.31 #230 - 0.30			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.15	0.15	0.15	0.15
5	-2.00	4.00	0.20	0.20	0.35	0.35
7	-1.50	2.83	1.56	1.59	1.91	1.94
10	-1.00	2.00	4.05	4.12	5.96	6.06
14	-0.50	1.41	6.84	6.96	12.80	13.02
18	0.00	1.00	9.89	10.07	22.69	23.09
25	0.50	0.71	13.36	13.60	36.05	36.69
35	1.00	0.50	13.34	13.58	49.39	50.27
45	1.50	0.35	20.26	20.62	69.65	70.89
60	2.00	0.25	19.32	19.66	88.97	90.55
80	2.50	0.18	7.87	8.01	96.84	98.56
120	3.00	0.13	1.02	1.04	97.86	99.60
170	3.50	0.09	0.07	0.07	97.93	99.67
200	3.75	0.07	0.02	0.02	97.95	99.69
230	4.00	0.06	0.01	0.01	97.96	99.70

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.28	1.83	1.60	0.99	0.07	-0.35	-1.13
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.79	0.58	1.03	-0.5	2.59	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-11 #03 Mid Berm

Analysis Date: 08-12-15

Analyzed By: TM

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,955,502	909,257	North Carolina State Plane	7.2 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-6/2 Dry - 2.5Y-7/3 Washed - 2.5Y-8/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.41	100.10	0.01	0.16	#200 - 0.48 #230 - 0.46			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.69	0.69	0.69	0.69
10	-1.00	2.00	1.14	1.14	1.83	1.83
14	-0.50	1.41	3.11	3.10	4.94	4.93
18	0.00	1.00	7.92	7.89	12.86	12.82
25	0.50	0.71	12.83	12.78	25.69	25.60
35	1.00	0.50	18.94	18.86	44.63	44.46
45	1.50	0.35	23.72	23.62	68.35	68.08
60	2.00	0.25	22.14	22.05	90.49	90.13
80	2.50	0.18	8.45	8.42	98.94	98.55
120	3.00	0.13	0.91	0.91	99.85	99.46
170	3.50	0.09	0.04	0.04	99.89	99.50
200	3.75	0.07	0.02	0.02	99.91	99.52
230	4.00	0.06	0.02	0.02	99.93	99.54

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.29	1.86	1.66	1.12	0.48	0.12	-0.50
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.01	0.50	0.85	-0.57	3.15	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-11 #04 Berm Crest

Analysis Date: 08-12-15

Analyzed By: TM

Easting (ft): 2,955,522	Northing (ft): 909,264	Coordinate System: North Carolina State Plane	Elevation (ft): 6.0 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SP	Munsell: Wet - 2.5Y-6/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/1	Comments:
--------------------	--	-----------

Dry Weight (g): 97.74	Wash Weight (g): 97.48	Pan Retained (g): 0.00	Sieve Loss (%): 0.10	Fines (%): #200 - 0.39 #230 - 0.38	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.10	0.10	0.10	0.10
14	-0.50	1.41	0.14	0.14	0.24	0.24
18	0.00	1.00	0.16	0.16	0.40	0.40
25	0.50	0.71	0.61	0.62	1.01	1.02
35	1.00	0.50	2.17	2.22	3.18	3.24
45	1.50	0.35	12.16	12.44	15.34	15.68
60	2.00	0.25	39.55	40.46	54.89	56.14
80	2.50	0.18	36.35	37.19	91.24	93.33
120	3.00	0.13	5.84	5.98	97.08	99.31
170	3.50	0.09	0.26	0.27	97.34	99.58
200	3.75	0.07	0.03	0.03	97.37	99.61
230	4.00	0.06	0.01	0.01	97.38	99.62

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.64	2.37	2.25	1.92	1.62	1.50	1.07
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.9	0.27	0.48	-0.98	6.79	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-11 #05 MHW

Analysis Date: 08-12-15

Analyzed By: TM

Easting (ft): Northing (ft):
2,955,562 909,277

Coordinate System: Elevation (ft):
North Carolina State Plane 1.2 NAVD 88

USCS: Munsell: Wet - 2.5Y-6/3 Comments:
SW Dry - 2.5Y-7/2
 Washed - 2.5Y-8/2

Dry Weight (g): Wash Weight (g): Pan Retained (g): Sieve Loss (%): Fines (%): Organics (%): Carbonates (%): Shell Hash (%):
85.51 84.81 0.00 0.02 #200 - 0.83
 #230 - 0.83

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.28	0.33	0.28	0.33
7	-1.50	2.83	1.18	1.38	1.46	1.71
10	-1.00	2.00	1.69	1.98	3.15	3.69
14	-0.50	1.41	4.42	5.17	7.57	8.86
18	0.00	1.00	6.36	7.44	13.93	16.30
25	0.50	0.71	6.60	7.72	20.53	24.02
35	1.00	0.50	8.38	9.80	28.91	33.82
45	1.50	0.35	13.27	15.52	42.18	49.34
60	2.00	0.25	20.55	24.03	62.73	73.37
80	2.50	0.18	18.74	21.92	81.47	95.29
120	3.00	0.13	3.24	3.79	84.71	99.08
170	3.50	0.09	0.07	0.08	84.78	99.16
200	3.75	0.07	0.01	0.01	84.79	99.17
230	4.00	0.06	0.00	0.00	84.79	99.17

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.49	2.24	2.04	1.51	0.55	-0.02	-0.87
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.2	0.44	1.07	-0.85	3	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-11 #06 MTL

Analysis Date: 08-12-15

Analyzed By: TM

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,955,575	909,285	North Carolina State Plane	-0.5 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
83.78	82.97	0.00	0.05	#200 - 1.04 #230 - 1.03			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.75	0.90	0.75	0.90
7	-1.50	2.83	2.33	2.78	3.08	3.68
10	-1.00	2.00	3.41	4.07	6.49	7.75
14	-0.50	1.41	4.09	4.88	10.58	12.63
18	0.00	1.00	3.86	4.61	14.44	17.24
25	0.50	0.71	2.65	3.16	17.09	20.40
35	1.00	0.50	2.27	2.71	19.36	23.11
45	1.50	0.35	5.13	6.12	24.49	29.23
60	2.00	0.25	16.75	19.99	41.24	49.22
80	2.50	0.18	32.37	38.64	73.61	87.86
120	3.00	0.13	9.01	10.75	82.62	98.61
170	3.50	0.09	0.28	0.33	82.90	98.94
200	3.75	0.07	0.02	0.02	82.92	98.96
230	4.00	0.06	0.01	0.01	82.93	98.97

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.83	2.45	2.33	2.01	1.15	-0.13	-1.34
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.48	0.36	1.27	-1.3	3.53	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-11 #07 MLW

Analysis Date: 08-12-15

Analyzed By: TM

Easting (ft): 2,955,596	Northing (ft): 909,291	Coordinate System: North Carolina State Plane	Elevation (ft): -2.1 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 85.83	Wash Weight (g): 85.10	Pan Retained (g): 0.00	Sieve Loss (%): 0.14	Fines (%): #200 - 0.98 #230 - 0.97	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.11	0.13	0.11	0.13
5	-2.00	4.00	0.70	0.82	0.81	0.95
7	-1.50	2.83	1.01	1.18	1.82	2.13
10	-1.00	2.00	2.87	3.34	4.69	5.47
14	-0.50	1.41	6.15	7.17	10.84	12.64
18	0.00	1.00	6.10	7.11	16.94	19.75
25	0.50	0.71	5.13	5.98	22.07	25.73
35	1.00	0.50	5.28	6.15	27.35	31.88
45	1.50	0.35	7.63	8.89	34.98	40.77
60	2.00	0.25	17.31	20.17	52.29	60.94
80	2.50	0.18	26.27	30.61	78.56	91.55
120	3.00	0.13	6.21	7.24	84.77	98.79
170	3.50	0.09	0.17	0.20	84.94	98.99
200	3.75	0.07	0.03	0.03	84.97	99.02
230	4.00	0.06	0.01	0.01	84.98	99.03

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.74	2.38	2.23	1.73	0.44	-0.26	-1.07
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.28	0.41	1.22	-0.9	2.74	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-11 #08 Trough

Analysis Date: 08-12-15

Analyzed By: TM

Easting (ft): 2,955,721	Northing (ft): 909,339	Coordinate System: North Carolina State Plane	Elevation (ft): -5.0 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 83.28	Wash Weight (g): 82.45	Pan Retained (g): 0.00	Sieve Loss (%): 0.12	Fines (%): #200 - 1.17 #230 - 1.13	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.17	0.20	0.17	0.20
7	-1.50	2.83	0.37	0.44	0.54	0.64
10	-1.00	2.00	0.82	0.98	1.36	1.62
14	-0.50	1.41	2.20	2.64	3.56	4.26
18	0.00	1.00	2.53	3.04	6.09	7.30
25	0.50	0.71	2.01	2.41	8.10	9.71
35	1.00	0.50	1.77	2.13	9.87	11.84
45	1.50	0.35	5.07	6.09	14.94	17.93
60	2.00	0.25	16.43	19.73	31.37	37.66
80	2.50	0.18	30.72	36.89	62.09	74.55
120	3.00	0.13	17.75	21.31	79.84	95.86
170	3.50	0.09	2.36	2.83	82.20	98.69
200	3.75	0.07	0.12	0.14	82.32	98.83
230	4.00	0.06	0.03	0.04	82.35	98.87

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.98	2.72	2.51	2.17	1.68	1.34	-0.38
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.93	0.26	0.95	-1.71	5.99	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-11 #09 Bar Crest

Analysis Date: 08-12-15

Analyzed By: TM

Easting (ft): 2,956,169 Northing (ft): 909,500

Coordinate System: North Carolina State Plane Elevation (ft): -9.0 NAVD 88

USCS: SP Munsell: Wet - 5Y-5/1
Dry - 5Y-6/1
Washed - 5Y-7/1 Comments:

Dry Weight (g): 82.85 Wash Weight (g): 81.92 Pan Retained (g): 0.01 Sieve Loss (%): 0.05 Fines (%): #200 - 1.23
#230 - 1.18 Organics (%): Carbonates (%): Shell Hash (%):

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.03	0.04	0.03	0.04
14	-0.50	1.41	0.01	0.01	0.04	0.05
18	0.00	1.00	0.12	0.14	0.16	0.19
25	0.50	0.71	0.36	0.43	0.52	0.62
35	1.00	0.50	2.03	2.45	2.55	3.07
45	1.50	0.35	7.04	8.50	9.59	11.57
60	2.00	0.25	17.09	20.63	26.68	32.20
80	2.50	0.18	31.82	38.41	58.50	70.61
120	3.00	0.13	19.84	23.95	78.34	94.56
170	3.50	0.09	3.26	3.93	81.60	98.49
200	3.75	0.07	0.23	0.28	81.83	98.77
230	4.00	0.06	0.04	0.05	81.87	98.82

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.06	2.78	2.59	2.23	1.83	1.61	1.11
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.17	0.22	0.57	-0.63	4.08	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-11 #10 (-12.5)

Analysis Date: 08-12-15

Analyzed By: TM

Easting (ft): 2,956,015	Northing (ft): 909,445	Coordinate System: North Carolina State Plane	Elevation (ft): -12.5 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP	Munsell: Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 82.58	Wash Weight (g): 81.62	Pan Retained (g): 0.00	Sieve Loss (%): 0.08	Fines (%): #200 - 1.29 #230 - 1.24	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.03	0.04	0.03	0.04
14	-0.50	1.41	0.11	0.13	0.14	0.17
18	0.00	1.00	0.34	0.41	0.48	0.58
25	0.50	0.71	0.85	1.03	1.33	1.61
35	1.00	0.50	2.78	3.37	4.11	4.98
45	1.50	0.35	8.58	10.39	12.69	15.37
60	2.00	0.25	18.53	22.44	31.22	37.81
80	2.50	0.18	30.86	37.37	62.08	75.18
120	3.00	0.13	16.92	20.49	79.00	95.67
170	3.50	0.09	2.32	2.81	81.32	98.48
200	3.75	0.07	0.19	0.23	81.51	98.71
230	4.00	0.06	0.04	0.05	81.55	98.76

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.98	2.72	2.50	2.16	1.71	1.51	1.00
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	2.08	0.24	0.62	-0.8	4.46	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-11 #11 (-15.0)

Analysis Date: 08-12-15

Analyzed By: TM

Easting (ft): Northing (ft):
2,956,195 909,510

Coordinate System: Elevation (ft):
North Carolina State Plane -15.0 NAVD 88

USCS: Munsell: Comments:
SP Wet - 5Y-5/1
 Dry - 5Y-6/1
 Washed - 5Y-7/1

Dry Weight (g): Wash Weight (g): Pan Retained (g): Sieve Loss (%): Fines (%): Organics (%): Carbonates (%): Shell Hash (%):
81.78 80.77 0.01 0.07 #200 - 1.40
 #230 - 1.31

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.22	0.27	0.22	0.27
5	-2.00	4.00	0.00	0.00	0.22	0.27
7	-1.50	2.83	0.00	0.00	0.22	0.27
10	-1.00	2.00	0.00	0.00	0.22	0.27
14	-0.50	1.41	0.17	0.21	0.39	0.48
18	0.00	1.00	0.26	0.32	0.65	0.80
25	0.50	0.71	0.80	0.98	1.45	1.78
35	1.00	0.50	3.96	4.84	5.41	6.62
45	1.50	0.35	11.59	14.17	17.00	20.79
60	2.00	0.25	21.05	25.74	38.05	46.53
80	2.50	0.18	28.18	34.46	66.23	80.99
120	3.00	0.13	12.86	15.73	79.09	96.72
170	3.50	0.09	1.41	1.72	80.50	98.44
200	3.75	0.07	0.13	0.16	80.63	98.60
230	4.00	0.06	0.07	0.09	80.70	98.69

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.95	2.60	2.41	2.05	1.58	1.33	0.83
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.96	0.26	0.66	-1.22	8.08	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-11 #12 (-17.5)

Analysis Date: 08-12-15

Analyzed By: TM

Easting (ft): 2,956,212	Northing (ft): 909,517	Coordinate System: North Carolina State Plane	Elevation (ft): -17.5 NAVD 88
----------------------------	---------------------------	--	----------------------------------

USCS: SP	Munsell: Wet - 5Y-4/1 Dry - 5Y-5/1 Washed - 5Y-6/1	Comments:
-------------	---	-----------

Dry Weight (g): 81.11	Wash Weight (g): 79.98	Pan Retained (g): 0.01	Sieve Loss (%): 0.09	Fines (%): #200 - 1.64 #230 - 1.49	Organics (%):	Carbonates (%):	Shell Hash (%):
--------------------------	---------------------------	---------------------------	-------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.11	0.14	0.11	0.14
14	-0.50	1.41	0.14	0.17	0.25	0.31
18	0.00	1.00	0.28	0.35	0.53	0.66
25	0.50	0.71	0.62	0.76	1.15	1.42
35	1.00	0.50	1.59	1.96	2.74	3.38
45	1.50	0.35	4.77	5.88	7.51	9.26
60	2.00	0.25	13.34	16.45	20.85	25.71
80	2.50	0.18	34.79	42.89	55.64	68.60
120	3.00	0.13	20.84	25.69	76.48	94.29
170	3.50	0.09	3.02	3.72	79.50	98.01
200	3.75	0.07	0.28	0.35	79.78	98.36
230	4.00	0.06	0.12	0.15	79.90	98.51

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.10	2.80	2.62	2.28	1.98	1.70	1.14
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.22	0.21	0.59	-1.25	6.94	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-11 #13 (-20.0)

Analysis Date: 08-12-15

Analyzed By: TM

Easting (ft): 2,956,280	Northing (ft): 909,542	Coordinate System: North Carolina State Plane	Elevation (ft): -20.0 NAVD 88
----------------------------	---------------------------	--	----------------------------------

USCS: SP	Munsell: Wet - 5Y-4/1 Dry - 5Y-5/1 Washed - 5Y-6/1	Comments:
-------------	---	-----------

Dry Weight (g): 80.14	Wash Weight (g): 78.33	Pan Retained (g): 0.07	Sieve Loss (%): 0.04	Fines (%): #200 - 3.03 #230 - 2.39	Organics (%):	Carbonates (%):	Shell Hash (%):
--------------------------	---------------------------	---------------------------	-------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.15	0.19	0.15	0.19
3.5	-2.50	5.66	0.00	0.00	0.15	0.19
4	-2.25	4.76	0.08	0.10	0.23	0.29
5	-2.00	4.00	0.04	0.05	0.27	0.34
7	-1.50	2.83	0.05	0.06	0.32	0.40
10	-1.00	2.00	0.02	0.02	0.34	0.42
14	-0.50	1.41	0.08	0.10	0.42	0.52
18	0.00	1.00	0.03	0.04	0.45	0.56
25	0.50	0.71	0.12	0.15	0.57	0.71
35	1.00	0.50	0.25	0.31	0.82	1.02
45	1.50	0.35	0.62	0.77	1.44	1.79
60	2.00	0.25	3.61	4.50	5.05	6.29
80	2.50	0.18	25.37	31.66	30.42	37.95
120	3.00	0.13	36.58	45.65	67.00	83.60
170	3.50	0.09	9.33	11.64	76.33	95.24
200	3.75	0.07	1.39	1.73	77.72	96.97
230	4.00	0.06	0.51	0.64	78.23	97.61

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.49	3.02	2.91	2.63	2.30	2.15	1.86
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.57	0.17	0.57	-3.64	34.05	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-13 #01 Dune

Analysis Date: 11-06-13

Analyzed By: LC

Easting (ft): 2,956,165	Northing (ft): 907,584	Coordinate System: North Carolina State Plane	Elevation (ft): 14.1 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 2.5Y-6/3 Dry - 2.5Y-6/2 Washed - 2.5Y-7/2	Comments:
--------------------	--	-----------

Dry Weight (g): 146.89	Wash Weight (g): 146.62	Pan Retained (g): 0.00	Sieve Loss (%): 0.00	Fines (%): #200 - 0.18 #230 - 0.18	Organics (%):	Carbonates (%): 4	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.53	0.36	0.53	0.36
4	-2.25	4.76	1.20	0.82	1.73	1.18
5	-2.00	4.00	0.91	0.62	2.64	1.80
7	-1.50	2.83	3.19	2.17	5.83	3.97
10	-1.00	2.00	5.88	4.00	11.71	7.97
14	-0.50	1.41	10.07	6.86	21.78	14.83
18	0.00	1.00	15.08	10.27	36.86	25.10
25	0.50	0.71	23.25	15.83	60.11	40.93
35	1.00	0.50	30.50	20.76	90.61	61.69
45	1.50	0.35	25.81	17.57	116.42	79.26
60	2.00	0.25	19.93	13.57	136.35	92.83
80	2.50	0.18	8.20	5.58	144.55	98.41
120	3.00	0.13	1.85	1.26	146.40	99.67
170	3.50	0.09	0.19	0.13	146.59	99.80
200	3.75	0.07	0.03	0.02	146.62	99.82
230	4.00	0.06	0.00	0.00	146.62	99.82

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.19	1.67	1.38	0.72	0.00	-0.44	-1.37
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.61	0.66	1.06	-0.53	3.15	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-13 #02 TOD

Analysis Date: 11-07-13

Analyzed By: LC

Easting (ft): 2,956,180	Northing (ft): 907,590	Coordinate System: North Carolina State Plane	Elevation (ft): 9.3 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SW	Munsell: Wet - 2.5Y-5/3 Dry - 2.5Y-6/2 Washed - 2.5Y-6/2	Comments:
--------------------	--	-----------

Dry Weight (g): 144.63	Wash Weight (g): 143.75	Pan Retained (g): 0.03	Sieve Loss (%): 0.00	Fines (%): #200 - 0.66 #230 - 0.64	Organics (%):	Carbonates (%): 4	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	1.54	1.06	1.54	1.06
4	-2.25	4.76	0.96	0.66	2.50	1.72
5	-2.00	4.00	3.51	2.43	6.01	4.15
7	-1.50	2.83	10.49	7.25	16.50	11.40
10	-1.00	2.00	12.80	8.85	29.30	20.25
14	-0.50	1.41	14.41	9.96	43.71	30.21
18	0.00	1.00	16.77	11.60	60.48	41.81
25	0.50	0.71	20.81	14.39	81.29	56.20
35	1.00	0.50	21.90	15.14	103.19	71.34
45	1.50	0.35	19.90	13.76	123.09	85.10
60	2.00	0.25	12.71	8.79	135.80	93.89
80	2.50	0.18	6.15	4.25	141.95	98.14
120	3.00	0.13	1.52	1.05	143.47	99.19
170	3.50	0.09	0.18	0.12	143.65	99.31
200	3.75	0.07	0.04	0.03	143.69	99.34
230	4.00	0.06	0.03	0.02	143.72	99.36

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.13	1.46	1.13	0.28	-0.76	-1.24	-1.94
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.17	0.89	1.24	-0.18	2.31	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-13 #03 Mid Berm

Analysis Date: 11-05-13

Analyzed By: LC

Easting (ft): 2,956,201	Northing (ft): 907,596	Coordinate System: North Carolina State Plane	Elevation (ft): 7.3 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SW	Munsell: Wet - 2.5Y-6/3 Dry - 2.5Y-6/2 Washed - 2.5Y-7/2	Comments:
--------------------	--	-----------

Dry Weight (g): 144.89	Wash Weight (g): 144.08	Pan Retained (g): 0.00	Sieve Loss (%): 0.06	Fines (%): #200 - 0.63 #230 - 0.63	Organics (%):	Carbonates (%): 2	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	2.34	1.62	2.34	1.62
4	-2.25	4.76	0.00	0.00	2.34	1.62
5	-2.00	4.00	0.25	0.17	2.59	1.79
7	-1.50	2.83	0.81	0.56	3.40	2.35
10	-1.00	2.00	0.76	0.52	4.16	2.87
14	-0.50	1.41	1.36	0.94	5.52	3.81
18	0.00	1.00	2.81	1.94	8.33	5.75
25	0.50	0.71	7.45	5.14	15.78	10.89
35	1.00	0.50	17.62	12.16	33.40	23.05
45	1.50	0.35	32.60	22.50	66.00	45.55
60	2.00	0.25	49.01	33.83	115.01	79.38
80	2.50	0.18	25.10	17.32	140.11	96.70
120	3.00	0.13	3.71	2.56	143.82	99.26
170	3.50	0.09	0.15	0.10	143.97	99.36
200	3.75	0.07	0.02	0.01	143.99	99.37
230	4.00	0.06	0.00	0.00	143.99	99.37

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.45	2.13	1.94	1.57	1.04	0.71	-0.19
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	1.37	0.39	0.91	-2.03	9.18	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-13 #04 Berm Crest

Analysis Date: 11-05-13

Analyzed By: LC

Easting (ft): 2,956,234	Northing (ft): 907,608
-----------------------------------	----------------------------------

Coordinate System: North Carolina State Plane	Elevation (ft): 4.4 NAVD 88
---	---------------------------------------

USCS: SW	Munsell: Wet - 2.5Y-6/3 Dry - 2.5Y-6/2 Washed - 2.5Y-7/2	Comments:
--------------------	--	-----------

Dry Weight (g): 137.59	Wash Weight (g): 137.22	Pan Retained (g): 0.01	Sieve Loss (%): 0.04	Fines (%): #200 - 0.31 #230 - 0.31	Organics (%):	Carbonates (%): 3	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.25	0.18	0.25	0.18
10	-1.00	2.00	0.43	0.31	0.68	0.49
14	-0.50	1.41	3.43	2.49	4.11	2.98
18	0.00	1.00	12.27	8.92	16.38	11.90
25	0.50	0.71	16.77	12.19	33.15	24.09
35	1.00	0.50	16.48	11.98	49.63	36.07
45	1.50	0.35	23.17	16.84	72.80	52.91
60	2.00	0.25	34.77	25.27	107.57	78.18
80	2.50	0.18	25.42	18.48	132.99	96.66
120	3.00	0.13	4.00	2.91	136.99	99.57
170	3.50	0.09	0.15	0.11	137.14	99.68
200	3.75	0.07	0.01	0.01	137.15	99.69
230	4.00	0.06	0.00	0.00	137.15	99.69

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.46	2.16	1.94	1.41	0.54	0.17	-0.39
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.23	0.43	0.9	-0.5	2.43	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-13 #05 MHW

Analysis Date: 11-06-13

Analyzed By: LC

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,956,264	907,622	North Carolina State Plane	1.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-5/2 Dry - 2.5Y-6/2 Washed - 2.5Y-7/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
160.82	159.78	0.01	0.04	#200 - 0.68 #230 - 0.68		4	

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	1.11	0.69	1.11	0.69
5/16"	-3.00	8.00	0.00	0.00	1.11	0.69
3.5	-2.50	5.66	1.45	0.90	2.56	1.59
4	-2.25	4.76	1.01	0.63	3.57	2.22
5	-2.00	4.00	1.05	0.65	4.62	2.87
7	-1.50	2.83	5.26	3.27	9.88	6.14
10	-1.00	2.00	7.88	4.90	17.76	11.04
14	-0.50	1.41	15.77	9.81	33.53	20.85
18	0.00	1.00	15.72	9.77	49.25	30.62
25	0.50	0.71	15.50	9.64	64.75	40.26
35	1.00	0.50	13.55	8.43	78.30	48.69
45	1.50	0.35	14.15	8.80	92.45	57.49
60	2.00	0.25	28.69	17.84	121.14	75.33
80	2.50	0.18	31.10	19.34	152.24	94.67
120	3.00	0.13	7.17	4.46	159.41	99.13
170	3.50	0.09	0.27	0.17	159.68	99.30
200	3.75	0.07	0.03	0.02	159.71	99.32
230	4.00	0.06	0.00	0.00	159.71	99.32

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.54	2.22	1.99	1.07	-0.29	-0.75	-1.67
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.78	0.58	1.4	-0.62	2.67	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-13 #06 MTL

Analysis Date: 11-06-13

Analyzed By: LC

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,956,284	907,627	North Carolina State Plane	-0.7 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-5/3 Dry - 2.5Y-6/2 Washed - 2.5Y-7/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
190.11	188.81	0.00	0.00	#200 - 0.68 #230 - 0.68		6	

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	6.16	3.24	6.16	3.24
3.5	-2.50	5.66	17.90	9.42	24.06	12.66
4	-2.25	4.76	5.61	2.95	29.67	15.61
5	-2.00	4.00	6.11	3.21	35.78	18.82
7	-1.50	2.83	17.17	9.03	52.95	27.85
10	-1.00	2.00	21.22	11.16	74.17	39.01
14	-0.50	1.41	30.08	15.82	104.25	54.83
18	0.00	1.00	21.42	11.27	125.67	66.10
25	0.50	0.71	16.12	8.48	141.79	74.58
35	1.00	0.50	9.10	4.79	150.89	79.37
45	1.50	0.35	7.76	4.08	158.65	83.45
60	2.00	0.25	11.79	6.20	170.44	89.65
80	2.50	0.18	14.52	7.64	184.96	97.29
120	3.00	0.13	3.75	1.97	188.71	99.26
170	3.50	0.09	0.09	0.05	188.80	99.31
200	3.75	0.07	0.01	0.01	188.81	99.32
230	4.00	0.06	0.00	0.00	188.81	99.32

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.35	1.54	0.54	-0.65	-1.66	-2.22	-2.91
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	-0.51	1.42	1.58	0.28	2.24	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-13 #07 MLW

Analysis Date: 11-07-13

Analyzed By: LC

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,956,299	907,633	North Carolina State Plane	-2.1 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-5/3 Dry - 2.5Y-6/2 Washed - 2.5Y-7/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
161.90	160.84	0.00	0.04	#200 - 0.70 #230 - 0.69		4	

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	1.17	0.72	1.17	0.72
3.5	-2.50	5.66	10.18	6.29	11.35	7.01
4	-2.25	4.76	3.52	2.17	14.87	9.18
5	-2.00	4.00	4.32	2.67	19.19	11.85
7	-1.50	2.83	10.71	6.62	29.90	18.47
10	-1.00	2.00	12.98	8.02	42.88	26.49
14	-0.50	1.41	16.95	10.47	59.83	36.96
18	0.00	1.00	16.70	10.32	76.53	47.28
25	0.50	0.71	15.29	9.44	91.82	56.72
35	1.00	0.50	10.19	6.29	102.01	63.01
45	1.50	0.35	7.46	4.61	109.47	67.62
60	2.00	0.25	15.40	9.51	124.87	77.13
80	2.50	0.18	26.71	16.50	151.58	93.63
120	3.00	0.13	8.94	5.52	160.52	99.15
170	3.50	0.09	0.22	0.14	160.74	99.29
200	3.75	0.07	0.02	0.01	160.76	99.30
230	4.00	0.06	0.01	0.01	160.77	99.31

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.62	2.21	1.89	0.14	-1.09	-1.69	-2.66
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.2	0.87	1.69	-0.14	1.86	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-13 #08 Trough

Analysis Date: 11-07-13

Analyzed By: LC

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,956,343	907,653	North Carolina State Plane	-5.1 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/2 Dry - 5Y-6/2 Washed - 5Y-7/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
124.91	123.68	0.00	0.01	#200 - 1.05 #230 - 1.01		1	

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.20	0.16	0.20	0.16
7	-1.50	2.83	0.13	0.10	0.33	0.26
10	-1.00	2.00	0.44	0.35	0.77	0.61
14	-0.50	1.41	0.83	0.66	1.60	1.27
18	0.00	1.00	1.28	1.02	2.88	2.29
25	0.50	0.71	1.55	1.24	4.43	3.53
35	1.00	0.50	2.01	1.61	6.44	5.14
45	1.50	0.35	4.83	3.87	11.27	9.01
60	2.00	0.25	15.03	12.03	26.30	21.04
80	2.50	0.18	52.09	41.70	78.39	62.74
120	3.00	0.13	42.24	33.82	120.63	96.56
170	3.50	0.09	2.84	2.27	123.47	98.83
200	3.75	0.07	0.15	0.12	123.62	98.95
230	4.00	0.06	0.05	0.04	123.67	98.99

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.98	2.81	2.68	2.35	2.05	1.79	0.96
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.23	0.21	0.7	-2.39	11.32	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-13 #09 Bar Crest

Analysis Date: 11-07-13

Analyzed By: LC

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,956,442	907,691	North Carolina State Plane	-4.8 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/2 Dry - 5Y-6/2 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
114.06	112.98	0.00	0.00	#200 - 0.96 #230 - 0.94		1	

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.06	0.05	0.06	0.05
14	-0.50	1.41	0.09	0.08	0.15	0.13
18	0.00	1.00	0.26	0.23	0.41	0.36
25	0.50	0.71	0.43	0.38	0.84	0.74
35	1.00	0.50	1.29	1.13	2.13	1.87
45	1.50	0.35	4.63	4.06	6.76	5.93
60	2.00	0.25	15.67	13.74	22.43	19.67
80	2.50	0.18	43.41	38.06	65.84	57.73
120	3.00	0.13	41.36	36.26	107.20	93.99
170	3.50	0.09	5.55	4.87	112.75	98.86
200	3.75	0.07	0.21	0.18	112.96	99.04
230	4.00	0.06	0.02	0.02	112.98	99.06

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.10	2.86	2.74	2.40	2.07	1.87	1.39
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.34	0.20	0.53	-1.23	6.76	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-13 #10 (-12.5)

Analysis Date: 11-07-13

Analyzed By: LC

Easting (ft): 2,956,643	Northing (ft): 907,748	Coordinate System: North Carolina State Plane	Elevation (ft): -12.5 NAVD 88
----------------------------	---------------------------	--	----------------------------------

USCS: SP	Munsell: Wet - 5Y-4/2 Dry - 5Y-5/2 Washed - 5Y-7/1	Comments:
-------------	---	-----------

Dry Weight (g): 174.13	Wash Weight (g): 172.33	Pan Retained (g): 0.06	Sieve Loss (%): 0.03	Fines (%): #200 - 1.18 #230 - 1.10	Organics (%):	Carbonates (%): 1	Shell Hash (%):
---------------------------	----------------------------	---------------------------	-------------------------	--	---------------	----------------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.10	0.06	0.10	0.06
10	-1.00	2.00	0.14	0.08	0.24	0.14
14	-0.50	1.41	0.23	0.13	0.47	0.27
18	0.00	1.00	0.46	0.26	0.93	0.53
25	0.50	0.71	1.13	0.65	2.06	1.18
35	1.00	0.50	2.90	1.67	4.96	2.85
45	1.50	0.35	6.29	3.61	11.25	6.46
60	2.00	0.25	14.73	8.46	25.98	14.92
80	2.50	0.18	55.51	31.88	81.49	46.80
120	3.00	0.13	78.69	45.19	160.18	91.99
170	3.50	0.09	11.20	6.43	171.38	98.42
200	3.75	0.07	0.70	0.40	172.08	98.82
230	4.00	0.06	0.14	0.08	172.22	98.90

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.23	2.91	2.81	2.54	2.16	2.02	1.30
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.42	0.19	0.58	-1.79	9.12	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-13 #11 (-15.0)

Analysis Date: 11-07-13

Analyzed By: LC

Easting (ft): 2,956,781	Northing (ft): 907,786	Coordinate System: North Carolina State Plane	Elevation (ft): -15.0 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP-SM	Munsell: Wet - 5Y-4/1 Dry - 5Y-5/2 Washed - 5Y-7/1	Comments:
-----------------------	---	-----------

Dry Weight (g): 164.26	Wash Weight (g): 155.36	Pan Retained (g): 0.31	Sieve Loss (%): 0.09	Fines (%): #200 - 6.48 #230 - 5.70	Organics (%):	Carbonates (%): 1	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.03	0.02	0.03	0.02
10	-1.00	2.00	0.07	0.04	0.10	0.06
14	-0.50	1.41	0.15	0.09	0.25	0.15
18	0.00	1.00	0.31	0.19	0.56	0.34
25	0.50	0.71	0.81	0.49	1.37	0.83
35	1.00	0.50	4.16	2.53	5.53	3.36
45	1.50	0.35	7.71	4.69	13.24	8.05
60	2.00	0.25	14.68	8.94	27.92	16.99
80	2.50	0.18	36.49	22.21	64.41	39.20
120	3.00	0.13	61.38	37.37	125.79	76.57
170	3.50	0.09	24.33	14.81	150.12	91.38
200	3.75	0.07	3.51	2.14	153.63	93.52
230	4.00	0.06	1.28	0.78	154.91	94.30

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.25	2.98	2.64	2.18	1.94	1.17
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	2.49	0.18	0.67	-1.07	5.1	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-13 #12 (-17.5)

Analysis Date: 11-11-13

Analyzed By: LC

Easting (ft): Northing (ft):
2,957,503 908,059

Coordinate System: Elevation (ft):
North Carolina State Plane -17.5 NAVD 88

USCS: Munsell: Comments:
SP Wet - 5Y-4/2 Dry - 5Y-5/2
 Washed - 5Y-7/1

Dry Weight (g): Wash Weight (g): Pan Retained (g): Sieve Loss (%): Fines (%): Organics (%): Carbonates (%): Shell Hash (%):
150.96 149.18 0.06 0.03 #200 - 1.37 1
 #230 - 1.24

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.12	0.08	0.12	0.08
10	-1.00	2.00	0.05	0.03	0.17	0.11
14	-0.50	1.41	0.19	0.13	0.36	0.24
18	0.00	1.00	0.41	0.27	0.77	0.51
25	0.50	0.71	0.84	0.56	1.61	1.07
35	1.00	0.50	1.89	1.25	3.50	2.32
45	1.50	0.35	4.25	2.82	7.75	5.14
60	2.00	0.25	12.26	8.12	20.01	13.26
80	2.50	0.18	55.64	36.86	75.65	50.12
120	3.00	0.13	65.76	43.56	141.41	93.68
170	3.50	0.09	6.83	4.52	148.24	98.20
200	3.75	0.07	0.65	0.43	148.89	98.63
230	4.00	0.06	0.19	0.13	149.08	98.76

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.15	2.89	2.79	2.50	2.16	2.04	1.48
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.41	0.19	0.54	-1.9	10.8	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-13 #13 (-20.0)

Analysis Date: 11-11-13

Analyzed By: LC

Easting (ft):

2,957,745

Northing (ft):

908,170

Coordinate System:

North Carolina State Plane

Elevation (ft):

-20.0 NAVD 88

USCS:

SP

Munsell:

Wet - 5Y-4/2

Dry - 5Y-5/2

Washed - 2.5Y-7/1

Comments:

Dry Weight (g):

150.52

Wash Weight (g):

148.91

Pan Retained (g):

0.12

Sieve Loss (%):

0.01

Fines (%):

#200 - 1.41

#230 - 1.18

Organics (%):

Carbonates (%):

1

Shell Hash (%):

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.38	0.25	0.38	0.25
3.5	-2.50	5.66	0.05	0.03	0.43	0.28
4	-2.25	4.76	0.00	0.00	0.43	0.28
5	-2.00	4.00	0.14	0.09	0.57	0.37
7	-1.50	2.83	0.35	0.23	0.92	0.60
10	-1.00	2.00	0.05	0.03	0.97	0.63
14	-0.50	1.41	0.12	0.08	1.09	0.71
18	0.00	1.00	0.05	0.03	1.14	0.74
25	0.50	0.71	0.06	0.04	1.20	0.78
35	1.00	0.50	0.11	0.07	1.31	0.85
45	1.50	0.35	0.50	0.33	1.81	1.18
60	2.00	0.25	7.64	5.08	9.45	6.26
80	2.50	0.18	54.26	36.05	63.71	42.31
120	3.00	0.13	67.70	44.98	131.41	87.29
170	3.50	0.09	15.56	10.34	146.97	97.63
200	3.75	0.07	1.45	0.96	148.42	98.59
230	4.00	0.06	0.35	0.23	148.77	98.82

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.37	2.96	2.86	2.59	2.26	2.14	1.88

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.53	0.17	0.58	-4.45	41.06

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
 Coastal Planning & Engineering, Inc.
 2481 NW Boca Raton Blvd.
 Boca Raton, FL 33431
 ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-15 #01 Dune

Analysis Date: 08-13-15

Analyzed By: TM

Easting (ft): 2,956,880	Northing (ft): 905,768	Coordinate System: North Carolina State Plane	Elevation (ft): 19.8 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SP	Munsell: Wet - 2.5Y-6/2 Dry - 2.5Y-7/3 Washed - 2.5Y-7/1	Comments:
--------------------	--	-----------

Dry Weight (g): 97.25	Wash Weight (g): 96.37	Pan Retained (g): 0.01	Sieve Loss (%): 0.01	Fines (%): #200 - 1.00 #230 - 0.95	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.10	0.10	0.10	0.10
3.5	-2.50	5.66	0.00	0.00	0.10	0.10
4	-2.25	4.76	0.00	0.00	0.10	0.10
5	-2.00	4.00	0.00	0.00	0.10	0.10
7	-1.50	2.83	0.14	0.14	0.24	0.24
10	-1.00	2.00	0.14	0.14	0.38	0.38
14	-0.50	1.41	0.60	0.62	0.98	1.00
18	0.00	1.00	0.89	0.92	1.87	1.92
25	0.50	0.71	2.87	2.95	4.74	4.87
35	1.00	0.50	7.07	7.27	11.81	12.14
45	1.50	0.35	20.14	20.71	31.95	32.85
60	2.00	0.25	33.75	34.70	65.70	67.55
80	2.50	0.18	23.87	24.54	89.57	92.09
120	3.00	0.13	5.81	5.97	95.38	98.06
170	3.50	0.09	0.76	0.78	96.14	98.84
200	3.75	0.07	0.16	0.16	96.30	99.00
230	4.00	0.06	0.05	0.05	96.35	99.05

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.74	2.34	2.15	1.75	1.31	1.09	0.51
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.68	0.31	0.68	-1.15	7.48	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-15 #02 TOD

Analysis Date: 08-13-15

Analyzed By: TM

Easting (ft):

2,956,917

Northing (ft):

905,783

Coordinate System:

North Carolina State Plane

Elevation (ft):

8.5 NAVD 88

USCS:

SP

Munsell:

Wet - 2.5Y-6/2
Dry - 2.5Y-7/2
Washed - 2.5Y-7/1

Comments:

Dry Weight (g):

99.31

Wash Weight (g):

99.00

Pan Retained (g):

0.01

Sieve Loss (%):

0.11

Fines (%):

#200 - 0.44
#230 - 0.43

Organics (%):

Carbonates (%):

Shell Hash (%):

Sieve Number

Sieve Size (Phi)

Sieve Size (Millimeters)

Grams Retained

% Weight Retained

Cum. Grams Retained

C. % Weight Retained

3/4"

-4.25

19.03

0.00

0.00

0.00

0.00

5/8"

-4.00

16.00

0.00

0.00

0.00

0.00

7/16"

-3.50

11.31

0.00

0.00

0.00

0.00

5/16"

-3.00

8.00

0.00

0.00

0.00

0.00

3.5

-2.50

5.66

0.00

0.00

0.00

0.00

4

-2.25

4.76

0.00

0.00

0.00

0.00

5

-2.00

4.00

0.00

0.00

0.00

0.00

7

-1.50

2.83

0.24

0.24

0.24

0.24

10

-1.00

2.00

0.96

0.97

1.20

1.21

14

-0.50

1.41

3.50

3.52

4.70

4.73

18

0.00

1.00

9.43

9.50

14.13

14.23

25

0.50

0.71

16.03

16.14

30.16

30.37

35

1.00

0.50

23.85

24.02

54.01

54.39

45

1.50

0.35

21.56

21.71

75.57

76.10

60

2.00

0.25

16.85

16.97

92.42

93.07

80

2.50

0.18

5.73

5.77

98.15

98.84

120

3.00

0.13

0.65

0.65

98.80

99.49

170

3.50

0.09

0.06

0.06

98.86

99.55

200

3.75

0.07

0.01

0.01

98.87

99.56

230

4.00

0.06

0.01

0.01

98.88

99.57

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

2.17

1.73

1.47

0.91

0.33

0.05

-0.49

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

0.88

0.54

0.8

-0.26

2.84

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-15 #03 Mid Berm

Analysis Date: 08-13-15

Analyzed By: TM

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,956,960	905,796	North Carolina State Plane	6.9 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-6/2 Dry - 2.5Y-7/3 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
98.73	98.40	0.00	0.07	#200 - 0.42 #230 - 0.42			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	1.13	1.14	1.13	1.14
3.5	-2.50	5.66	0.31	0.31	1.44	1.45
4	-2.25	4.76	0.00	0.00	1.44	1.45
5	-2.00	4.00	0.00	0.00	1.44	1.45
7	-1.50	2.83	0.17	0.17	1.61	1.62
10	-1.00	2.00	0.17	0.17	1.78	1.79
14	-0.50	1.41	1.10	1.11	2.88	2.90
18	0.00	1.00	2.79	2.83	5.67	5.73
25	0.50	0.71	5.24	5.31	10.91	11.04
35	1.00	0.50	8.05	8.15	18.96	19.19
45	1.50	0.35	15.59	15.79	34.55	34.98
60	2.00	0.25	31.30	31.70	65.85	66.68
80	2.50	0.18	27.91	28.27	93.76	94.95
120	3.00	0.13	4.35	4.41	98.11	99.36
170	3.50	0.09	0.20	0.20	98.31	99.56
200	3.75	0.07	0.02	0.02	98.33	99.58
230	4.00	0.06	0.00	0.00	98.33	99.58

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.51	2.31	2.15	1.74	1.18	0.80	-0.13
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.53	0.35	0.94	-2.22	10.63	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-15 #04 Berm Crest

Analysis Date: 08-13-15

Analyzed By: TM

Easting (ft): 2,956,970	Northing (ft): 905,801	Coordinate System: North Carolina State Plane	Elevation (ft): 6.7 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SP	Munsell: Wet - 2.5Y-6/2 Dry - 2.5Y-7/3 Washed - 2.5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 99.64	Wash Weight (g): 99.40	Pan Retained (g): 0.00	Sieve Loss (%): 0.01	Fines (%): #200 - 0.25 #230 - 0.25	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.05	0.05	0.05	0.05
7	-1.50	2.83	0.00	0.00	0.05	0.05
10	-1.00	2.00	0.29	0.29	0.34	0.34
14	-0.50	1.41	1.04	1.04	1.38	1.38
18	0.00	1.00	3.13	3.14	4.51	4.52
25	0.50	0.71	7.10	7.13	11.61	11.65
35	1.00	0.50	16.58	16.64	28.19	28.29
45	1.50	0.35	24.79	24.88	52.98	53.17
60	2.00	0.25	27.99	28.09	80.97	81.26
80	2.50	0.18	16.08	16.14	97.05	97.40
120	3.00	0.13	2.23	2.24	99.28	99.64
170	3.50	0.09	0.08	0.08	99.36	99.72
200	3.75	0.07	0.03	0.03	99.39	99.75
230	4.00	0.06	0.00	0.00	99.39	99.75

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.43	2.08	1.89	1.44	0.90	0.63	0.03
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.36	0.39	0.73	-0.61	3.49	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-15 #05 MHW

Analysis Date: 08-13-15

Analyzed By: TM

Easting (ft): 2,957,028	Northing (ft): 905,823	Coordinate System: North Carolina State Plane	Elevation (ft): 1.8 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SP	Munsell: Wet - 2.5Y-6/1 Dry - 2.5Y-7/3 Washed - 2.5Y-8/1	Comments:
--------------------	--	-----------

Dry Weight (g): 83.09	Wash Weight (g): 82.25	Pan Retained (g): 0.00	Sieve Loss (%): 0.10	Fines (%): #200 - 1.11 #230 - 1.11	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.09	0.11	0.09	0.11
10	-1.00	2.00	0.10	0.12	0.19	0.23
14	-0.50	1.41	0.38	0.46	0.57	0.69
18	0.00	1.00	1.12	1.35	1.69	2.04
25	0.50	0.71	3.31	3.98	5.00	6.02
35	1.00	0.50	7.27	8.75	12.27	14.77
45	1.50	0.35	15.65	18.83	27.92	33.60
60	2.00	0.25	27.19	32.72	55.11	66.32
80	2.50	0.18	23.42	28.19	78.53	94.51
120	3.00	0.13	3.54	4.26	82.07	98.77
170	3.50	0.09	0.09	0.11	82.16	98.88
200	3.75	0.07	0.01	0.01	82.17	98.89
230	4.00	0.06	0.00	0.00	82.17	98.89

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.56	2.31	2.15	1.75	1.27	1.03	0.37
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.65	0.32	0.66	-0.99	4.56	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-15 #06 MTL

Analysis Date: 08-13-15

Analyzed By: TM

Easting (ft): 2,957,051	Northing (ft): 905,830	Coordinate System: North Carolina State Plane	Elevation (ft): -0.4 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 2.5Y-6/1 Dry - 2.5Y-7/2 Washed - 2.5Y-8/1	Comments:
--------------------	--	-----------

Dry Weight (g): 82.73	Wash Weight (g): 81.94	Pan Retained (g): 0.00	Sieve Loss (%): 0.10	Fines (%): #200 - 1.06 #230 - 1.05	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.48	0.58	0.48	0.58
4	-2.25	4.76	0.28	0.34	0.76	0.92
5	-2.00	4.00	0.28	0.34	1.04	1.26
7	-1.50	2.83	1.32	1.60	2.36	2.86
10	-1.00	2.00	2.83	3.42	5.19	6.28
14	-0.50	1.41	4.44	5.37	9.63	11.65
18	0.00	1.00	3.46	4.18	13.09	15.83
25	0.50	0.71	2.26	2.73	15.35	18.56
35	1.00	0.50	2.42	2.93	17.77	21.49
45	1.50	0.35	3.86	4.67	21.63	26.16
60	2.00	0.25	13.48	16.29	35.11	42.45
80	2.50	0.18	35.36	42.74	70.47	85.19
120	3.00	0.13	11.13	13.45	81.60	98.64
170	3.50	0.09	0.24	0.29	81.84	98.93
200	3.75	0.07	0.01	0.01	81.85	98.94
230	4.00	0.06	0.01	0.01	81.86	98.95

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.86	2.49	2.38	2.09	1.38	0.03	-1.19
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.58	0.33	1.25	-1.47	4.16	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-15 #07 MLW

Analysis Date: 08-13-15

Analyzed By: TM

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,957,078	905,841	North Carolina State Plane	-2.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-6/2 Dry - 2.5Y-7/2 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
89.65	89.18	0.00	0.04	#200 - 0.56 #230 - 0.55			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.48	0.54	0.48	0.54
3.5	-2.50	5.66	4.79	5.34	5.27	5.88
4	-2.25	4.76	1.34	1.49	6.61	7.37
5	-2.00	4.00	1.95	2.18	8.56	9.55
7	-1.50	2.83	5.40	6.02	13.96	15.57
10	-1.00	2.00	6.55	7.31	20.51	22.88
14	-0.50	1.41	8.11	9.05	28.62	31.93
18	0.00	1.00	7.02	7.83	35.64	39.76
25	0.50	0.71	6.14	6.85	41.78	46.61
35	1.00	0.50	5.34	5.96	47.12	52.57
45	1.50	0.35	7.37	8.22	54.49	60.79
60	2.00	0.25	12.79	14.27	67.28	75.06
80	2.50	0.18	17.82	19.88	85.10	94.94
120	3.00	0.13	3.95	4.41	89.05	99.35
170	3.50	0.09	0.07	0.08	89.12	99.43
200	3.75	0.07	0.01	0.01	89.13	99.44
230	4.00	0.06	0.01	0.01	89.14	99.45

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.51	2.22	2.00	0.78	-0.88	-1.47	-2.58
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.46	0.73	1.66	-0.42	1.94	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-15 #08 Trough

Analysis Date: 08-13-15

Analyzed By: TM

Easting (ft):

2,957,145

Northing (ft):

905,866

Coordinate System:

North Carolina State Plane

Elevation (ft):

-5.0 NAVD 88

USCS:

SP

Munsell:

Wet - 5Y-5/1
Dry - 5Y-6/1
Washed - 5Y-7/1

Comments:

Dry Weight (g):

81.47

Wash Weight (g):

80.58

Pan Retained (g):

0.01

Sieve Loss (%):

0.05

Fines (%):

#200 - 1.22
#230 - 1.16

Organics (%):

Carbonates (%):

Shell Hash (%):

Sieve Number

Sieve Size (Phi)

Sieve Size (Millimeters)

Grams Retained

% Weight Retained

Cum. Grams Retained

C. % Weight Retained

3/4"

-4.25

19.03

0.00

0.00

0.00

0.00

5/8"

-4.00

16.00

0.00

0.00

0.00

0.00

7/16"

-3.50

11.31

0.00

0.00

0.00

0.00

5/16"

-3.00

8.00

0.00

0.00

0.00

0.00

3.5

-2.50

5.66

0.00

0.00

0.00

0.00

4

-2.25

4.76

0.00

0.00

0.00

0.00

5

-2.00

4.00

0.00

0.00

0.00

0.00

7

-1.50

2.83

0.00

0.00

0.00

0.00

10

-1.00

2.00

0.07

0.09

0.07

0.09

14

-0.50

1.41

0.13

0.16

0.20

0.25

18

0.00

1.00

0.05

0.06

0.25

0.31

25

0.50

0.71

0.19

0.23

0.44

0.54

35

1.00

0.50

0.38

0.47

0.82

1.01

45

1.50

0.35

1.44

1.77

2.26

2.78

60

2.00

0.25

6.81

8.36

9.07

11.14

80

2.50

0.18

31.10

38.17

40.17

49.31

120

3.00

0.13

34.92

42.86

75.09

92.17

170

3.50

0.09

5.11

6.27

80.20

98.44

200

3.75

0.07

0.28

0.34

80.48

98.78

230

4.00

0.06

0.05

0.06

80.53

98.84

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

3.23

2.90

2.80

2.51

2.18

2.06

1.63

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

2.45

0.18

0.48

-1.6

10.93

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-15 #09 Bar Crest

Analysis Date: 08-13-15

Analyzed By: TM

Easting (ft):	Northing (ft):
2,957,287	905,918

Coordinate System:	Elevation (ft):
North Carolina State Plane	-9.0 NAVD 88

USCS:	Munsell:	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	Comments:
SP			

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
82.38	81.45	0.01	0.04	#200 - 1.25 #230 - 1.18			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.17	0.21	0.17	0.21
7	-1.50	2.83	0.08	0.10	0.25	0.31
10	-1.00	2.00	0.48	0.58	0.73	0.89
14	-0.50	1.41	1.00	1.21	1.73	2.10
18	0.00	1.00	1.29	1.57	3.02	3.67
25	0.50	0.71	1.44	1.75	4.46	5.42
35	1.00	0.50	1.74	2.11	6.20	7.53
45	1.50	0.35	3.55	4.31	9.75	11.84
60	2.00	0.25	11.68	14.18	21.43	26.02
80	2.50	0.18	33.03	40.09	54.46	66.11
120	3.00	0.13	23.40	28.40	77.86	94.51
170	3.50	0.09	3.23	3.92	81.09	98.43
200	3.75	0.07	0.26	0.32	81.35	98.75
230	4.00	0.06	0.06	0.07	81.41	98.82

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.06	2.81	2.66	2.30	1.96	1.65	0.38
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.15	0.23	0.8	-2.04	8.55	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-15 #10 (-12.5)

Analysis Date: 08-13-15

Analyzed By: TM

Easting (ft): 2,957,465
Northing (ft): 905,982

Coordinate System: North Carolina State Plane
Elevation (ft): -12.5 NAVD 88

USCS: SW
Munsell: Wet - 5Y-5/1
Dry - 5Y-6/1
Washed - 5Y-7/1
Comments:

Dry Weight (g): 81.52
Wash Weight (g): 80.50
Pan Retained (g): 0.06
Sieve Loss (%): 0.02
Fines (%): #200 - 1.51
#230 - 1.35
Organics (%):
Carbonates (%):
Shell Hash (%):

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.19	0.23	0.19	0.23
5	-2.00	4.00	0.00	0.00	0.19	0.23
7	-1.50	2.83	0.96	1.18	1.15	1.41
10	-1.00	2.00	2.15	2.64	3.30	4.05
14	-0.50	1.41	2.79	3.42	6.09	7.47
18	0.00	1.00	2.11	2.59	8.20	10.06
25	0.50	0.71	0.94	1.15	9.14	11.21
35	1.00	0.50	0.36	0.44	9.50	11.65
45	1.50	0.35	0.50	0.61	10.00	12.26
60	2.00	0.25	2.95	3.62	12.95	15.88
80	2.50	0.18	23.15	28.40	36.10	44.28
120	3.00	0.13	37.54	46.05	73.64	90.33
170	3.50	0.09	6.09	7.47	79.73	97.80
200	3.75	0.07	0.56	0.69	80.29	98.49
230	4.00	0.06	0.13	0.16	80.42	98.65

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
	3.31	2.93	2.83	2.56	2.16	2.00	-0.86
	2.19	0.22	1.15	-2.12	6.62		

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-15 #11 (-15.0)

Analysis Date: 08-13-15

Analyzed By: TM

Easting (ft): 2,958,024	Northing (ft): 906,185	Coordinate System: North Carolina State Plane	Elevation (ft): -15.0 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP	Munsell: Wet - 5Y-4/1 Dry - 5Y-5/1 Washed - 5Y-6/1	Comments:
--------------------	---	-----------

Dry Weight (g): 80.08	Wash Weight (g): 78.93	Pan Retained (g): 0.01	Sieve Loss (%): 0.04	Fines (%): #200 - 1.72 #230 - 1.50	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.01	0.01	0.01	0.01
10	-1.00	2.00	0.02	0.02	0.03	0.03
14	-0.50	1.41	0.05	0.06	0.08	0.09
18	0.00	1.00	0.08	0.10	0.16	0.19
25	0.50	0.71	0.31	0.39	0.47	0.58
35	1.00	0.50	0.92	1.15	1.39	1.73
45	1.50	0.35	2.00	2.50	3.39	4.23
60	2.00	0.25	6.56	8.19	9.95	12.42
80	2.50	0.18	31.89	39.82	41.84	52.24
120	3.00	0.13	30.56	38.16	72.40	90.40
170	3.50	0.09	5.60	6.99	78.00	97.39
200	3.75	0.07	0.71	0.89	78.71	98.28
230	4.00	0.06	0.18	0.22	78.89	98.50

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.33	2.92	2.80	2.47	2.16	2.04	1.55
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	2.43	0.19	0.51	-1.16	7.49	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-15 #12 (-17.5)

Analysis Date: 08-13-15

Analyzed By: TM

Easting (ft): 2,958,528	Northing (ft): 906,369	Coordinate System: North Carolina State Plane	Elevation (ft): -17.5 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP	Munsell: Wet - 5Y-4/1 Dry - 5Y-5/1 Washed - 5Y-6/1	Comments:
--------------------	---	-----------

Dry Weight (g): 81.15	Wash Weight (g): 80.17	Pan Retained (g): 0.02	Sieve Loss (%): 0.06	Fines (%): #200 - 1.51 #230 - 1.30	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.25	0.31	0.25	0.31
10	-1.00	2.00	0.22	0.27	0.47	0.58
14	-0.50	1.41	0.26	0.32	0.73	0.90
18	0.00	1.00	0.08	0.10	0.81	1.00
25	0.50	0.71	0.11	0.14	0.92	1.14
35	1.00	0.50	0.15	0.18	1.07	1.32
45	1.50	0.35	0.48	0.59	1.55	1.91
60	2.00	0.25	3.24	3.99	4.79	5.90
80	2.50	0.18	32.18	39.65	36.97	45.55
120	3.00	0.13	36.39	44.84	73.36	90.39
170	3.50	0.09	5.92	7.30	79.28	97.69
200	3.75	0.07	0.65	0.80	79.93	98.49
230	4.00	0.06	0.17	0.21	80.10	98.70

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.32	2.93	2.83	2.55	2.24	2.13	1.89
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.5	0.18	0.54	-3.32	24.88	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-15 #13 (-20.0)

Analysis Date: 08-13-15

Analyzed By: TM

Easting (ft): Northing (ft):
2,958,508 906,363

Coordinate System: Elevation (ft):
North Carolina State Plane -20.0 NAVD 88

USCS: Munsell: Comments:
SP Wet - 5Y-4/1
 Dry - 5Y-5/1
 Washed - 5Y-6/1

Dry Weight (g): Wash Weight (g): Pan Retained (g): Sieve Loss (%): Fines (%): Organics (%): Carbonates (%): Shell Hash (%):
79.44 78.24 0.06 0.00 #200 - 1.97
 #230 - 1.58

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.06	0.08	0.06	0.08
10	-1.00	2.00	0.03	0.04	0.09	0.12
14	-0.50	1.41	0.03	0.04	0.12	0.16
18	0.00	1.00	0.01	0.01	0.13	0.17
25	0.50	0.71	0.06	0.08	0.19	0.25
35	1.00	0.50	0.08	0.10	0.27	0.35
45	1.50	0.35	0.12	0.15	0.39	0.50
60	2.00	0.25	0.73	0.92	1.12	1.42
80	2.50	0.18	20.83	26.22	21.95	27.64
120	3.00	0.13	43.33	54.54	65.28	82.18
170	3.50	0.09	11.23	14.14	76.51	96.32
200	3.75	0.07	1.36	1.71	77.87	98.03
230	4.00	0.06	0.31	0.39	78.18	98.42

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.45	3.06	2.93	2.70	2.45	2.28	2.07
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	2.69	0.15	0.41	-1.7	20.07	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-17 #01 Dune

Analysis Date: 08-13-15

Analyzed By: TM

Easting (ft): 2,957,590	Northing (ft): 903,963	Coordinate System: North Carolina State Plane	Elevation (ft): 16.9 NAVD 88
----------------------------	---------------------------	--	---------------------------------

USCS: SW	Munsell: Wet - 2.5Y-5/3 Dry - 2.5Y-6/2 Washed - 2.5Y-7/2	Comments:
-------------	---	-----------

Dry Weight (g): 85.88	Wash Weight (g): 84.75	Pan Retained (g): 0.02	Sieve Loss (%): 0.23	Fines (%): #200 - 1.63 #230 - 1.58	Organics (%):	Carbonates (%):	Shell Hash (%):
--------------------------	---------------------------	---------------------------	-------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.03	0.03	0.03	0.03
10	-1.00	2.00	0.38	0.44	0.41	0.47
14	-0.50	1.41	2.05	2.39	2.46	2.86
18	0.00	1.00	3.54	4.12	6.00	6.98
25	0.50	0.71	6.15	7.16	12.15	14.14
35	1.00	0.50	12.07	14.05	24.22	28.19
45	1.50	0.35	16.76	19.52	40.98	47.71
60	2.00	0.25	20.06	23.36	61.04	71.07
80	2.50	0.18	15.32	17.84	76.36	88.91
120	3.00	0.13	7.14	8.31	83.50	97.22
170	3.50	0.09	0.91	1.06	84.41	98.28
200	3.75	0.07	0.08	0.09	84.49	98.37
230	4.00	0.06	0.04	0.05	84.53	98.42

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.87	2.36	2.11	1.55	0.89	0.57	-0.24

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.43	0.37	0.88	-0.49	3

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-17 #02 TOD

Analysis Date: 08-13-15

Analyzed By: TM

Easting (ft): 2,957,606	Northing (ft): 903,963	Coordinate System: North Carolina State Plane	Elevation (ft): 10.1 NAVD 88
----------------------------	---------------------------	--	---------------------------------

USCS: SW	Munsell: Wet - 2.5Y-6/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
-------------	---	-----------

Dry Weight (g): 94.98	Wash Weight (g): 94.47	Pan Retained (g): 0.00	Sieve Loss (%): 0.12	Fines (%): #200 - 0.69 #230 - 0.68	Organics (%):	Carbonates (%):	Shell Hash (%):
--------------------------	---------------------------	---------------------------	-------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.05	0.05	0.05	0.05
10	-1.00	2.00	0.94	0.99	0.99	1.04
14	-0.50	1.41	4.05	4.26	5.04	5.30
18	0.00	1.00	6.29	6.62	11.33	11.92
25	0.50	0.71	6.51	6.85	17.84	18.77
35	1.00	0.50	8.77	9.23	26.61	28.00
45	1.50	0.35	17.61	18.54	44.22	46.54
60	2.00	0.25	28.57	30.08	72.79	76.62
80	2.50	0.18	18.37	19.34	91.16	95.96
120	3.00	0.13	2.88	3.03	94.04	98.99
170	3.50	0.09	0.26	0.27	94.30	99.26
200	3.75	0.07	0.05	0.05	94.35	99.31
230	4.00	0.06	0.01	0.01	94.36	99.32

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.48	2.19	1.97	1.56	0.84	0.30	-0.54
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.32	0.40	0.91	-0.83	3.08	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-17 #03 Mid Berm

Analysis Date: 08-14-15

Analyzed By: TM

Easting (ft): 2,957,634
Northing (ft): 903,973

Coordinate System: North Carolina State Plane
Elevation (ft): 7.5 NAVD 88

USCS: SW
Munsell: Wet - 2.5Y-6/2
Dry - 2.5Y-7/2
Washed - 2.5Y-8/2
Comments:

Dry Weight (g): 100.16
Wash Weight (g): 99.87
Pan Retained (g): 0.00
Sieve Loss (%): 0.12
Fines (%): #200 - 0.41
#230 - 0.41
Organics (%):
Carbonates (%):
Shell Hash (%):

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.07	0.07	0.07	0.07
10	-1.00	2.00	0.88	0.88	0.95	0.95
14	-0.50	1.41	6.87	6.86	7.82	7.81
18	0.00	1.00	10.64	10.62	18.46	18.43
25	0.50	0.71	11.23	11.21	29.69	29.64
35	1.00	0.50	13.52	13.50	43.21	43.14
45	1.50	0.35	17.03	17.00	60.24	60.14
60	2.00	0.25	22.24	22.20	82.48	82.34
80	2.50	0.18	14.83	14.81	97.31	97.15
120	3.00	0.13	2.28	2.28	99.59	99.43
170	3.50	0.09	0.15	0.15	99.74	99.58
200	3.75	0.07	0.01	0.01	99.75	99.59
230	4.00	0.06	0.00	0.00	99.75	99.59

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.43	1.83	1.20	0.29	-0.70
	1.05	0.48	0.97	-0.37	2.19

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-17 #04 Berm Crest

Analysis Date: 08-14-15

Analyzed By: TM

Easting (ft):	Northing (ft):
2,957,687	903,992

Coordinate System:	Elevation (ft):
North Carolina State Plane	5.2 NAVD 88

USCS:	Munsell:	Wet - 2.5Y-7/2 Dry - 2.5Y-8/1 Washed - 2.5Y-8/1	Comments:
SP			

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
96.94	96.66	0.00	0.08	#200 - 0.36 #230 - 0.36			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.18	0.19	0.18	0.19
5	-2.00	4.00	0.00	0.00	0.18	0.19
7	-1.50	2.83	0.27	0.28	0.45	0.47
10	-1.00	2.00	0.39	0.40	0.84	0.87
14	-0.50	1.41	0.75	0.77	1.59	1.64
18	0.00	1.00	1.23	1.27	2.82	2.91
25	0.50	0.71	2.71	2.80	5.53	5.71
35	1.00	0.50	5.69	5.87	11.22	11.58
45	1.50	0.35	15.62	16.11	26.84	27.69
60	2.00	0.25	35.44	36.56	62.28	64.25
80	2.50	0.18	29.67	30.61	91.95	94.86
120	3.00	0.13	4.43	4.57	96.38	99.43
170	3.50	0.09	0.17	0.18	96.55	99.61
200	3.75	0.07	0.03	0.03	96.58	99.64
230	4.00	0.06	0.00	0.00	96.58	99.64

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.52	2.32	2.18	1.81	1.42	1.14	0.37
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.7	0.31	0.7	-1.71	8.14	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-17 #05 MHW

Analysis Date: 08-14-15

Analyzed By: TM

Easting (ft): 2,957,713	Northing (ft): 903,999	Coordinate System: North Carolina State Plane	Elevation (ft): 1.2 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SW	Munsell: Wet - 2.5Y-6/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/1	Comments:
--------------------	--	-----------

Dry Weight (g): 88.56	Wash Weight (g): 87.90	Pan Retained (g): 0.00	Sieve Loss (%): 0.08	Fines (%): #200 - 0.85 #230 - 0.84	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.37	0.42	0.37	0.42
4	-2.25	4.76	0.00	0.00	0.37	0.42
5	-2.00	4.00	0.00	0.00	0.37	0.42
7	-1.50	2.83	0.55	0.62	0.92	1.04
10	-1.00	2.00	0.87	0.98	1.79	2.02
14	-0.50	1.41	2.36	2.66	4.15	4.68
18	0.00	1.00	3.13	3.53	7.28	8.21
25	0.50	0.71	3.98	4.49	11.26	12.70
35	1.00	0.50	6.91	7.80	18.17	20.50
45	1.50	0.35	13.23	14.94	31.40	35.44
60	2.00	0.25	25.95	29.30	57.35	64.74
80	2.50	0.18	25.85	29.19	83.20	93.93
120	3.00	0.13	4.48	5.06	87.68	98.99
170	3.50	0.09	0.13	0.15	87.81	99.14
200	3.75	0.07	0.01	0.01	87.82	99.15
230	4.00	0.06	0.01	0.01	87.83	99.16

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.61	2.33	2.18	1.75	1.15	0.71	-0.45
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.52	0.35	0.93	-1.49	5.64	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-17 #06 MTL

Analysis Date: 08-14-15

Analyzed By: TM

Easting (ft): 2,957,726	Northing (ft): 904,004	Coordinate System: North Carolina State Plane	Elevation (ft): -0.5 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 2.5Y-6/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
--------------------	--	-----------

Dry Weight (g): 90.47	Wash Weight (g): 89.89	Pan Retained (g): 0.00	Sieve Loss (%): 0.02	Fines (%): #200 - 0.67 #230 - 0.66	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	1.94	2.14	1.94	2.14
3.5	-2.50	5.66	11.09	12.26	13.03	14.40
4	-2.25	4.76	2.09	2.31	15.12	16.71
5	-2.00	4.00	3.60	3.98	18.72	20.69
7	-1.50	2.83	5.59	6.18	24.31	26.87
10	-1.00	2.00	6.94	7.67	31.25	34.54
14	-0.50	1.41	8.60	9.51	39.85	44.05
18	0.00	1.00	5.99	6.62	45.84	50.67
25	0.50	0.71	4.16	4.60	50.00	55.27
35	1.00	0.50	3.20	3.54	53.20	58.81
45	1.50	0.35	5.20	5.75	58.40	64.56
60	2.00	0.25	11.39	12.59	69.79	77.15
80	2.50	0.18	16.24	17.95	86.03	95.10
120	3.00	0.13	3.72	4.11	89.75	99.21
170	3.50	0.09	0.09	0.10	89.84	99.31
200	3.75	0.07	0.02	0.02	89.86	99.33
230	4.00	0.06	0.01	0.01	89.87	99.34

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.50	2.19	1.91	-0.05	-1.65	-2.33	-2.88
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.01	0.99	1.89	-0.13	1.58	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
 Coastal Planning & Engineering, Inc.
 2481 NW Boca Raton Blvd.
 Boca Raton, FL 33431
 ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-17 #07 MLW

Analysis Date: 08-14-15

Analyzed By: TM

Easting (ft): 2,957,738	Northing (ft): 904,007	Coordinate System: North Carolina State Plane	Elevation (ft): -2.1 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 2.5Y-6/2 Dry - 2.5Y-7/2 Washed - 2.5Y-7/2	Comments:
--------------------	---	-----------

Dry Weight (g): 97.14	Wash Weight (g): 96.76	Pan Retained (g): 0.00	Sieve Loss (%): 0.02	Fines (%): #200 - 0.43 #230 - 0.42	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	2.50	2.57	2.50	2.57
5/16"	-3.00	8.00	12.86	13.24	15.36	15.81
3.5	-2.50	5.66	24.67	25.40	40.03	41.21
4	-2.25	4.76	5.83	6.00	45.86	47.21
5	-2.00	4.00	8.13	8.37	53.99	55.58
7	-1.50	2.83	12.64	13.01	66.63	68.59
10	-1.00	2.00	9.18	9.45	75.81	78.04
14	-0.50	1.41	5.37	5.53	81.18	83.57
18	0.00	1.00	2.47	2.54	83.65	86.11
25	0.50	0.71	1.16	1.19	84.81	87.30
35	1.00	0.50	0.91	0.94	85.72	88.24
45	1.50	0.35	1.12	1.15	86.84	89.39
60	2.00	0.25	2.41	2.48	89.25	91.87
80	2.50	0.18	5.31	5.47	94.56	97.34
120	3.00	0.13	2.11	2.17	96.67	99.51
170	3.50	0.09	0.05	0.05	96.72	99.56
200	3.75	0.07	0.01	0.01	96.73	99.57
230	4.00	0.06	0.01	0.01	96.74	99.58

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.29	-0.42	-1.16	-2.17	-2.82	-3.00	-3.41
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	-1.69	3.23	1.64	1.36	4.02	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-17 #08 Trough

Analysis Date: 08-14-15

Analyzed By: TM

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,958,120	904,151	North Carolina State Plane	-5.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
81.76	80.80	0.01	0.06	#200 - 1.32 #230 - 1.25			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.06	0.07	0.06	0.07
10	-1.00	2.00	0.03	0.04	0.09	0.11
14	-0.50	1.41	0.09	0.11	0.18	0.22
18	0.00	1.00	0.21	0.26	0.39	0.48
25	0.50	0.71	0.58	0.71	0.97	1.19
35	1.00	0.50	1.50	1.83	2.47	3.02
45	1.50	0.35	4.57	5.59	7.04	8.61
60	2.00	0.25	13.97	17.09	21.01	25.70
80	2.50	0.18	34.73	42.48	55.74	68.18
120	3.00	0.13	22.28	27.25	78.02	95.43
170	3.50	0.09	2.46	3.01	80.48	98.44
200	3.75	0.07	0.20	0.24	80.68	98.68
230	4.00	0.06	0.06	0.07	80.74	98.75

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.99	2.79	2.63	2.29	1.98	1.72	1.18
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.22	0.21	0.56	-1.29	7.39	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-17 #09 Bar Crest

Analysis Date: 08-14-15

Analyzed By: TM

Easting (ft):	Northing (ft):
2,957,944	904,087

Coordinate System:	Elevation (ft):
North Carolina State Plane	-9.0 NAVD 88

USCS:	Munsell:	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	Comments:
SP			

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%): #200 - 1.05 #230 - 1.04	Organics (%):	Carbonates (%):	Shell Hash (%):
82.42	81.57	0.00	0.01				

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.03	0.04	0.03	0.04
18	0.00	1.00	0.09	0.11	0.12	0.15
25	0.50	0.71	0.39	0.47	0.51	0.62
35	1.00	0.50	2.20	2.67	2.71	3.29
45	1.50	0.35	6.61	8.02	9.32	11.31
60	2.00	0.25	17.85	21.66	27.17	32.97
80	2.50	0.18	36.39	44.15	63.56	77.12
120	3.00	0.13	16.72	20.29	80.28	97.41
170	3.50	0.09	1.18	1.43	81.46	98.84
200	3.75	0.07	0.09	0.11	81.55	98.95
230	4.00	0.06	0.01	0.01	81.56	98.96

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.94	2.67	2.48	2.19	1.82	1.61	1.11
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.12	0.23	0.53	-0.78	4.25	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-17 #10 (-12.5)

Analysis Date: 08-14-15

Analyzed By: TM

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,958,268	904,206	North Carolina State Plane	-12.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
81.01	80.02	0.03	0.14	#200 - 1.54 #230 - 1.38			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.03	0.04	0.03	0.04
18	0.00	1.00	0.03	0.04	0.06	0.08
25	0.50	0.71	0.07	0.09	0.13	0.17
35	1.00	0.50	0.03	0.04	0.16	0.21
45	1.50	0.35	0.50	0.62	0.66	0.83
60	2.00	0.25	4.51	5.57	5.17	6.40
80	2.50	0.18	38.35	47.34	43.52	53.74
120	3.00	0.13	31.17	38.48	74.69	92.22
170	3.50	0.09	4.62	5.70	79.31	97.92
200	3.75	0.07	0.44	0.54	79.75	98.46
230	4.00	0.06	0.13	0.16	79.88	98.62

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.24	2.89	2.78	2.46	2.20	2.10	1.87
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.47	0.18	0.39	-0.38	6.91	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-17 #11 (-15.0)

Analysis Date: 08-14-15

Analyzed By: TM

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,958,787	904,393	North Carolina State Plane	-15.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
82.76	81.74	0.02	0.02	#200 - 1.53 #230 - 1.29			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.06	0.07	0.06	0.07
18	0.00	1.00	0.09	0.11	0.15	0.18
25	0.50	0.71	0.36	0.43	0.51	0.61
35	1.00	0.50	1.57	1.90	2.08	2.51
45	1.50	0.35	3.33	4.02	5.41	6.53
60	2.00	0.25	7.12	8.60	12.53	15.13
80	2.50	0.18	27.98	33.81	40.51	48.94
120	3.00	0.13	33.81	40.85	74.32	89.79
170	3.50	0.09	6.42	7.76	80.74	97.55
200	3.75	0.07	0.76	0.92	81.50	98.47
230	4.00	0.06	0.20	0.24	81.70	98.71

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.34	2.93	2.82	2.51	2.15	2.01	1.31
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.43	0.19	0.56	-1.11	5.62	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-17 #12 (-17.5)

Analysis Date: 08-14-15

Analyzed By: TM

Easting (ft):	Northing (ft):
2,959,007	904,473

Coordinate System:	Elevation (ft):
North Carolina State Plane	-17.5 NAVD 88

USCS:	Munsell:	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	Comments:
SP			

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
78.47	77.37	0.03	0.03	#200 - 1.74 #230 - 1.47			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.19	0.24	0.19	0.24
10	-1.00	2.00	0.32	0.41	0.51	0.65
14	-0.50	1.41	0.23	0.29	0.74	0.94
18	0.00	1.00	0.08	0.10	0.82	1.04
25	0.50	0.71	0.10	0.13	0.92	1.17
35	1.00	0.50	0.12	0.15	1.04	1.32
45	1.50	0.35	0.18	0.23	1.22	1.55
60	2.00	0.25	2.01	2.56	3.23	4.11
80	2.50	0.18	29.22	37.24	32.45	41.35
120	3.00	0.13	36.42	46.41	68.87	87.76
170	3.50	0.09	7.27	9.26	76.14	97.02
200	3.75	0.07	0.97	1.24	77.11	98.26
230	4.00	0.06	0.21	0.27	77.32	98.53

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.39	2.96	2.86	2.59	2.28	2.16	2.01
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.55	0.17	0.54	-3.37	25.4	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-17 #13 (-20.0)

Analysis Date: 08-14-15

Analyzed By: TM

Easting (ft): 2,959,179	Northing (ft): 904,536	Coordinate System: North Carolina State Plane	Elevation (ft): -20.0 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP	Munsell: Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 80.19	Wash Weight (g): 79.08	Pan Retained (g): 0.07	Sieve Loss (%): 0.01	Fines (%): #200 - 1.77 #230 - 1.50	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.39	0.49	0.39	0.49
4	-2.25	4.76	0.01	0.01	0.40	0.50
5	-2.00	4.00	0.05	0.06	0.45	0.56
7	-1.50	2.83	0.22	0.27	0.67	0.83
10	-1.00	2.00	0.23	0.29	0.90	1.12
14	-0.50	1.41	0.04	0.05	0.94	1.17
18	0.00	1.00	0.02	0.02	0.96	1.19
25	0.50	0.71	0.09	0.11	1.05	1.30
35	1.00	0.50	0.08	0.10	1.13	1.40
45	1.50	0.35	0.07	0.09	1.20	1.49
60	2.00	0.25	0.99	1.23	2.19	2.72
80	2.50	0.18	22.07	27.52	24.26	30.24
120	3.00	0.13	44.05	54.93	68.31	85.17
170	3.50	0.09	9.35	11.66	77.66	96.83
200	3.75	0.07	1.12	1.40	78.78	98.23
230	4.00	0.06	0.22	0.27	79.00	98.50

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.42	2.99	2.91	2.68	2.40	2.24	2.04
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.61	0.16	0.63	-4.99	39.65	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-18 #01 Dune

Analysis Date: 11-05-13

Analyzed By: LC

Easting (ft): 2,957,975	Northing (ft): 902,981	Coordinate System: North Carolina State Plane	Elevation (ft): 16.4 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SP	Munsell: Wet - 2.5Y-5/2 Dry - 2.5Y-6/2 Washed - 2.5Y-6/2	Comments:
--------------------	---	-----------

Dry Weight (g): 155.52	Wash Weight (g): 154.53	Pan Retained (g): 0.03	Sieve Loss (%): 0.01	Fines (%): #200 - 0.67 #230 - 0.66	Organics (%):	Carbonates (%): 1	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.01	0.01	0.01	0.01
10	-1.00	2.00	0.03	0.02	0.04	0.03
14	-0.50	1.41	0.18	0.12	0.22	0.15
18	0.00	1.00	1.43	0.92	1.65	1.07
25	0.50	0.71	6.78	4.36	8.43	5.43
35	1.00	0.50	15.04	9.67	23.47	15.10
45	1.50	0.35	26.46	17.01	49.93	32.11
60	2.00	0.25	48.39	31.11	98.32	63.22
80	2.50	0.18	43.34	27.87	141.66	91.09
120	3.00	0.13	11.98	7.70	153.64	98.79
170	3.50	0.09	0.74	0.48	154.38	99.27
200	3.75	0.07	0.09	0.06	154.47	99.33
230	4.00	0.06	0.02	0.01	154.49	99.34

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.75	2.37	2.21	1.79	1.29	1.03	0.45
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.71	0.31	0.67	-0.58	3.24	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-18 #02 TOD

Analysis Date: 11-04-13

Analyzed By: LC

Easting (ft): 2,957,988	Northing (ft): 902,985	Coordinate System: North Carolina State Plane	Elevation (ft): 10.2 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 2.5Y-5/3 Dry - 2.5Y-6/2 Washed - 2.5Y-7/2	Comments:
--------------------	--	-----------

Dry Weight (g): 161.31	Wash Weight (g): 160.84	Pan Retained (g): 0.03	Sieve Loss (%): 0.04	Fines (%): #200 - 0.36 #230 - 0.35	Organics (%):	Carbonates (%): 3	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.74	0.46	0.74	0.46
4	-2.25	4.76	0.63	0.39	1.37	0.85
5	-2.00	4.00	2.24	1.39	3.61	2.24
7	-1.50	2.83	3.36	2.08	6.97	4.32
10	-1.00	2.00	8.58	5.32	15.55	9.64
14	-0.50	1.41	14.81	9.18	30.36	18.82
18	0.00	1.00	17.09	10.59	47.45	29.41
25	0.50	0.71	17.21	10.67	64.66	40.08
35	1.00	0.50	18.75	11.62	83.41	51.70
45	1.50	0.35	30.07	18.64	113.48	70.34
60	2.00	0.25	27.82	17.25	141.30	87.59
80	2.50	0.18	14.74	9.14	156.04	96.73
120	3.00	0.13	4.28	2.65	160.32	99.38
170	3.50	0.09	0.39	0.24	160.71	99.62
200	3.75	0.07	0.03	0.02	160.74	99.64
230	4.00	0.06	0.01	0.01	160.75	99.65

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.41	1.90	1.64	0.93	-0.21	-0.65	-1.44
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.69	0.62	1.2	-0.47	2.52	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-18 #03 Mid-Berm

Analysis Date: 11-04-13

Analyzed By: LC

Easting (ft): Northing (ft):
2,958,025 902,998

Coordinate System: Elevation (ft):
North Carolina State Plane 7.7 NAVD 88

USCS: Munsell: Wet - 2.5Y-5/3 Comments:
SW Dry - 2.5Y-6/2
 Washed - 2.5Y-7/2

Dry Weight (g): Wash Weight (g): Pan Retained (g): Sieve Loss (%): Fines (%): Organics (%): Carbonates (%): Shell Hash (%):
138.60 138.40 0.00 0.07 #200 - 0.22 4
 #230 - 0.21

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.73	0.53	0.73	0.53
10	-1.00	2.00	9.30	6.71	10.03	7.24
14	-0.50	1.41	32.23	23.25	42.26	30.49
18	0.00	1.00	27.21	19.63	69.47	50.12
25	0.50	0.71	16.39	11.83	85.86	61.95
35	1.00	0.50	15.77	11.38	101.63	73.33
45	1.50	0.35	15.41	11.12	117.04	84.45
60	2.00	0.25	15.25	11.00	132.29	95.45
80	2.50	0.18	4.88	3.52	137.17	98.97
120	3.00	0.13	0.98	0.71	138.15	99.68
170	3.50	0.09	0.13	0.09	138.28	99.77
200	3.75	0.07	0.01	0.01	138.29	99.78
230	4.00	0.06	0.01	0.01	138.30	99.79

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
1.98	1.48	1.08	0.00	-0.62	-0.81	-1.17
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.23	0.85	1.02	0.43	2.15	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-18 #04 Berm Crest

Analysis Date: 11-05-13

Analyzed By: LC

Easting (ft): 2,958,062	Northing (ft): 903,012	Coordinate System: North Carolina State Plane	Elevation (ft): 5.7 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SP	Munsell: Wet - 2.5Y-6/3 Dry - 2.5Y-7/2 Washed - 2.5Y-7/2	Comments:
--------------------	--	-----------

Dry Weight (g): 147.30	Wash Weight (g): 146.38	Pan Retained (g): 0.00	Sieve Loss (%): 0.01	Fines (%): #200 - 0.64 #230 - 0.64	Organics (%):	Carbonates (%): 1	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.07	0.05	0.07	0.05
10	-1.00	2.00	0.20	0.14	0.27	0.19
14	-0.50	1.41	0.46	0.31	0.73	0.50
18	0.00	1.00	1.75	1.19	2.48	1.69
25	0.50	0.71	5.31	3.60	7.79	5.29
35	1.00	0.50	15.42	10.47	23.21	15.76
45	1.50	0.35	38.25	25.97	61.46	41.73
60	2.00	0.25	52.74	35.80	114.20	77.53
80	2.50	0.18	29.08	19.74	143.28	97.27
120	3.00	0.13	2.96	2.01	146.24	99.28
170	3.50	0.09	0.11	0.07	146.35	99.35
200	3.75	0.07	0.01	0.01	146.36	99.36
230	4.00	0.06	0.00	0.00	146.36	99.36

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.44	2.16	1.96	1.62	1.18	1.00	0.46
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.54	0.34	0.61	-0.8	4.43	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-18 #05 MHW

Analysis Date: 11-05-13

Analyzed By: LC

Easting (ft): Northing (ft):
2,958,086 903,020

Coordinate System: Elevation (ft):
North Carolina State Plane 1.2 NAVD 88

USCS: Munsell: Wet - 2.5Y-5/3 Comments:
SW Dry - 2.5Y-6/2
 Washed - 2.5Y-7/2

Dry Weight (g): Wash Weight (g): Pan Retained (g): Sieve Loss (%): Fines (%): Organics (%): Carbonates (%): Shell Hash (%):
168.48 167.62 0.00 0.00 #200 - 0.50 4
 #230 - 0.50

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	1.80	1.07	1.80	1.07
3.5	-2.50	5.66	2.07	1.23	3.87	2.30
4	-2.25	4.76	1.15	0.68	5.02	2.98
5	-2.00	4.00	3.32	1.97	8.34	4.95
7	-1.50	2.83	8.04	4.77	16.38	9.72
10	-1.00	2.00	13.41	7.96	29.79	17.68
14	-0.50	1.41	20.87	12.39	50.66	30.07
18	0.00	1.00	25.27	15.00	75.93	45.07
25	0.50	0.71	24.19	14.36	100.12	59.43
35	1.00	0.50	17.82	10.58	117.94	70.01
45	1.50	0.35	15.29	9.08	133.23	79.09
60	2.00	0.25	17.79	10.56	151.02	89.65
80	2.50	0.18	13.97	8.29	164.99	97.94
120	3.00	0.13	2.53	1.50	167.52	99.44
170	3.50	0.09	0.09	0.05	167.61	99.49
200	3.75	0.07	0.01	0.01	167.62	99.50
230	4.00	0.06	0.00	0.00	167.62	99.50

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.32	1.73	1.27	0.17	-0.70	-1.11	-1.99
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.2	0.87	1.31	-0.16	2.49	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-18 #06 MTL

Analysis Date: 11-05-13

Analyzed By: LC

Easting (ft): 2,958,101	Northing (ft): 903,026	Coordinate System: North Carolina State Plane	Elevation (ft): -0.5 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 2.5Y-5/3 Dry - 2.5Y-6/2 Washed - 2.5Y-7/2	Comments:
--------------------	--	-----------

Dry Weight (g): 196.89	Wash Weight (g): 195.77	Pan Retained (g): 0.01	Sieve Loss (%): 0.04	Fines (%): #200 - 0.59 #230 - 0.59	Organics (%):	Carbonates (%): 4	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	6.26	3.18	6.26	3.18
3.5	-2.50	5.66	5.47	2.78	11.73	5.96
4	-2.25	4.76	3.38	1.72	15.11	7.68
5	-2.00	4.00	5.10	2.59	20.21	10.27
7	-1.50	2.83	9.58	4.87	29.79	15.14
10	-1.00	2.00	12.78	6.49	42.57	21.63
14	-0.50	1.41	17.43	8.85	60.00	30.48
18	0.00	1.00	20.31	10.32	80.31	40.80
25	0.50	0.71	27.03	13.73	107.34	54.53
35	1.00	0.50	27.24	13.84	134.58	68.37
45	1.50	0.35	23.37	11.87	157.95	80.24
60	2.00	0.25	21.36	10.85	179.31	91.09
80	2.50	0.18	14.05	7.14	193.36	98.23
120	3.00	0.13	2.27	1.15	195.63	99.38
170	3.50	0.09	0.06	0.03	195.69	99.41
200	3.75	0.07	0.00	0.00	195.69	99.41
230	4.00	0.06	0.00	0.00	195.69	99.41

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.27	1.67	1.28	0.34	-0.81	-1.43	-2.67
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.14	0.91	1.45	-0.49	2.54	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-18 #07 MLW

Analysis Date: 11-05-13

Analyzed By: LC

Easting (ft): Northing (ft):
2,958,119 903,031

Coordinate System: Elevation (ft):
North Carolina State Plane -2.1 NAVD 88

USCS: Munsell: Wet - 2.5Y-5/3 Comments:
SW Dry - 2.5Y-6/2
 Washed - 2.5Y-7/2

Dry Weight (g): Wash Weight (g): Pan Retained (g): Sieve Loss (%): Fines (%): Organics (%): Carbonates (%): Shell Hash (%):
196.42 195.48 0.00 0.10 #200 - 0.55 4
 #230 - 0.55

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	3.63	1.85	3.63	1.85
5/16"	-3.00	8.00	0.70	0.36	4.33	2.21
3.5	-2.50	5.66	8.56	4.36	12.89	6.57
4	-2.25	4.76	4.45	2.27	17.34	8.84
5	-2.00	4.00	4.73	2.41	22.07	11.25
7	-1.50	2.83	12.33	6.28	34.40	17.53
10	-1.00	2.00	18.73	9.54	53.13	27.07
14	-0.50	1.41	23.21	11.82	76.34	38.89
18	0.00	1.00	22.96	11.69	99.30	50.58
25	0.50	0.71	21.62	11.01	120.92	61.59
35	1.00	0.50	18.76	9.55	139.68	71.14
45	1.50	0.35	13.79	7.02	153.47	78.16
60	2.00	0.25	17.20	8.76	170.67	86.92
80	2.50	0.18	18.60	9.47	189.27	96.39
120	3.00	0.13	5.77	2.94	195.04	99.33
170	3.50	0.09	0.22	0.11	195.26	99.44
200	3.75	0.07	0.02	0.01	195.28	99.45
230	4.00	0.06	0.00	0.00	195.28	99.45

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.43	1.83	1.27	-0.02	-1.11	-1.62	-2.68
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	-0.01	1.01	1.56	-0.16	2.33	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-18 #08 Trough

Analysis Date: 11-05-13

Analyzed By: LC

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,958,183	903,049	North Carolina State Plane	-4.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-5/2 Dry - 2.5Y-6/2 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
115.46	114.25	0.01	0.01	#200 - 1.09 #230 - 1.06		0	

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.14	0.12	0.14	0.12
14	-0.50	1.41	0.16	0.14	0.30	0.26
18	0.00	1.00	0.43	0.37	0.73	0.63
25	0.50	0.71	0.51	0.44	1.24	1.07
35	1.00	0.50	0.83	0.72	2.07	1.79
45	1.50	0.35	3.52	3.05	5.59	4.84
60	2.00	0.25	16.46	14.26	22.05	19.10
80	2.50	0.18	50.18	43.46	72.23	62.56
120	3.00	0.13	38.83	33.63	111.06	96.19
170	3.50	0.09	2.96	2.56	114.02	98.75
200	3.75	0.07	0.18	0.16	114.20	98.91
230	4.00	0.06	0.03	0.03	114.23	98.94

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.98	2.82	2.68	2.36	2.07	1.89	1.51
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.31	0.20	0.51	-1.71	10.02	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-18 #09 Bar Crest

Analysis Date: 11-05-13

Analyzed By: LC

Easting (ft): Northing (ft):
2,958,275 903,087

Coordinate System: Elevation (ft):
North Carolina State Plane -4.5 NAVD 88

USCS: Munsell: Comments:
SP Wet - 5Y-5/2
 Dry - 5Y-6/2
 Washed - 5Y-7/1

Dry Weight (g): Wash Weight (g): Pan Retained (g): Sieve Loss (%): Fines (%): Organics (%): Carbonates (%): Shell Hash (%):
170.09 168.71 0.01 0.03 #200 - 0.87 1
 #230 - 0.85

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.12	0.07	0.12	0.07
14	-0.50	1.41	0.32	0.19	0.44	0.26
18	0.00	1.00	0.62	0.36	1.06	0.62
25	0.50	0.71	1.29	0.76	2.35	1.38
35	1.00	0.50	2.97	1.75	5.32	3.13
45	1.50	0.35	7.05	4.14	12.37	7.27
60	2.00	0.25	25.60	15.05	37.97	22.32
80	2.50	0.18	65.04	38.24	103.01	60.56
120	3.00	0.13	57.66	33.90	160.67	94.46
170	3.50	0.09	7.64	4.49	168.31	98.95
200	3.75	0.07	0.30	0.18	168.61	99.13
230	4.00	0.06	0.04	0.02	168.65	99.15

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.06	2.85	2.71	2.36	2.04	1.79	1.23
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	2.29	0.20	0.58	-1.41	7.12	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
 Coastal Planning & Engineering, Inc.
 2481 NW Boca Raton Blvd.
 Boca Raton, FL 33431
 ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-18 #10 (-12.5)

Analysis Date: 11-05-13

Analyzed By: LC

Easting (ft): 2,958,446	Northing (ft): 903,137	Coordinate System: North Carolina State Plane	Elevation (ft): -12.5 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP	Munsell: Wet - 5Y-4/2 Dry - 5Y-5/2 Washed - 2.5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 140.51	Wash Weight (g): 138.96	Pan Retained (g): 0.13	Sieve Loss (%): 0.04	Fines (%): #200 - 1.46 #230 - 1.24	Organics (%):	Carbonates (%): 0	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.38	0.27	0.38	0.27
4	-2.25	4.76	0.00	0.00	0.38	0.27
5	-2.00	4.00	0.00	0.00	0.38	0.27
7	-1.50	2.83	0.11	0.08	0.49	0.35
10	-1.00	2.00	0.40	0.28	0.89	0.63
14	-0.50	1.41	0.48	0.34	1.37	0.97
18	0.00	1.00	0.48	0.34	1.85	1.31
25	0.50	0.71	0.43	0.31	2.28	1.62
35	1.00	0.50	0.56	0.40	2.84	2.02
45	1.50	0.35	1.30	0.93	4.14	2.95
60	2.00	0.25	5.79	4.12	9.93	7.07
80	2.50	0.18	34.65	24.66	44.58	31.73
120	3.00	0.13	76.92	54.74	121.50	86.47
170	3.50	0.09	15.75	11.21	137.25	97.68
200	3.75	0.07	1.21	0.86	138.46	98.54
230	4.00	0.06	0.31	0.22	138.77	98.76

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.38	2.98	2.90	2.67	2.36	2.18	1.75
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.57	0.17	0.62	-3.78	26.73	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-18 #11 (-15.0)

Analysis Date: 11-05-13

Analyzed By: LC

Easting (ft):

2,958,511

Northing (ft):

903,172

Coordinate System:

North Carolina State Plane

Elevation (ft):

-15.0 NAVD 88

USCS:

SP

Munsell:

Wet - 5Y-4/2
Dry - 5Y-5/2
Washed - 5Y-6/2

Comments:

Dry Weight (g):

186.41

Wash Weight (g):

183.22

Pan Retained (g):

0.25

Sieve Loss (%):

0.05

Fines (%):

#200 - 2.13
#230 - 1.90

Organics (%):

Carbonates (%):

2

Shell Hash (%):

Sieve Number

Sieve Size (Phi)

Sieve Size (Millimeters)

Grams Retained

% Weight Retained

Cum. Grams Retained

C. % Weight Retained

3/4"

-4.25

19.03

0.00

0.00

0.00

0.00

5/8"

-4.00

16.00

0.00

0.00

0.00

0.00

7/16"

-3.50

11.31

0.00

0.00

0.00

0.00

5/16"

-3.00

8.00

0.00

0.00

0.00

0.00

3.5

-2.50

5.66

0.00

0.00

0.00

0.00

4

-2.25

4.76

0.02

0.01

0.02

0.01

5

-2.00

4.00

0.38

0.20

0.40

0.21

7

-1.50

2.83

0.25

0.13

0.65

0.34

10

-1.00

2.00

0.60

0.32

1.25

0.66

14

-0.50

1.41

0.92

0.49

2.17

1.15

18

0.00

1.00

1.99

1.07

4.16

2.22

25

0.50

0.71

4.23

2.27

8.39

4.49

35

1.00

0.50

7.44

3.99

15.83

8.48

45

1.50

0.35

11.05

5.93

26.88

14.41

60

2.00

0.25

24.65

13.22

51.53

27.63

80

2.50

0.18

50.55

27.12

102.08

54.75

120

3.00

0.13

58.92

31.61

161.00

86.36

170

3.50

0.09

19.60

10.51

180.60

96.87

200

3.75

0.07

1.86

1.00

182.46

97.87

230

4.00

0.06

0.42

0.23

182.88

98.10

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

3.41

2.96

2.82

2.41

1.90

1.56

0.56

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

2.23

0.21

0.84

-1.5

6.47

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-18 #12 (-17.5)

Analysis Date: 11-05-13

Analyzed By: LC

Easting (ft): 2,959,284	Northing (ft): 903,452	Coordinate System: North Carolina State Plane	Elevation (ft): -17.5 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP	Munsell: Wet - 5Y-4/2 Dry - 5Y-5/2 Washed - 5Y-6/2	Comments:
--------------------	---	-----------

Dry Weight (g): 150.14	Wash Weight (g): 148.20	Pan Retained (g): 0.15	Sieve Loss (%): 0.03	Fines (%): #200 - 1.68 #230 - 1.40	Organics (%):	Carbonates (%): 0	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.01	0.01	0.01	0.01
10	-1.00	2.00	0.07	0.05	0.08	0.06
14	-0.50	1.41	0.01	0.01	0.09	0.07
18	0.00	1.00	0.01	0.01	0.10	0.08
25	0.50	0.71	0.04	0.03	0.14	0.11
35	1.00	0.50	0.24	0.16	0.38	0.27
45	1.50	0.35	0.65	0.43	1.03	0.70
60	2.00	0.25	2.45	1.63	3.48	2.33
80	2.50	0.18	37.80	25.18	41.28	27.51
120	3.00	0.13	92.24	61.44	133.52	88.95
170	3.50	0.09	12.62	8.41	146.14	97.36
200	3.75	0.07	1.44	0.96	147.58	98.32
230	4.00	0.06	0.42	0.28	148.00	98.60

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.36	2.96	2.89	2.68	2.45	2.27	2.05
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.65	0.16	0.36	-1.25	13.99	

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Town of Duck, NC

Sample Name: D-18 #13 (-20.0)

Analysis Date: 11-05-13

Analyzed By: LC

Easting (ft): 2,959,430
Northing (ft): 903,509

Coordinate System: North Carolina State Plane
Elevation (ft): -20.0 NAVD 88

USCS: SP
Munsell: Wet - 5Y-4/2
Dry - 5Y-5/2
Washed - 5Y-6/2
Comments:

Dry Weight (g): 126.39
Wash Weight (g): 124.66
Pan Retained (g): 0.30
Sieve Loss (%): 0.04
Fines (%): #200 - 2.11
#230 - 1.64
Organics (%):
Carbonates (%): 1
Shell Hash (%):

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	1.11	0.88	1.11	0.88
3.5	-2.50	5.66	0.00	0.00	1.11	0.88
4	-2.25	4.76	0.85	0.67	1.96	1.55
5	-2.00	4.00	0.15	0.12	2.11	1.67
7	-1.50	2.83	0.17	0.13	2.28	1.80
10	-1.00	2.00	0.05	0.04	2.33	1.84
14	-0.50	1.41	0.01	0.01	2.34	1.85
18	0.00	1.00	0.02	0.02	2.36	1.87
25	0.50	0.71	0.42	0.33	2.78	2.20
35	1.00	0.50	0.71	0.56	3.49	2.76
45	1.50	0.35	0.49	0.39	3.98	3.15
60	2.00	0.25	0.82	0.65	4.80	3.80
80	2.50	0.18	14.26	11.28	19.06	15.08
120	3.00	0.13	80.23	63.48	99.29	78.56
170	3.50	0.09	22.33	17.67	121.62	96.23
200	3.75	0.07	2.10	1.66	123.72	97.89
230	4.00	0.06	0.59	0.47	124.31	98.36

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	3.47	2.97	2.78	2.58	2.05
	2.67	0.16	0.84	-5.1	33.4

GRANULARMETRIC REPORT DUCK_2013_BEACH_SAMPLES.GPJ JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
 Coastal Planning & Engineering, Inc.
 2481 NW Boca Raton Blvd.
 Boca Raton, FL 33431
 ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 0+00 #01 Dune

Analysis Date: 06-18-14

Analyzed By: TM

Easting (ft): 2,971,344	Northing (ft): 871,969	Coordinate System: North Carolina State Plane	Elevation (ft): 15.9 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 5Y-6/1 Dry - 5Y-7/2 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 119.36	Wash Weight (g): 119.08	Pan Retained (g): 0.01	Sieve Loss (%): 0.23	Fines (%): #200 - 0.50 #230 - 0.50	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.05	0.04	0.05	0.04
4	-2.25	4.76	0.71	0.59	0.76	0.63
5	-2.00	4.00	0.48	0.40	1.24	1.03
7	-1.50	2.83	2.38	1.99	3.62	3.02
10	-1.00	2.00	2.56	2.14	6.18	5.16
14	-0.50	1.41	3.72	3.12	9.90	8.28
18	0.00	1.00	6.20	5.19	16.10	13.47
25	0.50	0.71	17.10	14.33	33.20	27.80
35	1.00	0.50	32.17	26.95	65.37	54.75
45	1.50	0.35	22.55	18.89	87.92	73.64
60	2.00	0.25	23.31	19.53	111.23	93.17
80	2.50	0.18	6.58	5.51	117.81	98.68
120	3.00	0.13	0.91	0.76	118.72	99.44
170	3.50	0.09	0.06	0.05	118.78	99.49
200	3.75	0.07	0.01	0.01	118.79	99.50
230	4.00	0.06	0.00	0.00	118.79	99.50

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.17	1.77	1.53	0.91	0.40	0.09	-1.04
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	0.84	0.56	0.93	-0.91	4.21	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 0+00 #02 DuneToe

Analysis Date: 08-19-15

Analyzed By: KM

Easting (ft): 2,971,365	Northing (ft): 871,965	Coordinate System: North Carolina State Plane	Elevation (ft): 10.5 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 2.5Y-5/3 Dry - 2.5Y-6/2 Washed - 2.5Y-8/2	Comments:
--------------------	--	-----------

Dry Weight (g): 110.07	Wash Weight (g): 110.01	Pan Retained (g): 0.00	Sieve Loss (%): 0.04	Fines (%): #200 - 0.10 #230 - 0.10	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	1.11	1.01	1.11	1.01
10	-1.00	2.00	5.25	4.77	6.36	5.78
14	-0.50	1.41	12.99	11.80	19.35	17.58
18	0.00	1.00	14.95	13.58	34.30	31.16
25	0.50	0.71	21.73	19.74	56.03	50.90
35	1.00	0.50	21.82	19.82	77.85	70.72
45	1.50	0.35	16.20	14.72	94.05	85.44
60	2.00	0.25	11.40	10.36	105.45	95.80
80	2.50	0.18	3.68	3.34	109.13	99.14
120	3.00	0.13	0.77	0.70	109.90	99.84
170	3.50	0.09	0.06	0.05	109.96	99.89
200	3.75	0.07	0.01	0.01	109.97	99.90
230	4.00	0.06	0.00	0.00	109.97	99.90

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
1.96	1.45	1.15	0.48	-0.23	-0.57	-1.08
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.46	0.73	0.93	-0.02	2.46	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 0+00 #03 MidBerm

Analysis Date: 08-14-15

Analyzed By: DA

Easting (ft): 2,971,393	Northing (ft): 871,980	Coordinate System: North Carolina State Plane	Elevation (ft): 9.1 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SW	Munsell: Wet - 2.5Y-5/3 Dry - 2.5Y-7/3 Washed - 2.5Y-7/3	Comments:
--------------------	--	-----------

Dry Weight (g): 107.88	Wash Weight (g): 107.64	Pan Retained (g): 0.00	Sieve Loss (%): 0.06	Fines (%): #200 - 0.28 #230 - 0.27	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.10	0.09	0.10	0.09
5	-2.00	4.00	0.49	0.45	0.59	0.54
7	-1.50	2.83	3.47	3.22	4.06	3.76
10	-1.00	2.00	5.43	5.03	9.49	8.79
14	-0.50	1.41	5.53	5.13	15.02	13.92
18	0.00	1.00	10.73	9.95	25.75	23.87
25	0.50	0.71	20.95	19.42	46.70	43.29
35	1.00	0.50	21.38	19.82	68.08	63.11
45	1.50	0.35	19.62	18.19	87.70	81.30
60	2.00	0.25	15.16	14.05	102.86	95.35
80	2.50	0.18	4.21	3.90	107.07	99.25
120	3.00	0.13	0.46	0.43	107.53	99.68
170	3.50	0.09	0.04	0.04	107.57	99.72
200	3.75	0.07	0.00	0.00	107.57	99.72
230	4.00	0.06	0.01	0.01	107.58	99.73

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
1.99	1.60	1.33	0.67	0.03	-0.40	-1.38
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.58	0.67	0.99	-0.51	2.88	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 0+00 #04 BermCrest

Analysis Date: 08-13-15

Analyzed By: DA

Easting (ft): 2,971,420	Northing (ft): 871,994	Coordinate System: North Carolina State Plane	Elevation (ft): 8.1 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SP	Munsell: Wet - 2.5Y-6/3 Dry - 2.5Y-7/3 Washed - 2.5Y-7/3	Comments:
--------------------	--	-----------

Dry Weight (g): 104.25	Wash Weight (g): 103.85	Pan Retained (g): 0.00	Sieve Loss (%): 0.02	Fines (%): #200 - 0.39 #230 - 0.39	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.42	0.40	0.42	0.40
7	-1.50	2.83	0.72	0.69	1.14	1.09
10	-1.00	2.00	1.96	1.88	3.10	2.97
14	-0.50	1.41	4.98	4.78	8.08	7.75
18	0.00	1.00	11.34	10.88	19.42	18.63
25	0.50	0.71	28.12	26.97	47.54	45.60
35	1.00	0.50	24.65	23.65	72.19	69.25
45	1.50	0.35	15.53	14.90	87.72	84.15
60	2.00	0.25	10.07	9.66	97.79	93.81
80	2.50	0.18	4.89	4.69	102.68	98.50
120	3.00	0.13	1.09	1.05	103.77	99.55
170	3.50	0.09	0.05	0.05	103.82	99.60
200	3.75	0.07	0.01	0.01	103.83	99.61
230	4.00	0.06	0.00	0.00	103.83	99.61

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.13	1.49	1.19	0.59	0.12	-0.12	-0.79
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.63	0.65	0.84	-0.06	3.34	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 0+00 #05 MHW

Analysis Date: 08-19-15

Analyzed By: DA

Easting (ft):	Northing (ft):
2,971,465	872,018

Coordinate System:	Elevation (ft):
North Carolina State Plane	1.8 NAVD 88

USCS:	Munsell:	Wet - 2.5Y-5/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
SP			

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
85.49	84.42	0.01	0.01	#200 - 1.26 #230 - 1.26			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.01	0.01	0.01	0.01
10	-1.00	2.00	0.07	0.08	0.08	0.09
14	-0.50	1.41	0.27	0.32	0.35	0.41
18	0.00	1.00	0.52	0.61	0.87	1.02
25	0.50	0.71	0.62	0.73	1.49	1.75
35	1.00	0.50	1.24	1.45	2.73	3.20
45	1.50	0.35	6.17	7.22	8.90	10.42
60	2.00	0.25	27.87	32.60	36.77	43.02
80	2.50	0.18	40.72	47.63	77.49	90.65
120	3.00	0.13	6.55	7.66	84.04	98.31
170	3.50	0.09	0.33	0.39	84.37	98.70
200	3.75	0.07	0.03	0.04	84.40	98.74
230	4.00	0.06	0.00	0.00	84.40	98.74

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.78	2.43	2.34	2.07	1.72	1.59	1.12
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.99	0.25	0.5	-1.71	9.56	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
 Coastal Planning & Engineering, Inc.
 2481 NW Boca Raton Blvd.
 Boca Raton, FL 33431
 ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 0+00 #06 MTL

Analysis Date: 06-18-14

Analyzed By: TM

Easting (ft): **2,971,461** Northing (ft): **872,010**

Coordinate System: **North Carolina State Plane** Elevation (ft): **-0.5 NAVD 88**

USCS: **SW** Munsell: **Wet - 5Y-6/2
Dry - 5Y-7/2
Washed - 5Y-7/1** Comments:

Dry Weight (g): **101.52** Wash Weight (g): **100.71** Pan Retained (g): **0.00** Sieve Loss (%): **0.29** Fines (%): **#200 - 1.08
#230 - 1.08** Organics (%): Carbonates (%): Shell Hash (%):

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.70	0.69	0.70	0.69
4	-2.25	4.76	0.56	0.55	1.26	1.24
5	-2.00	4.00	1.57	1.55	2.83	2.79
7	-1.50	2.83	6.15	6.06	8.98	8.85
10	-1.00	2.00	9.70	9.55	18.68	18.40
14	-0.50	1.41	11.57	11.40	30.25	29.80
18	0.00	1.00	13.05	12.85	43.30	42.65
25	0.50	0.71	16.63	16.38	59.93	59.03
35	1.00	0.50	22.92	22.58	82.85	81.61
45	1.50	0.35	9.91	9.76	92.76	91.37
60	2.00	0.25	4.08	4.02	96.84	95.39
80	2.50	0.18	2.67	2.63	99.51	98.02
120	3.00	0.13	0.84	0.83	100.35	98.85
170	3.50	0.09	0.06	0.06	100.41	98.91
200	3.75	0.07	0.01	0.01	100.42	98.92
230	4.00	0.06	0.00	0.00	100.42	98.92

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
1.95	1.12	0.85	0.22	-0.71	-1.13	-1.82
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	0.08	0.95	1.09	-0.16	2.65	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 0+00 #07 MLW

Analysis Date: 06-18-14

Analyzed By: TM

Easting (ft): 2,971,477	Northing (ft): 872,017	Coordinate System: North Carolina State Plane	Elevation (ft): -2.1 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 5Y-6/2 Dry - 5Y-7/2 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 101.78	Wash Weight (g): 101.01	Pan Retained (g): 0.00	Sieve Loss (%): 0.07	Fines (%): #200 - 0.83 #230 - 0.83	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.67	0.66	0.67	0.66
4	-2.25	4.76	1.04	1.02	1.71	1.68
5	-2.00	4.00	3.79	3.72	5.50	5.40
7	-1.50	2.83	8.72	8.57	14.22	13.97
10	-1.00	2.00	15.42	15.15	29.64	29.12
14	-0.50	1.41	17.47	17.16	47.11	46.28
18	0.00	1.00	19.17	18.83	66.28	65.11
25	0.50	0.71	19.07	18.74	85.35	83.85
35	1.00	0.50	12.09	11.88	97.44	95.73
45	1.50	0.35	1.96	1.93	99.40	97.66
60	2.00	0.25	1.44	1.41	100.84	99.07
80	2.50	0.18	0.08	0.08	100.92	99.15
120	3.00	0.13	0.01	0.01	100.93	99.16
170	3.50	0.09	0.01	0.01	100.94	99.17
200	3.75	0.07	0.00	0.00	100.94	99.17
230	4.00	0.06	0.00	0.00	100.94	99.17

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
0.97	0.51	0.26	-0.40	-1.14	-1.43	-2.03
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	-0.45	1.37	0.92	-0.07	2.52	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
 Coastal Planning & Engineering, Inc.
 2481 NW Boca Raton Blvd.
 Boca Raton, FL 33431
 ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 0+00 #08 Trough

Analysis Date: 06-18-14

Analyzed By: TM

Easting (ft):	Northing (ft):
2,971,500	872,022

Coordinate System:	Elevation (ft):
North Carolina State Plane	-6.4 NAVD 88

USCS:	Munsell:	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	Comments:
SP			

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.21	99.18	0.00	0.00	#200 - 1.03 #230 - 1.03			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.21	0.21	0.21	0.21
10	-1.00	2.00	0.13	0.13	0.34	0.34
14	-0.50	1.41	0.34	0.34	0.68	0.68
18	0.00	1.00	0.58	0.58	1.26	1.26
25	0.50	0.71	1.67	1.67	2.93	2.93
35	1.00	0.50	7.39	7.37	10.32	10.30
45	1.50	0.35	19.98	19.94	30.30	30.24
60	2.00	0.25	29.85	29.79	60.15	60.03
80	2.50	0.18	31.20	31.13	91.35	91.16
120	3.00	0.13	7.56	7.54	98.91	98.70
170	3.50	0.09	0.24	0.24	99.15	98.94
200	3.75	0.07	0.03	0.03	99.18	98.97
230	4.00	0.06	0.00	0.00	99.18	98.97

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.75	2.38	2.24	1.83	1.37	1.14	0.64
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	1.76	0.30	0.64	-1.02	5.69	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
 Coastal Planning & Engineering, Inc.
 2481 NW Boca Raton Blvd.
 Boca Raton, FL 33431
 ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 0+00 #09 BarCrest

Analysis Date: 08-18-15

Analyzed By: DA

Easting (ft): 2,971,798	Northing (ft): 872,194	Coordinate System: North Carolina State Plane	Elevation (ft): -9.0 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SP	Munsell: Wet - 2.5Y-5/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
--------------------	--	-----------

Dry Weight (g): 85.97	Wash Weight (g): 84.99	Pan Retained (g): 0.00	Sieve Loss (%): 0.01	Fines (%): #200 - 1.20 #230 - 1.14	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.02	0.02	0.02	0.02
18	0.00	1.00	0.11	0.13	0.13	0.15
25	0.50	0.71	0.18	0.21	0.31	0.36
35	1.00	0.50	0.37	0.43	0.68	0.79
45	1.50	0.35	1.14	1.33	1.82	2.12
60	2.00	0.25	6.98	8.12	8.80	10.24
80	2.50	0.18	41.21	47.94	50.01	58.18
120	3.00	0.13	31.64	36.80	81.65	94.98
170	3.50	0.09	3.10	3.61	84.75	98.59
200	3.75	0.07	0.18	0.21	84.93	98.80
230	4.00	0.06	0.05	0.06	84.98	98.86

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.00	2.85	2.73	2.41	2.15	2.06	1.68
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.41	0.19	0.42	-1.06	7.95	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 0+00 #10 (-12.5)

Analysis Date: 08-13-15

Analyzed By: DA

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,971,992	872,287	North Carolina State Plane	-12.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-5/2 Dry - 2.5Y-6/2 Washed - 2.5Y-7/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
82.02	81.01	0.00	0.02	#200 - 1.31 #230 - 1.26			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.01	0.01	0.01	0.01
10	-1.00	2.00	0.01	0.01	0.02	0.02
14	-0.50	1.41	0.07	0.09	0.09	0.11
18	0.00	1.00	0.23	0.28	0.32	0.39
25	0.50	0.71	0.51	0.62	0.83	1.01
35	1.00	0.50	1.06	1.29	1.89	2.30
45	1.50	0.35	3.75	4.57	5.64	6.87
60	2.00	0.25	13.26	16.17	18.90	23.04
80	2.50	0.18	28.60	34.87	47.50	57.91
120	3.00	0.13	29.92	36.48	77.42	94.39
170	3.50	0.09	3.34	4.07	80.76	98.46
200	3.75	0.07	0.19	0.23	80.95	98.69
230	4.00	0.06	0.04	0.05	80.99	98.74

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.07	2.86	2.73	2.39	2.03	1.78	1.30
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.31	0.20	0.55	-1.18	6.08	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 0+00 #11 (-15)

Analysis Date: 08-14-15

Analyzed By: SMT

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,972,491	872,558	North Carolina State Plane	-15.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-5/2 Dry - 2.5Y-7/2 Washed - 2.5Y-7/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
83.40	82.42	0.00	0.02	#200 - 1.24 #230 - 1.20			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.01	0.01	0.01	0.01
18	0.00	1.00	0.05	0.06	0.06	0.07
25	0.50	0.71	0.27	0.32	0.33	0.39
35	1.00	0.50	1.37	1.64	1.70	2.03
45	1.50	0.35	5.00	6.00	6.70	8.03
60	2.00	0.25	12.16	14.58	18.86	22.61
80	2.50	0.18	28.12	33.72	46.98	56.33
120	3.00	0.13	31.49	37.76	78.47	94.09
170	3.50	0.09	3.59	4.30	82.06	98.39
200	3.75	0.07	0.31	0.37	82.37	98.76
230	4.00	0.06	0.03	0.04	82.40	98.80

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.11	2.87	2.75	2.41	2.04	1.77	1.25
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	2.32	0.20	0.54	-0.85	4.07	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 0+00 #12 (-17.5)

Analysis Date: 08-18-15

Analyzed By: DA

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,972,592	872,613	North Carolina State Plane	-17.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-4/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
90.42	89.25	0.01	0.04	#200 - 1.47 #230 - 1.36			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.01	0.01	0.01	0.01
18	0.00	1.00	0.05	0.06	0.06	0.07
25	0.50	0.71	0.26	0.29	0.32	0.36
35	1.00	0.50	0.75	0.83	1.07	1.19
45	1.50	0.35	1.46	1.61	2.53	2.80
60	2.00	0.25	5.70	6.30	8.23	9.10
80	2.50	0.18	34.15	37.77	42.38	46.87
120	3.00	0.13	41.28	45.65	83.66	92.52
170	3.50	0.09	5.03	5.56	88.69	98.08
200	3.75	0.07	0.41	0.45	89.10	98.53
230	4.00	0.06	0.10	0.11	89.20	98.64

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.22	2.91	2.81	2.53	2.21	2.09	1.67
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.48	0.18	0.45	-1.18	7.06	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 0+00 #13 (-20)

Analysis Date: 08-19-15

Analyzed By: DA

Easting (ft):	Northing (ft):
2,972,712	872,676

Coordinate System:	Elevation (ft):
North Carolina State Plane	-20.0 NAVD 88

USCS:	Munsell:	Wet - 2.5Y-3/2 Dry - 2.5Y-6/2 Washed - 2.5Y-7/1	Comments:
SP			

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
91.01	89.57	0.02	0.03	#200 - 1.79 #230 - 1.65			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.03	0.03	0.03	0.03
10	-1.00	2.00	0.22	0.24	0.25	0.27
14	-0.50	1.41	0.21	0.23	0.46	0.50
18	0.00	1.00	0.16	0.18	0.62	0.68
25	0.50	0.71	0.14	0.15	0.76	0.83
35	1.00	0.50	0.30	0.33	1.06	1.16
45	1.50	0.35	0.43	0.47	1.49	1.63
60	2.00	0.25	3.38	3.71	4.87	5.34
80	2.50	0.18	39.54	43.45	44.41	48.79
120	3.00	0.13	38.49	42.29	82.90	91.08
170	3.50	0.09	6.00	6.59	88.90	97.67
200	3.75	0.07	0.49	0.54	89.39	98.21
230	4.00	0.06	0.13	0.14	89.52	98.35

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.30	2.92	2.81	2.51	2.23	2.12	1.95
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.49	0.18	0.48	-2.64	20.85	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 50+00 #01 Dune

Analysis Date: 06-18-14

Analyzed By: TM

Easting (ft): 2,973,628	Northing (ft): 867,473	Coordinate System: North Carolina State Plane	Elevation (ft): 13.3 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 5Y-6/2 Dry - 5Y-7/2 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 118.62	Wash Weight (g): 118.33	Pan Retained (g): 0.00	Sieve Loss (%): 0.11	Fines (%): #200 - 0.37 #230 - 0.36	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.16	0.13	0.16	0.13
4	-2.25	4.76	0.23	0.19	0.39	0.32
5	-2.00	4.00	1.14	0.96	1.53	1.28
7	-1.50	2.83	5.03	4.24	6.56	5.52
10	-1.00	2.00	11.01	9.28	17.57	14.80
14	-0.50	1.41	17.85	15.05	35.42	29.85
18	0.00	1.00	18.94	15.97	54.36	45.82
25	0.50	0.71	19.54	16.47	73.90	62.29
35	1.00	0.50	18.06	15.23	91.96	77.52
45	1.50	0.35	7.91	6.67	99.87	84.19
60	2.00	0.25	13.24	11.16	113.11	95.35
80	2.50	0.18	3.99	3.36	117.10	98.71
120	3.00	0.13	0.88	0.74	117.98	99.45
170	3.50	0.09	0.18	0.15	118.16	99.60
200	3.75	0.07	0.03	0.03	118.19	99.63
230	4.00	0.06	0.01	0.01	118.20	99.64

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
1.98	1.49	0.92	0.13	-0.66	-0.96	-1.56
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.17	0.89	1.1	0.14	2.42	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 50+00 #02 DuneToe

Analysis Date: 08-13-15

Analyzed By: TM

Easting (ft): 2,973,681	Northing (ft): 867,502	Coordinate System: North Carolina State Plane	Elevation (ft): 8.7 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SW	Munsell: Wet - 2.5Y-5/3 Dry - 2.5Y-6/3 Washed - 2.5Y-7/3	Comments:
--------------------	--	-----------

Dry Weight (g): 103.62	Wash Weight (g): 103.35	Pan Retained (g): 0.00	Sieve Loss (%): 0.05	Fines (%): #200 - 0.30 #230 - 0.30	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.25	0.24	0.25	0.24
4	-2.25	4.76	0.18	0.17	0.43	0.41
5	-2.00	4.00	0.60	0.58	1.03	0.99
7	-1.50	2.83	1.47	1.42	2.50	2.41
10	-1.00	2.00	4.49	4.33	6.99	6.74
14	-0.50	1.41	9.56	9.23	16.55	15.97
18	0.00	1.00	17.17	16.57	33.72	32.54
25	0.50	0.71	27.79	26.82	61.51	59.36
35	1.00	0.50	21.67	20.91	83.18	80.27
45	1.50	0.35	12.96	12.51	96.14	92.78
60	2.00	0.25	4.98	4.81	101.12	97.59
80	2.50	0.18	1.50	1.45	102.62	99.04
120	3.00	0.13	0.60	0.58	103.22	99.62
170	3.50	0.09	0.07	0.07	103.29	99.69
200	3.75	0.07	0.01	0.01	103.30	99.70
230	4.00	0.06	0.00	0.00	103.30	99.70

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
1.73	1.15	0.87	0.33	-0.23	-0.50	-1.20
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	0.3	0.81	0.86	-0.2	3.53	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 50+00 #03 MidBerm

Analysis Date: 08-19-15

Analyzed By: KM

Easting (ft): 2,973,694	Northing (ft): 867,508	Coordinate System: North Carolina State Plane	Elevation (ft): 7.3 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SW	Munsell: Wet - 2.5Y-5/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
--------------------	---	-----------

Dry Weight (g): 108.86	Wash Weight (g): 108.78	Pan Retained (g): 0.01	Sieve Loss (%): 0.06	Fines (%): #200 - 0.15 #230 - 0.15	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.35	0.32	0.35	0.32
5	-2.00	4.00	0.26	0.24	0.61	0.56
7	-1.50	2.83	0.69	0.63	1.30	1.19
10	-1.00	2.00	2.01	1.85	3.31	3.04
14	-0.50	1.41	6.62	6.08	9.93	9.12
18	0.00	1.00	7.04	6.47	16.97	15.59
25	0.50	0.71	8.45	7.76	25.42	23.35
35	1.00	0.50	16.65	15.29	42.07	38.64
45	1.50	0.35	21.86	20.08	63.93	58.72
60	2.00	0.25	23.01	21.14	86.94	79.86
80	2.50	0.18	18.17	16.69	105.11	96.55
120	3.00	0.13	3.36	3.09	108.47	99.64
170	3.50	0.09	0.20	0.18	108.67	99.82
200	3.75	0.07	0.03	0.03	108.70	99.85
230	4.00	0.06	0.00	0.00	108.70	99.85

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.45	2.12	1.89	1.28	0.55	0.03	-0.84
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.12	0.46	1.01	-0.74	3.16	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 50+00 #04 BermCrest

Analysis Date: 08-14-15

Analyzed By: SMT

Easting (ft): 2,973,699	Northing (ft): 867,511	Coordinate System: North Carolina State Plane	Elevation (ft): 7.0 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SP	Munsell: Wet - 2.5Y-6/2 Dry - 2.5Y-7/2 Washed - 2.5Y-7/2	Comments:
--------------------	--	-----------

Dry Weight (g): 99.90	Wash Weight (g): 99.51	Pan Retained (g): 0.00	Sieve Loss (%): 0.06	Fines (%): #200 - 0.46 #230 - 0.46	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.02	0.02	0.02	0.02
10	-1.00	2.00	0.00	0.00	0.02	0.02
14	-0.50	1.41	0.02	0.02	0.04	0.04
18	0.00	1.00	0.01	0.01	0.05	0.05
25	0.50	0.71	0.17	0.17	0.22	0.22
35	1.00	0.50	0.85	0.85	1.07	1.07
45	1.50	0.35	7.71	7.72	8.78	8.79
60	2.00	0.25	33.14	33.17	41.92	41.96
80	2.50	0.18	42.32	42.36	84.24	84.32
120	3.00	0.13	14.67	14.68	98.91	99.00
170	3.50	0.09	0.51	0.51	99.42	99.51
200	3.75	0.07	0.03	0.03	99.45	99.54
230	4.00	0.06	0.00	0.00	99.45	99.54

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.86	2.50	2.39	2.09	1.74	1.61	1.25
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.07	0.24	0.45	-0.45	4.54	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 50+00 #05 MHW

Analysis Date: 08-19-15

Analyzed By: DA

Easting (ft): 2,973,749	Northing (ft): 867,538	Coordinate System: North Carolina State Plane	Elevation (ft): 1.1 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SW	Munsell: Wet - 2.5Y-5/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
--------------------	---	-----------

Dry Weight (g): 86.86	Wash Weight (g): 85.83	Pan Retained (g): 0.00	Sieve Loss (%): 0.03	Fines (%): #200 - 1.23 #230 - 1.23	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.17	0.20	0.17	0.20
7	-1.50	2.83	0.48	0.55	0.65	0.75
10	-1.00	2.00	1.34	1.54	1.99	2.29
14	-0.50	1.41	1.93	2.22	3.92	4.51
18	0.00	1.00	2.60	2.99	6.52	7.50
25	0.50	0.71	2.42	2.79	8.94	10.29
35	1.00	0.50	3.33	3.83	12.27	14.12
45	1.50	0.35	6.91	7.96	19.18	22.08
60	2.00	0.25	22.90	26.36	42.08	48.44
80	2.50	0.18	34.26	39.44	76.34	87.88
120	3.00	0.13	8.77	10.10	85.11	97.98
170	3.50	0.09	0.56	0.64	85.67	98.62
200	3.75	0.07	0.13	0.15	85.80	98.77
230	4.00	0.06	0.00	0.00	85.80	98.77

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.85	2.45	2.34	2.02	1.56	1.12	-0.42
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.75	0.30	0.92	-1.72	6.01	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 50+00 #06 MTL

Analysis Date: 08-18-15

Analyzed By: DA

Easting (ft):	Northing (ft):
2,973,763	867,545

Coordinate System:	Elevation (ft):
North Carolina State Plane	-0.6 NAVD 88

USCS:	Munsell:	Wet - 2.5Y-6/3 Dry - 2.5Y-7/3 Washed - 2.5Y-8/2	Comments:
SW			

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
87.49	86.61	0.00	0.02	#200 - 1.03 #230 - 1.03			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.15	0.17	0.15	0.17
5	-2.00	4.00	0.00	0.00	0.15	0.17
7	-1.50	2.83	0.36	0.41	0.51	0.58
10	-1.00	2.00	1.17	1.34	1.68	1.92
14	-0.50	1.41	2.37	2.71	4.05	4.63
18	0.00	1.00	3.77	4.31	7.82	8.94
25	0.50	0.71	5.14	5.87	12.96	14.81
35	1.00	0.50	8.36	9.56	21.32	24.37
45	1.50	0.35	11.25	12.86	32.57	37.23
60	2.00	0.25	23.31	26.64	55.88	63.87
80	2.50	0.18	25.27	28.88	81.15	92.75
120	3.00	0.13	5.11	5.84	86.26	98.59
170	3.50	0.09	0.29	0.33	86.55	98.92
200	3.75	0.07	0.04	0.05	86.59	98.97
230	4.00	0.06	0.00	0.00	86.59	98.97

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.69	2.35	2.19	1.74	1.02	0.56	-0.46
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.49	0.36	0.94	-1.13	4.04	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 50+00 #07 MLW

Analysis Date: 06-18-14

Analyzed By: TM

Easting (ft): 2,973,767	Northing (ft): 867,536	Coordinate System: North Carolina State Plane	Elevation (ft): -2.1 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 5Y-6/2 Dry - 5Y-7/2 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 108.87	Wash Weight (g): 108.30	Pan Retained (g): 0.00	Sieve Loss (%): 0.07	Fines (%): #200 - 0.59 #230 - 0.59	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	1.59	1.46	1.59	1.46
3.5	-2.50	5.66	21.21	19.48	22.80	20.94
4	-2.25	4.76	7.54	6.93	30.34	27.87
5	-2.00	4.00	12.76	11.72	43.10	39.59
7	-1.50	2.83	14.72	13.52	57.82	53.11
10	-1.00	2.00	9.61	8.83	67.43	61.94
14	-0.50	1.41	7.96	7.31	75.39	69.25
18	0.00	1.00	8.18	7.51	83.57	76.76
25	0.50	0.71	8.51	7.82	92.08	84.58
35	1.00	0.50	9.42	8.65	101.50	93.23
45	1.50	0.35	4.07	3.74	105.57	96.97
60	2.00	0.25	1.81	1.66	107.38	98.63
80	2.50	0.18	0.67	0.62	108.05	99.25
120	3.00	0.13	0.16	0.15	108.21	99.40
170	3.50	0.09	0.01	0.01	108.22	99.41
200	3.75	0.07	0.00	0.00	108.22	99.41
230	4.00	0.06	0.00	0.00	108.22	99.41

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
1.24	0.46	-0.12	-1.62	-2.35	-2.63	-2.91
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	-1.25	2.38	1.35	0.6	2.25	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 50+00 #08 Trough

Analysis Date: 06-19-14

Analyzed By: TM

Easting (ft): 2,973,795	Northing (ft): 867,549	Coordinate System: North Carolina State Plane	Elevation (ft): -5.9 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 5Y-6/2 Dry - 5Y-7/2 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 107.88	Wash Weight (g): 107.19	Pan Retained (g): 0.00	Sieve Loss (%): 0.03	Fines (%): #200 - 0.66 #230 - 0.66	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.90	0.83	0.90	0.83
3.5	-2.50	5.66	11.13	10.32	12.03	11.15
4	-2.25	4.76	6.07	5.63	18.10	16.78
5	-2.00	4.00	9.36	8.68	27.46	25.46
7	-1.50	2.83	14.01	12.99	41.47	38.45
10	-1.00	2.00	7.93	7.35	49.40	45.80
14	-0.50	1.41	6.17	5.72	55.57	51.52
18	0.00	1.00	6.81	6.31	62.38	57.83
25	0.50	0.71	10.76	9.97	73.14	67.80
35	1.00	0.50	14.24	13.20	87.38	81.00
45	1.50	0.35	7.30	6.77	94.68	87.77
60	2.00	0.25	9.73	9.02	104.41	96.79
80	2.50	0.18	2.13	1.97	106.54	98.76
120	3.00	0.13	0.59	0.55	107.13	99.31
170	3.50	0.09	0.03	0.03	107.16	99.34
200	3.75	0.07	0.00	0.00	107.16	99.34
230	4.00	0.06	0.00	0.00	107.16	99.34

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
1.90	1.22	0.77	-0.63	-2.01	-2.28	-2.80
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	-0.58	1.49	1.55	0.14	1.72	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 50+00 #09 BarCrest

Analysis Date: 08-18-15

Analyzed By: DA

Easting (ft): 2,973,986	Northing (ft): 867,661	Coordinate System: North Carolina State Plane	Elevation (ft): -9.0 NAVD 88
----------------------------	---------------------------	--	---------------------------------

USCS: SP	Munsell: Wet - 2.5Y-5/3 Dry - 2.5Y-7/3 Washed - 2.5Y-8/2	Comments:
-------------	---	-----------

Dry Weight (g): 92.45	Wash Weight (g): 91.41	Pan Retained (g): 0.01	Sieve Loss (%): 0.02	Fines (%): #200 - 1.22 #230 - 1.17	Organics (%):	Carbonates (%):	Shell Hash (%):
--------------------------	---------------------------	---------------------------	-------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3 1/2"	-2.50	5.66	0.96	1.04	0.96	1.04
4	-2.25	4.76	0.00	0.00	0.96	1.04
5	-2.00	4.00	0.00	0.00	0.96	1.04
7	-1.50	2.83	0.20	0.22	1.16	1.26
10	-1.00	2.00	0.06	0.06	1.22	1.32
14	-0.50	1.41	0.15	0.16	1.37	1.48
18	0.00	1.00	0.19	0.21	1.56	1.69
25	0.50	0.71	0.42	0.45	1.98	2.14
35	1.00	0.50	1.24	1.34	3.22	3.48
45	1.50	0.35	2.51	2.71	5.73	6.19
60	2.00	0.25	12.88	13.93	18.61	20.12
80	2.50	0.18	41.82	45.24	60.43	65.36
120	3.00	0.13	27.44	29.68	87.87	95.04
170	3.50	0.09	3.31	3.58	91.18	98.62
200	3.75	0.07	0.15	0.16	91.33	98.78
230	4.00	0.06	0.05	0.05	91.38	98.83

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.00	2.81	2.66	2.33	2.05	1.85	1.28
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.24	0.21	0.75	-3.78	24.19	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 50+00 #10 (-12.5)

Analysis Date: 08-18-15

Analyzed By: DA

Easting (ft): 2,974,103	Northing (ft): 867,725	Coordinate System: North Carolina State Plane	Elevation (ft): -12.5 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP	Munsell: Wet - 2.5Y-5/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
--------------------	---	-----------

Dry Weight (g): 86.93	Wash Weight (g): 85.83	Pan Retained (g): 0.00	Sieve Loss (%): 0.05	Fines (%): #200 - 1.36 #230 - 1.31	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3 1/2"	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.01	0.01	0.01	0.01
14	-0.50	1.41	0.02	0.02	0.03	0.03
18	0.00	1.00	0.03	0.03	0.06	0.06
25	0.50	0.71	0.13	0.15	0.19	0.21
35	1.00	0.50	0.45	0.52	0.64	0.73
45	1.50	0.35	2.48	2.85	3.12	3.58
60	2.00	0.25	12.40	14.26	15.52	17.84
80	2.50	0.18	43.95	50.56	59.47	68.40
120	3.00	0.13	24.32	27.98	83.79	96.38
170	3.50	0.09	1.83	2.11	85.62	98.49
200	3.75	0.07	0.13	0.15	85.75	98.64
230	4.00	0.06	0.04	0.05	85.79	98.69

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.98	2.78	2.62	2.32	2.07	1.94	1.55
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	2.3	0.20	0.43	-0.76	5.9	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 50+00 #11 (-15)

Analysis Date: 08-14-15

Analyzed By: DA

Easting (ft):	Northing (ft):
2,974,740	868,071

Coordinate System:	Elevation (ft):
North Carolina State Plane	-15.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-5/2 Dry - 2.5Y-6/2 Washed - 2.5Y-7/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
81.09	80.05	0.00	0.00	#200 - 1.44 #230 - 1.29			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.02	0.02	0.02	0.02
18	0.00	1.00	0.06	0.07	0.08	0.09
25	0.50	0.71	0.21	0.26	0.29	0.35
35	1.00	0.50	0.80	0.99	1.09	1.34
45	1.50	0.35	1.51	1.86	2.60	3.20
60	2.00	0.25	5.70	7.03	8.30	10.23
80	2.50	0.18	38.85	47.91	47.15	58.14
120	3.00	0.13	29.56	36.45	76.71	94.59
170	3.50	0.09	2.90	3.58	79.61	98.17
200	3.75	0.07	0.32	0.39	79.93	98.56
230	4.00	0.06	0.12	0.15	80.05	98.71

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.06	2.85	2.73	2.42	2.15	2.06	1.63
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.4	0.19	0.44	-1.09	7.43	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 50+00 #12 (-17.5)

Analysis Date: 08-14-15

Analyzed By: DA

Easting (ft): 2,974,892	Northing (ft): 868,141	Coordinate System: North Carolina State Plane	Elevation (ft): -17.5 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP	Munsell: Wet - 2.5Y-4/2 Dry - 2.5Y-6/2 Washed - 2.5Y-7/2	Comments:
--------------------	--	-----------

Dry Weight (g): 81.26	Wash Weight (g): 80.14	Pan Retained (g): 0.01	Sieve Loss (%): 0.00	Fines (%): #200 - 1.60 #230 - 1.39	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3 1/2"	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.07	0.09	0.07	0.09
10	-1.00	2.00	0.18	0.22	0.25	0.31
14	-0.50	1.41	0.30	0.37	0.55	0.68
18	0.00	1.00	0.45	0.55	1.00	1.23
25	0.50	0.71	0.61	0.75	1.61	1.98
35	1.00	0.50	0.74	0.91	2.35	2.89
45	1.50	0.35	1.02	1.26	3.37	4.15
60	2.00	0.25	3.97	4.89	7.34	9.04
80	2.50	0.18	23.08	28.40	30.42	37.44
120	3.00	0.13	41.60	51.19	72.02	88.63
170	3.50	0.09	7.25	8.92	79.27	97.55
200	3.75	0.07	0.69	0.85	79.96	98.40
230	4.00	0.06	0.17	0.21	80.13	98.61

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.36	2.95	2.87	2.62	2.28	2.12	1.59
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	2.51	0.18	0.6	-2.62	14.48	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 50+00 #13 (-20)

Analysis Date: 08-14-15

Analyzed By: DA

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,975,068	868,234	North Carolina State Plane	-20.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-3/1 Dry - 2.5Y-6/2 Washed - 2.5Y-7/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
83.64	82.24	0.04	0.00	#200 - 2.17 #230 - 1.72			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3 1/2"	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.17	0.20	0.17	0.20
7	-1.50	2.83	0.13	0.16	0.30	0.36
10	-1.00	2.00	0.09	0.11	0.39	0.47
14	-0.50	1.41	0.05	0.06	0.44	0.53
18	0.00	1.00	0.03	0.04	0.47	0.57
25	0.50	0.71	0.08	0.10	0.55	0.67
35	1.00	0.50	0.14	0.17	0.69	0.84
45	1.50	0.35	0.21	0.25	0.90	1.09
60	2.00	0.25	1.15	1.37	2.05	2.46
80	2.50	0.18	25.03	29.93	27.08	32.39
120	3.00	0.13	45.36	54.23	72.44	86.62
170	3.50	0.09	8.50	10.16	80.94	96.78
200	3.75	0.07	0.88	1.05	81.82	97.83
230	4.00	0.06	0.38	0.45	82.20	98.28

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.41	2.98	2.89	2.66	2.38	2.23	2.04
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.62	0.16	0.49	-3.86	36.09	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 75+00 #01 Dune

Analysis Date: 06-18-14

Analyzed By: TM

Easting (ft): 2,974,797
Northing (ft): 865,285

Coordinate System: North Carolina State Plane
Elevation (ft): 16.2 NAVD 88

USCS: SP
Munsell: Wet - 5Y-6/2
Dry - 5Y-7/2
Washed - 5Y-7/1
Comments:

Dry Weight (g): 112.51
Wash Weight (g): 112.09
Pan Retained (g): 0.00
Sieve Loss (%): 0.11
Fines (%): #200 - 0.47
#230 - 0.47
Organics (%):
Carbonates (%):
Shell Hash (%):

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.28	0.25	0.28	0.25
18	0.00	1.00	2.80	2.49	3.08	2.74
25	0.50	0.71	9.01	8.01	12.09	10.75
35	1.00	0.50	19.92	17.71	32.01	28.46
45	1.50	0.35	27.10	24.09	59.11	52.55
60	2.00	0.25	34.78	30.91	93.89	83.46
80	2.50	0.18	16.54	14.70	110.43	98.16
120	3.00	0.13	1.42	1.26	111.85	99.42
170	3.50	0.09	0.10	0.09	111.95	99.51
200	3.75	0.07	0.02	0.02	111.97	99.53
230	4.00	0.06	0.00	0.00	111.97	99.53

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.39	1.86	1.45	0.90	0.14
	1.36	0.39	0.66	-0.4	2.77

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 75+00 #02 DuneToe

Analysis Date: 06-18-14

Analyzed By: TM

Easting (ft): 2,974,801	Northing (ft): 865,289	Coordinate System: North Carolina State Plane	Elevation (ft): 12.5 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SP	Munsell: Wet - 5Y-6/2 Dry - 5Y-7/2 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 113.62	Wash Weight (g): 113.21	Pan Retained (g): 0.00	Sieve Loss (%): 0.24	Fines (%): #200 - 0.60 #230 - 0.60	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.06	0.05	0.06	0.05
7	-1.50	2.83	0.20	0.18	0.26	0.23
10	-1.00	2.00	2.89	2.54	3.15	2.77
14	-0.50	1.41	27.93	24.58	31.08	27.35
18	0.00	1.00	34.52	30.38	65.60	57.73
25	0.50	0.71	19.63	17.28	85.23	75.01
35	1.00	0.50	11.60	10.21	96.83	85.22
45	1.50	0.35	5.10	4.49	101.93	89.71
60	2.00	0.25	8.00	7.04	109.93	96.75
80	2.50	0.18	2.58	2.27	112.51	99.02
120	3.00	0.13	0.35	0.31	112.86	99.33
170	3.50	0.09	0.07	0.06	112.93	99.39
200	3.75	0.07	0.01	0.01	112.94	99.40
230	4.00	0.06	0.00	0.00	112.94	99.40

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
1.88	0.94	0.50	-0.13	-0.55	-0.73	-0.95

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	0.07	0.95	0.84	0.93	3.35

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 75+00 #03 MidBerm

Analysis Date: 06-19-14

Analyzed By: TM

Easting (ft): 2,974,816	Northing (ft): 865,296	Coordinate System: North Carolina State Plane	Elevation (ft): 6.0 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SW	Munsell: Wet - 5Y-6/2 Dry - 5Y-7/2 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 116.01	Wash Weight (g): 115.65	Pan Retained (g): 0.00	Sieve Loss (%): 0.05	Fines (%): #200 - 0.37 #230 - 0.37	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.12	0.10	0.12	0.10
5	-2.00	4.00	0.16	0.14	0.28	0.24
7	-1.50	2.83	1.16	1.00	1.44	1.24
10	-1.00	2.00	3.25	2.80	4.69	4.04
14	-0.50	1.41	15.33	13.21	20.02	17.25
18	0.00	1.00	29.54	25.46	49.56	42.71
25	0.50	0.71	27.38	23.60	76.94	66.31
35	1.00	0.50	19.37	16.70	96.31	83.01
45	1.50	0.35	3.43	2.96	99.74	85.97
60	2.00	0.25	12.94	11.15	112.68	97.12
80	2.50	0.18	2.44	2.10	115.12	99.22
120	3.00	0.13	0.37	0.32	115.49	99.54
170	3.50	0.09	0.09	0.08	115.58	99.62
200	3.75	0.07	0.01	0.01	115.59	99.63
230	4.00	0.06	0.00	0.00	115.59	99.63

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
1.90	1.17	0.76	0.15	-0.35	-0.55	-0.96
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.26	0.84	0.87	0.43	2.99	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 75+00 #04 BermCrest

Analysis Date: 06-19-14

Analyzed By: TM

Easting (ft): 2,974,829	Northing (ft): 865,302	Coordinate System: North Carolina State Plane	Elevation (ft): 3.9 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SP	Munsell: Wet - 5Y-6/2 Dry - 5Y-7/2 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 114.43	Wash Weight (g): 113.83	Pan Retained (g): 0.00	Sieve Loss (%): 0.17	Fines (%): #200 - 0.69 #230 - 0.68	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.31	0.27	0.31	0.27
10	-1.00	2.00	0.72	0.63	1.03	0.90
14	-0.50	1.41	3.92	3.43	4.95	4.33
18	0.00	1.00	14.85	12.98	19.80	17.31
25	0.50	0.71	29.61	25.88	49.41	43.19
35	1.00	0.50	31.51	27.54	80.92	70.73
45	1.50	0.35	17.20	15.03	98.12	85.76
60	2.00	0.25	11.44	10.00	109.56	95.76
80	2.50	0.18	3.52	3.08	113.08	98.84
120	3.00	0.13	0.47	0.41	113.55	99.25
170	3.50	0.09	0.06	0.05	113.61	99.30
200	3.75	0.07	0.01	0.01	113.62	99.31
230	4.00	0.06	0.01	0.01	113.63	99.32

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
1.96	1.44	1.14	0.62	0.15	-0.05	-0.47
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	0.65	0.64	0.73	0.15	3.1	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 75+00 #05 MHW

Analysis Date: 06-19-14

Analyzed By: TM

Easting (ft): 2,974,892	Northing (ft): 865,337	Coordinate System: North Carolina State Plane	Elevation (ft): 1.2 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SW	Munsell: Wet - 5Y-5/1 Dry - 5Y-6/2 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 106.67	Wash Weight (g): 106.01	Pan Retained (g): 0.00	Sieve Loss (%): 0.07	Fines (%): #200 - 0.71 #230 - 0.70	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.55	0.52	0.55	0.52
4	-2.25	4.76	0.17	0.16	0.72	0.68
5	-2.00	4.00	1.57	1.47	2.29	2.15
7	-1.50	2.83	8.25	7.73	10.54	9.88
10	-1.00	2.00	10.51	9.85	21.05	19.73
14	-0.50	1.41	11.18	10.48	32.23	30.21
18	0.00	1.00	11.30	10.59	43.53	40.80
25	0.50	0.71	10.90	10.22	54.43	51.02
35	1.00	0.50	12.44	11.66	66.87	62.68
45	1.50	0.35	5.61	5.26	72.48	67.94
60	2.00	0.25	22.80	21.37	95.28	89.31
80	2.50	0.18	9.58	8.98	104.86	98.29
120	3.00	0.13	1.00	0.94	105.86	99.23
170	3.50	0.09	0.06	0.06	105.92	99.29
200	3.75	0.07	0.00	0.00	105.92	99.29
230	4.00	0.06	0.01	0.01	105.93	99.30

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.32	1.88	1.67	0.45	-0.75	-1.19	-1.82
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.37	0.77	1.34	-0.18	1.85	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 75+00 #06 MTL

Analysis Date: 06-19-14

Analyzed By: TM

Easting (ft): 2,974,907	Northing (ft): 865,346	Coordinate System: North Carolina State Plane	Elevation (ft): 0.7 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SW	Munsell: Wet - 5Y-5/1 Dry - 5Y-5/1 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 105.77	Wash Weight (g): 105.07	Pan Retained (g): 0.00	Sieve Loss (%): 0.07	Fines (%): #200 - 0.71 #230 - 0.71	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	1.17	1.11	1.17	1.11
3.5	-2.50	5.66	2.29	2.17	3.46	3.28
4	-2.25	4.76	1.46	1.38	4.92	4.66
5	-2.00	4.00	4.01	3.79	8.93	8.45
7	-1.50	2.83	13.77	13.02	22.70	21.47
10	-1.00	2.00	18.35	17.35	41.05	38.82
14	-0.50	1.41	13.12	12.40	54.17	51.22
18	0.00	1.00	9.04	8.55	63.21	59.77
25	0.50	0.71	8.95	8.46	72.16	68.23
35	1.00	0.50	9.93	9.39	82.09	77.62
45	1.50	0.35	7.35	6.95	89.44	84.57
60	2.00	0.25	9.06	8.57	98.50	93.14
80	2.50	0.18	5.86	5.54	104.36	98.68
120	3.00	0.13	0.60	0.57	104.96	99.25
170	3.50	0.09	0.03	0.03	104.99	99.28
200	3.75	0.07	0.01	0.01	105.00	99.29
230	4.00	0.06	0.00	0.00	105.00	99.29

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.17	1.46	0.86	-0.55	-1.40	-1.71	-2.23
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	-0.3	1.23	1.4	0.26	2.09	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 75+00 #07 MLW

Analysis Date: 06-19-14

Analyzed By: TM

Easting (ft):

2,974,923

Northing (ft):

865,354

Coordinate System:

North Carolina State Plane

Elevation (ft):

-1.5 NAVD 88

USCS:

SW

Munsell:

Wet - 5Y-5/1
Dry - 5Y-6/1
Washed - 5Y-7/1

Comments:

Dry Weight (g):

107.52

Wash Weight (g):

106.93

Pan Retained (g):

0.00

Sieve Loss (%):

0.00

Fines (%):

#200 - 0.54
#230 - 0.54

Organics (%):

Carbonates (%):

Shell Hash (%):

Sieve Number

Sieve Size (Phi)

Sieve Size (Millimeters)

Grams Retained

% Weight Retained

Cum. Grams Retained

C. % Weight Retained

3/4"

-4.25

19.03

0.00

0.00

0.00

0.00

5/8"

-4.00

16.00

0.00

0.00

0.00

0.00

7/16"

-3.50

11.31

0.00

0.00

0.00

0.00

5/16"

-3.00

8.00

2.04

1.90

2.04

1.90

3.5

-2.50

5.66

10.09

9.38

12.13

11.28

4

-2.25

4.76

9.62

8.95

21.75

20.23

5

-2.00

4.00

16.73

15.56

38.48

35.79

7

-1.50

2.83

23.95

22.27

62.43

58.06

10

-1.00

2.00

12.50

11.63

74.93

69.69

14

-0.50

1.41

4.07

3.79

79.00

73.48

18

0.00

1.00

2.55

2.37

81.55

75.85

25

0.50

0.71

2.99

2.78

84.54

78.63

35

1.00

0.50

4.15

3.86

88.69

82.49

45

1.50

0.35

0.73

0.68

89.42

83.17

60

2.00

0.25

11.09

10.31

100.51

93.48

80

2.50

0.18

5.61

5.22

106.12

98.70

120

3.00

0.13

0.76

0.71

106.88

99.41

170

3.50

0.09

0.04

0.04

106.92

99.45

200

3.75

0.07

0.01

0.01

106.93

99.46

230

4.00

0.06

0.00

0.00

106.93

99.46

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

2.15

1.54

-0.18

-1.68

-2.17

-2.37

-2.83

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

-1.07

2.10

1.59

0.99

2.65

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 75+00 #08 Trough

Analysis Date: 06-19-14

Analyzed By: TM

Easting (ft): 2,974,963	Northing (ft): 865,386	Coordinate System: North Carolina State Plane	Elevation (ft): -5.1 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SP	Munsell: Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 99.06	Wash Weight (g): 98.01	Pan Retained (g): 0.00	Sieve Loss (%): 0.02	Fines (%): #200 - 1.09 #230 - 1.08	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.36	0.36	0.36	0.36
7	-1.50	2.83	0.58	0.59	0.94	0.95
10	-1.00	2.00	1.02	1.03	1.96	1.98
14	-0.50	1.41	0.78	0.79	2.74	2.77
18	0.00	1.00	0.82	0.83	3.56	3.60
25	0.50	0.71	1.85	1.87	5.41	5.47
35	1.00	0.50	5.63	5.68	11.04	11.15
45	1.50	0.35	9.54	9.63	20.58	20.78
60	2.00	0.25	24.54	24.77	45.12	45.55
80	2.50	0.18	41.81	42.21	86.93	87.76
120	3.00	0.13	10.59	10.69	97.52	98.45
170	3.50	0.09	0.42	0.42	97.94	98.87
200	3.75	0.07	0.04	0.04	97.98	98.91
230	4.00	0.06	0.01	0.01	97.99	98.92

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.84	2.46	2.35	2.05	1.59	1.25	0.37
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	1.84	0.28	0.8	-2.06	8.82	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 75+00 #09 BarCrest

Analysis Date: 06-19-14

Analyzed By: TM

Easting (ft): 2,975,199	Northing (ft): 865,482	Coordinate System: North Carolina State Plane	Elevation (ft): -9.9 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SP	Munsell: Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 95.67	Wash Weight (g): 94.48	Pan Retained (g): 0.03	Sieve Loss (%): 0.03	Fines (%): #200 - 1.36 #230 - 1.32	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.26	0.27	0.26	0.27
14	-0.50	1.41	0.35	0.37	0.61	0.64
18	0.00	1.00	0.71	0.74	1.32	1.38
25	0.50	0.71	1.84	1.92	3.16	3.30
35	1.00	0.50	3.76	3.93	6.92	7.23
45	1.50	0.35	2.52	2.63	9.44	9.86
60	2.00	0.25	24.86	25.99	34.30	35.85
80	2.50	0.18	42.74	44.67	77.04	80.52
120	3.00	0.13	16.19	16.92	93.23	97.44
170	3.50	0.09	1.10	1.15	94.33	98.59
200	3.75	0.07	0.05	0.05	94.38	98.64
230	4.00	0.06	0.04	0.04	94.42	98.68

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.93	2.60	2.44	2.16	1.79	1.62	0.72
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	2.05	0.24	0.63	-1.67	7.65	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 75+00 #10 (-12.5)

Analysis Date: 06-19-14

Analyzed By: TM

Easting (ft):	Northing (ft):
2,975,742	865,778

Coordinate System:	Elevation (ft):
North Carolina State Plane	-13.8 NAVD 88

USCS:	Munsell:	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	Comments:
SP			

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
99.29	98.02	0.01	0.00	#200 - 1.42 #230 - 1.31			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.52	0.52	0.52	0.52
14	-0.50	1.41	0.10	0.10	0.62	0.62
18	0.00	1.00	0.10	0.10	0.72	0.72
25	0.50	0.71	0.84	0.85	1.56	1.57
35	1.00	0.50	3.03	3.05	4.59	4.62
45	1.50	0.35	4.87	4.90	9.46	9.52
60	2.00	0.25	14.25	14.35	23.71	23.87
80	2.50	0.18	44.99	45.31	68.70	69.18
120	3.00	0.13	25.80	25.98	94.50	95.16
170	3.50	0.09	3.09	3.11	97.59	98.27
200	3.75	0.07	0.31	0.31	97.90	98.58
230	4.00	0.06	0.11	0.11	98.01	98.69

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.00	2.79	2.61	2.29	2.01	1.73	1.04
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.21	0.22	0.61	-1.69	9.04	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 75+00 #11 (-15)

Analysis Date: 06-19-14

Analyzed By: TM

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,975,816	865,829	North Carolina State Plane	-15.7 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-4/1 Dry - 5Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
95.58	94.29	0.03	0.01	#200 - 1.51 #230 - 1.39			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.05	0.05	0.05	0.05
10	-1.00	2.00	0.10	0.10	0.15	0.15
14	-0.50	1.41	0.10	0.10	0.25	0.25
18	0.00	1.00	0.33	0.35	0.58	0.60
25	0.50	0.71	0.81	0.85	1.39	1.45
35	1.00	0.50	2.11	2.21	3.50	3.66
45	1.50	0.35	0.04	0.04	3.54	3.70
60	2.00	0.25	8.27	8.65	11.81	12.35
80	2.50	0.18	36.66	38.36	48.47	50.71
120	3.00	0.13	39.33	41.15	87.80	91.86
170	3.50	0.09	5.64	5.90	93.44	97.76
200	3.75	0.07	0.70	0.73	94.14	98.49
230	4.00	0.06	0.11	0.12	94.25	98.61

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.27	2.90	2.80	2.49	2.16	2.05	1.58
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	2.42	0.19	0.56	-1.97	10.94	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
 Coastal Planning & Engineering, Inc.
 2481 NW Boca Raton Blvd.
 Boca Raton, FL 33431
 ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 75+00 #12 (-17.5)

Analysis Date: 06-20-14

Analyzed By: TM

Easting (ft): 2,975,981	Northing (ft): 865,916	Coordinate System: North Carolina State Plane	Elevation (ft): -17.7 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP	Munsell: Wet - 5Y-4/1 Dry - 5Y-5/1 Washed - 5Y-6/1	Comments:
--------------------	---	-----------

Dry Weight (g): 94.90	Wash Weight (g): 93.48	Pan Retained (g): 0.04	Sieve Loss (%): 0.00	Fines (%): #200 - 1.57 #230 - 1.54	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.04	0.04	0.04	0.04
14	-0.50	1.41	0.04	0.04	0.08	0.08
18	0.00	1.00	0.10	0.11	0.18	0.19
25	0.50	0.71	0.03	0.03	0.21	0.22
35	1.00	0.50	0.04	0.04	0.25	0.26
45	1.50	0.35	0.02	0.02	0.27	0.28
60	2.00	0.25	0.85	0.90	1.12	1.18
80	2.50	0.18	25.43	26.80	26.55	27.98
120	3.00	0.13	57.55	60.64	84.10	88.62
170	3.50	0.09	8.66	9.13	92.76	97.75
200	3.75	0.07	0.65	0.68	93.41	98.43
230	4.00	0.06	0.03	0.03	93.44	98.46

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.35	2.96	2.89	2.68	2.44	2.28	2.07
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	2.65	0.16	0.35	-1.7	18.92	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 75+00 #13 (-20)

Analysis Date: 06-20-14

Analyzed By: TM

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,976,144	866,020	North Carolina State Plane	-19.7 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-4/1 Dry - 5Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
93.56	91.71	0.08	0.01	#200 - 2.63 #230 - 2.07			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.21	0.22	0.21	0.22
4	-2.25	4.76	0.00	0.00	0.21	0.22
5	-2.00	4.00	0.02	0.02	0.23	0.24
7	-1.50	2.83	0.00	0.00	0.23	0.24
10	-1.00	2.00	0.03	0.03	0.26	0.27
14	-0.50	1.41	0.02	0.02	0.28	0.29
18	0.00	1.00	0.02	0.02	0.30	0.31
25	0.50	0.71	0.03	0.03	0.33	0.34
35	1.00	0.50	0.02	0.02	0.35	0.36
45	1.50	0.35	0.09	0.10	0.44	0.46
60	2.00	0.25	0.14	0.15	0.58	0.61
80	2.50	0.18	11.43	12.22	12.01	12.83
120	3.00	0.13	61.10	65.31	73.11	78.14
170	3.50	0.09	16.29	17.41	89.40	95.55
200	3.75	0.07	1.70	1.82	91.10	97.37
230	4.00	0.06	0.52	0.56	91.62	97.93

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.48	3.17	2.98	2.78	2.59	2.52	2.18
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.78	0.15	0.43	-5.47	70.32	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 110+00 #01 Dune

Analysis Date: 06-20-14

Analyzed By: TM

Easting (ft): 2,976,514	Northing (ft): 862,254	Coordinate System: North Carolina State Plane	Elevation (ft): 14.9 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 5Y-6/2 Dry - 5Y-7/2 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 119.23	Wash Weight (g): 118.82	Pan Retained (g): 0.02	Sieve Loss (%): 0.04	Fines (%): #200 - 0.45 #230 - 0.41	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.28	0.23	0.28	0.23
7	-1.50	2.83	4.75	3.98	5.03	4.21
10	-1.00	2.00	14.45	12.12	19.48	16.33
14	-0.50	1.41	22.97	19.27	42.45	35.60
18	0.00	1.00	16.92	14.19	59.37	49.79
25	0.50	0.71	12.01	10.07	71.38	59.86
35	1.00	0.50	9.90	8.30	81.28	68.16
45	1.50	0.35	5.02	4.21	86.30	72.37
60	2.00	0.25	18.78	15.75	105.08	88.12
80	2.50	0.18	11.85	9.94	116.93	98.06
120	3.00	0.13	1.57	1.32	118.50	99.38
170	3.50	0.09	0.18	0.15	118.68	99.53
200	3.75	0.07	0.02	0.02	118.70	99.55
230	4.00	0.06	0.05	0.04	118.75	99.59

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.35	1.87	1.58	0.01	-0.78	-1.01	-1.47
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.28	0.82	1.26	0.27	1.82	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 110+00 #02 DuneToe

Analysis Date: 08-14-15

Analyzed By: SMT

Easting (ft): 2,976,534	Northing (ft): 862,265	Coordinate System: North Carolina State Plane	Elevation (ft): 8.5 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SW	Munsell: Wet - 2.5Y-5/3 Dry - 2.5Y-6/2 Washed - 2.5Y-7/2	Comments:
--------------------	--	-----------

Dry Weight (g): 106.90	Wash Weight (g): 106.60	Pan Retained (g): 0.00	Sieve Loss (%): 0.02	Fines (%): #200 - 0.31 #230 - 0.31	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.33	0.31	0.33	0.31
4	-2.25	4.76	0.00	0.00	0.33	0.31
5	-2.00	4.00	0.80	0.75	1.13	1.06
7	-1.50	2.83	5.91	5.53	7.04	6.59
10	-1.00	2.00	23.81	22.27	30.85	28.86
14	-0.50	1.41	17.12	16.01	47.97	44.87
18	0.00	1.00	9.47	8.86	57.44	53.73
25	0.50	0.71	7.02	6.57	64.46	60.30
35	1.00	0.50	10.65	9.96	75.11	70.26
45	1.50	0.35	11.72	10.96	86.83	81.22
60	2.00	0.25	12.21	11.42	99.04	92.64
80	2.50	0.18	6.47	6.05	105.51	98.69
120	3.00	0.13	0.97	0.91	106.48	99.60
170	3.50	0.09	0.09	0.08	106.57	99.68
200	3.75	0.07	0.01	0.01	106.58	99.69
230	4.00	0.06	0.00	0.00	106.58	99.69

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.20	1.62	1.22	-0.21	-1.09	-1.29	-1.64
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.05	0.97	1.28	0.29	1.81	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 110+00 #03 MidBerm

Analysis Date: 08-18-15

Analyzed By: DA

Easting (ft):	Northing (ft):
2,976,562	862,282

Coordinate System:	Elevation (ft):
North Carolina State Plane	5.1 NAVD 88

USCS:	Munsell:	Wet - 2.5Y-5/2 Dry - 2.5Y-7/3 Washed - 2.5Y-8/2	Comments:
SP			

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
97.48	97.16	0.00	0.01	#200 - 0.34 #230 - 0.33			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3 1/2"	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.20	0.21	0.20	0.21
10	-1.00	2.00	0.20	0.21	0.40	0.42
14	-0.50	1.41	0.64	0.66	1.04	1.08
18	0.00	1.00	0.75	0.77	1.79	1.85
25	0.50	0.71	1.22	1.25	3.01	3.10
35	1.00	0.50	4.04	4.14	7.05	7.24
45	1.50	0.35	9.78	10.03	16.83	17.27
60	2.00	0.25	32.11	32.94	48.94	50.21
80	2.50	0.18	39.29	40.31	88.23	90.52
120	3.00	0.13	8.36	8.58	96.59	99.10
170	3.50	0.09	0.51	0.52	97.10	99.62
200	3.75	0.07	0.04	0.04	97.14	99.66
230	4.00	0.06	0.01	0.01	97.15	99.67

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.76	2.42	2.31	2.00	1.62	1.44	0.73
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.89	0.27	0.63	-1.7	8.47	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 110+00 #04 BermCrest

Analysis Date: 08-19-15

Analyzed By: KM

Easting (ft): 2,976,582	Northing (ft): 862,293	Coordinate System: North Carolina State Plane	Elevation (ft): 5.0 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SP	Munsell: Wet - 2.5Y-6/3 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
--------------------	---	-----------

Dry Weight (g): 97.96	Wash Weight (g): 97.70	Pan Retained (g): 0.01	Sieve Loss (%): 0.10	Fines (%): #200 - 0.38 #230 - 0.38	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3 1/2"	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.14	0.14	0.14	0.14
14	-0.50	1.41	0.42	0.43	0.56	0.57
18	0.00	1.00	1.57	1.60	2.13	2.17
25	0.50	0.71	4.22	4.31	6.35	6.48
35	1.00	0.50	9.07	9.26	15.42	15.74
45	1.50	0.35	15.25	15.57	30.67	31.31
60	2.00	0.25	28.51	29.10	59.18	60.41
80	2.50	0.18	32.22	32.89	91.40	93.30
120	3.00	0.13	6.03	6.16	97.43	99.46
170	3.50	0.09	0.15	0.15	97.58	99.61
200	3.75	0.07	0.01	0.01	97.59	99.62
230	4.00	0.06	0.00	0.00	97.59	99.62

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.64	2.36	2.22	1.82	1.30	1.01	0.33
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.7	0.31	0.69	-0.93	3.84	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 110+00 #05 MHW

Analysis Date: 08-14-15

Analyzed By: DA

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,976,610	862,309	North Carolina State Plane	1.6 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-5/3 Dry - 2.5Y-7/2 Washed - 2.5Y-7/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
83.22	82.08	0.01	0.02	#200 - 1.43 #230 - 1.42			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3 1/2"	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.25	0.30	0.25	0.30
10	-1.00	2.00	0.33	0.40	0.58	0.70
14	-0.50	1.41	0.76	0.91	1.34	1.61
18	0.00	1.00	2.16	2.60	3.50	4.21
25	0.50	0.71	4.18	5.02	7.68	9.23
35	1.00	0.50	6.67	8.01	14.35	17.24
45	1.50	0.35	9.19	11.04	23.54	28.28
60	2.00	0.25	18.85	22.65	42.39	50.93
80	2.50	0.18	31.59	37.96	73.98	88.89
120	3.00	0.13	7.71	9.26	81.69	98.15
170	3.50	0.09	0.32	0.38	82.01	98.53
200	3.75	0.07	0.03	0.04	82.04	98.57
230	4.00	0.06	0.01	0.01	82.05	98.58

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.83	2.44	2.32	1.98	1.35	0.92	0.08
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.73	0.30	0.81	-1.24	4.59	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 110+00 #06 MTL

Analysis Date: 08-19-15

Analyzed By: DA

Easting (ft): 2,976,630	Northing (ft): 862,319	Coordinate System: North Carolina State Plane	Elevation (ft): -0.8 NAVD 88
----------------------------	---------------------------	--	---------------------------------

USCS: SP	Munsell: Wet - 2.5Y-5/3 Dry - 2.5Y-7/3 Washed - 2.5Y-8/2	Comments:
-------------	---	-----------

Dry Weight (g): 91.63	Wash Weight (g): 90.55	Pan Retained (g): 0.01	Sieve Loss (%): 0.00	Fines (%): #200 - 1.19 #230 - 1.18	Organics (%):	Carbonates (%):	Shell Hash (%):
--------------------------	---------------------------	---------------------------	-------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.12	0.13	0.12	0.13
7	-1.50	2.83	0.06	0.07	0.18	0.20
10	-1.00	2.00	0.10	0.11	0.28	0.31
14	-0.50	1.41	0.40	0.44	0.68	0.75
18	0.00	1.00	1.30	1.42	1.98	2.17
25	0.50	0.71	2.71	2.96	4.69	5.13
35	1.00	0.50	4.80	5.24	9.49	10.37
45	1.50	0.35	5.99	6.54	15.48	16.91
60	2.00	0.25	18.17	19.83	33.65	36.74
80	2.50	0.18	42.20	46.05	75.85	82.79
120	3.00	0.13	14.19	15.49	90.04	98.28
170	3.50	0.09	0.47	0.51	90.51	98.79
200	3.75	0.07	0.02	0.02	90.53	98.81
230	4.00	0.06	0.01	0.01	90.54	98.82

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.89	2.54	2.42	2.14	1.70	1.43	0.48
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.97	0.26	0.71	-1.65	6.73	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 110+00 #07 MLW

Analysis Date: 06-20-14

Analyzed By: TM

Easting (ft): 2,976,627	Northing (ft): 862,303	Coordinate System: North Carolina State Plane	Elevation (ft): -2.6 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 5Y-5/2 Dry - 5Y-6/2 Washed - 5Y-7/2	Comments:
--------------------	---	-----------

Dry Weight (g): 105.23	Wash Weight (g): 104.31	Pan Retained (g): 0.00	Sieve Loss (%): 0.06	Fines (%): #200 - 0.93 #230 - 0.92	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	3.15	2.99	3.15	2.99
5/16"	-3.00	8.00	0.00	0.00	3.15	2.99
3.5	-2.50	5.66	0.15	0.14	3.30	3.13
4	-2.25	4.76	0.69	0.66	3.99	3.79
5	-2.00	4.00	1.43	1.36	5.42	5.15
7	-1.50	2.83	3.93	3.73	9.35	8.88
10	-1.00	2.00	6.09	5.79	15.44	14.67
14	-0.50	1.41	18.61	17.69	34.05	32.36
18	0.00	1.00	37.62	35.75	71.67	68.11
25	0.50	0.71	28.48	27.06	100.15	95.17
35	1.00	0.50	3.85	3.66	104.00	98.83
45	1.50	0.35	0.10	0.10	104.10	98.93
60	2.00	0.25	0.05	0.05	104.15	98.98
80	2.50	0.18	0.03	0.03	104.18	99.01
120	3.00	0.13	0.04	0.04	104.22	99.05
170	3.50	0.09	0.02	0.02	104.24	99.07
200	3.75	0.07	0.00	0.00	104.24	99.07
230	4.00	0.06	0.01	0.01	104.25	99.08

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
0.50	0.29	0.13	-0.25	-0.71	-0.96	-2.03
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	-0.42	1.34	0.86	-1.88	8.11	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 110+00 #08 Trough

Analysis Date: 06-20-14

Analyzed By: TM

Easting (ft): 2,976,647	Northing (ft): 862,319	Coordinate System: North Carolina State Plane	Elevation (ft): -6.4 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 5Y-5/2 Dry - 5Y-6/2 Washed - 5Y-7/2	Comments:
--------------------	---	-----------

Dry Weight (g): 111.45	Wash Weight (g): 110.88	Pan Retained (g): 0.00	Sieve Loss (%): 0.11	Fines (%): #200 - 0.61 #230 - 0.61	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	3.53	3.17	3.53	3.17
3.5	-2.50	5.66	6.90	6.19	10.43	9.36
4	-2.25	4.76	6.35	5.70	16.78	15.06
5	-2.00	4.00	7.81	7.01	24.59	22.07
7	-1.50	2.83	22.90	20.55	47.49	42.62
10	-1.00	2.00	21.63	19.41	69.12	62.03
14	-0.50	1.41	20.67	18.55	89.79	80.58
18	0.00	1.00	13.71	12.30	103.50	92.88
25	0.50	0.71	5.56	4.99	109.06	97.87
35	1.00	0.50	1.36	1.22	110.42	99.09
45	1.50	0.35	0.03	0.03	110.45	99.12
60	2.00	0.25	0.15	0.13	110.60	99.25
80	2.50	0.18	0.07	0.06	110.67	99.31
120	3.00	0.13	0.05	0.04	110.72	99.35
170	3.50	0.09	0.02	0.02	110.74	99.37
200	3.75	0.07	0.02	0.02	110.76	99.39
230	4.00	0.06	0.00	0.00	110.76	99.39

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
0.21	-0.36	-0.65	-1.31	-1.93	-2.22	-2.85
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	-1.31	2.48	0.9	0.1	3.13	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 110+00 #09 BarCrest

Analysis Date: 08-19-15

Analyzed By: DA

Easting (ft): 2,976,941	Northing (ft): 862,504	Coordinate System: North Carolina State Plane	Elevation (ft): -9.0 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SP	Munsell: Wet - 2.5Y-5/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
--------------------	--	-----------

Dry Weight (g): 83.49	Wash Weight (g): 82.38	Pan Retained (g): 0.00	Sieve Loss (%): 0.02	Fines (%): #200 - 1.43 #230 - 1.36	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.02	0.02	0.02	0.02
14	-0.50	1.41	0.01	0.01	0.03	0.03
18	0.00	1.00	0.18	0.22	0.21	0.25
25	0.50	0.71	0.37	0.44	0.58	0.69
35	1.00	0.50	1.32	1.58	1.90	2.27
45	1.50	0.35	2.89	3.46	4.79	5.73
60	2.00	0.25	10.43	12.49	15.22	18.22
80	2.50	0.18	35.15	42.10	50.37	60.32
120	3.00	0.13	26.78	32.08	77.15	92.40
170	3.50	0.09	4.86	5.82	82.01	98.22
200	3.75	0.07	0.29	0.35	82.30	98.57
230	4.00	0.06	0.06	0.07	82.36	98.64

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.22	2.87	2.73	2.38	2.08	1.91	1.39
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.34	0.20	0.53	-1.03	5.97	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 110+00 #10 (-12.5)

Analysis Date: 08-18-15

Analyzed By: DA

Easting (ft):

Northing (ft):

Coordinate System:

Elevation (ft):

2,977,304

862,712

North Carolina State Plane

-12.5 NAVD 88

USCS:

Munsell: Wet - 2.5Y-5/3
Dry - 2.5Y-7/3
Washed - 2.5Y-8/2

Comments:

SP

Dry Weight (g):

Wash Weight (g):

Pan Retained (g):

Sieve Loss (%):

Fines (%):

Organics (%):

Carbonates (%):

Shell Hash (%):

99.25

98.24

0.00

0.04

#200 - 1.11
#230 - 1.06

Sieve Number

Sieve Size (Phi)

Sieve Size (Millimeters)

Grams Retained

% Weight Retained

Cum. Grams Retained

C. % Weight Retained

3/4"

-4.25

19.03

0.00

0.00

0.00

0.00

5/8"

-4.00

16.00

0.00

0.00

0.00

0.00

7/16"

-3.50

11.31

0.00

0.00

0.00

0.00

5/16"

-3.00

8.00

0.00

0.00

0.00

0.00

3.5

-2.50

5.66

0.00

0.00

0.00

0.00

4

-2.25

4.76

0.00

0.00

0.00

0.00

5

-2.00

4.00

0.00

0.00

0.00

0.00

7

-1.50

2.83

0.00

0.00

0.00

0.00

10

-1.00

2.00

0.00

0.00

0.00

0.00

14

-0.50

1.41

0.01

0.01

0.01

0.01

18

0.00

1.00

0.06

0.06

0.07

0.07

25

0.50

0.71

0.28

0.28

0.35

0.35

35

1.00

0.50

2.14

2.16

2.49

2.51

45

1.50

0.35

4.13

4.16

6.62

6.67

60

2.00

0.25

12.48

12.57

19.10

19.24

80

2.50

0.18

45.23

45.57

64.33

64.81

120

3.00

0.13

29.97

30.20

94.30

95.01

170

3.50

0.09

3.54

3.57

97.84

98.58

200

3.75

0.07

0.31

0.31

98.15

98.89

230

4.00

0.06

0.05

0.05

98.20

98.94

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

3.00

2.82

2.67

2.34

2.06

1.87

1.30

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

2.3

0.20

0.51

-0.92

4.98

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 110+00 #11 (-15)

Analysis Date: 08-19-15

Analyzed By: DA

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,977,485	862,824	North Carolina State Plane	-15.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-4/3 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
89.42	88.51	0.01	0.01	#200 - 1.15 #230 - 1.04			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.00	0.00	0.00	0.00
18	0.00	1.00	0.04	0.04	0.04	0.04
25	0.50	0.71	0.20	0.22	0.24	0.26
35	1.00	0.50	0.82	0.92	1.06	1.18
45	1.50	0.35	1.43	1.60	2.49	2.78
60	2.00	0.25	6.33	7.08	8.82	9.86
80	2.50	0.18	35.59	39.80	44.41	49.66
120	3.00	0.13	36.57	40.90	80.98	90.56
170	3.50	0.09	6.85	7.66	87.83	98.22
200	3.75	0.07	0.56	0.63	88.39	98.85
230	4.00	0.06	0.10	0.11	88.49	98.96

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.29	2.92	2.81	2.50	2.19	2.08	1.66
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.47	0.18	0.46	-0.86	5.85	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 110+00 #12 (-17.5)

Analysis Date: 08-18-15

Analyzed By: KM

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,977,633	862,910	North Carolina State Plane	-17.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-3/1 Dry - 2.5Y-6/2 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
96.79	95.76	0.01	0.00	#200 - 1.27 #230 - 1.09			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3 1/2"	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.01	0.01	0.01	0.01
14	-0.50	1.41	0.06	0.06	0.07	0.07
18	0.00	1.00	0.16	0.17	0.23	0.24
25	0.50	0.71	0.44	0.45	0.67	0.69
35	1.00	0.50	0.68	0.70	1.35	1.39
45	1.50	0.35	1.03	1.06	2.38	2.45
60	2.00	0.25	4.66	4.81	7.04	7.26
80	2.50	0.18	27.43	28.34	34.47	35.60
120	3.00	0.13	50.03	51.69	84.50	87.29
170	3.50	0.09	10.05	10.38	94.55	97.67
200	3.75	0.07	1.03	1.06	95.58	98.73
230	4.00	0.06	0.17	0.18	95.75	98.91

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.37	2.97	2.88	2.64	2.31	2.15	1.77
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.57	0.17	0.48	-1.59	9.65	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 110+00 #13 (-20)

Analysis Date: 08-17-15

Analyzed By: DA

Easting (ft): 2,977,778	Northing (ft): 862,993	Coordinate System: North Carolina State Plane	Elevation (ft): -20.0 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP	Munsell: Wet - 2.5Y-4/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
--------------------	---	-----------

Dry Weight (g): 70.06	Wash Weight (g): 69.14	Pan Retained (g): 0.02	Sieve Loss (%): 0.03	Fines (%): #200 - 1.55 #230 - 1.38	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.02	0.03	0.02	0.03
18	0.00	1.00	0.03	0.04	0.05	0.07
25	0.50	0.71	0.03	0.04	0.08	0.11
35	1.00	0.50	0.12	0.17	0.20	0.28
45	1.50	0.35	0.21	0.30	0.41	0.58
60	2.00	0.25	2.20	3.14	2.61	3.72
80	2.50	0.18	30.00	42.82	32.61	46.54
120	3.00	0.13	32.02	45.70	64.63	92.24
170	3.50	0.09	3.98	5.68	68.61	97.92
200	3.75	0.07	0.37	0.53	68.98	98.45
230	4.00	0.06	0.12	0.17	69.10	98.62

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.24	2.91	2.81	2.54	2.25	2.14	2.01
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.53	0.17	0.37	-0.52	7.78	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 160+00 #01 Dune

Analysis Date: 05-19-14

Analyzed By: TM

Easting (ft): 2,979,009	Northing (ft): 857,919	Coordinate System: North Carolina State Plane	Elevation (ft): 14.8 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SP	Munsell: Wet - 5Y-6/1 Dry - 5Y-7/2 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 136.74	Wash Weight (g): 136.43	Pan Retained (g): 0.00	Sieve Loss (%): 0.05	Fines (%): #200 - 0.30 #230 - 0.29	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.06	0.04	0.06	0.04
14	-0.50	1.41	1.52	1.11	1.58	1.15
18	0.00	1.00	8.42	6.16	10.00	7.31
25	0.50	0.71	15.25	11.15	25.25	18.46
35	1.00	0.50	32.83	24.01	58.08	42.47
45	1.50	0.35	31.51	23.04	89.59	65.51
60	2.00	0.25	29.21	21.36	118.80	86.87
80	2.50	0.18	15.56	11.38	134.36	98.25
120	3.00	0.13	1.82	1.33	136.18	99.58
170	3.50	0.09	0.15	0.11	136.33	99.69
200	3.75	0.07	0.02	0.01	136.35	99.70
230	4.00	0.06	0.01	0.01	136.36	99.71

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.36	1.93	1.72	1.16	0.64	0.39	-0.19
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	1.15	0.45	0.74	-0.18	2.6	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 160+00 #02 DuneToe

Analysis Date: 08-14-15

Analyzed By: DA

Easting (ft): 2,979,049	Northing (ft): 857,945	Coordinate System: North Carolina State Plane	Elevation (ft): 7.7 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SP	Munsell: Wet - 2.5Y-6/3 Dry - 2.5Y-7/3 Washed - 2.5Y-7/2	Comments:
--------------------	---	-----------

Dry Weight (g): 98.07	Wash Weight (g): 97.55	Pan Retained (g): 0.00	Sieve Loss (%): 0.04	Fines (%): #200 - 0.59 #230 - 0.58	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.22	0.22	0.22	0.22
10	-1.00	2.00	0.55	0.56	0.77	0.78
14	-0.50	1.41	2.85	2.91	3.62	3.69
18	0.00	1.00	7.28	7.42	10.90	11.11
25	0.50	0.71	16.81	17.14	27.71	28.25
35	1.00	0.50	27.13	27.66	54.84	55.91
45	1.50	0.35	23.16	23.62	78.00	79.53
60	2.00	0.25	13.33	13.59	91.33	93.12
80	2.50	0.18	5.12	5.22	96.45	98.34
120	3.00	0.13	1.01	1.03	97.46	99.37
170	3.50	0.09	0.04	0.04	97.50	99.41
200	3.75	0.07	0.00	0.00	97.50	99.41
230	4.00	0.06	0.01	0.01	97.51	99.42

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.18	1.66	1.40	0.89	0.41	0.14	-0.41
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.88	0.54	0.75	-0.16	3.16	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 160+00 #03 MidBerm

Analysis Date: 08-17-15

Analyzed By: KM

Easting (ft): 2,979,069	Northing (ft): 857,955	Coordinate System: North Carolina State Plane	Elevation (ft): 6.6 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SW	Munsell: Wet - 2.5Y-6/2 Dry - 2.5Y-7/3 Washed - 2.5Y-8/2	Comments:
--------------------	--	-----------

Dry Weight (g): 90.75	Wash Weight (g): 89.65	Pan Retained (g): 0.00	Sieve Loss (%): 0.00	Fines (%): #200 - 1.22 #230 - 1.22	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.16	0.18	0.16	0.18
7	-1.50	2.83	0.07	0.08	0.23	0.26
10	-1.00	2.00	0.22	0.24	0.45	0.50
14	-0.50	1.41	1.74	1.92	2.19	2.42
18	0.00	1.00	7.53	8.30	9.72	10.72
25	0.50	0.71	20.55	22.64	30.27	33.36
35	1.00	0.50	20.05	22.09	50.32	55.45
45	1.50	0.35	12.97	14.29	63.29	69.74
60	2.00	0.25	11.62	12.80	74.91	82.54
80	2.50	0.18	10.79	11.89	85.70	94.43
120	3.00	0.13	3.81	4.20	89.51	98.63
170	3.50	0.09	0.13	0.14	89.64	98.77
200	3.75	0.07	0.01	0.01	89.65	98.78
230	4.00	0.06	0.00	0.00	89.65	98.78

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.57	2.06	1.71	0.88	0.32	0.12	-0.34
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	0.98	0.51	0.88	0.17	2.52	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 160+00 #04 BermCrest

Analysis Date: 08-19-15

Analyzed By: DA

Easting (ft): 2,979,086	Northing (ft): 857,966	Coordinate System: North Carolina State Plane	Elevation (ft): 6.2 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SP	Munsell: Wet - 2.5Y-5/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
--------------------	--	-----------

Dry Weight (g): 98.91	Wash Weight (g): 98.53	Pan Retained (g): 0.00	Sieve Loss (%): 0.02	Fines (%): #200 - 0.42 #230 - 0.41	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.18	0.18	0.18	0.18
10	-1.00	2.00	0.12	0.12	0.30	0.30
14	-0.50	1.41	0.53	0.54	0.83	0.84
18	0.00	1.00	1.89	1.91	2.72	2.75
25	0.50	0.71	4.66	4.71	7.38	7.46
35	1.00	0.50	9.87	9.98	17.25	17.44
45	1.50	0.35	12.34	12.48	29.59	29.92
60	2.00	0.25	26.16	26.45	55.75	56.37
80	2.50	0.18	34.66	35.04	90.41	91.41
120	3.00	0.13	7.70	7.78	98.11	99.19
170	3.50	0.09	0.37	0.37	98.48	99.56
200	3.75	0.07	0.02	0.02	98.50	99.58
230	4.00	0.06	0.01	0.01	98.51	99.59

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.73	2.39	2.27	1.88	1.30	0.93	0.24
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	1.71	0.31	0.75	-1.03	4.19	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 160+00 #05 MHW

Analysis Date: 05-22-14

Analyzed By: TM

Easting (ft): 2,979,120	Northing (ft): 857,984	Coordinate System: North Carolina State Plane	Elevation (ft): 1.2 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SW	Munsell: Wet - 5Y-6/2 Dry - 5Y-7/2 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 122.58	Wash Weight (g): 121.96	Pan Retained (g): 0.01	Sieve Loss (%): 0.20	Fines (%): #200 - 0.71 #230 - 0.70	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	2.92	2.38	2.92	2.38
3.5	-2.50	5.66	3.61	2.95	6.53	5.33
4	-2.25	4.76	1.67	1.36	8.20	6.69
5	-2.00	4.00	2.73	2.23	10.93	8.92
7	-1.50	2.83	3.60	2.94	14.53	11.86
10	-1.00	2.00	8.31	6.78	22.84	18.64
14	-0.50	1.41	19.07	15.56	41.91	34.20
18	0.00	1.00	26.24	21.41	68.15	55.61
25	0.50	0.71	18.45	15.05	86.60	70.66
35	1.00	0.50	10.10	8.24	96.70	78.90
45	1.50	0.35	4.34	3.54	101.04	82.44
60	2.00	0.25	6.55	5.34	107.59	87.78
80	2.50	0.18	10.09	8.23	117.68	96.01
120	3.00	0.13	3.72	3.03	121.40	99.04
170	3.50	0.09	0.29	0.24	121.69	99.28
200	3.75	0.07	0.01	0.01	121.70	99.29
230	4.00	0.06	0.01	0.01	121.71	99.30

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.44	1.65	0.76	-0.13	-0.80	-1.19	-2.56
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	-0.03	1.02	1.38	0.02	2.89	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 160+00 #06 MTL

Analysis Date: 08-19-15

Analyzed By: KM

Easting (ft): 2,979,167	Northing (ft): 858,014	Coordinate System: North Carolina State Plane	Elevation (ft): -0.8 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 2.5Y-4/1 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
--------------------	---	-----------

Dry Weight (g): 87.25	Wash Weight (g): 86.48	Pan Retained (g): 0.01	Sieve Loss (%): 0.03	Fines (%): #200 - 0.93 #230 - 0.93	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	2.40	2.75	2.40	2.75
4	-2.25	4.76	0.41	0.47	2.81	3.22
5	-2.00	4.00	1.28	1.47	4.09	4.69
7	-1.50	2.83	4.41	5.05	8.50	9.74
10	-1.00	2.00	4.30	4.93	12.80	14.67
14	-0.50	1.41	5.51	6.32	18.31	20.99
18	0.00	1.00	6.38	7.31	24.69	28.30
25	0.50	0.71	7.13	8.17	31.82	36.47
35	1.00	0.50	6.41	7.35	38.23	43.82
45	1.50	0.35	6.38	7.31	44.61	51.13
60	2.00	0.25	12.37	14.18	56.98	65.31
80	2.50	0.18	21.26	24.37	78.24	89.68
120	3.00	0.13	7.89	9.04	86.13	98.72
170	3.50	0.09	0.28	0.32	86.41	99.04
200	3.75	0.07	0.03	0.03	86.44	99.07
230	4.00	0.06	0.00	0.00	86.44	99.07

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.79	2.38	2.20	1.42	-0.23	-0.89	-1.97
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.9	0.54	1.53	-0.68	2.36	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 160+00 #07 MLW

Analysis Date: 08-19-15

Analyzed By: DA

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,979,184	858,027	North Carolina State Plane	-2.5 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-6/3 Dry - 2.5Y-7/3 Washed - 2.5Y-8/3	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
98.61	97.77	0.00	0.07	#200 - 0.93 #230 - 0.93			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.29	0.29	0.29	0.29
4	-2.25	4.76	0.62	0.63	0.91	0.92
5	-2.00	4.00	0.99	1.00	1.90	1.92
7	-1.50	2.83	4.34	4.40	6.24	6.32
10	-1.00	2.00	6.85	6.95	13.09	13.27
14	-0.50	1.41	12.40	12.57	25.49	25.84
18	0.00	1.00	14.07	14.27	39.56	40.11
25	0.50	0.71	9.27	9.40	48.83	49.51
35	1.00	0.50	5.35	5.43	54.18	54.94
45	1.50	0.35	3.37	3.42	57.55	58.36
60	2.00	0.25	7.60	7.71	65.15	66.07
80	2.50	0.18	23.73	24.06	88.88	90.13
120	3.00	0.13	8.57	8.69	97.45	98.82
170	3.50	0.09	0.23	0.23	97.68	99.05
200	3.75	0.07	0.02	0.02	97.70	99.07
230	4.00	0.06	0.00	0.00	97.70	99.07

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.78	2.37	2.19	0.55	-0.53	-0.89	-1.65
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.7	0.62	1.48	-0.13	1.69	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
 Coastal Planning & Engineering, Inc.
 2481 NW Boca Raton Blvd.
 Boca Raton, FL 33431
 ph (561) 391 8102

Project Name: Kitty Hawk, NC
 Sample Name: KH 160+00 #08 Trough
 Analysis Date: 05-22-14
 Analyzed By: TM

Easting (ft): 2,980,362	Northing (ft): 858,714	Coordinate System: North Carolina State Plane	Elevation (ft): -5.1 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SP	Munsell: Wet - 5Y-6/2 Dry - 5Y-6/1 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 121.20	Wash Weight (g): 119.26	Pan Retained (g): 0.00	Sieve Loss (%): 0.00	Fines (%): #200 - 1.63 #230 - 1.61	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.05	0.04	0.05	0.04
10	-1.00	2.00	0.11	0.09	0.16	0.13
14	-0.50	1.41	0.17	0.14	0.33	0.27
18	0.00	1.00	0.24	0.20	0.57	0.47
25	0.50	0.71	0.44	0.36	1.01	0.83
35	1.00	0.50	1.26	1.04	2.27	1.87
45	1.50	0.35	2.75	2.27	5.02	4.14
60	2.00	0.25	12.57	10.37	17.59	14.51
80	2.50	0.18	56.53	46.64	74.12	61.15
120	3.00	0.13	41.48	34.22	115.60	95.37
170	3.50	0.09	3.53	2.91	119.13	98.28
200	3.75	0.07	0.11	0.09	119.24	98.37
230	4.00	0.06	0.02	0.02	119.26	98.39

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.99	2.83	2.70	2.38	2.11	2.02	1.54
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.34	0.20	0.49	-1.93	12.15	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 160+00 #09 BarCrest

Analysis Date: 08-17-15

Analyzed By: DA

Easting (ft): 2,979,309	Northing (ft): 858,100	Coordinate System: North Carolina State Plane	Elevation (ft): -9.0 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SP	Munsell: Wet - 2.5Y-5/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
--------------------	---	-----------

Dry Weight (g): 84.31	Wash Weight (g): 83.29	Pan Retained (g): 0.03	Sieve Loss (%): 0.01	Fines (%): #200 - 1.50 #230 - 1.25	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.03	0.04	0.03	0.04
10	-1.00	2.00	0.04	0.05	0.07	0.09
14	-0.50	1.41	0.04	0.05	0.11	0.14
18	0.00	1.00	0.06	0.07	0.17	0.21
25	0.50	0.71	0.14	0.17	0.31	0.38
35	1.00	0.50	0.62	0.74	0.93	1.12
45	1.50	0.35	1.36	1.61	2.29	2.73
60	2.00	0.25	5.39	6.39	7.68	9.12
80	2.50	0.18	34.92	41.42	42.60	50.54
120	3.00	0.13	33.39	39.60	75.99	90.14
170	3.50	0.09	6.20	7.35	82.19	97.49
200	3.75	0.07	0.85	1.01	83.04	98.50
230	4.00	0.06	0.21	0.25	83.25	98.75

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.33	2.92	2.81	2.49	2.19	2.08	1.68
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	2.47	0.18	0.48	-1.22	10.03	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 160+00 #10 (-12.5)

Analysis Date: 08-19-15

Analyzed By: DA

Easting (ft): 2,979,586	Northing (ft): 858,259	Coordinate System: North Carolina State Plane	Elevation (ft): -12.5 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP	Munsell: Wet - 2.5Y-4/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
--------------------	---	-----------

Dry Weight (g): 90.21	Wash Weight (g): 89.23	Pan Retained (g): 0.02	Sieve Loss (%): 0.04	Fines (%): #200 - 1.49 #230 - 1.15	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.01	0.01	0.01	0.01
10	-1.00	2.00	0.06	0.07	0.07	0.08
14	-0.50	1.41	0.05	0.06	0.12	0.14
18	0.00	1.00	0.08	0.09	0.20	0.23
25	0.50	0.71	0.24	0.27	0.44	0.50
35	1.00	0.50	0.75	0.83	1.19	1.33
45	1.50	0.35	1.05	1.16	2.24	2.49
60	2.00	0.25	3.78	4.19	6.02	6.68
80	2.50	0.18	40.58	44.98	46.60	51.66
120	3.00	0.13	36.11	40.03	82.71	91.69
170	3.50	0.09	5.21	5.78	87.92	97.47
200	3.75	0.07	0.94	1.04	88.86	98.51
230	4.00	0.06	0.31	0.34	89.17	98.85

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.29	2.90	2.79	2.48	2.20	2.10	1.80
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.47	0.18	0.46	-1.37	11.38	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 160+00 #11 (-15)

Analysis Date: 08-17-15

Analyzed By: DA

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,979,784	858,377	North Carolina State Plane	-15.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-5/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
83.53	82.56	0.01	0.04	#200 - 1.40 #230 - 1.22			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.06	0.07	0.06	0.07
14	-0.50	1.41	0.00	0.00	0.06	0.07
18	0.00	1.00	0.01	0.01	0.07	0.08
25	0.50	0.71	0.15	0.18	0.22	0.26
35	1.00	0.50	0.57	0.68	0.79	0.94
45	1.50	0.35	0.67	0.80	1.46	1.74
60	2.00	0.25	2.69	3.22	4.15	4.96
80	2.50	0.18	33.83	40.50	37.98	45.46
120	3.00	0.13	37.04	44.34	75.02	89.80
170	3.50	0.09	6.74	8.07	81.76	97.87
200	3.75	0.07	0.61	0.73	82.37	98.60
230	4.00	0.06	0.15	0.18	82.52	98.78

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.32	2.93	2.83	2.55	2.25	2.14	2.00
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.53	0.17	0.43	-1.18	10.3	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 160+00 #12 (-17.5)

Analysis Date: 08-18-15

Analyzed By: DA

Easting (ft): 2,979,972	Northing (ft): 858,486	Coordinate System: North Carolina State Plane	Elevation (ft): -17.5 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP	Munsell: Wet - 2.5Y-4/1 Dry - 2.5Y-7/1 Washed - 2.5Y-8/1	Comments:
--------------------	--	-----------

Dry Weight (g): 87.54	Wash Weight (g): 86.38	Pan Retained (g): 0.02	Sieve Loss (%): 0.05	Fines (%): #200 - 1.77 #230 - 1.39	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.06	0.07	0.06	0.07
10	-1.00	2.00	0.00	0.00	0.06	0.07
14	-0.50	1.41	0.07	0.08	0.13	0.15
18	0.00	1.00	0.08	0.09	0.21	0.24
25	0.50	0.71	0.18	0.21	0.39	0.45
35	1.00	0.50	0.41	0.47	0.80	0.92
45	1.50	0.35	0.41	0.47	1.21	1.39
60	2.00	0.25	2.20	2.51	3.41	3.90
80	2.50	0.18	31.18	35.62	34.59	39.52
120	3.00	0.13	44.41	50.73	79.00	90.25
170	3.50	0.09	6.20	7.08	85.20	97.33
200	3.75	0.07	0.79	0.90	85.99	98.23
230	4.00	0.06	0.33	0.38	86.32	98.61

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.34	2.94	2.85	2.60	2.30	2.17	2.02
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.56	0.17	0.43	-1.86	16.77	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kitty Hawk, NC

Sample Name: KH 160+00 #13 (-20)

Analysis Date: 08-18-15

Analyzed By: DA

Easting (ft):	Northing (ft):
2,980,182	858,608

Coordinate System:	Elevation (ft):
North Carolina State Plane	-20.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-4/2 Dry - 2.5Y-6/2 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
94.36	93.14	0.04	0.02	#200 - 1.97 #230 - 1.34			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.04	0.04	0.04	0.04
5	-2.00	4.00	0.00	0.00	0.04	0.04
7	-1.50	2.83	0.04	0.04	0.08	0.08
10	-1.00	2.00	0.09	0.10	0.17	0.18
14	-0.50	1.41	0.09	0.10	0.26	0.28
18	0.00	1.00	0.19	0.20	0.45	0.48
25	0.50	0.71	0.29	0.31	0.74	0.79
35	1.00	0.50	0.30	0.32	1.04	1.11
45	1.50	0.35	0.22	0.23	1.26	1.34
60	2.00	0.25	0.72	0.76	1.98	2.10
80	2.50	0.18	14.17	15.02	16.15	17.12
120	3.00	0.13	60.17	63.77	76.32	80.89
170	3.50	0.09	14.71	15.59	91.03	96.48
200	3.75	0.07	1.46	1.55	92.49	98.03
230	4.00	0.06	0.59	0.63	93.08	98.66

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.45	3.10	2.95	2.76	2.56	2.46	2.10
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.73	0.15	0.46	-3.3	28.52	

GRANULARMETRIC REPORT KH_NATIVESS_2014_NAVD.GPJ_JPBRAZIL.GDT 8/21/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH210#01 Dune

Analysis Date: 05-14-14

Analyzed By: TM

Easting (ft):

2,981,550

Northing (ft):

853,641

Coordinate System:

North Carolina State Plane

Elevation (ft):

12.6 NAVD 88

USCS:

SP

Munsell:

Wet - 5Y-6/1
Dry - 5Y-7/2
Washed - 5Y-7/1

Comments:

Dry Weight (g):

177.29

Wash Weight (g):

176.99

Pan Retained (g):

0.00

Sieve Loss (%):

0.15

Fines (%):

#200 - 0.33
#230 - 0.32

Organics (%):

Carbonates (%):

Shell Hash (%):

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.11	0.06	0.11	0.06
7	-1.50	2.83	0.27	0.15	0.38	0.21
10	-1.00	2.00	0.25	0.14	0.63	0.35
14	-0.50	1.41	0.61	0.34	1.24	0.69
18	0.00	1.00	1.82	1.03	3.06	1.72
25	0.50	0.71	7.29	4.11	10.35	5.83
35	1.00	0.50	25.91	14.61	36.26	20.44
45	1.50	0.35	37.67	21.25	73.93	41.69
60	2.00	0.25	64.28	36.26	138.21	77.95
80	2.50	0.18	33.42	18.85	171.63	96.80
120	3.00	0.13	4.39	2.48	176.02	99.28
170	3.50	0.09	0.64	0.36	176.66	99.64
200	3.75	0.07	0.05	0.03	176.71	99.67
230	4.00	0.06	0.01	0.01	176.72	99.68

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

2.45

2.16

1.96

1.61

1.11

0.85

0.40

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

1.52

0.35

0.65

-0.79

4.83

GRANULARMETRIC REPORT KD_H_NATIVES_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH210#02 DuneToe

Analysis Date: 08-14-15

Analyzed By: DA

Easting (ft): 2,981,575	Northing (ft): 853,655	Coordinate System: North Carolina State Plane	Elevation (ft): 9.4 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SW	Munsell: Wet - 2.5Y-5/3 Dry - 2.5Y-6/3 Washed - 2.5Y-7/2	Comments:
--------------------	--	-----------

Dry Weight (g): 100.88	Wash Weight (g): 100.59	Pan Retained (g): 0.02	Sieve Loss (%): 0.23	Fines (%): #200 - 0.54 #230 - 0.54	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.19	0.19	0.19	0.19
7	-1.50	2.83	1.37	1.36	1.56	1.55
10	-1.00	2.00	2.90	2.87	4.46	4.42
14	-0.50	1.41	5.58	5.53	10.04	9.95
18	0.00	1.00	9.07	8.99	19.11	18.94
25	0.50	0.71	19.56	19.39	38.67	38.33
35	1.00	0.50	30.49	30.22	69.16	68.55
45	1.50	0.35	15.64	15.50	84.80	84.05
60	2.00	0.25	9.38	9.30	94.18	93.35
80	2.50	0.18	5.10	5.06	99.28	98.41
120	3.00	0.13	0.95	0.94	100.23	99.35
170	3.50	0.09	0.10	0.10	100.33	99.45
200	3.75	0.07	0.01	0.01	100.34	99.46
230	4.00	0.06	0.00	0.00	100.34	99.46

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.16	1.50	1.21	0.69	0.16	-0.16	-0.95
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.65	0.64	0.87	-0.28	3.35	

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH210#03 MidBerm

Analysis Date: 08-14-15

Analyzed By: SMT

Easting (ft):	Northing (ft):
2,981,624	853,682

Coordinate System:	Elevation (ft):
North Carolina State Plane	7.1 NAVD 88

USCS:	Munsell:	Wet - 2.5Y-4/4 Dry - 2.5Y-7/3 Washed - 2.5Y-7/3	Comments:
SP			

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.29	100.05	0.00	0.04	#200 - 0.28 #230 - 0.28			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.26	0.26	0.26	0.26
14	-0.50	1.41	2.86	2.85	3.12	3.11
18	0.00	1.00	8.14	8.12	11.26	11.23
25	0.50	0.71	22.14	22.08	33.40	33.31
35	1.00	0.50	26.23	26.15	59.63	59.46
45	1.50	0.35	19.82	19.76	79.45	79.22
60	2.00	0.25	11.75	11.72	91.20	90.94
80	2.50	0.18	6.63	6.61	97.83	97.55
120	3.00	0.13	2.09	2.08	99.92	99.63
170	3.50	0.09	0.09	0.09	100.01	99.72
200	3.75	0.07	0.00	0.00	100.01	99.72
230	4.00	0.06	0.00	0.00	100.01	99.72

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.31	1.70	1.39	0.82	0.31	0.11	-0.38

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	0.87	0.55	0.78	0.22	2.8

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH210#04 BermCrest

Analysis Date: 08-14-15

Analyzed By: SMT

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,981,657	853,704	North Carolina State Plane	6.6 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-5/3 Dry - 2.5Y-7/3 Washed - 2.5Y-7/3	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
103.58	103.12	0.00	0.05	#200 - 0.51 #230 - 0.50			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.67	0.65	0.67	0.65
7	-1.50	2.83	1.90	1.83	2.57	2.48
10	-1.00	2.00	2.50	2.41	5.07	4.89
14	-0.50	1.41	2.52	2.43	7.59	7.32
18	0.00	1.00	6.10	5.89	13.69	13.21
25	0.50	0.71	12.41	11.98	26.10	25.19
35	1.00	0.50	19.74	19.06	45.84	44.25
45	1.50	0.35	18.55	17.91	64.39	62.16
60	2.00	0.25	19.57	18.89	83.96	81.05
80	2.50	0.18	14.57	14.07	98.53	95.12
120	3.00	0.13	4.21	4.06	102.74	99.18
170	3.50	0.09	0.31	0.30	103.05	99.48
200	3.75	0.07	0.01	0.01	103.06	99.49
230	4.00	0.06	0.01	0.01	103.07	99.50

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.50	2.10	1.84	1.16	0.49	0.12	-0.98
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.06	0.48	1.02	-0.69	3.4	

GRANULARMETRIC REPORT KD_H_NATIVES_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH210#05 MHW

Analysis Date: 08-18-15

Analyzed By: KM

Easting (ft):	Northing (ft):
2,981,726	853,737

Coordinate System:	Elevation (ft):
North Carolina State Plane	0.8 NAVD 88

USCS:	Munsell:	Wet - 2.5Y-5/3 Dry - 2.5Y-7/3 Washed - 2.5Y-8/3	Comments:
SW			

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
95.10	94.50	0.02	0.02	#200 - 0.69 #230 - 0.69			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.38	0.40	0.38	0.40
4	-2.25	4.76	0.21	0.22	0.59	0.62
5	-2.00	4.00	0.94	0.99	1.53	1.61
7	-1.50	2.83	2.02	2.12	3.55	3.73
10	-1.00	2.00	3.31	3.48	6.86	7.21
14	-0.50	1.41	7.26	7.63	14.12	14.84
18	0.00	1.00	11.88	12.49	26.00	27.33
25	0.50	0.71	15.29	16.08	41.29	43.41
35	1.00	0.50	14.35	15.09	55.64	58.50
45	1.50	0.35	12.51	13.15	68.15	71.65
60	2.00	0.25	13.43	14.12	81.58	85.77
80	2.50	0.18	10.33	10.86	91.91	96.63
120	3.00	0.13	2.41	2.53	94.32	99.16
170	3.50	0.09	0.12	0.13	94.44	99.29
200	3.75	0.07	0.02	0.02	94.46	99.31
230	4.00	0.06	0.00	0.00	94.46	99.31

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.42	1.94	1.62	0.72	-0.09	-0.45	-1.32
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.68	0.62	1.14	-0.32	2.64	

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH210#06 MTL

Analysis Date: 05-22-14

Analyzed By: TM

Easting (ft):
2,981,709

Northing (ft):
853,731

Coordinate System:
North Carolina State Plane

Elevation (ft):
-0.4 NAVD 88

USCS: SW
Munsell: Wet - 5Y-6/2
Dry - 5Y-7/2
Washed - 5Y-7/1

Comments:

Dry Weight (g): 121.35
Wash Weight (g): 120.24
Pan Retained (g): 0.00
Sieve Loss (%): 0.07
Fines (%): #200 - 1.00
 #230 - 1.00
Organics (%):
Carbonates (%):
Shell Hash (%):

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.23	0.19	0.23	0.19
4	-2.25	4.76	0.63	0.52	0.86	0.71
5	-2.00	4.00	0.20	0.16	1.06	0.87
7	-1.50	2.83	1.58	1.30	2.64	2.17
10	-1.00	2.00	1.90	1.57	4.54	3.74
14	-0.50	1.41	3.58	2.95	8.12	6.69
18	0.00	1.00	4.64	3.82	12.76	10.51
25	0.50	0.71	5.18	4.27	17.94	14.78
35	1.00	0.50	11.01	9.07	28.95	23.85
45	1.50	0.35	18.37	15.14	47.32	38.99
60	2.00	0.25	35.40	29.17	82.72	68.16
80	2.50	0.18	29.37	24.20	112.09	92.36
120	3.00	0.13	7.66	6.31	119.75	98.67
170	3.50	0.09	0.39	0.32	120.14	98.99
200	3.75	0.07	0.01	0.01	120.15	99.00
230	4.00	0.06	0.00	0.00	120.15	99.00

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.71	2.33	2.14	1.69	1.04	0.57	-0.79

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.43	0.37	1.03	-1.39	4.99

GRANULARMETRIC REPORT KDH_NATIVESS_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH210#07 MLW

Analysis Date: 08-17-15

Analyzed By: DA

Easting (ft):	Northing (ft):
2,983,074	851,593

Coordinate System:	Elevation (ft):
North Carolina State Plane	-2.5 NAVD 88

USCS:	Munsell:	Wet - 2.5Y-5/3 Dry - 2.5Y-7/3 Washed - 2.5Y-7/3	Comments:
SW			

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
88.72	88.10	0.01	0.00	#200 - 0.71 #230 - 0.71			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	1.56	1.76	1.56	1.76
4	-2.25	4.76	1.30	1.47	2.86	3.23
5	-2.00	4.00	1.36	1.53	4.22	4.76
7	-1.50	2.83	3.20	3.61	7.42	8.37
10	-1.00	2.00	2.88	3.25	10.30	11.62
14	-0.50	1.41	5.78	6.51	16.08	18.13
18	0.00	1.00	8.34	9.40	24.42	27.53
25	0.50	0.71	8.66	9.76	33.08	37.29
35	1.00	0.50	11.29	12.73	44.37	50.02
45	1.50	0.35	9.63	10.85	54.00	60.87
60	2.00	0.25	13.13	14.80	67.13	75.67
80	2.50	0.18	17.19	19.38	84.32	95.05
120	3.00	0.13	3.57	4.02	87.89	99.07
170	3.50	0.09	0.18	0.20	88.07	99.27
200	3.75	0.07	0.02	0.02	88.09	99.29
230	4.00	0.06	0.00	0.00	88.09	99.29

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.50	2.21	1.98	1.00	-0.13	-0.66	-1.97

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	0.78	0.58	1.38	-0.66	2.65

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH210#08 Trough

Analysis Date: 05-22-14

Analyzed By: TM

Easting (ft):

2,981,795

Northing (ft):

853,780

Coordinate System:

North Carolina State Plane

Elevation (ft):

-5.1 NAVD 88

USCS:

SW

Munsell:

Wet - 5Y-6/2
Dry - 5Y-7/2
Washed - 5Y-7/1

Comments:

Dry Weight (g):

108.85

Wash Weight (g):

108.07

Pan Retained (g):

0.00

Sieve Loss (%):

0.12

Fines (%):

#200 - 0.85
#230 - 0.84

Organics (%):

Carbonates (%):

Shell Hash (%):

Sieve Number

Sieve Size (Phi)

Sieve Size (Millimeters)

Grams Retained

% Weight Retained

Cum. Grams Retained

C. % Weight Retained

3/4"

-4.25

19.03

0.00

0.00

0.00

0.00

5/8"

-4.00

16.00

0.00

0.00

0.00

0.00

7/16"

-3.50

11.31

0.00

0.00

0.00

0.00

5/16"

-3.00

8.00

0.00

0.00

0.00

0.00

3.5

-2.50

5.66

0.33

0.30

0.33

0.30

4

-2.25

4.76

0.00

0.00

0.33

0.30

5

-2.00

4.00

0.28

0.26

0.61

0.56

7

-1.50

2.83

1.44

1.32

2.05

1.88

10

-1.00

2.00

2.32

2.13

4.37

4.01

14

-0.50

1.41

3.43

3.15

7.80

7.16

18

0.00

1.00

4.48

4.12

12.28

11.28

25

0.50

0.71

4.57

4.20

16.85

15.48

35

1.00

0.50

6.15

5.65

23.00

21.13

45

1.50

0.35

4.88

4.48

27.88

25.61

60

2.00

0.25

21.14

19.42

49.02

45.03

80

2.50

0.18

40.07

36.81

89.09

81.84

120

3.00

0.13

17.74

16.30

106.83

98.14

170

3.50

0.09

1.05

0.96

107.88

99.10

200

3.75

0.07

0.05

0.05

107.93

99.15

230

4.00

0.06

0.01

0.01

107.94

99.16

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

2.90

2.57

2.41

2.07

1.43

0.55

-0.84

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

1.68

0.31

1.12

-1.47

4.61

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH210#09 BarCrest

Analysis Date: 08-17-15

Analyzed By: KM

Easting (ft): 2,982,345	Northing (ft): 854,088	Coordinate System: North Carolina State Plane	Elevation (ft): -9.0 NAVD 88
----------------------------	---------------------------	--	---------------------------------

USCS: SP	Munsell: Wet - 2.5Y-5/2 Dry - 2.5Y-7/1 Washed - 2.5Y-8/1	Comments:
-------------	---	-----------

Dry Weight (g): 83.22	Wash Weight (g): 82.02	Pan Retained (g): 0.01	Sieve Loss (%): 0.14	Fines (%): #200 - 1.72 #230 - 1.59	Organics (%):	Carbonates (%):	Shell Hash (%):
--------------------------	---------------------------	---------------------------	-------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3 1/2"	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.01	0.01	0.01	0.01
18	0.00	1.00	0.04	0.05	0.05	0.06
25	0.50	0.71	0.13	0.16	0.18	0.22
35	1.00	0.50	0.37	0.44	0.55	0.66
45	1.50	0.35	0.87	1.05	1.42	1.71
60	2.00	0.25	4.20	5.05	5.62	6.76
80	2.50	0.18	27.85	33.47	33.47	40.23
120	3.00	0.13	39.24	47.15	72.71	87.38
170	3.50	0.09	8.32	10.00	81.03	97.38
200	3.75	0.07	0.75	0.90	81.78	98.28
230	4.00	0.06	0.11	0.13	81.89	98.41

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.38	2.96	2.87	2.60	2.27	2.14	1.83

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.56	0.17	0.44	-0.85	6.39

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT_8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH210#10 (-12.5)

Analysis Date: 08-17-15

Analyzed By: KM

Easting (ft): 2,982,414	Northing (ft): 854,130	Coordinate System: North Carolina State Plane	Elevation (ft): -12.5 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP	Munsell: Wet - 2.5Y-4/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
--------------------	---	-----------

Dry Weight (g): 89.43	Wash Weight (g): 88.17	Pan Retained (g): 0.01	Sieve Loss (%): 0.11	Fines (%): #200 - 1.65 #230 - 1.54	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3 1/2"	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.01	0.01	0.01	0.01
14	-0.50	1.41	0.02	0.02	0.03	0.03
18	0.00	1.00	0.05	0.06	0.08	0.09
25	0.50	0.71	0.27	0.30	0.35	0.39
35	1.00	0.50	0.85	0.95	1.20	1.34
45	1.50	0.35	1.75	1.96	2.95	3.30
60	2.00	0.25	6.72	7.51	9.67	10.81
80	2.50	0.18	31.58	35.31	41.25	46.12
120	3.00	0.13	37.63	42.08	78.88	88.20
170	3.50	0.09	8.50	9.50	87.38	97.70
200	3.75	0.07	0.58	0.65	87.96	98.35
230	4.00	0.06	0.10	0.11	88.06	98.46

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.36	2.95	2.84	2.55	2.20	2.07	1.61
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.49	0.18	0.49	-1.03	6.28	

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT_8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH210#11 (-15)

Analysis Date: 08-18-15

Analyzed By: KM

Easting (ft): 2,982,634	Northing (ft): 854,254	Coordinate System: North Carolina State Plane	Elevation (ft): -15.0 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP	Munsell: Wet - 2.5Y-4/1 Dry - 2.5Y-7/1 Washed - 2.5Y-8/1	Comments:
--------------------	---	-----------

Dry Weight (g): 80.69	Wash Weight (g): 79.59	Pan Retained (g): 0.02	Sieve Loss (%): 0.04	Fines (%): #200 - 1.58 #230 - 1.43	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.09	0.11	0.09	0.11
14	-0.50	1.41	0.13	0.16	0.22	0.27
18	0.00	1.00	0.45	0.56	0.67	0.83
25	0.50	0.71	1.37	1.70	2.04	2.53
35	1.00	0.50	2.01	2.49	4.05	5.02
45	1.50	0.35	2.08	2.58	6.13	7.60
60	2.00	0.25	4.57	5.66	10.70	13.26
80	2.50	0.18	20.36	25.23	31.06	38.49
120	3.00	0.13	36.49	45.22	67.55	83.71
170	3.50	0.09	11.15	13.82	78.70	97.53
200	3.75	0.07	0.72	0.89	79.42	98.42
230	4.00	0.06	0.12	0.15	79.54	98.57

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.41	3.01	2.90	2.63	2.23	2.05	1.00

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.48	0.18	0.67	-1.78	7.47

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT_8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH210#12 (-17.5)

Analysis Date: 08-17-15

Analyzed By: KM

Easting (ft): 2,982,734	Northing (ft): 854,311	Coordinate System: North Carolina State Plane	Elevation (ft): -17.5 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP	Munsell: Wet - 2.5Y-5/2 Dry - 2.5Y-7/1 Washed - 2.5Y-8/1	Comments:
--------------------	---	-----------

Dry Weight (g): 88.76	Wash Weight (g): 87.49	Pan Retained (g): 0.01	Sieve Loss (%): 0.01	Fines (%): #200 - 1.74 #230 - 1.45	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3 1/2"	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.20	0.23	0.20	0.23
5	-2.00	4.00	0.07	0.08	0.27	0.31
7	-1.50	2.83	0.29	0.33	0.56	0.64
10	-1.00	2.00	0.21	0.24	0.77	0.88
14	-0.50	1.41	0.23	0.26	1.00	1.14
18	0.00	1.00	0.17	0.19	1.17	1.33
25	0.50	0.71	0.16	0.18	1.33	1.51
35	1.00	0.50	0.21	0.24	1.54	1.75
45	1.50	0.35	0.38	0.43	1.92	2.18
60	2.00	0.25	1.83	2.06	3.75	4.24
80	2.50	0.18	14.16	15.95	17.91	20.19
120	3.00	0.13	50.10	56.44	68.01	76.63
170	3.50	0.09	17.55	19.77	85.56	96.40
200	3.75	0.07	1.65	1.86	87.21	98.26
230	4.00	0.06	0.26	0.29	87.47	98.55

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.46	3.19	2.99	2.76	2.54	2.37	2.02

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.7	0.15	0.63	-4.16	29.43

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH210#13 (-20)

Analysis Date: 08-17-15

Analyzed By: KM

Easting (ft):

2,982,776

Northing (ft):

854,333

Coordinate System:

North Carolina State Plane

Elevation (ft):

-20.0 NAVD 88

USCS:

SP

Munsell: Wet - 2.5Y-3/1
Dry - 2.5Y-6/1
Washed - 2.5Y-7/1

Comments:

Dry Weight (g):

83.90

Wash Weight (g):

82.62

Pan Retained (g):

0.02

Sieve Loss (%):

0.00

Fines (%):

#200 - 1.91
#230 - 1.54

Organics (%):

Carbonates (%):

Shell Hash (%):

Sieve Number

Sieve Size (Phi)

Sieve Size (Millimeters)

Grams Retained

% Weight Retained

Cum. Grams Retained

C. % Weight Retained

3/4"

-4.25

19.03

0.00

0.00

0.00

0.00

5/8"

-4.00

16.00

0.00

0.00

0.00

0.00

7/16"

-3.50

11.31

0.00

0.00

0.00

0.00

5/16"

-3.00

8.00

0.00

0.00

0.00

0.00

3 1/2"

-2.50

5.66

0.00

0.00

0.00

0.00

4

-2.25

4.76

0.00

0.00

0.00

0.00

5

-2.00

4.00

0.00

0.00

0.00

0.00

7

-1.50

2.83

0.01

0.01

0.01

0.01

10

-1.00

2.00

0.03

0.04

0.04

0.05

14

-0.50

1.41

0.04

0.05

0.08

0.10

18

0.00

1.00

0.03

0.04

0.11

0.14

25

0.50

0.71

0.01

0.01

0.12

0.15

35

1.00

0.50

0.01

0.01

0.13

0.16

45

1.50

0.35

0.06

0.07

0.19

0.23

60

2.00

0.25

0.28

0.33

0.47

0.56

80

2.50

0.18

8.34

9.94

8.81

10.50

120

3.00

0.13

49.69

59.23

58.50

69.73

170

3.50

0.09

22.29

26.57

80.79

96.30

200

3.75

0.07

1.50

1.79

82.29

98.09

230

4.00

0.06

0.31

0.37

82.60

98.46

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

3.48

3.27

3.10

2.83

2.62

2.55

2.22

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

2.84

0.14

0.36

-1.6

20.03

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH235#01 Dune

Analysis Date: 08-18-15

Analyzed By: KM

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,981,550	853,641	North Carolina State Plane	14.8 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-5/3 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
98.68	98.40	0.03	0.04	#200 - 0.39 #230 - 0.36			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.03	0.03	0.03	0.03
10	-1.00	2.00	0.18	0.18	0.21	0.21
14	-0.50	1.41	0.53	0.54	0.74	0.75
18	0.00	1.00	1.63	1.65	2.37	2.40
25	0.50	0.71	5.16	5.23	7.53	7.63
35	1.00	0.50	16.21	16.43	23.74	24.06
45	1.50	0.35	27.15	27.51	50.89	51.57
60	2.00	0.25	29.12	29.51	80.01	81.08
80	2.50	0.18	15.84	16.05	95.85	97.13
120	3.00	0.13	2.21	2.24	98.06	99.37
170	3.50	0.09	0.22	0.22	98.28	99.59
200	3.75	0.07	0.02	0.02	98.30	99.61
230	4.00	0.06	0.03	0.03	98.33	99.64

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.43	2.09	1.90	1.47	1.02	0.75	0.25
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.42	0.37	0.66	-0.49	3.68	

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH235#02 DuneToe

Analysis Date: 08-13-15

Analyzed By: DA

Easting (ft): 2,982,870	Northing (ft): 851,476	Coordinate System: North Carolina State Plane	Elevation (ft): 10.5 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 2.5Y-5/3 Dry - 2.5Y-7/3 Washed - 2.5Y-8/3	Comments:
--------------------	--	-----------

Dry Weight (g): 98.32	Wash Weight (g): 98.15	Pan Retained (g): 0.01	Sieve Loss (%): 0.11	Fines (%): #200 - 0.29 #230 - 0.29	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	1.17	1.19	1.17	1.19
5	-2.00	4.00	1.45	1.47	2.62	2.66
7	-1.50	2.83	5.03	5.12	7.65	7.78
10	-1.00	2.00	6.92	7.04	14.57	14.82
14	-0.50	1.41	13.16	13.38	27.73	28.20
18	0.00	1.00	8.83	8.98	36.56	37.18
25	0.50	0.71	7.40	7.53	43.96	44.71
35	1.00	0.50	9.94	10.11	53.90	54.82
45	1.50	0.35	13.94	14.18	67.84	69.00
60	2.00	0.25	15.56	15.83	83.40	84.83
80	2.50	0.18	11.46	11.66	94.86	96.49
120	3.00	0.13	3.04	3.09	97.90	99.58
170	3.50	0.09	0.11	0.11	98.01	99.69
200	3.75	0.07	0.02	0.02	98.03	99.71
230	4.00	0.06	0.00	0.00	98.03	99.71

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.44	1.97	1.69	0.76	-0.62	-0.96	-1.77

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	0.54	0.69	1.34	-0.27	1.96

GRANULARMETRIC REPORT KD_H_NATIVES_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH235#03 MidBerm

Analysis Date: 08-18-15

Analyzed By: KM

Easting (ft): 2,982,943	Northing (ft): 851,516	Coordinate System: North Carolina State Plane	Elevation (ft): 6.5 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SW	Munsell: Wet - 2.5Y-5/3 Dry - 2.5Y-7/3 Washed - 2.5Y-8/2	Comments:
--------------------	--	-----------

Dry Weight (g): 95.22	Wash Weight (g): 95.02	Pan Retained (g): 0.01	Sieve Loss (%): 0.05	Fines (%): #200 - 0.30 #230 - 0.28	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.07	0.07	0.07	0.07
5	-2.00	4.00	0.16	0.17	0.23	0.24
7	-1.50	2.83	0.41	0.43	0.64	0.67
10	-1.00	2.00	2.71	2.85	3.35	3.52
14	-0.50	1.41	3.01	3.16	6.36	6.68
18	0.00	1.00	7.02	7.37	13.38	14.05
25	0.50	0.71	7.49	7.87	20.87	21.92
35	1.00	0.50	6.39	6.71	27.26	28.63
45	1.50	0.35	6.94	7.29	34.20	35.92
60	2.00	0.25	18.56	19.49	52.76	55.41
80	2.50	0.18	31.76	33.35	84.52	88.76
120	3.00	0.13	9.82	10.31	94.34	99.07
170	3.50	0.09	0.55	0.58	94.89	99.65
200	3.75	0.07	0.05	0.05	94.94	99.70
230	4.00	0.06	0.02	0.02	94.96	99.72

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.80	2.43	2.29	1.86	0.73	0.12	-0.77

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.47	0.36	1.11	-0.96	3.02

GRANULARMETRIC REPORT KD_H_NATIVES_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH235#04 BermCrest

Analysis Date: 08-18-15

Analyzed By: KM

Easting (ft): 2,983,013 Northing (ft): 851,556

Coordinate System: North Carolina State Plane Elevation (ft): 4.2 NAVD 88

USCS: SP Munsell: Wet - 2.5Y-5/3 Dry - 2.5Y-7/3 Washed - 2.5Y-8/2 Comments:

Dry Weight (g): 98.82 Wash Weight (g): 98.54 Pan Retained (g): 0.00 Sieve Loss (%): 0.01 Fines (%): #200 - 0.29 #230 - 0.29 Organics (%): Carbonates (%): Shell Hash (%):

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.11	0.11	0.11	0.11
10	-1.00	2.00	0.05	0.05	0.16	0.16
14	-0.50	1.41	0.08	0.08	0.24	0.24
18	0.00	1.00	0.40	0.40	0.64	0.64
25	0.50	0.71	1.52	1.54	2.16	2.18
35	1.00	0.50	4.80	4.86	6.96	7.04
45	1.50	0.35	13.84	14.01	20.80	21.05
60	2.00	0.25	33.27	33.67	54.07	54.72
80	2.50	0.18	34.15	34.56	88.22	89.28
120	3.00	0.13	9.41	9.52	97.63	98.80
170	3.50	0.09	0.80	0.81	98.43	99.61
200	3.75	0.07	0.10	0.10	98.53	99.71
230	4.00	0.06	0.00	0.00	98.53	99.71

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.88	0.27	0.59	-0.9	5.59

GRANULARMETRIC REPORT KD_H_NATIVES_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH235#05 MHW

Analysis Date: 08-18-15

Analyzed By: KM

Easting (ft): 2,983,031	Northing (ft): 851,566	Coordinate System: North Carolina State Plane	Elevation (ft): 1.6 NAVD 88
----------------------------	---------------------------	--	--------------------------------

USCS: SW	Munsell: Wet - 2.5Y-5/3 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
-------------	---	-----------

Dry Weight (g): 96.34	Wash Weight (g): 95.99	Pan Retained (g): 0.00	Sieve Loss (%): 0.04	Fines (%): #200 - 0.42 #230 - 0.42	Organics (%):	Carbonates (%):	Shell Hash (%):
--------------------------	---------------------------	---------------------------	-------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.19	0.20	0.19	0.20
5	-2.00	4.00	0.10	0.10	0.29	0.30
7	-1.50	2.83	1.04	1.08	1.33	1.38
10	-1.00	2.00	2.86	2.97	4.19	4.35
14	-0.50	1.41	7.45	7.73	11.64	12.08
18	0.00	1.00	7.10	7.37	18.74	19.45
25	0.50	0.71	5.76	5.98	24.50	25.43
35	1.00	0.50	5.30	5.50	29.80	30.93
45	1.50	0.35	7.70	7.99	37.50	38.92
60	2.00	0.25	19.32	20.05	56.82	58.97
80	2.50	0.18	28.28	29.35	85.10	88.32
120	3.00	0.13	10.39	10.78	95.49	99.10
170	3.50	0.09	0.41	0.43	95.90	99.53
200	3.75	0.07	0.05	0.05	95.95	99.58
230	4.00	0.06	0.00	0.00	95.95	99.58

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.81	2.43	2.27	1.78	0.46	-0.23	-0.96

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.35	0.39	1.21	-0.86	2.6

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT_8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
 Coastal Planning & Engineering, Inc.
 2481 NW Boca Raton Blvd.
 Boca Raton, FL 33431
 ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH235#06 MTL

Analysis Date: 08-19-15

Analyzed By: KM

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,981,709	853,731	North Carolina State Plane	-0.8 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-5/3 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
93.29	92.64	0.01	0.00	#200 - 0.73 #230 - 0.73			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	1.02	1.09	1.02	1.09
3.5	-2.50	5.66	7.02	7.52	8.04	8.61
4	-2.25	4.76	3.01	3.23	11.05	11.84
5	-2.00	4.00	6.00	6.43	17.05	18.27
7	-1.50	2.83	10.12	10.85	27.17	29.12
10	-1.00	2.00	7.98	8.55	35.15	37.67
14	-0.50	1.41	7.10	7.61	42.25	45.28
18	0.00	1.00	6.08	6.52	48.33	51.80
25	0.50	0.71	5.07	5.43	53.40	57.23
35	1.00	0.50	3.76	4.03	57.16	61.26
45	1.50	0.35	4.37	4.68	61.53	65.94
60	2.00	0.25	9.80	10.50	71.33	76.44
80	2.50	0.18	15.19	16.28	86.52	92.72
120	3.00	0.13	5.92	6.35	92.44	99.07
170	3.50	0.09	0.16	0.17	92.60	99.24
200	3.75	0.07	0.03	0.03	92.63	99.27
230	4.00	0.06	0.00	0.00	92.63	99.27

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.68	2.23	1.93	-0.14	-1.69	-2.09	-2.74

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	0.01	0.99	1.86	0.01	1.55

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH235#07 MLW

Analysis Date: 08-19-15

Analyzed By: DA

Easting (ft): 2,983,074
Northing (ft): 851,593

Coordinate System: North Carolina State Plane
Elevation (ft): -2.3 NAVD 88

USCS: SW
Munsell: Wet - 2.5Y-5/3
Dry - 2.5Y-7/2
Washed - 2.5Y-8/2

Comments:

Dry Weight (g): 94.24	Wash Weight (g): 93.41	Pan Retained (g): 0.01	Sieve Loss (%): 0.03	Fines (%): #200 - 0.93 #230 - 0.92	Organics (%):	Carbonates (%):	Shell Hash (%):
-----------------------	------------------------	------------------------	----------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.44	0.47	0.44	0.47
5	-2.00	4.00	2.25	2.39	2.69	2.86
7	-1.50	2.83	3.47	3.68	6.16	6.54
10	-1.00	2.00	4.04	4.29	10.20	10.83
14	-0.50	1.41	6.82	7.24	17.02	18.07
18	0.00	1.00	7.86	8.34	24.88	26.41
25	0.50	0.71	7.41	7.86	32.29	34.27
35	1.00	0.50	6.97	7.40	39.26	41.67
45	1.50	0.35	7.11	7.54	46.37	49.21
60	2.00	0.25	13.20	14.01	59.57	63.22
80	2.50	0.18	24.55	26.05	84.12	89.27
120	3.00	0.13	8.84	9.38	92.96	98.65
170	3.50	0.09	0.38	0.40	93.34	99.05
200	3.75	0.07	0.02	0.02	93.36	99.07
230	4.00	0.06	0.01	0.01	93.37	99.08

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.81	2.40	2.23	1.53	-0.08	-0.64	-1.71
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.03	0.49	1.41	-0.64	2.23	

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH235#08 Trough

Analysis Date: 08-17-15

Analyzed By: KM

Easting (ft):	Northing (ft):
2,981,795	853,780

Coordinate System:	Elevation (ft):
North Carolina State Plane	-5.0 NAVD 88

USCS:	Munsell:	Wet - 2.5Y-5/2 Dry - 2.5Y-7/1 Washed - 2.5Y-8/1	Comments:
SP			

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
90.68	89.59	0.01	0.02	#200 - 1.31 #230 - 1.23			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.03	0.03	0.03	0.03
18	0.00	1.00	0.01	0.01	0.04	0.04
25	0.50	0.71	0.05	0.06	0.09	0.10
35	1.00	0.50	0.38	0.42	0.47	0.52
45	1.50	0.35	1.64	1.81	2.11	2.33
60	2.00	0.25	7.43	8.19	9.54	10.52
80	2.50	0.18	34.22	37.74	43.76	48.26
120	3.00	0.13	39.16	43.18	82.92	91.44
170	3.50	0.09	6.22	6.86	89.14	98.30
200	3.75	0.07	0.35	0.39	89.49	98.69
230	4.00	0.06	0.07	0.08	89.56	98.77

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.26	2.91	2.81	2.52	2.19	2.07	1.66
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.48	0.18	0.44	-0.74	5.35	

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH235#09 BarCrest

Analysis Date: 08-18-15

Analyzed By: KM

Easting (ft):

2,983,611

Northing (ft):

851,903

Coordinate System:

North Carolina State Plane

Elevation (ft):

-9.0 NAVD 88

USCS:

SP

Munsell:

Wet - 2.5Y-4/2

Dry - 2.5Y-7/2

Washed - 2.5Y-8/1

Comments:

Dry Weight (g):

79.85

Wash Weight (g):

78.82

Pan Retained (g):

0.01

Sieve Loss (%):

0.04

Fines (%):

#200 - 1.43
#230 - 1.33

Organics (%):

Carbonates (%):

Shell Hash (%):

Sieve Number

Sieve Size (Phi)

Sieve Size (Millimeters)

Grams Retained

% Weight Retained

Cum. Grams Retained

C. % Weight Retained

3/4"

-4.25

19.03

0.00

0.00

0.00

0.00

5/8"

-4.00

16.00

0.00

0.00

0.00

0.00

7/16"

-3.50

11.31

0.00

0.00

0.00

0.00

5/16"

-3.00

8.00

0.00

0.00

0.00

0.00

3.5

-2.50

5.66

0.00

0.00

0.00

0.00

4

-2.25

4.76

0.00

0.00

0.00

0.00

5

-2.00

4.00

0.00

0.00

0.00

0.00

7

-1.50

2.83

0.00

0.00

0.00

0.00

10

-1.00

2.00

0.01

0.01

0.01

0.01

14

-0.50

1.41

0.02

0.03

0.03

0.04

18

0.00

1.00

0.06

0.08

0.09

0.12

25

0.50

0.71

0.27

0.34

0.36

0.46

35

1.00

0.50

0.76

0.95

1.12

1.41

45

1.50

0.35

1.54

1.93

2.66

3.34

60

2.00

0.25

4.81

6.02

7.47

9.36

80

2.50

0.18

23.52

29.46

30.99

38.82

120

3.00

0.13

39.08

48.94

70.07

87.76

170

3.50

0.09

8.28

10.37

78.35

98.13

200

3.75

0.07

0.35

0.44

78.70

98.57

230

4.00

0.06

0.08

0.10

78.78

98.67

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

3.35

2.96

2.87

2.61

2.27

2.11

1.64

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

2.54

0.17

0.49

-1.35

7.3

GRANULARMETRIC REPORT KD_H_NATIVESS_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH235#10 (-12.5)

Analysis Date: 08-17-15

Analyzed By: DA

Easting (ft): 2,983,854
Northing (ft): 852,043

Coordinate System: North Carolina State Plane
Elevation (ft): -12.5 NAVD 88

USCS: SP
Munsell: Wet - 2.5Y-3/1
Dry - 2.5Y-6/2
Washed - 2.5Y-7/1
Comments:

Dry Weight (g): 80.75
Wash Weight (g): 79.43
Pan Retained (g): 0.01
Sieve Loss (%): 0.00
Fines (%): #200 - 1.83
#230 - 1.64
Organics (%):
Carbonates (%):
Shell Hash (%):

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.02	0.02	0.02	0.02
14	-0.50	1.41	0.07	0.09	0.09	0.11
18	0.00	1.00	0.11	0.14	0.20	0.25
25	0.50	0.71	0.21	0.26	0.41	0.51
35	1.00	0.50	0.89	1.10	1.30	1.61
45	1.50	0.35	1.62	2.01	2.92	3.62
60	2.00	0.25	5.37	6.65	8.29	10.27
80	2.50	0.18	27.53	34.09	35.82	44.36
120	3.00	0.13	37.19	46.06	73.01	90.42
170	3.50	0.09	5.82	7.21	78.83	97.63
200	3.75	0.07	0.44	0.54	79.27	98.17
230	4.00	0.06	0.15	0.19	79.42	98.36

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
	3.32	2.93	2.83	2.56	2.22	2.08	1.60
	2.48	0.18	0.49	-1.45	8.48		

GRANULARMETRIC REPORT KD_H_NATIVES_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH235#11 (-15)

Analysis Date: 08-19-15

Analyzed By: KM

Easting (ft): 2,983,691	Northing (ft): 851,946	Coordinate System: North Carolina State Plane	Elevation (ft): -15.0 NAVD 88
----------------------------	---------------------------	--	----------------------------------

USCS: SP	Munsell: Wet - 2.5Y-5/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/1	Comments:
-------------	---	-----------

Dry Weight (g): 91.92	Wash Weight (g): 90.77	Pan Retained (g): 0.02	Sieve Loss (%): 0.11	Fines (%): #200 - 1.52 #230 - 1.39	Organics (%):	Carbonates (%):	Shell Hash (%):
--------------------------	---------------------------	---------------------------	-------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.10	0.11	0.10	0.11
4	-2.25	4.76	0.00	0.00	0.10	0.11
5	-2.00	4.00	0.03	0.03	0.13	0.14
7	-1.50	2.83	0.20	0.22	0.33	0.36
10	-1.00	2.00	0.10	0.11	0.43	0.47
14	-0.50	1.41	0.17	0.18	0.60	0.65
18	0.00	1.00	0.45	0.49	1.05	1.14
25	0.50	0.71	1.49	1.62	2.54	2.76
35	1.00	0.50	3.35	3.64	5.89	6.40
45	1.50	0.35	3.96	4.31	9.85	10.71
60	2.00	0.25	7.14	7.77	16.99	18.48
80	2.50	0.18	28.92	31.46	45.91	49.94
120	3.00	0.13	38.55	41.94	84.46	91.88
170	3.50	0.09	5.71	6.21	90.17	98.09
200	3.75	0.07	0.36	0.39	90.53	98.48
230	4.00	0.06	0.12	0.13	90.65	98.61

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.25	2.91	2.80	2.50	2.10	1.84	0.81
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.32	0.20	0.72	-2.08	10.12	

GRANULARMETRIC REPORT KD_H_NATIVES_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH235#12 (-17.5)

Analysis Date: 08-17-15

Analyzed By: KM

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,984,079	852,171	North Carolina State Plane	-17.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-3/1 Dry - 2.5Y-6/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
87.14	85.74	0.03	0.03	#200 - 1.85 #230 - 1.68			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.02	0.02	0.02	0.02
14	-0.50	1.41	0.05	0.06	0.07	0.08
18	0.00	1.00	0.08	0.09	0.15	0.17
25	0.50	0.71	0.22	0.25	0.37	0.42
35	1.00	0.50	0.52	0.60	0.89	1.02
45	1.50	0.35	0.64	0.73	1.53	1.75
60	2.00	0.25	1.62	1.86	3.15	3.61
80	2.50	0.18	16.46	18.89	19.61	22.50
120	3.00	0.13	48.02	55.11	67.63	77.61
170	3.50	0.09	16.92	19.42	84.55	97.03
200	3.75	0.07	0.98	1.12	85.53	98.15
230	4.00	0.06	0.15	0.17	85.68	98.32

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.45	3.16	2.98	2.75	2.52	2.33	2.04
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.71	0.15	0.45	-1.79	11.83	

GRANULARMETRIC REPORT KD_H_NATIVESS_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH235#13 (-20)

Analysis Date: 08-19-15

Analyzed By: KM

Easting (ft):

2,984,362

Northing (ft):

852,334

Coordinate System:

North Carolina State Plane

Elevation (ft):

-20.0 NAVD 88

USCS:

SP

Munsell:

Wet - 2.5Y-4/1

Dry - 2.5Y-7/1

Washed - 2.5Y-8/1

Comments:

Dry Weight (g):

79.86

Wash Weight (g):

78.75

Pan Retained (g):

0.03

Sieve Loss (%):

0.04

Fines (%):

#200 - 1.77
#230 - 1.44

Organics (%):

Carbonates (%):

Shell Hash (%):

Sieve Number

Sieve Size (Phi)

Sieve Size (Millimeters)

Grams Retained

% Weight Retained

Cum. Grams Retained

C. % Weight Retained

3/4"

-4.25

19.03

0.00

0.00

0.00

0.00

5/8"

-4.00

16.00

0.00

0.00

0.00

0.00

7/16"

-3.50

11.31

0.00

0.00

0.00

0.00

5/16"

-3.00

8.00

0.00

0.00

0.00

0.00

3.5

-2.50

5.66

0.00

0.00

0.00

0.00

4

-2.25

4.76

0.00

0.00

0.00

0.00

5

-2.00

4.00

0.02

0.03

0.02

0.03

7

-1.50

2.83

0.03

0.04

0.05

0.07

10

-1.00

2.00

0.15

0.19

0.20

0.26

14

-0.50

1.41

0.22

0.28

0.42

0.54

18

0.00

1.00

0.57

0.71

0.99

1.25

25

0.50

0.71

0.91

1.14

1.90

2.39

35

1.00

0.50

0.82

1.03

2.72

3.42

45

1.50

0.35

0.58

0.73

3.30

4.15

60

2.00

0.25

1.46

1.83

4.76

5.98

80

2.50

0.18

12.10

15.15

16.86

21.13

120

3.00

0.13

48.15

60.29

65.01

81.42

170

3.50

0.09

12.25

15.34

77.26

96.76

200

3.75

0.07

1.17

1.47

78.43

98.23

230

4.00

0.06

0.26

0.33

78.69

98.56

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

3.44

3.08

2.95

2.74

2.53

2.33

1.73

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

2.65

0.16

0.61

-2.95

15.62

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT_8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH260#01 Dune

Analysis Date: 05-14-14

Analyzed By: TM

Easting (ft): 2,984,118	Northing (ft): 849,293	Coordinate System: North Carolina State Plane	Elevation (ft): 13.6 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SP	Munsell: Wet - 5Y-6/1 Dry - 5Y-7/2 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 144.75	Wash Weight (g): 144.47	Pan Retained (g): 0.00	Sieve Loss (%): 0.13	Fines (%): #200 - 0.32 #230 - 0.32	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.12	0.08	0.12	0.08
10	-1.00	2.00	0.30	0.21	0.42	0.29
14	-0.50	1.41	2.20	1.52	2.62	1.81
18	0.00	1.00	9.71	6.71	12.33	8.52
25	0.50	0.71	18.84	13.02	31.17	21.54
35	1.00	0.50	39.24	27.11	70.41	48.65
45	1.50	0.35	38.81	26.81	109.22	75.46
60	2.00	0.25	25.72	17.77	134.94	93.23
80	2.50	0.18	8.21	5.67	143.15	98.90
120	3.00	0.13	0.98	0.68	144.13	99.58
170	3.50	0.09	0.13	0.09	144.26	99.67
200	3.75	0.07	0.02	0.01	144.28	99.68
230	4.00	0.06	0.00	0.00	144.28	99.68

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.16	1.74	1.49	1.03	0.56	0.29	-0.26

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1	0.50	0.7	-0.23	3.07

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH260#02 DuneToe

Analysis Date: 08-18-15

Analyzed By: KM

Easting (ft): 2,984,136	Northing (ft): 849,302	Coordinate System: North Carolina State Plane	Elevation (ft): 10.5 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SP	Munsell: Wet - 2.5Y-5/4 Dry - 2.5Y-7/3 Washed - 2.5Y-8/3	Comments:
--------------------	--	-----------

Dry Weight (g): 100.23	Wash Weight (g): 99.95	Pan Retained (g): 0.01	Sieve Loss (%): 0.03	Fines (%): #200 - 0.31 #230 - 0.31	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.39	0.39	0.39	0.39
5	-2.00	4.00	0.15	0.15	0.54	0.54
7	-1.50	2.83	1.34	1.34	1.88	1.88
10	-1.00	2.00	1.20	1.20	3.08	3.08
14	-0.50	1.41	2.75	2.74	5.83	5.82
18	0.00	1.00	4.40	4.39	10.23	10.21
25	0.50	0.71	10.14	10.12	20.37	20.33
35	1.00	0.50	29.05	28.98	49.42	49.31
45	1.50	0.35	31.14	31.07	80.56	80.38
60	2.00	0.25	14.37	14.34	94.93	94.72
80	2.50	0.18	4.07	4.06	99.00	98.78
120	3.00	0.13	0.81	0.81	99.81	99.59
170	3.50	0.09	0.09	0.09	99.90	99.68
200	3.75	0.07	0.01	0.01	99.91	99.69
230	4.00	0.06	0.00	0.00	99.91	99.69

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.03	1.63	1.41	1.01	0.58	0.29	-0.65
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	0.92	0.53	0.8	-1.06	5.36	

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
 Coastal Planning & Engineering, Inc.
 2481 NW Boca Raton Blvd.
 Boca Raton, FL 33431
 ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH260#03 MidBerm

Analysis Date: 08-17-15

Analyzed By: DA

Easting (ft): 2,984,160	Northing (ft): 849,315	Coordinate System: North Carolina State Plane	Elevation (ft): 9.2 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SP	Munsell: Wet - 2.5Y-4/4 Dry - 2.5Y-7/3 Washed - 2.5Y-7/2	Comments:
--------------------	--	-----------

Dry Weight (g): 102.19	Wash Weight (g): 102.02	Pan Retained (g): 0.01	Sieve Loss (%): 0.04	Fines (%): #200 - 0.20 #230 - 0.20	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.10	0.10	0.10	0.10
7	-1.50	2.83	0.54	0.53	0.64	0.63
10	-1.00	2.00	0.77	0.75	1.41	1.38
14	-0.50	1.41	2.24	2.19	3.65	3.57
18	0.00	1.00	6.20	6.07	9.85	9.64
25	0.50	0.71	19.22	18.81	29.07	28.45
35	1.00	0.50	37.99	37.18	67.06	65.63
45	1.50	0.35	20.94	20.49	88.00	86.12
60	2.00	0.25	10.36	10.14	98.36	96.26
80	2.50	0.18	2.99	2.93	101.35	99.19
120	3.00	0.13	0.57	0.56	101.92	99.75
170	3.50	0.09	0.04	0.04	101.96	99.79
200	3.75	0.07	0.01	0.01	101.97	99.80
230	4.00	0.06	0.00	0.00	101.97	99.80

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
1.94	1.45	1.23	0.79	0.41	0.17	-0.38

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	0.79	0.58	0.69	-0.32	4.34

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH260#04 BermCrest

Analysis Date: 08-18-15

Analyzed By: KM

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,984,195	849,333	North Carolina State Plane	7.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-5/3 Dry - 2.5Y-7/3 Washed - 2.5Y-8/3	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
101.88	101.68	0.00	0.00	#200 - 0.20 #230 - 0.20			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.15	0.15	0.15	0.15
10	-1.00	2.00	0.41	0.40	0.56	0.55
14	-0.50	1.41	0.91	0.89	1.47	1.44
18	0.00	1.00	2.79	2.74	4.26	4.18
25	0.50	0.71	6.11	6.00	10.37	10.18
35	1.00	0.50	14.27	14.01	24.64	24.19
45	1.50	0.35	23.62	23.18	48.26	47.37
60	2.00	0.25	30.89	30.32	79.15	77.69
80	2.50	0.18	19.90	19.53	99.05	97.22
120	3.00	0.13	2.50	2.45	101.55	99.67
170	3.50	0.09	0.09	0.09	101.64	99.76
200	3.75	0.07	0.04	0.04	101.68	99.80
230	4.00	0.06	0.00	0.00	101.68	99.80

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.44	2.16	1.96	1.54	1.02	0.71	0.07
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.43	0.37	0.73	-0.81	3.97	

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH260#05 MHW

Analysis Date: 05-19-14

Analyzed By: TM

Easting (ft): 2,984,233	Northing (ft): 849,355	Coordinate System: North Carolina State Plane	Elevation (ft): 1.2 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SW	Munsell: Wet - 5Y-6/1 Dry - 5Y-7/2 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 176.73	Wash Weight (g): 175.98	Pan Retained (g): 0.00	Sieve Loss (%): 0.10	Fines (%): #200 - 0.54 #230 - 0.53	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.67	0.38	0.67	0.38
4	-2.25	4.76	0.93	0.53	1.60	0.91
5	-2.00	4.00	1.49	0.84	3.09	1.75
7	-1.50	2.83	3.43	1.94	6.52	3.69
10	-1.00	2.00	7.09	4.01	13.61	7.70
14	-0.50	1.41	22.38	12.66	35.99	20.36
18	0.00	1.00	37.60	21.28	73.59	41.64
25	0.50	0.71	40.99	23.19	114.58	64.83
35	1.00	0.50	29.44	16.66	144.02	81.49
45	1.50	0.35	13.17	7.45	157.19	88.94
60	2.00	0.25	11.21	6.34	168.40	95.28
80	2.50	0.18	6.47	3.66	174.87	98.94
120	3.00	0.13	0.83	0.47	175.70	99.41
170	3.50	0.09	0.09	0.05	175.79	99.46
200	3.75	0.07	0.00	0.00	175.79	99.46
230	4.00	0.06	0.01	0.01	175.80	99.47

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
1.98	1.17	0.81	0.18	-0.39	-0.67	-1.34

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	0.21	0.86	0.95	0.05	3.29

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH260#06 MTL

Analysis Date: 08-17-15

Analyzed By: KM

Easting (ft): 2,984,256	Northing (ft): 849,365	Coordinate System: North Carolina State Plane	Elevation (ft): -0.6 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SP	Munsell: Wet - 2.5Y-5/3 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
--------------------	--	-----------

Dry Weight (g): 83.23	Wash Weight (g): 82.13	Pan Retained (g): 0.00	Sieve Loss (%): 0.05	Fines (%): #200 - 1.36 #230 - 1.36	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.10	0.12	0.10	0.12
14	-0.50	1.41	0.13	0.16	0.23	0.28
18	0.00	1.00	0.34	0.41	0.57	0.69
25	0.50	0.71	0.99	1.19	1.56	1.88
35	1.00	0.50	4.00	4.81	5.56	6.69
45	1.50	0.35	10.38	12.47	15.94	19.16
60	2.00	0.25	21.62	25.98	37.56	45.14
80	2.50	0.18	31.13	37.40	68.69	82.54
120	3.00	0.13	13.01	15.63	81.70	98.17
170	3.50	0.09	0.35	0.42	82.05	98.59
200	3.75	0.07	0.04	0.05	82.09	98.64
230	4.00	0.06	0.00	0.00	82.09	98.64

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.90	2.55	2.40	2.06	1.61	1.37	0.82
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.96	0.26	0.6	-0.96	4.74	

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH260#07 MLW

Analysis Date: 05-22-14

Analyzed By: TM

Easting (ft): 2,984,257	Northing (ft): 849,369	Coordinate System: North Carolina State Plane	Elevation (ft): -2.0 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 5Y-5/2 Dry - 5Y-6/1 Washed - 5Y-7/2	Comments:
--------------------	---	-----------

Dry Weight (g): 92.25	Wash Weight (g): 91.89	Pan Retained (g): 0.00	Sieve Loss (%): 0.01	Fines (%): #200 - 0.41 #230 - 0.41	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	4.63	5.02	4.63	5.02
5/16"	-3.00	8.00	1.01	1.09	5.64	6.11
3.5	-2.50	5.66	2.94	3.19	8.58	9.30
4	-2.25	4.76	2.04	2.21	10.62	11.51
5	-2.00	4.00	5.00	5.42	15.62	16.93
7	-1.50	2.83	9.80	10.62	25.42	27.55
10	-1.00	2.00	11.48	12.44	36.90	39.99
14	-0.50	1.41	16.05	17.40	52.95	57.39
18	0.00	1.00	14.90	16.15	67.85	73.54
25	0.50	0.71	7.36	7.98	75.21	81.52
35	1.00	0.50	3.77	4.09	78.98	85.61
45	1.50	0.35	2.74	2.97	81.72	88.58
60	2.00	0.25	4.66	5.05	86.38	93.63
80	2.50	0.18	4.67	5.06	91.05	98.69
120	3.00	0.13	0.78	0.85	91.83	99.54
170	3.50	0.09	0.04	0.04	91.87	99.58
200	3.75	0.07	0.01	0.01	91.88	99.59
230	4.00	0.06	0.00	0.00	91.88	99.59

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.14	0.80	0.09	-0.71	-1.62	-2.04	-3.50

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	-0.68	1.60	1.47	0.14	2.9

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH260#08 Trough

Analysis Date: 05-22-14

Analyzed By: TM

Easting (ft): 2,984,399
Northing (ft): 849,457

Coordinate System: North Carolina State Plane
Elevation (ft): -5.0 NAVD 88

USCS: SP
Munsell: Wet - 5Y-5/1
Dry - 5Y-7/2
Washed - 5Y-7/1
Comments:

Dry Weight (g): 163.88
Wash Weight (g): 162.09
Pan Retained (g): 0.01
Sieve Loss (%): 0.03
Fines (%): #200 - 1.14
#230 - 1.13
Organics (%):
Carbonates (%):
Shell Hash (%):

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.08	0.05	0.08	0.05
14	-0.50	1.41	0.25	0.15	0.33	0.20
18	0.00	1.00	0.52	0.32	0.85	0.52
25	0.50	0.71	1.03	0.63	1.88	1.15
35	1.00	0.50	2.87	1.75	4.75	2.90
45	1.50	0.35	3.29	2.01	8.04	4.91
60	2.00	0.25	25.31	15.44	33.35	20.35
80	2.50	0.18	68.09	41.55	101.44	61.90
120	3.00	0.13	54.79	33.43	156.23	95.33
170	3.50	0.09	5.57	3.40	161.80	98.73
200	3.75	0.07	0.22	0.13	162.02	98.86
230	4.00	0.06	0.01	0.01	162.03	98.87

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
	3.00	2.83	2.70	2.36	2.06	1.86	1.50
	2.3	0.20	0.53	-1.51	8.1		

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT_8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH260#09 BarCrest

Analysis Date: 08-18-15

Analyzed By: DA

Easting (ft): 2,984,828	Northing (ft): 849,673	Coordinate System: North Carolina State Plane	Elevation (ft): -9.0 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SP	Munsell: Wet - 2.5Y-4/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
--------------------	---	-----------

Dry Weight (g): 83.86	Wash Weight (g): 82.73	Pan Retained (g): 0.00	Sieve Loss (%): 0.04	Fines (%): #200 - 1.40 #230 - 1.38	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.04	0.05	0.04	0.05
14	-0.50	1.41	0.02	0.02	0.06	0.07
18	0.00	1.00	0.11	0.13	0.17	0.20
25	0.50	0.71	0.52	0.62	0.69	0.82
35	1.00	0.50	2.13	2.54	2.82	3.36
45	1.50	0.35	3.77	4.50	6.59	7.86
60	2.00	0.25	10.54	12.57	17.13	20.43
80	2.50	0.18	30.95	36.91	48.08	57.34
120	3.00	0.13	30.75	36.67	78.83	94.01
170	3.50	0.09	3.73	4.45	82.56	98.46
200	3.75	0.07	0.12	0.14	82.68	98.60
230	4.00	0.06	0.02	0.02	82.70	98.62

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.11	2.86	2.74	2.40	2.06	1.82	1.18
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.32	0.20	0.56	-1.22	5.61	

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH260#10 (-12.5)

Analysis Date: 08-17-18

Analyzed By: KM

Easting (ft):

2,984,902

Northing (ft):

849,712

Coordinate System:

North Carolina State Plane

Elevation (ft):

-12.5 NAVD 88

USCS:

SP

Munsell:

Wet - 2.5Y-5/3
Dry - 2.5Y-7/2
Washed - 2.5Y-8/2

Comments:

Dry Weight (g):

88.26

Wash Weight (g):

87.29

Pan Retained (g):

0.02

Sieve Loss (%):

0.00

Fines (%):

#200 - 1.16
#230 - 1.13

Organics (%):

Carbonates (%):

Shell Hash (%):

Sieve Number

Sieve Size (Phi)

Sieve Size (Millimeters)

Grams Retained

% Weight Retained

Cum. Grams Retained

C. % Weight Retained

3/4"

-4.25

19.03

0.00

0.00

0.00

0.00

5/8"

-4.00

16.00

0.00

0.00

0.00

0.00

7/16"

-3.50

11.31

0.00

0.00

0.00

0.00

5/16"

-3.00

8.00

0.00

0.00

0.00

0.00

3.5

-2.50

5.66

0.00

0.00

0.00

0.00

4

-2.25

4.76

0.00

0.00

0.00

0.00

5

-2.00

4.00

0.00

0.00

0.00

0.00

7

-1.50

2.83

0.00

0.00

0.00

0.00

10

-1.00

2.00

0.00

0.00

0.00

0.00

14

-0.50

1.41

0.02

0.02

0.02

0.02

18

0.00

1.00

0.04

0.05

0.06

0.07

25

0.50

0.71

0.32

0.36

0.38

0.43

35

1.00

0.50

1.47

1.67

1.85

2.10

45

1.50

0.35

3.74

4.24

5.59

6.34

60

2.00

0.25

9.95

11.27

15.54

17.61

80

2.50

0.18

26.37

29.88

41.91

47.49

120

3.00

0.13

39.70

44.98

81.61

92.47

170

3.50

0.09

5.37

6.08

86.98

98.55

200

3.75

0.07

0.26

0.29

87.24

98.84

230

4.00

0.06

0.03

0.03

87.27

98.87

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

3.21

2.91

2.81

2.53

2.12

1.93

1.34

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

2.41

0.19

0.53

-1.11

4.88

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH260#11 (-15)

Analysis Date: 08-18-15

Analyzed By: KM

Easting (ft): 2,985,206	Northing (ft): 849,876	Coordinate System: North Carolina State Plane	Elevation (ft): -15.0 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP	Munsell: Wet - 2.5Y-4/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/1	Comments:
--------------------	--	-----------

Dry Weight (g): 81.31	Wash Weight (g): 80.31	Pan Retained (g): 0.01	Sieve Loss (%): 0.02	Fines (%): #200 - 1.33 #230 - 1.27	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.04	0.05	0.04	0.05
14	-0.50	1.41	0.01	0.01	0.05	0.06
18	0.00	1.00	0.09	0.11	0.14	0.17
25	0.50	0.71	0.40	0.49	0.54	0.66
35	1.00	0.50	1.96	2.41	2.50	3.07
45	1.50	0.35	4.50	5.53	7.00	8.60
60	2.00	0.25	12.13	14.92	19.13	23.52
80	2.50	0.18	27.44	33.75	46.57	57.27
120	3.00	0.13	29.88	36.75	76.45	94.02
170	3.50	0.09	3.49	4.29	79.94	98.31
200	3.75	0.07	0.29	0.36	80.23	98.67
230	4.00	0.06	0.05	0.06	80.28	98.73

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.11	2.86	2.74	2.39	2.02	1.75	1.17
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.3	0.20	0.57	-1.02	4.88	

GRANULARMETRIC REPORT KD_H_NATIVES_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH260#12 (-17.5)

Analysis Date: 08-18-15

Analyzed By: DA

Easting (ft): 2,985,356	Northing (ft): 849,953	Coordinate System: North Carolina State Plane	Elevation (ft): -17.5 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP	Munsell: Wet - 2.5Y-4/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
--------------------	---	-----------

Dry Weight (g): 89.70	Wash Weight (g): 88.61	Pan Retained (g): 0.00	Sieve Loss (%): 0.01	Fines (%): #200 - 1.37 #230 - 1.23	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.01	0.01	0.01	0.01
14	-0.50	1.41	0.03	0.03	0.04	0.04
18	0.00	1.00	0.06	0.07	0.10	0.11
25	0.50	0.71	0.24	0.27	0.34	0.38
35	1.00	0.50	0.91	1.01	1.25	1.39
45	1.50	0.35	2.25	2.51	3.50	3.90
60	2.00	0.25	7.39	8.24	10.89	12.14
80	2.50	0.18	41.48	46.24	52.37	58.38
120	3.00	0.13	32.43	36.15	84.80	94.53
170	3.50	0.09	3.36	3.75	88.16	98.28
200	3.75	0.07	0.31	0.35	88.47	98.63
230	4.00	0.06	0.13	0.14	88.60	98.77

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.06	2.85	2.73	2.41	2.14	2.04	1.57
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.39	0.19	0.46	-1.11	7.14	

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
 Coastal Planning & Engineering, Inc.
 2481 NW Boca Raton Blvd.
 Boca Raton, FL 33431
 ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH260#13 (-20)

Analysis Date: 08-18-15

Analyzed By: DA

Easting (ft): 2,985,455	Northing (ft): 850,007	Coordinate System: North Carolina State Plane	Elevation (ft): -20.0 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP	Munsell: Wet - 2.5Y-4/1 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
--------------------	---	-----------

Dry Weight (g): 80.95	Wash Weight (g): 79.81	Pan Retained (g): 0.01	Sieve Loss (%): 0.04	Fines (%): #200 - 1.61 #230 - 1.45	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.01	0.01	0.01	0.01
10	-1.00	2.00	0.03	0.04	0.04	0.05
14	-0.50	1.41	0.02	0.02	0.06	0.07
18	0.00	1.00	0.07	0.09	0.13	0.16
25	0.50	0.71	0.06	0.07	0.19	0.23
35	1.00	0.50	0.12	0.15	0.31	0.38
45	1.50	0.35	0.33	0.41	0.64	0.79
60	2.00	0.25	2.63	3.25	3.27	4.04
80	2.50	0.18	34.85	43.05	38.12	47.09
120	3.00	0.13	37.68	46.55	75.80	93.64
170	3.50	0.09	3.51	4.34	79.31	97.98
200	3.75	0.07	0.33	0.41	79.64	98.39
230	4.00	0.06	0.13	0.16	79.77	98.55

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.16	2.90	2.80	2.53	2.24	2.14	2.01
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.51	0.18	0.37	-1.33	14.26	

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH290#01 Dune

Analysis Date: 05-14-14

Analyzed By: TM

Easting (ft): 2,985,624	Northing (ft): 846,715	Coordinate System: North Carolina State Plane	Elevation (ft): 16.7 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SP	Munsell: Wet - 5Y-6/1 Dry - 5Y-7/2 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 139.02	Wash Weight (g): 138.77	Pan Retained (g): 0.00	Sieve Loss (%): 0.15	Fines (%): #200 - 0.34 #230 - 0.33	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.10	0.07	0.10	0.07
14	-0.50	1.41	0.63	0.45	0.73	0.52
18	0.00	1.00	3.55	2.55	4.28	3.07
25	0.50	0.71	13.68	9.84	17.96	12.91
35	1.00	0.50	30.51	21.95	48.47	34.86
45	1.50	0.35	28.08	20.20	76.55	55.06
60	2.00	0.25	34.05	24.49	110.60	79.55
80	2.50	0.18	22.74	16.36	133.34	95.91
120	3.00	0.13	4.78	3.44	138.12	99.35
170	3.50	0.09	0.39	0.28	138.51	99.63
200	3.75	0.07	0.04	0.03	138.55	99.66
230	4.00	0.06	0.01	0.01	138.56	99.67

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.47	2.14	1.91	1.37	0.78	0.57	0.10
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	1.34	0.40	0.74	-0.16	2.55	

GRANULARMETRIC REPORT KD_H_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
 Coastal Planning & Engineering, Inc.
 2481 NW Boca Raton Blvd.
 Boca Raton, FL 33431
 ph (561) 391 8102

Project Name: Kill Devil Hills, NC
 Sample Name: KDH290#02 DuneToe
 Analysis Date: 05-22-14
 Analyzed By: TM

Easting (ft): 2,985,642	Northing (ft): 846,725	Coordinate System: North Carolina State Plane	Elevation (ft): 12.0 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SP	Munsell: Wet - 5Y-6/1 Dry - 5Y-6/2 Washed - 5Y-7/2	Comments:
--------------------	---	-----------

Dry Weight (g): 108.35	Wash Weight (g): 108.00	Pan Retained (g): 0.01	Sieve Loss (%): 0.23	Fines (%): #200 - 0.58 #230 - 0.57	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.30	0.28	0.30	0.28
10	-1.00	2.00	0.24	0.22	0.54	0.50
14	-0.50	1.41	1.37	1.26	1.91	1.76
18	0.00	1.00	4.24	3.91	6.15	5.67
25	0.50	0.71	10.03	9.26	16.18	14.93
35	1.00	0.50	24.90	22.98	41.08	37.91
45	1.50	0.35	25.31	23.36	66.39	61.27
60	2.00	0.25	23.51	21.70	89.90	82.97
80	2.50	0.18	13.96	12.88	103.86	95.85
120	3.00	0.13	3.17	2.93	107.03	98.78
170	3.50	0.09	0.61	0.56	107.64	99.34
200	3.75	0.07	0.09	0.08	107.73	99.42
230	4.00	0.06	0.01	0.01	107.74	99.43

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.47	2.04	1.82	1.26	0.72	0.52	-0.09
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	1.24	0.42	0.78	-0.28	3.33	

GRANULARMETRIC REPORT KD_H_NATIVESS_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
 Coastal Planning & Engineering, Inc.
 2481 NW Boca Raton Blvd.
 Boca Raton, FL 33431
 ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH290#03 MidBerm

Analysis Date: 05-22-14

Analyzed By: TM

Easting (ft): 2,985,681	Northing (ft): 846,745	Coordinate System: North Carolina State Plane	Elevation (ft): 7.1 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SW	Munsell: Wet - 5Y-6/2 Dry - 5Y-6/1 Washed - 5Y-7/2	Comments:
--------------------	---	-----------

Dry Weight (g): 92.09	Wash Weight (g): 91.84	Pan Retained (g): 0.00	Sieve Loss (%): 0.13	Fines (%): #200 - 0.41 #230 - 0.41	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3 1/2"	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.94	1.02	0.94	1.02
10	-1.00	2.00	12.64	13.73	13.58	14.75
14	-0.50	1.41	18.56	20.15	32.14	34.90
18	0.00	1.00	14.13	15.34	46.27	50.24
25	0.50	0.71	15.27	16.58	61.54	66.82
35	1.00	0.50	16.50	17.92	78.04	84.74
45	1.50	0.35	5.74	6.23	83.78	90.97
60	2.00	0.25	5.28	5.73	89.06	96.70
80	2.50	0.18	1.86	2.02	90.92	98.72
120	3.00	0.13	0.69	0.75	91.61	99.47
170	3.50	0.09	0.10	0.11	91.71	99.58
200	3.75	0.07	0.01	0.01	91.72	99.59
230	4.00	0.06	0.00	0.00	91.72	99.59

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
1.85	0.98	0.73	-0.01	-0.75	-0.97	-1.36

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	0.05	0.97	0.96	0.45	2.63

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH290#04 BermCrest

Analysis Date: 05-19-14

Analyzed By: TM

Easting (ft): 2,985,716	Northing (ft): 846,764	Coordinate System: North Carolina State Plane	Elevation (ft): 6.4 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SP	Munsell: Wet - 5Y-6/1 Dry - 5Y-7/2 Washed - 5Y-7/1	Comments:
--------------------	--	-----------

Dry Weight (g): 130.21	Wash Weight (g): 129.62	Pan Retained (g): 0.00	Sieve Loss (%): 0.18	Fines (%): #200 - 0.65 #230 - 0.65	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3 1/2"	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.12	0.09	0.12	0.09
10	-1.00	2.00	0.75	0.58	0.87	0.67
14	-0.50	1.41	2.19	1.68	3.06	2.35
18	0.00	1.00	3.86	2.96	6.92	5.31
25	0.50	0.71	11.51	8.84	18.43	14.15
35	1.00	0.50	19.08	14.65	37.51	28.80
45	1.50	0.35	18.95	14.55	56.46	43.35
60	2.00	0.25	33.42	25.67	89.88	69.02
80	2.50	0.18	32.61	25.04	122.49	94.06
120	3.00	0.13	6.58	5.05	129.07	99.11
170	3.50	0.09	0.25	0.19	129.32	99.30
200	3.75	0.07	0.06	0.05	129.38	99.35
230	4.00	0.06	0.00	0.00	129.38	99.35

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.59	2.30	2.12	1.63	0.87	0.56	-0.05

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.45	0.37	0.84	-0.71	3.14

GRANULARMETRIC REPORT KDH_NATIVESS_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
 Coastal Planning & Engineering, Inc.
 2481 NW Boca Raton Blvd.
 Boca Raton, FL 33431
 ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH290#05 MHW

Analysis Date: 05-19-14

Analyzed By: TM

Easting (ft): 2,985,757	Northing (ft): 846,785	Coordinate System: North Carolina State Plane	Elevation (ft): 1.2 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SW	Munsell: Wet - 5Y-6/1 Dry - 5Y-7/2 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 103.85	Wash Weight (g): 103.55	Pan Retained (g): 0.00	Sieve Loss (%): 0.20	Fines (%): #200 - 0.51 #230 - 0.50	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3 1/2"	-2.50	5.66	2.05	1.97	2.05	1.97
4	-2.25	4.76	0.00	0.00	2.05	1.97
5	-2.00	4.00	2.41	2.32	4.46	4.29
7	-1.50	2.83	6.11	5.88	10.57	10.17
10	-1.00	2.00	11.26	10.84	21.83	21.01
14	-0.50	1.41	16.69	16.07	38.52	37.08
18	0.00	1.00	19.19	18.48	57.71	55.56
25	0.50	0.71	14.29	13.76	72.00	69.32
35	1.00	0.50	10.57	10.18	82.57	79.50
45	1.50	0.35	5.15	4.96	87.72	84.46
60	2.00	0.25	6.72	6.47	94.44	90.93
80	2.50	0.18	7.43	7.15	101.87	98.08
120	3.00	0.13	1.39	1.34	103.26	99.42
170	3.50	0.09	0.07	0.07	103.33	99.49
200	3.75	0.07	0.00	0.00	103.33	99.49
230	4.00	0.06	0.01	0.01	103.34	99.50

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.28	1.45	0.78	-0.15	-0.88	-1.23	-1.94

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	-0.02	1.01	1.24	0.26	2.57

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH290#06 MTL

Analysis Date: 05-19-14

Analyzed By: TM

Easting (ft): 2,985,769	Northing (ft): 846,792	Coordinate System: North Carolina State Plane	Elevation (ft): -0.4 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 5Y-6/1 Dry - 5Y-7/2 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 134.49	Wash Weight (g): 133.74	Pan Retained (g): 0.00	Sieve Loss (%): 0.14	Fines (%): #200 - 0.71 #230 - 0.71	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	1.72	1.28	1.72	1.28
3.5	-2.50	5.66	11.29	8.39	13.01	9.67
4	-2.25	4.76	6.53	4.86	19.54	14.53
5	-2.00	4.00	6.09	4.53	25.63	19.06
7	-1.50	2.83	14.15	10.52	39.78	29.58
10	-1.00	2.00	10.17	7.56	49.95	37.14
14	-0.50	1.41	12.71	9.45	62.66	46.59
18	0.00	1.00	13.09	9.73	75.75	56.32
25	0.50	0.71	11.29	8.39	87.04	64.71
35	1.00	0.50	11.70	8.70	98.74	73.41
45	1.50	0.35	9.08	6.75	107.82	80.16
60	2.00	0.25	11.61	8.63	119.43	88.79
80	2.50	0.18	11.68	8.68	131.11	97.47
120	3.00	0.13	2.31	1.72	133.42	99.19
170	3.50	0.09	0.12	0.09	133.54	99.28
200	3.75	0.07	0.01	0.01	133.55	99.29
230	4.00	0.06	0.00	0.00	133.55	99.29

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.36	1.72	1.12	-0.32	-1.72	-2.17	-2.78

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	-0.29	1.22	1.64	0.08	1.85

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT_8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH290#07 MLW

Analysis Date: 05-19-14

Analyzed By: TM

Easting (ft): 2,985,780	Northing (ft): 846,797	Coordinate System: North Carolina State Plane	Elevation (ft): -2.0 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SW	Munsell: Wet - 5Y-6/1 Dry - 5Y-7/2 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 125.56	Wash Weight (g): 125.09	Pan Retained (g): 0.00	Sieve Loss (%): 0.10	Fines (%): #200 - 0.48 #230 - 0.48	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	2.25	1.79	2.25	1.79
5/16"	-3.00	8.00	2.14	1.70	4.39	3.49
3.5	-2.50	5.66	8.93	7.11	13.32	10.60
4	-2.25	4.76	5.14	4.09	18.46	14.69
5	-2.00	4.00	9.89	7.88	28.35	22.57
7	-1.50	2.83	30.12	23.99	58.47	46.56
10	-1.00	2.00	31.76	25.29	90.23	71.85
14	-0.50	1.41	18.61	14.82	108.84	86.67
18	0.00	1.00	4.06	3.23	112.90	89.90
25	0.50	0.71	0.83	0.66	113.73	90.56
35	1.00	0.50	0.59	0.47	114.32	91.03
45	1.50	0.35	0.80	0.64	115.12	91.67
60	2.00	0.25	2.43	1.94	117.55	93.61
80	2.50	0.18	5.20	4.14	122.75	97.75
120	3.00	0.13	2.10	1.67	124.85	99.42
170	3.50	0.09	0.11	0.09	124.96	99.51
200	3.75	0.07	0.01	0.01	124.97	99.52
230	4.00	0.06	0.00	0.00	124.97	99.52

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.17	-0.59	-0.89	-1.43	-1.95	-2.21	-2.89

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	-1.25	2.38	1.28	1.39	5.43

GRANULARMETRIC REPORT KDH_NATIVESS_2013_NAVD.GPJ_JPBRAZIL.GDT_8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH290#08 Trough

Analysis Date: 05-22-14

Analyzed By: TM

Easting (ft): 2,985,811	Northing (ft): 846,809	Coordinate System: North Carolina State Plane	Elevation (ft): -5.1 NAVD 88
----------------------------	---------------------------	--	---------------------------------

USCS: SP	Munsell: Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	Comments:
-------------	---	-----------

Dry Weight (g): 128.21	Wash Weight (g): 127.00	Pan Retained (g): 0.00	Sieve Loss (%): 0.08	Fines (%): #200 - 1.21 #230 - 1.04	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------	----------------------------	---------------------------	-------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.51	0.40	0.51	0.40
4	-2.25	4.76	0.22	0.17	0.73	0.57
5	-2.00	4.00	0.16	0.12	0.89	0.69
7	-1.50	2.83	0.61	0.48	1.50	1.17
10	-1.00	2.00	0.80	0.62	2.30	1.79
14	-0.50	1.41	0.85	0.66	3.15	2.45
18	0.00	1.00	1.04	0.81	4.19	3.26
25	0.50	0.71	0.99	0.77	5.18	4.03
35	1.00	0.50	1.89	1.47	7.07	5.50
45	1.50	0.35	3.93	3.07	11.00	8.57
60	2.00	0.25	13.55	10.57	24.55	19.14
80	2.50	0.18	57.98	45.22	82.53	64.36
120	3.00	0.13	40.80	31.82	123.33	96.18
170	3.50	0.09	3.35	2.61	126.68	98.79
200	3.75	0.07	0.00	0.00	126.68	98.79
230	4.00	0.06	0.22	0.17	126.90	98.96

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.98	2.81	2.67	2.34	2.06	1.85	0.83
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.2	0.22	0.81	-3.09	15.62	

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT_8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH290#09 BarCrest

Analysis Date: 05-22-14

Analyzed By: TM

Easting (ft):	Northing (ft):
2,985,994	846,887

Coordinate System:	Elevation (ft):
North Carolina State Plane	-9.1 NAVD 88

USCS:	Munsell:	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	Comments:
SW			

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%): #200 - 1.11 #230 - 1.09	Organics (%):	Carbonates (%):	Shell Hash (%):
147.18	145.84	0.00	0.18				

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.86	0.58	0.86	0.58
5	-2.00	4.00	0.43	0.29	1.29	0.87
7	-1.50	2.83	2.09	1.42	3.38	2.29
10	-1.00	2.00	2.20	1.49	5.58	3.78
14	-0.50	1.41	3.19	2.17	8.77	5.95
18	0.00	1.00	4.33	2.94	13.10	8.89
25	0.50	0.71	7.22	4.91	20.32	13.80
35	1.00	0.50	14.15	9.61	34.47	23.41
45	1.50	0.35	14.27	9.70	48.74	33.11
60	2.00	0.25	22.93	15.58	71.67	48.69
80	2.50	0.18	38.59	26.22	110.26	74.91
120	3.00	0.13	30.94	21.02	141.20	95.93
170	3.50	0.09	4.15	2.82	145.35	98.75
200	3.75	0.07	0.20	0.14	145.55	98.89
230	4.00	0.06	0.03	0.02	145.58	98.91

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.98	2.72	2.50	2.02	1.08	0.61	-0.72
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.67	0.31	1.14	-1.25	4.36	

GRANULARMETRIC REPORT KDH_NATIVESS_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH290#10 (-12.5)

Analysis Date: 05-22-14

Analyzed By: TM

Easting (ft): 2,986,086 Northing (ft): 847,000

Coordinate System: North Carolina State Plane Elevation (ft): -12.5 NAVD 88

USCS: SP Munsell: Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1 Comments:

Dry Weight (g): 113.34 Wash Weight (g): 111.77 Pan Retained (g): 0.02 Sieve Loss (%): 0.05 Fines (%): #200 - 1.55 #230 - 1.46 Organics (%): Carbonates (%): Shell Hash (%):

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.08	0.07	0.08	0.07
7	-1.50	2.83	0.00	0.00	0.08	0.07
10	-1.00	2.00	0.00	0.00	0.08	0.07
14	-0.50	1.41	0.10	0.09	0.18	0.16
18	0.00	1.00	0.10	0.09	0.28	0.25
25	0.50	0.71	0.18	0.16	0.46	0.41
35	1.00	0.50	0.74	0.65	1.20	1.06
45	1.50	0.35	0.91	0.80	2.11	1.86
60	2.00	0.25	12.84	11.33	14.95	13.19
80	2.50	0.18	42.71	37.68	57.66	50.87
120	3.00	0.13	44.67	39.41	102.33	90.28
170	3.50	0.09	8.70	7.68	111.03	97.96
200	3.75	0.07	0.56	0.49	111.59	98.45
230	4.00	0.06	0.10	0.09	111.69	98.54

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	3.31	2.81	2.49	2.16	1.64
	2.45	0.18	0.49	-1.4	11.56

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
 Coastal Planning & Engineering, Inc.
 2481 NW Boca Raton Blvd.
 Boca Raton, FL 33431
 ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH290#11 (-15)

Analysis Date: 05-22-14

Analyzed By: TM

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,986,592	847,225	North Carolina State Plane	-15.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
106.86	105.57	0.02	0.08	#200 - 1.48 #230 - 1.31			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.01	0.01	0.01	0.01
18	0.00	1.00	0.02	0.02	0.03	0.03
25	0.50	0.71	0.09	0.08	0.12	0.11
35	1.00	0.50	0.51	0.48	0.63	0.59
45	1.50	0.35	1.70	1.59	2.33	2.18
60	2.00	0.25	5.87	5.49	8.20	7.67
80	2.50	0.18	29.05	27.19	37.25	34.86
120	3.00	0.13	53.69	50.24	90.94	85.10
170	3.50	0.09	13.31	12.46	104.25	97.56
200	3.75	0.07	1.03	0.96	105.28	98.52
230	4.00	0.06	0.18	0.17	105.46	98.69

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.40	2.99	2.90	2.65	2.32	2.15	1.76
Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
	2.59	0.17	0.45	-0.87	5.47	

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH290#12 (-17.5)

Analysis Date: 05-20-14

Analyzed By: TM

Easting (ft):

2,986,754

Northing (ft):

847,311

Coordinate System:

North Carolina State Plane

Elevation (ft):

-17.5 NAVD 88

USCS:

SP

Munsell:

Wet - 5Y-5/1
Dry - 5Y-6/2
Washed - 5Y-7/1

Comments:

Dry Weight (g):

123.68

Wash Weight (g):

122.02

Pan Retained (g):

0.01

Sieve Loss (%):

0.00

Fines (%):

#200 - 1.40
#230 - 1.37

Organics (%):

Carbonates (%):

Shell Hash (%):

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3 1/2"	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.06	0.05	0.06	0.05
10	-1.00	2.00	0.03	0.02	0.09	0.07
14	-0.50	1.41	0.08	0.06	0.17	0.13
18	0.00	1.00	0.29	0.23	0.46	0.36
25	0.50	0.71	0.80	0.65	1.26	1.01
35	1.00	0.50	2.98	2.41	4.24	3.42
45	1.50	0.35	6.67	5.39	10.91	8.81
60	2.00	0.25	19.99	16.16	30.90	24.97
80	2.50	0.18	51.63	41.74	82.53	66.71
120	3.00	0.13	35.62	28.80	118.15	95.51
170	3.50	0.09	3.65	2.95	121.80	98.46
200	3.75	0.07	0.17	0.14	121.97	98.60
230	4.00	0.06	0.04	0.03	122.01	98.63

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

2.99

2.80

2.64

2.30

2.00

1.72

1.15

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

2.23

0.21

0.56

-1.23

6.48

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT_8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH290#13 (-20)

Analysis Date: 05-20-14

Analyzed By: TM

Easting (ft): 2,986,914	Northing (ft): 847,396	Coordinate System: North Carolina State Plane	Elevation (ft): -20.0 NAVD 88
----------------------------	---------------------------	--	----------------------------------

USCS: SP	Munsell: Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	Comments:
-------------	---	-----------

Dry Weight (g): 109.52	Wash Weight (g): 108.09	Pan Retained (g): 0.01	Sieve Loss (%): 0.01	Fines (%): #200 - 1.42 #230 - 1.33	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------	----------------------------	---------------------------	-------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.05	0.05	0.05	0.05
14	-0.50	1.41	0.06	0.05	0.11	0.10
18	0.00	1.00	0.12	0.11	0.23	0.21
25	0.50	0.71	0.18	0.16	0.41	0.37
35	1.00	0.50	0.55	0.50	0.96	0.87
45	1.50	0.35	1.35	1.23	2.31	2.10
60	2.00	0.25	6.54	5.97	8.85	8.07
80	2.50	0.18	44.98	41.07	53.83	49.14
120	3.00	0.13	48.00	43.83	101.83	92.97
170	3.50	0.09	5.64	5.15	107.47	98.12
200	3.75	0.07	0.50	0.46	107.97	98.58
230	4.00	0.06	0.10	0.09	108.07	98.67

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.20	2.90	2.80	2.51	2.21	2.10	1.74
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.47	0.18	0.43	-1.42	10.54	

GRANULARMETRIC REPORT KD_H_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT_8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH320#01 Dune

Analysis Date: 05-19-14

Analyzed By: TM

Easting (ft): 2,987,166
Northing (ft): 844,132

Coordinate System: North Carolina State Plane
Elevation (ft): 20.1 NAVD 88

USCS: SP
Munsell: Wet - 5Y-6/1
Dry - 5Y-7/2
Washed - 5Y-7/1
Comments:

Dry Weight (g): 136.74
Wash Weight (g): 136.43
Pan Retained (g): 0.00
Sieve Loss (%): 0.05
Fines (%): #200 - 0.30
#230 - 0.29
Organics (%):
Carbonates (%):
Shell Hash (%):

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.06	0.04	0.06	0.04
14	-0.50	1.41	1.52	1.11	1.58	1.15
18	0.00	1.00	8.42	6.16	10.00	7.31
25	0.50	0.71	15.25	11.15	25.25	18.46
35	1.00	0.50	32.83	24.01	58.08	42.47
45	1.50	0.35	31.51	23.04	89.59	65.51
60	2.00	0.25	29.21	21.36	118.80	86.87
80	2.50	0.18	15.56	11.38	134.36	98.25
120	3.00	0.13	1.82	1.33	136.18	99.58
170	3.50	0.09	0.15	0.11	136.33	99.69
200	3.75	0.07	0.02	0.01	136.35	99.70
230	4.00	0.06	0.01	0.01	136.36	99.71

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
	2.36	1.93	1.72	1.16	0.64	0.39	-0.19
	1.15	0.45	0.74	-0.18	2.6		

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH320#02 DuneToe

Analysis Date: 08-19-15

Analyzed By: DA

Easting (ft): 2,987,194	Northing (ft): 844,145	Coordinate System: North Carolina State Plane	Elevation (ft): 12.4 NAVD 88
-----------------------------------	----------------------------------	---	--

USCS: SP	Munsell: Wet - 2.5Y-5/3 Dry - 2.5Y-7/3 Washed - 2.5Y-8/3	Comments:
--------------------	--	-----------

Dry Weight (g): 96.86	Wash Weight (g): 96.39	Pan Retained (g): 0.00	Sieve Loss (%): 0.07	Fines (%): #200 - 0.56 #230 - 0.55	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.20	0.21	0.20	0.21
10	-1.00	2.00	0.48	0.50	0.68	0.71
14	-0.50	1.41	3.24	3.35	3.92	4.06
18	0.00	1.00	8.59	8.87	12.51	12.93
25	0.50	0.71	13.05	13.47	25.56	26.40
35	1.00	0.50	25.25	26.07	50.81	52.47
45	1.50	0.35	24.25	25.04	75.06	77.51
60	2.00	0.25	14.58	15.05	89.64	92.56
80	2.50	0.18	5.65	5.83	95.29	98.39
120	3.00	0.13	0.93	0.96	96.22	99.35
170	3.50	0.09	0.09	0.09	96.31	99.44
200	3.75	0.07	0.00	0.00	96.31	99.44
230	4.00	0.06	0.01	0.01	96.32	99.45

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.21	1.72	1.45	0.95	0.45	0.11	-0.45

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	0.91	0.53	0.77	-0.25	3.01

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH320#03 MidBerm

Analysis Date: 08-14-15

Analyzed By: SMT

Easting (ft): 2,987,217
Northing (ft): 844,158

Coordinate System: North Carolina State Plane
Elevation (ft): 10.6 NAVD 88

USCS: SP
Munsell: Wet - 2.5Y-4/3
Dry - 2.5Y-6/2
Washed - 2.5Y-7/3
Comments:

Dry Weight (g): 85.29
Wash Weight (g): 84.24
Pan Retained (g): 0.00
Sieve Loss (%): 0.00
Fines (%): #200 - 1.25, #230 - 1.24
Organics (%):
Carbonates (%):
Shell Hash (%):

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.06	0.07	0.06	0.07
10	-1.00	2.00	0.52	0.61	0.58	0.68
14	-0.50	1.41	1.97	2.31	2.55	2.99
18	0.00	1.00	8.29	9.72	10.84	12.71
25	0.50	0.71	19.89	23.32	30.73	36.03
35	1.00	0.50	32.80	38.46	63.53	74.49
45	1.50	0.35	14.80	17.35	78.33	91.84
60	2.00	0.25	5.04	5.91	83.37	97.75
80	2.50	0.18	0.70	0.82	84.07	98.57
120	3.00	0.13	0.13	0.15	84.20	98.72
170	3.50	0.09	0.02	0.02	84.22	98.74
200	3.75	0.07	0.01	0.01	84.23	98.75
230	4.00	0.06	0.01	0.01	84.24	98.76

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	0.65	0.64	0.6	-0.11	3.77

GRANULARMETRIC REPORT KD_H_NATIVES_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH320#04 BermCrest

Analysis Date: 08-13-15

Analyzed By: DA

Easting (ft):	Northing (ft):
2,987,247	844,175

Coordinate System:	Elevation (ft):
North Carolina State Plane	8.9 NAVD 88

USCS:	Munsell:	Wet - 2.5Y-6/3 Dry - 2.5Y-7/3 Washed - 2.5Y-7/2	Comments:
SP			

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
98.57	98.28	0.00	0.02	#200 - 0.32 #230 - 0.32			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.15	0.15	0.15	0.15
10	-1.00	2.00	0.09	0.09	0.24	0.24
14	-0.50	1.41	0.60	0.61	0.84	0.85
18	0.00	1.00	1.88	1.91	2.72	2.76
25	0.50	0.71	8.32	8.44	11.04	11.20
35	1.00	0.50	25.57	25.94	36.61	37.14
45	1.50	0.35	31.04	31.49	67.65	68.63
60	2.00	0.25	20.09	20.38	87.74	89.01
80	2.50	0.18	7.99	8.11	95.73	97.12
120	3.00	0.13	2.40	2.43	98.13	99.55
170	3.50	0.09	0.12	0.12	98.25	99.67
200	3.75	0.07	0.01	0.01	98.26	99.68
230	4.00	0.06	0.00	0.00	98.26	99.68

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.37	1.88	1.66	1.20	0.77	0.59	0.13

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.21	0.43	0.65	-0.12	3.75

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH320#05 MHW

Analysis Date: 05-22-14

Analyzed By: TM

Easting (ft): 2,987,287	Northing (ft): 844,196	Coordinate System: North Carolina State Plane	Elevation (ft): 1.2 NAVD 88
-----------------------------------	----------------------------------	---	---------------------------------------

USCS: SW	Munsell: Wet - 5Y-6/2 Dry - 5Y-7/2 Washed - 5Y-7/1	Comments:
--------------------	---	-----------

Dry Weight (g): 122.58	Wash Weight (g): 121.96	Pan Retained (g): 0.01	Sieve Loss (%): 0.20	Fines (%): #200 - 0.71 #230 - 0.70	Organics (%):	Carbonates (%):	Shell Hash (%):
----------------------------------	-----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	2.92	2.38	2.92	2.38
3.5	-2.50	5.66	3.61	2.95	6.53	5.33
4	-2.25	4.76	1.67	1.36	8.20	6.69
5	-2.00	4.00	2.73	2.23	10.93	8.92
7	-1.50	2.83	3.60	2.94	14.53	11.86
10	-1.00	2.00	8.31	6.78	22.84	18.64
14	-0.50	1.41	19.07	15.56	41.91	34.20
18	0.00	1.00	26.24	21.41	68.15	55.61
25	0.50	0.71	18.45	15.05	86.60	70.66
35	1.00	0.50	10.10	8.24	96.70	78.90
45	1.50	0.35	4.34	3.54	101.04	82.44
60	2.00	0.25	6.55	5.34	107.59	87.78
80	2.50	0.18	10.09	8.23	117.68	96.01
120	3.00	0.13	3.72	3.03	121.40	99.04
170	3.50	0.09	0.29	0.24	121.69	99.28
200	3.75	0.07	0.01	0.01	121.70	99.29
230	4.00	0.06	0.01	0.01	121.71	99.30

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.44	1.65	0.76	-0.13	-0.80	-1.19	-2.56

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	-0.03	1.02	1.38	0.02	2.89

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT_8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH320#06 MTL

Analysis Date: 05-14-14

Analyzed By: TM

Easting (ft): 2,987,301
Northing (ft): 844,204

Coordinate System: North Carolina State Plane
Elevation (ft): -0.4 NAVD 88

USCS: SW
Munsell: Wet - 5Y-6/1
Dry - 5Y-7/2
Washed - 5Y-7/1
Comments:

Dry Weight (g): 153.02
Wash Weight (g): 152.43
Pan Retained (g): 0.00
Sieve Loss (%): 0.08
Fines (%): #200 - 0.44
#230 - 0.44
Organics (%):
Carbonates (%):
Shell Hash (%):

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	6.16	4.03	6.16	4.03
5/16"	-3.00	8.00	8.65	5.65	14.81	9.68
3.5	-2.50	5.66	14.75	9.64	29.56	19.32
4	-2.25	4.76	5.18	3.39	34.74	22.71
5	-2.00	4.00	12.13	7.93	46.87	30.64
7	-1.50	2.83	17.51	11.44	64.38	42.08
10	-1.00	2.00	13.02	8.51	77.40	50.59
14	-0.50	1.41	14.63	9.56	92.03	60.15
18	0.00	1.00	12.91	8.44	104.94	68.59
25	0.50	0.71	8.52	5.57	113.46	74.16
35	1.00	0.50	7.45	4.87	120.91	79.03
45	1.50	0.35	5.63	3.68	126.54	82.71
60	2.00	0.25	8.37	5.47	134.91	88.18
80	2.50	0.18	11.45	7.48	146.36	95.66
120	3.00	0.13	5.41	3.54	151.77	99.20
170	3.50	0.09	0.50	0.33	152.27	99.53
200	3.75	0.07	0.04	0.03	152.31	99.56
230	4.00	0.06	0.00	0.00	152.31	99.56

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.46	1.62	0.59	-1.03	-2.18	-2.67	-3.41

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	-0.78	1.72	1.82	0.37	2.11

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH320#07 MLW

Analysis Date: 08-18-15

Analyzed By: KM

Easting (ft): 2,987,340	Northing (ft): 844,230	Coordinate System: North Carolina State Plane	Elevation (ft): -2.5 NAVD 88
----------------------------	---------------------------	--	---------------------------------

USCS: SW	Munsell: Wet - 2.5Y-4/3 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
-------------	---	-----------

Dry Weight (g): 90.14	Wash Weight (g): 89.37	Pan Retained (g): 0.01	Sieve Loss (%): 0.02	Fines (%): #200 - 0.89 #230 - 0.89	Organics (%):	Carbonates (%):	Shell Hash (%):
--------------------------	---------------------------	---------------------------	-------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.49	0.54	0.49	0.54
4	-2.25	4.76	2.30	2.55	2.79	3.09
5	-2.00	4.00	4.39	4.87	7.18	7.96
7	-1.50	2.83	4.79	5.31	11.97	13.27
10	-1.00	2.00	4.56	5.06	16.53	18.33
14	-0.50	1.41	5.51	6.11	22.04	24.44
18	0.00	1.00	6.47	7.18	28.51	31.62
25	0.50	0.71	5.34	5.92	33.85	37.54
35	1.00	0.50	5.49	6.09	39.34	43.63
45	1.50	0.35	6.63	7.36	45.97	50.99
60	2.00	0.25	11.87	13.17	57.84	64.16
80	2.50	0.18	22.54	25.01	80.38	89.17
120	3.00	0.13	8.66	9.61	89.04	98.78
170	3.50	0.09	0.29	0.32	89.33	99.10
200	3.75	0.07	0.01	0.01	89.34	99.11
230	4.00	0.06	0.00	0.00	89.34	99.11

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.80	2.40	2.22	1.43	-0.46	-1.23	-2.15
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	0.83	0.56	1.62	-0.6	2.01	

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT_8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH320#08 Trough

Analysis Date: 05-23-14

Analyzed By: TM

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,987,409	844,260	North Carolina State Plane	-5.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-6/2 Dry - 5Y-6/1 Washed - 5Y-7/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
108.88	108.07	0.00	0.12	#200 - 0.86 #230 - 0.85			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.07	0.06	0.07	0.06
7	-1.50	2.83	0.64	0.59	0.71	0.65
10	-1.00	2.00	1.82	1.67	2.53	2.32
14	-0.50	1.41	3.97	3.65	6.50	5.97
18	0.00	1.00	6.67	6.13	13.17	12.10
25	0.50	0.71	6.88	6.32	20.05	18.42
35	1.00	0.50	6.63	6.09	26.68	24.51
45	1.50	0.35	6.16	5.66	32.84	30.17
60	2.00	0.25	13.25	12.17	46.09	42.34
80	2.50	0.18	34.70	31.87	80.79	74.21
120	3.00	0.13	24.80	22.78	105.59	96.99
170	3.50	0.09	2.25	2.07	107.84	99.06
200	3.75	0.07	0.09	0.08	107.93	99.14
230	4.00	0.06	0.01	0.01	107.94	99.15

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.96	2.71	2.52	2.12	1.04	0.31	-0.63
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	1.7	0.31	1.13	-1.06	3.16	

GRANULARMETRIC REPORT KDH_NATIVESS_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
 Coastal Planning & Engineering, Inc.
 2481 NW Boca Raton Blvd.
 Boca Raton, FL 33431
 ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH320#09 BarCrest

Analysis Date: 05-23-14

Analyzed By: TM

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,987,471	844,277	North Carolina State Plane	-9.4 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-6/2 Dry - 5Y-6/1 Washed - 5Y-7/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
176.86	175.84	0.00	0.16	#200 - 0.74 #230 - 0.74			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	2.21	1.25	2.21	1.25
3.5	-2.50	5.66	1.85	1.05	4.06	2.30
4	-2.25	4.76	4.34	2.45	8.40	4.75
5	-2.00	4.00	5.13	2.90	13.53	7.65
7	-1.50	2.83	14.32	8.10	27.85	15.75
10	-1.00	2.00	17.43	9.86	45.28	25.61
14	-0.50	1.41	21.30	12.04	66.58	37.65
18	0.00	1.00	29.84	16.87	96.42	54.52
25	0.50	0.71	35.21	19.91	131.63	74.43
35	1.00	0.50	19.64	11.10	151.27	85.53
45	1.50	0.35	5.40	3.05	156.67	88.58
60	2.00	0.25	7.21	4.08	163.88	92.66
80	2.50	0.18	6.84	3.87	170.72	96.53
120	3.00	0.13	4.40	2.49	175.12	99.02
170	3.50	0.09	0.41	0.23	175.53	99.25
200	3.75	0.07	0.02	0.01	175.55	99.26
230	4.00	0.06	0.00	0.00	175.55	99.26

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.30	0.93	0.53	-0.13	-1.03	-1.49	-2.23
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	-0.18	1.13	1.26	0.15	2.96	

GRANULARMETRIC REPORT KD_H_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH320#10 (-12.5)

Analysis Date: 08-17-15

Analyzed By: DA

Easting (ft): 2,987,951	Northing (ft): 844,549	Coordinate System: North Carolina State Plane	Elevation (ft): -12.5 NAVD 88
----------------------------	---------------------------	--	----------------------------------

USCS: SP	Munsell: Wet - 2.5Y-5/2 Dry - 2.5Y-7/2 Washed - 2.5Y-8/2	Comments:
-------------	---	-----------

Dry Weight (g): 90.19	Wash Weight (g): 89.25	Pan Retained (g): 0.01	Sieve Loss (%): 0.02	Fines (%): #200 - 1.14 #230 - 1.06	Organics (%):	Carbonates (%):	Shell Hash (%):
--------------------------	---------------------------	---------------------------	-------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.02	0.02	0.02	0.02
18	0.00	1.00	0.10	0.11	0.12	0.13
25	0.50	0.71	0.39	0.43	0.51	0.56
35	1.00	0.50	2.36	2.62	2.87	3.18
45	1.50	0.35	3.96	4.39	6.83	7.57
60	2.00	0.25	10.62	11.78	17.45	19.35
80	2.50	0.18	35.26	39.10	52.71	58.45
120	3.00	0.13	31.24	34.64	83.95	93.09
170	3.50	0.09	4.87	5.40	88.82	98.49
200	3.75	0.07	0.33	0.37	89.15	98.86
230	4.00	0.06	0.07	0.08	89.22	98.94

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.18	2.87	2.74	2.39	2.07	1.86	1.21
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.33	0.20	0.55	-1.01	4.9	

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT_8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
 Coastal Planning & Engineering, Inc.
 2481 NW Boca Raton Blvd.
 Boca Raton, FL 33431
 ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH320#11 (-15)

Analysis Date: 08-17-15

Analyzed By: DA

Easting (ft): 2,988,072	Northing (ft): 844,612	Coordinate System: North Carolina State Plane	Elevation (ft): -15.0 NAVD 88
-----------------------------------	----------------------------------	---	---

USCS: SP	Munsell: Wet - 2.5Y-4/1 Dry - 2.5Y-7/1 Washed - 2.5Y-7/1	Comments:
--------------------	--	-----------

Dry Weight (g): 78.07	Wash Weight (g): 76.93	Pan Retained (g): 0.02	Sieve Loss (%): 0.01	Fines (%): #200 - 1.82 #230 - 1.50	Organics (%):	Carbonates (%):	Shell Hash (%):
---------------------------------	----------------------------------	----------------------------------	--------------------------------	--	---------------	-----------------	-----------------

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.26	0.33	0.26	0.33
7	-1.50	2.83	0.15	0.19	0.41	0.52
10	-1.00	2.00	0.07	0.09	0.48	0.61
14	-0.50	1.41	0.10	0.13	0.58	0.74
18	0.00	1.00	0.13	0.17	0.71	0.91
25	0.50	0.71	0.10	0.13	0.81	1.04
35	1.00	0.50	0.19	0.24	1.00	1.28
45	1.50	0.35	0.57	0.73	1.57	2.01
60	2.00	0.25	2.89	3.70	4.46	5.71
80	2.50	0.18	28.96	37.09	33.42	42.80
120	3.00	0.13	37.40	47.91	70.82	90.71
170	3.50	0.09	5.18	6.64	76.00	97.35
200	3.75	0.07	0.65	0.83	76.65	98.18
230	4.00	0.06	0.25	0.32	76.90	98.50

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.32	2.93	2.84	2.58	2.26	2.14	1.90
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.51	0.18	0.55	-3.79	30.3	

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH320#12 (-17.5)

Analysis Date: 08-17-15

Analyzed By: DA

Easting (ft):	Northing (ft):
2,988,123	844,639

Coordinate System:	Elevation (ft):
North Carolina State Plane	-17.5 NAVD 88

USCS:	Munsell:	Wet - 2.5Y-4/1 Dry - 2.5Y-6/1 Washed - 2.5Y-7/1	Comments:
SW			

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
88.15	86.90	0.01	0.00	#200 - 1.67 #230 - 1.43			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.94	1.07	0.94	1.07
3.5	-2.50	5.66	1.51	1.71	2.45	2.78
4	-2.25	4.76	0.93	1.06	3.38	3.84
5	-2.00	4.00	1.00	1.13	4.38	4.97
7	-1.50	2.83	1.03	1.17	5.41	6.14
10	-1.00	2.00	0.59	0.67	6.00	6.81
14	-0.50	1.41	0.53	0.60	6.53	7.41
18	0.00	1.00	0.35	0.40	6.88	7.81
25	0.50	0.71	0.36	0.41	7.24	8.22
35	1.00	0.50	0.53	0.60	7.77	8.82
45	1.50	0.35	0.92	1.04	8.69	9.86
60	2.00	0.25	4.62	5.24	13.31	15.10
80	2.50	0.18	32.76	37.16	46.07	52.26
120	3.00	0.13	33.75	38.29	79.82	90.55
170	3.50	0.09	6.21	7.04	86.03	97.59
200	3.75	0.07	0.65	0.74	86.68	98.33
230	4.00	0.06	0.21	0.24	86.89	98.57

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.32	2.91	2.80	2.47	2.13	2.01	-1.99

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.13	0.23	1.34	-2.73	9.81

GRANULARMETRIC REPORT KDH_NATIVES_2013_NAVD.GPJ_JPBRAZIL.GDT 8/26/15

Granularmetric Report

Depths and elevations based on measured values



CB&I
 Coastal Planning & Engineering, Inc.
 2481 NW Boca Raton Blvd.
 Boca Raton, FL 33431
 ph (561) 391 8102

Project Name: Kill Devil Hills, NC

Sample Name: KDH320#13 (-20)

Analysis Date: 08-17-15

Analyzed By: KM

Easting (ft):	Northing (ft):
2,988,231	844,698

Coordinate System:	Elevation (ft):
North Carolina State Plane	-20.0 NAVD 88

USCS:	Munsell:	Wet - 2.5Y-4/1 Dry - 2.5Y-7/1 Washed - 2.5Y-8/1	Comments:
SP			

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
95.73	94.14	0.00	0.02	#200 - 1.96 #230 - 1.70			

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.01	0.01	0.01	0.01
7	-1.50	2.83	0.07	0.07	0.08	0.08
10	-1.00	2.00	0.11	0.11	0.19	0.19
14	-0.50	1.41	0.01	0.01	0.20	0.20
18	0.00	1.00	0.05	0.05	0.25	0.25
25	0.50	0.71	0.08	0.08	0.33	0.33
35	1.00	0.50	0.12	0.13	0.45	0.46
45	1.50	0.35	0.42	0.44	0.87	0.90
60	2.00	0.25	3.00	3.13	3.87	4.03
80	2.50	0.18	24.07	25.14	27.94	29.17
120	3.00	0.13	55.65	58.13	83.59	87.30
170	3.50	0.09	9.20	9.61	92.79	96.91
200	3.75	0.07	1.08	1.13	93.87	98.04
230	4.00	0.06	0.25	0.26	94.12	98.30

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.40	2.97	2.89	2.68	2.42	2.24	2.02
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis	
Statistics	2.63	0.16	0.43	-2.42	23.22	

GRANULARMETRIC REPORT KDH_NATIVESS_2013_NAVD.GPJ JPBRAZIL.GDT 8/26/15